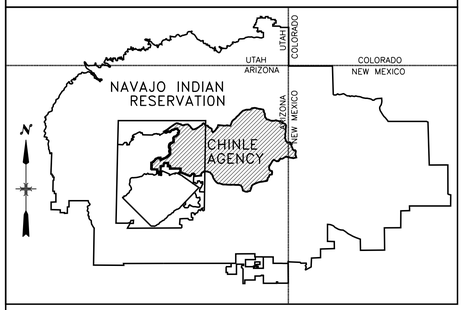
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGION D.O.T.
ROUTE

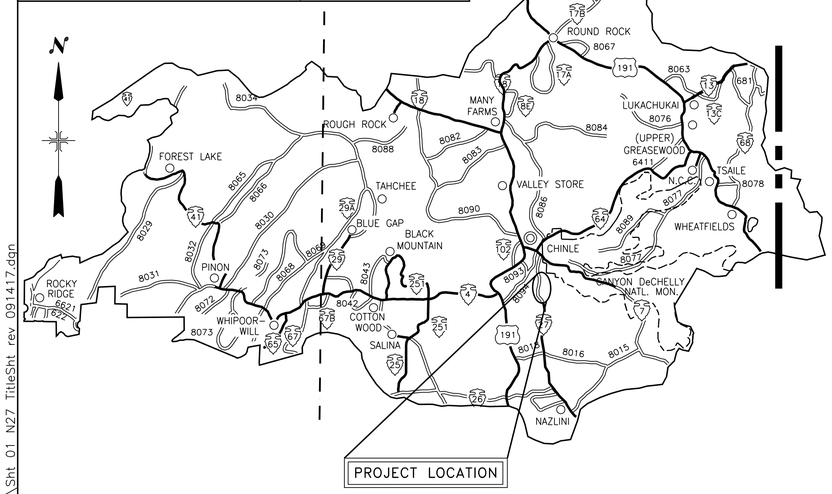
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APPROVED
By Harold Riley-PE at 11:41 am, Sep 26, 2017

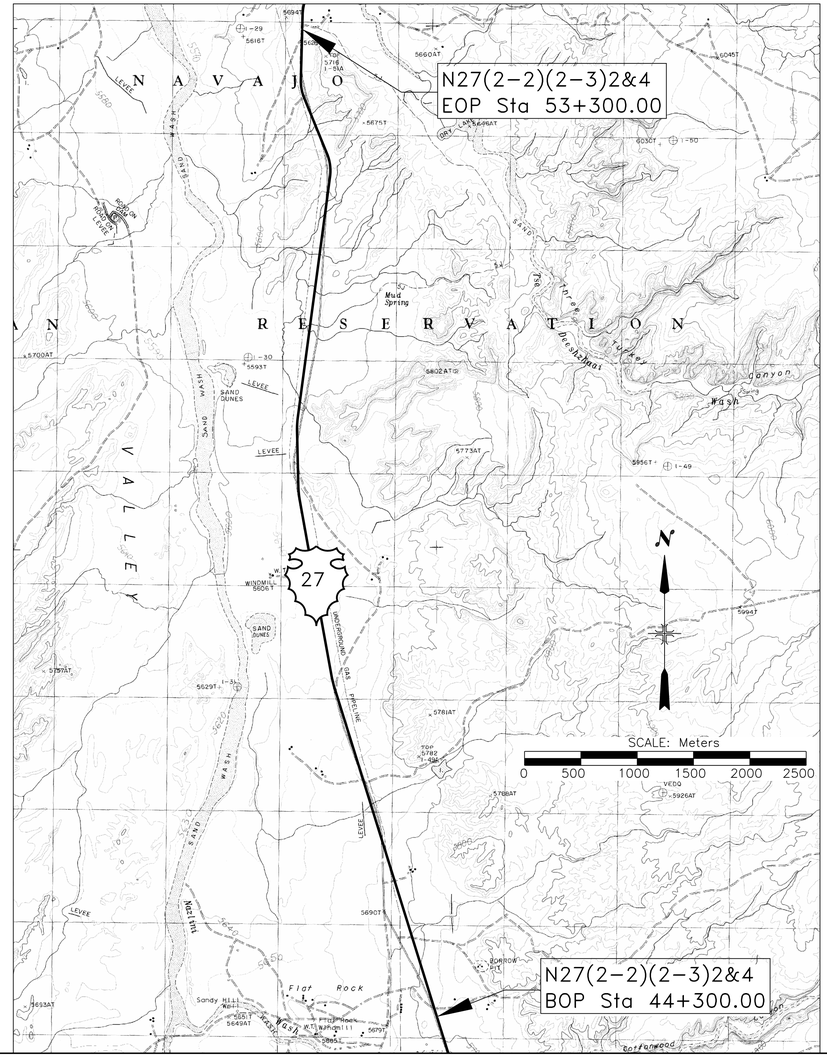
PROJECT N27(2-2)(2-3)2&4
GRADE, DRAIN & AGGREGATE BASE COURSE,
HOT ASPHALTIC CONCRETE PAVEMENT
AND MISCELLANEOUS CONSTRUCTION
9.000 km ID. NO. N35275

INDEX MAP





CHINLE AGENCY MAP



ALIGNMENT TABLE

PROJECT: N27(2-3)2&4			
STATION		LENGTH (m)	LENGTH (km)
BOP Sta.	44+300.000		
		9,000.000	9.000
EOP STATION	53+300.000		
GRAND TOTAL		**9,000.000**	**9.000**

DESIGN DATA – N27(2-3)2&4

DESIGN SPEED	100 km/h
MINIMUM RADIUS	394
MAXIMUM GRADIENT	3.12%
MINIMUM STOPPING SIGHT DISTANCE	185 m
MINIMUM PASSING SIGHT DISTANCE	670 m
AVERAGE DAILY TRAFFIC-ADT (2014)	1817 vpd
AVERAGE DAILY TRAFFIC-ADT (2034)	2648 vpd
DESIGN HOURLY VOLUME-DVH (2014)	272 vph
DESIGN HOURLY VOLUME-DVH (2034)	400 vph
MAXIMUM SUPERELEVATION (e max)	8.0%

RIGHT-OF-WAY TABLE

STATION TO STATION			LEFT OFFSET (m)	RIGHT OFFSET (m)
44+310.00	To	44+980.00	30.48	30.48
44+980.00	To	45+060.00	30.48	145.00
45+060.00	To	46+096.00	30.48	30.48
46+096.00	To	46+210.00	30.48	75.50
46+210.00	To	49+860.00	30.48	30.48
49+860.00	To	49+960.00	30.48	120.00
49+960.00	To	52+670.00	30.48	30.48
52+670.00	To	52+760.00	45.00	30.48
52+760.00	To	53+300.00	30.48	30.48

INDEX OF SHEETS

SHEET No.	DESCRIPTION
1	TITLE SHEET
2	TYPICAL CROSS SECTION DETAILS
3	GENERAL NOTES
4	HORIZONTAL AND VERTICAL ALIGNMENT TABLES
5	ESTIMATED QUANTITIES & MISC TABLES
6	DRAINAGE STRUCTURE – QUANTITY TABLE
7	GASKET/HUGGER BAND DETAILS
8–20	PLAN AND PROFILE (MAIN ROADWY) SHEETS
21	STA 52+750 TURNOUT (PLAN & PROFILE) DETAILS
22	GABION WALL (PLAN & PROFILE) AND X-SECTION DETAILS
23	TEMPORARY TRAFFIC CONTROL DETAILS
24	TEMPORARY AND PERMANENT TRAFFIC CONTROL DETAILS
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47	CATTLEGUARD & WING BRACE DETAILS
48	PRECAST CATTLEGUARD DETAILS
49	5-STRAND BARB WIRE FENCING DETAILS
50	STANDARD PIPE INSTALLATION AND DITCH DETAILS
51	PLACED & WIRE ENCLOSED RIPRAP APRON DETAILS
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63	SQUARE TUBE STEEL POST/REFLECTIVE PANEL DELINEATOR DETAILS
64	STANDARD MILEPOST AND PERFORATED SQUARE STEEL TUBE POST DETAILS
65–71	DRAINAGE PIPE CROSS SECTION DETAILS

LEGEND

STATE LINE
RESERVATION LINE
COUNTY LINE
TOWNSHIP or RANGE LINE
SECTION LINE
NATIONAL FOREST LINE (SHOWING ON INSIDE OF LINE)
HIGHWAY RIGHT-OF-WAY LINE
UNFENCED PROPERTY
SECTION CORNER and 1/4 CORNER
POWER LINE and POLES
TELEPHONE LINE and POLES
POLE GUY and ANCHOR
TRAFFIC SIGN
GUARD RAIL (PLANNED / EXISTING)
DELINEATORS (ONE WAY / TWO WAY)
CHEVRON SIGN
BARBED WIRE FENCE (GATE)
WOVEN WIRE FENCE
CATTLE GUARD (PLANNED / EXISTING)
CULVERTS (PLANNED / EXISTING)
CONCRETE BOX CULVERTS (PLANNED / EXISTING)
GROUND LINE – EARTH
GROUND LINE – ROCK
EXISTING ROAD (WIDTH & TYPE)
SIDE ROAD TURNOUT (PLANNED / EXISTING)
TREES and SHRUBS
CHANNEL or DITCH
EARTHEN DIKE and BERM
RIPRAP
DWELLING
RIGHT-OF-WAY MONUMENT (PLANNED / EXISTING)
TELEPHONE PEDESTAL
IRRIGATION DITCH
FURROW DITCH (F.D.)
EROSION CONTROL TYPE IV FABRIC
OBLITERATION OF EXISTING ROAD

31 INDIAN SERVICE · COUNTY · 134 STATE · 491 FEDERAL

PROPOSED · PAVED · GRADED · UNIMPROVED

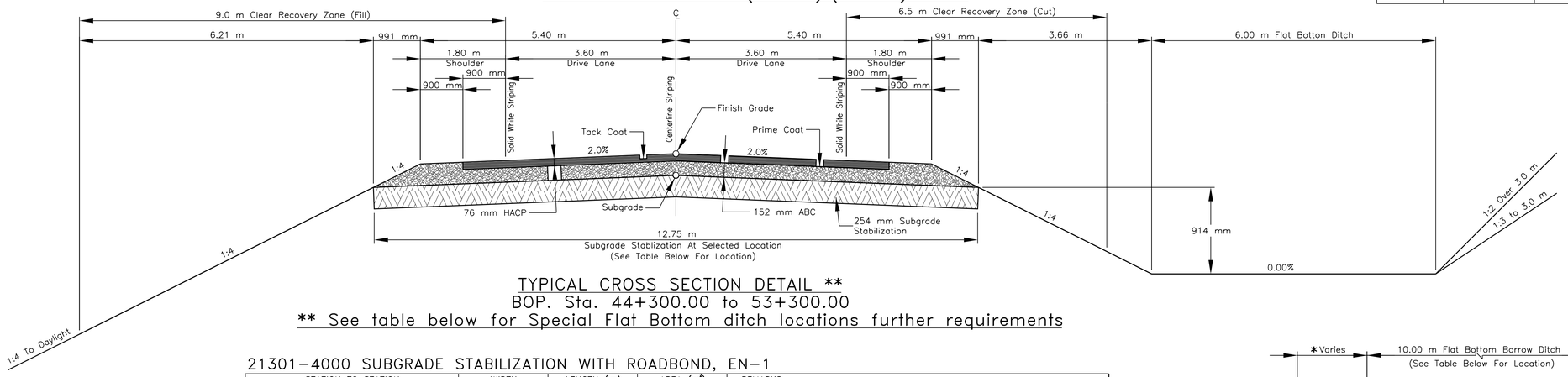
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

RECOMMENDED APPROVAL		APPROVAL	
AGENCY ROAD ENGINEER	DATE 9/18/17		
DIVISION MANAGER	DATE 9/14/17		
PLANNING & DESIGN BRANCH CHIEF	DATE	REGIONAL DIRECTOR	DATE 9/18/2017

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	2	71

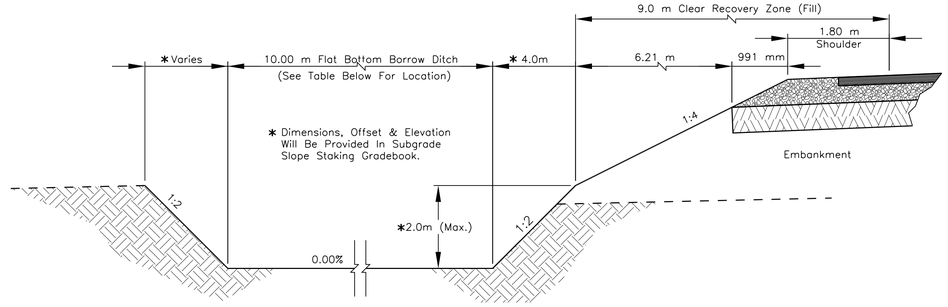
PROJECT N27(2-2)(2-3)2&4



TYPICAL CROSS SECTION DETAIL **
BOP. Sta. 44+300.00 to 53+300.00
** See table below for Special Flat Bottom ditch locations further requirements

21301-4000 SUBGRADE STABILIZATION WITH ROADBOND, EN-1

STATION TO STATION			WIDTH	LENGTH (m)	AREA (m^2)	REMARKS
44+300.00	to	44+765.00	12.75	465.0	5,928.75	Stabilize top 254 mm of Subgrade with RoadBond EN-1
49+355.00	to	49+415.00	12.75	60.0	765.00	Stabilize top 254 mm of Subgrade with RoadBond EN-1
51+820.00	to	53+300.00	12.75	1480.0	18,870.00	Stabilize top 254 mm of Subgrade with RoadBond EN-1
			TOTAL:	2005.00	25,563.75	



SPECIAL FLAT BOTTOM DITCH
CROSS SECTION DETAIL FOR BORROW

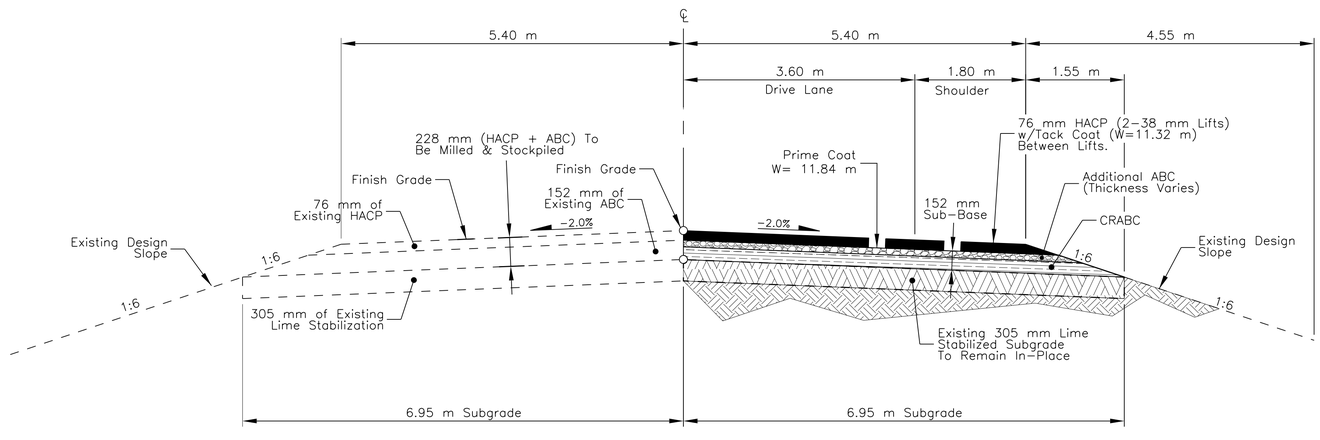
SPECIAL FLAT BOTTOM DITCH LOCATION For BORROW

STATION TO STATION			Loction	REMARKS
44+610.000	To	44+820.000	Right	Flat Bottom Ditch for Borrow
44+620.000	To	44+820.000	Left	Flat Bottom Ditch for Borrow
45+100.000	To	45+250.000	Left	Flat Bottom Ditch for Borrow
45+320.000	To	45+480.000	Right	Flat Bottom Ditch for Borrow
45+560.000	To	45+750.000	Right	Flat Bottom Ditch for Borrow
45+720.000	To	46+020.000	Left	Flat Bottom Ditch for Borrow
46+510.000	To	46+780.000	Left	Flat Bottom Ditch for Borrow
46+510.000	To	46+780.000	Right	Flat Bottom Ditch for Borrow
47+230.000	To	47+440.000	Right	Flat Bottom Ditch for Borrow
47+240.000	To	47+450.000	Left	Flat Bottom Ditch for Borrow
47+600.000	To	48+130.000	Left	Flat Bottom Ditch for Borrow
48+480.000	To	49+130.000	Left	Flat Bottom Ditch for Borrow
49+520.000	To	49+900.000	Left	Flat Bottom Ditch for Borrow
49+540.000	To	49+880.000	Right	Flat Bottom Ditch for Borrow
50+020.000	To	50+450.000	Left	Flat Bottom Ditch for Borrow
50+020.000	To	50+450.000	Right	Flat Bottom Ditch for Borrow
50+650.000	To	50+760.000	Left	Flat Bottom Ditch for Borrow
50+820.000	To	50+920.000	Left	Flat Bottom Ditch for Borrow
51+080.000	To	51+220.000	Left	Flat Bottom Ditch for Borrow
51+080.000	To	51+220.000	Right	Flat Bottom Ditch for Borrow
51+290.000	To	51+430.000	Left	Flat Bottom Ditch for Borrow
51+290.000	To	51+430.000	Right	Flat Bottom Ditch for Borrow

PROJECT: N27(2-1)2&4

EXISTING "AS-BUILT"
HALF SECTION

NEW HALF SECTION *



TYPICAL CROSS SECTION
PAVEMENT REPAIR CUTOUT SECTIONS
Sta. 44+145.00 to 44+165.00
Sta. 44+270.00 to 44+290.00

N27(2-2) SEQUENCE OF PAVEMENT RECONSTRUCTION

1. THE CONTRACTOR SHALL MILL OR PULVERIZE THE TOP 228 mm OF EXISTING HOT ASPHALT CONCRETE PAVEMENT (HACP) AND AGGREGATE BASE COURSE (ABC) STRUCTURE AT THE REPAIR SECTIONS, TO MINUS 25 mm SIEVE SIZE AND NEAT STRAIGHT LINES. THE EXISTING 305 mm OF EXISTING LIME STABILIZATION LAYER SHALL NOT BE DISTURBED AND SHALL REMAIN IN PLACE. THE MILLED MATERIAL SHALL BE STOCKPILED AT A SITE DETERMINED APPROPRIATE BY THE COR/COTR CLOSE TO THE REMOVAL. THE STOCKPILED MATERIAL SHALL THEN BECOME COLD RECYCLED AGGREGATE BASE COURSE (CRABC). THE CONTRACTOR HAS THE OPTION TO UTILIZE A SELF-PROPELLING PULVERIZING MACHINE OR OTHER CONSTRUCTION EQUIPMENT/METHODS CAPABLE OF MAINTAINING A UNIFORM GRADE AND CROSS SECTION TO STRAIGHT LINES.
2. THE CONTRACTOR SHALL PLACE 152 mm THICKNESS OF THE CRABC MATERIAL ON THE ON TOP OF THE EXISTING 305 mm LIME STABILIZED LAYER WITH MOISTURE AND COMPACTION. IF NECESSARY, ADDITIONAL ABC SHALL BE USED TO BRING SUB-BASE TO REQUIRED ELEVATION.
3. THE CONTRACTOR SHALL PLACE NEW 76 mm (2-38 mm lifts) OF HACP ON TOP OF THE ABC WITH TACK COAT BETWEEN LIFTS.
4. THE CONTRACTOR SHALL PROVIDE FOR A SAFE AND RELATIVELY DUST FREE DRIVING SURFACE THROUGHOUT THE RECONSTRUCTION PROCESS FOR ALL SCHOOL, GENERAL TRAVELING PUBLIC, AND LOCAL TRAFFIC USE DAY AND NIGHT. THE CONTRACTOR'S TRAFFIC CONTROL AND CONSTRUCTION SEQUENCING PLAN SHALL INCLUDE THESE REQUIREMENTS AND BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO ANY GROUND DISTURBING ACTIVITIES TAKING PLACE.
5. THIS WORK SHALL BE INCUDED IN THE UNIT PRICE BID FOR THE PAVING ITEMS SHOWN IN THE BID SCHEDULE.

BASIS OF ESTIMATED QUANTITIES

ITEM No.	DESCRIPTION	GRADE	UNIT WT.	APPLICATION
30103-2000	Untreated Aggregate Base Course	"Special"	2164 kg/m^3	Main Roadway: 152 mm, Turnouts: 127 mm
21301-4000	RoadBond EN-1 Treated Aggregate Course, Grading	"Special"	Liter	Mix Ration: EN-1:: Water, 1::200 Liters. Application: Scarify Subgrade Depth: 152 mm.
40201-0500	Hot Asphaltic Concrete Pavement, Class "B", Grade B, Type III Smoothness	"B"	2324 kg/m3	Main Roadway: 76 mm (2-38 mm Lifts), Turnouts: 76 mm (2-38 mm Lifts)
40502-1100	Asphalt Cement	PG 58-28	-	6.0% By Weight of Total Mix
41101-5000	Prime Coat, Penetrating Emulsified Prime	PEP	1056 L/t	Unit Weight: 1.36 L/m^3. Apply on top of ABC.
41201-1000	Asphalt Tack Coat	SS-1	0.23 L/m2	Unit Weight: 1000 L/t. Apply Between the Two Lifts of HACP.

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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TYPICAL CROSS
SECTION DETAIL

DRAWN BY: NRDOT DATE: 3/29/2017
DESIGNED BY: NRDOT DATE: 3/29/2017
REVISED: 9/19/2017 BY: Leroy.Toledo
Sht 02 N27 Typ Sec 1 rev hjr 032917.dgn

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	3	71

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (**FP-03 METRIC**), 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 COR/COTR, 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, AND THE SUPPLEMENTAL SPECIFICATIONS FOR SECTION 635.-TEMPORARY TRAFFIC CONTROL.

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 APPROVAL OF THE NAVAJO REGION OFFICE-DIVISION OF TRANSPORTATION (NRDOT) DIVISION MANAGER THROUGH THE CONTRACTING OFFICER (CO), 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 5.0 METERS FROM THE LOCATIONS SHOWN ON THE PLANS WITHOUT THE WRITTEN APPROVAL OF THE OWNER THROUGH THE CONTRACTING OFFICER (CO).

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-03** 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, SOILS, AND LIMITATIONS BEFORE MAKING A BID PROPOSAL. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY AND ALL ERRORS RESULTING FROM THE FAILURE TO MAKE SUCH AN EXAMINATION OF THE DATA AND SITE. ANY INFORMATION DERIVED FROM THE MAPS, PLANS, SPECIFICATIONS, PROFILES, DRAWINGS OR THE ENGINEER OF RECORD, SHALL NOT RELIEVE THE CONTRACTOR FROM ANY RISK OR FROM FULFILLING THE TERMS OF THE CONTRACT. THERE ARE SEVERAL AREAS WITH LIMITED WORKING ROOM WITHIN THE PROJECT RIGHT-OF-WAY, AND/OR WITH EXISTING FEATURES NEAR THE PROJECT RIGHT-OF-WAY, THAT WILL REQUIRE 'SPECIAL' CONSTRUCTION PROCEDURES AND EQUIPMENT.

7. THE CONTRACTOR IS REQUIRED TO SUBMIT A REVISED PIPE LIST TO THE NRDOT, PLANNING & DESIGN BRANCH CHIEF THROUGH THE COR/COTR, 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, SEE SHEET 50 OF 70 FOR DETAILS FOR COVERING UP ALL DRAINAGE STRUCTURES TO 305MM FROM THE INLET AND OUTLET OPENINGS AS PART OF THE EARTHWORK.

8. NO WORK SHALL BE PERFORMED OR GROUND DISTURBED OUTSIDE OF THE DESIGNATED CONSTRUCTION LIMITS IN ACCORDANCE WITH SECTION 107 OF THE FP-03 WITHOUT WRITTEN APPROVAL BY THE NRDOT DIVISION MANAGER 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 NRDOT DIVISION MANAGER, UNLESS OTHERWISE SHOWN AND CALLED OUT ON THESE PLANS AS "WORK AREAS". THE CONSTRUCTION LIMIT IS THE CATCH POINT EARTHWORK LIMIT PLUS 3.0 METERS, NOT TO EXCEED THE RIGHT-OF-WAY LIMITS.

9. THE DETAILS SHOWN ON THE STORM WATER POLLUTION AND EROSION/SEDIMENT CONTROL DETAILS ARE GENERAL REQUIREMENTS TO BE USED BY THE CONTRACTOR IN PREPARING A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) 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 FOR AUTHORIZED CHANGES THAT AFFECT THE QUANTITIES. ANY OVER-RUN OR UNDER-RUN OF QUANTITIES SHALL BE SUBJECT TO THE VARIATION IN ESTIMATED QUANTITIES REQUIREMENTS UNDER THE SUPLEMENTAL SPECIFICATIONS FOR SECTION 109.02(a).

11. ALL TURNOUTS/DRIVEWAYS, AS CALLED FOR WORK ON, IN THESE PLANS, SHALL EITHER BE CONSTRUCTED, REBUILT, RESHAPED AND/OR REMOVED UP TO THE RIGHT-OF-WAY LIMITS. ALL TURNOUTS SHALL BE PAVED TO THE CATTLEGUARD. FROM THE BACK OF CATTLEGUARD TO THE R/W LINE, PLACE AGGREGATE BASE FOR ALL 4.5 METERS WIDE TURNOUTS. PLACE AGGREGATE AND HOT ASPHALTIC CONCRETE FOR TURNOUTS WIDER THAN 4.5 METERS TO MATCH THE STRUCTURAL SECTION. REQUIRED GRADING, SHAPING, AND EARTH COMPACTION OUTSIDE OF THE RIGHT-OF-WAY, TO CONNECT NEW TURNOUTS TO THE EXISTING ROADWAY/DRIVEWAY (AS SHOWN ON THE PLANS OR AS DIRECTED BY THE COR/COTR. THIS WORK SHALL BE INCIDENTAL TO BID ITEM 20401-0000. ANY REQUIRED AGGREGATE BASE AND/OR ASPHALT MATERIAL SHALL BE PAID FOR UNDER THE APPROPRIATE PAVING BID ITEMS FOR THIS WORK AS SHOWN IN THE BID SCHEDULE.

12. THE CONTRACTOR SHALL BE REQUIRED TO OBLITERATE ALL EXISTING ABANDONED TURNOUTS AND ROADWAY WITHIN THE RIGHT-OF-WAY LIMITS AS INCIDENTAL OBLIGATIONS UNDER THE EARTHWORK BID ITEMS. ANY EXISTING TURNOUTS/ROADWAY OUTSIDE OF THE RIGHT-OF-WAY THAT ARE DESIGNATED ON THE PLANS FOR OBLITERATION SHALL BE DONE UNDER THE BID ITEM 21102-2000. OBLITERATION SHALL BE AS PER FP-03, METHOD 2. SCARIFICATION SHALL BE TO A DEPTH OF 300 MILLIMETERS. THE SCARIFIED SURFACE SHALL BE LEFT ROUGH, WITH 100 MILLIMETERS TO 300 MILLIMETERS HIGH RIDGES PERPENDICULAR TO THE EXISTING ROAD CENTERLINE. ROADWAY OBLITERATION INCLUDES GRADING DRAINAGE CHANNELS ACROSS THE OLD ROADBED, TO RE-ESTABLISH NATURAL DRAINAGE CHANNELS AND/OR TO OPEN CHANNELS FOR THE NEWLY INSTALLED (IN NEW ROADWAY) DRAINAGE STRUCTURES. THIS WORK TO BE INCLUDED IN THE BID ITEM 21102-2000. PERMANENT SEEDING AND STRAW MULCHING SHALL BE APPLIED TO ALL OBLITERATION AREAS, WITHIN THE WITHIN THE LIMITS DESIGNATED IN THE PLANS OR BY THE COR/COTR. SEEDING AND MULCHING TO BE PAID UNDER ITEM 62510-1000.

13. STRUCTURAL EXCAVATION AND BEDDING/BACKFILL OF ALL DRAINAGE STRUCTURES (CULVERTS AND CONCRETE HEAD/WING WALLS) SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF STRUCTURES. BEDDING AND BACKFILL MATERIAL SHALL MEET ALL REQUIREMENTS OF FP-03, SECTIONS 209 AND 704. APPROVED EXCESS/WASTE EXCAVATION MATERIAL CALLED FOR IN THE DESIGN PLANS MAY BE USED TO REBUILD TURNOUTS, EARTHEN DITCH BLOCKS, AND/OR PLACED ALONG THE RIGHTS-OF-WAY AS WASTE IN AREAS ADJACENT TO THE REMOVAL AND AS DIRECTED BY THE COR/COTR.

14. 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 COR/COTR. 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 COR/COTR. THIS WORK SHALL BE INCIDENTAL TO BID ITEMS FOR SECTIONS 602, 603, AND/OR 607.

15. IMMEDIATELY PRIOR TO PLACING AGGREGATE BASE AND/OR RECYCLED MATERIAL, THE TOP 152 MILLMETERS OF THE 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 AS NEEDED 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 CONSIDERED AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.

16. THE EARTHWORK TABLE SHOWN IS TO ASSIST THE CONTRACTOR IN ESTABLISHING A BID UNDER THE EARTHWORK ITEMS SHOWN IN THE BID SCHEDULE. ANY BORROW MATERIAL CALLED FOR ON THE PLANS SHALL BE TAKEN FROM CONTRACTOR IDENTIFIED SOURCES OUTSIDE THE RIGHT-OF-WAY LIMITS. IT IS THE SOLE RESPONSIBILITY AND EXPENSE OF THE CONTRACTOR TO PROVIDE ANY NECESSARY BORROW MATERIAL FOR THIS PROJECT INCLUDING ALL NECESSARY PERMITS. ALL EXCAVATION, BORROW, ROCK EXCAVATION/REMOVAL AND EMBANKMENT MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 20401-0000 AND 20403-0000.

17. AT ALL TOP EDGES OF CUT SLOPES 3.0 METER OR HIGHER THAN THE DITCH FLOWLINE, THE CONTRACTOR SHALL REMOVE ALL LOOSE AND UNSTABLE ROCK OR ROCK THAT AS DETERMINED BY THE COR/COTR, MAY BECOME LOOSE WITHIN 5.0 METER OF THE TOP CUT SLOPE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO BID ITEM 20401-0000, AND NO ADDITIONAL PAYMENT WILL BE MADE.

18. 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. THE CONTRACTOR SHALL CONTACT THE NAVAJO TRIBAL UTILITY AUTHORITY (NTUA) AT (928)-729-5721, AND FRONTIER COMMUNICATION COMPANY AT (928)-871-3748, PRIOR TO STARTING ANY CONSTRUCTION ACTIVITIES. 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.

GENERAL NOTES (Continued)

19. THE CONTRACTOR SHALL REMOVE, CLEAN, AND STOCKPILE ALL SALVAGEABLE EXISTING CULVERTS, CATTLE GUARDS, FENCING MATERIALS, ETC, AS CALLED FOR ON THESE PLANS IN ACCORDANCE TO SECTIONS 203 AND 607 IN A DESIGNATED LOCATION ADJACENT TO THE REMOVAL LOCATION BUT OUTSIDE OF THE RIGHT-OF-WAY. THE COR/COTR 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 UNUSEABLE BY THE COR /COTR 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.

20. THE ROADWAY TYPICAL SECTION SHOWN IS THE BASIC TEMPLATE TO WHICH THE PROJECT IS TO BE STAKED AND BUILT. HOWEVER, THERE WILL BE LOCATIONS WHERE, DUE TO EXISTING GROUND CONDITIONS, TURNOUTS, CULVERTS OR OTHER STRUCTURES, ETC., THE SHOWN TYPICAL SLOPES CANNOT BE CONSTRUCTED. IN THIS CASE, THE NRDOT PLANNING & DESIGN BRANCH CHIEF, THROUGH THE COR/COTR, SHALL BE CONSULTED FOR CHANGES IN THE TYPICAL SECTIONS, DESIGN SLOPES, AND/OR OTHER ADJUSTMENTS BEFORE PROCEEDING WITH THE WORK UNLESS NOTED OTHERWISE ON THE PLANS. THE FINAL CONSTRUCTED ROAD SECTION SHALL BE BASED ON THE GOVERNMENT FURNISHED COMPUTERIZED STAKING REPORT AS ADJUSTED TO FIT FIELD CONDITIONS. THE CONTRACTOR SHALL STAY WITHIN THE LIMITS OF CONSTRUCTION, UNLESS OTHERWISE APPROVED. IN NO CASE SHALL THE CUT AND FILL BACK SLOPES BE BUILT STEEPER THAN THE MAXIMUM ALLOWED IN THE ROADWAY TYPICAL SECTION SHOWN.

21. THE CONTRACTOR SHALL SAW CUT (FULL DEPTH) THE EXISTING ASPHALT PAVEMENT 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 AT TIE-IN POINTS AND TO PROVIDE FOR A SMOOTH TRANSITION AS DIRECTED BY THE COR/COTR. ALL SAWED PAVEMENT EDGES TO RECEIVE ASPHALT TACK COAT. THIS WORK SHALL BE INCIDENTAL TO BID ITEM 40201-0500 AS SHOWN IN THE BID SCHEDULE.

22. ANY EXISTING OR NEW ROADSIDE FEATURES OR OTHER IMPROVEMENTS NEGLIGENTLY DAMAGED BY THE CONTRACTOR, DURING CONSTRUCTION, SHALL BE RESTORED/REPLACED IN EQUAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE.

23. REMOVAL AND RE-ATTACHMENT OF FENCING REQUIRED TO COMPLETE SPECIFIED WORK AT DRAINAGE STRUCTURES, CATTLE GUARDS, GATES, TURNOUTS, RIPRAP, ETC, SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEMS RELATED TO THE WORK REQUIRING SAID FENCE REMOVAL/RE-ATTACHMENT. FENCING REPAIRS, TEMPORARY FENCING AND/OR REMOVAL AND RE-ATTACHMENT OF FENCING, SHALL BE COMPLETED IN THE SAME WORK DAY SO AS NOT TO ALLOW LIVESTOCK ONTO THE PROJECT. IF WIRE TENSION IS LOST IN THE EXISTING FENCE, THE CONTRACTOR SHALL RE-TIGHTEN THE FENCE AS DIRECTED BY THE COR/COTR.

24. THE CONTRACTOR SHALL REMOVE BIA ROUTE N27 EXISTING ROADSIDE SIGNS THAT INTERFERE WITH ROAD CONSTRUCTION AND/OR CONTRADICT THE CONTRACTOR'S TEMPORARY TRAFFIC CONTROL PLAN, AT THE START OF THE CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE COR/COTR AT LEAST THREE (3) WORKING DAYS IN ADVANCE OF SUCH SIGN REMOVAL. THESE ROADSIDE SIGNS SHALL BE SALVAGED AND TAKEN TO THE CHINLE AGENCY MAINTENANCE YARD. SIGNS NEEDED FOR SAFETY/INFORMATION SHALL BE TEMPORARILY RESET AS DIRECTED BY THE COR/COTR. ALL REMAINING SIGNS ALONG THE EXISTING N27 ROADWAY, NOT SPECIFICALLY DESIGNATED ON THE PLANS TO REMAIN, SHALL BE REMOVED. THIS WORK SHALL BE CONSIDERED AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.

25. GRADE AND SHAPE THE SHOULDER AND DITCHES (AS DIRECTED BY COR/COTR) FROM THE SUBGRADE HINGE POINTS TO AND INCLUDING THE EXISTING DITCH LINE AREAS FOR THE CONSTRUCTION OF RIPRAP DITCH LININGS, SLOPE PROTECTION, AND RUNDOWNS. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE RIPRAP ITEMS SHOWN IN THE BID SCHEDULE.

26. AT MAJOR DRAINAGE STRUCTURES AND LIVESTOCK PASS LOCATIONS, THE CONTRACTOR SHALL EITHER TIE THE WING FENCES TO STRUCTURES IN ACCORDANCE WITH THE DETAILS ON SHEET 44 OF 61 OR INSTALL FENCE OVER THE STRUCTURE AT THE CLEAR RECOVERY ZONE AS NOTED ON THE PLANS. IF NO CORNER FENCE POST/BRACE/STRAIN EXISTS AT TIE-IN TO RIGHT-OF-WAY FENCE, THE CONTRACTOR SHALL INSTALL A STRAIN POST ASSEMBLY AS PER PLAN SHEET 44 OF 71. ANY EXISTING CATTLE PASS CLOSURES ARE TO BE REMOVED. THIS WORK TO BE INCIDENTAL TO BID ITEM 61901-1000 AND NO ADDITIONAL PAYMENT SHALL BE MADE.

27. ALL RIGHT-OF-WAY REFERENCE MARKERS SHALL BE LABELED IN THE METRIC UNITS OF MEASURE. ALL EXISTING AND NEW BRASS CAPS SHALL BE STAMPED WITH BOTH ALIGNMENT STATIONING AND ELEVATIONS IN METRIC, UNLESS OTHERWISE NOTED UNDER SECTION 152 OF THE SUPPLEMENTAL SPECIFICATIONS. ANY EXISTING R/W MONUMENTS AND BRASS CAPS MISSING SHALL BE RE-SURVEYED IN TO THEIR ORIGINAL POSITION AND LABELED ACCORDINGLY. ALL EXISTING REFERENCE MARKERS SHALL BE SAND BLASTED, CLEAN, AND REPAINTED WITH ENGLISH STATIONS ON ONE SIDE AND METRIC STATIONS ON THE OTHER. ANY MISSING OR DAMAGED MARKERS SHALL BE RE-SURVEYED AND REPLACED. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 62101-0000 AND 62102-0000.

28. THERE MAY BE A NUMBER OF ARCHAEOLOGICAL SITE MITIGATIONS THAT ARE NOTED ON THE PLANS. THE CONTRACTOR SHALL NOTIFY THE NAVAJO NATION DEPARTMENT OF TRANSPORTATION (NNDOT) ROAD CULTURAL RESOURCE MANAGEMENT (RCRM) AS REQUIRED PRIOR TO STARTING CONSTRUCTION ACTIVITIES IN THESE LOCATIONS. SEE THE SPECIAL CONTRACT REQUIREMENT SECTION OF THE CONTRACT FOR ADDITIONAL INFORMATION, AND REQUIREMENTS. THE CONTRACTOR SHALL PLACE TEMPORARY FLEXIBLE SAFETY FENCE AROUND THE ARCHAEOLOGY SITE(S) AS NOTED ON THE PLANS. THE FENCING MATERIAL SHALL BE SQUARE LINK ORANGE (OR EQUIVALENT) PLASTIC TYPE MADE OF HI-DENSITY HDPE, AS PER SECTION 710.11 OF FP-03. TEMPORARY ARCHAEOLOGY FENCING SHALL BE CONSIDERED INCIDENTAL OBLIGATIONS OF THE CONTRACTOR IF A SPECIFIC BID ITEM IS NOT SHOWN IN THE BID SCHEDULE.

29. AS-BUILTS PLAN AND PROFILE SHEETS [OF PROJECT N27(2-1)] SHALL BE PROVIDED UPON WRITTEN REQUEST TO THE COR/COTR. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEYING AND CHECKING THE EXISTING ROADWAY (HORIZONTAL AND VERTICAL) CENTERLINE ALIGNMENT TO INSURE THE PROPOSED PROJECT ALIGNMENT MATCHES THE NEW ROADWAY ALIGNMENT AT THE BOP. REGRADE AND RESHAPE THE EXISTING ROADSIDE DITCHES AS NEEDED TO MATCH THE NEW DITCH LINES. THE CONTRACTOR IS ADVISED THAT MUCH OF THE INFORMATION FOUND ON THE AS-BUILT PLANS HAS BEEN REVISED/UPDATED/CORRECTED FOR THE CURRENT PROJECT. THE AS-BUILT PLANS ARE PROVIDED FOR BACKGROUND INFORMATION ONLY. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 15201-0000, 20401-000, 30302-6000 AND 40201-0500.

30. THE GEO-TECHNICAL REPORT FOR THIS PROJECT SHALL BE PROVIDED UPON WRITTEN REQUEST FROM THE CONTRACTOR THRU COR/COTR.

31. ROADWAY END AREA AND PIPE CROSS SECTION DRAWINGS WILL BE PROVIDED IN EITHER HARD COPY OR ELECTRONIC FORMAT UPON WRITTEN REQUEST FROM THE CONTRACTOR THRU THE CONTRACTING OFFICER.

32. ANY EXISTING MAIL BOXES, ADVERTISING BILLBOARDS, OR HOUSE ADDRESS SIGNS CALLED OUT ON THESE PLANS OR FOUND TO BE LOCATED ALONG THE ROADWAY PRISM SHALL BE REMOVED AND RE-INSTALLED OUTSIDE OF THE RIGHT-OF-WAY LIMIT OR AS DIRECTED BY THE COR/COTR. THE CONTRACTOR SHALL NOTIFY THE CHAPTER OFFICIALS AND ATTEMPT TO CONTACT ALL AFFECTED RESIDENTS TEN (10) WORKING DAYS PRIOR TO RESETTING MAIL BOX (ES). THIS WORK SHALL BE INCIDENTAL TO BID ITEM 20304-1000.

33. AT THE COMPLETION OF THE CONSTRUCTION, THE CONTRACTOR SHALL INSPECT THE INTERIOR OF ALL NEWLY INSTALLED CULVERTS, CATTLEGUARDS, AND/OR OTHER EXISTING DRAINAGE STRUCTURES. THESE STRUCTURES SHALL BE MAINTAINED IN A CLEAN CONDITION, FREE OF SILT AND OTHER DEBRIS UNTIL FINAL ACCEPTANCE OF THE PROJECT. THIS WORK SHALL BE CONSIDERED AN INCIDENTAL OBLIGATIONS OF THE CONTRACTOR UNDER THE APPROPRIATE BID ITEMS, FOR SECTIONS 602, 603, 607, AND 619.

34. THERE ARE NUMBER OF LOCATIONS WHERE RIPRAP, CHANNEL FLOWLINE GRADING, TURNOUTS, ETC., WILL REQUIRE WORK AND IMPROVEMENTS PLACED THROUGH AND BEYOND THE RIGHT-OF-WAY FENCING LOCATIONS. IN THESE LOCATIONS, THE RIGHT-OF-WAY FENCING SHALL BE ADJUSTED (POST SPACING, VERTICAL ALIGNMENT, POST INSTALLATIONS THROUGH RIPRAP, RIGHT-OF-WAY MONUMENT/MARKER ADJUSTMENT, ETC.) AS DIRECTED BY THE COR/COTR. THIS WORK TO BE INCIDENTAL TO BID ITEMS 61901-1000, 62101-0000, AND 62102-0000, AND NO ADDITIONAL PAYMENT WILL BE MADE.

35. IT IS EXPECTED A REVISED/ FINAL RIGHTS-OF-WAY GRANT OF EASEMENT BE DEVELOPED DURING THE CONSTRUCTION OF THE N27 PROJECT. THE CONTRACTOR SHALL NOT SURVEY FOR OR INSTALL R.O.W. MONUMENTS AND MARKERS OR FENCINGS UNTIL EXPRESSLY APPROVED BY THE NRDOT DIVISION MANAGER THROUGH THE COR/COTR. FENCING CAN BE PLACED AT ALL ARCHAEOLOGICAL SITES IF SPECIFIED ON THE PLANS.

36. THE FINISHED SUBGRADE SOIL CLASSIFICATION AND PI'S WILL BE DETERMINED PRIOR TO SUBGRADE TREATMENT WITH ROADBOND EN-1. THE FINAL LOCATIONS (BY STATION) FOR SUBGRADE TREATMENT WILL BE DETERMINED BY THE BIA-NRDOT MATERIALS SECTION AND PROVIDED TO THE CONTRACTOR BEFORE THE WORK CAN PROCEED.

NTUA NATURAL GAS DISTRIBUTION AND OTHER UTILITIES CONSTRUCTION NOTES:

1. CONTRACTOR TO PROVIDE MINIMUM 90 DAYS NOTICE TO NTUA PROR TO NTUA COMMENCING WITH UTILITY RELOCATIONS. NOTICE SHALL BE MADE VIA LETTER TO THE. NATURAL GAS MANAGER ADDRESSED AS FOLLOW:

   NTUA
   ATTN: NATURAL GAS MANAGER
   POST OFFICE BOX 170
   FORT DEFIANCE, ARIZONA 86504

2. MINIMUM 30 DAYS NOTICE IS REQUIRED FOR ANY PROPOSED DESIGN CHANGES BY GOVERNMENT THAT MAY IMPACT THE GASLINE. NTUA SHALL APPROVE OF SUCH CHANGES IN WRITING.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INCLUDING TRAFFIC CONTROL FOR WORK OVER THE GASLINES IN THEIR TRAFFIC CONTROL PLAN. THE TRAFFIC CONTROL PLAN SHALL BE SUBMITTED TO NTUA AND THE GOVERNMENT FOR REVIEW AND APPROVAL PRIOR TO ANY CONSTRUCTION.

4. ALL CONSTRUCTION OVER AN NEAR THE GASLINES SHALL COMPLY WITH THE APPLICABLE SECTIONS OF NTUA'S*TECHNICAL SPECIFICATIONS FOR WORKMANSHIP AND MATERIALS FOR NATURAL GAS FACILITIES (2004)*.

5. FUEL GAS PIPING SHALL BE IN ACCORDANCE WITH THE MOST RECENT VERSION OF THE UNIFORM PLUMBING CODE (2015) AS APPLICABLE AND THE*UNIFORM MECHANICAL CODE (2015)*

6. CONTRACTOR SHALL CONTACT THE NTUA NATURAL GAS DEPARTMENT AT (928) 729-6275 REGARDING NTUA SCHEDULING, ENGINEERING, CONSTRUCTION, AND PROJECT MANAGEMENT FOR THE GASLINE ADJUSTMENTS.

7. CONTRACTOR SHALL CALL 811 AND NTUA CHINLE DISTRICT OFFICE BEFORE ANY DIGGING OR PLACEMENT OF EMBANKMENT MATERIALS (MINIMUM 72 HOUR NOTICE REQUIRED). LOCATION/STAKING OF THE GASLINES SHALL BE COMPLETED PRIOR TO DIGGING.

8. DIGGING IN VICINITY OF ANY EXISTING NTUA NATURAL GAS FACILTIES SHALL BE MONITORED BY NTUA WITH A MINIMUM OF 72 HOUR NOTICE REQUIRED.

9. STOP WORK IF EXPOSURE, CONTACT, OR DAMAGE OF NTUA GASLINE FACILITIES OCCURS. NTUA SHALL INSPECT FACILITIES, PROVIDE INSTRUCTION, AND NOTICE TO PROCEED WITH CONSTRUCTION WORK IN THE AREA.

10. NTUA CONSTRUCTION MATERIALS AND EQUIPMENT TO BE STORED ON SITE. LOCATION TO BE COORDINATED WITH GOVERNMENT AND CONTRACTOR.

11. NTUA NATURAL GAS LINES REQUIRE EASEMENTS OF 30 FEET (9.14 m), 15 FEET (4.57 m) ON EACH SIDE FROM THE CENTER OF THE PIPELINE.

12. NO BUILDING, STRUCTURE, SLAB, PARKING LOT OR OTHER FIXED EQUIPMENT OR FACILTIES SHALL BE CONSTRUCTED OVER NTUAS UTILITES WITHOUT FIRST GETTING THE CONSENT OF NTUA'S NATURAL GAS MANAGER IN WRITING.

13. A NATURAL GAS PIPEL NE CROSSING AN ARROYO OR WASH SHALL HAVE A MINIMUM BURY DEPTH OF 5 FEET (1.524 m).

14. A NATURAL GAS PIPELINE CROSS ING OR UNDER AN UNPAVED ROAD SHALL HAVE A MINIMUM BURY DEPTH OF 5 FEET (1.524 m). GOVERNMENT SHALL MONITOR DEPTH AND MAINTAIN COVER.

15. IN THE EVENT WHERE THE EXISTING UNDERGROUND NATURAL GASLINE IS IN CONFLICT WITH A PERMANENT STRUCTURE (i.e. WITHIN 5') THE NTUA NATURAL GAS DEPARTMENT SHALL APPROVE OF SUCH CONSTRUCTION BEFORE ANY CONSTRUCTION OVER THE EXISTING NATURAL GASLINE IS STARTED.

16. FOR TEMPORARY ROADS THE BURIED NATURAL GASLINE SHOULD BE CROSSED CAREFULLY, AND ONLY WHEN NTUA REPRESENTATIVE IS ON SITE AND ABLE TO OBSERVE THE WORK. THE CROSSING SHOULD BE AS NEAR TO PERPENDICULAR (NINETY 90 DEGREES) AS MUCH AS POSSBLE AND HAVE A MINIMUM COVER OF 3 FEET (0.914 m) OVER THE TOP OF THE GASLINE.

17. WHEN CUTTING DITCH GRADES ABOVE THE BURIED NATURAL GASLINE IS NOT PERMISSIBLE UNLESS THE LINE HAS THE MINIMUM COVER DEPTH AND PROTECTION AS REQUIRED.

18. ALL NTUA UTILITIES SHALL BE PROTECTED IN PLACE UNLESS OTHERWISE SPECIFIED IN THE DESIGN PLANS. NTUA SHALL INSPECT PROTECTION IN PLACE AND APPROVE ANY INSTALLATION PRIOR TO SUBJECTING FACLITIES TO LOADING, SUCH AS CONSTRUCTION EQUIPMENT AND VEHICLE TRAFFIC.

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

GENERAL NOTES

DRAWN BY: NRDOT	DATE: 12/19/2013
DESIGNED BY: NRDOT	DATE: 12/19/2013
REVISED: 5/19/2015	BY: Leroy.Toledo
Sht 03_N27 GenNotes REV 091417.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	4	71

HORIZONTAL ALIGNMENT TABLE

POINT	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
POB	44+300.000			555,330.528	269,711.338
		Linear= 10.000 (m)	N 17°17'28" W		
PI	44+310.000			555,340.076	269,708.366
		Linear= 3041.718 (m)	N 17°17'28" W		
PC	47+351.718			558,244.328	268,804.280
PI	47+412.181	CURVE DATA		558,302.058	268,786.308
		Delta = 7°01'30.89" Rt.			
		Deg. = 1°46'22.69"			
		R = 985.000 (m)			
		L = 120.774 (m)			
		T = 60.463 (m)			
		e = 1.854 (m)			
PT	47+472.492			558,361.553	268,775.533
		Linear= 1575.534 (m)	N 10°15'58" W		
PC	49+048.027			559,911.865	268,494.744
PI	49+109.647	CURVE DATA		559,972.499	268,483.762
		Delta = 8°56'33.81" Rt.			
		Deg. = 2°12'58.36"			
		R = 788.000 (m)			
		L = 122.991 (m)			
		T = 61.621 (m)			
		e = 2.406 (m)			
PT	49+171.018			560,034.103	268,482.339
		Linear= 496.364 (m)	N 1°19'24" W		
PC	49+667.381			560,530.335	268,470.876
PI	49+729.017	CURVE DATA		560,591.954	268,469.453
		Delta = 8°56'41.75" Rt.			
		Deg. = 2°12'58.36"			
		R = 788.000 (m)			
		L = 123.021 (m)			
		T = 61.636 (m)			
		e = 2.407 (m)			
PT	49+790.403			560,653.045	268,477.628
		Linear= 2153.835 (m)	N 7°37'18" E		
PC	51+944.238			562,787.852	268,763.294
PI	52+049.735	CURVE DATA		562,892.417	268,777.286
		Delta = 29°58'46.46" Lt.			
		Deg. = 4°25'56.73"			
		R = 394.000 (m)			
		L = 206.157 (m)			
		T = 105.497 (m)			
		e = 13.879 (m)			
PT	52+150.395			562,989.983	268,737.156
		Linear= 535.333 (m)	N 22°21'28" W		
PC	52+685.728			563,485.073	268,533.520
PI	52+769.217	CURVE DATA		563,562.285	268,501.762
		Delta = 23°55'40.75" Rt.			
		Deg. = 4°25'56.73"			
		R = 394.000 (m)			
		L = 164.543 (m)			
		T = 83.489 (m)			
		e = 8.748 (m)			
PT	52+850.271			563,645.742	268,504.050
		Linear= 449.729 (m)	N 1°34'12" E		
POE	53+300.000			564,095.302	268,516.372

Note: Coordinates are Modified (Ground)
Arizona State Plane Coordinates System,
East Zone, NAD83, Meters
Combine Grid to Ground Scale Factor =0.999668489

VERTICAL ALIGNMENT TABLE

Point Type	Start Station	Start Elevation	Start Gradient	Point Type	End Station	End Elevation	End Gradient	Length (m)	Remarks
POB	44+300.000	1,743.561	1.0986%	PVC	44+320.000	1,743.781	1.0986%	20.000	Linear
PVC	44+320.000	1,743.781	1.0986%	PVT	44+440.000	1,743.767	−1.1212%	120.000	Parabola
PVT	44+440.000	1,743.767	−1.1212%	PVC	44+734.945	1,740.460	−1.1212%	294.945	Linear
PVC	44+734.945	1,740.460	−1.1212%	PVT	44+784.945	1,740.180	0.0000%	50.000	Parabola
PVT	44+784.945	1,740.180	0.0000%	PVC	45+262.505	1,740.180	0.0000%	477.560	Linear
PVC	45+262.505	1,740.180	0.0000%	PVT	45+327.505	1,739.788	−1.2062%	65.000	Parabola
PVT	45+327.505	1,739.788	−1.2062%	PVC	46+136.775	1,730.027	−1.2062%	809.270	Linear
PVC	46+136.775	1,730.027	−1.2062%	PVT	46+191.775	1,729.695	0.0000%	55.000	Parabola
PVT	46+191.775	1,729.695	0.0000%	PVC	46+450.000	1,729.695	0.0000%	258.225	Linear
PVC	46+450.000	1,729.695	0.0000%	PVT	46+550.000	1,728.741	−1.9080%	100.000	Parabola
PVT	46+550.000	1,728.741	−1.9080%	PVC	46+785.000	1,724.257	−1.9080%	235.000	Linear
PVC	46+785.000	1,724.257	−1.9080%	PVT	46+815.000	1,723.779	−1.2806%	30.000	Parabola
PVT	46+815.000	1,723.779	−1.2806%	PVC	47+622.500	1,713.438	−1.2806%	807.500	Linear
PVC	47+622.500	1,713.438	−1.2806%	PVT	47+677.500	1,713.070	−0.0592%	55.000	Parabola
PVT	47+677.500	1,713.070	−0.0592%	PVI	48+300.000	1,712.701	−0.0592%	622.500	Linear
PVI	48+300.000	1,712.701	−0.3076%	PVI	49+300.000	1,709.625	−0.3076%	1,000.000	Linear
PVI	49+300.000	1,709.625	−0.1508%	PVI	49+950.000	1,708.645	−0.1508%	650.000	Linear
PVI	49+950.000	1,708.645	−0.5878%	PVI	50+600.000	1,704.824	−0.5878%	650.000	Linear
PVI	50+600.000	1,704.824	−0.1233%	PVC	51+336.500	1,703.916	−0.1233%	736.500	Linear
PVC	51+336.500	1,703.916	−0.1233%	PVT	51+383.500	1,704.105	0.9258%	47.000	Parabola
PVT	51+383.500	1,704.105	0.9258%	PVC	51+917.000	1,709.044	0.9258%	533.500	Linear
PVC	51+917.000	1,709.044	0.9258%	PVT	52+003.000	1,710.610	2.7164%	86.000	Parabola
PVT	52+003.000	1,710.610	2.7164%	PVC	52+113.500	1,713.612	2.7164%	110.500	Linear
PVC	52+113.500	1,713.612	2.7164%	PVT	52+246.500	1,715.535	0.1756%	133.000	Parabola
PVT	52+246.500	1,715.535	0.1756%	PVC	52+318.500	1,715.661	0.1756%	72.000	Linear
PVC	52+318.500	1,715.661	0.1756%	PVT	52+481.500	1,718.884	3.7785%	163.000	Parabola
PVT	52+481.500	1,718.884	3.7785%	PVC	52+516.000	1,720.187	3.7785%	34.500	Linear
PVC	52+516.000	1,720.187	3.7785%	PVT	52+956.000	1,718.338	−4.6193%	440.000	Parabola
PVT	52+956.000	1,718.338	−4.6193%	PVC	52+975.000	1,717.460	−4.6193%	19.000	Linear
PVC	52+975.000	1,717.460	−4.6193%	PVT	53+125.000	1,713.345	−0.8678%	150.000	Parabola
PVT	53+125.000	1,713.345	−0.8678%	POE	53+300.000	1,711.826	−0.8678%	175.000	Linear

SUPERELEVATION TABLE

Station	Lt Rate	Rt Rate	Point Type
CURVE 1			
47+310.718	−2.00%	−2.00%	Runout
47+327.118	0.00%	−2.00%	Runoff
47+343.518	2.00%	−2.00%	Reverse Crown
47+368.118	5.00%	−5.00%	Full Super
47+456.092	5.00%	−5.00%	Full Super
47+480.692	2.00%	−2.00%	Reverse Crown
47+497.092	0.00%	−2.00%	Runoff
47+513.492	−2.00%	−2.00%	Runout
CURVE 2			
49+003.620	−2.00%	−2.00%	Runout
49+019.827	0.00%	−2.00%	Runoff
49+036.034	2.00%	−2.00%	Reverse Crown
49+066.827	5.80%	−5.80%	Full Super
49+152.218	5.80%	−5.80%	Full Super
49+183.011	2.00%	−2.00%	Reverse Crown
49+199.218	0.00%	−2.00%	Runoff
49+215.42	−2.00%	−2.00%	Runout
CURVE 3			
49+622.974	−2.00%	−2.00%	Runout
49+639.181	0.00%	−2.00%	Runoff
49+655.388	2.00%	−2.00%	Reverse Crown
49+686.181	5.80%	−5.80%	Full Super
49+771.603	5.80%	−5.80%	Full Super
49+802.396	2.00%	−2.00%	Reverse Crown
49+818.603	0.00%	−2.00%	Runoff
49+834.810	−2.00%	−2.00%	Runout
CURVE 4			
51+888.988	−2.00%	−2.00%	Runout
51+905.238	−2.00%	0.00%	Runoff
51+921.488	−2.00%	2.00%	Reverse Crown
51+970.238	−8.00%	8.00%	Full Super
52+124.395	−8.00%	8.00%	Full Super
52+173.145	−2.00%	2.00%	Reverse Crown
52+189.395	−2.00%	0.00%	Runoff
52+205.645	−2.00%	−2.00%	Runout
CURVE 5			
52+630.478	−2.00%	−2.00%	Runout
52+646.728	0.00%	−2.00%	Runoff
52+662.978	2.00%	−2.00%	Reverse Crown
52+711.728	8.00%	−8.00%	Full Super
52+824.271	8.00%	−8.00%	Full Super
52+873.021	2.00%	−2.00%	Reverse Crown
52+889.271	0.00%	−2.00%	Runoff
52+905.521	−2.00%	−2.00%	Runout

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HORIZONTAL AND
VERTICAL ALIGNMENT TABLES

DRAWN BY: NRDOT	DATE: 11/4/2013
DESIGNED BY: NRDOT	DATE: 11/4/2013
REVISED: 9/14/2017	BY: Leroy.Toledo
Sht 04 N27 AlignTbl.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 04 N27 AlignTbl.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	5	71

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	QUANTITY	Units
10901-0000	Extra & Miscellaneous Work Authorized under Section 109.02(m)	All Req'd	Lump Sum
15101-0000	Mobilization	All Req'd	Lump Sum
15201-0000	Construction Survey and Staking	All Req'd	Lump Sum
15301-0020	Contractor Quality Control	8,600	Man Hrs.
15701-0000	Temporary Erosion Control	All Req'd	Lump Sum
15708-1000	Temporary Straw Mulching	21.00	ha
20102-0000	Clearing & Grubbing	All Req'd	Lump Sum
20304-1000	Removal of Structures & Obstructions	All Req'd	Lump Sum
20401-0000	Roadway Excavation	215,858	m^3
20403-0000	Unclassified Borrow	65,466	m^3
20425-2000	Furrow Ditches	300.0	m
20443-1000	Earthen Dikes & Berms, Type A	480.0	m
20443-2000	Earthen Dikes & Berms, Type B	390.0	m
20601-0000	Development of Water Supply	42.03	M-Liter
21102-2000	Roadway Obliteration, Method 2	23,200	m^2
21301-4000	Subgrade Stabilization with RoadBond EN-1, 152 mm depth	25,864	m^2
25101-2000	Placed Riprap , Class 2	2,332.4	m^3
25112-2000	Wire Enclosed Riprap, Class 2	804.7	m^3
25302-1000	Gabions, Aluminized Coated, Class 2	477.0	m^3
30101-2000	Untreated Aggregate Base, Grading "Special"	59,337.0	t
40201-0500	Hot Asphaltic Concrete Pavement, Class B, Grade B	14,797.0	t
40502-0800	Asphalt Cement, Grade PG-58-28	887.0	t
41101-5000	Prime Coat Grade, Penetrating Emulsified Prime (PEP)	116.0	t
41201-1000	Tack Coat, Grade SS-1	19.0	t
60101-1000	Minor Concrete Class A(AE)	120.0	m^3
60201-0810	610 mm Corrugated Steel Pipe	302.97	m
60201-0910	762 mm Corrugated Steel Pipe	118.43	m
60201-1010	914 mm Corrugated Steel Pipe	530.96	m
60201-1110	1067 mm Corrugated Steel Pipe	72.54	m
60201-1310	1372 mm Corrugated Steel Pipe	114.60	m
60202-0610	899 mm Span x 610 mm Rise, Corrugated Steel Pipe Arch	359.67	m
60202-0710	1067 mm Span x 737 mm Rise, Corrugated Steel Pipe Arch	84.13	m
60202-0810	1245 mm Span x 838 mm Rise, Corrugated Steel Pipe Arch	366.98	m
60202-0910	1448 mm Span x 965 mm Rise, Corrugated Steel Pipe Arch	596.32	m
60202-1110	1803 mm Span x 1194 mm Rise, Corrugated Steel Pipe Arch	544.03	m
60202-1210	1953 mm Span x 1321 mm Rise, Corrugated Steel Pipe Arch	71.32	m
60210-0810	End Section, 610 mm Corrugated Steel Pipe	19	Each
60210-0910	End Section, 762 mm Corrugated Steel Pipe	5	Each
60210-1010	End Section, 914 mm Corrugated Steel Pipe	20	Each
60210-1110	End Section, 1067 mm Corrugated Steel Pipe	3	Each
60210-1310	End Section, 1372 mm Corrugated Steel Pipe	4	Each
60211-1010	End Section, 899 mm Span x 610 mm Rise, CSPA	17	Each
60211-1110	End Section, 1067 mm Span x 737 mm Rise, CSPA	3	Each
60211-1210	End Section, 1245 mm Span x 838 mm Rise, CSPA	14	Each
60211-1310	End Section, 1448 mm Span x 965 mm Rise, CSPA	23	Each
60211-1510	End Section, 1803 mm Span x 1194 mm Rise, CSPA	12	Each
60211-1610	End Section, 1956 mm Span x 1321 mm Rise, CSPA	3	Each
60222-3250	3048 mm Span x 3048 mm Rise Single Barrel Precast CBC with wingwalls, head & cutoff walls	28.81	m
60701-1000	Remove, Clean and Stockpile Pipe	106	m
61701-5000	Guardrail System, SGR04b, Type PDE02, w/ SKT-350 End Treatment	144.3	m
61801-0000	Concrete Barriers	48.8	m
61901-1000	Fence, 5-Strand Barb Wire Fencing	18,958.9	m
61902-0910	Type 1 Gate for 4.5 m Wide Turnout	1	Each
61902-1300	Type 1 Gate (4200 mm)	2	Each
61902-2310	Type 2 Gate	1	Each
61903-0310	Cattleguard, 4,900 mm Width 2 unit	5	Each
61903-0710	Cattleguard, 7,190 mm Width 3 unit	5	Each
62101-0000	Right-Of-Way Monument	36	Each
62102-0000	Reference Marker	36	Each
62510-1000	Permanent Seeding, Dry Method	21.00	ha
62901-1100	Rolled Erosion Control Product, Type 4	1499.00	m^2
63302-2001	Sign Installation, 1-Post 38 mm X 38 mm, Square Steel Tube Galvanized	0.28	m^2
63302-2002	Sign Installation, 1-Post 44 mm x 44 mm, Square Steel Tube Galvanized	5.52	m^2
63302-2003	Sign Installation, 1-Post 50 mm x 50 mm, Square Steel Tube Galvanized	11.60	m^2
63302-2006	Sign Installation, 2-Post 50 mm x 50 mm, Square Steel Tube Galvanized	3.12	m^2
63302-2007	Sign Installation, 2-Post 57 mm x 57 mm, Square Steel Tube Galvanized	1.68	m^2
63308-2000	Object Marker, Type 2, with 1-Post, 38 mm x 38 mm, Square Steel Tube Galvanize	114	Each
63308-3010	Object Marker, Type 3 with 1-Post, 51 mm x 51 mm, Square Steel Tube Galvanize	4	Each
63309-0030	Delineator, Type 1a with 1-Post, 38mm x 38mm, Steel Square Tube Galvanized	20	Each
63309-0040	Delineator, Type 1b with 1-Post, 38mm x 38mm, Steel Square Tube Galvanized	39	Each
63318-1020	Milepost, 38 mm x 38 mm, Square Steel Tube Galvanized	12	Each
63401-1510	Pavement Markings, Type "H", Solid Yellow	2,540.0	m
63401-1520	Pavement Markings, Type "H", Solid White	18,014.0	m
63401-1610	Pavement Markings, Type "H", Broken Yellow	8,610.0	m
63501-0000	Temporary Traffic Control	All Req'd	Lump Sum
63502-3000	Temporary Raised Pavement Markers, Flexible, Reflective 2-Way Yellow Tabs	4,000	Each
63509-1000	Flagger	8,678	Man Hrs.

ITEM 21102-2000 ROADWAY OBLITERATION - METHOD 2

Station		to Station	Location	Area (sq/m)	Remarks
44+500.00	to	45+340.00	Left	7,688.00	Existing Roadway Oblitration Outside The Right-Of-Way
45+499.00	to	45+851.00	Left	3,356.00	Existing Roadway Oblitration Outside The Right-Of-Way
49+298.00	to	49+448.00	Left	681.00	Existing Roadway Oblitration Outside The Right-Of-Way
49+705.00	to	49+860.00	Right	309.00	Existing Roadway Oblitration Outside The Right-Of-Way
49+960.00	to	51+375.00	Right	10,582.00	Existing Roadway Oblitration Outside The Right-Of-Way
52+676.00	to	52+833.00	Right	584.00	Existing Roadway Oblitration Outside The Right-Of-Way
			Total	23,200.00	

ITEM 15708-1000 TEMPORARY STRAW MULCHING
ITEM 62510-1000 PERMANENT SEEDING, DRY METHOD

STATION TO STATION			LOCATION	AREA (m^2)	REMARKS:
44+300.00	to	53+300.00	Left	116,054.45	Subgrade Hinge Point to Catch Point
44+300.00	to	53+300.00	Right	91,257.72	Subgrade Hinge Point to Catch Point
			TOTAL:	207,312.17	
			TOTAL:	20.73	Hectares

TURNOUT LOCATIONS

STATION	LOC.	DESCRIPTION	Remarks
44+378.00	Rt.	7.0 m Wide Turnout With 3 Unit Cattleguard & Type 2 Gate	No Pipe
44+460.00	Lt.	7.0 m Wide Turnout With 3 Unit Cattleguard, Type 2 Gate w/ 1-610 mm x 14.630 m CSPC & End Section at Inlet & Outlet	
45+487.00	Lt.	4.5 m Wide Turnout With 2 Unit Cattleguard & Type 2 Gate	No Pipe
45+545.00	Rt.	4.5 m Wide Turnout With 2 Unit Cattleguard & Type 2 Gate,	No Pipe
46+476.00	Rt.	4.5 m Wide Turnout With Type 2 Gate	No Pipe
46+507.00	Lt.	7.0 m Wide Turnout With 3 Unit Cattleguard, Type 2 Gate, 1-610 mm x 15.850 m CSPC & End Section at Inlet & Outlet	
47+100.00	Lt.	4.5 m Wide Turnout With 2 Unit Cattleguard, Type 2 Gate, 1-610 mm x 15.850 m CSPC & End Section at Inlet & Outlet	Turnout Extends Outside R/W To 50.0 m
47+340.00	Rt.	7.0 m Wide Turnout With 3 Unit Cattleguard, Type 2 Gate, 1-610 mm x 14.43 m CSPC & End Section at Inlet & Outlet	
48+340.00	Lt.	4.5 m Wide Turnout With 2 Unit Cattleguard, Type 2 Gate, 1-610 mm x 10.973 m CSPC & End Section at Inlet & Outlet.	School Bus Turnout
48+340.00	Rt.	4.5 m Wide Turnout With 2 Unit Cattleguard, Type 2 Gate, 1-610 mm x 9.754 m CSPC & End Section at Inlet & Outlet	
49+800.00	Rt.	4.5 m Wide Turnout With Type 1 Gate, 1-610 mm x 12.802 m CSPC & End Section at Inlet & Outlet,	Turnout Extends Outside R/W To 35.0 m, No Cattleguard
52+750.00	Lt.	7.0 m Wide Turnout With 3 Unit Cattleguard & Type 2 Gate	No Pipe

ITEM: 60701-1000: REMOVE, CLEAN, & STOCKPILE CULVERTS

STATION	LOCATION	DESCRIPTION	LENGTH (m)	REMARKS
44+595.038	49.60 m Lt.	1-610 mm x 9.12 m CSPC	9.12	Existing Pipe, Inlet Damaged
46+172.874	28.23 m Rt.	1-914 mm x 10.81 m CSPC	10.82	Existing Pipe, Inlet Bent, Crushed at Middle
46+284.116	27.68 m Rt.	1-1219 mm x 11.95 m CSP	11.95	Existing Pipe, Inlet & Outlet ok, Crushed at Middle
46+288.895	27.70 m Rt.	1-1219 mm x 12.16 m CSP	12.16	Existing Pipe, Inlet Crushed
47+130.923	28.95 m Lt.	1-457 mm x 9.15 m CSPC	9.15	Existing Pipe, Good Condition
48+138.654	CL	1-610 mm x 9.01 m CSPC	9.01	Existing Pipe, Bent at Inlet
49+369.741	37.69 m Lt	1-914 mm x 12.32 m CSPC	12.32	Existing Pipe, Good Condition
51+246.785	38.13 m Rt.	1-610 mm x 11.45 m CSPC	11.45	Existing Pipe, Hole in Culvert
51+263.466	35.80 m Rt.	1-610 mm x 11.37 m CSPC	11.37	Existing Pipe, Good Condition
52+421.826	CL	1-610 mm x 8.69 m CSPC	8.69	Existing Pipe, Inlet, Outlet Damaged
		TOTAL	106.04	

EXISTING UTILITY LINES

STATION	LOCATION	DESCRIPTION	REMARKS
44+324.58	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
44+346.24	C/L	Existing Powerline X-ing	Protect-in-Place
45+767.46	C/L	Existing Powerline X-ing	Protect-in-Place
45+804.26	C/L	Existing 102 mm High Pressure Gasline X-ing	To Be modified/rerouted By Owner
46+883.39	C/L	Existing Powerline X-ing	Protect-in-Place
46+898.41	C/L	Existing 102 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
49+210.19	C/L	Existing 102 mm High Pressure Gasline X-ing	To Be modified/rerouted By Owner
49+794.77	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
49+816.50	C/L	Existing Telephone Line X-ing	Protect-in-Place
49+816.80	C/L	Existing Powerline X-ing	Protect-in-Place
52+867.35	C/L	Existing Powerline X-ing	Protect-in-Place

NOTE: Protection/Relocate comments noted are assumed and are based on the best available information. The Actual Work Required/Performed By The Utility Owner may Vary.

ITEM No. 61901-1000, 5-STRAND BARB WIRE FENCING

STATION	To	STATION	LOC.	LENGTH	SIZE	REMARKS
44+300.00	To	53+300.00	Lt.	9,000.00	-	Entire Length of Project-Left ROW
44+300.00	To	53+300.00	Rt.	9,000.00	-	Entire Length of Project-Right ROW
44+378.00			Rt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
44+460.00			Lt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
44+980.78	To	45+059.21	Rt.	227.47	Construction Area	Dike, Type A, ROW fence perimeter
45+059.21	To	45+096.00	Rt.	-3.20	9- Pipe Laterals	Overlap -Diagonal Offset Fence to Pipe, approach - back
45+060.00			Lt.	-13.22	9- Pipe Laterals	Overlap -Diagonal Offset Fence to Pipe, approach - back
45+545.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
46+070.78	To	46+209.21	Rt.	50.00	Construction Area	Dike, Type A, ROW fence perimeter
46+280.00	To	53+938.00	Rt.	-3.40	CBC & Wingwall	Fence Add Forward & Back, Rt, ROW to Wingwall, 39.36 m
46+280.00			Lt.	3.70	CBC & Wingwall	Fence Add Forward & Back, Rt, ROW to Wingwall, 38.36 m
46+476.00	To	54+582.00	Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
46+507.00	To	54+890.00	Lt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
47+100.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
47+340.00	To	54+890.00	Rt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
48+340.00	To	55+371.00	Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
48+340.00	To	55+371.00	Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
49+800.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
49+860.00	To	49+960.00	Rt.	179.04	Construction Area	Dike, Type B, ROW fence perimeter
52+670.00	To	52+760.00	Lt.	13.40	Turnout - Offset	Offset fence for elongated curved Turnout
		Sub-Total:		18,406.79		
		GRAND TOTAL:		18,958.99	** 3% Added to Account for Terrain Slope/Special Fencing/Arch Sites	

N27(2-2)(2-3)1,2&4 (EARTHWORK VOLUME)
ITEM NO. 20401-0000, ROADWAY EXCAVATION
N27(2-3)2&4 EARTHWORK TABLE

Sta. to Sta.	Cut (m^3)	Fill (m^3)	Borrow (m^3)	Waste (m^3)
44+300.00 to 45+289.79	28,344.00	28,344.00	0.00	0.00
45+289.79 to 45+356.18	1,567.00	1,567.00	0.00	0.00
45+356.18 to 45+480.69	3,623.00	3,623.00	0.00	0.00
45+480.69 to 53+300.00	182,050.00	256,728.00	74,678.00	0.00
Sub-Total	215,584.00	290,262.00	74,678.00	0.00
Turnouts	274.00	5,885.00	5,611.00	0.00
*N27(2-3) (4-2)/N7(2-3)/N105(1)				14,823.00
GRAND TOTAL	215,858.00	296,147.00	65,446.00	0.00

15% Shrinkage Factor Applied To Fill
* Note: All Waste from the N27 North project shall be used on this project. The work of hauling and placing the Waste shall be included in the earthwork bid items shown in the bid schedule.

20304-1000: REMOVAL OF STRUCTURES AND OBSTRUCTIONS

STATION to STATION			LOCATION	DESCRIPTION	REMARKS
44+310.00			CL	5-Unit Cattle Guard	Remove Wingbrace and Fence Lt. & Rt. To R/W Line.
44+100.00	To	44+300.00	Rt. (Lane)	Roadway Taper: Striping	Remove By Sandblasting the Solid Yellow Diagonal Striping
48+667.00			Lt.	Chapter Boundary Sign	Remove Entire Structure (base & post)

ITEM No. 61903-0310: CATTLEGUARD, 4900 mm (2-Unit) With TYPE 2 GATE

STATION	LOCATION	EACH	REMARKS
45+487.00	Lt.	1	4.50 m Turnout To Residence
45+545.00	Rt.	1	4.50 m Turnout To Residence
47+100.00	Lt.	1	4.50 m Turnout To Residence
48+340.00	Rt.	1	4.50 m Turnout To Residence
48+340.00	Lt.	1	4.50 m Turnout To Residence
	TOTAL	5	

ITEM No. 61903-0710: CATTLEGUARD, 7190 mm (3-Unit) With TYPE 2 GATE

STATION	LOC.	EACH	REMARKS
44+380.00	Rt.	1	7.00 m Turnout To Residence
44+460.00	Lt.	1	7.00 m Turnout To Residence/ N8017
46+507.00	Lt.	1	7.00 m Turnout To Residence/ Bus Route
47+340.00	Rt.	1	7.00 m Turnout To Residence/ Bus Route
52+750.00	Lt.	1	7.00 m Turnout To Residence/ Bus Route
	TOTAL	5	

ITEM No. 61902-2310: TYPE-2 GATES ONLY (4200 mm), No Cattleguard

STATION	LOC.	EACH	REMARKS
46+476.00	Rt.	1	4.5 m Turnout To Residence
	TOTAL	1	

*Type-1 And Type-II Gates Associated With a Cattleguard Are Included In The Cost Of The Cattleguard. No Separate Payment Will Be Made. Gates Not Associated With Cattleguards Will Be Paid Under The Item(s) Listed In The Bid Schedule.

ITEM No. 61902-0910 4500 mm TURNOUT with TYPE 1 GATE

STATION	LOC.	EACH	REMARKS
49+800.00	Rt.	1	NTUA Pump House Access
	TOTAL	1	

*Type-1 And Type-II Gates Associated With a Cattleguard are Included In The Cost Of The Cattleguard
Pavement Will Be Made. Gates Not Associated With Cattleguards Will Be Paid Under The Item(s) Listed In The Bid Schedule.

