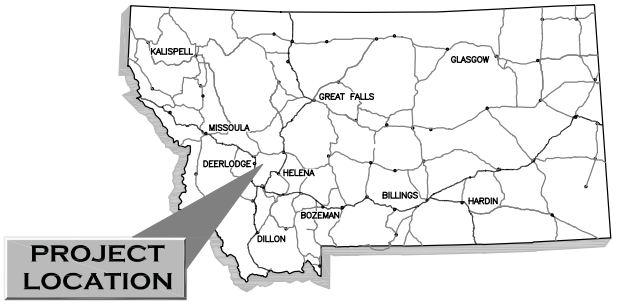
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE, REGION 1

CONSTRUCTION PLANS FOR:

NF DRY COTTONWOOD CREEK AOP CULVERT REPLACEMENT

NFSR 85 MP 11.9

BEAVERHEAD-DEERLODGE NATIONAL FOREST
PINTLER RANGER DISTRICT
DEERLODGE COUNTY, MONTANA



LOCATION MAP

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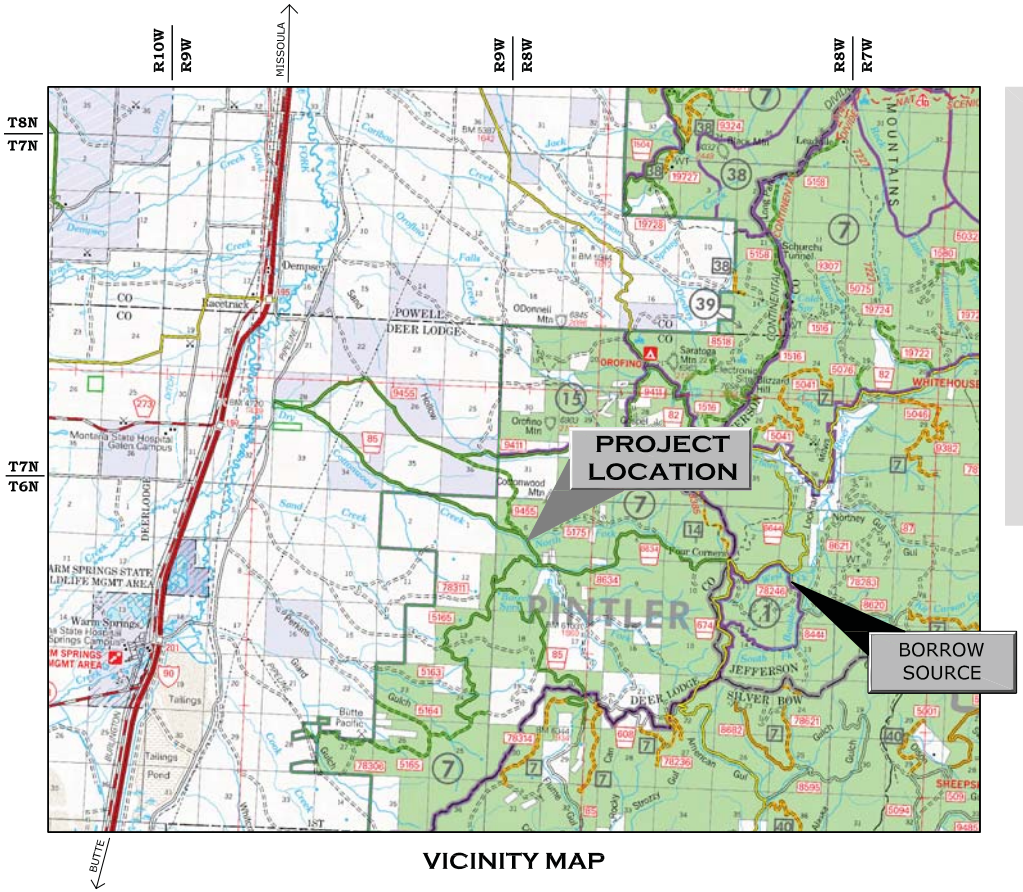
XS1	ROAD CROSS SECTIONS

MATERIAL SOURCES

GOVERNMENT FURNISHED
Unclassified Borrow
Waste Site
CONTRACTOR FURNISHED
Bedding
Crushed Aggregate
Riprap



VICINITY MAP

RECOMMENDED:

_____ DATE _____
DISTRICT RANGER
PINTLER RANGER DISTRICT

REVIEWED:

_____ DATE _____
FOREST ENGINEER
BEAVERHEAD-DEERLODGE NATIONAL FOREST

APPROVED:

_____ DATE _____
FOREST SUPERVISOR
BEAVERHEAD-DEERLODGE NATIONAL FOREST

MONTANA
CURTIS N. THOMPSON
15514 PE
3/18/15
LICENSED
PROFESSIONAL ENGINEER

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3203 RUSSELL STREET, MISSOULA, MONTANA 59801-8091
PHONE 406/721-4320 FAX 406/549-8071

SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	ITEM DESCRIPTION	MEASUREMENT		QUANTITY
		METHOD	UNIT	
15101	MOBILIZATION	LSQ	Lump Sum	1
15102	EQUIPMENT WASHING	LSQ	Lump Sum	1
15202	STAKE CLEANUP	LSQ	Lump Sum	1
15221	CONSTRUCTION STAKING	CQ	Lump Sum	1
15401	CONTRACTOR TESTING	LSQ	Lump Sum	1
15713	SOIL EROSION & POLLUTION CONTROL	LSQ	Lump Sum	1
15730	DEWATERING	LSQ	Lump Sum	1
20301	REMOVAL OF EXISTING 64"x43" CORRUGATED STEEL PIPE-ARCH	AQ	Each	1
20404	UNCLASSIFIED BORROW (GOVERNMENT FURNISHED)	CQ	Cubic Yard	80
20806	STRUCTURE EXCAVATION	LSQ	Lump Sum	1
25101	PLACED RIPRAP, CLASS 3 MACHINE PLACED (CONTRACTOR FURNISHED)	CQ	Cubic Yard	40 *
25150	GRADE CONTROL, ROCK WEIR (GOVERNMENT FURNISHED)	AQ	Each	4
30809	CRUSHED AGGREGATE, SURFACING, COMPACTION METHOD 2 (CONTRACTOR FURNISHED)	CQ	Cubic Yard	55
60202	128" SPAN x 83" RISE CORRUGATED STEEL PIPE-ARCH, 0.138" THICKNESS, 3x1 OR 5x1 COURRUGATIONS	AQ	Linear Foot	56
62201	EQUIPMENT RENTAL, HYDRAULIC EXCAVATOR WITH THUMB	AQ	Hour	8
62202	EQUIPMENT RENTAL, LARGE DUMP TRUCK	AQ	Hour	8

