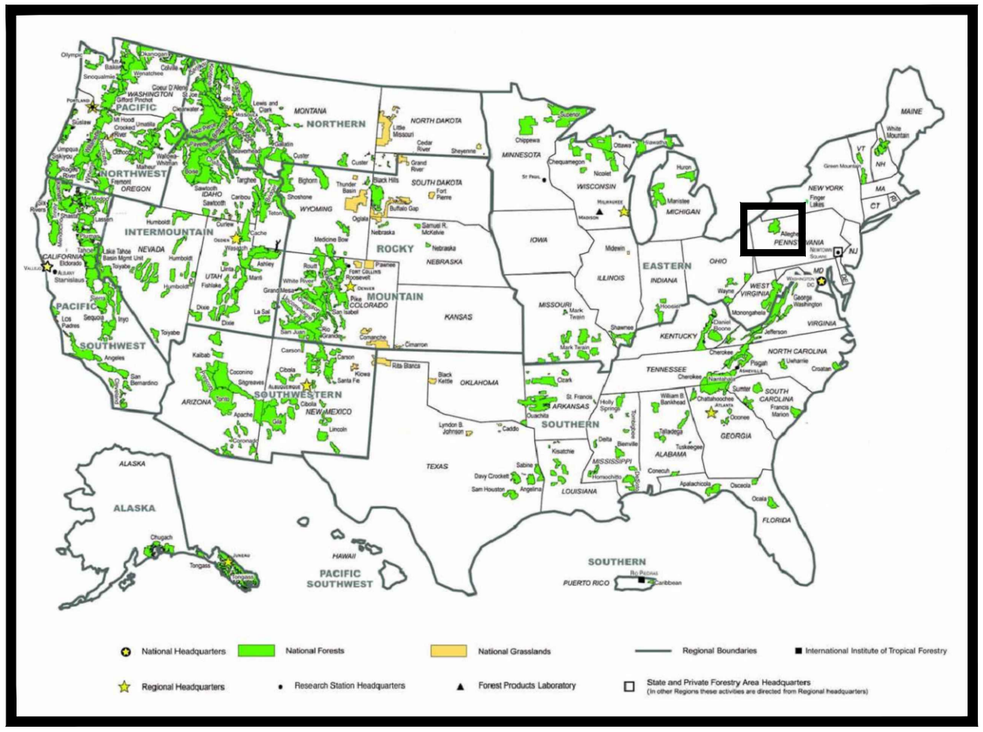
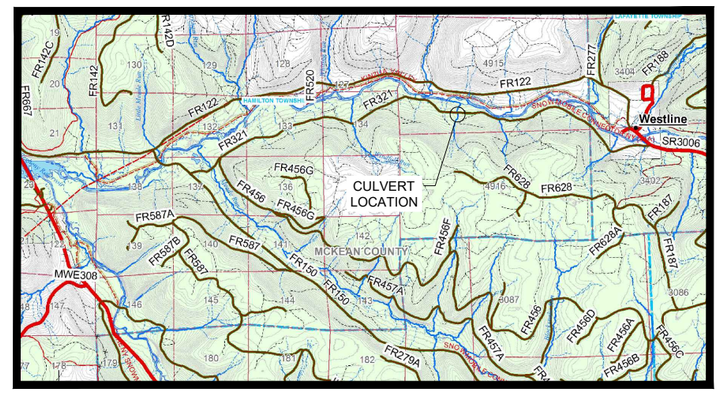
United States Department of Agriculture
Forest Service

PENNSYLVANIA
MCKEAN COUNTY
(R09) EASTERN REGION
ALLEGHENY NATIONAL FOREST
BRADFORD RANGER DISTRICT

FR 321 CULVERT REPLACEMENT
STATION 145+80



FOREST LOCATION



VICINITY MAP

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RECOMMENDED BY:

CHASE HOWARD — Digitally signed by CHASE HOWARD Date: 2026.04.13 16:28:21 -04'00' — 4/13/
DESIGN ENGINEER — DATE

RICHARD HATFIELD — Digitally signed by RICHARD HATFIELD Date: 2026.04.14 16:26:49-04'00' — DATE
DISTRICT RANGER

ROBERT HEIAR — Digitally signed by ROBERT HEIAR Date: 2026.04.14 14:48:04 -04'00' — DATE
FOREST SUPERVISOR

