

June 30, 2021

Mr. Robert Parks
City of Independence, Water Dept.
420 N. Forest Ave.
Independence, MO 64050

Re: Van Horn Potable Water Reservoir Improvements
Pullman Change Proposal 598790-01 – Roof Topping Slab

Dear Mr. Parks:

This change proposal is a follow up to the changed condition letter provided on April 30, 2021. Following complete removal of the existing roof materials on the roof slab, preliminary survey results, and several discussions with the City Water Department, PULLMAN has presented the following findings and alternate repair recommendations to be considered in effectively repairing the existing roof slab. PULLMAN has also provided a cost associated with the proposed repair method.

Summary of Findings:

On June 18, 2021, PULLMAN performed a laser scan survey of the reservoir roof slab and surrounding perimeter curb once all material, debris, and water had been removed from the slab. The purpose of the laser scan survey was to identify the following items to come up with the most appropriate and accurate repair solution:

- Gain a better understanding of the perimeter curb elevations.
- Determine if there is an existing slope built into the original construction of the slab. If so, was the slab sloped in multiple directions or one direction.
- To determine the volume of concrete required to place a flat topping slab versus a sloped topping slab.

PULLMAN has provided preliminary Drawing Sheet C01 to illustrate a general arrangement of the reservoir including a developed elevation view of the perimeter curb. **In summary, the low points around the curb vary, which are referenced on the drawing as +/-0". The theoretical high line across the slab goes from northeast to west centerline with the highest east point at +/-2.2" and the highest west point at +/-2.7".**

The laser scan survey data results for the roof slab are not entirely complete yet, but some preliminary results indicate that there is not a definitive slope built into the existing slab and the slab is relatively flat in nature (other than surface irregularities caused by previous roof repairs). PULLMAN has therefore **presented the most accurate thickness of concrete (based on the**

information available) required for the topping slab option and would offer a deduct based on actual volume of concrete required, if less than assumed.

PULLMAN has also performed a condition assessment of the exposed reinforcing steel on the reservoir roof and provided a plan view of the roof to illustrate the locations of reinforcing steel exposing more than 50%. There was a total of 17 locations recorded and each location is estimated to be around 40 square feet. These areas will require chipping behind the exposed rebar then coating with anti-corrosion inhibitor. There has not been any supplemental rebar included within our proposal since this won't be determined until the rebar is fully exposed to measure the section loss.

Scope of Work:

Base Bid – Re-slope Over Curb

PULLMAN has described the repair process below and has also provided a preliminary detail per Drawing C13 for the concrete roof resurfacing details.

- Recommendations:
 - Chip out additional concrete around rebar with more than 50% exposure. There are approximately 17 locations that will require additional concrete to be removed to fully expose the reinforcing steel. Any supplemental rebar required will be performed at the already established unit pricing.
 - Any exposed rebar will then be cleaned and primed with Sika Armatec anti-corrosion inhibitor. PULLMAN has assumed 17 areas at approximately 40 SF each of rebar which will require cleaning and coating with anti-corrosion inhibitor.
 - 3/8" x 2-1/4" carbon steel Hilti Kwik bolts will then be installed at 18" O/C to tie into the existing slab and support #4 reinforcing steel installed on a 9" grid.
 - A waterstop will be added around the perimeter curb before placing new concrete topping slab.
 - After calculating the additional loading to the reservoir roof caused by placing this new concrete topping slab, it was determined that shoring would be required beneath the slab before each placement. The shoring analysis assumed a uniform existing concrete roof slab thickness of 3 7/8". The shoring would be required in approximately 15 setups, essentially (2) post shores located at center spans between existing columns and between columns and tank walls, which would be moved appropriately ahead of each placement. Post shores will be braced for stability around existing columns.
 - The topping slab will then be poured in the center and eight (8) sections to build a slope into the roof with a lightweight ready-mix concrete using a concrete pump truck. The new concrete topping slab would be placed all the way over the top of the existing perimeter curb to allow for proper drainage. The average thickness of this concrete overlay is assumed to be roughly 8.5" thick to achieve an approximate 1/8:12 slope (1% slope). **The estimated volume of concrete is 315**

cubic yards. PULLMAN believes that this average thickness can be reduced once completing the survey data results. It may be possible to slope the topping slab in the north and south direction starting at the theoretical high line and increasing the slope while still maintaining the appropriate cover along the slab and low points on the curb.

