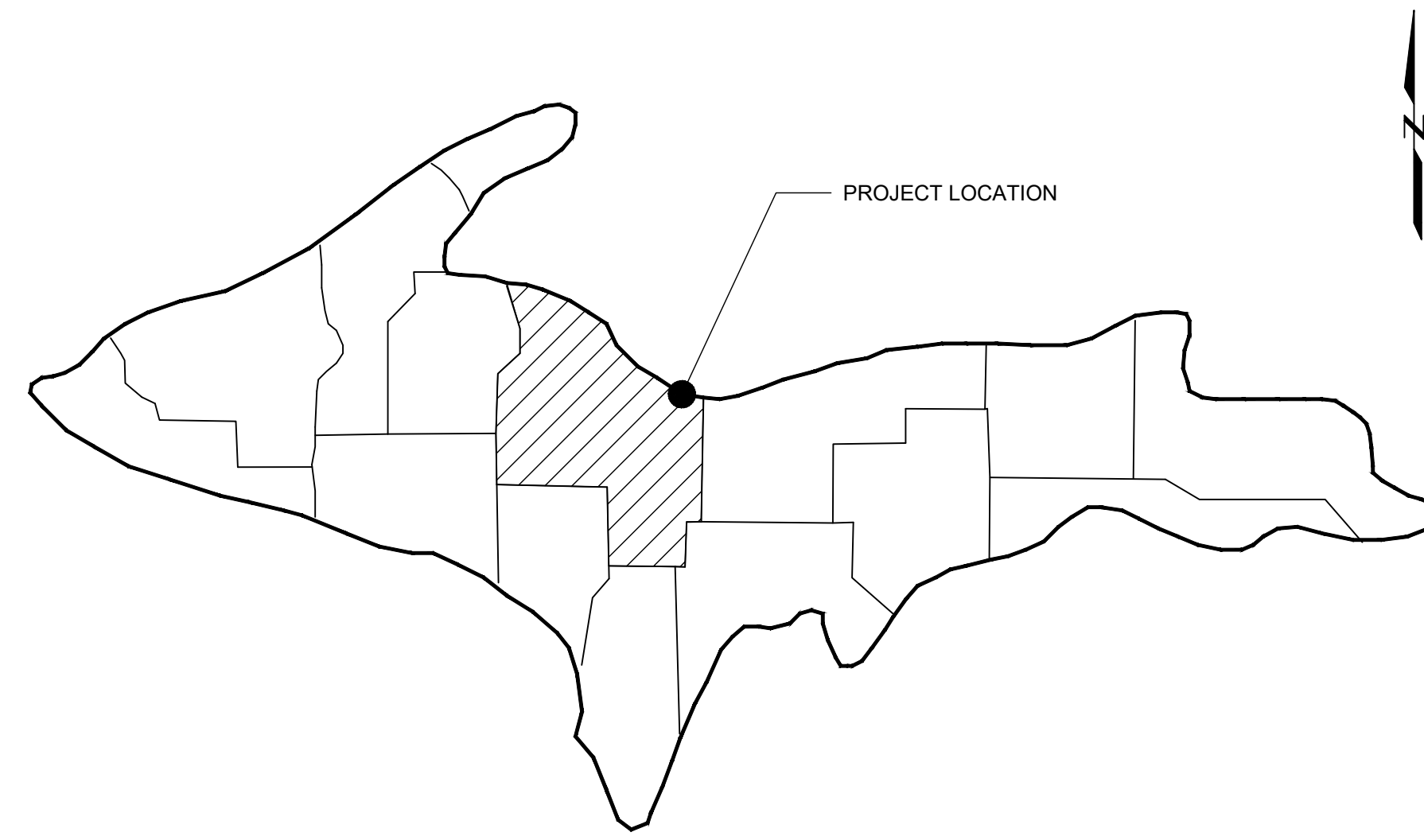
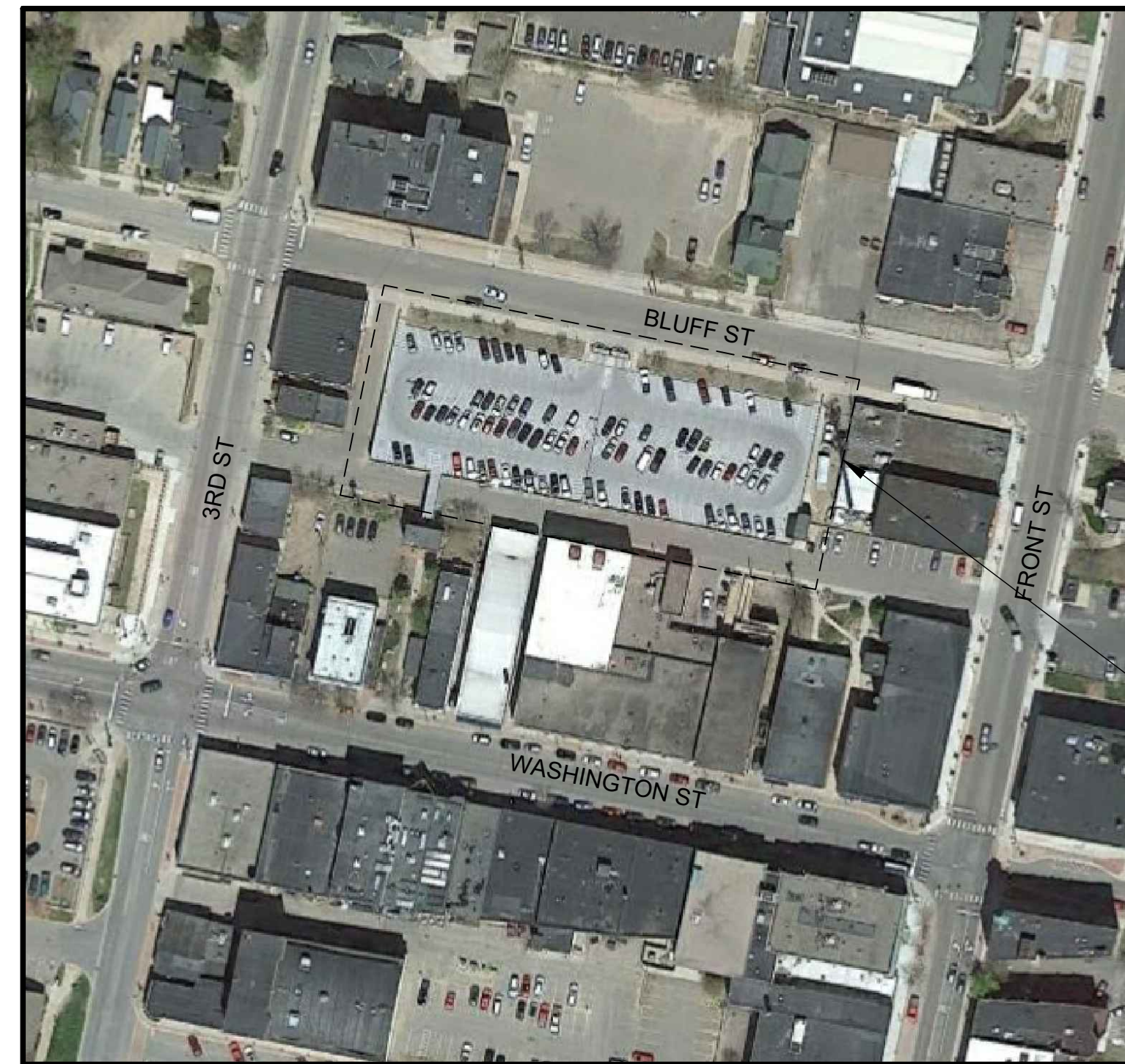


Bluff Street Parking Deck Repair Design



PROJECT LOCATION MAP
(NOT TO SCALE)



SOURCE:
GOOGLE EARTH PRO 4/15/2021

SITE LOCATION MAP
(NOT TO SCALE)

SHEET INDEX		
SHEET NO.	DRAWING NO.	SHEET NAME
1	G-01	COVER SHEET
2	S-01	LOCATION PLAN
3	S-02	REPAIR DETAILS
4	S-03	REPAIR DETAILS
5	T-01	TECHNICAL SPECIFICATIONS

PREPARED FOR:

MARQUETTE DOWNTOWN
DEVELOPMENT AUTHORITY
337 WEST WASHINGTON ST
MARQUETTE, MI 49855

PREPARED BY:

GEI CONSULTANTS OF MICHIGAN, P.C.
109 W. BARAGA AVENUE
MARQUETTE, MI 49855
(906)451-4021



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GEI PROJECT NO. 2004881
APRIL, 2021

