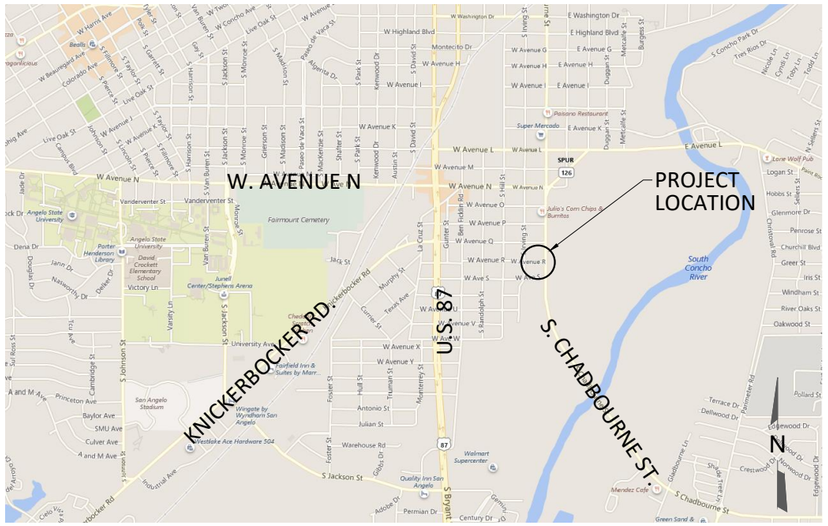
CITY OF SAN ANGELO, TEXAS

AVENUE R
BRIDGE REPAIR



JULY 2019

SHEET INDEX

PREPARED BY:

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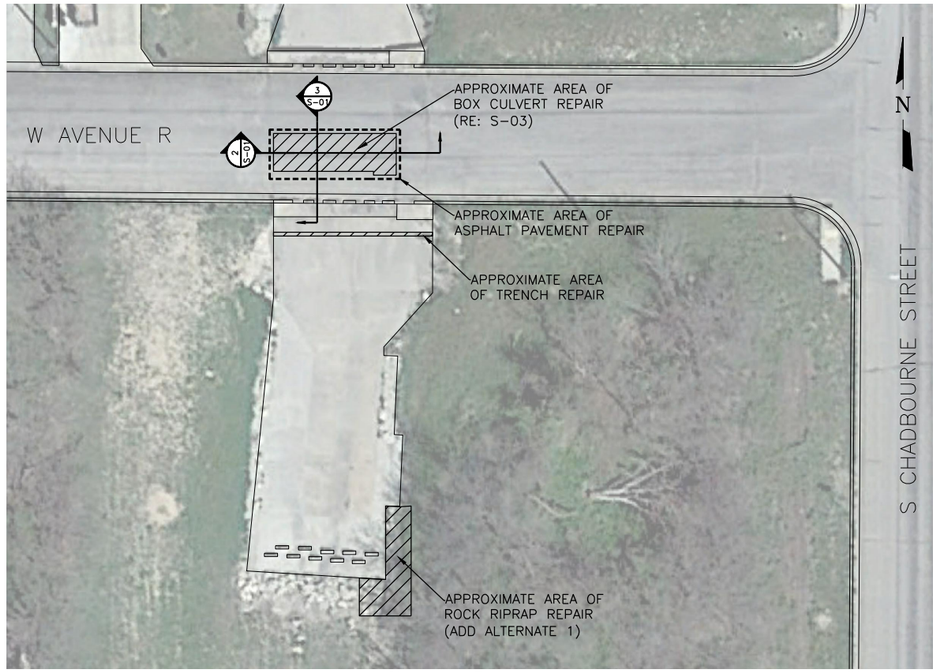
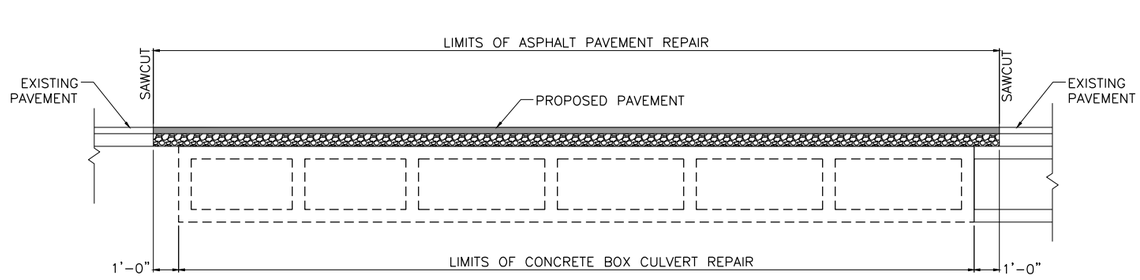
FNI PROJECT NUMBER: SAN19313



