CITY OF ALBUQUERQUE

PLANNING DEPARTMENT – Development Review Services

Richard J. Berry, Mayor

October 7, 2016

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

RE: **Albuquerque Biopark Zoo Penguin Exhibit (File: K13D034G)**
Grading & Drainage Plan, Engineer's Stamp Date 9-15-2016
Supplemental Information, Engineer's Stamp Date 10-5-2016

Dear Mr. Arfman:

Based upon the information provided in your submittal received 10-6-2016, the above referenced plan is approved for Building Permit with the following condition:

1. The WUA must accept drainage from the trench drains into the sanitary sewer. Verify with Jane Rael (505-289-3439).

Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

If you have any questions, you can contact me at 924-3695.

Sincerely,

Rita Harmon, P.E.
Senior Engineer, Planning Dept.
Development Review Services

Orig: Drainage file

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

ISAACSON & ARFMAN, P.A. Consulting Engineering Associates
Thomas O. Isaacson, PE(RET.) & LS(RET.) . Fred C. Arfman, PE . Åsa Nilsson-Weber, PE

October 5, 2016

Rita Harmon, P.E.
Senior Engineer, Hydrology
COA, Planning Department

RE: **ALBUQUERQUE BIOPARK ZOO PENGUIN EXHIBIT**
RESPONSE TO REVIEW COMMENTS DATED September 30, 2016

Dear Ms. Harmon,

Included with this letter is a revised Grading and Drainage resubmittal with associated supplemental information which addresses your review comments dated September 30, 2016. Our comments below correspond directly to the numbered comments you provided.

1. Aerial image showing the location of the proposed development within the zoo is provided. We have also included portions of our in-house elevation analysis which was used to set the proposed building grades (using the Bernalillo County contour files). The existing low elevations to the north and south (shown black) are 4947.0 to 4947.5. Any excess stormwater will continue to pass north and south. The grading concept for both existing and proposed conditions utilizes landscaping for water harvesting with overflow to adjacent landscaping and ultimately to the lowest portions of the zoo property. There is no significant difference between pre and post development impervious area which would adversely impact the existing conditions.

2. Regarding a maximum water surface elevation, the localized water harvesting basins will equalize via overflow elevations of 4947.5. Stormwater will continue to be retained to infiltrate into the ground until the site overflows at the historic low points (4948.4). Without a Master Drainage Study of the overall zoo drainage basins, land treatments, storm drain infrastructure and retention pond areas, a maximum water surface elevation for the main park area cannot be determined. Per conversations with Ray Johnson, Zoo Maintenance Director, they have never experienced any extensive ponding from storms.

3. Elevations and keyed notes are provided on the plans to clarify the high side and low side grades of all site retaining walls. Per the architect, "*the exposed site retaining walls*

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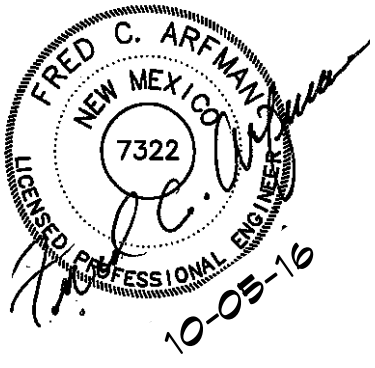
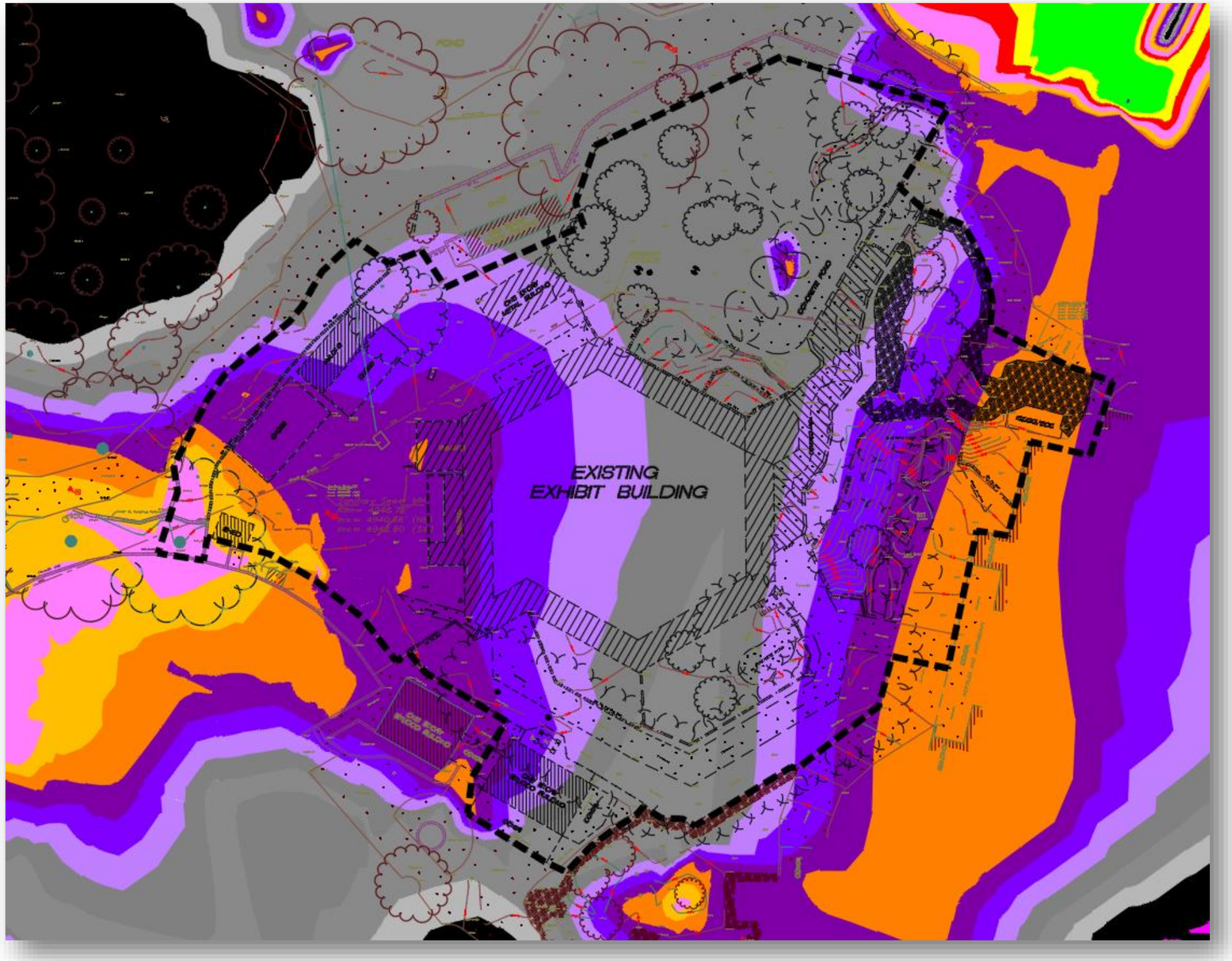
will be engineered interlocking stacked masonry systems. Engineering and final detailing will be performed by the manufacturer and installer. This is specified in Section 04 22 33."

4. Regarding the drainage from the upper plaza over the retaining wall, the architect responds "*The zoo is aware that the water from the Plaza will drain over the edge and down the retaining wall masonry. The masonry units specified are designed for retention… The units have integral protection to resist staining and are made of 3000 PSI concrete*."
5. A basin exhibit for the project is included.
6. The plumbing plan will be provided as soon as I receive it. This plan calls out the ramp trench drain connection to the SAS system and is currently under review as part of the electronic submittal. In addition, the small floor drain in the concrete landing on the north side (at the bottom of the stairs) will also tie to the SAS system. The reason for this is that the door / landing in this area is below grade and must be sealed to prevent groundwater from rising up into the space. Therefore, the only drain options are sump pump (200 sf with 100-year Q=0.02 cfs) or tie to SAS.
7. The architectural sections showing how the building relates to the site are included. The sections include the open mechanical area on the east side.
8. A copy of the architectural site plan is provided. This plan clarifies the hard surface areas and the gravel area in the mechanical yard on the east side. Final landscaping is not included in this project. All unpaved areas will be seeded with natural grasses until landscaping is designed / installed under separate contract.
9. Per the architect, the triple lines on the south side indicated standard curb and gutter. The architect has eliminated this C&G from the site base.
10. As noted above, the flat grading design in both the existing and proposed condition consists of localized landscaped areas (water harvesting) which overflowed to adjacent landscaped areas and ultimately overflowed to the historic lower areas to the north and south. The depressions shown on our plan noted as temporary stormwater retention ponds have been relabeled water harvesting / sediment control basins (varying depths from 0.5' to 2.5') with a general note on CG-100 "The proposed development will utilize water harvesting landscaped areas for infiltration. Excess stormwater will continue to the historic low points within the property. The final landscaping will be designed as part of a separate project."




Site



Per the colored elevation banding study shown with the existing exhibit building which will be demolished to make room for this project, the orange/pink reflects higher grades to the east and west (4949 to 4951) with the center gray/lavender at 4947.75 to 4948.50 sloping to lower grades to the north (the zoo park area) and south.

Using this information, we established a design grade of 4948.7 as the control elevation for the building.

The lower level grade of 4946.2 is depressed below this control grade but all openings to the building lower than 4948.7 are enclosed.

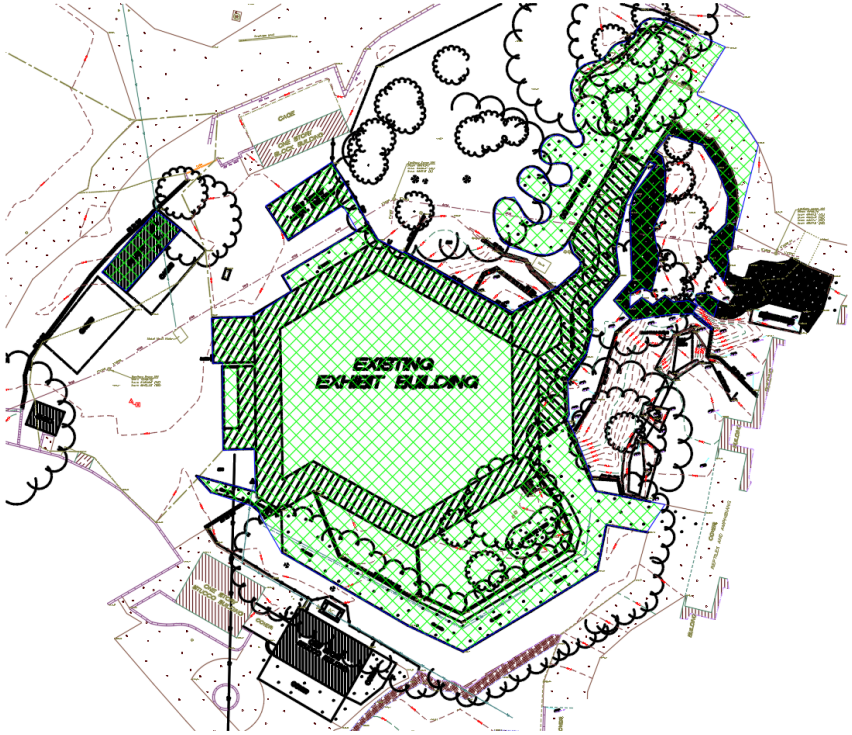
In the existing condition, stormwater discharge is accepted into the flat site grading concept

The center of the park area and the south low area (shown black) represent the low elevation in the area 4947.0 to which accepts any overflow from the project boundary.

