

# CITY OF ALBUQUERQUE



Richard J. Berry, Mayor

June 14, 2017

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

RE: **ABQ Biopark Elephant Exhibit**  
**903 10<sup>th</sup> St SW**  
**Engineer's Stamp Date 6/13/17**  
**Hydrology File: K13D034B**

Dear Mr. Arfman:

Based on the information provided in the submittal received on 6/14/17 the above-referenced Grading and Drainage Plan is approved for Building Permit.

If you have any questions, please contact me at 924-3695 or [dpeterson@cabq.gov](mailto:dpeterson@cabq.gov).

Sincerely,

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



# City of Albuquerque

Planning Department

Development & Building Services Division

## DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: \_\_\_\_\_ Building Permit #: \_\_\_\_\_ City Drainage #: \_\_\_\_\_

DRB#: \_\_\_\_\_ EPC#: \_\_\_\_\_ Work Order#: \_\_\_\_\_

Legal Description: \_\_\_\_\_

City Address: \_\_\_\_\_

Engineering Firm: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

bryanb@iacivil.com

Owner: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

Architect: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

Other Contact: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

Check all that Apply:

### DEPARTMENT:

- ☒ HYDROLOGY/ DRAINAGE  
☐ TRAFFIC/ TRANSPORTATION  
☐ MS4/ EROSION & SEDIMENT CONTROL

### TYPE OF SUBMITTAL:

☒ ENGINEER ARCHITECT CERTIFICATION

☐ CONCEPTUAL G & D PLAN

☒ GRADING PLAN

☐ DRAINAGE MASTER PLAN

☐ DRAINAGE REPORT

☐ CLOMR/LOMR

☐ TRAFFIC CIRCULATION LAYOUT (TCL)

☐ TRAFFIC IMPACT STUDY (TIS)

☐ EROSION & SEDIMENT CONTROL PLAN (ESC)

☒ OTHER (SPECIFY) Supplemental Information

IS THIS A RESUBMITTAL?: ☒ Yes ☐ No

### CHECK 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

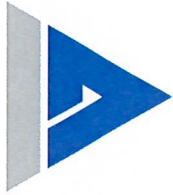
☐ CLOMR/LOMR

☐ PRE-DESIGN MEETING

☐ OTHER (SPECIFY) \_\_\_\_\_

DATE SUBMITTED: June 14, 2017 By: Fred C. Arfman

COA STAFF: \_\_\_\_\_ ELECTRONIC SUBMITTAL RECEIVED: \_\_\_\_\_



June 13, 2017

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

**RE: ABQ Bio-park Elephant Barn (K13D034B)**

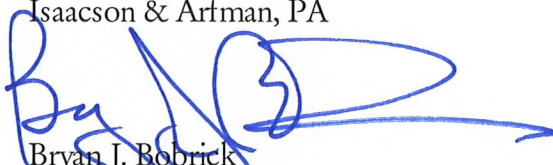
Dear Mr. Peterson,

Attached with this letter is a revised Grading & Drainage Plan for the proposed Elephant Barn project at the ABQ Biopark. Revisions were made based on your review comments dated June 7, 2017. The following items correspond to your original numbered comments.

1. A supplemental information packet included with this submittal provides basin analysis and confirmation of the 100-year 10-day storm volume.
2. The maximum water surface elevation of 4948.5 has been noted on the plan.
3. The finished floor of the new elephant barn has been set to 4949.0 which is 0.5' above the MWSE. The reasons for this are:
  - a. The available volume at elevation 4949.0 is 28,225 cf which is 17,962 cf more than the 100-year 10-day volume of 10,263 requires.
  - b. The barn is an open air enclosure with crusher fines & sand floor.
  - c. The access doors on the west side transition to existing over a short distance (7'±) which limits the FF elevation.
  - d. Based on emails exchanged with the project architect, Robert Brumfield with Van H. Gilbert Architect, the building cannot be relocated because of potential interference with the existing train tracks. He has discussed this with his project contacts at the biopark.

