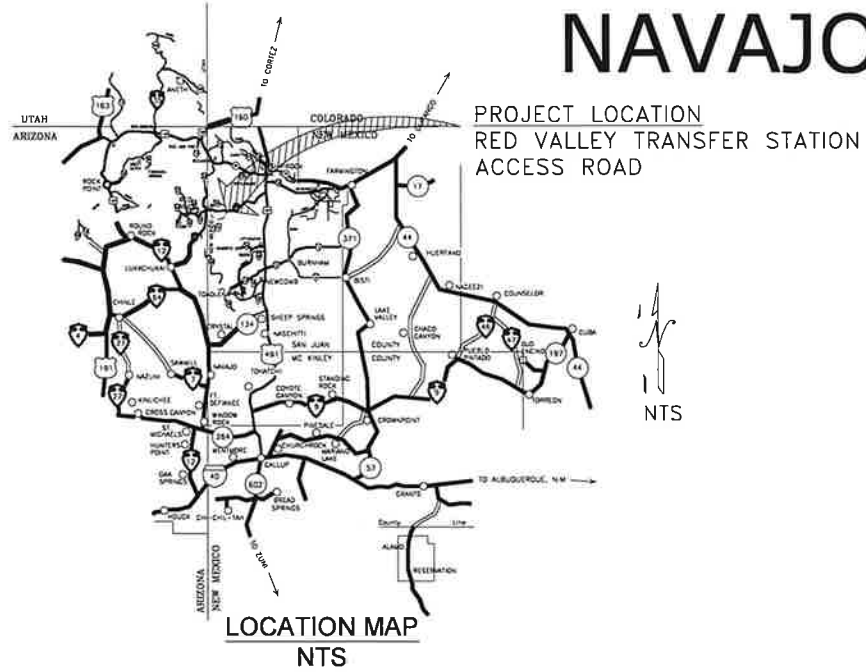


# NAVAJO DIVISION OF TRANSPORTATION



## PLANS FOR PROPOSED RED VALLEY TRANSFER STATION ACCESS ROAD

SAN JUAN COUNTY  
LENGTH 0.075 miles



TYPE OF CONSTRUCTION:  
GRADE, DRAIN, AGGREGATE BASE COURSE, HOT ASPHALT CONCRETE  
PAVEMENT AND MISCELLANEOUS CONSTRUCTION

SHEET INDEX	
SHEET	SHEET TITLE
1	COVER SHEET
2	GENERAL NOTES AND UTILITY CONTACTS
3	MISCELLANEOUS QUANTITIES
4 THRU 5	SITE LAYOUT
6	PERMANENT SIGNING DETAILS
7	TWO LANE ROADWAY WITH ONE-LANE CLOSURE NMDOT STANDARD DRAWING 702-11-1/2
8	CMP AND PIPE ARCHES BEDDING AND BACK FILL DETAILS NMDOT STANDARD DRAWING 206-07-1/1
9	CULVERT PIPE END SECTIONS (METAL) NMDOT STANDARD DRAWING 206-02-1/2
10	EROSION CONTROL AT CULVERT OUTLETS NMDOT STANDARD DRAWING 602-02-1/1
11	LAP SPLICE U-CHANNEL BREAK AWAY SYSTEM POST & HARDWARE DETAILS
12	PERMANENT SIGNING DETAILS
13	PRE-CAST CONCRETE CATTLE GUARD DETAILS
14	CATTLE GUARD AND WING BRACE DETAILS
15	25' TYPE 3 STEEL LOCKING GATE DETAILS
15	TOTAL SHEET COUNT

PLANS PREPARED BY  
WILSON & COMPANY  
4401 MASTHEAD ST. NE  
SUITE 150  
ALBUQUERQUE, NM 87109



RECOMMENDED:

PRINCIPAL ENGINEER  
NAVAJO DIVISION OF TRANSPORTATION

APPROVED:

DIRECTOR  
NAVAJO DIVISION OF TRANSPORTATION

DATE: \_\_\_\_\_

DATE: \_\_\_\_\_

**GENERAL NOTES:**

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-14), AND THE SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. ALL PERMANENT AND TEMPORARY ROADSIDE SIGNS, AND PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS (LATEST EDITION) AND IN ACCORDANCE WITH THE DETAILS ON THESE PLANS. PLACEMENT OF "STOP" BAR, PERMANENT TRAFFIC SIGNS AND PAVEMENT MARKINGS SHALL BE FIELD ADJUSTED AS DIRECTED BY THE CONSTRUCTION MANAGER (CM), AT NO ADDITIONAL COST TO THE GOVERNMENT.
3. THE TEMPORARY TRAFFIC CONTROL DETAILS SHOWN REFLECTS GENERAL REQUIREMENTS FOR THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR PREPARING AND SUBMITTING A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH THESE DETAILS, TAKING INTO ACCOUNT THE CONTRACTOR'S CONSTRUCTION SEQUENCING PLAN, MUTCD. THE CONTRACTOR SHALL ALSO SUBMIT A COPY OF THIS TRAFFIC CONTROL PLAN TO THE CM (2)-WEEKS PRIOR TO START OF CONSTRUCTION. TEMPORARY TRAFFIC CONTROL SHALL BE INCIDENTAL TO THE COMPLETION OF THE PROJECT, NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE.
4. THE DESIGN FEATURES INCLUDING HORIZONTAL AND VERTICAL ALIGNMENTS, TYPICAL SECTIONS, AND OTHER DESIGN DETAILS SHOWN SHALL NOT BE ALTERED OR MODIFIED IN ANYWAY DURING CONSTRUCTION WITHOUT THE EXPRESSED WRITTEN DIRECTION AND WRITTEN APPROVAL OF THE ENGINEER OF RECORD THROUGH THE CM, UNLESS OTHERWISE NOTED IN THESE PLANS OR SPECIFICATIONS. DRAINAGE STRUCTURES AND TURNOUTS SHALL BE INSTALLED AS SHOWN WITH ONLY MINOR CORRECTIONS IN LOCATION, SKEW, AND/OR INVERT ELEVATIONS AS NEEDED TO FIT FIELD CONDITIONS. TURNOUTS MAY NOT BE SHIFTED MORE THAN 15 FEET FROM THE LOCATIONS SHOWN ON THE PLANS WITHOUT THE WRITTEN APPROVAL OF THE CM.
5. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND EXPENSE FOR DISPOSAL OF TRASH AND/OR CONSTRUCTION DEBRIS IN ACCORDANCE WITH SECTIONS 107 AND 203 OF THE FP-14 AS WELL AS ANY AND ALL PERMIT REQUIREMENTS. THIS WORK SHALL BE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
6. THE BIDDER SHALL READ AND MAKE CAREFUL EXAMINATION OF THE PLANS, SPECIFICATIONS, QUANTITIES, MATERIAL, SURVEYING REQUIREMENTS, AND VISIT THE SITE OF THE PROPOSED CONSTRUCTION TO BECOME FAMILIAR WITH THE SITE CONDITIONS AND LIMITATIONS BEFORE MAKING A PROPOSAL. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY AND ALL ERRORS RESULTING FROM THE FAILURE TO MAKE SUCH AN EXAMINATION. ANY INFORMATION DERIVED FROM THE MAPS, PLANS, SPECIFICATIONS, PROFILES, DRAWINGS OR THE ENGINEER, SHALL NOT RELIEVE THE CONTRACTOR FROM ANY RISK OR FROM FULFILLING THE TERMS OF THE CONTRACT.
7. THE CONTRACTOR IS REQUIRED TO SUBMIT A REVISED PIPE LIST TO THE CM BASED ON THE FIELD STAKING IN ACCORDANCE WITH SECTION 152 OF THE CONTRACT SUPPLEMENTAL SPECIFICATION. THE APPROVAL OF ANY AND ALL REVISED PIPE LISTS WITH ACCOMPANYING DRAWINGS IS RENDERED AS A SERVICE ONLY AND IS NOT CONSIDERED A GUARANTEE OF MEASUREMENTS, QUANTITIES, INSTALLATION PROCEDURES, AND/OR DIMENSIONS, NOR SHALL IT BE CONSIDERED AS RELIEVING THE CONTRACTOR FROM COMPLYING WITH THE CONTRACT SPECIFICATIONS AND DESIGN PLANS. THE CONTRACTOR IS HEREBY NOTIFIED THAT UNDER NO CIRCUMSTANCE SHALL ANY DRAINAGE STRUCTURE(S) BE INSTALLED BELOW THE NATURAL FLOW LINE OF THE WASH, CHANNEL, ARROYO, OR DITCH LINE.
8. NO WORK SHALL BE PERFORMED OR GROUND DISTURBED OUTSIDE OF THE DESIGNATED CONSTRUCTION LIMITS IN ACCORDANCE WITH SECTION 107 OF THE FP-14 WITHOUT THE WRITTEN APPROVAL BY THE CM UNLESS OTHERWISE SHOWN AND LABELED ON THESE PLANS AS "CONSTRUCTION ZONE". IN NO CASE SHALL ANY WORK BE PERFORMED OUTSIDE THE DESIGNATED RIGHTS-OF-WAY LIMITS WITHOUT WRITTEN APPROVAL FROM THE CM, UNLESS OTHERWISE SHOWN AND CALLED OUT ON THESE PLANS AS "CONSTRUCTION ZONE". THE CONSTRUCTION LIMIT IS THE CATCH POINT EARTHWORK LIMIT PLUS 10 FEET, NOT TO EXCEED THE RIGHT-OF-WAY LIMITS.
9. THE DETAILS SHOWN ON THE EROSION/SEDIMENT CONTROL DETAILS ARE GENERAL REQUIREMENTS TO BE USED BY THE CONTRACTOR IN PREPARING A STORM WATER POLLUTION PREVENTION PLAN ALONG WITH THE REQUIREMENTS IN SECTION 157 OF THE SUPPLEMENTAL SPECIFICATION AND SPECIAL CONTRACT REQUIREMENTS. THE SWPPP IS ONLY REQUIRED AT THE DRAINAGE PIPE REPLACEMENT LOCATIONS. THE CONTRACTOR IS REQUIRED TO SUBMIT COURTESY COPY OF THE APPROVED SWPPP TO THE NAVAJO NATION WATER QUALITY EPA OFFICE.
10. THE QUANTITIES SHOWN ARE FOR ESTIMATING PURPOSES ONLY AND TO COMPARE AND CANVAS BIDS. ACTUAL PAY QUANTITIES WILL BE DETERMINED IN THE FIELD.
11. ALL TURNOUT/DRIVEWAYS, AS CALLED FOR ON THESE PLANS, SHALL EITHER BE CONSTRUCTED, REBUILT, RESHAPED AND/OR REMOVED UP TO THE RIGHT-OF-WAY LIMITS. ALL TURNOUTS SHALL BE PAVED TO CONNECT NEW TURNOUTS TO THE EXISTING ROADWAY/DRIVEWAY (AS SHOWN ON THE PLANS OR AS DIRECTED BY THE CM) SHALL BE INCIDENTAL TO BID ITEM 20401-0000. ANY REQUIRED AGGREGATE BASE AND/OR ASPHALT MATERIAL SHALL BE PAID FOR UNDER THE APPROPRIATE BID ITEMS FOR THIS WORK AS SHOWN IN THE BID SCHEDULE.
12. STRUCTURAL EXCAVATION AND BEDDING/BACKFILL OF ALL DRAINAGE STRUCTURES (CULVERTS) SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF STRUCTURES. BEDDING AND BACKFILL MATERIAL SHALL MEET ALL REQUIREMENTS OF FP-14, SECTIONS 209 AND 704. APPROVED EXCESS EXCAVATION MATERIAL MAY BE USED TO REBUILD TURNOUTS, EARTHEN DITCH BLOCKS, AND/OR PLACED ALONG ROADWAY SHOULDERS AS EMBANKMENT IN AREAS ADJACENT TO THE REMOVAL AND AS DIRECTED BY THE CM.
13. ALL FURROW AND DRAINAGE DITCHES SHALL BE STAKED AND GRADED TO DRAIN UP TO THE RIGHT-OF-WAY LIMITS. EARTHEN DITCH BLOCKS, DIKES AND DITCHES SHALL BE CONSTRUCTED AS SHOWN ON THESE PLANS AND/OR ADDED AT LOCATIONS DESIGNATED BY THE CM. ALL DITCH BLOCKS, DIKES AND FURROW DITCHES SHALL BE PAID FOR UNDER THE APPROPRIATE BID ITEMS FOR THIS WORK AS SHOWN IN THE BID SCHEDULE. AT ALL DRAINAGE PIPE REPLACEMENTS, INSTALLATIONS, EXTENSIONS, AND IN-PLACE PIPE CLEANING LOCATIONS, THE CONTRACTOR SHALL CLEAN, REGRADE, AND RESHAPE THE INLET AND OUTLET CHANNELS TO THE RIGHT-OF-WAY LINE AS DIRECTED BY THE CM. THIS WORK SHALL BE INCIDENTAL TO BID ITEMS FOR SECTIONS 602, 603, AND/OR 607.
14. IMMEDIATELY PRIOR TO PLACING EMBANKMENT, AGGREGATE BASE AND/OR RECYCLED MATERIAL, THE TOP 6 INCHES OF THE ORIGINAL GROUND, OR FINISHED SUBGRADE (INCLUDING TURNOUTS) SHALL BE CHECKED FOR COMPACTION AND GRADE. IF COMPACTION DOES NOT MEET THE MINIMUM SPECIFIED COMPACTION AND TOLERANCE REQUIREMENTS, THE ORIGINAL GROUND AND/OR SUBGRADE SHALL BE RE-WATERED AND/OR SCARIFIED AND RE-COMPACTED TO THE REQUIRED DENSITY AND TOLERANCE. AT THE CONTRACTOR'S EXPENSE, IN NO CASE SHALL ANY EMBANKMENT OR SURFACING MATERIAL BE PLACED ON FROZEN, MUDDY OR UNSTABLE NATURAL GROUND OR SUBGRADE. THIS WORK SHALL BE PAID UNDER BID ITEM 20414-0000 SUBGRADE PREPARATION.
15. THE EARTHWORK TABLE SHOWN IS TO ASSIST THE CONTRACTOR IN ESTABLISHING A BID UNDER THE EARTHWORK ITEMS SHOWN IN THE BID SCHEDULE. ALL ROADWAY EARTHWORK WILL BE PAID UNDER 20401-0000 ROADWAY EXCAVATION, NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE. ROADWAY EXCAVATION WILL COME FROM FURROW DITCH EXCAVATION AND EXCAVATION PIT LOCATED IN GATED AREA AS SHOWN IN PLANS.
16. THE LOCATION OF UTILITIES AS SHOWN IN THESE PLANS ARE APPROXIMATE AND ARE ONLY TO ASSIST THE CONTRACTOR IN COMPLETING THE WORK. THE CONTRACTOR SHALL CONTACT ALL UTILITY OWNERS PRIOR TO STARTING ANY CONSTRUCTION ACTIVITIES. SEE UTILITY CONTACT INFORMATION THIS SHEET. THE CONTRACTOR SHALL VERIFY ALL UTILITIES AND THEIR LOCATIONS WITH THE UTILITY OWNERS PRIOR TO CONSTRUCTION. ANY UTILITIES DAMAGED DUE TO NEGLIGENCE OF THE CONTRACTOR SHALL BE RESTORED TO CODE REQUIREMENTS AT THE CONTRACTOR'S EXPENSE.
17. THE CONTRACTOR SHALL REMOVE, CLEAN, AND STOCKPILE ALL SALVAGEABLE EXISTING CULVERTS, GUARDRAIL, CATTLE GUARDS, FENCING MATERIALS, ETC. AS CALLED FOR ON THESE PLANS AND/OR SECTIONS 203 AND 607 IN A DESIGNATED LOCATION ADJACENT TO THE REMOVAL LOCATION BUT OUTSIDE OF THE RIGHT-OF-WAY. THE CM SHALL OFFER THIS SALVAGED MATERIALS TO THE COMMUNITY MEMBERS AND/OR PROPERTY OWNERS. IF THEY ACCEPT, THE MATERIALS MUST BE PICKED UP THAT SAME DAY. ANY PIPE MATERIALS DETERMINED TO BE UNUSABLE BY THE CM OR UNACCEPTABLE BY THE LAND OWNER/ COMMUNITY MEMBERS SHALL BE DISPOSED OF BY THE CONTRACTOR IN ACCORDANCE WITH SECTIONS 107, AND 203. THE SALVAGE WORK SHALL BE INCLUDED IN THE APPROPRIATE UNIT PRICE BID ITEMS FOR SECTIONS 203 AND/OR 607.
18. THE CONTRACTOR SHALL BE REQUIRED TO REPAIR ALL DENTED, BENT OR OTHERWISE DAMAGED PIPE EDGES FOR THE SECTION AS CALLED FOR REPAIR WORK. THIS WORK SHALL MEET THE APPROVAL OF THE CM, AND IS EXPECTED TO INCLUDE STRAIGHTENING OF DENTED/BENTED CULVERT EDGES, WELDING OF CUTS/TEARS IN THE EXISTING CULVERTS, TRIMMING BACK THE EXISTING CULVERT TO CREATE AN END SUITABLE FOR AN EXTENSION COLLAR, ETC. NO SEPARATE PAYMENT FOR THIS WORK WILL BE MADE. THE CONTRACTOR SHALL CONSIDER THESE REPAIRS INCIDENTAL TO THE DRAINAGE PIPE BID ITEMS UNDER SECTION 602, AND 603.
19. THE CONTRACTOR SHALL SAW CUT (FULL DEPTH) THE EXISTING ASPHALT PAVEMENT (INCLUDING TURNOUTS) WHERE NEW ASPHALT IS TO TIE INTO THE OLD ASPHALT PAVEMENT AT THE LOCATIONS NOTED ON THE PLANS. THE CONTRACTOR SHALL MATCH THE NEW ASPHALTIC CONCRETE PAVEMENT SURFACE TO EXISTING PAVEMENT SECTION TIE-IN POINTS AND TO PROVIDE FOR A SMOOTH TRANSITION AS DIRECTED BY THE CM. ALL SAWED PAVEMENT EDGES TO RECEIVE ASPHALT TACK COAT. THIS WORK SHALL BE INCIDENTAL TO BID ITEM 40301-0000 AS SHOWN IN THE BID SCHEDULE.
20. THE CONTRACTOR WILL INCLUDE THE COST OF WATER NEEDED FOR CONSTRUCTION IN HIS BID COST FOR THE INDIVIDUAL ITEMS. THE COST FOR WATER WHICH IS NEEDED DURING THE COURSE OF THE PROJECT FOR ALL OTHER BID ITEMS/PURPOSES, INCLUDING DUST CONTROL AND FOUNDATION COMPACTION, WILL ALSO BE INCLUDED IN THE OVERALL BID COST FOR THE PROJECT. THE CONTRACTOR WILL BE RESPONSIBLE FOR COMPUTING HIS OWN WATER QUANTITIES AND THEN BASING HIS BID ON HIS OWN COMPUTED QUANTITIES. NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE.
21. AS INDICATED IN NOTE #3 THE TEMPORARY TRAFFIC CONTROL NECESSARY ALONG N13 FOR THE PROJECT WILL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO SEPARATE MEASUREMENT OF PAYMENT WILL BE MADE. THE BIA WILL NEED TO REVIEW AND APPROVE BEFORE IMPLEMENTING.