Elevations Table

Minimum Elevation	Maximum Elevation	Color
4947.75	4948.00	
4948.00	4948.25	
4948.25	4948.50	
4948.50	4948.75	
4948.75	4949.00	
4949.00	4949.50	
4949.50	4950.00	
4950.00	4951.00	

EXISTING –VS- PROPOSED IMPERVIOUS AREA



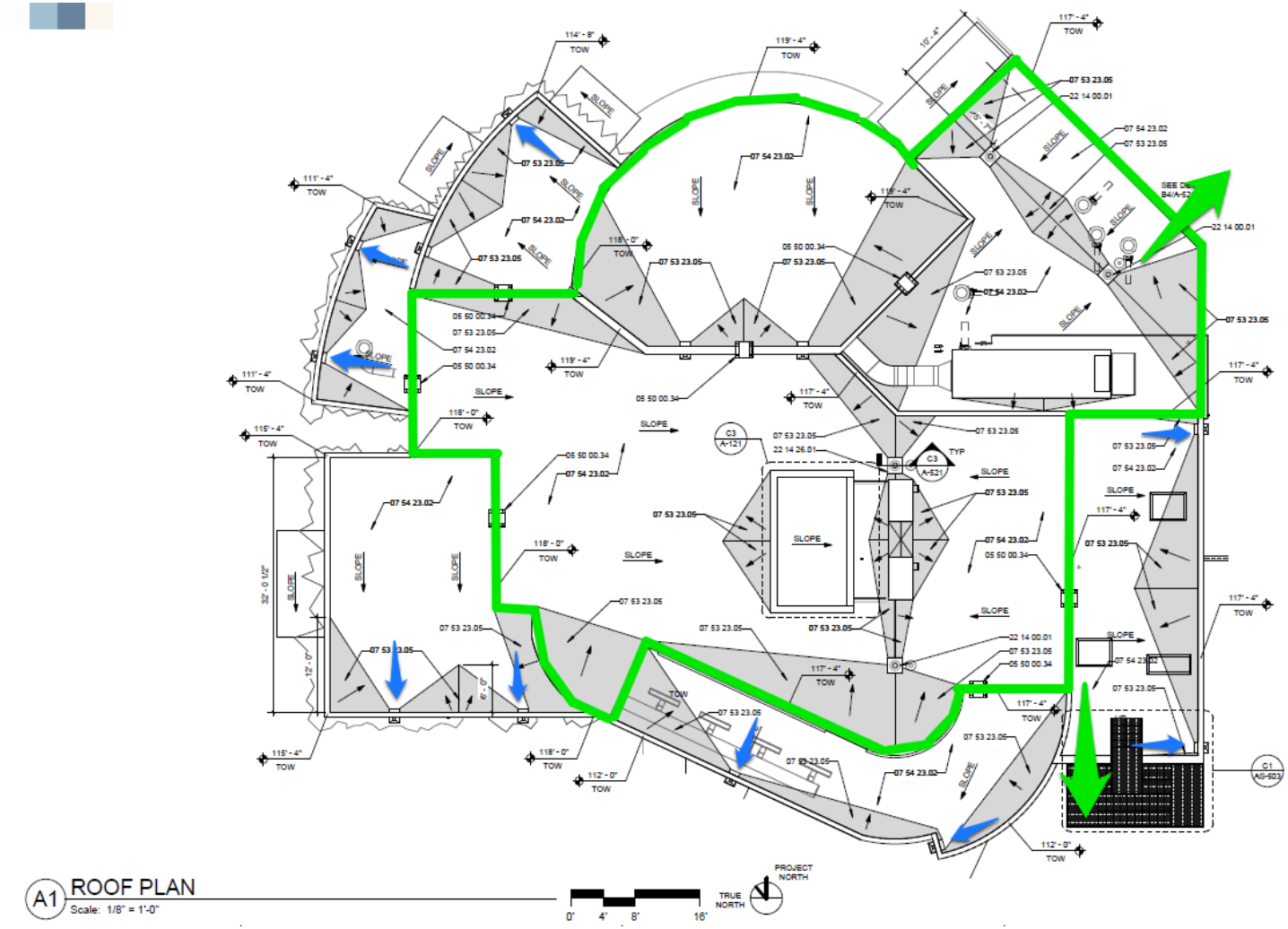
Proposed Condition: Treatment ‘D’ (impervious) = 23600± sf

Proposed Condition: Treatment ‘D’ (impervious) = 24800± sf

The proposed development will include a small (1200± sf) increase in impervious area.

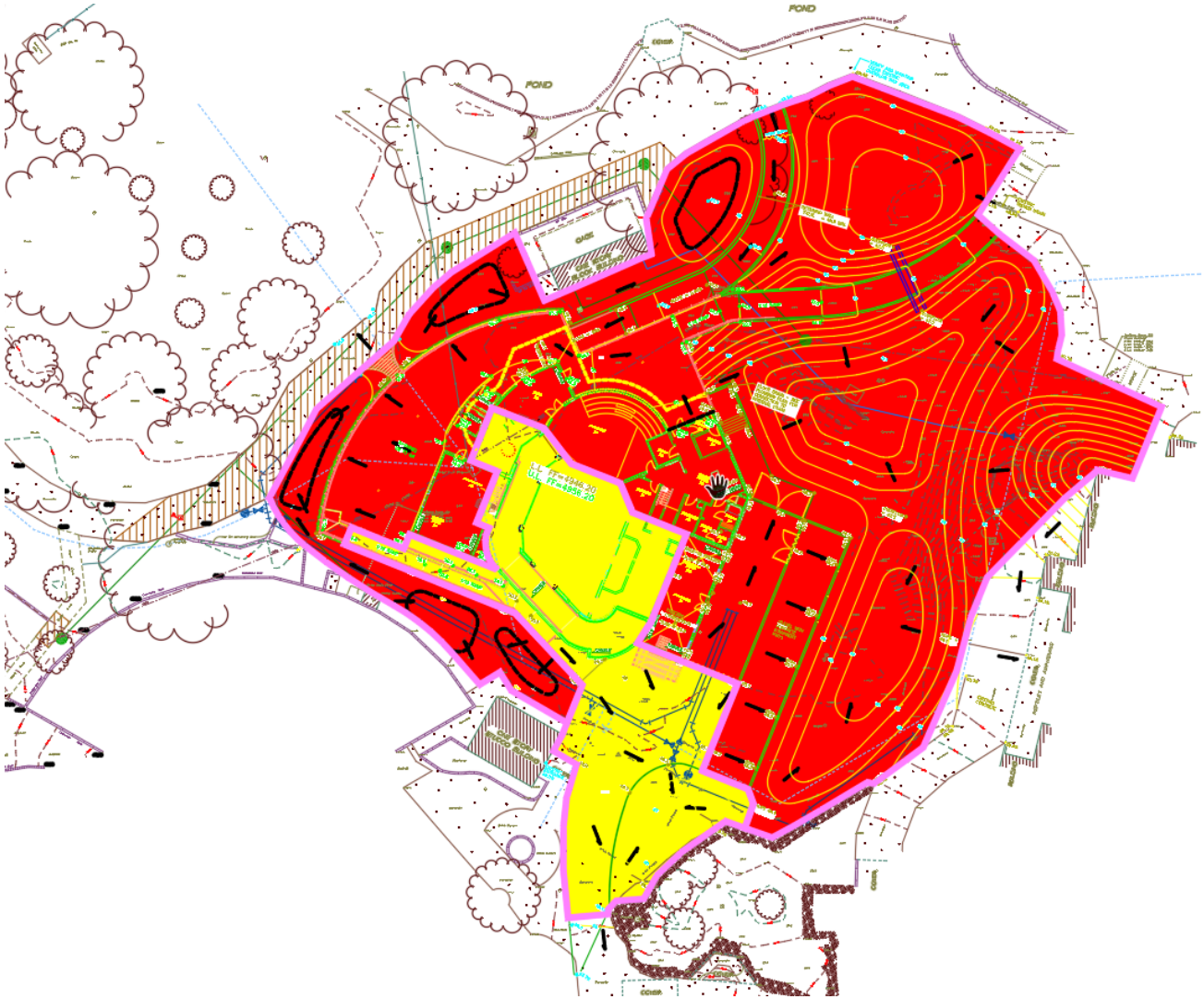
Roof Discharge

The green outline drains to interior roof drains and discharges at the locations shown (green arrows). The remainder of the small, isolated roof areas drain from canales on all sides of the building (blue arrows).



Proposed Drainage Basins

The redeveloped property can be divided into two main drainage basins. Basin 1 (red) which overflows to the north park and Basin 2 (yellow) which overflows to the south.



CALCULATIONS: COA Rio Grande Zoo - Penguin Enxhibit : Sept. 19, 2016

Based on Drainage Design Criteria for City of Albuquerque Section 22.2, DPM, Vol 2, dated Jan., 1993

ON-SITE

AREA OF SITE: 53014 SF = 1.2

100-year, 6-hour

HISTORIC FLOWS:

		Treatment SF	%
Area A	=	0	0%
Area B	=	15904.2	30%
Area C	=	13253.5	25%
Area D	=	23856.3	45%
Total Area	=	53014	100%

DEVELOPED FLOWS:

		Treatment SF	%
Area A	=	0	0%
Area B	=	18555	35%
Area C	=	9543	18%
Area D	=	24917	47%
Total Area	=	53014	100%

EXCESS PRECIP:

Precip. Zone 2

E_A = 0.53

E_B = 0.78

E_C = 1.13

E_D = 2.12

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	=	1.47 in.	Developed E	=	1.47 in.

On-Site Volume of Runoff: V360 = E*A / 12

Historic V_{360}	=	6496 CF	Developed V_{360}	=	6507 CF

On-Site Peak Discharge Rate: $Qp = Q_{pA}A_A + Q_{pB}A_B + Q_{pC}A_C + Q_{pD}A_D / 43{,}560$

For Precipitation Zone 2

Q_{pA}	=	1.56	Q_{pC}	=	3.14
Q_{pB}	=	2.28	Q_{pD}	=	4.70
Historic Q_p	=	4.4 CFS	Developed Q_p	=	4.3 CFS

BASIN NO. 1 **DESCRIPTION** Overflowing to the north park

Area of basin flows = 43423 SF = 1.0 Ac.

