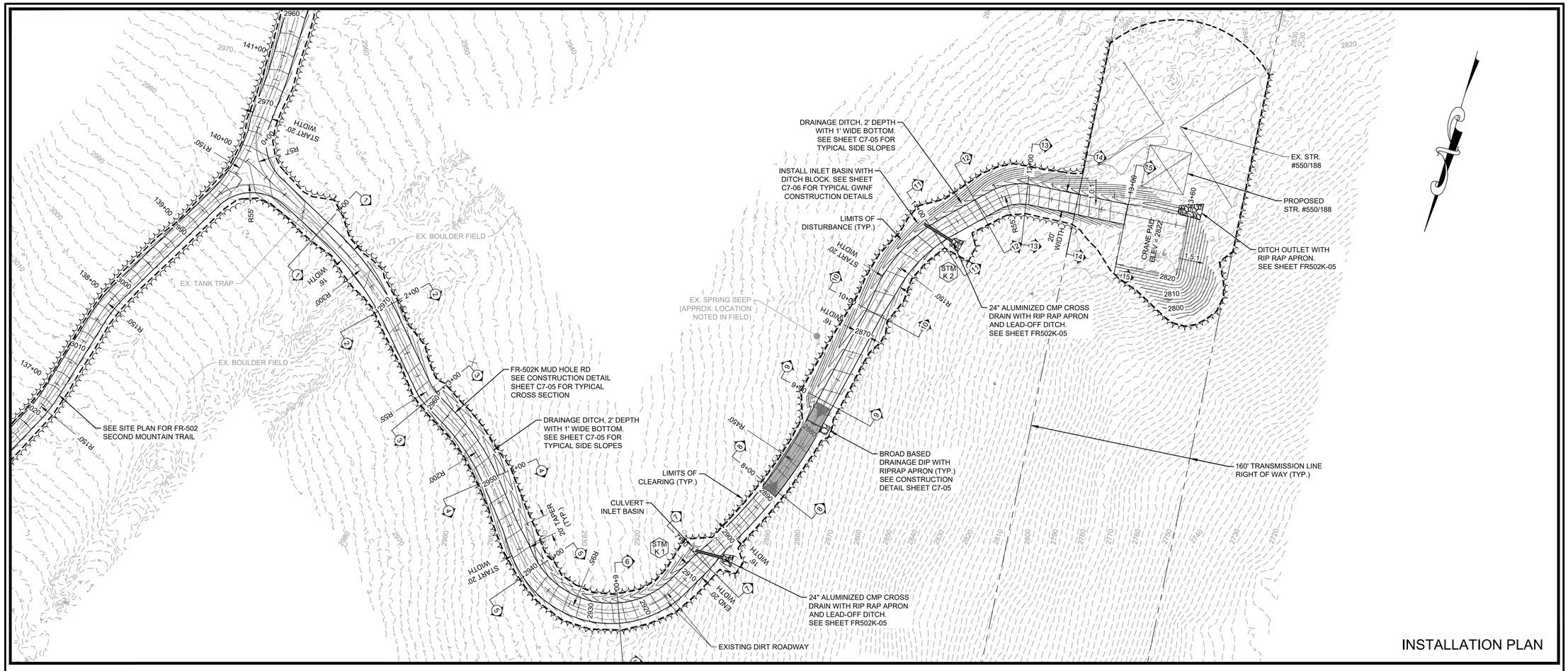
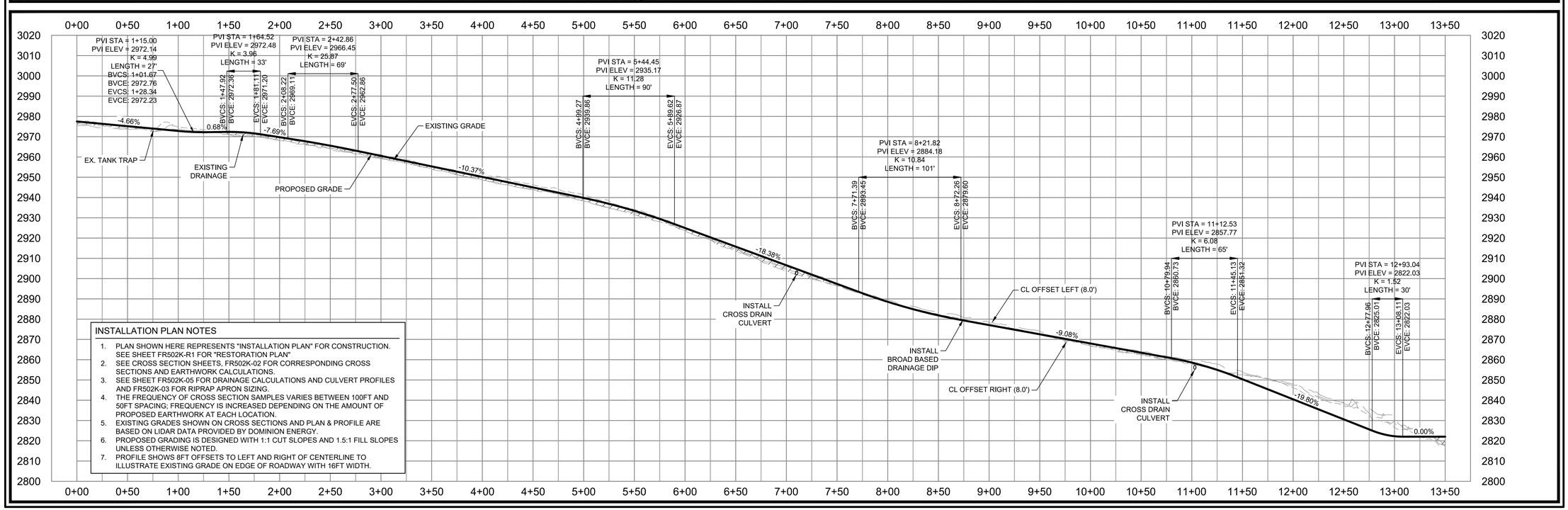