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	1710009030	2	15

**UTILITY CONTACTS:**

**WATER & WASTEWATER (SANITARY SEWER)**

NAVAJO TRIBAL UTILITY AUTHORITY  
 P.O. BOX 170  
 FT. DEFIANCE, AZ 86504  
 CONTACT PERSON: ADRIAN SHOWALTER  
 PHONE: (928) 729-5721, EXT. 2340  
 FAX: (928) 729-6240  
 EMAIL: adrians@ntua.com

**NEW MEXICO ONE CALL**

PH #811 OR (505)-260-1990



NAVAJO DIVISION OF TRANSPORTATION	
GENERAL NOTES AND UTILITY CONTACTS	
Designed by: DDM	Date: 3/20
Drawn by: ELO	Date: 3/20
Checked by: DDM	Date: 3/20
File Name: 1709030_GEN_NTS_DWG	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	1710009010	3	15

### SURFACING SCHEDULE

STATION TO STATION	LENGTH (FT)	DESCRIPTION	20414-0000				30101-2000				40301-0000				41101-5000	
			SUBGRADE PREPARATION		AGGREGATE BASE GRADING D		ASPHALT CONCRETE PAVEMENT (COMPLETE IN PLACE)				ASPHALT PRIME COAT GRADE PENETRATING EMULSIFIED PRIME (PEP)					
			WIDTH (FT)	S.Y.	WIDTH (FT)	DEPTH (IN)	S.Y.	TON	WIDTH (FT)	DEPTH (IN)	S.Y.	TON	WIDTH (FT)	TON		
10+65	11+50	85	TURNOUT	VARIES	346.35	VARIES	6.00	346.35	114.58	VARIES	3.00	346.35	59.54	VARIES	0.65	
11+50	14+60	310	2-12' LANES	24.00	826.67	24.00	6.00	826.67	273.49	24.00	3.00	826.67	142.12	24.00	1.55	
11+50	14+60	310	TAPERS	4.00	137.78	2.00	6.00	68.89	22.79	0.00	0.00	0.00	0.00	0.00	0.00	
<b>PROJECT SUBTOTAL</b>					1310.8				410.86				201.66		2.20	
<b>PROJECT USE</b>					1350				420				225		3	

SURFACING FACTORS			
ITEM	41101	UNIT WT	UNIT WT
	PRIME COAT		
	GAL/SQ YD	GALLONS PER TON	TON/CY
Base Course			1.985
HMA SP-III			2.063
Asphalt for Prime Coat	0.450	240	

ITEM NO. 61903-0700 - CATTLE GUARD, 24 FEET			
STATION	LOCATION	QUANTITY (EACH)	COMMENTS
11+50	LT & RT	1	3-UNIT
<b>PROJECT SUBTOTAL</b>		1	
<b>PROJECT USE</b>		1	

61902-0000			
STATION	LOCATION	GATE, 25' TYPE 3 STEEL LOCKING GATE	REMARKS
11+56	LT & RT	1	
<b>PROJECT TOTAL</b>		1	
<b>PROJECT USE</b>		1	

ESTIMATED DRAINAGE STRUCTURE QUANTITIES						
STATION	TO STATION	LOC	SKEW	60201-0800	60210-0800	NOTES
				24" CULVERT PIPE LF	24" CULVERT PIPE END SECTION EA	
12+12		LT/RT	NORMAL	34	2	
<b>PROJECT SUBTOTAL</b>				34	2	
<b>PROJECT USE</b>				34	2	

ITEM NO. 20425-2000 - DITCH, EXCAVATION, FURROW DITCH					
STATION	TO STATION	LOC	QUANTITY (LF)	REMARKS	
12+12	14+60	LT	248.00	V-DITCH	
<b>PROJECT TOTAL</b>			248.0		
<b>PROJECT USE</b>			250		

NOTE: EXCAVATED MATERIAL TO BE USED FOR ROADWAY FILL

SIGN CODE	SIGN AREA (SF)	NO. OF SIGNS	TOTAL SIGN AREA (SF)	POST LENGTHS				MOUNTING REQUIREMENTS		BASE POSTS	
				LEFT (LF)	CENTER (LF)	RIGHT (LF)	TOTAL (LF)	1 3/4 x 1 3/4	2.0 x 2.0	NO. (EACH)	TOTAL LENGTH (LF)
<b>PERMANENT SIGNING</b>											
R1-1-30	6	1	6		13		13		3.5	1	16.00
W2-2L-30	6	3	19		10		10		3.5	3	39.00
<b>PROJECT TOTAL</b>			25							4	55
<b>PROJECT USE</b>			30							4	60



EARTHWORK SUMMARY							
STATION	TO STATION	LOC	DITCH* EXCAVATION	EMBANKMENT*	SHRINK (15%)	ROADWAY EXCAVATION**	
			CU YD	CU YD	CU YD	CU YD	***
11+50	14+60	LT & RT	6.89	170	25	188	
<b>PROJECT SUBTOTAL</b>						188	
<b>PROJECT USE</b>						200	

\*FOR CONTRACTORS INFORMATION ONLY  
 \*\*ROADWAY EXCAVATION WILL COME FROM V-DITCH EXCAVATION AND EXCAVATION PIT LOCATED IN GATED AREA AS SHOWN IN PLANS.  
 \*\*\* EXCAVATION TO BE PAID UNDER ITEM 20401-0000 ROADWAY EXCAVATION

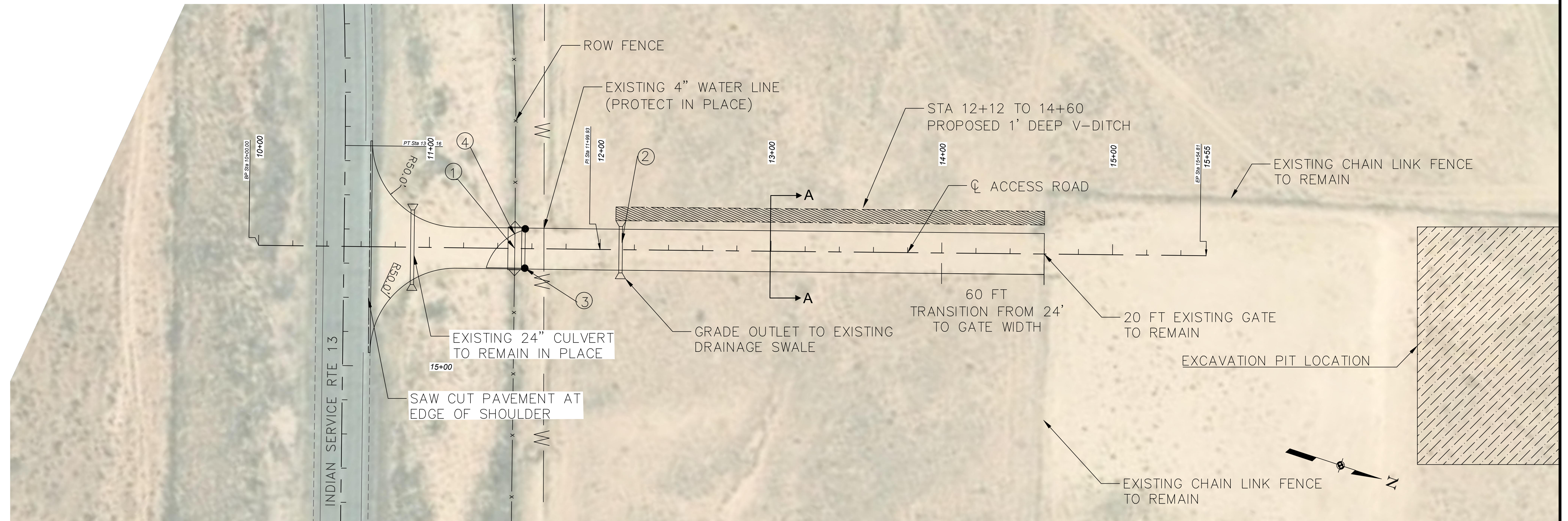
STATION	TO STATION	LOCATION	ITEM NO. 63401a-24" STOP BARS
14+18.20	14+30.20	Stop Bars	24
<b>PROJECT SUBTOTAL</b>			24
<b>PROJECT USE</b>			30

\*Quantities shown include two applications for item no. 63401

NAVAJO DIVISION OF TRANSPORTATION  
 RED VALLEY TRANSFER STATION  
 ACCESS ROAD

Designed by: MJM	Date: 3/31/20
Drawn by: ELO	Date: 3/31/20
Checked by: DDM	Date: 3/31/20
File Name: 1709030_TURNOUT_SHT MJM.DWG	

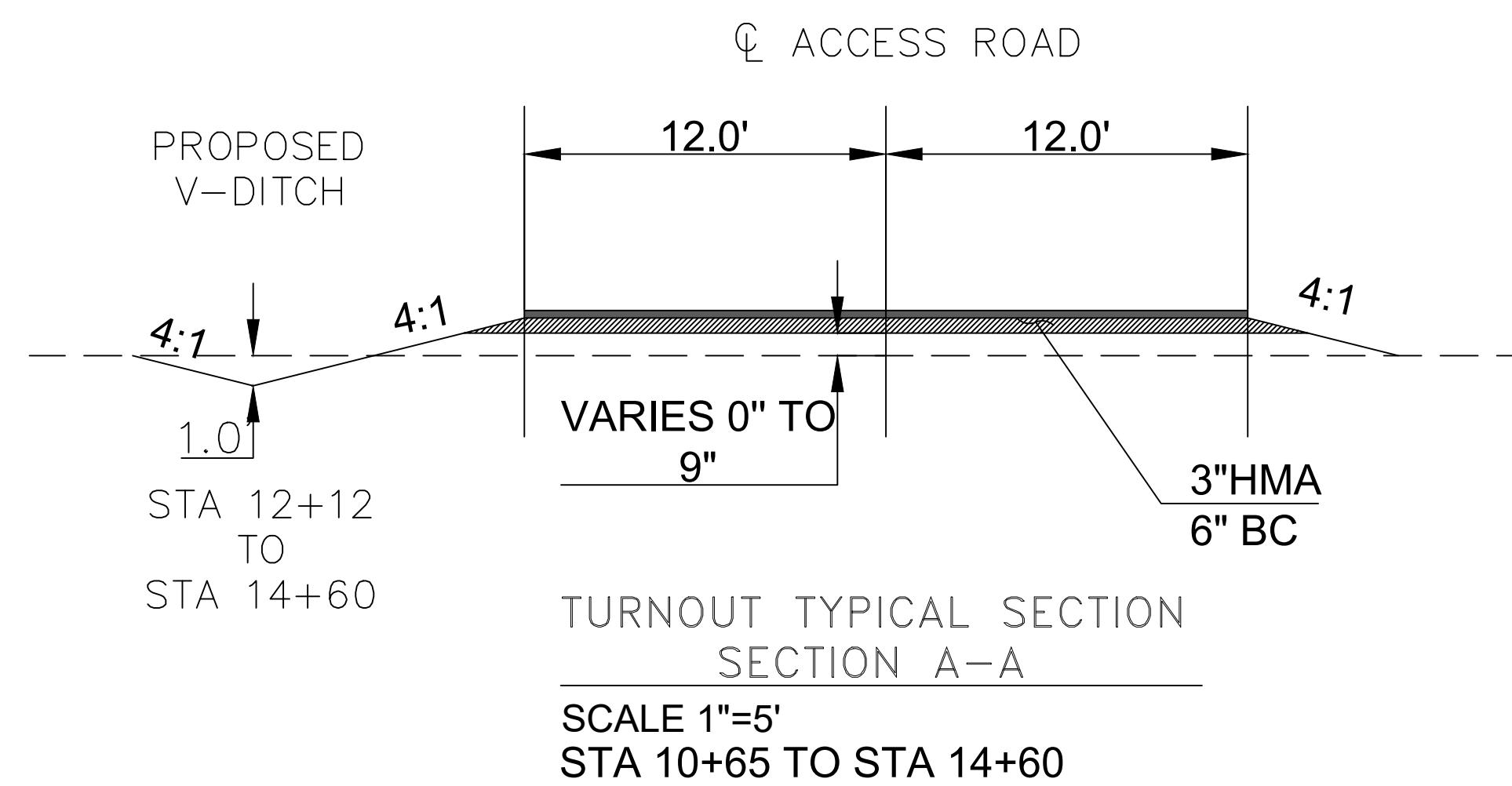
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	1710009010	4	15



### RED VALLEY TRANSFER STATION ACCESS ROAD

SCALE: 1"=30'

- ① INSTALL NEW 3-UNIT, 24' CATTLE GUARD
- ② INSTALL 34 LF OF 24" CMP WITH END SECTIONS
- ③ INSTALL 25' TYPE 3 STEEL LOCKING GATE
- ④ REMOVE 32 LF OF EXISTING BARBED WIRE FENCE