** Material salvaged from the excavation meeting the Class 3 Riprap gradation requirements may be used.*

CQ= Contract Quantity (See SECTION 109.02(b) of the STANDARD SPECIFICATIONS)
AQ= Actual Quantity; LSQ = Lump Sum Quantity

GENERAL NOTES

DESIGN *: This structure is designed for HL-93 live loading in accordance with AASHTO LRFD Bridge Design Specifications, 6th edition.*

HYDROLOGY AND HYDRAULICS *: This structure has been designed to pass a flood of 101 cfs (Q100) with a Headwater Depth to Culvert Rise ratio less than 1.0.*

SPECIFICATIONS *: Construct the project in compliance with Federal Highway Administration Standard Specifications for Construction of Road and Bridges on Federal Highway Projects (FP-03) and applicable Forest Service Supplemental Specifications (FSSS).*

EROSION CONTROL PLAN *: Submit a Dewatering and Soil Erosion and Sediment Control Plan to the Contracting Officer for approval at least seven (7) days prior to beginning work. See Section 157 of the Supplemental Specifications for details. Construct temporary means to divert the flow of the live stream as necessary to perform work. Do not pump water from excavations directly into the live stream.*

CLEARING AND GRUBBING *: Clearing and grubbing is incidental and will not be measured separately.*

DISPOSAL *: All materials designated for removal become the property of the Contractor and are to be disposed of by removing from the forest in an environmentally safe manner in accordance with all Local, State and Federal requirements.*

TEMPORARY TRAFFIC CONTROL *: Contractor will be allowed to close Road 85 to traffic during construction of the new culvert. See Section 156.03 of the Supplemental Specifications for road closure limitations. Submit a Temporary Traffic Control Plan to the Contracting Officer for approval at least 30 days prior to intended use. Temporary traffic control is incidental to other items.*

FOREST SERVICE U S DEPARTMENT OF AGRICULTURE

REGION ONE

BY	DATE	REVISION DESCRIPTION

DESIGN KG PROJ. NO. 6389
DRAWN KG DATE Mar-15
CHECKED CT SURVEYED DJ&A

DJ&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-5891
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USFS BEAVERHEAD-DEERLODGE NF
NORTH FORK DRY COTTONWOOD
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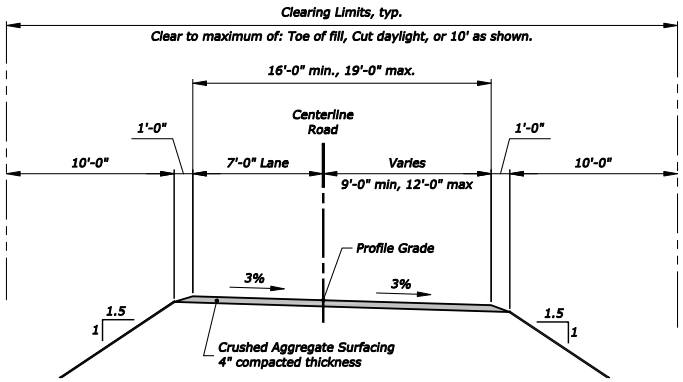
SUMMARY OF QUANTITIES & GENERAL NOTES

SHEET 2 OF 8

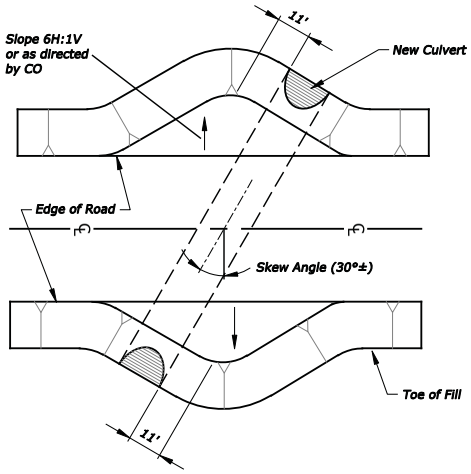


TYPICAL ROAD SECTION

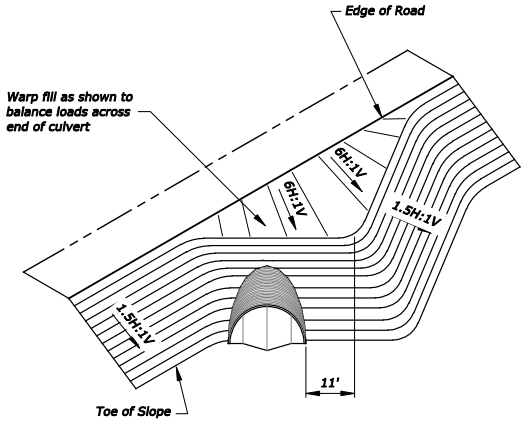
Not to Scale

CONTROL POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-20	730933.07	1171474.80	5652.01	SET-RPC
CP-21	731003.16	1171568.32	5652.68	SET-RPC
CP-22	731164.03	1171480.46	5648.86	SET-RPC
CP-23	731065.59	1171483.67	5648.30	SET-NAIL
CP-24	731041.43	1171437.92	5645.11	SET-NAIL