ITEM No. 61902-1300: TYPE 1 GATE (4200 mm)

STATION	LOC.	EACH	REMARKS
45+705.00	Lt.	1	Livestock Passage Only, No TO
45+705.00	Rt.	1	Livestock Passage Only, No TO
	TOTAL	2	

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ESTIMATED QUANTITY TABLES

DRAWN BY: NRDOT DATE: 3/21/2014
DESIGNED BY: NRDOT DATE: 3/21/2014
REVISED: 3/28/2017 BY: Leroy.Toledo
$FILES$

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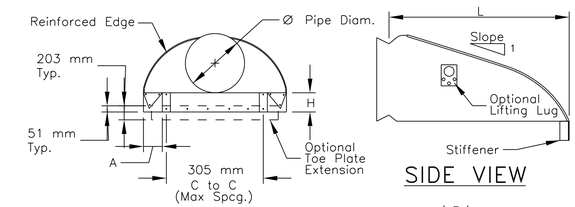
ESTIMATED DRAINAGE STRUCTURE QUANTITY

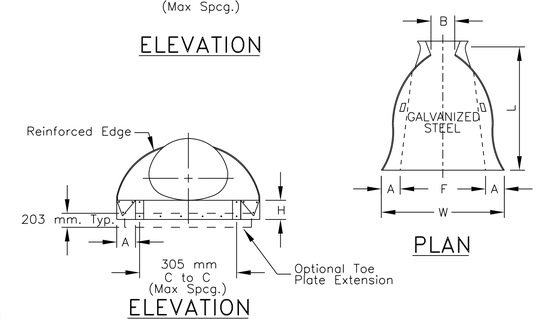
Station	Recommended Structure	Skew No.	CIRCULAR 60201-0810 68 x 2.77 mm CSPC 610 mm Corr.	CIRCULAR 60201-0910 68 x 2.77 mm CSPC 762 mm Corr.	CIRCULAR 60201-1010 68 x 2.77 mm CSPC 914 mm Corr.	CIRCULAR 60201-1110 68 x 2.77 mm CSPC 1067 mm Corr.	CIRCULAR 60201-1310 68 x 2.77 mm CSPC 1372 mm Corr.	PIPE ARCH 60202-0610 889 mm S x 68 x 2.77 mm CSPA 610 mm R Corr.	PIPE ARCH 60202-0710 1067 mm S x 68 x 2.77 mm CSPA 762 mm R Corr.	PIPE ARCH 60202-0810 1245 mm S x 68 x 2.77 mm CSPA 838 mm R Corr.	PIPE ARCH 60202-0910 1448 mm S x 68 x 2.77 mm CSPA 965 mm R Corr.	PIPE ARCH 60202-1110 1803 mm S x 68 x 2.77 mm CSPA 1194 mm R Corr.	PIPE ARCH 60202-1210 1953 mm S x 68 x 2.77 mm CSPA 1321 mm R Corr.	CIRCULAR END SECTION 60210-0810 End Section CSPC 2.77 mm 610 mm Thickness	CIRCULAR END SECTION 60210-0910 End Section CSPC 2.77 mm 762 mm Thickness	CIRCULAR END SECTION 60210-1010 End Section CSPC 2.77 mm 914 mm Thickness	CIRCULAR END SECTION 60210-1110 End Section CSPC 2.77 mm 1067 mm Thickness	CIRCULAR END SECTION 60210-1310 End Section CSPC 2.77 mm 1372 mm Thickness	PIPE ARCH END SECTION 60211-1010 889 mm S x 2.77 mm CSPA End Section 610 mm R Thickness	PIPE ARCH END SECTION 60211-1110 1067 mm S x 2.77 mm CSPA End Section 762 mm R Thickness	PIPE ARCH END SECTION 60211-1210 1245 mm S x 2.77 mm CSPA End Section 914 mm R Thickness	PIPE ARCH END SECTION 60211-1310 1448 mm S x 2.77 mm CSPA End Section 965 mm R Thickness	PIPE ARCH END SECTION 60211-1510 1803 mm S x 2.77 mm CSPA End Section 1194 mm R Thickness	PIPE ARCH END SECTION 60211-1610 1956 mm S x 2.77 mm CSPA End Section 1321 mm R Thickness	CBC 60222-3250 3000 mm x 3000 mm Box Precast Concrete Culvert-One Barrel
			m	m	m	m	m	m	m	m	m	m	m	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	m
44+460.00	1-610 mm x 17.678 m CSPC Under TO Left	90.0	17.678											2												
44+470.00	2-610 mm x 22.555 m CSPC	120.0	45.110											2												
44+549.00	1-762 mm x 20.727 m CSPC	100.0		20.727												1										
44+583.00	2-610 mm x 21.946 m CSPC	100.0	43.892											2												
44+850.00	2-914 mm x 25.603 m CSPC	120.0			51.206												2									
45+060.00	7-1803 mm S x 1194 mm R x 29.569 m CSPA	60.0											209.963												4	
45+280.00	1-914 mm x 24.384 m CSPC	80.0			24.384												1									
45+520.00	1-1245 mm S x 838 mm R x 24.994 m CSPA	90.0									24.994												1			
45+530.00	2-1245 mm S x 838 mm R x 25.603 m CSPA	90.0									51.206												2			
46+185.00	4-1372 mm x 28.651 m CSPC	120.0						114.604														4				
46+280.00	1-Barrel 3.05m x 3.05m R x 28.814 m PC CBC	75.0																								28.814
46+454.00	3-914 mm x 40.843 m CSPC	100.0			122.529												3									
46+810.00	2-762 mm x 22.336 m CSPC	100.0		44.672												2										
46+902.00	2-914 mm x 23.165 m CSPC	100.0			46.330												2									
46+973.00	3-1245 mm S x 838 mm R x 21.946 m CSPA	100.0									65.838												3			
47+003.00	1-610 mm x 21.946 m CSPC	100.0	21.946											1												
47+040.00	2-610 mm x 22.555 m CSPC	100.0	45.110											2												
47+144.00	2-914 mm x 26.213 m CSPC	115.0			52.426												2									
47+205.00	1-1067 mm S x 737 mm R x 23.165 m CSPA	115.0								23.165												1				
47+100.00	1-610 mm x 17.069 m CSPC Under TO Left	90.0	17.069											2												
47+340.00	1-610 mm x 12.802 m CSPC Under TO Right	90.0	12.802											2												
47+480.00	3-914 mm x 24.384 m CSPC	115.0			73.152												3									
47+646.00	2-889 mm S x 610 mm x 21.336 m CSPA	90.0							42.672											2						
47+660.00	2-889 mm S x 610 mm x 20.726 m CSPA	90.0							41.452											2						
47+740.00	3-889 mm S x 610 mm x 20.117 m CSPA	90.0							60.351											3						
47+830.00	1-610 mm x 20.727 m CSPC	90.0	20.727											1												
47+845.00	1-610 mm x 21.336 m CSPC	90.0	21.336											1												
47+900.00	1-610 mm x 21.336 m CSPC	90.0	21.336											1												
48+102.00	2-889 mm S x 610 mm x 22.556 m CSPA	90.0							45.112											2						
48+140.00	2-889 mm S x 610 mm x 24.384 m CSPA	90.0							48.768											2						
48+211.50	4-1448 mm S x 965 mm R x 23.774 m CSPA	90.0										95.096													4	
48+246.00	4-1448 mm S x 965 mm R x 23.774 m CSPA	90.0										95.096													4	
48+296.00	4-1448 mm S x 965 mm R x 24.994 m CSPA	90.0										99.976													4	
48+413.00	3-1245 mm S x 838 mm R x 28.042 m CSPA	100.0									84.126												3			
48+500.00	1-914 mm x 22.555 m CSPC	90.0			22.555												1									
48+600.00	1-914 mm x 22.555 m CSPC	90.0			22.555												1									
48+700.00	1-914 mm x 24.384 m CSPC	90.0			24.384												1									
48+800.00	1-762 mm x 23.774 m CSPC	90.0		23.774												1										
48+900.00	2-914 mm x 23.165 m CSPC	90.0			46.330												2									
49+000.00	1-610 mm x 23.165 m CSPC	90.0	23.165											1												
49+120.00	2-914 mm x 22.555 m CSPC	90.0			45.110												2									
49+497.00	3-889 mm S x 610 mm x 18.898 m CSPA	90.0							56.694											3						
49+800.00	1-610 mm x 12.802 m CSPC Under TO Right	90.0	12.802											2												
49+945.00	7-1803 mm S x 1194 mm R x 29.261 m CSPA	120.0											204.827												4	
50+514.00	4-1803 mm S x 1194 mm R x 32.309 m CSPA	130.0											129.236												4	
50+622.00	3-1956 mm S x 1321 mm R x 23.774 m CSPA	130.0												71.322												3
50+795.00	3-1448 mm S x 965 mm x 27.432 m CSPA	65.0										82.296													3	
50+938.00	3-1448 mm S x 965 mm x 27.432 m CSPA	135.0										82.296													3	
51+043.00	3-1448 mm S x 965 mm x 23.615 m CSPA	110.0										70.845													3	
51+250.00	1-1067 mm x 24.384 m CSPC	90.0			24.384												1									
51+257.00	1-1067 mm x 28.651 m CSPC	90.0			23.774												1									
51+264.00	1-1067 mm x 29.261 m CSPC	90.0			24.384												1									
51+480.00	1-762 mm x 34.747 m CSPC	45.0		29.261												1										
51+614.00	3-1245 mm S x 838 mm x 28.651 m CSPA	45.0									85.953												3			
51+721.00	2-1245 mm S x 838 mm R x 27.432 m CSPA	45.0									54.864												2			
52+180.00	2-889 mm S x 610 mm x 18.898 m CSPA	70.0							37.796											2						
52+272.00	1-889 mm S x 610 mm x 26.822 m CSPA	70.0							26.822											1						
52+420.00	2-1067 mm S x 737 mm R x 30.480 m CSPA	60.0								60.960												2				
52+464.00	2-1448 mm S x 965 mm R x 35.357 m CSPA	55.0										70.714													2	
	TOTAL		302.973	118.434	530.961	72.542	114.604	359.667	84.125	366.981	596.319	544.026	71.322	19	5	20	3	4	17	3	14	23	12	3	28.814

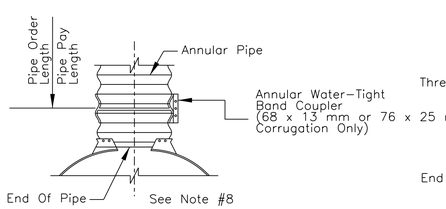
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	6	71

GENERAL NOTES

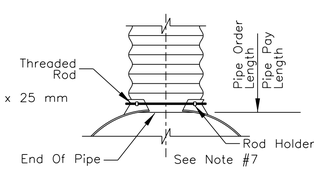
1. FOR MULTIPLE INSTALLATION OF ALL TYPES, A MINIMUM OF A 610 mm SPACING MEASURED ALONG THE HORIZONTAL BETWEEN FLARED END SECTIONS AT THEIR WIDEST CROSS SECTION SHALL BE USED.
2. ALL THREE (3) PIECE BODIES TO HAVE 2.77 mm THICKNESS SIDES AND 3.5 mm THICKNESS CENTER PANELS. WIDTH OF CENTER PANELS TO BE GREATER THAN 20% OF THE PIPE PERIPHERY. MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED BY 9.53 mm ø GALVANIZED RIVETS OR BOLTS.
3. END SECTIONS FOR STEEL PIPE-ARCHES: FOR THE 1956 mm x 1321 mm AND 2108 mm x 1448 mm SIZES, REINFORCED EDGE TO BE SUPPLEMENTED BY 51 mm x 51 mm x 6.35 mm GALVANIZED ANGLES. THE ANGLES TO BE ATTACHED BY 9.53 mm dia. GALVANIZED NUTS AND BOLTS. ANGLE REINFORCEMENT WILL BE PLACED UNDER THE CENTER PANEL SEAMS.
4. END SECTIONS FOR STEEL CIRCULAR PIPES: FOR 1524 mm ø THRU 2134 mm ø SIZES, REINFORCED EDGE TO BE SUPPLEMENTED WITH GALVANIZED STIFFENER ANGLES. THE ANGLES WILL BE 51 mm x 51 mm x 6.35 mm FOR 1524 mm ø THRU 1829 mm ø, AND 64 mm x 64 mm x 6.35 mm FOR 1981 mm ø AND 2134 mm ø. THE ANGLES TO BE ATTACHED BY 9.53 mm ø GALVANIZED NUTS AND BOLTS.
5. WELDING SHALL NOT BE PERMITTED IN CONNECTING END SECTIONS TO CONNECTOR SECTIONS OR CONNECTOR SECTIONS TO PIPE.
6. TYPE NO. 1 STEEL END SECTION. CONNECT END SECTION WITH THREADED ROD WITH CONNECTOR LUG, FOR 610 mm ø ROUND PIPE & 711 mm x 308 mm CSPA.
7. TYPE NO. 2 STEEL END SECTION. CONNECT END SECTION WITH THREADED ROD WITH ROD HOLDER, FOR 762 mm ø AND 914 mm ø ROUND PIPE; AND 432 mm x 330 mm THRU 1448 mm x 965 mm CSPA.
8. TYPE NO. 3 STEEL END SECTION. THE CONNECTION INCLUDES 305 mm OF THE PIPE LENGTH AS A CONNECTOR SECTION FOR PIPE ARCH SIZES 1626 mm x 1092 mm THRU 2108 mm x 1448 mm AND ROUND PIPE SIZES 1067 mm ø THRU 2134 mm ø. GAGES OF CONNECTOR SECTION SHALL BE THE SAME AS THE END SECTIONS AS MENTION ABOVE. THE CONNECTOR SECTION WILL BE ATTACHED TO THE END SECTION BY 9.5 mm ø GALVANIZED RIVETS OR BOLTS APPROXIMATELY 152mm CENTERS.
9. HELICALLY-CORRUGATED PIPE FOR TYPE NO 5 AND TYPE NO.3 THE DIMPLE BAND OR CORRUGATED PIPE CONNECTOR SECTION SHALL BE ATTACHED TO THE END SECTION BY 9.5 mm ø GALVANIZED STEEL RIVETS OR BOLTS SPACED AT APPROXIMATELY 152mm CENTERS.
10. TYPE NO. 1, TYPE NO. 2 AND TYPE NO. 3 CONNECTIONS MAY BE USED WITH WELDED SEAMS HELICALLY CORRUGATED PIPE WITH RE-ROLLED ENDS. RE-ROLLED ENDS SHALL INCLUDE A MINIMUM OF TWO (2) ANNULAR CORRUGATIONS OF THE SAME SIZE AS THE PIPE CORRUGATIONS



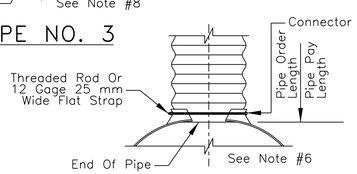




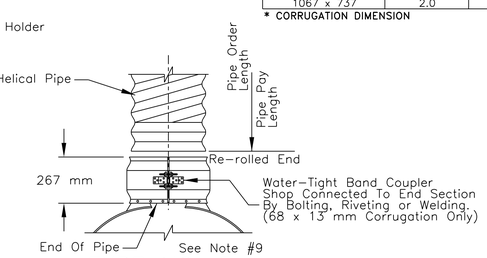
TYPE NO. 3



TYPE NO. 2



TYPE NO. 1



TYPE NO. 5

ROUND PIPE END SECTION, TYPE 2

Pipe Diam (mm)	Thickness (mm)	DIMENSIONS A (25 mm=)	B (Max.)	H (25 mm±)	F (mm)	L (38 mm±)	W Max Width	Approx. Slope	BODY
610	1.6	229	330	152	1168	1041	1829	2 1/2	1 Pc
762	2	279	406	203	1397	1295	2235	2 1/2	2 Pc
914	2	330	482	229	1778	1524	2665	2 1/2	2 Pc
1067	2.8	381	635	254	2083	1753	3098	2 1/2	2 Pc
1219	2.8	432	736	305	2235	1981	3327	2 1/4	3 Pc

ARCH PIPE END SECTION, TYPE 2

SPAN* *68 mm x 13 mm	RISE *76 mm x 25 mm	Thickness (mm)	DIMENSIONS A (25 mm±)	B (Max.)	H (25 mm±)	F (mm)	L (38 mm±)	W Max Width	Approx. Slope	BODY
711 x 508		1.6	177	406	152	1168	813	1778	2 1/2	1 Pc
890 x 610		2.0	229	406	152	1473	991	2159	2 1/2	1 Pc
1067 x 737		2.0	279	457	178	1854	1168	2642	2 1/2	2 Pc

* CORRUGATION DIMENSION

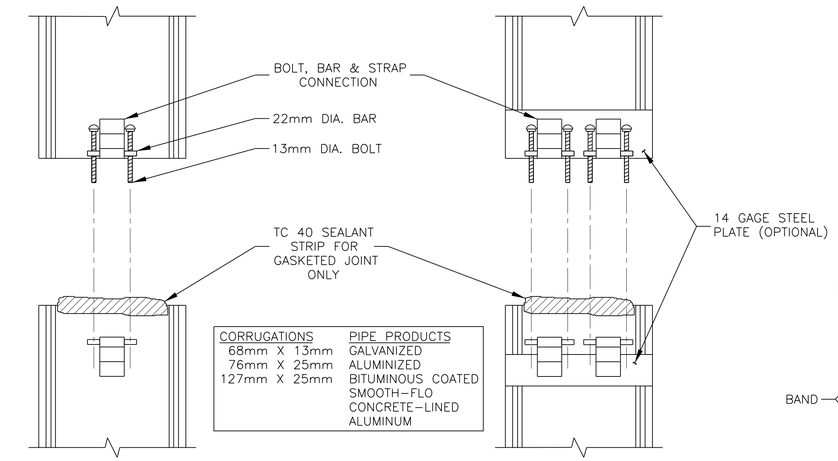
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

DRAINAGE STRUCTURE QUANTIY TABLE

DRAWN BY: NRDOT	DATE: 5/28/2014
DESIGNED BY: NRDOT	DATE: 5/28/2014
REVISED: 9/18/2017	BY: Allen.Nakaidinae
Sht 06 N27 PipeStruct.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 06 N27 PipeStruct.dgn

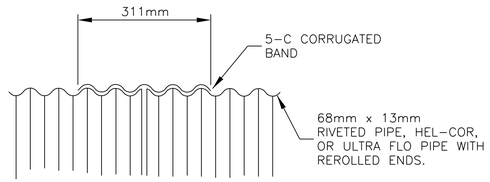
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	7	71



CONNECTION DETAIL
SINGLE BOLT, BAR & STRAP

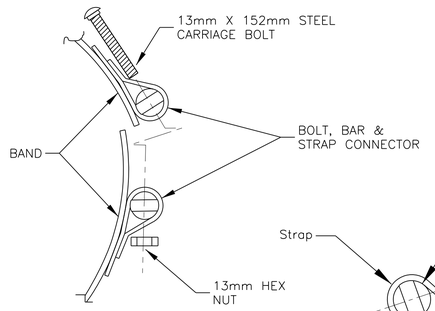
CONNECTION DETAIL
DOUBLE BOLT, BAR & STRAP

H-10 HUGGER BAND



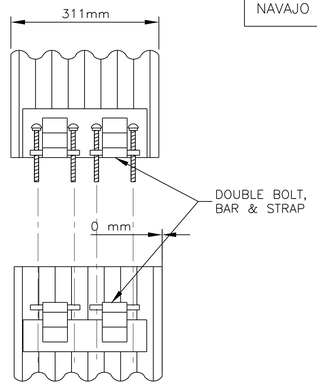
SECTION

CORRUGATIONS	PIPE PRODUCTS
68mm X 13mm ULTRA FLO	GALVANIZED ALUMINIZED BITUMINOUS COATED FIBER-BONDED

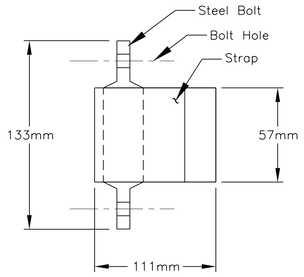


CONNECTION DETAIL
BOLT, BAR & STRAP

BOLT/STRAP DETAIL



CONNECTION DETAIL



TOP VIEW
BAR & STRAP

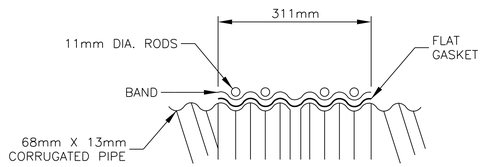
GENERAL NOTES

1. CARE SHALL BE TAKEN THAT NO FOREIGN MATERIAL IS ALLOWED TO ENTER BETWEEN THE OUTER PIPE SURFACE AND THE INSIDE OF THE BAND.
2. TIGHTENING OF THE BOLTS MAY BE ACCOMPLISHED WITH THE USE OF SPANNER OR SOCKETHEAD DEEPWELL WRENCHES, EITHER MANUAL OR POWER. FASTENERS SHOULD BE TIGHTENED UNIFORMLY TO PREVENT UNEVEN COMPRESSION AGAINST THE PIPE WALL. FELTON BAND PULLER SHALL BE USED TO TIGHTEN BAND ON LARGER DIAMETER STRUCTURES, WHICH QUICKLY DRAWS THE BAND CONNECTORS TOGETHER TO FACILITATE BOLT AND NUT TIGHTENING. BOLTS SHOULD BE TIGHENED TO THE RECOMMENDED TORQUE OF 25-30 FT/LBS.
3. BANDS FOR PIPE-ARCH ARE THE SAME AS FOR EQUIVALENT DIAMETER ROUND PIPE.
4. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:

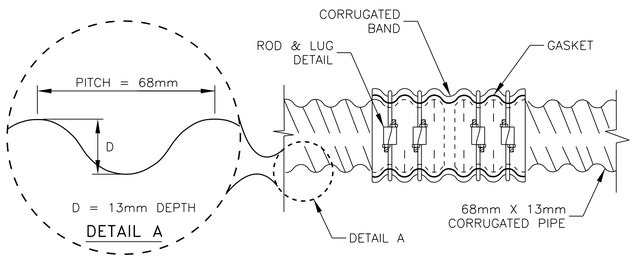
   305mm THRU 1219mm; 1-PIECE
   1372mm THRU 2438mm; 2-PIECE
   2591mm THRU 3658mm; 3-PIECE

5. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS. ALL ALUMINUM BANDS ARE FURNISHED WITH A 14-GAGE ALUMINUM BACK-UP PLATE WELDED TO THE BAND AND THE STRAP.
6. THE GASKET AND BAND INSTALLATION SHALL BE ASSEMBLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. A REPRESENTATIVE OF THE MANUFACTURER MAY BE PRESENT AT THE SITE DURING INSTALLATION.
7. THE COST OF SUPPLYING ALL MATERIALS AND INSTALLATION OF THE GASKET AND BAND ASSEMBLY SHALL BE INCLUDED IN THE BID ITEMS 602, 603, AND 607.
8. ANY RELATED PATENT RIGHTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AS PER SECTION 107.01 OF THE FP-03.

5-C CORRUGATED BAND



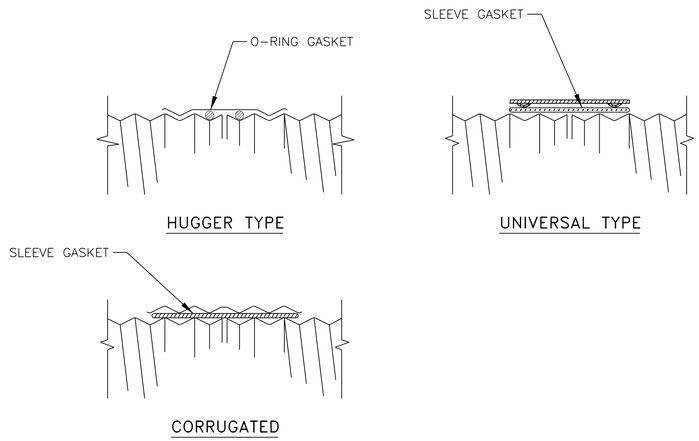
SECTION



SIDE VIEW
5-C CORRUGATED BAND

FLAT GASKET INSTALLATION GUIDELINES

1. CLEAN THE PIPE EDGES.
2. LIBERALLY AMOUNT OF LUBRICANT TO THE FIRST TWO ANNULAR CORRUGATIONS ON THE OUTSIDE OF THE PIPE.
3. SNAP THE FLAT GASKET INTO POSITION SUCH THAT THE GASKET COVERS THE FIRST ANNULAR CORRUGATION OR THE RECORRUGATED END. HALF OF THE GASKET WILL BE HANGING OVER THE END OF THE PIPE.
4. FOLD THE REMAINING HALF OF THE GASKET THAT IS EXTENDED OVER THE PIPE END BACK OVER THE SECTION OF THE GASKET POSITIONED ON THE END OF THE PIPE.
5. APPLY A LIBERAL AMOUNT OF LUBRICANT TO THE ENTIRE INNER SURFACE OF THE BAND.
6. PLACE THE BAND INTO POSITION ON THE INSTALLED LENGTH OF PIPE SO THAT THE NEXT LENGTH OF PIPE CAN BE INDEXED CORRECTLY AND THE FLAT GASKET ROLLED OVER THE SECOND PIPE END.
7. APPLY A LIBERAL AMOUNT OF LUBRICANT TO THE END OF THE SECOND LENGTH OF PIPE.
8. PLACE THE SECOND LENGTH OF PIPE INTO POSITION. THE TWO PIPE LENGTHS MUST BE POSITIONED PROPERLY FOR THE GASKET TO FIT OVER, AND THE BAND TO INDEX, ONTO THE SECOND PIPE END.
9. UNFOLD THE GASKET INTO POSITION OVER THE SECOND LENGTH OF PIPE. TAKE CARE TO INSURE THAT THE GASKET FITS OVER THE END OF THE SECOND PIPE SECTION. ALSO, THE BAND MUST BE INDEXED INTO THE PROPER ANNULAR CORRUGATION ON EACH LENGTH OF PIPE.
10. CHECK THE COMPLETE PERIPHERY OF THE PIPE TO INSURE THAT THE GASKET IS CENTERED EVENLY ON THE TWO LENGTHS OF PIPE.
11. SLIDE THE BAND INTO POSITION AND TIGHTEN THE BOLTS. FOR MAXIMUM COMPRESSION OF THE GASKET, THE BAND CORRUGATIONS MUST BE FULL SEATED INTO THE PROPER CORRUGATION ON EACH PIPE END. THIS WILL INSURE THAT THE PIPE LENGTHS ARE POSITIONED PROPERLY FOR THE GASKET.



TYPICAL GASKET/BAND COUPLERS

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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GASKET/HUGGER BAND DETAILS

DRAWN BY: NRDOT	DATE: 4/12/2017
DESIGNED BY: NRDOT	DATE: 4/12/2017
REVISED: 9/14/2017	BY: Leroy.Toledo
Sht 07 N27 Gasket HBand Details_101316.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	8	71

Sta. 44+145.000 to 44+165.000 and 44+270.000 to 44+290.00, ℄, Contractor Shall Reconstruct the Full Width of Damaged Roadway (40 m) Per Existing Road Geometry. See Sheet 2 of 61 For Repair Details And Sequence Of Reconstruction.

Sta. 44+347.950, 10.18 m Lt. Existing Powerpole. The Contractor Shall Protect In-Place.

Sta. 44+460.000, Lt. Construct 7.0 m Wide Turnout (N8017) With 3-Unit Cattleguard, Type 2 Gate & CSPC. Install New 610 mm CSPC. Grade 7.0 Wide Access To Tie Into N8017 Existing Graded Road As Shown.

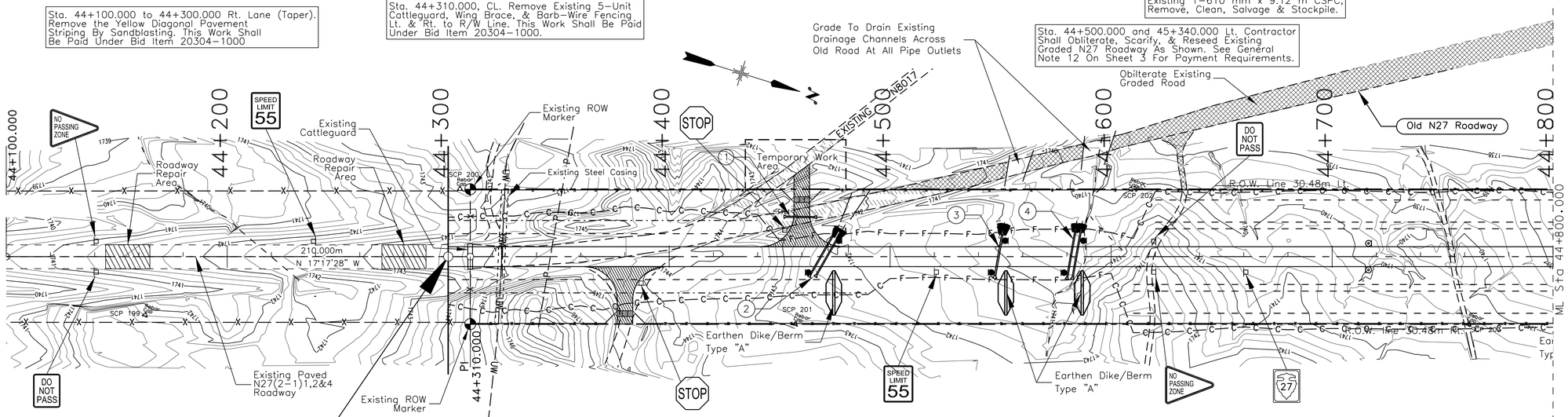
Sta. 44+595.040, 49.60 m Lt. Existing 1-610 mm x 9.12 m CSPC, Remove, Clean, Salvage & Stockpile.

Sta. 44+100.000 to 44+300.000 Rt. Lane (Taper). Remove the Yellow Diagonal Pavement Striping By Sandblasting. This Work Shall Be Paid Under Bid Item 20304-1000

Sta. 44+310.000, CL. Remove Existing 5-Unit Cattleguard, Wing Brace, & Barb-Wire Fencing Lt. & Rt. to R/W Line. This Work Shall Be Paid Under Bid Item 20304-1000.

Grade To Drain Existing Drainage Channels Across Old Road At All Pipe Outlets

Sta. 44+500.000 and 45+340.000 Lt. Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown. See General Note 12 On Sheet 3 For Payment Requirements.



N27(2-2)(2-3)1,2&4
BEGINNING OF PROJECT
Sta. 44+300.000
Elev: 1743.561

Sta. 44+346.240, Existing Overhead Powerline X-ing Elev: 1755.003 Clearance: 10.99 m Protect-In-Place

Sta. 44+324.580, Existing 152 mm PVC Waterline X-ing w/356 mm ø x 60.69 m Steel Casing. The Contractor Shall Protect In-Place. Elev: 1740.87 Depth: -3.27 m

Sta. 44+380.000, Rt. Construct 7.0 m Wide Turnout With 3-Unit Cattleguard & Type 2 Gate

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊙	●	⊕	--NO SYMBOL--
2	0	6	0	0

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
1	44+460.000	1-610 mm x 14.630 m CSPC, TO Left	90.0	DA1aa	0.161214644	0.039	With End Section @ Inlet & Outlet
2	44+470.000	2-610 mm x 22.555 m CSPC	120.0	DA1a	1.456	0.338	With End Section at Each Inlet
3	44+549.000	1-762 mm x 20.727 m CSPC	100.0	DA1b	1.813	0.421	With End Section At Inlet & Placedd Riprap Stilling Basin At Outlet
4	44+583.000	2-610 mm x 21.946 m CSPC	100.0	DA1c	2.363	0.523	With End Section at Each Inlet & Placed Riprap Stilling Basin at Outlet

SCALE: Meters
0 20 40 60 80 100

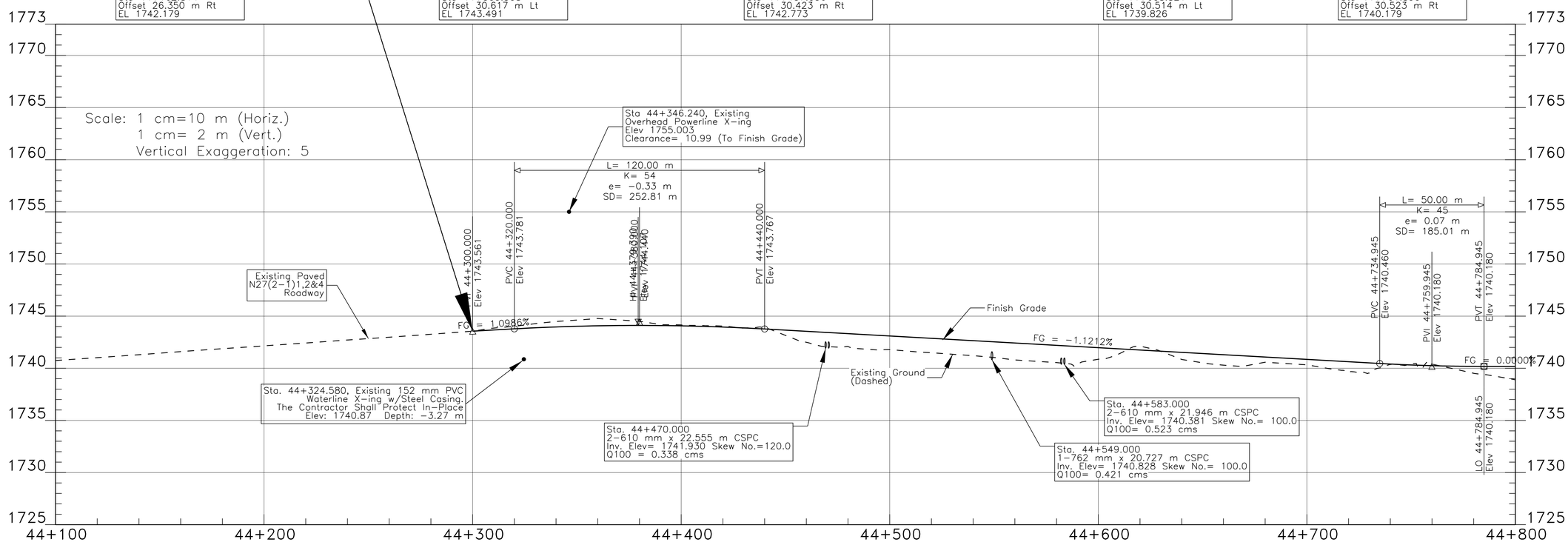
SCP 199 Rebar with Cap
Sta 44+162.814
Offset 26.350 m Rt
EL 1742.179

SCP 200 Rebar with Cap
Sta 44+305.308
Offset 30.617 m Lt
EL 1743.491

SCP 201 Rebar with Cap
Sta 44+457.056
Offset 30.423 m Rt
EL 1742.773

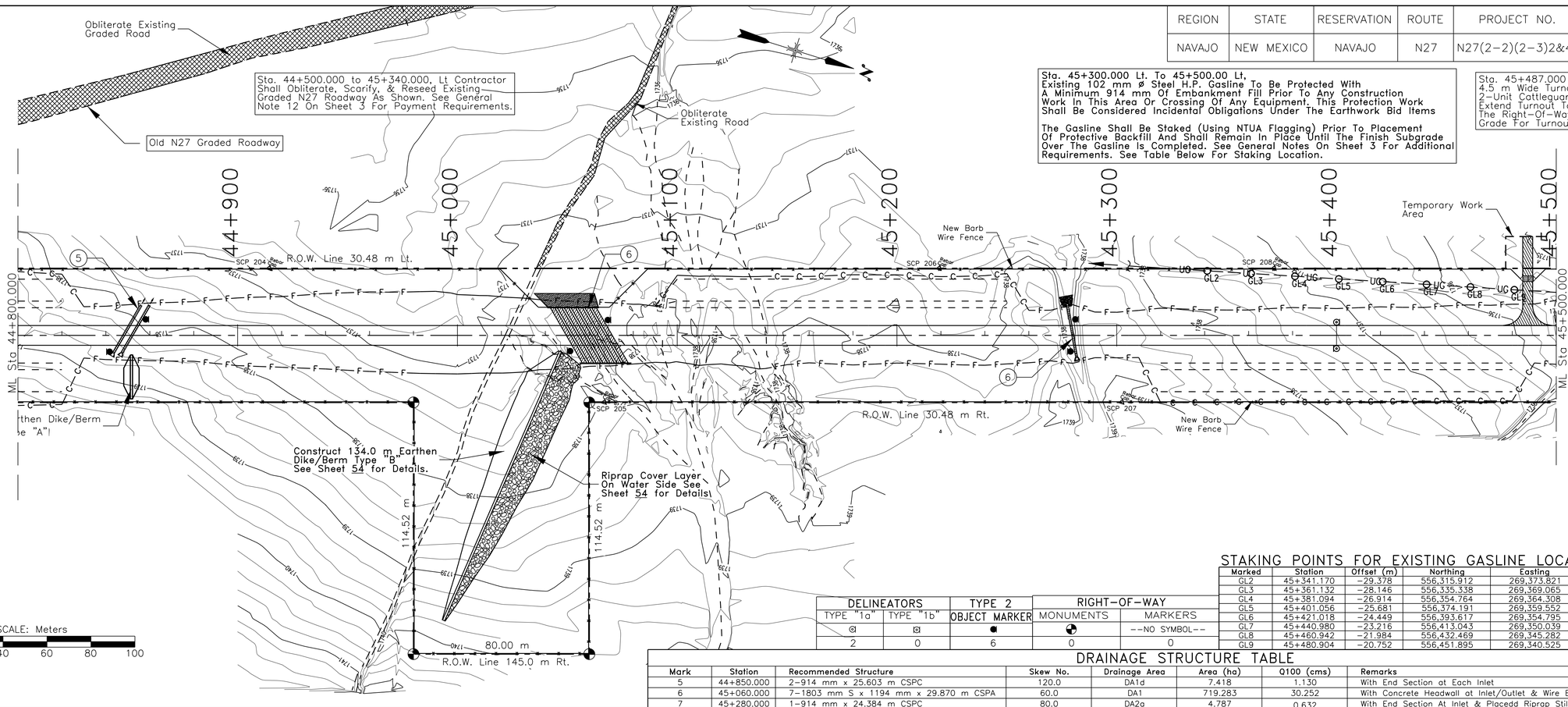
SCP 202 Rebar with Cap
Sta 44+608.821
Offset 30.514 m Lt
EL 1739.826

SCP 203 Rebar with Cap
Sta 44+761.890
Offset 30.523 m Rt
EL 1740.179



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	9	71



SCALE: Meters
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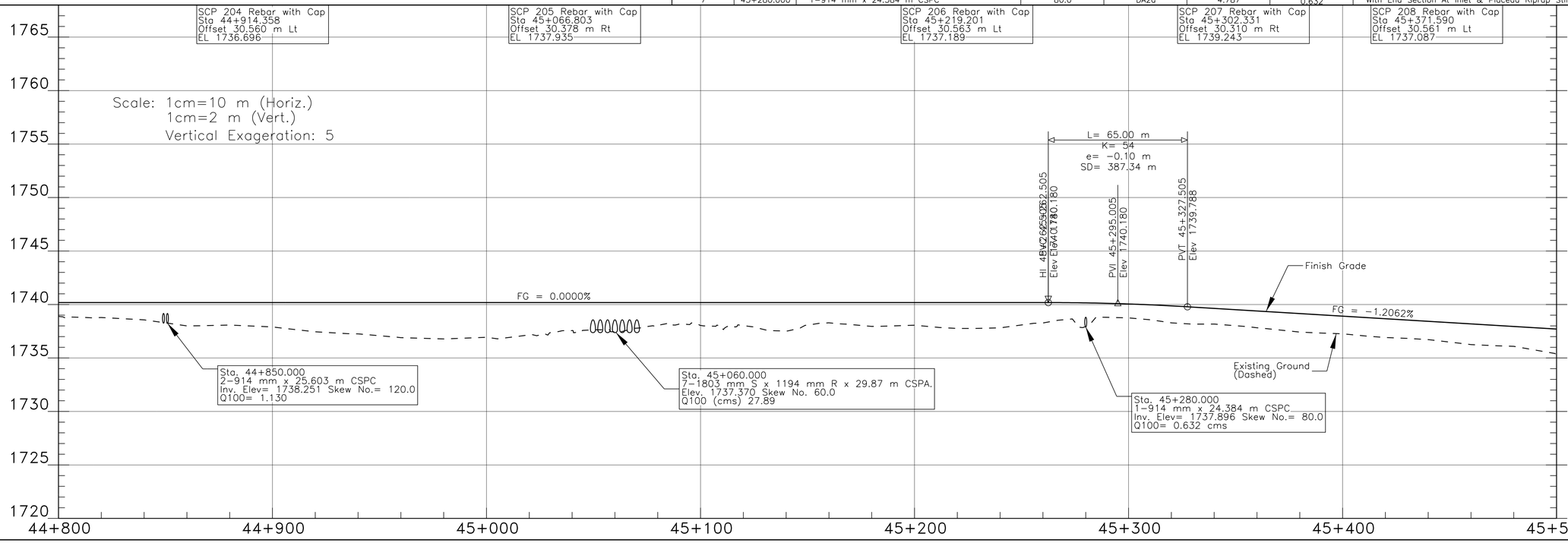
DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	●	⊕	--NO SYMBOL--
2	0	6	0	0

STAKING POINTS FOR EXISTING GASLINE LOCATION

Marked	Station	Offset (m)	Northing	Easting	Description
GL2	45+341.170	-29.378	556,315.912	269,373.821	Underground Gas
GL3	45+361.132	-28.146	556,335.338	269,369.065	Underground Gas
GL4	45+381.094	-26.914	556,354.764	269,364.308	Underground Gas
GL5	45+401.056	-25.681	556,374.191	269,359.552	Underground Gas
GL6	45+421.018	-24.449	556,393.617	269,354.795	Underground Gas
GL7	45+440.980	-23.216	556,413.043	269,350.039	Underground Gas
GL8	45+460.942	-21.984	556,432.469	269,345.282	Underground Gas
GL9	45+480.904	-20.752	556,451.895	269,340.525	Underground Gas

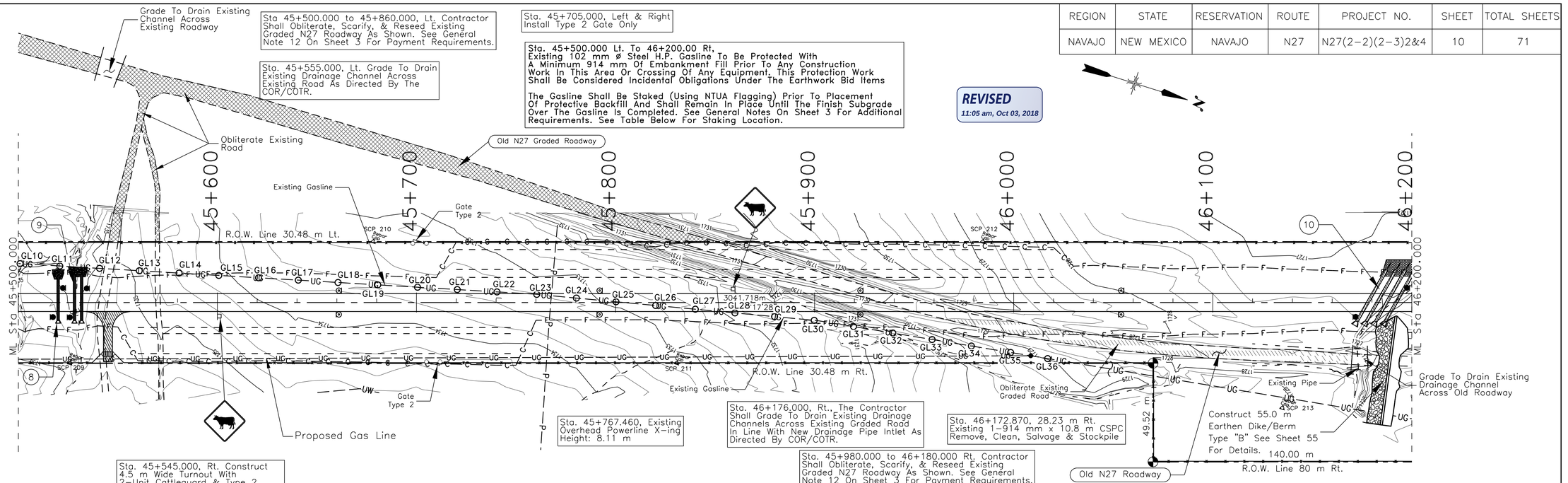
DRAINAGE STRUCTURE TABLE

Mark	Station	Recommended Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
5	44+850.000	2-914 mm x 25.603 m CSPC	120.0	DA1d	7.418	1.130	With End Section at Each Inlet
6	45+060.000	7-1803 mm S x 1194 mm x 29.870 m CSPA	60.0	DA1	719.283	30.252	With Concrete Headwall at Inlet/Outlet & Wire Enclosed Riprap Apron at Outlet
7	45+280.000	1-914 mm x 24.384 m CSPC	80.0	DA2a	4.787	0.632	With End Section At Inlet & Placedd Riprap Stilling Basin At Outlet



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	10	71



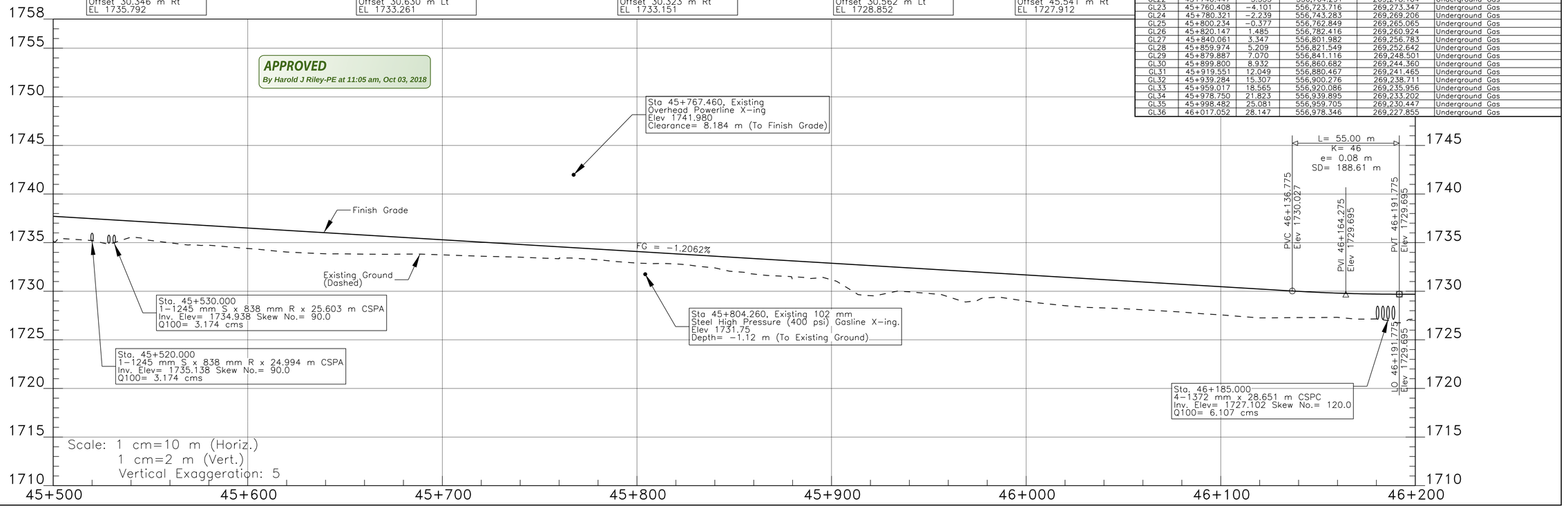
STAKING POINTS FOR EXISTING GASLINE LOCATION

Marked	Station	Offset (m)	Northing	Easting	Description
GL10	45+500.867	-19.524	556,471.320	269,335.765	Underground Gas
GL11	45+520.832	-18.341	556,490.734	269,330.959	Underground Gas
GL12	45+540.797	-17.158	556,510.149	269,326.154	Underground Gas
GL13	45+560.762	-15.976	556,529.563	269,321.349	Underground Gas
GL14	45+580.727	-14.793	556,548.977	269,316.544	Underground Gas
GL15	45+600.692	-13.611	556,568.391	269,311.739	Underground Gas
GL16	45+620.657	-12.428	556,587.805	269,306.934	Underground Gas
GL17	45+640.622	-11.246	556,607.220	269,302.129	Underground Gas
GL18	45+660.587	-10.063	556,626.634	269,297.324	Underground Gas
GL19	45+680.552	-8.880	556,646.048	269,292.519	Underground Gas
GL20	45+700.517	-7.698	556,665.462	269,287.714	Underground Gas
GL21	45+720.482	-6.515	556,684.877	269,282.909	Underground Gas
GL22	45+740.447	-5.333	556,704.291	269,278.104	Underground Gas
GL23	45+760.408	-4.101	556,723.716	269,273.347	Underground Gas
GL24	45+780.321	-2.239	556,743.283	269,269.206	Underground Gas
GL25	45+800.234	-0.377	556,762.849	269,265.065	Underground Gas
GL26	45+820.147	1.485	556,782.416	269,260.924	Underground Gas
GL27	45+840.061	3.347	556,801.982	269,256.783	Underground Gas
GL28	45+859.974	5.209	556,821.549	269,252.642	Underground Gas
GL29	45+879.887	7.070	556,841.116	269,248.501	Underground Gas
GL30	45+899.800	8.932	556,860.682	269,244.360	Underground Gas
GL31	45+919.551	12.049	556,880.467	269,241.465	Underground Gas
GL32	45+939.284	15.307	556,900.276	269,238.711	Underground Gas
GL33	45+959.017	18.565	556,920.086	269,235.956	Underground Gas
GL34	45+978.750	21.823	556,939.895	269,233.202	Underground Gas
GL35	45+998.482	25.081	556,959.705	269,230.447	Underground Gas
GL36	46+017.052	28.147	556,978.346	269,227.855	Underground Gas

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	■	◕	--NO SYMBOL--
8	0	6	0	0

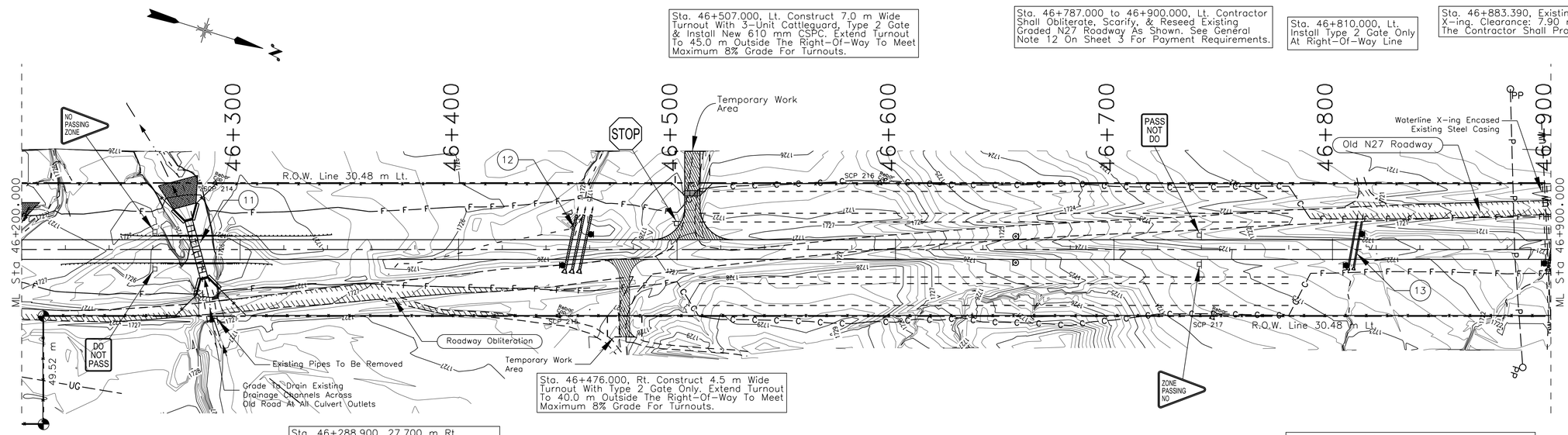
DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
8	45+520.000	1-1245 mm S x 838 mm R x 24.994 m CSPA	90.0	DA2	29.177	3.174	With End Section At Inlet & PlaceddRiprap Stilling Basin At Outlet
9	45+530.000	2-1245 mm S x 838 mm R x 25.603 m CSPA	90.0				With End Sections At Each Inlet & Placed Riprap Stilling Basin At Outlet
10	46+185.000	4-1372 mm x 28.651 m CSPC	120.0	DA3	61.031	6.107	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	11	71

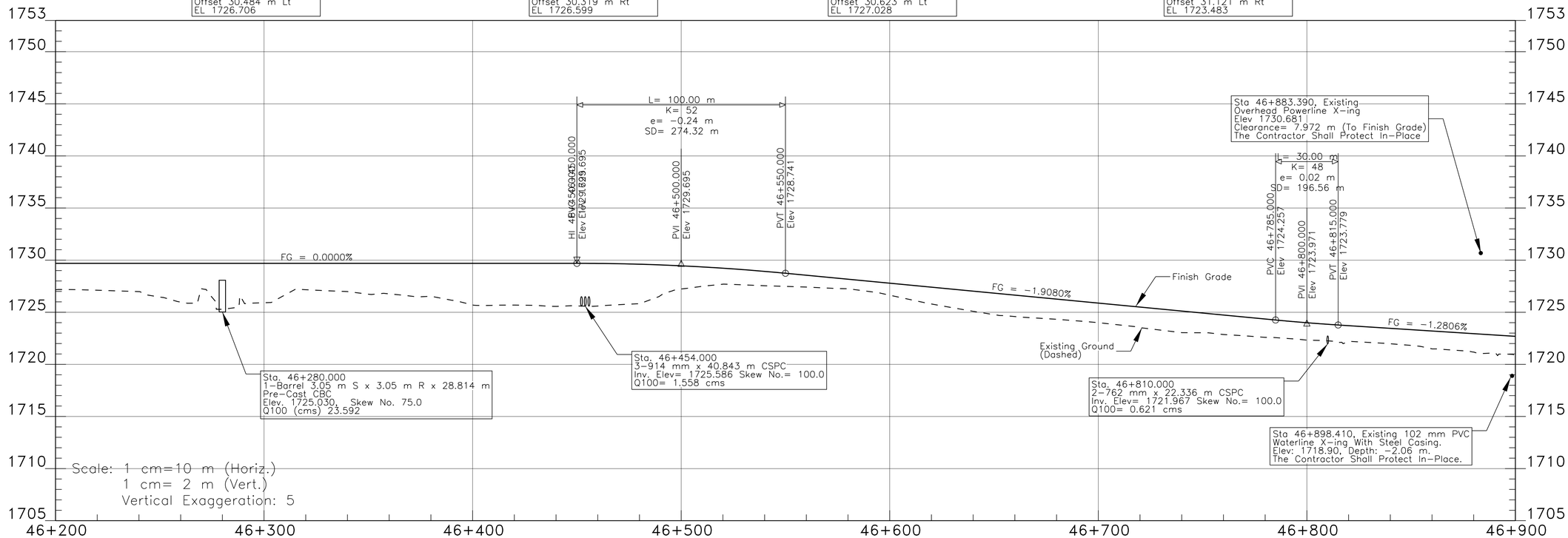


Sta. 46+286.000, Rt., The Contractor Shall Grade Drainage Channel Across Existing Graded N27 In Line With Inlet Channels As Shown.

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊡	⊡	■	◔	--NO SYMBOL--
2	1	7	2	2

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
11	46+280.000	1-Barrel 3.05 m S x 3.05 R x 28.814 Pre-Cast CBC	75.0	DA4	567.963	26.359	CBC With Headwalls & Wingwall
12	46+454.000	3-914 mm x 40.843 m CSPC	100.0	DA5a	10.230	1.558	With End Section At Each Inlet
13	46+810.000	2-762 mm x 22.336 m CSPC	100.0	DA5a_1a	3.424	0.621	With End Section at Each Inlet



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	12	71

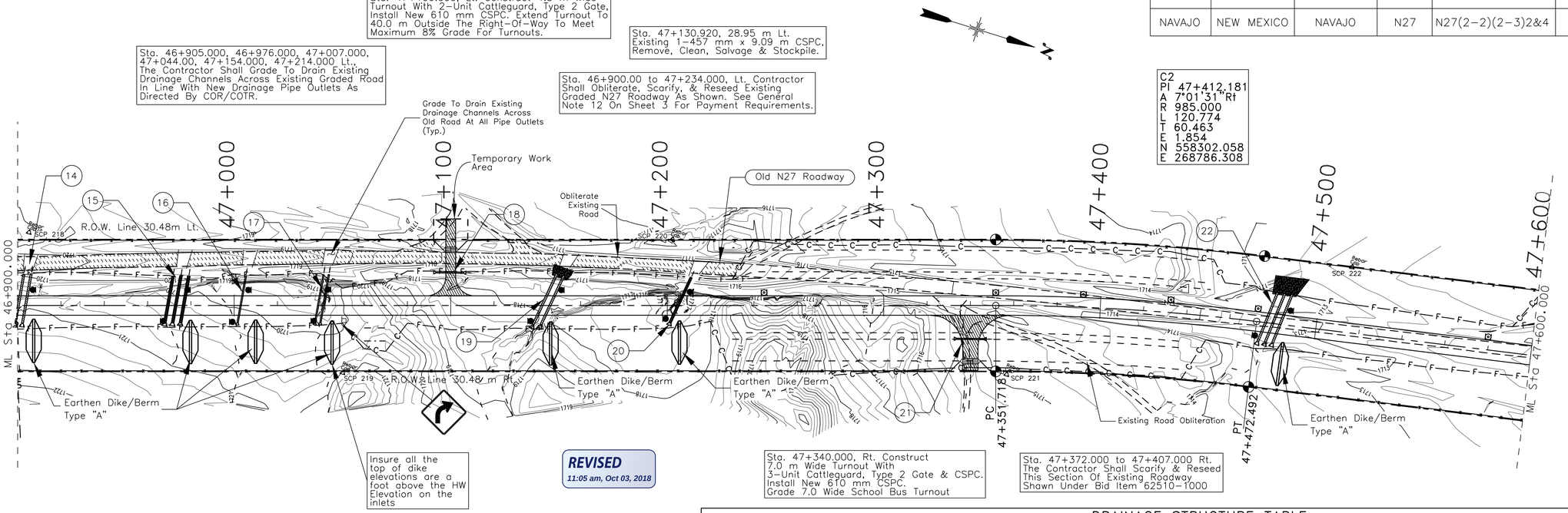
Sta. 47+100.000, Lt. Construct 4.5 m Wide Turnout With 2-Unit Cattleguard, Type 2 Gate, Install New 610 mm CSPC. Extend Turnout To 40.0 m Outside The Right-Of-Way To Meet Maximum 8% Grade For Turnouts.

Sta. 47+130.920, 28.95 m Lt. Existing 1-457 mm x 9.09 m CSPC, Remove, Clean, Salvage & Stockpile.

Sta. 46+905.000, 46+976.000, 47+007.000, 47+044.00, 47+154.000, 47+214.000 Lt., The Contractor Shall Grade To Drain Existing Drainage Channels Across Existing Graded Road In Line With New Drainage Pipe Outlets As Directed By COR/COTR.

Sta. 46+900.00 to 47+234.000, Lt. Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown. See General Note 12 On Sheet 3 For Payment Requirements.

C2
PI 47+412.181
A 7°01'31"Rt
R 985.000
L 120.774
T 60.463
E 1.854
N 558302.058
E 268786.308



Insure all the top of dike elevations are a foot above the HW Elevation on the inlets

REVISED
11:05 am, Oct 03, 2018

Sta. 47+340.000, Rt. Construct 7.0 m Wide Turnout With 3-Unit Cattleguard, Type 2 Gate & CSPC. Install New 610 mm CSPC. Grade 7.0 Wide School Bus Turnout

Sta. 47+372.000 to 47+407.000 Rt. The Contractor Shall Scarify & Reseed This Section Of Existing Roadway Shown Under Bid Item 62510-1000

SCALE: Meters
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	RIGHT-OF-WAY
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER	MARKER
⊡	⊡	●	◔	◔
0	6	13	4	4

DRAINAGE STRUCTURE TABLE

No.	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
14	46+902.000	2-914 mm x 23.165 m CSPC	100.0	DA5a_1b	8.615	1.312	With End Section at Each Inlet
15	46+973.000	3-1245 mm S x 838 mm R x 21.946 m CSPA	100.0	DA5a_1c	16.062	2.335	With End Section At Each Inlet
16	47+003.000	1-610 mm x 21.946 m CSPC	100.0	DA5a_1d	1.382	0.250	With End Section At Inlet
17	47+040.000	2-610 mm x 22.555 m CSPC	100.0	DA5a_1e	2.896	0.525	With End Section at Each Inlet
18	47+100.000	1-610 mm x 15.850 m CSPC, TO Left	90.0	DA5c_1	0.060	0.001	With End Section @ Inlet & Outlet
19	47+144.000	2-914 mm x 26.213 m CSPC	115.0	DA5b_1	7.407	1.343	With End Section at Each Inlet & Placed Riprap Stilling Basin at Outlet
20	47+205.000	1-1067 mm S x 737 mm R x 23.165 m CSPA	115.0	DA5b_2	2.495	0.452	With End Section At Inlet
21	47+340.000	1-610 mm x 14.021 m CSPC, TO Right	90.0	DA5c_2	0.270	0.004	With End Section @ Inlet & Outlet
22	47+480.000	3-914 mm x 24.384 m CSPC	115.0	DA6	10.909	1.661	With End Section at Each Inlet & Placed Riprap Stilling Basin at Outlet

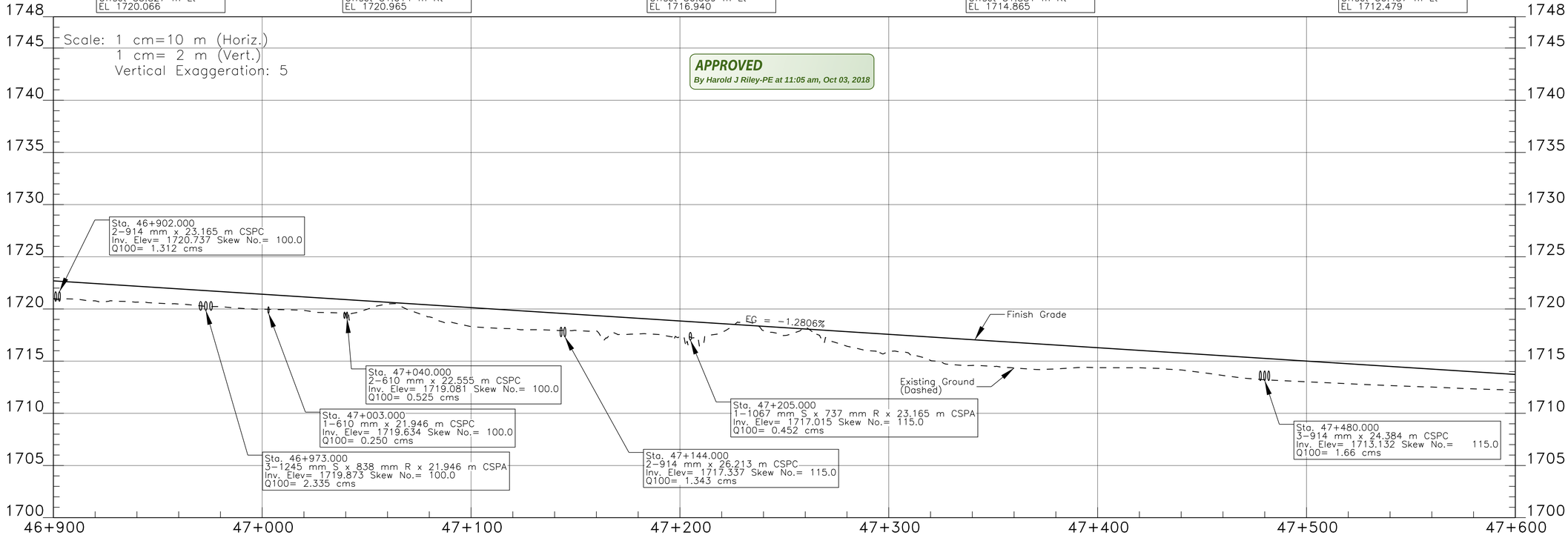
SCP 218 Rebar with Cap
Sta 46+905.230
Offset 33.827 m Lt
EL 1720.066

SCP 219 Rebar with Cap
Sta 47+050.115
Offset 31.014 m Rt
EL 1720.965

SCP 220 Rebar with Cap
Sta 47+202.398
Offset 30.589 m Lt
EL 1716.940

SCP 221 Rebar with Cap
Sta 47+356.890
Offset 31.881 m Rt
EL 1714.865

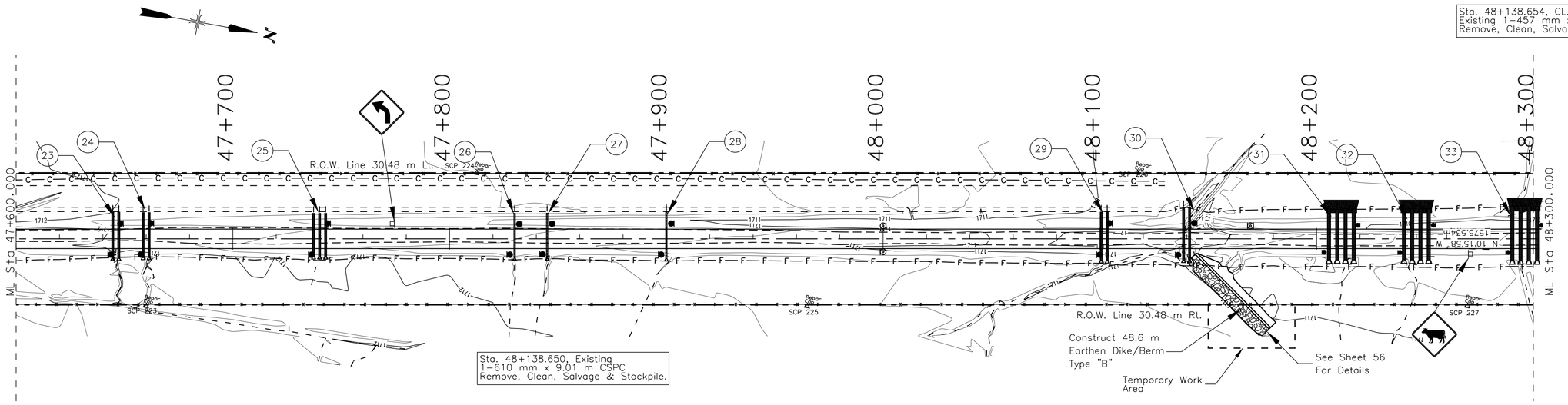
SCP 222 Rebar with Cap
Sta 47+513.135
Offset 30.437 m Lt
EL 1712.479



APPROVED
By Harold J Riley-PE at 11:05 am, Oct 03, 2018

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	13	71



DRAINAGE STRUCTURE TABLE

No.	Station	Recommended Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
23	47+646.000	2-889 mm S x 610 mm x 21.336 m CSPA	90.0	DA6a_1	8.474	1.291	With End Section at Each Inlet
24	47+660.000	2-889 mm S x 610 mm x 20.726 m CSPA	90.0				With End Section at Each Inlet
25	47+740.000	3-889 mm S x 610 mm x 20.117 m CSPA	90.0	DA6a_2	7.536	1.148	With End Section At Each Inlet
26	47+830.000	1-610 mm x 20.727 m CSPC	90.0	DA6a_3	5.732	0.833	With End Section At Inlet
27	47+845.000	1-610 mm x 21.336 m CSPC	90.0				With End Section At Inlet
28	47+900.000	1-610 mm x 21.336 m CSPC	90.0				With End Section At Inlet
29	48+102.000	2-889 mm S x 610 mm x 22.556 m CSPA	90.0	DA6a_4	12.667	1.672	With End Section at Each Inlet
30	48+140.000	2-889 mm S x 610 mm x 24.384 m CSPA	90.0				With End Section at Each Inlet
31	48+211.500	4-1448 mm S x 965 mm R x 23.774 m CSPA	90.0	DA7	149.893	12.174	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet
32	48+246.000	4-1448 mm S x 965 mm R x 23.774 m CSPA	90.0				With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet
33	48+296.000	4-1448 mm S x 965 mm R x 24.994 m CSPA	90.0				With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet

SCALE: Meters
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊙	■	⊕	--NO SYMBOL--
2	1	22	0	0

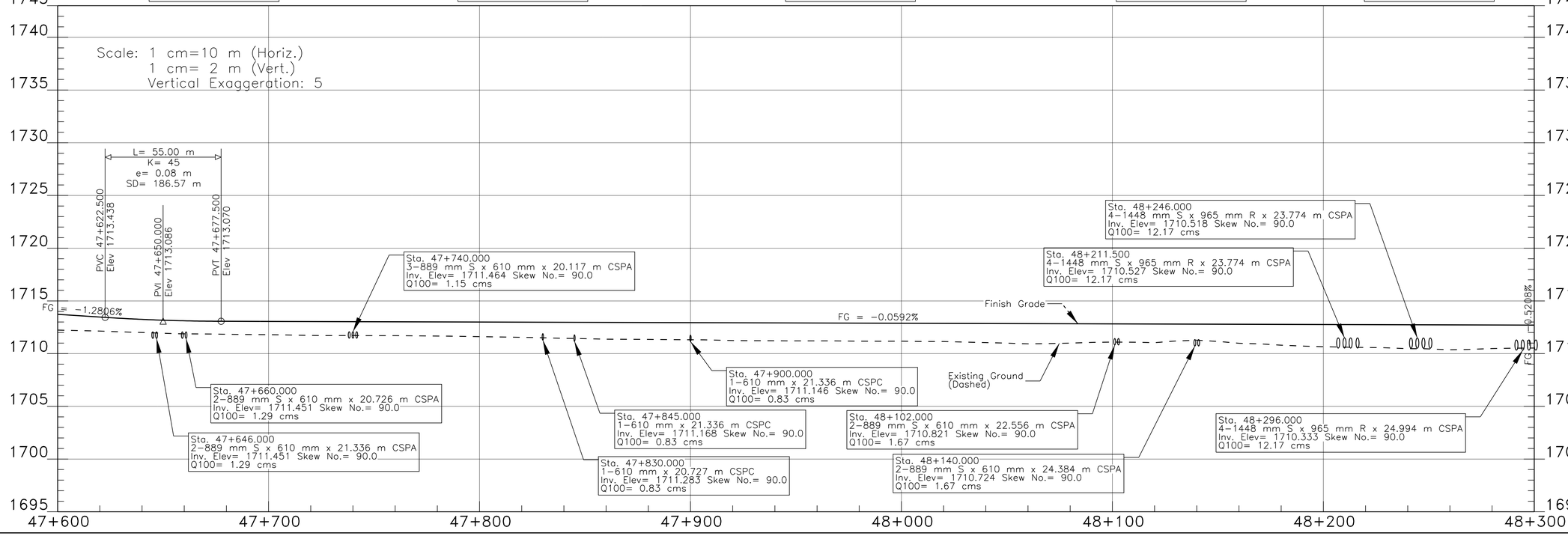
SCP 223 Rebar with Cap
Sta 47+659.916
Offset 31.019 m Rt
EL 1712.381

SCP 224 Rebar with Cap
Sta 47+812.440
Offset 30.415 m Lt
EL 1711.714

SCP 225 Rebar with Cap
Sta 47+964.911
Offset 31.097 m Rt
EL 1711.582

SCP 226 Rebar with Cap
Sta 48+117.225
Offset 30.486 m Lt
EL 1710.890

SCP 227 Rebar with Cap
Sta 48+269.522
Offset 31.028 m Rt
EL 1710.718

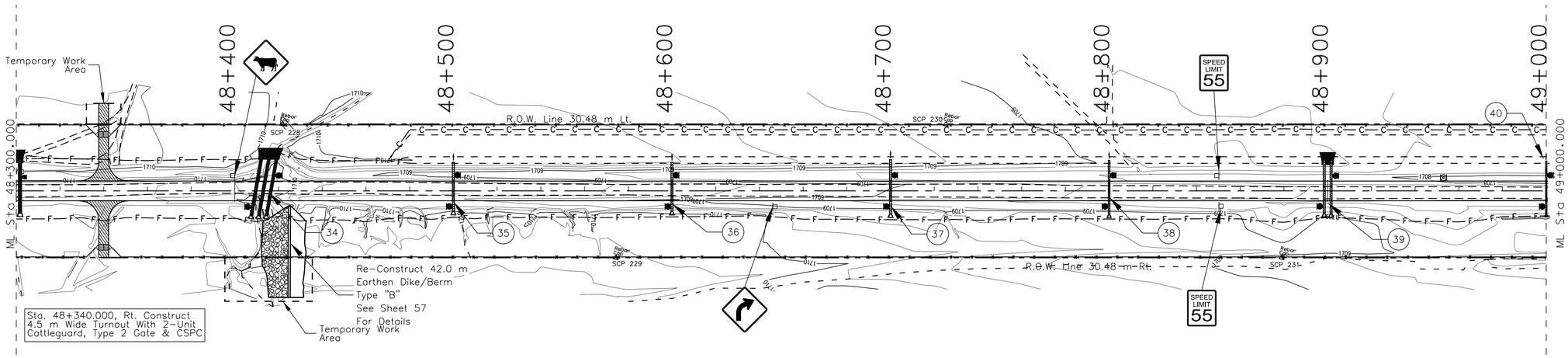


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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	14	71

Sta. 48+340.000, Lt. Construct 4.5 m Wide Turnout With 2-Unit Cattleguard, Type 2 Gate & CSPC. Extend Turnout To 40.0 m Outside The Right-Of-Way To Meet Maximum 8% Grade For Turnouts.

Sta. 48+667.600, 15.70 m Lt., Remove Existing Sign Structure Of Concrete Block Base, Wooden Post With "Welcome To Nazlini Community" Sign From ROW. The New Sign Structure (Future) Shall Be Placed Outside the ROW By Others.



SCALE: Meters
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
				--NO SYMBOL--
0	1	16	0	0

DRAINAGE STRUCTURE TABLE

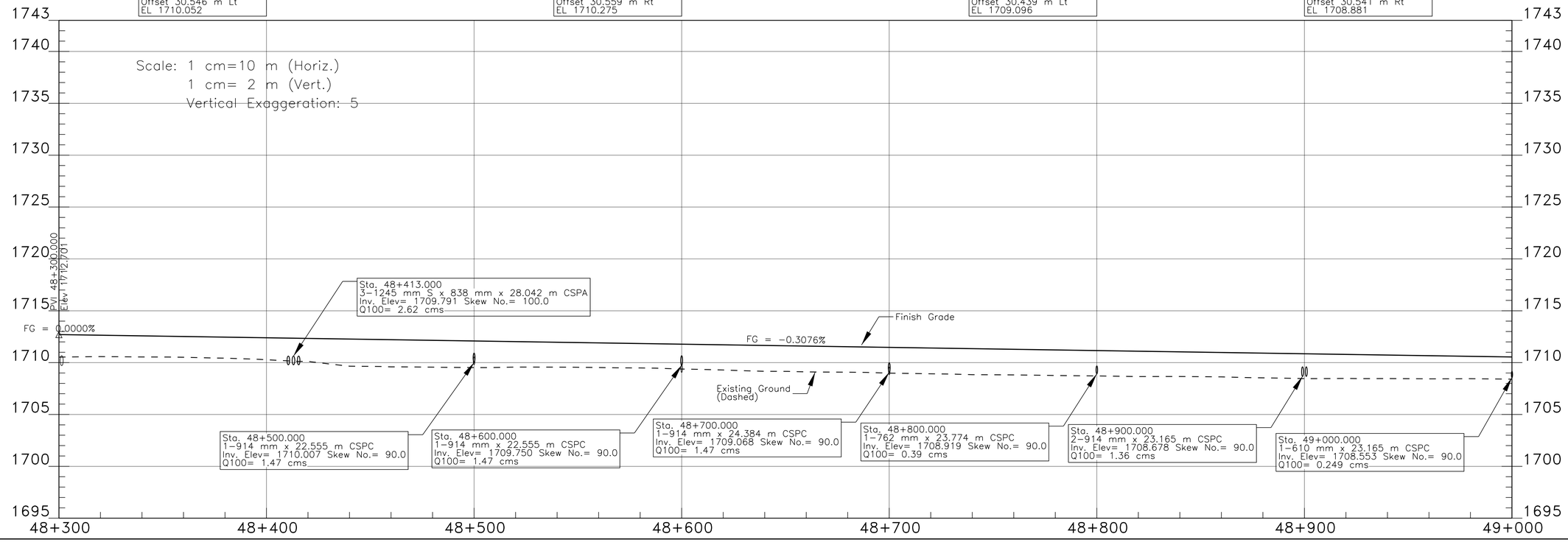
No.	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
34	48+413.000	3-1245 mm S x 838 mm x 28.042 m CSPA	100.0	DA7a	17.223	2.623	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet
35	48+500.000	1-914 mm x 22.555 m CSPC	90.0	DA7b	9.636	1.467	With End Section At Inlet
36	48+600.000	1-914 mm x 22.555 m CSPC	90.0				With End Section At Inlet
37	48+700.000	1-914 mm x 24.384 m CSPC	90.0				With End Section At Inlet
38	48+800.000	1-762 mm x 23.774 m CSPC	90.0	DA7c_1	2.143	0.388	With End Section At Inlet
39	48+900.000	2-914 mm x 23.165 m CSPC	90.0	DA7c_2	7.482	1.356	With End Section At Inlet & Wire Enclosed Riprap Apron at Outlet
40	49+000.000	1-610 mm x 23.165 m CSPC	90.0	DA7c_3	1.071	0.249	With End Section At Inlet

SCP 228 Rebar with Cap
Sta 48+421.752
Offset 30.546 m Lt
EL 1710.052

SCP 229 Rebar with Cap
Sta 48+574.292
Offset 30.559 m Rt
EL 1710.275

SCP 230 Rebar with Cap
Sta 48+725.327
Offset 30.439 m Lt
EL 1709.096

SCP 231 Rebar with Cap
Sta 48+878.942
Offset 30.541 m Rt
EL 1708.881



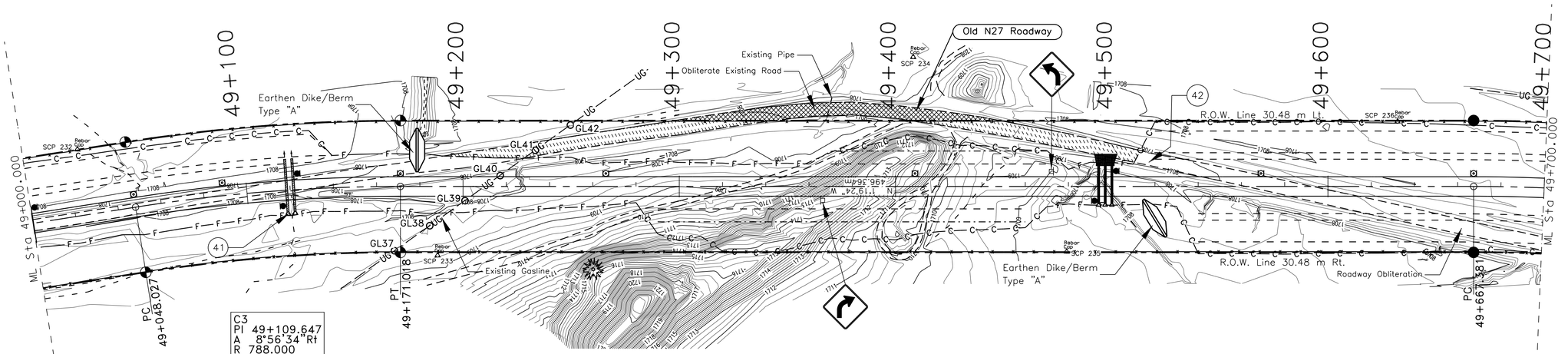
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	15	71

Sta. 49+210.190, Existing 102 mm Steel High Pressure (400 psi) Gasline X-ing (NTUA). Elev: 1707.25 Depth: -1.05 m.

Sta. 49+369.740, 37.69 m Lt. Existing 1-914 mm x 12.32 m CSPC, Remove, Clean, Salvage & Stockpile.

Sta. 49+298.000 to 49+448.000, Lt. Contractor Shall Obliterate,Scarify, & Reseed Existing N27 Graded Roadway As Shown. See General Note 12 On Sheet 3 For Payment Requirements



C3
PI 49+109.647
A 8°56'34"Rt
R 788.000
L 122.991
T 61.621
E 2.406
N 559972.499
E 268483.762

Sta. 49+167.000, 30 m Rt. To 49+253.000, 30 m Lt. Existing 102 mm ø Steel H.P. Gasline To Be Protected With A Minimum 914 mm Of Embankment Fill Prior To Any Construction Work In This Area Or Crossing Of Any Equipment. This Protection Work Shall Be Considered Incidental Obligations Under The Earthwork Bid Items

The Gasline Shall Be Staked (Using NTUA Flagging) Prior To Placement Of Protective Backfill And Shall Remain In Place Until The Finish Subgrade Over The Gasline Is Completed. See General Notes On Sheet 3 For Additional Requirements. See Table Below For Staking Location.