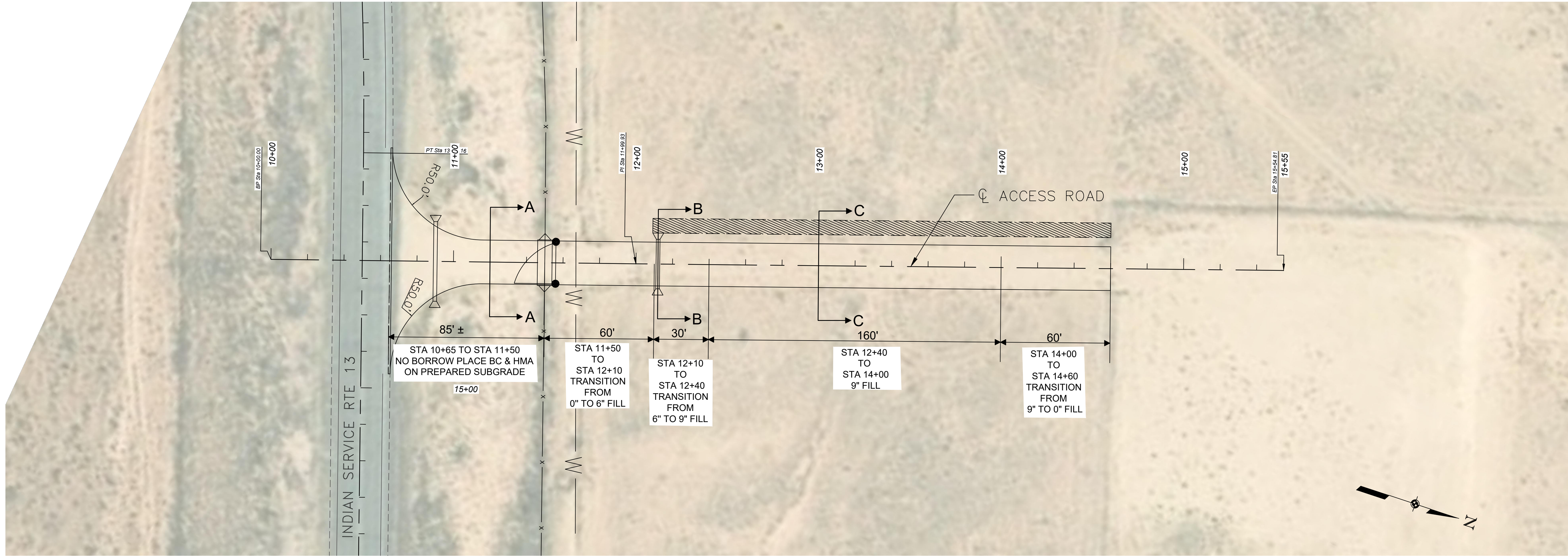


NAVAJO DIVISION OF TRANSPORTATION

### RED VALLEY TRANSFER STATION ACCESS ROAD

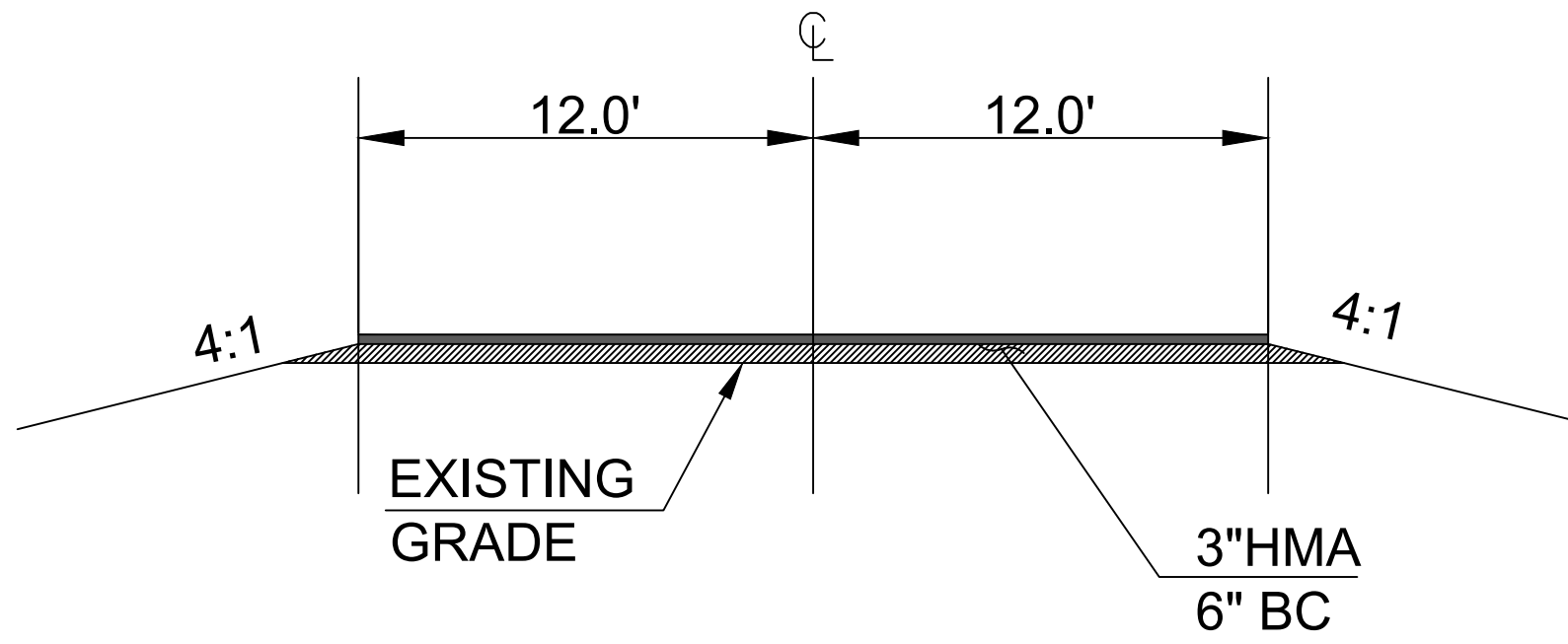
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Checked by: DDM	Date: 3/31/20
File Name: 1709030_TURNOUT_SHT MJM.DWG	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	1710009030	5	15

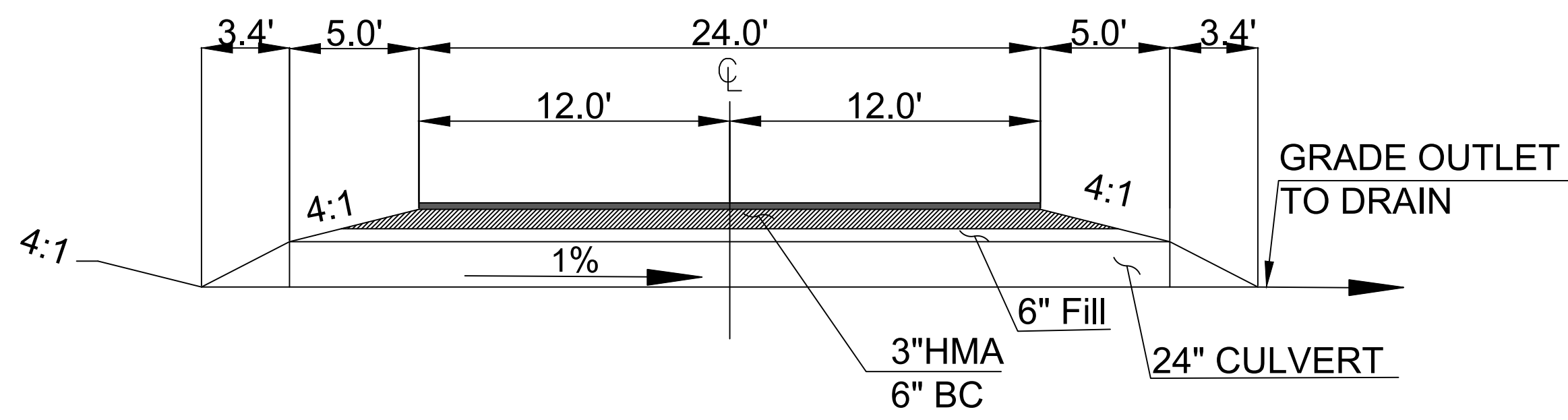


**RED VALLEY TRANSFER STATION ACCESS ROAD**

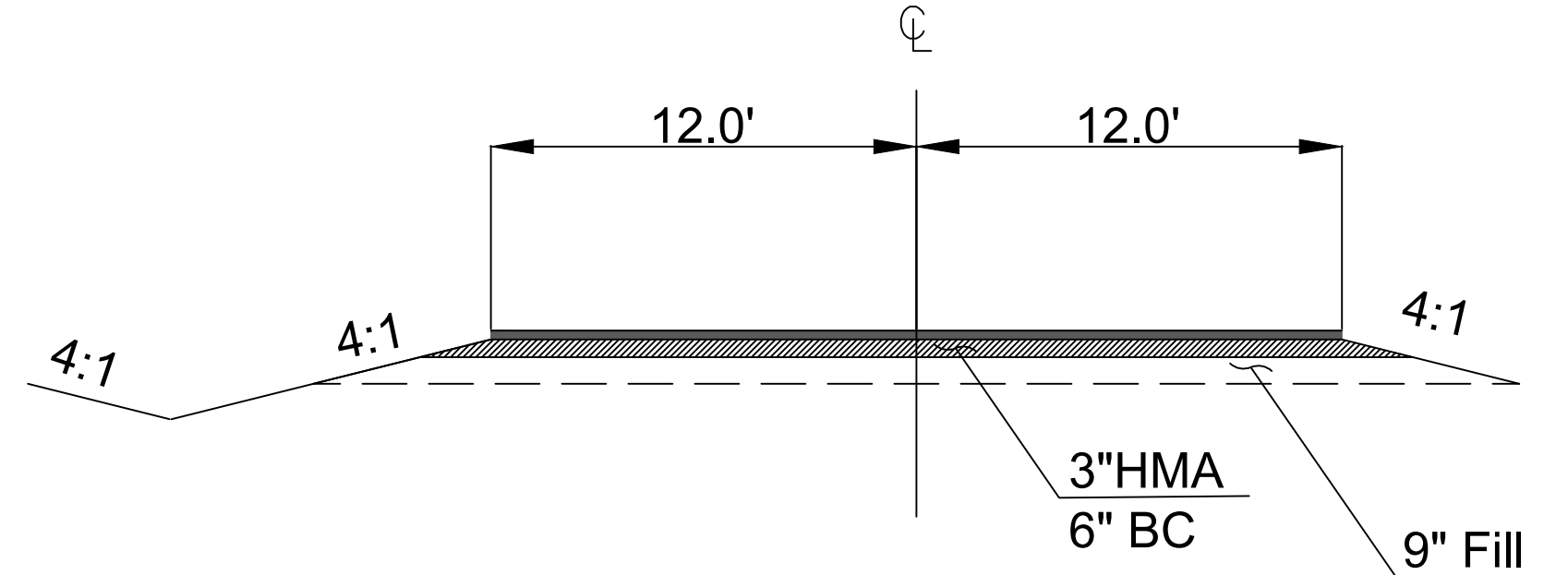
SCALE: 1"=30'



TURNOUT TYPICAL SECTION  
SECTION A-A  
SCALE 1"=5'  
STA 10+65 TO STA 11+47



TYPICAL SECTION  
SECTION B-B  
SCALE 1"=5'  
STA 12+12



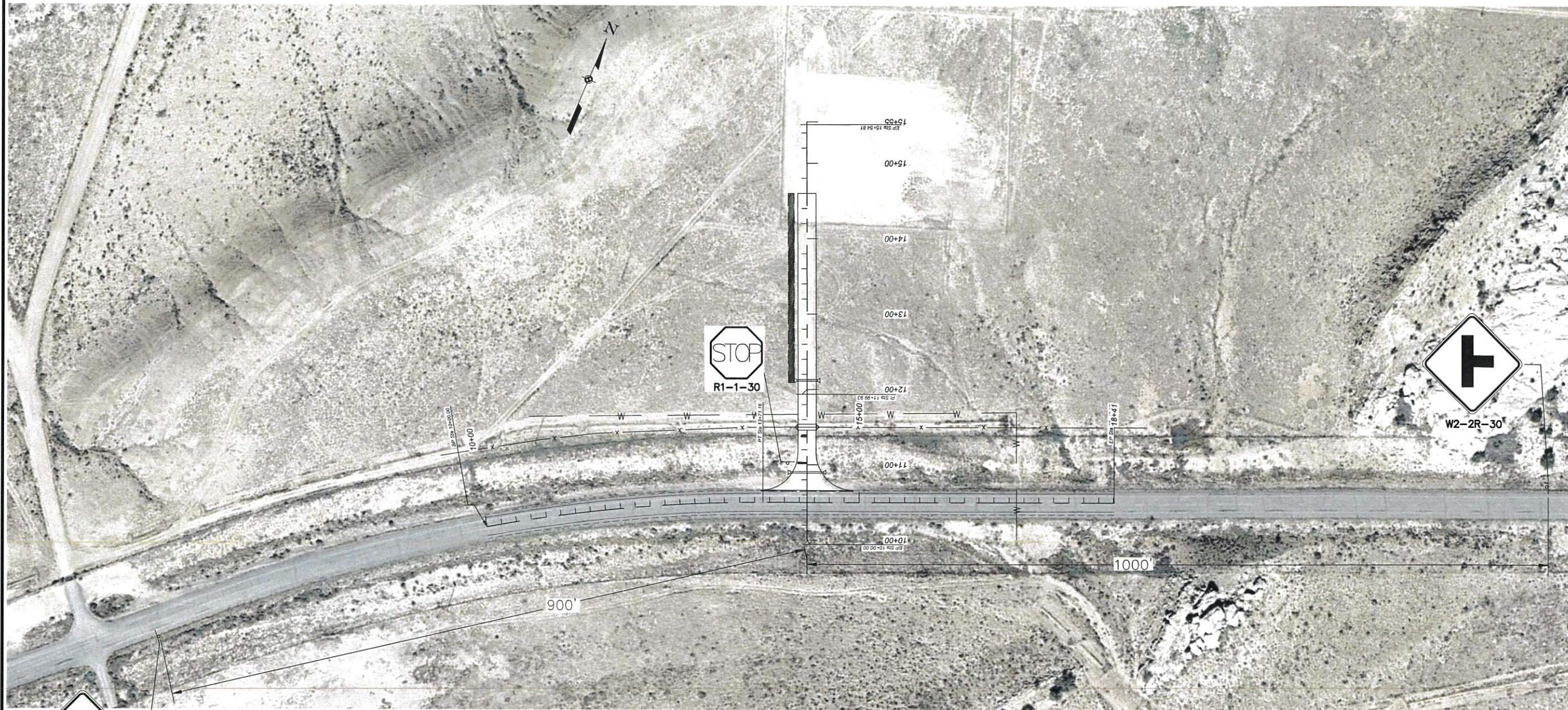
TYPICAL SECTION  
SECTION C-C  
SCALE 1"=5'  
STA 12+40 TO STA 14+00



NAVAJO DIVISION OF TRANSPORTATION	
RED VALLEY TRANSFER STATION ACCESS ROAD	
Designed by: MJM	Date: 3/31/20
Drawn by: ELO	Date: 3/31/20
Checked by: DDM	Date: 3/31/20
File Name: 1709030_TURNOUT_SHT MJM.DWG	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	1710009030	6	16



W2-2L-30

**RED VALLEY TRANSFER STATION ACCESS ROAD**  
SCALE: 1"=70'



NAVAJO DIVISION OF TRANSPORTATION

**PERMANENT SIGNING  
DETAILS**

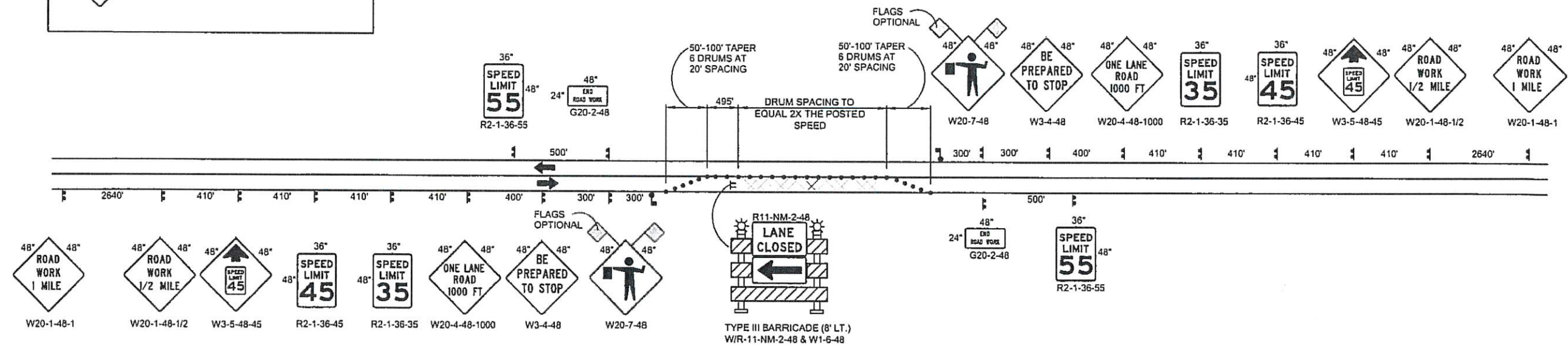
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Drawn by: ELO	Date: 3/31/20
Checked by: DDM	Date: 3/31/20

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	1710009030	7	15

36" 36"  
45 MPH  
SPEED ZONE  
AHEAD  
NOTE:  
W3-5a-36-45 CAN BE USED  
INSTEAD OF W3-5-36-45.



**TYPICAL SIGNING AND DRUM PLACEMENT**  
WORKING HOURS - FOR DETOUR CONNECTIONS AND OBLITERATION

LONGITUDINAL BUFFER			
SPEED (MPH)	LENGTH (FEET)	DRUMS (EACH)	SPACING (FEET)
55	495	10	55 (MAX)

\* DEVICE SPACING MAY BE REDUCED AND ADDITIONAL DEVICES USED AS NEEDED.

**NOTES:**

- DURING CONSTRUCTION OPERATION (ONE LANE TRAFFIC), TRAFFIC SHALL BE MOVED THROUGH THE WORK ZONE USING PILOT CARS. ALL PILOT CARS SHALL BE EQUIPPED WITH THE FOLLOWING SIGNS AND RADIO FOR FLAGMAN & PILOT CARS.
 

36" 18"  
PILOT CAR FOLLOW ME  
G20-4-36

THE PILOT CAR, APPLICABLE SIGN, AND OTHER ITEMS RELATED TO THE USE OF THE PILOT CAR SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION. NO PAYMENT OR MEASUREMENT WILL BE MADE THEREFORE.
- AT THE END OF THE WORKING DAY, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE A DRIVING SURFACE FREE OF OBSTRUCTION (TWO WAY TRAFFIC).
- BUFFERS SHOULD BE ADJUSTED TO INCREASE VISIBILITY OF FLAGGER STATIONS.
- TO ENHANCE VISIBILITY OF WORK ZONE USE 48"X48" WARNING SIGNS.
- NIGHTTIME OPERATIONS SHALL ADHERE TO NCHRP 476 GUIDELINES FOR DESIGN AND OPERATION OF NIGHTTIME TRAFFIC CONTROL; FLAGGERS SHALL WEAR HIGH VISIBILITY SAFETY APPAREL CLASS 2 OR 3; FLAGGER STATIONS SHALL BE ILLUMINATED.