1 REPAIR LAYOUT PLAN
NOT TO SCALE



2 S-01 SECTION A-A
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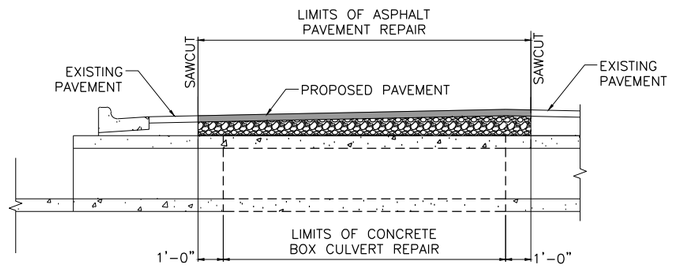

3 S-01 SECTION B-B
NOT TO SCALE

NOTES:

1. SEE CITY OF SAN ANGELO STANDARD DETAIL S-A-1 FOR NEW PAVEMENT INFORMATION.
2. SAWCUT 1' MINIMUM PAST LIMIT OF CONCRETE REPAIR, CLEAN AND NEAT THROUGH PAVEMENT AND FLOWABLE FILL, IF PRESENT.
3. CONTRACTOR SHALL TAKE CARE TO PROTECT EXISTING CONCRETE BOX CULVERTS.

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
HEATHER PAIGE KESSLER
100095
LICENSED
PROFESSIONAL ENGINEER
08/06/2019

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CITY OF SAN ANGELO

AVENUE R BRIDGE REPAIR

STRUCTURAL

REPAIR LAYOUT AND SECTIONS

F&N JOB NO. SAN19313
DATE 04/30/2019
DESIGNED PKC
DRAWN DAP
REVISED
CHECKED

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GENERAL NOTES

1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE, INCLUDING LOCAL SUPPLEMENTS, EXCEPT WHERE APPLICABLE CODES OR THE CONTRACT DOCUMENTS ARE MORE RESTRICTIVE.

2. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH APPLICABLE OSHA, STATE, AND LOCAL REGULATIONS. THIS DESIGN IS NOT INTENDED TO CONFLICT WITH SAFETY OR APPLICABLE REGULATIONS OR TO RELIEVE THE CONTRACTOR OF COMPLIANCE WITH THESE REQUIREMENTS. IN CASE OF CONFLICT WITH SAFETY OR APPLICABLE REGULATIONS, CONTACT THE ENGINEER FOR GUIDANCE BEFORE PROCEEDING WITH FABRICATION OR CONSTRUCTION.

3. LIVE LOADS
   HS-93 LOADING

4. VERIFY ALL DIMENSIONS, ELEVATIONS AND OPENING SIZESPRIOR TO STARTING WORK.

5. REMOVE ALL ABANDONED FOUNDATIONS, UTILITIES, PIPELINES, ETC. THAT INTERFERE WITH NEW CONSTRUCTION.

6. FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION AND UTILITIES. NOTIFY ENGINEER IF THERE IS A CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND EXISTING CONDITIONS BEFORE PROCEEDING WITH WORK. PROVIDE EXCAVATION SHORING TO PROTECT AND SUPPORT FOUNDATION SOILS UNDER EXISTING STRUCTURES.

7. THE STRUCTURE IS DESIGNED FOR STABILITY IN THE FINAL CONDITION ONLY. PROVIDE TEMPORARY BRACING AND SHORING AS REQUIRED FOR STABILITY DURING CONSTRUCTION.

8. PLANS, SECTIONS, AND DETAILS ARE NOT TO BE SCALED FOR DETERMINATION OF QUANTITIES, LENGTHS, OR FIT OF MATERIALS.

9. THE GENERAL NOTES AND TYPICAL DETAILS ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE THERE ARE SPECIFIC INDICATIONS TO THE CONTRARY.

10. BARRICADE THE CONSTRUCTION SITE DURING AND PROVIDE THE ALTERNATE TRAFFIC ROUTE AS REQUIRED.

CONCRETE

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST EDITIONS OF ACI 301 AND ACI 318.
2. ALL DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS, UNLESS NOTED OTHERWISE, SHALL BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI 315), LATEST EDITION.

3. CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 5,000PSI
   a. CEMENT: PORTLAND CEMENT, ASTM C 150, TYPE I/II, EQUIVALENT ALKALIES < 0.60%
   b. W/C RATIO: 0.45 MAXIMUM
   c. AGGREGATE: ASTM C 33, 1" MAXIMUM, CLASS 3M
   d. ENTRAINED AIR: ACI 318-08, EXPOSURE CLASS F1
   e. SLUMP: xx" (+/-1")

4. ALL REINFORCING SHALL BE IN ACCORDANCE WITH ASTM A615, GRADE 60, DEFORMED.

5. CONCRETE CLEAR COVER OVER REINFORCING SHALL BE AS LISTED BELOW, UNLESS OTHERWISE NOTED.
   a. CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3"
   b. EXPOSED TO SEWAGE: 2-1/2"
   c. EXPOSED TO EARTH, WATER, OR WEATHER:
   i. SLABS
      1. #6 AND LARGER: 2-1/2"
      2. #5 AND SMALLER: 2"
   ii. BEAMS AND COLUMNS: 2-1/2"
   iii. WALLS
      1. ALL OTHERS: 2"
   d. FORMED CONCRETE SURFACES NOT PERMANENTLY EXPOSED TO WEATHER NOR IN CONTACT WITH GROUND:
   i. BEAMS AND COLUMNS: 2"
   ii. SLABS AND WALLS: 1-1/2"

   e. SEE DRAWINGS FOR EXCEPTIONS

1. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" INSIDE FORMS OR TOOLED TO 3/4" RADIUS ON SLABS UNLESS OTHERWISE NOTED.

2. IN CASES WHERE REINFORCING BARS CANNOT BE EXTENDED AS FAR AS REQUIRED DUE TO THE LIMITED EXTENT OF THE ADJACENT CONCRETE STRUCTURE, THE BARS SHALL EXTEND AS FAR AS POSSIBLE AND END IN STANDARD HOOKS.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ALL FORMING, TEMPORARY BRACING AND SHORING.

4. UNLESS NOTED OTHERWISE, HOOKS SHOWN ON DRAWINGS SHALL BE ASSUMED TO BE STANDARD HOOKS PER ACI 318.

5. UNLESS INDICATED OTHERWISE, LAP SPLICES IN BEAMS AND WALLS SHALL BE STAGGERED.

6. ALL REINFORCING SHALL BE CONTINUOUS. CONTINUOUS BARS SHALL LAP 48 BAR DIAMETERS OF SMALLER BAR LAPPED, UNLESS NOTED OTHERWISE. ALL REBAR EMBEDMENT LENGTHS SHALL BE 36 BAR DIAMETERS, UNLESS NOTED OTHERWISE.

ADHESIVE ANCHOR SYSTEMS

1. REINFORCING BARS, DOWELS, OR THREADED ROD INDICATED TO BE ADHESIVE ANCHORED OR DOWELED INTO CONCRETE RY SHALL BE INSTALLED USING ONE OF THE FOLLOWING OR AN APPROVED EQUAL:
   a. ACRYLIC-TIE ADHESIVE BY SIMPSON STRONG-TIE CO., INC.
   b. SET EPOXY BY SIMPSON STRONG-TIE CO., INC.
   c. HIT RE 500 EPOXY BY HILTI, INC.

2. THREADED RODS INDICATED TO BE ANCHORED IN HOLLOW MASONRY SHALL BE INSTALLED USING ONE OF THE FOLLOWING OR AN APPROVED EQUAL:
   a. ACRYLIC-TIE ADHESIVE BY SIMPSON STRONG-TIE CO., INC.
   b. SET EPOXY BY SIMPSON STRONG-TIE CO., INC.
   c. HIT HY 20 ADHESIVE BY HILTI, INC.

3. DEFORMED REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60. PRIOR TO INSTALLATION, CLEAN, FREE OF OIL, GREASE, OR OTHER RESIDUE, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

4. HOLES SHALL BE DRILLED USING ROTARY HAMMER DRILLS WITH ANSI MATCHED TOLERANCE CARBIDE-TIPPED DRILL BITS. DRILL BIT DIAMETER SHALL MATCH DIAMETER RECOMMENDED BY MANUFACTURER. INSTALLATION OF ALL ADHESIVE ANCHORS SHALL CONFORM TO THE MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS, THE REQUIREMENTS OF THE RESPECTIVE ICBO REPORT, AND ALL APPLICABLE BUILDING CODES.