** See Sheet 4 For Control Point Locations*



PLAN VIEW



ISOMETRIC VIEW

FILL WARPING DETAILS

Not to Scale

CENTERLINE POINTS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
6000	731128.5396	1171403.3490	5644.68	STA: 20+40
6001	731111.0007	1171427.6880	5646.09	STA: 20+70
6002	731096.9637	1171447.1673	5647.23	STA: 20+94.01 PC
6003	731093.7402	1171451.3987	5647.48	STA: 20+99.33
6004	731071.1765	1171471.9943	5648.88	STA: 21+30
6005	731048.8405	1171483.1005	5649.78	STA: 21+55.01
6006	731029.9638	1171487.7015	5650.30	STA: 21+74.47
6007	731025.2274	1171488.2627	5650.41	STA: 21+79.24 PT
6008	730994.6035	1171491.1526	5651.10	STA: 22+10
6009	730964.7362	1171493.9712	5651.78	STA: 22+40.00

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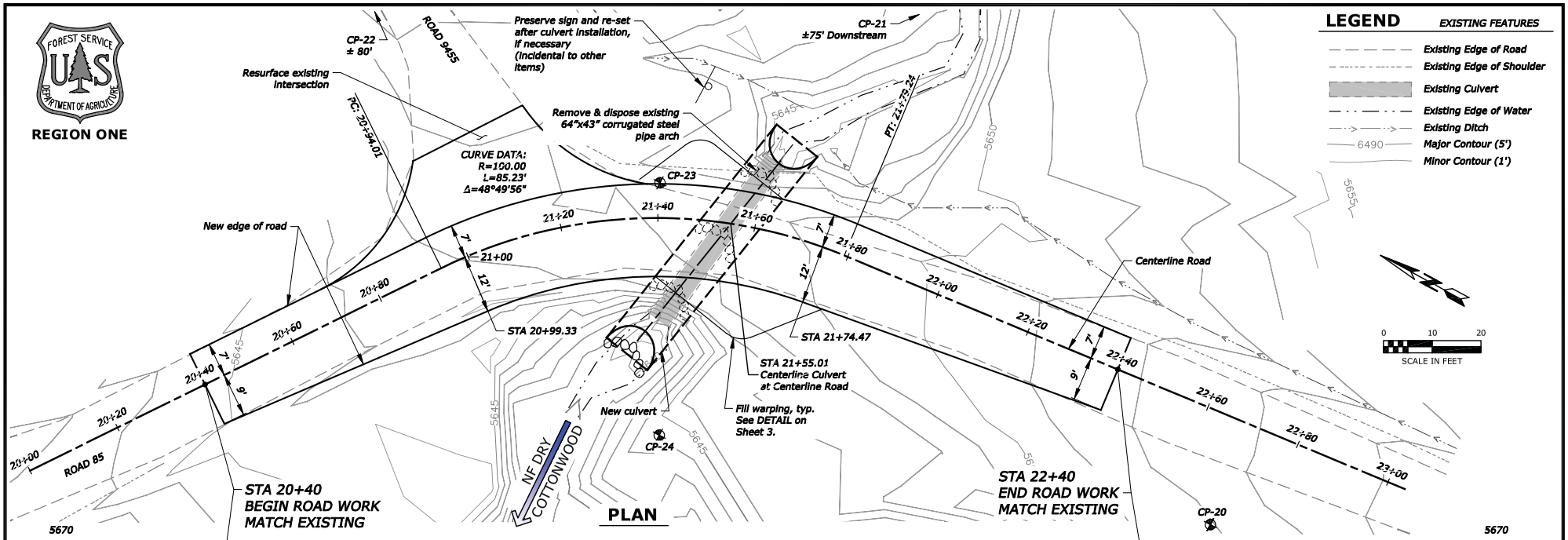
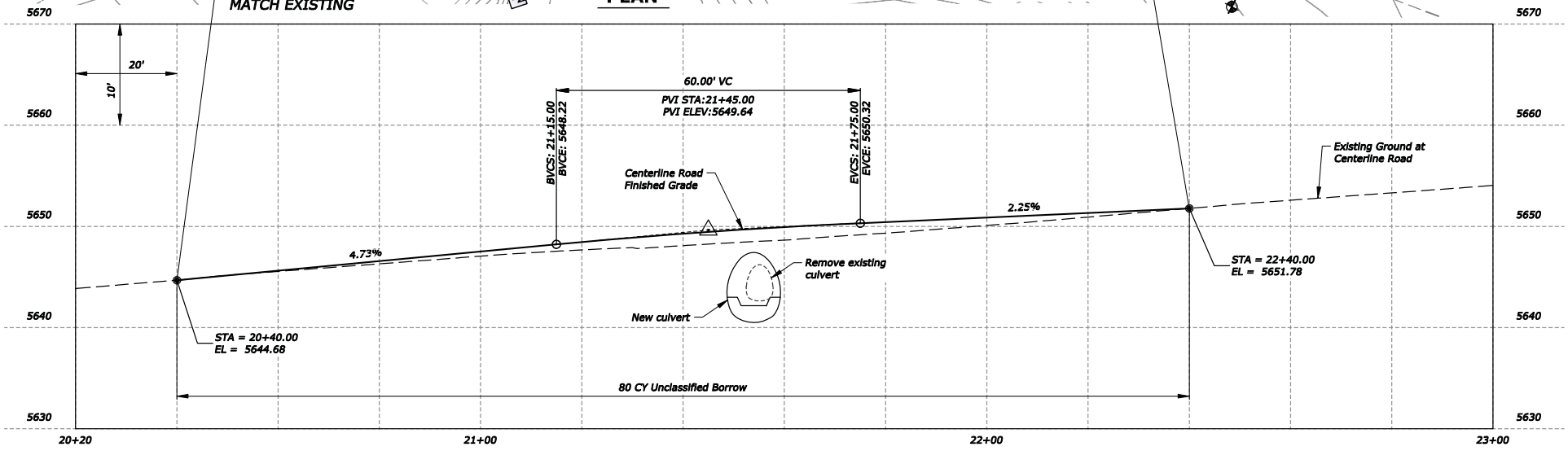
ROAD TYPICAL SECTION, DETAILS & POINT TABLES