**LEGEND:**

- TYPE B WARNING LIGHT
- FLAGGER STATION

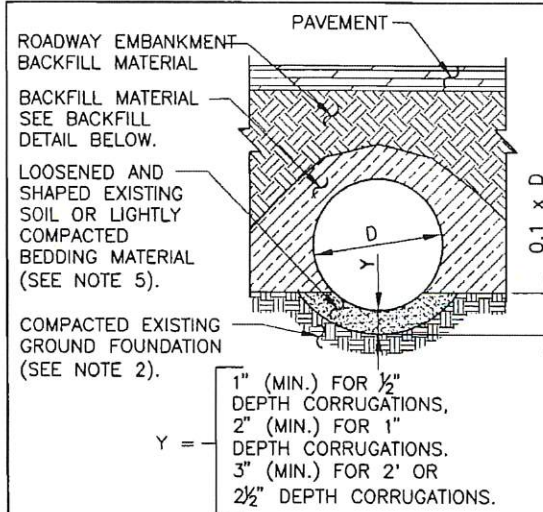
FLUORESCENT ORANGE FLAG

NO.	DATE	REV BY	DESCRIPTION
REVISIONS (OR CHANGE NOTICES)			
NEW MEXICO DEPARTMENT OF TRANSPORTATION STANDARD DRAWING			
TWO LANE ROADWAY WITH ONE-LANE CLOSURE, FLAGMAN, PILOT CAR (55 MPH)			
APPROVED			DATE
	DESIGN ENGINEER		11/15/15

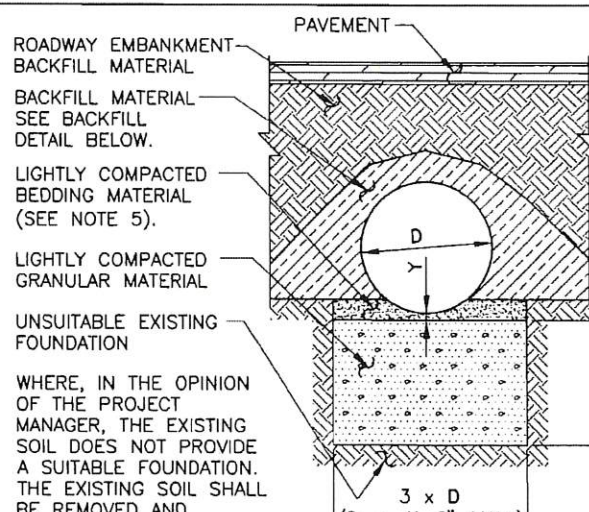
DRAWING SCALE: NOT TO SCALE

702-11-1/2

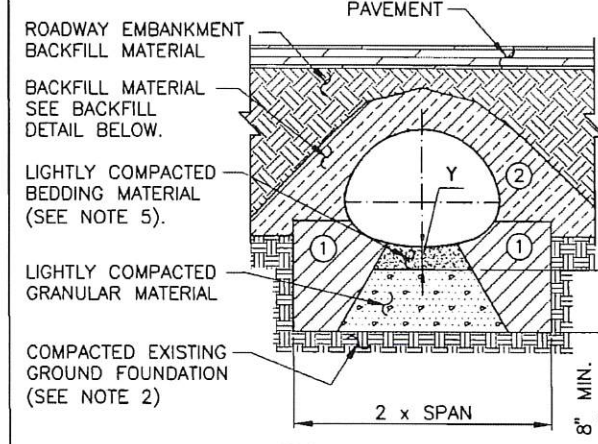
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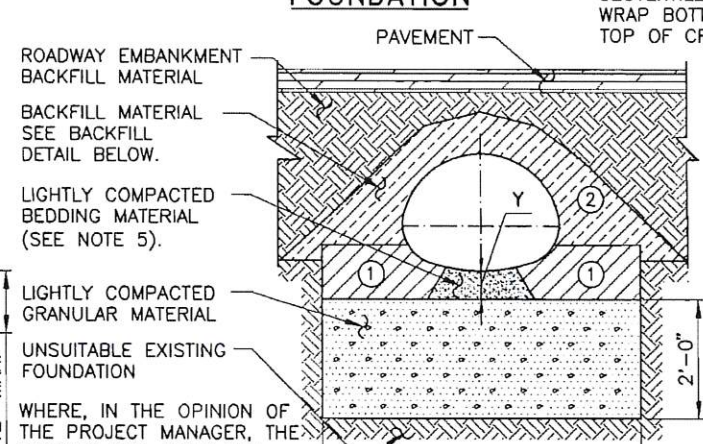
**SUITABLE EXISTING GROUND FOUNDATION**



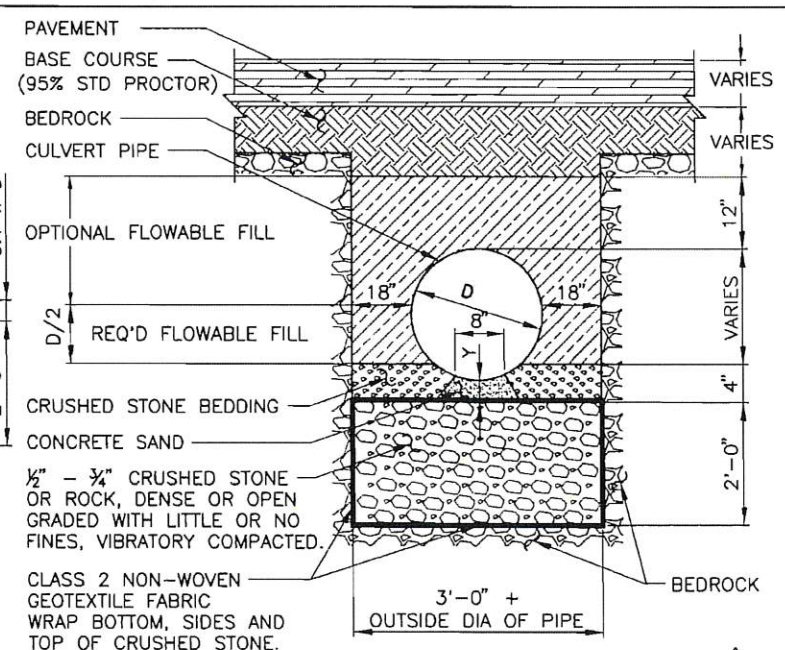
**UNSUITABLE EXISTING FOUNDATION**



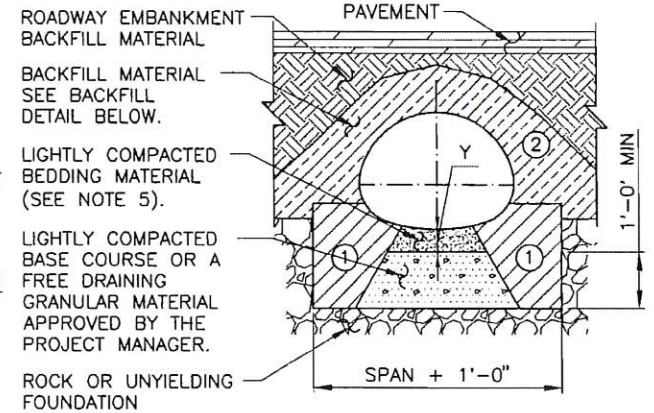
**SUITABLE EXISTING GROUND FOUNDATION**



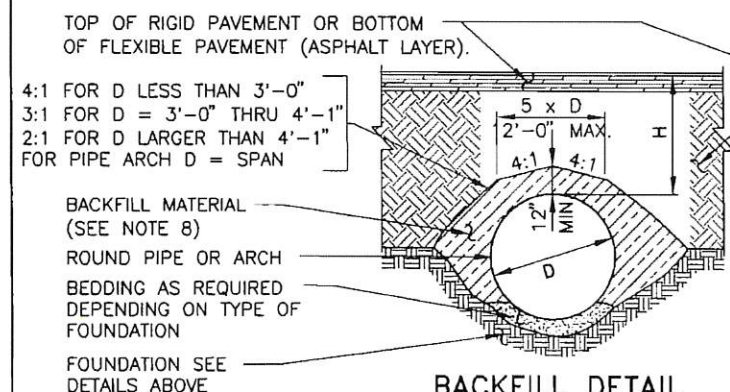
**UNSUITABLE EXISTING FOUNDATION**



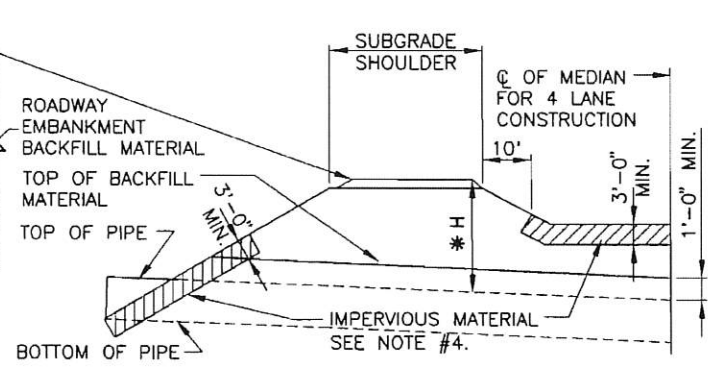
**PIPE INSTALLATION DETAIL (FOR BEDROCK EXCAVATION ONLY)**



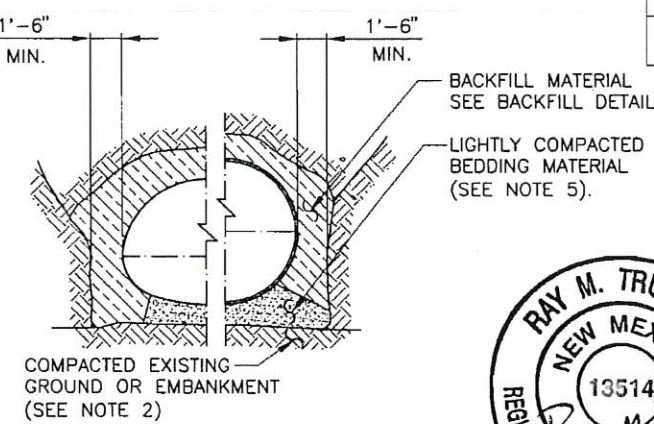
**ROCK OR UNYIELDING FOUNDATION**



**BACKFILL DETAIL**



**CROSS SECTION OF ROADWAY EMBANKMENT PIPE ARCHES ROUND PIPE**



**TRENCH CONDITION**

**GENERAL NOTES:**

1. RIVETED OR WELDED METAL PIPE AND ARCHES SHALL BE PLACED WITH THE INSIDE CIRCUMFERENTIAL LAPS POINTING DOWNSTREAM AND WITH LONGITUDINAL LAPS AT THE SIDE ON QUARTER POINTS, NOT TOP OR BOTTOM. STRUCTURAL PLATE AND PIPE ARCH CULVERTS SHALL BE ERECTED AS SHOWN ON THE ERECTION DIAGRAMS FURNISHED BY THE SUPPLIER.
2. THE EXISTING GROUND FOUNDATION MATERIAL UNDER PIPES SHALL BE BROKEN UP AND COMPACTED TO A MINIMUM DEPTH OF 6". COMPACTION SHALL BE 95% OF MAXIMUM DENSITY BY AASHTO SPECIFICATION T-99.
3. WHERE AN UNSUITABLE MATERIAL (PEAT, MUCK, ETC.) IS ENCOUNTERED AT OR BELOW THE INVERT ELEVATION. THE NECESSARY SUBSURFACE EXPLORATION AND ANALYSIS SHALL BE MADE AND CORRECTIVE TREATMENT SHALL BE AS DIRECTED BY THE PROJECT MANAGER.
4. IMPERVIOUS MATERIAL SHALL BE PLACED LONGITUDINALLY ALONG THE PIPE TO THE ELEVATIONS AND LIMITS SHOWN ON THE "CROSS SECTION OF ROADWAY EMBANKMENT," AND TRANSVERSELY AROUND THE PIPE TO THE DENSITY AND SLOPES SHOWN FOR BACKFILL MATERIAL ON THE "BACKFILL DETAIL." UNLESS OTHERWISE DESIGNATED ON THE PLANS OR DIRECTED BY THE PROJECT MANAGER IMPERVIOUS MATERIAL SHALL CONFORM TO AASHTO SPECIFICATION A-6 OR A-7 SOILS.
5. BEDDING MATERIAL SHALL BE ROUGHLY SHAPED TO FIT BOTTOM OF PIPES AND THEN LIGHTLY COMPACTED. MATERIAL SHALL CONFORM TO SECTION 206 OF THE NEW MEXICO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS. FOR PIPE ARCH, THE WIDTH OF THE BEDDING SHALL NOT EXCEED THE WIDTH OF THE BOTTOM ARC.
6. WHERE MULTIPLE LINES OF PIPE OR PIPE ARCHES GREATER THAN 4'-0" IN DIAMETER OR SPAN ARE USED, THEY SHALL BE SPACED SO THAT ADJACENT SIDES OF THE PIPE SHALL BE AT LEAST ONE-HALF DIAMETER OR 3'-0" APART, WHICHEVER IS LESS, TO PERMIT ADEQUATE COMPACTION OF BACKFILL MATERIAL. FOR DIAMETERS 4'-0" AND LESS, THE MINIMUM SPACING SHALL BE NOT LESS THAN 2'-0". SEE 570-02-2/2 OR 570-02-2/2 FOR FLARED END SECTIONS.
7. A CONTINUOUS CONCRETE CRADLE SHALL BE USED ONLY WHEN CALLED FOR ON THE PLANS.
8. BACKFILL MATERIAL SHALL CONFORM TO SECTION 206 OF THE NEW MEXICO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS. SPECIAL CARE SHALL BE TAKEN WHEN COMPACTING BACKFILL AT THE HUNCHES AND SIDES OF PIPES.
9. REFER TO 206-03-1/1 THRU 206-06-1/1 FOR TABLE OF MINIMUM AND MAXIMUM COVER AND CORRESPONDING GAUGE.

KEY	SYMBOL	DESCRIPTION
①		100% COMPACTION
②		90% COMPACTION

NO.	DATE	REV. BY	DESCRIPTION
Δ	2/14/07	YML	REVISIONS TO BEDROCK DETAIL

NEW MEXICO  
DEPARTMENT OF TRANSPORTATION  
STANDARD DRAWING  
CORRUGATED METAL CULVERT  
AND PIPE ARCHES  
BEDDING AND BACKFILL  
DETAILS



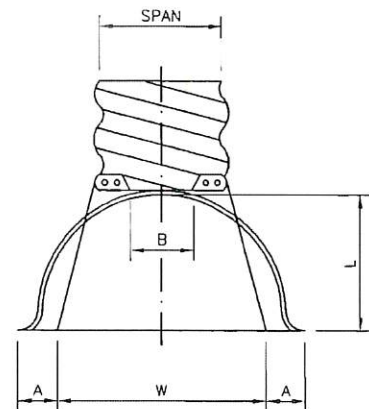
8/29/08

DESIGNED BY \_\_\_\_\_ DRAWN BY SKL CHECKED BY TM/YML

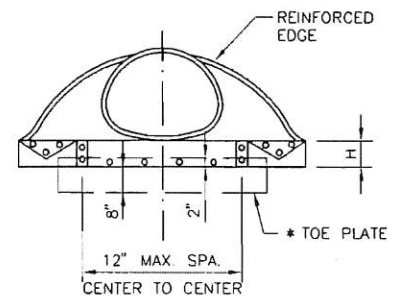
206-07-1/1

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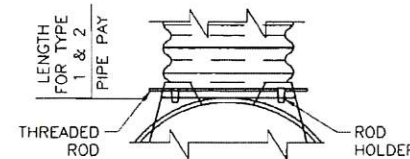


PLAN



ELEVATION

NOTE: SIZES EQUIVALENT TO THE ABOVE, USING 3" x 1" CORRUGATIONS, MAY BE USED PROVIDING THAT THEY MEET THE SIZES SHOWN UNDER TABLE 6 OF SERIAL 206-04-1/3 THRU 206-04-3/3.



TYPE 2

FOR 17" x 13" THRU 57" x 38"

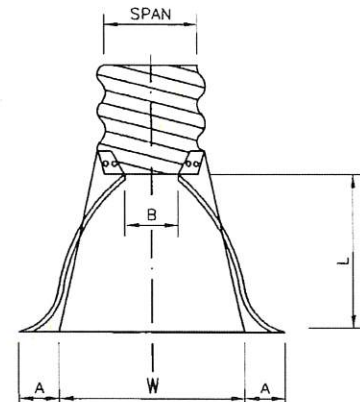
PIPE ARCH DIMENSIONS		GALVANIZED THICKNESS GA.	DIMENSIONS					APPROX. SLOPE	BODY
SPAN (IN.)	RISE (IN.)		A (IN.) (± 1")	B (IN.) (MAX.)	H (IN.) (± 1")	L (IN.) (± 1/2")	W (IN.) (± 2")		
17	13	16	7	9	6	19	30	2 1/2:1	1 PC.
21	15	16	7	10	6	23	36	2 1/2:1	1 PC.
24	18	16	8	12	6	28	42	2 1/2:1	1 PC.
28	20	16	9	14	6	32	48	2 1/2:1	1 PC.
35	24	14	10	16	6	39	60	2 1/2:1	1 PC.
42	29	14	12	18	6	46	75	2 1/2:1	1 PC.
49	33	12	13	21	9	53	85	2 1/2:1	2 PC.
57	38	12	18	26	12	63	90	2 1/2:1	2 PC.
64	43	12	18	30	12	70	102	2 1/4:1	2 PC.
71	47	12	18	33	12	77	114	2 1/4:1	3 PC.
77	52	12	18	36	12	77	126	2:1	3 PC.
83	57	12	18	39	12	77	138	2:1	3 PC.