5. WHEN BASE MATERIAL TEMPERATURE FALLS BELOW 40 DEGREES F, ONLY ACRYLIC BASED ADHESIVES SHALL BE USED.

6. USE CARE AND CAUTION WHEN INSTALLING ANCHORS TO AVOID CUTTING OR DAMAGING EXISTING REINFORCING STEEL.

STRUCTURAL MODIFICATIONS

1. ALL DEMOLITION, REMOVAL AND CONSTRUCTION ACTIVITIES SHALL BE CONDUCTED WITH CONSIDERATION FOR EXISTING FACILITIES STRUCTURES, EQUIPMENT, ETC. ANY DAMAGE WHICH MAY OCCUR BEYOND DESCRIBED DEMOLITION AND CONSTRUCTION SHALL BE REMEDIED AT CONTRACTOR'S EXPENSE AND OWNER/ENGINEER NOTIFIED.

3. CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL DEMOLISHED CONCRETE AND OTHER MATERIALS FROM THE EXISTING STRUCTURES OFF SITE PRIOR TO THE NEW CONSTRUCTION.

4. WHERE REMOVING EXISTING CONCRETE BUT RETAINING REBARS IS INDICATED ON DRAWINGS, SAWCUT EXISTING CONCRETE TO THE LIMITS SHOWN ON PLANS BUT NOT MORE THAN 3/4" DEEP TO AVOID DAMAGING OR NICKING THE REINFORCING.

6. WHERE DEMOLITION OF EXISTING CONCRETE WILL LEAVE EMBEDDED EXISTING REBARS EXPOSED, AN ADDITIONAL 11/2" CONCRETE AND REINFORCEMENT BEYOND LIMITS OF THE DEMOLITION SHALL BE REMOVED. THE 11/2" AREAS BEING REMOVED SHALL THEN BE PLACED BACK WITH CONCRETE STRUCTURAL REPAIR MATERIAL AS SPECIFIED TO PROVIDE CORROSION PROTECTION FOR THE EXPOSED EXISTING REBARS, UNLESS OTHERWISE NOTED ON PLAN.

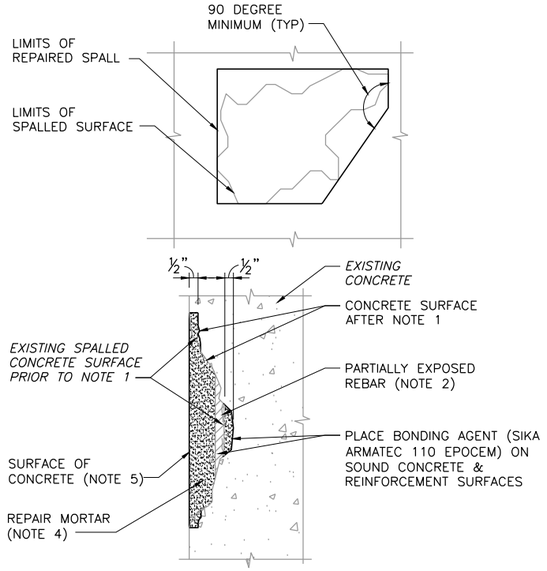
7. ROUGHEN THE EXISTING CONCRETE SURFACES THAT WILL ENCOUNTER NEW CONCRETE. "ROUGHENED SURFACE" SHALL HAVE A UNIFORMLY ROUGHENED CONCRETE SURFACE TO A FULL AMPLITUDE (DISTANCE BETWEEN HIGH AND LOW POINTS OR SIDE TO SIDE) OF APPROXIMATELY 1/4" WITH SUITABLE TOOLS TO EXPOSE A FRESH FACE. APPLY BONDING AGENT TO THE EXISTING CONCRETE SURFACES PRIOR TO THE PLACEMENT OF NEW CONCRETE PER MANUFACTURER'S INSTRUCTIONS.

1. ALL EXPOSED EXISTING REBARS SHALL BE CLEANED BY ABRASIVE BLASTING AND COATED WITH AN EPOXY RESIN/PORTLAND CEMENT ADHESIVE BONDING AGENT TO PROVIDE CORROSION PROTECTION.