FOR BID

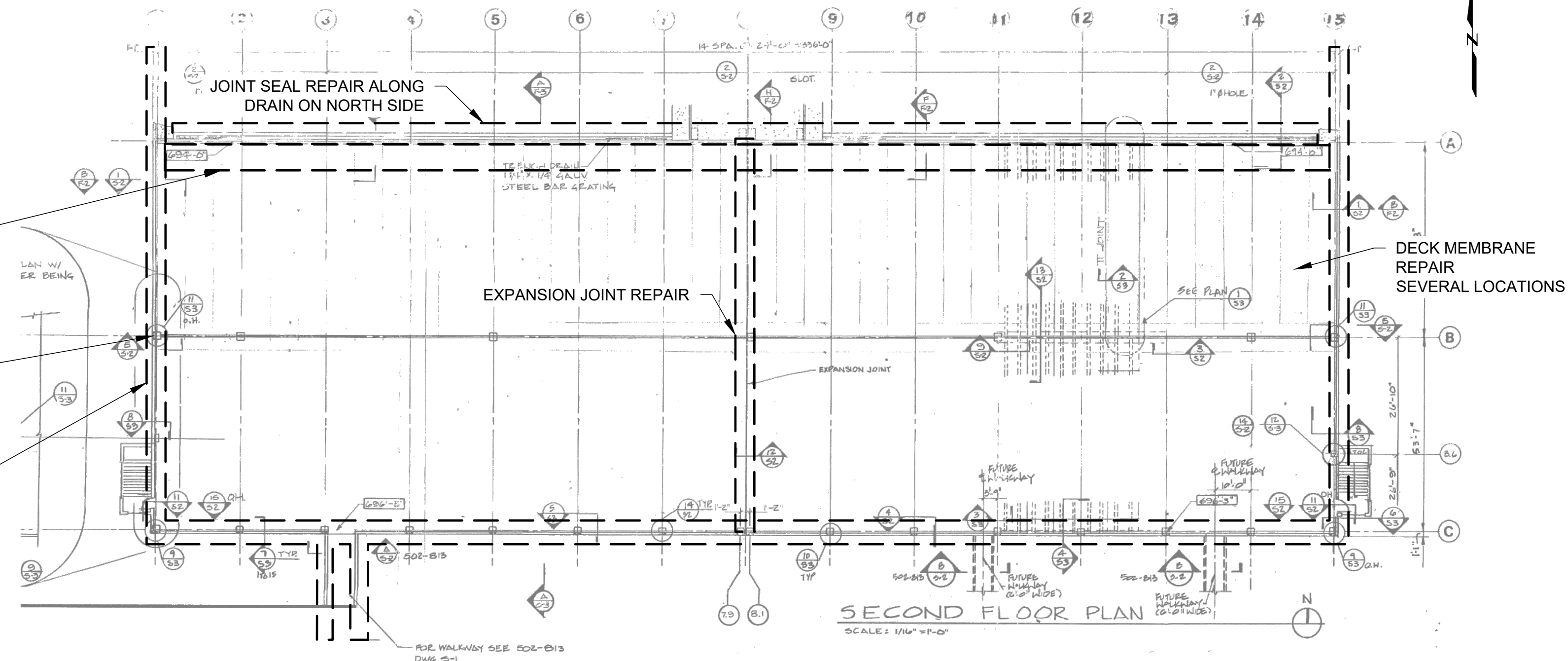
DWG. NO.
G-01

SHEET NO.
1

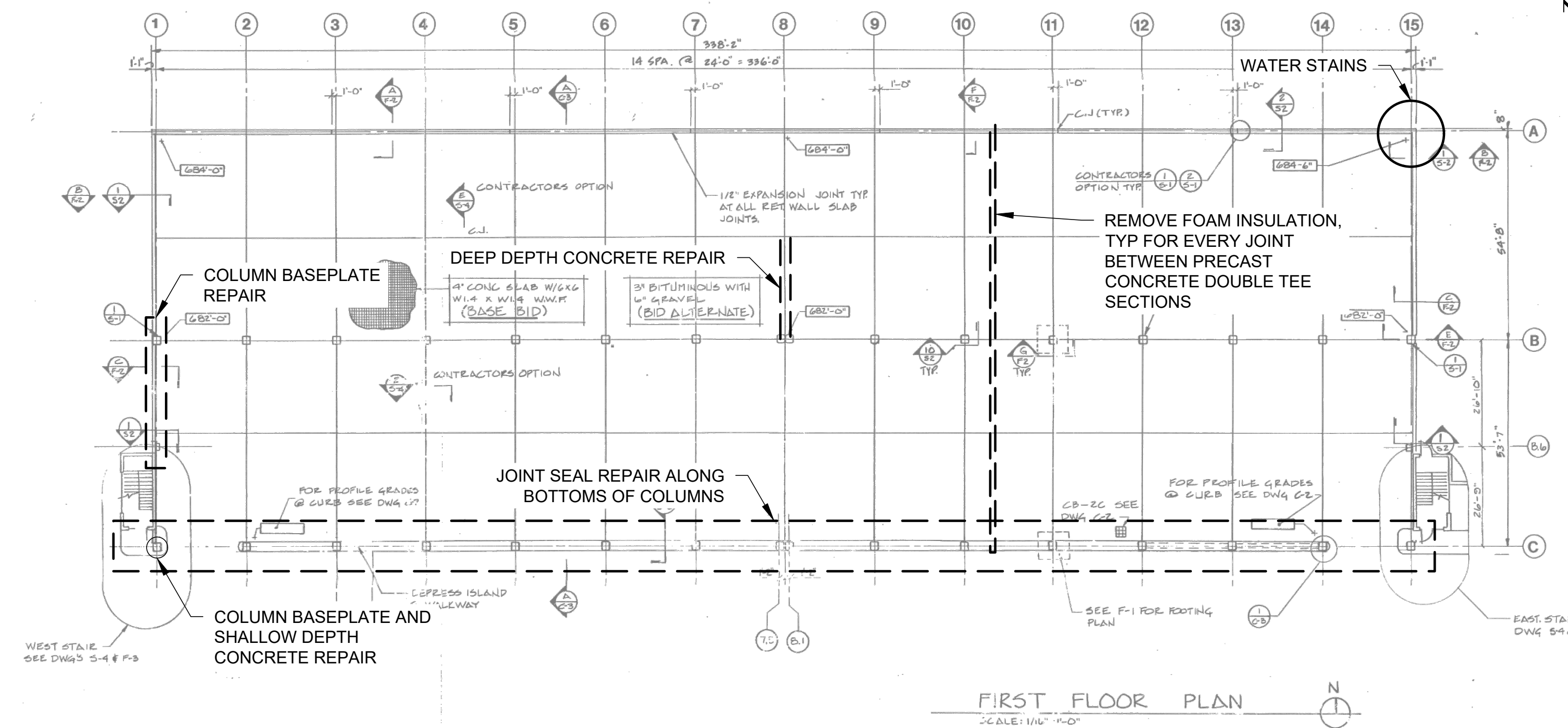
DOUBLE TEE CONCRETE REPAIR AT MOST PRECAST DOUBLE TEE FLANGES ON NORTH SIDE. DAMAGE IS VISIBLE ON UNDERSIDE OF FLANGES.

SEAL JOINT REPAIR ALONG TOPS OF COLUMNS

SHALLOW DEPTH CONCRETE AND GUARDRAIL BASEPLATE REPAIR



TOP DECK LOCATIONS
NOT TO SCALE



BOTTOM DECK LOCATIONS
NOT TO SCALE

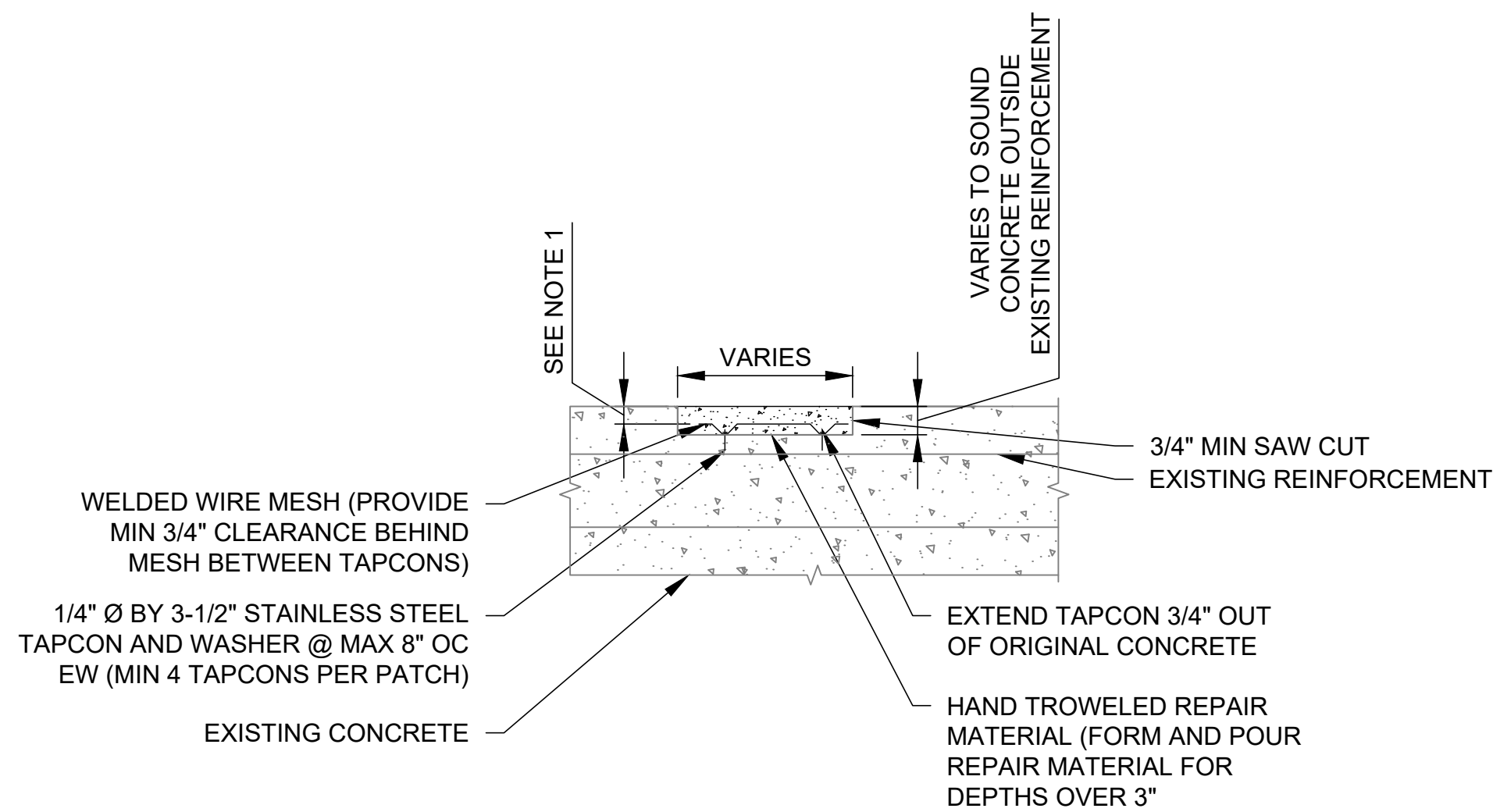
REPAIR QUANTITIES

Detail/Section Number	Repair Name	Estimated Quantity	Unit
1	Shallow Depth Concrete Repair	25	CF
2	Deep Depth Concrete Repair	25	CF
3	Joint Seal Repair	650	LF
4	Expansion Joint Repair	125	LF
5	Guardrail Base Plate Repair	100	Baseplates
6	Deck Membrane Repair	6000	SF
7	Column Bearing Plate Repair	3	Bearing Plates
A	Double Tee Flange Concrete Repair	500	CF
NA	Remove Insulation Foam in Joints	4500	LF