\* THE CONTRACTOR SHALL VERIFY WITH PROVIDERS FOR CURRENT INDUSTRY SIZES.

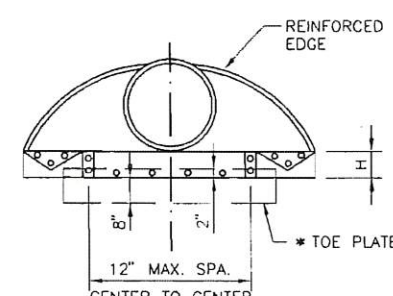
NOTE:

- ALL 3 PIECE BODIES TO HAVE 12 GAUGE THICK SIDES AND 10 GAUGE THICK CENTER PANELS. WIDTH OF CENTER PANELS TO BE GREATER THAN 20% OF THE PIPE PERIPHERY. MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED BY 3/8" GALVANIZED RIVETS OR BOLTS.
- FOR 77" X 52" AND 83" X 57" SIZES, REINFORCED EDGED TO BE SUPPLEMENTED BY L 2" X 2" X 1/4" GALVANIZED ANGLES. THE ANGLES TO BE ATTACHED BY 3/8" GALVANIZED NUTS AND BOLTS.
- ANGLE REINFORCEMENT WILL BE PLACED UNDER THE CENTER PANEL SEAMS ON THE 77" X 52" AND 83" X 57" SIZES.

\* 4. TOE PLATE TO BE CONSTRUCTED WHERE SHOWN ON PLANS.



PLAN



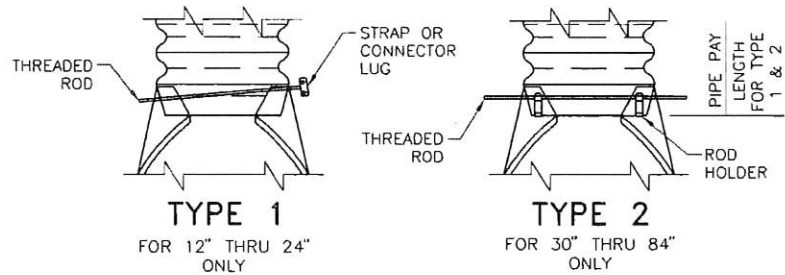
ELEVATION

ROUND PIPE DIMENSIONS		GALVANIZED THICKNESS GAUGE.	DIMENSIONS					APPROX. SLOPE	BODY
PIPE DIA. (IN.)	RISE (IN.)		A (IN.) (± 1")	B (IN.) (MAX.)	H (IN.) (± 1")	L (IN.) (± 1/8")	W (IN.) (± 2")		
12	16	16	6	6	6	21	24	2 1/2:1	1 PC.
15	16	16	7	8	6	26	30	2 1/2:1	1 PC.
18	16	16	8	10	6	31	36	2 1/2:1	1 PC.
21	16	16	9	12	6	36	42	2 1/2:1	1 PC.
24	16	16	10	13	6	41	48	2 1/2:1	1 PC.
30	14	12	16	8	8	51	60	2 1/2:1	1 PC.
36	14	14	19	9	9	60	72	2 1/2:1	2 PC.
42	12	16	22	11	11	69	84	2 1/2:1	2 PC.
48	12	18	27	12	12	78	90	2 1/4:1	2 PC.
54	12	18	30	12	12	84	102	2:1	2 PC.
60	12	18	33	12	12	87	114	1 3/4:1	3 PC.
66	12	18	36	12	12	87	120	1 1/2:1	3 PC.
72	12	18	39	12	12	87	126	1 1/3:1	3 PC.
78	12	18	42	12	12	87	132	1 1/4:1	3 PC.
84	12	18	45	12	12	87	138	1 1/16:1	3 PC.

\* THE CONTRACTOR SHALL VERIFY WITH PROVIDERS FOR CURRENT INDUSTRY SIZES.

NOTE:

- ALL 3 PIECE BODIES TO HAVE 12 GAUGE THICK SIDES AND 10 GAUGE CENTER PANELS. WIDTH OF CENTER PANELS TO BE GREATER THAN 20% OF THE PIPE PERIPHERY. MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED BY 3/8" GALVANIZED RIVETS OR BOLTS.
- FOR 60" THRU 84" SIZES, REINFORCED EDGES TO BE SUPPLEMENTED WITH GALVANIZED STIFFENER ANGLES. THE ANGLES WILL BE L 2" X 2" X 1/4" FOR 60" THRU 78" DIAMETER AND L 2 1/2" X 2 1/2" X 1/4" FOR 78" AND 84" DIAMETER. THE ANGLES TO BE ATTACHED BY 3/8" GALVANIZED NUTS AND BOLTS.
- TOE PLATE TO BE CONSTRUCTED WHERE SHOWN ON PLANS.



TYPE 1

FOR 12" THRU 24" ONLY

TYPE 2

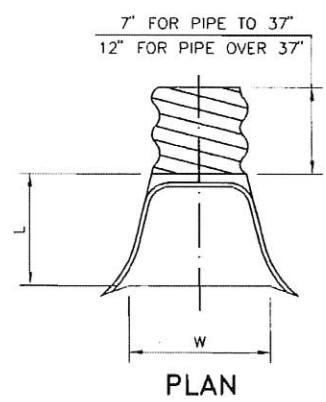
FOR 30" THRU 84" ONLY

STANDARD CONNECTION  
STANDARD END SECTIONS FOR PIPE-ARCH STEEL PIPE

STANDARD CONNECTIONS  
STANDARD END SECTIONS FOR ROUND STEEL PIPE

GENERAL NOTES

- FOR MULTIPLE INSTALLATION OF ALL TYPES, A MIN. OF A 2'-0" SPACING MEASURED ALONG THE HORIZONTAL BETWEEN FLARED END SECTIONS AT THEIR WIDEST CROSS SECTION SHALL BE USED.
- WELDING WILL NOT BE PERMITTED IN CONNECTING END SECTIONS TO CONNECTOR SECTIONS OR CONNECTOR SECTIONS TO PIPE.
- TYPE 1 AND TYPE 2 MAY BE USED WITH WELDED SEAM OR LOCKSEAM CONNECTIONS HELICALLY CORRUGATED PIPE WITH REROLLED ENDS. REROLLED ENDS SHALL INCLUDE A MINIMUM OF TWO ANNULAR CORRUGATIONS OF THE SAME SIZE AS THE PIPE CORRUGATIONS.



PLAN

CORRUGATED ALUMINUM PIPE END SECTION

PIPE DIAM. (IN.)	APRONS	
	L (IN.)	W (IN.)
18	19	30
21	23	36
24	28	42
30	31.5	48
36	38.5	60
42	47	75
48	54	85
60	63	96
66	70	112
72	77	128



NO.	DATE	REV. BY	DESCRIPTION
2/10/09	YML		CORRECTED 0.6 GA. TO 3/8" #
2/10/09	YML		MADE GENERAL REVISIONS
2/10/09	YML		CORRECTED 83" x 35" TO 83" x 57"

NEW MEXICO  
DEPARTMENT OF TRANSPORTATION  
STANDARD DRAWING

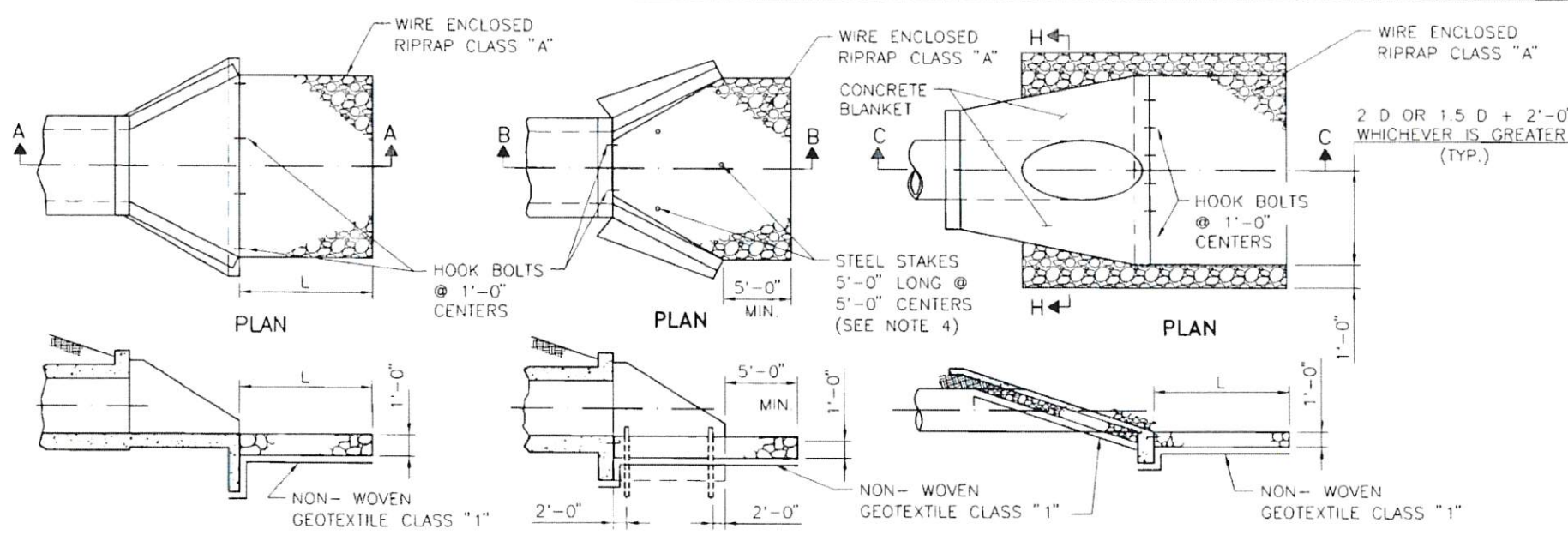
CULVERT PIPE  
END SECTIONS  
(METAL)

DESIGNED BY \_\_\_\_\_ DRAWN BY SKL CHECKED BY TM/YML

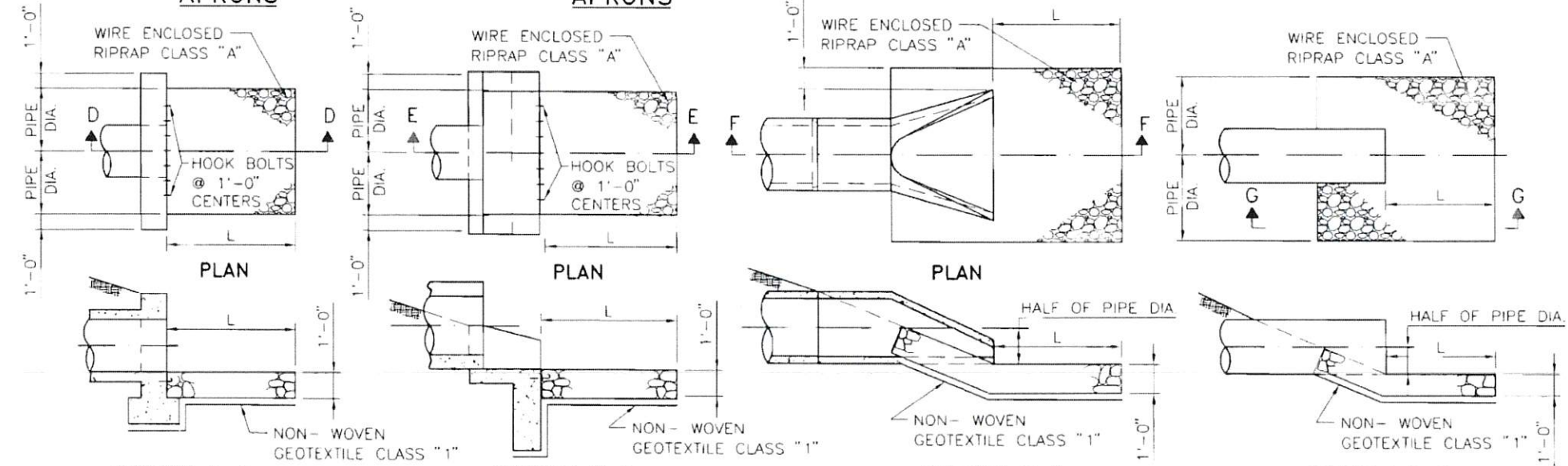
570-02-1/2

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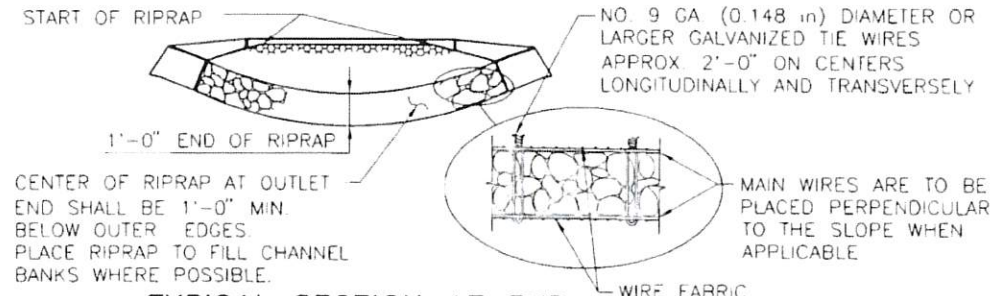
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	1710009030	10	15



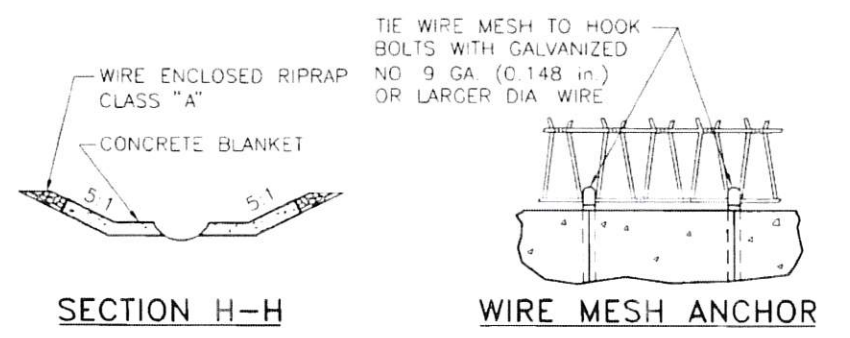
SECTION A-A BOX CULVERTS WITH APRONS  
 SECTION B-B BOX CULVERTS WITHOUT APRONS  
 SECTION C-C CONCRETE BLANKETS



SECTION D-D H-1 HEADWALL  
 SECTION E-E H-2 HEADWALL  
 SECTION F-F PIPE WITH END SECTIONS  
 SECTION G-G PIPE WITHOUT HEADWALLS



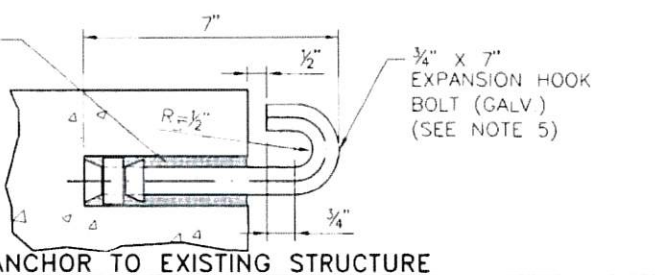
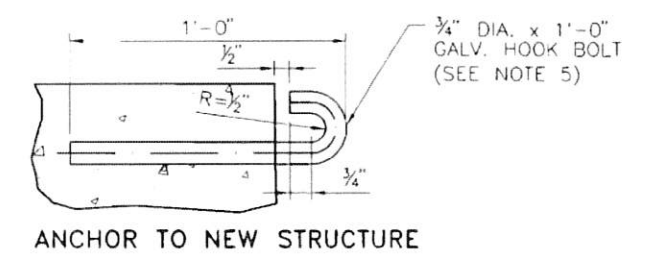
TYPICAL SECTION AT END OF RIPRAP



NOTE SEE SHEET 602-01-1/1 FOR WIRE MESH SPLICE DETAILS

**GENERAL NOTES**

1. ALL RIPRAP SHALL BE CLASS "A" UNLESS SPECIFIED OTHERWISE IN THE PLANS. DIMENSIONS OF RIPRAP CLASS "A" SHALL BE VERIFIED IN FIELD.
2. RIPRAP ON THIS STANDARD IS SHOWN FOR SINGLE PIPES AND CULVERTS ONLY. FOR MULTIPLE PIPE AND CULVERT INSTALLATIONS, EXTEND RIPRAP BEYOND OUTLET OPENING AS SHOWN IN PLAN DETAILS AND PLACE RIPRAP BETWEEN OUTLET OPENINGS AS SHOWN IN ELEVATION DETAILS.
3. SERIAL 602-02-1/1 MAY BE REFERENCED FOR DESCRIPTIONS OF WIRE MESH AND ALTERNATE PATTERNS.
4. STEEL STAKES MAY BE RAILROAD RAILS WEIGHING NOT LESS THAN 30 LBS. PER YARD, 4" NOMINAL DIAMETER STANDARD STRENGTH GALVANIZED STEEL PIPE, OR L 4" X 4" X 3/8" STEEL ANGLES. STEEL STAKES SHALL PROJECT 6" ABOVE TOP OF RIPRAP. STEEL STAKES ARE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE WORK AND NO DIRECT MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE.
5. CONTRACTOR MAY SUBSTITUTE CONCRETE CHEMICAL ANCHORS WITH HOOK GEOMETRY SHOWN, WHICH MEET REQUIREMENTS OF SECTION 522.
6. TOE-IN OR PLACE EROSION CONTROL GEOTEXTILE UNDER FOOTINGS OR CUT-OFF WALL.
7. L (MIN) = 10'-0" OR 1.5 x DIAMETER OR RISE, WHICHEVER IS GREATER.



