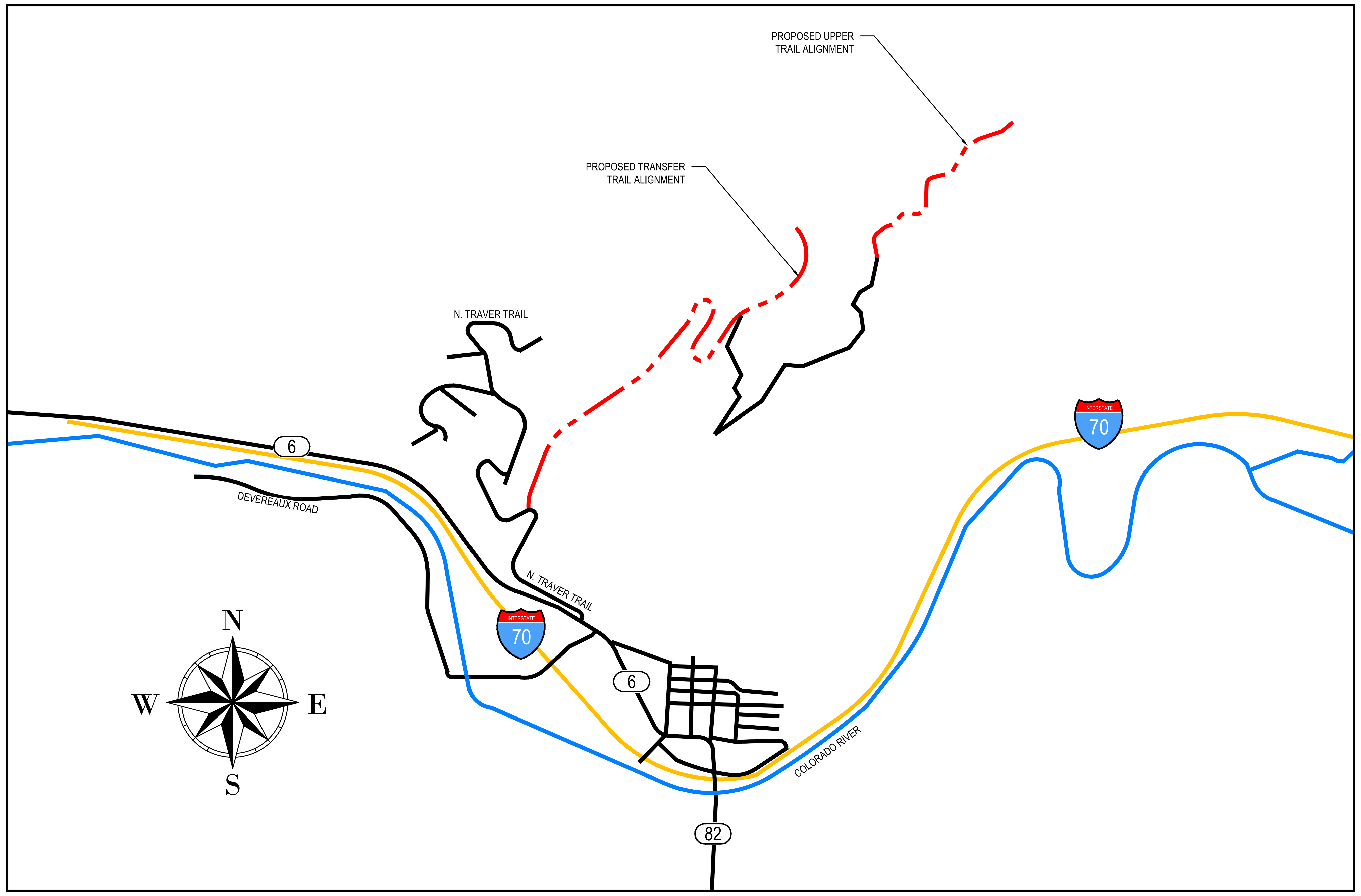
PRELIMINARY DESIGN
TRANSFER TRAIL & UPPER TRANSFER TRAIL

COUNTY OF GARFIELD, STATE OF COLORADO

NOTES

1. CULVERT OUTFALLS WILL BE DESIGNED TO MEET CDOT STANDARDS INCLUDING CULVERT EXTENSIONS AND/OR SLOPE STABILIZATION AS REQUIRED.



VICINITY MAP

SCALE 1" = 2000'

OWNER

ROCKY MOUTAIN RESOURCES
4601 DTC BOULEVARD, SUITE 130
DENVER, COLORADO 80237
CONTACT: GREGORY DANGLER
(720) 614-5213

ENGINEER

ENERTIA CONSULTING GROUP, LLC
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202
CONTACT: ROB SINGER, PE
(303) 257-8865

SHEET INDEX

SHEET NO	DESCRIPTION
1	COVER SHEET
2	DRAINAGE BASIN PLAN
3	TRANSFER TRAIL PLAN & PROFILE
4	TRANSFER TRAIL DRAINAGE PLAN
5	UPPER TRANSFER TRAIL PLAN & PROFILE
6	UPPER TRANSFER TRAIL DRAINAGE PLAN
7	DETAIL SHEET
8	RETAINING WALL DETAIL SHEET

