

CITY OF ALBUQUERQUE

Planning Department
David Campbell, Director



Mayor Timothy M. Keller

June 25, 2019

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. N.E
Albuquerque, NM 87108

**RE: Albuquerque RV & Boat Storage
2201 Vista Oriente St. NW
Grading and Drainage Plan
Engineer's Stamp Date: 06/18/19
Hydrology File: H10D030**

Dear Mr. Arfman:

PO Box 1293

Based upon the information provided in your submittal received 06/18/2019, the Grading and Drainage Plan is approved for Building Permit and SO-19 Permit.

Albuquerque

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 approval in support of Permanent Release of Occupancy by Hydrology, Engineer Certification per the DPM checklist will be required.

NM 87103

As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

www.cabq.gov

As a reminder, please provide a Drainage Covenant per Chapter 17 of the DPM for water quality ponds prior to Permanent Release of Occupancy. Please submit this on the 4th floor of Plaza de Sol. A \$25 fee will be required.

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

Sincerely,

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



City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 11/2018)

Project Title: Albuquerque RV & Boat Storage **Building Permit #:** _____ **Hydrology File #:** H09D030
DRB#: _____ **EPC#:** _____ **Work Order#:** _____
Legal Description: Tract 1, Ladera Business Park, Unit 2
City Address: 2201 Vista Oriente Street NW - Albuquerque, NM 87129

Applicant: Isaacson & Arfman, PA **Contact:** Fred C. Arfman or
Bryan J. Bobrick
Address: 128 Monroe Street NE - Albuquerque, NM 87108
Phone#: (505) 268-8828 **Fax#:** _____ **E-mail:** freda@iacivil.com
bryanb@iacivil.com
Owner: Ladera Enterprises, LLC **Contact:** _____
Address: _____
Phone#: _____ **Fax#:** _____ **E-mail:** _____

TYPE OF SUBMITTAL: _____ PLAT (____ # OF LOTS) _____ RESIDENCE _____ DRB SITE ☒ ADMIN SITE

IS THIS A RESUBMITTAL?: ☒ Yes _____ No

DEPARTMENT: _____ TRAFFIC/ TRANSPORTATION ☒ HYDROLOGY/ DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

_____ ENGINEER/ARCHITECT CERTIFICATION
_____ PAD CERTIFICATION
_____ CONCEPTUAL G & D PLAN
☒ GRADING PLAN
_____ DRAINAGE MASTER PLAN
_____ DRAINAGE REPORT
_____ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
_____ ELEVATION CERTIFICATE
_____ CLOMR/LOMR
_____ TRAFFIC CIRCULATION LAYOUT (TCL)
_____ TRAFFIC IMPACT STUDY (TIS)
_____ 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: June 18, 2019 **By:** Fred C. Arfman

COA STAFF:

ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____



June 6, 2019

Reneé C. Brissette, P.E.
Senior Engineer, Hydrology
City of Albuquerque
Planning Department

RE: Albuquerque RV & BOAT Storage (H09D030)

Dear Ms. Brissette,

Attached with this letter are two sets of the revised Grading & Drainage plans for the above referenced project. Revisions made are in response to your review comments dated May 30, 2019 as follows:

1. Sections through the proposed perimeter wall on the west and north property lines are provided. Per your request, the sections include the proposed perimeter wall, gravel swale, location of the wall 'L' footer and the proposed grades.
2. Reference to CABQ standard detail 2236 for sidewalk culverts has been added.
3. CG-101 border placement has been corrected.
4. Note Added "TOTAL SITE STORMWATER QUALITY POND VOLUME REQUIRED = 5,747 CF. TOTAL STORMWATER QUALITY POND VOLUME PROVIDED = 6,502 CF.
5. The outfall structure has been modified to control discharge with four 2' wide covered sidewalk culverts. The water surface elevation at the top of curb (emergency overflow) = 81.6. Orifice calculations for are provided on Sheet CG-502. Note: The opening through the site perimeter wall is redefined as three 4' wide x 1' high.
6. See weir calculations on Sheet CG-502.
7. Our client has been informed that because the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

8. Our client has been informed that, prior to Permanent Release of Occupancy, a Drainage Covenant for water quality ponds will be required. This will be submitted on the 4th floor of Plaza de Sol (\$25 fee).

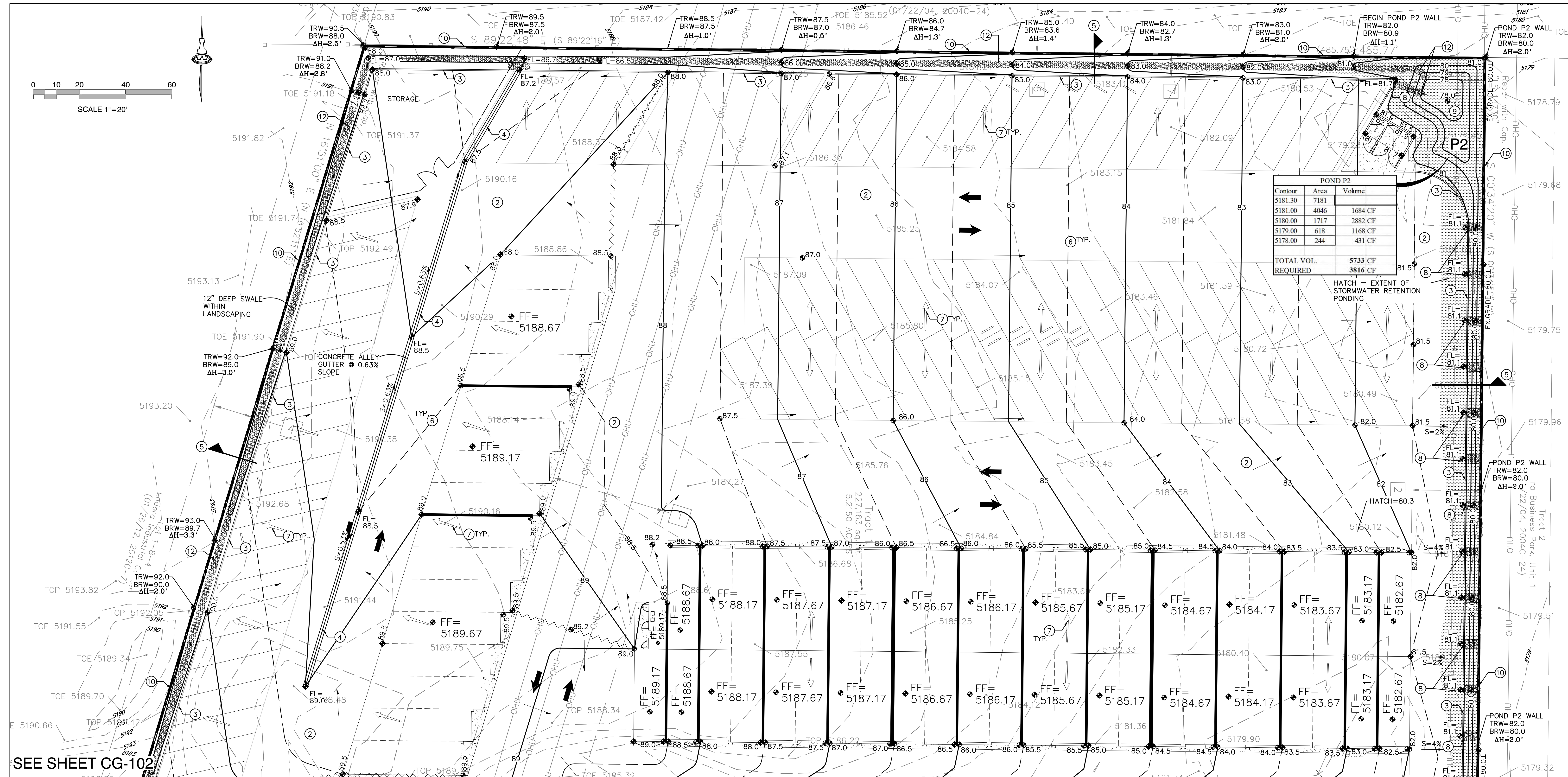
Please contact us at 268-8828 if you have any questions or need anything else.