DOUGHERTY, RACHEL, W. Marquette_DDA2004881_Buff Street Parking Deck Repair Design02_CADDesign1S-01 Plan.dwg - 5/19/2021

<p>Attention:</p> <p>If this scale bar does not measure 1" then drawing is not original scale.</p>	DRAFT	Designed: RMD	<p>GEI Consultants GEI CONSULTANTS OF MICHIGAN, P.C. 109 W. BARAGA AVENUE MARQUETTE, MI 49855 (906)451-4021</p>	<p>MARQUETTE DOWNTOWN DEVELOPMENT AUTHORITY</p> <p>122 W BLUFF ST, MARQUETTE, MI 49855</p>					SHEET NAME	SHEET NO.
		P.E. No: NA							LOCATION PLAN	S-01
		GEI Project 2004881							0 5/19/2021 FOR BID	SAE
									NO DATE ISSUE/REVISION	APP

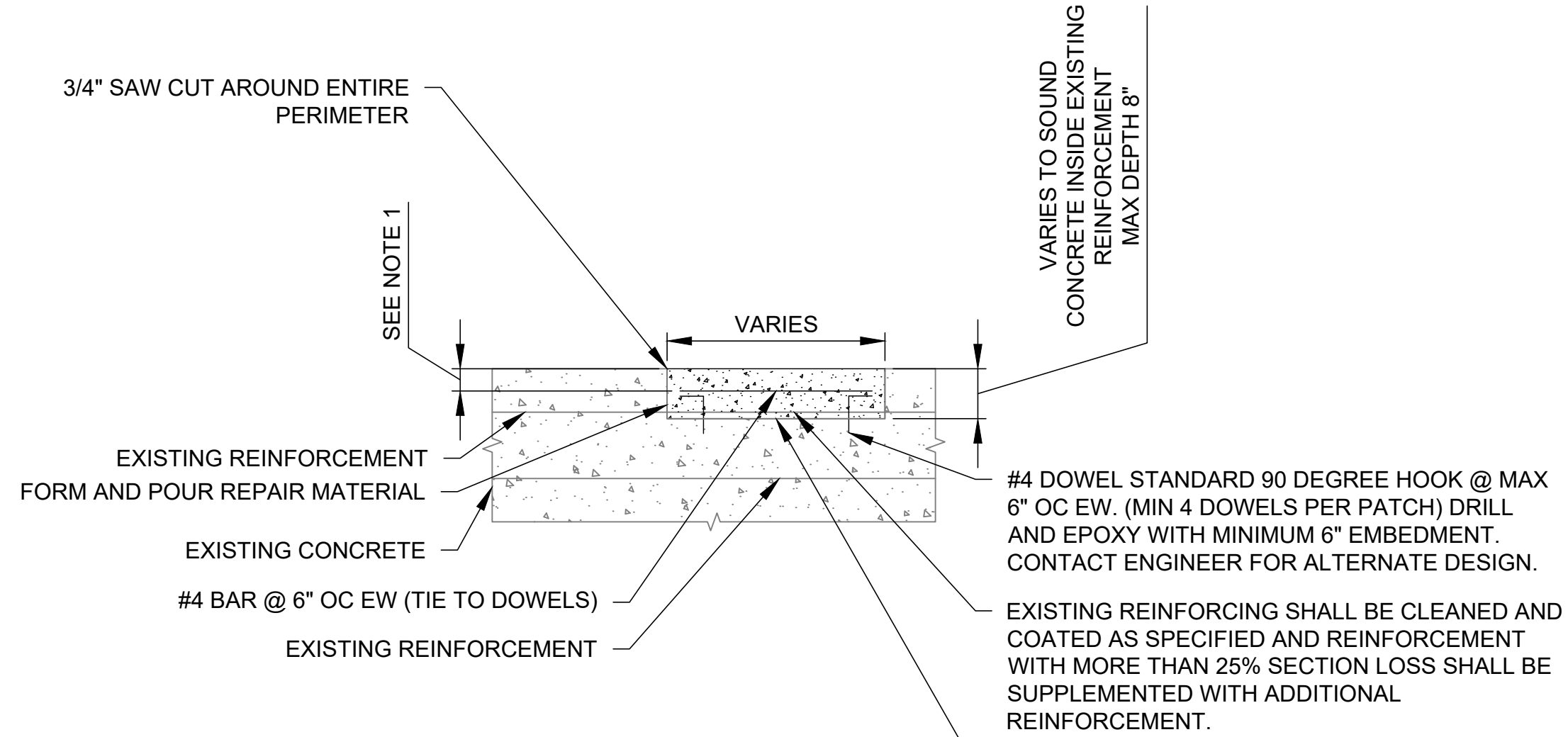
FOR REVIEW



NOTES:

1. PROVIDE MINIMUM REINFORCEMENT COVER AS DIRECTED IN SPECIFICATIONS

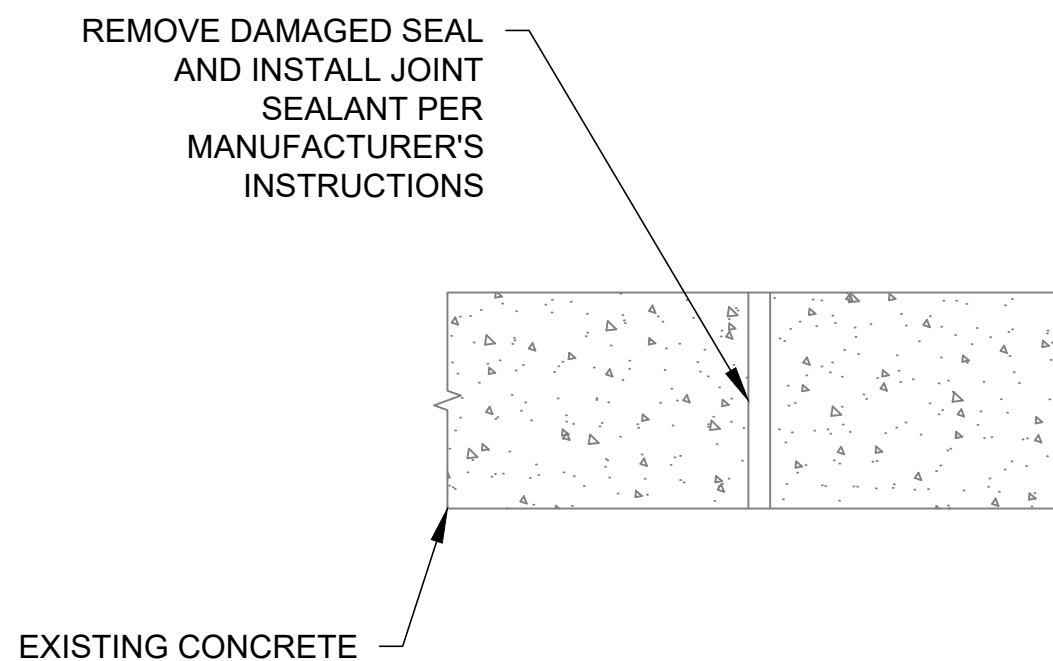
1 DETAIL
- SHALLOW DEPTH CONCRETE REPAIR OUTSIDE EXISTING REINFORCEMENT NOT TO SCALE



NOTES:

1. PROVIDE MINIMUM REINFORCEMENT COVER AS DIRECTED IN SPECIFICATIONS
2. VERIFY THICKNESS OF EXISTING SLAB TO ACCOMMODATE 6" DOWEL EMBEDMENT LENGTH, CONTACT ENGINEER IF NOT ATTAINABLE