NO.	DATE	REVISION	BY	APVD
DSGN	DR	CHK	APVD	

ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202

ROCKY MOUNTAIN
4601 DTC BLVD., SUITE 130
DENVER, CO 80237

TRANSFER TRAIL & UPPER TRANSFER TRAIL
PRELIMINARY DESIGN
COUNTY OF GARFIELD, COLORADO

COVER SHEET

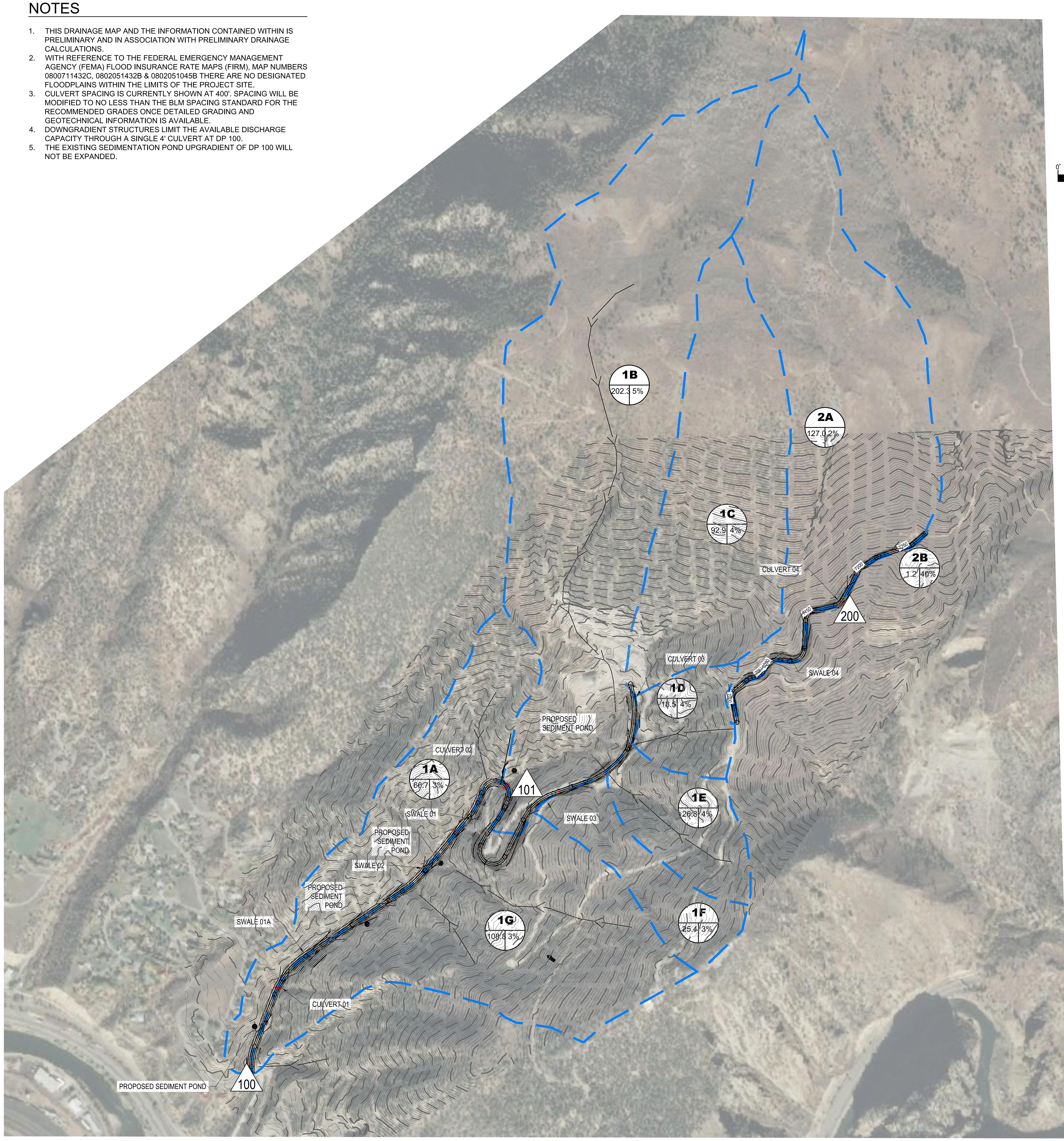
FOR BURIED UTILITY INFORMATION
THREE (3) BUSINESS DAYS
BEFORE YOU DIG
CALL 811
(OR 1-800-922-1987)
UTILITY NOTIFICATION
CENTER OF COLORADO (UNCC)
WWW.UNCC.ORG

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE MARCH 15, 2019
FILE
DWG
SHEET 1 OF 8

NOTES

1. THIS DRAINAGE MAP AND THE INFORMATION CONTAINED WITHIN IS PRELIMINARY AND IN ASSOCIATION WITH PRELIMINARY DRAINAGE CALCULATIONS.
2. WITH REFERENCE TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAPS (FIRM), MAP NUMBERS 0800711432C, 0802051432B & 0802051045B THERE ARE NO DESIGNATED FLOODPLAINS WITHIN THE LIMITS OF THE PROJECT SITE.
3. CULVERT SPACING IS CURRENTLY SHOWN AT 400'. SPACING WILL BE MODIFIED TO NO LESS THAN THE BLM SPACING STANDARD FOR THE RECOMMENDED GRADES ONCE DETAILED GRADING AND GEOTECHNICAL INFORMATION IS AVAILABLE.
4. DOWNGRADIENT STRUCTURES LIMIT THE AVAILABLE DISCHARGE CAPACITY THROUGH A SINGLE 4' CULVERT AT DP 100.
5. THE EXISTING SEDIMENTATION POND UPGRADIENT OF DP 100 WILL NOT BE EXPANDED.



N

0' 250 500 1000

SCALE: 1"=500'

LEGEND

- PROPOSED CONDITION SUB-BASIN
- PROPOSED STORM DRAIN
- PROPOSED SWALE
- EXISTING DITCH
- EXISTING MAJOR CONTOUR (5525)
- PROPOSED MAJOR CONTOUR (5525)
- PROPOSED MINOR CONTOUR
- XX / XX XX: PROPOSED SUB-BASIN IDENTIFICATION, IMPERVIOUSNESS, DRAINAGE AREA (ACRES)
- XX (triangle): DESIGN POINT

BASIN SUMMARY

Basin	Area (acres)	Q_2 (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
1A	66.74	1.27	47.80	54.50	89.52
1B	202.26	6.01	140.11	159.75	258.28
1C	92.85	2.34	75.96	86.61	141.67
1D	18.51	0.57	17.57	20.03	32.70
1E	26.84	0.67	23.75	27.08	44.41
1F	25.41	0.53	22.05	25.14	41.40
1G	108.77	2.21	93.25	106.32	175.14
2A	127.01	1.70	93.03	106.07	175.67
2B	1.19	0.49	1.86	2.12	2.83

DESIGN POINT SUMMARY

Design Point	Tributary Basins	Area (acres)	Q_2 (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
100	1A-1G	541.37	12.18	367.93	419.50	684.73
101	1B-1F	365.86	9.27	250.55	285.68	464.52
200	2A, 2B	128.20	2.08	94.44	107.68	177.82

NO.	DATE	REVISION	BY	APVD

DSGN | DR | CHK | APVD

ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202

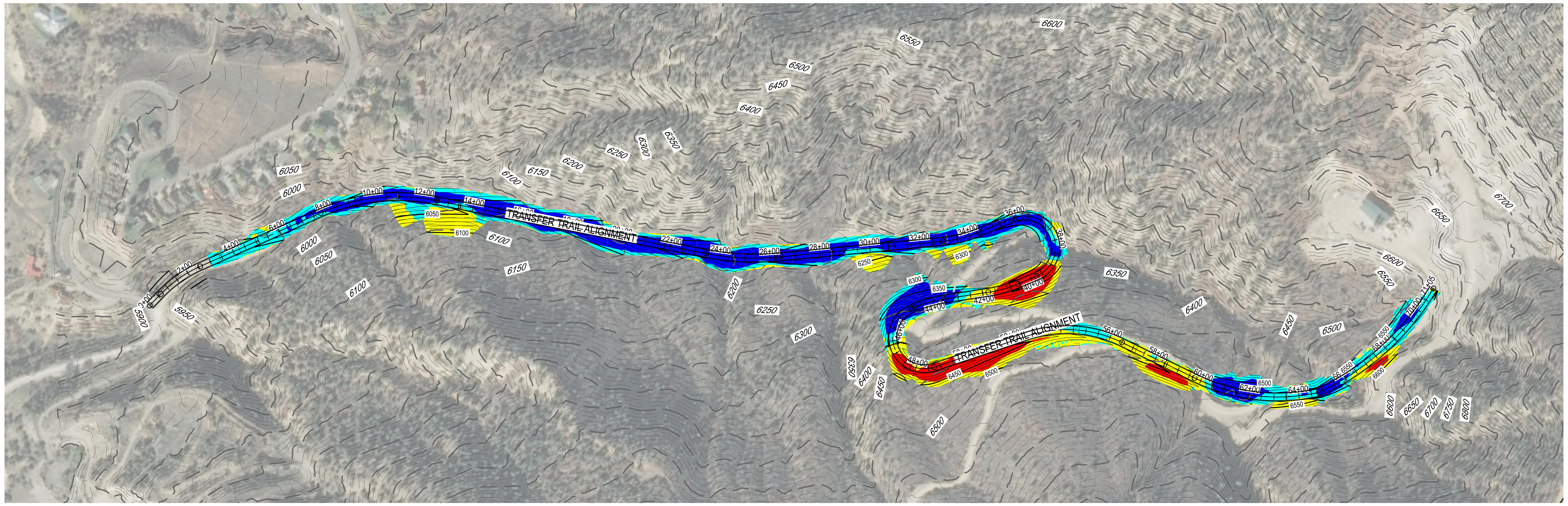
ROCKY MOUNTAIN
4601 DTC BLVD., SUITE 130
DENVER, CO 80237