Sta. 49+615.000 to 51+700.000, Rt. Contractor Shall Obliterate, Scarify, & Reseed Existing N27 Graded Roadway As Shown. The Contractor Shall Also Grade Drainage Chan-nels Across Existing N27 Roadway Into All New Pipe In-lets. See General Note 12 On Sheet 3 For Payment Requirements

SCALE: Meters
0 20 40 60 80 100

SCALE: Meters
0 20 40 60 80 100

STAKING POINTS FOR EXISTING GASLINE LOCATION

Marked	Station	Offset (m)	Northing	Easting	Description
GL37	49+168.149	29.724	560,032.030	268,512.124	Underground Gas
GL38	49+184.576	18.166	560,048.077	268,500.187	Underground Gas
GL39	49+200.894	6.603	560,064.124	268,488.250	Underground Gas
GL40	49+217.172	-5.018	560,080.129	268,476.257	Underground Gas
GL41	49+233.410	-16.694	560,096.093	268,464.209	Underground Gas
GL42	49+249.648	-28.370	560,112.057	268,452.161	Underground Gas

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	●	⊕	--NO SYMBOL--
0	7	5	6	6

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
41	49+120.000	2-914 mm x 22.555 m CSPC	90.0	DA7c_4	5.688	1.031	With End Section at Each Inlet
42	49+497.000	3-886 mm S x 610 mm x 18.898 m CSPA	90.0	DA8	8.965	1.625	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet

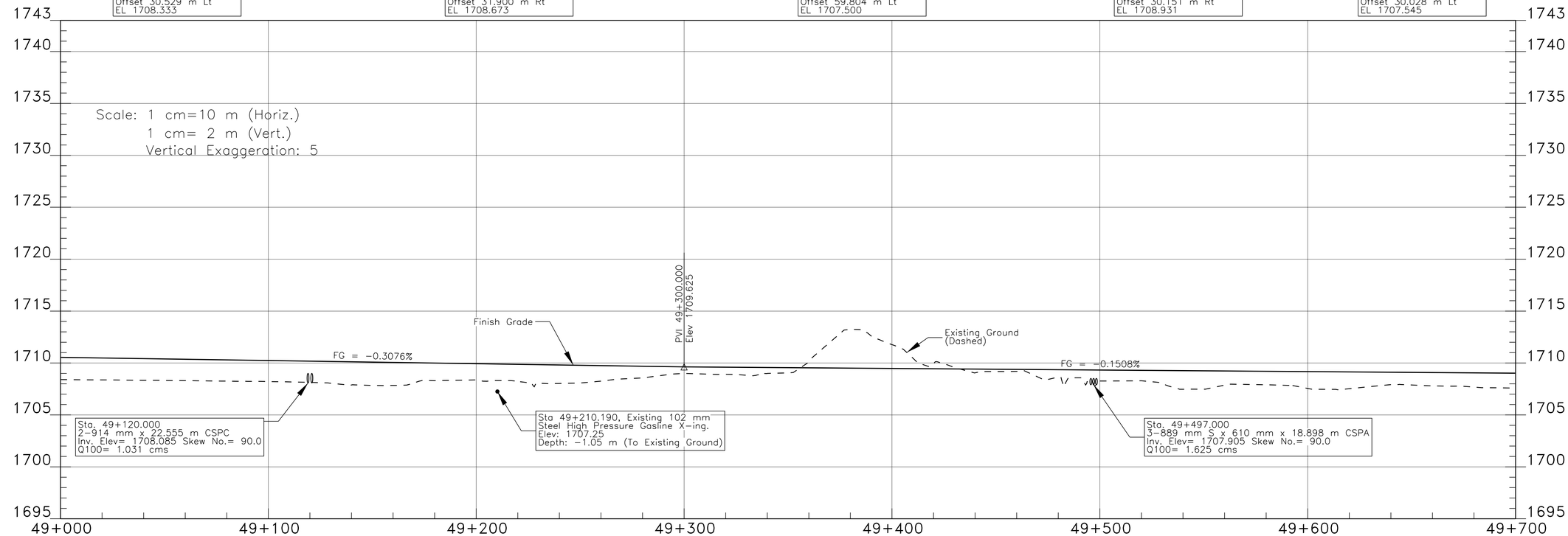
SCP 232 Rebar with Cap
Sta 49+025.602
Offset 30.529 m Lt
EL 1708.333

SCP 233 Rebar with Cap
Sta 49+188.201
Offset 31.900 m Rt
EL 1708.673

SCP 234 Rebar with Cap
Sta 49+408.175
Offset 59.804 m Lt
EL 1707.500

SCP 235 Rebar with Cap
Sta 49+479.147
Offset 30.151 m Rt
EL 1708.931

SCP 236 Rebar with Cap
Sta 49+632.202
Offset 30.028 m Lt
EL 1707.545

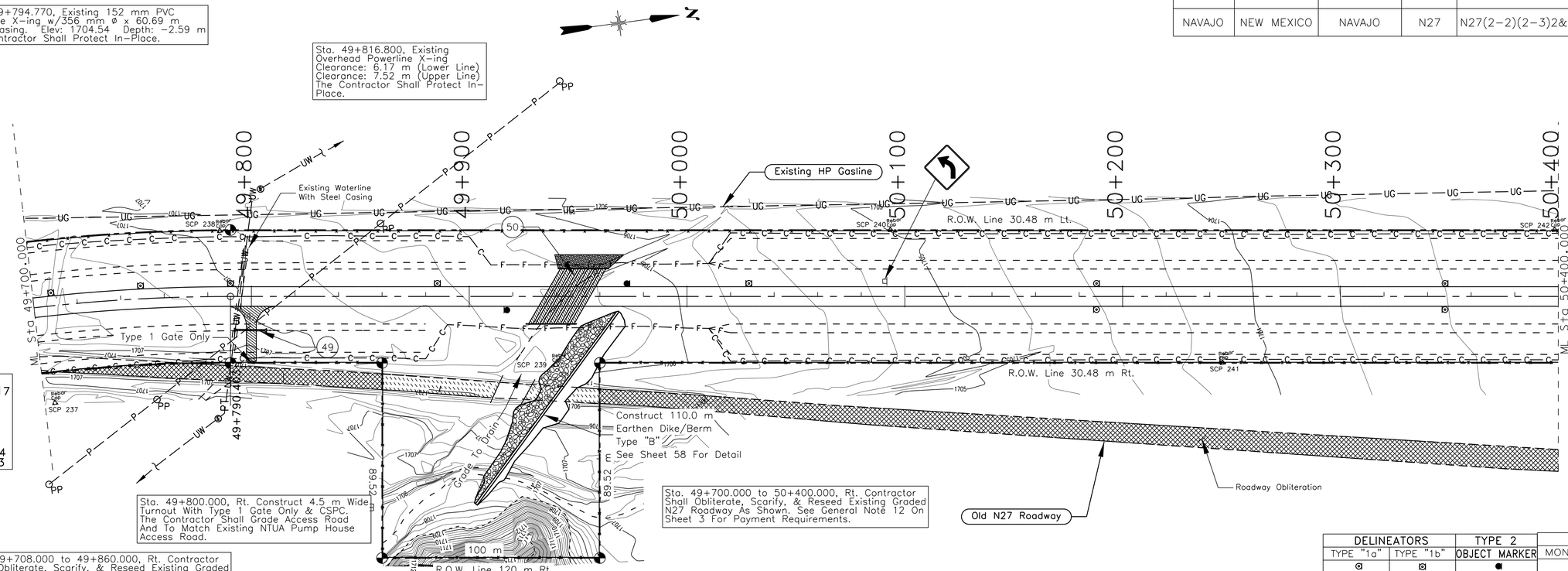


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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	16	71

Sta 49+794.770, Existing 152 mm PVC Waterline X-ing w/356 mm ø x 60.69 m Steel Casing. Elev: 1704.54 Depth: -2.59 m The Contractor Shall Protect In-Place.

Sta. 49+816.800, Existing Overhead Powerline X-ing Clearance: 6.17 m (Lower Line) Clearance: 7.52 m (Upper Line) The Contractor Shall Protect In-Place.



C4
PI 49+729.017
A 8°56'42"Rt
R 788.000
L 123.021
T 61.636
E 2.407
N 560591.954
E 268469.453

Sta. 49+800.000, Rt. Construct 4.5 m Wide Turnout With Type 1 Gate Only & CSPC. The Contractor Shall Grade Access Road And To Match Existing NTUA Pump House Access Road.

Sta. 49+700.000 to 50+400.000, Rt. Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown. See General Note 12 On Sheet 3 For Payment Requirements.

Sta. 49+708.000 to 49+860.000, Rt. Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown. See General Note 12 On Sheet 3 For Payment Requirements.

Sta. 49+918.00, Rt. Contractor Shall Grade Drainage Channels Across Old N27 Road In-Line With Existing Upstream Flows To All New Pipe Inlets As Per COR/COTR.

SCALE: Meters
20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	●	⊕	--NO SYMBOL--
4	5	4	6	6

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (sq/m)	Area (ha)	Q50 (cfs)	Q100 (cms)	Remarks	Outlet Protection
49	49+800.000	Install 1-610 mm x 12.802 m CSPC Under Turnout Rt.	90.0						With End Section At Inlet & Outlet	
50	49+945.000	Install 7-1803 mm S x 1194 mm x 29.261 m CSPA	126.0	DA9		397.06		18.142	With Concrete Headwalls At Inlet and Outlet	With Wire Enclosed Riprap Apron

SCP 237 Rebar with Cap
Sta 49+704.875
Offset 44.428 m Rt
EL 1707.638

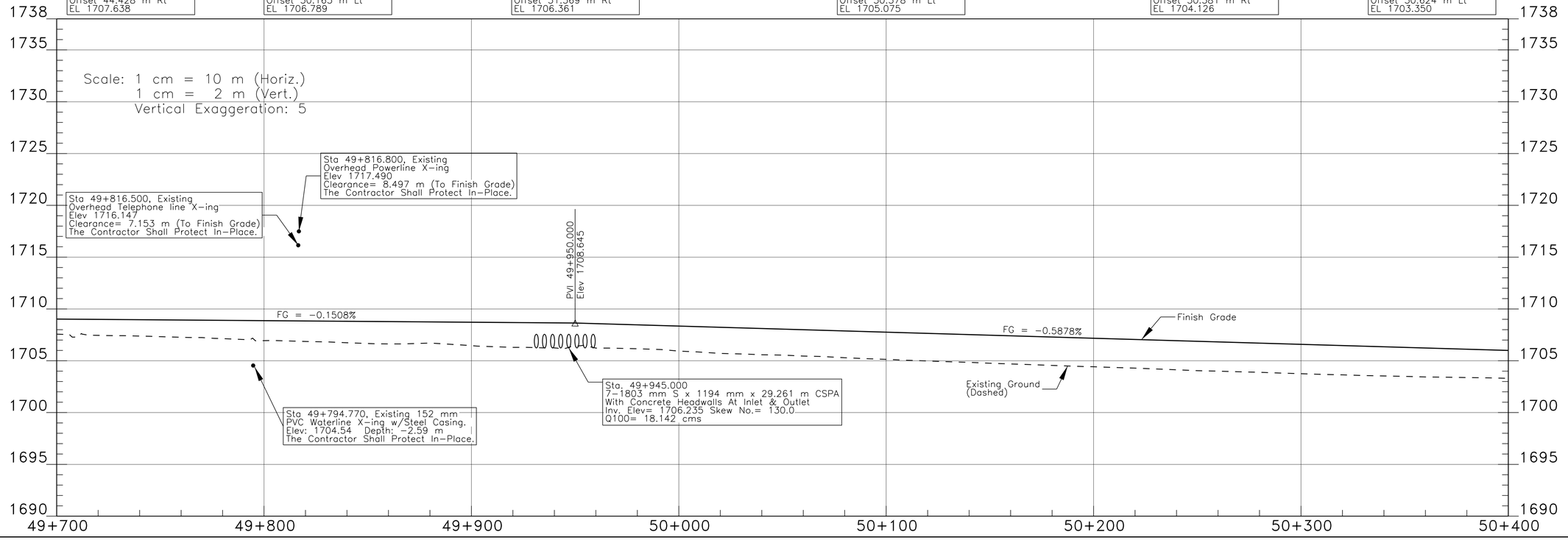
SCP 238 Rebar with Cap
Sta 49+785.702
Offset 30.163 m Lt
EL 1706.789

SCP 239 Rebar with Cap
Sta 49+939.846
Offset 31.369 m Rt
EL 1706.361

SCP 240 Rebar with Cap
Sta 50+093.435
Offset 30.578 m Lt
EL 1705.075

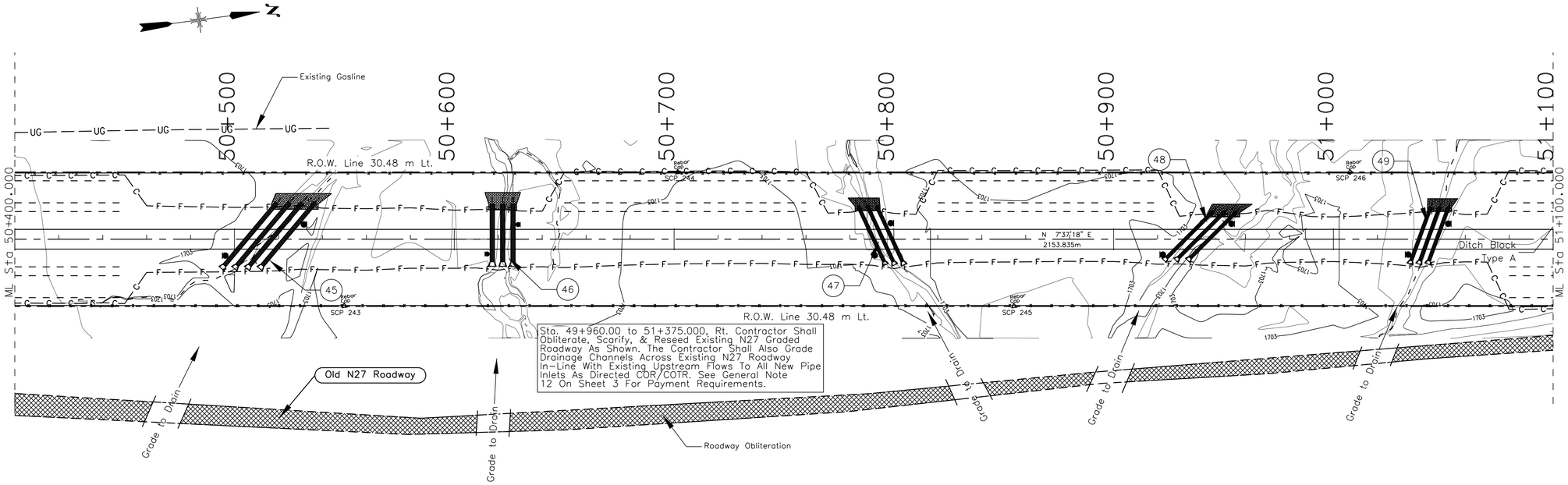
SCP 241 Rebar with Cap
Sta 50+245.902
Offset 30.381 m Rt
EL 1704.126

SCP 242 Rebar with Cap
Sta 50+398.356
Offset 30.624 m Lt
EL 1703.350



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	17	71



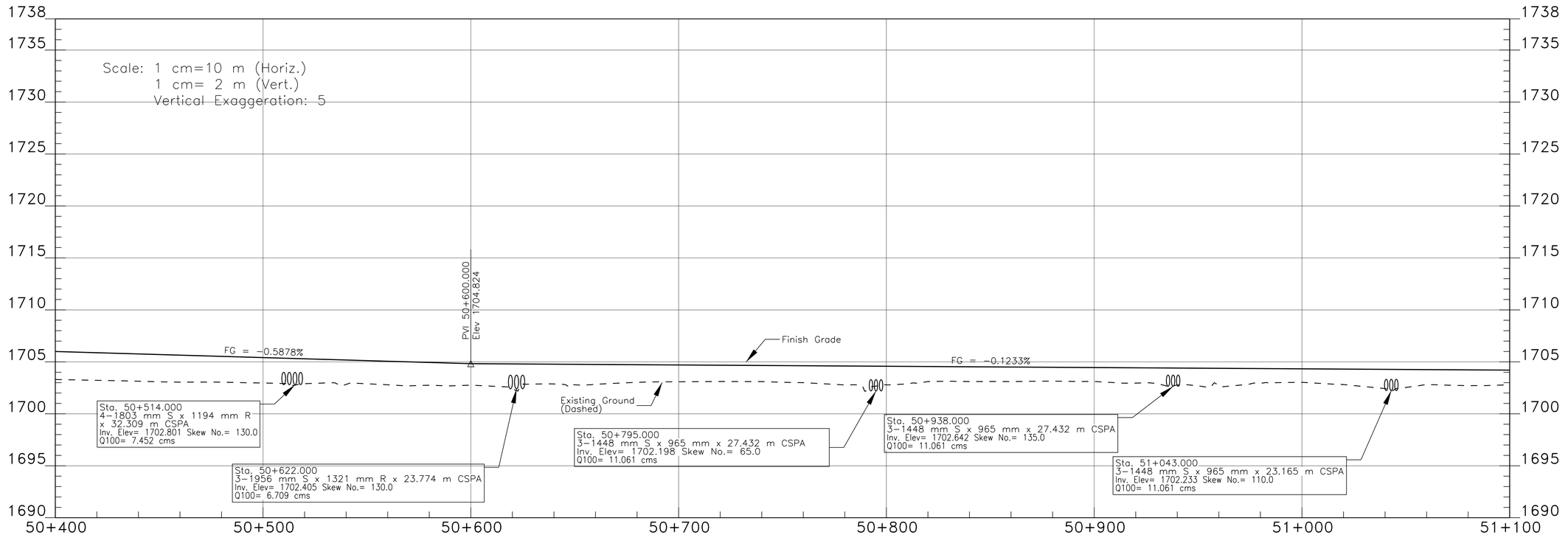
SCALE: Meters

0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
				--NO SYMBOL--
0	0	10	0	0

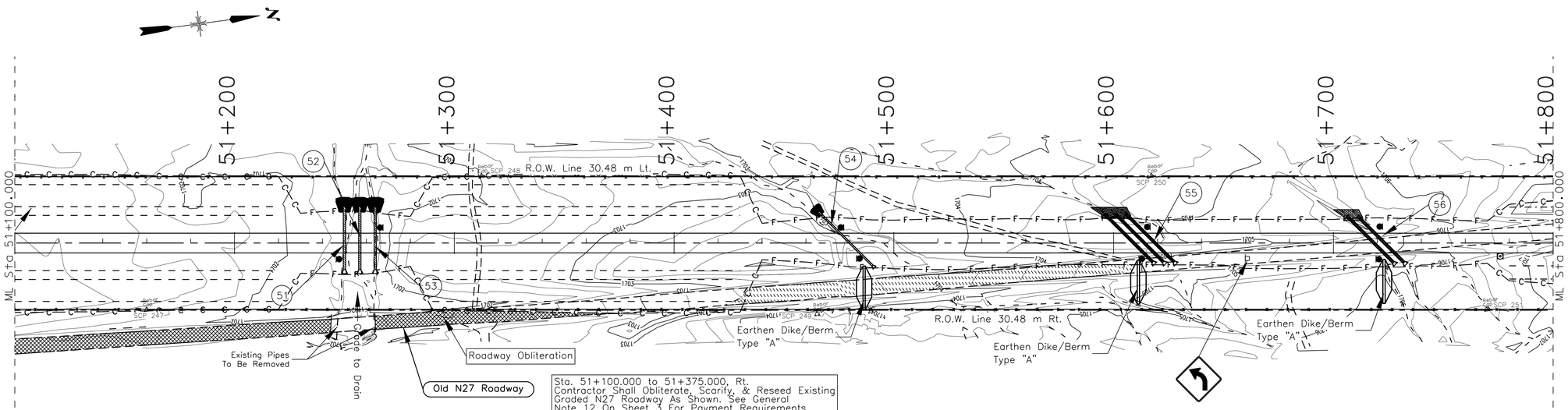
DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
45	50+514.000	4-1803 mm S x 1194 mm R x 32.309 m CSPA	130.0	DA10	68.505	7.452	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet
46	50+622.000	3-1956 mm S x 1321 mm R x 23.774 m CSPA	130.0	DA10a	67.045	6.709	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet
47	50+795.000	3-1448 mm S x 965 mm x 27.432 m CSPA	65.0	DA11	110.532	11.061	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet
48	50+938.000	3-1448 mm S x 965 mm x 27.432 m CSPA	135.0				With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet
49	51+043.000	3-1448 mm S x 965 mm x 23.165 m CSPA	110.0				With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	18	71



SCALE: Meters
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊙	●	⊕	--NO SYMBOL--
0	1	8	0	0

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
50	51+250.000	1-1067 mm x 24.384 m CSPC	90.0	DA12	43.919	4.077	With End Section at Each Inlet & Placed Riprap Stilling Basin at Outlet
51	51+257.000	1-1067 mm x 23.774 m CSPC	90.0				With End Section at Each Inlet & Placed Riprap Stilling Basin at Outlet
52	51+264.000	1-1067 mm x 23.384 m CSPC	90.0				With End Section at Each Inlet & Placed Riprap Stilling Basin at Outlet
53	51+480.000	1-762 mm x 29.261 m CSPC	45.0	DA12a	1.663	0.386	With End Section At Inlet & Placed Riprap Stilling Basin At Outlet
54	51+614.000	3-1245 mm S x 838 mm x 28.651 m CSPA	45.0	DA13	24.404	2.655	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet
55	51+721.000	2-1245 mm S x 838 mm x 27.432 m CSPA	45.0	DA14	10.518	1.388	With End Section at Each Inlet & Wire Enclosed Riprap Apron at Outlet

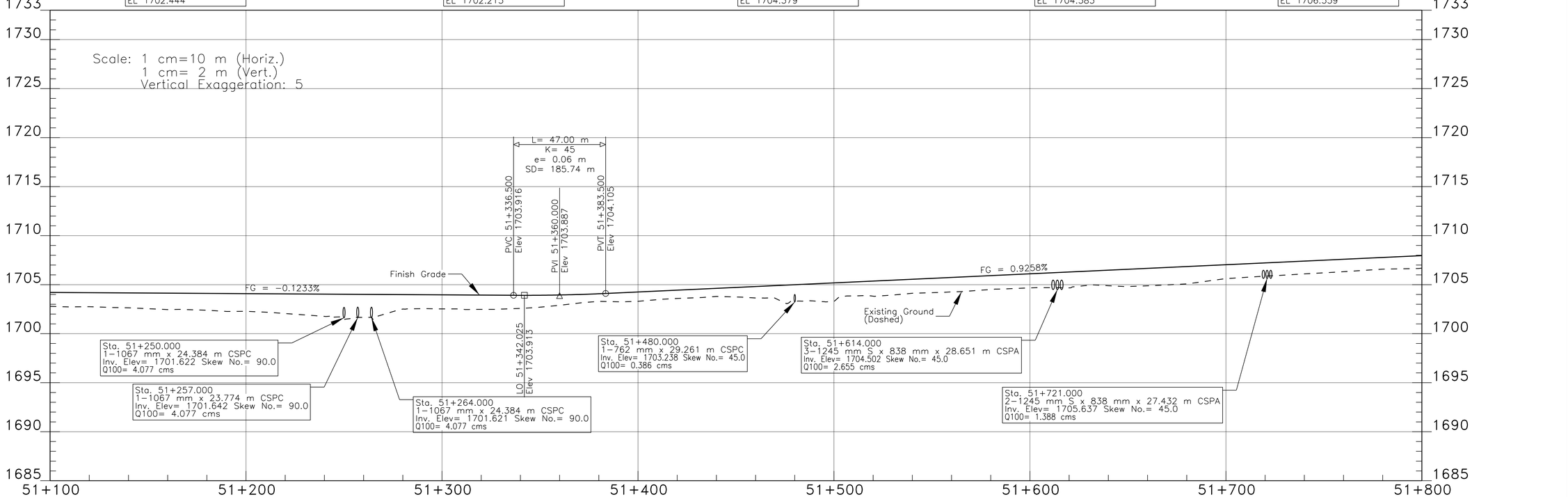
SCP 247 Rebar with Cap
Sta 51+160.072
Offset 30.387 m Rt
EL 1702.444

SCP 248 Rebar with Cap
Sta 51+312.522
Offset 30.542 m Lt
EL 1702.215

SCP 249 Rebar with Cap
Sta 51+465.078
Offset 32.345 m Rt
EL 1704.379

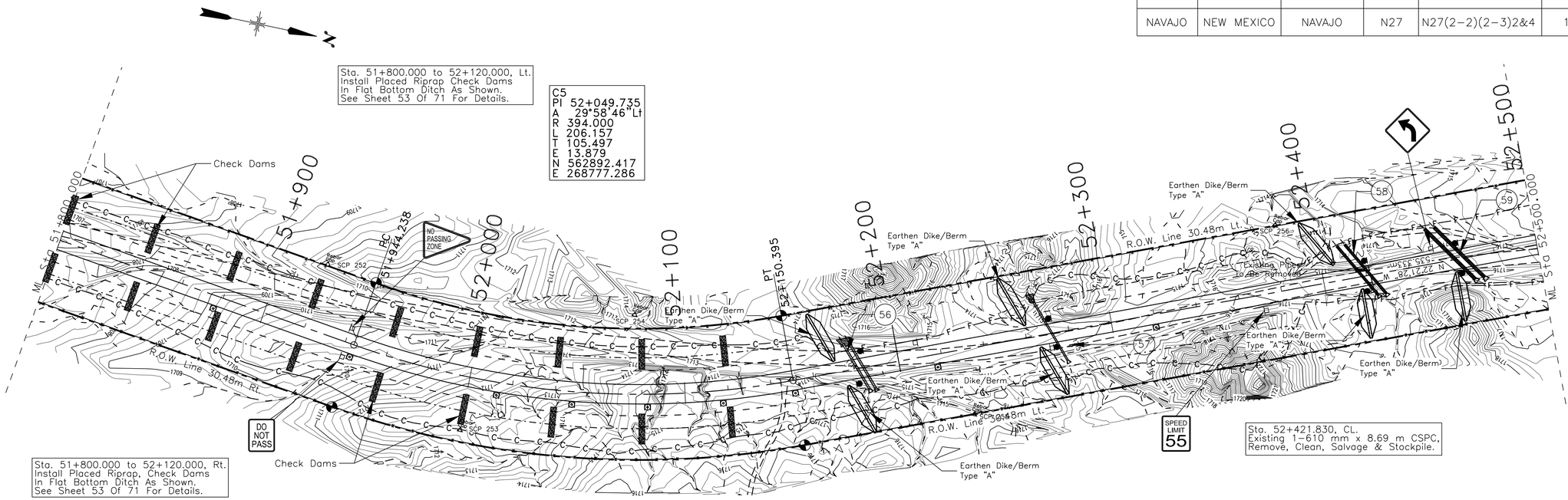
SCP 250 Rebar with Cap
Sta 51+617.261
Offset 30.606 m Lt
EL 1704.583

SCP 251 Rebar with Cap
Sta 51+769.835
Offset 30.272 m Rt
EL 1706.559



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	19	71



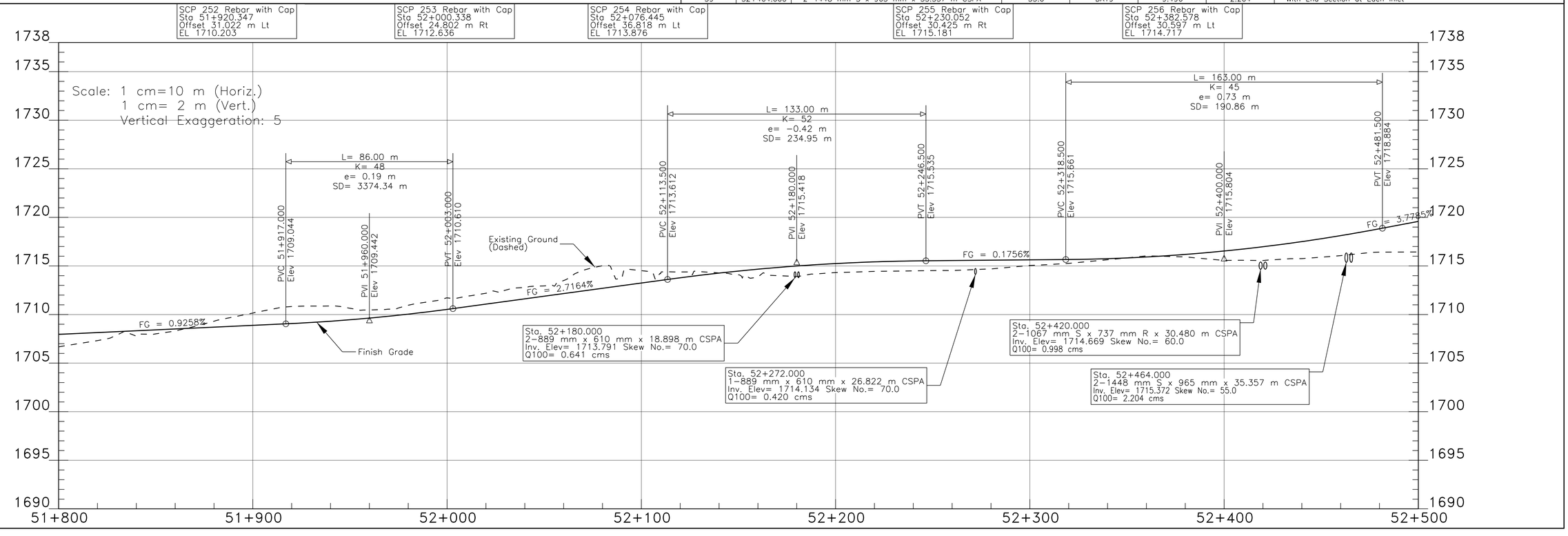
DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊙	●	⊕	--NO SYMBOL--
0	9	8	4	4

SCALE: Meters

0 20 40 60 80 100

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks
56	52+180.000	2-889 mm x 610 mm x 18.898 m CSPA	70.0	DA15	2.763	0.641	With End Section At Inlet & Wire Enlcosed Riprap Apron At Outlet
57	52+272.000	1-889 mm x 610 mm x 26.822 m CSPA	70.0	DA16	2.427	0.420	With End Section At Inlet & Wire Enlcosed Riprap Apron At Outlet
58	52+420.000	2-1067 mm S x 737 mm R x 30.480 m CSPA	60.0	DA17	4.300	0.998	With End Section at Each Inlet
59	52+464.000	2-1448 mm S x 965 mm x 35.357 m CSPA	55.0	DA19	9.496	2.204	With End Section at Each Inlet



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	20	71

Sta. 52+650.000 to 52+739.610, 9.0 m Lt.
Construct Gabion Basket Retaining Wall.
See Sheet 21 Of 71 For Details.

Sta. 52+750.000, Lt., Construct 7.0 m Wide Residential/Bus Turnout (L=97.68 m) w/3-Unit Cattleguard & Type 2 Gate At Station 52+678.93 (Offset: -40.83 m). See Sheet 21 Of 71 For Construction Details.

Sta. 52+940.000 to 53+200.000, Lt. Install Placed Riprap Check Dams In Flat Bottom Ditch As Shown. See Sheet 53 Of 71 For Details.

Sta. 52+270.000 to 53+300.000, Existing ABC Transition Taper (30 m) Removal Shall Be Coordinated With Construction Sequence And Payment Shall Be Incidental To Earthwork Bid Item.

SEE SHT. 20 FOR TURNOUT CONSTRUCTION & SEE SHT. 22 FOR GABION (NOT SHOWN HERE) DESIGN DETAILS.

New Cattleguard

14.52 m

R.O.W. Line 45m Lt.

R.O.W. Line 30.48m Lt.

R.O.W. Line 30.48m Rt.

SCP 258

SCP 259

SCP 260

SCP 261

SCP 257

Rebar Cap

PT 52+850.271

PP

STOP

DO NOT PASS

SPEED LIMIT 35

NO PASSING ZONE

New Barb Wire Fence

Check Dams

Existing 30 m Transition Taper

Existing Pavement N27(2-3)1,2&4 Completed Roadway

N 1°34'12" E
L 58.572m

Roadway Obliteration

Old N27 Roadway

C6
PI 52+769.217
A 23°55'41"Rt
R 394.000
L 164.543
T 83.489
E 8.748
N 563562.285
E 268501.762

Sta. 52+867.350, Existing Powerline X-ing. Height=10.30 m

Sta. 52+676.000 to 52+833.000, Rt. Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown, See General Note 12 On Sheet 3 For Payment Requirements.

Sta. 52+900.000 to 53+200.000, Rt. Install Placed Riprap Check Dams In Flat Bottom Ditch As Shown. See Sheet 53 Of 71 For Details.

SCALE: Meters
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	●	⊕	--NO SYMBOL--
0	10	0	7	7

N27(2-2)(2-3)1,2&4
END OF PROJECT
Sta. 53+300.000
Elev: 1711.826

SCP 257 Rebar with Cap
Sta 52+534.302
Offset 30.816 m Rt
EL 1717.553

SCP 258 Rebar with Cap
Sta 52+697.309
Offset 24.638 m Lt
EL 1726.914

SCP 259 Rebar with Cap
Sta 52+849.441
Offset 56.153 m Rt
EL 1722.897

SCP 260 Rebar with Cap
Sta 52+996.931
Offset 31.009 m Lt
EL 1716.003

SCP 261 Rebar with Cap
Sta 53+153.582
Offset 35.966 m Rt
EL 1712.603

Sta 52+867.350, Existing Overhead Powerline X-ing, Elev 1730.521
Clearance= 9.731 m (To Finish Grade).
The Contractor Shall Protect In-Place.

L= 440.00 m
K= 52
e= -4.62 m
SD= 211.78 m

L= 150.00 m
K= 40
e= 0.70 m
SD= 170.55 m

Existing Ground (Dashed)

Finish Grade

PVT 52+510.000 Elev 1720.118

HI 52+713.973 Elev 1723.928

PVI 52+736.000 Elev 1728.500

PVT 52+956.000 Elev 1718.338

PVC 52+975.000 Elev 1717.460

PVI 53+050.000 Elev 1713.995

PVT 53+125.000 Elev 1713.345

PVT 53+300.000 Elev 1711.826

FG = -4.693%

FG = -0.8678%

Scale: 1cm = 10 m (Horiz.)
1cm = 2 m (Vert.)
Vertical Exaggeration: 5

Existing ABC Transition Taper To Existing Graded Road From Completed Roadway.

Existing Pavement N27(2-2)(2-3)1,2&4 Completed Roadway.

1735 1730 1725 1720 1715 1710 1705 1700 1695

52+500 52+600 52+700 52+800 52+900 53+000 53+100 53+200 53+300

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	21	71

Sta. 52+678.93 = 0+103.11,
40.83 m Lt. Install New 3-Unit
Cattleguard With Type 2 Gate

PT 0+105.254

R.O.W. Line 45m Lt.

C1
PI 0+030.000
Δ 93°19'48" Lt
R 12.500
L 20.361
T 13.248
E 5.715
N 563539.485
E 268484.788

R.O.W. Line 14.52 m

R.O.W. Line 30.48m Lt.

PC 0+083.176

TURNOUT
CENTERLINE
L = 105.254 m

S 16°20'30" E
46.063m

PT 0+037.113

7.19 m

C2
PI 0+095.176
Δ 55°43'13" Rt
R 22.702
L 22.078
T 12.000
E 2.976
N 563471.055
E 268504.852

END PT.
Sta. 0+102.186
Elev. 1727.661

Note: Contour Not
Shown for Clarity

PC 0+016.752

S 76°59'19" W
16.752m

High Pressure
Gasline

SEE SHEET 22
FOR GABION WALL
DESIGN DETAILS

Gabion Wall

Ditch Line

Edge of pavement

N27
CENTERLINE

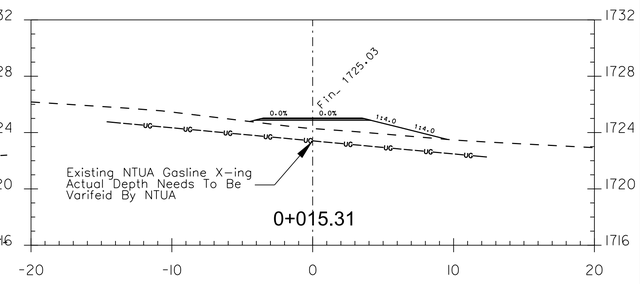
EDGE OF
PAVEMENT

TURNOUT ALIGNMENT
Sta. 52+750.00 =
Sta. 0+000.00

START PT.
Sta. 0+004.50
Elev. 1723.164

SCALE: Meters
0 5 10 15 20

SEE SHEET 20 FOR
PLAN & PROFILE VIEW &
SHEET 3, FOR NTUA NOTES



NTUA Gas To Pothole To Varify Depth Of The Line Which will Require Special Trench Wall to Protect gasline, in this area During Construction of the Gabion wall and access road.

L= 35.00 m
K= 5
e= -0.28 m
SD= 119.74 m

PVI 0+102.186
Elev 1727.661

PVT 0+053.251
Elev 1726.927

PVI 0+035.751
Elev 1726.664

PVC 0+018.251
Elev 1725.264

PVI 0+004.500
Elev 1724.164

START PT.

FG = 1.5000%

FG = 8.0000%

Turnout
Profile

Existing ground
(dashed line)

Sta. 0+015.314
Existing Gasline X-ing
Elev: 1723.217

Left
Roadside

Superelevated
Roadway

CL
Roadway

Right Half of
Roadway Not
Shown

1736
1732
1728
1724
1720
1716
1712

0+110 0+100 0+080 0+060 0+040 0+020 0+000 -0+010

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

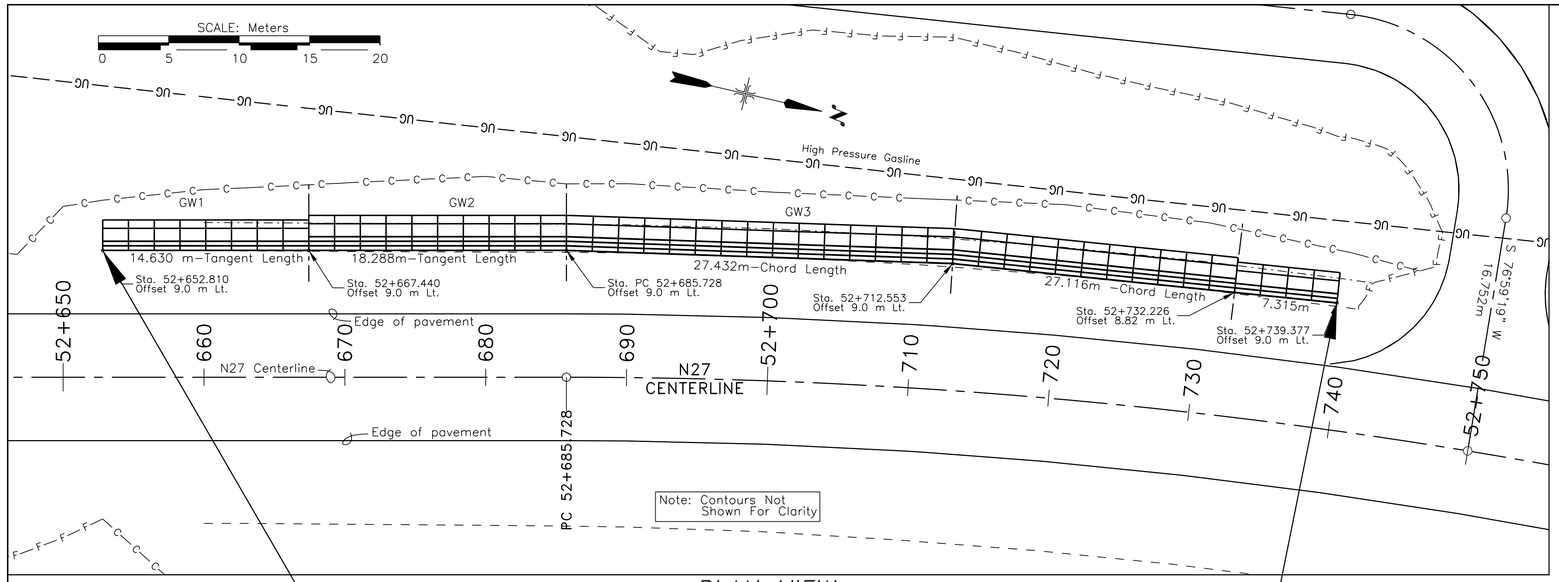
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

Sta. 52+750.00 Lt TURNOUT
PLAN & PROFILE DETAILS

DRAWN BY: NRDOT	DATE: 7/19/2016
DESIGNED BY: NRDOT	DATE: 7/19/2016
REVISED: 9/20/2017	BY: Leroy.Toledo
Sht 21 N27 plp14 52+750 TO PLP.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Plan and Profile Sheets\Sht 21 N27 plp14 52+750 TO PLP.dgn

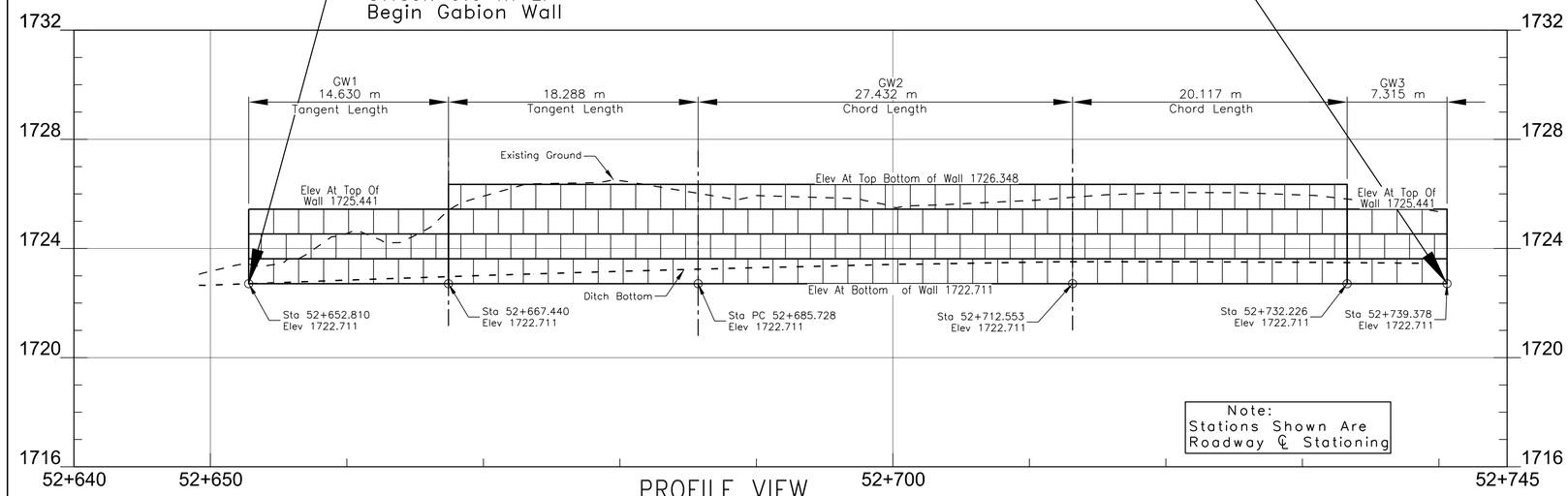
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N27	N27(2-2)(2-3)2&4	22	71



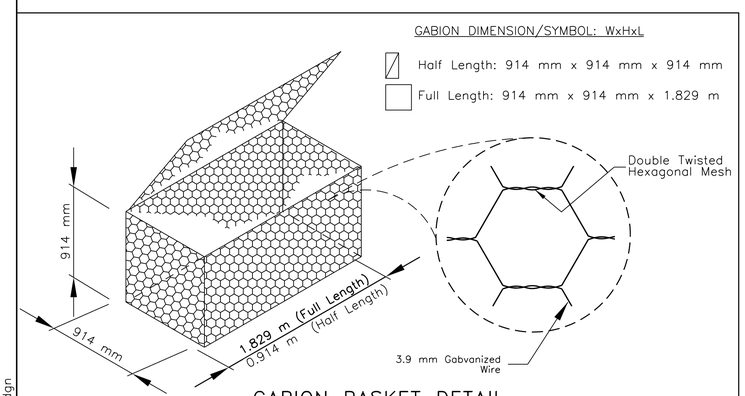
PLAN VIEW

Rdway. Sta. 52+652.810
Offset: 9.0 m Lt
Begin Gabion Wall

Rdway. Sta. 52+739.378
Offset: 9.0 m Lt
End of Gabion Wall



PROFILE VIEW



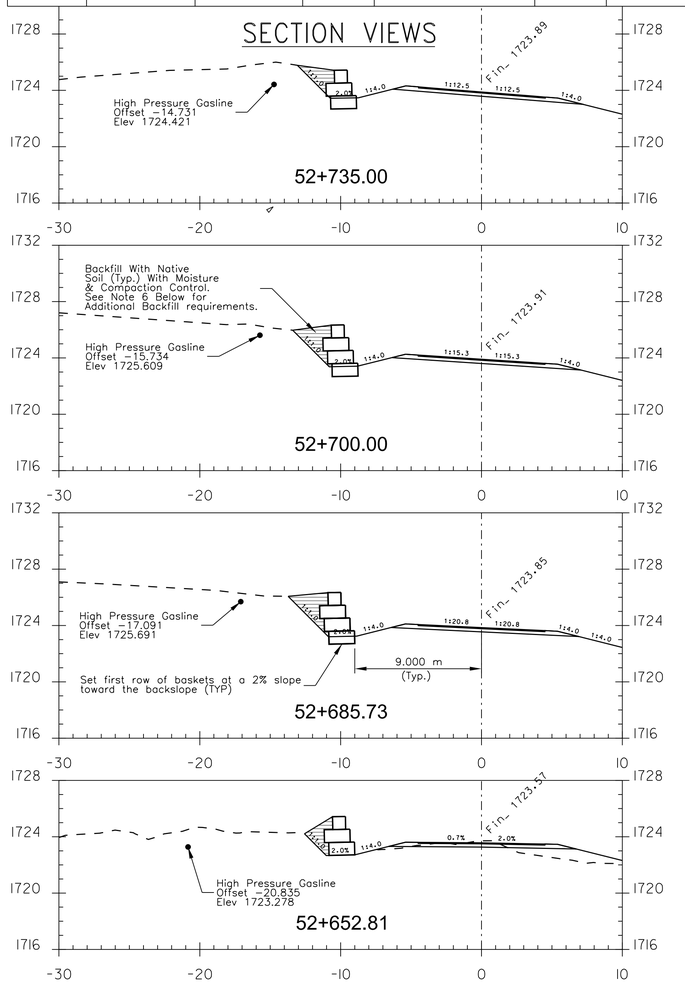
GABION BASKET DETAIL
(nts)

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS OR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) ALONG WITH ALL SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. THE QUANTITIES SHOWN ARE ONLY AN ESTIMATE. ACTUAL QUANTITIES SHALL BE DETERMINED IN THE FIELD. THE CONTRACTOR WILL BE REQUIRED TO MAKE ANY NECESSARY ADJUSTMENTS IN THE FIELD TO MATCH EXISTING FIELD CONDITIONS. THESE FIELD ADJUSTMENTS ARE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
3. GABION MATERIAL SHALL BE RECTANGULAR, COMPARTMENTED CONTAINERS FABRICATED FROM STYLE 1 DOUBLE-TWISTED HEXAGONAL MESH OF GALVANIZED STEEL WIRE.
4. WIRE SHALL CONFORM TO ASTM A-691, GALVANIZED STEEL WIRE, SOFT TEMPER. MESH OPENING OF 83 mm x 114 mm.

   MESH WIRE _____3.05 mm dia.
   WIRE FOR NETTING: _____3.00 mm dia.
   WIRE FOR SELVEDGES & CORNERS: _____3.80 mm dia.
   WIRE FOR BINDING: _____2.20 mm dia.
   ZINC COATING: _____260 g/m²
5. GABIONS SHALL BE PLACED TO THE DETAIL SHOWN. IF UNSUITABLE MATERIAL IS FOUND AT THE FOOTING LOCATION AND ELEVATIONS, THE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED SELECTED BACKFILL AS DESIGNED BY THE COR/COTR. ALL SELECTED BACKFILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99 METHOD C, BEFORE AND AFTER FOOT INGS ARE PLACED. THE SELECT BACKFILL MATERIAL FOR THE FOOTING AND BACK OF WALL SHALL CONFORM TO AASHTO "A-2-4" SOIL CLASS OR BETTER. THIS WORK AND MATERIAL SHALL BE CONSIDERED INCIDENTAL TO ITEM 25302-1000.
6. ALL FOOTING EXCAVATIONS SHALL BE INSPECTED AND APPROVED BY THE COR/COTR PRIOR TO PLACEMENT OF WELDED WIRE BASKETS, H ARDWARE AND SUBSEQUENT BACKFILL. ALL FOOTINGS EXCAVATIONS SHALL BE KEPT FREE OF WATER AT ALL TIMES. ALL BACKFILL BEHIND THE WALL SHALL BE DONE FROM THE ROADWAY SIDE OF THE WALL WITH COMPACTION (HAND COMPACTORS ONLY). NO HEAVY EQUIPMENT IS ALLOWED BEHIND THE WALL SO AS TO PROTECT THE GASLINE. SEE SHEET 3 FOR NTUA ADDITIONAL REQUIREMENTS.
7. BACK SLOPES RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE PLANS AND AS DIRECTED BY THE COR\COTR. ANY WASTE MATERIAL SHALL BE USED AS BORROW WHERE NEEDED IN OTHER PROJECT LOCATIONS AS DESIGNATED AND APPROVAL BY THE COR\COTR. ALL BACK SLOPES EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE (SEE NOTE 6 ABOVE).
8. ALL STONE FOR WIRE ENCLOSED RIPRAP TO BE CLASS 2 MEETING THE GRADING REQUIREMENTS OF TABLE 705-1, AND SECTION 705 OF THE FP-03
9. WARP EXISTING CUT BACK SLOPES AROUND ENDS OF GABION WALLS AND COMPACT SO THAT THE ENDS OF THE GABION STRUCTURE ARE BURIED INTO THE CUT BACK SLOPES USING HAND AND SMALL EQUIPMENT TO AVOID IMPACTING THE GASLINE. THIS WORK IS AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.
10. FILTER FABRIC SHALL CONFORM TO SECTION 207 AND 714.01(a) OF THE FP-03 FOR TYPE 1V-B MATERIAL. ALL MATERIALS, EXCAVATION, INSTALLATION, EQUIPMENT, LABOR, AND BACKFILL SHALL BE INCLUDED IN THE UNIT PRICE FOR ITEM 25302-1000.

SECTION VIEWS



ITEM 25302-1000: GABION ALUM COAT WALL LAYOUT TABLE

Station to Station: N27(2-3) CL	Ht. (m)	Width (m)	Length (m)	Vol. (m³)	Description
52+652.810 to 52+667.440, Left GW1	0.914	1.829	14.630	24.457	Bottom double rows
	0.914	1.829	14.630	24.457	Middle double rows
	0.914	0.914	14.630	12.222	Top single row
			GW1 Total Volume:	61.136	
52+667.440 to 52+732.226, Left GW2	0.914	1.829	65.837	110.060	Bottom double rows
	0.914	1.829	65.837	110.060	Middle double rows
	0.914	1.829	65.837	110.060	Middle double rows
	0.914	0.914	65.837	55.000	Top single row
			GW2 Total Volume:	385.180	
52+732.226 to 52+7739.378, Left GW3	0.914	1.829	7.315	12.229	Bottom double rows
	0.914	1.829	7.315	12.229	Middle double rows
	0.914	0.914	7.315	6.111	Top single row
			GW3 Total Volume:	30.568	
			GRAND TOTAL	476.884	

UNITED STATES
DEPARTMENT OF THE INTERIOR
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GABION WALL PLAN & PROFILE AND CROSS SECTION DETAILS

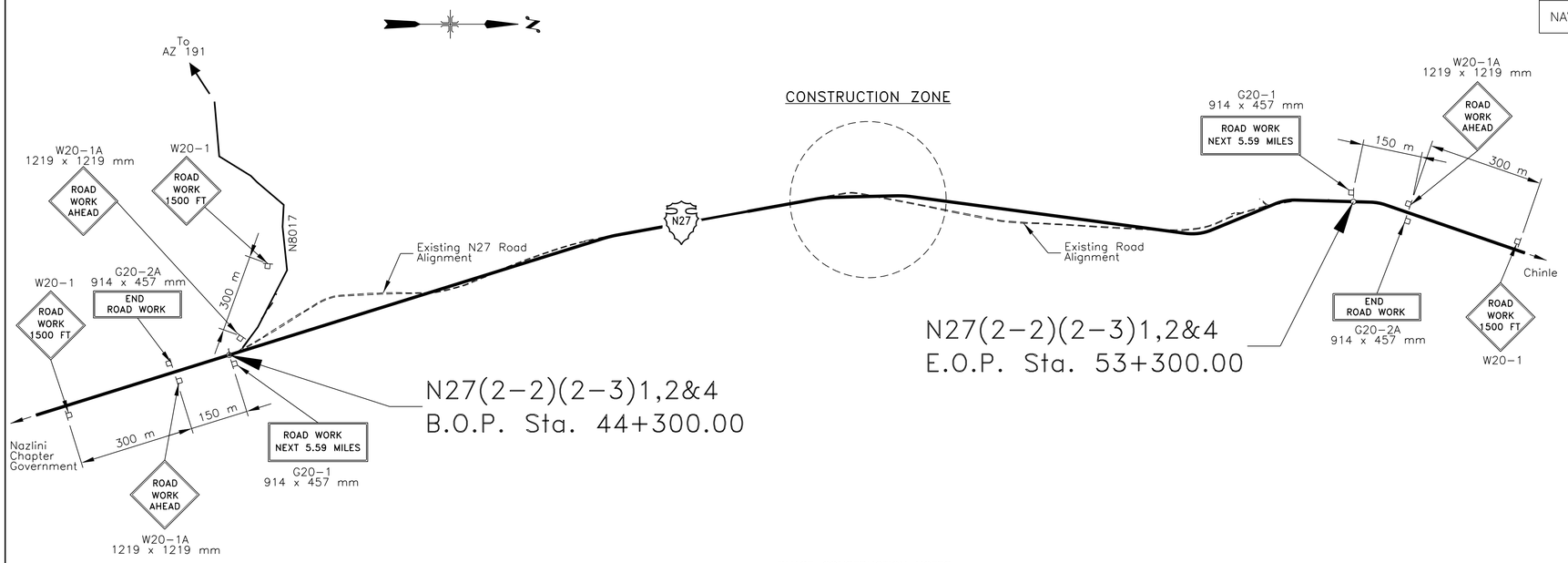
DRAWN BY: NRDOT	DATE: 9/15/2017
DESIGNED BY: NRDOT	DATE: 9/15/2017
REVISED: 9/15/2017	BY: Harold.Riley

Sht 22 N27 plp15 REV Rtwl PLP Xsec rev 091517.dgn

U.S. DEPARTMENT OF THE INTERIOR 1824 BUREAU OF INDIAN AFFAIRS

Plotted: 15-SEP-2017 09:45 By: Harold.Riley
N:\Projects\N27 Gabion Wall\Sht 22 N27 plp15 REV Rtwl PLP Xsec rev 091517.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	23	71

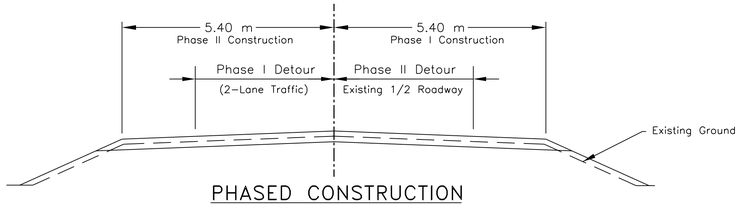


PHASE CONSTRUCTION NOTES:

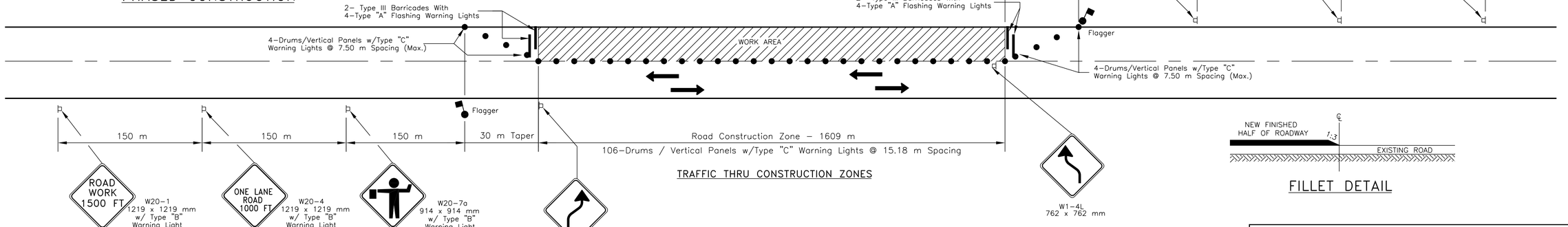
1. THE CONTRACTOR MAY CONSTRUCT 1/2 THE NEW ROADWAY (UNDER THE PHASE CONSTRUCTION PLAN SHOWN) WHILE DETOURING TWO-WAY TRAFFIC ON THE OTHER (EXISTING) HALF ONCE THE FIRST 1/2 OF ROADWAY IS BUILD UP TO THE NEW GRADES; THEN TRAFFIC SHALL BE DIRECTED TO THE NEW HALF OF ROADWAY WHILE THE OTHER (EXISTING) HALF IS CONSTRUCTED.
2. ALL (NEW) DRAINAGE PIPE INSTALLATION SHALL BE IN ACCORDANCE WITH THE PHASED CONSTRUCTION PLAN ABOVE AS WELL AS REMOVAL OF EXISTING PIPES. ALL THIS PIPE INSTALLATION & REMOVAL SHALL BE CONSIDERED INCIDENTAL TO PIPE ITEMS SHOWN AND NO ADDITIONAL PAYMENT SHALL BE MADE.
3. THIS PHASED CONSTRUCTION SHALL BE CONSIDERED INCIDENTAL TO THE TCP AND NO ADDITIONAL PAYMENT SHALL BE MADE.
4. THE CONTRACTOR'S CONSTRUCTION SCHEDULE, CONSTRUCTION SEQUENCING PLAN, AND STORM WATER POLLUTION PREVENTION PLAN SHALL REFLECT THIS PHASED CONSTRUCTION.

GENERAL NOTES

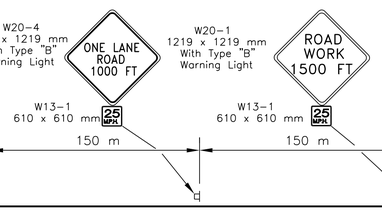
1. ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE MUTCD MANUAL (LATEST EDITION AND AMENDMENTS) AND THE SUPPLEMENTAL SPECIFICATION FOR THIS PROJECT.
2. THE TRAFFIC CONTROL DETAILS SHOWN ARE ONLY A GUIDE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PREPARING AND IMPLEMENTING A TRAFFIC CONTROL PLAN (TCP) IN ACCORDANCE WITH THESE DETAILS, SECTION 635, AND THE MUTCD UNDER CONTRACT ITEM 63501. ANY ADDITIONAL TRAFFIC CONTROL DEVICES CALLED FOR ON THE CONTRACTOR'S TCP WILL NOT BE MEASURED FOR PAYMENT BUT SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEMS FOR TRAFFIC CONTROL SHOWN IN THE BID SCHEDULE SEE SUPPLEMENTAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. SIGNS (G20-1, W20-1A, AND G20-2A) SHALL BE PLACED AT THE PROJECT LIMITS AND REMAIN IN PLACE THROUGH THE DURATION OF THE PROJECT.
4. FLAGGERS SHALL BE STATIONED LEFT & RIGHT AS SHOWN WHEN EQUIPMENT IS CROSSING OR WORKING WITHIN EXISTING ROADWAY PRISM.
5. IN AREAS OF EXISTING ROADWAY WIDENING, THE CONTRACTOR SHALL ENSURE THAT NO PAVEMENT DROP-OFFS ARE LEFT EXPOSED DURING NON-WORKING HOURS. THE CONTRACTOR SHALL INITIATE CORRECTIVE MEANS TO ACHIEVE A MINIMUM 1:3 SLOPE AS SHOWN OF FILLET DETAIL.
6. AT THE END OF EACH WORKING DAY, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE A DRIVING SURFACE FREE OF OBSTRUCTIONS AS SHOWN ON THE PHASED AND FILLET CONSTRUCTION DETAILS AS APPLICABLE, ACCESS TO ALL ADJOINING PROPERTIES AND BIA SYSTEM ROUTES SHALL BE MAINTAINED AT ALL TIMES (DAY AND NIGHT).
7. ALL TRAFFIC CONTROL DEVICES (EXCEPT AT DETOUR ROAD LOCATIONS AND AS NOTED IN ABOVE NOTE #3) SUCH AS CONSTRUCTION SIGNS, DRUMS, BARRICADES, ETC. SHALL BE REMOVED TO A LOCATION AT LEAST NINE (9) METERS FROM THE EDGE OF THE SHOULDER WHEN CONSTRUCTION IS NOT IN PROGRESS.
8. DURING CONSTRUCTION OPERATIONS, TRAFFIC SHALL BE MOVED THROUGH THE WORK ZONE USING PILOT CARS (AS REQUIRED). APPLICABLE SIGNS AND OTHER ITEMS (TWO-WAY RADIO CONTACT) RELATED TO THE USE OF THE PILOT CARS AND SHALL BE CONSIDERED INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
9. THE CONTRACTOR HAS THE OPTION TO EITHER USE DRUMS OR VERTICAL PANELS; BUT SHALL NOT USE A COMBINATION OF BOTH. NO TRAFFI CONES SHALL BE ALLOWED.
10. THE CONTRACTOR HAS THE OPTION TO UTILIZE DETOUR ROADS IN ACCORDANCE WITH THE MUTCD MANUAL IN CONJUNCTION WITH OR IN LIEU OF THE PHASE CONSTRUCTION DETAILS SHOWN AND IN ACCORDANCE WITH SECTION 107 AND 204, THE COST OF ANY DETOUR ROADS (INCLUDING ALL DETOUR RELATED EARTHWORK AND MAINTENANCE) SHALL BE CONSIDERED INCIDENTAL TO THE TEMPORARY TRAFFIC CONTROL BID ITEM. THE CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY PERMITS AND CLEARANCES FOR ANY DETOUR ROADS.
11. AT LOCATIONS WHERE NEW ROAD CONSTRUCTION CROSSES EXISTING ROADWAY , AT TIE-INS WITH EXISTING ROADS, AND AT THE END OF THE NEW CONSTRUCTION DETAILS SHOWN AND IN ACCORDANCE WITH SECTION 107 AND 204, THE COST OF ANY DETOUR ROADS (INCLUDING ALL DETOUR RELATED EARTHWORK AND MAINTENANCE) SHALL BE CONSIDERED INCIDENTALTO THE TEMPORARY TRAFFIC CONTROL BID ITEMS. THE CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY PERMITS AND CLEARANCES FOR ANY DETOUR ROADS.
12. THE TRAFFIC CONTROL ON THIS PROJECT SHALL BE COORDINATED WITH THE PROJECT CONSTRUCTION SCHEDULE.



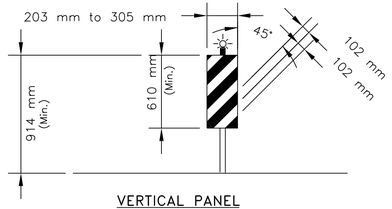
PHASED CONSTRUCTION



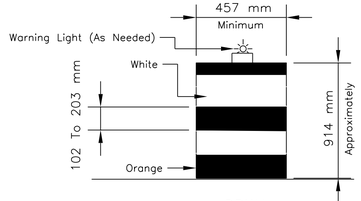
TRAFFIC THRU CONSTRUCTION ZONES



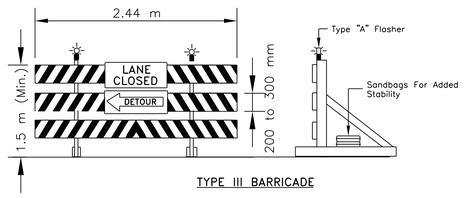
FILLET DETAIL



VERTICAL PANEL (ALTERNATE)



DRUM



TYPE III BARRICADE

UNITED STATES
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BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TEMPORARY TRAFFIC CONTROL

DRAWN BY: NRDOT	DATE: 12/30/2013
DESIGNED BY: NRDOT	DATE: 12/30/2013
REVISED: 5/27/2015	BY: Leroy.Toledo
Sht 23 N27_tcp.dgn	

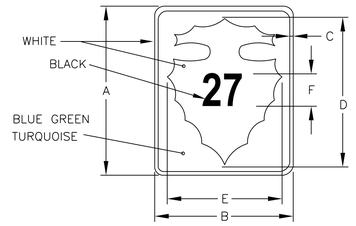
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	24	71

PERMANENT TRAFFIC CONTROL – SIGN, POST, & HARDWARE

Station	Location	Detail No.	Description	Sign Panel Size (mm)	Area of Sign (m^2)	No. of Tube	Size	No. of Panel	Total Area Panels (m^2)
44+386.31 44+452.71 46+499.70 52+743.00	Rt. Lt. Lt. Lt.	R1-1	STOP	762 x 762	0.58	1	50 mm x 50 mm	4	2.32
44+660.00	Rt.	See Details ROUTE NO.	27	457 x 610	0.28	1	38 mm x 38 mm	1	0.28
52+470.00 53+360.00	Rt. Lt.	R2-1	SPEED LIMIT 35	610 x 762	0.46	1	44 mm x 44 mm	2	0.92
44+240.00 44+520.00 48+850.00 48+850.00	Lt. Rt. Rt. Lt.	R2-1	SPEED LIMIT 55	610 x 762	0.46	1	44 mm x 44 mm	4	1.84
44+140.00 44+620.00 44+260.00 46+740.00 51+940.00 53+080.00	Lt. Rt. Lt. Rt. Lt. Rt.	W14-3	NO PASSING ZONE	1219 x 1219 x 914	0.52	2	50 mm x 50 mm	6	3.12
44+140.00 44+620.00 44+260.00 46+740.00 51+940.00 53+080.00	Rt. Lt. Rt. Lt. Rt. Lt.	R4-1	DO NOT PASS	610 x 762	0.46	1	44 mm x 44 mm	6	2.76
52+628.00 52+872.00	Rt. Lt.	S3-2	SCHOOL BUS TURN AHEAD	914 x 914	0.84	2	57 mm x 57 mm	2	1.68
45+600.00 45+860.00 48+270.00 48+400.00	Rt. Lt. Rt. Lt.	W11-4		762 x 762	0.58	1	50 mm x 50 mm	4	2.32
47+050.00 48+745.00 49+363.00	Rt. Rt. Rt.	W1-2R		762 x 762	0.58	1	50 mm x 50 mm	3	1.74
47+775.00 49+473.00 50+092.00 51+642.00 52+452.00	Lt. Lt. Lt. Rt. Lt.	W1-2L		762 x 762	0.58	1	50 mm x 50 mm	5	2.90
52+972.00	Lt.	W1-10L		762 x 762	0.58	1	50 mm x 50 mm	1	0.58
52+563.00	Rt.	W1-10R		762 x 762	0.58	1	50 mm x 50 mm	1	0.58
52+209.00 53+321.00	Rt. Lt.	W3-5	SPEED LIMIT 35	762 x 762	0.58	1	50 mm x 50 mm	2	1.16

	Area (m^2)
63302-2001 – Sign Installation, 1 Post – 38 mm x 38 mm Square Steel Tube	0.28
63302-2002 – Sign Installation, 1 Post – 44 mm x 44 mm Square Steel Tube	5.52
63302-2003 – Sign Installation, 1 Post – 50 mm x 50 mm Square Steel Tube	11.60
63302-2006 – Sign Installation, 2 Post – 50 mm x 50 mm Square Steel Tube	3.12
63302-2007 – Sign Installation, 2 Post – 57 mm x 57 mm Square Steel Tube	1.68



SIGN	DIMENSION (mm) A	B	C	D	E	F NUMERALS DIGITS IN ROUTE	1	2	3	4
MIN.	610	457	13	495	343	SIZE & SERIES (mm)	254E	254D	203C	152B

TEMPORARY TRAFFIC CONTROL SIGNS (minimum)

TYPE	DESCRIPTION	SIZE (mm)
W20-1	ROAD WORK XXX FT	1219 x 1219
W20-4	ONE LANE ROAD XXX FT	1219 x 1219
W13-1	25 MPH	610 x 610
W20-7a		914 x 914
supplemental plate	500 FEET	457 x 610
G20-2	END ROAD WORK	1524 x 610
W1-4L		762 x 762
W20-1a	ROAD WORK AHEAD	1219 x 1219
G20-1	ROAD WORK NEXT 8 MILES	1524 x 914
W8-12	NO CENTER STRIPE	914 x 914

ITEM No. 63401-1510: PAVEMENT MARKINGS, SOLID YELLOW

STATION	TO	STATION	LOCATION	DESCRIPTION	LENGTH(m)
44+140.00	To	44+320.00	Rt. CL	Solid Yellow	180.00
44+430.00	To	44+620.00	Lt. CL	Solid Yellow	190.00
46+260.00	To	46+500.00	Rt. CL	Solid Yellow	240.00
46+500.00	To	46+740.00	Lt. CL	Solid Yellow	240.00
51+940.00	To	52+230.00	Rt. CL	Solid Yellow	290.00
52+230.00	To	52+780.00	CL	Double Solid Yellow	1,100.00
52+780.00	To	53+080.00	Lt. CL	Solid Yellow	300.00
				TOTAL	2,540.00

ITEM No. 63401-1610: PAVEMENT MARKINGS, BROKEN YELLOW

STATION	TO	STATION	LOCATION	DESCRIPTION	LENGTH(m)
44+140.00	To	52+230.00	CL	Broken Yellow	8,090.00
52+780.00	To	53+300.00	CL	Broken Yellow	520.00
				TOTAL	8,610.00

ITEM No. 63401-1520: PAVEMENT MARKINGS, SOLID WHITE

STATION	TO	STATION	LOCATION	DESCRIPTION	LENGTH(m)
44+140.00	To	53+300.00	Lt. Shoulder	Solid White	9,160.00
44+140.00	To	53+300.00	Rt. Shoulder	Solid White	9,160.00
Minus 4.5 m TO Lt. (-20.67 m x 3 Turnouts= -62.01 m)					-62.01
Minus 4.5 m TO Rt. (-20.67 m x 5 Turnouts= -103.35 m)					-103.35
Minus 7.0 m TO Lt. (-35.17 m x 3 Turnouts= -105.51 m)					-105.51
Minus 7.0 m TO Rt. (-35.17 m x 1 Turnouts= -35.17 m)					-35.17
				TOTAL	18,013.96

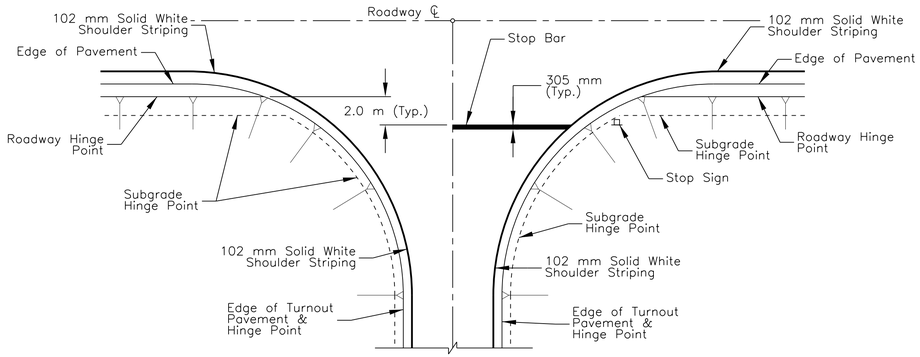
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PERMANENT & TEMPORARY TRAFFIC CONTROL DETAILS

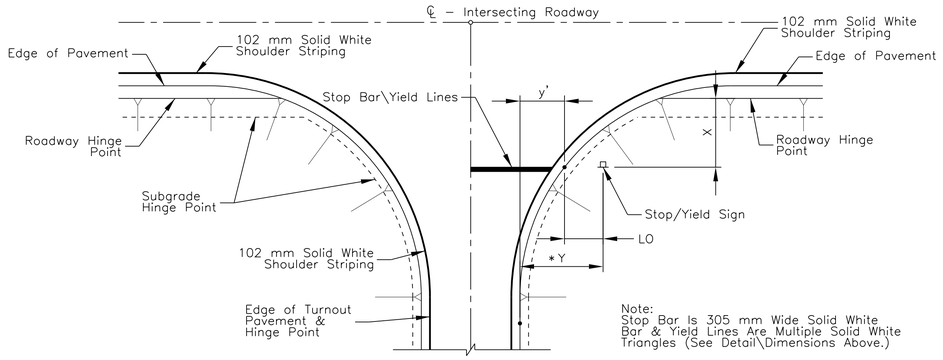
DRAWN BY: NRDOT DATE: 10/28/2014
DESIGNED BY: NRDOT DATE: 10/28/2014
REVISED: 12/15/2016 BY: Leroy.Toledo
Sht 24 N27 PrmTmp Sign.dgn

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	25	71



TYPICAL PAVEMENT MARKING LAYOUT & STOP BAR
PLACEMENT TURNOUTS 7.0 m OR GREATER

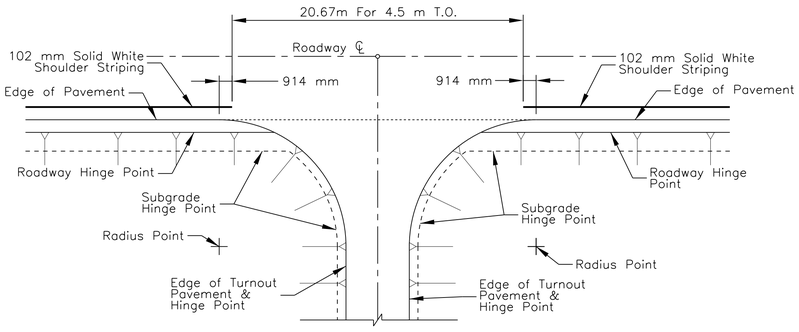


TYPICAL PAVEMENT MARKING LAYOUT AND
STOP\YIELD SIGN PLACEMENT
AT MAJOR INTERSECTION

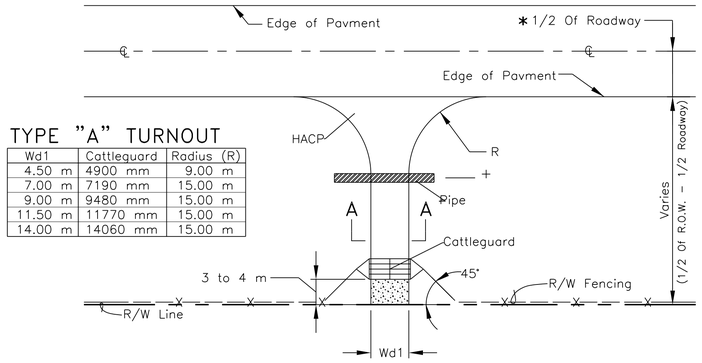
STOP\YIELD SIGN LOCATION TABLE

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

y'= Distance is 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.
*Y = y'+LO



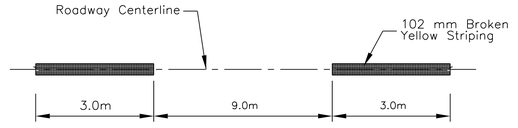
TYPICAL PAVEMENT MARKING LAYOUT
At 4.5 m TURNOUTS



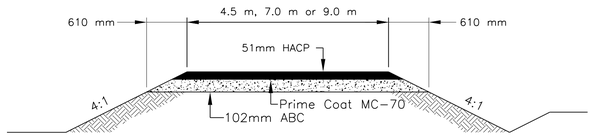
TYPE "A" TURNOUT

Wd1	Cattleguard	Radius (R)
4.50 m	4900 mm	9.00 m
7.00 m	7190 mm	15.00 m
9.00 m	9480 mm	15.00 m
11.50 m	11770 mm	15.00 m
14.00 m	14060 mm	15.00 m

TYPICAL TYPE "A" TURNOUT LAYOUT DETAIL
*See Typical Section Detail For Roadway Width



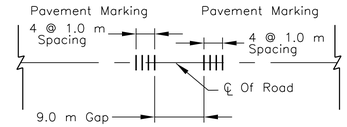
TYPICAL PAVEMENT MARKING "BROKEN YELLOW"



SECTION A–A

GENERAL NOTES

USE THIS SHEET & Sheet 24 FOR SIGN DETAILS, DIMENSIONS, PLACEMENT/LOCATIONS, MARKINGS, TURNOUNT TYPICALS, & STOP BARS.