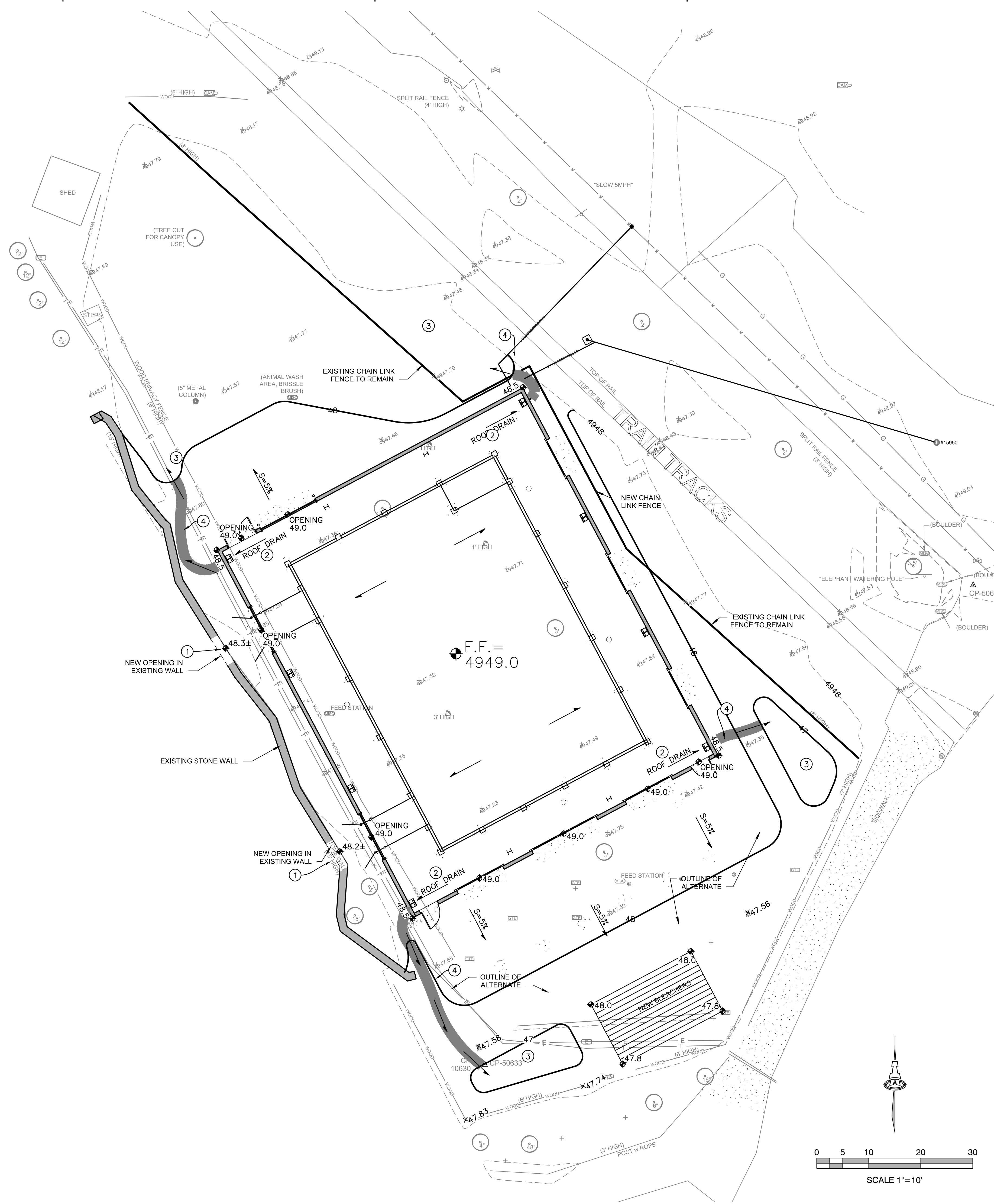
Please don't hesitate to call me or Fred Arfman, the project engineer, with any questions.