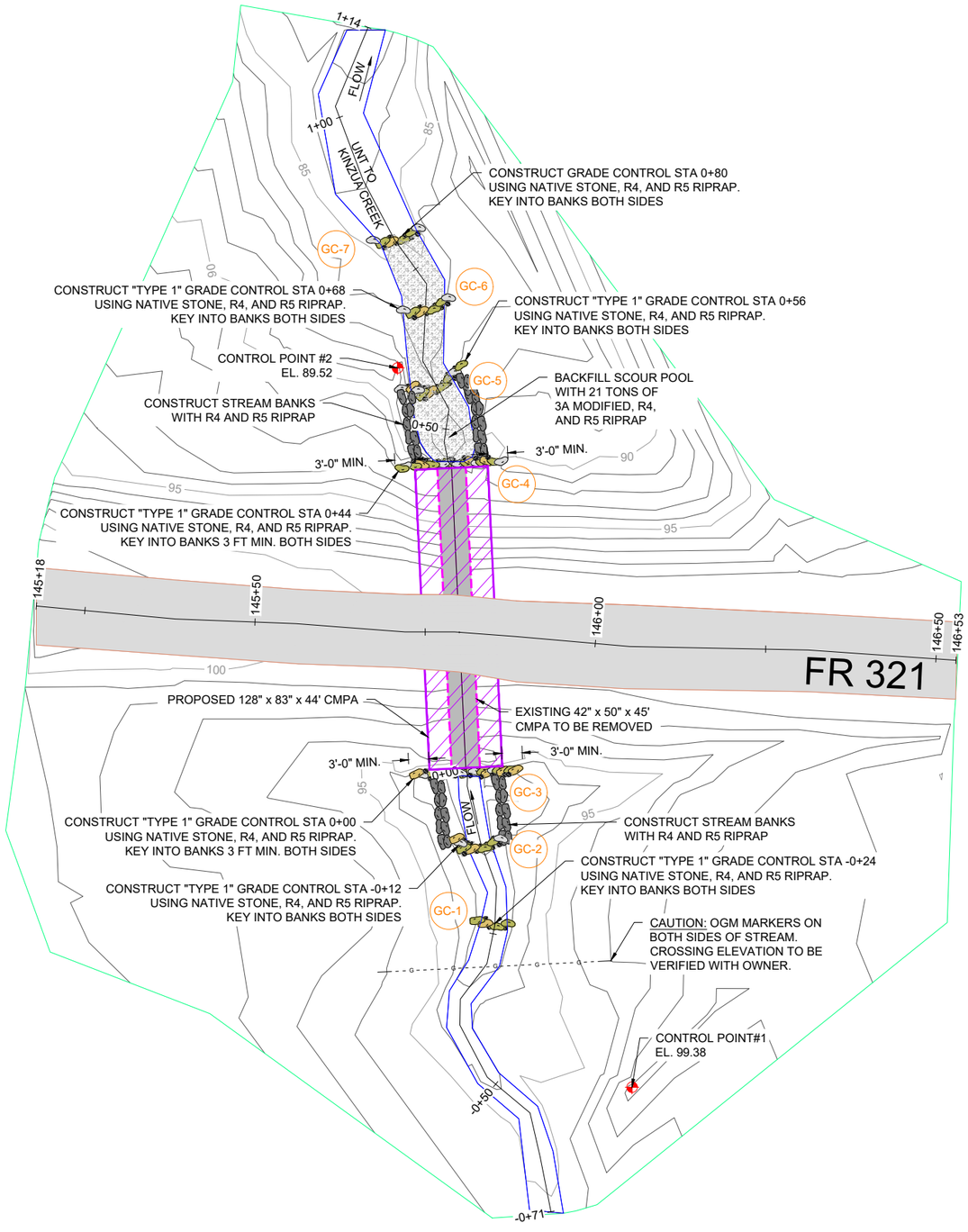
DATE
RO FACILITIES PROGRAM MANAGER

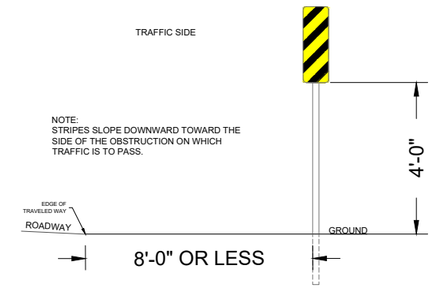
APPROVED:

ROBERT KLASEN — Digitally signed by ROBERT KLASEN Date: 2026.04.13 16:31:58 -04'00'
FOREST ENGINEER — DATE

SHEET 01 OF 05

5/3/23 16:36 CHOWARD C:\USERS\ADAMDELANEY\BOX\0919 7700 TRAVEL MANAGEMENT\R09 ANF 7700 TRAVEL MGMT\7720DEVELOPMENT\7722_ROADSTRUCTURES\CULVERTS\DESIGNS\FR321 UNT KINZUA CREEK\FR 321 CULVERT REPLACEMENT COVER.DWG;





TYPICAL TYPE 3 OBJECT MARKER PLACEMENT-G6-1

SCALE: 1" = 2'-0"