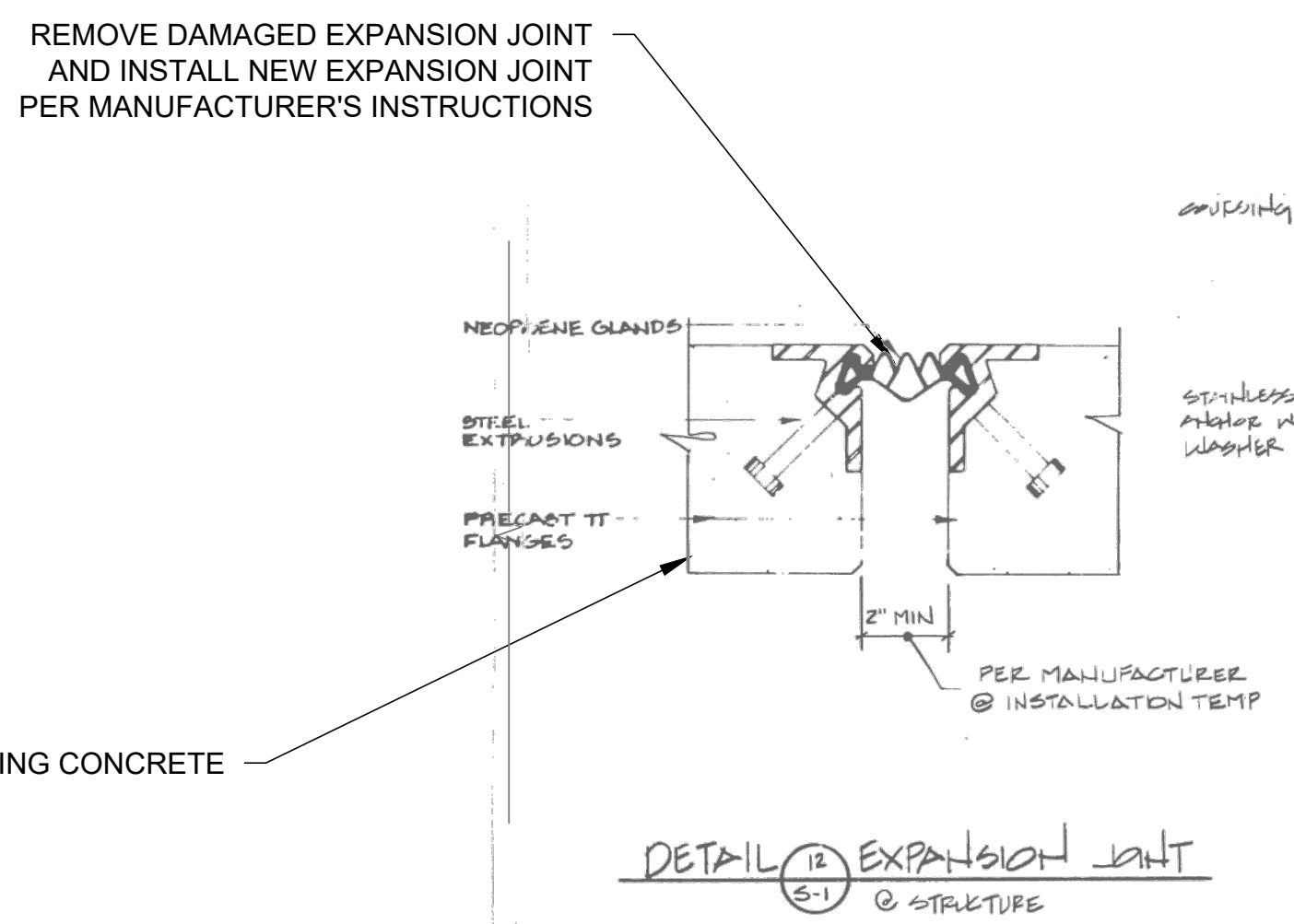
2 DETAIL
- DEEP DEPTH CONCRETE REPAIR NOT TO SCALE



NOTES:

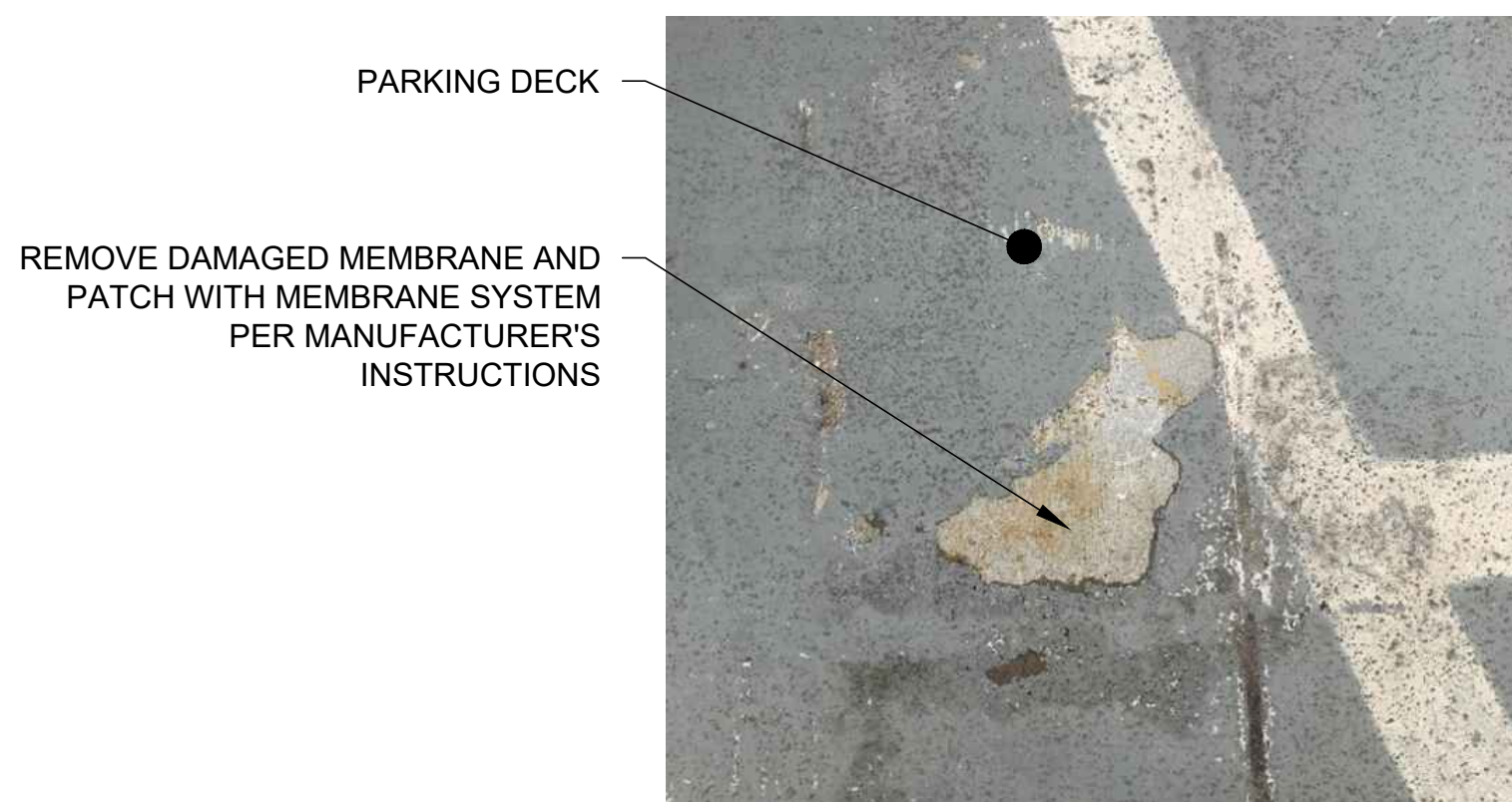
1. IN CASE OF JOINTS BETWEEN DOUBLE TEES, REMOVE SPRAY FOAM INSULATION AND INSTALL JOINT SEALANT
2. PREP SIDES FOR SEALANT ADHESION, INSTALL BACKER ROD OF PROPER SIZE AND AT PROPER DEPTH FOR WIDTH OF JOINT, PER SEALANT MANUFACTURER'S INSTRUCTIONS