- This will require formwork to be installed for each placement section. A waterstop will be added between placements. Formwork will also be required around the perimeter curbing since the placement is being made over the curb.
- Once placed, the concrete topping slab will be broom finished and cured with an approved curing compound.
- The formwork will also be removed once concrete has adequately cured.
- Add Sikaflex 1A sealant around the exterior of the existing curb.
- The SikaTop Seal 107 roof coating could then be applied overtop the concrete overlay after being allowed to cure for at least 28-days. The SikaTop Seal 107 could also be applied overtop the curb and down the side of the exterior reservoir wall as described on Detail A, Sheet 6 of the Project Plans. This would provide the most adequate seal at the curb/wall transition. The pricing to apply the SikaTop Seal 107 is not included as this was already included with the original contractual work.
- Considerations:
 - The added layer of concrete would add more weight to the existing concrete slab, which would require shoring during concrete placements.
 - This option would add significant strength to the existing roof slab by adding a pinning system to tie in the topping slab. The pinning system is to supplement the bonding capacity to the existing slab and will tie in and provide some suspension capacity of the existing slab.
 - There will be a considerable amount of water runoff from the roof slab once these two slopes are built into the roof. Consideration should be taken to adding a gutter around the roof perimeter to capture and redirect water runoff to the new overflow drainage channel. A perimeter gutter option has not been included with this proposal but can be provided upon request.

Option 1 – Standing Seam Metal Roof (Budgetary)

PULLMAN has also provided a budgetary cost estimate for installing a standing seam MR-24 metal roof system manufactured by Butler. This roof system would be a single-sloped roof installed on clips to slope water runoff directly over the existing perimeter curb. A gutter would then be installed directly off the roof at the exterior of the curb and directed to the overflow drainage channel or elsewhere. Flashing would be required around the access hatch opening, roof vents, and perimeter curbing to provide a weather tight system.

This option would require a drawing in order to accurately price, but PULLMAN wanted to present a budgetary cost estimate as a potential option. If the City is interested, then PULLMAN

can provide a firm proposal for this option. This metal roof would also take the place of the SikaTop Seal 107 roof coating, so the City would receive a credit for that bid amount as well.

Estimated costs are as follows:

Base Bid – Sloped Topping Slab	\$282,800.00
Concrete Volume Deduct / Add	\$360/cubic yard*

**Deduct / Add to be applied if concrete volume is more or less than assumed.*

<u>OPTION 1 – Metal Roof System (Budgetary Cost)</u>	\$180,000 to \$210,000**
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***This price does not include the roof coating credit. We would still need to confirm material pricing and lead times as well as restocking fees, etc. associated with the original roof coating scope of work.*

Additional Schedule Required:

The above base bid would revise the schedule by **25 days**

The work schedule will be performed on five (5) 8-hour shifts. The anticipated crew makeup is with 6 men, but could be up to 8-9 men during concrete placements. The accumulations of days will result in an extension to the overall schedule duration.

This will also add another 4-weeks to the overall schedule to account for 28-day cure of the topping slab before application of the SikaTop Seal 107 roof coating.

Clarifications:

1. This work will be performed under the same terms and conditions of the existing contract.
2. This proposal is based on performing work under the current mobilization. A remobilization may be required to complete the SikaTop Seal 107 coating application after 28-day cure of topping slab. Consideration should be given to using a different coating product(s) that would incorporate the curing compound as a primer and allow installation after 7 days instead of 28 days.
3. Pricing does not include sales tax.
4. This includes engineering and drafting hours associated with creating topping slab repair details.
5. Reinforcing steel to be #4, Grade 60, which is about 4-weeks lead time.

- 6. Several deliveries will be required to place this amount of concrete for each placement. PULLMAN will require close coordination with the Water Dept. facility to coordinate concrete ready-mix and pump truck deliveries as to not delay each concrete placement.

This proposal shall remain open for acceptance for ten (10) days from date of issue, after which time it may, at the option of Pullman be modified or extended. An acceptance response is requested no later than 7/06 to plan accordingly.

Please let us know if you have any questions or would like to set up a meeting to discuss further.