ESTIMATED PROJECT MATERIALS AND QUANTITIES

CULVERT AND ROADWAY MATERIALS	TOTAL ITEM QUANTITY	UNIT OF MEASURE
REPLACEMENT CULVERT (128" x 83" CMPA)	44	FT
R6 RIPRAP	23	TONS
R5 RIPRAP	23	TONS
R4 RIPRAP	23	TONS
PA 2A (BEDDING AND BACKFILL)	184	TONS
LIMESTONE 3A MODIFIED (STREAMBED)	69	TONS
LIMESTONE DSA (ROAD SURFACING)	253	TONS
TYPE 3 OBJECT MARKERS	4	EACH

GENERAL NOTES:

1. CONTRACTOR TO COMPLETE PENNSYLVANIA ONE CALL PRIOR TO EXCAVATION (800) 242-1776
2. FOREST SERVICE TO OBTAIN GP-7 PERMIT FOR WORK IN STREAM.
3. CONTRACTOR TO NOTIFY FOREST SERVICE TWO WEEKS PRIOR TO START OF CONSTRUCTION TO COORDINATE RELOCATION OF AQUATIC SPECIES PRIOR TO DE-WATERING SITE.
4. SITE SURVEY COMPLETED BY FOREST SERVICE. SUPPLEMENTAL LONGITUDINAL PROFILE SURVEY COLLECTED BY FOREST SERVICE. SURVEY IS NOT TIED TO A KNOWN CORRIDOR SURVEY, DATUM IS ASSUMED.
5. IN-STREAM GRADE CONTROLS AND BANK STABILIZATION STRUCTURES ARE APPROXIMATED AND SHOULD BE FIT IN THE FIELD UNDER THE GUIDANCE OF AN INSPECTOR EXPERIENCED WITH THEIR CONSTRUCTION.
6. STREAM CHANNEL RECONSTRUCTION SHALL INCLUDE A DEFINE LOW-FLOW THALWEG AND BANKFULL WIDTH OF 7.3 FT. SEE TYPICAL DETAILS.

LEGEND

GC-# — GRADE CONTROL NUMBER

SURVEY CONTROL POINT

3A MODIFIED STREAMBED MATERIAL

EXISTING PIPE

PROPOSED CMPA

N

0 10 20 Feet

United States Department of Agriculture
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STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
4		
3		
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PROJECT NAME