IBC CHAPTER 17 SPECIAL INSPECTION REQUIREMENTS

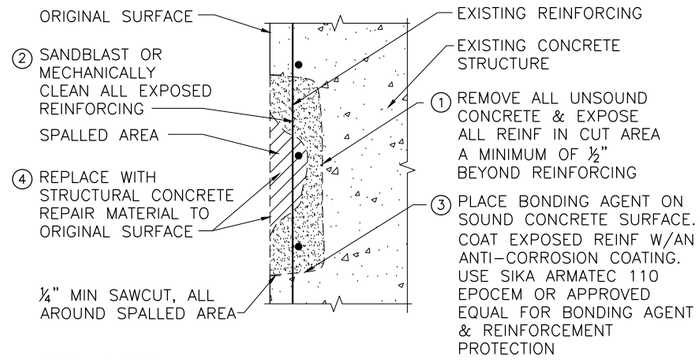
1. THE OWNER OR THE OWNER'S REPRESENTATIVE IS REQUIRED TO PERFORM SPECIAL INSPECTIONS IN ACCORDANCE WITH IBC 2015 AND AS OUTLINED IN THE STATEMENT OF SPECIAL INSPECTION.

2. THE CONTRACTOR IS REQUIRED TO ENABLE THE ABOVE INSPECTIONS TO OCCUR BY PROVIDING ACCESS TO THE ELEMENTS REQUIRING INSPECTION. IN ADDITION, THE CONTRACTOR SHALL PROVIDE 48 HOURS ADVANCED NOTICE TO THE OWNER OR THE OWNER'S REPRESENTATIVE REGARDING ALL CONSTRUCTION ACTIVITIES RELATED TO AND/OR AFFECTING THE REQUIRED SPECIAL INSPECTIONS.



DETAIL NOTE:
1. SAW CUT PERIMETER OF SPALLED AREA. REMOVE CONCRETE WITHIN CUT PERIMETER AS REQUIRED TO PROVIDE A ½" MINIMUM REPAIR DEPTH. REMOVE ALL UNSOUND CONCRETE. CLEAN REBAR OF CORROSION AND CONTAMINATES USING MECHANICAL MEANS.
2. IF ANY REBAR HAS MORE THAN HALF ITS CROSS-SECTION EXPOSED, THEN REMOVE CONCRETE FROM AROUND THE BAR TO A MINIMUM DEPTH OF ½".
3. CRACKS IN SOUND CONCRETE, THAT EXTEND OUT FROM THE SPALLED AREA TO BE REPAIRED, SHALL BE PRESSURE INJECTED WITH HIGH STRENGTH, LOW VISCOSITY EPOXY. USE SIKADUR 35, HI-MOD LV, BY SIKA CORPORATION. PROVIDE SUPPORT PRODUCTS AND CRACK PREPARATION AS RECOMMENDED BY MANUFACTURER.
4. REPAIR MORTAR SHALL BE SIKATOP 122 PLUS (FOR HORIZONTAL SURFACES) OR SIKATOP 123 PLUS (FOR VERTICAL AND OVERHEAD SURFACES), BY SIKA CORPORATION. PREPARE, INSTALL IN MULTIPLE LIFTS AS REQUIRED, FINISH, AND CURE AS RECOMMENDED BY MANUFACTURER.
5. FINISHED SURFACE TEXTURE SHALL MATCH EXISTING FINISH TEXTURE.

1 TYPICAL CONCRETE SPALL & CRACK REPAIR
NOT TO SCALE



DETAIL NOTES:

1. THIS DETAIL APPLIES ONLY TO EXPOSED REBAR, SPALL AND PRE-SPALL REPAIR. CRACKS SHALL BE REPAIRED BY CLEANING WITH HIGH-PRESSURE WATER (2000 PSI MINIMUM). THOROUGHLY DRY CRACK WITH AIR AND INJECT WITH HIGH STRENGTH, HIGH VISCOSITY EPOXY AS SPECIFIED.

2 TYPICAL CONCRETE SPALL REPAIR
NOT TO SCALE

Freese and Nichols, Inc.
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STATE OF TEXAS — PRABIN MISC 112999 — LICENSED PROFESSIONAL ENGINEER — 08/06/2019