3 DETAIL
- JOINT SEAL REPAIR
0 1 2
SCALE, FEET

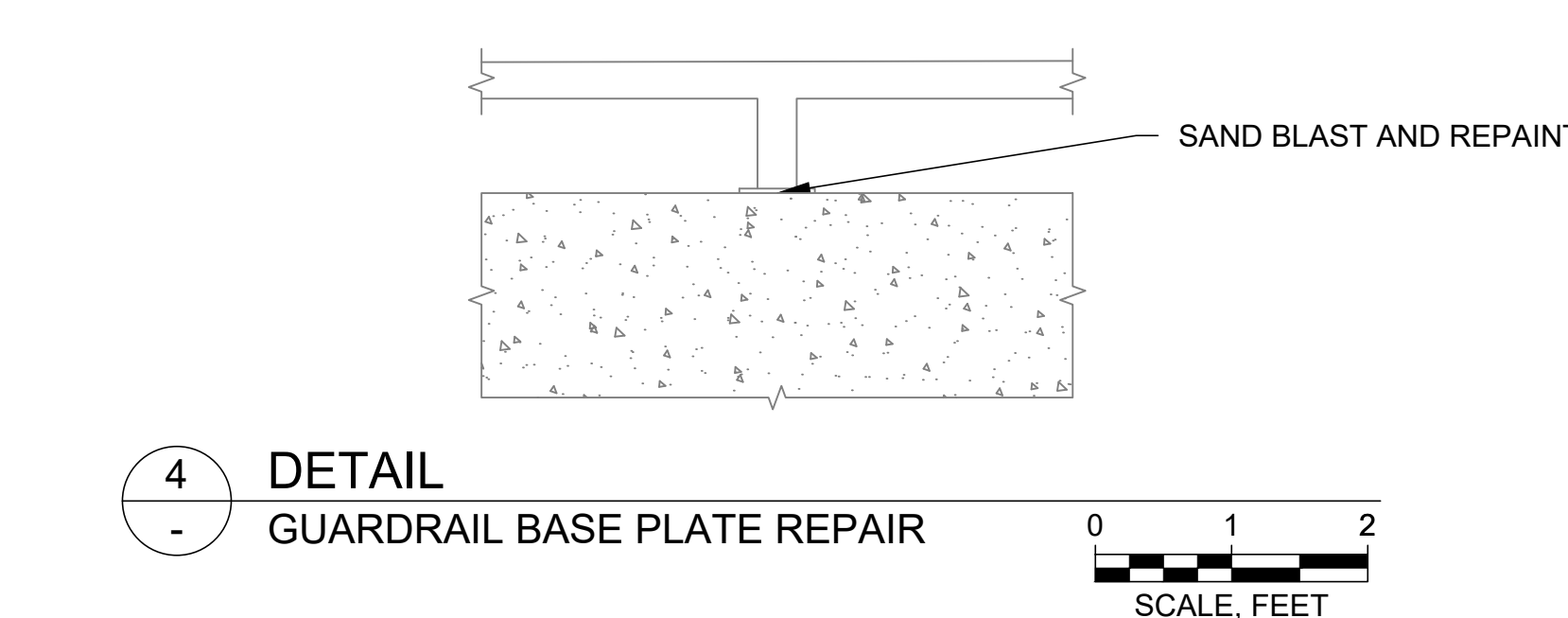


DETAIL 12 EXPANSION JOINT @ STRUCTURE

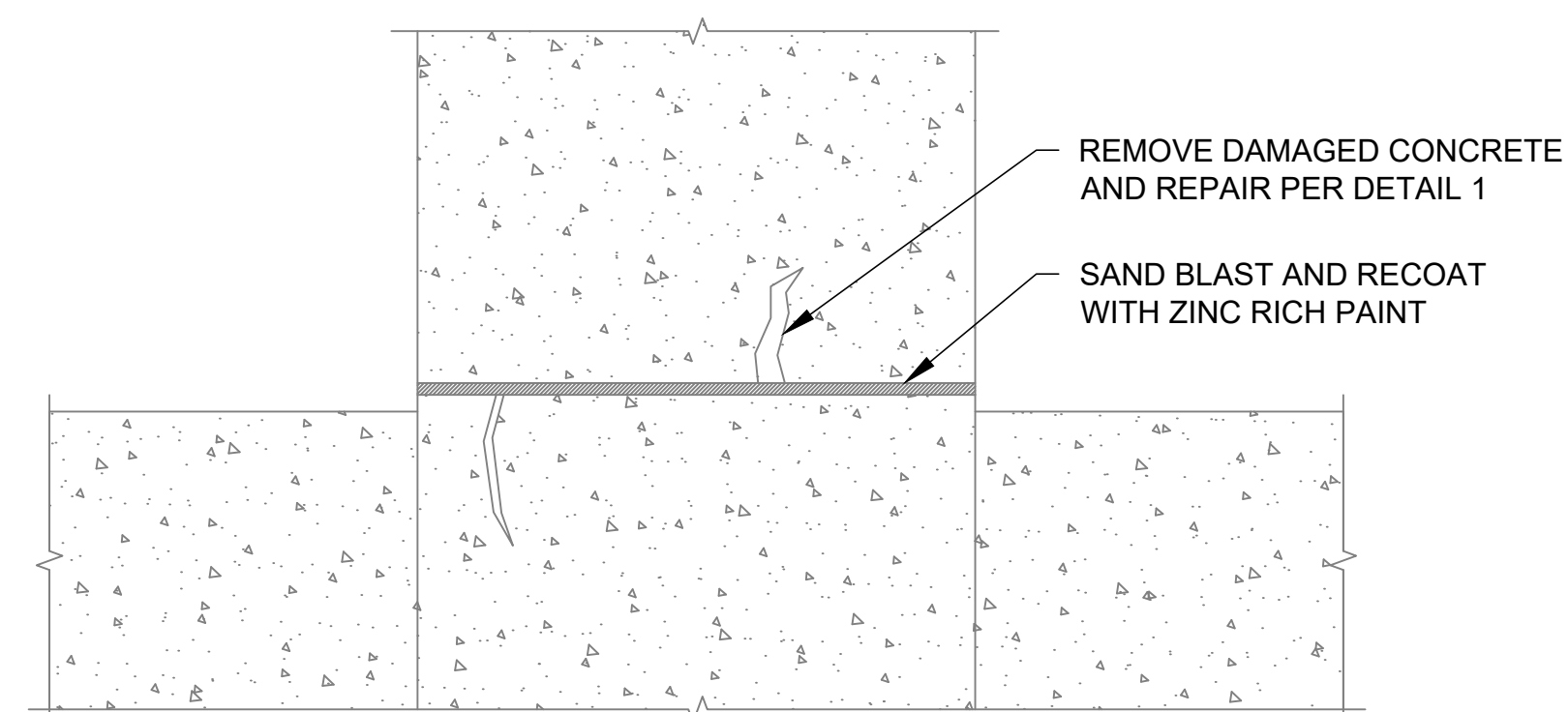
3 DETAIL
- EXPANSION JOINT REPAIR
0 1 2
SCALE, FEET



5 DETAIL
- DECK MEMBRANE REPAIR
0 1 2
SCALE, FEET



4 DETAIL
- GUARDRAIL BASE PLATE REPAIR
0 1 2
SCALE, FEET



4 DETAIL
- COLUMN BEARING PLATE REPAIR
0 1 2
SCALE, FEET

FOR REVIEW

Attention: If this scale bar does not measure 1" then drawing is not original scale.	Designed: RMD
	Drawn: RMD
	Checked: JWP
	Approved: SAE
	P.E. No: NA
GEI Project: 2004881	



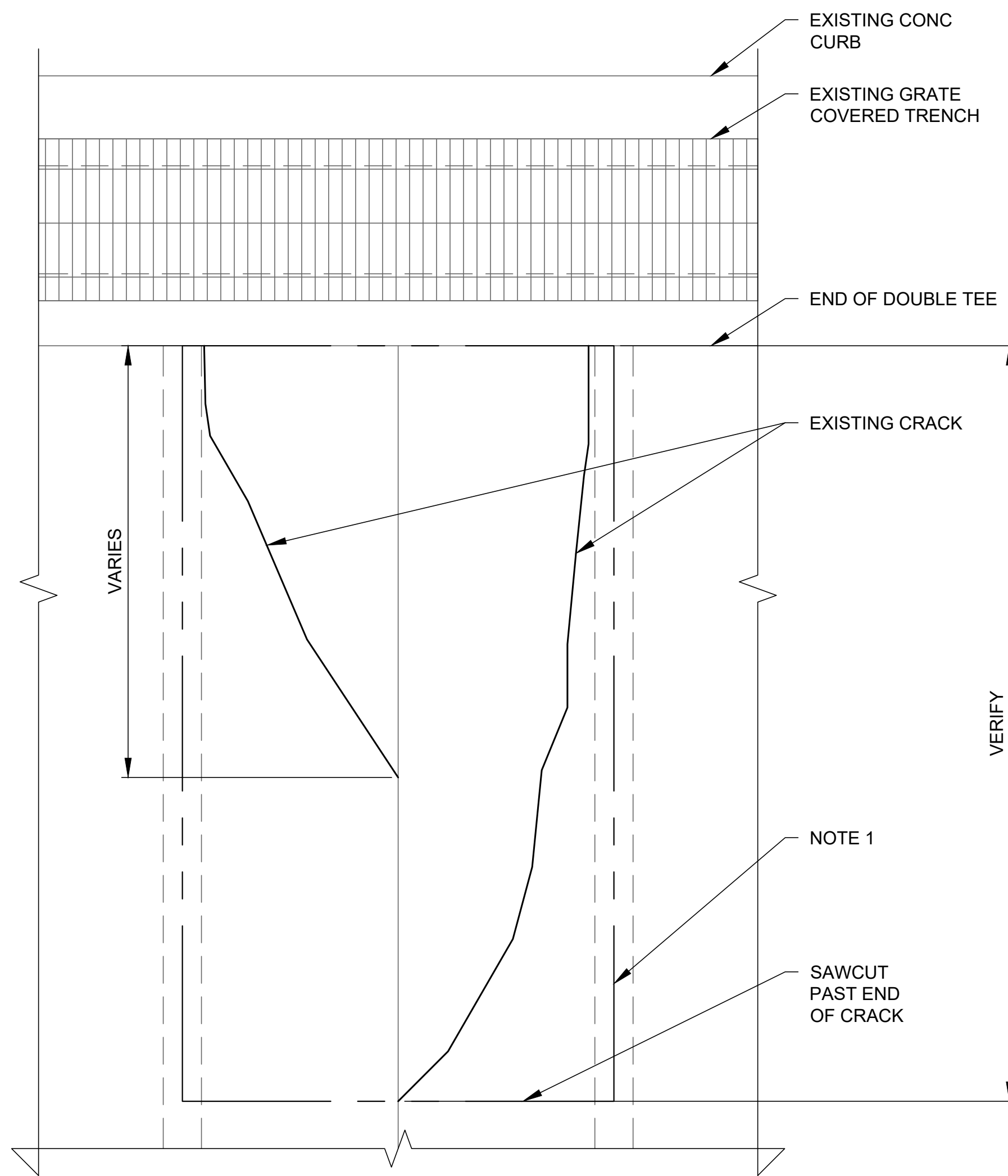
MARQUETTE DOWNTOWN DEVELOPMENT AUTHORITY