The following calculations are based on Treatment areas as shown in table to the right

LAND TREATMENT

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.40 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 5077 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 3.4 cfs

A = 0%

B = 38%

C = 21%

D = 41%

FIRST FLUSH VOL.

504 CF

BASIN NO. 2 **DESCRIPTION** Overflowing to the south

Area of basin flows = 9591 SF = 0.2 Ac.

The following calculations are based on Treatment areas as shown in table to the right

LAND TREATMENT

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.81 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 1449 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 0.9 cfs

A = 0%

B = 17%

C = 8%

D = 75%

FIRST FLUSH VOL.

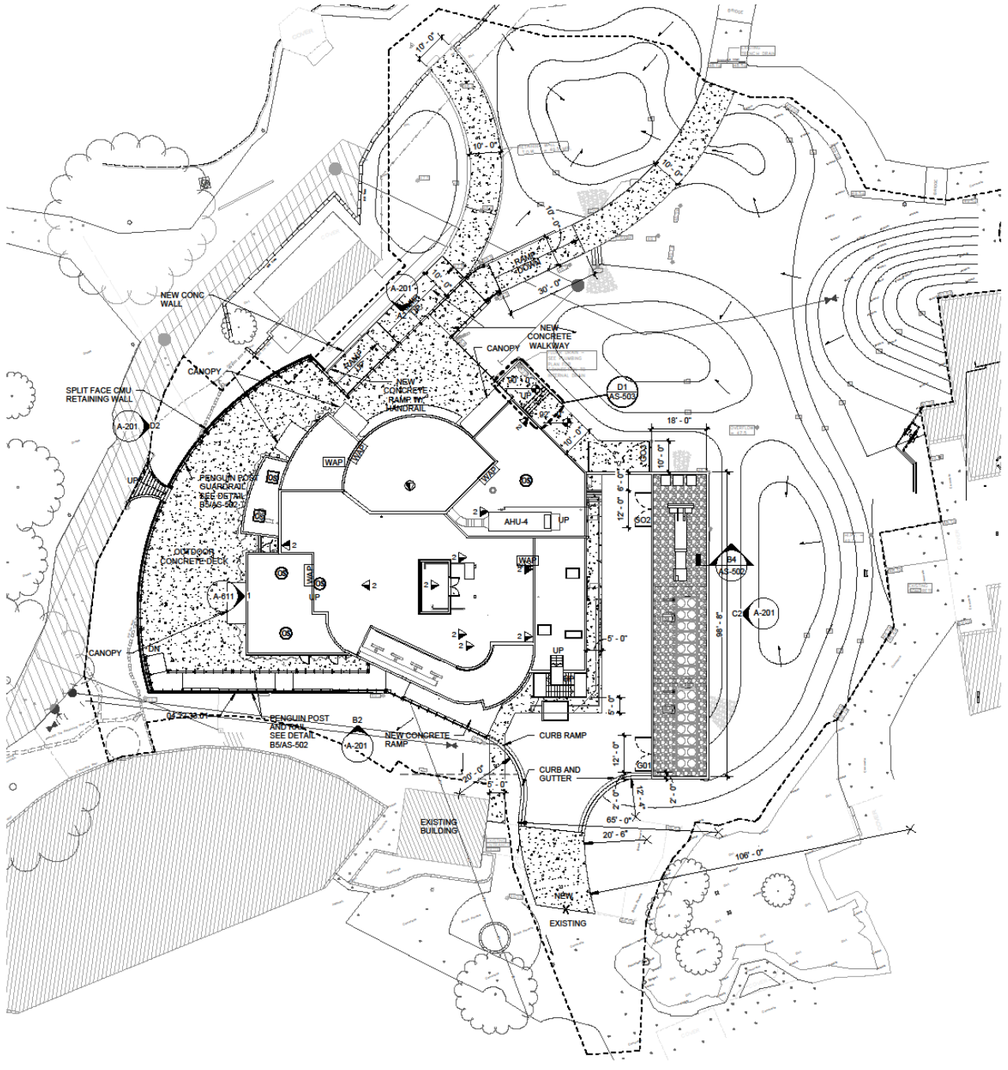
204 CF

GENERAL SHEET NOTES

1. PRIOR TO COMPLETION OF PROJECT, REPAIR, REGRADE, AND COMPACT EXISTING GRAVEL ACCESS ROAD AS REQUIRED FOR PERMANENT USE BY THE BIOPARK.
2. BASE ELEVATION: ELEVATION 4956.3 = ELEVATION 100'-0"

SPECIFICATION KEYNOTES

04 22 33.01	INTERLOCKING CONCRETE UNIT MASONRY



A1 SITE PLAN
Scale: 1" = 20'-0"

TRUE NORTH
PROJECT NORTH
0' 10' 20' 40'

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CONSULTANTS

CIVIL ENGINEER	Isaacson & Arfman, P.A
STRUCTURAL ENGINEERS:	Chavez - Grieves Consulting Engineers, Inc
MECHANICAL, ELECTRICAL ENGINEERS:	Bridgers and Paxton Consulting Engineers, Inc
LIFE SUPPORT ENGINEERS:	Alvine and Associates, Inc.

ABQ BIOPARK
ZOO BOTANIC GARDEN TINGLEY BEACH AQUARIUM

NO.	DATE	REVISION/REMARKS	BY

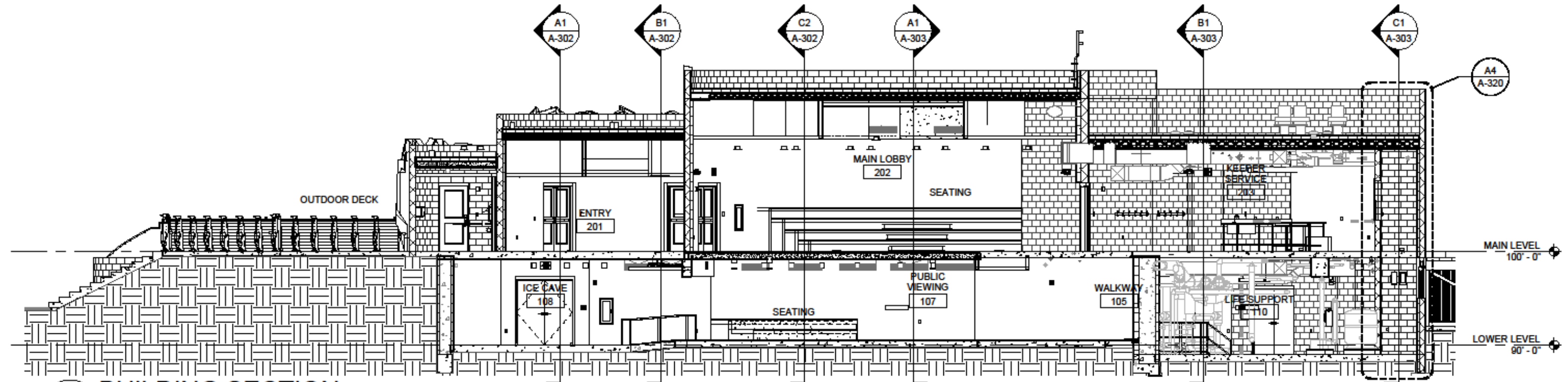
DESIGNED BY:	VHG	DATE: 9/15/2016
DRAWN BY:	RS	DATE: 9/15/2016
CHECKED BY:	RB	DATE: 9/15/2016
SUBMITTAL / DATE:	CONTRACT DOCUMENTS	09/15/2016
PROJECT NUMBER		16600
PROJECT FILENAME		16600 Penguin Exhibit.rvt

STATE OF NEW MEXICO VAN H. GILBERT 9/15/2016 REGISTERED ARCHITECT

ALBUQUERQUE BIOPARK ZOO
PENGUIN EXHIBIT
Albuquerque, New Mexico

SHEET TITLE
SITE PLAN

AS-101
SHEET OF



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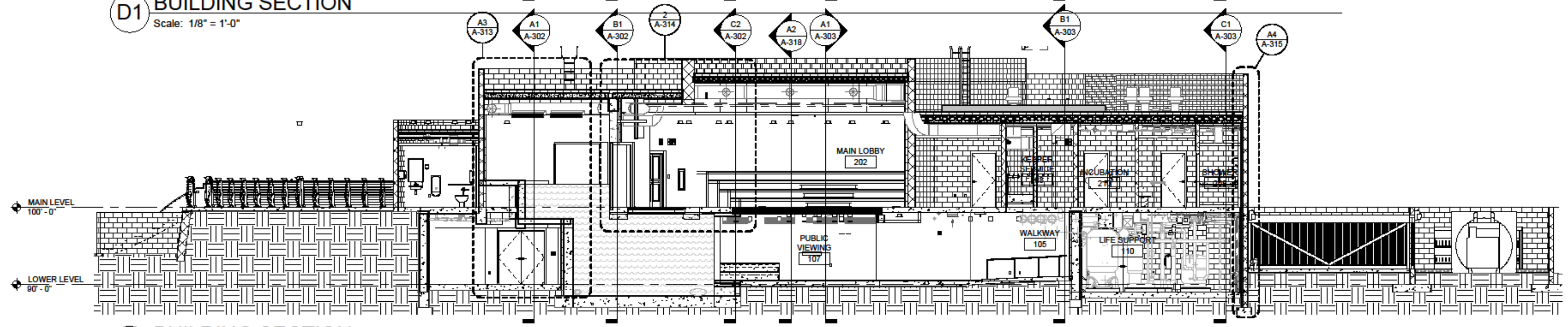