Sincerely,

Isaacson & Arfman, PA



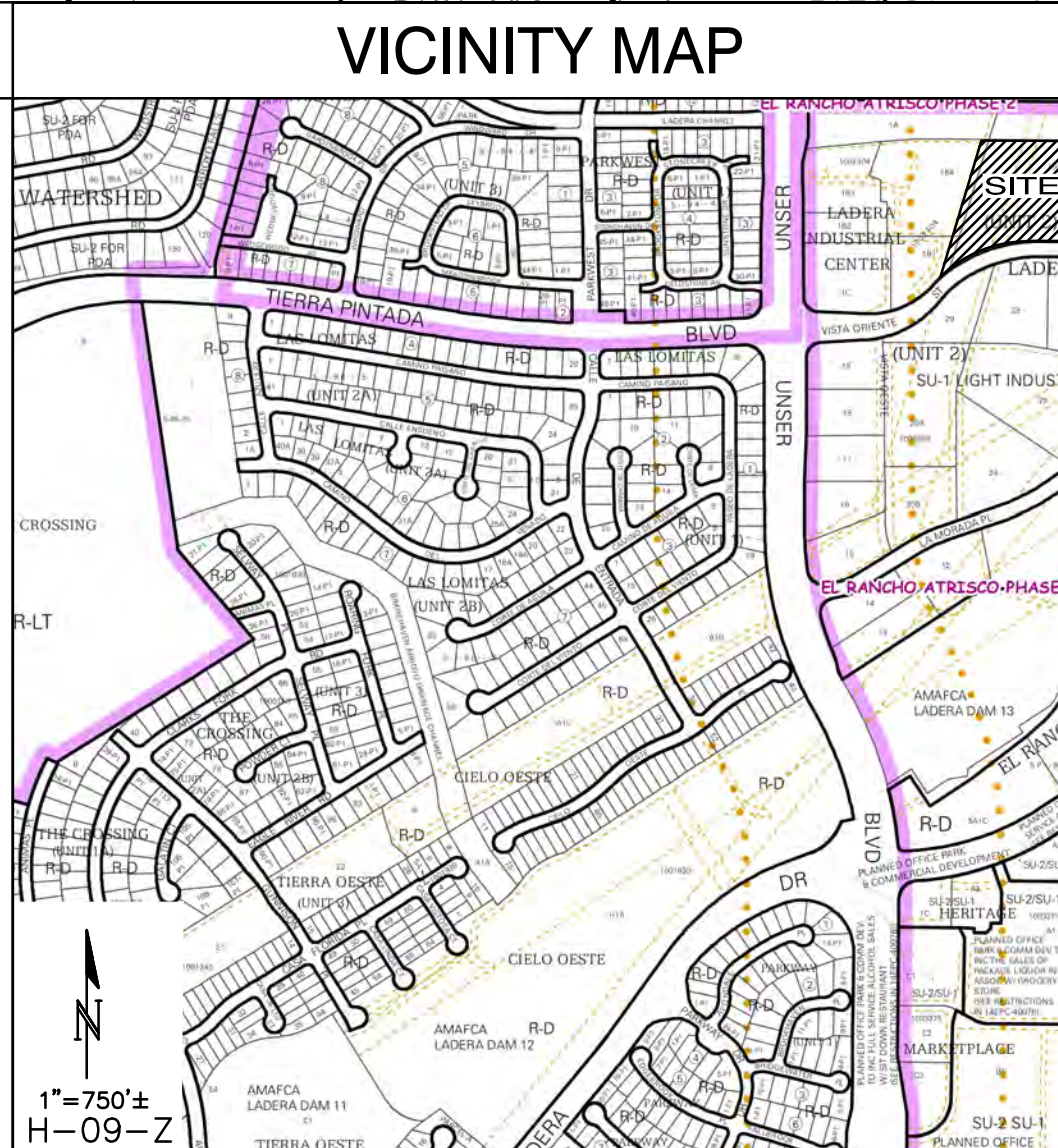
Fred C. Arfman, PE
AFC/bjb



S.O.19 : NOTICE TO CONTRACTORS		
1	AN EXCAVATION / CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN THE CITY RIGHT-OF-WAY.	
2	ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION AS REVISED THROUGH UPDATE #9.	
3	TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM (CALL '811') FOR LOCATION OF EXISTING UTILITIES.	
4	PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.	
5	BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC / STREET USE.	
6	MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.	
7	WORK ON ARTERIAL STREETS SHALL BE PERFORMED ON A 24-HOUR BASIS.	
8	THE WORK IN THE CITY ROW MUST BE INSPECTED AND ACCEPTED. THE CONTRACTOR MUST CONTACT JASON RODRIGUEZ AT 235-8016 AND CONSTRUCTION COORDINATION AT 924-3416 TO SCHEDULE INSPECTIONS.	
APPROVAL	NAME	DATE
INSPECTOR		

KEYED NOTES	
KEYED NOTES ARE REFERENCED ON SHEETS CG-101 AND CG-102. NOT ALL NOTES ARE USED ON EACH SHEET.	
1. CONSTRUCT ENTRANCE DRIVES, CONCRETE VALLEY GUTTER, PUBLIC SIDEWALK, AND ADA COMPLIANT RAMPS PER COA STD. DETAILS AND SPECIFICATIONS. SEE CP-101 FOR ADDITIONAL INFORMATION.	
2. CONSTRUCT NEW PAVING AT ELEVATIONS SHOWN. SEE CP-101 FOR ADDITIONAL INFORMATION FOR MATERIAL, EXTENTS, JOINTS, AND PAVING SECTIONS.	
3. CONSTRUCT 6" HIGH CURB (HEADER OR MEDIAN CURB AND GUTTER - OWNER'S OPTION). NOTE: ENGINEER RECOMMENDS MEDIAN CURB AND GUTTER FOR CONCENTRATED FLOWPATHS.	
4. CONSTRUCT 2' WIDE CONC. ALLEY GUTTER. SEE CG-501 FOR SECTION.	
5. SEE CG-501 FOR SECTIONS THROUGH EAST, WEST AND NORTH PROPERTY LINES.	
6. 0.5' DESIGN CONTOURS ARE SHOWN DASHED WHERE NECESSARY TO CLARIFY GRADING CONCEPT.	
7. BUILDING AND OVERHEAD CANOPY ROOF DISCHARGE DIRECTION. (OWNER'S OPTION - ENGINEER RECOMMENDS CONCRETE SPLASHPAD FOR CONCENTRATED ROOF DISCHARGE TO ASPHALT PAVEMENT.) SEE BUILDING PLANS FOR SPECIFIC ROOF DISCHARGE INFORMATION.	
8. PROVIDE 2' WIDE OPENING(S) IN CURB TO PASS FLOW.	
OPENINGS.	
9. CONSTRUCT STORMWATER QUALITY RETENTION POND AT ELEVATIONS AND VOLUMES SHOWN. ALL STORMWATER QUALITY PONDING VOLUMES REQUIRE VERIFICATION AS PART OF AS-BUILT ENGINEER'S CERTIFICATION PROCEDURE. PONDS WHICH DO NOT PROVIDE THE REQUIRED VOLUME WILL BE CORRECTED AT CONTRACTOR'S EXPENSE.	
10. CONSTRUCT PERIMETER RETAINING/PRIVACY WALLS TO ACHIEVE GRADE DIFFERENCE SHOWN. SEE ARCHITECTURAL FOR DETAILS, ADDITIONAL WALL HEIGHT, FOOTING, GUARDRAIL, REINFORCING, ETC. NO STRUCTURE OR FOOTING MAY BE CONSTRUCTED ON ADJACENT PROPERTIES WITHOUT ADJACENT PROPERTY OWNER PERMISSION.	
11. SEE CG-102 FOR ENLARGED PLAN OF OUTFALL TO VISTA ORIENTE STREET NW.	
12. SEE CG-501 FOR ROCK EROSION PROTECTION DETAIL.	