HOOK BOLT DETAILS  
 COST OF HOOK BOLT IN PLACE TO BE INCLUDED IN UNIT BID PRICE FOR RIPRAP.

NO	DATE	REV BY	DESCRIPTION
1	8/09/09	YML	GENERAL REVISIONS

NEW MEXICO  
 DEPARTMENT OF TRANSPORTATION  
 STANDARD DRAWING

EROSION CONTROL  
 AT CULVERT OUTLETS



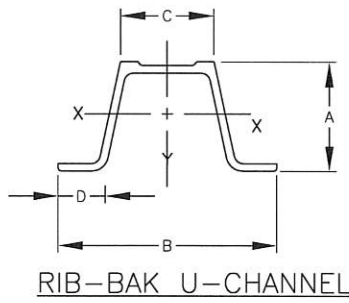
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	171000930	11	15

**RIB-BAK U-CHANNEL SIGN SUPPORTS**

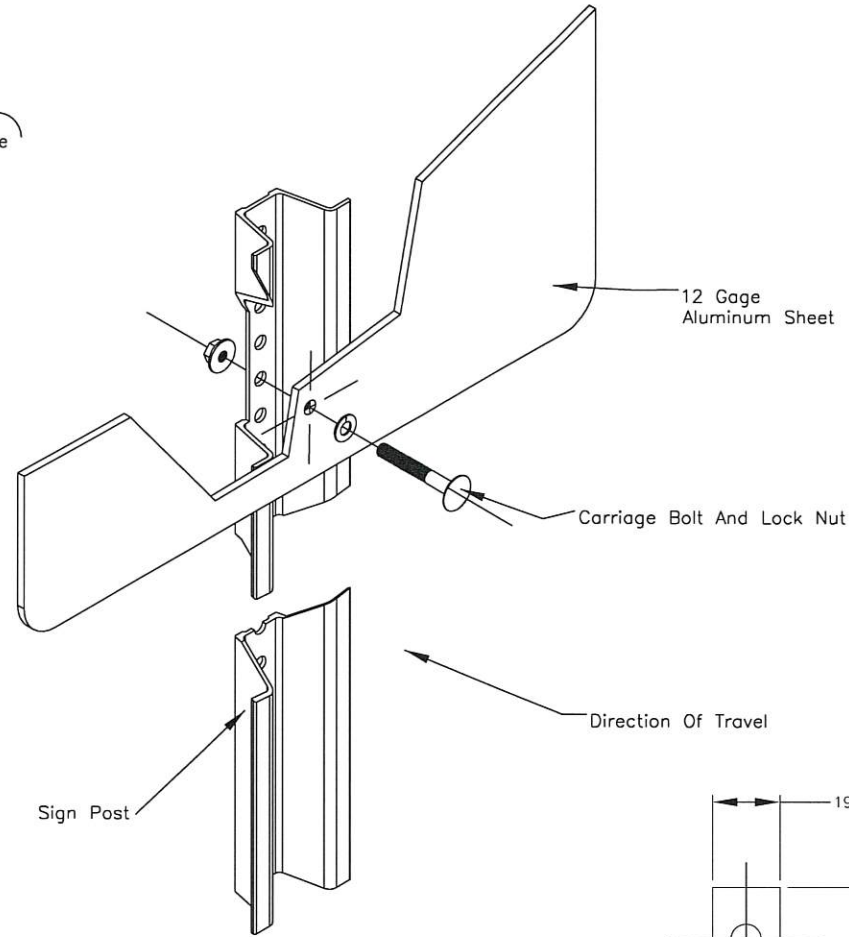
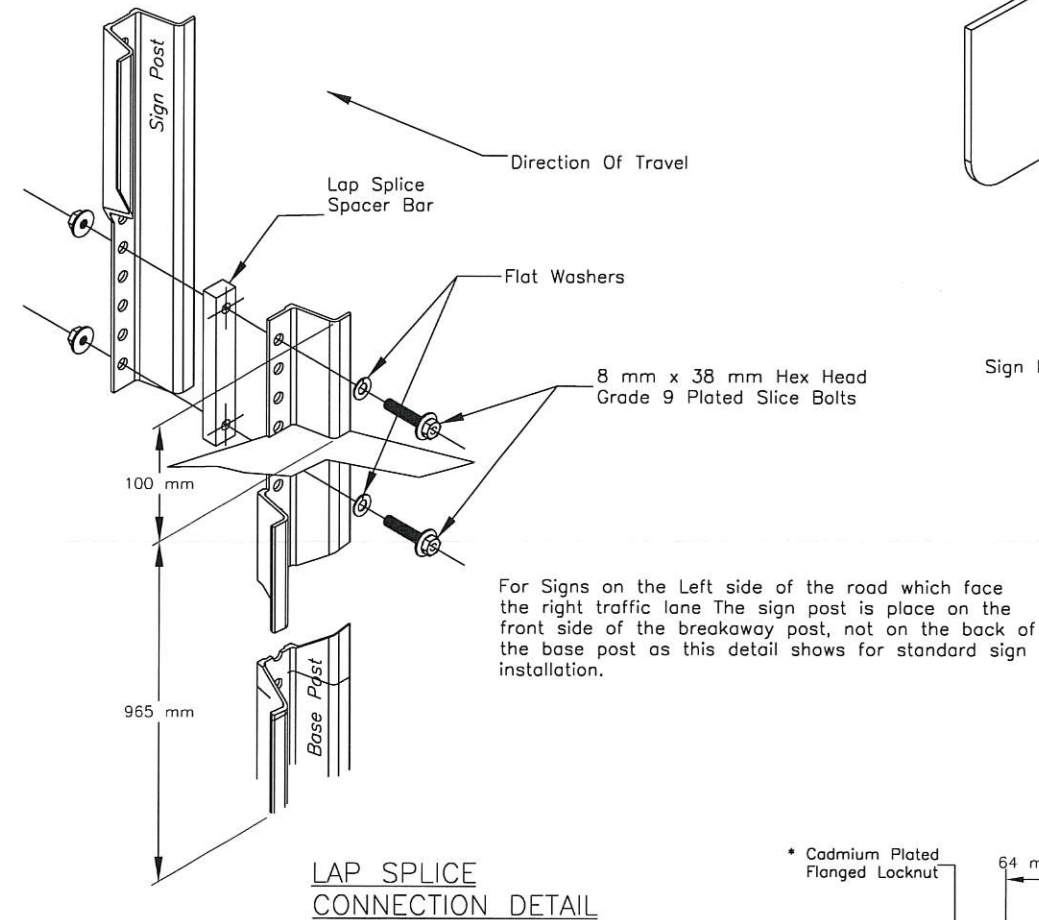
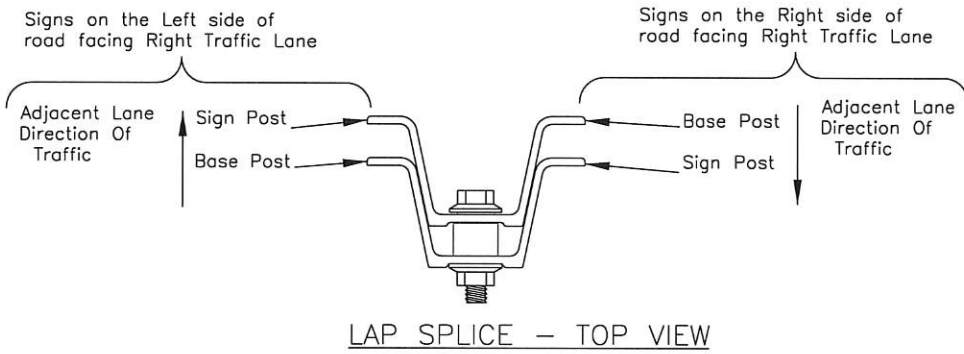
WEIGHT *kg/m	DIMENSIONS (mm)				AREA mm <sup>2</sup>	X-X AXIS		Y-Y AXIS	
	A	B	C	D		I(mm <sup>4</sup> )	S(mm <sup>3</sup> )	I(mm <sup>4</sup> )	S(mm <sup>3</sup> )
2.97	38.30	76.91	33.12	16.10	54.83	81.99	42.27	195.62	50.96
3.71	38.68	79.35	33.15	18.33	51.28	103.22	51.29	249.73	62.92
4.08	39.47	78.77	32.72	16.94	55.74	112.38	54.89	278.04	70.62
4.45	48.34	85.85	33.73	18.42	62.45	188.65	73.24	374.60	87.34
5.94	50.27	85.78	34.04	19.10	80.77	260.14	97.99	476.58	111.10

\* ±5%

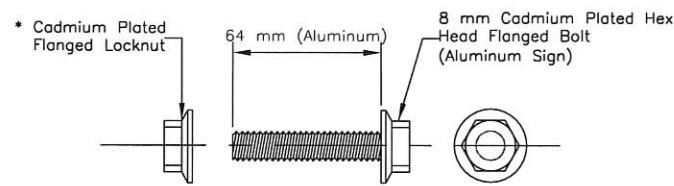


**GENERAL NOTES**

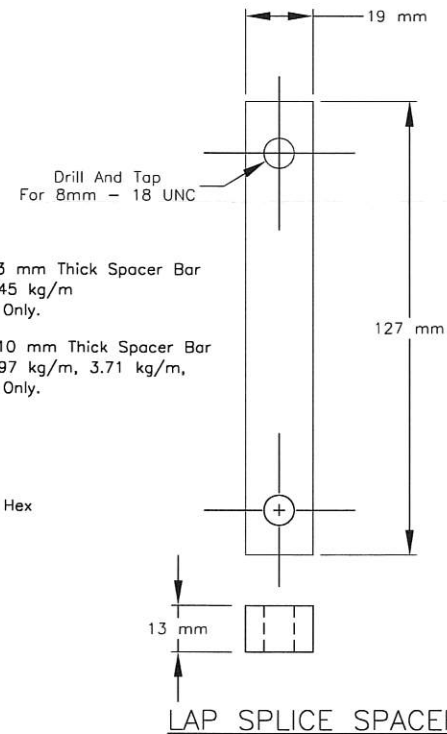
1. BASE POST AND SIGN POST SHALL BE RIB-BAK U-CHANNEL FABRICATED FROM HOT ROLLED CARBON STEEL BARS CONFORMING TO THE REQUIREMENTS OF ASTM A499. YIELD POINT AND TENSILE STRENGTH OF STEEL SHALL BE 550 AND 689.47 MPa (MINIMUM), RESPECTIVELY.
2. STEEL POSTS SHALL BE UNIFORM, MODIFIED, FLANGED CHANNEL SECTION OF RIB-BAK DESIGN. WEIGHT OF THE STEEL SHALL BE AS SPECIFIED BY THE USER, ±5% BEFORE PUNCHING. THE POST SHALL BE PUNCHED WITH CONTINUOUS 9mmØ HOLES ON 25mm INTERVAL ON CENTERS FOR THE ENTIRE LENGTH OF POST.
3. STEEL POSTS SHALL BE MACHINE STRAIGHTENED TO HAVE A SMOOTH UNIFORM FINISH, FREE FROM DEFECTS AFFECTING STRENGTH, DURABILITY, AND APPEARANCE. ALL HOLES AND EDGES SHALL BE FREE OF BURRS. THE PERMISSIBLE TOLERANCE FOR STRAIGHTNESS SHALL BE WITHIN 6.35mm IN 1.52 METER.
4. STEEL POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM 123 BOLTS, NUTS, AND WASHERS SHALL BE CADMIUM PLATED IN ACCORDANCE WITH ASTM A-165 OR ZINC PLATED IN ACCORDANCE WITH ASTM B-633.
5. SPLICE HARDWARE SHALL CONSIST OF TWO FULLY THREADED, 8mm X 38mm GRADE-9 PLATED HEX HEAD BOLTS, FLAT WASHERS, AND SELF LOCKING HEX NUTS PER POST. IN ADDITION, ONE 19mm X 127mm PLATED SPACER BAR PER POST, TO STIFFEN THE SPLICE CONNECTION. EACH SPACER SHALL BE DRILLED AND TAPPED WITH 8mm-18 UNC THREADS. THE SPACER SHALL BE FABRICATED FROM HOT ROLLED CARBON STEEL BAR CONFORMING TO ASTM A-36 OR M-1020.
6. BOLTS AND LOCK NUT HARDWARE FOR SIGN ATTACHMENT SHALL BE CARRIAGE HEAD TYPE, 8mm-18 UNC, AND SHALL BE CADMIUM PLATED CONFORMING TO ASTM B-766.
7. AN APPROVED ALTERNATE BREAKAWAY SYSTEM AND SIGN SUPPORT POST ASSEMBLY MAY BE SUBMITTED TO THE COR/AOTR FOR REVIEW AND APPROVAL PRIOR TO IT'S USE.
8. THE CONTRACTOR HAS THE OPTION TO USE "ANTI-THEFT" NUTS IN LIEU OF JAMMING THE BOLT THREADS. NO ADDITIONAL PAYMENT WILL BE MADE IN RELATION TO USING ANTI-THEFT BOLTS.
9. SUPPLEMENTAL SIGNS ON THE OPPOSITE SIDE OF ROADWAY SHALL HAVE THE U-CHANNEL REVERSED SO THAT RIB-BAK IS FACING AWAY FROM THE OPPOSING TRAFFIC.



NOTE: The GOLD ANODIZED 13 mm Thick Spacer Bar Is To Be Used With 4.45 kg/m And 5.94 kg/m Posts Only.  
The SILVER ANODIZED 10 mm Thick Spacer Bar Is To Be Used With 2.97 kg/m, 3.71 kg/m, And 4.08 kg/m Posts Only.



\* Flanged Locknut Required For Carriage And Hex.