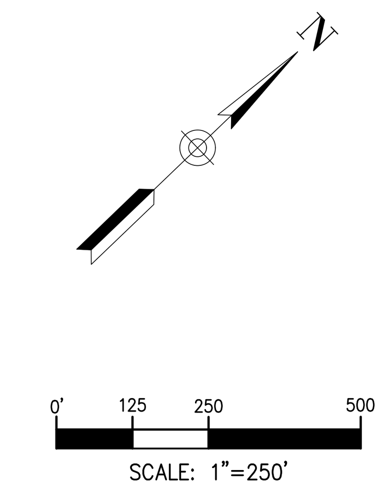
TRANSFER TRAIL & UPPER TRANSFER TRAIL
PRELIMINARY DESIGN
COUNTY OF GARFIELD, COLORADO

DRAINAGE BASIN PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE MARCH 15, 2019
FILE
DWG

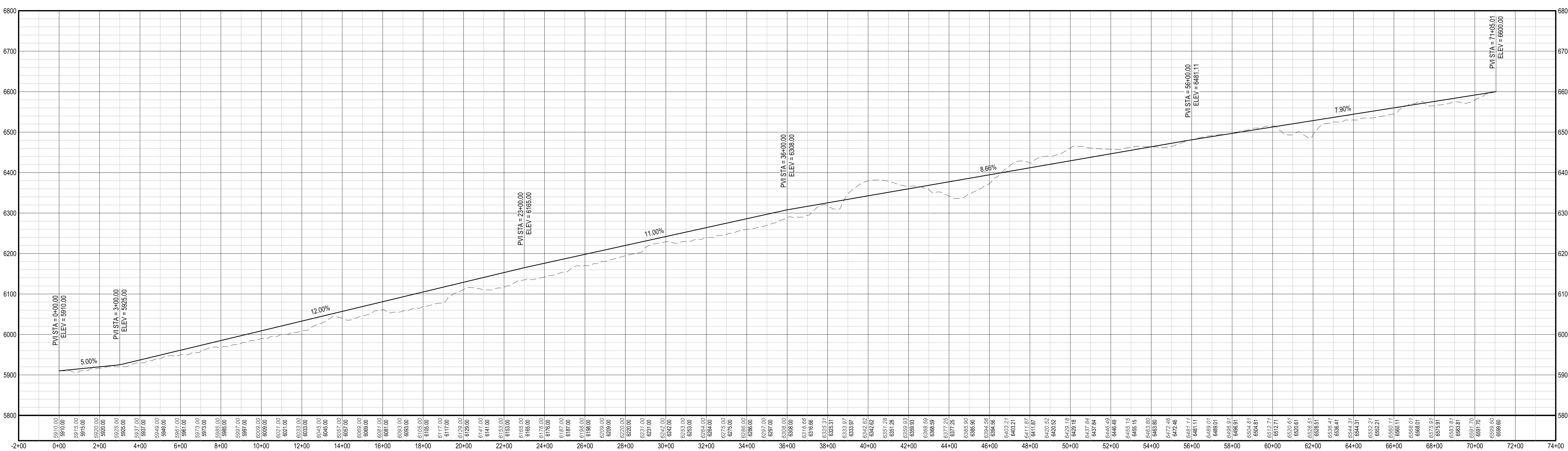




ELEVATIONS TABLE

NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	COLOR
1	-85	-15	
2	-15	0	
3	0	15	
4	15	85	

PLAN: TRANSFER TRAIL
HORIZONTAL SCALE: 1" = 250'



PROFILE: TRANSFER TRAIL ALIGNMENT STA: -2+00 TO 74+00
HORIZONTAL SCALE: 1" = 250'
VERTICAL SCALE: 1" = 125

NO.	DATE	REVISION	BY	APVD

DSGN	DR	CHK	APVD

ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202

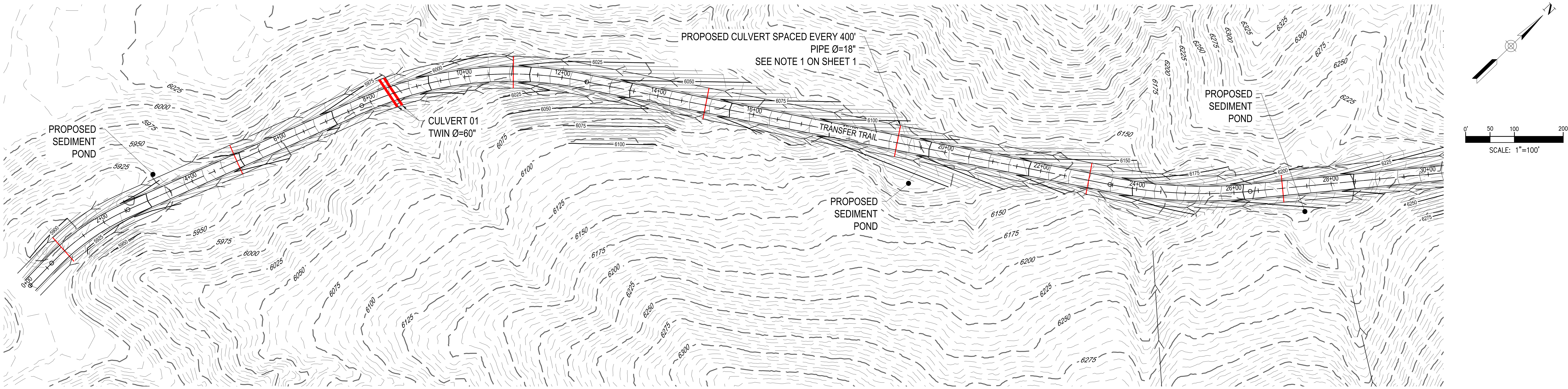
ROCKY MOUNTAIN
4601 DTC BLVD., SUITE 130
DENVER, CO 80237