FR 321 x UNT TO KINZUA CREEK CULVERT REPLACEMENT

ALLEGHENY NATIONAL FOREST

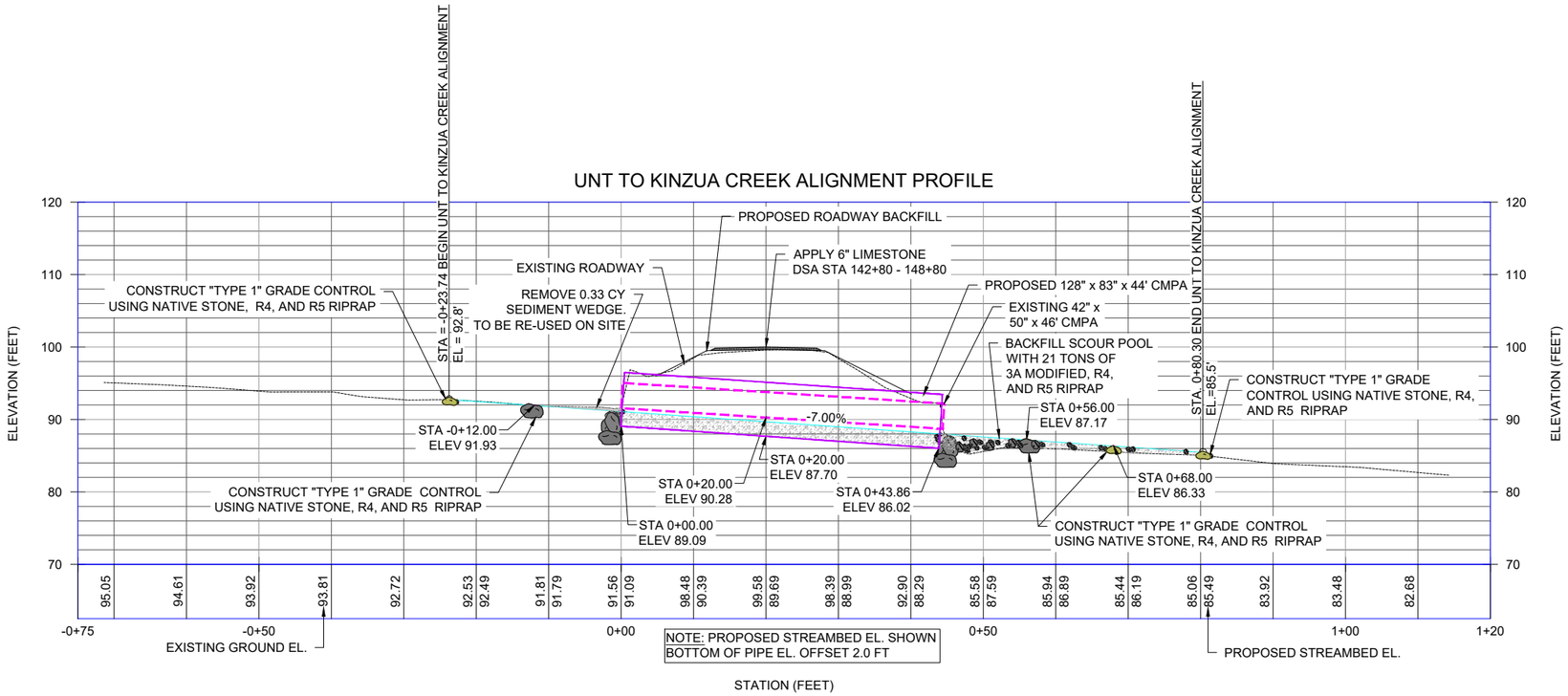
BRADFORD RANGER DISTRICT

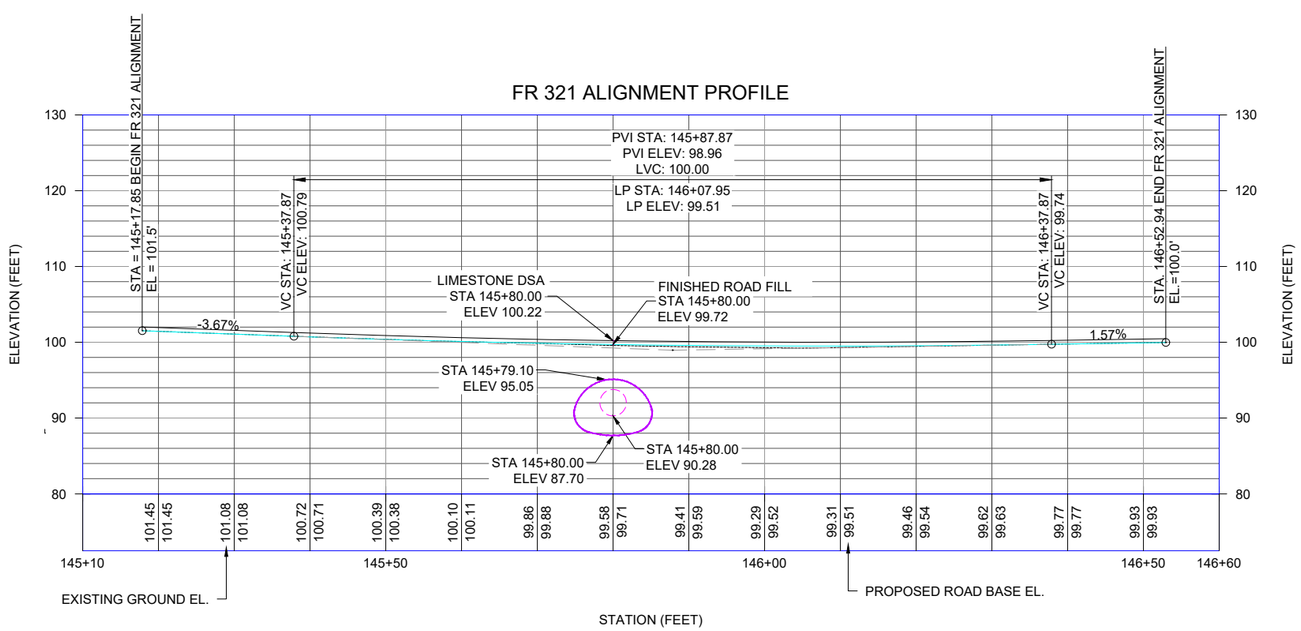
DRAWING TITLE

FR 321 x KINZUA CREEK CULVERT REPLACEMENT PLAN

DATE 03/02/2026	ARCHIVE NO.
DESIGNER C.HOWARD	DRAWING SHEET NO. C-01
DRAWN C.HOWARD	
CHECKED W. PRINTUP	
PROJECT NO.	SHEET 2 OF 5

3/24/26 15:04 ADAMDELANEY C:\USERS\ADAMDELANEY\BOX\0919 7700 TRAVELMANAGEMENT\R09 ANF 7700 TRAVEL MGMT\7720\DEVELOPMENT\7722_ROADSTRUCTURES\CULVERTS\DESIGNS\FR321_UNT KINZUA CREEK\CONTRACT DOCUMENTS\FR 321 X UNT AOP 3.19.2026 EDITS.DWG;