ITEM 63502-3000: TEMPORARY RAISED PAVEMENT
MARKERS FLEXIBLE, REFLECTIVE
2-WAY YELLOW TABS YELLOW

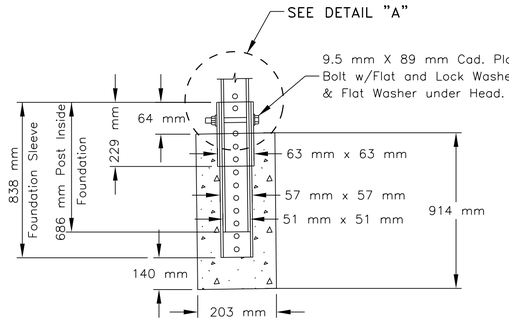
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TURNOUT CONSTRUCTION &
PAVEMENT MARKINGS LAYOUT

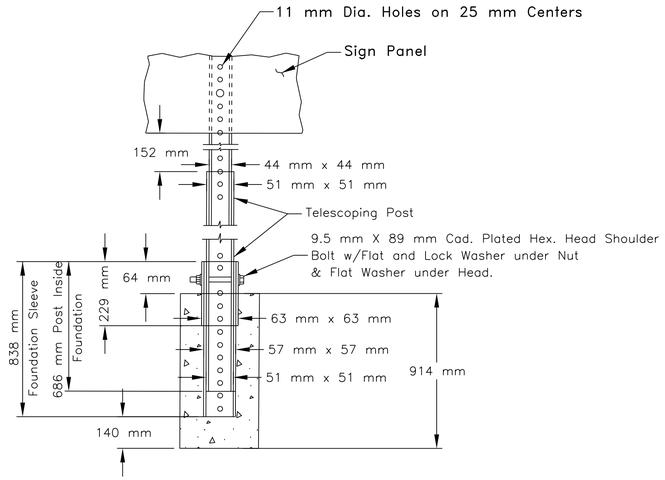
DRAWN BY: NRDOT	DATE: 12/19/2013
DESIGNED BY: NRDOT	DATE: 12/19/2013
REVISED: 12/15/2016	BY: Leroy.Toledo
Sht 25 N27 PrmTmpTC rev 091517.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 25 N27 PrmTmpTC rev 091517.dgn

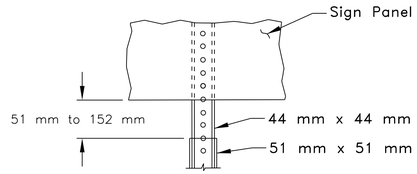
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	26	71



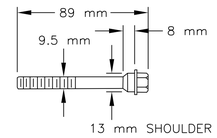
SINGLE POST FOUNDATION DETAIL



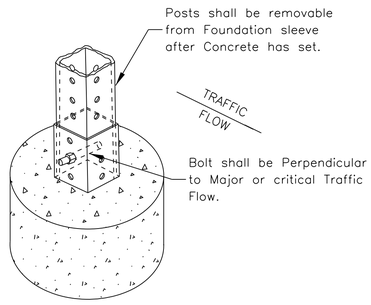
TELESCOPING POST DETAIL



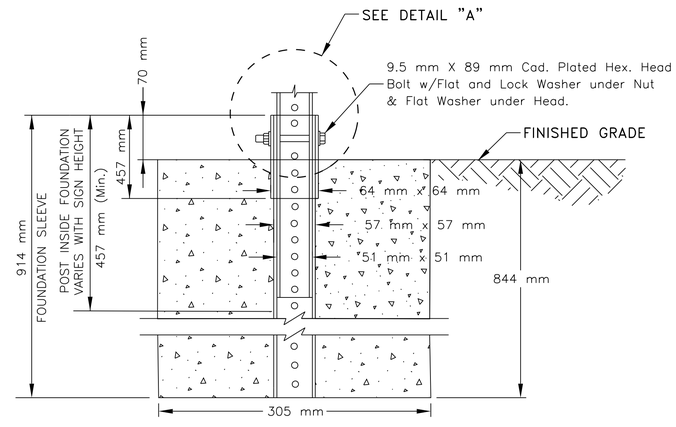
TELESCOPING POST INSTALLATION



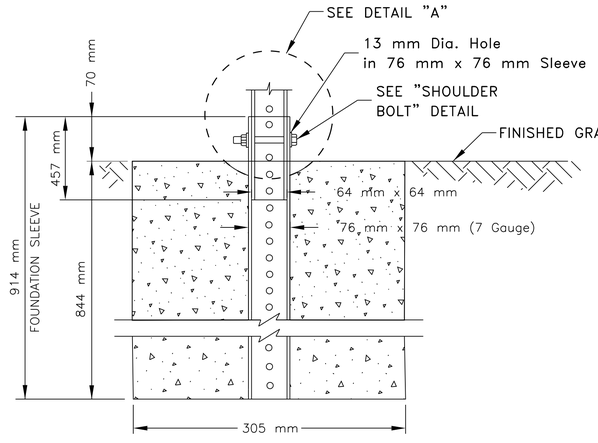
SHOULDER BOLT (HEAD)



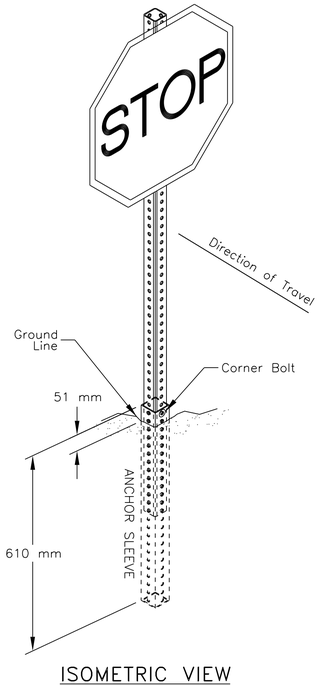
DETAIL "A"



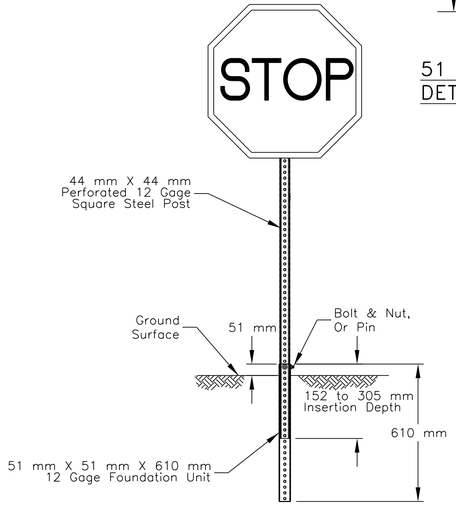
51 mm SINGLE POST CONCRETE FOUNDATION DETAIL (IN WEAK SOILS OR SANDSTONE)



64 mm SINGLE POST CONCRETE FOUNDATION DETAIL (IN WEAK SOILS OR SANDSTONE)

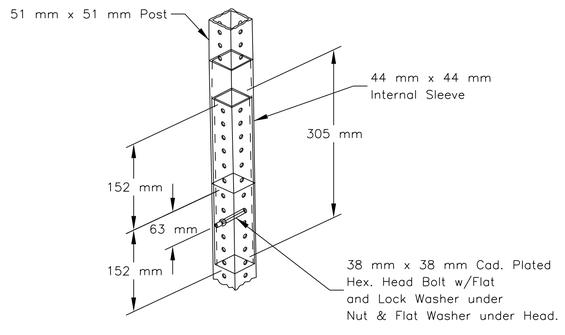


ISOMETRIC VIEW



TELESCOPING BREAKAWAY

(Single Post)
For all other soils



SINGLE POST PERMISSIBLE FIELD SPLICE

(Not allowed on Telescoping Post)

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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STEEL TUBE POST BREAK-A-WAY AND SIGN MOUNTING DETAILS

DRAWN BY: NRDOT	DATE: 5/10/2016
DESIGNED BY: NRDOT	DATE: 5/10/2016
REVISED: 07/08/2015	BY: Design 2
Sht 26 Post Selecting & Sign Mounting 012315.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 26 Post Selecting & Sign Mounting 012315.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	27	71

Square Tube Selection; Single post – 2.80 mm thickness

Post Size	H = Panel Height To Bottom Of Sign + 1/2 Height Of Traffic Sign (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H
38 mm x 38 mm	0.51	0.43	0.37	0.31	n/a	Maximum Sign Area (m^2)
44 mm x 44 mm	0.81	0.68	0.58	0.47	0.41	
50 mm x 50 mm	1.14	0.95	0.84	0.70	0.58	
57 mm x 57 mm	1.49	1.27	1.07	0.95	0.84	
64 mm x 64 mm	1.88	1.68	1.41	1.25	1.07	

Square Tube Selection; Double post – 2.80 mm thickness

Post Size	H = Panel Height To Bottom Of Sign + 1/2 Height Of Traffic Sign (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H
50 mm x 50 mm	n/a	n/a	1.49	0.84	0.58	Maximum Sign Area (m^2)
57 mm x 57 mm	n/a	n/a	2.15	1.97	1.81	
64 mm x 64 mm	n/a	n/a	2.68	2.46	2.26	

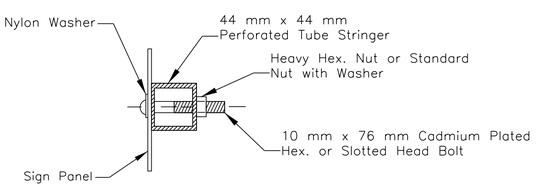
Square Tube Selection; Triple post – 2.80 mm thickness

Post Size	H = Panel Height To Bottom Of Sign + 1/2 Height Of Traffic Sign (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H
57 mm x 57 mm	n/a	n/a	3.08	2.83	2.61	Maximum Sign Area (m^2)
64 mm x 64 mm	n/a	n/a	3.82	3.52	3.26	

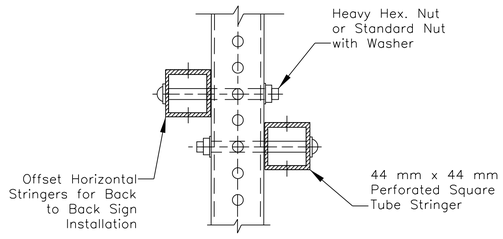
Guide Sign Post Dimensions
(Not for use with Warning, Regulatory or Marker Panels)

Panel Width	914 mm	1.22 m	1.52 m	1.83 m	2.13 m	2.44 m	2.74 m	3.05 m
two posts spacing (A)	559 mm	711 mm	914 mm	1.12 m	1.27 m	1.47 m	1.63 m	1.83 m
bolts to panel (per stringer)	–	–	3	3	3	3	4 4	4 4
length of each stringer	–	–	1.22 m	1.42 m	1.57 m	1.78 m	1.93 m	2.13 m
two posts spacing (B)	–	–	533 mm	635 mm	737 mm	864 mm	965 mm	1.07 m
bolts to panel (per stringer)	–	–	3	3	3	4	4 4	4 4
length of each stringer	–	–	1.37 m	1.57 m	1.78 m	2.03 m	2.24 m	2.44 m

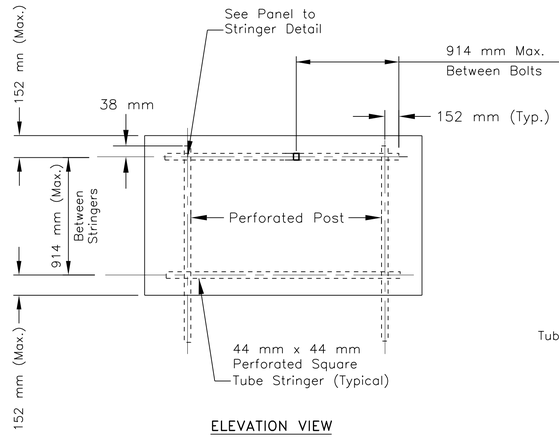
Note: All Square Tube Steel Post Shall Be Galvanized In Accordance With Section 718.08(B) Of FP-03.



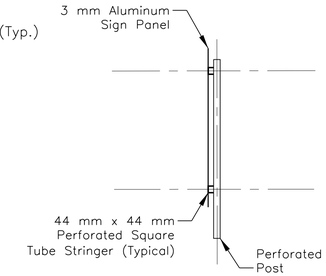
PANEL TO STRINGER OR POST



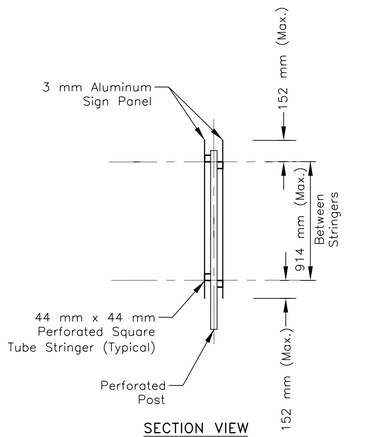
STRINGER TO POST



ELEVATION VIEW



SECTION VIEW
SINGLE PANEL INSTALLATION



SECTION VIEW
BACK-TO-BACK SIGN INSTALLATION

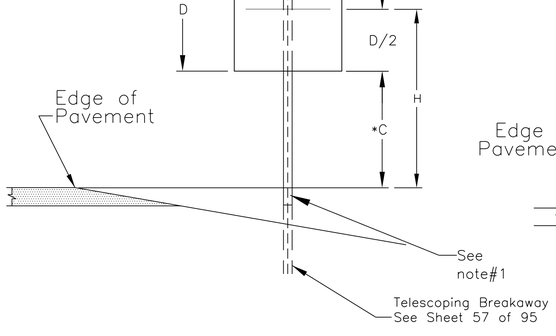
GENERAL NOTES:

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.

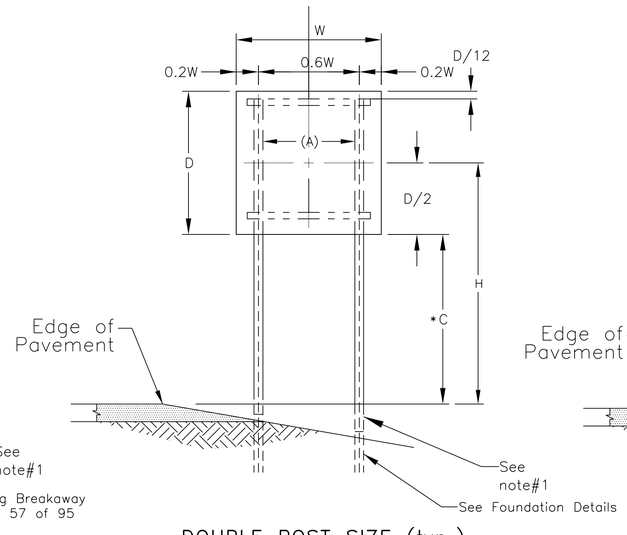
2. SIGNS GREATER THAN 762 mm IN WIDTH SHALL BE MOUNTED ON TWO OR MORE POSTS.

3. SIGN POST CONCRETE FOUNDATION SHALL BE USED IN LOOSE FINE GRAVELLY SOILS THAT ARE HARD TO COMPACT OR FOR INSTALLATION IN SANDSTONE AS DIRECTED BY COTR. THE CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 601.

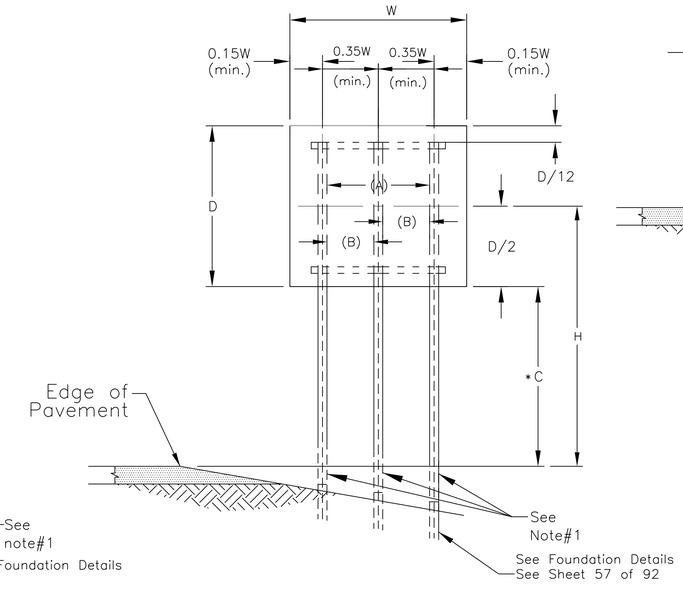
STRINGER DETAILS (FOR GUIDE SIGNS UP TO AND INCLUDING 3.05 mm WIDE)



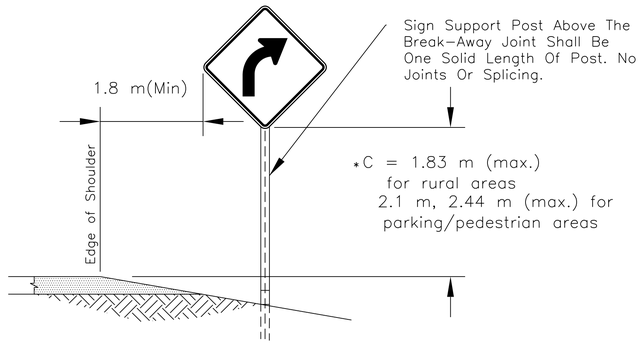
SINGLE POST SIZE (typ.)



DOUBLE POST SIZE (typ.)



THREE POST SIZE (typ.)



TYPICAL ROADSIDE SIGN LOCATION

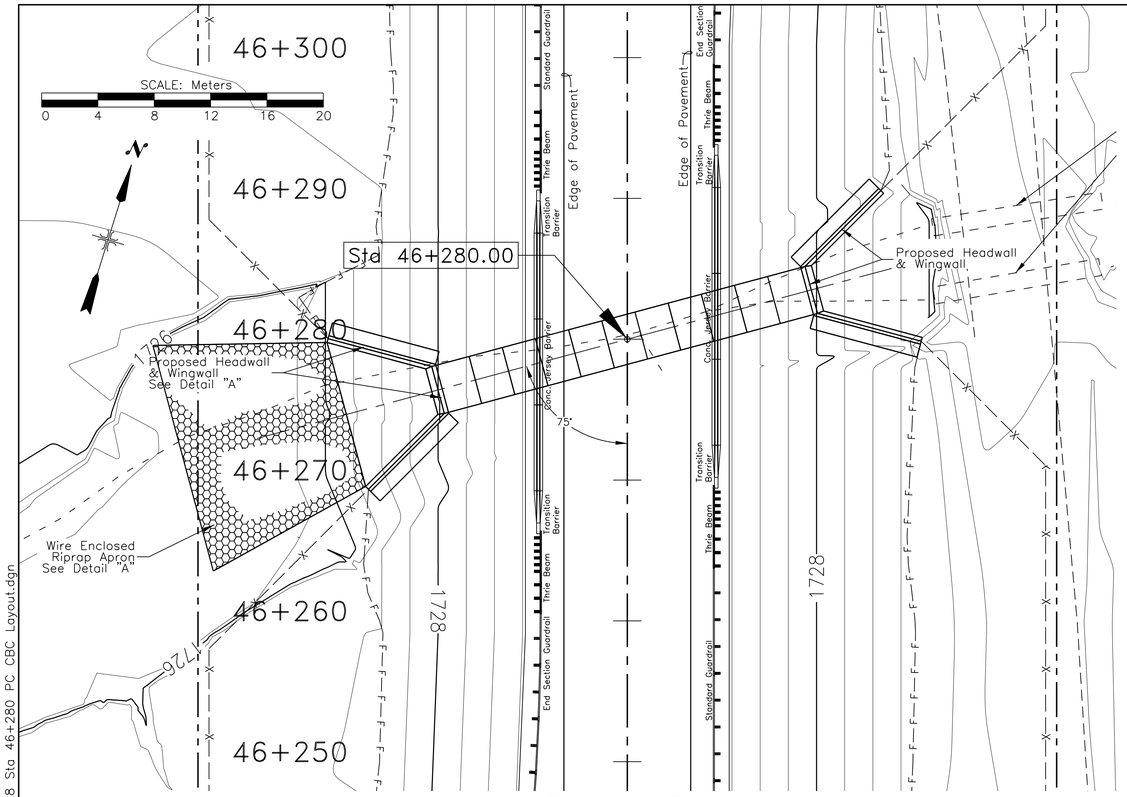
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SQUARE TUBE POST SELECTION
AND SIGN MOUNTING DETAILS

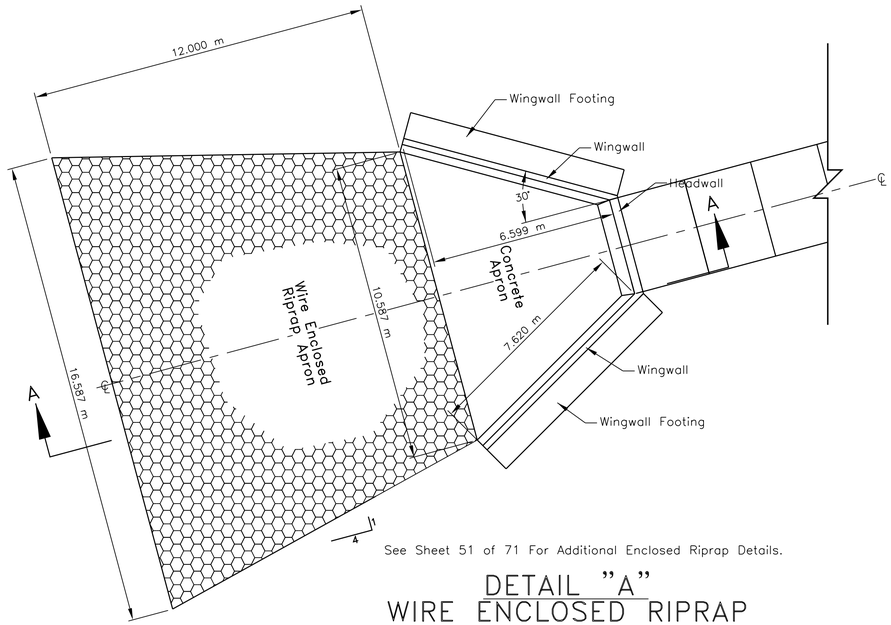
DRAWN BY: NRDOT	DATE: 5/10/2016
DESIGNED BY: NRDOT	DATE: 5/10/2016
REVISED: 5/24/2016	BY: Leroy.Toledo
Sht 27 Square Tube Post Section Sign Mounting 012615.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 27 Square Tube Post Section Sign Mounting 012615.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	28	71

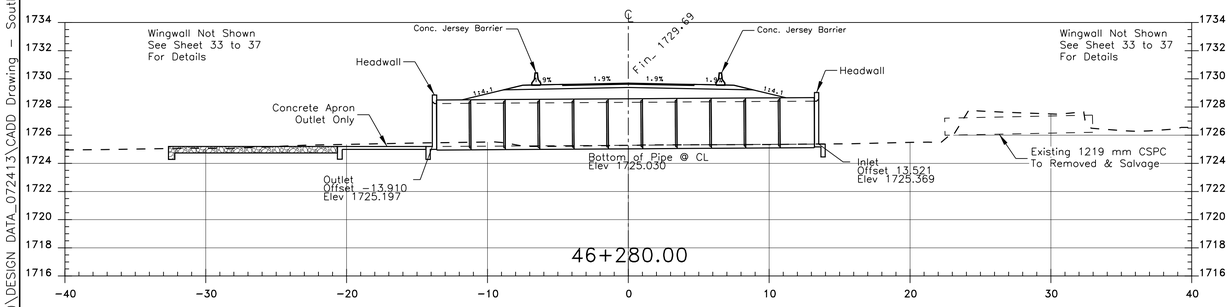


PLAN VIEW

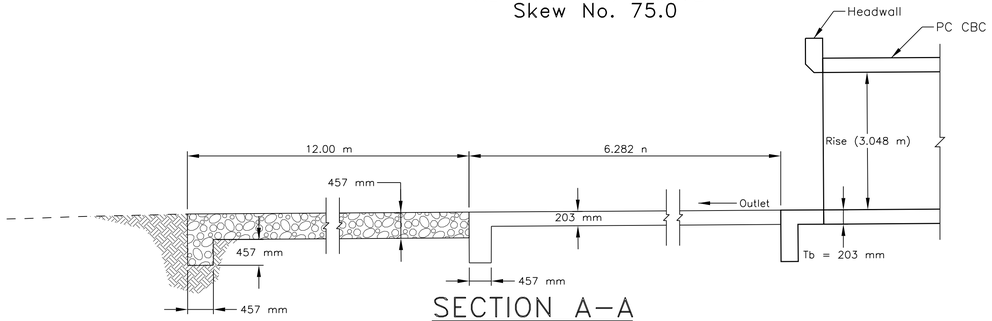


See Sheet 51 of 71 For Additional Enclosed Riprap Details.

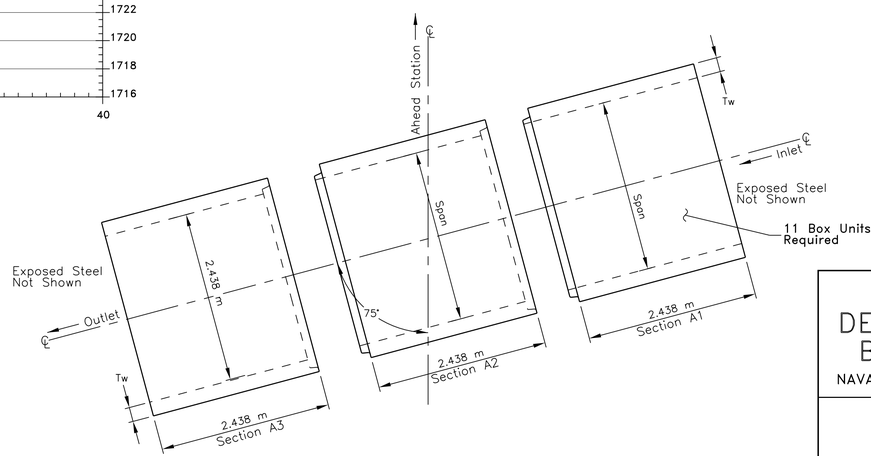
DETAIL "A"
WIRE ENCLOSED RIPRAP APRON
Est. Qty.= 78.0 m³
(NTS)



CROSS SECTION VIEW
1-BARREL 3.048 m Span x 3.048 m Rise x 28.814 m
PRE-CAST BOX CULVERT
Skew No. 75.0



SECTION A-A
(NTS)



PRE-CAST BOX CULVERT
LAYOUT DETAIL
(NTS)

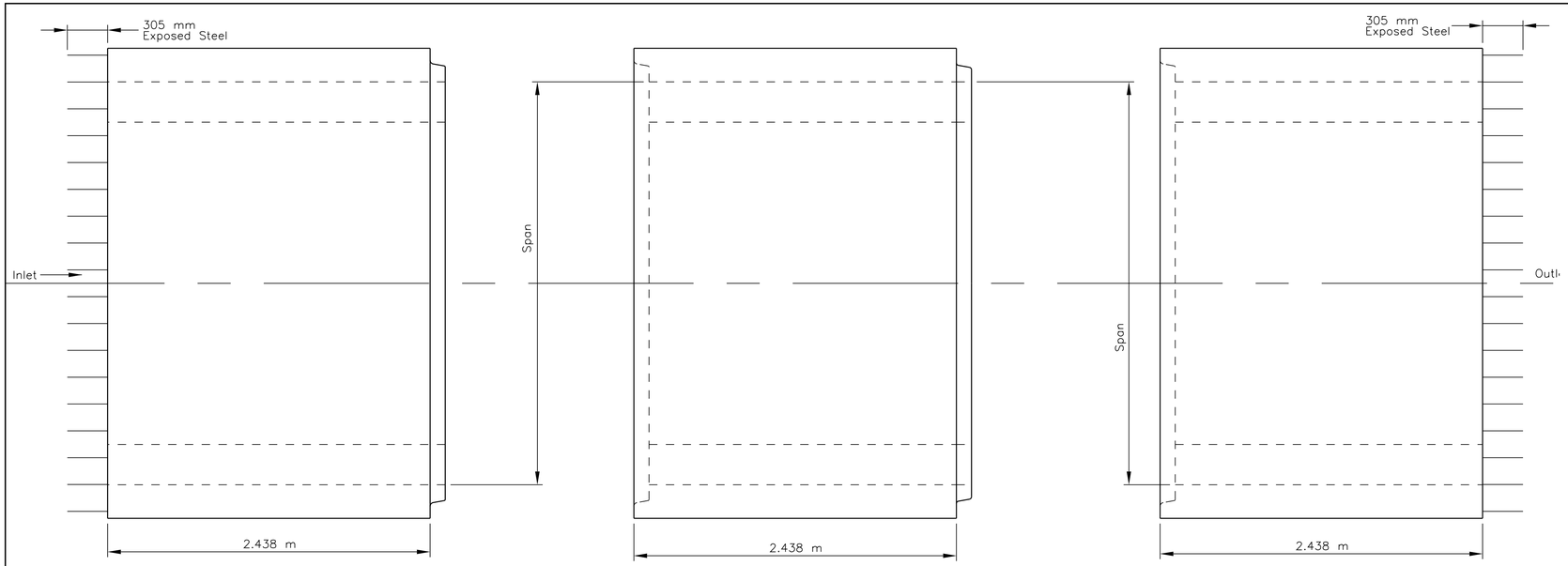
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRE-CAST CONCRETE BOX CULVERT
LAYOUT DETAIL AT
Sta. 46+278.49 & 46+281.51

DRAWN BY: NRDOT	DATE: 3/6/2014
DESIGNED BY: NRDOT	DATE: 3/6/2014
REVISED: 9/19/2017	BY: Leroy.Toledo
Sht 28 Sta 46+280 PC CBC Layout.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 28 Sta 46+280 PC CBC Layout.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	29	71



PLAN VIEW-BOX CULVERT
SECTION A 1

PLAN VIEW-BOX CULVERT
SECTION A 2

PLAN VIEW-BOX CULVERT
SECTION A 3

Note: Protect Exposed Steel From Damage Or Accidentally Deformed or Bent In Fabrication Yard And During Transport To Project Site.

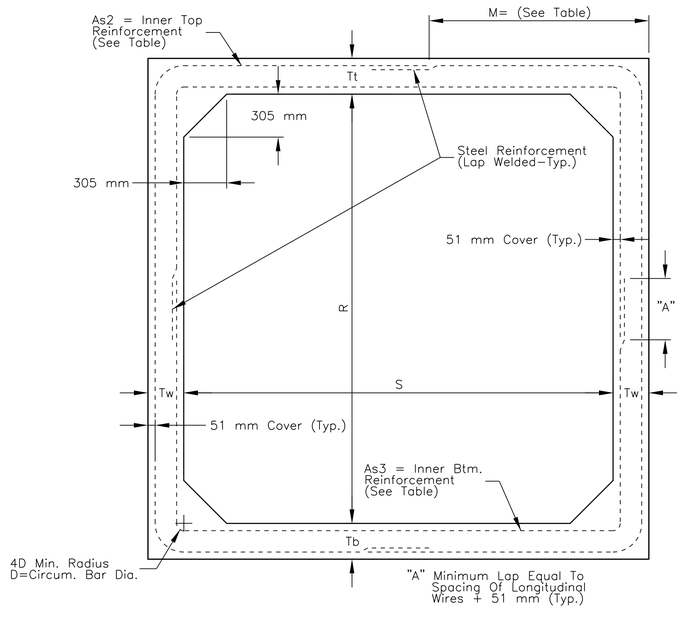
GENERAL NOTES

1. ONLY ONE DESIGN OF PRECAST BOX CULVERT IS TO BE USED FOR ANY INSTALLATION.
2. REINFORCING STEEL MUST CONSIST OF SMOOTH OR DEFORMED WELDED WIRE REINFORCEMENT (WWR) MEETING THE REQUIREMENTS OF SPECIFICATION SECTION 931. LONGITUDINAL REINFORCEMENT MAY CONSIST OF REINFORCING BARS MEETING THE REQUIREMENTS OF SPECIFICATION SECTION 931. MINIMUM COVER MUST BE 51 mm FOR SLIGHTLY AGGRESSIVE ENVIRONMENTS OR 76 mm FOR MODERATELY TO EXTREMELY AGGRESSIVE ENVIRONMENTS, UNLESS OTHERWISE SHOWN. THE SPACING OF CIRCUMFERENTIAL WIRES MUST NOT BE LESS THAN 51 mm NOR MORE THAN 102 mm. THE SPACING OF LONGITUDINAL WIRES OR BARS MUST NOT BE MORE THAN 203 mm.
3. AS9 LONGITUDINAL WIRES MUST HAVE A MINIMUM CROSS-SECTIONAL AREA OF 40% OF THE CIRCUMFERENTIAL WIRES, BUT NOT LESS THAN A W2.5 OR D2.5 FOR WWR, OR #3 BARS FOR DEFORMED BARS.
4. WELDING OF REINFORCEMENT MUST BE LIMITED TO THE LOCATIONS SHOWN IN ASTM C1577 AND IN ACCORDANCE WITH ANSI/AWS D1.4 "STRUCTURAL WELDING CODE - REINFORCING STEEL".
5. FOR ALTERNATE REINFORCING CONFIGURATION OPTIONS 2 AND 3 SHOWN IN DETAIL "A" AND "B" (SHEET 1), AS1 MAY BE EXTENDED TO THE MIDDLE OF EITHER SLAB AND LAP SPLICED WITH AS7 AND AS8. AS4 MAY BE LAP SPLICED AT ANY LOCATION OR CONNECTED TO AS2 OR AS3 AT CORNERS BY WELDING.
6. HAUNCH DIMENSIONS MAY VARY BETWEEN THE MINIMUM AND MAXIMUM DIMENSIONS SHOWN IN THE DESIGN TABLES BUT ONLY ONE HAUNCH DIMENSION MUST BE USED WITHIN THE FULL LENGTH OF THE BOX CULVERT INSTALLATION.
7. SUBMITTAL OF REDESIGN CALCULATIONS ARE NOT REQUIRED FOR ANY INCREASE TO THE SLAB AND/OR WALL THICKNESS WHEN THE MINIMUM REINFORCEMENT AREAS SHOWN IN THE DESIGN TABLES ARE PROVIDED.
8. FOR DESIGN EARTH COVER GREATER THAN 3 m, THE CONTRACTOR MAY INTERPOLATE THE REQUIRED AREAS OF REINFORCEMENT AND SLAB OR WALL THICKNESS. INTERPOLATED AREAS OF REINFORCEMENT SLAB OR WALL THICKNESS MUST BE APPROVED BY THE ENGINEER.
9. MINIMUM LENGTH OF PRECAST BOX SEGMENTS IS 1.22 m AND MAXIMUM LENGTH IS 4.88 m.
10. SEE INDEX NO. 291 FOR CONNECTIONS TO WING WALLS, HEADWALLS AND OTHER GENERAL DETAIL

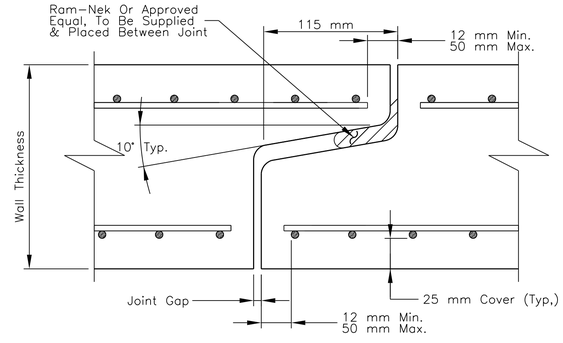
STANDARD PRECAST BOX CULVERT DESIGNS (51 mm COVER) - 2.438 m, 3.048 m & 3.658 m SPANS

STATION	SPAN X RISE	SLAB/WALL THICKNESS				DESIGN EARTH COVER ABOVE TOP SLAB (mm)	REINFORCEMENT AREA (cm2/per meter)								As1 EXT. LENGTH (M)
	S x R	TOP (Tt)	BOTTOM (Tb)	SIDE (Tw)	HAUNCH (H)		As1	As2	As3	As4	As5	As6	As7	As8	
	(m)	(mm)	(mm)	(mm)	(mm)										(mm)
46+280.00	3.05 x 3.05	254	254	254	102 - 305	610 to < 914	9.313	15.028	13.547	3.598	5.080	8.043	9.313	*	2007

* See General Note No. 5



SIDE VIEW-SINGE BARREL



BOX CULVERT
JOINT DETAIL

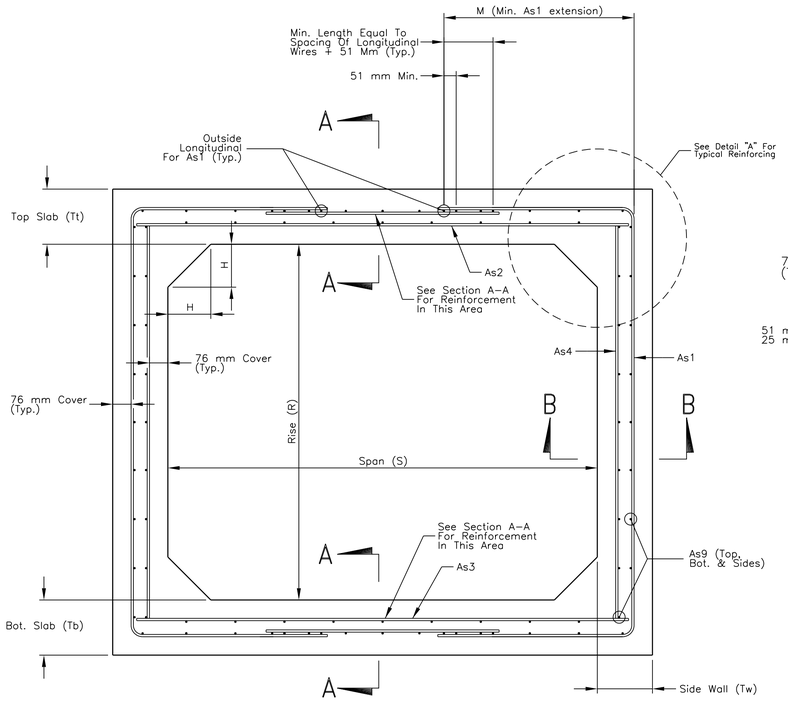
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRE-CAST CONCRETE
BOX CULVERT DETAIL

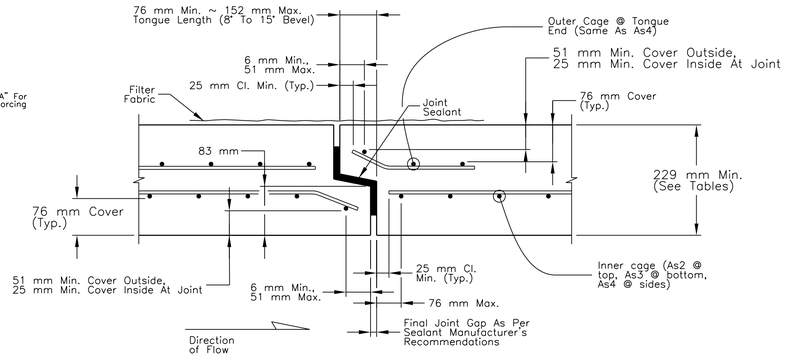
DRAWN BY: NRDOT	DATE: 3/4/2014
DESIGNED BY: NRDOT	DATE: 3/4/2014
REVISED: 9/14/2017	BY: Leroy.Toledo
Sht 29 PC CBC Dtl 1 030414.dgn	

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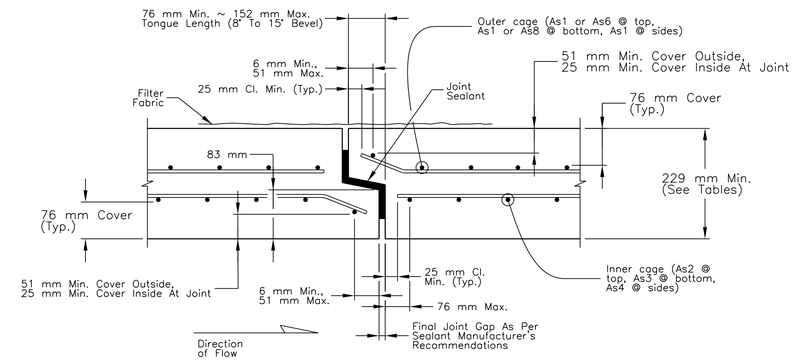
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	30	71



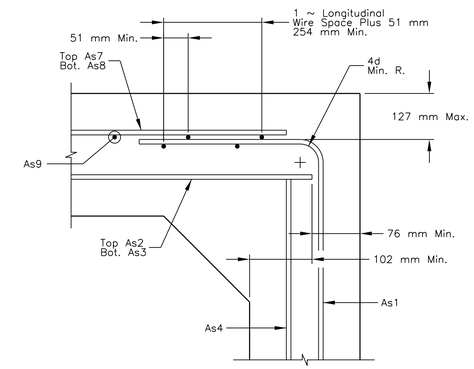
TYPICAL BOX SECTION (TYPE 2)
DESIGN EARTH COVER 51 mm OR GREATER
(Option 1 Reinforcing Configuration Shown)



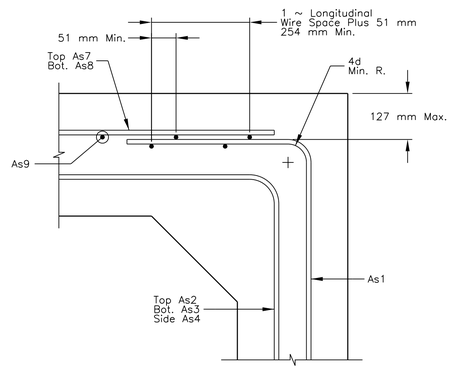
SECTION A-A



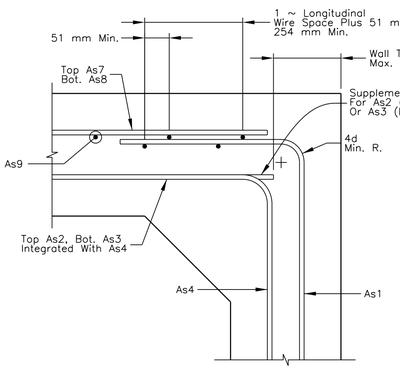
SECTION B-B
TYPICAL SECTION THRU JOINT



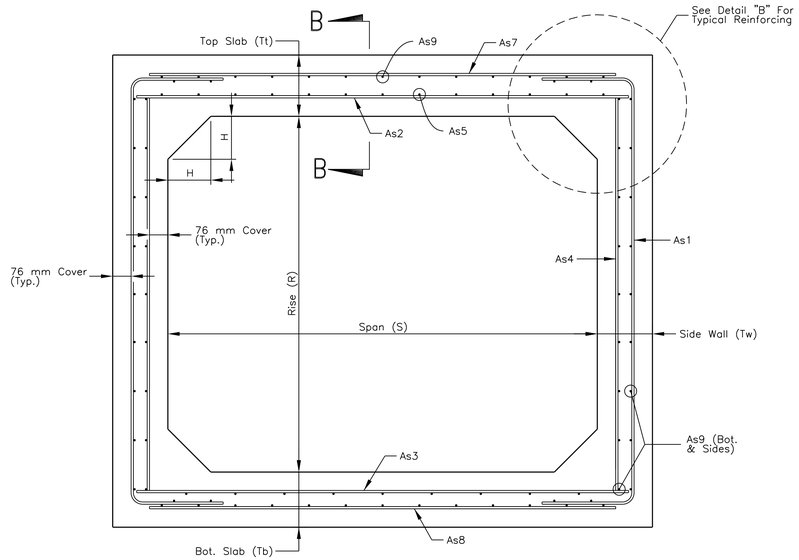
DETAIL "B"
(OPTION 1)



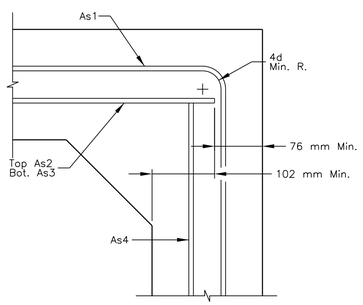
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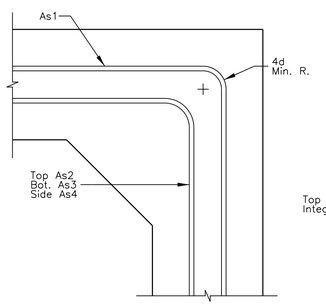
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(OPTION 3)



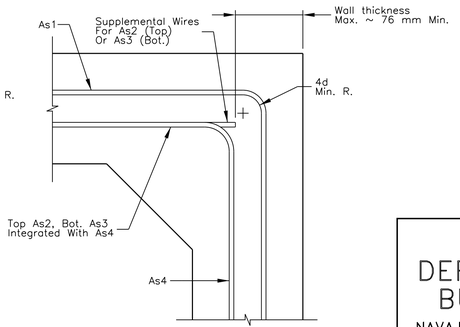
TYPICAL BOX SECTION (TYPE 1)
DESIGN EARTH COVER LESS THAN 51 mm
(Option 1 Reinforcing Configuration Shown)



DETAIL "A"
(OPTION 1)



DETAIL "A"
(OPTION 2)



DETAIL "A"
(OPTION 3)

NOTES:

1. Work this Index with Index No. 291.
2. See Sheet 29 for dimensions and areas of reinforcement.

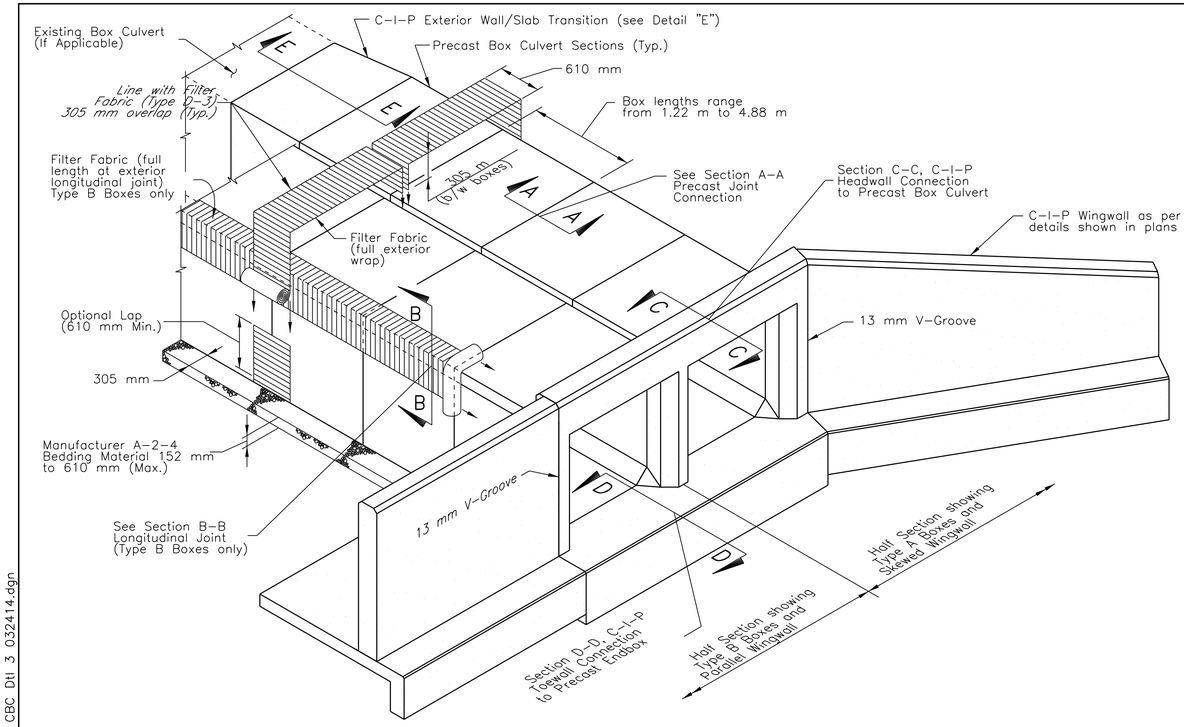
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD PRECAST BOX CULVERT WITH 76 mm CONCRETE COVER

DRAWN BY: NRDOT	DATE: 3/18/2014
DESIGNED BY: NRDOT	DATE: 3/18/2014
REVISED: 9/7/2017	BY: Leroy.Toledo
Sht 30 PC CBC Dtl 2 031814.dgn	

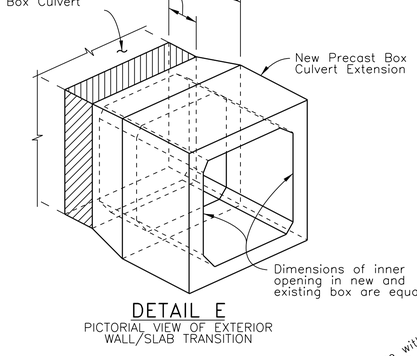
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	31	71



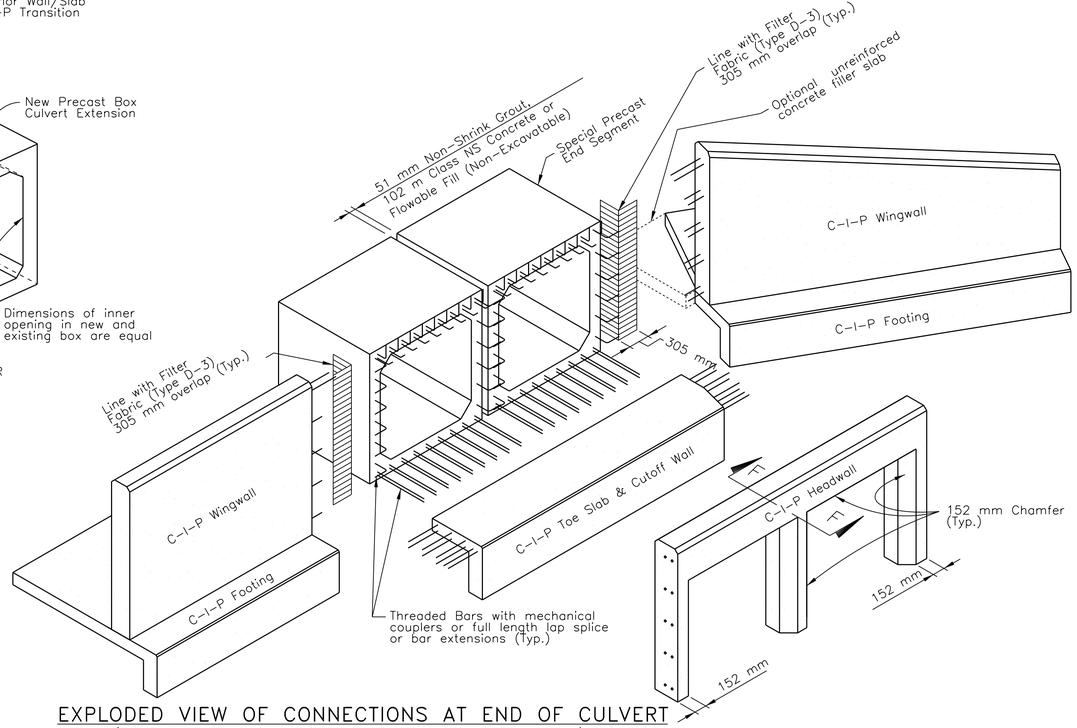
ISOMETRIC VIEW OF PRECAST CONCRETE BOX CULVERT

ISOMETRIC VIEW OF PRECAST CONCRETE BOX CULVERT
(Double Barrel Culvert shown,
Single or Multiple Barrel Culvert similar)



DETAIL E

PICTORIAL VIEW OF EXTERIOR
WALL/SLAB TRANSITION



EXPLODED VIEW OF CONNECTIONS AT END OF CULVERT

(Double Barrel Culvert shown, Single or Multiple Barrel Culvert similar)

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) ALONG WITH ALL SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. THE CONTRACTOR SHALL DESIGN, MANUFACTURER, AND CONSTRUCT A FOUR BARREL PRE-CAST CONCRETE BOX CULVERT STRUCTURES WITH WINGWALLS IN ACCORDANCE WITH ASTM C-1501-04 AND DESIGN CRITERIA BELOW. THE DESIGN SHALL INCLUDE DETAILS OF THE CULVERT BARREL, HEADWALLS, APRONS, WINGWALLS AND FOUNDATIONS INCLUDING DRAINAGE AND BACKFILL REQUIREMENTS. THE NORMAL OPENING WIDTH AND HEIGHT OF THE CBC SHALL BE 3.048m BY 3.048m. THE REQUIRED MINIMUM LENGTH OF STRUCTURE AND ORIENTATION OF WINGWALLS IS SHOWN ON THE DRAWINGS. JOINTS IN THE BOX SHALL BE SEALED TO PREVENT WATER LEAKAGE USING AN APPROVED JOINT COMPOUND CONFORMING TO ASTM C 990 AS REFLECTED IN THE SHOP DRAWINGS.
3. PRE-CASTER QUALIFICATIONS:
   A. SUPPLIERS MUST HAVE A MINIMUM OF 5-YEARS EXPERIENCE DESIGNING AND MANUFACTURING PRECAST CONCRETE BOX STRUCTURES.
   B. PRECASTER SHALL BE CERTIFIED BY THE PRECAST/PRESTRESSED CONCRETE INSTITUTE PLANT CERTIFICATION PROGRAM OR THE NATIONAL PRECAST CONCRETE ASSOCIATION'S PLANT CERTIFICATION PROGRAM PRIOR TO AND DURING PRODUCTION OF THE PRODUCTS COVERED UNDER THIS CONTRACT.
   C. PRECAST BOX CULVERT SUPPLIER MUST BE PRESENT AT PRE-CONSTRUCTION MEETING, IF ONE IS HELD.
4. SUBMITTAL REQUIREMENTS: SUBMIT PRECASTER QUALIFICATIONS. SUBMIT A COMPLETE SET OF STRUCTURAL CALCULATIONS, SHOP DRAWINGS, PERTINENT STANDARD DETAILS AND PRODUCT DATA OF ALL MATERIALS TO BE USED IN THE MANUFACTURER OF PRECAST UNITS AND COMPONENTS. IF CALCULATIONS ARE BASED ON COMPUTER PROGRAMS, COMPLETE INPUT FILES OF GEOMETRY, MATERIALS PROPERTIES, MEMBER SIZES AND DESIGN ANALYSIS AND CALCULATION OF REINFORCING STEEL SHALL BE SUBMITTED. CALCULATIONS AND ALL DRAWINGS SHALL BE SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT RESIDES AND WHO IS RESPONSIBLE FOR THEIR PREPARATION. THE DIMENSIONS SHOWN ON THE SHOP DRAWINGS SHALL BE PREPARED IN METRIC UNITS.
5. SUBSTITUTION: PRECAST MANUFACTURER MAY SUBMIT A DIFFERENT TYPE OF BOX CULVERT THAN THE ONE DEPICTED ON THE DRAWINGS, PROVIDED THAT THE MINIMUM OPENING AREA OF BOX UNITS IS PROVIDED AND OTHER MINIMUM AND MAXIMUM DIMENSIONS ARE MAINTAINED. THE NET OPENING AREA SHALL NOT BE LESS THAN THAT SHOWN IN THESE DESIGN PLANS. ANY PROPOSED CHANGES IN LENGTH OF HEIGHT OF STRUCTURE OR IN GRADING SHALL BE INCLUDED IN THE DESIGN CALCULATIONS AND DETAILS.
6. DESIGN CRITERIA:
   A. DESIGN CODE: LATEST EDITION OF THE AASHTO LRFD DESIGN SPECIFICATIONS.
   B. LIVE LOAD: HL-93 FOR BOX UNITS ONLY.
7. MATERIAL PROPERTIES:
   A. PRECAST CONCRETE COMPRESSIVE STRENGTH: 34.5 MPa (5,000 psi) AT 28-DAYS.
   B. CAST-IN-PLACE CONCRETE: FP-03, f'c = 20.7 MPa (3,000 psi) MIN AT 28-DAYS.
   C. ALL CONCRETE SHALL BE AIR ENTRAINED.
   D. REINFORCING STEEL: ASTM A615, fy=413.7 MPa (60,000 psi) EPOXY COATED
   E. STEEL HARDWARE: ASTM A36, GALVANIZIED IN ACCORDANCE WITH ASTM-123.
   F. ALLOWABLE BEARING PRESURE: 143kPa/sm (1.33t/SF).
   G. HEIGHT OF FILL OVER BOX: 0.972m or 2045kg/cm.
   H. ANGLE OF INTERNAL FRICTION Ó: 34 degrees
8. A GEOTECHNICAL DATA IS AVAILABLE FOR BIDDER'S INSPECTION UPON WRITTEN REQUEST TO THE CONTRACTING OFFICER (CO). THE CONTRACTOR MAY CONDUCT HIS OWN GEOTECHNICAL INVESTIGATIONS AND PROPOSE A DIFFERENT FOUNDATION CONCEPT SUBJECT TO REVIEW AND APPROVAL BY THE BIA-NRDOT. THE FOLLOWING IS A PARTIAL LIST OF DESIGN INFORMATION TO BE USED:
   A. CANTILEVERED WINGWALLS:
      1. LEVEL BACKFILL: SOIL PRESSURE EQUIVALENT TO FLUID WITH UNIT WEIGHT OF 560 kg PER CUBIC METER (115 pcf). HORIZONTAL PRESSURE DUE TO A SURCHARGE LOAD: 342kg/sm UNIFORM PRESSURE EQUAL TO 0.33 TIMES THE SURCHARGE LOAD.
      2. SLOPING BACKFILL: SOIL PRESSURE EQUIVALENT TO FLUID WITH UNIT WEIGHT OF 342kg PER CUBIC METER (115 pcf). HORIZONTAL PRESSURE DUE TO A SURCHARGE LOAD: UNIFORM PRESSURE EQUAL TO 0.40 TIMES THE SURCHARGE LOAD.
   B. BELOW GRADE REINFORCED CONCRETE BOX: NON-YIELDING BELOW GRADE WALLS WHICH CANNOT DEFLECT TO MOBILIZE THE ACTIVE SOIL PRESSURE SHOULD BE DESIGN FOR THE AT-REST LATERAL EARTH PRESSURE STATE EQUAL TO AN EQUIVALENT FLUID LATERAL EARTH PRESSURE OF 8.5 kN PER CUBIC METER (178 pcf).
   C. FACTOR OF SAFETY AGAINST SLIDING: 1.5 MINIMUM. FACTOR OF SAFETY AGAINST OVERTURNING: 1.5 MINIMUM FOR FOOTINGS ON ROCK AND 2.0 FOR ALL OTHER SOILS.
   D. ALLOWABLE BEARING PRESSURE: 143 kPa (1.33 Ton per ft^2). TO SUPPORT ON SPREAD FOOTINGS PLACED ON THE UNDISTURBED SANDY-SILT SOILS.
   E. COEFFICIENT OF BASE FRICTION = 0.37 FOR FOUNDATIONS FOUNDED ON SANDY-SILT SOILS.
9. THE TOP LAYER OF UNSUITABLE SOIL UNDER BOX UNITS AND WINGWALLS SHALL BE REMOVED TO A MAX DEPTH OF 610mm AND MANUFACTURER RECOMMENDED (A-2-4) BACKFILL PLACED PRIOR TO CONSTRUCTING CONCRETE FOUNDATION FOR PRECAST UNITS AND ANY WINGWALLS.
10. ALL DIMENSIONS ARE IN METRIC UNITS.
11. MANUFACTURER: MANUFACTURING OF PRECAST UNITS SHALL NOT BE STARTED UNTIL THE DESIGN CALCULATIONS AND SHOP DRAWINGS HAVE BEEN APPROVED BY THE BIA-NRDOT. MANUFACTURE PRECAST UNITS AT THE PRECASTER'S PLANT ONLY.
12. CONSTRUCTION: CONTRACTOR SHALL COORDINATE INSTALLATION OF THE PRECAST STRUCTURE TO PREVENT DAMAGE. PROVIDE CRANES WITH SUFFICIENT CAPACITY TO ALLOW SAFE INSTALLATION OF THE STRUCTURE. IF ANY PRECAST UNIT IS CRACKED OR DAMAGED, THE PRECAST UNITS SHALL BE REPLACED AT NO ADDITIONAL COST TO THE GOVERNMENT. THE CONTRACTOR SHALL SUBMIT A PROCEDURE FOR REPAIR OF MINOR SPALLS FOR THE CO'S APPROVAL.
13. EACH PRECAST UNIT SHALL BE JOINED TOGETHER BY A METHOD RECOMMENDED BY THE MANUFACTURER THAT DOES NOT CAUSE ANY DAMAGE TO THE SECTIONS. DO NOT DRIVE OR RAM SECTIONS TOGETHER WITH MACHINERY OR HAND TOOLS.
14. BASIS OF PAYMENT: PAYMENT FOR DESIGN, MANUFACTURER, AND ERECTION OF THE COMPLETE STRUCTURE, INCLUDING THE BOX BARREL(S), CONCRETE APRONS, WINGWALLS, HEADWALLS, CAST-IN-PLACE FOUNDATIONS, ROCK REMOVAL FOR WINGWALL FOOTINGS, AND DRAINAGE SYSTEM SHALL BE PAID FOR BY LUMP SUM OR LINEAR METER AS REFLECTED IN THE BID SCHEDULE.
15. ANY RELATED PATENT RIGHTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AS PER SECTION 107.01 OF THE FP-03.

STANDARD CRITERA

CLASS	TYPE (1)	APPLOCATION DESCRIPTION	INDEX No.	PERMITTIVITY SEC^{-1}	AOS SIEVE #	Min. GRAB TENSILE STRENGTH kg	Min. SEWN STRENGTH kg/cm	Min. PUNCTURE kg	Min. TRAPEZOIDAL TEAR kg	UV RESISTANCE (Min. Allowed) %	UV RESISTANCE (Min. Allowed) Time (Hrs.)	REMARKS
DRAINAGE (D)	D-3	Underdrain ***	286	% SOIL PASSING	% SOIL PASSING	Elongation	Elongation	Elongation	Elongation	50	500	No woven slit film fabrics allowed.50 sieve. * For cohesive soils with plasticity index >7, maximum average role value AOS is number ** Required Trapezoidal tear for woven monofilament is 250. *** See Index No. 286 for the permittivity and AOS values of the
		French Drain	285	No. 200 SIEVE	No. 200 SIEVE							
		Sheet Piling Filter		<15% 0.5	<15% 40							
		Filter Fabric Jacket (Culvert)	280	15% to 50% 0.2	15% to 50% 60	<50% 248 ≥ 50% 128	<50% 5.7 ≥50% 3.6	<50% 90 ≥ 50% 57	<50% 90** ≥ 50% 57			
		Concrete Pavement Subdrainage	287	>50% 0.1	>50% 70*							

PERMITTED PRECAST ALTERNATE BOX SECTIONS

TYPE	DESCRIPTION	SINGLE BARREL	MULTIPLE BARRELS	DESIGN NOTES
A	Single Cell Monolithic (Four Sided)			Contractor Design
B	Single Cell Two-Piece (Four Sided)	Three sided bottom section; Top slab section		Contractor Design
C	Multicell Monolithic	Not Applicable		Contractor Design

TABLE 1

Test	Unit	Test Method
Permittivity	sec^{-1}	ASTM-D-4491
AOS	US Sieve No.	ASTM-D-4751
Elongation	%	ASTM-D-4632
Grab Tensile Strength	kg	ASTM-D-4595
Wide With Tensile Strength	kg/cm	See Note Below
Maximum Design Velocity	m/sec	ASTM-D-4884
Sewn Strength	kg/cm	ASTM-D-4833
Puncture	kg	ASTM-D-4533
Tranapezoidial Tear	kg	ASTM-D-4355
Ultraviolet Resistance	% Retained In Strength	
Filtration Efficiency	%	ASTM-D-5141
Flow Rate	L^3// min.	ASTM-D-5141

*Note: Shear stress limits for plastic erosion mats determined by 30 minutes susutained flow in unvegatated state as determined by tests performed by Utah State University, Texas Transportation Institute or and independent testing approved

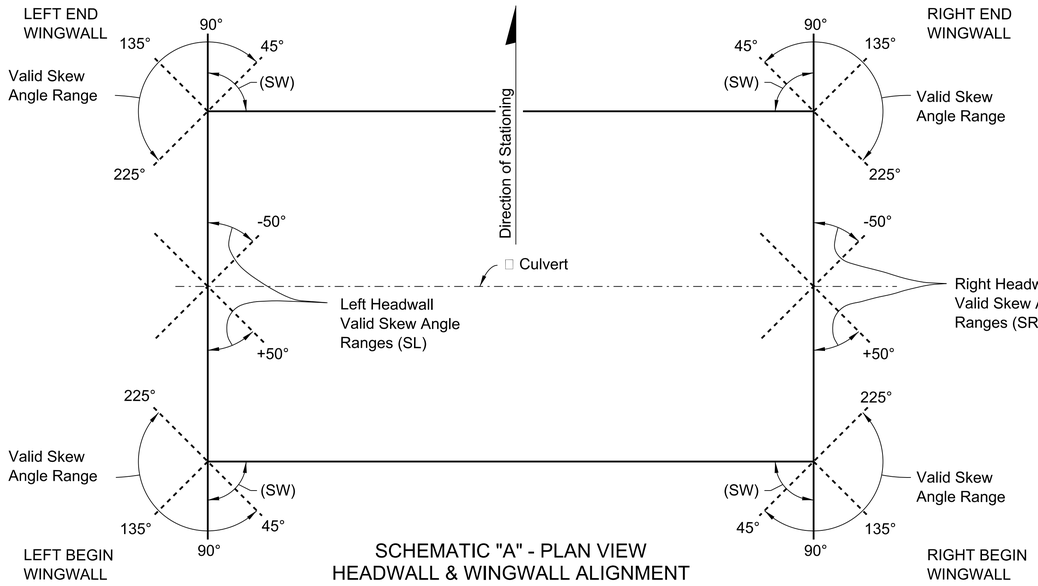
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRECAST CONCRETE BOX CULVERTS WITH WINGWALLS DETAILS

DRAWN BY: NRDOT	DATE: 3/18/2016
DESIGNED BY: NRDOT	DATE: 3/18/2016
REVISED: 9/14/2017	BY: Leroy.Toledo
Sht 31 Rev PC CBC Dtl 3 032414.dgn	

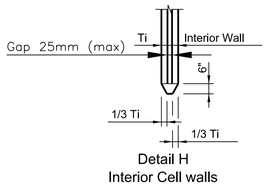
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	32	71

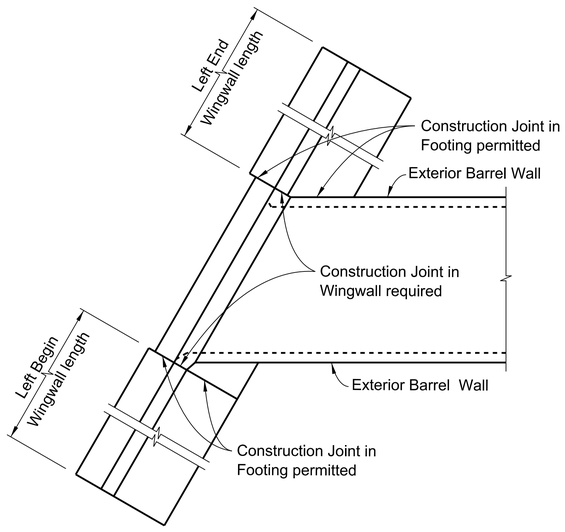


SCHEMATIC "A" - PLAN VIEW
HEADWALL & WINGWALL ALIGNMENT

NOTE: All headwall and culvert skew angles are measured in degrees from a line perpendicular to the centerline of culvert (counter-clockwise positive), see Schematic "B".

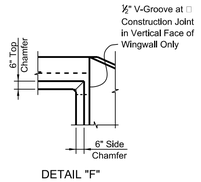


Detail H
Interior Cell walls

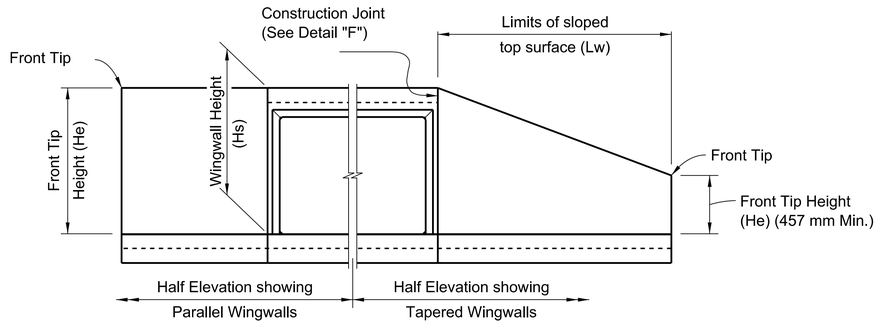


PART PLAN SHOWING PARALLEL WINGWALLS
AND LOCATION OF CONSTRUCTION JOINTS

NOTE:
Construction Joints in wingwalls and footings are located as follows: For non-skewed wingwalls they are located adjacent to the exterior face of the exterior barrel wall; when the CL of wingwall and CL of exterior barrel wall results in an acute angle see Left End Wingwall above, and when the angle is obtuse see Left Begin Wingwall above and Detail C.



DETAIL "F"



END ELEVATION
OF CULVERT

1. For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less then 90 degrees, field bend wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this work.

GENERAL NOTES:

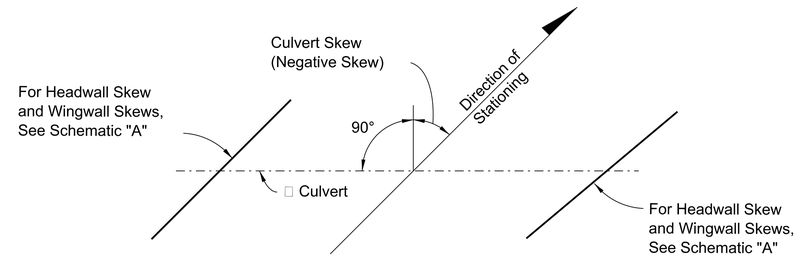
LIVE LOAD: HL-93.

CONSTRUCTION LOADING: It is the construction Contractor's responsibility to provide for supporting construction loads that exceed AASHTO HL-93, and any construction load applied prior to 610 mm of compacted fill placed above the top slab.

SURFACE FINISH: All concrete surfaces shall receive a Class I finish per Section 552.16(a)

SKEWED CONSTRUCTION JOINTS: Construction joints in barrels of culverts with skewed wingwalls may be placed parallel to the headwalls and the reinforcing steel, and the slabs may be cut provided that the cut reinforcing steel extends beyond the construction joint enough for splices to be made in accordance with Table 1 on this sheet. The cost of construction joints and additional reinforcing shall be at the expense of the Contractor.

REINFORCING STEEL: See Sheet 33 for type, size, number, and reinforcing per meter requirements for wingwall and sheet 29 for precast box units.



SCHEMATIC "B" - PLAN VIEW
CULVERT ALIGNMENT

NOTE: For Culvert Skew see Contract Plans.

TABLE 1 - MINIMUM BAR SPLICE LENGTHS FOR LONGITUDINAL REINFORCING

BAR SIZE	SPLICE (CLASS A/AE) CLASS A(AE) (2344 mPa)	SPLICE (CLASS A/AE) CLASS A(AE) (3792 mPa)	BAR SIZE	SPLICE (CLASS B) CLASS A(AE) (2344 mPa)	SPLICE (CLASS B) CLASS A(AE) (3792 mPa)
#10M	305 mm	305 mm	#25M	1.067 m	838 mm
#13M	406 mm	406 mm	#29M	1.346 m	1.067 m
#16M	508 mm	508 mm	#32M	2.006 m	1.346 m
#19M	584 mm	584 mm	#36M	2.388 m	1.956 m
#22M	813 mm	686 mm			

TABLE 1 NOTE: Splice lengths are based on an AASHTO Class B tension lap splice for the Specification Section 552 concrete class shown.

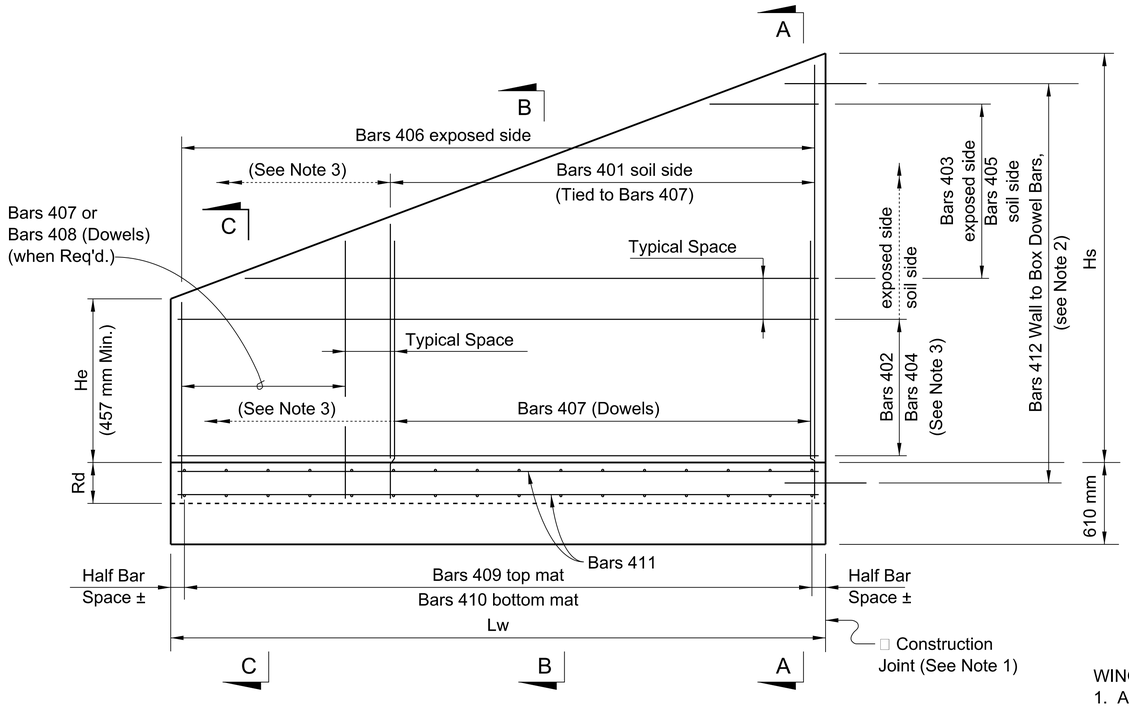
UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BOX CULVERT DETAIL

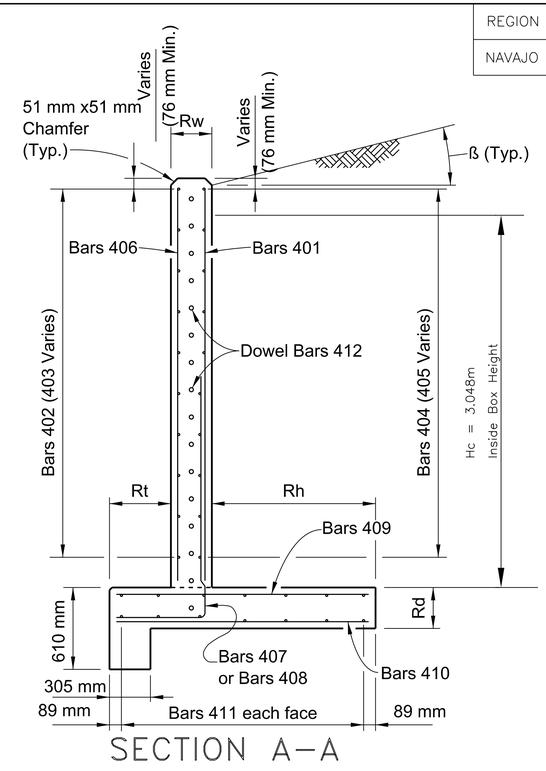
DRAWN BY: NRDOT	DATE: 4/3/2014
DESIGNED BY: NRDOT	DATE: 4/3/2014
REVISED: 8/5/2015	BY: Leroy.Toledo
Sht 32 PC CBC Dtl 4 040314.dgn	

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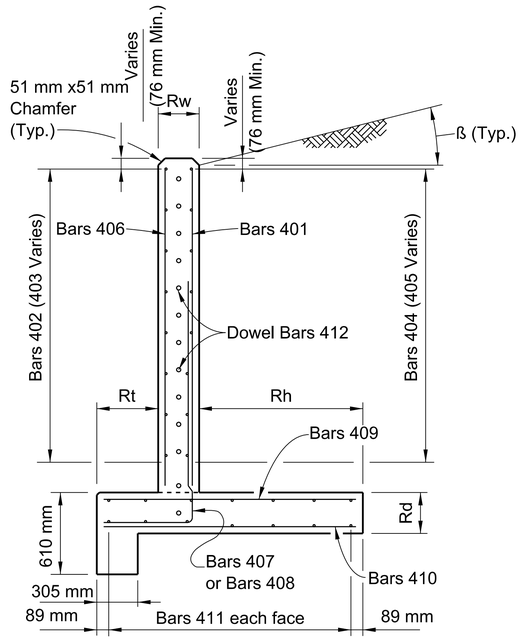
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
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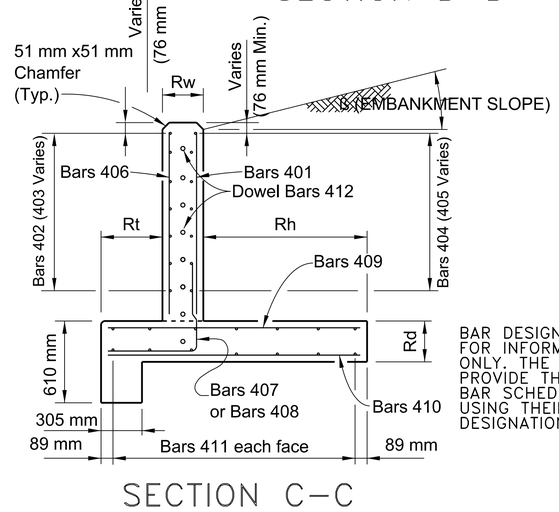
WINGWALL ELEVATION - Variable Height
(Left End shown - other corners similar)



SECTION A-A



SECTION B-B



SECTION C-C

BAR DESIGNATIONS SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL PROVIDE THEIR OWN DETAIL BAR SCHEDULE AND DRAWINGS USING THEIR OWN BAR DESIGNATIONS.

WINGWALL NOTES:

1. Align construction joint perpendicular to wingwall.
2. In the vicinity of the construction joint, field bend reinforcement as necessary to maintain minimum reinforcement cover.
3. For constant height wingwalls, variable length Bars 403, 405 & 408 are not required, and as such the limits of Bars 401 & 407 extend the full length of the wingwall, and the limits of Bars 402 & 404 extend to the full height of the wingwall.
4. Contractor is resonsible for determiming all bar lengths dimensions for the barrel, wingwall and concrete apron reinforcement in accordance with table on drawing, using the bar designations shown and provide shop plans for review.

BOX, HEADWALL AND CUTOFF WALL DATA TABLE (mm unless shown otherwise) — Table date: 4-17-14

LOCATION:	STRUCTURE / BRIDGE NUMBER	BOX									HEADWALL AND CUTOFF WALL									
		Wc (m)	Hc (m)	Tt	Tw	Tb	Ti	#cells	Lc (m)	Cover	Blhw	Hlhw	Brhw	Hrhw	Blcw	Hlcw	Brcw	Hrcw	SL(deg)	SR(deg)
46+280.00		3.048	3.048	254	254	254	229	44	26.822	51	305	356	305	356	356	914	305	914	30	30

LEFT SIDE WINGWALLS DATA TABLE (mm unless shown otherwise) — Table date: 4-17-14

STRUCTURE / BRIDGE NUMBER	LEFT END WINGWALL									LEFT BEGIN WINGWALL								
	Rt	Rw	Rh	Rd	SW (deg)	B (deg)	He (m)	Hs (m)	Lw (m)	Rt	Rw	Rh	Rd	SW (deg)	B (deg)	He (m)	Hs (m)	Lw (m)
	548	254	1105	292	30	18.43	0.152	3.658	10.420	548	254	1105	292	30	18.43	0.152	3.658	5.867

RIGHT SIDE WINGWALLS DATA TABLE (mm unless shown otherwise) — Table date: 4-17-14

STRUCTURE / BRIDGE NUMBER	RIGHT END WINGWALL									RIGHT BEGIN WINGWALL								
	Rt	Rw	Rh	Rd	SW (deg)	B (deg)	He (m)	Hs (m)	Lw (m)	Rt	Rw	Rh	Rd	SW (deg)	B (deg)	He (m)	Hs (m)	Lw (m)
	548	254	1105	292	30	18.43	0.152	3.658	5.867	548	254	1105	292	30	18.43	0.152	3.658	13.006

WINGWALL REINFORCEMENT AREA (mm2 per linear meter) — Table date: 4-17-14

Wall Height (m)	Stem Wall (back face)	Stem Wall T&S (back face)	Stem Wall (front face)	Stem Wall T&S (front face)	Footing (top mat)	Footing T&S (top mat)	Footing (bottom mat)	Footing T&S (bottom mat)
4.267	1968	423	423	423	1968	423	423	423
3.048	1312	423	423	423	1312	423	423	423
2.134	847	423	423	423	847	423	423	423
1.219	423	423	423	423	423	423	423	423
0.610	423	423	423	423	423	423	423	423

Wingwall Note: Bar designations in "( )" are only required for variable height wingwalls.

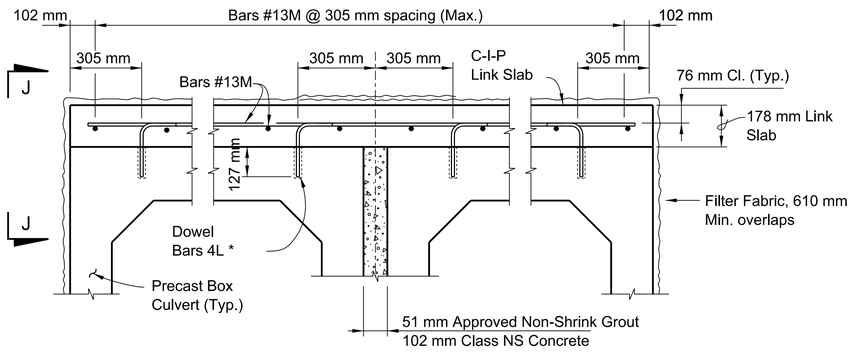
UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BOX CULVERT AND WINGWALLS DETAIL

DRAWN BY: NRDOT	DATE: 4/3/2014
DESIGNED BY: NRDOT	DATE: 4/3/2014
REVISED: 8/5/2015	BY: Leroy.Toledo
Sht 33 Rev PC CBC WWall Dtl 5 040314.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 33 Rev PC CBC WWall Dtl 5 040314.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	34	71



LINK SLAB TYPICAL SECTION
(Multiple Barrel Culvert shown, Single Barrel Culvert similar)

* Install dowels with an Adhesive Bonding Material System in accordance with manufacture Specification. The Contractor may substitute mechanical couplers in lieu of adhesive bonded dowels. Shift dowels to clear box culvert reinforcing.

LINK SLAB NOTES:

1. Provide a Cast-In-Place Link Slab to ensure uniform joint opening of precast box culverts when the differential settlement shown in the plans exceeds the following limits, except that a Link Slab is not required for differential settlements less than 26 mm

$$\Delta Y \leq \frac{(L)^2}{3100 \times R \times W} \times 1000$$

Where:
ΔY = Maximum Long-Term Differential Settlement (mm)
R = Exterior height of Box Culvert (m)
W = Length of Box Culvert Segments (m)
L = Effective length for single curvature deflection (m)

2. Extend Link Slab to back face of headwalls and to limits of existing box culverts for extensions.

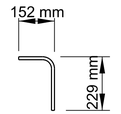
3. The P&D Branch Chief will inspect the Box Sections completed in-place before backfilling to determined if link slabs are required per sec.109.02(m).

ESTIMATED LINK SLAB QUANTITIES		
ITEM	UNIT	QUANTITY
Class A(AE) Concrete (Culvert)	m3/m2	0.1778
Reinforcing Steel (Roadway)	Kg/m2	7.0214

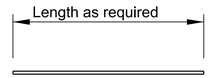
NOTE: Estimated quantities are based the plan area of precast box slabs, and are provided for information only. No additional payment will be made for Link Slabs where these are required for the precast box culverts.

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D	LENGTH
L	#13M	2 per Barrel/mm	381 mm
M	#13M	As Reqd.	As Reqd.