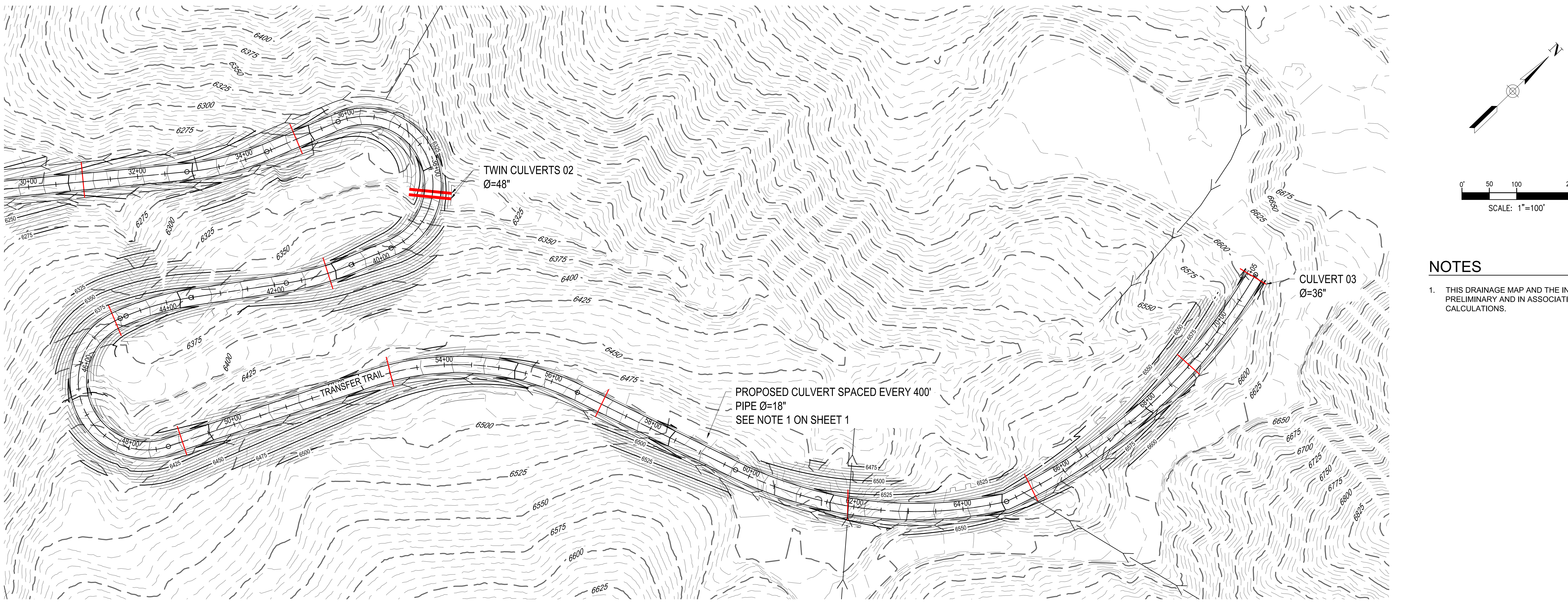
TRANSFER TRAIL & UPPER TRANSFER TRAIL PRELIMINARY DESIGN
COUNTY OF GARFIELD, COLORADO

TRANSFER TRAIL PLAN & PROFILE

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE MARCH 15, 2019
FILE
DWG





NOTES

1. THIS DRAINAGE MAP AND THE INFORMATION CONTAINED WITHIN IS PRELIMINARY AND IN ASSOCIATION WITH PRELIMINARY DRAINAGE CALCULATIONS.

NO.	DATE	REVISION	BY	APVD

DSGN	DR	CHK	APVD

ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202

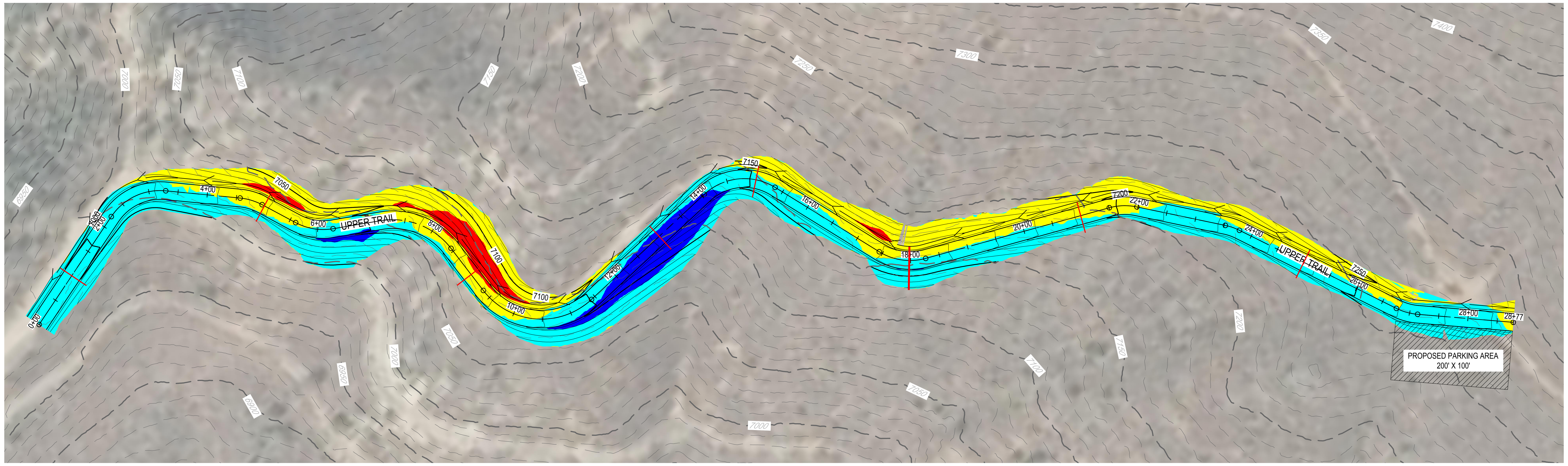
ROCKY MOUNTAIN
4601 DTC BLVD., SUITE 130
DENVER, CO 80237