LEGEND	
• 5105.85'	EXISTING SPOT ELEVATION
— 5110 —	EXISTING CONTOUR
— 12 —	PROPOSED CONTOUR (1' INCREMENT)
— 10.5 —	PROPOSED CONTOUR (0.5' INCREMENT)
◆ 08.9	PROPOSED SPOT ELEVATION
→	FLOW ARROW
[Pattern]	PROPOSED STORMWATER QUALITY RETENTION POND LIMITS
←	ROOF / CANOPY DISCHARGE DIRECTION
~~~~~	GRADE BREAK
[Pattern]	EROSION CONTROL (TO EXTENTS SHOWN)
== == ==	PERIMETER RETAINING WALL (>16" RETAINING)
== == ==	PERIMETER WALL (<16" RETAINING)



**ISAACSON & ARFMAN, P.A.**  
Consulting Engineering Associates  
128 Monroe Street N.E.  
Albuquerque, New Mexico 87108  
Ph. 505-268-8828 www.isaacson.com

2278 CG-101.dwg Jun 18, 2019

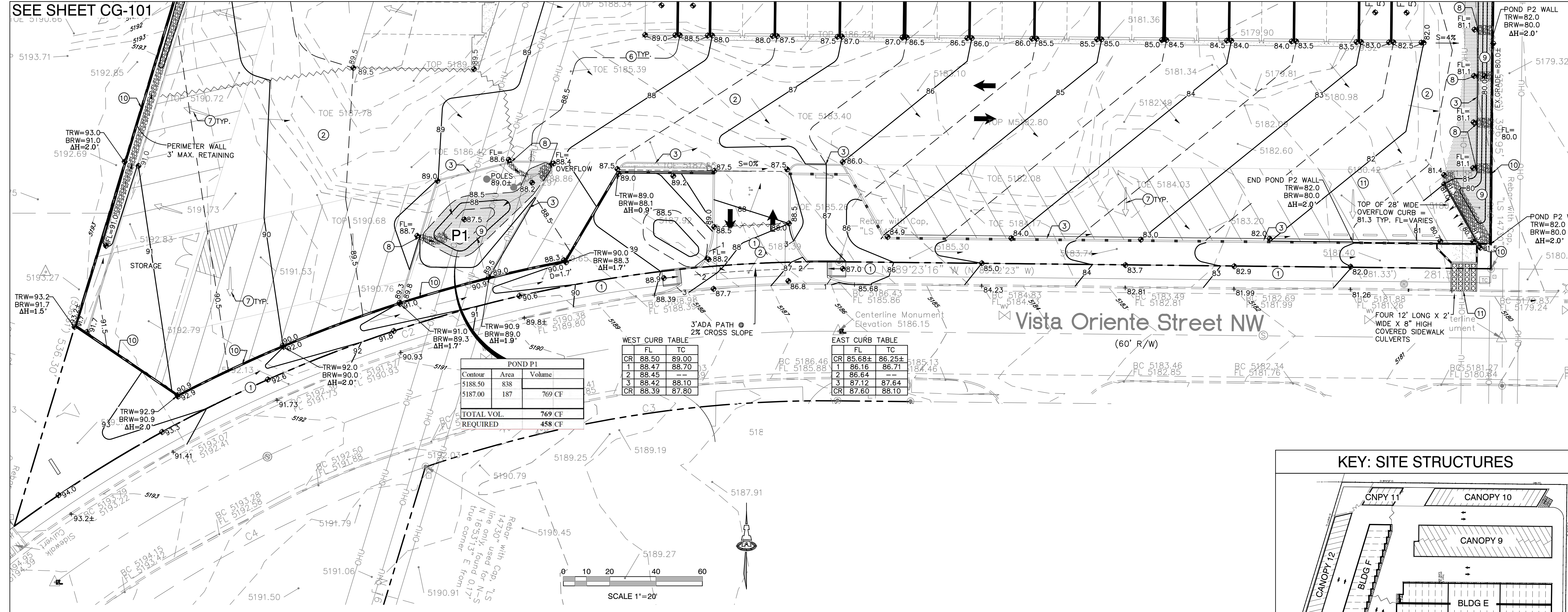
This design, calculations, and concepts are owned by and remain the property of Isaacson & Arfman, P.A. and no part thereof shall be utilized by any person, firm or corporation for any purpose whatsoever except with the written permission of Isaacson & Arfman, P.A. ©

**ABQ RV & BOAT STORAGE**  
LADERA ENTERPRISES LLC

Date:	05-17-19	No. Revision:		Date:		Job No.	2278
Drawn By:	BJB						
Ckd By:	FCA						

**CG-101**  
SH. OF

SEE SHEET CG-101



\\projects\2278-2278\2278\2278 CG-101.dwg 6/18/2019 11:19 PM

**LEGEND**

- 5105.65' EXISTING SPOT ELEVATION
- - - 5110 - - - EXISTING CONTOUR
- 12 — PROPOSED CONTOUR (1' INCREMENT)
- - - 10.5 - - - PROPOSED CONTOUR (0.5' INCREMENT)
- ◆ 08.9 PROPOSED SPOT ELEVATION
- FLOW ARROW
- PROPOSED STORMWATER QUALITY RETENTION POND LIMITS
- ← ROOF / CANOPY DISCHARGE DIRECTION
- GRADE BREAK
- EROSION CONTROL (TO EXTENTS SHOWN)
- PERIMETER RETAINING WALL (>16" RETAINING)
- PERIMETER WALL (<16" RETAINING)

**KEYED NOTES**

KEYED NOTES ARE REFERENCED ON SHEETS CG-101 AND CG-102. NOT ALL NOTES ARE USED ON EACH SHEET.

- CONSTRUCT ENTRANCE DRIVES, CONCRETE VALLEY GUTTER, PUBLIC SIDEWALK, AND ADA COMPLIANT RAMP PER COA STD. DETAILS AND SPECIFICATIONS. SEE CP-101 FOR ADDITIONAL INFORMATION.
- CONSTRUCT NEW PAVING AT ELEVATIONS SHOWN. SEE CP-101 FOR ADDITIONAL INFORMATION FOR MATERIAL, EXTENTS, JOINTS, AND PAVING SECTIONS.
- CONSTRUCT 6" HIGH CURB (HEADER OR MEDIAN CURB AND GUTTER - OWNER'S OPTION). NOTE: ENGINEER RECOMMENDS MEDIAN CURB AND GUTTER FOR CONCENTRATED FLOWPATHS.