REINFORCING STEEL BENDING DIAGRAMS



DOWEL BARS 4L

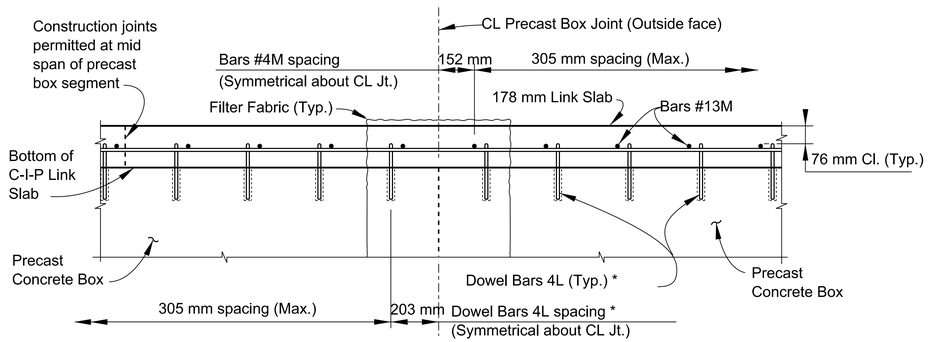


BAR #13M

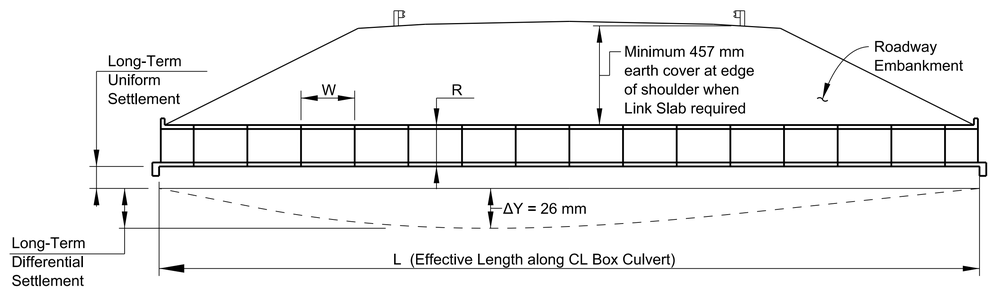
NOTES:
1. All bar dimensions are out to out.
2. Lap splice length for Bars #13M is 406 mm minimum.

DESIGN NOTE:

1. Link Slab required when joint openings from differential settlement exceed 26 mm as determined in Link Slab Note 1.



VIEW J-J



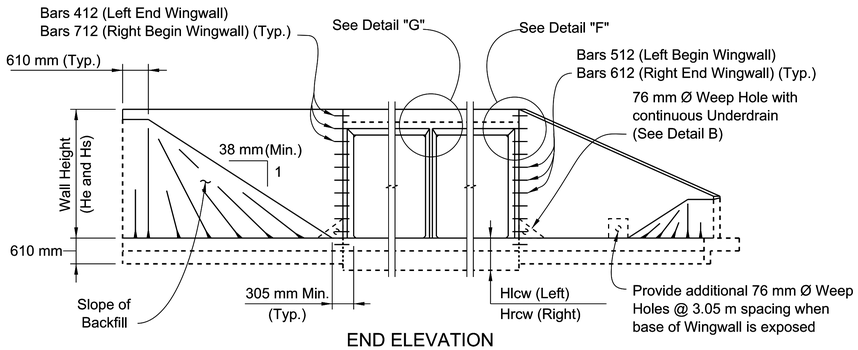
SCHEMATIC LONGITUDINAL SECTION (NEW CONSTRUCTION)

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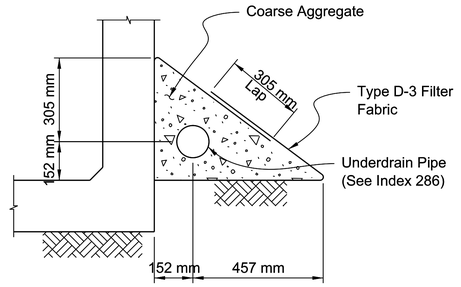
LINK SLAB DETAILS

DRAWN BY: NRDOT	DATE: 1/31/2013
DESIGNED BY: NRDOT	DATE: 1/31/2013
REVISED: 5/28/2013	BY: Leroy.Toledo
Sht 34 PC CBC Dtl 6 040314.dgn	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	35	71



END ELEVATION
(Showing Constant Height And Variable Height Wingwalls)



DETAIL "B"
UNDERDRAIN DETAIL
(Similar to Type II)

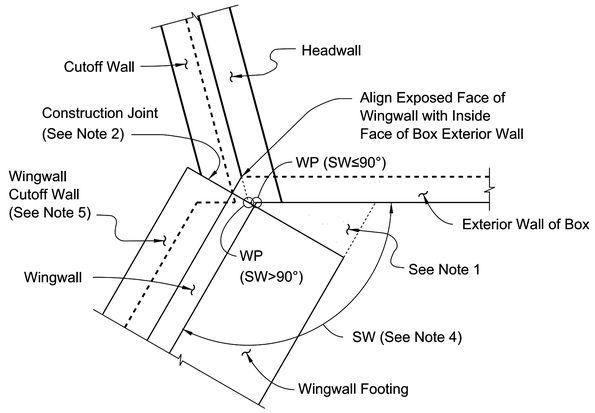
NOTES:
1. For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less then 90 degrees, field bend wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this work.

2. Location of Construction Joint determined by WP at theoretical intersection of: - Soil side face of Headwall and outside face of Box Exterior Wall, for SW≤90°; - Outside face of Wingwall and outside face of Box Exterior Wall, for SW>90°.

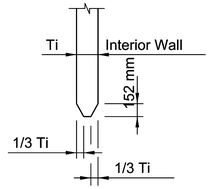
3. Provide 152 mm chamfer when angle 'A' is greater than 45°. Maintain minimum wall thickness. Field adjust reinforcing to maintain cover.

4. Wingwall Skew Angles (SW) are measured from the adjacent box exterior wall to the wingwall.
5. Turn or extend Wingwall Cutoff Wall as necessary to meet Box Cutoff Wall.

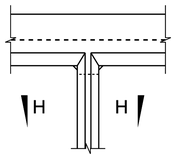
6. Provide additional reinforcement in the top of the top slab below traffic railings to ensure a minimum area of 0.80 sq. in./ft. transverse reinforcing.



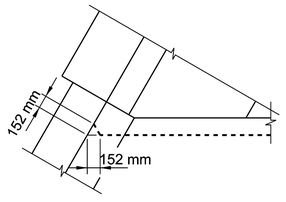
DETAIL "C" - PLAN VIEW
WINGWALL TO BOX CONNECTION
(Left Begin Corner Shown, Other Corners Similar)



SECTION H-H
Ti = 229 mm

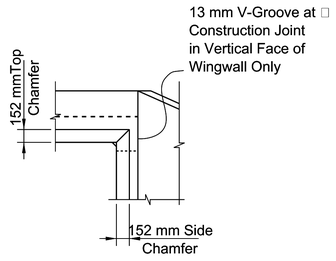


DETAIL "G"

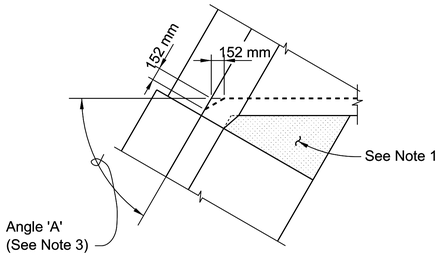


DETAIL "D"

CROSS REFERENCE:
See Sheet 53 for locations of Details "D", "E", "J" & "K".
See Sheet 54 for locations of Detail "C".



DETAIL "F"



DETAIL "E"

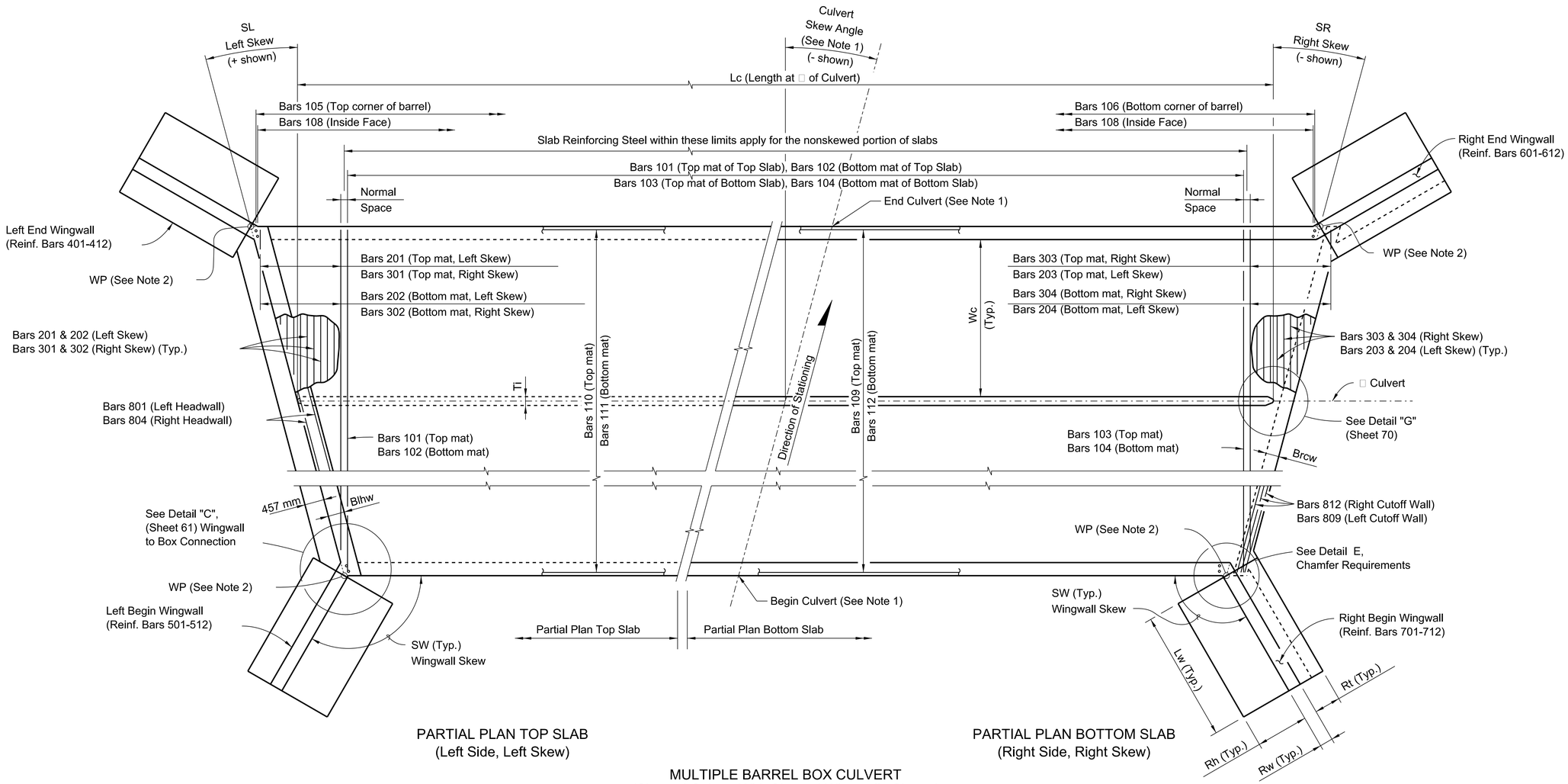
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CUT OFF SECTION
CONCRETE BOX CULVERT DETAIL

DRAWN BY: NRDOT	DATE: 4/2/2014
DESIGNED BY: NRDOT	DATE: 4/2/2014
REVISED: 4/15/2014	BY: Leroy.Toledo
Sht 35 PC CBC Dtl 7 040214.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 35 PC CBC Dtl 7 040214.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	36	71



PARTIAL PLAN TOP SLAB
(Left Side, Left Skew)

PARTIAL PLAN BOTTOM SLAB
(Right Side, Right Skew)

MULTIPLE BARREL BOX CULVERT
(Skewed Culvert With Skewed Wingwalls Shown)

NOTES:
1. See Contract Plans Sht 61 & 62 for Culvert Location, Culvert Skew Angle and Roadway Cross Section.
2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail C (Sheet 61).

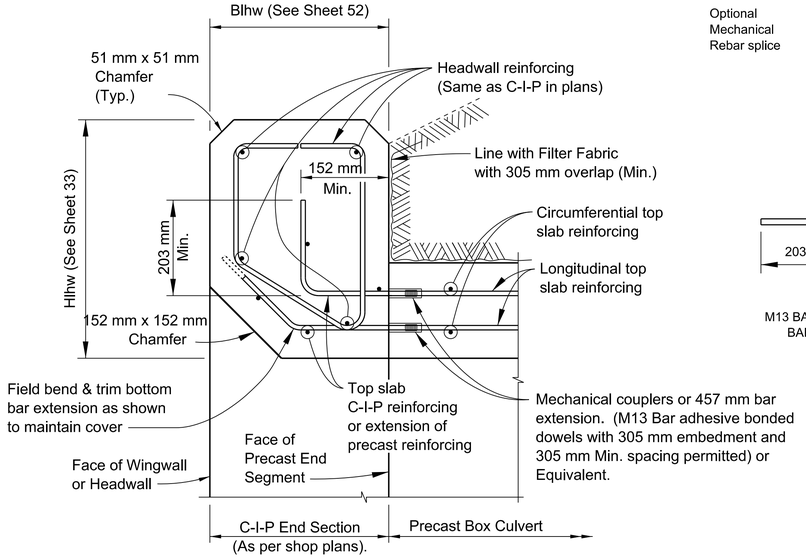
UNITED STATES
DEPARTMENT OF THE INTERIOR
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

MULTIPLE BARREL BOX CULVERT DETAIL

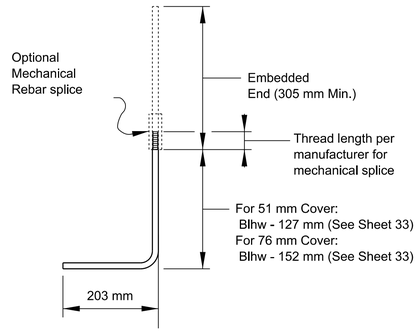
DRAWN BY: NRDOT	DATE: 4/3/2014
DESIGNED BY: NRDOT	DATE: 4/3/2014
REVISED: 4/15/2014	BY: Leroy.Toledo
Sht 36 PC CBC Dtl 8 rev 082317.dgn	

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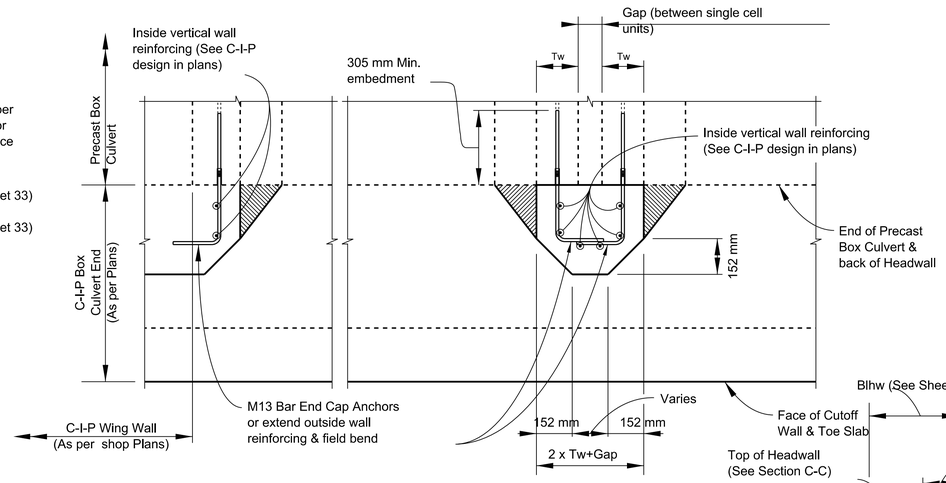
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	37	71



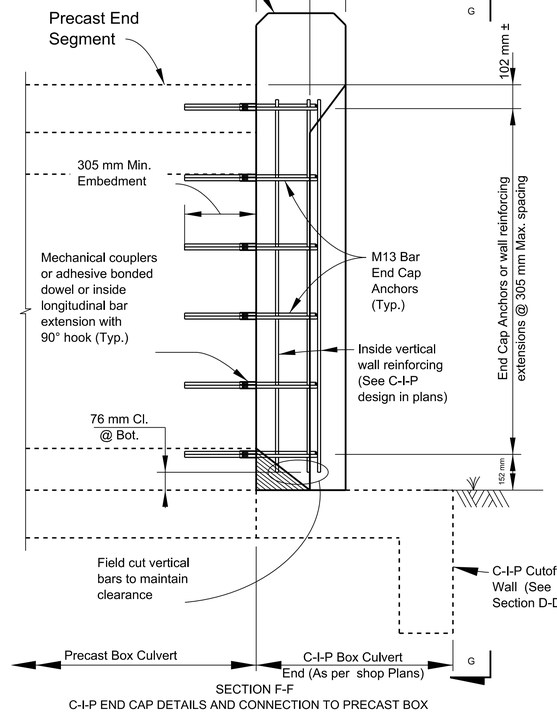
SECTION C-C
C-I-P HEADWALL DETAILS AND CONNECTION TO PRECAST BOX



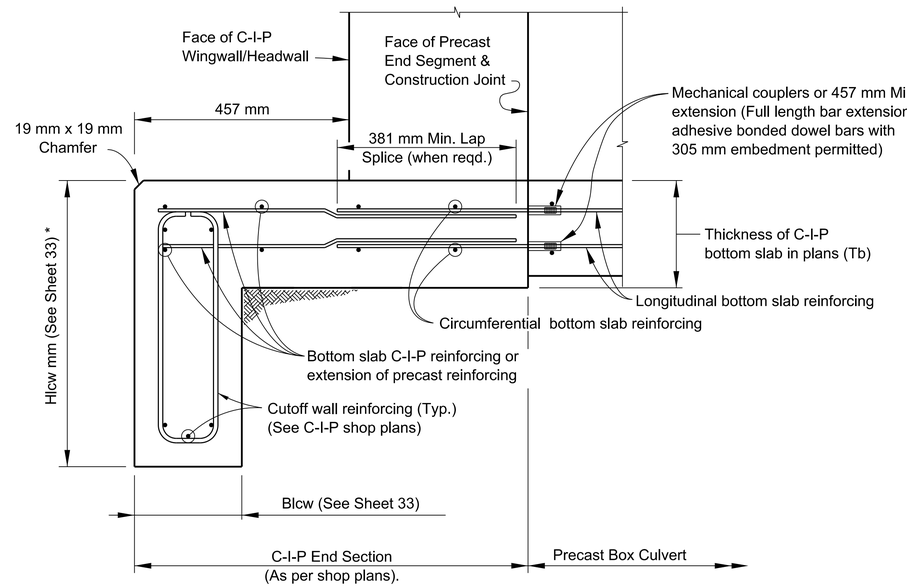
M13 BAR END CAP ANCHOR BAR BEND DIAGRAM



SECTION H-H

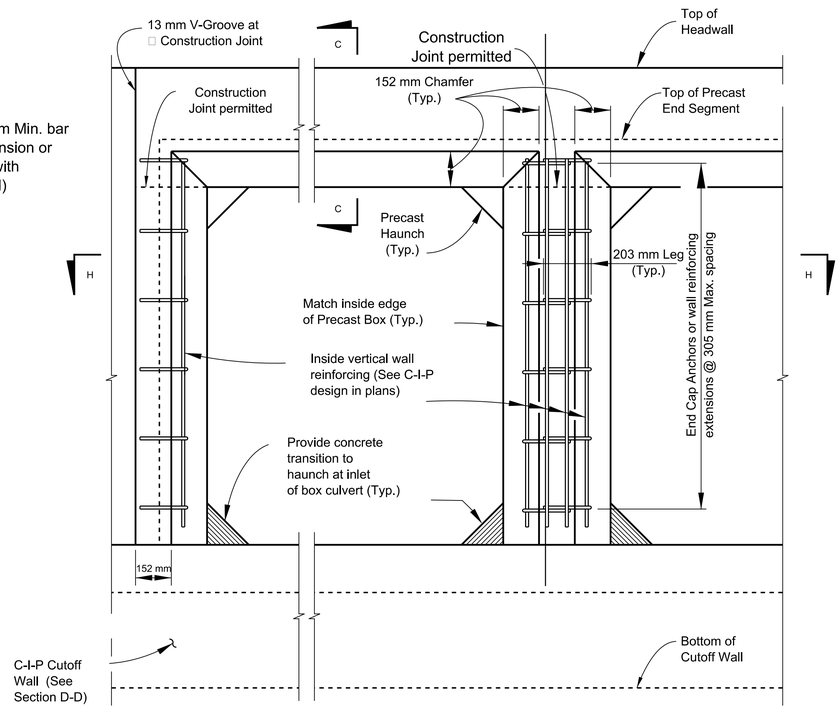


SECTION F-F
C-I-P END CAP DETAILS AND CONNECTION TO PRECAST BOX



SECTION D-D
C-I-P TOE SLAB & CUTOFF WALL DETAILS
AND CONNECTION TO PRECAST BOX

* Provide additional 152 mm depth of cutoff wall at no additional cost.



VIEW G-G
(Headwall, Toe Slab and Cutoff Wall Reinforcing not shown for clarity)

ELEVATION VIEW

BOX BLOCKOUT DETAILS

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

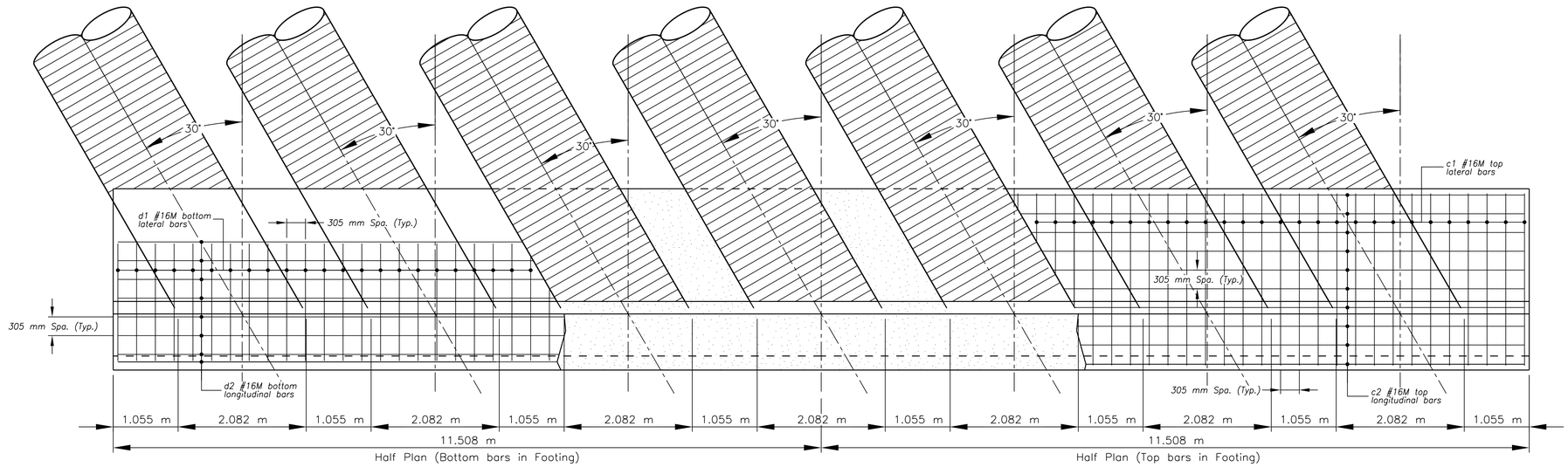
BOX HEADWALL, CAP & CUTOFF WALL DETAILS

DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 3/14/2014	BY: Leroy.Toledo

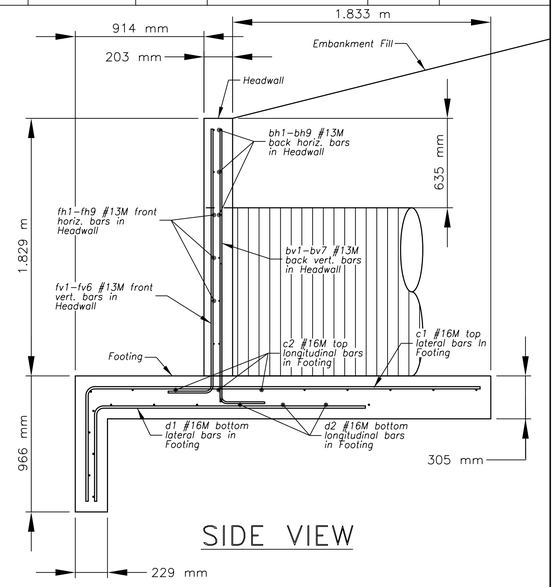
Sht 37 Box headwall cutoff wall end cap details 091517.dgn

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 37 Box headwall cutoff wall end cap details 091517.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	38	71



PLAN VIEW: FOOTING

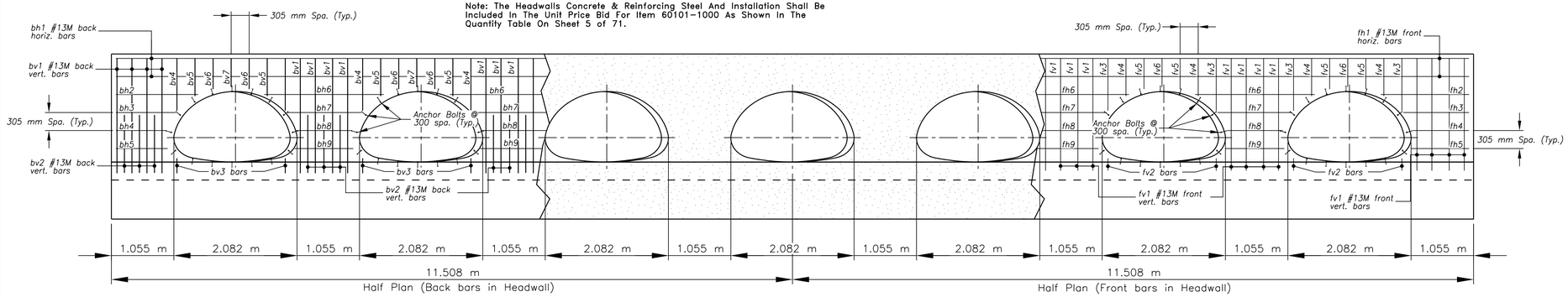


SIDE VIEW

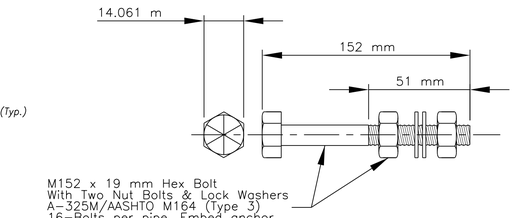
ITEM No. 60101–1000 MINOR CONCRETE CLASS A(AE)
CONCRETE VOLUME FOR HEADWALL & FOOTING

Station	Structure	Location	Inlet – Vol. (m^3)	Outlet – Vol. (m^3)	Total Vol. (m^3)
45+060.00	7–1803 mm S x 1194 mm Rise CSPA	Headwall	5.75	5.75	11.50
		Footing	24.20	24.20	48.40
49+945.000	7–1803 mm S x 1194 mm Rise CSPA	Headwall	5.75	5.75	11.50
		Footing	24.20	24.20	48.40
				TOTAL	119.80

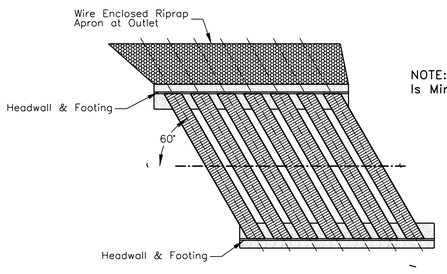
Note: The Headwalls Concrete & Reinforcing Steel And Installation Shall Be Included In The Unit Price Bid For Item 60101–1000 As Shown In The Quantity Table On Sheet 5 of 71.



ELEVATION VIEW: HEADWALL

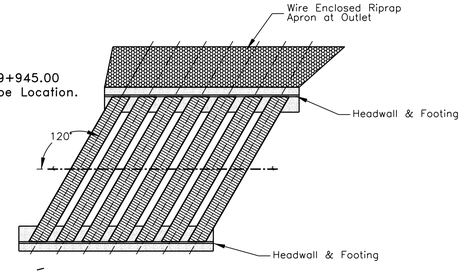


ANCHOR BOLT DETAIL



PLAN VIEW
Sta. 45+060.00

NOTE: Pipe Location for Sta. 49+945.00 Is Mirror of Sta. 45+060.00 Pipe Location.



PLAN VIEW
Sta. 49+945.00

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CONCRETE HEADWALL LAYOUT DETAIL FOR CSPA

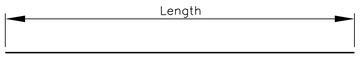
DRAWN BY: NRDOT	DATE: 9/18/2017
DESIGNED BY: NRDOT	DATE: 9/18/2017
REVISED: 9/18/2017	BY: Harold.Riley
Sht 38 Hdwlls Details rev 091817.dgn	

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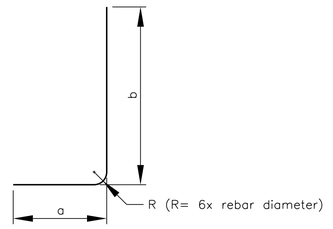
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	39	71

GRADE 60 REINFORCING BAR SCHEDULE

MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	c* (mm)	d* (mm)	REMARKS
fh1	#13M	305	1	2	22.864	0.994	45.454					Front Horizontal Straight Bars in Headwall
fh2_1	#13M	305	1	1	1.491	0.994	1.482					Front Horizontal Straight Bars in Headwall on Right Side
fh3_1	#13M	305	1	1	1.110	0.994	1.103					Front Horizontal Straight Bars in Headwall on Right Side
fh4_1	#13M	305	1	1	0.954	0.994	0.948					Front Horizontal Straight Bars in Headwall on Right Side
fh5_1	#13M	305	1	1	0.977	0.994	0.971					Front Horizontal Straight Bars in Headwall on Right Side
fh2_2	#13M	305	1	1	1.432	0.994	1.423					Front Horizontal Straight Bars in Headwall on Left Side
fh3_2	#13M	305	1	1	1.051	0.994	1.045					Front Horizontal Straight Bars in Headwall on Left Side
fh4_2	#13M	305	1	1	0.895	0.994	0.890					Front Horizontal Straight Bars in Headwall on Left Side
fh5_2	#13M	305	1	1	0.918	0.994	0.912					Front Horizontal Straight Bars in Headwall on Left Side
fh6	#13M	305	1	6	2.020	0.994	12.047					Front Horizontal Straight Bars in Headwall Between Pipes
fh7	#13M	305	1	6	1.258	0.994	7.503					Front Horizontal Straight Bars in Headwall Between Pipes
fh8	#13M	305	1	6	0.945	0.994	5.636					Front Horizontal Straight Bars in Headwall Between Pipes
fh9	#13M	305	1	6	0.993	0.994	5.922					Front Horizontal Straight Bars in Headwall Between Pipes
fv1	#13M	305	2	32	2.160	0.994	68.705	318	1874			Front Vertical Bent Bars in Headwall
fv2	#13M	305	1	14	0.209	0.994	2.908					Front Vertical Straight Bars in Headwall Below Pipes
fv3	#13M	305	1	14	0.885	0.994	12.316					Front Vertical Straight Bars in Headwall Above Pipes
fv4	#13M	305	1	14	0.637	0.994	8.864					Front Vertical Straight Bars in Headwall Above Pipes
fv5	#13M	305	1	14	0.519	0.994	7.222					Front Vertical Straight Bars in Headwall Above Pipes
fv6	#13M	305	1	7	0.483	0.994	3.361					Front Vertical Straight Bars in Headwall Above Pipes
bh1	#13M	305	1	2	22.864	0.994	45.454					Back Horizontal Straight Bars in Headwall
bh2_1	#13M	305	1	1	1.535	0.994	1.526					Back Horizontal Straight Bars in Headwall on Right Side
bh3_1	#13M	305	1	1	1.154	0.994	1.147					Back Horizontal Straight Bars in Headwall on Right Side
bh4_1	#13M	305	1	1	0.997	0.994	0.991					Back Horizontal Straight Bars in Headwall on Right Side
bh5_1	#13M	305	1	1	1.021	0.994	1.015					Back Horizontal Straight Bars in Headwall on Right Side
bh2_2	#13M	305	1	1	1.388	0.994	1.380					Back Horizontal Straight Bars in Headwall on Left Side
bh3_2	#13M	305	1	1	1.007	0.994	1.001					Back Horizontal Straight Bars in Headwall on Left Side
bh4_2	#13M	305	1	1	0.851	0.994	0.846					Back Horizontal Straight Bars in Headwall on Left Side
bh5_2	#13M	305	1	1	0.874	0.994	0.869					Back Horizontal Straight Bars in Headwall on Left Side
bh6	#13M	305	1	6	2.020	0.994	12.047					Back Horizontal Straight Bars in Headwall Between Pipes
bh7	#13M	305	1	6	1.258	0.994	7.503					Back Horizontal Straight Bars in Headwall Between Pipes
bh8	#13M	305	1	6	0.945	0.994	5.636					Back Horizontal Straight Bars in Headwall Between Pipes
bh9	#13M	305	1	6	0.993	0.994	5.922					Back Horizontal Straight Bars in Headwall Between Pipes
bv1	#13M	305	2	32	2.236	0.994	71.123	318	1950			Back Vertical Bent Bars in Headwall
bv2	#13M	305	1	24	0.981	0.994	23.403					Back Vertical Straight Bars in Headwall
bv3	#13M	305	1	14	0.247	0.994	3.437					Back Vertical Straight Bars in Headwall Below Pipes
bv4	#13M	305	1	14	0.885	0.994	12.316					Back Vertical Straight Bars in Headwall Above Pipes
bv5	#13M	305	1	14	0.637	0.994	8.864					Back Vertical Straight Bars in Headwall Above Pipes
bv6	#13M	305	1	14	0.519	0.994	7.222					Back Vertical Straight Bars in Headwall Above Pipes
bv7	#13M	305	1	7	0.483	0.994	3.361					Back Vertical Straight Bars in Headwall Above Pipes
c1	#16M	305	2	76	3.570	1.552	421.089	814	2798			Top Lateral Bent Bars in Footing
c2	#16M	305	1	12	22.864	1.552	425.819					Top Longitudinal Straight Bars in Footing
d1	#16M	305	2	76	2.560	1.552	301.957	677	1323			Bottom Lateral Bent Bars in Footing
d2	#16M	305	1	10	22.864	1.552	354.849					Bottom Longitudinal Straight Bars in Footing
						SUB-TOTAL	1,907.490	Sta. 45+060.00 INLET				
						SUB-TOTAL	1,907.490	Sta. 45+060.00 OUTLET				
						SUB-TOTAL	1,907.490	Sta. 49+945.00 INLET				
						SUB-TOTAL	1,907.490	Sta. 49+945.00 OUTLET				
						GRAND TOTAL	7,629.960					



TYPE 1 BAR



TYPE 2 BAR

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE HEADWALL STEEL REINFORCING BAR SCHEDULE

DRAWN BY: NRDOT	DATE: 9/18/2017
DESIGNED BY: NRDOT	DATE: 9/18/2017
REVISED: 9/18/2017	BY: Harold.Riley
Sht 39 Hdwlls Rebar Schedule rev 091817.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 39 Hdwlls Rebar Schedule rev 091817.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	40	71

ITEM No. 61701-5000
GUARDRAIL SYSTEM, SGR04b, TYPE PDE02 w/SKT-350

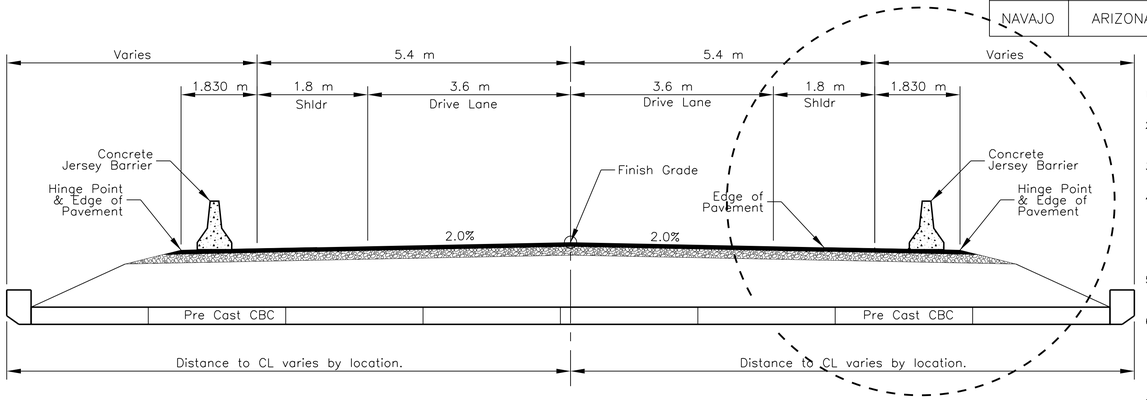
STATION	To	STATION	LOCATION	LENGTH (m)	REMARKS
46+218.178	To	46+269.132	Right	50.954	South; SKT-350 to Jersey barrier
46+245.470	To	46+266.375	Left	20.905	South; SKT-350 to Jersey barrier
46+293.640	To	46+314.596	Right	20.956	North; Jersey barrier to SKT-350
46+290.403	To	46+341.838	Left	51.435	North; Jersey barrier to SKT-350
			TOTAL	144.250	

ITEM No. 61801-0000
CONCRETE BARRIER

STATION	To	STATION	LOCATION	LENGTH (m)	REMARKS
46+266.191	To	46+290.587	Left	24.384	guardrail thrie-beam excluded
46+269.429	To	46+293.825	Right	24.384	guardrail thrie-beam excluded
			TOTAL	48.768	

ITEM No. 63308-3010
OBJECT MARKERS, TYPE 3

DESCRIPTION	Qty. (Ea.)	Type	REMARKS
Object Markers	4	3	Hardware: 1 Post, 51mm x 51mm Square Tube

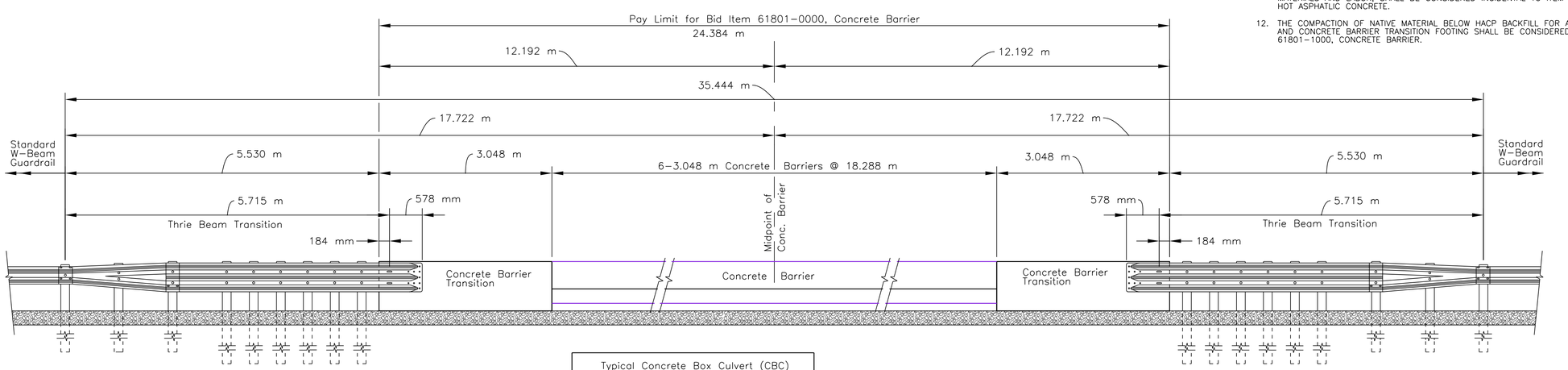


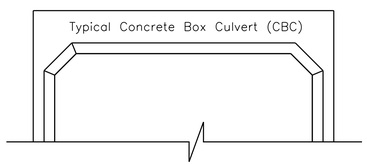
TYPICAL CBC SECTION AT NORMAL

SEE DETAIL "A"

GENERAL NOTES:

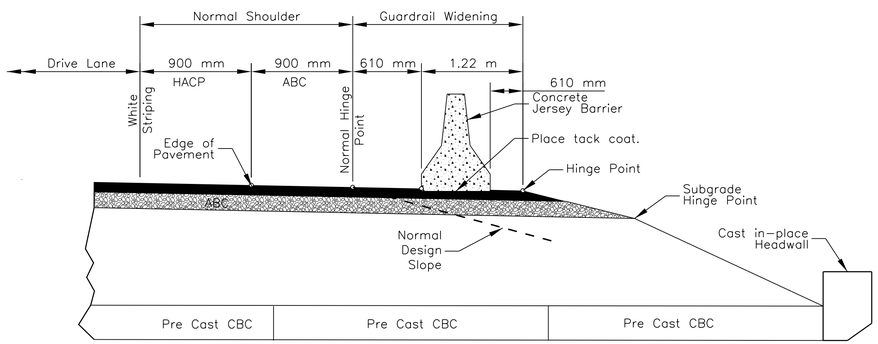
1. AT NO TIME DURING THE PLACEMENT OF THE CBC GUARDRAILS SHALL THE ROADWAY EDGE AT ACTIVE TRAFFIC LANES BE LEFT WITHOUT CONTROL BARRIERS OR FLAGMEN.
2. PLACMENT OF PRECAST CONCRETE BARRIER SECTIONS SHALL BE BASED ON THE MIDPOINT OF CBC. MIDPOINT OF CBC SHALL BE DETEMINED IN THE FIELD BY MEASURMENT OF INLET AND OUTLET OF EACH CBC, AND SHALL BE CONCURRED BY THE COR/COTR.
3. AT THE CONTRACTOR'S OPTION, THE CONCRETE BARRIER MAY BE CAST IN PLACE IN LIEU OF PROVIDING PRECAST SECTIONS.
4. THE EXISTING ASPHALT AT THE NEW W-BEAM GUARDRAIL (INCLUDING THE 6 METER SHOULDER WIDENING TAPER AT GUARDRAIL ENDS) AND CONCRETE BARRIER TRANSITION (NOT THE PRECAST BARRIER SECTIONS) LOCATIONS, SHALL BE FULL DEPTH SAW CUT AT THE SHOULDER LINE AND ALL ASPHALT BEYOND SAW CUT SHALL BE REMOVED. THE EXISTING ASPHALT AT THE PRECAST BARRIER SECTIONS SHALL BE SAW CUT AND REMOVED TO THE LIMITS SHOWN ON THIS SHEET. THE WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 20304-1000, REMOVAL OF STRUCTURES AND OBSTRUCTIONS.
5. THE PRECAST CONCRETE BARRIER SECTIONS AND THE CONCRETE BARRIER TRANSITIONS WITH FOOTING SHALL BE SET AS PER FP-03, SECTION 618 AND AS DETAILED ON THIS SHEET AND 41& 45 OF 71.
6. GUARDRAIL WIDENING AND THE AREA IN FRONT OF THE TRANSITION FOOTING SHALL BE SURFACED WITH 152 mm OF ABC AND 76 mm OF ASPHALT SURFACING AND SHALL BE PLACED TO THE DIMENSIONS SHOWN ON SHEET 18 OF 95. AGGREGATE BASE COURSE AND HOT ASPHALTIC CONCRETE FOR GUARDRAIL WIDENING SHALL BE PAID UNDER ITEM 30301-2000, UNTREATED AGGREGATE BASE COURSE, GRADING D, AND ITEM 40401-0000, MINOR HOT ASPHALTIC CONCRETE, RESPECTIVELY. THE FINISH ELEVATION OF THE GUARDRAIL WIDENING ASPHALT SHALL MATCH THE FINISHED RECYCLED ASPHALT COURSE ELEVATION.
7. THE NEW GUARDRAIL AND THRIE BEAM TRANSITION STRUCTURES SHALL BE INSTALLED AS PER FP-03, SECTION 617 AND AS DETAILED ON SHEETS 41-46 OF 71.
8. THRIE-BEAM TRANSITIONS, INCLUDING ALL HARDWARE FOR CONNECTION TO THE CONCRETE BARRIER TRANSITON, SHALL BE PAID UNDER ITEM 61801-1000 CONCRETE BARRIER.
9. ALL WORK, MATERIALS AND LABOR REQUIRED FOR THE EXISTING MATERIAL REMOVAL ABOVE THE EXISTING GUARDRAIL ATTACHMENT BLOCKS, AS SHOWN ON THIS SHEET, SHALL BE CONSIDERED INCIDENTAL ITEM 20304-1000, REMOVAL OF STRUCTURES AND OBSTRUCTIONS.
10. ALL WORK, MATERIALS AND LABOR REQUIRED FOR THE CONSTRUCTION OF THE HACP BACKFILL BENEATH THE CONCRETE BARRIER, AS SHOWN ON THIS SHEET, SHALL BE PAID UNDER ITEM 40201-0500, MINOR HOT ASPHALTIC CONCRETE.
11. THE PLACEMENT OF TACK COAT AGAINST AND UNDER CONCRETE BARRIER, INCLUDING ALL MATERIALS AND LABOR, SHALL BE CONSIDERED INCIDENTAL TO ITEM 40201-0500, MINOR HOT ASPHATLIC CONCRETE.
12. THE COMPACTION OF NATIVE MATERIAL BELOW HACP BACKFILL FOR AREAS BETWEEN CBC AND CONCRETE BARRIER TRANSITION FOOTING SHALL BE CONSIDERED INCIDENTAL TO ITEM 61801-1000, CONCRETE BARRIER.





ELEVATION

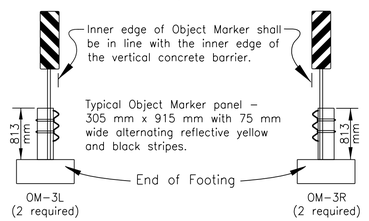
NOTE:
1. Concrete Barrier Transition sections shall be cast in place.
2. At Skewed Box Locations, guardrailing are off center relative to the Centerline



DETAIL "A"
BARRIER PLACEMENT

SYSTEM	A	H
SGM10a	60	810

NOTE: Place Type 3 Object Markers between Concrete Barrier Transition and first Thrie-beam Transition post. If this is not possible, place between first and second post.



TYPE 3 OBJECT
MARKER INSTALLATION

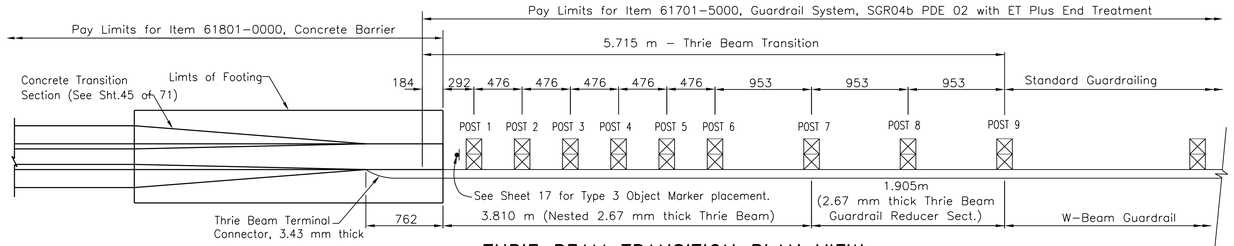
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BARRIER DETAILS
AT CBC LOCATIONS

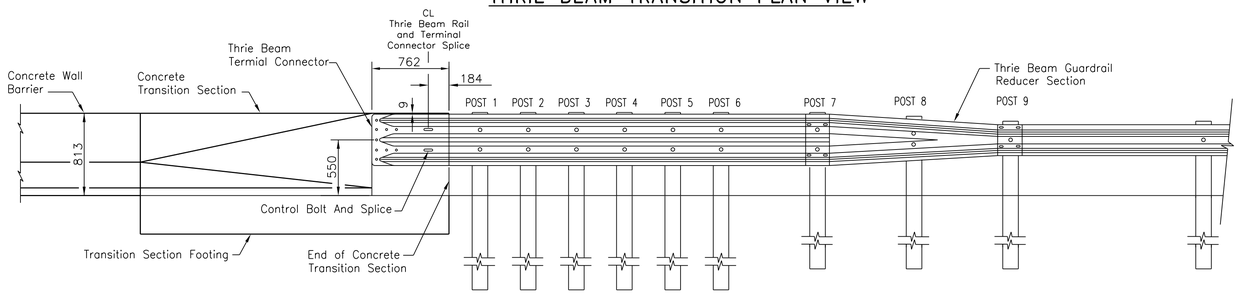
DRAWN BY: NRDOT	DATE: 9/18/2017
DESIGNED BY: NRDOT	DATE: 9/18/2017
REVISED: 9/19/2017	BY: Leroy.Toledo
Sht 40 Concrete Barrier Details 091817.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 40 Concrete Barrier Details 091817.dgn

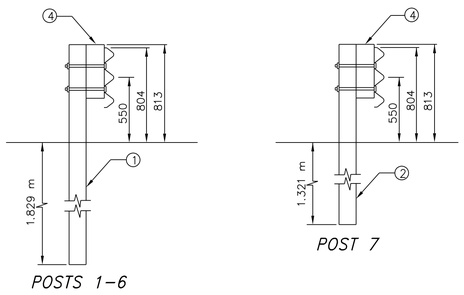
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	41	71



THRIE BEAM TRANSITION PLAN VIEW

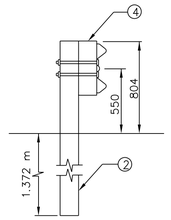


THRIE BEAM TRANSITION ELEVATION VIEW

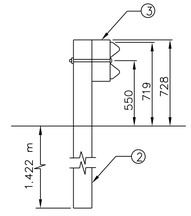


POSTS 1-6

POST 7



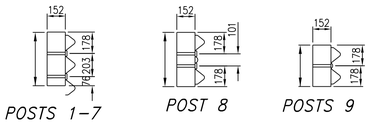
POST 8



POST 9

LEGEND

1. 152 x 635 x 2.591 m or W203 x 533 x 2.591 m Post
2. W152 x 508 x 2.134 m or W203 x 457 x 2.134 m Post
3. 152 x 203 x 356 Treated Timber Offset Block
4. 152 x 203 x 457 Treated Timber Offset Block

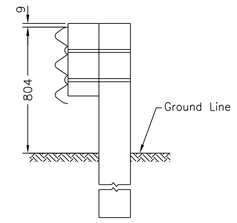


POSTS 1-7 | POST 8 | POSTS 9

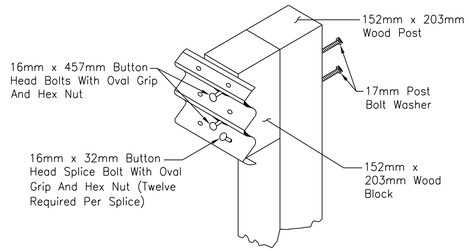
BLOCK DETAILS

GENERAL NOTES

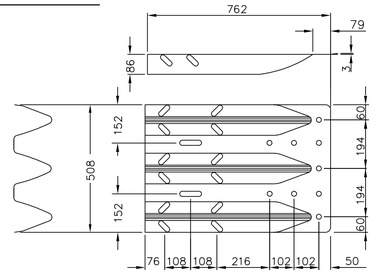
1. All Dimensions In Millimeters Unless Otherwise Shown.
2. All Materials and Workmanship Shall Conform To FP-03.
3. All Hardware Shall Meet FHWA Crash Worthiness Requirements As Per NCHRP 350 Guidelines.
4. Five 22 mm Diameter Galvanized AASHTO M164 Bolts Are Required For The Attachment Of The Thrie Beam Terminal Connector To The Concrete Barrier, Length To Be Determined In The Field By The COR/AOTR. Holes For Bolts Shall Be 25 mm Dia. And Shall Be Either Formed Or Core Drilled.
5. Furnishing And Placing Of Bolts, Washers, And Bearing Plate Shall Be Considered Incidental To The Cost OF Metal Barrier And No Direct Payment Will Be Made Therefor.
6. Install Thrie Beam Terminal Connector Between Nested Guardrail Elements On The Approach Section.
7. Install Thrie Beam Terminal Connector Outside Of The Nested Guardrail Elements On The Departure Section.
8. Bolts Are To Be Installed As Shown So That The Threaded End Of The Bolts And Nuts Are Placed Away From Traffic Side Of Rail.
9. Do Not Place Any Washers Under The Bolts On The Traffic Side Of The Barrier.
10. Place Reflector Tabs on posts 1, 6 and 9..
11. The Color Of The Reflective Sheeting On The Reflector Tabs Shall Be The Same As The Color Of The Edgeline Pavement Marking In Front Of The Barrier.
12. Reflector Tabs Shall Have a Minimum Of 76 mm x 127 mm Reflective Sheeting On Both Sides And Shall Attach Securely To The Blockout.
13. Splices Shall Be Lapped So The Free End Does Not Face Traffic Flow.
14. Construction Tolerance For Height Of Guardrail Is 13 mm.
15. Terminal Connector, Thrie Beam Bearing Plate And Associated Hardware Shall Be Included In The Unit price For Bid Item 61701-5000.



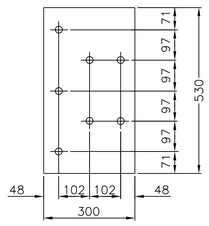
THRIE BEAM RAIL ASSEMBLY



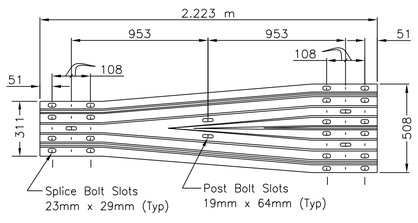
THRIE BEAM POST ASSEMBLY



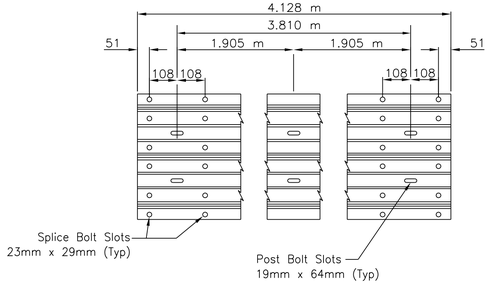
STANDARD THRIE BEAM TERMINAL CONNECTOR



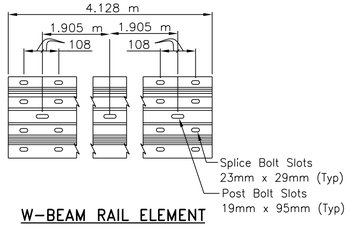
16 mm BEARING PLATE



THRIE BEAM GUARDRAIL REDUCER SECTION



THRIE BEAM RAIL ELEMENT



W-BEAM RAIL ELEMENT

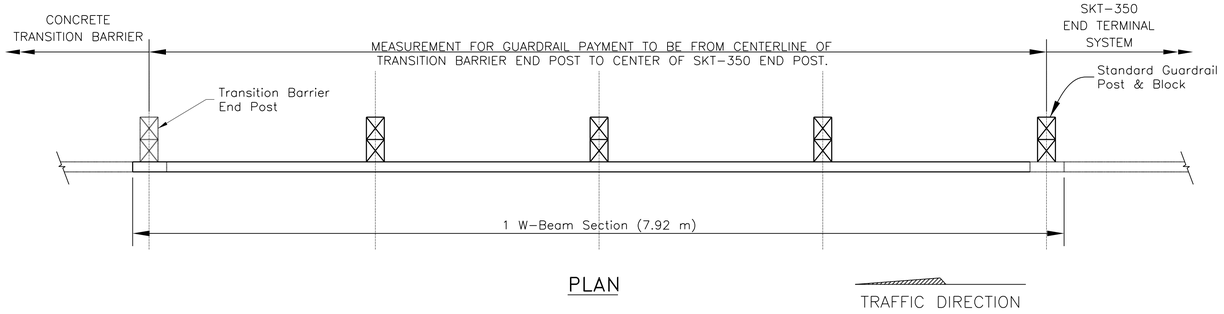
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GUARDRAIL TRANSITION AND THRIE BEAM DETAILS

DRAWN BY: NRDOT	DATE: 9/18/2017
DESIGNED BY: NRDOT	DATE: 9/18/2017
REVISED: 9/18/2017	BY: Harold.Riley
Sht 41 ThrieBeamTransition_091817.dgn	

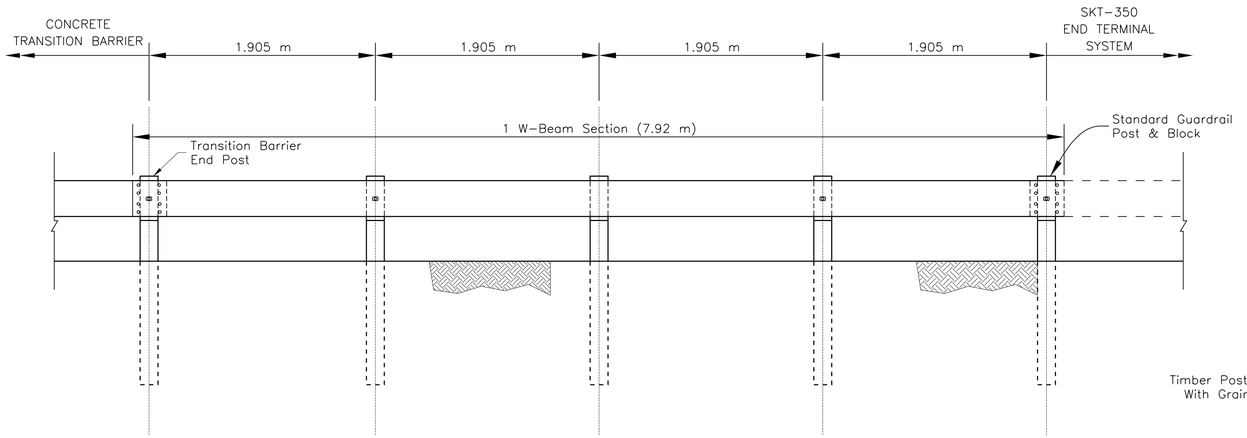
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	42	71

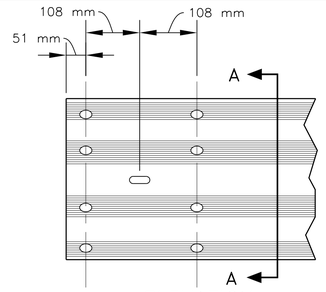


PLAN

TRAFFIC DIRECTION



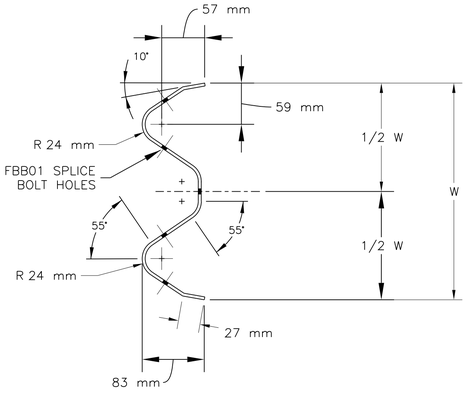
ELEVATION



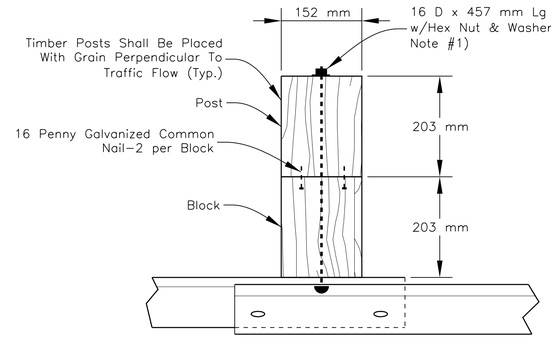
ELEVATION
RAIL

STANDARD GUARDRAIL HARDWARE

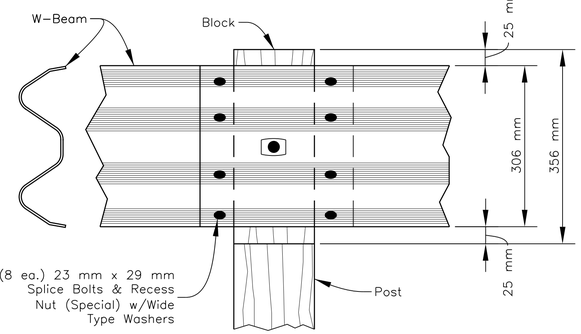
DESIGNATOR	COMPONENT	NUMBER
FBB01	Splice Bolt and Nut	2
FBB02	Guardrail-Post Bolt and Nut	2
FBB03	Guardrail-Post Bolt and Nut	2
FBB04	Guardrail-Post Bolt and Nut	2
FBX16a	Post Blockout Bolt (40 mm)	4
FWC16a	Round Washer	2
PDB01a	Timber Post Blockout	2
PDB01b	Timber Post Blockout	2
PDE02	Timber Post	2
PDE13	Timber Post	2
PWB01	Steel Post Blockout	2
PWE01	Steel Post	2
PWE02	Steel Post	2
RWB01a	W - Beam Backup Plate	1
RWM02a	W - Beam Rail	1



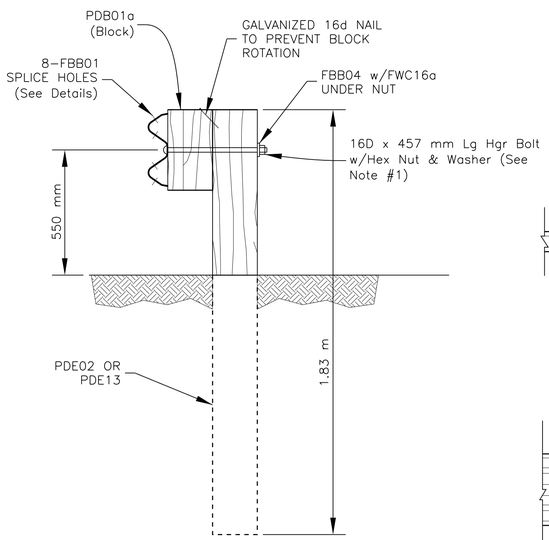
SECTION A-A
W-BEAM (RWM02A)



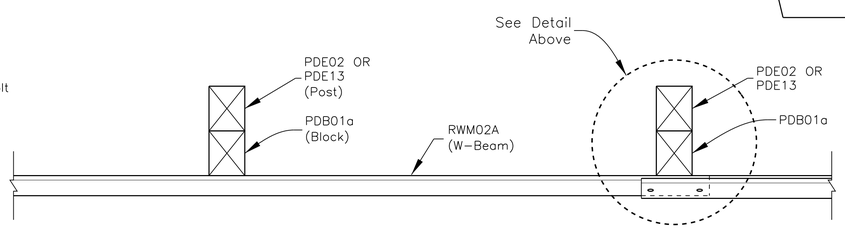
PLAN
POST/BLOCK &
SPLICE DETAIL



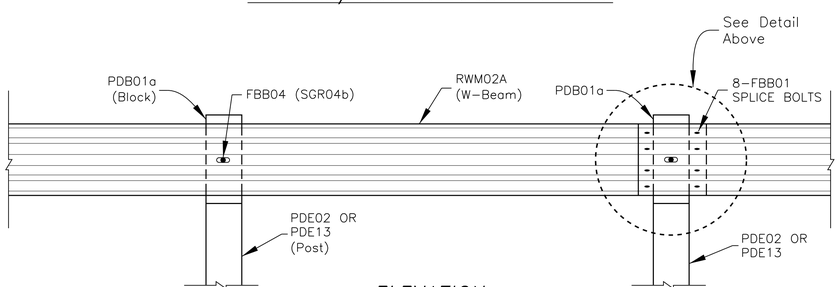
ELEVATION
POST/BLOCK
SPLICE DETAIL



ELEVATION
STRONG-POST W-BEAM



PLAN
W-BEAM/POST & BLOCK DETAILS



ELEVATION
W-BEAM/POST & BLOCK DETAILS

GENERAL NOTES

1. THE 16 D FLAT WASHER IS USED UNDER THE NUT, BEHIND THE POST ONLY. NO WASHER IS USED AT THE RAIL.
2. SEE SHEET 82 OF 95 FOR ADDITIONAL NOTES.
3. THE CONTRACTOR HAS THE OPTION TO USE ALL-STEEL POSTS W/WOODEN BLOCK ON STANDARD LINE POSTS, UNLESS OTEHERWISE NOTED ON THE DESIGN PLANS.
4. IF STEEL POSTS ARE APPROVED THEN RUBBER BLOCKS WILL BE REQUIRED.
5. BEGIN/END ASPHALT CURB AT POST #??.
6. BEGIN REFLECTIVE TABS ON THE W-BEAM AT EVERY FOURTH POST. THE COLOR OF THE TABS SHALL CONFORM TO THE COLOR OF THE ADJACENT EDGE LINE.
7. ANGLE STRUT MUST BE ATTACHED USING 19D HIGH STRENGTH BOLTS.

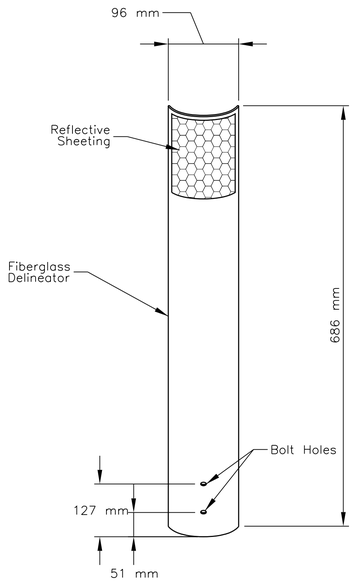
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STANDARD GUARDRAIL DETAIL 1

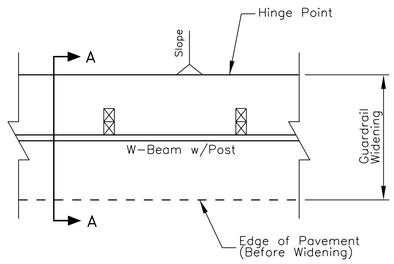
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DESIGNED BY: NRDOT	DATE: 6/1/2015
REVISED: 9/14/2017	BY: Leroy.Toledo
Sht 42 N27_SGR04 Std Gdrail Redesign1_041615.dgn	

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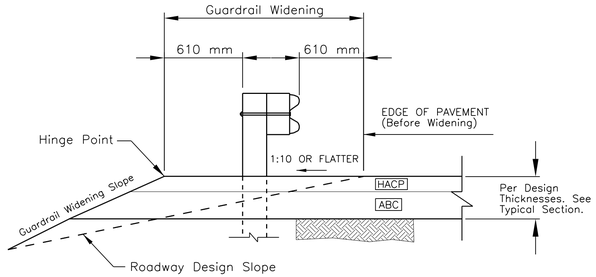
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
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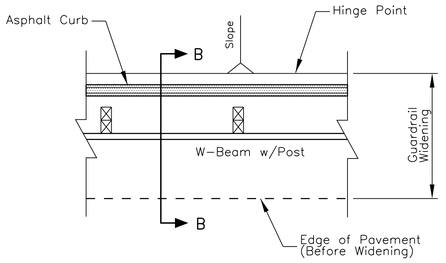
DELINEATOR DETAIL
(Reflective Sheeting Shall Face Traffic)



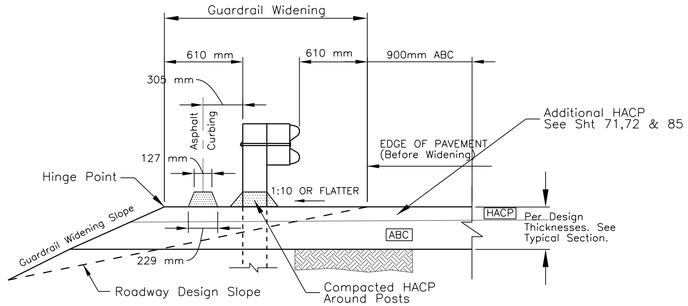
PLAN VIEW
w/NO CURBING



SECTION A-A
w/No Curbing



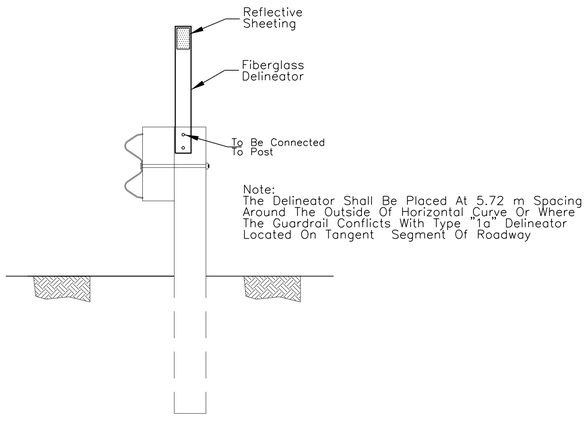
PLAN VIEW
w/CURBING



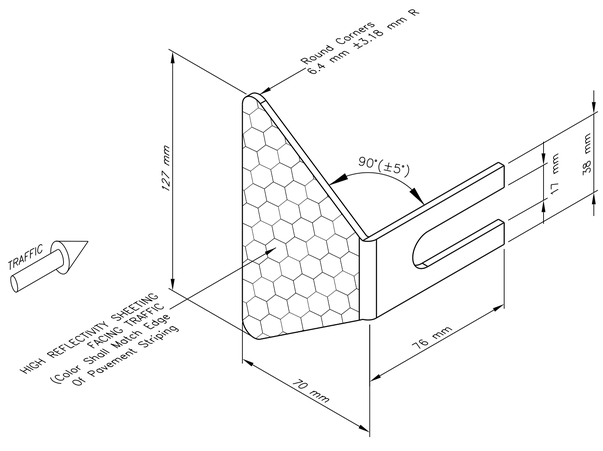
SECTION B-B
w/CURBING
Asphalt Curb Depth=102 mm

GENERAL NOTES

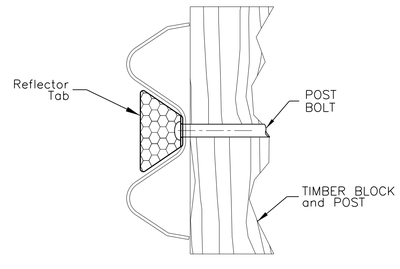
1. ALL GUARDRAIL "W" BEAMS, SHALL BE GALVANIZED IN ACCORDANCE WITH (AASHTO M-180, CLASS A, TYPE 1) SPECIFICATION. ALL HARDWARE SHALL CONFORM TO (ASTM A-325) AND GALVANIZED IN ACCORDANCE WITH (ASTM A-153).
2. ALL STRUCTURAL STEEL ITEMS SHOWN SHALL CONFORM TO (AASHTO N183/ASTM A36) AND BE GALVANIZED IN ACCORDANCE WITH (AASHTO M-111) SPECIFICATION.
3. WIRE ROPE, FITTINGS AND HARDWARE SHALL CONFORM TO (ASSHTO M-30) SPECIFICATION TYPE II WITH A 19 mm DIAMETER AND A CLASS B ZINC COATING.
4. WOOD POSTS AND BLOCKS SHALL BE ROUGH SAWN LUMBER OR (S4S) HAVING MINIMUM BENDING STRENGTH OF 8.27 MPa (SINGLE MEMBER USE) AND MEETING AASHTO N168 (21TH EDITION), ALL POSTS SHALL BE TREATED IN ACCORDANCE WITH (AASHTO M-133) SPECIFICATION.
5. ASPHALT CONCRETE CURBING SHALL BE INSTALLED IN ACCORDANCE WITH SECTION B-B, AND CONSIDERED INCIDENTAL TO PAVING ITEMS AND NO DIRECT PAYMENT SHALL BE MADE.
6. ALL EMBANKMENT AND AGGREGATE BASE COURSE MATERIALS SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY.
7. THE EMBANKMENT MATERIALS AND THE PLACING THEREOF SHALL BE INCLUDED IN CONTRACT BID ITEM 20401-0000 AND NO DIRECT PAYMENT SHALL BE MADE.
8. THE CONTRACTOR SHALL BE REQUIRED TO COMPACT THE BACKFILL AND THE ASPHALT ALL AROUND EACH GUARD RAIL POST WITH HAND TAMPERS TO INSURE INTEGRITY OF THE PAVEMENT AND GUARDRAIL AND TO PREVENT SEEPAGE OF WATER INTO THE PAVEMENT FROM THE GUARD RAIL POST HOLES. THIS WORK SHALL BE INCIDENTAL OBLIGATIONS OF THE WORK DESCRIBED HEREIN.
9. PLACEMENT OF HOT ASPHALT AND ABC MATERIAL FOR GUARDRAIL WIDENING SHALL BE INCLUDED IN BID ITEMS 30101-2000 AND 40201-0500.
10. FURNISHING & PLACEMENT OF 371 mm x 701 mm REFLECTIVE SHEETING AND REFLECTIVE TABS SHALL BE CONSIDERED INCIDENTAL TO ITEM 61701-5000 AND NO DIRECT PAYMENT SHALL BE MADE.
11. ANY RELATED PATENT RIGHTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AS PER SECTION 107.01 OF THE FP-03.
12. THE CONTRACTOR HAS THE OPTION TO USE STEEL POSTS. IF STEEL POSTS ARE APPROVED THEN RUBBER BLOCKS WILL BE REQUIRED.
13. PLACE REFLECTIVE TABS ON POSTS AT EVERY FOURTH POST. THE COLOR OF THE TABS SHALL CONFORM TO THE COLOR OF THE ADJACENT EDGE LINE.



ELEVATION
GUARDRAIL/POST MOUNTED
DELINEATOR (TYP.)



ISOMETRIC VIEW
REFLECTOR TAB DETAIL



SECTION
REFLECTOR TAB
MOUNTING DETAIL
Install Tab on Every Second Post

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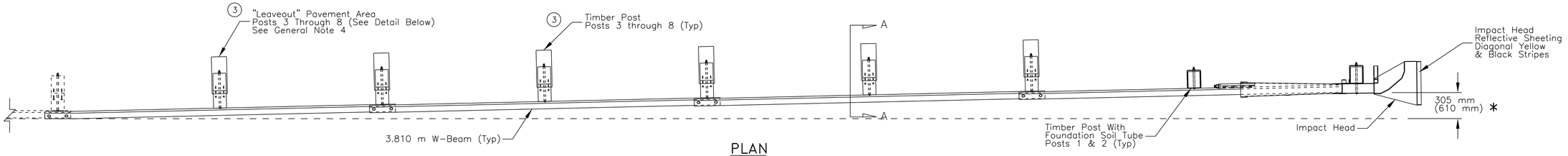
STANDARD GUARDRAIL DETAIL 2

DRAWN BY: NRDOT	DATE: 6/1/2015
DESIGNED BY: NRDOT	DATE: 6/1/2015
REVISED: 9/14/2017	BY: Leroy.Toledo
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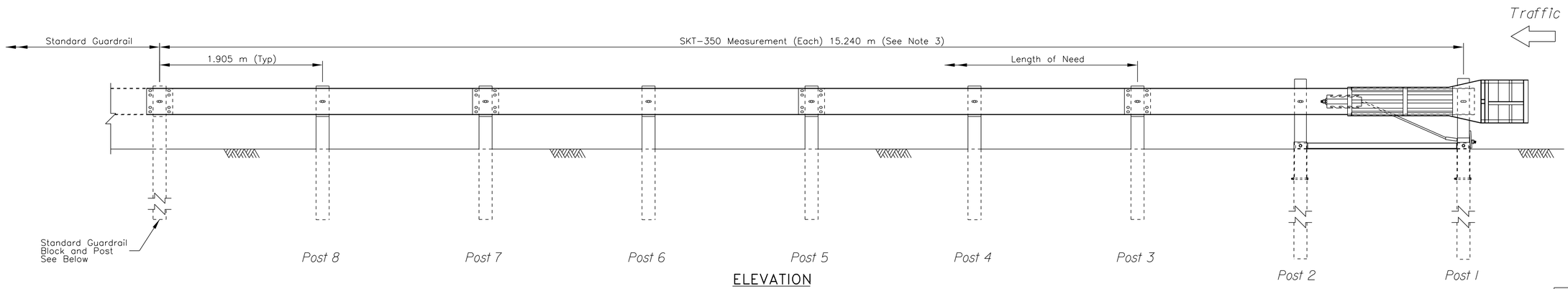
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	44	71

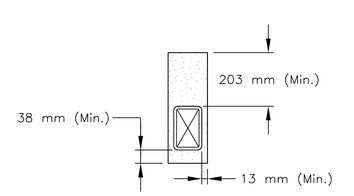
*FOR ELEVATIONS ABOVE (1,220 m) USE THE VALUES IN PARENTHESES



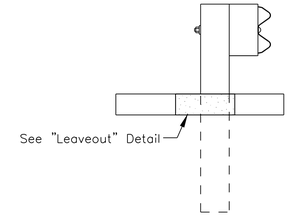
PLAN



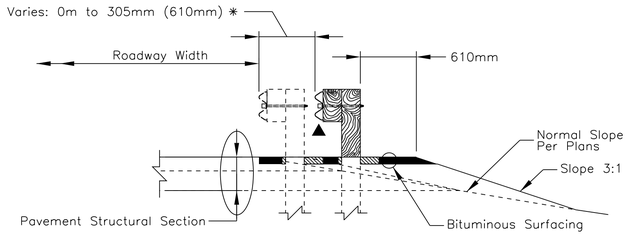
ELEVATION



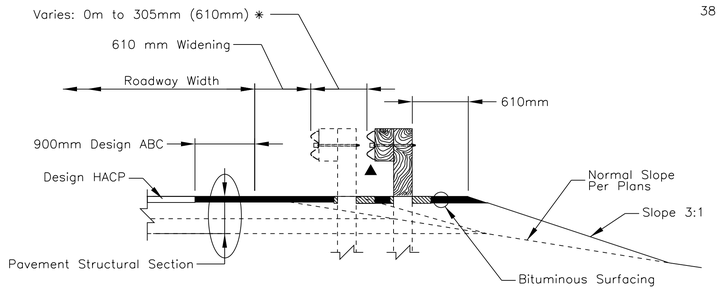
LEAVEOUT DETAIL



SECTION A-A
Typical At Post 3 Thru 8



TYPE A SECTION

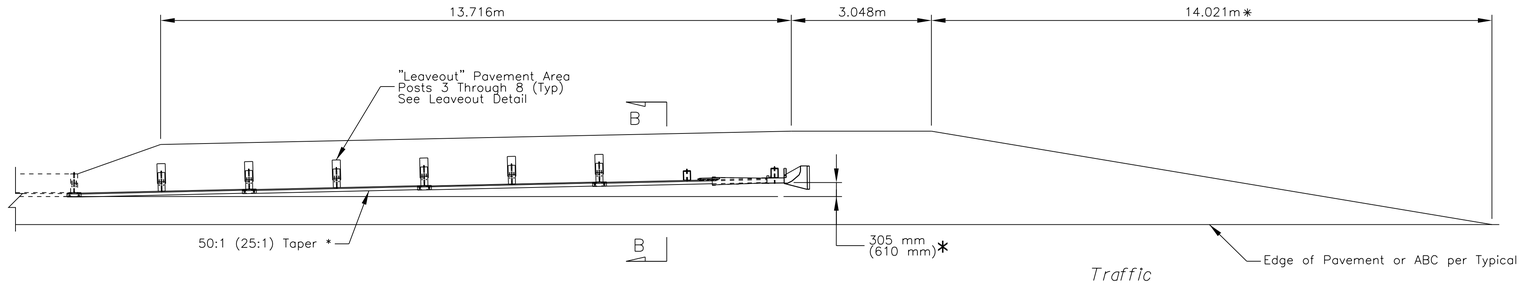


TYPE B SECTION

GENERAL NOTES

1. THIS DETAIL IS FOR ROADWAY LAYOUT ONLY.
2. THE SKT-350 SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND CURRENT APPROVED DRAWINGS INCLUDING ALL DETAILS HARDWARE. HARDWARE QUANTITIES AND OTHER INFORMATION AS SHOWN IN THESE PLANS.
3. THE 15.240 m W-BEAM LENGTH SHALL CONSIST OF FOUR 4.0 m SECTIONS. THE END SECTION BEING A PROPRIETARY SPLIT RAIL.
4. "LEAVEOUT" IN ASPHALTIC CONCRETE SHALL BE PROVIDED IN THE AC PAVEMENT AROUND THE GUARDRAIL POSTS AT THE LOCATIONS AND DIMENSIONS SPECIFIED ON THE ROAD SYSTEMS INC. APPROVED DRAWING SHOWN IN THESE PLANS. "LEAVEOUT" MATERIAL SHALL CONSIST OF A 1-SACK GROUT MIX OR OTHER NON-COHESIVE MATERIAL AS APPROVED BY THE NRDOT MATERIALS UNIT.

See Sheet 41 For General Notes.