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CITY OF SAN ANGELO

AVENUE R BRIDGE REPAIR

STRUCTURAL

BOX CULVERT GENERAL NOTES AND TYPICAL CONCRETE REPAIR

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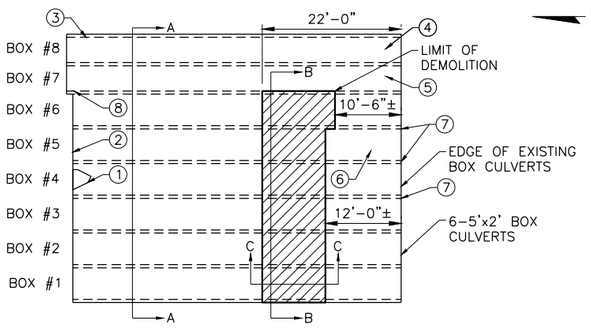
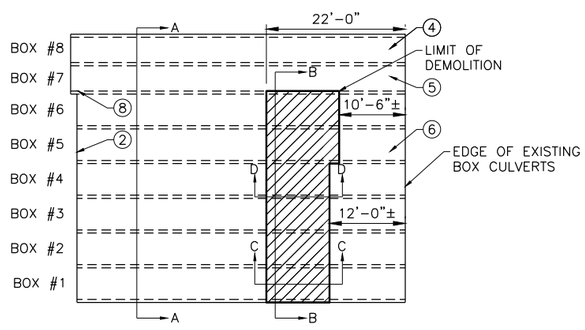


1 BOTTOM SLAB DEMOLITION
NOT TO SCALE



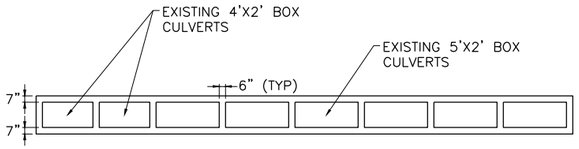
2 TOP SLAB DEMOLITION
NOT TO SCALE

PLAN NOTES:

1. SAW CUT SLAB AND WALLS AS SHOWN. DO NOT OVER CUT THE EDGES. REMOVE ALL UNSOUND CONCRETE. CLEAN REBAR OF ALL CORROSION AND CONTAMINATES USING MECHANICAL MEANS.
2. DO NOT CUT REBAR, CHIP OFF REMAINING CONCRETE AND SALVAGE EXISTING REBAR.
3. DOWEL THE REPAIR AS SHOWN. REFER TO GENERAL NOTE S-02 FOR ADHESIVE ANCHORS SECTION.
4. EXISTING CONCRETE TO BE THOROUGHLY CLEANED OF ALL LOOSE MATERIAL, LAITANCE, DIRT OR FOREIGN MATTER. ALL FREE WATER SHALL BE REMOVED AND THE SURFACE SHALL BE IN A MOIST CONDITION WHEN CONCRETE AND/OR BONDING AGENT IS APPLIED.
5. USE LOW VISCOSITY EPOXY, TYPE V, SIKADUR 35, H-MOD BY SIKA CORPORATION OR APPROVED EQUAL. PROVIDE SUPPORT FOR PRODUCT AND SURFACE PREPARATION AS RECOMMENDED BY THE MANUFACTURER.
6. FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION, UTILITIES AND CULVERTS. THE INSIDE CROSS-SECTION SHALL BE THE SAME AS EXISTING. IN THE EVENT OF CONFLICT, CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO PROCEEDING WITH WORK.

NOTES BY SYMBOL: (#)

1. REPAIR BOTTOM SLAB SPALL BOX #4
2. REPAIR CONCRETE SPALL AT BOTTOM OF TOP SLAB BOXES #1-#6
3. REPAIR HONEYCOMBING AT WALL OF BOX #8 WALL
4. REPAIR HONEYCOMBING AT BOTTOM OF TOP SLAB BOX #8
5. REPAIR SPALL AT BOTTOM OF TOP SLAB BOX #7
6. REPAIR SPALL AND CORROSION 16" INSIDE FROM EDGE IN BOXES #1-#6
7. REPAIR SPALL AND CORROSION AT BOXES #4-#6 WALL
8. FULL DEPTH CONCRETE REPAIR AT UPSTREAM CHANNEL APRON



3 SECTION A-A
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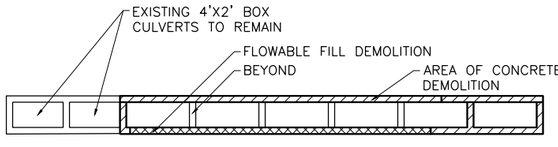

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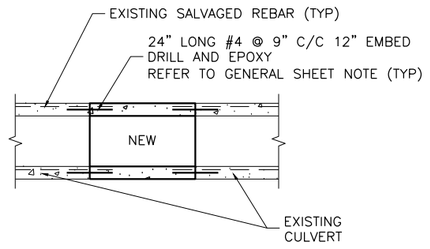

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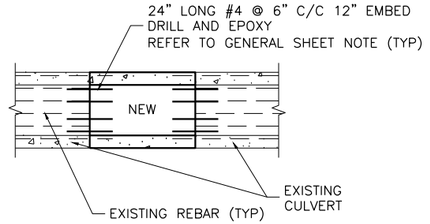