- CONSTRUCT 2' WIDE CONC. ALLEY GUTTER. SEE CG-501 FOR SECTION.
- SEE CG-501 FOR SECTIONS THROUGH EAST, WEST AND NORTH PROPERTY LINES.
- 0.5' DESIGN CONTOURS ARE SHOWN DASHED WHERE NECESSARY TO CLARIFY GRADING CONCEPT.
- BUILDING AND OVERHEAD CANOPY ROOF DISCHARGE DIRECTION. (OWNER'S OPTION - ENGINEER RECOMMENDS CONCRETE SPLASHPAD FOR CONCENTRATED ROOF DISCHARGE TO ASPHALT PAVEMENT.) SEE BUILDING PLANS FOR SPECIFIC ROOF DISCHARGE INFORMATION.
- PROVIDE 2' WIDE OPENING(S) IN CURB TO PASS FLOW. INSTALL 4'x4'x8" DEEP ROCK EROSION PROTECTION AT CURB

OPENINGS.

9. CONSTRUCT STORMWATER QUALITY RETENTION POND AT ELEVATIONS AND VOLUMES SHOWN. ALL STORMWATER QUALITY PONDING VOLUMES REQUIRE VERIFICATION AS PART OF AS-BUILT ENGINEER'S CERTIFICATION PROCEDURE. PONDS WHICH DO NOT PROVIDE THE REQUIRED VOLUME WILL BE CORRECTED AT CONTRACTOR'S EXPENSE.

10. CONSTRUCT PERIMETER RETAINING/PRIVACY WALLS TO ACHIEVE GRADE DIFFERENCE SHOWN. SEE ARCHITECTURAL FOR DETAILS, ADDITIONAL WALL HEIGHT, FOOTING, GUARDRAIL, REINFORCING, ETC. NO STRUCTURE OR FOOTING MAY BE CONSTRUCTED ON ADJACENT PROPERTIES WITHOUT ADJACENT PROPERTY OWNER PERMISSION.

11. SEE CG-102 FOR ENLARGED PLAN OF OUTFALL TO VISTA ORIENTE STREET NW.

12. SEE CG-501 FOR ROCK EROSION PROTECTION DETAIL.

TRW=HIGH SIDE GRADE + 6" OR AS NOTED

BRW=LOW SIDE GRADE OR AS NOTED

ΔH VARIES

**PROJECT DATA**

**PROPERTY:** THE SITE IS A 5.22 ACRE, UNDEVELOPED PROPERTY LOCATED WITHIN C.O.A. VICINITY MAP H-09. THE SITE IS BOUND TO THE LADERA CHANNEL, TO THE WEST AND EAST BY UNDEVELOPED LAND, AND TO THE SOUTH BY VISTA ORIENTE ST NW.

**PROPOSED IMPROVEMENTS:** THE PROPOSED IMPROVEMENTS INCLUDE SELF STORAGE BUILDINGS AND OUTDOOR RV STORAGE WITH ASSOCIATED ASPHALT PAVED ACCESS, PARKING AND LANDSCAPING.

**PROPERTY ADDRESS:** 2201 VISTA ORIENTE ST. NW, ALBUQUERQUE, 87120

**LEGAL:** TRACT 1, LADERA BUSINESS PARK, UNIT 2, CITY OF ALBUQUERQUE, BERNALILLO CNTY, NM.

**BENCHMARK:** BRASS CAP STAMPED "2-H9, 1980", ON THE WEST MESA UNDER POWER LINES RUNNING NE/SW, 0.2 MI. NORTH OF LADERA DR. NW, 111FT. WEST OF THE CENTERLINE OF UNSER BLVD., IN THE MIDDLE OF A SET OF POWERPOLES.