TRANSFER TRAIL & UPPER TRANSFER TRAIL
PRELIMINARY DESIGN
COUNTY OF GARFIELD, COLORADO

TRANSFER TRAIL DRAINAGE PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

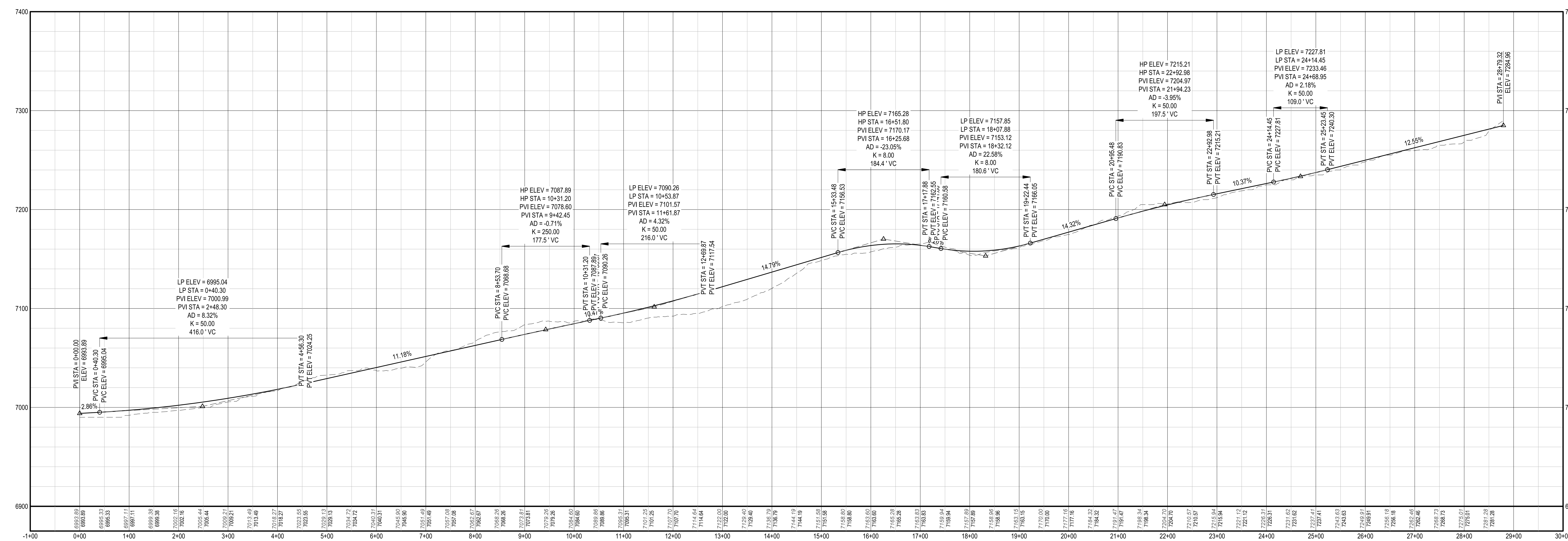
DATE MARCH 15, 2019
FILE
DWG



SCALE: 1"=100'

ELEVATIONS TABLE			
NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	COLOR
1	-35	-15	red
2	-15	0	yellow
3	0	15	cyan
4	15	35	blue

PLAN: UPPER TRAIL
HORIZONTAL SCALE: 1" = 100'



PROFILE: UPPER TRAIL STA: -1+00 TO 30+00
HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 50

NO.	DATE	REVISION	BY	APVD

DSGN | DR | CHK | APVD

ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202

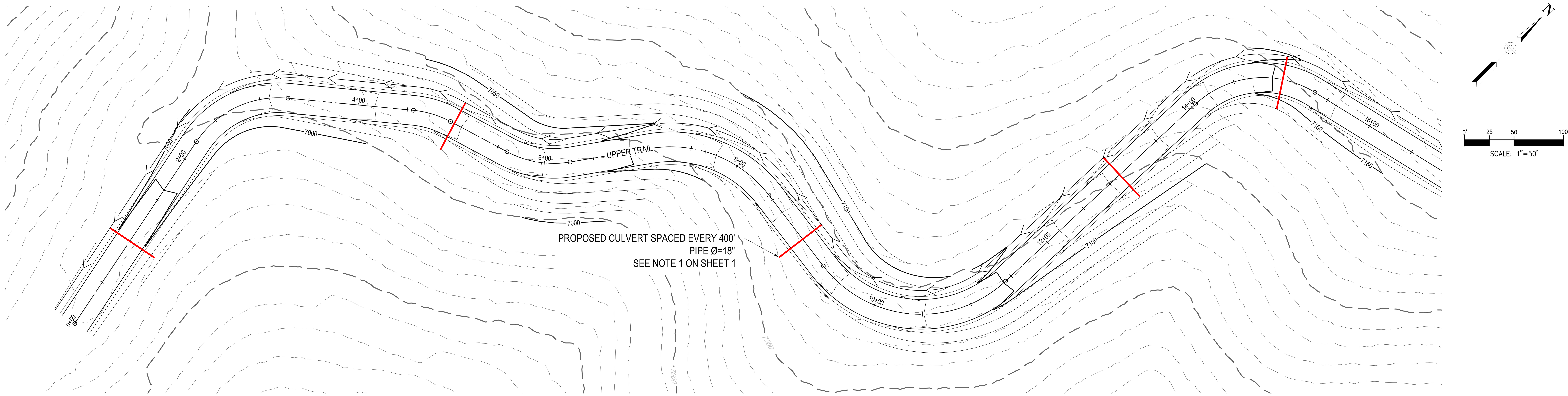
ROCKY MOUNTAIN
4601 DTC BLVD., SUITE 130
DENVER, CO 80237

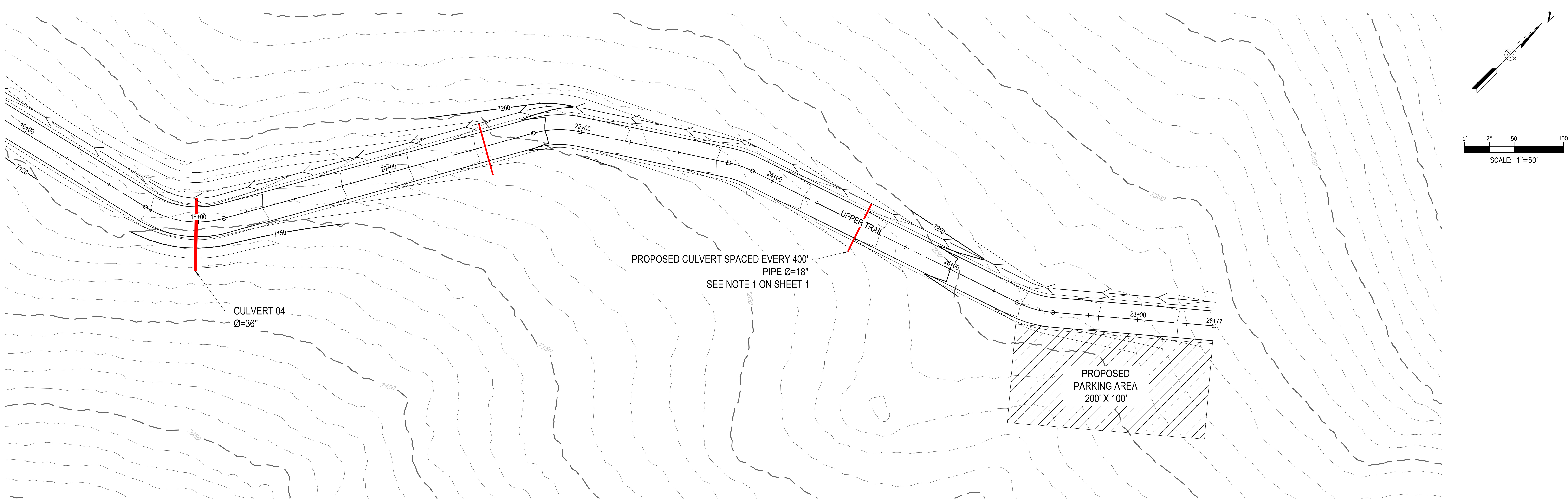
TRANSFER TRAIL & UPPER TRANSFER TRAIL
PRELIMINARY DESIGN
COUNTY OF GARFIELD, COLORADO

UPPER TRANSFER TRAIL PLAN & PROFILE

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE MARCH 15, 2019
FILE
DWG
SHEET 5 OF 8