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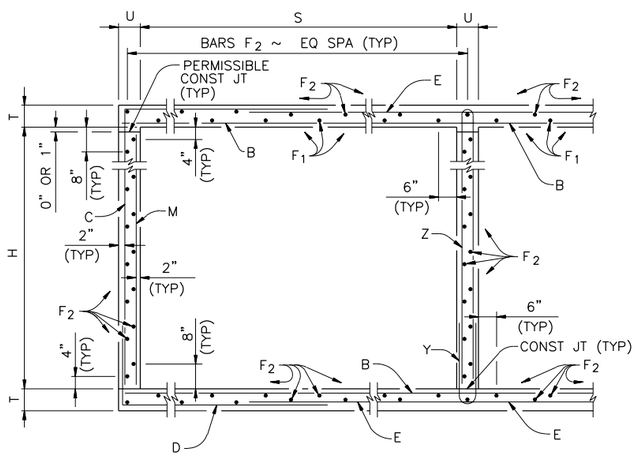

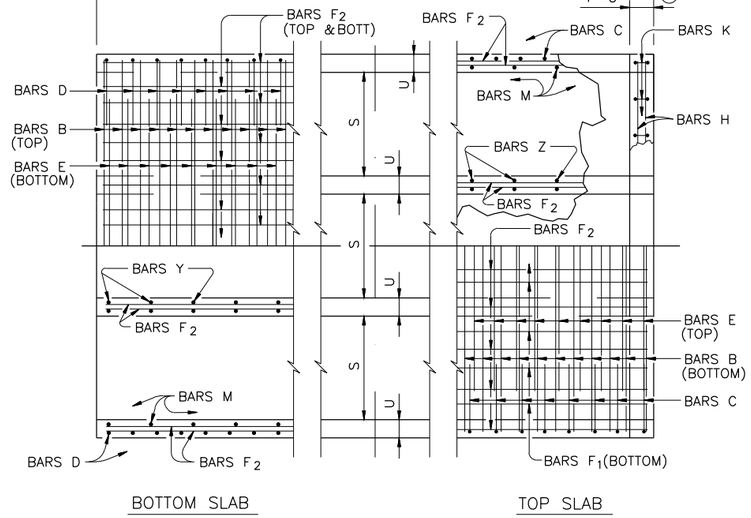

BOTTOM SLAB TOP SLAB

TYPICAL SECTION

PART PLANS

NUMBER OF SPANS	SECTION DIMENSIONS				REINFORCING STEEL											
					BARS B		BARS C & D		BARS E		BARS F_1		BARS F_2~#4 AT 1'-6" MAX	BARS M~#4 AT 1'-6" MAX	BARS Y & Z~#4 AT 1'-0" MAX	BARS H 4~#4
	S	H	T	U	SIZE	SPA	SIZE	SPA	SIZE	SPA	SIZE	SPA				
6	5'-0"	2'-0"	7"	6"	#4	5"	#4	6"	#4	5"	#4	5				

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STATE OF TEXAS — PRABIN MAHARJAN — 112999 — LICENSED PROFESSIONAL ENGINEER — 08/06/2019

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CITY OF SAN ANGELO
AVENUE R BRIDGE REPAIR

STRUCTURAL
BOX CULVERT
REPAIR PLAN AND SECTIONS

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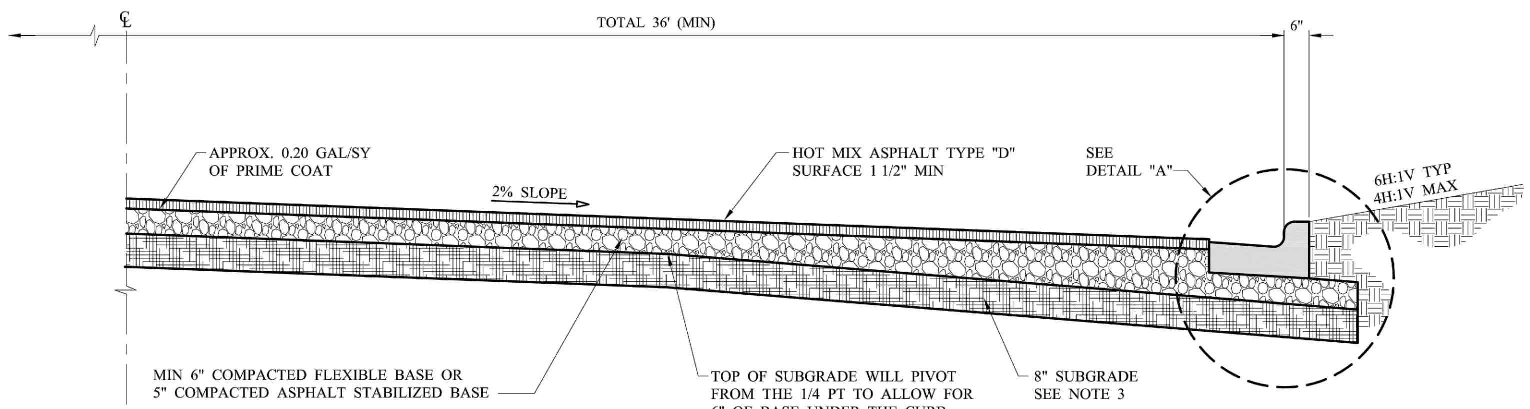