Sincerely,



Ronnie Roustio, Project Manager
PULLMAN
(816) 841-9730

Accepted and Agreed to:

By: _____

Date: _____

Enclosures:

C01 Drawing R1

Exposed Roof Reinforcement Locations

C13 Drawing RA



ROOF VENT (SEE LAMP RYNEARSON DRAWING SHEET 6 FOR DETAILS) (TYPICAL 2 PLACES)

UNDISTURBED AREA OF CONCRETE ALL-AROUND PERIMETER OF SLAB

STEP FROM CHIPPING HAMMER DEMOLITION

FIELD NOTE:
DIFFERENCE IN EAST AND WEST HIGH POINT IS 0.5"±

WEST HIGH POINT

VARIABLES

DEMOLISHED AREA IN CENTER OF SLAB

VARIABLES

NORTHEAST HIGH POINT

TOP OF SHELL WALL (VARIES IN ELEVATION)

SECTION C

TAKEN APPROXIMATELY ALONG THEORETICAL SLAB RIDGE LINE (NE TO W)

GENERAL NOTES:

- SEE LAMP RYNEARSON DRAWING SET FOR ADDITIONAL INFORMATION
- ALL BARS THAT ARE CUT SHALL BE COATED WITH SIKA ARMATEC-10ZR

LEGEND:

- ▲ = THEORETICAL HIGH POINT OF RAISED AREA AT TOP OF SLAB
- ▼ = THEORETICAL LOW POINT OF LOW AREA AT TOP OF SLAB
- ◆ = EVERY 10° ELEVATION MARKERS AT TOP OF SLAB
- ◻ (with dots) = EXTENTS OF RAISED AREA OF SLAB PERIMETER
- ◻ (with horizontal lines) = EXTENTS OF LOWER (FLAT) AREA OF SLAB PERIMETER

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NO	DESCRIPTION	BY	CHKD	DATE
1	REVISED WITH CONCRETE RESURFACING	RSH	WJG	28JUN2021
2	ISSUED FOR CONSTRUCTION	RSH	BDJ	30APR2021
3	ISSUED FOR REVIEW	RSH	WJG	09APR2021