SHEET 3 OF 8

REGION ONE





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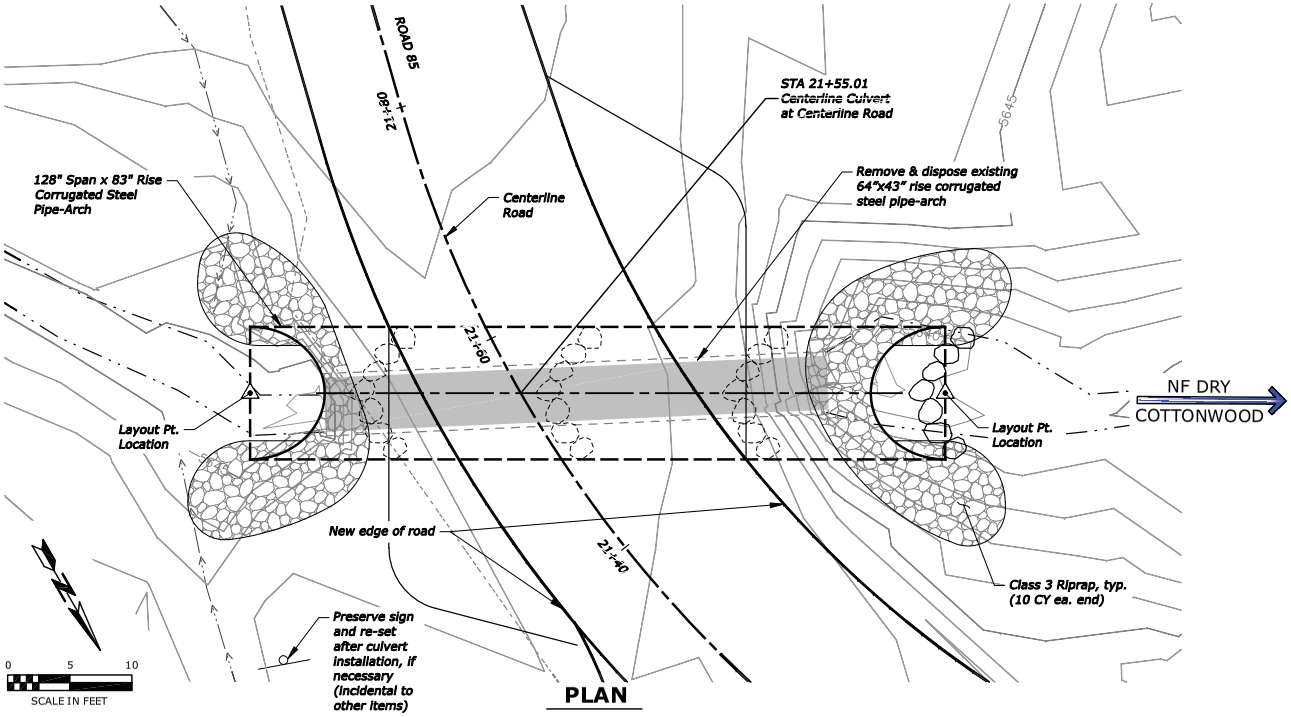
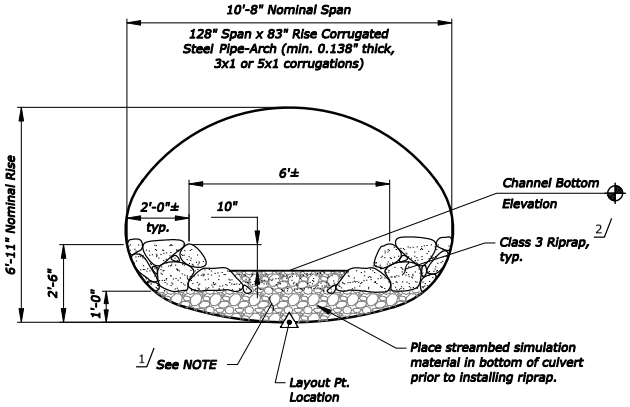
ROAD PLAN & PROFILE

SHEET 4 OF 8



PLAN

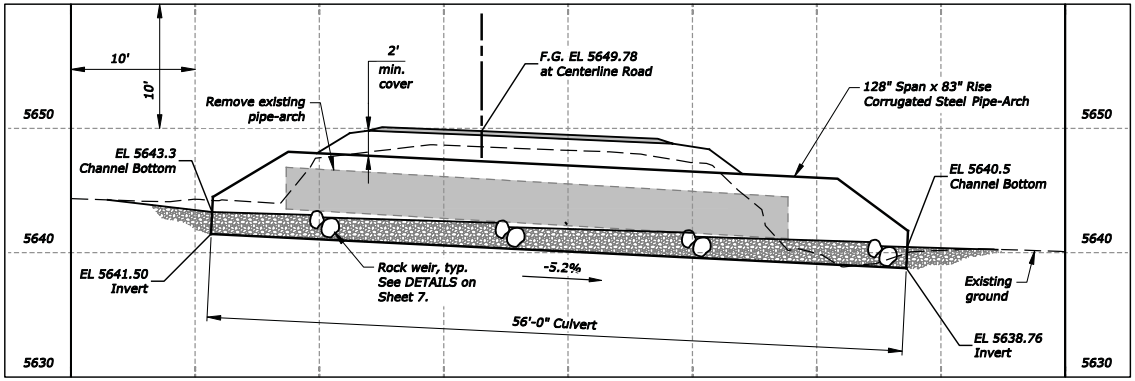


TYPICAL SECTION

Not to Scale

1/ Fill between riprap with native material preserved from the excavation. The final mix should be well-graded to produce a dense, well interlocked streambed with low permeability. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THE STREAM FLOW DOES NOT GO SUBSURFACE THROUGH THE CULVERT FOR A 48 HOUR PERIOD AFTER RE-WATERING. All work is paid under Item 20806.