Sincerely,  
Isaacson & Arfman, PA



Bryan J. Bobrick  
Project Designer





## GENERAL NOTES

- THE CONTRACTOR SHALL ABIDE BY ALL STATE, LOCAL, AND FEDERAL LAWS, CODES, RULES AND REGULATIONS WHICH APPLY TO THE CONSTRUCTION OF THESE IMPROVEMENTS, INCLUDING EPA AND ADA REQUIREMENTS.
- ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED ON OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT EDITION OF THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS (COA SPEC.).
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FOR THE PROJECT PRIOR TO COMMENCING CONSTRUCTION, OR PRIOR TO OCCUPANCY, AS APPROPRIATE.
- COORDINATE WORK WITH SITE PLAN, UTILITY PLAN AND DEMOLITION PLAN.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING OBSTRUCTIONS, AND CONDITION OF ALL EXISTING INFRASTRUCTURE PRIOR TO CONSTRUCTION. REPORT ALL DISCREPANCIES TO THE ARCHITECT AND VERIFY THE ARCHITECT INTENT BEFORE PROCEEDING.
- THE CONTRACTOR SHALL OBTAIN ALL REQUIRED INSPECTIONS OF THE WORK.
- CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE PROJECT LIMITS. ANY DAMAGE TO ADJACENT STRUCTURES RESULTING FROM THE CONSTRUCTION PROCESS SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE. CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL MAINTAIN ALL BARRICADING AND CONSTRUCTION SIGNING AT ALL TIMES. THE CONTRACTOR SHALL VERIFY THE PROPER LOCATION OF ALL BARRICADING AT THE END AND BEGINNING OF EACH DAY.
- EXISTING UTILITY LINES ARE SHOWN IN AN APPROXIMATE MANNER ONLY AND MAY BE INCOMPLETE OR OBSOLETE. SUCH LINES MAY OR MAY NOT EXIST WHERE SHOWN OR NOT SHOWN. CONTRACTOR SHALL CONTACT NM-811 FOR UTILITY SPOTS FIVE WORKING DAYS PRIOR TO CONDUCTING SITE FIELD WORK. CONTRACTOR SHALL FIELD VERIFY AND LOCATE ALL UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION. CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES, PIPELINES, AND UNDERGROUND UTILITY LINES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF NECESSARY DRY UTILITY ADJUSTMENTS.
- FIVE WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NM811 (811) FOR LOCATION OF EXISTING UTILITIES.
- ALL SITE PREPARATION, GRADING OPERATIONS, FOUNDATION CONSTRUCTION, AND PAVEMENT INSTALLATION WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT, WHICH WILL BE PROVIDED BY THE OWNER OR ARCHITECT.
- ALL TRASH, DEBRIS, & SURFACE VEGETATION SHALL BE CLEARED AND LEGALLY DISPOSED OF OFFSITE.
- VIBRATORY COMPACTION SHALL NOT BE USED OVER IN-PLACE UTILITIES.
- SOIL TESTING AND INSPECTION SERVICES DURING SITE OPERATIONS ARE REQUIRED. CONTRACTOR SHALL ALLOW TESTING LABS TO INSPECT AND APPROVE COMPACTED SUBGRADES, BACKFILL, AND FILL LAYERS BEFORE FURTHER CONSTRUCTION WORK IS DONE. SHOULD COMPACTION TESTS INDICATE INADEQUATE DENSITY, CONTRACTOR SHALL PROVIDE ADDITIONAL COMPACTION AND TESTING AT THE CONTRACTOR'S SOLE EXPENSE.
- ADJUST ANY RIMS OF EXISTING UTILITY FEATURES AS NECESSARY TO MATCH NEW GRADES. UTILITIES IN PAVED AREAS SHALL BE HS-25 TRAFFIC RATED.

## GRADING NOTES

- GRADING SHALL BE PERFORMED AT THE ELEVATIONS AND IN ACCORDANCE WITH THE DETAILS SHOWN ON THIS PLAN.
- PROPOSED SPOT AND CONTOUR ELEVATIONS SHOWN REPRESENT TOP OF FINISH MATERIAL (I.E. TOP OF COMPACTED DIRT, TOP OF PAVEMENT MATERIAL, TOP OF LANDSCAPING MATERIAL, ETC.). CONTRACTOR SHALL GRADE, COMPACT SUBGRADE AND DETERMINE EARTHWORK ESTIMATES BASED ON ELEVATIONS SHOWN MINUS FINISH MATERIAL THICKNESSES.
- IF FIELD GRADE ADJUSTMENTS ARE REQUIRED, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT.
- POST-CONSTRUCTION MAINTENANCE FOR STORMWATER FACILITIES WILL BE THE RESPONSIBILITY OF THE FACILITIES OWNER. ENGINEER RECOMMENDS THAT OWNER INSPECT SITE YEARLY AND AFTER EACH RAINFALL TO IDENTIFY NEW AREAS OF EROSION AND INSTALL ADDITIONAL EROSION PROTECTION AS NEEDED BASED ON ACTUAL OCCURRENCES.