REVISIONS

Safety 24/7

APPROVED FOR CONSTRUCTION PULLMAN POWER LLC	
PM	CONST
DATE: 2021-06-30	

CHKD BY	ENGR	REVIEWED BY CLIENT:	APPROVED BY PULLMAN POWER LLC FOR PROCUREMENT/FABRICATION:
PM	WJG	VAN HORN	28APR2021

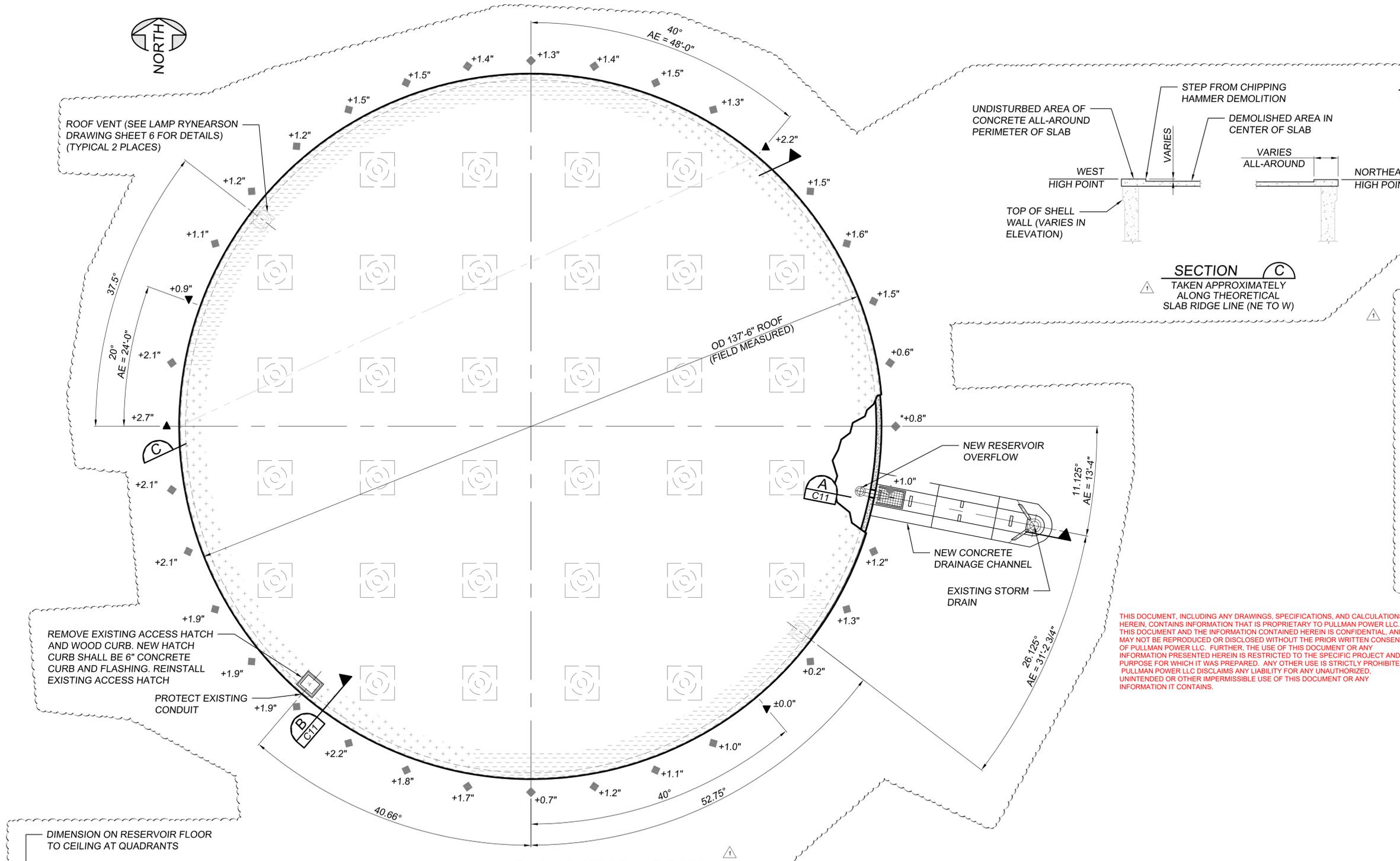
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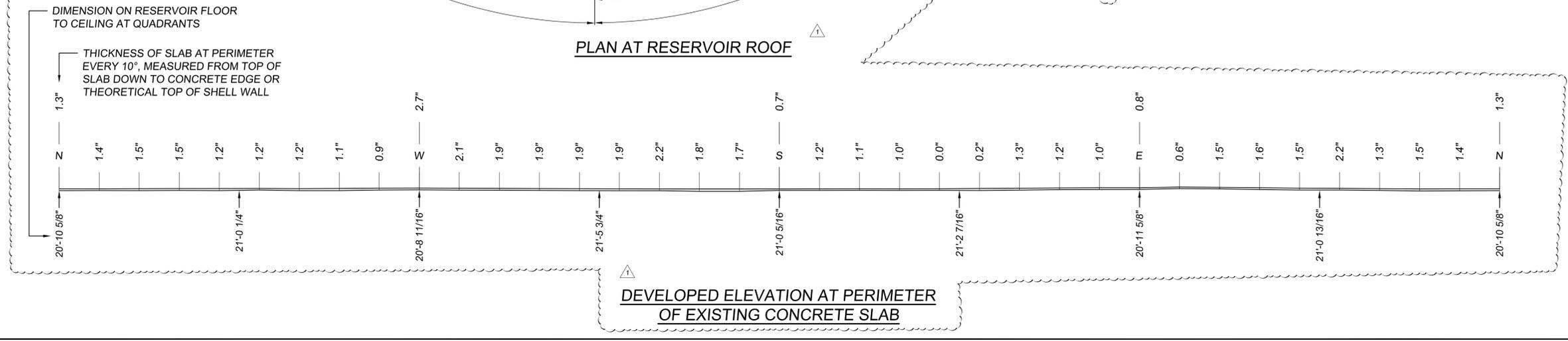
PROJECT INFORMATION:
CITY OF INDEPENDENCE
VAN HORN
WATER DEPARTMENT DISTRIBUTION FACILITY
POTABLE WATER RESERVOIR IMPROVEMENTS
INDEPENDENCE, MISSOURI

TITLE:
GENERAL ARRANGEMENT OF RESERVOIR (PRIOR TO RESURFACING, AFTER DEMOLITION OF EXISTING SURFACE)