**OFF-SITE FLOW:** NO OFF-SITE DRAINAGE IMPACTS THIS PROPERTY.

**FLOOD HAZARD:** PER BERNALILLO COUNTY FIRM MAP #35001C0326J, THE SITE IS LOCATED WITHIN FLOODZONE "X" DESIGNATED AS AREAS DETERMINED TO BE OUTSIDE 500-YEAR FLOODPLAIN.

**DRAINAGE FOR THIS TRACT WAS INCLUDED IN THE LADERA BUSINESS PARK MASTER DRAINAGE REPORT (MDR) BY MARK GOODWIN & ASSOCIATES DATED 11-21-02. PER THE MDR, THIS PROPERTY (DESIGNATED AS BASIN B-1) IS PERMITTED FREE DISCHARGE.**

**ENGINEER:** FRED C. ARFMAN: NMPE 7322 - ISAACSON & ARFMAN, P.A. 128 MONROE NE 87108 - (505) 268-8828

**SURVEYOR:** WILL PLOTNER JR: NMPS NO. 14271 - CARTESIAN SURVEYS INC P.O. BOX 44414 RIO RANCHO, NM 87174 - (505) 891-0244

**ISAACSON & ARFMAN, P.A.**  
Consulting Engineering Associates  
128 Monroe Street N.E.  
Albuquerque, New Mexico 87108  
Ph. 505-268-8828 www.isaacson.com

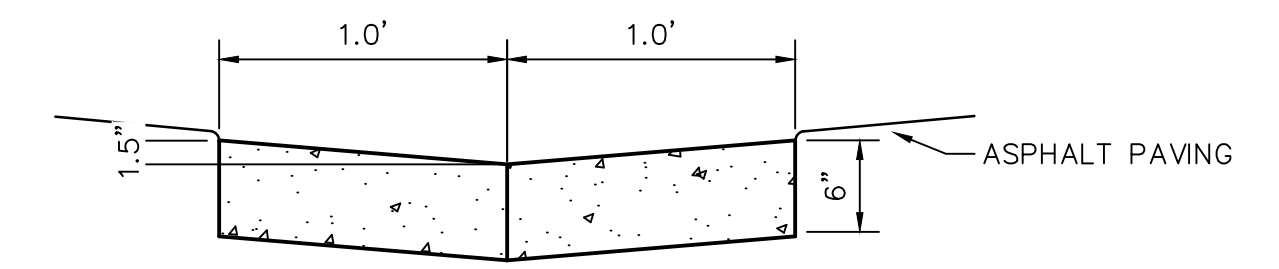
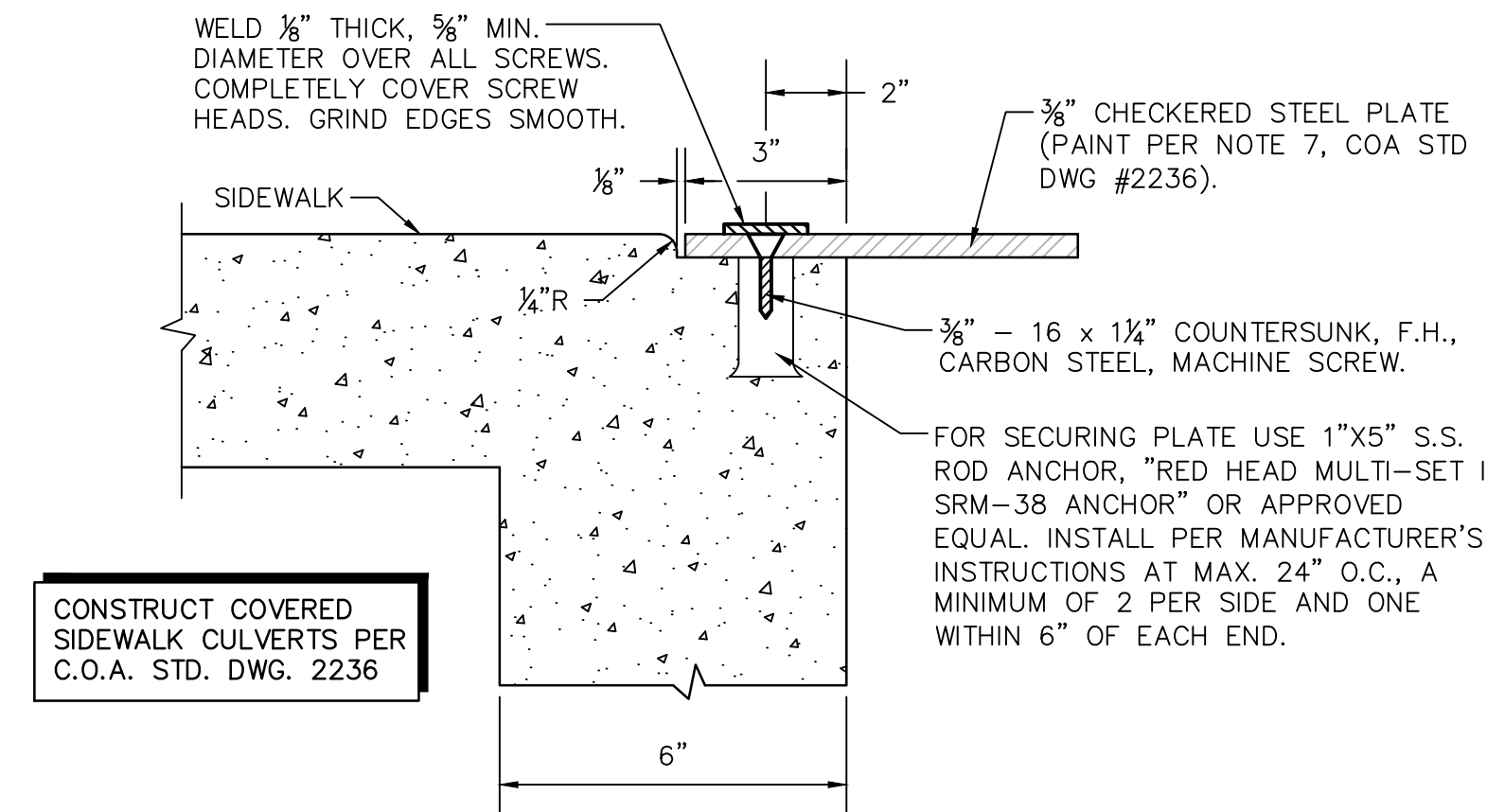
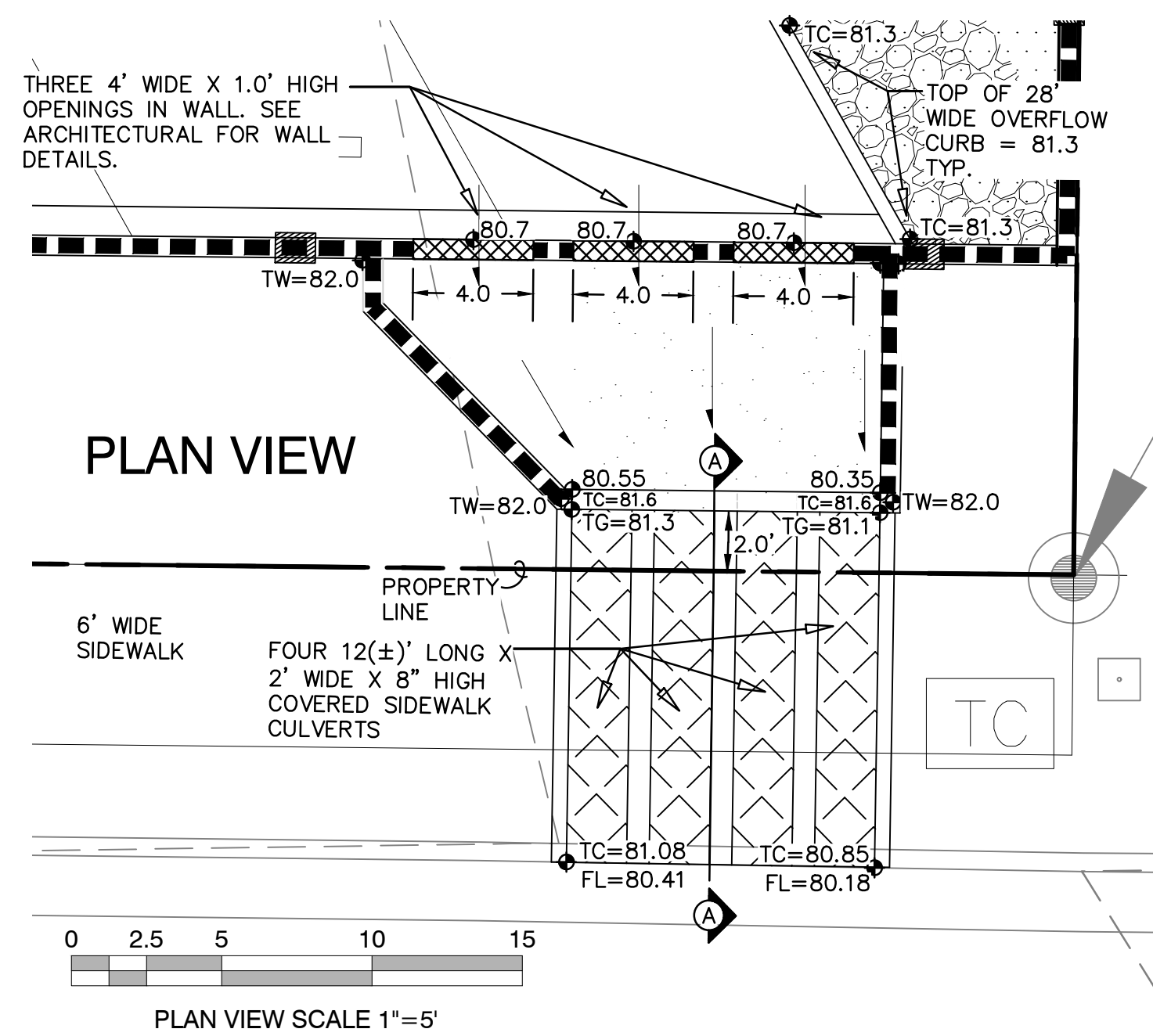
2278 CG-101.dwg Jun 18, 2019

This design, calculations, and concepts are owned by and remain the property of Isaacson & Arfman, P.A. and no part thereof shall be utilized by any person, firm or corporation for any purpose whatsoever except with the written permission of Isaacson & Arfman, P.A. ©

**ABQ RV & BOAT STORAGE**  
LADERA ENTERPRISES LLC

**GRADING & DRAINAGE PLAN 2 OF 2**

Date:	No. Revision:	Date:	Job No.
05-17-19			2278
Drawn By:			<b>CG-102</b>
Ckd By:			<b>SH. OF</b>

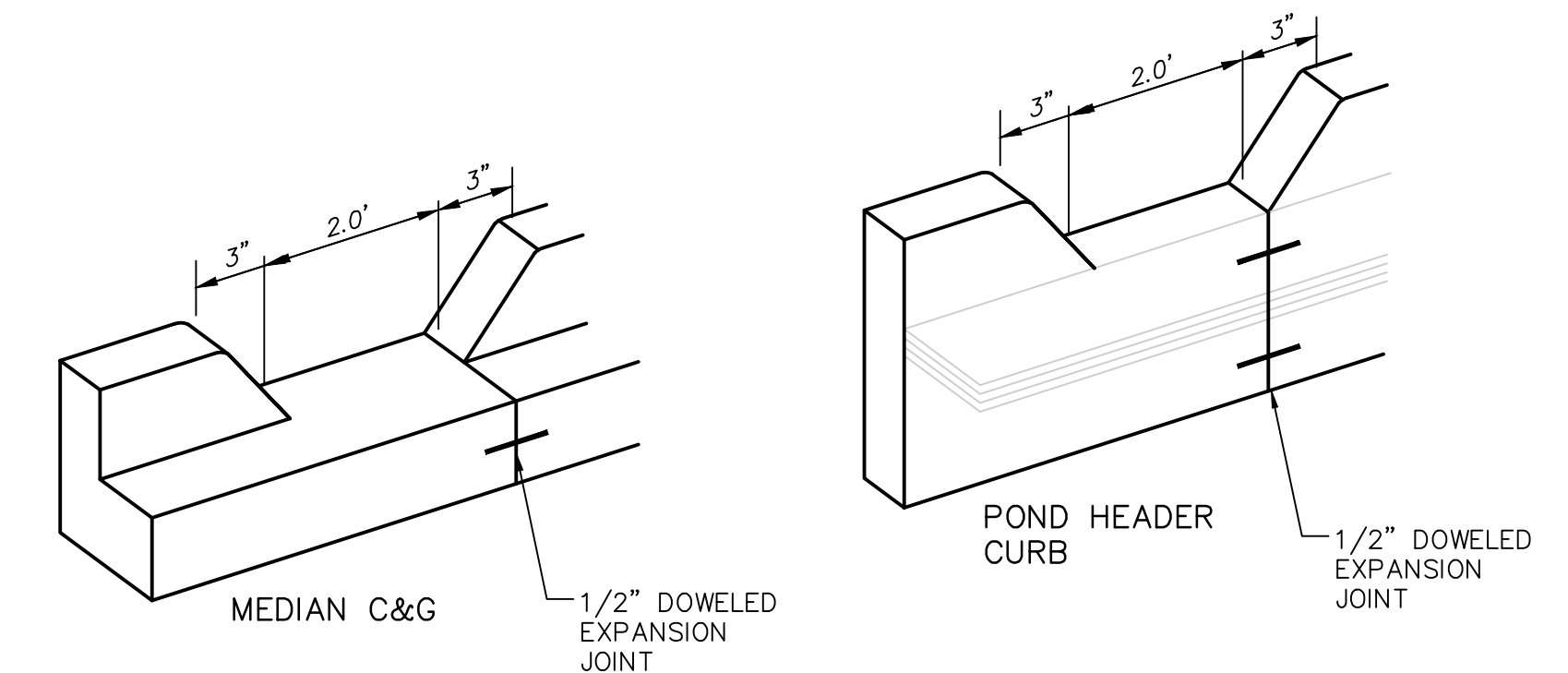


GENERAL NOTES

1. EDGES SHALL BE SHAPED WITH A 3/8" EDGING TOOL.
2. CONSTRUCTION CONTROL JOINTS AT 6' O.C. MAX.
3. SEALED 1/2" EXPANSION JOINTS AT 48' O.C. MAX.
4. EDGE OF ASPHALT PAVING TO BE 1/2" ABOVE EDGE OF CONCRETE (TYP).

## CONCRETE ALLEY GUTTER

SCALE: N.T.S.
---------------



GENERAL NOTES

1. EDGES NOT SPECIFICALLY DIMENSIONED SHALL BE SHAPED WITH A 3/8" EDGING TOOL.

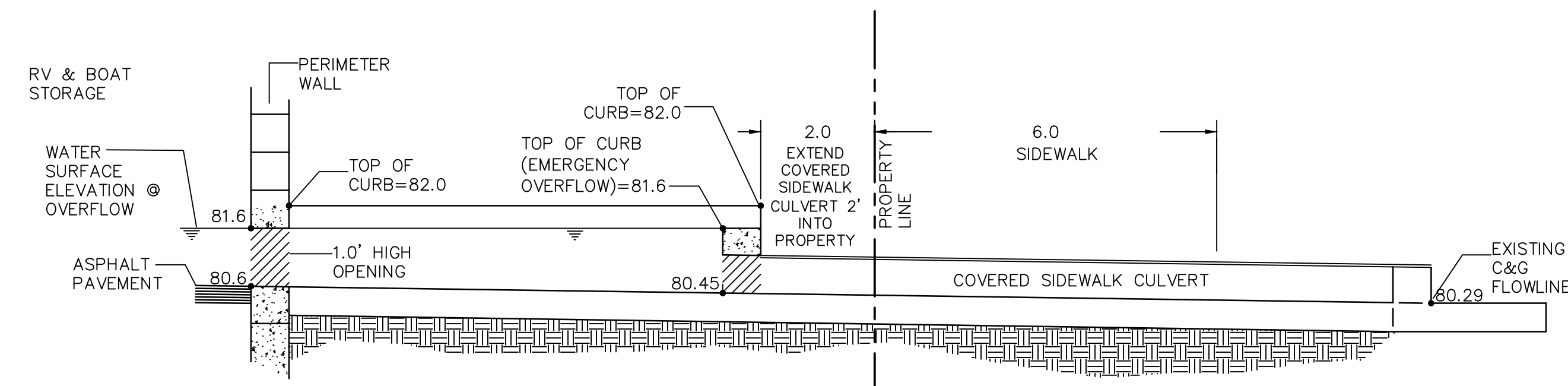
ORIFICE EQUATION - 2' WIDE CURB OPENING			
The Orifice Equation is used to calculate the Flow at the opening of a Channel			