## VICINITY MAP



## PROJECT DATA

PROPERTY: THE SITE IS A PORTION OF THE ALBUQUERQUE RIO GRANDE ZOO PROPERTY LOCATED WITHIN C.O.A. VICINITY MAP K-13. THE SITE IS BOUND TO THE NORTH OF THE MAIN PARK AREA.

PROPOSED IMPROVEMENTS: THE PROPOSED IMPROVEMENTS INCLUDE A NEW ELEPHANT BARN WITH ASSOCIATED SITE WORK.

LEGAL: A PORTION OF RIO GRANDE ZOO, ALBUQUERQUE, NM

BENCHMARK: VERTICAL DATUM IS BASED UPON THE ALBUQUERQUE CONTROL STATION, "6-K14R", A STANDARD CITY OF ALBUQUERQUE BRASS CAP MONUMENT. ELEVATION: 4971.456' (NAVD 1988)

OFF-SITE: NO OFFSITE FLOW IMPACTS THIS PROPERTY.

FLOOD HAZARD: PER BERNALILLO COUNTY FIRM MAP #333, THE SITE IS LOCATED WITHIN FLOOD ZONE "X" (SHADED) DESIGNATED AS AREA OF MODERATE FLOOD HAZARD, USUALLY THE AREA BETWEEN THE LIMITS OF THE 100-YEAR AND 500-YEAR FLOODS.

DRAINAGE PLAN CONCEPT: PER THE BERNALILLO COUNTY CONTOUR DATA, THE PROPOSED AREA IS SITUATED WITHIN A SELF-PONDING AREA (MINIMUM OF 3 ACRES X 1' DEEP). THIS SUMP HAS THE CAPACITY TO CONTAIN ALL FLOW THAT FALLS WITHIN IT REGARDLESS OF LAND TREATMENT. THE PROPOSED INCREASE IN IMPERMEABLE AREA WILL GENERATE MINOR ADDITIONAL VOLUME. THE PROPOSED DEVELOPMENT WILL BE ELEVATED 6" ABOVE THE CALCULATED MAXIMUM WATER SURFACE ELEVATION. THE REMAINDER OF THE SITE WILL CONTINUE TO PROVIDE STORMWATER STORAGE UNTIL INFILTRATION OCCURS. LANDSCAPING FOR THIS EXHIBIT WILL BE CONTRACTED SEPARATELY BY OWNER.

## KEYED NOTES

- GRADE DIFFERENCE AT PROPOSED WALL OPENINGS ARE UNKNOWN (NO SURVEY DATA). FIELD COORDINATE TRANSITIONS WITH ARCHITECT AS NECESSARY.
- ROOF DISCHARGE TO GRADE. INSTALL SPLASH BLOCKS AT EACH DOWNSPOUT PER AS-101. PROVIDE EROSION PROTECTION WITHIN LANDSCAPING TO BOTTOM OF POND.
- GRADE SHALLOW (12" MAX) WATER HARVESTING BASIN TO ACCEPT INITIAL ROOF DISCHARGE FOR INFILTRATION.
- OWNER'S OPTION: ENGINEER RECOMMENDS THAT EROSION PROTECTION BE INSTALLED FROM END OF SPLASH BLOCKS TO BOTTOM OF SHALLOW WATER HARVESTING BASINS. DUE TO THE NATURE OF THIS INSTALLATION, THE TYPE OF EROSION CONTROL (CONCRETE, GROUTED ROCK, NATIVE GRASSES, EROSION CONTROL MATERIAL, NONE) IS OWNER'S OPTION. ENGINEER RECOMMENDS REGULAR INSPECTION AFTER RAINFALLS TO REPAIR EROSION.

## LEGEND

---	EXISTING CONTOUR
+4947.73	EXISTING SPOT ELEVATION
◆47.5	PROPOSED SPOT ELEVATION
→	FLOW ARROW
FF=4948.00	FINISH FLOOR ELEVATION
█	EROSION PROTECTION

Van H. Gilbert Architect PC  
ARCHITECTURE • INTERIORS • PLANNING

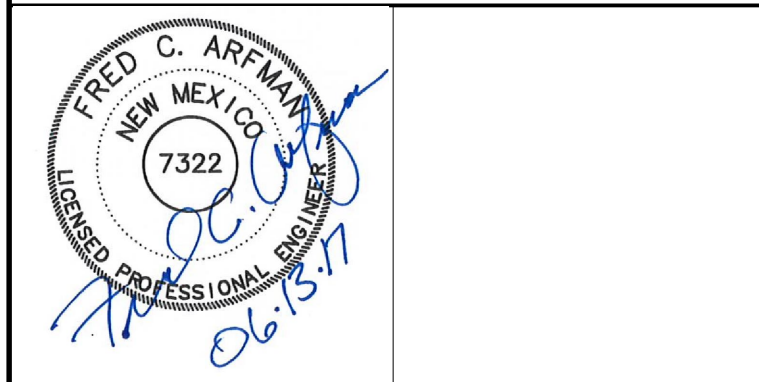


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E-mail info@vhgarchitect.com  
Web Site www.vhgarchitect.com