INSTALLATION PLAN




## INSTALLATION PLAN NOTES

1. PLAN SHOWN HERE REPRESENTS "INSTALLATION PLAN" FOR CONSTRUCTION. SEE SHEET FR502K-R1 FOR "RESTORATION PLAN"
2. SEE CROSS SECTION SHEETS, FR502K-02 FOR CORRESPONDING CROSS SECTIONS AND EARTHWORK CALCULATIONS.
3. SEE SHEET FR502K-05 FOR DRAINAGE CALCULATIONS AND CULVERT PROFILES AND FR502K-03 FOR RIPRAP APRON SIZING.
4. THE FREQUENCY OF CROSS SECTION SAMPLES VARIES BETWEEN 100FT AND 50FT SPACING; FREQUENCY IS INCREASED DEPENDING ON THE AMOUNT OF PROPOSED EARTHWORK AT EACH LOCATION.
5. EXISTING GRADES SHOWN ON CROSS SECTIONS AND PLAN & PROFILE ARE BASED ON LIDAR DATA PROVIDED BY DOMINION ENERGY.
6. PROPOSED GRADING IS DESIGNED WITH 1:1 CUT SLOPES AND 1.5:1 FILL SLOPES UNLESS OTHERWISE NOTED.
7. PROFILE SHOWS 8FT OFFSETS TO LEFT AND RIGHT OF CENTERLINE TO ILLUSTRATE EXISTING GRADE ON EDGE OF ROADWAY WITH 16FT WIDTH.


Dewberry

Dewberry Engineers Inc.
4805 LAKE BROOK DRIVE
SUITE 200
GLEN ALLEN, VA 23060
804.290.7957 (PHONE)
804.290.7928 ( FAX)


TRANSMISSION LINE REBUILD
PROJECT TL 550
CONSTRUCTION DOCUMENTS
GEORGE WASHINGTON NATIONAL FOREST
WEST VIRGINIA & VIRGINIA

SEAL

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE
0' 50' 100'
HORIZONTAL SCALE
0' 25' 50'
VERTICAL SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| 2 | 05/14/21 | ARB | FOR REVIEW |
| 1 | 05/03/21 | ARB | FOR REVIEW |
| 0 | 03/05/21 | ARB | FOR REVIEW |

REVISIONS

DRAWN BY ARB
APPROVED BY
CHECKED BY KAP
DATE 05/14/2021

TITLE

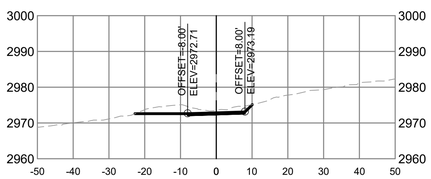
FR502K MUD HOLE TO STR. #188 PLAN & PROFILE

PROJECT NO. 50106442

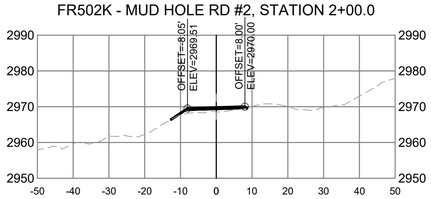
FR502K-01

SHEET NO.