C1 BUILDING SECTION
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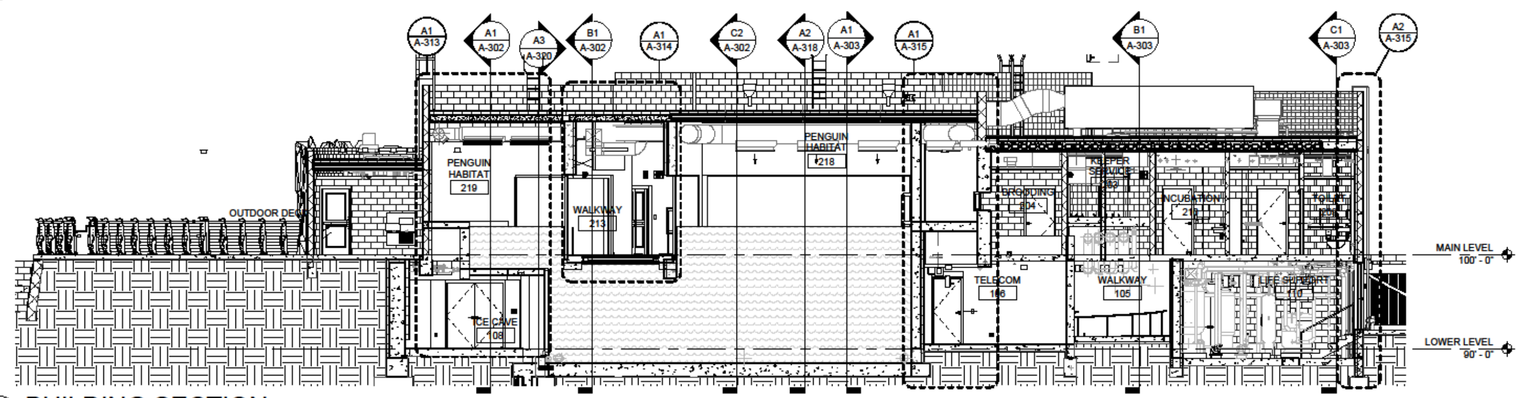
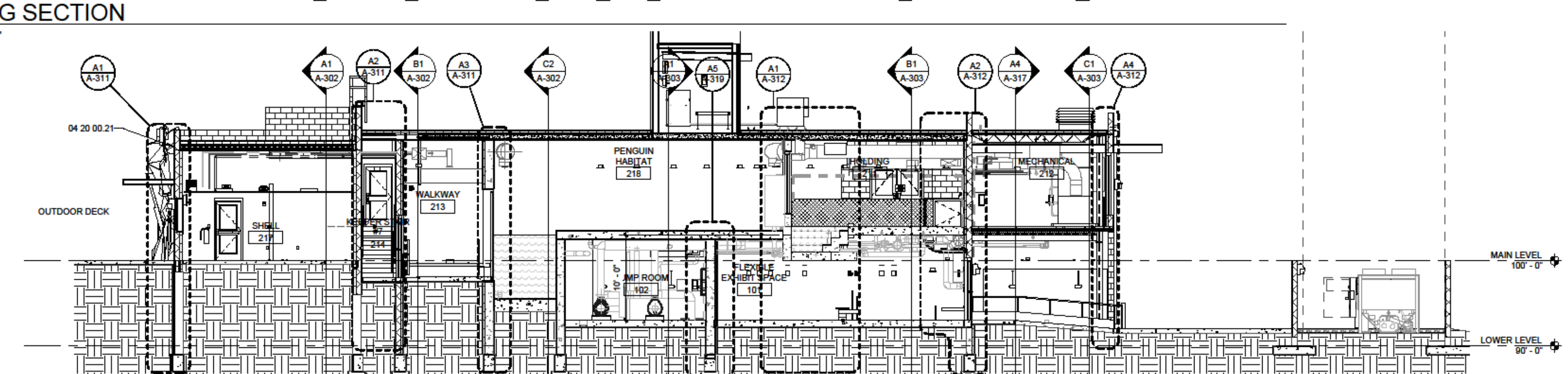


B1 BUILDING SECTION
Scale: 1/8" = 1'-0"



A1 BUILDING SECTION
Scale: 1/8" = 1'-0"

SPECIFICATION KEYNOTES

04 20 00.14	8" CMU
04 20 00.21	8" SPLIT-FACE CMU
05 52 13.04	1 1/2" (ID) METAL GUARDRAIL

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ABQ BIOPARK
ZOO BOTANIC GARDEN TINGLEY BEACH AQUARIUM

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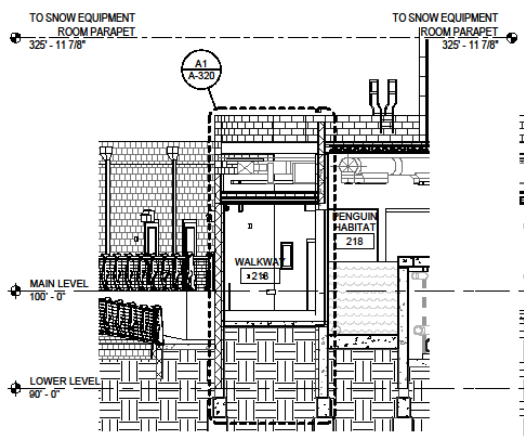
DESIGNED BY: VHG	DATE: 9/15/2016
DRAWN BY: RS	DATE: 9/15/2016
CHECKED BY: RB	DATE: 9/15/2016
SUBMITTAL / DATE: CONTRACT DOCUMENTS	09/15/2016
PROJECT NUMBER	16600
PROJECT FILENAME	16600 Penguin Exhibit.rvt

STATE OF NEW MEXICO VAN H. GILBERT No. 609 ALBUQUERQUE N.M. REGISTERED ARCHITECT 9.15.2016

ALBUQUERQUE BIOPARK ZOO
PENGUIN EXHIBIT
Albuquerque, New Mexico

SHEET TITLE
BUILDING SECTIONS

SHEET A-301 OF



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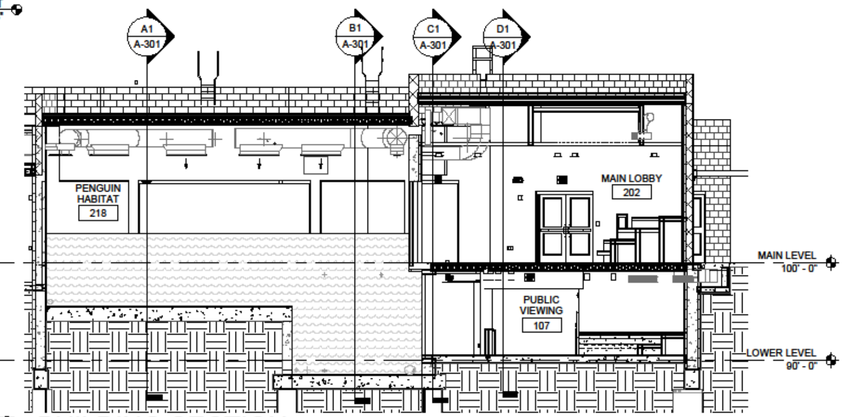

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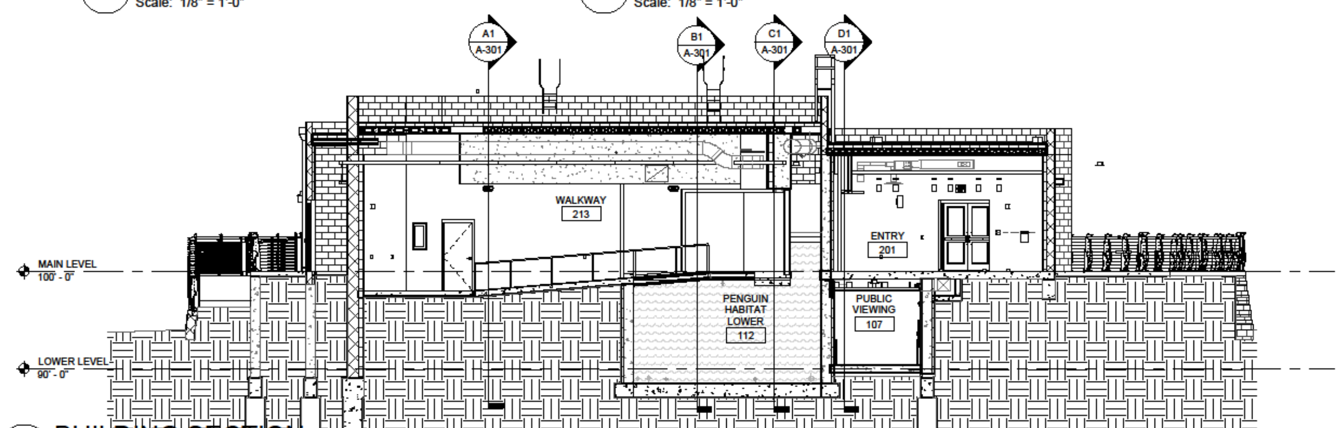

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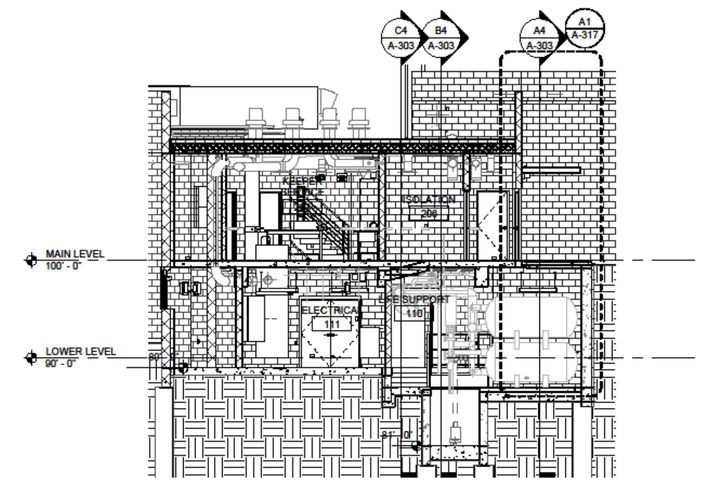

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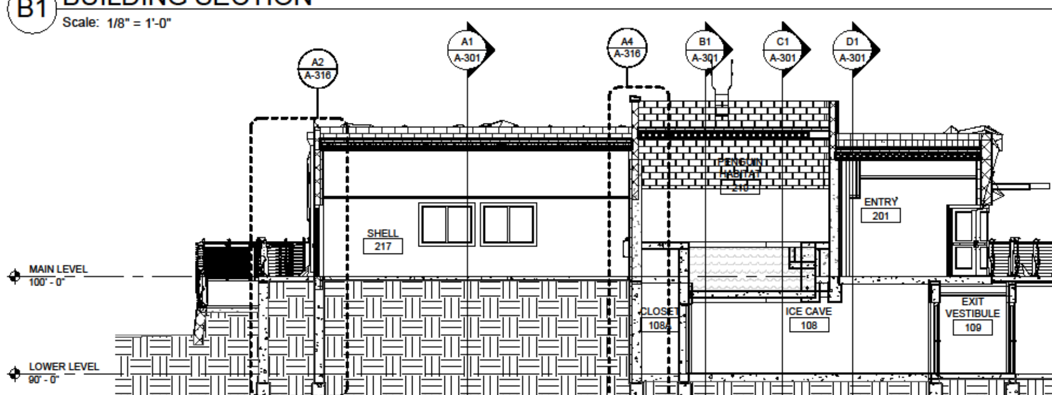

A1 BUILDING SECTION
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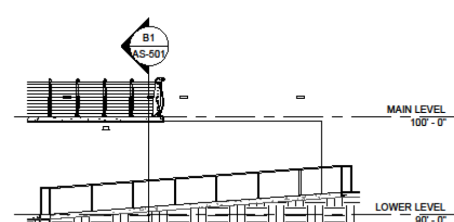

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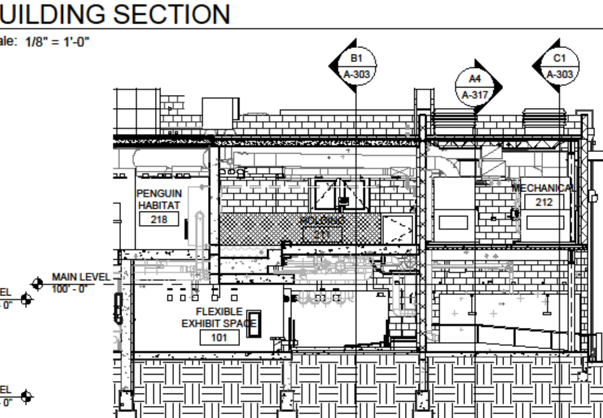