SCALE:	DRAWN BY:	APPR:	RELEASE DATE:	PROJECT NO:	SHEET NO:	REV:
VARIES	RSH	BDJ	09APR2021	598790	C01	1

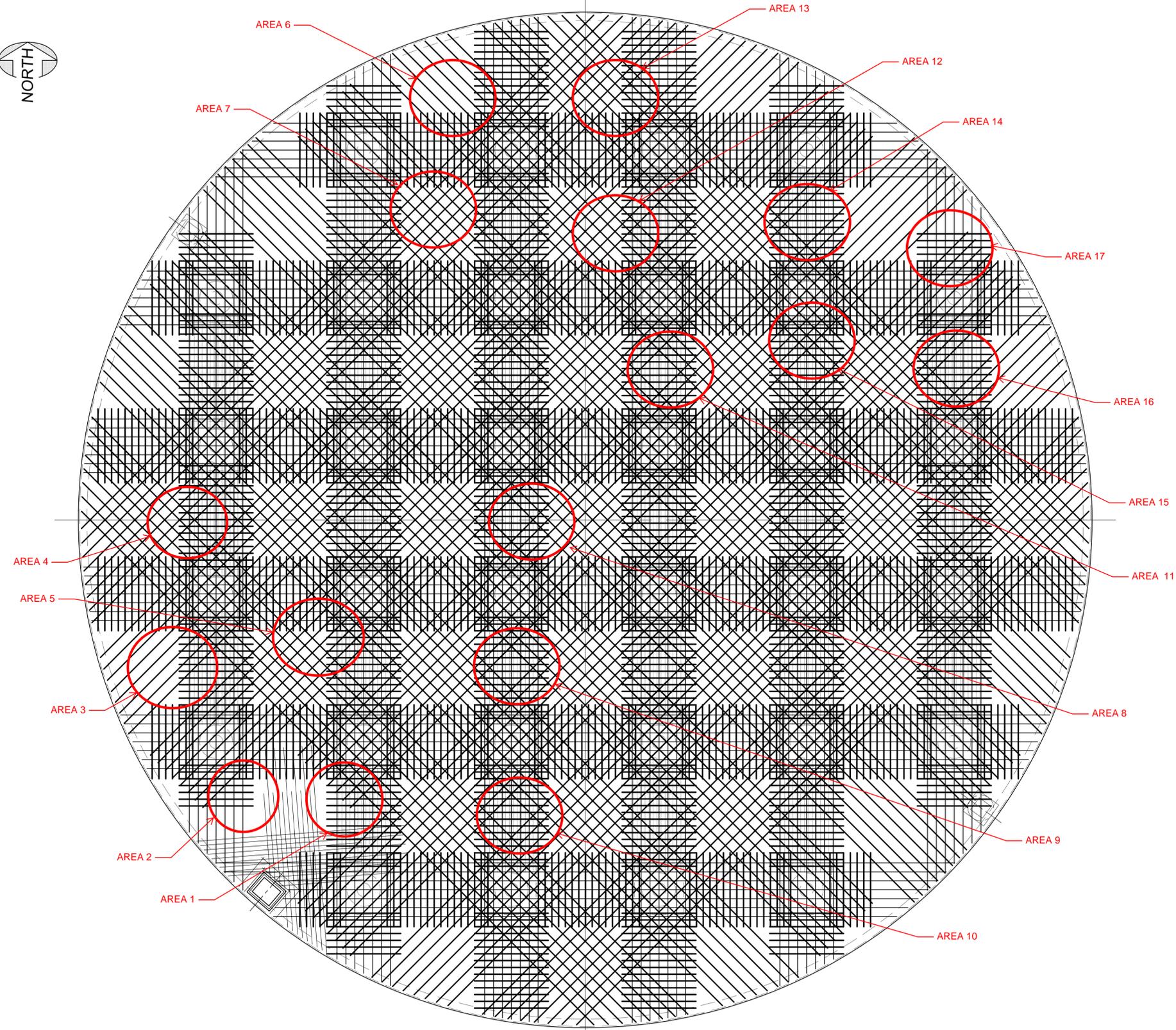


PLAN AT RESERVOIR ROOF



DEVELOPED ELEVATION AT PERIMETER OF EXISTING CONCRETE SLAB

ELECTRONIC FILE LOCATION: I:\Engineering\WP\598790_Van Horn Water Reservoir



APPROXIMATE LOCATIONS OF AREAS REQUIRING REINFORCING STEEL.
REFERENCE PHOTOS FOUND ON I:DRIVE AND PROCORE FOR DETAILS