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ALLEGHENY NATIONAL FOREST

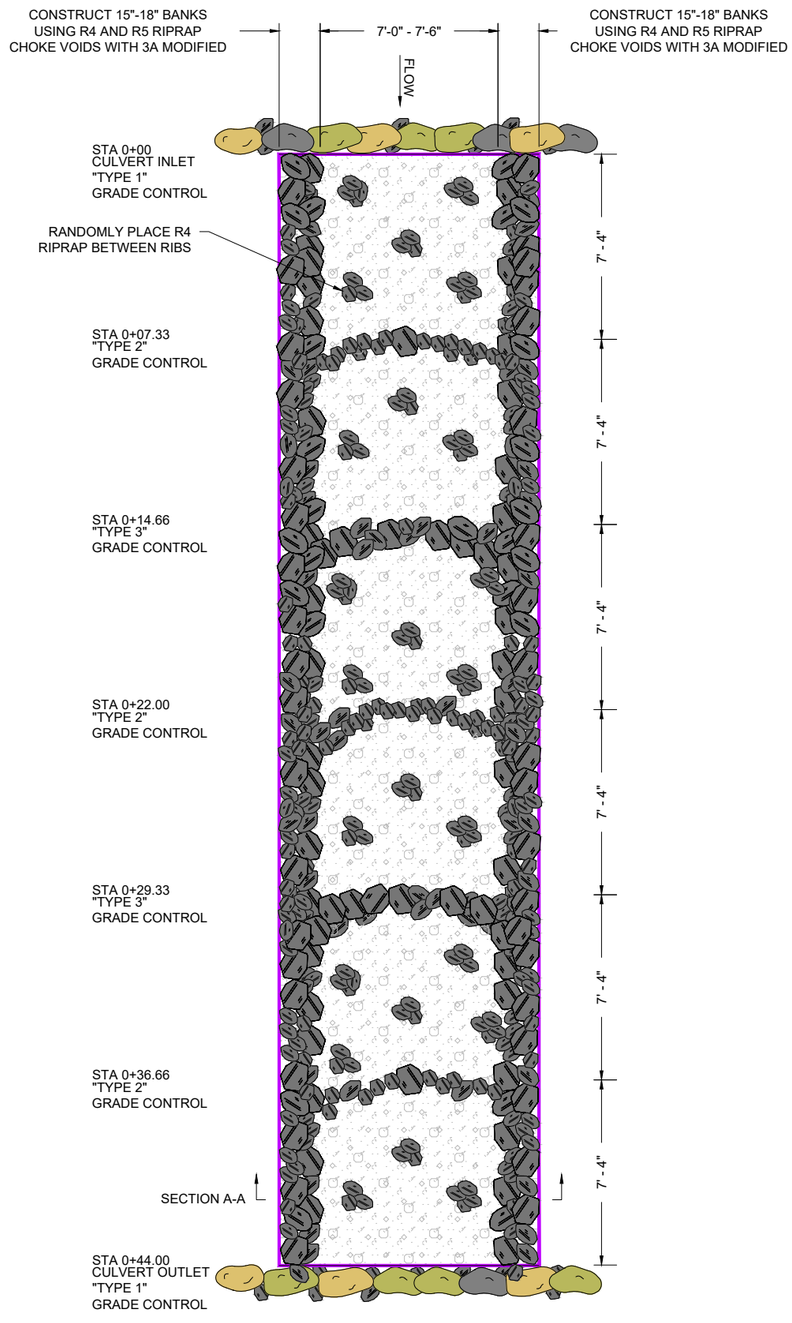
BRADFORD RANGER DISTRICT

DRAWING TITLE

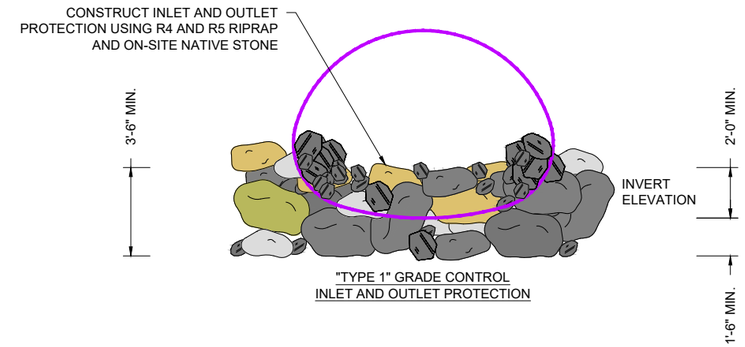
FR 321 x KINZUA CREEK CULVERT REPLACEMENT PROFILES

DATE 03/02/2026	ARCHIVE NO.
DESIGNER C.HOWARD	DRAWING SHEET NO. C-02
DRAWN C.HOWARD	
CHECKED W. PRINTUP	
PROJECT NO.	SHEET 3 OF 5