$Q = C^*A * (2*g*h)^{.5}$			
Where	Q =	2.71	cfs
	C =	0.6	
	A =	1.125	sq.ft.
	g =	32.2	ft/sec ²
	h =	0.25	ft
depth of flow at opening from the center of culvert			

## STORMWATER OUTFALL STRUCTURE TO VISTA ORIENTE

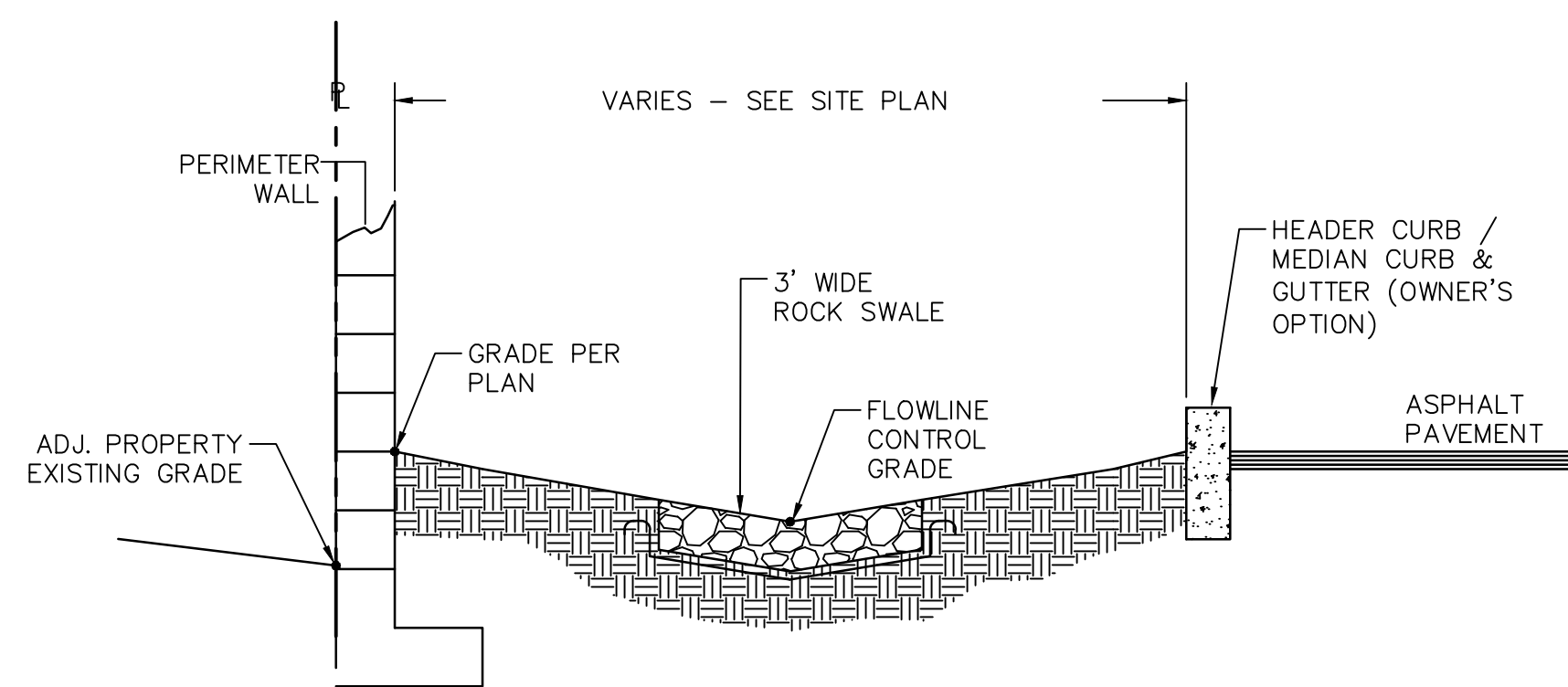
SCALE: N.T.S.

## TYPICAL CURB OPENING

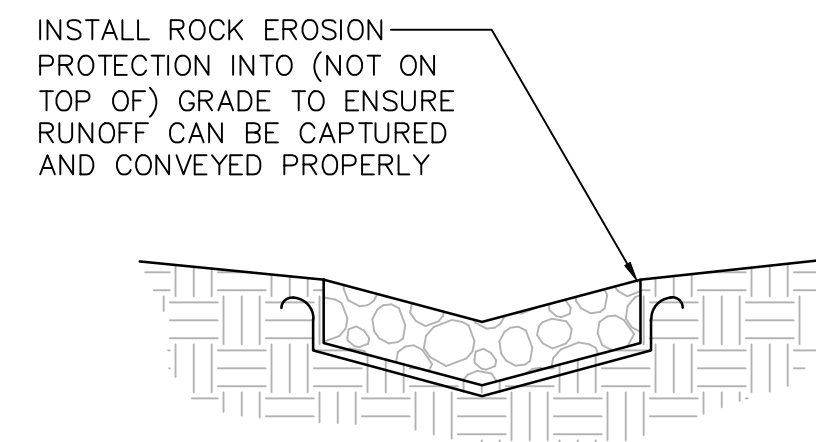
SCALE: N.T.S.
---------------



CONSTRUCT ALL PERIMETER RETAINING WALLS TO ACHIEVE GRADE DIFFERENCES SHOWN. SEE ARCHITECTURAL FOR DETAILS INCLUDING STRUCTURAL SECTIONS, ADDITIONAL WALL HEIGHT, FOOTING, GUARDRAIL, WATERPROOFING, REINFORCING, ETC. NO STRUCTURE OR FOOTING MAY BE CONSTRUCTED ON ADJACENT PROPERTIES WITHOUT ADJACENT PROPERTY OWNER PERMISSION.

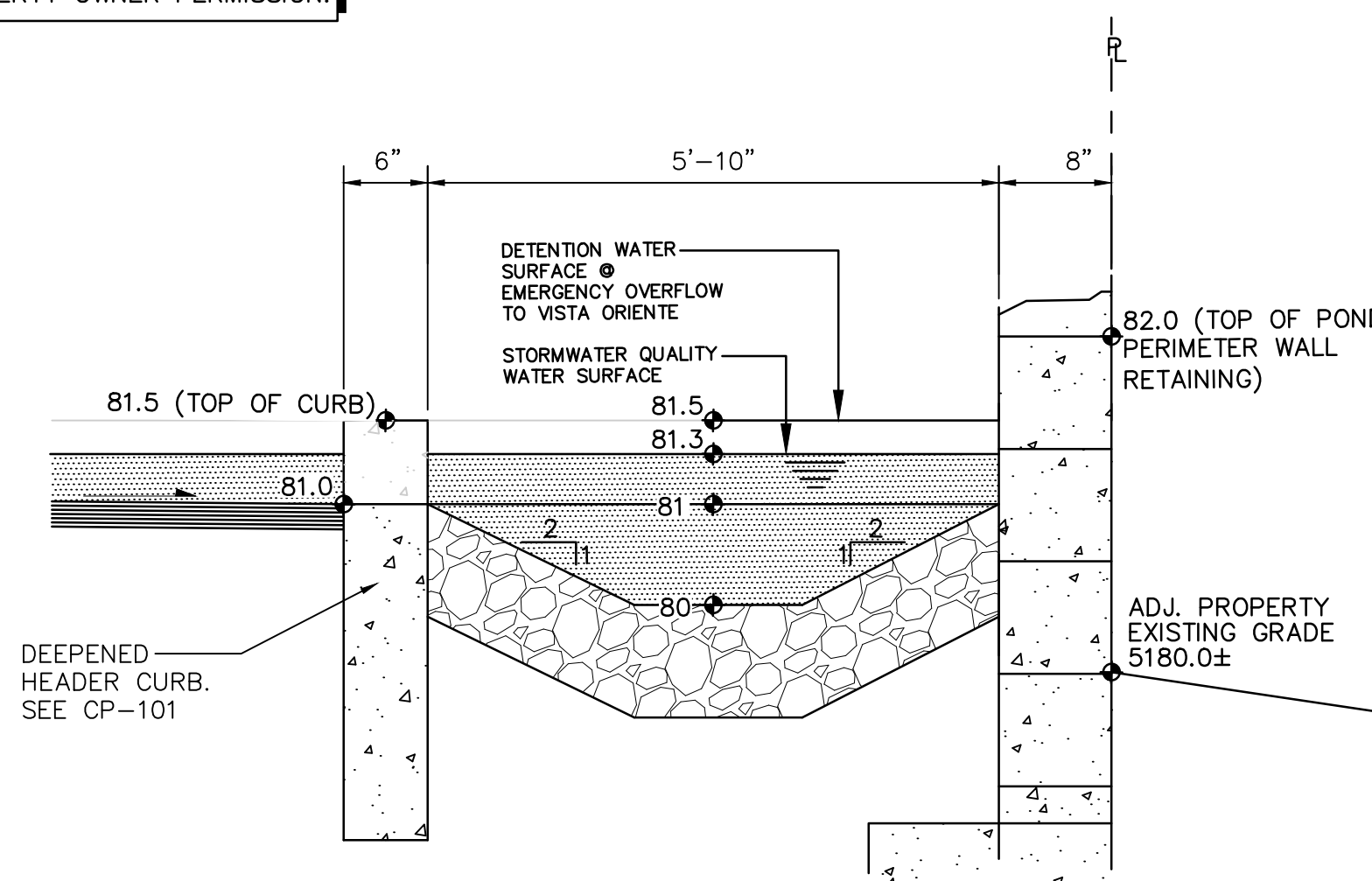


SCALE: N.T.S.

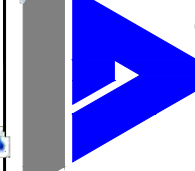


- ALL EROSION PROTECTION TO BE 8" DEEP, 4" AVG. DIA. ANGULAR FACED ROCK.
- PLACE GEOTEX 501 NON-WOVEN GEOTEXTILE (O.E.) BENEATH ALL EROSION PROTECTION
- ROCK SWALES TO BE 3' WIDE, 6" DEPRESSED

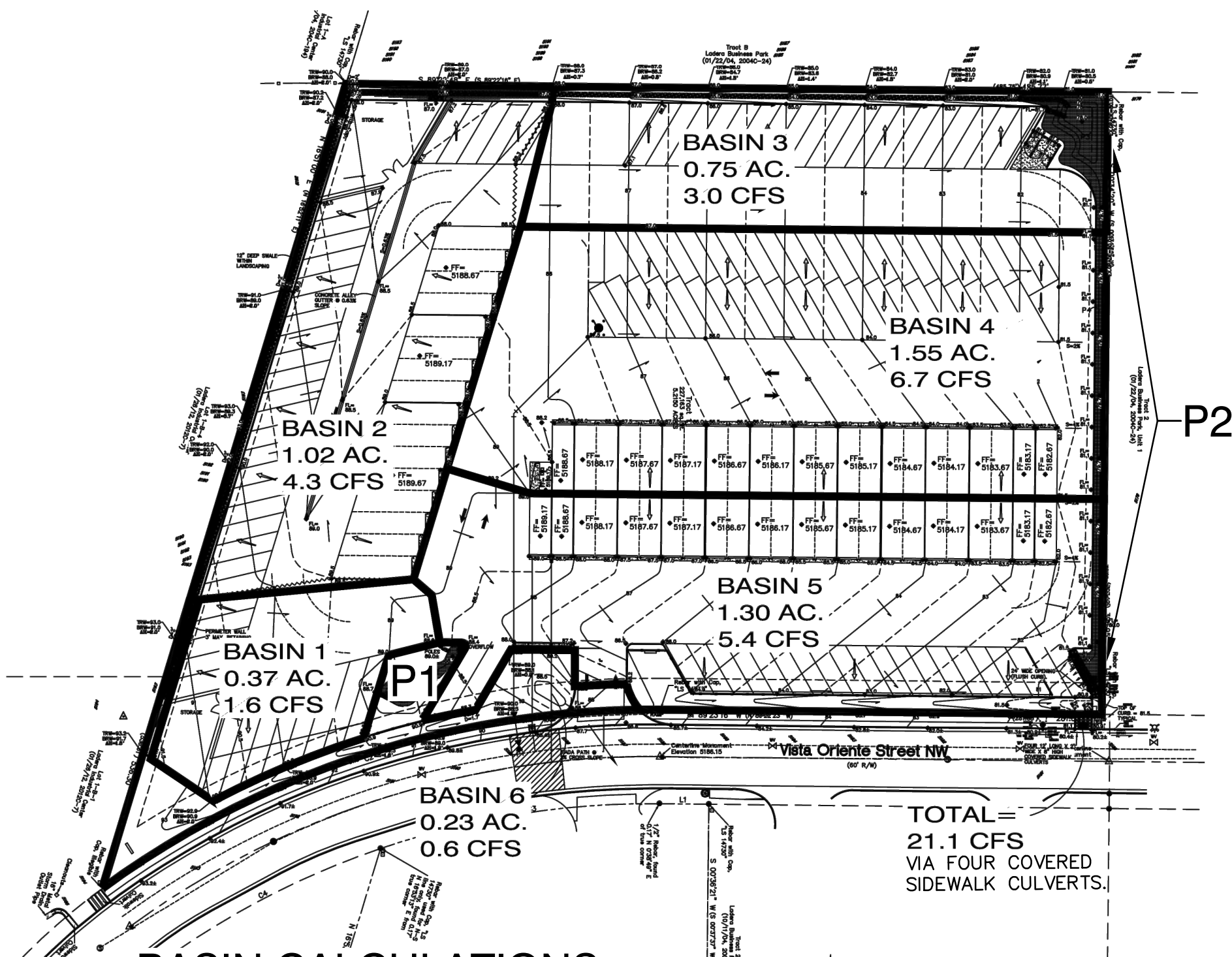
SCALE: N.T.S.



SCALE: N.T.S.

		<b>ISAACSON &amp; ARFMAN, P.A.</b> Consulting Engineering Associates 128 Monroe Street N.E. Albuquerque, New Mexico 87108 Ph. 505-268-8828 <a href="http://www.iaacivill.com">www.iaacivill.com</a>
2278 CG-501.dwg		Jun 18, 2019
This design, calculations, and concepts are owned by and remain the property of Isaacson & Arfman, P.A. and no part thereof shall be utilized by any person, firm or corporation for any purpose whatsoever except with the written permission of Isaacson & Arfman, P.A. ©		
ABQ RV &amp; BOAT STORAGE      LADERA ENTERPRISES LLC		
GRADING &amp; DRAINAGE DETAILS		
Date: 05-17-19	No.    Revision:	Date:    Job No. 2278
Drawn By: BUB		CG-501
Ckd By: FCA		
		SH. OF

## DRAINAGE BASINS



## BASIN CALCULATIONS

BASIN NO.	DESCRIPTION	Area of basin flows =	Weighted E	Sub-basin Volume of Runoff (see formula above)	Sub-basin Peak Discharge Rate (see formula above)	Q _p	First Flush Vol.
1	0.37 AC.	16168 SF	1.27 in.	2654 CF	1.6 cfs	458 CF	
2	1.02 AC.	44466 SF	1.89 in.	7010 CF	4.3 cfs	1172 CF	
3	0.75 AC.	32547 SF	1.79 in.	4848 CF	3.0 cfs	775 CF	