TYPE B GUARDRAIL INSTALLATION
(FACE OF RAIL OFFSET 610mm FROM NORMAL EDGE OF PAVEMENT)

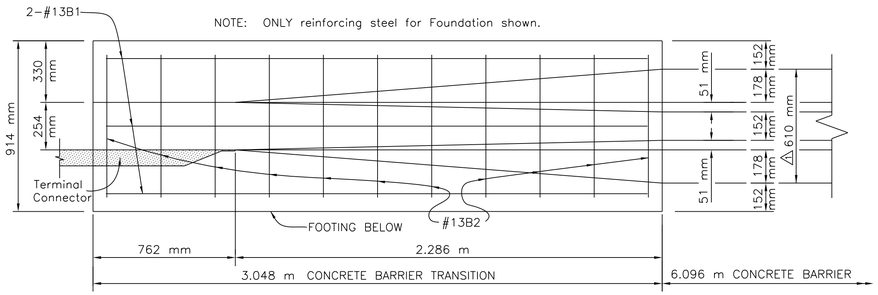
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GUARDRAIL END TREATMENT
SKT-350 LAYOUT; SHEET 1 of 2

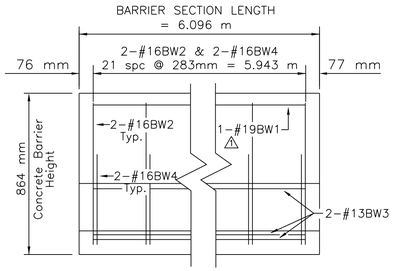
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DESIGNED BY: NRDOT	DATE: 6/1/2015
REVISED: 9/19/2017	BY: Leroy.Toledo
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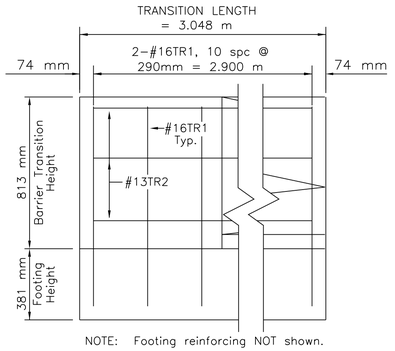
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	45	71



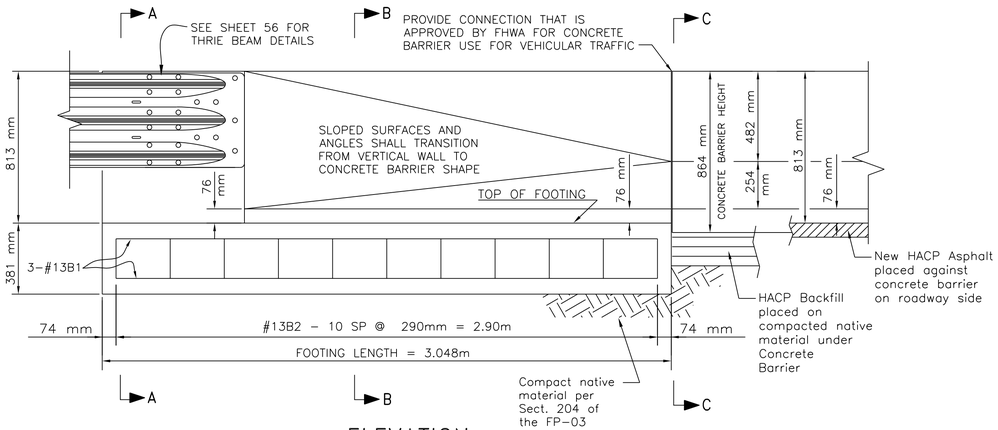
PLAN



CONCRETE BARRIER
REINFORCING DETAILS – ELEVATION



CONCRETE BARRIER TRANSTION
REINFORCING DETAILS – ELEVATION



ELEVATION

1. SPECIFICATIONS: DESIGN: AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES, SEVENTEENTH EDITION, 2002 AND SUBSEQUENT INTERIM SPECS. CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-03, AND ALL SUBSEQUENT REVISIONS.

2. UNITS: ALL DIMENSIONS ARE IN SI (METRIC) UNITS.

3. CONCRETE: CAST IN PLACE CONCRETE SHALL BE CLASS A(AE) WITH A 28 DAY MINIMUM STRENGTH OF 20.7 MPa. THE AIR CONTENT FOR CLASS A(AE) CONCRETE SHALL NOT BE LESS THAN SPECIFIED IN THE FP-03. CHAMFER EXPOSED CORNERS OF ALL CONCRETE 20mm UNLESS OTHERWISE SHOWN. ALL CONCRETE SHALL CONTAIN TYPE II PORTLAND CEMENT. THE TIME LIMITS SPECIFIED IN THE FP-03 SHALL APPLY. IF THE CONCRETE CANNOT BE DISCHARGED WITHIN THE SPECIFIED LIMIT, AN ALTERNATE METHOD OF DELIVERY, SUCH AS DRY BATCHING SHALL BE USED OR A SITE BATCHING PLANT CONFORMING TO THE SPECIFICATIONS SHALL BE USED. ALL CONCRETE FOR BARRIERS AND BARRIER TRANSTIONS AND ALL EXPANSION JOINTS INCLUDING ANY FILLER MATERIAL, SHALL BE CONSIDERED INCIDENTAL TO ITEM 61801-1000, CONCRETE BARRIER.

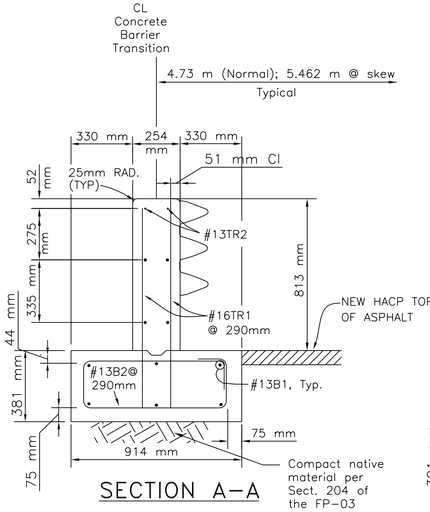
4. FINISHING CONCRETE SURFACES: ALL CONCRETE SURFACES ABOVE GROUND LEVEL SHALL BE GIVEN A CLASS 1 ORDINARY FINISH.

5. REINFORCING STEEL: ALL REINFORCING STEEL SHALL CONFORM TO AASHTO M 31M, GRADE 420 UNLESS A DIFFERENT GRADE IS SPECIFIED. THE MINIMUM COVER OF ANY REINFORCING STEEL SHALL BE 50mm UNLESS OTHERWISE SPECIFIED. DIMENSIONS SHOWN REFER TO THE CENTERLINE OR BARS UNLESS NOTED OTHERWISE. LENGTHS OF REINFORCING STEEL BARS SHOWN INCLUDE REQUIRED SPLICE LENGTHS FOR SPLICES SHOWN. ALL REINFORCING STEEL FOR PRECAST CONCRETE BARRIER AND CAST-IN-PLACE CONCRETE BARRIER TRANSITIONS SHALL BE CONSIDERED INCIDENTAL TO ITEM 61801-1000, CONCRETE BARRIER.

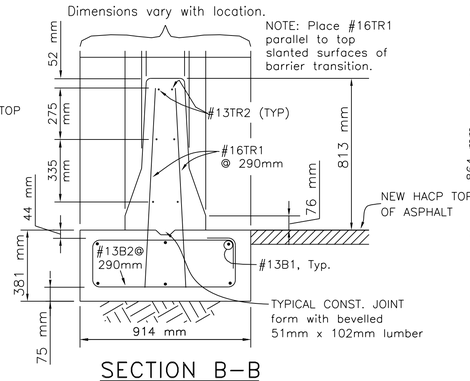
6. CONTRACTOR SHALL VERIFY: IN THE FIELD ALL DIMENSIONS, ELEVATIONS, AND DETAILS WHICH WILL BE INVOLVED IN THE NEW CONSTRUCTION BEFORE PROCEEDING WITH NEW WORK.

7. PRECAST CONCRETE BARRIERS: FABRICATE (PRE-CAST) OR CAST IN PLACE. CONTRACTOR SHALL SUBMIT A PROPOSED CONCRETE BARRIER (JERSEY BARRIER) DESIGN AND LAYOUT TO THE NAVAJO REGIONAL PLANNING AND DESIGN SECTION THROUGH THE COR/AOTR PRIOR TO FABRICATION OR ORDERING OF MATERIAL. SEE THIS SHEET FOR SAMPLE DESIGN/LAYOUT. THE CONTRACTOR HAS THE OPTION TO SUBMIT ALTERNATE DESIGNS FOR REVIEW AND APPROVAL AND SHALL INCLUDE DESIGN OF BARRIER SECTION CONNECTIONS CAPABLE OF RESISTING TRAFFIC IMPACTS CONFORMING TO FEDERAL STANDARDS, LIFTING ANCHORS, ANY ADDITIONAL REINFORCING STEEL NECESSARY TO SUIT LIFTING AND HANDLING OF THE PRECAST BARRIERS, ALTERNATE DESIGNS SHALL BE OF EQUAL OR GREATER CAPACITY FOR TRAFFIC IMPACT. PAYMENT FOR PRECAST CONCRETE BARRIERS, CAST-IN-PLACE CONCRETE BARRIER TRANSITIONS AND ALL NECESSARY LABOR, HARDWARE AND MATERIALS SHALL BE PAID BY THE LINEAR METER. UNDER BID ITEM 61801-0000. THE COST OF ALL REINFORCING STEEL, INSERTS AND CONNECTIONS ASSOCIATED WITH THESE ITEM ARE CONSIDERED INCIDENTAL TO ITEM 61801-1000.

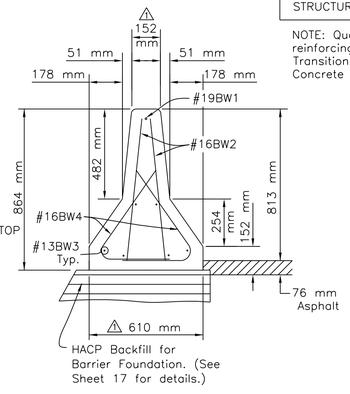
8. FOUNDATION BELOW CONCRETE BARREIR TRANSITION FOOTING SHALL BE COMPACTED NATIVE MATERIAL COMPACTED PER SECTION 204 OF THE FP-03. ALL WORK, MATERIALS AND LABOR NECESSARY FOR THE COMPACTION OF THE FOOTING BED SHALL BE CONSIDERED INCIDENTAL TO ITEM 61801-1000, CONCRETE BARRIER.



SECTION A–A



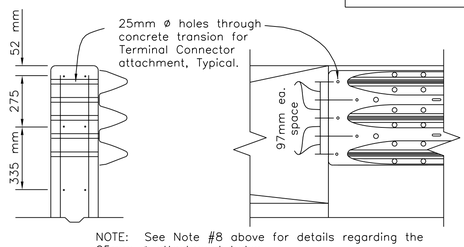
SECTION B–B



SECTION C–C

ESTIMATED QUANTITIES		
ONE 3.048 m TRANSITION W/ FOOTING		
REINFORCING BAR GRADE 420	96	kg
STRUCTURAL CONCRETE CLASS "AE"	1.81	m^3
ONE 6.096m CONCRETE BARRIER		
REINFORCING BAR GRADE 420	161	kg
STRUCTURAL CONCRETE CLASS "AE"	1.74	m^3

NOTE: Quantities shown for information only. Concrete and reinforcing steel for Concrete Barrier and Concrete Barrier Transition is considered incidental to Item 61801-0000, Concrete Barrier.



NOTE: See Note #8 above for details regarding the 25mm ø attachment holes.

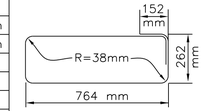
TERMINAL CONNECTOR
ATTACHMENT DETAIL

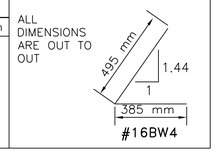
REINFORCING BAR SCHEDULE

LOCATION	MARK	QTY.	SIZE	LENGTH	SPACING
Footing, Longitudinal	13B1	6	13	2.900 m	
Footing, Stirrup (bent)	13B2	11	13	2.360 m	290 mm
Transition, Vertical	16TR1	22	16	1.070 m	290 mm
Transition, Horizontal	13TR2	6	13	2.900 m	
Barrier, Top Horizontal	19BW1	1	19	5.900 m	
Barrier, Vertical	16BW2	44	16	760 mm	283 mm
Barrier, Lower Horizontal	13BW3	6	13	5.900 m	
Barrier, Stirrup (bent)	16BW4	44	16	880 mm	283 mm

NOTE: Quantities shown above are for ONE 3.048 m long Concrete Barrier Transition with Footing, and for ONE 6.096 m long Concrete Barrier Section.

BENDING DIAGRAMS





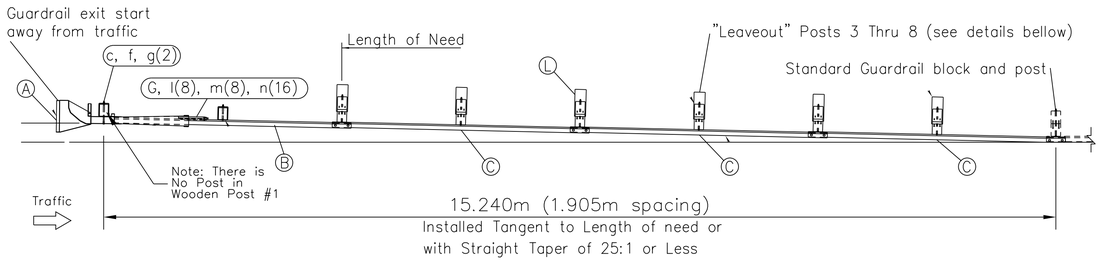
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BARRIER TRANSITION TO THRIE BEAM DETAILS

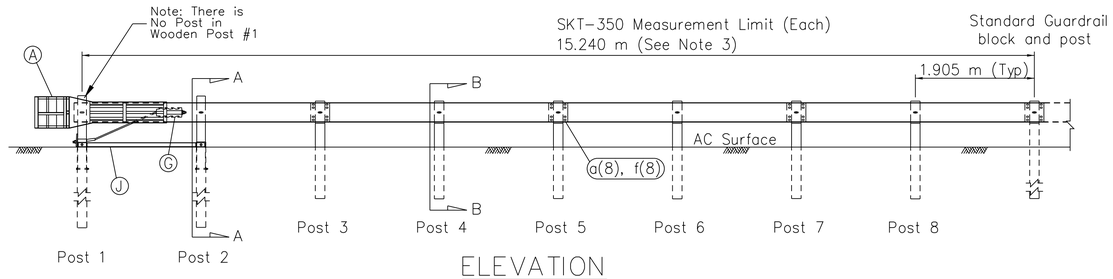
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REVISED: 5/28/2013	BY: Leroy.Toledo
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	46	71



PLAN

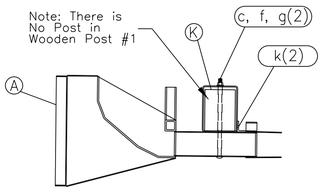


ELEVATION

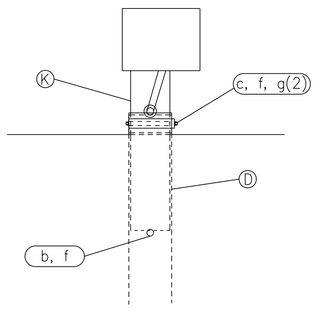
GENERAL NOTES

1. BREAKAWAY POSTS ARE REQUIRED WITH THE SEQUENTIAL KINKING TERMINAL.
2. ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS AND BEARING PLATES SHALL BE GALVANIZED.
3. THE SKT-350 CAN BE FLARED AT A RATE OF 25:1 TO PREVENT THE IMPACT HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE IS NOT REQUIRED AND MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS.
4. THE SOIL TUBES SHALL NOT PROTRUDE MORE THAN 102 mm ABOVE GROUND (MEASURED ALONG A 1.5 m CHORD). SITE GRADING MAY BE NECESSARY TO MEET THIS REQUIREMENT.
5. THE SOIL TUBES MAY BE DRIVEN WITH AN APPROVED DRIVING HEAD. SOIL TUBES SHOULD NOT BE DRIVEN WITH THE POST IN THE TUBE. IF THE TUBES ARE PLACED IN DRILLED HOLES, THE BACKFILL MATERIAL MUST BE SATISFACTORILY COMPACTED TO PREVENT SETTLEMENT.
6. WHEN ROCK IS ENCOUNTERED DURING EXCAVATION, A 305 mm DIA. POST HOLE, 508 mm INTO ROCK MAY BE USED IF APPROVED BY THE ENGINEER. GRANULAR MATERIAL WILL BE PLACED IN THE BOTTOM OF THE HOLE APPROX. 64 mm DEEP TO PROVIDE DRAINAGE. THE SOIL TUBES WILL BE FIELD CUT TO LENGTH, PLACED IN THE HOLE AND BACKFILLED WITH ADEQUATELY COMPACTED MATERIAL EXCAVATED FROM THE HOLE.
7. THE BREAKAWAY CABLE ASSEMBLY MUST BE TAUT. A LOCKING DEVICE, (VICE-GRIPS OR CHANNEL-LOCK PLIERS) SHOULD BE USED TO PREVENT THE CABLE FROM TWISTING WHEN TIGHTENING NUTS.
8. A SPECIAL SITE EVALUATION SHOULD BE CONSIDERED PRIOR TO USING THE SKT-350 WHERE THERE IS LESS THAN 7.620 m BETWEEN THE OUTLET SIDE OF THE SKT-350 AND ANY ADJACENT DRVING LANE.
9. THE WOOD BLOCKOUTS SHOULD BE "TOE-NAILED" TO THE WOOD POSTS TO PREVENT THEM FROM TURNING WHEN THE WOOD SHRINKS.
10. GUARDRAIL SPLICE SHALL BE OVERLAPPED IN THE DIRECTION OF ADJACENT TRAFFIC.
11. BILL OF MATERIALS AND SOME OF THE DETAILS HEREIN WERE PROVIDED BY ROAD SYSTEMS INC.

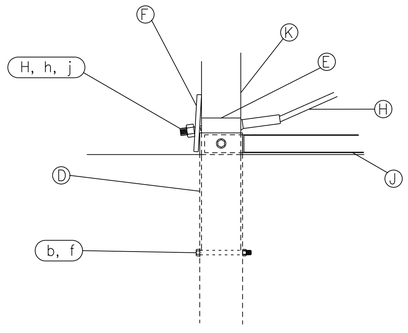
Code	QTY.	BILL OF MATERIALS	ITEM#
A	1	IMPACT HEAD	S3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 GA., 3.810m	FS1303
C	3	W-BEAM GUARDRAIL, 12 GA., 3.810m RAIL ELEMENTS	G1203
D	2	FOUNDATION SOIL TUBE, 152mm x 203mm x 1.829m	E731
E	1	PIPE SLEEVE	E740
F	1	BEARING PLATE, 203mm x 203mm x 16mm	E750
G	1	CABLE ANCHOR BOX	S760
H	1	BCT CABLE ANCHOR ASSEMBLY	E770
J	1	GROUND STRUT	E780
K	2	140mm x 191mm x 1.143m WOOD POSTS	P650
L	6	152mm x 203mm x 1.829m WOOD CRT POST	P671
M	6	152mm x 203mm x 356mm TIMBER BLOCKOUT	P675
		HARDWARE	
a	32	16mm Dia. x 32mm SPLICE BOLT	B580122
b	2	16mm Dia. x 191mm HEX BOLT	B580754
c	2	16mm Dia. x 254mm HEX BOLT	B581004
d	1	16mm Dia. x 191mm H.G.R. BOLT (post 2 only)	B581002
e	6	16mm Dia. x 457mm H.G.R. BOLT (posts 3-8)	B581802
f	43	16mm Dia. H.G.R. NUT	N050
g	11	H.G.R. WASHER	W050
h	2	25mm ANCHOR CABLE HEX NUT	N100
j	2	25mm ANCHOR CABLE WASHER	W100
k	2	9.5mm X 76mm LAG SCREW	E350
l	8	CABLE ANCHOR BOX SHOULDER BOLTS	SB58A
m	8	12.7mm A325 STRUCTURAL NUTS	N055A
n	16	27mm OD x 14mm ID A325 STR. WASHER	W050A



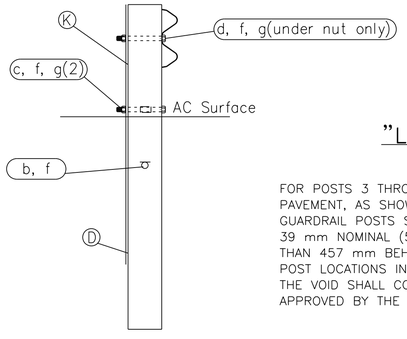
IMPACT HEAD
CONNECTING DETAIL



FRONT VIEW OF POST 1



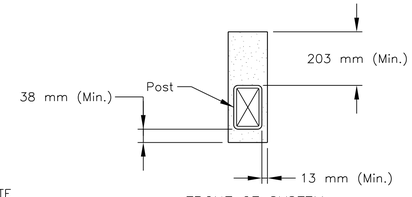
SIDE VIEW OF POST 1



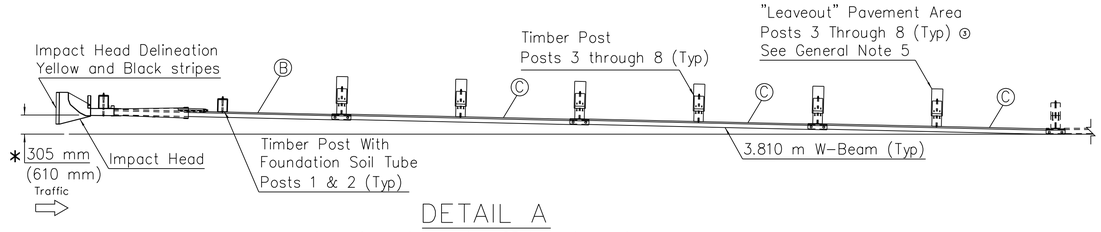
SECTION A-A

"LEAVEOUT" REQUIREMENT:

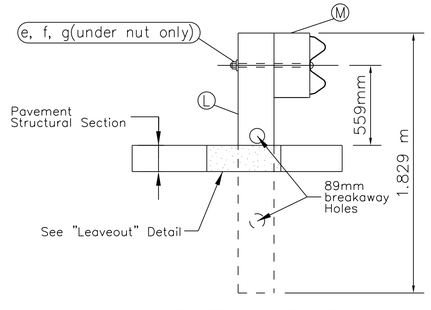
FOR POSTS 3 THROUGH 8, "LEAVEOUTS" IN THE ASPHALTIC CONCRETE PAVEMENT, AS SHOWN IN SECTION B-B AND BLOCKOUT DETAIL, AROUND GUARDRAIL POSTS SHALL BE PROVIDED WHERE ASPHALT THICKNESS EXCEEDS 39 mm NOMINAL (51 mm max) AND WHERE THE ASPHALT EXTENDS MORE THAN 457 mm BEHIND THE POSTS. THE "LEAVEOUT" SHALL BE USED AT THE POST LOCATIONS INDICATED AND THE "LEAVEOUT" MATERIAL TO BE PLACE IN THE VOID SHALL CONSIST OF A 1-SACK GROUT MIX MATERIAL AS APPROVED BY THE COR/COTR (NRDOT MATERIALS UNIT).



"LEAVEOUT" DETAIL



DETAIL A
optional flared installation, 25:1 maximum flare rate



SECTION B-B
typical at Post 3 thru 8

APPROVED AS NCHRP 350 T3 TERMINAL

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GUARDRAIL END TREATMENT
SKT-350 LAYOUT; SHEET 2 of 2

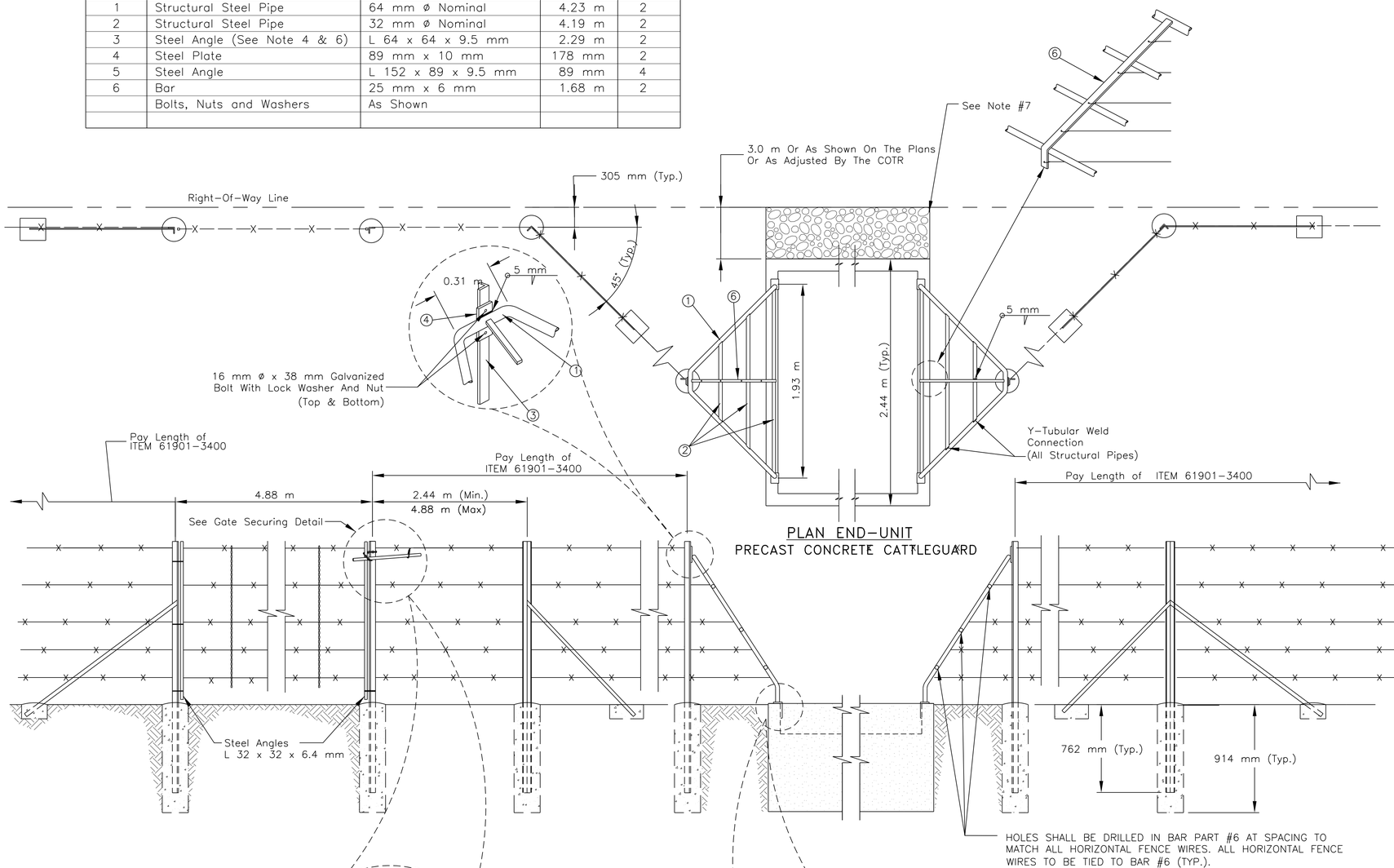
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DESIGNED BY: NRDOT	DATE: 6/1/2015
REVISED: 9/19/2017	BY: Leroy.Toledo
Sht 46 N27 SKT-350_3of3_021315.dgn	

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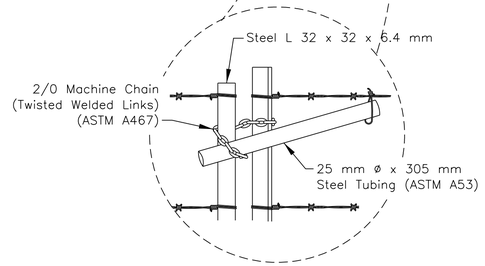
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	47	71

ESTIMATED MATERIAL LIST

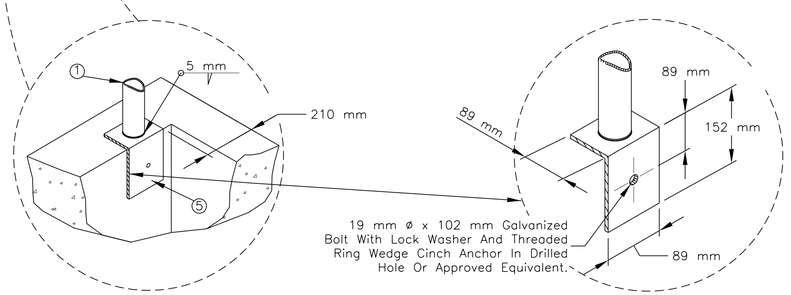
PART NO.	MATERIAL	SIZE AND THICKNESS	LENGTH	QUANTITY
1	Structural Steel Pipe	64 mm ø Nominal	4.23 m	2
2	Structural Steel Pipe	32 mm ø Nominal	4.19 m	2
3	Steel Angle (See Note 4 & 6)	L 64 x 64 x 9.5 mm	2.29 m	2
4	Steel Plate	89 mm x 10 mm	178 mm	2
5	Steel Angle	L 152 x 89 x 9.5 mm	89 mm	4
6	Bar	25 mm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



PLAN END-UNIT
PRECAST CONCRETE CATTLEGUARD



GATE SECURING DETAIL



GENERAL NOTES

1. STRUCTURAL PIPE SHALL CONFORM TO ASTM A53-93a, GRADE B. ALL OTHER STRUCTURAL STEEL SHALL CONFORM TO ASTM-A36.
2. ALL STRUCTURAL PIPE JOINTS SHALL BE FABRICATED IN ACCORDANCE WITH AISC MANUAL OF STEEL CONSTRUCTION, LATEST EDITION.
3. WELDING SHALL MEET THE REQUIREMENTS OF AASHTO STANDARD SPECIFICATIONS FOR WELDING AT STRUCTURAL STEEL HIGHWAY BRIDGES, LATEST EDITION.
4. THE SUPPORTING WING BRACE POSTS LENGTH (PART 3) SHALL PROVIDE A MINIMUM OF 610 mm OF SOIL PENETRATION. UNDER CERTAIN CONDITIONS (SUCH AS DRAIN THROUGH CATTLEGUARD, HIGH EMBANKMENT, ETC.) THE LENGTH OF POST MAY VARY TO FULLY SUPPORT THE WING BRACES. THIS WORK SHALL BE INCIDENTAL TO CONTRACT ITEM 61903. INSTALLATION OF GATE SHALL BE SUBSIDIARY ITEM TO THE CATTLEGUARD ITEM(S).
5. THE COR/COTR MAY ADJUST THE FINISHED CATTLEGUARD 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 CONTRACT ITEM 61903 OF FP-03. ANY MISTAKES MADE BY COR/COTR IN DIRECTING ADJUSTMENTS TO THE FINISHED GRADE FOR THE CATTLEGUARDS AND APPROACH ROADWAY WILL BE CORRECTED UNDER SUBSECTION 109.02(m).
6. AT SHEWED TURNOUT LOCATIONS, THE CATTLEGUARD SHALL BE INSTALLED PERPENDICULAR TO TURNOUT.
7. THE LENGTH OF THE TRUNOUT BETWEEN THE BACK EDGE OF THE CATTLEGUARD AND THE RIGHT-OF-WAY LIMIT SHALL BE SURFACED WITH A 100 mm THICKNESS OF AGGREGATE BASE COURSE AT ALL 4.5 m WIDE TURNOUTS. FOR TURNOUTS WIDER THAN 4.5 m, PLACE AGGREGATE BASE COURSE AND ASPHALT SURFACING TO MATCH THE TURNOUT STRUCTURAL SECTION, BETWEEN THE BACK OF THE CATTLEGUARD 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.
8. AT CATTLEGUARD LOCATIONS WHERE THE DESIGN TYICAL WIDTH IS WIDER ON ONE SIDE OF THE CATTLEGUARD THAN THE OTHER SIDE, THE NARROWER ROADWAY WIDTH SHALL FLARED OUT TO MATCH THE WIDER ROADWAY WIDTH USING AN 8:1 TAPER OR TO THE LENGTH ALLOW BY THE RIGHT-OF-WAY WIDTH. THIS INCLUDES AT NARROW RIGHT-OF-WAY WIDTH WHERE THE TURNOUT RADIUS CANNOT BE COMPLETELY INSTALL BETWEEN THE MAIN ROAD AND THE CATTLEGUARD. THIS WORK SHALL BE PAID UNDER THE EARTHWORK, AGGREGATE BASE, AND PAVING ITEMS INCLUDED IN THED BID SCHEDULE.

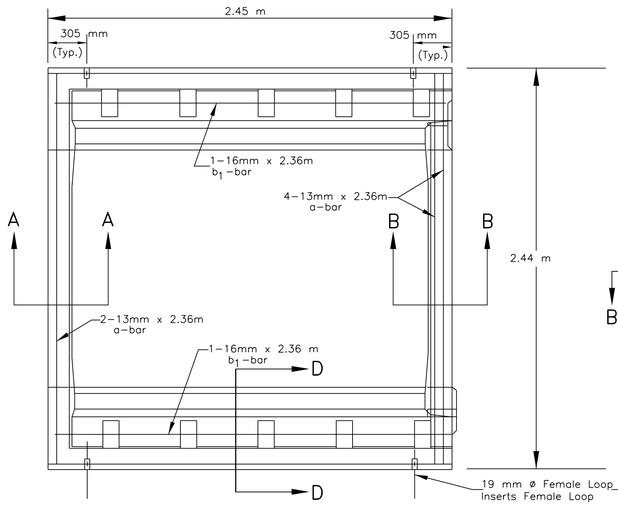
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CATTLEGUARD AND WING BRACE DETAILS

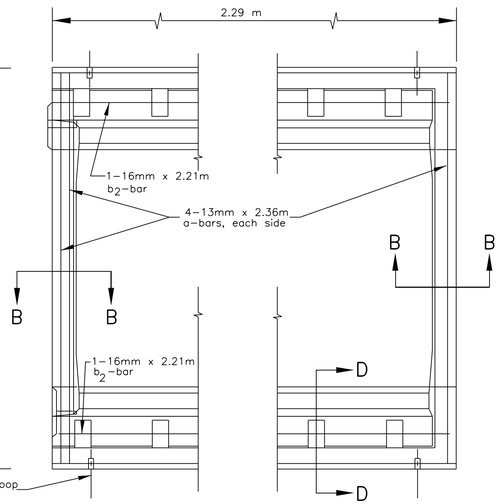
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DESIGNED BY: NRDOT	DATE: 2/12/2014
REVISED: 6/1/2015	BY: Leroy.Toledo
Sht 47 N27 CG WBRC.dgn	

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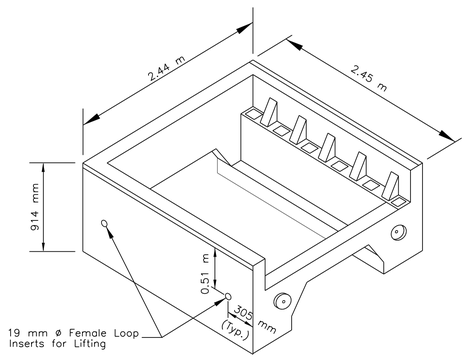
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	48	71



PLAN – END UNIT



PLAN – INTERMEDIATE UNIT



ISOMETRIC VIEW – END UNIT

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-03.

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 UNIT, 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-03.

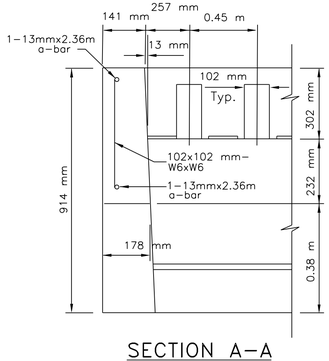
6. WING BRACES SHALL BE CONSIDERED SUBSIDIARY ITEMS TO THE CATTLEGUARD UNIT.

7. THE CONTRACTOR HAS THE OPTION TO USE ALL STEEL FRAME CATTLEGUARD. IF THE CONTRACTOR ELECTS TO SUBSTITUTE FOR THE STEEL FRAME CATTLEGUARD, CONTRACTOR 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 CATTLEGUARD SHALL BE USED FOR CONCRETE DRAINAGE PAD CATTLEGUARD LOCATIONS.

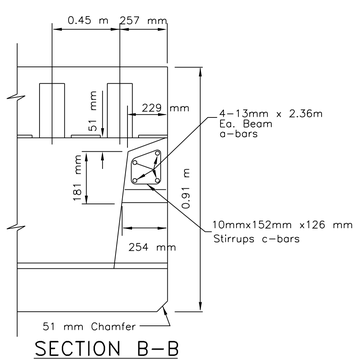
8. ELASTOMERIC BEARING PADS SHALL BE SEAL WITH EPOXY ADHESIVE PRIOR TO THE INSTALLATION OF TRAFFIC GRILL UNIT.

9. DESIGN DATA: DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, THIRD EDITION.

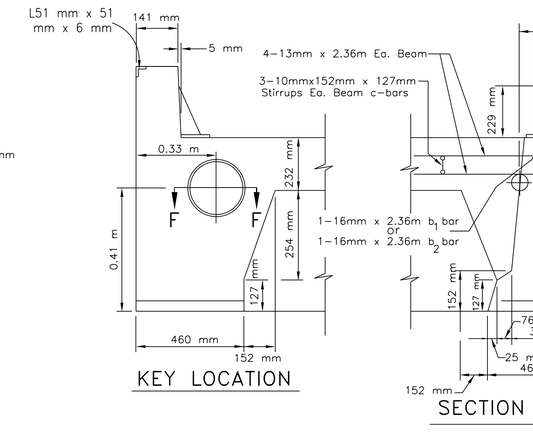
   DESIGN LOADS: HS20 AND DESIGN TANDEM WITH 33% IMPACT.



SECTION A-A

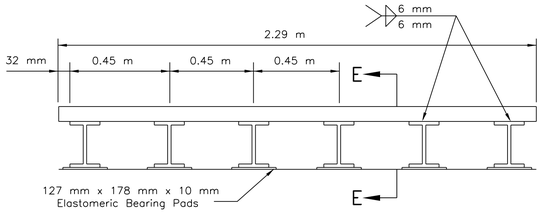


SECTION B-B

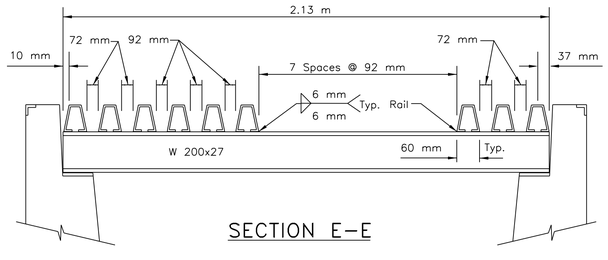


KEY LOCATION

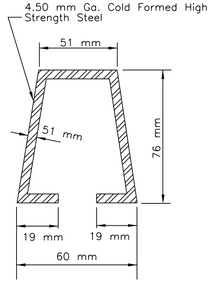
SECTION D-D



TRAFFIC GRILLE UNIT

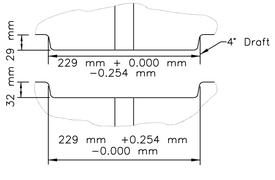


SECTION E-E

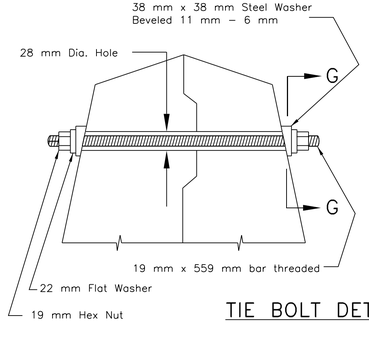


STEEL CROSSBAR SECTION

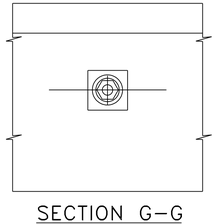
15 Req'd for 1 Grid



SECTION F-F



TIE BOLT DETAIL



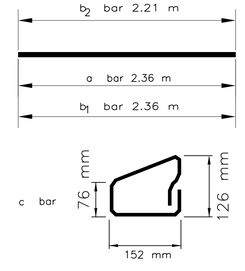
SECTION G-G

REINFORCING STEEL SCHEDULE

STRAIGHT BARS				BENT BARS			
MARK	NO.	SIZE	LENGTH	MARK	NO.	SIZE	LENGTH
END UNIT							
a	6	13	2.36 m				
b_1	2	16	2.36 m				
				c	3	10	0.61 m
D_1	20	13	0.46 m				
INTERMEDIATE UNIT							
a	8	13	2.36 m				
b_2	2	16	2.21 m				
				c	6	10	0.61 m
D_1	18	13	0.46 m				

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT



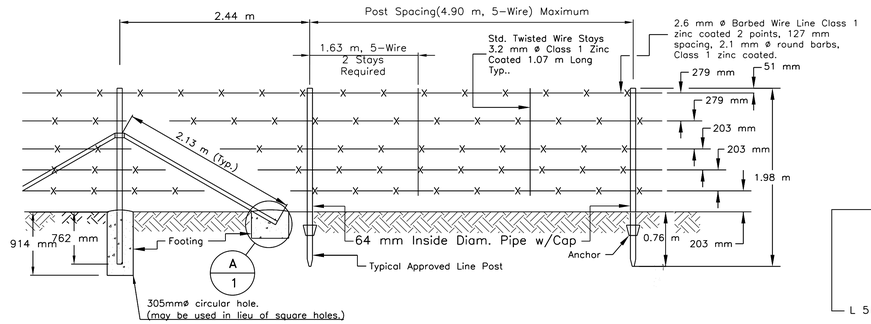
UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRECAST CONCRETE CATTLEGUARD DETAILS

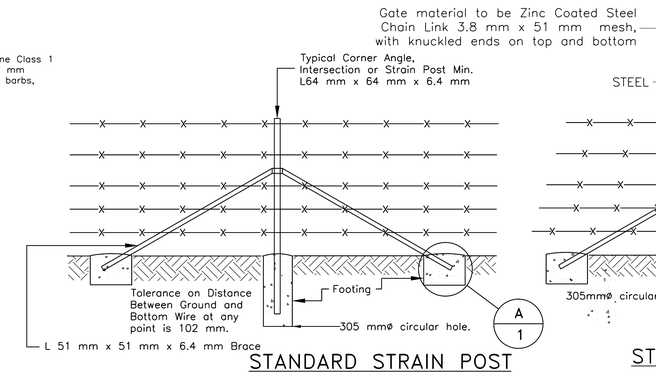
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DESIGNED BY: NRDOT	DATE: 2/12/2014
REVISED: 6/1/2015	BY: Leroy.Toledo
Sht 48 N27 PCCG.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 48 N27 PCCG.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	49	71

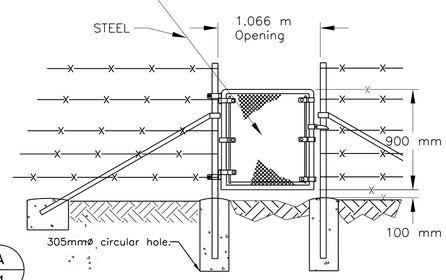


STANDARD 5 LINE GALVANIZED BARBED WIRE PANEL



STANDARD STRAIN POST

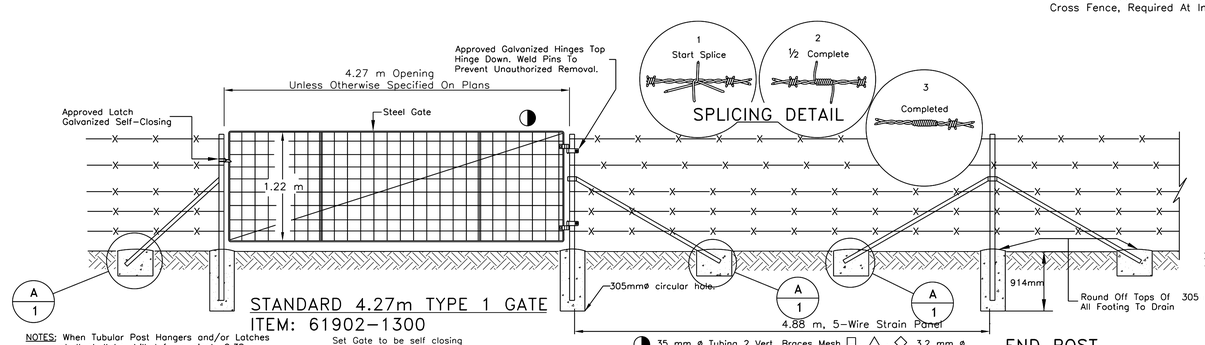
To Be Placed @ 198 m Max. Intervals. Strain Posts With Braces Shall Be Installed At All Corners (R/W Corners Etc.) And Angles Exceeding 15° And Fence Intersections. A Third Brace, In Line With Cross Fence, Required At Intersection.



STANDARD PEDESTRIAN GATE DETAIL

GENERAL NOTES

1. CORNER, GATE, INTERMEDIATE BRACE POSTS AND LINE POSTS SHALL BE EITHER GALVANIZED OR PAINTED IN ACCORDANCE WITH AASHTO M 281-96. METAL POST AND BRACES SHALL BE FABRICATED FROM RAIL, BILLET, OR COMMERICAL GRADE STEEL CONFORMING WITH THE REQUIREMENT OF ASTM A 702
2. LINE POSTS SHALL BE FABRICATED IN ACCORDANCE WITH AASHTO M 281-96, AND SHALL BE A NOMINAL WEIGHT OF 1.98 kg/m EXCLUSIVE OF ANCHOR PLATES. ANCHOR PLATES SHALL BE CLAMPED, WELDED OR RIVETED TO THE SECTION IN SUCH A MANNER AS TO PREVENT DISPLACEMENT WHEN THE POSTS ARE DRIVEN.
3. WHEN LINE POST ANCHORS ARE OMITTED, DUE TO CHANGE IN SOIL CONDITIONS SUCH AS ROCK, THEN THE POSTS SHALL BE SET IN CONCRETE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO BID ITEM 61901-1000.
4. THE WIRE, WIRE FASTENERS OR WIRE CLIPS FOR FASTENING BARBED AND WOVEN FABRIC FENCING TO THE STEEL POSTS SHALL BE 3.0 mm DIA. STEEL WIRE, CLASS 1 (ZINC COATED, SOFT TEMPER) SHALL MEET THE REQUIREMENTS OF ASTM A 641. FURNISHING AND PLACEMENT OF FASTENERS SHALL BE INCLUDED WITH BID ITEM 61901-1000.
5. CONCRETE FOR ANCHORS, POST HOLES, ETC. SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa IN 28 DAYS AND SHALL CONFORM TO SECTION 601 OF THE FP-03. FURNISHING AND PLACEMENT OF CONCRETE SHALL BE INCLUDED WITH ITEM 61901-1000.
6. TWO SPLICES ON THE SAME LINE BETWEEN THE STRAIN POST ASSEMBLIES SHALL NOT BE PERMITTED. NO SPLICES SHALL BE PLACED CLOSER THAN 30 METER OF ANY POST ASSEMBLIES.
7. CONNECT ALL R.O.W. FENCING TO CATTLEGUARDS, CULVERTS (GREATER THAN 1524 mm DIA.). AND CONCRETE STRUCTURES AS SHOWN ON THESE PLANS, AND/OR AS DIRECTED BY THE COR/COTR.
8. ANY CONFLICT IN PLACEMENT OF THE R/W FENCING AT DRAINAGE PIPE LOCATION, DUE TO NARROW R/W WIDTH OR OTHER CONSTRICTIONS, THE FENCE MAY BE PLACED OVER THE DRAINAGE STRUCTURE AS DIRECTED BY THE COR/COTR. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO BID ITEM 61901-1000.
9. CLEARING AND GRUBBING SHALL INCLUDE SHAPING AND/OR REMOVAL OF SMALL MOUNDS NECESSARY TO PRESENT A SMOOTH UNIFORM APPEARANCE OF BOTH GROUND AND FENCING LINE. THIS WORK SHALL BE INCIDENTALTO THE INSTALLATION OF FENCING AND NO ADDITIONAL PAYMENT SHALL BE MADE.
10. ALL DRILLING INTO ROCK MATERIAL, ETC. SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING AND NO ADDITIONAL PAYMENT SHALL BE MADE.
11. GATE CLOSURE DEVICE SHALL BE STEEL PIPE, NPS 3 /4 (26.7 mm) SCHEDULE 40, CONFORMING TO THE REQUIREMENT OF ASTM A 53. THE GATE CLOSURE STEEL CHAIN SHALL BE WELDED TO THE STEEL PIPE AND CIRCULAR TUBING IRON FENCE POST. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCE POST AND NO ADDITIONAL PAYMENT SHALL BE MADE.
12. CONTRACTOR SHALL BE REQUIRED TO INSTALL SAG WEIGHTS WHERE VERTICAL CLEARANCE BETWEEN THE BOTTOM WIRE AND NATURAL GROUND IS 610 mm OR GREATER. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING.
13. THE CONTRACTOR SHALL SUBMIT COMPLETE DETAILED SHOP DRAWINGS FOR PEDESTRAIN GATE, HINGES AND LATCH TO PLANNING AND DESIGN CHIEF, THROUGH THE COR/COTR, FOR REVIEW AND APPROVAL. GATE POSTS, BRACES, HINGES AND LATCH TO MATCH STANDARD TYPE 1 GATES, MINIMUM GATE. FRAME TO BE CONSTRUCTED WITH 30 mm DIAMETER PIPE. GATE SHALL BE SELF CLOSING.



STANDARD 4.27m TYPE 1 GATE
ITEM: 61902-1300

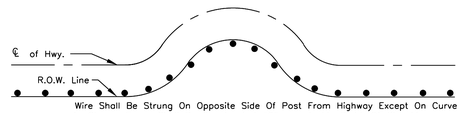
NOTES: When Tubular Post Hangers and/or Latches are used, it shall be drilled for a single 2.38 mm ø Min. drive pin to prevent rotation of the hangers and/or latches.

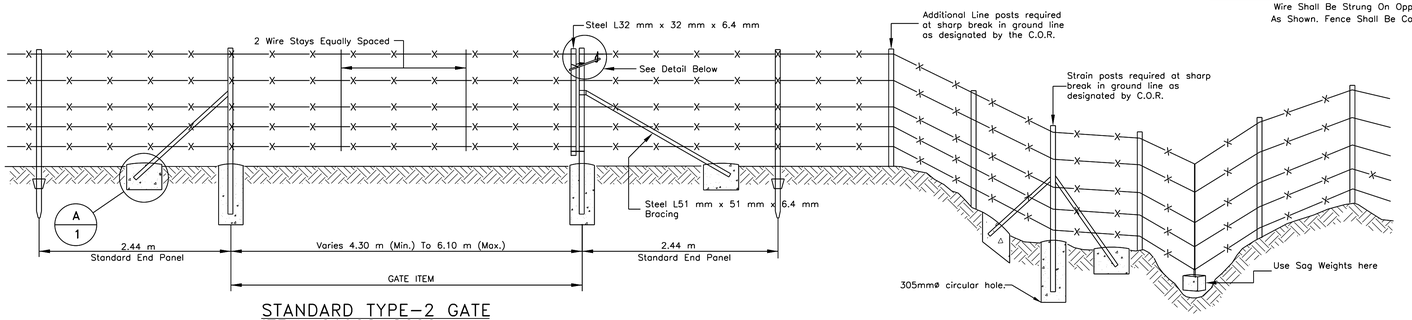
Set Gate to be self closing (use only when specified by special note in the plans)

For Gate Details at Cattle guard location see standard cattle guard drawings.

◑ 35 mm ø Tubing 2 Vert. Braces Mesh □, △, ◇, 3.2 mm ø Line Wires 2.6 mm ø Crosswires. 1 Adjustable Diagonal Guy Fully Galvanized.

END POST



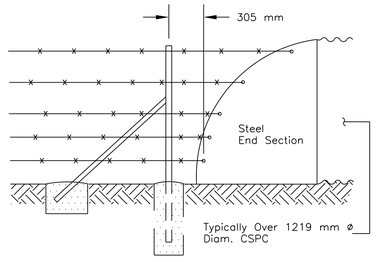


STANDARD TYPE-2 GATE
ITEM: 61902-2600

Use At Locations Noted On Plans

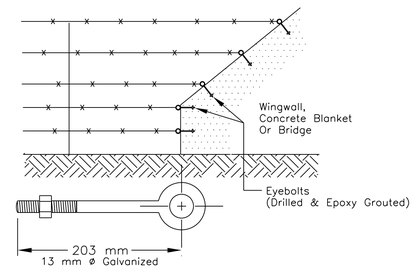
FENCE PROFILE IN ROUGH TERRAIN

In Rough Terrain Post Spacing Shall Be Reduced Where Necessary To Maintain Required Spacing Below Bottom Wire Within The Tolerance Allowed.



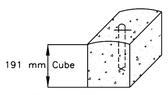
WING FENCE

Detail For Corr.
Metal Culvert



EYE BOLT DETAIL

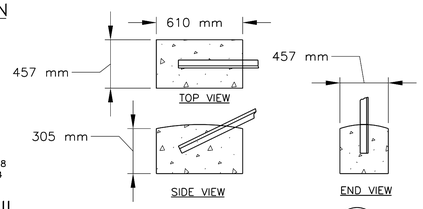
TYPICAL STEEL POST SECTION



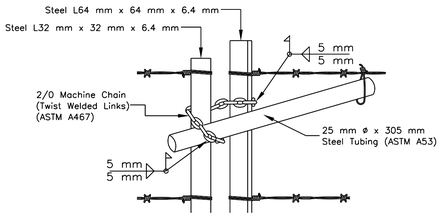
38 mm x 127 mm Doubled and Twisted 3.8 mm(dia.) Wire Loop Centered in Block. 25.4 mm Projection Twisted Ends Down.

CONCRETE SAG WEIGHT DETAIL

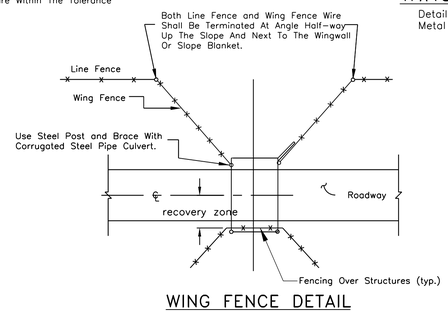
Min. Weight Of Concrete Sag Shall Be 16 kg.



CONCRETE FOOTING FOR CORNER & STRAIN POST (A/1)



GATE SECURING DETAIL



WING FENCE DETAIL

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

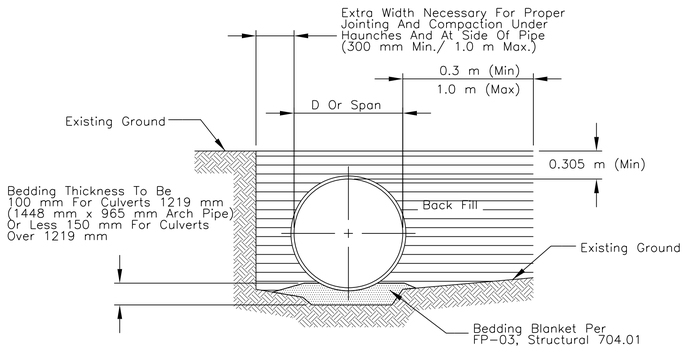
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD FENCING DETAIL

DRAWN BY: NRDOT	DATE: 1/31/2013
DESIGNED BY: NRDOT	DATE: 1/31/2013
REVISED: 5/28/2013	BY: Leroy.Toledo
Sht 49 N27 FenDtls 091817.dgn	

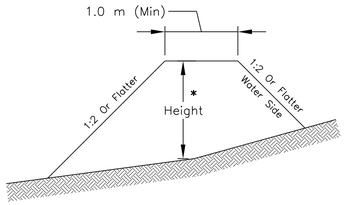
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
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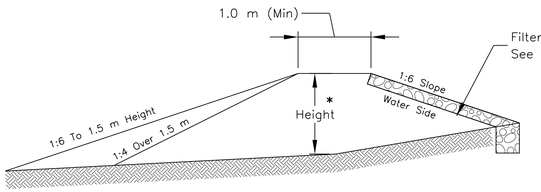


NEGATIVE PROJECTING POSITIVE PROJECTING

FIGURE A: BEDDING

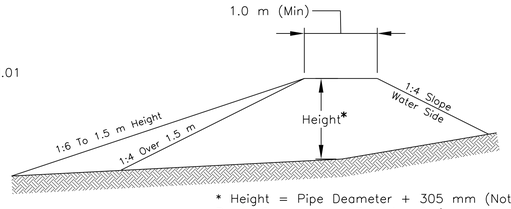


TYPE "A" DIKE/BERM



TYPE "B" DIKE/BERM

NOTE: When Necessary The Slope May Be Flattened To 1:6 With 457 mm Thick Riprap Protection As Called For On Plans.



* Height = Pipe Deameter + 305 mm (Not To Exceed Paved Shoulder And Elevation Or/As Given On Plans)

TYPE "B" DIKE/BERM

EARTHEN DIKE/BERM DETAILS

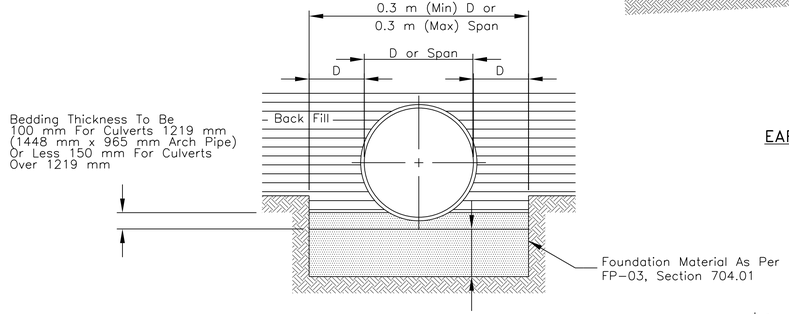
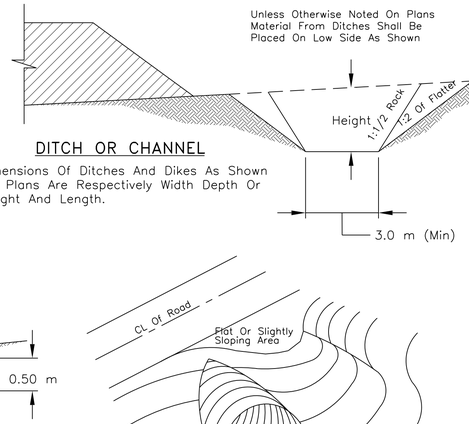
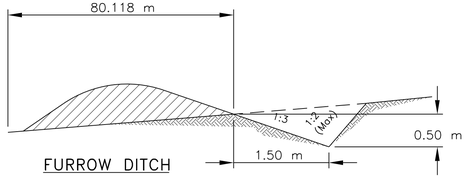


FIGURE B: ROCK BEDDING



DITCH OR CHANNEL

Note: Dimensions Of Ditches And Dikes As Shown On Plans Are Respectively Width Depth Or Height And Length.



FURROW DITCH

1. To Be Paid For By The meter.
2. Furrow Ditch Sections As Shown Above And/Or Approved Equivalent Shall Be Built As Directed By The COTR.
3. See Sheet XX For Riprap Lined Furrow Ditch Dimensions.

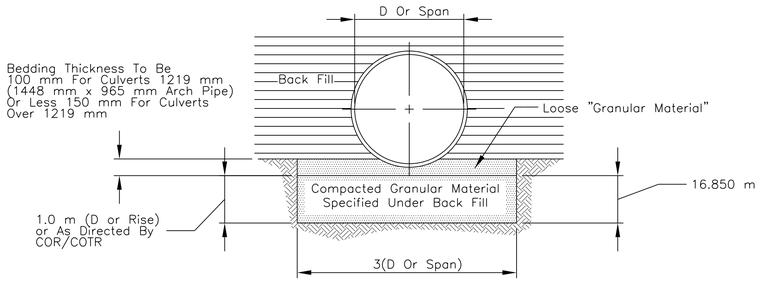
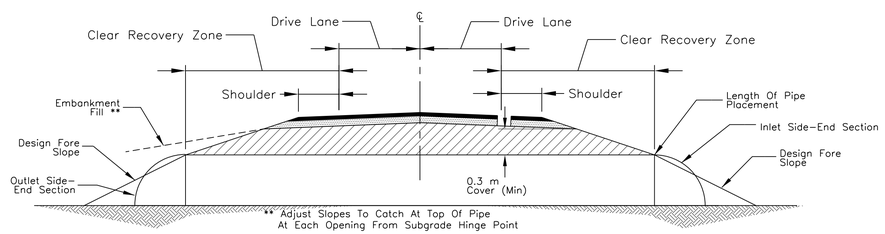


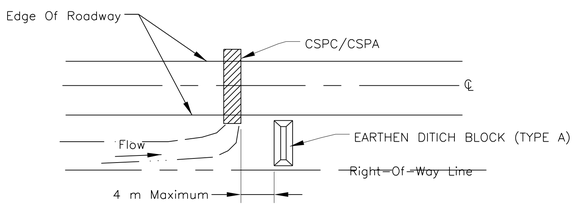
FIGURE C: FOUNDATION STABILIZATION BEDDING



TYPICAL PIPE INSTALLATION-(TURNOUT/DRIVEWAY AND MAIN ROADWAY.

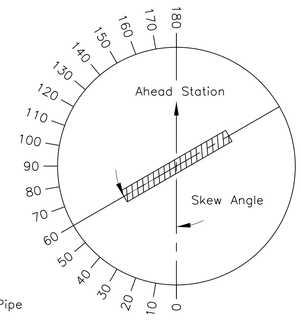
PIPE SKEWS TO THE EMBANKMENT (TYP.)

The Contractor Shall Be Required To Build The Warped Embankment Around The Skewed Drainage Pipe(s). This Work Shall Be Incidental To The Earthwork And Installation Of Drainage Pipe Items Shown.



EARTHEN DIKE/BERM INSTALLATION AT STRUCTURE

1. Earthen Dike/Berm At Structures To Be So Placed That They Create A Water Cushion. Elevation At Top Of Earthen Dike/Berm Shall Be 305 mm Above Elevation Of Top Of Pipe Unless Otherwise Shown Or Directed By The AOTR/COR.
2. Earthen Dike/Berm Shall Be Located A Distance Equal To The Largest Dimension Of Box Culvert Or Pipe From The Face Of The Drainage Structure. In No Case Shall The Distance Exceed 4.0 m.



STRUCTURE SKEW DIAGRAM

GENERAL NOTES

1. PLACE LOOSE BEDDING ROUGHLY SHAPED TO BOTTOM OF PIPE, THEN COMPACT UNDER HAUNCHES AFTER PIPE PLACEMENT.
2. SEE SECTION 204, 209, 602, AND 704 OF FP-03, INCLUDING THE SUPPLEMENTAL SPECIFICATION FOR ADDITIONAL NOTES.
3. ALL DRAINAGE STRUCTURE MATERIAL SHALL BE UNLOADED AND HANDLED WITH REASONABLE CARE. NO STRUCTURE SHALL BE DRAGGED OR ALLOWED TO STRIKE ANY HARD SURFACE DURING PLACEMENT. ANY DAMAGED STRUCTURE SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE GOVERNMENT.
4. ALL STRUCTURAL PLATE PIPE AND PRECAST BOX STRUCTURES SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE FABRICATORS RECOMMENDATIONS.
5. BACKFILL MATERIAL SHALL BE PLACED AT PIPE DIAMETER WIDE ON THE SIDES AND 300 mm(MIN)/ 1.0 m(MAX) OVER THE PIPE. BACKFILL MATERIAL BEYOND THE LIMITS SHALL BE REGULAR EARTHWORK EMBANKMENT MATERIAL, THE BACKFILL MATERIAL SHALL BE APPROVED BY THE COTR PRIOR TO IT'S USE AND SHALL BE PLACED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
6. PONDING OR JETTING PIPE BACKFILL SHALL NOT BE PERMITTED.
7. ALL PIPE EXCAVATION, BACKFILLING, DE-WATERING PUMPING OR COFFERDAMS REQUIRED TO PROPERLY INSTALL THE DRAINAGE PIPE SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE PROJECT AND NO ADDITIONAL PAYMENT SHALL BE MADE.
8. MULTIPLE PIPE INSTALLATIONS SHALL BE PLACED 610 mm BETWEEN END SECTIONS UNLESS OTHERWISE DIRECTED BY THE COTR OR AS SHOWN ON THE PLANS.
9. ALL PIPE SHALL BE PROTECTED BY A COVER OR NOT LESS THAN 0.91 m OF EMBANKMENT ABOVE PIPE BEFORE ANY HEAVY EQUIPMENT IS ALLOWED TO PASS OVER THE STRUCTURE(S) DURING CONSTRUCTION.
10. ALL CULVERTS SHALL BE INSTALLED AT THE ORIGINAL FLOW LINE AND SLOPED TO ASSURE POSITIVE DRAINAGE UP TO THE R.O.W. LIMITS. IN NO CASE SHALL THE PIPE BE PLACED BELOW THE ORIGINAL FLOW ELEVATIONS, UNLESS OTHERWISE DIRECTED BY THE COTR. THIS SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE PROJECT AND NO ADDITIONAL PAYMENT SHALL BE MADE.
11. AT DRAINAGE PIPE REPLACEMENTS, INSTALLATIONS, EXTENSIONS AND IN-PLACE PIPE CLEANING LOCATIONS, THE CONTRACTOR SHALL RESHAPE, REGRADE AND CLEAN THE INLET AND OUTLET CHANNELS TO THE RIGHT-OF-WAY LINE AND/OR EXISTING DRAINAGE CHANNEL, TO PRODUCE SMOOTH FLOWS AT CULVERT INTAKES AND DISCHARGES AS DIRECTED BY THE COTR. THIS WORK SHALL BE INCIDENTAL TO THE BID ITEMS UNDER SECTIONS 602, 603 AND 607.
12. ALL CULVERTS UNDER TURNOUTS AND DRIVEWAYS SHALL BE PLACED AT THE PROPOSED DITCH FLOWLINE. THE CONTRACTOR SHALL BE REQUIRED TO FIELD ADJUST THE PROFILE GRADES OVER THE PIPE AS DIRECTED BY COTR TO PROVIDE FOR MINIMUN COVER.
13. TYPE "A" DIKE /BERM SHALL BE USED ON THE PROJECT UNLESS OTHERWISE NOTED ON THE PLANS. EMBANKMENT MATERIAL NEEDED TO BUILD EARTHEN DIKE/DERM SHALL BE CONSIDERED INCIDENTAL TO ITEM 20443-1000.
14. IF DIRECTED BY THE COR/COTR TO BETTER FIT DRAINAGE FIELD CONDITIONS TO MORE SMOOTHLY DIRECT FLOW INTO THE PIPE AND/OR TO LESSEN THE WATERS IMPACT ON THE FACE OF THE EARTHEN DIKE/BERM. THIS WORK TO BE INCIDENTAL TO BID ITEM 20443-1000.

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STANDARD PIPE INSTALLATION AND DITCH DETAILS

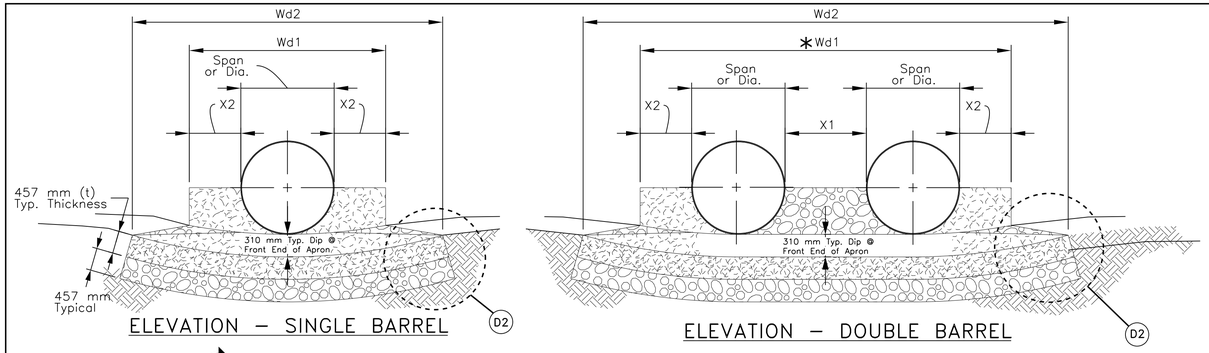
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DESIGNED BY: NRDOT	DATE: 2/4/2014
REVISED: 3/19/2014	BY: Leroy.Toledo
Sht 50 N27 pipe install details 091817.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	51	71

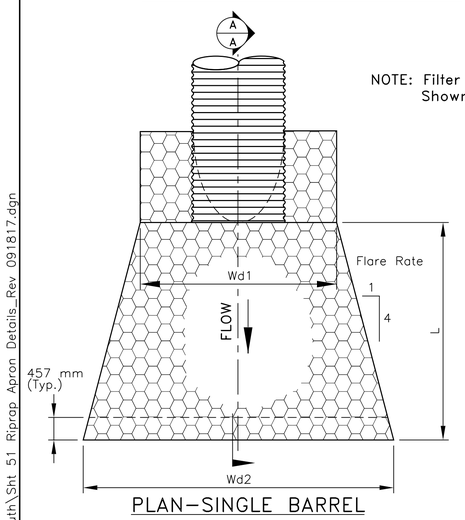
ITEM No. 25112-2000: WIRE ENCLOSED RIPRAP APRON, CLASS 2

Station:	Structure:	Location	Skew No.	X_1 (m)	X_2 (m)	W_{d1} (m) *	W_{d2} (m) *	L (m) *	L_s (m) *	t (mm)	Estimated Quantity (m^3)
45+060.00	7-1803 mm S x 1194 mm CSPA	Outlet	60.0	--	--	23.020	26.271	4.780	--	457	59.32
46+185.00	4-1372 mm ø CSPC	Outlet	120.0	3.167	0.704	17.248	20.959	5.488	2.855	457	74.79
46+280.00	1-Barrel 3.05 x 3.05 m PC CBC	Outlet	75.0	--	--	10.590	16.587	12.000	--	457	78.00
48+211.50	4-1448 mm S x 965 mm R CSPA	Outlet	90.0	2.362	0.610	14.098	16.028	3.860	2.046	457	43.10
48+246.00	4-1448 mm S x 965 mm R CSPA	Outlet	90.0	2.362	0.610	14.098	16.028	3.860	2.046	457	43.10
48+296.00	4-1448 mm S x 965 mm R CSPA	Outlet	90.0	2.362	0.610	14.098	16.028	3.860	2.046	457	43.10
48+413.00	3-1245 mm S x 838 mm R CSPA	Outlet	100.0	2.219	0.619	9.467	11.199	3.352	1.784	457	25.89
48+900.00	2-914 mm ø CSPC	Outlet	90.0	2.236	0.610	5.284	7.112	3.656	1.914	457	16.46
49+497.00	3-889 mm S x 610 mm R CSPA	Outlet	90.0	1.753	0.610	7.393	8.613	2.440	1.314	457	15.16
49+945.00	7-1803 mm S x 1194 mm CSPA	Outlet	120.0	--	--	23.020	26.271	4.780	--	457	59.32
50+514.00	4-1803 mm S x 1194 mm R CSPA	Outlet	130.0	3.416	0.796	21.256	25.513	4.776	2.518	457	80.83
50+622.00	3-1956 mm S x 1321 mm R CSPA	Outlet	130.0	3.614	0.797	16.482	21.192	5.284	2.780	457	70.85
50+795.00	3-1448 mm S x 965 mm R CSPA	Outlet	65.0	2.606	0.673	11.351	13.733	3.860	2.046	457	35.61
50+938.00	3-1448 mm S x 965 mm R CSPA	Outlet	135.0	3.341	0.863	14.549	18.666	3.860	2.046	457	46.80
51+043.00	3-1448 mm S x 965 mm R CSPA	Outlet	110.0	2.514	0.649	10.948	13.152	3.860	2.046	457	34.24
51+614.00	3-1245 mm S x 838 mm R CSPA	Outlet	45.0	3.090	0.863	13.185	16.761	3.352	1.784	457	37.19
51+721.00	2-1245 mm S x 838 mm R CSPA	Outlet	45.0	3.090	0.863	8.335	11.911	3.352	1.784	457	24.79
52+180.00	2-889 mm S x 610 mm R CSPA	Outlet	70.0	1.866	0.694	5.056	6.449	2.440	1.314	457	10.80
52+272.00	1-889 mm S x 610 mm R CSPA	Outlet	70.0	--	0.649	2.244	3.638	2.440	1.314	457	5.39
										TOTAL	804.74



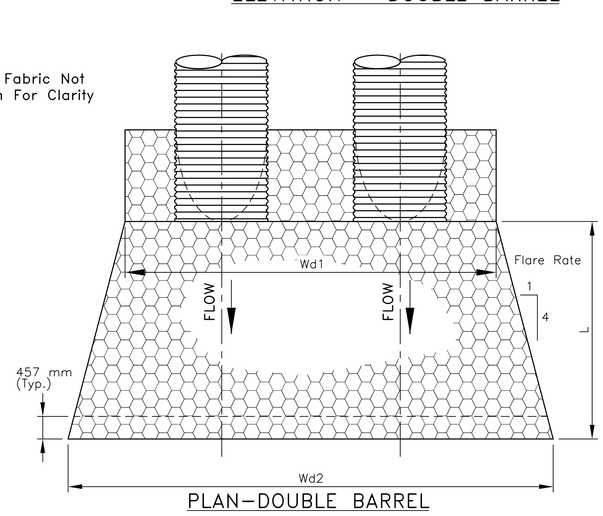
ELEVATION – SINGLE BARREL

ELEVATION – DOUBLE BARREL

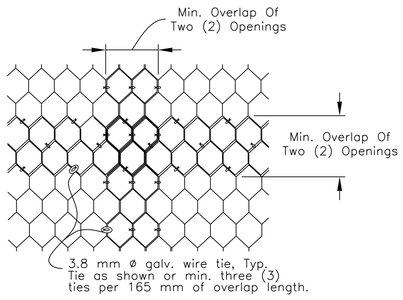


PLAN–SINGLE BARREL

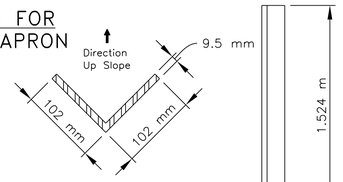
NOTE: Filter Fabric Not Shown For Clarity



PLAN–DOUBLE BARREL



FABRIC SPLICING DETAILS FOR WIRE ENCLOSED RIPRAP APRON



ANGLE IRON ANCHOR DETAIL

GENERAL NOTES

1. ALL STONE FOR RIPRAP SHALL BE CLASS 2 MEETING THE GRADING REQUIREMENTS OF TABLE 705-1 OF THE FP-03.

2. ALL EXCAVATIONS AND BACKFILL OPERATIONS SHALL BE DONE TO NEAT LINES IN ACCORDANCE WITH SECTION 209 OF THE FP-03 AND WILL BE INCIDENTAL TO INSTALLATION OF RIPRAP. SEE SUPPLEMENTAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

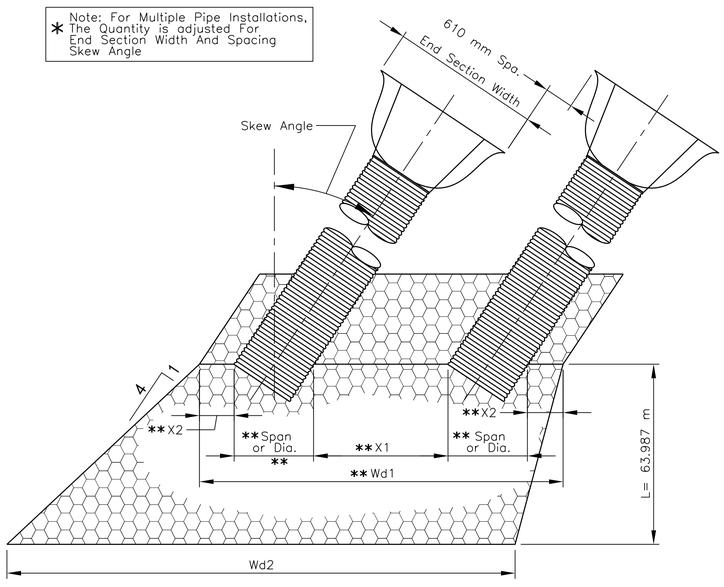
3. ANY BORROW MATERIAL NEEDED TO BRING EXISTING CHANNELS UP TO GRADE SHALL BE INCIDENTAL TO RIPRAP PAY ITEMS.

4. THE WIRE FABRIC SHALL BE GALVANIZED AND BE OF THE CONFIGURATION SHOWN IN THIS SHEET. AN ALTERNATE WIRE FABRIC MAY BE SUBMITTED FOR REVIEW AND APPROVAL. ANY WIRE FABRIC USED SHALL HAVE A MINIMUM WIRE DIAMETER OF 2.0 mm. A CLASS 3, ZINC COATING (GALVANIZED) SHALL HAVE A MAXIMUM OPENING DIMENSION OF 100 mm AND SHALL NOT ALLOW A 75 mm G SPHERE TO PASS THROUGH THE WIRE FABRIC OPENING. SEE SHT 52, NOTE 5 FOR FILTER FABRIC REQUIREMENTS.

5. WIRE ENCLOSED RIPRAP SHALL BE ANCHORED AS SHOWN WITH L 102 mm x 9.5 mm STEEL ANGLES SPACED AT 2.44 m EACH WAY. STEEL ANGLES SHALL EXTEND 75 mm ABOVE THE TOP OF THE MESH. IN ROCKY AREAS DRIVE ANGLE IRON ANCHORS TO REFUSAL (MIN. EMBEDDED 500 mm). THEN CUT AT 75 mm ABOVE REPRAP. ANCHORS SHALL BE SAW-CUT TO LEAVE A SMOOTH EDGE. DO NOT USE A CUTTING TORCE. FURNISHING AND PLACEMENT OF ANGLE STEEL SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.

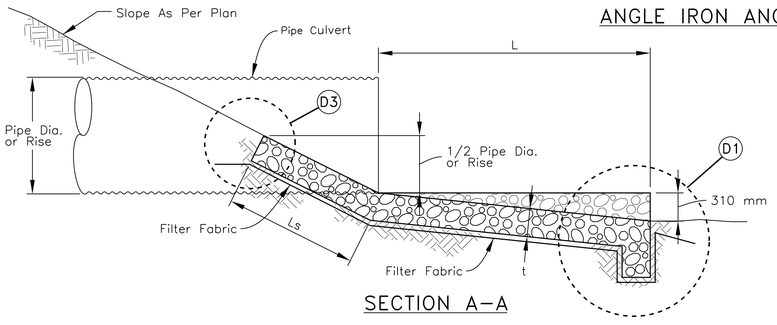
6. FOR ALL RIPRAP DOWNDRAIN AND CULVERT OUTLETS, PROVIDE CENTER OF RIPRAP 305 mm (MIN.) DIP BELOW OUTER EDGES AT OUTLET END. PLACE RIPRAP TO FIT CHANNEL BANKS WHERE POSSIBLE. ALL EXCAVATION AND APRON WARP RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.