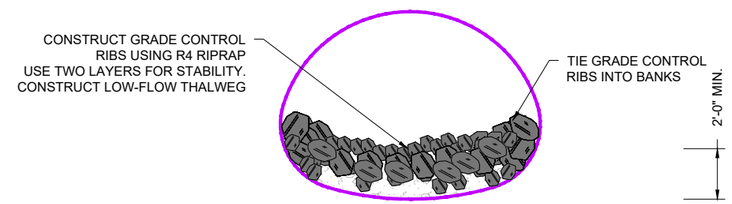
3/24/26 15:04 ADAMDELANEY C:\USERS\ADAMDELANEY\BOX\0919 7700 TRAVELMANAGEMENT\R09 ANF 7700 TRAVEL MGMT\7720\DEVELOPMENT\7722_ROADSTRUCTURES\CULVERTS\DESIGN\SFR321_UNT KINZUA CREEK\CONTRACT DOCUMENTS\FR 321 X UNT AOP 3.19.2026 EDITS.DWG;



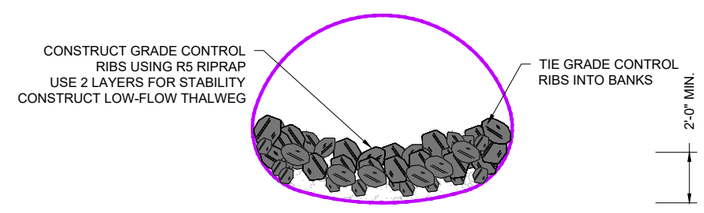
STREAM SIMULATION PLAN



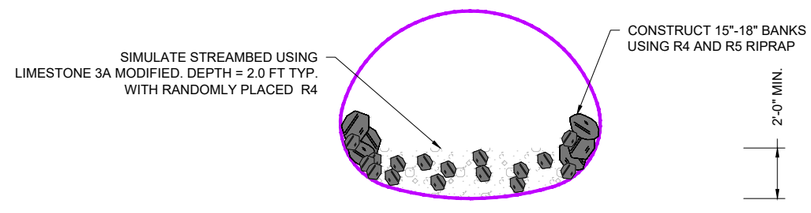
"TYPE 1" GRADE CONTROL
INLET AND OUTLET PROTECTION



"TYPE 2" GRADE CONTROL



"TYPE 3" GRADE CONTROL



SECTION A-A

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STAMPS, LOGOS, AND SEALS

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FR 321 x UNT TO KINZUA CREEK CULVERT REPLACEMENT