BLUFF STREET PARKING DECK REPAIR DESIGN

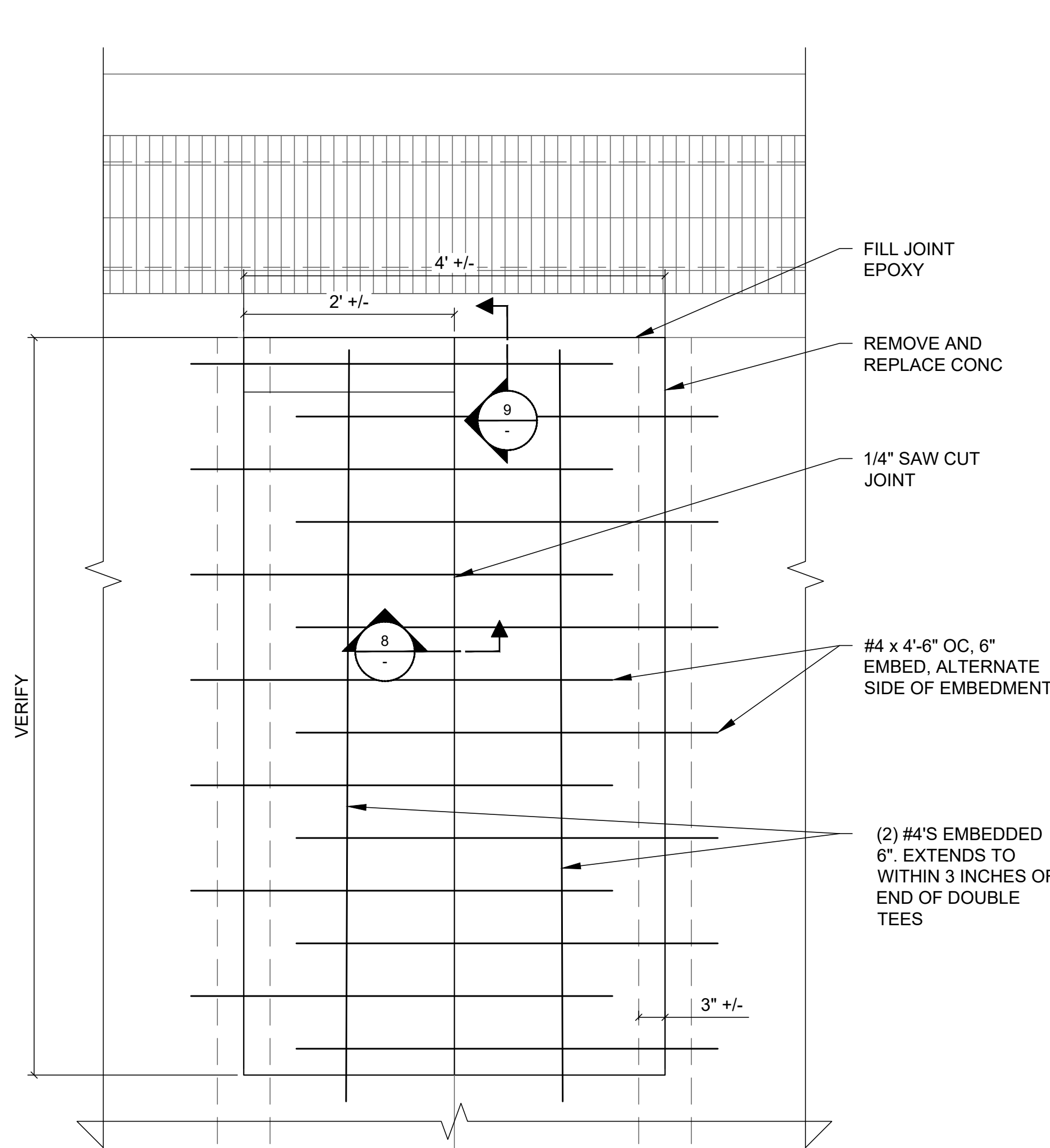
122 W BLUFF ST,
MARQUETTE, MI
49855

NO	DATE	ISSUE/REVISION	SAE APP
0	5/19/2021	FOR BID	SAE

SHEET NAME	SHEET NO.
REPAIR DETAILS	S-02



EXISTING CONDITION
SCALE: 1" = 1'-0"



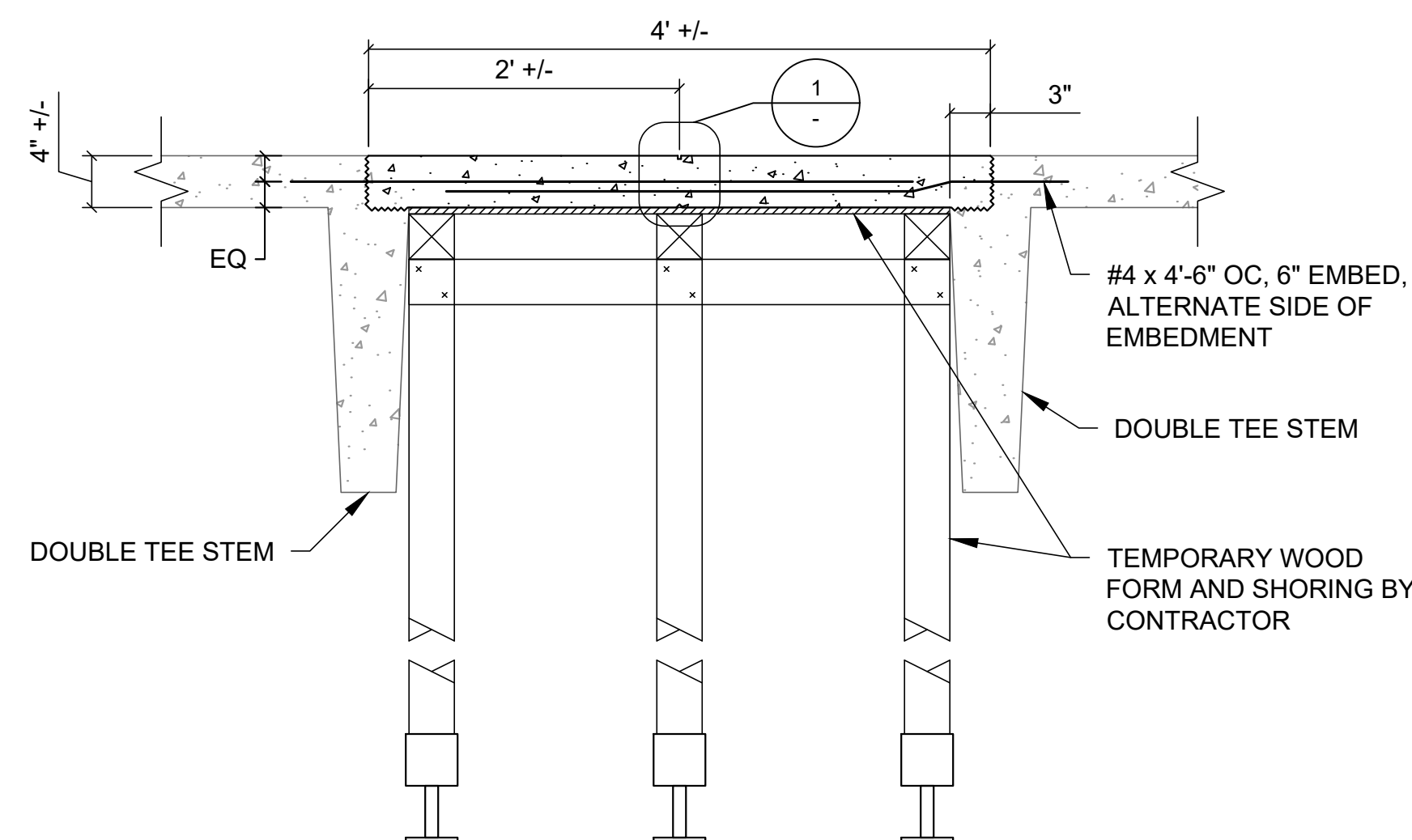
REPLACEMENT SLAB
SCALE: 1" = 1'-0"

GENERAL NOTES:

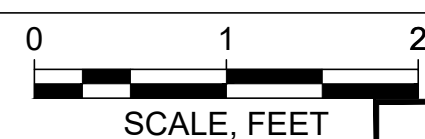
1. REMOVE CRACKED / DETERIORATED CONCRETE ABOVE STEM. SAVE EXISTING REINFORCING IF POSSIBLE.
 - 1.1. SAWCUT FULL DEPTH ACROSS TEE FLANGE AND 1" DEEP ABOVE STEMS. USE HAND HELD CHIPPING HAMMER TO REMOVE CONCRETE.
 - 1.1. REMOVE CONCRETE TO MIDDLE OF PRECAST DOUBLE TEE STEM
 - 1.2. REMOVE CONCRETE UNTIL SOUND CONCRETE IS OBSERVED.
 - 1.3. DO NOT ALLOW DEMOLISHED CONCRETE TO FREE FALL TO LOWER PARKING LEVEL.
2. EXISTING PRECAST DOUBLE TEE DECK IS 4" BASED ON EXISTING DRAWINGS, TOTAL THICKNESS MAY VARY.