NO.	DATE	REVISION	BY	APVD

DSGN	DR	CHK	APVD

ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202

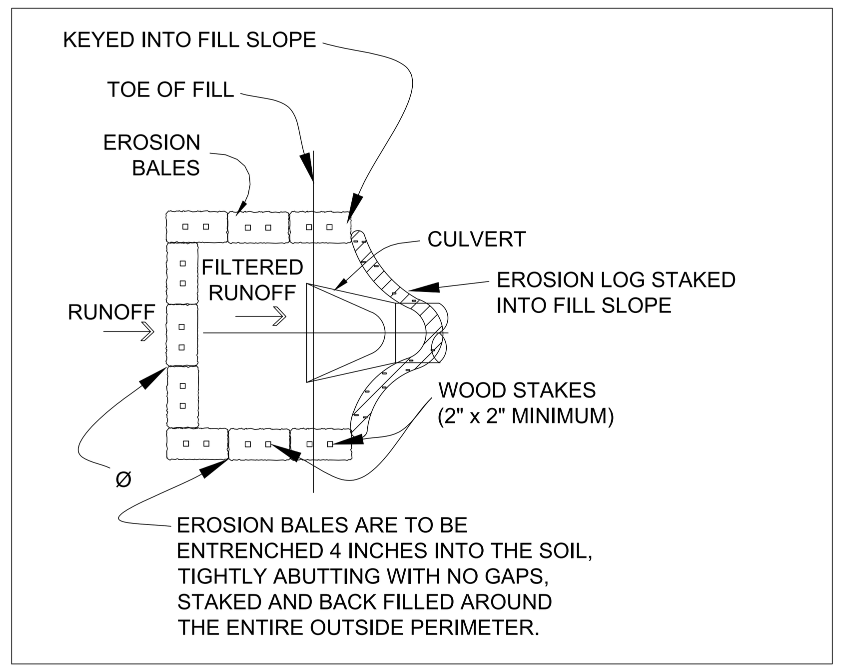
ROCKY MOUNTAIN RAIL PARK EST. 2017
4601 DTC BLVD., SUITE 130
DENVER, CO 80237

TRANSFER TRAIL & UPPER TRANSFER TRAIL PRELIMINARY DESIGN
COUNTY OF GARFIELD, COLORADO

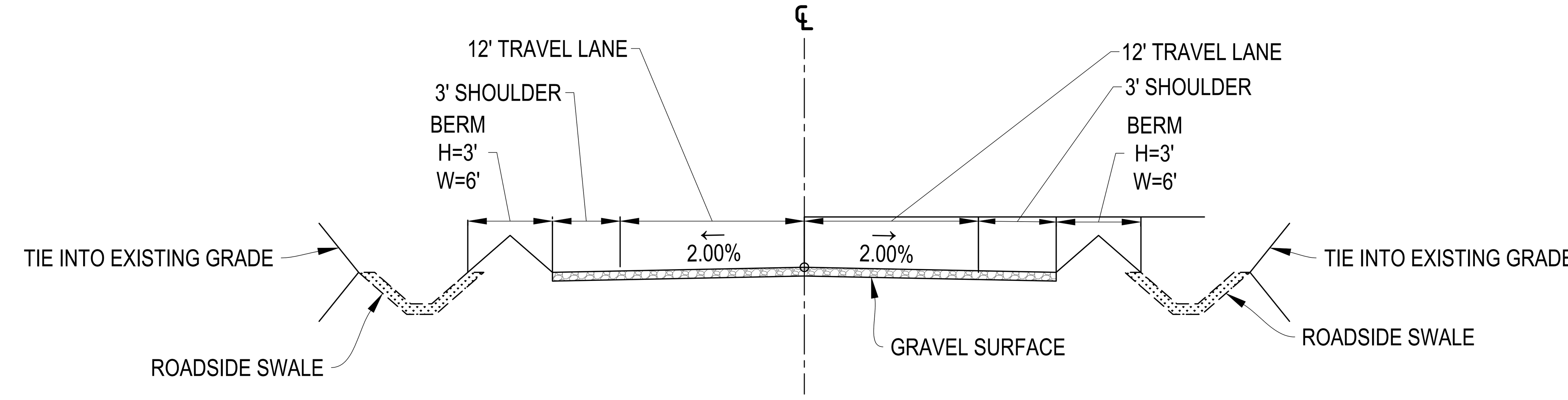
UPPER TRANSFER TRAIL DRAINAGE PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE MARCH 15, 2019
FILE
DWG