ALLEGHENY NATIONAL FOREST

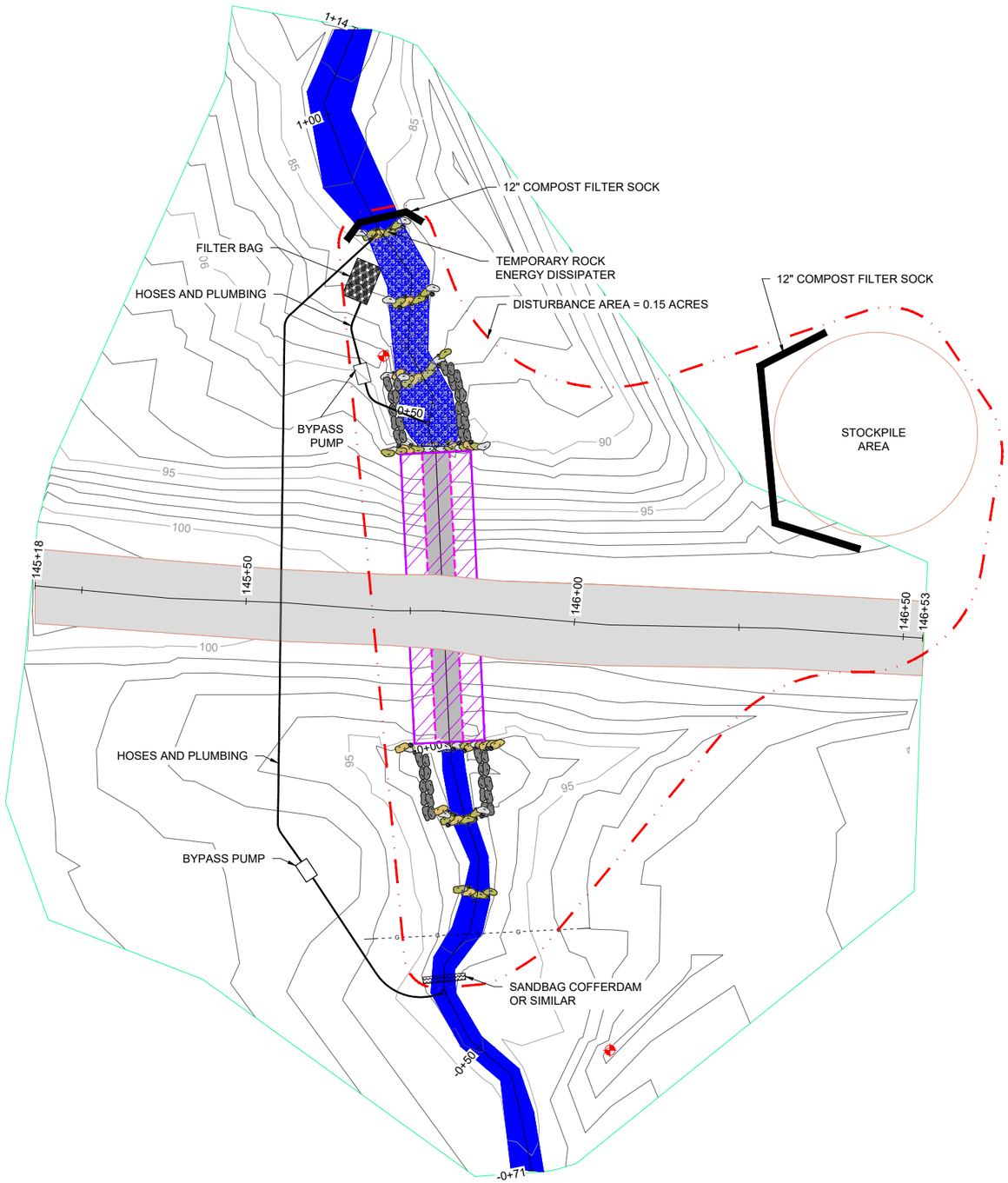
BRADFORD RANGER DISTRICT

DRAWING TITLE

FR 321 x KINZUA CREEK CULVERT REPLACEMENT DETAILS AND SECTIONS

DATE 03/02/2026	ARCHIVE NO.
DESIGNER C.HOWARD	DRAWING SHEET NO. C-03
DRAWN C.HOWARD	
CHECKED W. PRINTUP	
PROJECT NO.	SHEET 4 OF 5

3/24/26 15:04 ADAMDELANEY C:\USERS\ADAMDELANEY\BOX\0919 7700 TRAVEL MANAGEMENT\R09 ANF 7700 TRAVEL MGMT\7720\DEVELOPMENT\7722_ROAD\STRUCTURES\CULVERTS\DESIGNS\FR321_UNT KINZUA CREEK\CONTRACT DOCUMENTS\FR 321 X UNT AOP 3.19.2026 EDITS.DWG;



CONSTRUCTION NOTES:

1. EROSION AND SEDIMENTATION CONTROLS (E&SC)

   1.1 ALL REQUIRED E&S MEASURES MUST BE IMPLEMENTED AND FULLY FUNCTIONAL PRIOR TO ANY CLEARING, GRUBBING, OR EARTHWORK ASSOCIATED WITH THIS PROJECT.

   1.2 ALL ACTIVITIES ASSOCIATED WITH REMOVAL OF THE EXISTING CULVERT AND INSTALLATION OF THE REPLACEMENT CULVERT STRUCTURE MUST BE DONE IN A DE-WATERED CONDITION. CONTRACTOR WILL BE REQUIRED TO FOLLOW THE DE-WATERING PLAN PROVIDED ON SHEET 5 OF 5.

   1.3 CONTRACTOR WILL BE REQUIRED TO MEET ALL POST-CONSTRUCTION STABILIZATION MEASURES, INCLUDING SEEDING AND MULCHING REQUIREMENTS, PER PROJECT E&S PLAN

   1.4 ONCE THE DE-WATERING MEASURES HAVE BEEN INSTALLED AND ARE OPERATIONAL, CONSTRUCTION OF THE PROJECT MUST BE COMPLETED IN A CONTINUOUS AND EXPEDIENT MANNER, BOTH TO REDUCE THE RISK OF EROSION AND SEDIMENTATION AND TO MINIMIZE IMPACT TO THE STREAM RESOURCE.

2. EXCAVATION

   2.1 EXCAVATION OF THE ROADWAY AND EMBANKMENT SHOULD BE MINIMIZED TO THE WIDTH NECESSARY TO PLACE THE STRUCTURE AND MAINTAINING OSHA GUIDELINES FOR EXCAVATION SAFETY.

   2.2 OVER-EXCAVATE THE BOTTOM OF THE CUT A MINIMUM DEPTH OF 6" FOR PLACEMENT OF A FOUNDATION BED OF PA 2A STONE UPON WHICH TO CONSTRUCT THE PLATE INVERT AT ELEVATIONS AND SLOPE PROVIDED IN THIS PLAN SET. IF WET OR SOFT SOILS ARE ENCOUNTERED, INCREASE THICKNESS OF THE BED TO PROVIDE A SUITABLE FOUNDATION.