2/ Inter-Mix fine native material as directed by CO during placement of riprap to seal voids. Ensure fine material is dispersed throughout the full riprap section.



SECTION THRU CENTERLINE CULVERT

Scale: 1" = 10'

LAYOUT POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
7000	731044.8504	1171504.4972	5641.50	Pipe Invert
7001	731055.1121	1171449.5135	5638.76	Pipe Invert

HYDRAULIC DATA:
Drainage area= 2.14 sq. mi.
Bankfull width= 8 ft
Q2= 21 cfs
Avg. Depth= 1.3 ft

Q100= 101 cfs
Avg. Depth= 2.4 ft

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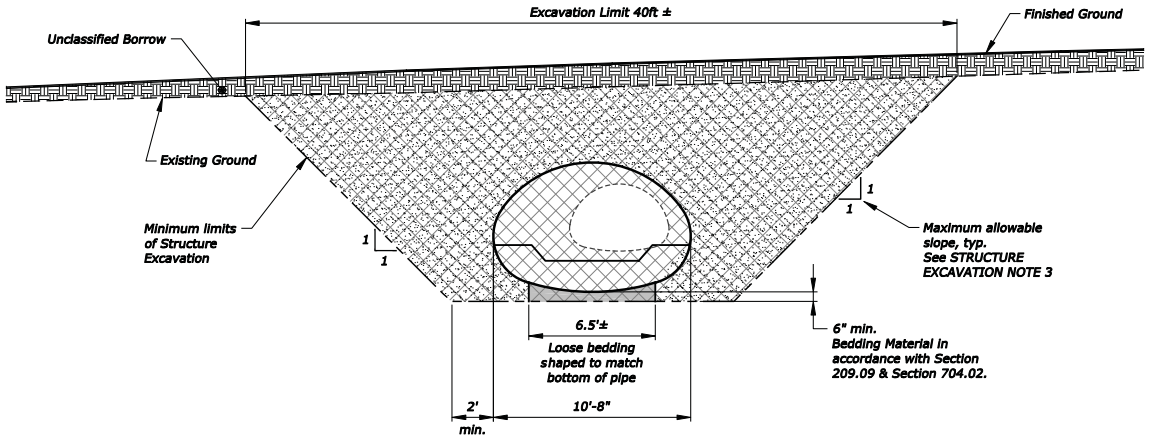
CULVERT GENERAL LAYOUT

SHEET 5 OF 8

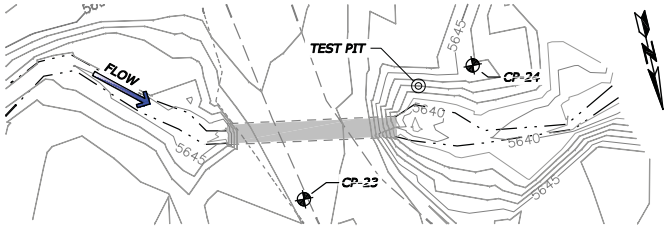


STRUCTURAL EXCAVATION & BACKFILL

Not to Scale

SOIL EXPLORATION SUMMARY									
TEST PIT #1									
Depth (ft)	Description	USCS	AASHTO	OSHA (Visual)	%<#200	Plasticity Index	Presumptive Allowable Bearing Pressure Range (tsf)	Suitable for Backfill according to 704.03(a)	Moisture Content (%)
0-4.5	Light brown silty-sandy gravel	no test	no test	B	no test	no test	4	-	no test
4.5-5	Dark brown sand w/ silt & gravel	SW-SM	A-1-b	B	6.5	NP	5	YES	no test
5-6+	Gray-Yellow sandy clay, wet	SC	A-7-6	A	49	19	1.5	NO	29.9

Soil sample information provided by USFS



SOIL TEST PIT LOCATIONS

STRUCTURE EXCAVATION NOTES:

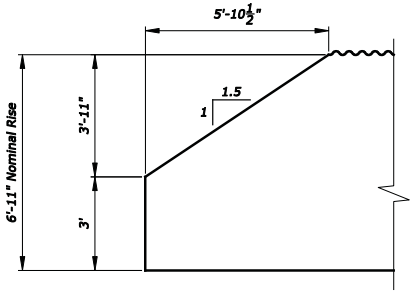
1. Complete Structure Excavation in accordance with FP-03 Section 208.
2. The contractor is solely responsible for excavation support and compliance with all applicable OSHA regulations.
3. Excavation limits shown comply with OSHA sloping and benching requirements based on Soil Type B (SM, SW Unified Soil Classification). Notify the CO immediately if actual conditions differ.
4. Submit an Excavation Plan for approval prior to beginning the work. As a minimum, the Excavation Plan must include: drawings and a written outline illustrating and describing the proposed excavation limits, methods, equipment to be used, location of stockpiles, and estimated quantities. The Excavation Plan must comply with all applicable OSHA requirements and list the soil type assumed. Changes to the excavation limits shown here for the Contractor's dewatering methods or Contractor convenience must be shown on the Plan and are the responsibility of the Contractor. The Excavation Plan is incidental to the work.
5. Structure Excavation quantity shown is for information only and based on the limits shown. The Contractor is responsible for determining actual quantities based on the approved Excavation Plan.

DEWATERING AND SOIL EROSION CONTROL NOTES:

1. Protect against soil erosion and sedimentation during construction in accordance with FP-03 Section 157 and the project permits. Prepare and submit a Soil Erosion and Sediment Control Plan to the CO for approval.
2. Dewater the excavation in accordance with FP-03 Sections 208 and 157 and the requirements on Sheet 8.
3. Contractor should anticipate water infiltrating the excavations.
4. Subgrade excavation, geocell installation, footing placement, riprap placement, and backfill are to be completed in accordance with the contract specifications. Standing or running water in the work area does not relieve the Contractor from meeting the specifications.
5. Dewatering is the sole responsibility of the Contractor. Develop and submit to the CO a project-specific Dewatering and Sediment Control Plan with the Excavation Plan for approval. Sheet 8 illustrates illustrates the general dewatering requirements and possible methods and equipment and is not considered adequate or complete for this project. Develop and submit a project-specific Dewatering Plan including drawings and a written outline illustrating and describing proposed layout, methods, equipment and anticipated stream flow volume. Approval of the Contractor's Dewatering Plan does not relieve the Contractor from completing the work as required. If the Contractor's methods are not producing adequate results, the Contractor must re-evaluate and submit another Dewatering Plan. Re-submittal of the Dewatering Plan, if required, is incidental to the work.