Note: For Multiple Pipe Installations, * The Quantity is adjusted For End Section Width And Spacing Skew Angle

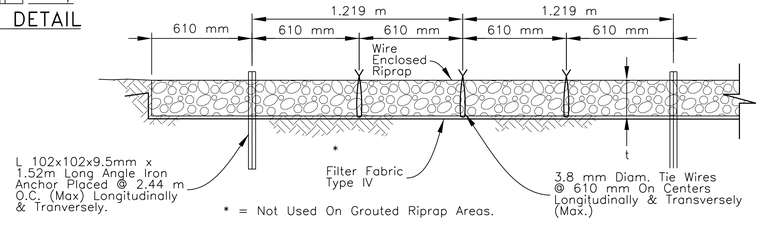


PLAN–SKEWED PIPES

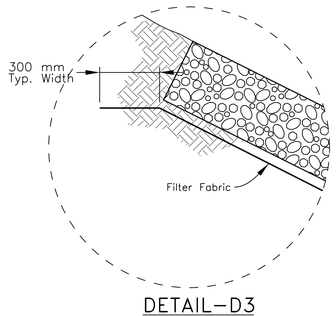
** Note: Divide X1, X2, Span or Diam. Wd1 & Wd2 Width by (1/ cos Skew Angel)



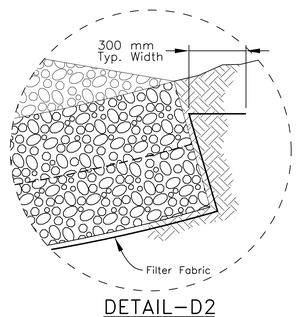
SECTION A–A



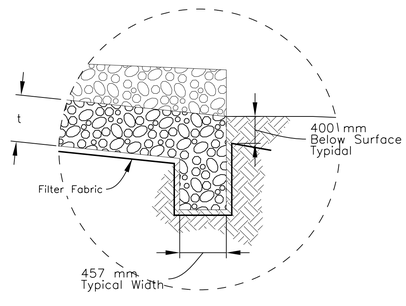
ANGLE IRON ANCHOR DETAILS
WIRE ENCLOSED RIPRAP APRON



DETAIL–D3



DETAIL–D2



DETAIL–D1

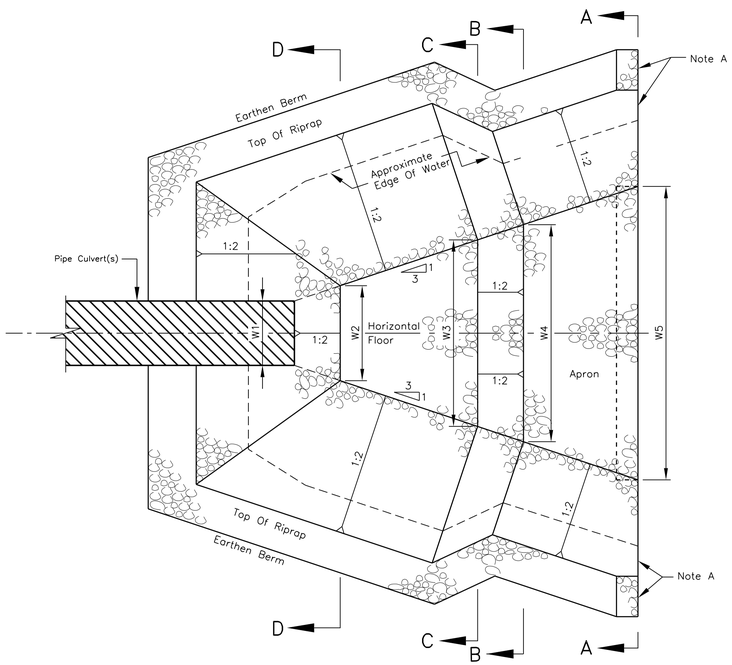
UNITED STATES
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BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

WIRE ENCLOSED RIPRAP APRON DETAILS

DRAWN BY: NRDOT	DATE: 5/8/2014
DESIGNED BY: NRDOT	DATE: 5/8/2014
REVISED: 5/24/2016	BY: Harold.Riley
Sht 51 Riprap Apron Details_Rev 091817.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 51 Riprap Apron Details_Rev 091817.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	52	71



PLAN VIEW

NOTE:

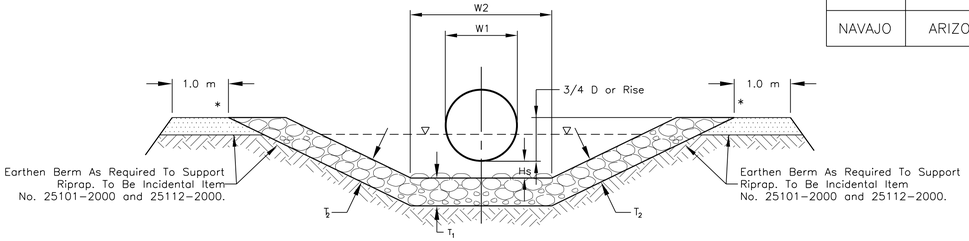
W_o = Diameter For Pipe Culvert(s) And Span Of Pipe-Arch Culvert(s) With Spacing(s) Between Barrel.

∇ = Water Surface Profile

$Y_o\nabla$ = Estimated Brink Depth

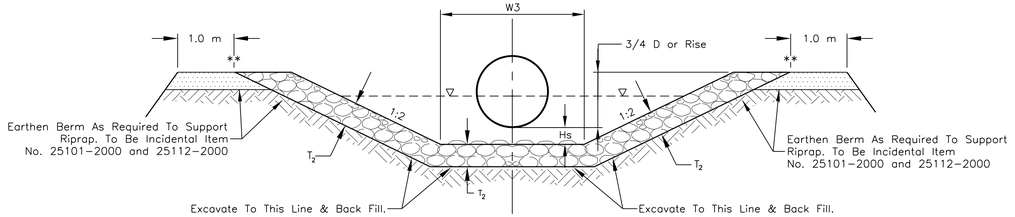
* = Dimension To Outside Riprap Edge = T_1 x 2.236

** = Dimension To Outside Riprap Edge = T_2 x 2.236



SECTION D-D

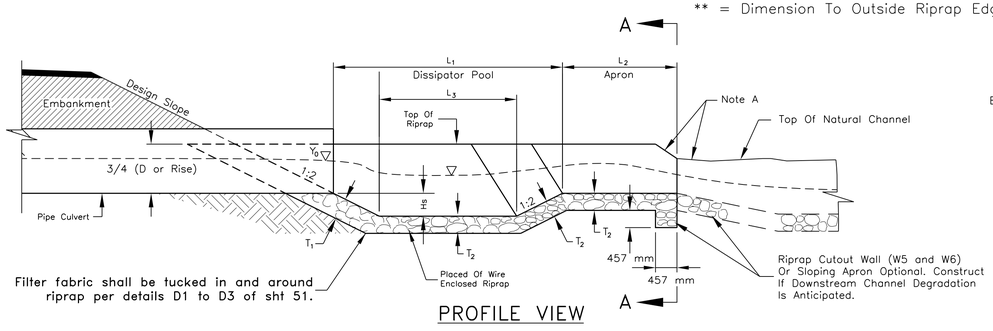
W2 =Bottom Width Of Hs, Begin Of Pool



SECTION C-C (W3 =Bottom Full Width @ End Of Pool.) (W3o =Top Edge of Riprap @ End Of Pool.)

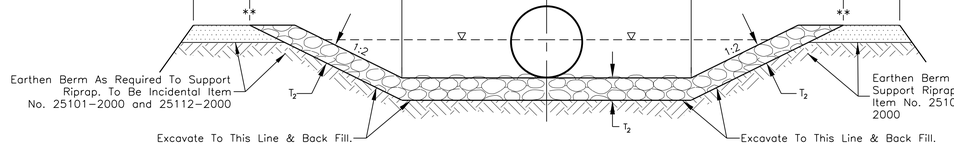
GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03), ALONG WITH ALL SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. THE QUANTITIES SHOWN ARE ONLY AN ESTIMATE. ACTUAL QUANTITIES SHALL BE DETERMINED IN THE FIELD. THE PROJECT MANAGER, COR/COTR, AND CONTRACTTOR SHALL REVIEW ALL ROCK CUT AREAS AFTER THE CONSTRUCTION OF VEE AND /OR FLAT BOTTOM DITCHES HAVE BEEN "ROUGHED-IN". IF IN THE OPINION OF THE COR/COTR THE ROCK CUT IS STABLE, THE COR/COTR MAY ELECT TO DELETE SECTIONS OF THE PLACED RIPRAP. THE CONTRACTOR WILL BE REQUIRED TO MAKE ADJUSTMENTS TO THE PLACED RIPRAP AS NECESSARY TO FIT ACTUAL FIELD CONDITIONS. THESE FIELD ADJUSTMENTS WILL BE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
3. DITCH AND BACK SLOPE RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE PLANS AND AS DETERMINED BY THE COR/COTR AND DITCH EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
4. THE SIZE OF ALL STONE FOR RIPRAP IS TO BE CLASS 2, MEETING THE GRADING REQUIREMENTS OF TABLE 705-1, AND SECTION 251 OF FP-03.
5. FILTER FABRIC SHALL BE INSTALLED UNDER ALL PLACED OR WIRE ENCLOSED RIPRAP AND SHALL CONFORM TO SECTION 714, TYPE IV-C, OF FP-96, AND SHALL BE CONSIDERED INCIDENTAL TO ITEM 25101. FILTER FABRIC SHALL BE TUCKED OR EMBEDDED 400mm INTO THE GROUND ALONG ALL EDGES AS SHOWN.
6. RIPRAP DOWNDRAINS SHALL BE CARRIED DOWN SLOPE TO THE INTERSECTION OF THE FILL SLOPE AND EXTENDED UNTIL A 2% OR LOWER SLOPE IS ACHIEVED BEFORE TERMINATION.
7. RIPRAP SHALL BE PLACED, OR WIRE ENCLOSED, AS SHOWN ON THE PLANS.
8. AT ALL LOCATIONS WHERE RIPRAP DITCH LINING CONNECTS TO CULVERTS OR CULVERT RIPRAP INLET/OUTLET STRUCTURES, THE CONTRACTOR SHALL SHAPE THE DITCH LINING TO CONNECT TO THE DRAINAGE STRUCTURE(S) AS DIRECTED BY THE COR/COTR. THIS WORK SHALL BE CONSIDERED INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
9. WIRE ENCLOSED CUT TO FILL TRANSITIONS AND DITCH LININGS SHALL BE CONSTRUCTED TO THE SAME GENERAL SHAPE AS THE PLACED RIPRAP OR WIRE ENCLOSED STRUCTURES SHOWN ON THIS SHEET.

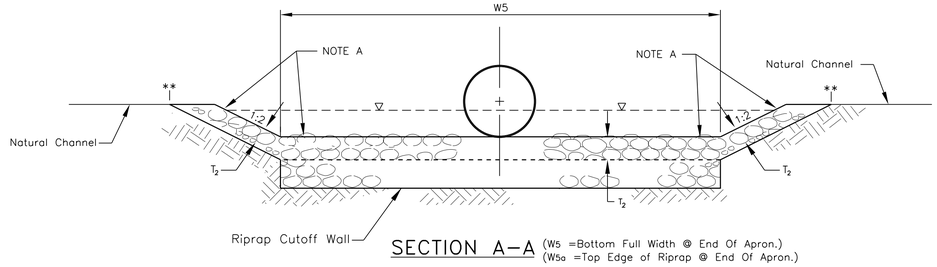


PROFILE VIEW

NOTE A: Warp Basin To Conform To Natural Stream Channel. Top Of Apron Riprap Should Be At The Same Elevation Or Lower Than Natural Channel Bottom At Section A-A.



SECTION B-B (W4 =Bottom Of Full Width @ Beginning Of Apron.) (W4o =Top Edge of Riprap @ Beginning Of Apron.)



SECTION A-A (W5 =Bottom Full Width @ End Of Apron.) (W5a =Top Edge of Riprap @ End Of Apron.)

ITEM No. 25101-2000: PLACED RIPRAP STILLING BASIN, CLASS 2

Station:	Structure:	L_1 (m)	L_2(m)	L^3 (m)	t_{2a} (mm)	t_1 (mm)	t_2 (mm)	W_1 (m)	W_2 (m)	W_3 (m)	W_{3a} (m)	W_4 (m)	W_{4a} (m)	W_5 (m)	W_{5a} (m)	W_6 (m)	Estimated Qty (m^3)
44+549.00	1-762 mm ø CSPC	2.29	1.09	1.41	220	506	380	0.76	1.06	2.00	2.79	2.29	2.73	3.02	3.45	3.74	17.29
44+583.00	2-610 mm ø CSPC	2.58	1.29	1.55	258	506	380	3.05	3.39	4.42	5.14	4.77	5.29	5.63	6.15	6.49	28.64
45+280.00	1-914 mm ø CSPC	2.74	1.23	1.75	247	506	380	0.91	1.24	2.41	3.34	2.74	3.23	3.35	4.05	4.38	23.01
45+520.00	1-1245 mm S x 838 mm R CSPA	3.56	1.19	2.76	199	506	380	4.83	5.09	6.94	7.76	7.20	7.60	7.99	0.84	8.79	43.09
45+530.00	1-1245 mm S x 838 mm R CSPA	3.56	1.19	2.76	199	506	380	4.83	5.09	6.94	7.76	7.20	7.60	7.99	0.84	8.79	43.09
47+144.00	2-914 mm ø CSPC	4.47	2.24	2.69	447	506	380	4.19	4.79	6.58	7.71	7.17	8.07	8.66	9.56	10.16	69.31
47+480.00	3-914 mm ø CSPC	5.99	2.99	3.60	598	506	380	7.47	8.27	10.66	11.95	11.46	12.66	13.45	14.65	15.45	129.84
51+250.00	1-1067 mm ø CSPC	3.20	1.07	2.70	126	506	380	4.78	4.94	6.73	7.67	6.91	7.16	7.62	7.87	7.16	41.62
51+257.00	1-1067 mm ø CSPC	3.20	1.07	2.70	126	506	380	4.78	4.94	6.73	7.67	6.91	7.16	7.62	7.87	7.16	41.62
51+264.00	1-1067 mm ø CSPC	3.20	1.07	2.70	126	506	380	4.78	4.94	6.73	7.67	6.91	7.16	7.62	7.87	7.16	41.62
51+480.00	1-762 mm ø CSPC	2.29	1.04	1.45	209	506	380	0.76	1.04	2.01	2.79	2.29	2.71	2.98	3.40	3.67	16.80
																TOTAL:	495.93

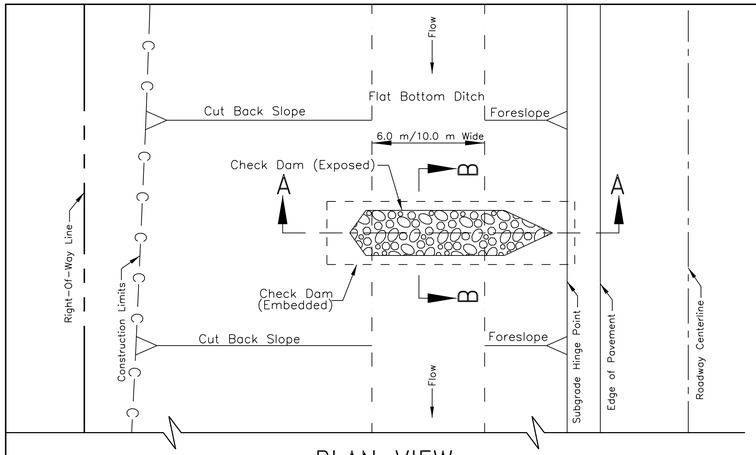
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PLACED RIPRAP STILLING BASIN DETAIL

DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/19/2017	BY: NRDOT
Sht 52 RR Stilling Basin Rev 091817.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	53	71



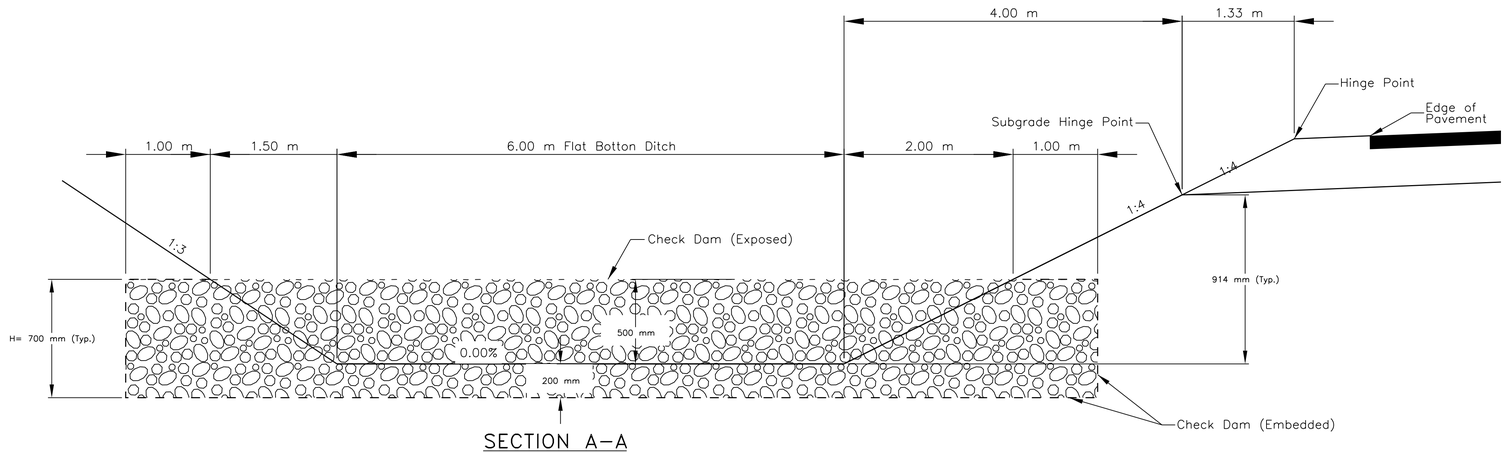
PLAN VIEW

ITEM NO. 25101-2000: PLACED RIPRAP, CLASS 2
CHECK DAM LOCATION AND ESTIMATED QUANTITIES

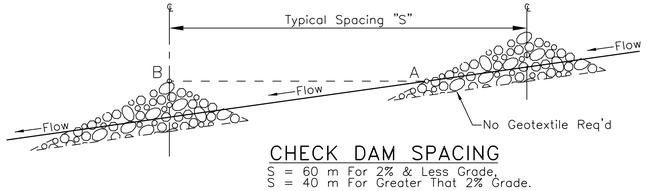
STATION	LOCATION	L (m)	W (m)	H (mm)	CUT BACKSLOPE	VOLUME (m^3)	REMARKS
51+800.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
51+840.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
51+880.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
51+920.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
51+960.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
52+000.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
52+040.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
52+080.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
52+120.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
52+980.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
53+020.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
53+060.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
53+100.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
53+140.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
53+200.00	Lt. & Rt.	10.50	2.80	700	1:3	20.58	6.0 m Wide Cut FBD
					TOTAL:	308.70	

GENERAL NOTES

1. ROUND ALL SHARP CONTOURS AS REQUIRED TO FIT THE RIPRAP MATERIAL FLUSH WITH THE EXISTING GROUND.
2. THE CONTRACTOR SHALL BE REQUIRED TO MAKE FIELD ADJUSTMENTS TO MATCH ACTUAL FIELD CONDITIONS AS DIRECTED BY THE COR/COTR AT NO ADDITIONAL PAYMENT FOR SUCH ADJUSTMENTS.
3. EMBANKMENT AROUND THE CHECK DAMS SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99, METHOD C AND CONFORM TO SECTION 204 OF FP-03.
4. EXCAVATION OF RIPRAP TOE TRENCH TO PLACE RIPRAP BELOW FLOW LINE AND OTHER EXCAVATION AND EMBANKMENT NECESSARY TO PLACE RIPRAP AS SHOWN SHALL BE INCIDENTAL TO ITEM 25101-2000 – PLACED RIPRAP.
5. STONE SIZE SHALL CONFORM TO TABLE 705-1, SECTION 705, STONE FOR RIPRAP, CLASS 2.
6. ROCK CHECK DAM SHALL BE INCLUDED IN BID ITEM 25101-2000.

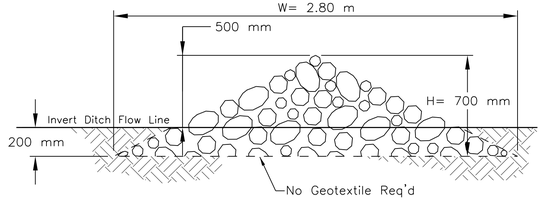


SECTION A-A
6.0 m WIDE FLAT BOTTOM DITCH
WITH CLASS 2 RIPRAP CHECK DAM WITH 1:3 BACKSLOPE
Sta. 52+940.00 to 53+200.00, Left & Right



CHECK DAM SPACING
S = 60 m For 2% & Less Grade.
S = 40 m For Greater That 2% Grade.

Note: Place Downstream Structure Such That Point "B" Is Approximately Level With The Lowest Ground Elevation (Point "A") Of The Upstream Structure.



SECTION B-B

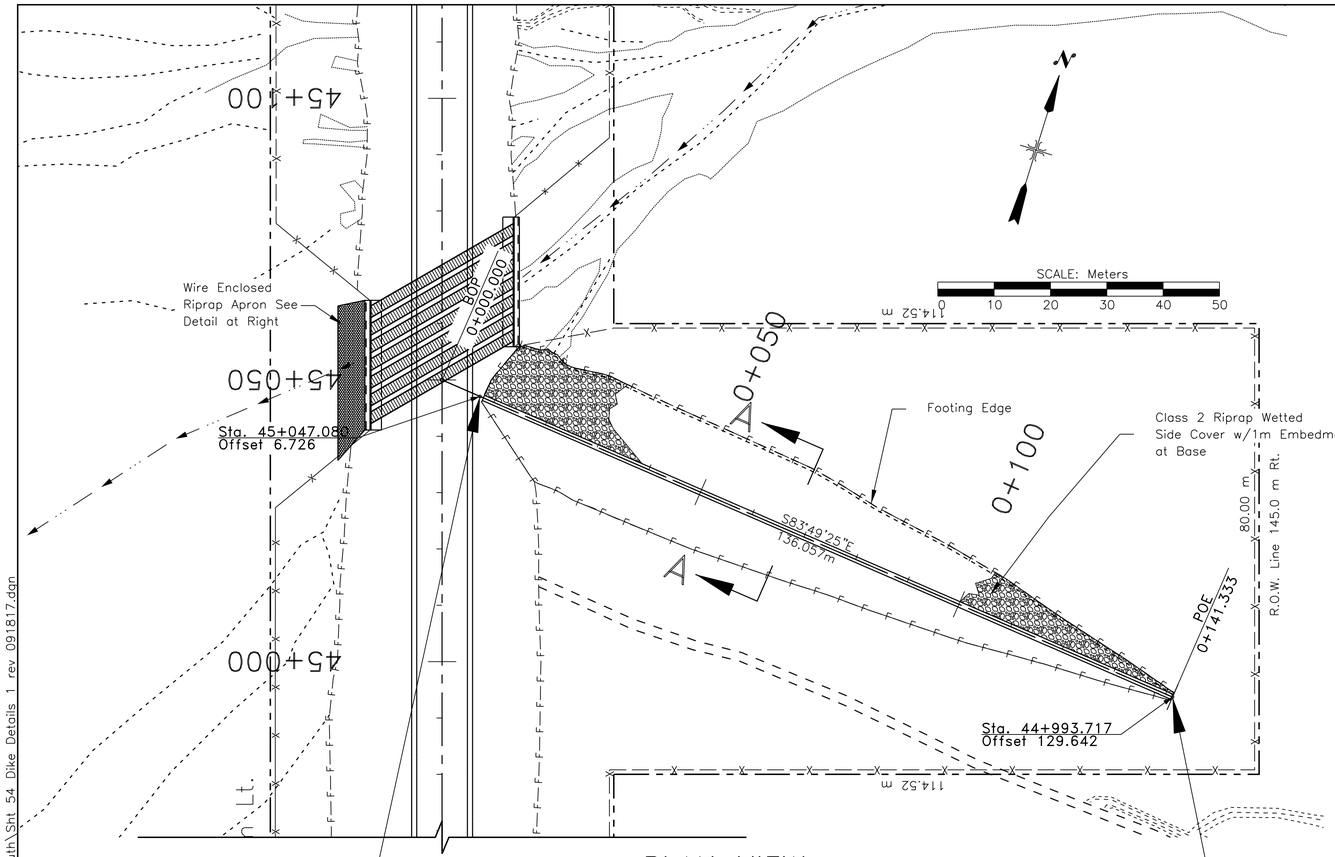
UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PLACED RIPRAP CHECK DAM
IN FLAT BOTTOM DITCH

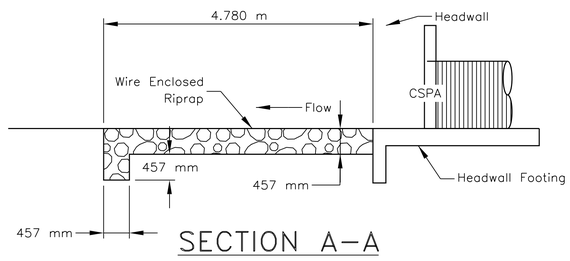
DRAWN BY: NRDOT	DATE: 6/25/2014
DESIGNED BY: NRDOT	DATE: 6/25/2014
REVISED: 12/16/2014	BY: Leroy.Toledo
Sht 53 N27 chkdam rev 091817.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	54	71

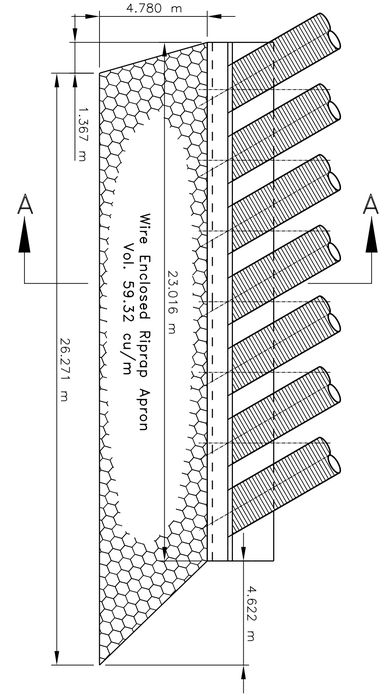


PLAN VIEW
TYPE B EARTHEN DIKE



SECTION A–A

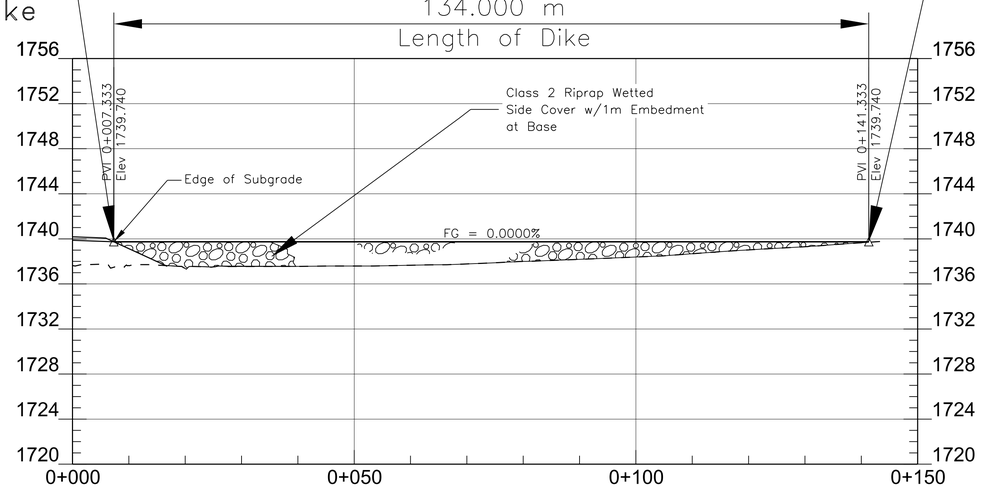
See Sheet 51 for General Note
And Additional Wire Enclosed Details



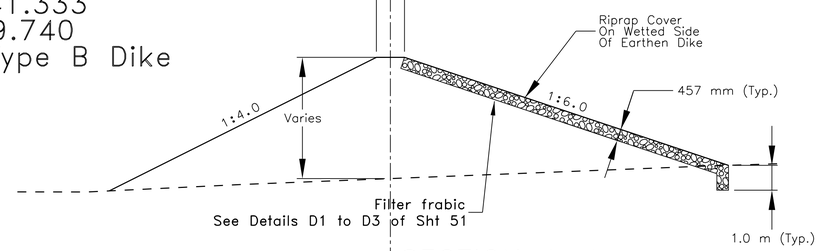
WIRE ENCLOSED RIPRAP
AT OUTLET

Sta 0+007.333
Elev 1739.740
Begin Type B Dike

Sta 0+141.333
Elev 1739.740
End Of Type B Dike



PROFILE VIEW
TYPE B EARTHEN DIKE



SECTION A–A
TYPE B EARTHEN DIKE
Total Length= 134.00 m
Total Vol.=2300.0 m^3

ITEM 25101-2000 PLACED RIPRAP EST. QTY

Station	End Section Area (m^2)	Volume (m^3)
0+008.00	7.77	
		78.23
0+020.00	5.26	
		109.14
0+040.00	5.65	
		111.94
0+060.00	5.54	
		111.07
0+080.00	5.56	
		94.02
0+100.00	3.84	
		60.62
0+120.00	2.22	
		10.14
0+125.00	1.83	
	TOTAL	575.16

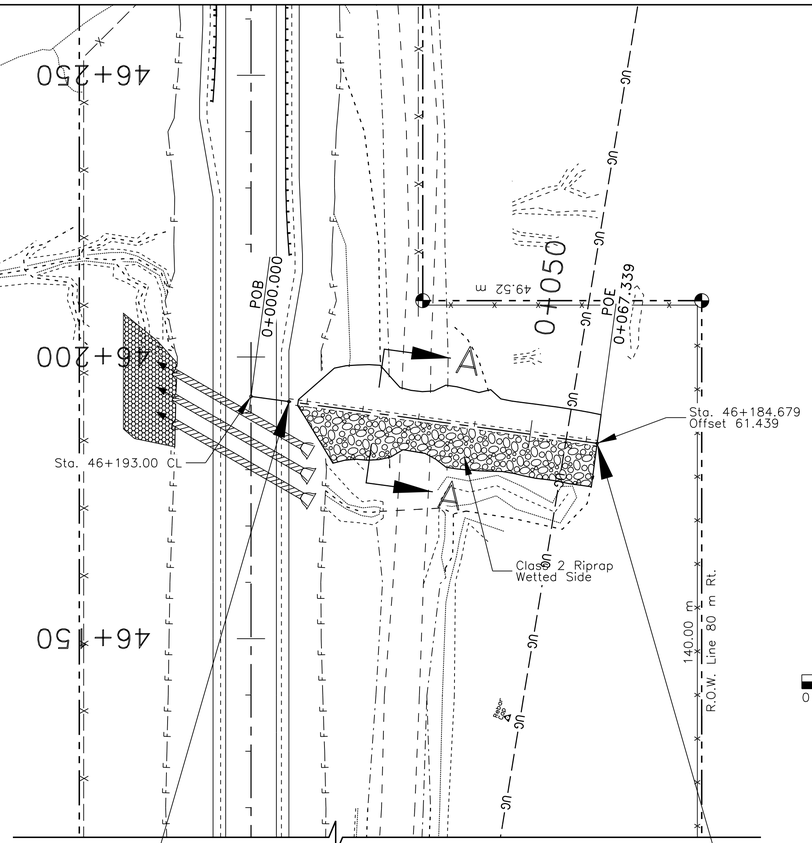
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TYPE B EARTHEN
DIKE LAYOUT DETAIL

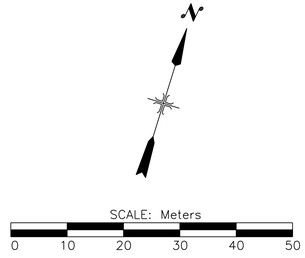
DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/19/2017	BY: Harold.Riley
Sht 54 Dike Details 1 rev 091817.dgn	

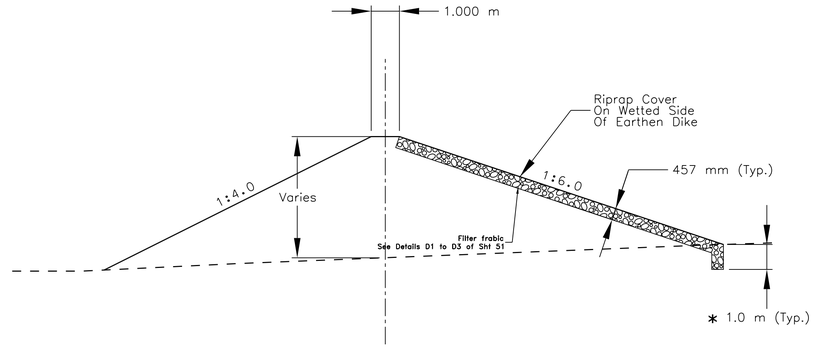
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	55	71



PLAN VIEW
TYPE B EARTHEN DIKE



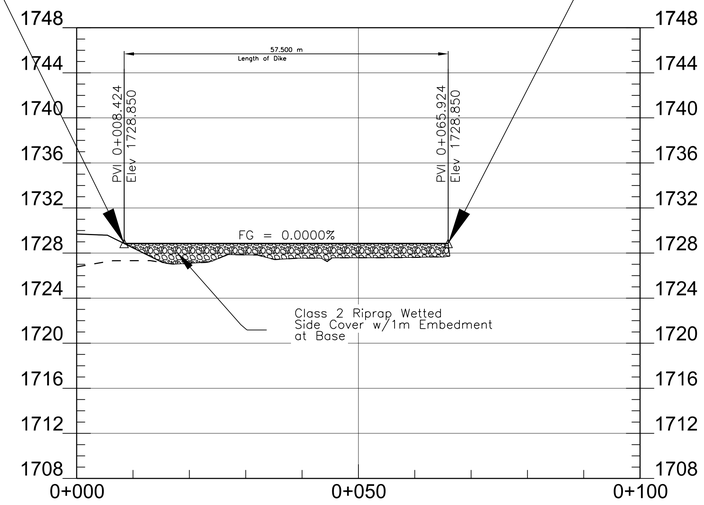


SECTION A-A
TYPE B EARTHEN DIKE
Total Length= 55.213 m
Total Vol.=560.0 m³

*NOTE: Sta. 46+150.000 to 46+200.000, Existing 102 mm Gasline At Right To Be Protected In-Place. Cutoff Wall For Riprap At The Toe Shall Be Adjusted To A Depth Of 610 mm Over The Gasline.

Sta 0+008.424
Elev 1728.850
Begin Type B Dike

Sta 0+065.924
Elev 1728.85
End Of Type B Dike



PROFILE VIEW
TYPE B EARTHEN DIKE

ITEM 25101-2000 PLACED RIPRAP EST. QTY

Station	End Section Area (m²)	Volume (m³)
0+010.00	2.203	
		30.41
0+020.00	3.879	
		32.30
0+030.00	2.58	
		30.34
0+040.00	3.487	
		34.22
0+050.00	3.357	
		34.29
0+060.00	3.50	
		7.00
0+062.00	3.50	
	TOTAL	168.55

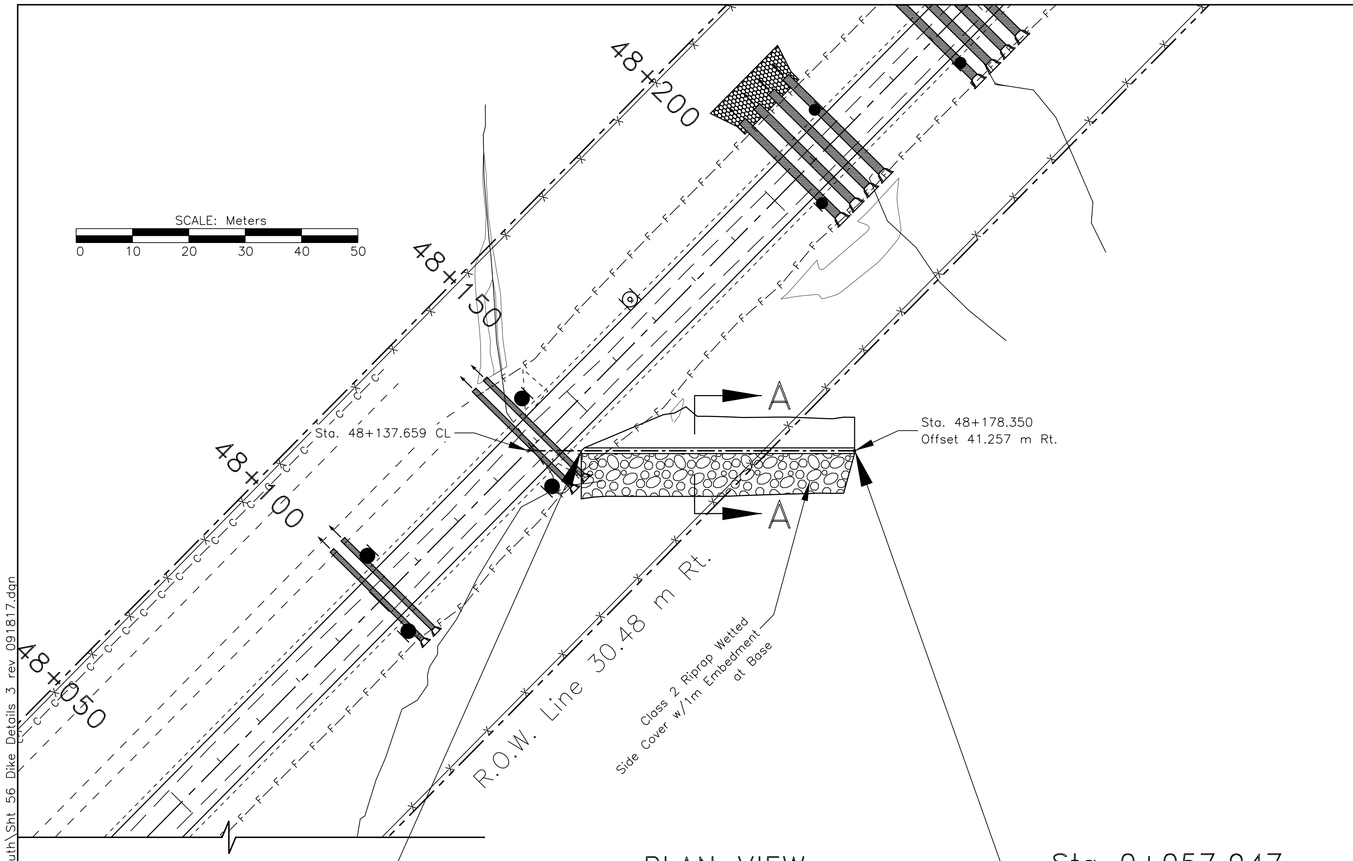
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TYPE B EARTHEN
DIKE LAYOUT DETAIL

DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/19/2017	BY: Harold.Riley
Sht 55 Dike Details 2 rev 091817.dgn	

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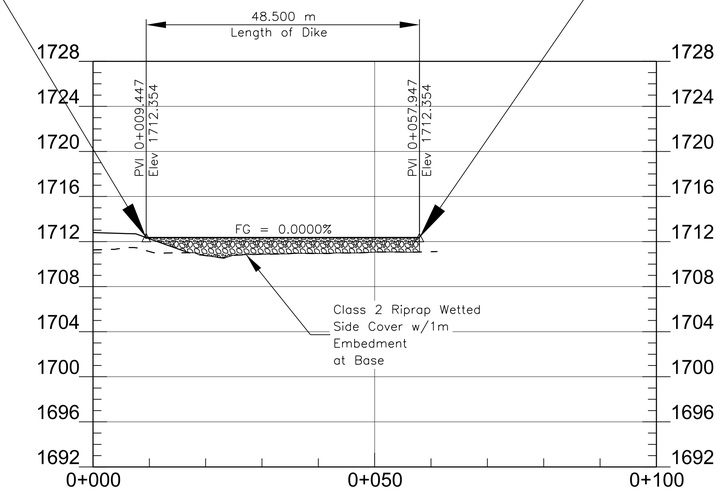
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	56	71



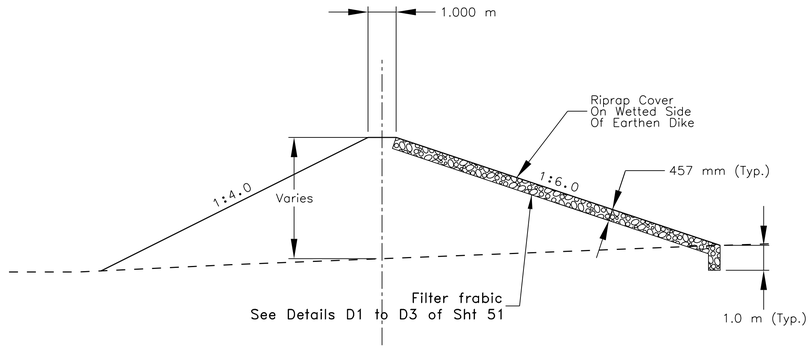
PLAN VIEW
TYPE B EARTHEN DIKE

Sta 0+009.447
Elev 1712.354
Begin Type B Dike

Sta 0+057.947
Elev 1712.354
Begin Type B Dike



PROFILE VIEW
TYPE B EARTHEN DIKE



SECTION A-A
TYPE B EARTHEN DIKE
Total Length= 48.500 m
Total Vol.=499.00 m^3

ITEM 25101-2000 PLACED RIPRAP EST. QTY

Station	End Section Area (m^2)	Volume (m^3)
0+010.00	3.963	
		38.815
0+020.00	3.800	
		38.000
0+030.00	3.800	
		38.510
0+040.00	3.902	
		37.330
0+050.00	3.564	
		27.224
0+058.00	3.242	
	TOTAL	179.879

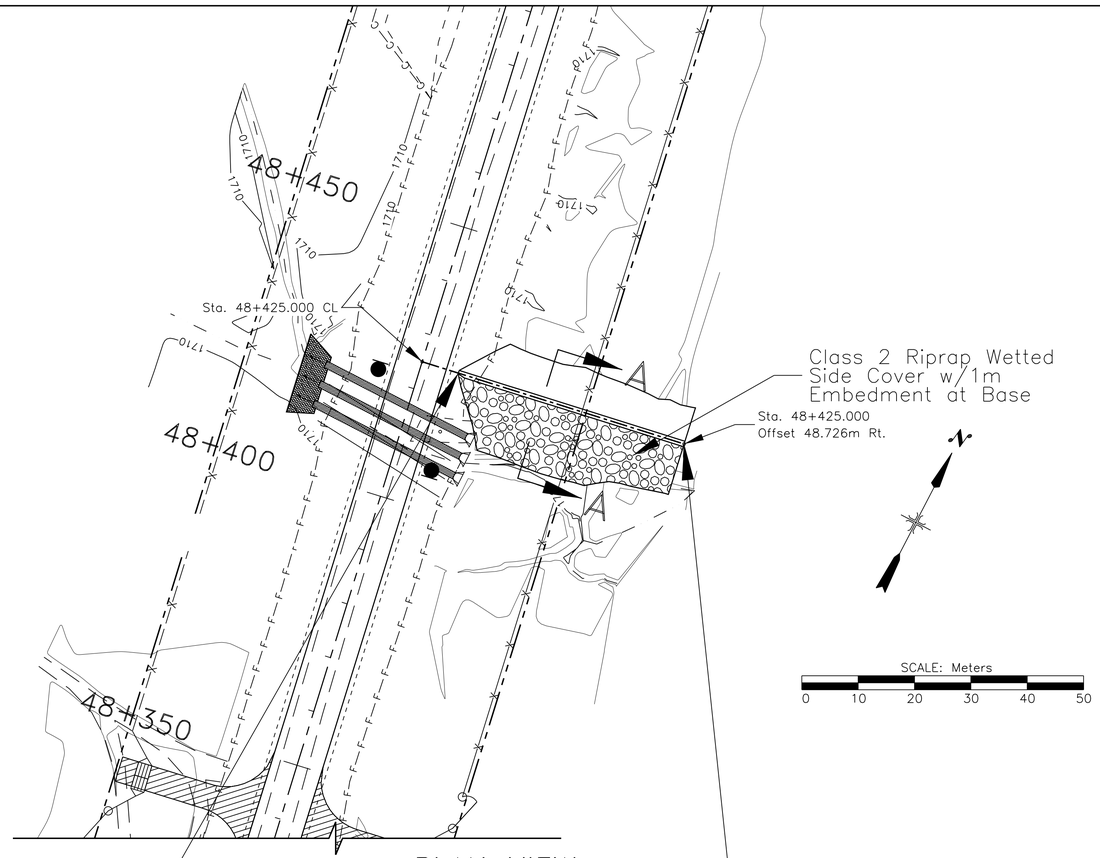
UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TYPE B EARTHEN
DIKE LAYOUT DETAIL

DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/19/2017	BY: Harold.Riley
Sht 56 Dike Details 3 rev 091817.dgn	

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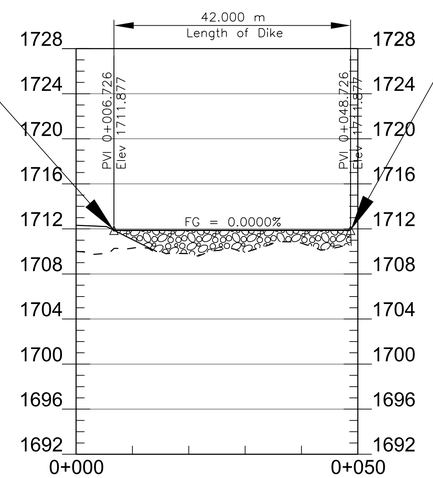
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	57	71



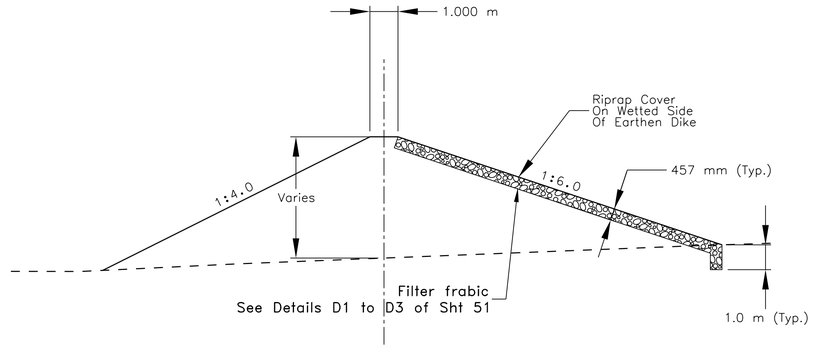
PLAN VIEW
TYPE B EARTHEN DIKE

Sta 0+006.726
Elev 1711.877
Begin Type B Dike

Sta 0+048.726
Elev 1711.877
End Of Type B Dike



PROFILE VIEW
TYPE B EARTHEN DIKE



SECTION A-A
TYPE B EARTHEN DIKE
Total Length= 42.00 m
Total Vol.=557.0 m³

ITEM 25101-2000 PLACED RIPRAP EST. QTY

Station	End Section Area (m²)	Volume (m³)
0+010.00	3.422	
		45.77
0+020.00	5.731	
		57.76
0+030.00	5.820	
		52.66
0+040.00	4.711	
		39.74
0+048.73	4.394	
	TOTAL	195.92

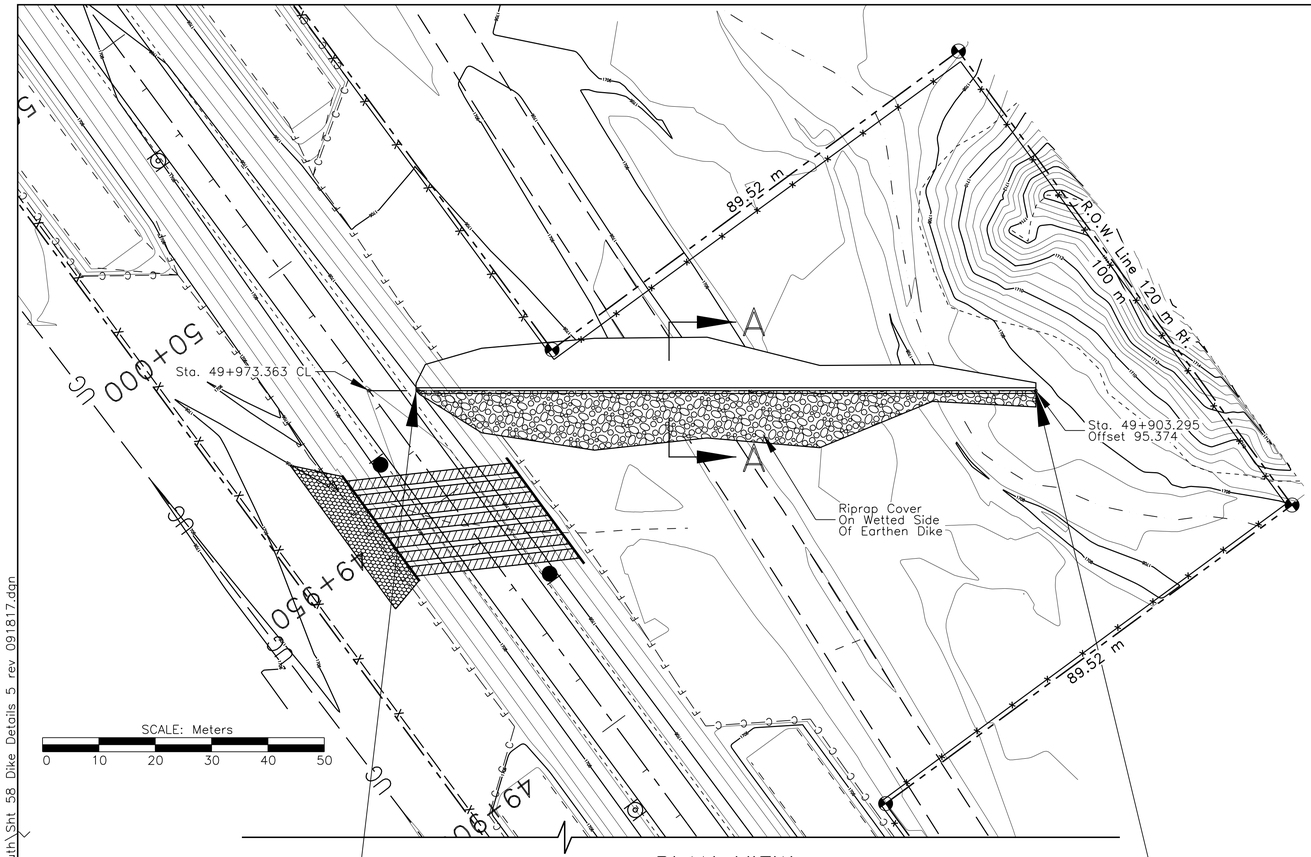
UNITED STATES
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TYPE B EARTHEN
DIKE LAYOUT DETAIL

DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/19/2017	BY: Harold.Riley
Sht 57 Dike Details 4 rev 091817.dgn	

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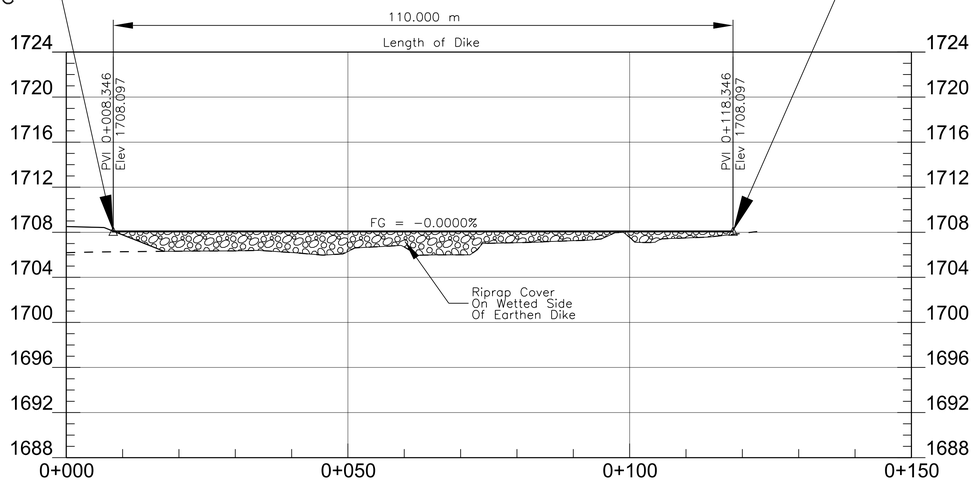
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	58	71



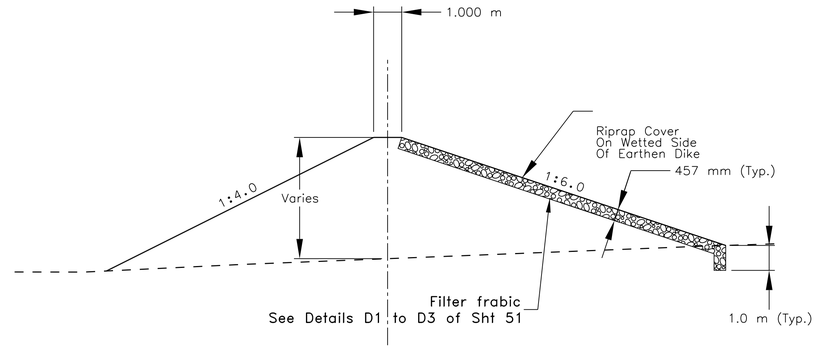
PLAN VIEW
TYPE B EARTHEN DIKE

Sta 0+008.346
Elev 1708.097
Begin Type B Dike

Sta 0+118.346
Elev 1708.097
End Of Type B Dike



PROFILE VIEW
TYPE B EARTHEN DIKE



SECTION A-A
TYPE B EARTHEN DIKE
Total Length= 110.000 m
Total Vol.= 1205.0 m³

ITEM 25101-2000 PLACED RIPRAP EST. QTY

Station	End Section Area (m^2)	Volume (m^3)
0+018.00	2.941	
		6.46
0+020.00	3.516	
		43.84
0+030.00	5.251	
		50.98
0+040.00	4.945	
		51.19
0+050.00	5.292	
		54.27
0+060.00	5.562	
		54.98
0+070.00	5.434	
		50.89
0+080.00	4.744	
		51.11
0+090.00	5.478	
		54.02
0+100.00	5.325	
	TOTAL	411.27

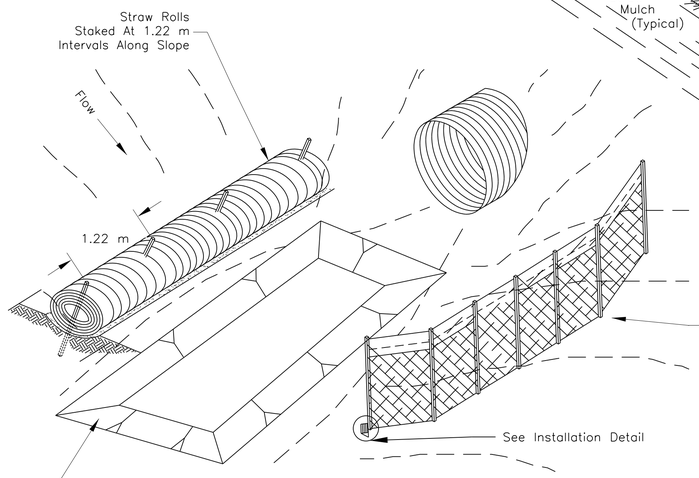
UNITED STATES
DEPARTMENT OF THE INTERIOR
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TYPE B EARTHEN
DIKE LAYOUT DETAIL

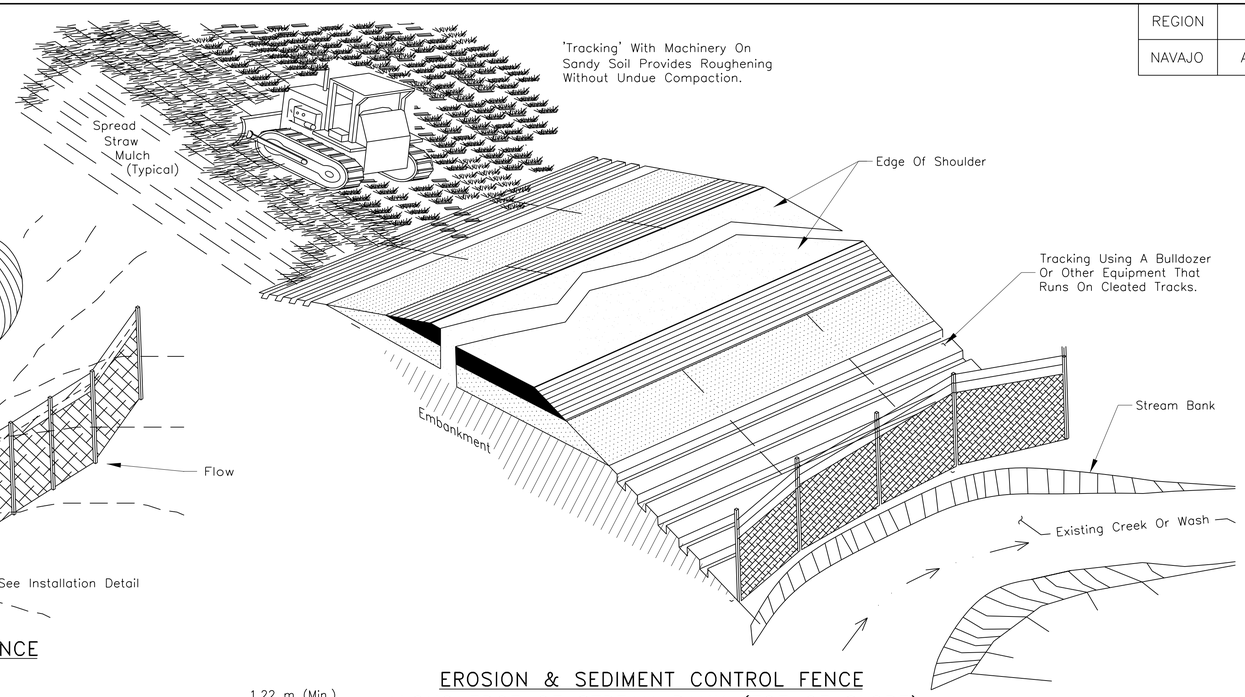
DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/19/2017	BY: Harold.Riley
Sht 58 Dike Details 5 rev 091817.dgn	

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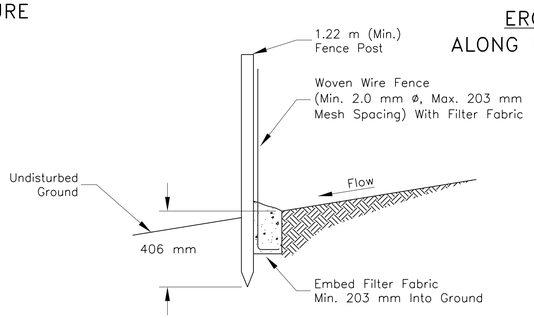
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	59	71



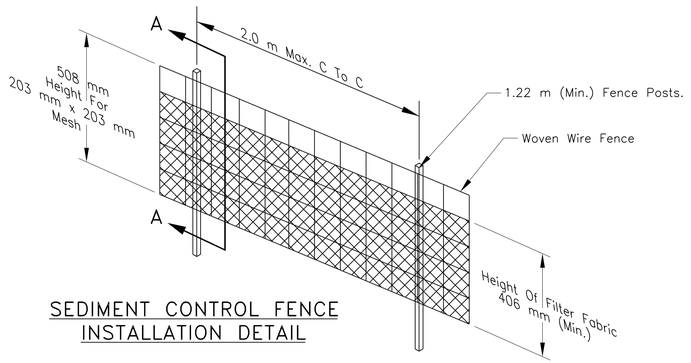
EROSION & SEDIMENT CONTROL FENCE AT DRAINAGE STRUCTURE



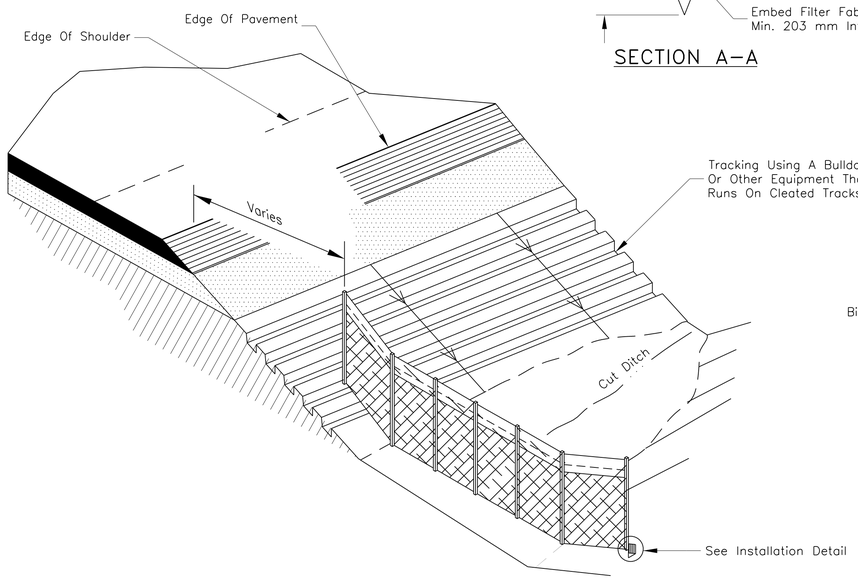
EROSION & SEDIMENT CONTROL FENCE ALONG EDGE OF STREAM BANK (TOE OF SLOPE)



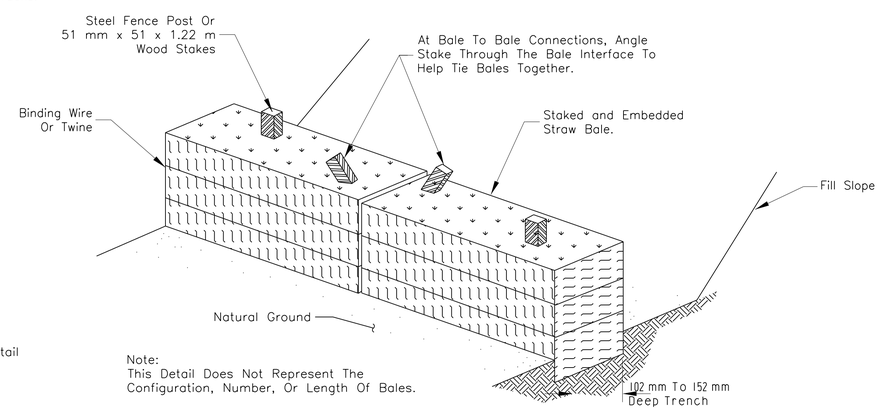
SECTION A-A



SEDIMENT CONTROL FENCE INSTALLATION DETAIL



EROSION & SEDIMENT CONTROL FENCE IN MINOR SWALES OR CUT DITCHES (APPROX. 60 m SPACING FOR FABRIC)



Note:
This Detail Does Not Represent The
Configuration, Number, Or Length Of Bales.

TYPICAL STRAW BALE STAKING AND TRENCHING DETAIL

GENERAL NOTES

1.. THE CONTRACTOR SHALL PREPARE AND SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IN FULL DETAIL FOR ALL PHASES OF THE WORK FOR REVIEW AND APPROVAL AT LEAST 14 CALANDER DAYS BEFORE IMPLEMENTATION. THE PLAN SHALL MEET THE REQUIREMENTS HEREIN AND SECTION 157 OF THE FP-03 AS MODIFIED IN THE SUPPLEMENTAL SPECIFICATION. SEE SPECIAL CONTRACT REQUIREMENTS FOR NPDES PERMIT REQUIREMENTS.

2. THE SILT FENCING CONSISTS OF 914 mm SEDIMENT CONTROL FABRIC CLOTH WITH BURIED-TOE, AND STEEL POSTS (TEE OR U-TYPE) SPACED AT 2.0 m WITH 2 mm SIZE WELDED WIRE BACK-UP FENCE.

3. WOVEN WIRE FABRIC TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 610 mm AT THE TIP AND MID-SECTION. GEOTEXTILE MATERIAL FOR SILT FENCING SHALL BE TYPE-V UNDER SUB-SECTION 714.01 OF FP-03.

4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 152 mm AND FOLDED. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED BEFORE "BULGES" DEVELOP IN THE SILT FENCE.

5. SILT FENCE SHALL BE INSTALLED PARALLEL TO THE TOE OF ALL ROADWAY EMBANKMENT FILLS IN LOCATIONS WHERE THE TOE OF THE FILLS ARE WITHIN 2.0 m OF EXISTING STREAMS, CREEKS OR WASHES; IN AREAS WITH HIGHLY EROSIVE SOILS AND/OR WHERE EMBANKMENTS ARE AT A 1:3 OR STEEPER SLOPE. THE SILT FENCE SHALL BE PLACED 1 m TO 2 m DOWNHILL FROM THE TOE OF FILL AND IN ACCORDANCE WITH SECTION 157 OF THE FP-03 AND THE SUPPLEMENTAL SPECIFICATIONS.

6. STRAW BALES MAY BE USED AT THE TOP OF CUT BACKSLOPES AND FOR DIKES PROVIDED THEY ARE PROPERLY ANCHORED WITH STEEL FENCE POSTS OR 51 mm X 51 mm X 1.22 m WOOD STAKES (TWO PER BALE) ANCHORED 508 mm INTO THE NATURAL GROUND. STRAW BALES SHALL BE CERTIFIED 0.5% WEED FREE. DO NOT USE STRAW BALES IN AREAS OF CONCENTRATED FLOW AND CUT DITCHES..

7. FURNISHING AND PLACEMENT OF SILT FENCE MATERIAL AND OTHER EROSION CONTROL MEASURES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 15701-0000, AND/OR 15708-1000.

8. SEDIMENT/SILT FENCING SHALL BE PLACED AT ALL LOCATIONS WHERE EMBANKMENTS HAVE SLOPE DISTANCES OF 30.0 m OR GREATER. THE SEDIMENT FENCING WILL BE PLACED AT THE TOE OF SLOPES OFFSET 1-2 METERS.

9 THE CONTRACTOR SHALL INSPECT AND MAINTAIN ALL SWPPP MEASURES WEEKLY AND AFTER EACH SIGNIFICANT STORM EVENT (I.E. 25 mm OF MOISTURE IN 24 HOURS).

10. PRIOR TO ACCEPTANCE, ALL PROJECT AREAS (AS DETERMINED BY THE CORT) SHOWING EROSION DAMAGE CAUSED BY THE CONTRACTOR'S FAILURE TO PROPERLY MAINTAIN THIS EROSION CONTROL STRUCTURES SHALL BE REPAIRED TO REMOVE DAMAGE, ANY SPECIFIED EROSION CONTROL MATERIALS, STRUCTURES, OR DEVICES DAMAGE OR LOST DUE TO IMPROPER INSTALLATION. THE CONTRACTOR'S NEGLIGENCE OR IMPROPER MAINTENANCE, SHALL ALSO BE PEPAIRED AND/OR REPLACE PRIOR TO FINAL ACCEPTANCE AT THE CONTRACTOR'S ENTIRE EXPENSE.

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

STORMWATER POLLUTION AND EROSION/SEDIMENT CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 2/4/2014
DESIGNED BY: NRDOT	DATE: 2/4/2014
REVISED: 6/1/2015	BY: Leroy.Toledo
Sht 59 N27 ERO1 SWPPP.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	60	71

GENERAL NOTES

1.. SEE SHEET XX OF XX FOR ADDITIONAL NOTES AND DETAILS.

2. THE CONTRACTOR SHALL INSTALL EROSION CONTROL BLANKETS, TYPE 4, PER SECTION 713.17(K).

   A. CONSTRUCT FINISH GRADING AROUND STRUCTURE TO BE PLACED.

   B. CUT TRENCHES FOR FOOTING OF SLAB.

   C. INSTALL 2.0 m OF EROSION CONTROL BLANKETS ANCHORED ON FLOOR AND TOP ALONG THE CUT FACE OF TRENCH AS SHOWN.

   D. PLACE CONCRETE FORMS, REINFORCEMENTS AND SUBSEQUENT CONCRETE.

3. CONSTRUCT SEDIMENT BASIN AND TRAPS, EROSION CHECKS AND/OR FILTERS IN STRATEGIC LOCATIONS ON THE PROJECT TO FILTER STORM RUNOFF BEFORE IT EXISTS THE PROJECT CONSTRUCTION LIMITS OR ENTERS A STREAM AS SHOWN IN THE APPROVED SWPPP.

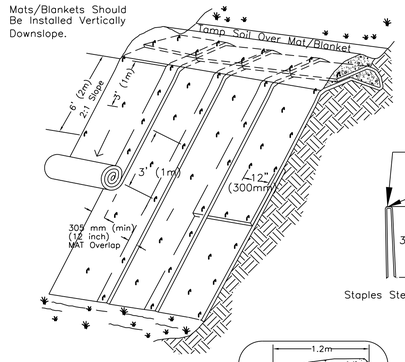
4. CLEAN ALL SEDIMENTS BASIN AND TRAPS OF ACCUMULATED SEDIMENT WHEN HALF FULL OF SEDIMENT.

5. USE DRAIN PIPE, RIPRAP, GEOTEXTILE FABRIC, OR GRASS-LINED WATERWAY FOR TEMPORARY SLOPE DRAINS TO CHANNEL RUNOFF DOWN SLOPES, CHANNEL WATER INTO SLOPE DRAINS WITH STRAW BALES, WATTLES, OR EARTH BERMS CONSTRUCTED AT THE TOP OF A CUT SLOPE. ANCHOR SLOPE DRAINS TO THE SLOPE.

6. THE CONTRACTOR SHALL ADJUST THE DIMENSIONS AND/OR LOCATIONS OF TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES TO FIT ACTUAL FIELD CONDITIONS.

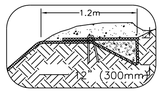
7. REMOVE AND DISPOSE OF EROSION CONTROL MEASURES ARE SATISFACTORILY ESTABLISHED. DRAINAGE DITCHES AND CHANNELS ARE LINED AND STABILIZED, IN ACCORDANCE WITH SECTION 157 OF FP-03.

8. AT CUT SLOPES SPECIFIED IN THESE PLANS TO BE COVERED WITH EROSION MATTING PROTECTION, THE CORT SHALL INSPECT THE SLOPES FOR EXISTING AND STABLE ROCK MATERIAL. IF IN THE OPINION OF THE CORT, THE CUT SLOPES ARE SUFFICIENTLY STABLE DUE TO THE NATURAL ROCK, THECORT MAY DELETE THE MATTING IN THOSE AREAS.



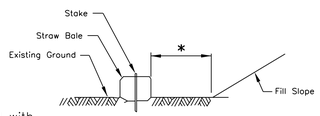
SOIL STABLIZATION

NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/ BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.



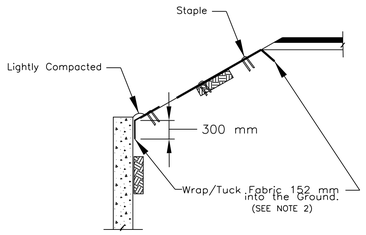
NOT TO SCALE

EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION

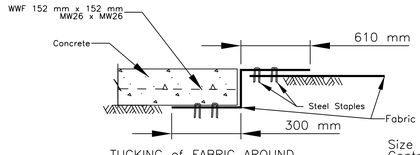


SECTION D-D

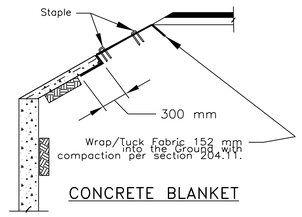
* See General Notes.



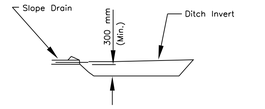
CONCRETE HEADWALL

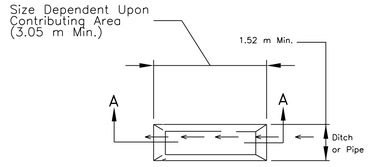


TUCKING of FABRIC AROUND CONCRETE STRUCTURE DETAIL



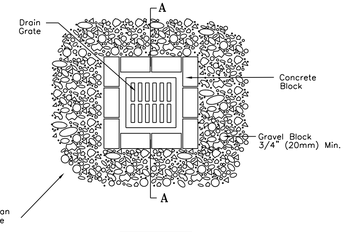
CONCRETE BLANKET

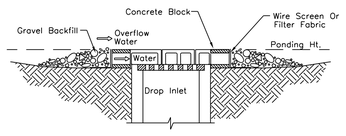




SEDIMENT TRAP

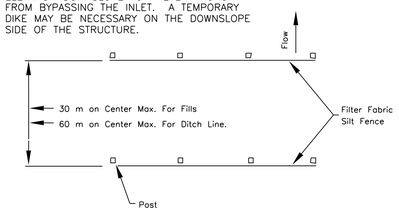
(Traps shall not fill to beyond one-half capacity prior to cleaning)





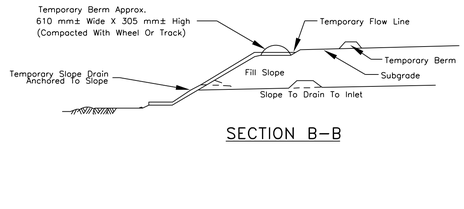
NOTES:
1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. EXCAVATE A BASIN OF SUFFICIENT SIZE ADJACENT TO THE DROP INLET.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.

BLOCK AND GRAVEL DROP INLET SEDIMENT BARRIER

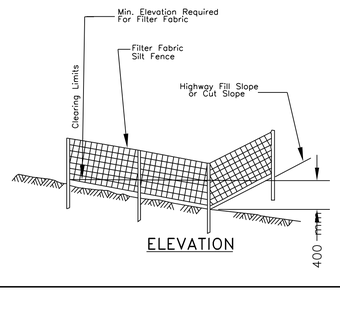


PLAN

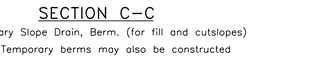
SILT FENCE EROSION CHECK



SECTION B-B

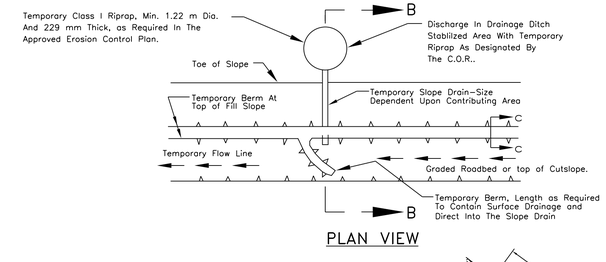


ELEVATION

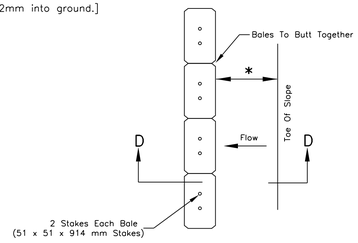


SECTION C-C

Temporary Slope Drain, Berm. (for fill and cutslopes)
[NOTE: Temporary berms may also be constructed of straw bales set 104-152mm into ground.]



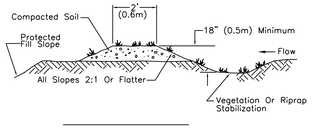
PLAN VIEW

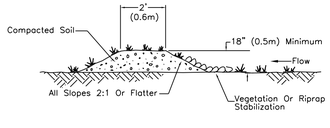


PLAN

STRAW BALE SILT BARRIER

* See general notes.

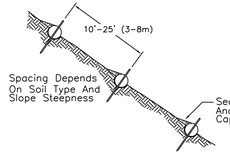


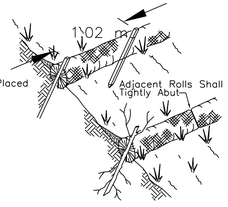


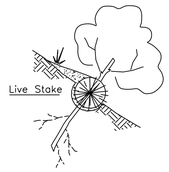
(For Top Of Cut Back Slopes.)

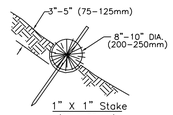
NOTES:
1. THE CHANNEL BEHIND THE DIKE SHALL HAVE POSITIVE GRADE TO A STABILIZED OUTLET.
2. THE DIKE SHALL BE ADEQUATELY COMPACTED TO PREVENT FAILURE.
3. THE DIKE SHALL BE STABILILIZED WITH TEMPORARY OR PERMANENT SEEDING OR RIPRAP.
4. THE DIVERSION DIKE SHALL EXTEND TO THE BOTTOM OF CUT BACK SLOPE AND INTERCEPT THE CUT DITCH.

TEMPORARY DIVERSION DIKE









Not To Scale

NOTE:
1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"-5" (75-125mm) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.

STRAW ROLLS

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

STORMWATER POLLUTION AND EROSION/SEDIMENT CONTROL DETAILS

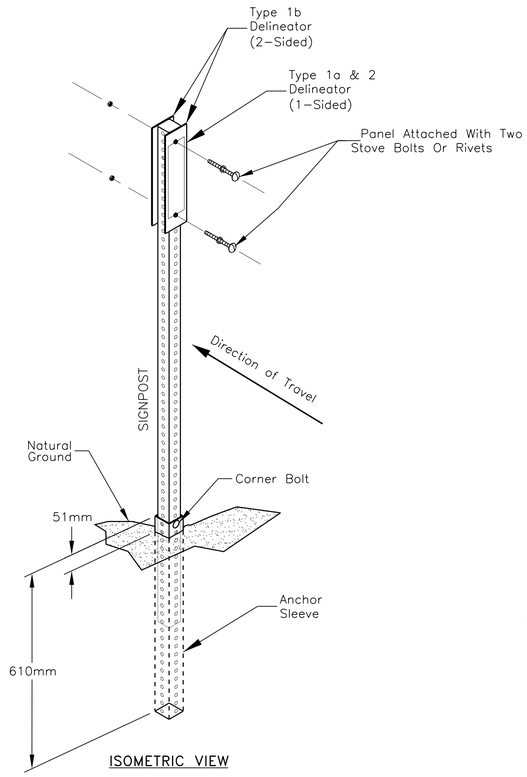
DRAWN BY: NRDOT	DATE: 3/19/2014
DESIGNED BY: NRDOT	DATE: 3/19/2014
REVISED: 3/19/2014	BY: Leroy.Toledo
Sht 60 N27 ERO2 SWPPP rev 091817.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 60 N27 ERO2 SWPPP rev 091817.dgn

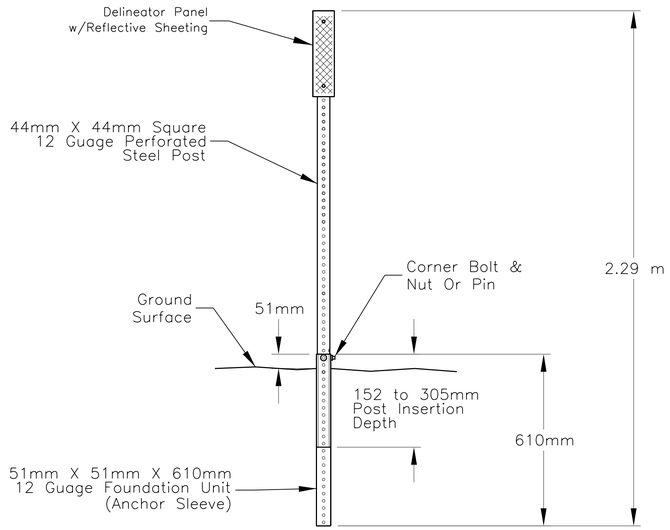
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	61	71

GENERAL NOTES

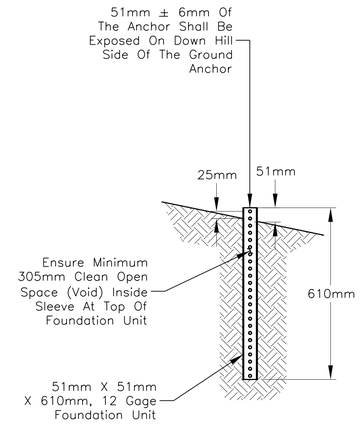
1. ALL CONCRETE SHALL BE CLASS A(AE) AND SHALL CONFORM TO SECTION 601 OF THE FP-03. FURNISHING AND PLACING OF CONCRETE, WHEN REQUIRED, SHALL BE CONSIDERED INCIDENTAL TO ITEMS 63308-2000, 63309-0010, AND 63309-0020.
2. THE CONTRACTOR SHALL USE SQUARE STEEL TUBE HIGHWAY DELINEATORS. THE COST OF SUPPLYING MATERIALS AND INSTALLATION SHALL BE INCLUDED IN THE UNIT PRICE BID UNDER ITEMS 63308-2000, 63309-0010, AND 63309-0020. SEE SHEET 63 FOR POST SPACING.