CONSULTANTS  
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128 Monroe NE, Alb., NM 87108 (505) 268-8628  
STRUCTURAL ENGINEERS: MacCormack Engineering  
1776 Montana Rd NW, Alb., NM 87107, (505) 861-0570  
PLUMBING, MECHANICAL, ELECTRICAL ENGINEERS: Bridges and Paxton Consulting Engineers, Inc.  
4600-C Montgomery Blvd NE, Alb., NM 87109, (505) 883-4111



NO.	DATE	REVISION/REMARKS	BY
DESIGNED BY:	Designer	DATE:	
DRAWN BY:	Author	DATE:	
CHECKED BY:	Checker	DATE:	
SUBMITTAL / DATE:	CONSTRUCTION DOCS	6/2/2017	
PROJECT NUMBER	2231		
PROJECT FILE	2231 CG-101.dwg	Jun 13, 2017	



CABQ - BioPark

Elephant Exhibit  
903 10th SW

SHEET TITLE

GRADING &  
DRAINAGE  
PLAN

DESIGN REVIEW COMMITTEE CITY ENGINEER APPROVAL

CITY PROJECT NO. 593393 ZONE MAP NO. K13-Z

CG-101

SHEET



JUNE 14, 2017

## SUPPLEMENTAL INFORMATION

FOR

City of Albuquerque  
Rio Grande Zoo  
Elephant Exhibit

BY



Based on Bernalillo County contour data and the project topographic survey information, the proposed zoo site is located at the low point of a self-ponding 1.4 acre drainage basin. Using a conservative land treatment ratio of 0% A, 20% B, 45% C and 35% D, the 100-year 6-hour storm will generate 7340 cf and the 100-year 10-day storm will generate 10,263 cf within the basin limits.

In the existing condition, the 100-year 10-day volume is stored with an estimated maximum water surface elevation of 4948.30 (see hatched area below).

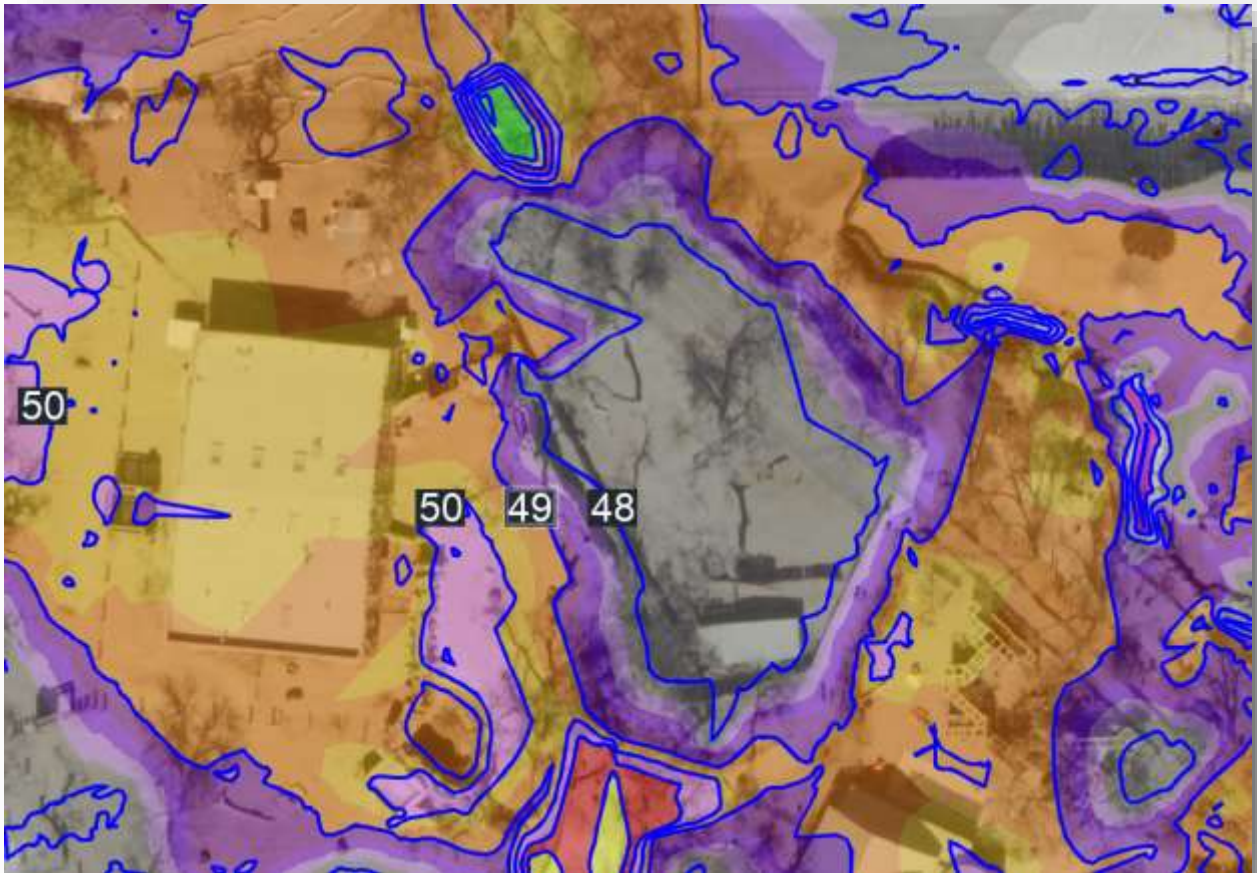
BASIN PONDING			
Contour	Area	Volume	
4948.30	19000		
4948.00	14650	5048	CF
4947.50	4960	4903	CF
4947.30	340	530	CF
TOTAL VOL.		<b>10480</b>	<b>CF</b>