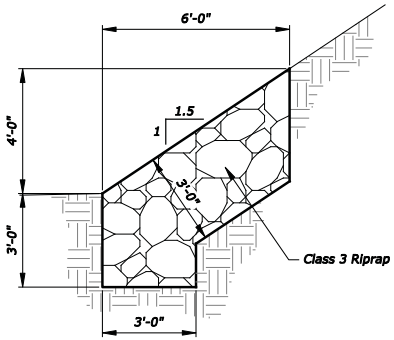
STRUCTURE BACKFILL NOTES:

1. Place Backfill in accordance with FP-03 Section 208 with material meeting the requirements of Section 704.03, Backfill.
2. Backfill limits shown here are the minimum requirements.
3. Any backfill outside the limits shown is considered embankment and must meet the requirements for embankment.
4. It is assumed that material from Structure Excavation at this site will be meet the requirements for Backfill. Some mixing and sorting may be required. Approval from the CO must be obtained prior to use.
5. Compact Backfill in accordance with FP-03 Section 208.11 (AASHTO T99, Method C and AASHTO T310) and submit test results to the CO.
6. Backfill quantity shown is for information only and must be verified by the Contractor.



CULVERT END BEVEL

Not to Scale



RIPRAP DETAIL

OUTSIDE OF CULVERT

Not to Scale

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
STRUCTURE EXCAVATION	Cubic Yard	320
BACKFILL (704.03)	Cubic Yard	270

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

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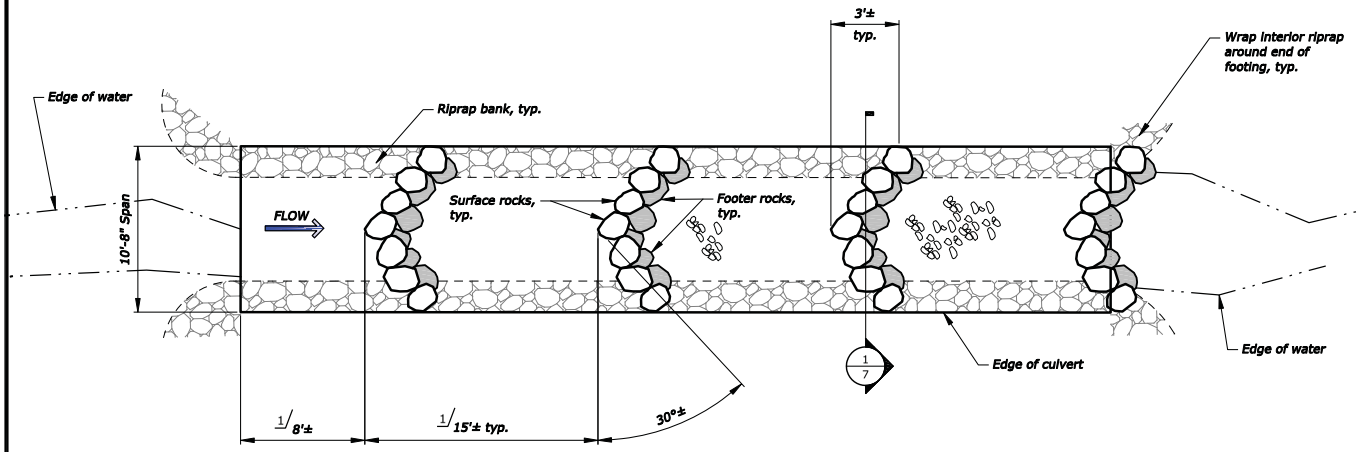
CULVERT DETAILS

SHEET 6 OF 8

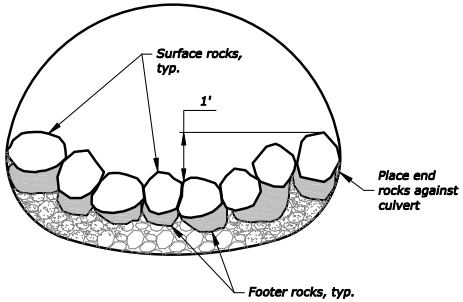


ROCK WEIR PLAN

Not to Scale

1/ The spacing and configuration of rock weirs may be adjusted in the field by the CO to fit the actual streambed conditions.