**INSTALLATION PROCEDURE**

- STEP 1: DRIVE BASE POST TO WITHIN APPROXIMATELY 300 mm ABOVE GROUND LEVEL. PLACE ONE BOLT AND CUT WASHER IN FIFTH HOLE FROM THE TOP, AND SECURELY TIGHTEN THREADED SPACER ONTO BOLT.
- STEP 2: DRIVE SIGN POST TO 100 mm ABOVE GROUND LEVEL. PLACE REMAINING BOLT AND CUT WASHER IN FIRST HOLE FROM THE END, AND SECURELY TIGHTEN THREADED SPACER ONTO BOLT.
- STEP 3: DIG OUT APPROXIMATELY 50 mm FROM AROUND BACK OF GROUND POST TO ALLOW ROOM FOR TOP POST TO BE ATTACHED.
- STEP 4: NEST TOP POST ONTO PROTRUDING BASE POST BOLTS, THROUGH THE FIRST AND FIFTH HOLES OF THE TOP POST.
- STEP 5: PLACE A SELF-LOCKING FLANGE NUT ON EACH BOLT. TIGHTEN NUTS AND TAMP EARTH AROUND POST FIRMLY.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF INDIAN AFFAIRS  
NAVAJO REGION OFFICE \* DIVISION OF TRANSPORTATION

**LAP SPLICE U-CHANNEL  
BREAKAWAY SYSTEM  
POST & HARDWARE DETAILS**

Designed by: NRDOT	Date: 7/00
Drawn by: NRDOT	Date: 7/00
Revised by: NRDOT	Date: 2/08
File Name: N11(1A)-SGN2.sht	

**SINGLE POST REQUIREMENT CHART**

K factor (B x A)	POST WEIGHT	B = Height To Bottom Of Traffic Sign + 1/2 Height Of Traffic Sign (Meter)											
		1.83	2.13	2.44	2.74	3.05	3.35	3.66	3.96	4.27	4.57	4.87	
DOES NOT APPLY	2.976 kg/m	0.36	0.36	0.36	0.36	0.36	0.36	0.34	0.32	0.30	0.27	0.26	
	3.348 kg/m	0.47	0.47	0.47	0.47	0.47	0.43	0.39	0.36	0.33	0.32	0.30	
	4.092 kg/m	0.62	0.62	0.62	0.62	0.62	0.56	0.51	0.47	0.44	0.41	0.38	
	4.464 kg/m	0.68	0.68	0.68	0.68	0.68	0.68	0.62	0.58	0.52	0.47	0.46	
	5.952 kg/m	0.87	0.87	0.87	0.87	0.87	0.87	0.80	0.74	0.70	0.65		

A (m<sup>2</sup>)  
SIGN AREA (W x D)

**DOUBLE POST REQUIREMENT CHART**

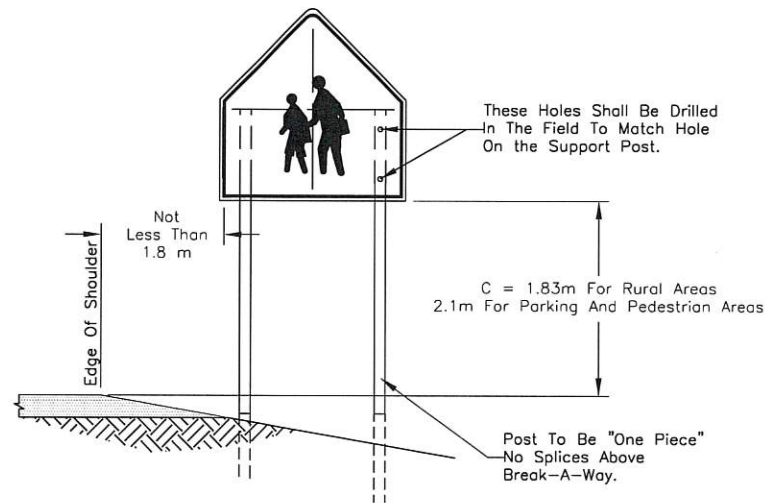
K factor (B x A)	POST WEIGHT	B = Height To Bottom Of Traffic Sign + 1/2 Height Of Traffic Sign (Meter)											
		1.83	2.13	2.44	2.74	3.05	3.35	3.66	3.96	4.27	4.57	4.87	
2.74	2.976 kg/m	1.50	1.28	1.12	1.00	0.90	0.82	0.75	0.70	0.64	0.60	0.57	
3.08	3.348 kg/m	1.69	1.45	1.27	1.13	1.01	0.92	0.85	0.78	0.72	0.68	0.63	
4.03	4.092 kg/m	2.20	1.89	1.65	1.47	1.32	1.20	1.10	1.01	0.94	0.88	0.83	
4.91	4.464 kg/m	2.69	2.31	2.03	1.79	1.62	1.47	1.35	1.24	1.15	1.08	1.01	
6.83	5.952 kg/m	3.73	3.20	2.80	2.49	2.24	2.03	1.87	1.72	1.60	1.50	1.40	

A (m<sup>2</sup>)  
SIGN AREA (W x D)

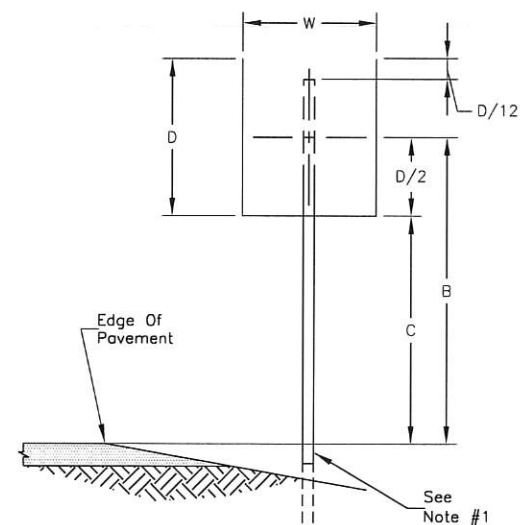
**THREE POST REQUIREMENT CHART**

K factor (B x A)	POST WEIGHT	B = Height To Bottom Of Traffic Sign + 1/2 Height Of Traffic Sign (Meter)											
		1.83	2.13	2.44	2.74	3.05	3.35	3.66	3.96	4.27	4.57	4.87	
4.12	2.976 kg/m	2.25	1.92	1.68	1.50	1.35	1.23	1.12	1.04	0.97	0.90	0.85	
4.65	3.348 kg/m	2.54	2.17	1.90	1.69	1.52	1.38	1.27	1.17	1.09	1.01	0.96	
6.02	4.092 kg/m	3.30	2.82	2.47	2.19	1.98	1.79	1.64	1.52	1.41	1.32	1.24	
7.40	4.464 kg/m	4.04	3.47	3.03	2.69	2.42	2.20	2.02	1.86	1.73	1.62	1.51	
10.20	5.952 kg/m	5.58	4.78	4.19	3.73	3.35	3.05	2.79	2.57	2.40	2.23	2.09	

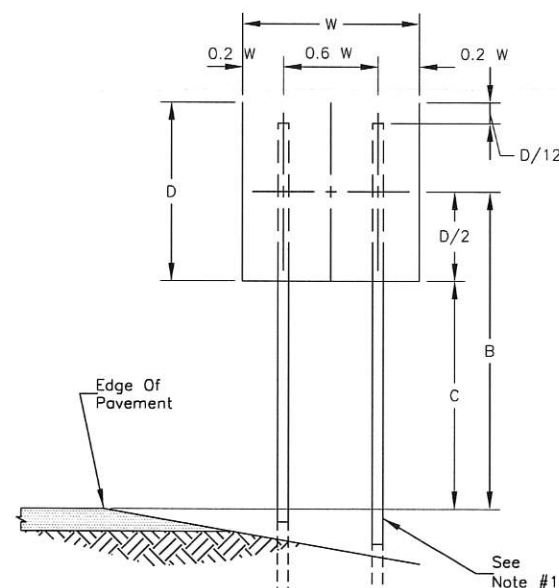
A (m<sup>2</sup>)  
SIGN AREA (W x D)



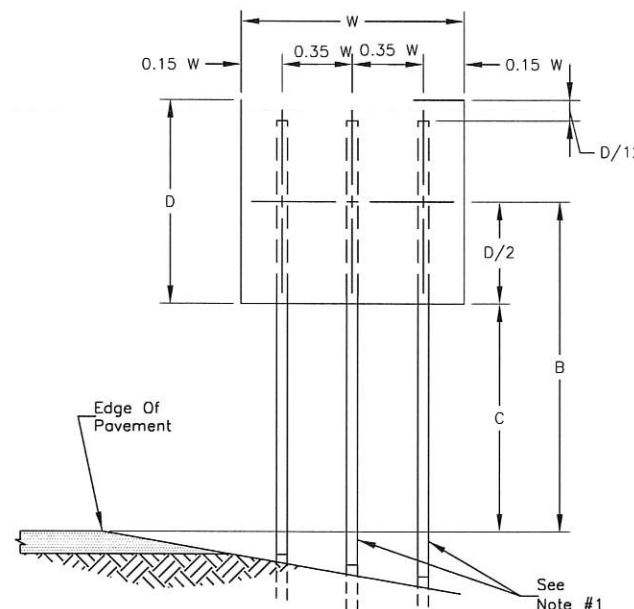
TYPICAL ROADSIDE SIGN LOCATION



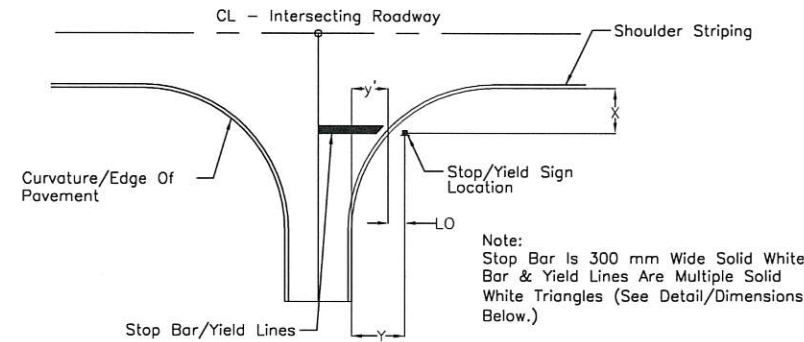
SINGLE POST SIZE (TYP.)



DOUBLE POST SIZE (TYP.)



THREE POST SIZE (TYP.)



RADIUS OF TURNOUT (m)	X (m)	y' (m)	Y (m) =		LENGTH OF STOP BAR
			y+LO		
3.00	1.80	0.25	2.05		1/2 Roadway Width + y'
6.00	3.00	0.80	2.60		1/2 Roadway Width + y'
9.00	4.50	1.21	3.01		1/2 Roadway Width + y'
12.00	6.00	1.61	3.41		1/2 Roadway Width + y'
15.00	7.50	2.01	3.81		1/2 Roadway Width + y'

y' = The Lateral Projection From Roadway EOP (Tangential) To Curvature/EOP.

Lateral Offset (LO) Is The Lateral Projection From Curvature/EOP To Sign Location = 1.80 m.

STOP/YIELD SIGN LOCATION TABLE

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	171000930	12	15

**GENERAL NOTES:**

1. THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE LENGTH OF SIGN SUPPORT POSTS. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE FOR THE APPROPRIATE BID ITEMS SHOWN IN THE BID SCHEDULE.
2. SIGN DIMENSION EQUAL TO OR IN EXCESS OF 762 mm X 762 mm SIZE SHALL BE INSTALLED WITH A MINIMUM OF TWO (2) STEEL POSTS.

**METHOD TO DETERMINE NUMBER OF POST(S) & POST WEIGHT REQUIREMENT:**

For A 1.52 m Wide x 1.22 m High Traffic Sign. Located On A Rural Highway.

GIVEN: W= 1.52 m  
D= 1.22 m  
C= 1.83 m For Rural Areas

SOLUTION: 1.) B = C + D/2  
B = 1.83 + (1.22/2)  
B = 2.44 m

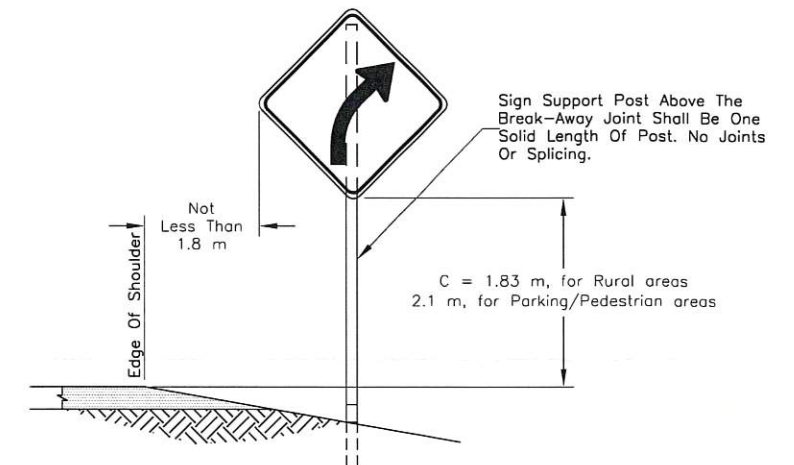
2.) A = W x D  
A = 1.52 x 1.22  
A = 1.85 sq. m

3.) K factor = A x B  
K factor = 1.85 x 2.44  
K factor = 4.51 cu. m

4.) Begin With The Single Post Chart For Column Of B= 2.44 m, And Continue Down Until The Area Of The Sign Equals Or Exceeds 1.85 sq. m, OR Down The K factor Column Until The Value Equals or Exceeds 4.51 cu. m. Both The Area & K factor Exceed The Single Post Chart So Go To The Double Post Chart.

Select Two (2) Posts Of 4.46 kg/m Yields A Factor Of 4.91 Which Is Optimum.

K factor	POST WEIGHT	2.44
4.03	4.09 kg/m	1.65
4.91	4.46 kg/m	2.03 ←
6.83	5.95 kg/m	2.80



TYPICAL ROADSIDE SIGN LOCATION

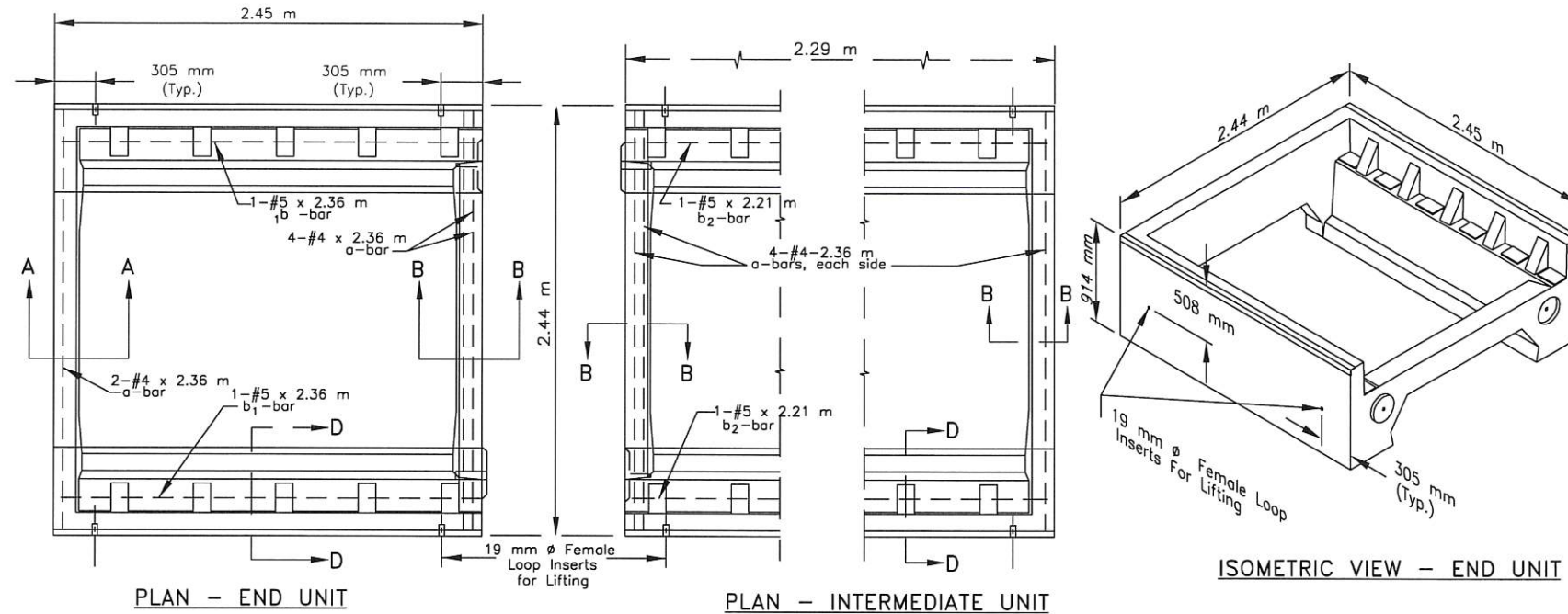
UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF INDIAN AFFAIRS  
NAVAJO REGION OFFICE \* DIVISION OF TRANSPORTATION

**PERMANENT SIGNING DETAILS**

Designed by: NRDOT Date: 1/05  
Drawn by: NRDOT Date: 1/05  
Revised by: WHPacific Date: 9/11  
File Name: N11(1A)-SGN1 sht