A4 BUILDING SECTION
Scale: 1/8" = 1'-0"

Van H. Gilbert Architect PC

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ABQ BIOPARK
ZOO BOTANIC GARDEN TINGLEY BEACH AQUARIUM

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DRAWN BY: RS	DATE: 9/15/2016
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PROJECT NUMBER	16600
PROJECT FILENAME	16600 Penguin Exhibit.rvt

9.15.2016

ALBUQUERQUE BIOPARK ZOO
PENGUIN EXHIBIT
Albuquerque, New Mexico

SHEET TITLE

BUILDING SECTIONS

SHEET A-302 OF

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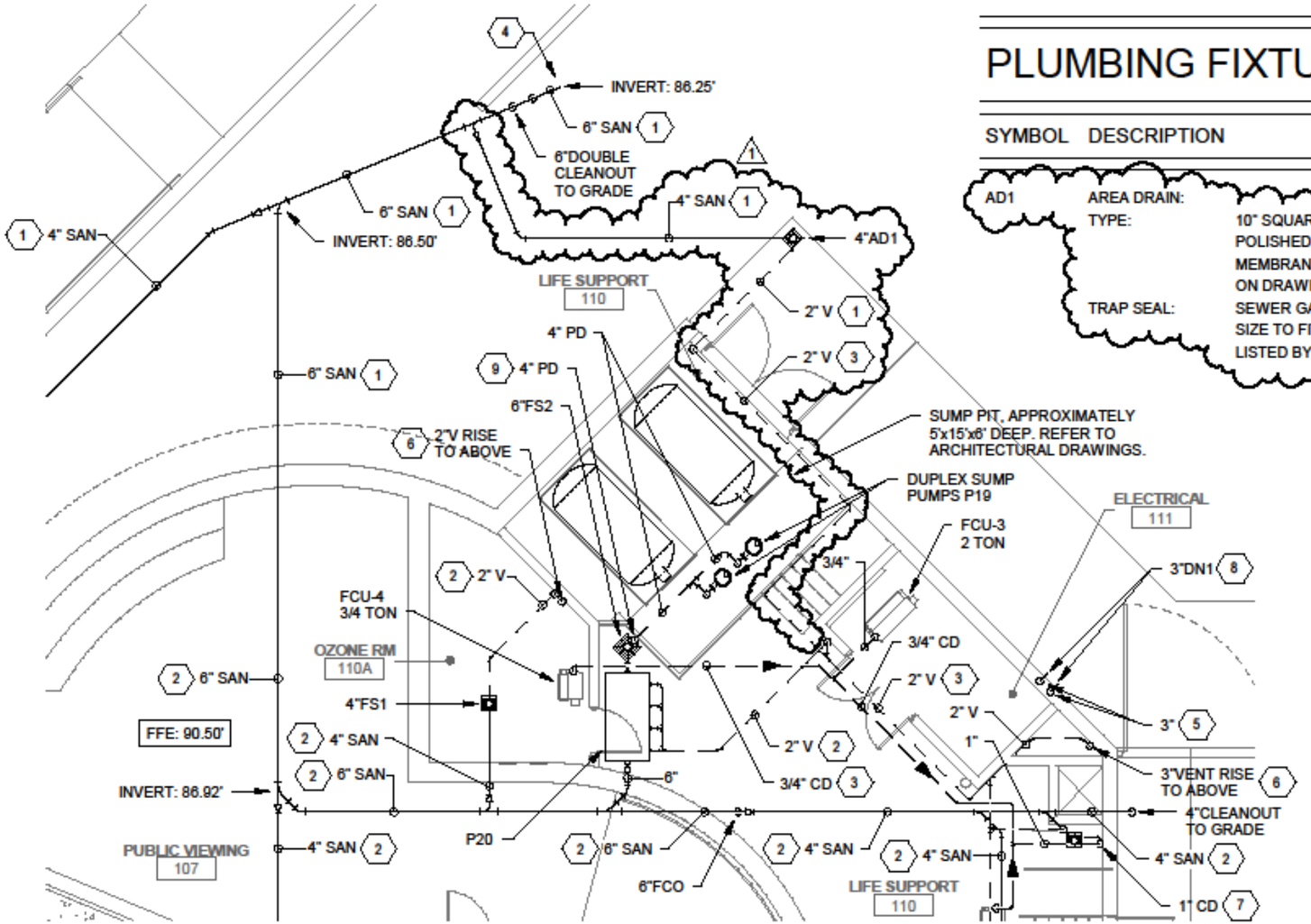

PLUMBING FIXTURE SPECIFICATIONS

SYMBOL	DESCRIPTION	(OR APPROVED EQUAL)
AD1	AREA DRAIN:	
	TYPE:	10" SQUARE TOP PROM-DECK DRAIN WITH HEEL-PROOF GRATE AND ROTATABLE FRAME POLISHED BRONZE, CAST IRON BODY WITH BOTTOM OUTLET, COMBINATION INVERTIBLE MEMBRANE CLAMP, VANDAL PROOF SECURED TOP, DIAMETER OF OUTLET AS SHOWN ON DRAWINGS. MFG: ZURN No. ZB158-VP.
	TRAP SEAL:	SEWER GAS EMISSION PROTECTION DEVICE, FOR INSERTION INTO ALL FLOOR DRAINS. SIZE TO FIT INSIDE PIPE AT DRAIN OPENING ACCORDING TO PIPE MATERIAL USED AS LISTED BY PROSET SYSTEMS. MFG: PROSET SYSTEMS No. TG33-Z OR TG34-Z.

1

1 PARTIAL LOWER LEVEL WASTE & VENT FLOOR PLAN

SCALE: 1/8" = 1'-0"

Van H. Gilbert Architect PC

www.vhgarchitect.com

RIO GRANDE ZOOLOGICAL PARK

THE PENGUIN CHILL HABITAT

No.	Description	Date
1	PERMIT REVIEW	10/10/2016

LOWER LEVEL W&V PLAN

Project number	16600
Date	10/10/2016
Drawn by	ATD
Checked by	JSS

SKP-001

Scale As indicated

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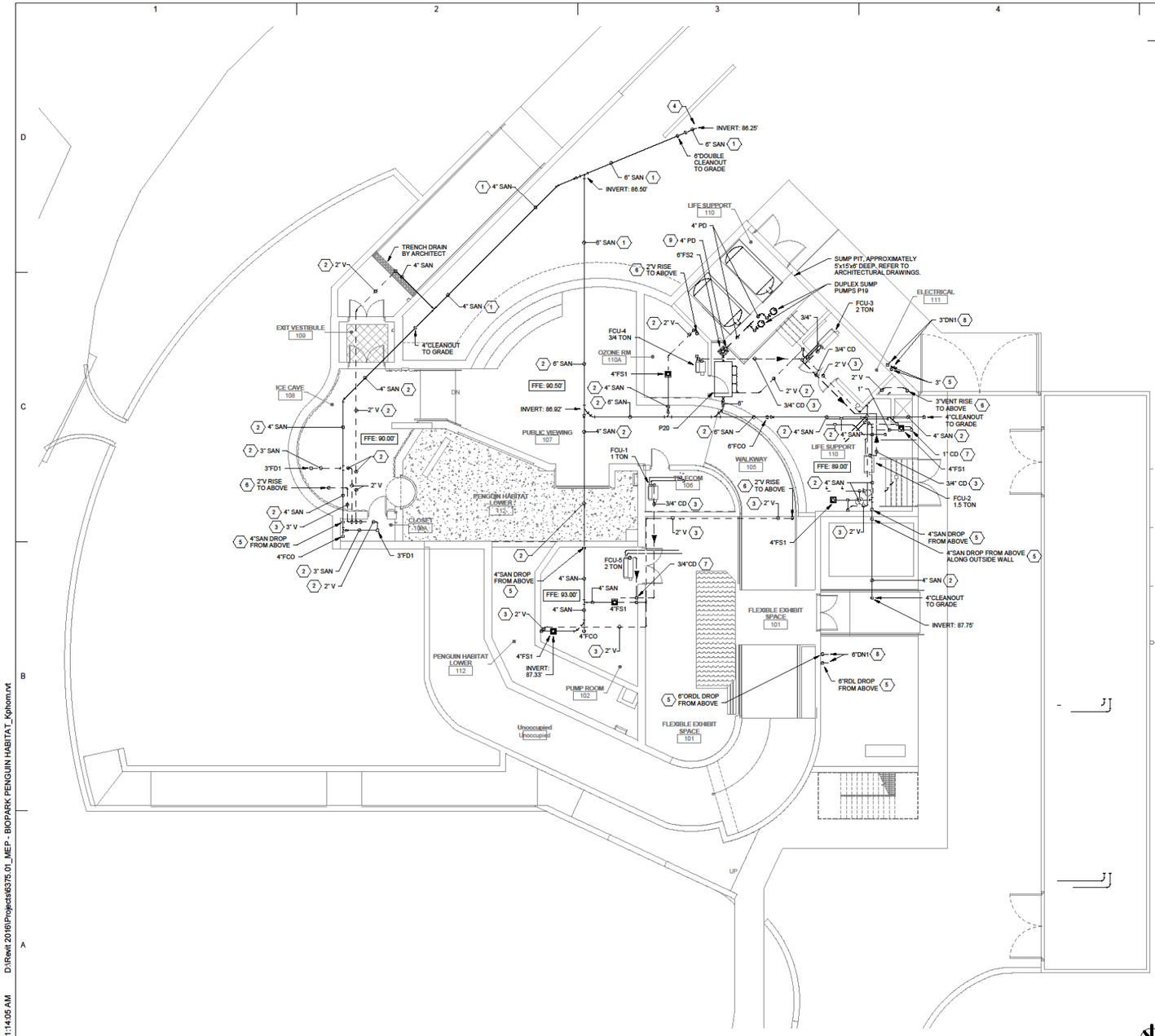

A1 LOWER LEVEL WASTE & VENT FLOOR PLAN

SCALE: 1/8" = 1'-0"

0' 4' 8' 16'

TRUE NORTH

PROJECT NORTH

GENERAL SHEET NOTES

A. ALL HOT AND COLD WATER DROPS/RISES TO FIXTURES SHALL BE VERTICAL BETWEEN THE FRAMING STUDS.

B. ALL WASTE, VENT, AND WATER PIPING IN PIPE CHASE SHALL BE RACKED TIGHT TO INTERIOR FRAME WALL, LEAVING CENTER OF CHASE CLEAR FOR MAINTENANCE. ANY CROSSOVER SHALL BE 7'-0" A.F.F. TO BOTTOM OF PIPE MINIMUM.