SUGGESTED CONSTRUCTION SEQUENCE

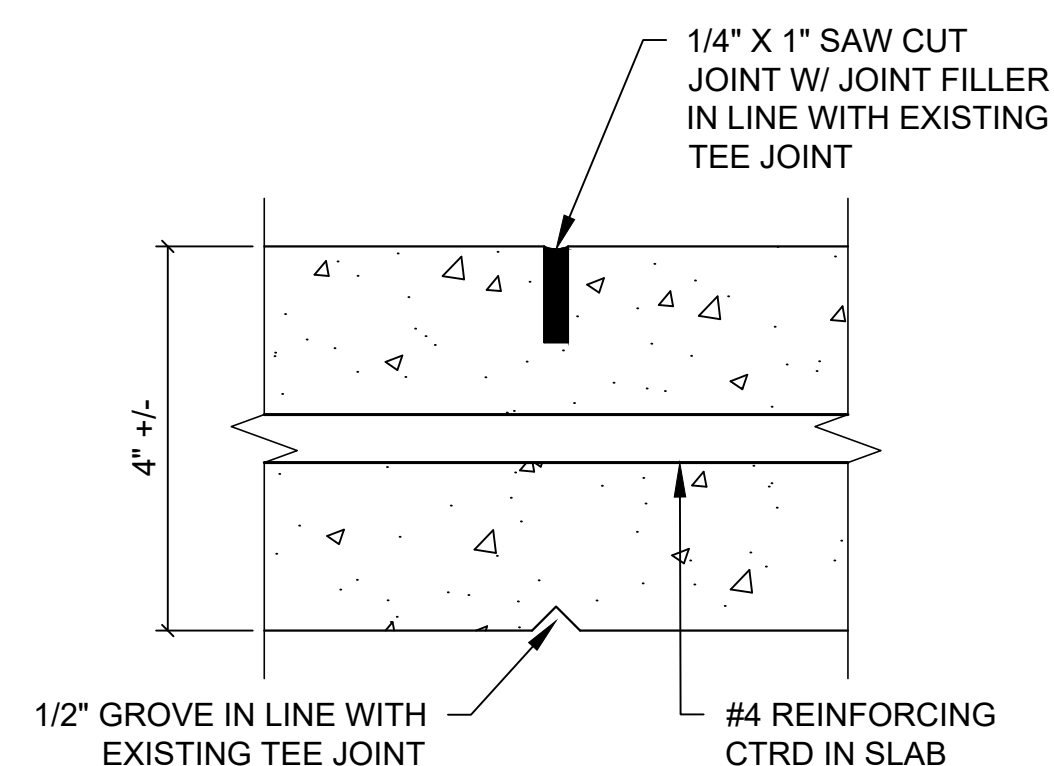
1. ERECT SHORING PRIOR TO DEMOLITION EFFORT.
 - 1.1. SHORING SHOULD BE ABLE TO SUPPORT DEMOLISHED DECK.
2. CAREFULLY REMOVE CONCRETE UNTIL SOUND CONCRETE IS REACHED BEYOND THE EXISTING CRACKED SECTION.
 - 2.1. DO NOT REMOVE MORE THAN THREE INCHES OF CONCRETE BEYOND THE EDGE OF THE DOUBLE TEE STEM WITHOUT PROVIDING SHORING UNDER ADJACENT SPAN.
3. COLLECT AND REMOVE DEMOLISHED CONCRETE FROM SITE.
4. CLEAN AREA OF REPAIR OF ALL DEBRIS.
5. CLEAN AREA USING HIGH-PRESSURE WATER OR OTHER ABRASIVE BLAST CLEANING TECHNIQUES.
6. DRILL AND EPOXY REBAR INTO PLACE.
7. PREPARE AREA AS SPECIFIED BY REPAIR MORTAR PRODUCT MANUFACTURER'S REQUIREMENTS.
8. PLACE 1/2" GROOVE FORM, FIBER EXPANSION JOINT AND REPAIR MORTAR.
9. SAW CUT JOINT TO MATCH EXISTING DECK JOINT.
10. APPLY ROUGH FINISH. SAWCUT JOINT AND INSTALL JOINT FILLER.
11. CURE PER MANUFACTURER'S GUIDELINES.
12. REMOVE SHORING.



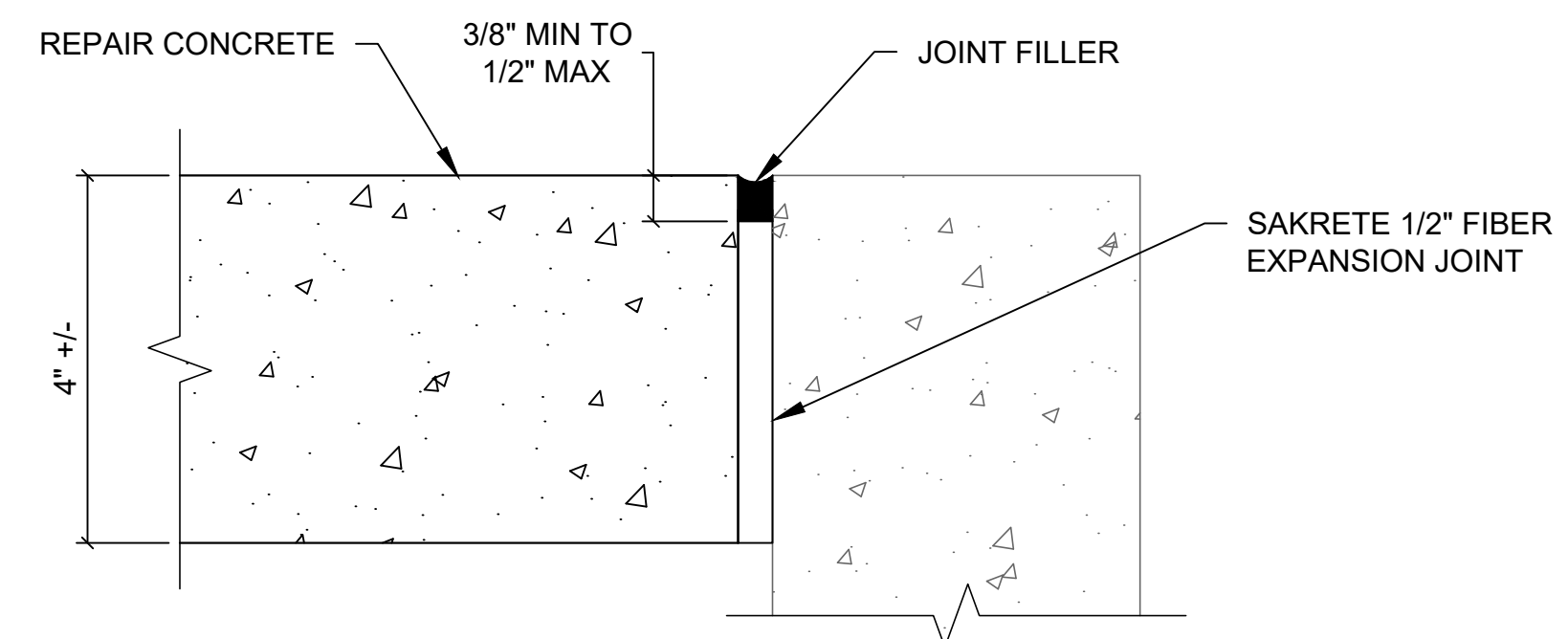
A SECTION
REPLACEMENT CONCRETE



Attention:
0 1" 1'
If this scale bar does not measure 1" then drawing is not original scale.



8 DETAIL
TYPICAL JOINT NOT TO SCALE



9 DETAIL
DECK AGAINST RETAINING WALL NOT TO SCALE

FOR REVIEW

DOUGHERTY, RACHEL, W:\Marquette\Bluff Street Parking Deck Repair\Design\03 DETAILS.dwg - 5/19/2021

Designed: RMD
 Drawn: RMD
 Checked: JWP
 Approved: SAE
 P.E. No: NA
 GEI Project: 2004881



MARQUETTE DOWNTOWN DEVELOPMENT AUTHORITY

BLUFF STREET PARKING DECK REPAIR DESIGN

122 W BLUFF ST,
MARQUETTE, MI
49855

NO	DATE	ISSUE/REVISION	APP
0	5/19/2021	FOR BID	SAE

SHEET NAME
REPAIR DETAILS

SHEET NO.
S-03

1. Material Specifications

1.1 Forms

- A. Forms shall be concrete-tight and sufficiently rigid to prevent displacements or deflection.
- B. Form surfaces shall be smooth and free from defects which would affect appearance of concrete.
- C. Form ties shall be of a type which provides watertight concrete.
- D. **Form Release Agent:** Colorless mineral oil which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

1.2 Reinforcement

- A. **Reinforcing Steel:** ASTM A615, 60 ksi yield grade billet steel deformed bars, uncoated finish.
- B. **Dowels:** ASTM A615, 60 ksi yield grade billet steel deformed bars, uncoated finish.
- C. **Welded Wire Mesh:** 12 or 14 GA., flat sheets, 4" x 4" square opening, ANSI/ASTM A185, 304 stainless steel.
- D. **Stainless Steel Tapcon:** Grade 410 stainless steel 1/4" diameter by 2-3/4" length hex head screw with stainless steel washer.

1.3 Epoxy Bonding Adhesive

- A. Two component, solvent-free, moisture-insensitive high-strength epoxy adhesive. Hilti HIT-HY 200-A or approved equivalent.

1.4 Repair Concrete

- A. Product performance shall meet or exceed that specified for R1 materials per ASTM C 928.
 - a. **Repair Concrete:** MasterEmaco S 466 CT, BASF or equivalent.

1.5 Expansion Joint Material

- a. **Expansion Joint Repair System:** Sika/Emseal Sole-Source Waterproofing System
- b. **Fiber Expansion Joint:** Sakrete Fiber Expansion Joint or Approved Equal

1.6 Joint Sealant Material

- A. Product performance shall meet or exceed that specified by ASTM C920.
 - a. **Joint Sealant Material:** Sikaflex-2c SL or Approved Equal.