PLAN AT RESERVOIR ROOF

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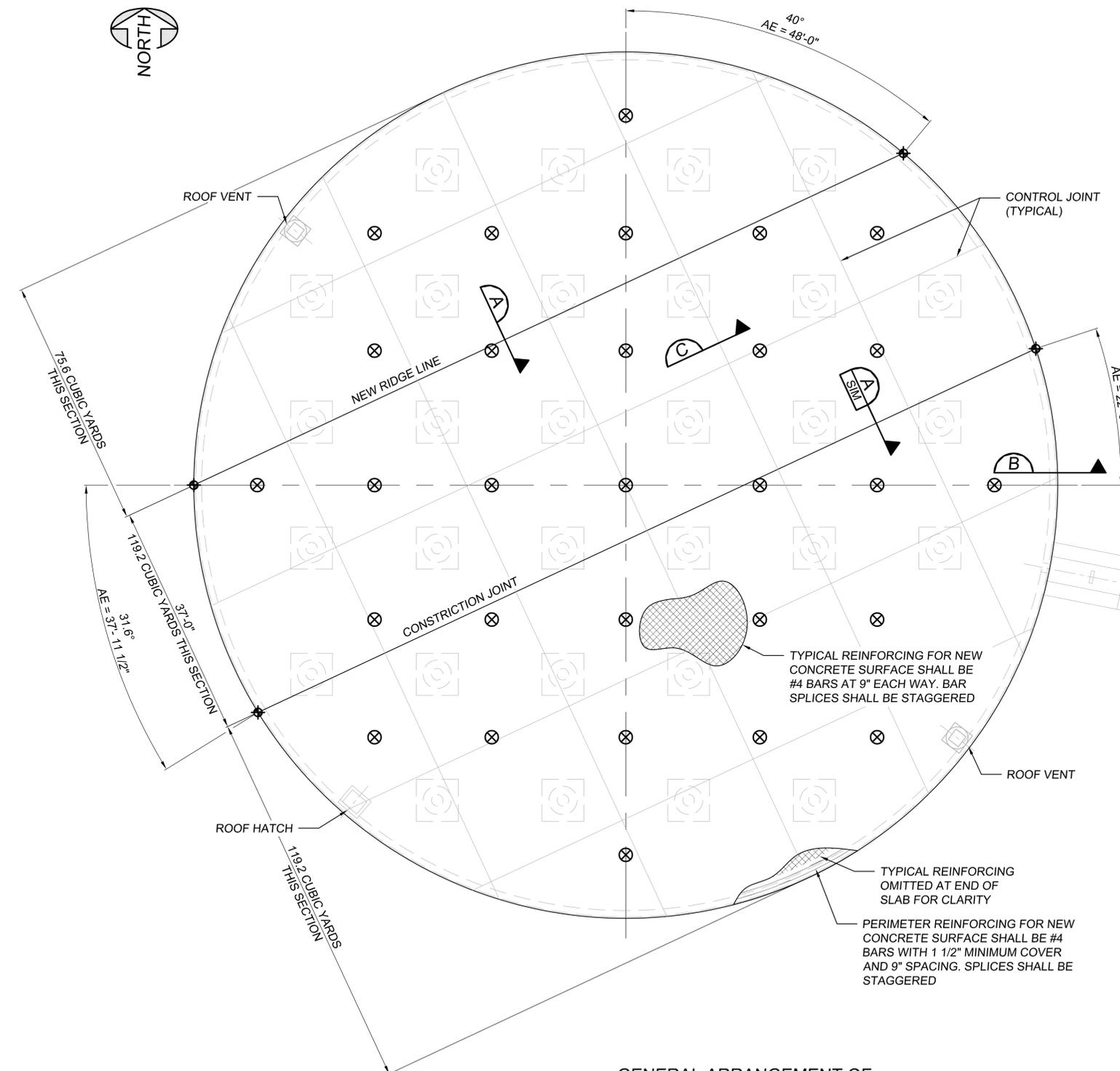
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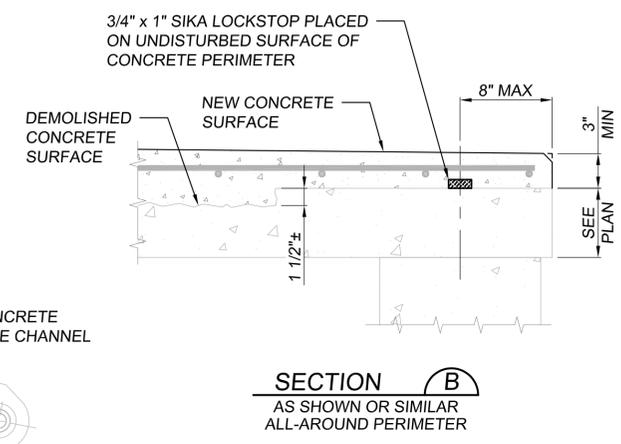
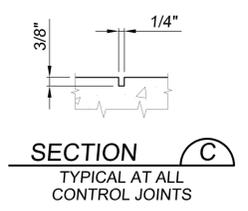
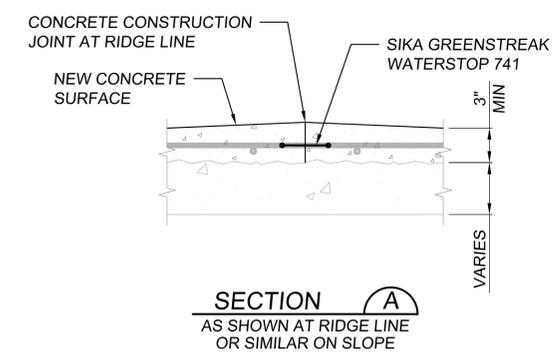
PROJECT INFORMATION: CITY OF INDEPENDENCE
VAN HORN
WATER DEPARTMENT DISTRIBUTION FACILITY
POTABLE WATER RESERVOIR IMPROVEMENTS
INDEPENDENCE, MISSOURI