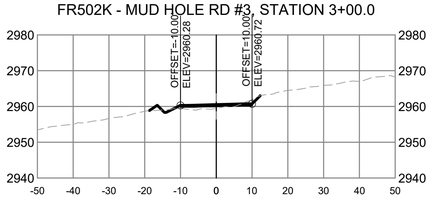
FR502K - MUD HOLE RD #1, STATION 1+00.0



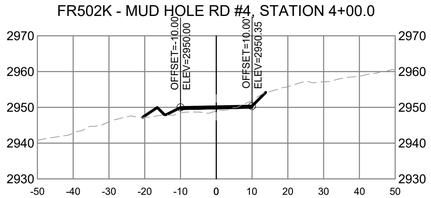

FR502K - MUD HOLE RD #2, STATION 2+00.0



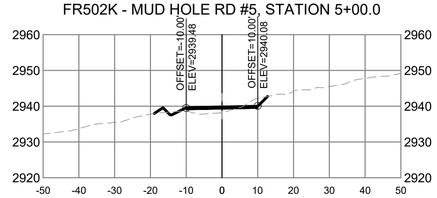

FR502K - MUD HOLE RD #3, STATION 3+00.0



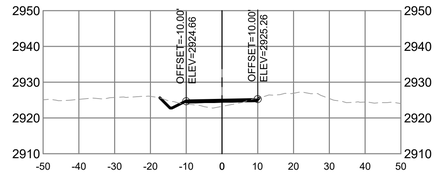

FR502K - MUD HOLE RD #4, STATION 4+00.0



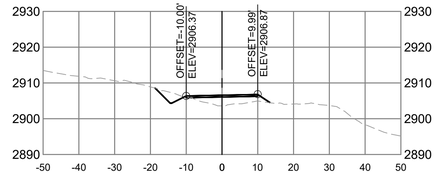

FR502K - MUD HOLE RD #5, STATION 5+00.0



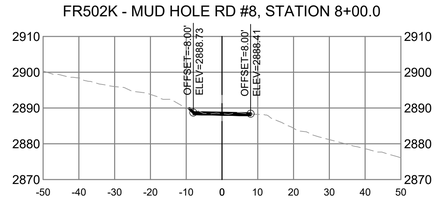

FR502K - MUD HOLE RD #6, STATION 6+00.0



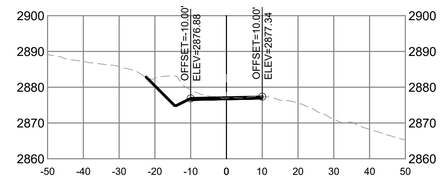

FR502K - MUD HOLE RD #7, STATION 7+00.0



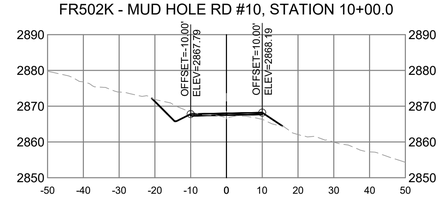

FR502K - MUD HOLE RD #8, STATION 8+00.0



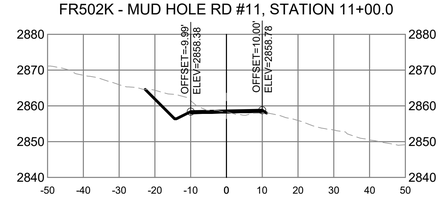

FR502K - MUD HOLE RD #9, STATION 9+00.0



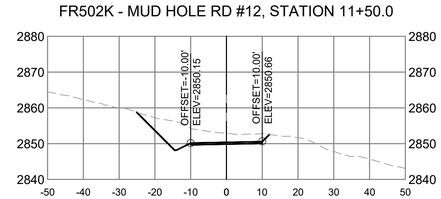

FR502K - MUD HOLE RD #10, STATION 10+00.0



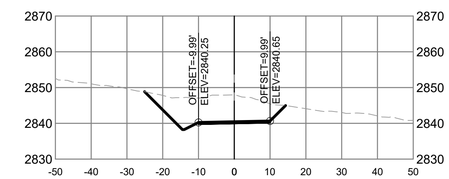

FR502K - MUD HOLE RD #11, STATION 11+00.0



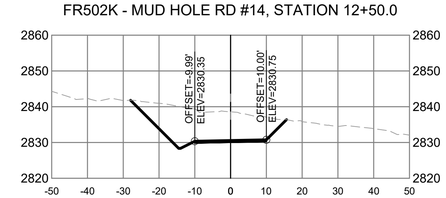

FR502K - MUD HOLE RD #12, STATION 11+50.0



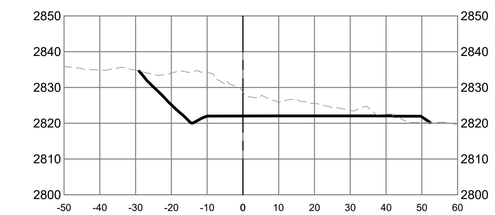

FR502K - MUD HOLE RD #13, STATION 12+00.0




FR502K - MUD HOLE RD #14, STATION 12+50.0




FR502K - MUD HOLE RD #15, STATION 13+00.0



| MUD HOLE ROAD INSTALLATION PLAN EARTHWORK CALCULATIONS | | | |
|---|---|---|---|
| | CUT (CY) | FILL (CY) | NET (CY) |
| MUD HOLE ROAD IMPROVEMENT | 2175 | 695 | 1480 (CUT) |
| INSTALL CRANE PAD AT STR. #188 | 130 | 1425 | 1295 (FILL) |
| INSTALLATION TOTALS | 2305 | 2120 | 185 (CUT) |

NOTES

1. SEE PLAN & PROFILE SHEETS, FR502K-01 FOR CORRESPONDING CROSS SECTION NUMBER AND ROAD STATION.
2. CROSS SECTIONS SHOWN ON PLANS ARE FOR PURPOSES OF DESIGN, CONSTRUCTION, AND REVIEW.
3. THE ABOVE CUT/FILL SUMMARY TABLE IS NOT DEPENDENT ON CROSS SECTION FREQUENCY (I.E. AVERAGE END AREA METHOD). THE CUT/FILL SUMMARY TABLE IS DEVELOPED BASED ON 3D MODELING (COMPOSITE VOLUMES) OF THE EXISTING AND PROPOSED GRADES.
4. THE FREQUENCY OF CROSS SECTION SAMPLES VARIES BETWEEN 100FT AND 50FT SPACING; FREQUENCY IS INCREASED DEPENDING ON THE AMOUNT OF PROPOSED EARTHWORK AT EACH LOCATION.
5. EXISTING GRADES SHOWN ON CROSS SECTIONS AND PLAN & PROFILE ARE BASED ON LIDAR DATA PROVIDED BY DOMINION ENERGY.
6. EXCESS MATERIALS SHALL BE STORED IN TEMPORARY STOCKPILE AREAS AS SHOWN ON ROAD PLANS FOR CE49.
7. SEE FR502K-R1 FOR RESTORATION EARTHWORK CALCULATIONS AND TOTAL CALCULATIONS.