C. PROVIDE BALL VALVES FOR ALL WATER ISOLATION AND SUPPLY TAKE-OFFS.

D. ISOLATION VALVES FOR BRANCH PIPING TO BE LOCATED ABOVE LAY-IN CEILING FOR EASY ACCESS BY MAINTENANCE. ISOLATION VALVES THAT CAN NOT BE LOCATED ABOVE LAY-IN CEILING MUST BE PROVIDED MAINTENANCE ACCESS IN THE FORM OF AN ACCESSIBLE PLUMBING CHASE OR AN ACCESS PANEL.

E. ALL EQUIPMENT DRAINS AND SHOCK ABSORBERS SHALL HAVE MAINTENANCE ACCESS IN THE FORM OF AN ACCESSIBLE PLUMBING CHASE OR AN ACCESS PANEL.

F. FLOOR DRAINS SHALL BE INSTALLED WITH NICKEL BRONZE AND HEEL PROOF GRATES.

G. COORDINATE ALL VTR'S WITH MECHANICAL FRESH AIR INTAKES ON ROOF. VENTS SHALL MAINTAIN A MINIMUM OF 15'-0" CLEARANCE.

H. SEE SPECIFICATION SECTION 23 0548, SEISMIC RESTRAINT AND VIBRATION ISLATION, FOR PROJECT SEISMIC RESTRAINT REQUIREMENTS.

I. WATER HEATERS SHALL BE ANCHORED OR STAPPED TO RESIST HORIZONTAL DISPLACEMENT DUE TO EARTHQUAKE MOTION. STRAPPING SHALL BE AT POINTS WITHIN THE UPPER ONE-THIRD AND LOWER ONE-THIRD OF ITS VERTICAL DIMENSIONS. AT THE LOWER POINT, A DISTANCE OF NOT LESS THAN FOUR INCHES SHALL BE MAINTAINED ABOVE THE CONTROLS WITH STRAPPING.

J. ALL COUNTERTOP AND WALL MOUNTED PLUMBING FIXTURES (URINALS, LAVATORIES, COUNTERTOP MOUNTED SINKS, DRINKING FOUNTAINS, ETC.) SHALL BE PROVIDED WITH A T-PATTERN WALL CLEANOUT BELOW PLUMBING FIXTURE. CLEANOUT SHALL BE CAST IRON DRAINAGE T-PATTERN, 90 DEGREE BRANCH FITTINGS WITH SQUARE HEAD BRASS SCREW PLUGS OF THE SAME SIZE AS THE PIPE UP TO AND INCLUDING 4 INCHES, PER SPECIFICATION 22 1300. WALL CLEANOUTS IN FINISHED AREAS SHALL BE ZURN No. Z-1466-S WITH POLISHED STAINLESS STEEL OR CHROME PLATED METAL COVER.

SHEET KEYED NOTES

1. PIPING TO BE ROUTED BELOW GRADE.
2. PIPING TO BE ROUTED BELOW FLOOR.
3. PIPING TO BE ROUTED IN CEILING SPACE. KEEP PIPING AS TIGHT TO STRUCTURE AS POSSIBLE.
4. FOR ORIGINATION OF PIPING, REFER TO CIVIL UTILITY DRAWINGS WITHIN THIS SET.
5. PIPE DROP FROM ABOVE. FOR ORIGINATION OF PIPING, REFER TO A1 - MAIN LEVEL WASTE & VENT FLOOR PLAN ON PLUMBING SHEET PL-102.
6. PIPE RISE TO ABOVE. FOR CONTINUATION OF PIPING, REFER TO A1 - MAIN LEVEL WASTE & VENT FLOOR PLAN ON PLUMBING SHEET PL-102.
7. CONDENSATE DRAIN PIPE DROP ALONG WALL TO FLOOR DRAIN AS SHOWN. TERMINATE CONDENSATE DRAIN INTO FLOOR SINK AT 6" ABOVE RIM TO MAINTAIN AIR GAP.
8. DOWNSPOUT NOZZLE TO DISCHARGE ONTO SPLASH BLOCK AT 18" ABOVE FINISHED GRADE.
9. PUMPED BACKWASH DRAIN PIPE DROP DOWN TO FLOOR SINK AS SHOWN. TERMINATE PUMPED BACKWASH DRAIN INTO FLOOR SINK AT 6" ABOVE RIM TO MAINTAIN AIR GAP.
10. INSTALL CLEANOUT TO GRADE IN ACCORDANCE WITH DETAIL C3 ON PLUMBING SHEET P501.
11. INSTALL DOUBLE CLEANOUT TO GRADE IN ACCORDANCE WITH DETAIL ON PLUMBING SHEET P501.

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LIFE SUPPORT ENGINEERS:	Alvine and Associates, Inc.

ABQ BIOPARK ZOO BOTANIC GARDEN TINGLEY BEACH AQUARIUM

NO.	DATE	REVISION/REMARKS	BY

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JOHN S. STEVENS NEW MEXICO 21071 PROFESSIONAL ENGINEER

THE PENGUIN CHILL HABITAT

Albuquerque, New Mexico

SHEET TITLE

LOWER LEVEL WASTE & VENT FLOOR PLAN

PL-101

SHEET OF

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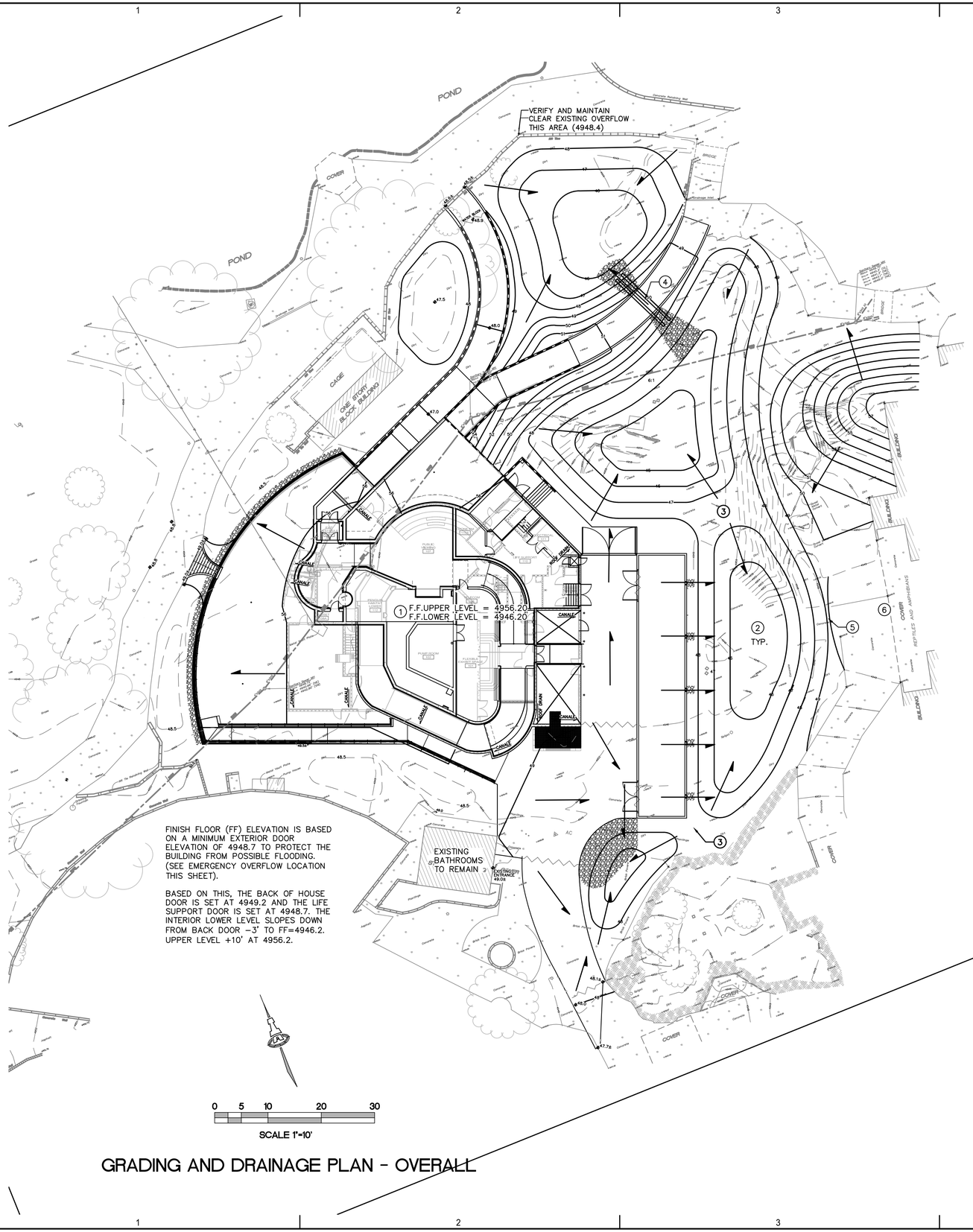

FINISH FLOOR (FF) ELEVATION IS BASED ON A MINIMUM EXTERIOR DOOR ELEVATION OF 4948.7 TO PROTECT THE BUILDING FROM POSSIBLE FLOODING. (SEE EMERGENCY OVERFLOW LOCATION THIS SHEET).

BASED ON THIS, THE BACK OF HOUSE DOOR IS SET AT 4949.2 AND THE LIFE SUPPORT DOOR IS SET AT 4948.7. THE INTERIOR LOWER LEVEL SLOPES DOWN FROM BACK DOOR −3' TO FF=4946.2. UPPER LEVEL +10' AT 4956.2.

GRADING AND DRAINAGE PLAN - OVERALL

GENERAL NOTES

A. 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.

B. 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.).

C. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FOR THE PROJECT PRIOR TO COMMENCING CONSTRUCTION, OR PRIOR TO OCCUPANCY, AS APPROPRIATE.

D. COORDINATE WORK WITH SITE PLAN, UTILITY PLAN, DEMOLITION PLAN, AND LANDSCAPE PLAN.

E. 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.

F. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SITE SAFETY.

G. THE CONTRACTOR SHALL MAINTAIN RECORD DRAWINGS ON SITE AT ALL TIMES.

H. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED INSPECTIONS OF THE WORK.

I. 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.

J. 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.

K. 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 LINE 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.

L. FIVE WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NM811 (811) FOR LOCATION OF EXISTING UTILITIES.

M. 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.

N. ALL TRASH, DEBRIS, & SURFACE VEGETATION SHALL BE CLEARED AND LEGALLY DISPOSED OF OFFSITE.

O. VIBRATORY COMPACTION SHALL NOT BE USED OVER IN−PLACE UTILITIES.

P. 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.

Q. ADJUST ANY RIMS OF EXISTING UTILITY FEATURES AS NECESSARY TO MATCH NEW GRADES. UTILITIES IN PAVED AREAS SHALL BE HS−25 TRAFFIC RATED.