CULVERT ROCK BANK EXAMPLE



1/7 **SECTION**

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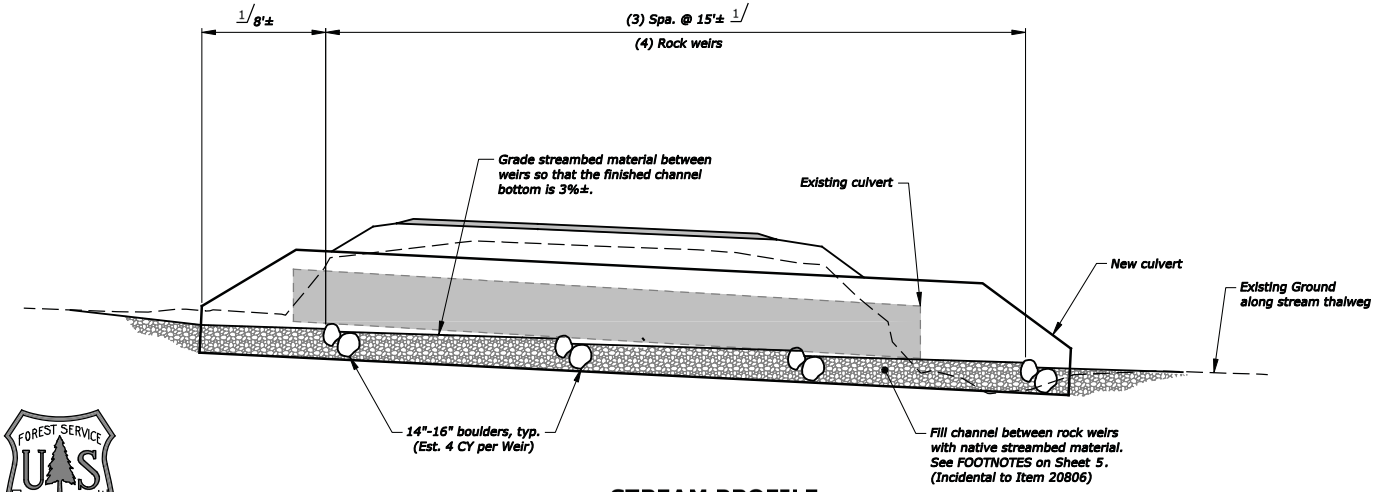
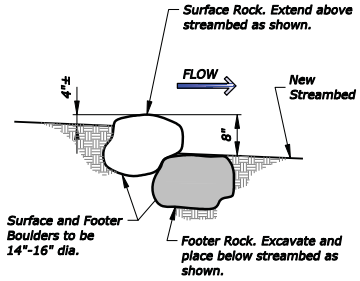


STREAM PROFILE

Not to Scale



ROCK WEIR DETAIL

Not to Scale

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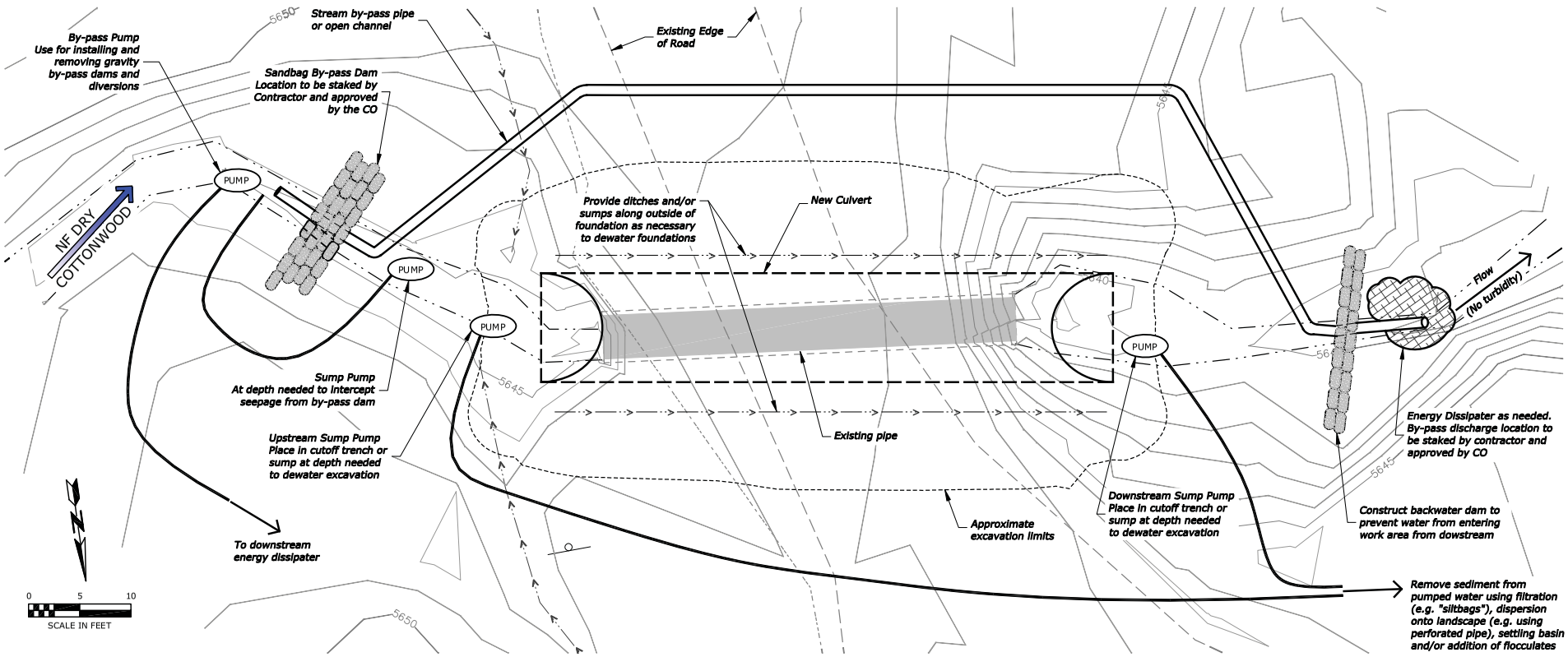
STREAM DETAILS

SHEET 7 OF 8



PLAN

NOTES:

1. Dewater excavations in accordance with FP-03 Sections 208 and 157 and the requirements shown.
2. Dewatering is the sole responsibility of the Contractor. Develop and submit to the CO a project-specific Dewatering Plan with the Excavation Plan for approval. At a minimum, the Dewatering Plan must include drawings and a written outline illustrating and describing proposed layout, methods, equipment and anticipated stream flow volume. Approval of the Contractor's Dewatering Plan does not relieve the Contractor from completing the work as required. If the Contractor's methods are not producing adequate results, the Contractor must re-evaluate and submit another Dewatering Plan. Re-submittal of the Dewatering Plan, if required, is incidental to the work.
3. This sheet illustrates the general dewatering requirements and possible methods and equipment and is not considered adequate or complete for this project.
4. Contractor is responsible for sizing all pumps, dams, bypass pipe, open channels, and any other means proposed to divert the stream flow.
5. Soil erosion and sediment control measures specific to the Dewatering Plan must be in conformance with the project permits and shown in the Dewatering Plan.