   2.3 NATIVE MATERIALS SHOULD BE EVALUATED BY THE CONSTRUCTION SUPERVISOR TO DETERMINE SUITABILITY FOR RE-USE IN CONSTRUCTION OF THE STREAMBED. MATERIALS SUITABLE FOR THIS PURPOSE WILL BE STOCKPILED ONSITE. UNSUITABLE CUT MATERIALS WILL BE DISPOSED OF IN AN APPROVED LOCATION PER THE PROJECT E&S PLAN.

3. CULVERT INSTALLATION

   3.1 THE STRUCTURE WILL BE INSTALLED AT THE INLET (89.09') AND OUTLET (86.02') INVERT ELEVATIONS AND INSTALLATION SLOPE (7.0%). RECONSTRUCTED STREAMBED (STA -0+24 TO 0+80) WILL BE CONSTRUCTED AT THE PROFILES, ELEVATIONS AND CROSS-SECTIONS PROVIDED IN THIS PLAN.

   3.2 CULVERT INSTALLATION MUST COMPLY WITH ALL SHOP DRAWINGS AND SPECIFICATIONS AS PROVIDED BY THE CULVERT MANUFACTURER / VENDOR, INCLUDING THOSE GOVERNING BACKFILL AROUND THE CULVERT WITH SUFFICIENT FINES TO ALLOW FOR COMPACTION. BACKFILL MUST BE PLACED IN LIFTS NO GREATER THAN 6" DEPTH AND COMPACTED PRIOR TO PLACEMENT OF THE NEXT LIFT OVER TOP.

4. STREAM CHANNEL RECONSTRUCTION

   4.1 MATERIAL FOR RECONSTRUCTION OF THE STREAMBED WILL BE COMPRISED OF LIMESTONE 3A MODIFIED WITH RANDOMLY PLACED R4 STONE. AT THE DIRECTION OF THE CONSTRUCTION SUPERVISOR, SUITABLE NATIVE MATERIAL OBTAINED DURING EXCAVATION OF THE CUT WILL BE ADDED TO THE AGGREGATE . THE AGGREGATE WILL BE WELL-MIXED OUTSIDE OF THE CUT BEFORE BEING PLACED IN THE STREAMBED OR CULVERT.

   4.2 THE CONTRACTOR WILL BE REQUIRED TO IDENTIFY A SUITABLE METHOD AND NECESSARY EQUIPMENT, LABOR ETC. FOR PLACING AND RECONSTRUCTING THE STREAMBED INSIDE THE STRUCTURE (MAX. AVAILABLE RISE INSIDE OF THE CULVERT PRIOR TO PLACING FILL IS 6'-11").

   4.3 PROPER INSTALLATION OF A CONSTRUCTED RIFFLES FOR GRADE CONTROL ARE CRITICAL TO THE LONG-TERM PERFORMANCE AND SUCCESS OF THIS PROJECT. INSTALL AT LOCATIONS AND ELEVATIONS INDICATED IN THIS PLAN, AND REFERENCE THE DETAIL DRAWINGS PROVIDED. INSTALLATION OF ALL IN-STREAM STRUCTURES INCLUDING GRADE CONTROLS AND IN-STREAM HABITAT STRUCTURES SHOULD OCCUR UNDER THE DIRECT GUIDANCE OF A CONSTRUCTION SUPERVISOR EXPERIENCED IN THEIR INSTALLATION AND INTENDED PURPOSE. PROPER CONSTRUCTION OF IN-STREAM ROCK STRUCTURES IS GREATLY AIDED BY USE OF AN EXCAVATOR LARGE ENOUGH TO EASILY HANDLE THE SIZE OF ROCKS PRESCRIBED, WITH A HYDRAULIC THUMB ATTACHED SO THAT ROCKS CAN BE INDIVIDUALLY PLACED.

   4.4 RECONSTRUCTED PORTIONS OF THE STREAMBED MUST MAINTAIN THE BANKFULL CHANNEL WIDTH OF ~7.3 FT THROUGH ENTIRE LENGTH OF RECONSTRUCTED STREAM CHANNEL, INCLUDING INSIDE THE CULVERT. THE FINISHED RECONSTRUCTED STREAMBED MUST PROVIDE A LOW-FLOW CHANNEL (THALWEG) AS SHOWN ON THE CULVERT DETAIL IN THIS PLAN.

LEGEND

- LIMIT OF DISTURBANCE
- SURVEY CONTROL POINT
- 3A MODIFIED STREAMBED MATERIAL
- EXISTING PIPE
- PROPOSED CMPA

N

0 10 20 Feet

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ALLEGHENY NATIONAL FOREST

BRADFORD RANGER DISTRICT

DRAWING TITLE

FR 321 x KINZUA CREEK CULVERT REPLACEMENT DEWATERING PLAN

DATE 03/02/2026	ARCHIVE NO.
DESIGNER C.HOWARD	DRAWING SHEET NO. E-01
DRAWN C.HOWARD	
CHECKED W. PRINTUP	
PROJECT NO.	SHEET 5 OF 5

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