1.7 Traffic Bearing Membrane

- A. Traffic Bearing Membrane System: MasterSeal Traffic 1500 or Approved Equal.

1.8 Zinc Rich Paint

- A. Zinc Rich Paint shall meet the specification of SSPC-Paint 20.

2. Execution

2.1 Surface Preparation

- A. **Concrete Removal:** Identify limits of repair area through the use of hammer soundings, concrete cores, or other means as needed. Saw-cut perimeter of areas indicated for removal. Do not cut reinforcing steel. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcing. Remove loose, deteriorated, or honeycombed concrete by breaking up and dislodging from reinforcing.
 - a. Remove concrete between cuts to depths needed to reach sound concrete. Limit demolition hammers for the final 2 inches of concrete removal to 15 lbs. maximum total weight. Limit hammer bit angle to 45 degrees or less as measured perpendicular to the concrete surface.
 - b. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar to provide a clearance of 3/4".
 - c. Test areas where concrete has been removed by sounding with hammer, and remove additional concrete until all unsound concrete is completely removed.
 - d. Provide fractured aggregate surfaces with a profile of at least 1/4 inch that are approximately perpendicular or parallel to original concrete surfaces. At walls, make top and bottom surfaces level.
 - e. Thoroughly clean removal areas of loose concrete, dust, and debris with a pressure washer.
 - f. In areas where it may not be practical to remove all marginal concrete, notify the Project Engineer.
- B. **Disposal of Demolished Materials:** Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from project site and legally dispose of them in an EPA-approved landfill.
 - a. Do not allow demolished materials to accumulate on-site.
 - b. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. **Reinforcing Bar Preparation:** Remove loose and flaking rust from reinforcing bars by high-pressure water cleaning or abrasive blast cleaning until only tightly bonded light rust remains.
 - a. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in 2 or more adjacent bars, supplement the existing reinforcement with new steel reinforcement as directed by Engineer. Remove additional concrete as necessary to provide adequate clearance as described above. Splice supplemental bars

to existing bars according to ACI 318, by lapping.

2.2 Reinforcement Installation

- A. Reinforcement shall be free from loose rust and scale, dirt, oil or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 301 at locations defined by the Engineer plus or minus one bar diameter.
- B. Concrete cover shall be as required by ACI 301 and as follows:
 - a. Surfaces Exposed to Weather - 2 inches
- C. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety.
- D. Bars shall be saw cut and never cut with a flame torch.
- E. Reinforcement shall be positioned and support to permit mortar/concrete to fully encircle the bars.

2.3 Dowel Installation

- A. Hooked dowel bars shall be installed in a grid pattern with sufficient area of temperature and shrinkage steel to meet ACI Code. Dowels are needed to provide sufficient patch anchorage and strength to be stable and avoid cracking.
- B. Dowels shall be sized and installed at locations indicated by the Engineer. Dowels shall be accurately positioned before concrete/concrete placement and shall be rigidly supported during concrete/concrete placement.
- C. Dowel holes shall be oversized as recommended by the epoxy bonding adhesive manufacturer or twice the dowel diameter. Holes shall be drilled to the depths indicated by the Engineer.
- D. Dowels shall be grouted into place such that no voids remain between the dowel and the existing concrete. Dowels shall be positioned and supported to permit concrete/concrete to fully encircle the dowels.

2.4 Welded Wire Mesh Installation

- A. Mesh shall be free from loose rust and scale, dirt, oil or other deleterious coating that could reduce bond with the concrete.
- B. Concrete cover shall be as required by ACI 301 and as follows:
 - a. Surfaces Exposed to Weather - 2 inches
- C. Mechanically anchor the mesh to the existing concrete with stainless steel Tapcon screws and washers as indicated on the project drawings.
- D. Adjacent mesh sheets shall be overlapped one mesh width and shall be tied firmly together with 304 stainless steel wire at intervals not exceeding 8 inches.
- E. Wire mesh is not necessary in areas where existing reinforcement will provide adequate restraint.

2.5 Formwork

- A. Forms shall be tight to prevent loss of concrete, grout, or cement paste. Forms shall be properly aligned and adequately supported to produce smooth concrete surfaces.
- B. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface so as to obtain accurate alignment of the surface and to prevent leakage of concrete.
- C. Forms shall not be reused if there is any evidence of surface wear and tear or defects which would impair the quality of the surface. Surfaces of forms to be reused shall be cleaned of concrete from previous concreting and of all other foreign material before reuse.
- D. **Chamfering:** Except as otherwise shown, external corners that will be exposed shall have one inch chamfer.
- E. **Coating:** Forms shall be coated with a form-releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete. Application of form release agent on reinforcing bars or joints shall not be permitted.
- F. Forms shall be removed in a manner that will prevent damage to the concrete and ensure the complete safety of the structure.
- G. Formwork for walls and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before at least 24 hours has elapsed since completion of concrete placement.
- H. Supporting forms and shores shall not be removed from walls until the structural units are strong enough to carry their own weight and any other construction or natural loads. In no case will supporting forms or shores be removed before the concrete strength has reached 50 percent of design strengths as determined by field cured cylinders or other approved methods. This strength shall be demonstrated by job-cured test specimens and by a structural analysis considering the proposed loads in relation to these test strengths and the strength of forming and shoring system. The job-cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive, insofar as possible, the same curing and protection as the structures they represent.

2.6 Repair Concrete Application

- A. Patching concrete repairs less than 3 inches thick - no forms. Unless otherwise recommended by concrete manufacturer, apply as follows:
 - a. The substrate shall be kept wet for the first 12 hours during the 24-hour period prior to placing concrete to assure saturated surface dry conditions. The surface shall be vacuumed completely clean as the last operation prior to placing concrete.
 - b. Where possible scrub a slurry of neat patching mortar into substrate, filling pores and voids.

- c. Place patching concrete by troweling toward edges of patch to force integral contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching concrete to fill space behind bars by compacting with trowel from sides of bars.
 - d. For vertical patching, place concrete in lifts of not more than 3 inches nor less than 1/4 inch. Do not feather edge.
 - e. For overhead patching, place concrete in lifts of not more than 1 inch nor less than 1/4 inch. Do not feather edge.
 - f. After each lift is placed, consolidate material and screed surface.
 - g. Where multiple lifts are used, score surface of lifts to provide a rough surface for application of subsequent lifts. Allow each lift to reach final set before placing subsequent lifts. Surface shall be kept continually moist between applications.
 - h. Allow surfaces of lifts that are to remain exposed to become firm and then finish to a smooth surface with a wood or sponge float.
 - i. Wet-cure concrete for not less than seven days by water-fog spray or water-saturated absorptive cover or curing compound applied in accordance with manufacturer's recommendations. If daily high temperatures are above 90 degrees Fahrenheit, wet-cure methods shall be used for a minimum of four days in addition to the use of a curing compound.
- B. Cast-in-place patching concrete repairs greater than 3 inches thick. Unless otherwise recommended by concrete manufacturer, place as follows:
 - a. The substrate shall be kept wet for the first 12 hours during the 24-hour period prior to placing concrete to assure saturated surface dry conditions. The surface shall be vacuumed completely clean as the last operation prior to placing concrete.
 - b. Use vibrators to consolidate concrete as it is placed.
 - c. At unformed surfaces, screed concrete to produce a surface that will match required profile and surrounding concrete.
 - d. When placing concrete by form and pour method.
 - i. Design and construct forms to resist weight of wet concrete. Seal joints and seams in forms and junctions of forms with existing concrete.
 - ii. Pour concrete into place, releasing air from forms as concrete is introduced. Vibrate to consolidate and remove air pockets.
 - e. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover or curing compound applied in accordance with manufacturer's recommendations. If daily high temperatures are above 90 degrees Fahrenheit, wet-cure methods shall be used for a minimum of four days in addition to the use of a curing compound.
 - C. **Cold-Weather Requirements:** Procedures shall conform to ACI 306. Special protective measures, approved by the Engineer, shall be used when the ambient air temperature is below 35F or if the ambient air temperature is below 40F and falling. Suitable covering and other means, as approved, shall be provided for maintaining the concrete at a temperature of at least 50F for not less than 72 hours after placing and at a temperature above freezing for the remainder of the curing period. Salt, chemicals or other foreign materials shall not be mixed with the concrete to prevent freezing.

2.7 Zinc Rich Paint Application

- A. The surface to be repaired shall be blast cleaned to SSPC-SP11 near bare metal. The blast cleaning must extend into the surrounding, undamaged metal.
- B. Begin paint application as soon as possible after preparation and before visible oxides develop. Apply paint per manufacturer's instruction.
- C. The surface of the painted coating area must be free of lumps, coarse areas, and loose particles.

DOUGHERTY, RACHEL, W:\Marquette_DDA\2004881_Bluff Street Parking Deck Repair Design\03_CAD\Design\T-01_SPECS.dwg - 5/19/2021

Attention:  If this scale bar does not measure 1" then drawing is not original scale.	Designed: RMD	 GEI Consultants GEI CONSULTANTS OF MICHIGAN, P.C. 109 W. BARAGA AVENUE MARQUETTE, MI 49855 (906)451-4021	MARQUETTE DOWNTOWN DEVELOPMENT AUTHORITY	BLUFF STREET PARKING DECK REPAIR DESIGN	122 W BLUFF ST, MARQUETTE, MI 49855					SHEET NAME TECHNICAL SPECIFICATIONS	SHEET NO. T-01
	Drawn: RMD					Checked: JWP	Approved: SAE	P.E. No: NA	GEI Project 2004881		

FOR REVIEW