TITLE: GENERAL ARRANGEMENT OF RESERVOIR
ROOF REINFORCING STEEL

SCALE: VARIES	DRAWN BY: RSH	APPR: BDJ	RELEASE DATE: DDMMYYYY	PROJECT NO: 598790	SHEET NO: SK02	REV: 0
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**GENERAL ARRANGEMENT OF
CONCRETE ROOF RESURFACING**



- GENERAL NOTES:**
- SEE LAMP RYNEARSON DRAWING SET FOR ADDITIONAL INFORMATION
 - ALL BARS THAT ARE CUT SHALL BE COATED WITH SIKA ARMATEC-10ZR
 - SIKA LOCKSTOP AND GREENSTREAK WATERSTOP SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS
 - SHORING POSTS SHALL BE ALUMA ALUPROP, 3,700 LBS CAPACITY
 - TWO POSTS REQUIRED PER SHORING LOCATION.
 - SHORING POSTS SHALL BE BRACED BACK TO EXISTING COLUMNS. PULLMAN ENGINEERING SHALL INSPECT SHORING POSTS AND BRACING PRIOR TO PLACEMENT OF CONCRETE

- CONCRETE RESURFACING NOTES:**
- CONCRETE RESURFACING VOLUME IS APPROXIMATELY 314.6 CUBIC YARDS OF NEW CONCRETE SEPARATED INTO (3) UNEQUAL PARTS AS SHOWN
 - REINFORCING STEEL SHALL BE ASTM A615 GR 60

- LEGEND:**
- ⊗ = SHORING POSTS FOR PLACEMENT OF NEW CONCRETE
 - ⊕ = WORKPOINT OF CONSTRUCTION JOINT AT EDGE

ISSUED FOR INTERNAL REVIEW		RSH	JNB	28JUN2021
NO	DESCRIPTION	BY	CHKD	DATE
REVISIONS				
Safety 24/7				
FOR APPROVAL				
NOT FOR CONSTRUCTION				
BY: <i>[Signature]</i>				
DATE: 2021-06-30				
CHKD BY:	ENGR <i>[Signature]</i>	CONST <i>[Signature]</i>	PM <i>[Signature]</i>	

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PROJECT INFORMATION: CITY OF INDEPENDENCE
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WATER DEPARTMENT DISTRIBUTION FACILITY
POTABLE WATER RESERVOIR IMPROVEMENTS
INDEPENDENCE, MISSOURI

TITLE:
CONCRETE ROOF RESURFACING DETAILS

SCALE: VARIES	DRAWN BY: RSH	APPR: BDJ	RELEASE DATE: 28JUN2021	PROJECT NO: 598790	SHEET NO: C13	REV: A
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