TYPICAL SECTION

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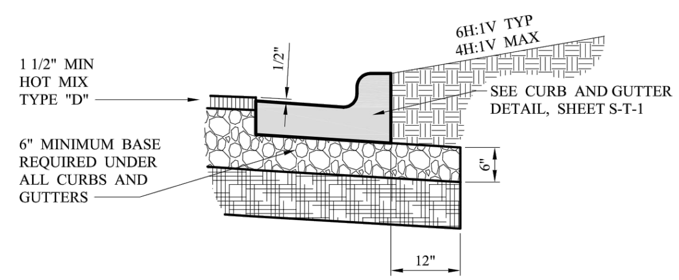


DETAIL "A"

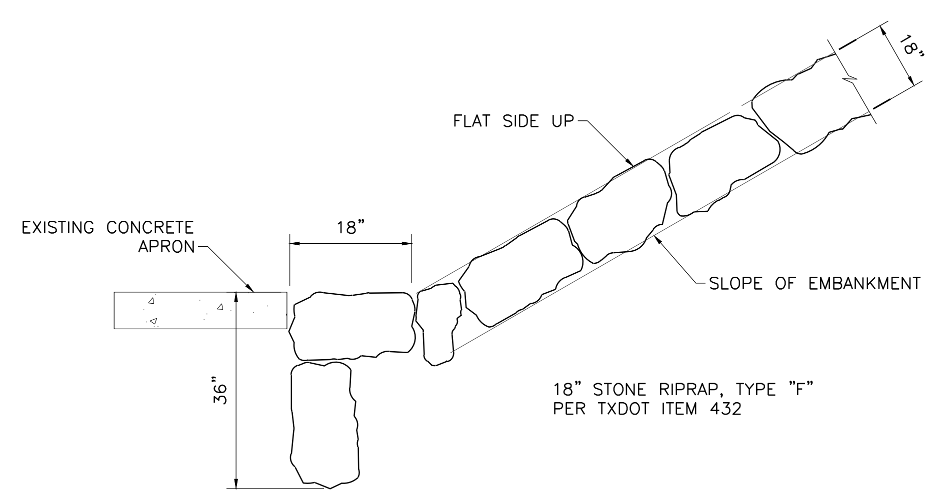
NOTES:

1. ALL BASE AND SUBGRADE WILL BE DENSITY CONTROLLED AND WILL MEET ALL SPECIFICATION REQUIREMENTS FOR THE CITY OF SAN ANGELO.
2. IT IS THE GOAL OF THE CITY TO DESIGN AND CONSTRUCT A STREET SYSTEM THAT WILL HAVE A LIFE EXPECTANCY OF TWENTY YEARS WITH NORMAL MAINTENANCE. STREETS THAT ARE CONSTRUCTED IN INDUSTRIAL AREAS WHERE HEAVY LOADS ARE EXPECTED WILL REQUIRE INDIVIDUAL DESIGN PROCESSES.
3. 8" ENGINEERED SUBGRADE. IF STABILIZATION IS REQUIRED, THE RATE WILL BE DETERMINED ACCORDING TO TEST RESULTS.

CITY OF SAN ANGELO

URBAN RESIDENTIAL STREETS WITH ALLEYS OR SIDEWALKS

S-A-1



2 ROCK RIPRAP DETAIL

NOT TO SCALE

Freese and Nichols, Inc.
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HEATHER RAE KEISTER
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PROFESSIONAL ENGINEER

08/06/2019

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CITY OF SAN ANGELO

AVENUE R BRIDGE REPAIR

STRUCTURAL

MISCELLANEOUS DETAILS

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