R. CONTRACTOR SHALL COMPLY WITH LOCAL REGULATIONS FOR RESEEDING OF DISTURBED AREAS.

GRADING NOTES

a. GRADING SHALL BE PERFORMED AT THE ELEVATIONS AND IN ACCORDANCE WITH THE DETAILS SHOWN ON THIS PLAN.

b. PROPOSED SPOT AND CONTOUR ELEVATIONS SHOWN REPRESENT TOP OF FINISH MATERIAL (I.E. TOP OF CONCRETE, TOP OF CONCRETE BUILDING PAD, 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.

c. IF FIELD GRADE ADJUSTMENTS ARE REQUIRED, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT.

d. THE ENVIRONMENTAL PROTECTION AGENCY (EPA) AND THE CITY OF ALBUQUERQUE REQUIRE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP), AN NDPES PERMIT, AND AN EROSION AND SEDIMENT CONTROL (ESC) PERMIT FOR PROJECTS WHERE CONSTRUCTION ACTIVITIES MEET THE EPA THRESHOLD. (SWPPP, NPDES PERMIT, AND ESC PLAN BY OTHERS.) A CURRENT CITY−APPROVED ESC PERMIT MUST BE INCLUDED WITH THE CONTRACTOR'S SUBMITTAL FOR A ROUGH GRADING, GRADING, PAVING, BUILDING, OR WORK ORDER PERMIT. CONTRACTOR SHALL COORDINATE WITH OWNER TO DETERMINE WHO WILL PREPARE SWPPP AND INSPECT REQUIRED ELEMENTS.

e. ALL NEW PAVEMENT SURFACES SHALL BE CONSTRUCTED WITH POSITIVE SLOPE AWAY FROM BUILDINGS AND POSITIVE SLOPE TOWARD EXISTING AND/OR PROPOSED DRAINAGE PATHS. PAVING AND ROADWAY GRADES SHALL BE ±0.1' FROM PLAN ELEVATIONS. BUILDING PAD ELEVATION SHALL BE ±0.05' FROM PLAN ELEVATION.

f. WHERE GRADES BETWEEN NEW AND EXISTING ARE SHOWN AS 'MATCH' OR '±', TRANSITIONS SHALL BE SMOOTH.

g. ALL EROSION PROTECTION SHALL BE 6" AVG. DIA. ANGULAR FACED ROCK (F.F. ROCK) PLACED OVER GEOTEX 501 NON−WOVEN GEOTEXTILE (O.E.). NOTE: IF APPROVED BY ENGINEER, ALTERNATIVE EROSION PROTECTION MAY BE SUBSTITUTED.

h. WATER HARVESTING BASIN ELEVATIONS AND SITE STORMWATER CONTROL MEASURES SHOWN ON THIS PLAN SHALL BE STRICTLY ADHERED TO FOR CERTIFICATION PURPOSES.

i. 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 AND WEST BY THE MAIN PARK AREA AND BANDSTAND POND, AND TO THE SOUTH AND EAST BY EXISTING ANIMAL EXHIBIT.

PROPOSED IMPROVEMENTS: THE PROPOSED IMPROVEMENTS INCLUDE A NEW FACILITY HOUSING THE PENGUIN EXHIBIT WITH ASSOCIATED CONCRETE WALKS AND LANDSCAPING. DRAINAGE IMPROVEMENTS WILL BE CONSTRUCTED TO ADDRESS BUILDING DISCHARGE.

LEGAL: TROPICAL AMERICA AND ADJACENT AREAS, RIO GRANDE ZOO, ALBUQUERQUE, NM

BENCHMARK: VERTICAL DATUM IS BASED UPON THE ALBUQUERQUE CONTROL STATION MONUMENT "12−L14", ELEVATION = 4947.708 FEET (NAVD 1988), AS PUBLISHED.

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: THE PROPOSED AREA TO BE DEVELOPED PREVIOUSLY HOUSED THE TROPICAL AMERICA EXHIBIT AND EXTENSIVE WALKS AND COVERED AREAS. THE TOTAL PROPOSED IMPERVIOUS AREA WILL BE APPROXIMATELY THE SAME AS THE PRE−DEVELOPED CONDITION. HISTORICALLY, THIS AREA UTILIZED FLAT GRADING CONCEPT WHICH DIRECTED STORMWATER TO LOCALIZED WATER HARVESTING AREAS WITHIN THE LANDSCAPING WITH EXCESS OVERFLOWING TO THE NORTH AND SOUTH. THE PROPOSED DEVELOPMENT WILL ALSO UTILIZE WATER HARVESTING BASINS FOR INFILTRATION. EXCESS STORMWATER WILL CONTINUE TO OVERFLOW TO THE NORTH AND SOUTH. LANDSCAPING FOR THIS EXHIBIT WILL BE CONTRACTED SEPARATELY BY OWNER. THE DESIGN WILL BE REQUIRED TO MAINTAIN THE FLAT GRADING CONCEPT WITH OVERFLOW ELEVATIONS AS SHOWN.

ⓧ→ KEYED NOTES

KEYED NOTES REFERENCE OVERALL GRADING (SCALE 1:20) AROUND BUILDING. SEE CG−101 AND CG−102 FOR SPECIFIC KEYED NOTES FOR UPPER LEVEL (SHOWN FADED) AND LOWER LEVEL GRADING AND DRAINAGE (SCALE 1:10).

1. SEE CG−101 FOR UPPER LEVEL GRADES THIS AREA. SEE CG−102 FOR LOWER LEVEL GRADES THIS AREA.
2. FINAL SITE LANDSCAPE PLAN TO BE DESIGNED UNDER SEPARATE CONTRACT. CONSTRUCT TEMPORARY WATER HARVESTING / SEDIMENT CONTROL BASINS TO ELEVATIONS SHOWN.
3. OVERFLOW BETWEEN WATER HARVESTING BASINS = 47.5.
4. INSTALL TWO 12"ø CULVERTS WITH END SECTIONS. PROVIDE EROSION PROTECTION EACH END.
5. GRADE THIS AREA WITH BERM (TOP OF BERM 49.0) TO PREVENT STORMWATER FROM BACKING UP INTO REPTILE AND AMPHIBIAN AREA.
6. EXISTING STORMWATER FROM THIS AREA WILL CONTINUE TO DRAIN TO THE REPTILE AND AMPHIBIAN AREA.

LEGEND

– – – – – –	EXISTING CONTOUR
——56——	PROPOSED CONTOUR
⊕56.2	PROPOSED SPOT ELEVATION
——→	FLOW ARROW (PROPOSED)
FF=4946.20	FINISH FLOOR ELEVATION
▨	EROSION PROTECTION

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2140 CG-100.dwg Sep 16,2016

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ABQ BIOPARK
ZOO BOTANIC GARDEN TINGLEY BEACH AQUARIUM

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PROJECT NUMBER			16200
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FRED C. ARFMAN
7322
09.15.16

ALBUQUERQUE BIOPARK ZOO
PENGUIN EXHIBIT
Albuquerque, New Mexico

SHEET TITLE

OVERALL GRADING AND DRAINAGE PLAN

SHEET
CG-100
OF

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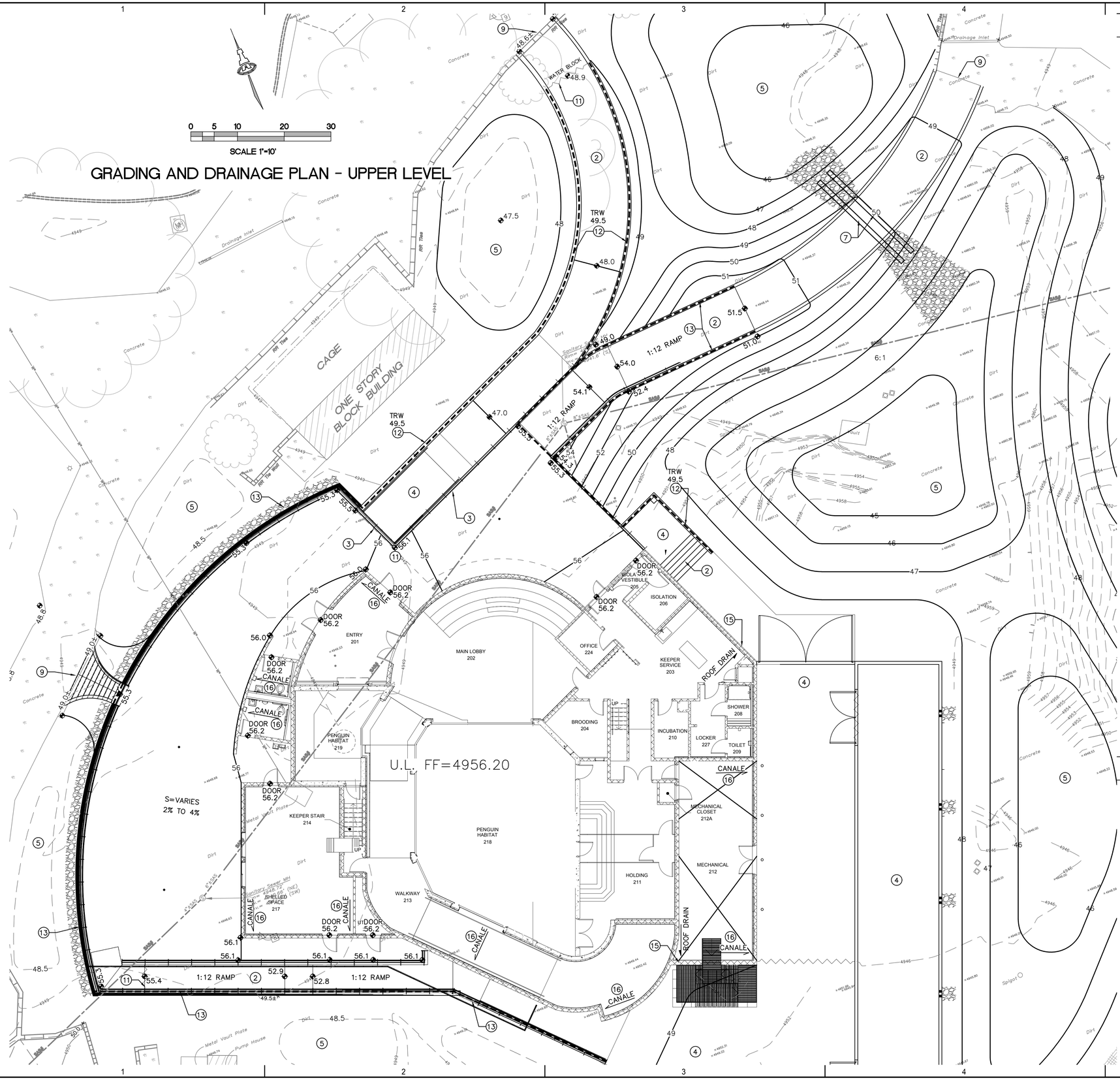
GRADING AND DRAINAGE PLAN - UPPER LEVEL

SCALE 1"=10'