2 INLET PROTECTION
NOT TO SCALE

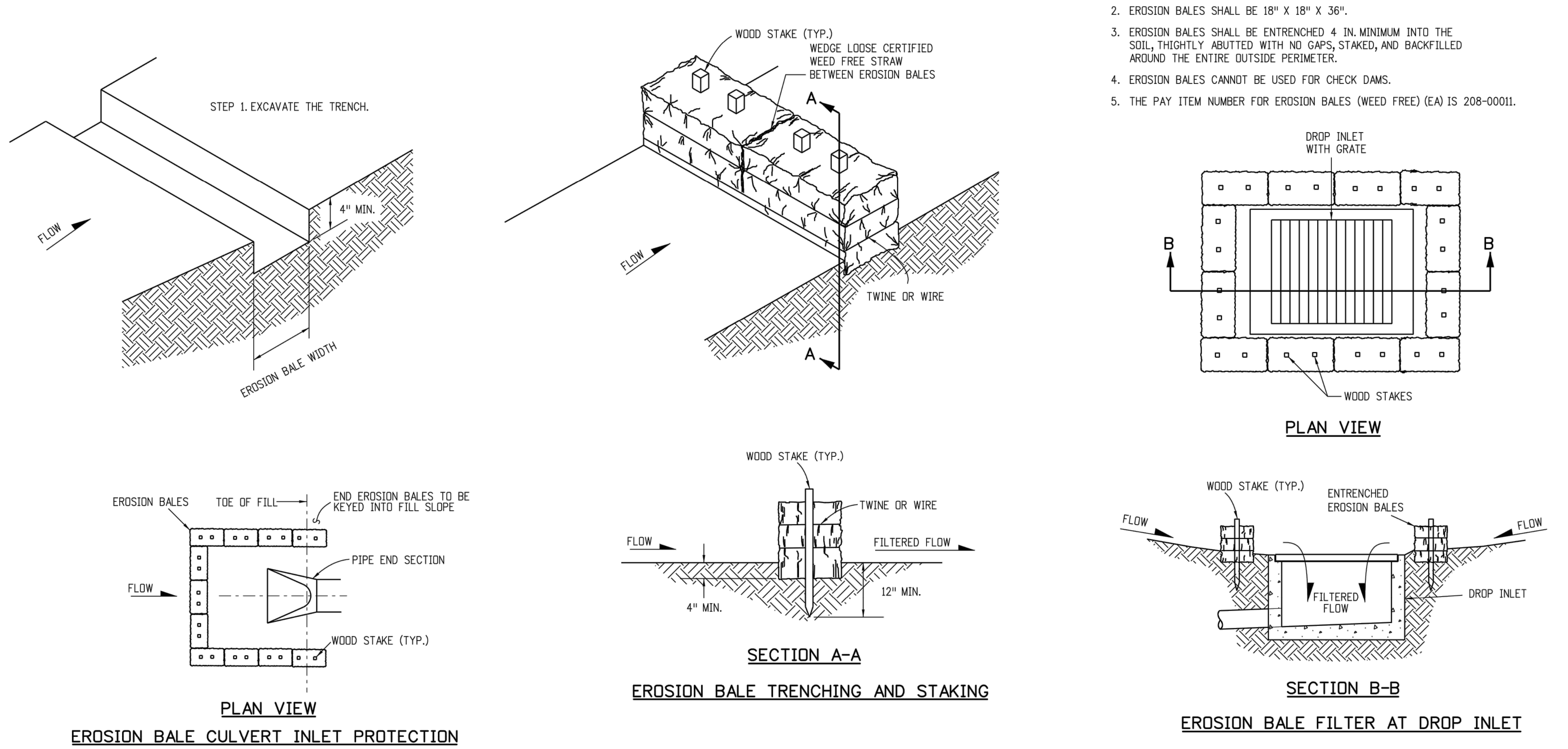


NOTE: UPGRADIENT BERM LOCATIONS AS NECESSARY BASED ON VEHICLE OVERTURNING POTENTIAL

A TRANSFER TRAIL
SECTION VARIES
NTS

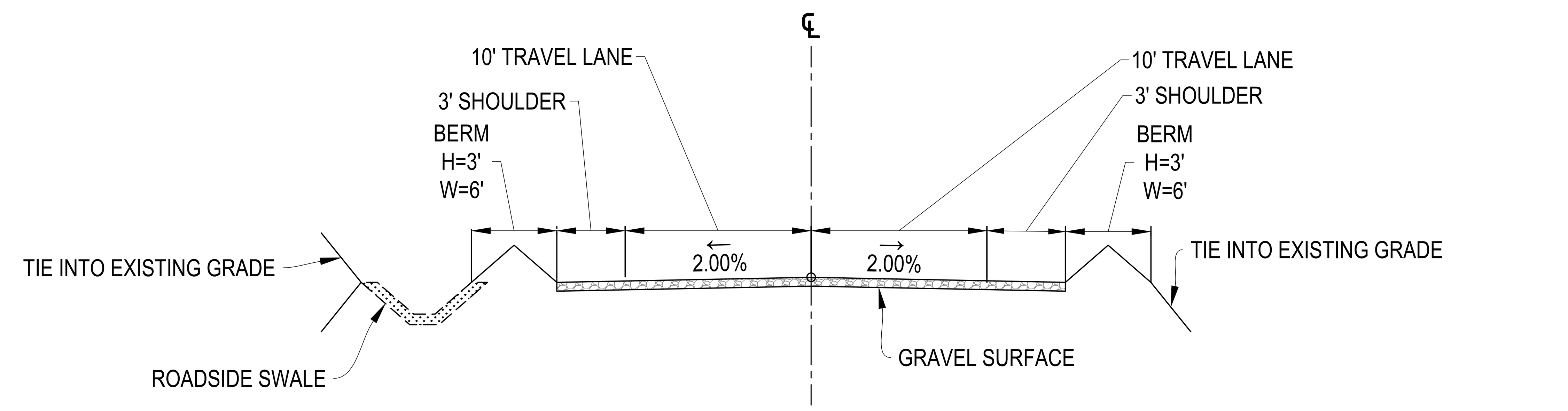
NOTES

1. STAKES SHALL BE WOOD AND SHALL BE 2" X 2" X 30" NOMINAL.
2. EROSION BALES SHALL BE 18" X 18" X 36".
3. EROSION BALES SHALL BE ENTRENCHED 4 IN. MINIMUM INTO THE SOIL, THIGHTLY ABUTTED WITH NO GAPS, STAKED, AND BACKFILLED AROUND THE ENTIRE OUTSIDE PERIMETER.
4. EROSION BALES CANNOT BE USED FOR CHECK DAMS.
5. THE PAY ITEM NUMBER FOR EROSION BALES (WEED FREE) (EA) IS 208-00011.