Dewberry

Dewberry Engineers Inc.
4805 LAKE BROOK DRIVE
SUITE 200
GLEN ALLEN, VA 23060
804.290.7957 (PHONE)
804.290.7928 ( FAX)


TRANSMISSION LINE REBUILD
PROJECT TL 550
CONSTRUCTION DOCUMENTS
GEORGE WASHINGTON NATIONAL FOREST
WEST VIRGINIA & VIRGINIA

SEAL

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE
0' 20' 40'
HORIZONTAL SCALE
0' 20' 40'
VERTICAL SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| 2 | 05/14/21 | ARB | FOR REVIEW |
| 1 | 05/03/21 | ARB | FOR REVIEW |
| 0 | 03/05/21 | ARB | FOR REVIEW |

REVISIONS

DRAWN BY ARB
APPROVED BY
CHECKED BY KAP
DATE 05/14/2021

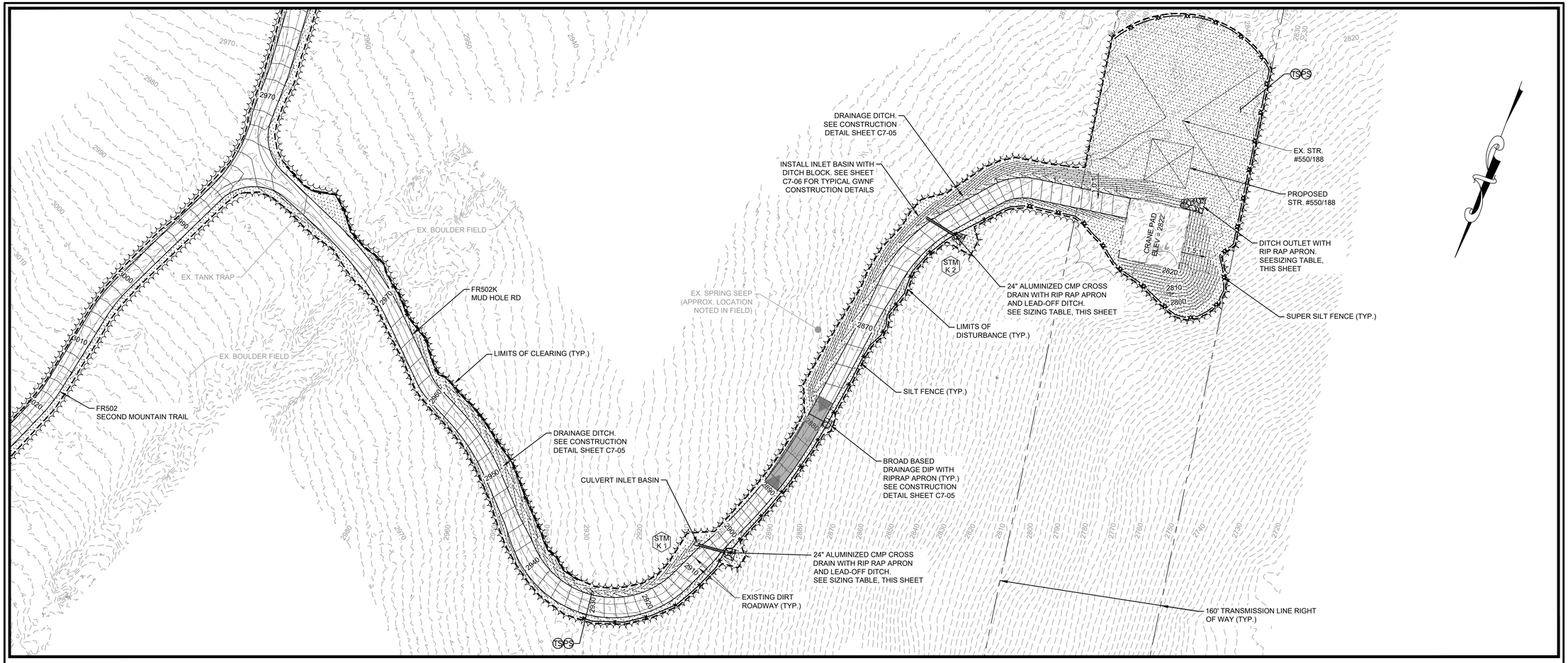
TITLE

FR502K
MUD HOLE RD
CROSS SECTIONS

PROJECT NO. 50106442

FR502K-02

SHEET NO.




| RIPRAP APRON SIZING | | | | | | |
|---|---|---|---|---|---|---|
| OUTLET NUMBER | FLOW (CFS) | D_50 (IN) | BLANKET THICKNESS (IN) | LENGTH (FT) | WIDTH (FT) | AGGREGATE |
| DA 1 CULVERT | 6.85 | 6 | 14 | 10 | 12 | VDOT CLASS A1 |
| DA 2 CULVERT | 5.51 | 6 | 14 | 10 | 12 | |
| DA 3 DITCH OUTLET | 24.29 | 6 | 14 | 16 | 18 | |