KEYED NOTES

1. NOT USED
2. CONSTRUCT STEPS AND ADA COMPLIANT RAMP(S) AND WALKWAYS TO ACHIEVE GRADE DIFFERENCES SHOWN. SEE ARCHITECTURAL FOR DETAILS.
3. SLOPE CONCRETE AT ELEVATIONS SHOWN TO ENSURE NO UPPER PLAZA STORMWATER DRAINS ONTO TO LOWER LEVEL RAMP.
4. SEE CG-102 FOR LOWER LEVEL GRADES THIS AREA.
5. FINAL SITE LANDSCAPING TO BE DESIGNED/CONSTRUCTED UNDER SEPARATE CONTRACT. GRADE NATURAL AREAS AS SHOWN TO PROVIDE TEMPORARY STORMWATER WATER HARVESTING AND SEDIMENT CONTROL. SEE OVERALL GRADING AND DRAINAGE PLAN (CG-001) FOR FULL EXTENT OF TEMPORARY GRADING.
6. NOT USED
7. INSTALL TWO 12"ø CULVERTS AT INV. = 47.5 (TO EQUALIZE FLOW). PROVIDE EROSION PROTECTION EACH END.
8. NOT USED
9. PROVIDE SMOOTH TRANSITION BETWEEN NEW CONSTRUCTION AND EXISTING.
10. NOT USED
11. PAVEMENT GRADE BREAK / WATER BLOCK.
12. CONSTRUCT BELOW GRADE SITE RETAINING WALL THIS AREA. MINIMUM TOP OF RETAINING WALL (TRW) ELEVATION SHOWN. ELEVATION AT HIGH SIDE AND LOW SIDE OF WALL ARE SHOWN ON SHEETS CG-101 AND CG-102. RETAINING WALLS EXTENDING BELOW ELEVATION 4948.5 ARE TO BE WATERPROOF. SEE ARCHITECTURAL FOR CONSTRUCTION INFORMATION.
13. CONSTRUCT ABOVE GRADE SITE RETAINING WALL THIS AREA (RETAINING BACKFILL FOR UPPER LEVEL). ELEVATION AT HIGH SIDE AND LOW SIDE OF WALL ARE SHOWN ON SHEETS CG-101 AND CG-102. SEE ARCHITECTURAL FOR CONSTRUCTION INFORMATION.
14. NOT USED
15. ROOF DISCHARGE FROM INTERNAL ROOF DRAINS TO GRADE. SEE PLUMBING PLANS FOR SPECIFIC DISCHARGE LOCATIONS. PROVIDE EROSION PROTECTION WITHIN LANDSCAPING TO BOTTOM OF POND.
16. ROOF DISCHARGE FROM CANALES. PROVIDE EROSION PROTECTION WITHIN LANDSCAPING TO BOTTOM OF POND.

LEGEND

- EXISTING CONTOUR
- 56 — PROPOSED CONTOUR
- 56.2 — PROPOSED SPOT ELEVATION
- FLOW ARROW (PROPOSED)
- FF=4946.20 — FINISH FLOOR ELEVATION
- EROSION PROTECTION
- SITE RETAINING WALL

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FRED C. ARFMAN NEW MEXICO 7322 LICENSED PROFESSIONAL ENGINEER 09-15-16

ALBUQUERQUE BIOPARK ZOO
PENGUIN EXHIBIT
Albuquerque, New Mexico

SHEET TITLE

GRADING AND DRAINAGE PLAN MAIN LEVEL

CG-101

SHEET OF

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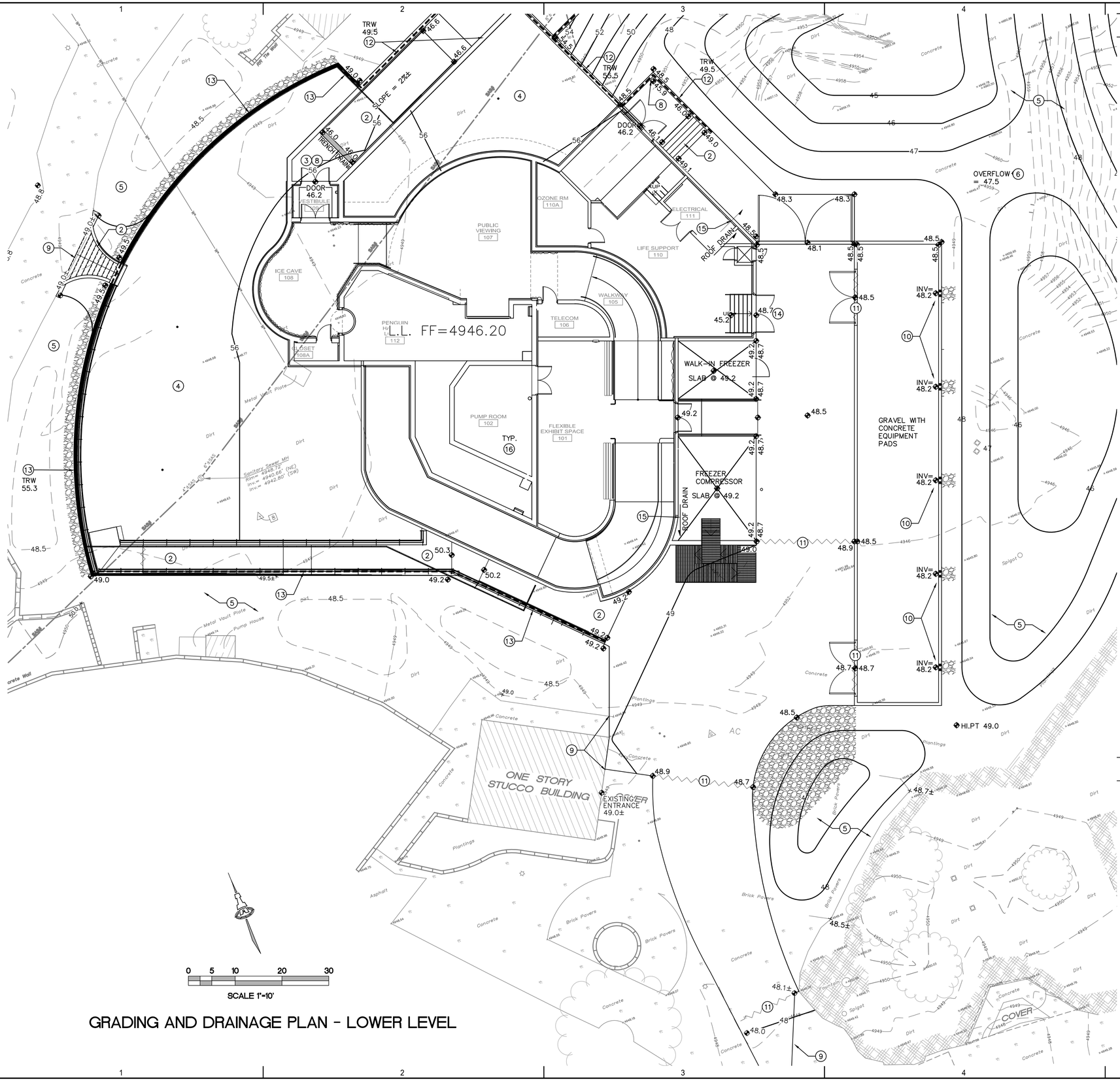

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SCALE 1"=10'

GRADING AND DRAINAGE PLAN - LOWER LEVEL

KEYED NOTES

1. GRADE CONCRETE TO DRAIN AWAY FROM BUILDING @ GRADES SHOWN. STORMWATER TO SHEETFLOW OVER EDGE OF PLAZA TO LANDSCAPE BELOW.
2. CONSTRUCT STEPS AND ADA COMPLIANT RAMP(S) AND WALKWAYS TO ACHIEVE GRADE DIFFERENCES SHOWN. SEE ARCHITECTURAL FOR DETAILS.
3. NO DISCHARGE FROM UPPER LEVEL MAY DRAIN ONTO LOWER LEVEL RAMP.
4. SEE CG-101 FOR UPPER LEVEL GRADES THIS AREA.
5. FINAL SITE LANDSCAPING TO BE DESIGNED/CONSTRUCTED UNDER SEPARATE CONTRACT. GRADE NATURAL AREAS AS SHOWN TO PROVIDE TEMPORARY STORMWATER WATER HARVESTING AND SEDIMENT CONTROL. SEE OVERALL GRADING AND DRAINAGE PLAN (CG-001) FOR FULL EXTENT OF TEMPORARY GRADING.
6. OVERFLOW BETWEEN WATER HARVESTING BASINS = 47.5.
7. NOT USED THIS SHEET
8. TRENCH DRAIN AND FLOOR DRAIN NOTED WILL BE CONNECTED TO BUILDING SANITARY SEWER SERVICE LINE. SEE PLUMBING PLANS FOR ADDITIONAL INFORMATION.
9. PROVIDE SMOOTH TRANSITION BETWEEN NEW CONSTRUCTION AND EXISTING.
10. CONSTRUCT WALL WITH TURNED BLOCKS @ 10' O.C. (INV. @ OPENING = 48.2) TO DRAIN ENCLOSURE. SEE ARCHITECTURAL FOR ADDITIONAL INFORMATION.
11. PAVEMENT GRADE BREAK / WATER BLOCK.
12. CONSTRUCT BELOW GRADE SITE RETAINING WALL THIS AREA. MINIMUM TOP OF RETAINING WALL (TRW) ELEVATION SHOWN. ELEVATION AT HIGH SIDE AND LOW SIDE OF WALL ARE SHOWN ON SHEETS CG-101 AND CG-102. RETAINING WALLS EXTENDING BELOW ELEVATION 4948.5 ARE TO BE WATERPROOF. SEE ARCHITECTURAL FOR CONSTRUCTION INFORMATION.
13. CONSTRUCT ABOVE GRADE SITE RETAINING WALL THIS AREA (RETAINING BACKFILL FOR UPPER LEVEL). ELEVATION AT HIGH SIDE AND LOW SIDE OF WALL ARE SHOWN ON SHEETS CG-101 AND CG-102. SEE ARCHITECTURAL FOR CONSTRUCTION INFORMATION.
14. GRADE AT DOOR TO LIFE SUPPORT AREA TO BE 48.7 MIN. TO PROTECT FROM STORMWATER. SEE ARCHITECTURAL FOR GRADE TRANSITIONS IN BUILDING.
15. ROOF DISCHARGE FROM INTERNAL ROOF DRAINS TO GRADE. SEE PLUMBING PLANS FOR SPECIFIC DISCHARGE LOCATIONS. PROVIDE EROSION PROTECTION WITHIN LANDSCAPING TO BOTTOM OF POND.
16. SEE CG-101 FOR UPPER LEVEL ROOF DISCHARGE FROM CANALES. .

LEGEND

- EXISTING CONTOUR
- 56 — PROPOSED CONTOUR
- 56.2 — PROPOSED SPOT ELEVATION
- FLOW ARROW (PROPOSED)
- FF=4946.20 — FINISH FLOOR ELEVATION
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ALBUQUERQUE BIOPARK ZOO
PENGUIN EXHIBIT
Albuquerque, New Mexico

SHEET TITLE

GRADING AND DRAINAGE PLAN LOWER LEVEL

CG-102

SHEET OF

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