4	1.55 AC.	67211 SF	1.95 in.	10922 CF	6.7 cfs	1869 CF	
5	1.30 AC.	56453 SF	1.87 in.	8778 CF	5.4 cfs	1456 CF	
6	0.23 AC.	10113 SF	0.90 in.	757 CF	0.6 cfs	17 CF	

BASIN 1 DISCHARGES THROUGH STORMWATER QUALITY POND P1 WITH EXCESS FLOW PASSING TO THE SOUTHEAST COVERED SIDEWALK CULVERTS. 458 CF REQUIRED.

BASINS 2, 3 AND 4 DISCHARGE THROUGH STORMWATER QUALITY POND P2 BEFORE FREE DISCHARGING TO VISTA ORIENTE STREET. 3,816 CF REQUIRED.

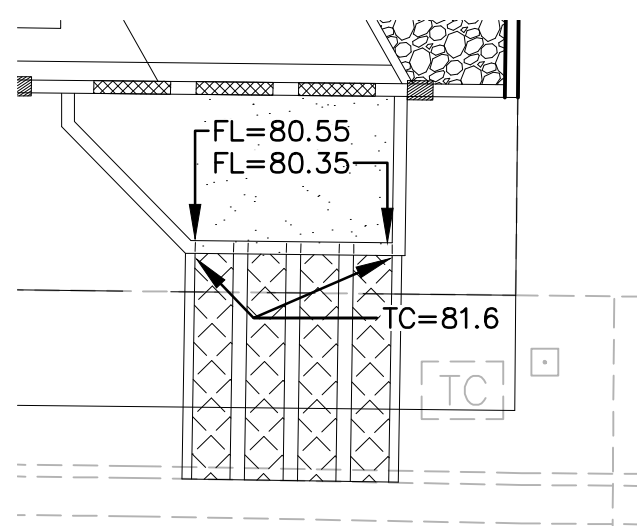
TOTAL SITE STORMWATER QUALITY POND VOLUME REQUIRED = 5,747 CF.  
TOTAL STORMWATER QUALITY POND VOLUME PROVIDED = 6,502 CF.

BASINS 5 AND 6 FREE DISCHARGE TO VISTA ORIENTE STREET. 1,473 CF REQUIRED.

## COVERED SIDEWALK CULVERT CALCULATIONS

ORIFICE EQUATION - SIDEWALK CULVERT			
The Orifice Equation is used to calculate the Flow at the opening of a Channel			
$Q = C^* A * (2 * g * h)^{0.5}$			
Where	Q	=	5.47 cfs
	C	=	0.6
	A	=	1.24 sq.ft.
	g	=	32.2 ft/sec ²
	h	=	0.84 ft
depth of flow at opening from the center of culvert			

COVERED SIDEWALK CULVERT CAPACITY = 5.5 CFS EACH  
FOUR REQUIRED: 4 * 5.5 CFS = 22.0 CFS > REQUIRED



## OVERALL CALCULATIONS

CALCULATIONS: 2278 - ABQ RV & BOAT STORAGE : May 17, 2019									
Based on Drainage Design Criteria for City of Albuquerque Section 22.2, DPM, Vol 2, dated Jan., 1993									
ON-SITE									
AREA OF SITE:		227163		SF		=		5.2	
100-year, 6-hour									
PREVIOUS DEVELOPED FLOWS:				DEVELOPED FLOWS:				EXCESS PRECIP:	
		Treatment SF %				Treatment SF %		Precip. Zone 1	
Area A	=	0	0%	Area A	=	0	0%	E _A = 0.44	
Area B	=	113581.5	50%	Area B	=	12239	5.4%	E _B = 0.67	
Area C	=	113581.5	50%	Area C	=	12119	5.3%	E _C = 0.99	
Area D	=	0.0	0%	Area D	=	202805	89.3%	E _D = 1.97	
Total Area	=	227163	100%	Total Area	=	227163	100%		

On-Site Weighted Excess Precipitation (100-Year, 6-Hour Storm)

$$\text{Weighted E} = \frac{E_A A_A + E_B A_B + E_C A_C + E_D A_D}{A_A + A_B + A_C + A_D}$$

Historic E	=	0.83 in.	Developed E	=	1.85 in.
------------	---	----------	-------------	---	----------

On-Site Volume of Runoff: V ₃₆₀ =	E*A / 12		
Historic V ₃₆₀ =	15712 CF	Developed V ₃₆₀ =	34977 CF