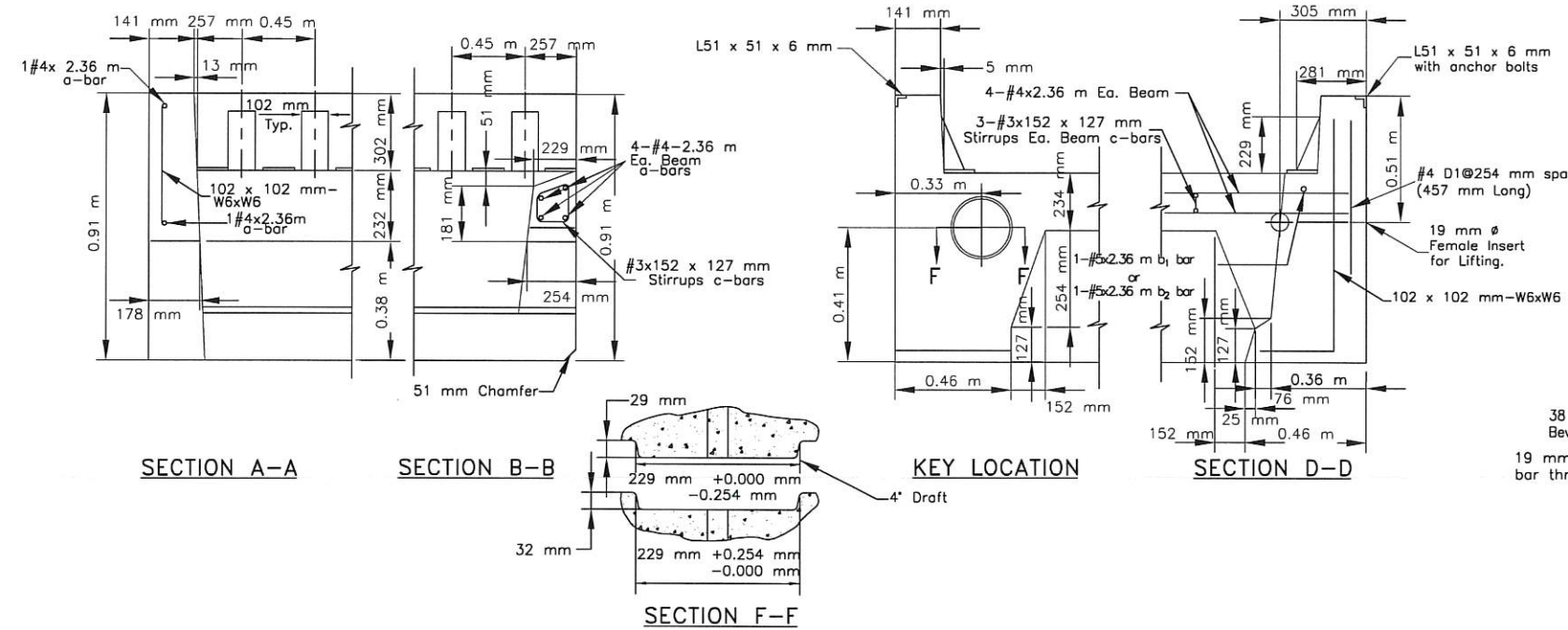


REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	171000930	13	15



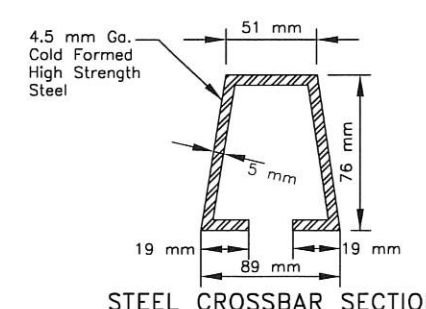
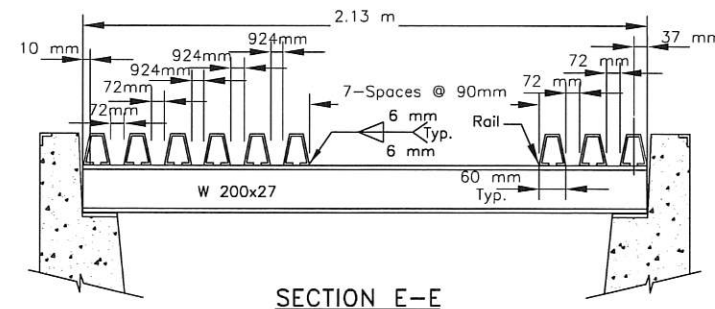
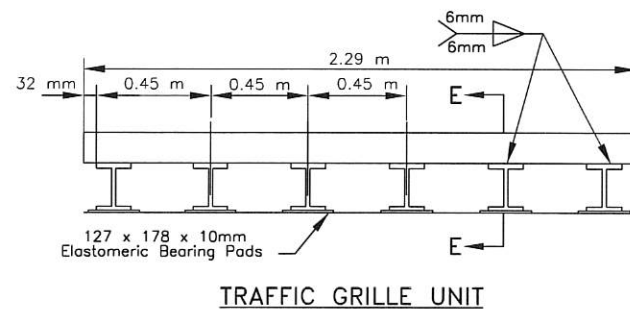
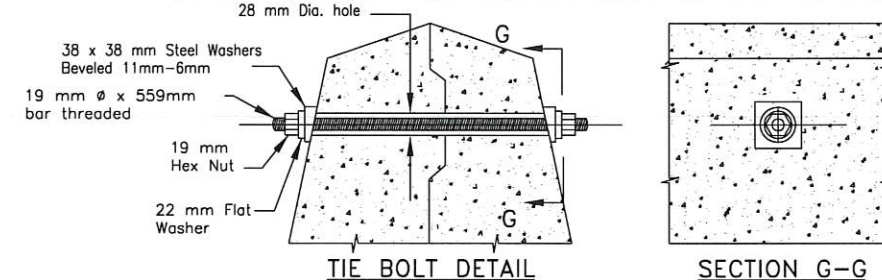
**GENERAL NOTES**

1. PRECAST CONCRETE SHALL ATTAIN 28-DAY COMPRESSIVE STRENGTH OF 27.62 MPa (minimum) IN ACCORDANCE WITH AASHTO T22 (ASTM C-39). THE CONCRETE SHALL BE CLASS A(AE) CONFORMING TO SECTION 552 OF FP-14.
2. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 420. ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M-183.
3. THE CONTRACTOR SHALL SLOPE THE BASES OF THE CATTLE GUARDS AS REQUIRED TO PROVIDE ROADWAY CROWNS OR SUPERELEVATION AS SHOWN ON THE PLANS.
4. BOLTS, WASHERS, AND NUTS SHALL BE GALVANIZED TO MEET THE REQUIREMENTS OF AASHTO M111 OR AASHTO M298.
5. ALL TRAFFIC GRILL UNITS, AND WING BRACE STRUCTURAL STEEL AND PIPE, INCLUDING THE STEEL ANGLES, SHALL RECEIVE ONE (1) PRIMER COAT, ONE (1) INTERMEDIATE COAT, AND ONE (1) FINISH COAT IN ACCORDANCE WITH SECTION 563, PAINT SYSTEM 2, OF FP-14.
6. WING BRACES SHALL BE CONSIDERED SUBSIDIARY ITEMS TO THE CATTLE GUARD UNIT.
7. THE CONTRACTOR HAS THE OPTION TO USE AN ALL STEEL FRAME CATTLE GUARD. IF THE CONTRACTOR ELECTS TO SUBSTITUTE FOR THE STEEL FRAME CATTLE GUARD, HE/SHE SHALL SHOW THEY ARE MORE COST EFFECTIVE WITH SUPPORTING DATA. THE CONTRACTOR IS RESPONSIBLE FOR ALL PATENT PROTECTION RIGHTS, SHOP DRAWINGS, MATERIAL CERTIFICATIONS, AND MILL TEST REPORTS. HOWEVER, NO STEEL FRAME CATTLE GUARD SHALL BE USED FOR CONCRETE DRAINAGE PAD CATTLE GUARD LOCATIONS.
8. ELASTOMERIC BEARING PADS SHALL BE SEALED WITH EPOXY ADHESIVE PRIOR TO THE INSTALLATION OF TRAFFIC GRILL UNIT.
9. DESIGN DATA: DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, THIRD EDITION, 2004. DESIGN LOADS: HS20 AND DESIGN TANDEM WITH 33% IMPACT.



**REINFORCING STEEL SCHEDULE**

STRAIGHT BARS				BENT BARS				BENDING DIAGRAMS ALL DIMENSIONS ARE OUT TO OUT
MARK	NO.	SIZE	LENGTH	MARK	NO.	SIZE	LENGTH	
END UNIT								
a	6	4	2.36 m					
b1	2	5	2.36 m					
c				3	3	0.61 m		
D1	20	4	0.46 m					
INTERMEDIATE UNIT								
a	8	4	2.36 m					
b2	2	5	2.21 m					
c				6	3	0.61 m		
D1	18	4	0.46 m					



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**PRE-CAST CONCRETE  
 CATTLE GUARD DETAILS**

Designed by: NRDOT	Date: 1/91
Drawn by: NRDOT	Date: 1/91
Revised by: NRDOT	Date: 3/07
File Name: N11(1A)-PCCG sht	

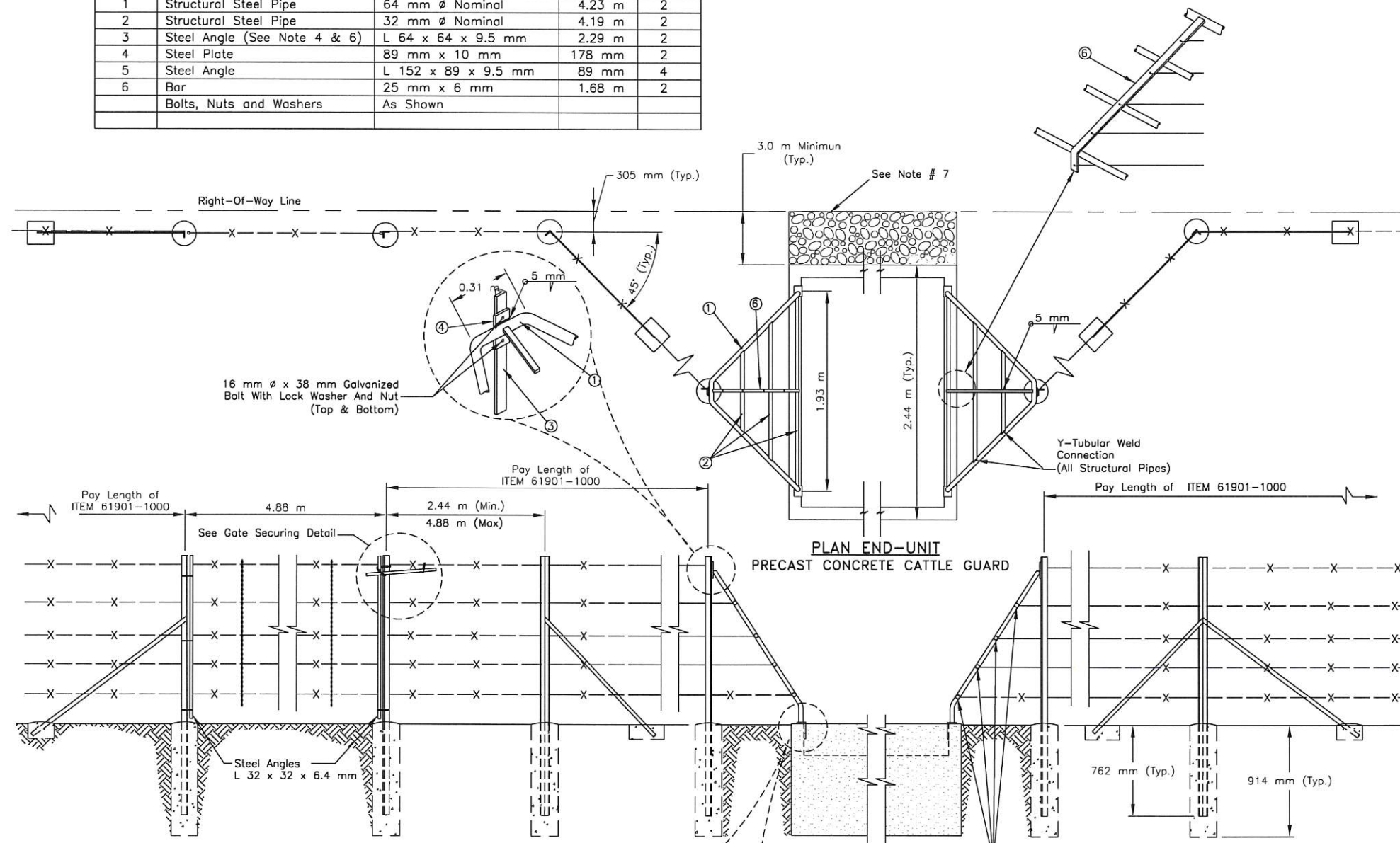
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N13	171000930	14	15

**ESTIMATED MATERIAL LIST**

PART NO.	MATERIAL	SIZE AND THICKNESS	LENGTH	QUANTITY
1	Structural Steel Pipe	64 mm $\phi$ Nominal	4.23 m	2
2	Structural Steel Pipe	32 mm $\phi$ Nominal	4.19 m	2
3	Steel Angle (See Note 4 & 6)	L 64 x 64 x 9.5 mm	2.29 m	2
4	Steel Plate	89 mm x 10 mm	178 mm	2
5	Steel Angle	L 152 x 89 x 9.5 mm	89 mm	4
6	Bar	25 mm x 6 mm	1.68 m	2
	Bolts, Nuts and Washers	As Shown		

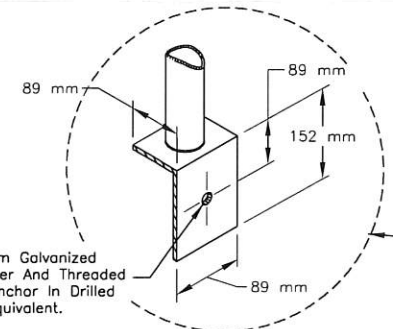
**GENERAL NOTES**

- STRUCTURAL PIPE SHALL CONFORM TO ASTM A53-93a, GRADE B. ALL OTHER STRUCTURAL STEEL SHALL CONFORM TO ASTM-A36.
- ALL STRUCTURAL PIPE JOINTS SHALL BE FABRICATED IN ACCORDANCE WITH AISC MANUAL OF STEEL CONSTRUCTION, LATEST EDITION.
- WELDING SHALL MEET THE REQUIREMENTS OF AASHTO STANDARD SPECIFICATIONS FOR WELDING AT STRUCTURAL STEEL HIGHWAY BRIDGES, LATEST EDITION.
- THE SUPPORTING WING BRACE POSTS (PART NO. 3) LENGTH SHALL BE SUFFICIENT TO ALLOW BRACE POSTS TO BE INSTALLED WITHIN CONCRETE FOUNDATIONS AS SHOWN ON THIS DETAIL SHEET. UNDER CERTAIN CONDITIONS (SUCH AS DRAIN THROUGH CATTLE GUARD, HIGH EMBANKMENT, ETC) THE LENGTH OF THE POST MAY VARY TO FULLY SUPPORT THE WING BRACES. THIS WORK SHALL BE INCIDENTAL TO THE CATTLE GUARD CONTRACT ITEMS. INSTALLATION OF GATE SHALL BE SUBSIDIARY ITEM TO THE CATTLE GUARD ITEM(S).
- THE COTR/COR MAY ADJUST THE FINISHED CATTLE GUARD ELEVATION AS NEEDED TO FIT FIELD/DRAINAGE CONDITIONS. THE CONTRACTOR SHALL RE-GRADE THE ADJOINING TURNOUT APPROACHES AS REQUIRED. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CATTLE GUARD CONTRACT ITEMS OF FP-14. ANY MISTAKES MADE BY THE COTR/COR IN DIRECTING ADJUSTMENTS TO THE FINISHED GRADE FOR THE CATTLE GUARDS AND APPROACH ROADWAY WILL BE CORRECTED UNDER A NEGOTIATED MODIFICATION UNDER SUBSECTION 109.02(m).
- AT SKEWED TURNOUT LOCATIONS, THE CATTLE GUARD SHALL BE INSTALLED PERPENDICULAR TO TURNOUT.
- THE LENGTH OF THE TURNOUT BETWEEN THE BACK EDGE OF THE CATTLE GUARD AND THE RIGHT-OF-WAY LIMIT SHALL BE SURFACED WITH A 100mm THICKNESS OF AGGREGATE BASE COURSE AT ALL 4.5 METER WIDE TURNOUTS. FOR TURNOUTS WIDER THAN 4.5 METERS, PLACE AGGREGATE BASE COURSE AND ASPHALT SURFACING TO MATCH THE TURNOUT STRUCTURAL SECTION, BETWEEN THE BACK OF THE CATTLE GUARD AND THE RIGHT-OF-WAY LINE. THE SURFACING MATERIAL AND WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PAVING ITEMS SHOWN IN THE BID SCHEDULE.
- AT CATTLE GUARD LOCATIONS WHERE THE DESIGN TYPICAL WIDTH IS WIDER ON ONE SIDE OF THE CATTLE GUARD THAN THE OTHER SIDE, THE NARROWER ROADWAY WIDTH SHALL BE FLARED OUT TO MATCH THE WIDER ROADWAY WIDTH USING AN 8:1 TAPER OR TO LENGTH ALLOWED BY THE RIGHT-OF-WAY WIDTH. THIS INCLUDES AT NARROW RIGHT-OF-WAY WIDTH WHERE THE TURNOUT RADIUS CANNOT BE COMPLETELY INSTALLED BETWEEN THE MAIN ROAD AND THE CATTLE GUARD. THIS WORK SHALL BE PAID UNDER THE EARTHWORK, BASE COURSE, AND PAVING ITEMS INCLUDED IN THE BID SCHEDULE.

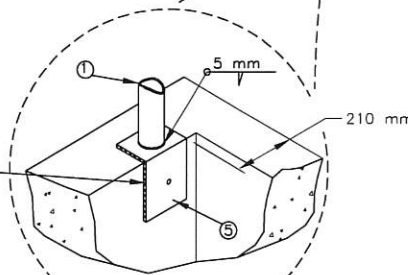


**PLAN END-UNIT  
PRECAST CONCRETE CATTLE GUARD**

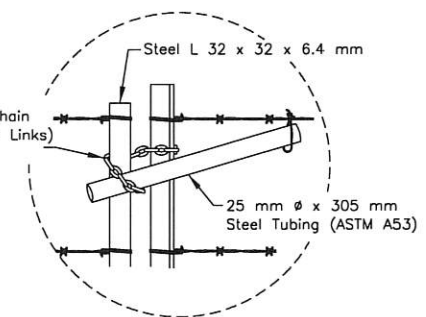
HOLES SHALL BE DRILLED IN BAR PART #6 AT SPACING TO MATCH ALL HORIZONTAL FENCE WIRES. ALL HORIZONTAL FENCE WIRES TO BE TIED TO BAR #6 (TYP.).



19 mm  $\phi$  x 102 mm Galvanized Bolt With Lock Washer And Threaded Ring Wedge Cinch Anchor In Drilled Hole Or Approved Equivalent.



2/0 Machine Chain (Twisted Welded Links) (ASTM A467)



**GATE SECURING DETAIL**

UNITED STATES  
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**CATTLE GUARD AND  
 WING BRACE DETAILS**

Designed by: NRDOT	Date: 3/00
Drawn by: NRDOT	Date: 3/00
Revised by: WHPacific	Date: 9/11
File Name: N11(1A)-CGWB.sht	