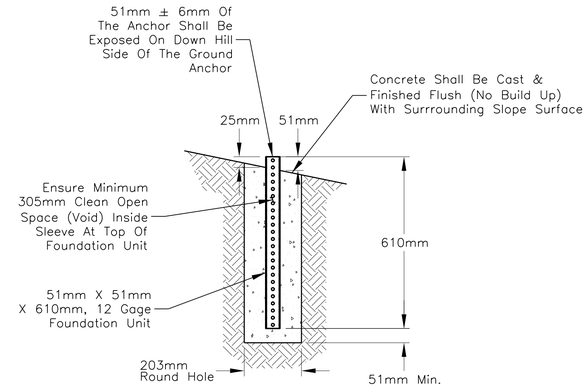
ISOMETRIC VIEW



ALTERNATE ASSEMBLY

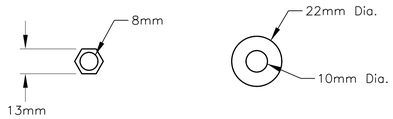


IN-GROUND DRIVEN

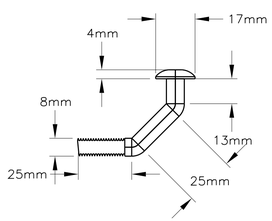


IN-GROUND CONCRETE

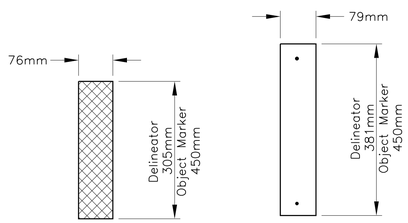
Note: Use Chair Device To Ensure
Minimum 51mm Clearance
Above Bottom Of Hole



LOCK NUT FLAT WASHER

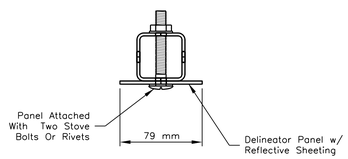


BREAK-AWAY BOLT

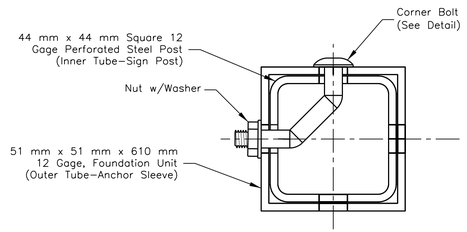


REFLECTIVE SHEETING DELINEATOR PANEL
(Pre-Drilled/Punched)

TYPE	POST	HIGH INTENSITY REFLECTIVE SHEETING
1a	SQ. TUBE	WHITE, ONE SIDE
1b	SQ. TUBE	WHITE, BOTH SIDES
2	SQ. TUBE	AMBER, ONE SIDE



SQUARE TUBE POST AND PANEL



"BREAK-AWAY" DETAIL
SIGN POST/SLEEVE INTERFACE

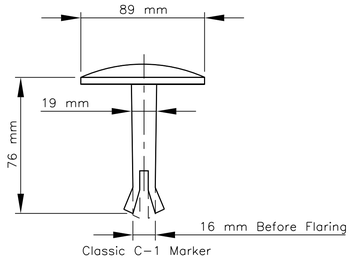
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SQUARE TUBE STEEL POST REFLECTIVE PANEL DELINEATOR DETAILS

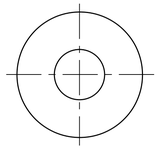
DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 12/18/2014	BY: Peterson.Yazzie
Sht 61 N27 DelinObjMkr_1.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawing - South\Sht 61 N27 DelinObjMkr_1.dgn

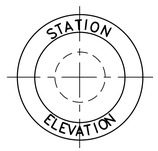
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	62	71



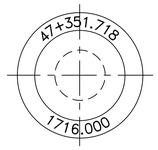
BRASS CAP DETAIL



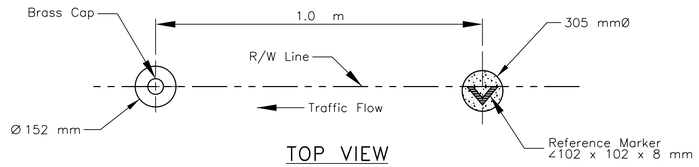
BOTTOM VIEW



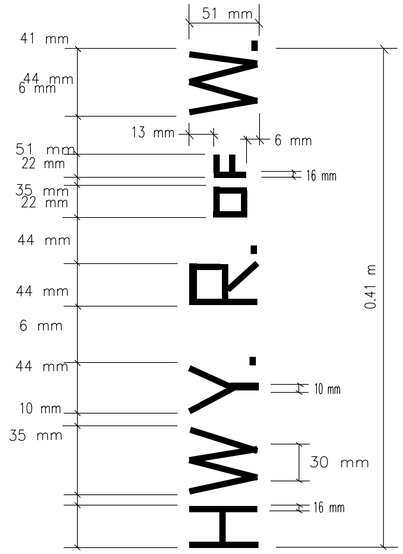
TOP VIEW



EXAMPLE



TOP VIEW



DETAIL OF LETTERS

GENERAL NOTES

1.. Survey monuments and reference markers shall be placed as shown on the plans or as directed by COR/COTR. The cost of supplying all materials and installation of Right-Of-Way Monument and Markers shall be included in the unit price bid under item 62101-0000 & 62102-0000.

2. If rock is encountered when installing the Right-Of-Way Monument and reference Marker, drill a 152 mm ø for survey monument and 305 mm ø for reference marker hole in the rock to the depth required to install the monument and marker to full depth. All holes drilled into rock material shall beincidentalto the completion of the work and no additional payment shall be made thereof.

3. Brass caps for the survey monument shall be supplied and installed by the Contractor conforming to the ASTM B-584 specification and shall be incidental to Item 62101-0000.

4. All concrete shall be Class A(AE) and shall conform to Section 601 of the FP-03. Furnishings and placement of concrete shall be considered incidental to Items 62101-0000 & 62102-0000.

5. Roadway stationing and elevations shall be stamped on all brass caps by the Contractor after installation, unless otherwise directed in writing by the COR/COTR.

6. The Contractor shall be required to paint the reference markers per Section 708 and subsection 708.04 of FP-03:

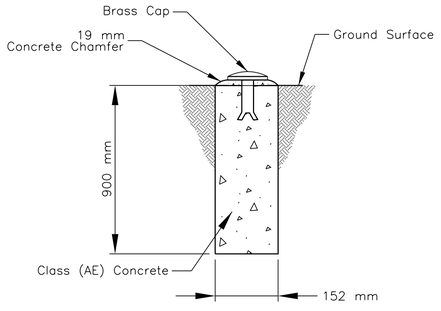
   a) Prime coat entire steel material and shall conform to subsection 708.04(a) or (b) of FP-03.

   b) Coat white finish of paint the tip 762 mm and shall conform to subsection 708.04(c), (d), or (e) of FP-03.

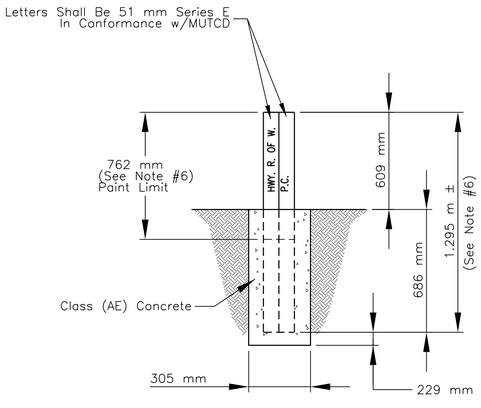
   c) All letters, numerals, symbols, etc. shall be painted on the reference markers using the dimensions shown using black Lamp paint conforming to ASTM D 209. The required information to place on the reference markers shall be furnished to the Contractor by the COR/COTR.

7. The Contractor has the option to use an approved State Highway paint specifications in lieu of that stated in Note (6) above. The Contractor shall submit (in writing) the paint specifications and request for use on the project at least 14 days in advance of the paint use for review and approval. The contractor shall not be allowed to use any paint until the proper approval has been given by the COR/COTR. Any painting performed by the contractor without the proper approval shall cause the work to be rejected.

8. Set Right-Of-Way monument at station and offset to match the Right-Of-Way plat. These locations may vary from the stations and offsets shown on the construction plan and profile sheets. The COR/COTR shall furnish the ROW Plat upon request.



SURVEY MONUMENT
NTS



REFERENCE MARKER
NTS

ITEM 62101-0000; RIGHT-OF-WAY MONUMENT
ITEM 62102-0000; REFERENCE MARKER

Station	Description	Location		ROW Monument	Reference Marker
		Right (m)	Left (m)		
44+940.00	POT/OFFSET	30.48 & 145.00	n/a	2	2
45+020.00	POT/OFFSET	30.48 & 145.00	n/a	2	2
46+070.00	POT/OFFSET	30.48 & 80.00	n/a	2	2
46+210.00	POT/OFFSET	30.48 & 80.00	n/a	2	2
47+351.72	PC	30.48	30.48	2	2
47+472.49	PT	30.48	30.48	2	2
49+048.03	PC	30.48	30.48	2	2
49+171.02	PT	30.48	30.48	2	2
49+667.38	PC	30.48	30.48	2	2
49+790.40	PT	30.48	30.48	2	2
49+860.00	POT/OFFSET	30.48 & 120.00	n/a	2	2
49+960.00	POT/OFFSET	30.48 & 120.00	n/a	2	2
51+944.24	PC	30.48	30.48	2	2
52+150.40	PT	30.48	30.48	2	2
52+670.00	POT/OFFSET	n/a	30.48 & 45.00	2	2
52+685.73	PC	30.48	45.00	2	2
52+760.00	POC/OFFSET	n/a	30.48 & 45.00	2	2
52+850.27	PT	30.48	30.48	2	2
			Total:	36	36



R/W MONUMENT SYMBOL

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

RIGHT-OF-WAY & REFERENCE MARKERS DETAIL

DRAWN BY: NRDOT	DATE: 2/3/2014
DESIGNED BY: NRDOT	DATE: 2/3/2014
REVISED: 6/1/2015	BY: Leroy.Toledo
Sht 62 N27 ROW Mkrs rev 091817.dgn	

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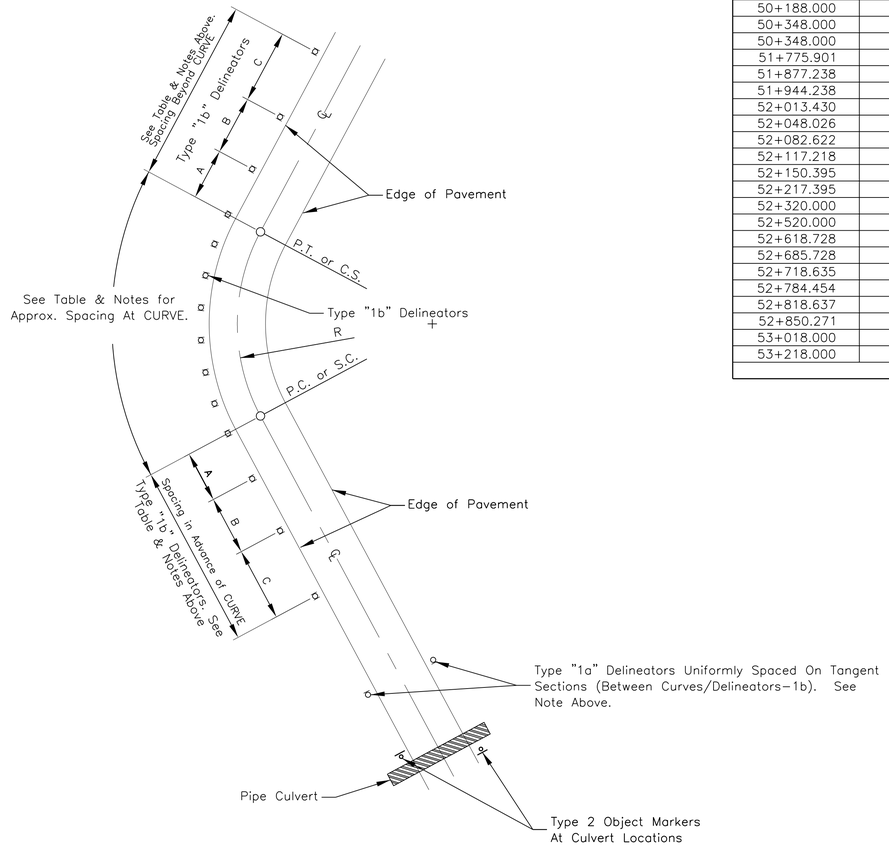
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	63	71

RADIUS OF CURVE (m)	APPROXIMATE SPACING (S) ON CURVE (m)	SPACING ON ADVANCE OF OR BEYOND A CURVE (m)		
		A (2S)	B (3S)	C (6S)
15	6	12	18	36
35	8	16	24	48
55	11	22	33	66
75	13	26	39	78
95	15	30	45	90
125	18	36	54	108
155	20	40	60	120
185	22	44	66	132
215	24	48	72	144
245	26	52	78	156
275	27	54	81	162
305	29	58	87	174
400	33	67	100	200
500	37	75	112	225
600	41	82	123	247
700	44	89	133	267
800	48	95	143	286
900	51	101	152	303
1000	53	107	160	320
1500	66	131	197	393
2000	76	151	227	454
2500	85	169	254	508
3000	93	186	279	557
3500	100	201	301	602
4000	107	215	322	644
4500	114	228	342	683
5000	120	240	360	720
5500	126	252	378	755
6000	132	263	395	789

S= 1.7 * sq. rt. (R-15).
Spacing for specific radii may be interpolated from table.
The spacing on curves should not exceed 90 meters.
Shaded areas denotes to use 90 meter spacings.
Delineators should be spaced 60 to 160 meters apart on Roadway tangent sections.

NOTE: When uniform spacing is interrupted by such features as culverts, signs, driveways, intersections, delineators which would ordinarily be located within the features may be relocated in either direction for a distance not exceeding one quarter of the uniform spacing. Delineators still falling within such features may be eliminated.

NOTE: Delineator and Object Markers shall be installed 610 (min) or 1219 mm (max) mearsured from Roadway or shoulder hinge point edge outward. For guardrail locations, place delineator in-line with the guardrail posts.



N27(2-3) - DELINEATORS

Station	Location	Type 1a Each	Type 1b Each	Description
44+716.500	Lt.	1		Type 1a Delineator
44+716.500	Rt.	1		Type 1a Delineator
45+400.000	Lt.	1		Type 1a Delineator
45+400.000	Rt.	1		Type 1a Delineator
45+661.000	Lt.	1		Type 1a Delineator
45+661.000	Rt.	1		Type 1a Delineator
45+792.000	Lt.	1		Type 1a Delineator
45+792.000	Rt.	1		Type 1a Delineator
45+923.000	Lt.	1		Type 1a Delineator
45+923.000	Rt.	1		Type 1a Delineator
46+054.000	Lt.	1		Type 1a Delineator
46+054.000	Rt.	1		Type 1a Delineator
46+655.000	Lt.	1		Type 1a Delineator
46+655.000	Rt.	1		Type 1a Delineator
47+244.720	Lt.		1	Type 1b Delineator
47+351.718	Lt.		1	Type 1b Delineator
47+391.976	Lt.		1	Type 1b Delineator
47+432.234	Lt.		1	Type 1b Delineator
47+472.492	Lt.		1	Type 1b Delineator
47+579.492	Lt.		1	Type 1b Delineator
48+000.000	Lt.	1		Type 1a Delineator
48+000.000	Rt.	1		Type 1a Delineator
48+169.492	Lt.		1	Type 1b Delineator
48+952.956	Lt.		1	Type 1b Delineator
49+048.027	Lt.		1	Type 1b Delineator
49+089.024	Lt.		1	Type 1b Delineator
49+171.018	Lt.		1	Type 1b Delineator
49+266.018	Lt.		1	Type 1b Delineator
49+409.017	Lt.		1	Type 1b Delineator
49+569.017	Lt.		1	Type 1b Delineator
49+667.381	Lt.		1	Type 1b Delineator
49+708.388	Lt.		1	Type 1b Delineator
49+749.395	Lt.		1	Type 1b Delineator
49+790.403	Lt.		1	Type 1b Delineator
49+885.403	Lt.		1	Type 1b Delineator
50+028.403	Lt.		1	Type 1b Delineator
50+188.000	Rt.	1		Type 1a Delineator
50+188.000	Lt.	1		Type 1a Delineator
50+348.000	Lt.	1		Type 1a Delineator
50+348.000	Rt.	1		Type 1a Delineator
51+775.901	Rt.		1	Type 1b Delineator
51+877.238	Rt.		1	Type 1b Delineator
51+944.238	Rt.		1	Type 1b Delineator
52+013.430	Rt.		1	Type 1b Delineator
52+048.026	Rt.		1	Type 1b Delineator
52+082.622	Rt.		1	Type 1b Delineator
52+117.218	Rt.		1	Type 1b Delineator
52+150.395	Rt.		1	Type 1b Delineator
52+217.395	Rt.		1	Type 1b Delineator
52+320.000	Rt.		1	Type 1b Delineator
52+520.000	Lt.		1	Type 1b Delineator
52+618.728	Lt.		1	Type 1b Delineator
52+685.728	Lt.		1	Type 1b Delineator
52+718.635	Lt.		1	Type 1b Delineator
52+784.454	Lt.		1	Type 1b Delineator
52+818.637	Lt.		1	Type 1b Delineator
52+850.271	Lt.		1	Type 1b Delineator
53+018.000	Lt.		1	Type 1b Delineator
53+218.000	Lt.		1	Type 1b Delineator
	TOTAL	20	39	

Type 2 OBJECT MARKER TABLE

STATION	LOCATION	TYPE 2
44+470.00	Lt. & Rt.	2
44+549.00	Lt. & Rt.	2
44+583.00	Lt. & Rt.	2
44+850.00	Lt. & Rt.	2
45+060.00	Lt. & Rt.	2
45+280.00	Lt. & Rt.	2
45+460.00	Lt. & Rt.	2
45+520.00	Lt. & Rt.	2
45+530.00	Lt. & Rt.	2
46+185.00	Lt. & Rt.	2
46+454.00	Lt. & Rt.	2
46+810.00	Lt. & Rt.	2
46+902.00	Lt. & Rt.	2
46+973.00	Lt. & Rt.	2
47+003.00	Lt. & Rt.	2
47+040.00	Lt. & Rt.	2
47+144.00	Lt. & Rt.	2
47+205.00	Lt. & Rt.	2
47+480.00	Lt. & Rt.	2
47+646.00	Lt. & Rt.	2
47+660.00	Lt. & Rt.	2
47+740.00	Lt. & Rt.	2
47+830.00	Lt. & Rt.	2
47+845.00	Lt. & Rt.	2
47+900.00	Lt. & Rt.	2
48+102.00	Lt. & Rt.	2
48+140.00	Lt. & Rt.	2
48+211.50	Lt. & Rt.	2
48+246.00	Lt. & Rt.	2
48+292.00	Lt. & Rt.	2
48+300.00	Lt. & Rt.	2
48+413.00	Lt. & Rt.	2
48+500.00	Lt. & Rt.	2
48+600.00	Lt. & Rt.	2
48+700.00	Lt. & Rt.	2
48+800.00	Lt. & Rt.	2
48+900.00	Lt. & Rt.	2
49+000.00	Lt. & Rt.	2
49+120.00	Lt. & Rt.	2
49+515.00	Lt. & Rt.	2
49+794.50	Lt. & Rt.	2
49+945.00	Lt. & Rt.	2
50+514.00	Lt. & Rt.	2
50+622.00	Lt. & Rt.	2
50+795.00	Lt. & Rt.	2
50+938.00	Lt. & Rt.	2
51+043.00	Lt. & Rt.	2
51+250.00	Lt. & Rt.	2
51+257.00	Lt. & Rt.	2
51+264.00	Lt. & Rt.	2
51+480.00	Lt. & Rt.	2
51+614.00	Lt. & Rt.	2
51+721.00	Lt. & Rt.	2
52+180.00	Lt. & Rt.	2
52+272.00	Lt. & Rt.	2
52+420.00	Lt. & Rt.	2
52+464.00	Lt. & Rt.	2
	TOTAL:	114

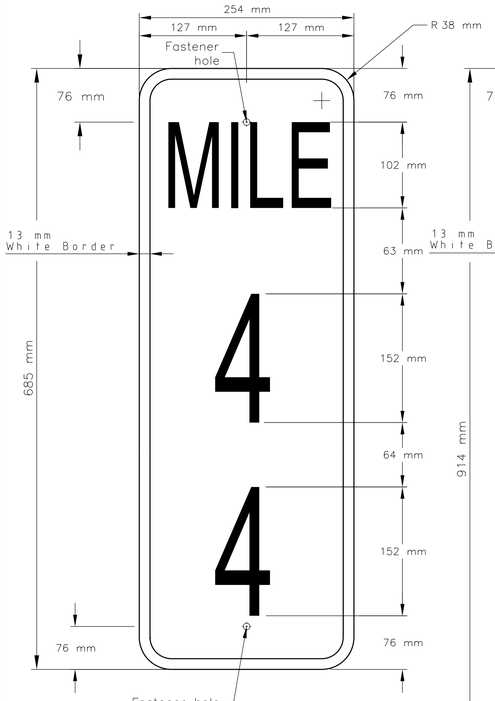
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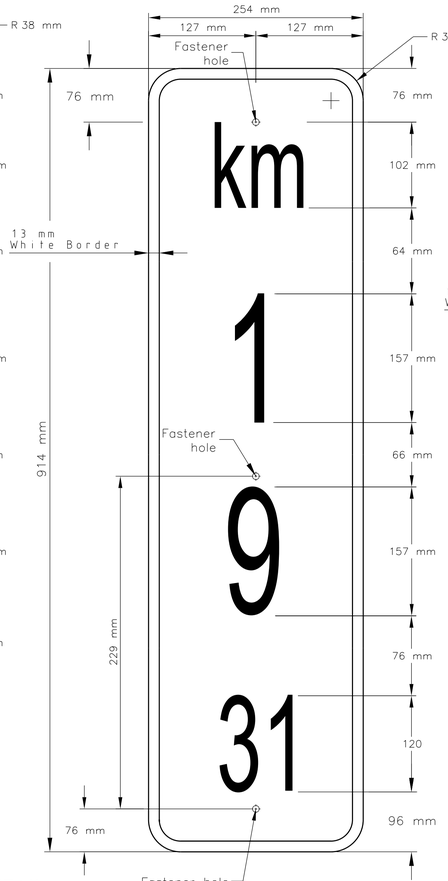
DELINEATOR LAYOUT DETAILS & QUANTITY TABLES

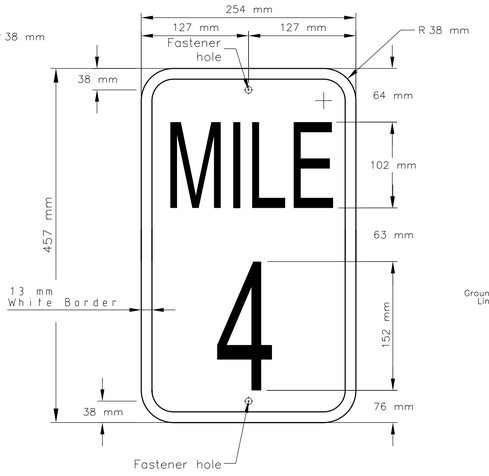
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REVISED: 5/28/2013	BY: Leroy.Toledo
Sht 63 N27 DelinObjMkr_2 rev 091817.dgn	

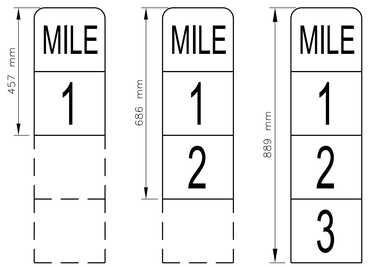
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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-2)(2-3)2&4	64	71







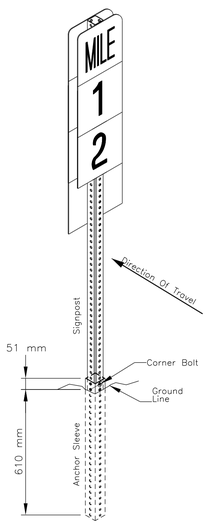


TYPICAL MILEPOST DETAIL

STANDARD NUMERAL POSITION

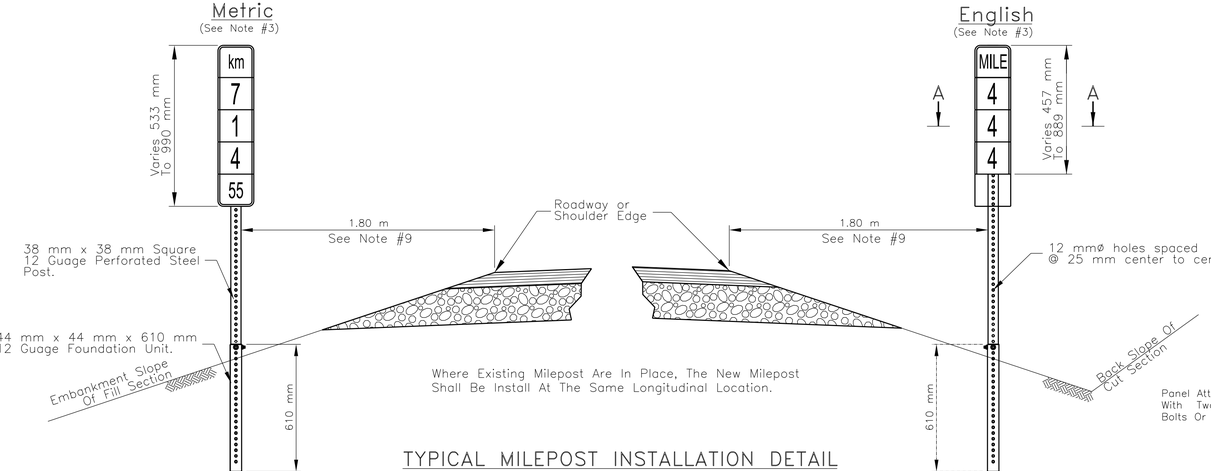
ITEM: 63318-1020: MILEPOST, 1-38 mm x 38 mm STEEL SQUARE TUBE

STATION (m)	LOCATION	Kilometers (Labels)	MILES (Labels)	QUANTITY (Each)
44+423.86	Lt. & Rt.	43.5	27	2
46+023.86	Lt. & Rt.	45.1	28	2
47+641.86	Lt. & Rt.	46.7	29	2
49+250.86	Lt. & Rt.	48.3	30	2
50+859.86	Lt. & Rt.	49.9	31	2
52+468.86	Lt. & Rt.	51.5	32	2
			TOTAL:	12



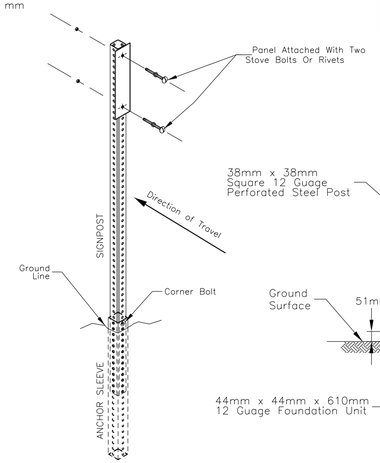
ISOMETRIC VIEW

NOTE: Square Tube Splice Connection Detail on Sheet 59

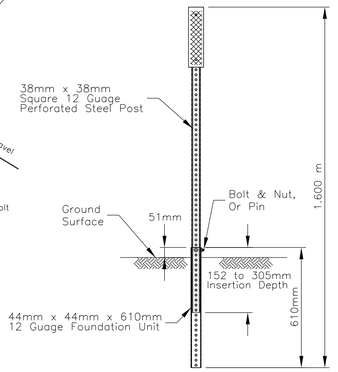


TYPICAL MILEPOST INSTALLATION DETAIL

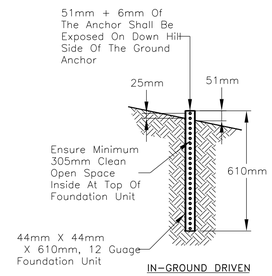
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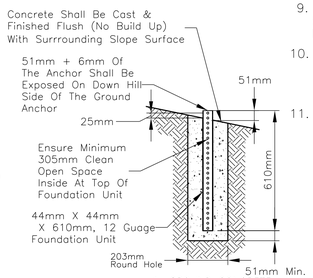
ISOMETRIC VIEW



ALTERNATE ASSEMBLY

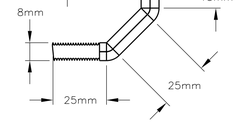


IN-GROUND DRIVEN

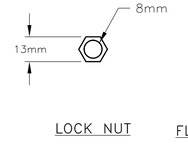


IN-GROUND CONCRETE

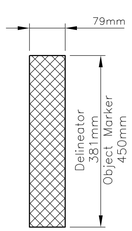
Use Chair Device To Ensure Minimum 51mm Clearance Above Bottom Of Hole



BREAK-AWAY BOLT

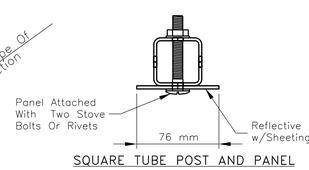


LOCK NUT FLAT WASHER

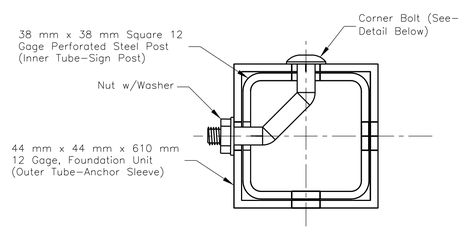


REFLECTIVE PANEL
(Pre-Drilled/Punched)

TYPE	POST COLOR	HIGH INTENSITY REFLECTIVE SHEETING
1a	WHITE	WHITE, ONE SIDE
1b	WHITE	WHITE, BOTH SIDES
2	YELLOW	AMBER, ONE SIDE



SQUARE TUBE POST AND PANEL



"BREAK-AWAY" DETAIL
SIGN POST/SLEEVE INTERFACE

GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS A(AE) AND SHALL CONFORM TO SECTION 601 OF THE FP-03. FURNISHING AND PLACING OF CONCRETE, WHEN REQUIRED, SHALL BE CONSIDERED INCIDENTAL TO ITEM 63309-0020.
2. THE CONTRACTOR SHALL USE 51mm X 51mm ALL STEEL SQUARE TUBE DELINEATORS. SEE SHEET 59 & 60 FOR POST SPACING.
3. THE MILE POSTS SHALL BE PLACED ON BOTH SIDE OF THE ROADWAY WITH ENGLISH UNITS PANEL ON APPROACHING TRAFFIC AND METRIC UNITS PANEL ON OPPOSING TRAFFIC.
4. MILE POST PLATES SHALL BE FABRICATED FROM 16 GAGE MINIMUM THICKNESS 5052-H38 OR 6061-T6 ALUMINUM ALLOY.
5. ALL SURFACE TO BE COVERED WITH REFLECTIVE SHEETING, AND SHALL BE PREPARED IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION SECTION 718.11, TABLE 718-3.
6. THE BORDER AND LEGEND SHALL BE STANDARD REFLECTIVITY SILVER-WHITE. THE BACKGROUND SHALL BE STANDARD REFLECTIVITY GREEN AND MAY BE REVERSE SILK-SCREENED.
7. THE BACK SIDE OF THE ALUMINUM SHEETS SHALL BE ETCHED BY APPROVED METHODS TO REDUCE GLARE FROM REFLECTED SUNLIGHT.
8. STEEL POSTS SHALL CONFORM TO ASTM A499- YIELD POINT AND TENSILE STRENGTH OF STEEL SHALL BE 550 & 689 MPa (MINIMUM) RESPECTFULLY AND SHALL NOT WEIGHT LESS THAN 2.98 kg/m. AN APPROVED ALTERNATE BREAKAWAY ASSEMBLY MAY BE SUBMITTED TO THE COR/AOTR FOR REVIEW AND APPROVAL PRIOR TO IT'S USE. THE POSTS SHALL BE GALVANIZED AFTER FABICATION IN ACCORDANCE WITH ASTM A-123.
9. INSTALL MILE POST MARKER 1.80 METER (MAXIMUM) FROM ROADWAY SHOULDER. AT GUARDRAIL LOCATIONS, THE MILE POST MARKER SHALL LINE UP WITH THE GUARDRAIL POSTS.
10. THE POSTS LENGTH SHALL BE DETERMINED IN THE FIELD BASED ON FINISH GROUND ELEVATION WITH RESPECT TO EDGE OF PAVEMENT ELEVATION.
11. THE UNIT PRICE BID FOR FURNISHING AND INSTALLING MILE POSTS SHALL INCLUDE ALL MATERIALS INCLUDING TWO SIGNS PER POST.

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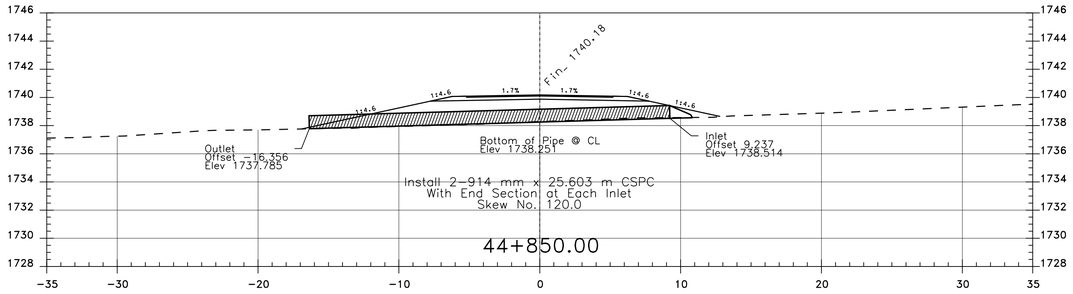
STANDARD MILEPOST AND PERFORATED SQUARE STEEL TUBE POST DETAILS

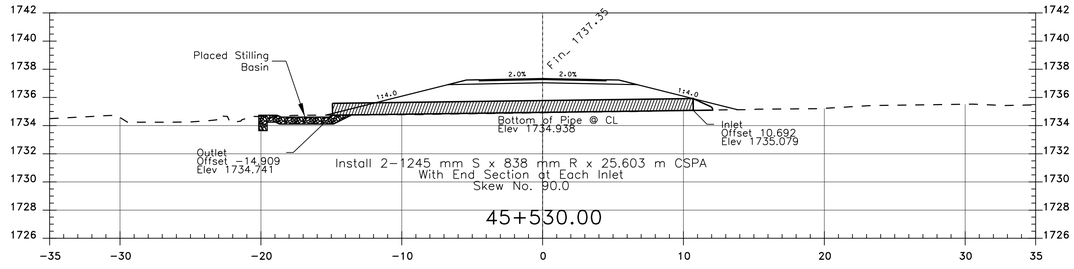
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REVISED: 6/1/2015	BY: Leroy.Toledo
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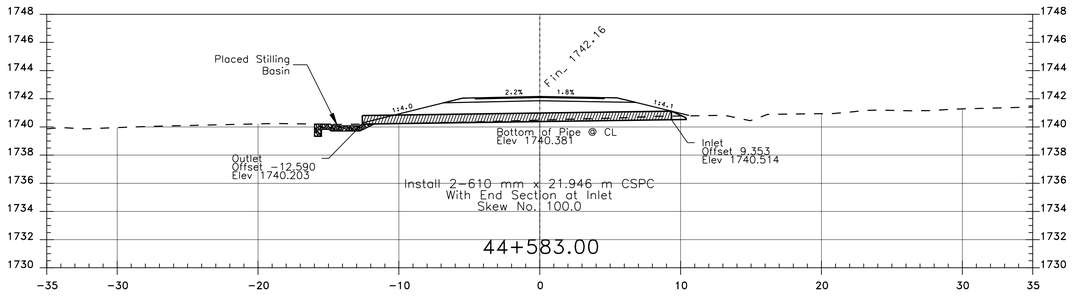
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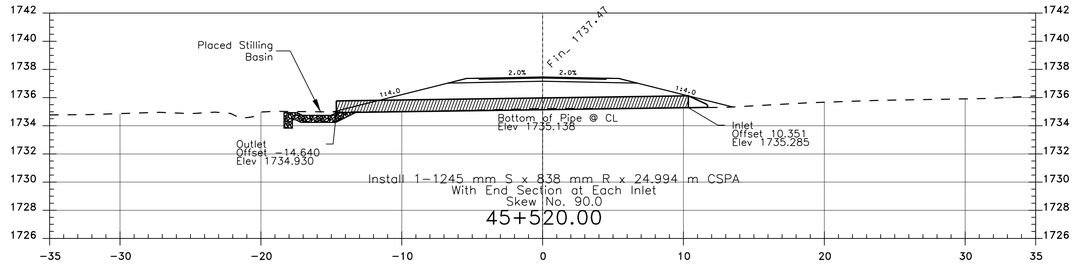
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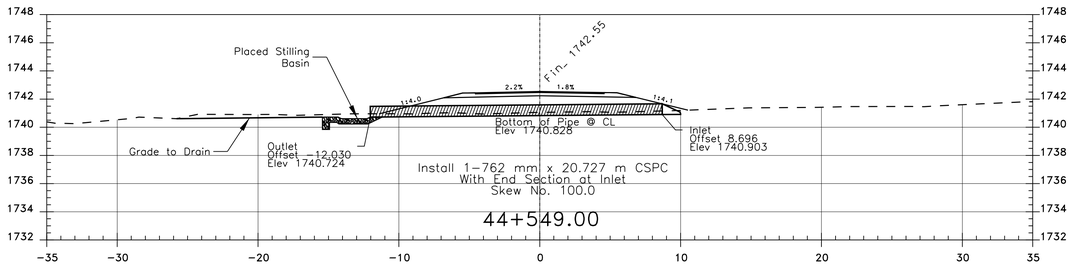
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	65	71

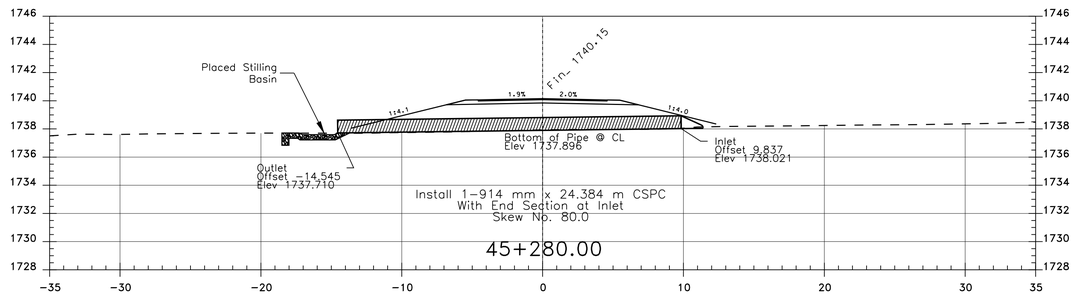


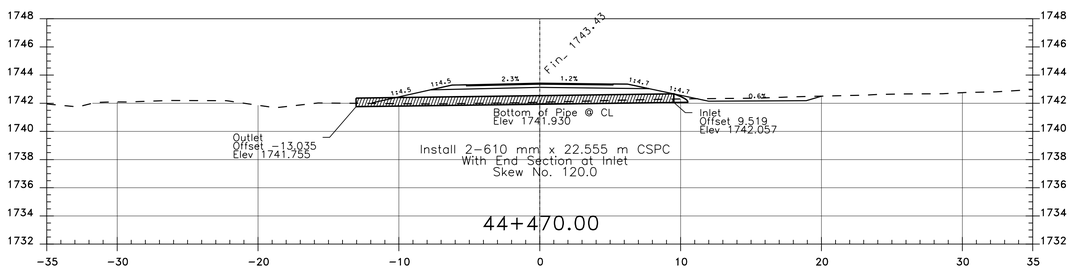


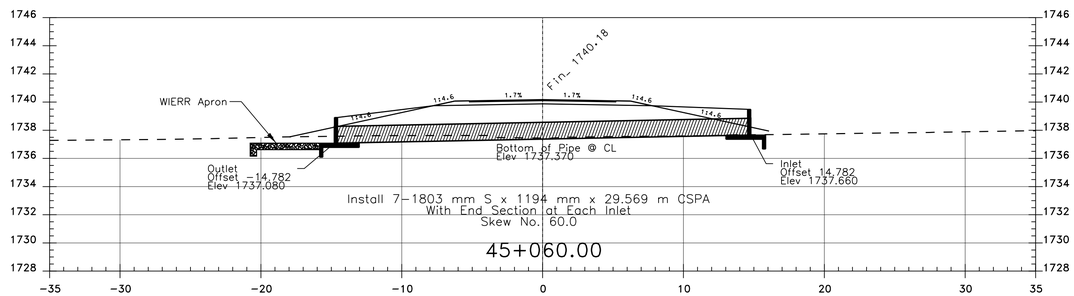






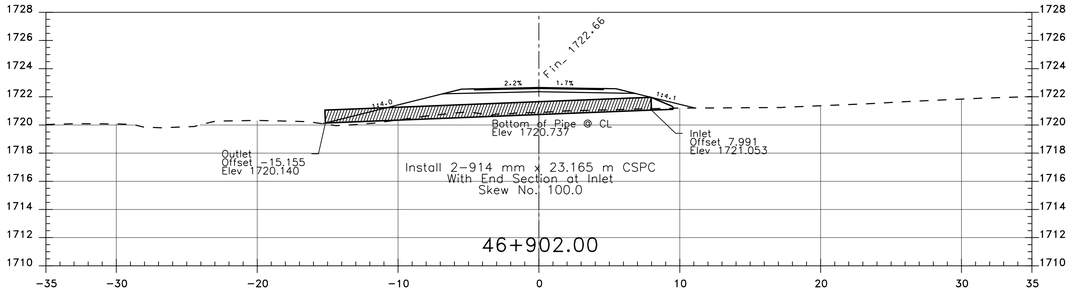


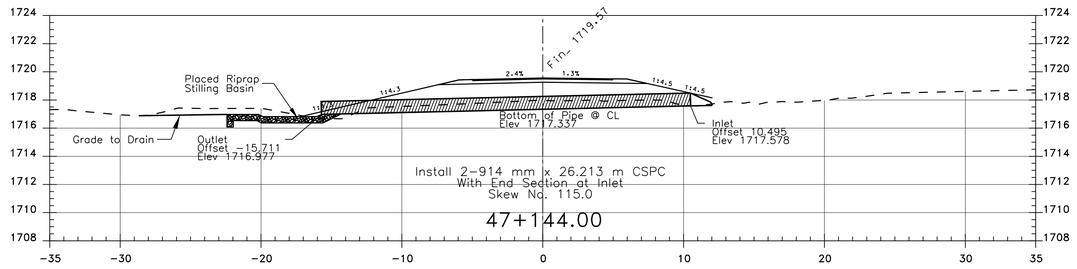


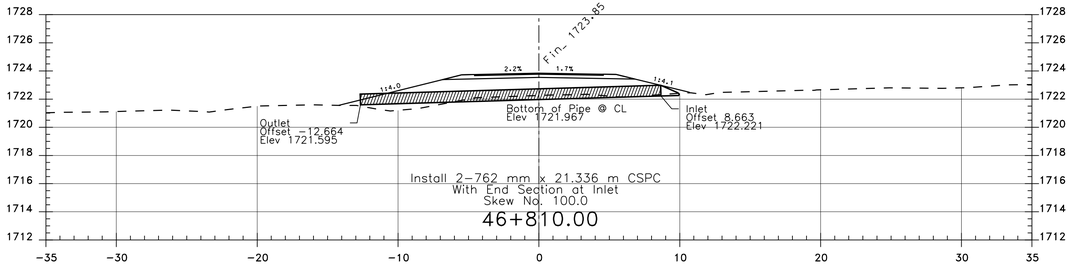


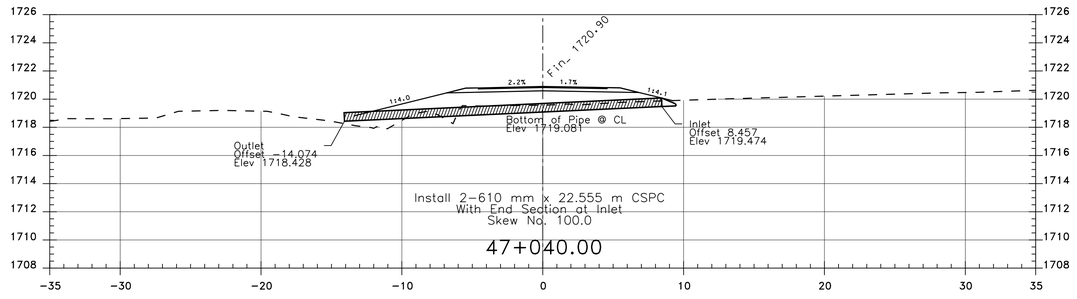
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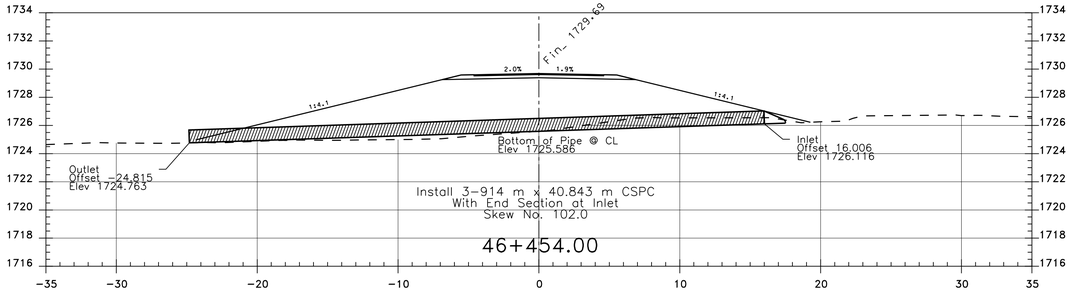
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NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	66	71

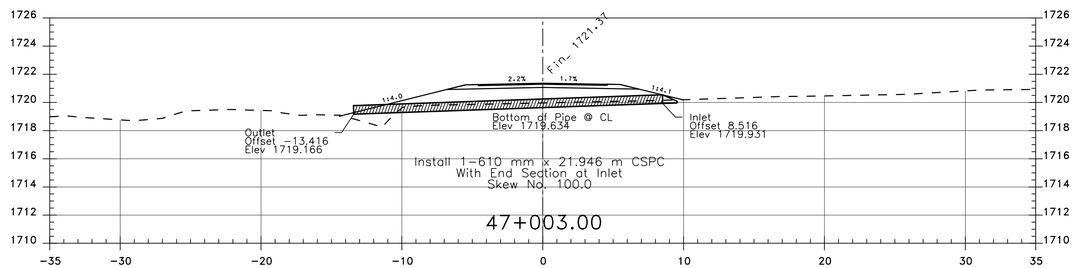


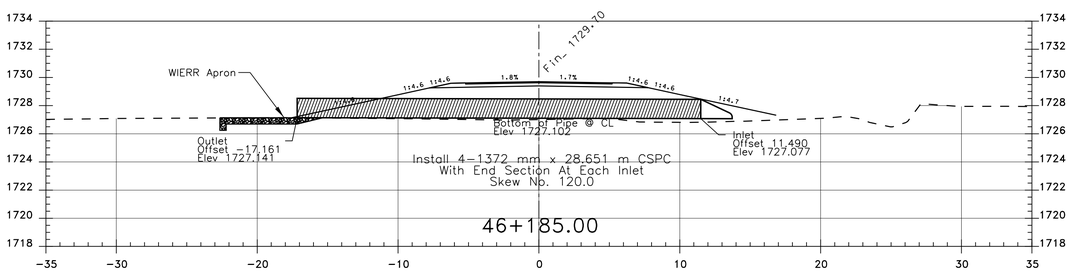


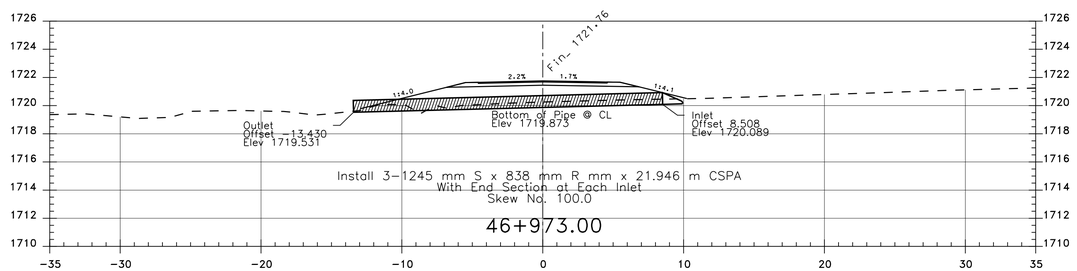






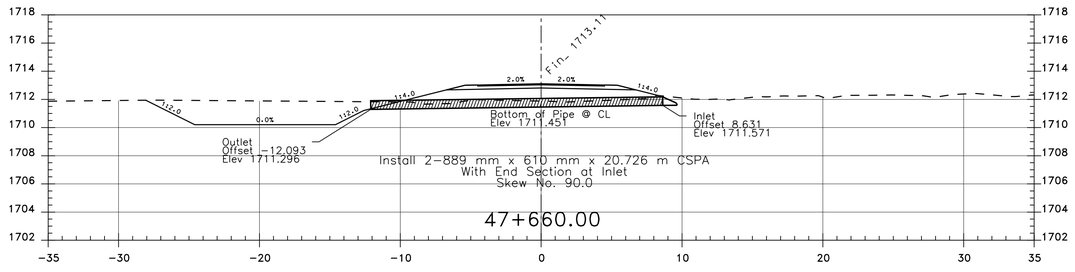


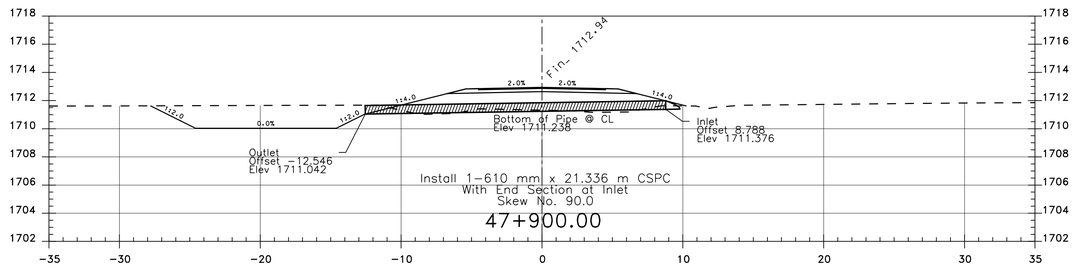


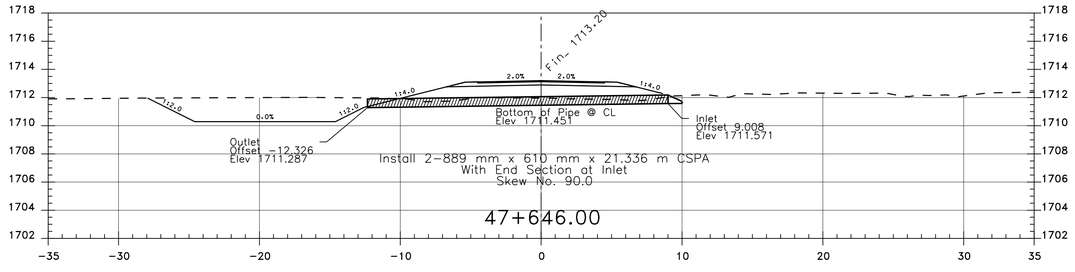


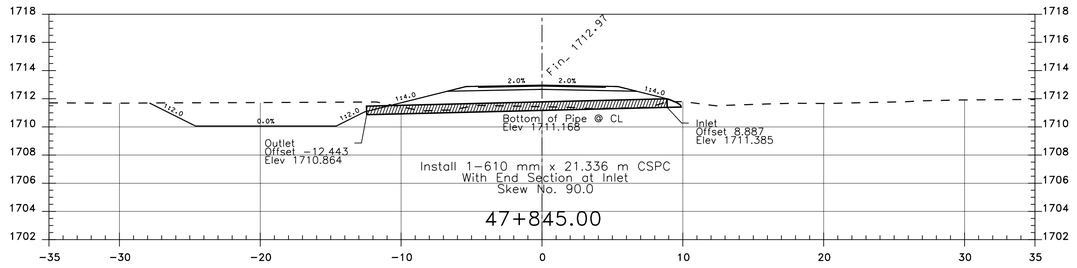
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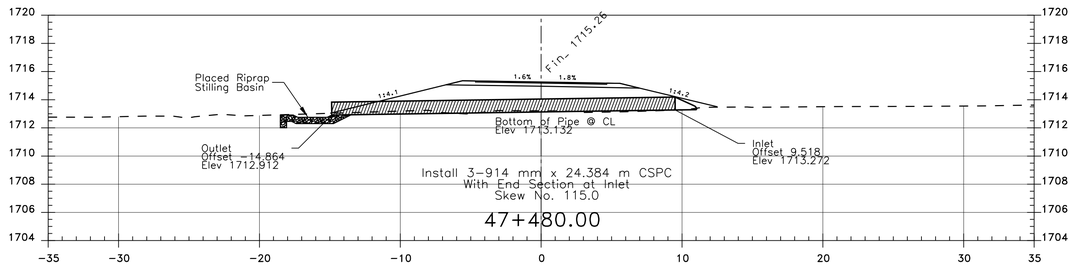
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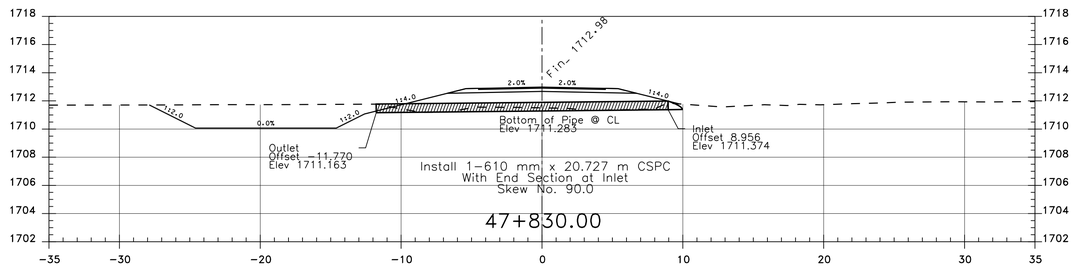


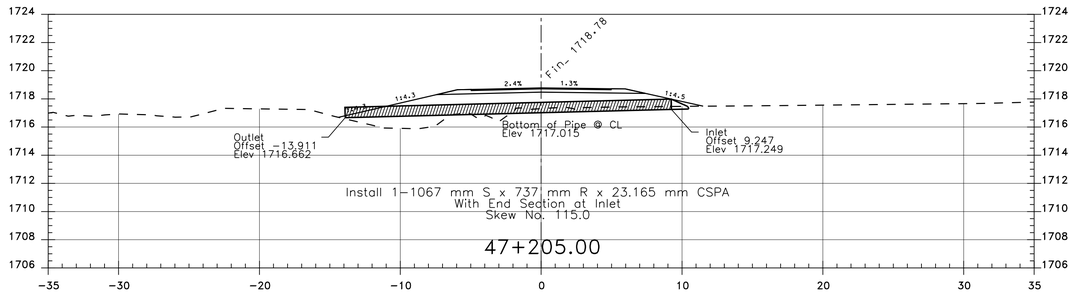


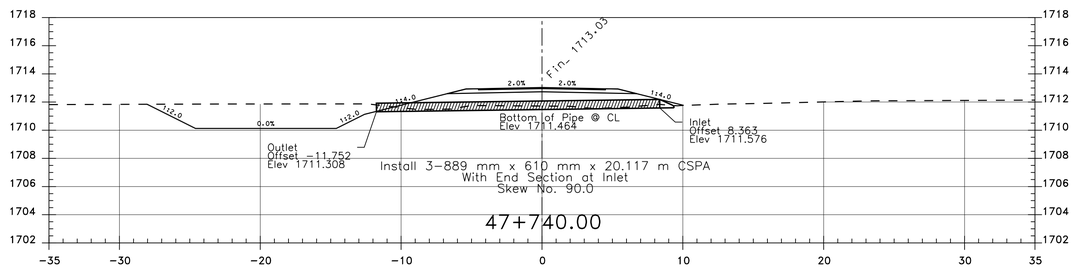






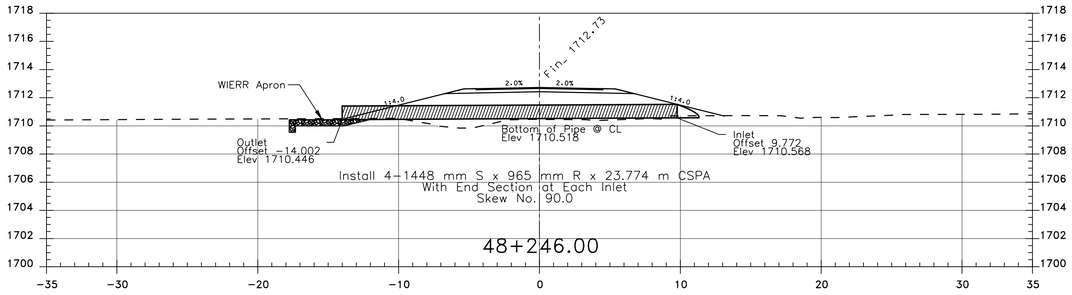


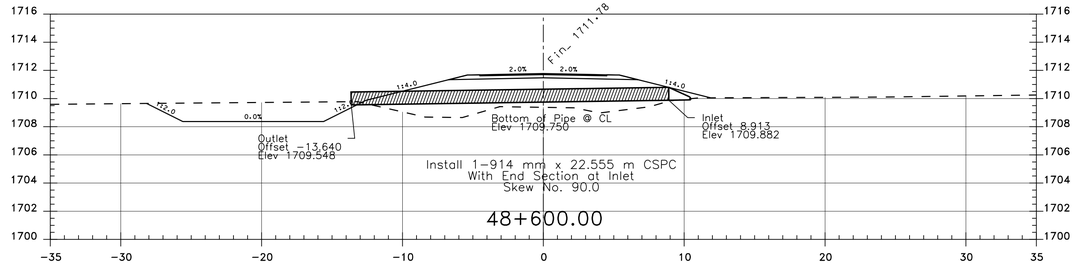


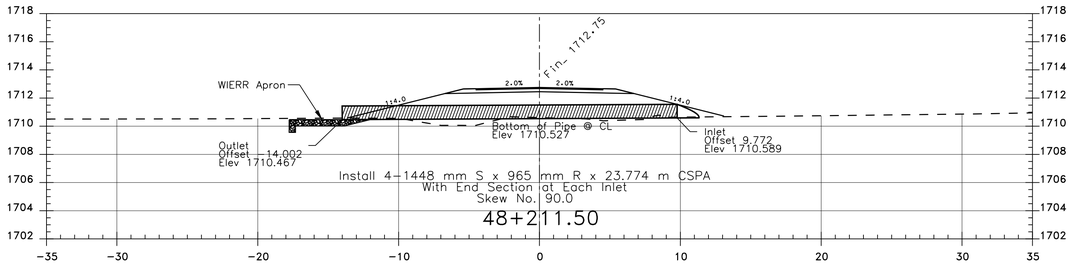


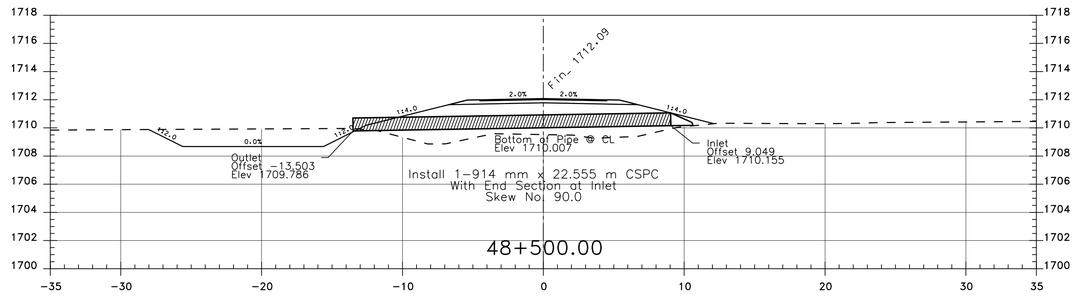
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	68	71

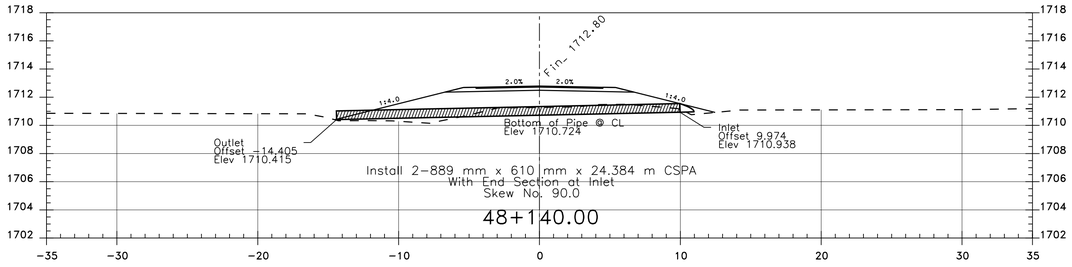
STA. 48+102.00 to STA. 48+600.00

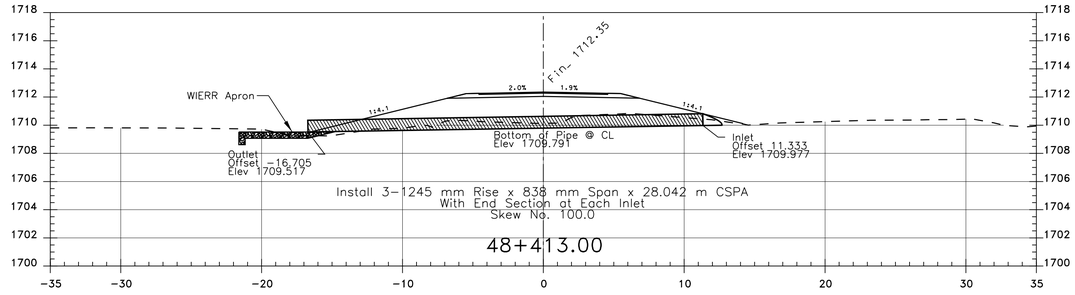


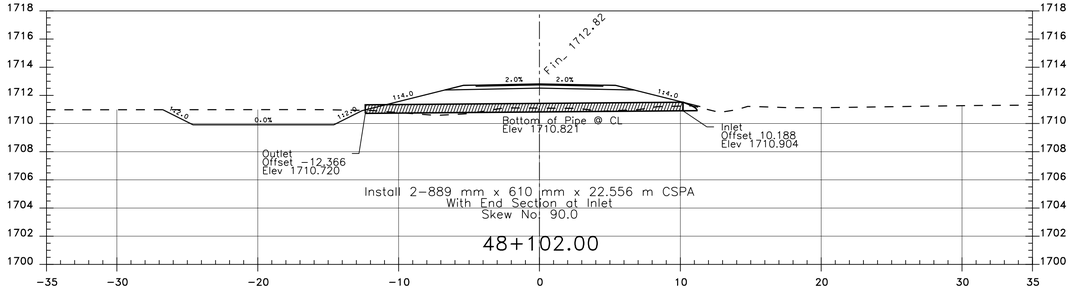


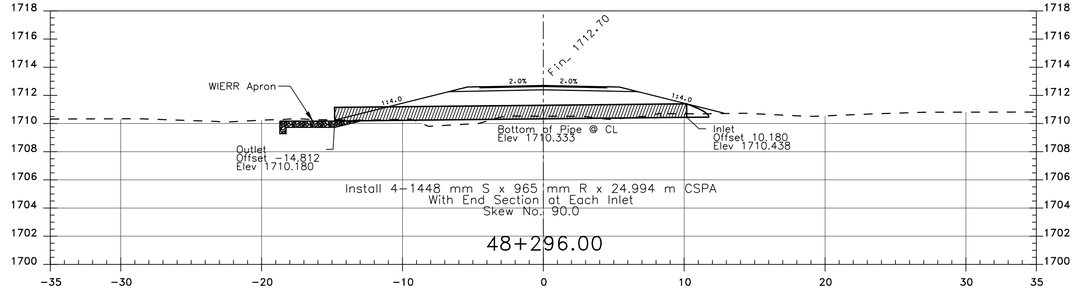






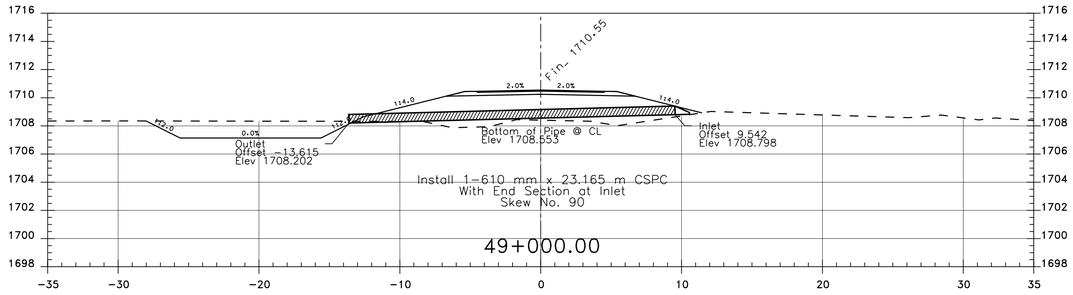


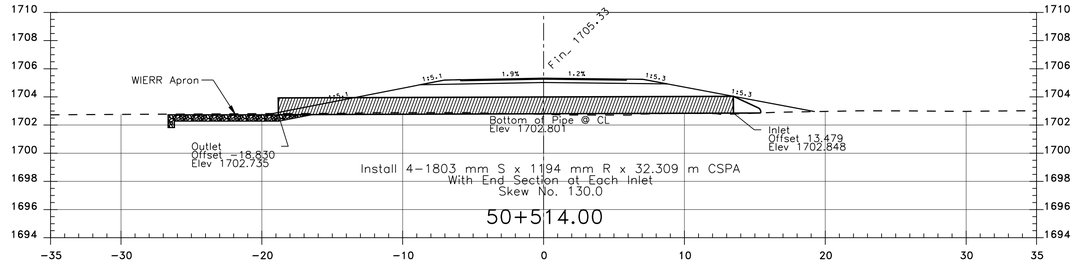


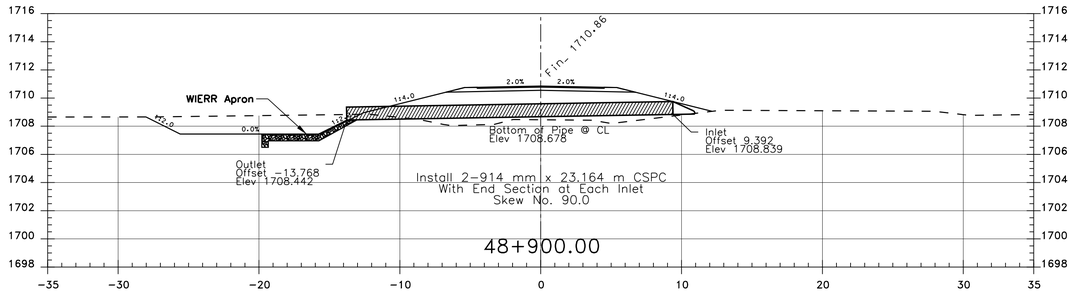


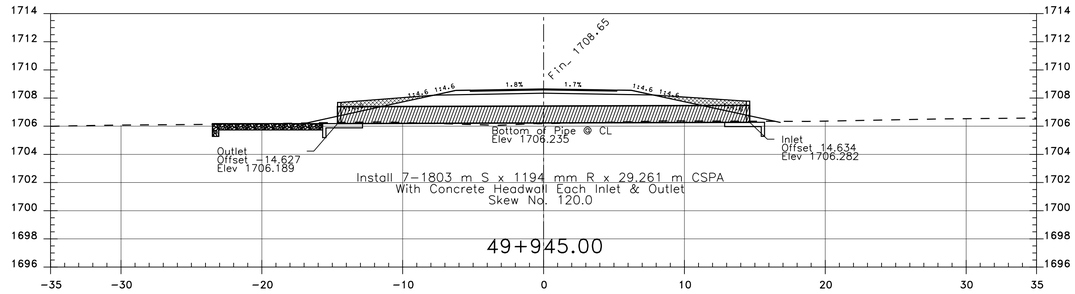
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	69	71

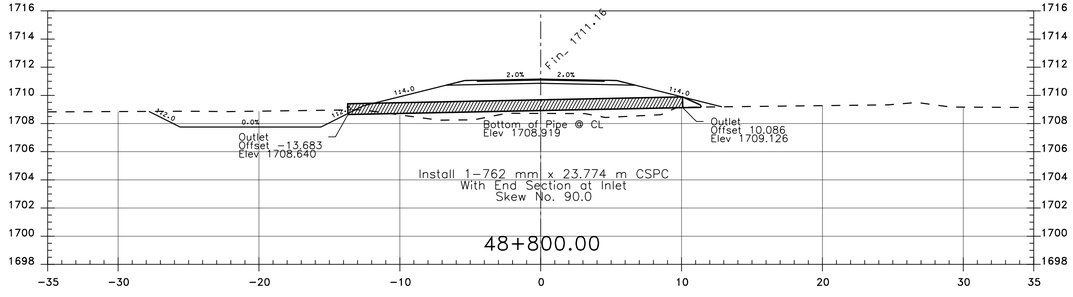
STA. 48+700.00 to STA. 50+514.00

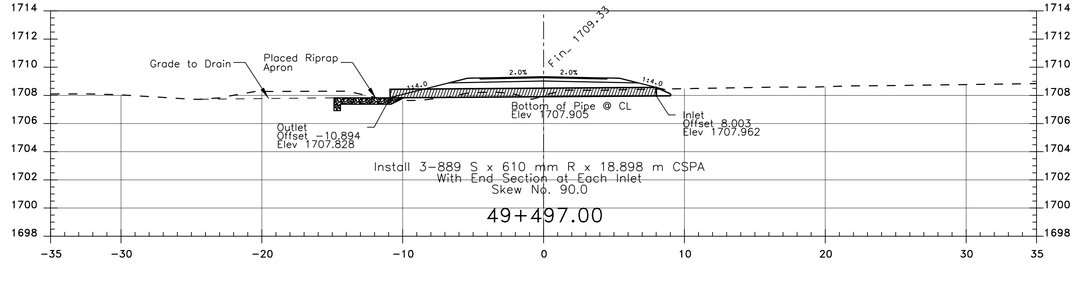


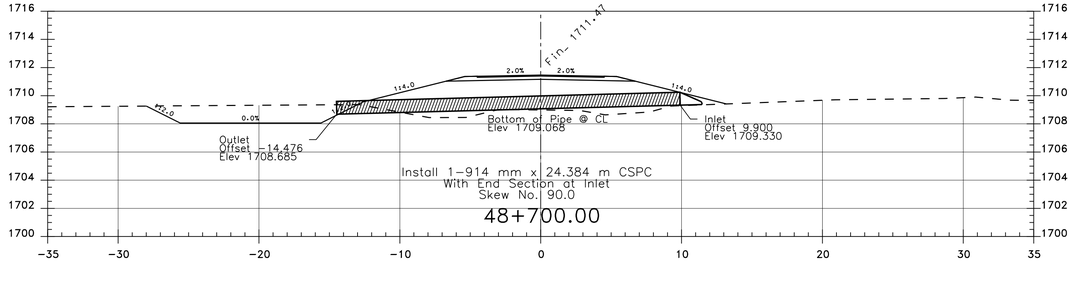


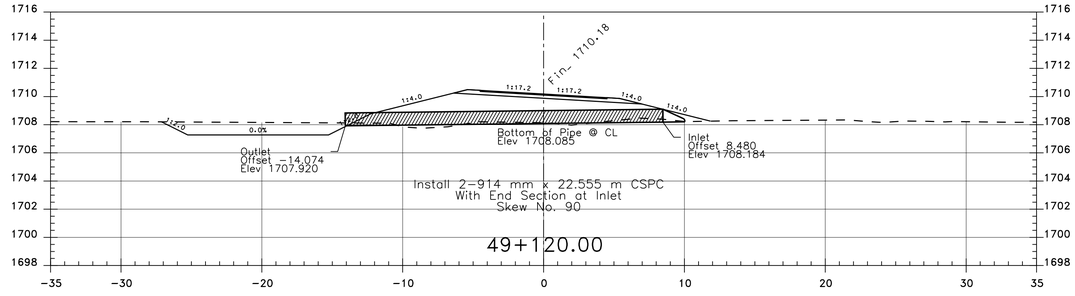






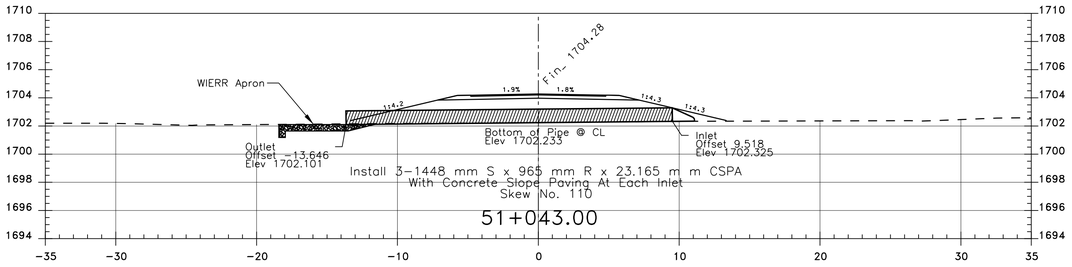


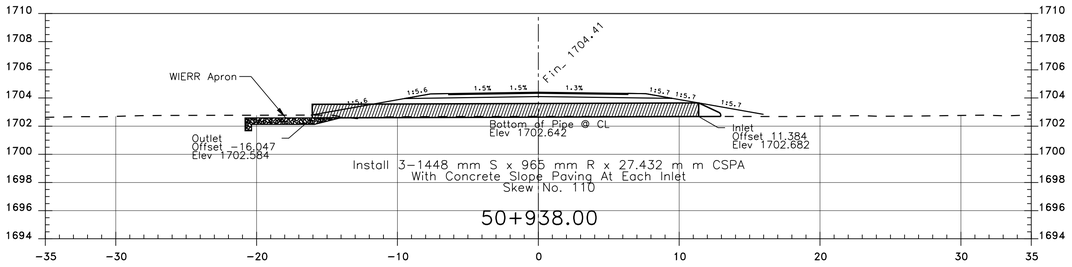


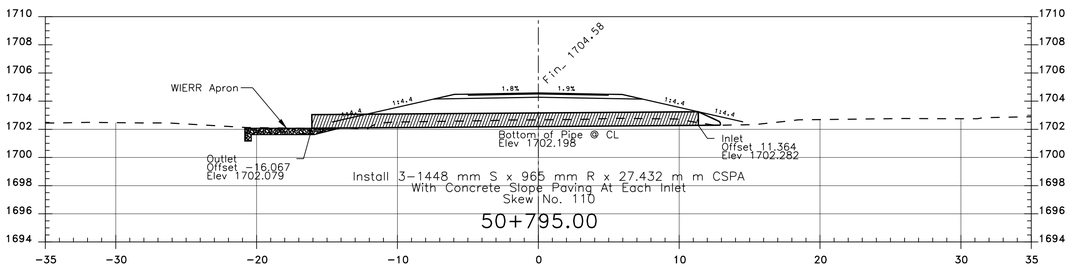


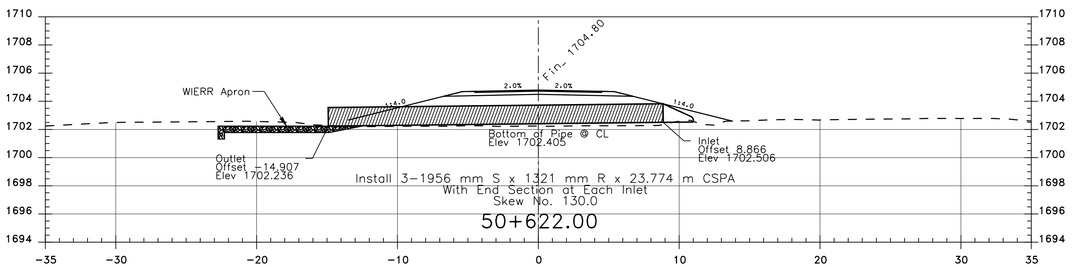
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	70	71

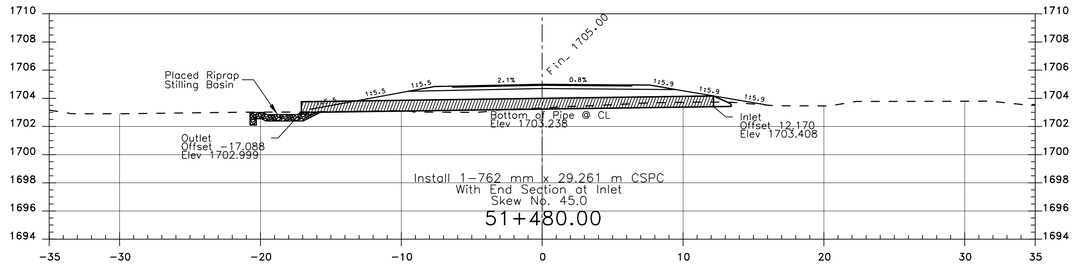
STA. 50+622.00 to STA. 51+480.00

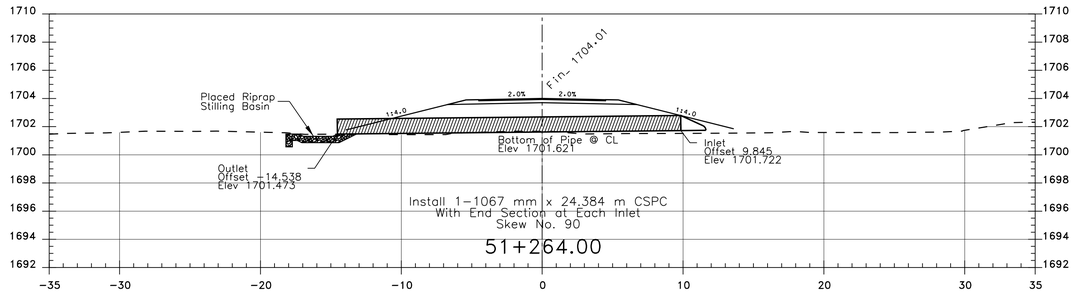


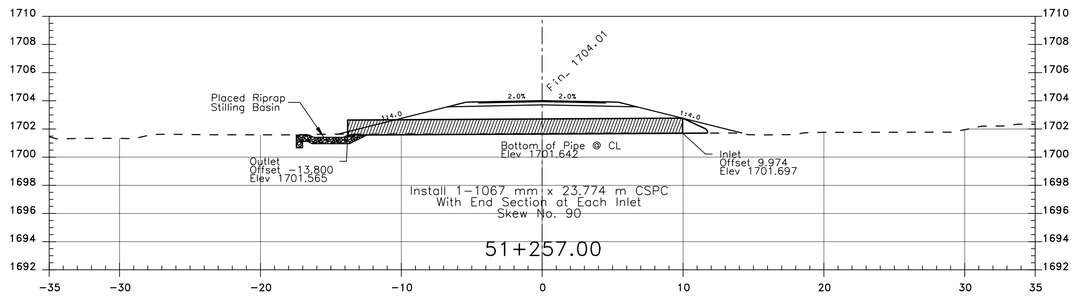


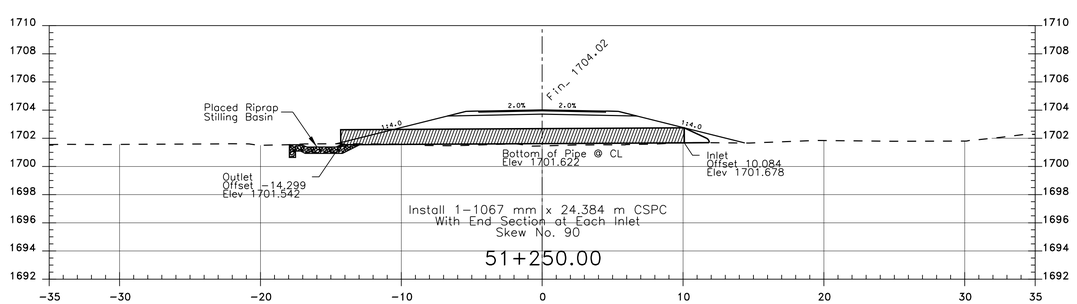












REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	71	71

STA. 51+614.00 to STA. 52+464.00