On-Site Peak Discharge Rate: Q_p = Q_{pA} + Q_{pB} + Q_{pC} + Q_{pD} / 43,560

For Precipitation Zone: 1					
Q _{pA}	=	1.29	Q _{pC}	=	2.87
Q _{pB}	=	2.03	Q _{pD}	=	4.37
Historic Q _p	=	12.78 CFS	Developed Q _p	=	21.7 CFS

## WEIR CALCULATIONS

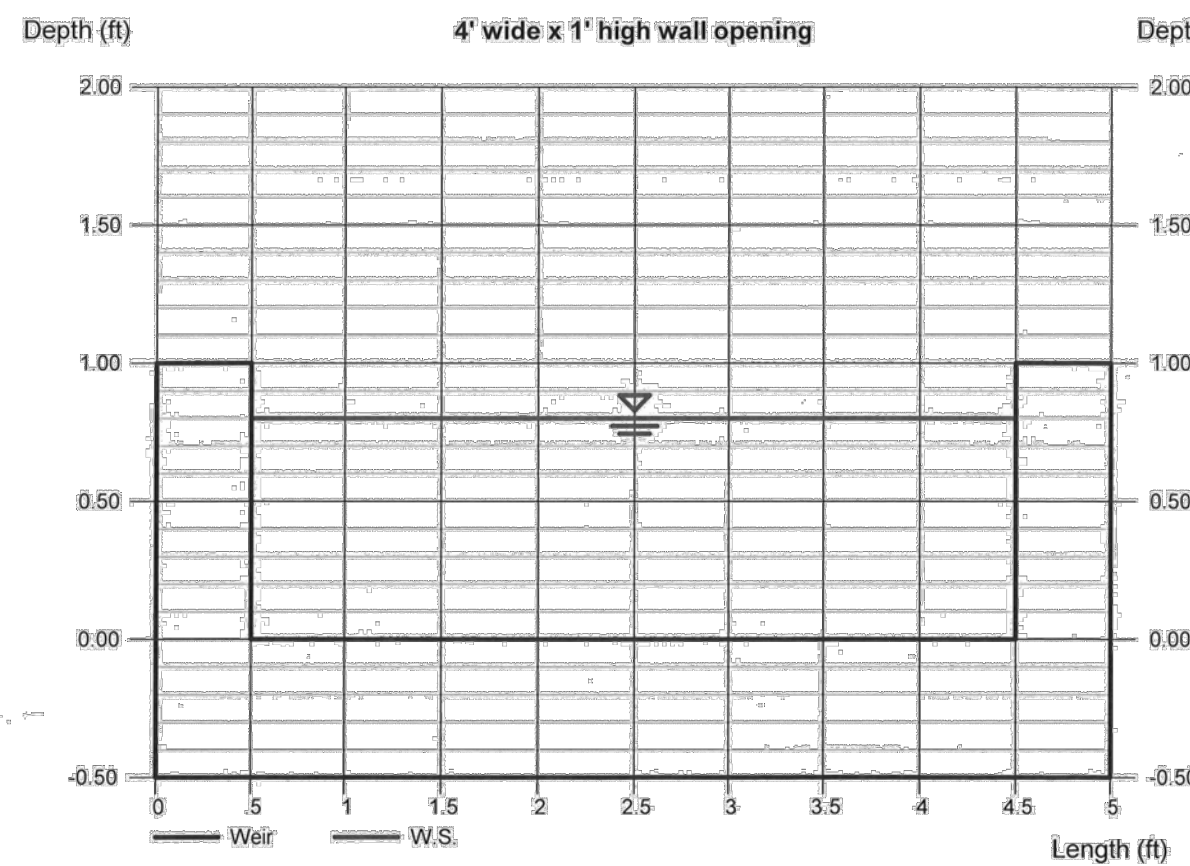
## Weir Report

Hydraflo Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 7 2019

## 4' wide x 1' high wall opening

Rectangular Weir	=	Broad	Highlighted	=	0.80
Crest	=	4.00	Depth (ft)	=	7.442
Bottom Length (ft)	=	1.00	Q (cfs)	=	3.20
Total Depth (ft)	=		Area (sqft)	=	2.33
			Velocity (ft/s)	=	4.00
Calculations	=	2.60	Top Width (ft)	=	
Weir Coeff. C _w	=	Q vs Depth			
Compute by:	=	5			
No. Increments	=				

THREE 4' WIDE X 1.0' HIGH OPENINGS IN WALL. SEE ARCHITECTURAL FOR WALL DETAILS. AT 0.8' DEEP, CAPACITY = 7.4 CFS. THREE @ 7.4 = 22.2 > REQUIRED



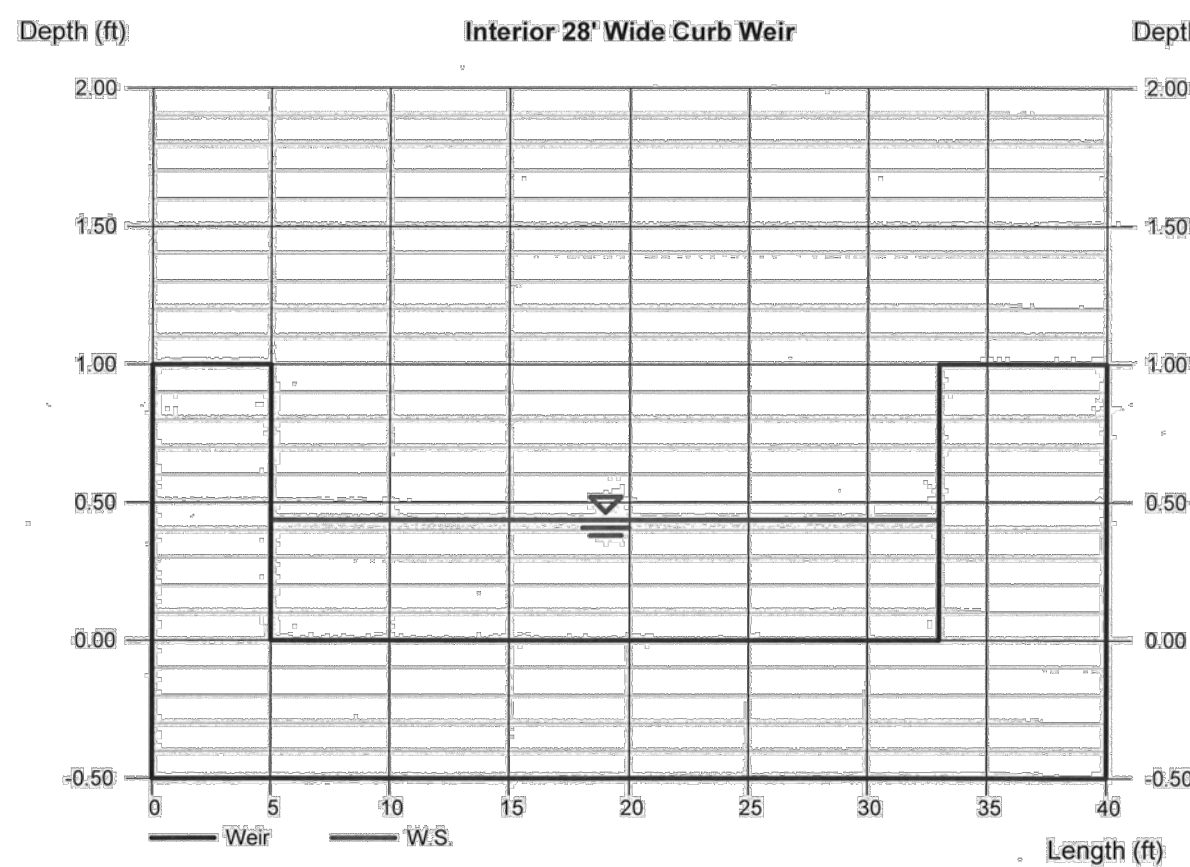
## Weir Report

Hydraflo Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 7 2019

## Interior 28' Wide Curb Weir

Rectangular Weir	=	Broad	Highlighted	=	0.44
Crest	=	28.00	Depth (ft)	=	21.00
Bottom Length (ft)	=	1.00	Q (cfs)	=	12.22
Total Depth (ft)	=		Area (sqft)	=	1.72
			Velocity (ft/s)	=	28.00
Calculations	=	2.60	Top Width (ft)	=	
Weir Coeff. C _w	=	Known Q			
Known Q (cfs)	=	21.00			

TOP OF 28' OVERFLOW WEIR ELEVATION = 81.3. AT 81.4, ADDITIONAL FLOW WILL BYPASS THE STORMWATER QUALITY PONDING AND DISCHARGE DIRECTLY.



FRED G. ARFMAN  
NEW MEXICO  
7322  
LICENSED PROFESSIONAL ENGINEER

**ISAACSON & ARFMAN, P.A.**  
Consulting Engineering Associates  
128 Monroe Street N.E.  
Albuquerque, New Mexico 87108  
Ph: 505-268-8828 www.isaacson.com

2278 CG-501.dwg Jun 18, 2019

This design, calculations, and concepts are owned by and remain the property of Isaacson & Arfman, P.A. and no part thereof shall be utilized by any person, firm or corporation for any purpose whatsoever except with the written permission of Isaacson & Arfman, P.A. ©

ABQ RV & BOAT STORAGE			
LADERA ENTERPRISES LLC			
DRAINAGE CALCULATIONS			
Date: 05-17-19	No. Revision:	Date:	Job No. 2278
Drawn By: BJB			CG-502
Ckd By: FCA			SH. OF