NOT FOR CONSTRUCTION

CONTRACTOR SUMBITTAL REQUIRED

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NORTH FORK DRY COTTONWOOD
NFSR 85 MP 11.9

DEWATERING REQUIREMENTS

SHEET 8 OF 8

NF DRY COTTONWOOD CREEK
NFSR 85 MP 11.9
ROAD CROSS SECTIONS

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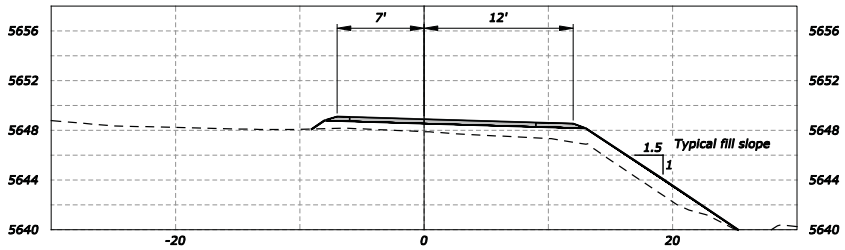
SHEET XS1 OF XS1

21+30.00



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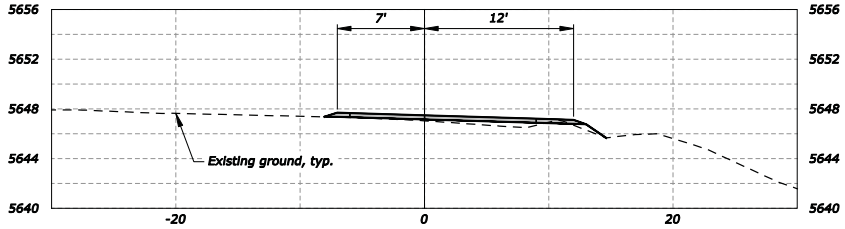

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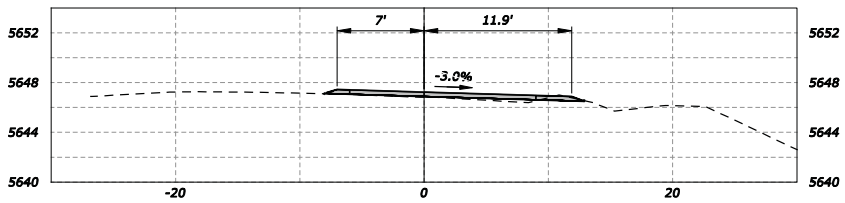
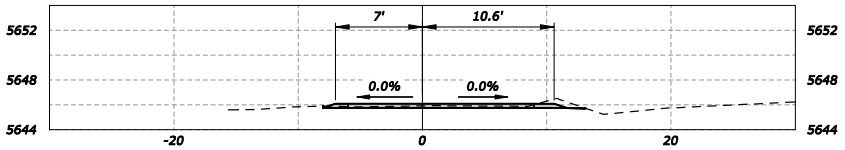


20+70.00



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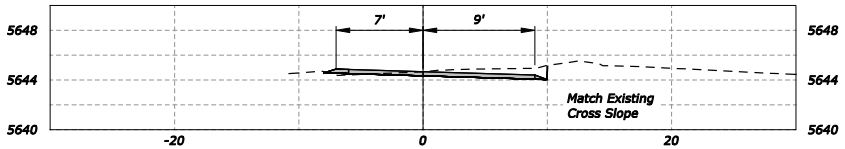

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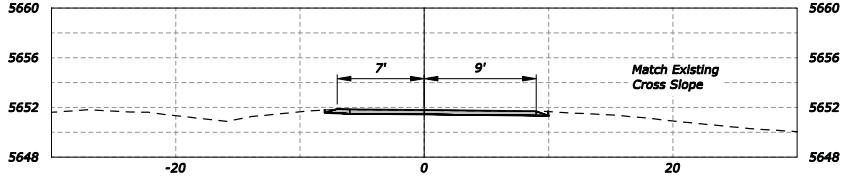

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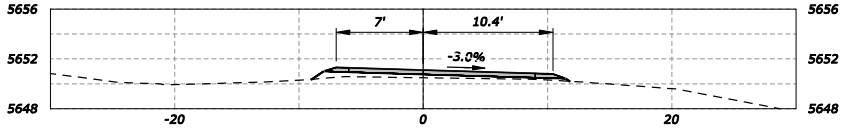

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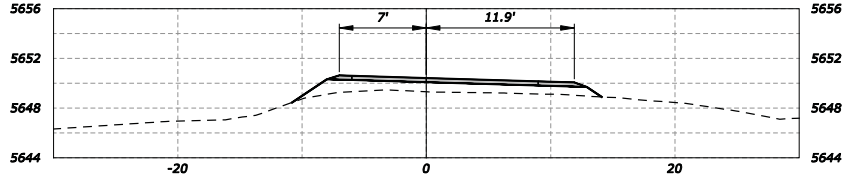

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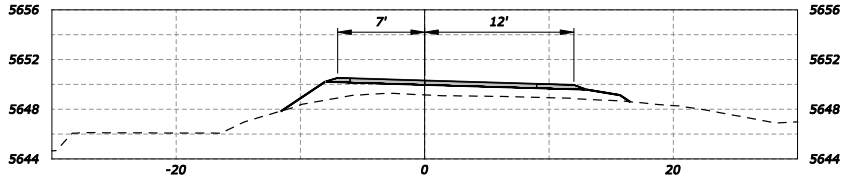
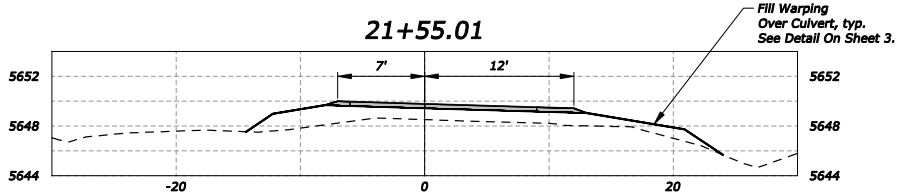
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