NOTES

1. SEE SHEET FR502K-05 FOR DRAINAGE CALCULATIONS AND CULVERT PROFILES
2. SEE SHEET FR502K-03 FOR CULVERT RIP RAP APRON SIZING.
3. SEE SHEET FR502K-04 FOR DRAINAGE AREA MAP
4. SEE SHEET C7-05 FOR TYPICAL SECTION FOR ROAD AND DITCH AND C7-06 TYPICAL GWNF CONSTRUCTION DETAILS
5. SEE SHEET 2 THROUGH 6W FOR EROSION AND SEDIMENT CONTROL NARRATIVE, NOTES, AND DETAILS
6. DITCHES SHALL BE LINED WITH RIPRAP IF LONGITUDINAL SLOPES ARE GREATER THAN 8%.

E&SC LEGEND

- PROPOSED 12" SILT SOCK
- PROPOSED SILT FENCE
- PROPOSED SUPER SILT FENCE
- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED RIPRAP APRON
- PROPOSED LIMITS OF CLEARING

HATCH LEGEND

- TS&S — TEMPORARY & PERMANENT SEEDING, SEE DOMINION SPEC TE VEP 8000-13-00

Dewberry

Dewberry Engineers Inc.
4805 LAKE BROOK DRIVE
SUITE 200
GLEN ALLEN, VA 23060
804.290.7957 (PHONE)
804.290.7928 ( FAX)

TRANSMISSION LINE REBUILD
PROJECT TL 550
CONSTRUCTION DOCUMENTS
GEORGE WASHINGTON NATIONAL FOREST
WEST VIRGINIA & VIRGINIA

SEAL

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE
0' 50' 100'
HORIZONTAL SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| 2 | 05/14/21 | ARB | FOR REVIEW |
| 1 | 05/03/21 | ARB | FOR REVIEW |
| 0 | 03/05/21 | ARB | FOR REVIEW |

REVISIONS

DRAWN BY ARB
APPROVED BY
CHECKED BY KAP
DATE 05/14/2021

TITLE

FR502K
MUD HOLE RD
E&SC PLAN

PROJECT NO. 50106442

FR502K-03

SHEET NO.

NOTES

1. ADDITIONAL TOPOGRAPHY (10' CONTOURS) OBTAINED FROM USGS DATA.


Dewberry

Dewberry Engineers Inc.
4805 LAKE BROOK DRIVE
SUITE 200
GLEN ALLEN, VA 23060
804.290.7957 (PHONE)
804.290.7928 ( FAX)


TRANSMISSION LINE REBUILD
PROJECT TL 550
CONSTRUCTION DOCUMENTS
GEORGE WASHINGTON NATIONAL FOREST
WEST VIRGINIA & VIRGINIA

SEAL

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE
0' 100' 200'
HORIZONTAL SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| 2 | 05/14/21 | ARB | FOR REVIEW |
| 1 | 05/03/21 | ARB | FOR REVIEW |
| 0 | 03/05/21 | ARB | FOR REVIEW |

REVISIONS

DRAWN BY ARB
APPROVED BY
CHECKED BY KAP
DATE 05/14/2021

TITLE

FR502K
MUD HOLE RD
DRAINAGE AREA

PROJECT NO. 50106442

FR502K-04

SHEET NO.

ARB

TL 550 Phase 3
Rockingham ZONE-1 NOAA-B County, Virginia

Hydrograph Peak/Peak Time Table

| Sub-Area or Reach Identifier | Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs) (hr) | 25-Yr (cfs) (hr) |
|---|---|---|
| SUBAREAS | | |
| FR502K DA1 | 5.18 12.23 | 6.85 12.23 |
| FR502K DA2 | 4.15 12.23 | 5.51 12.24 |
| FR502K DA3 | 18.23 12.27 | 24.29 12.28 |
| REACHES | | |
| OUTLET | 27.37 | 36.33 |

ARB

TL 550 Phase 3
Rockingham ZONE-1 NOAA-B County, Virginia

Sub-Area Land Use and Curve Number Details

| Sub-Area Identifier | Land Use | | Hydrologic Soil Group | Sub-Area Area (ac) | Curve Number |
|---|---|---|---|---|---|
| FR502K DA1 | Gravel (w/ right-of-way) | | D | .177 | 91 |
| | Woods - grass combination | (good) | D | 2.283 | 79 |
| | Total Area / Weighted Curve Number | | | 2.46 | 80 |
| | | | | ==== | == |
| FR502K DA2 | Gravel (w/ right-of-way) | | D | .04 | 91 |
| | Woods - grass combination | (good) | D | 1.95 | 79 |
| | Total Area / Weighted Curve Number | | | 1.99 | 79 |
| | | | | ==== | == |
| FR502K DA3 | Gravel (w/ right-of-way) | | D | .3 | 91 |
| | Woods - grass combination | (good) | D | 9.42 | 79 |
| | Total Area / Weighted Curve Number | | | 9.72 | 79 |
| | | | | ==== | == |