At a FF elevation of 4949.0, the proposed building will displace approximately 4800 cf. The result will be raise the maximum water surface elevation (100-year 10-day storm event) approximately 0.2' to 4948.5.

The proposed barn consists of an open air enclosure with crusher fines and sand floor. The standard rule of setting a finish floor elevation 1' above the maximum high water elevation is not warranted with this project. For this reason, the FF elevation is set to 4949.0 which is 6" above the maximum high water elevation.

As can be seen in the image below, the existing building to the west has a FF elevation of 4950+. No other buildings fall within this basin low point.



Even if the entire basin were impervious, the 100-year 10-day storm would generate 19,400 cf which is well below the available volume of 28,225 cf at a max. water surface of 4949.0.

BASIN NO.	OVERALL	DESCRIPTION	Bernalillo County Contours - Overall Basin
Area of basin flows =	62630	SF	= 1.4 Ac.
The following calculations are based on Treatment areas as shown in table to the right			
Sub-basin Weighted Excess Precipitation (see formula above)		LAND TREATMENT	
Weighted E =		A = 0%	
		B = 20%	
Sub-basin Volume of Runoff (see formula above)		C = 45%	
V <sub>360</sub> =		D = 35%	
		FIRST FLUSH VOL.	
Sub-basin Peak Discharge Rate: (see formula above)		621 CF	
Q <sub>P</sub> =			

Note: For ponds which hold water for longer than 6 hours, longer duration storms are required to establish runoff volumes. Since the additional precipitation is assumed to occur over a long period, the additional volume is based on the runoff from the impervious areas only.

V <sub>360</sub> (from previous calculation)	7341
Area Treatment D (SF)	21921
Zone	2

For 10 Day Storms:

$$V_{10\text{day}} = V_{360} + A_D * (P_{10\text{day}} - P_{360}) * 43560 \text{ SF/AC}$$

V <sub>360</sub>	=	7341
A <sub>D</sub> (SF)	=	21921
Zone	=	2
P <sub>10day</sub>	=	3.95
P <sub>360</sub>	=	2.35

V <sub>360</sub>	=	7341
+ imp. area	=	2923

Total Pond Volume (V <sub>10 day</sub> )	=	10263
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P <sub>360</sub>	
Zone	D
1	2.20
2	2.35
3	2.60
4	2.90

P <sub>10day</sub>	
Zone	D
1	3.67
2	3.95
3	4.90
4	5.95

from Table A-2  
Depth (inches) at 100-yr Storm