ARB

TL 550 Phase 3
Rockingham ZONE-1 NOAA-B County, Virginia

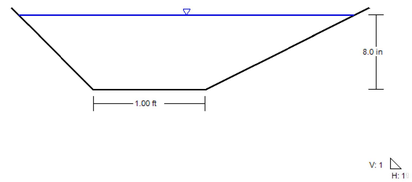
Sub-Area Time of Concentration Details

| Sub-Area Identifier/ | Flow Length (ft) | Slope (ft/ft) | Mannings's n | End Area (sq ft) | Wetted Perimeter (ft) | Velocity (ft/sec) | Travel Time (hr) |
|---|---|---|---|---|---|---|---|
| FR502K DA1 | | | | | | | |
| SHEET | 100 | 0.1600 | 0.800 | | | | 0.290 |
| SHALLOW | 600 | 0.1800 | 0.050 | | | | 0.024 |
| CHANNEL | 150 | 0.2000 | 0.069 | 5.80 | 7.00 | 8.333 | 0.005 |
| | | | | | Time of Concentration | | .319 |
| | | | | | | | ======== |
| FR502K DA2 | | | | | | | |
| SHEET | 100 | 0.1700 | 0.800 | | | | 0.283 |
| SHALLOW | 373 | 0.1600 | 0.050 | | | | 0.016 |
| CHANNEL | 96 | 0.2000 | 0.069 | 5.80 | 7.00 | 8.889 | 0.003 |
| | | | | | Time of Concentration | | .302 |
| | | | | | | | ======== |
| FR502K DA3 | | | | | | | |
| SHEET | 100 | 0.1500 | 0.800 | | | | 0.298 |
| SHALLOW | 1640 | 0.1600 | 0.050 | | | | 0.071 |
| CHANNEL | 230 | 0.2000 | 0.069 | 5.80 | 7.00 | 9.127 | 0.007 |
| | | | | | Time of Concentration | | .376 |
| | | | | | | | ======== |

## Cross Section for DA 1 - Ditch

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

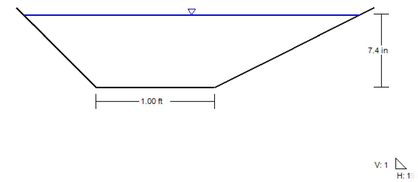
| Input Data | |
|---|---|
| Roughness Coefficient | 0.069 |
| Channel Slope | 20.000 % |
| Normal Depth | 8.0 in |
| Left Side Slope | 1.000 H:V |
| Right Side Slope | 2.000 H:V |
| Bottom Width | 1.00 ft |
| Discharge | 6.85 cfs |




## Cross Section for DA 2 - Ditch

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

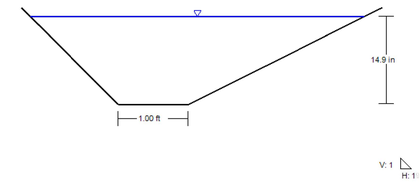
| Input Data | |
|---|---|
| Roughness Coefficient | 0.069 |
| Channel Slope | 18.000 % |
| Normal Depth | 7.4 in |
| Left Side Slope | 1.000 H:V |
| Right Side Slope | 2.000 H:V |
| Bottom Width | 1.00 ft |
| Discharge | 5.51 cfs |




## Cross Section for DA 3 - Ditch

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

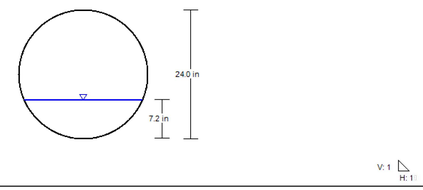
| Input Data | |
|---|---|
| Roughness Coefficient | 0.069 |
| Channel Slope | 18.000 % |
| Normal Depth | 14.9 in |
| Left Side Slope | 1.000 H:V |
| Right Side Slope | 2.000 H:V |
| Bottom Width | 1.00 ft |
| Discharge | 24.29 cfs |




## Cross Section for DA 1 - Culvert

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

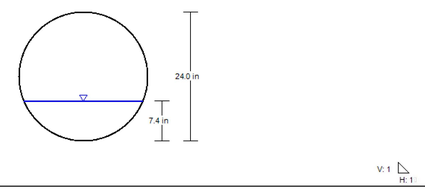
| Input Data | |
|---|---|
| Roughness Coefficient | 0.024 |
| Channel Slope | 8.010 % |
| Normal Depth | 7.2 in |
| Diameter | 24.0 in |
| Discharge | 6.85 cfs |



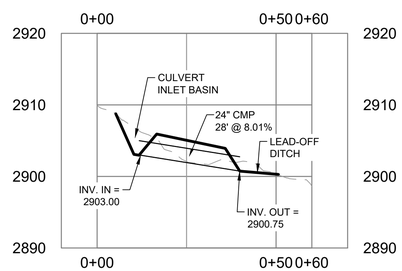

## Cross Section for DA 2 - Culvert

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

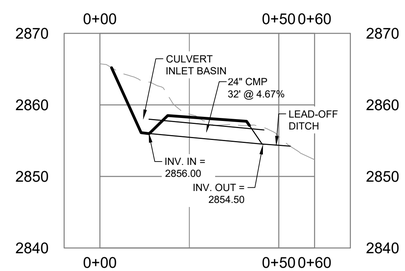
| Input Data | |
|---|---|
| Roughness Coefficient | 0.024 |
| Channel Slope | 4.670 % |
| Normal Depth | 7.4 in |
| Diameter | 24.0 in |
| Discharge | 5.51 cfs |

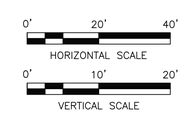



## FR502K STM 1




## FR502K STM 2





Dewberry

Dewberry Engineers Inc.
4805 LAKE BROOK DRIVE
SUITE 200
GLEN ALLEN, VA 23060
804.290.7957 (PHONE)
804.290.7928 ( FAX)


TRANSMISSION LINE REBUILD
PROJECT TL 550
CONSTRUCTION DOCUMENTS
GEORGE WASHINGTON NATIONAL FOREST
WEST VIRGINIA & VIRGINIA

SEAL

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| 2 | 05/14/21 | ARB | FOR REVIEW |
| 1 | 05/03/21 | ARB | FOR REVIEW |
| 0 | 03/05/21 | ARB | FOR REVIEW |

REVISIONS

| | |
|---|---|
| DRAWN BY | ARB |
| APPROVED BY | |
| CHECKED BY | KAP |
| DATE | 05/14/2021 |

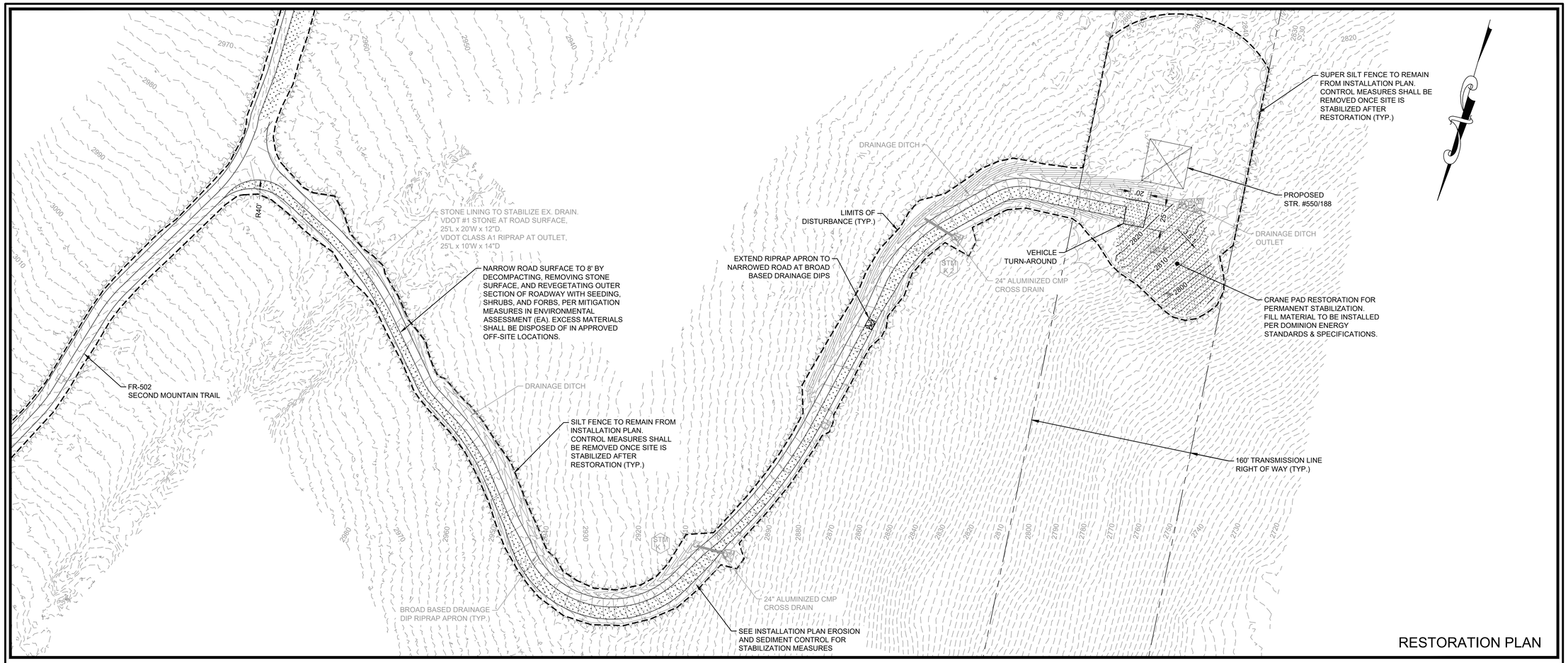
TITLE

FR502K
MUD HOLE RD
DRAINAGE CALCS

PROJECT NO. 50106442

FR502K-05

SHEET NO.




RESTORATION PLAN

## E&SC LEGEND

- PROPOSED 12" SILT SOCK
- X — PROPOSED SILT FENCE
- XX — PROPOSED SUPER SILT FENCE
- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED RIPRAP APRON
- PROPOSED LIMITS OF CLEARING

## HATCH LEGEND

- TEMPORARY & PERMANENT SEEDING, SEE DOMINION SPEC TE VEP 8000-13-00
- REVEGETATE AND DECOMPACT PER MITIGATION MEASURES IN EA

## RESTORATION PLAN NOTES

1. PLAN SHOWN HERE REPRESENTS "RESTORATION PLAN". SEE SHEET FR502K-01 FOR "INSTALLATION PLAN"
2. FOR SHENANDOAH CREST ZONE MITIGATION MEASURES, REFER TO ENVIRONMENTAL ASSESSMENT (EA), DESIGN ELEMENTS AND THREATENED & ENDANGERED SPECIES SECTIONS.
3. FIELD MODIFICATIONS WITHIN THE PERMITTED CONSTRUCTION LIMITS (AS SHOWN ON THE PROJECT MAPS) MAY BE APPROVED BY THE CONSTRUCTION COORDINATOR/CERTIFIED LAND DISTURBER AND NOTED ON THE DRAWING. FIELD MODIFICATIONS THAT EXTEND OUTSIDE OF PERMITTED CONSTRUCTION LIMITS (AS SHOWN ON THE PROJECT MAPS) REQUIRE APPROVAL BY THE GWNF PRIOR TO IMPLEMENTATION.
4. CRANE PADS ARE TO BE STABILIZED AS SHOWN ON RESTORATION PLAN. DUE TO PRESENCE OF ROCK, SITE CONTRACTOR AND ENVIRONMENTAL COMPLIANCE COORDINATOR MAY USE GEOTECHNICAL DATA TO DETERMINE SOIL STABILITY AT CRANE PADS AFTER INSTALLATION.
5. NARROWED ROAD WIDTH AS SHOWN ON RESTORATION PLAN IS BASED ON THE AVERAGE EXISTING ROAD WIDTH DETERMINED BY LIDAR SURVEY.
6. IN ADDITION TO TEMPORARY AND PERMANENT SEEDING, JUTE MATTING MAY BE REQUIRED TO ENSURE STABILIZATION.
7. REFER TO GEORGE WASHINGTON NATIONAL FOREST FORESTWIDE STANDARDS AND EROSION AND SEDIMENT CONTROL STANDARD NOTES AND DETAILS INCLUDED AT THE FRONT OF THE TL 550 PHASE 3 CONSTRUCTION DOCUMENT PACKAGE.
8. EXISTING GRADES SHOWN ON CROSS SECTIONS AND PLAN & PROFILE ARE BASED ON LIDAR DATA PROVIDED BY DOMINION ENERGY.
9. PROFILE SHOWS 8FT OFFSETS TO LEFT AND RIGHT OF CENTERLINE TO ILLUSTRATE EXISTING GRADE ON EDGE OF ROADWAY WITH 16FT WIDTH.

## MUD HOLE ROAD INSTALLATION PLAN EARTHWORK CALCULATIONS

| | CUT (CY) | FILL (CY) | NET (CY) |
|---|---|---|---|
| MUD HOLE ROAD IMPROVEMENT | 2175 | 695 | 1480 (CUT) |
| INSTALL CRANE PAD AT STR. #188 | 130 | 1425 | 1295 (FILL) |
| INSTALLATION TOTALS | 2305 | 2120 | 185 (CUT) |

## MUD HOLE ROAD RESTORATION PLAN EARTHWORK CALCULATIONS

| | CUT (CY) | FILL (CY) | NET (CY) |
|---|---|---|---|
| RESTORE SPUR AND CRANE PAD AT STR. #188 | 1555 | 25 | 1530 (CUT) |
| RESTORATION TOTALS | 1555 | 25 | 1530 (CUT) |

## FINAL EARTHWORK BALANCE

| | NET (CY) |
|---|---|
| MUD HOLE ROAD INSTALLATION | 185 (CUT) |
| MUD HOLE ROAD RESTORATION | 1530 (CUT) |
| MUD HOLE ROAD TOTAL | 1715 (CUT) |

## EARTHWORK NOTES

1. EXCESS MATERIALS SHALL BE STORED IN TEMPORARY STOCKPILE AREAS AS SHOWN ON ROAD PLANS FOR CE49.
2. WHERE ADDITIONAL FILL MATERIAL IS REQUIRED, SUITABLE EXCESS MATERIALS FROM INSTALLATION AND RESTORATION OF OTHER ROADS WITHIN THE GWNF MAY BE USED.
3. OVERALL EARTHWORK BALANCES FOR CE49 WILL BE PROVIDED IN SUMMARY TABLE.

Dewberry

Dewberry Engineers Inc.
4805 LAKE BROOK DRIVE
SUITE 200
GLEN ALLEN, VA 23060
804.290.7957 (PHONE)
804.290.7928 ( FAX)

TRANSMISSION LINE REBUILD
PROJECT TL 550
CONSTRUCTION DOCUMENTS
GEORGE WASHINGTON NATIONAL FOREST
WEST VIRGINIA & VIRGINIA

SEAL

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE
0' 50' 100'
HORIZONTAL SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| 2 | 05/14/21 | ARB | FOR REVIEW |
| 1 | 05/03/21 | ARB | FOR REVIEW |
| 0 | 03/05/21 | ARB | FOR REVIEW |

REVISIONS

DRAWN BY ARB
APPROVED BY
CHECKED BY KAP
DATE 05/14/2021

TITLE
FR502K
MUD HOLE RD
RESTORATION
PLAN

PROJECT NO. 50106442

FR502K-R1

SHEET NO.