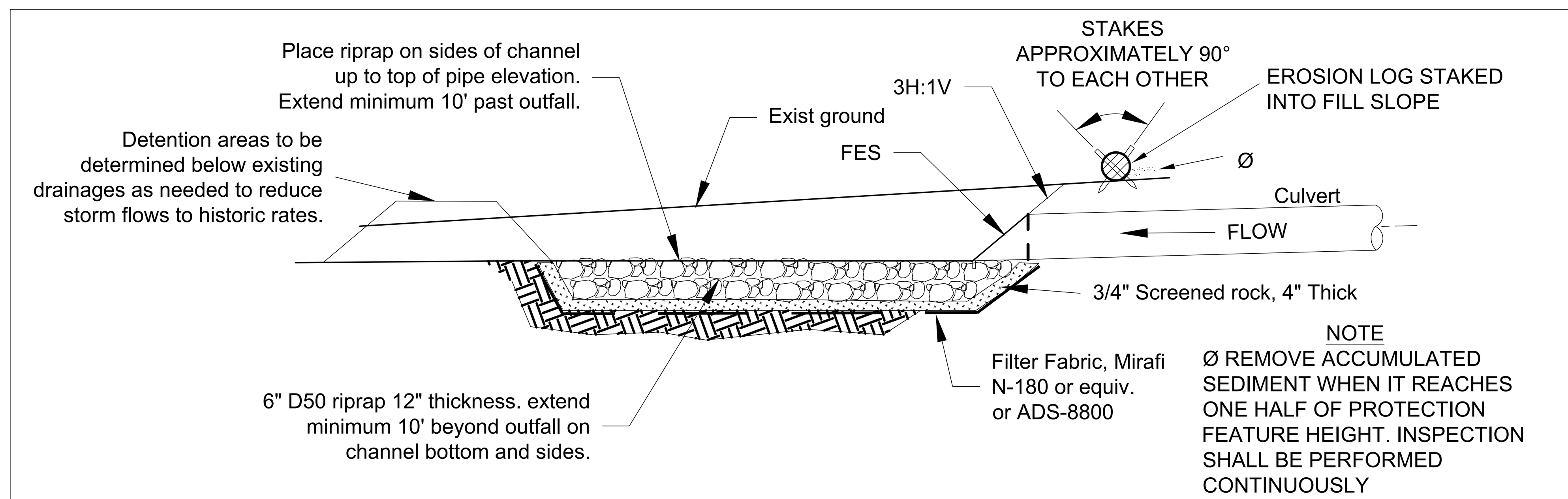
EROSION BALE APPLICATIONS

6 EROSION BALE CHANNEL PROTECTION
NOT TO SCALE



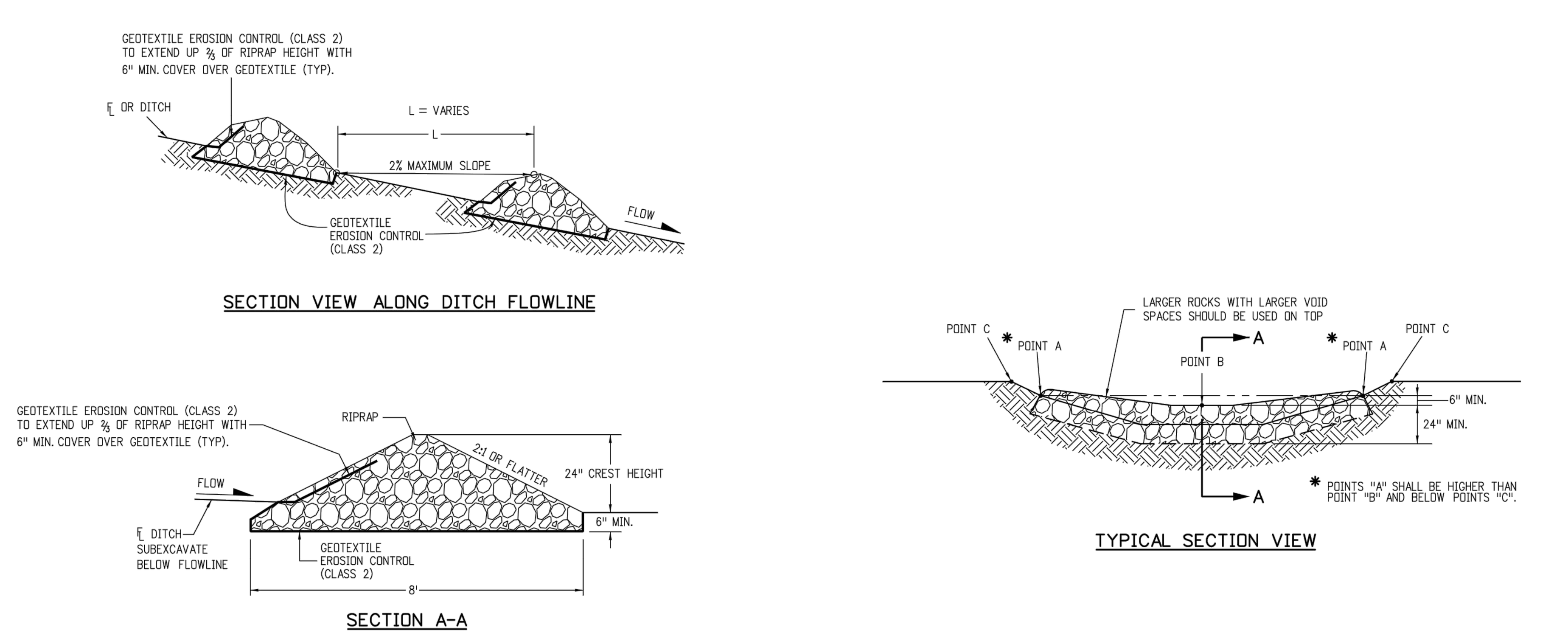
NOTE: UPGRADIENT BERM LOCATIONS AS NECESSARY BASED ON VEHICLE OVERTURNING POTENTIAL

B UPPER TRAIL
SECTION VARIES
NTS



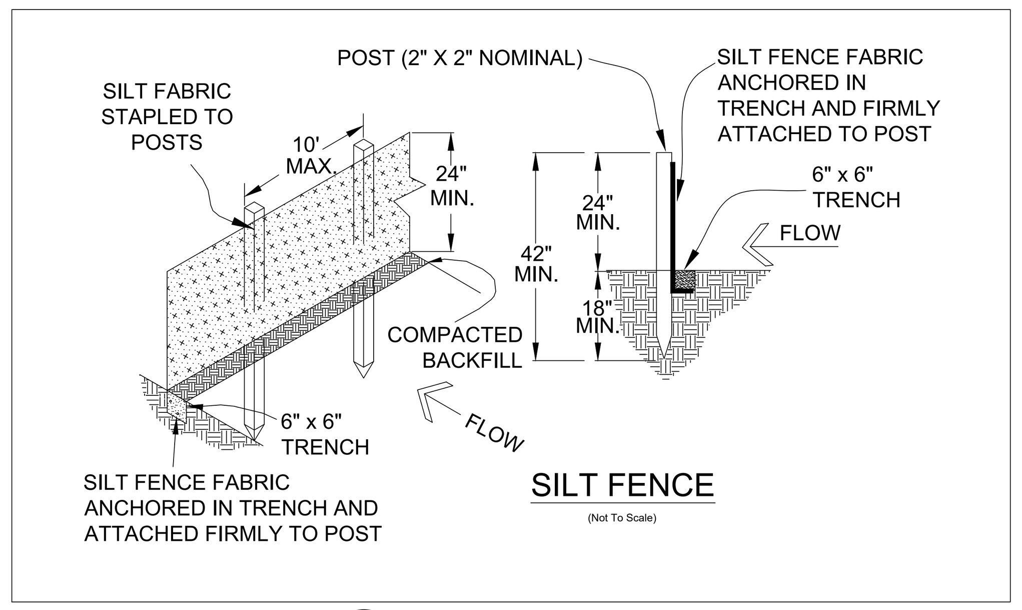
NOTE
Ø REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES ONE HALF OF PROTECTION FEATURE HEIGHT. INSPECTION SHALL BE PERFORMED CONTINUOUSLY

3 CULVERT OUTLET RIP-RAP PROTECTION: SECTION VIEW
NOT TO SCALE



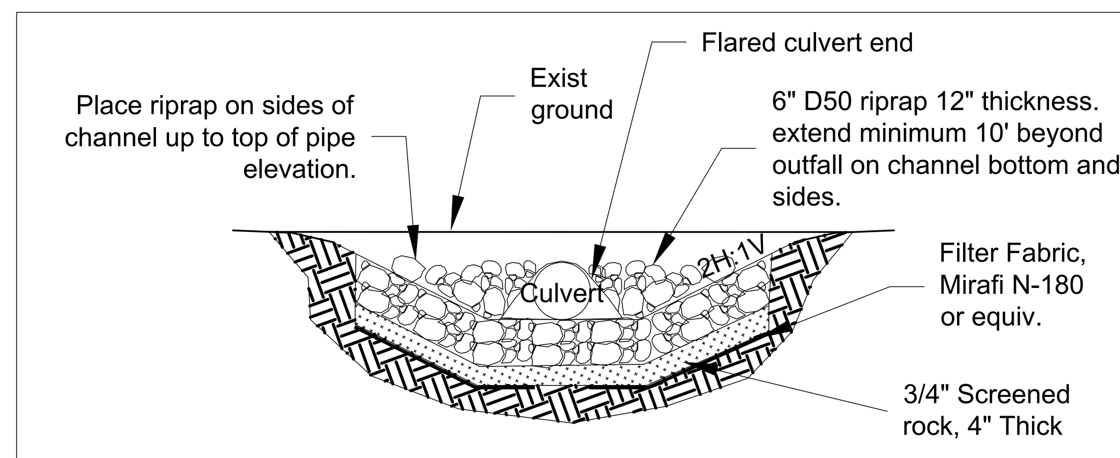
NOTES:
1. RIPRAP SIZE D_{50} = 6" OR AS SHOWN ON THE PLANS.
2. THE GEOTEXTILE EROSION CONTROL SHALL BE CLASS 2 AND CONFORM TO THE REQUIREMENTS OF SUBSECTION 712.08.
3. THE ENDS OF RIPRAP CHECK DAM SHALL BE A MINIMUM OF 6 IN. HIGHER THAN CENTER OF CHECK DAM.
4. FOR USE AS TEMPORARY CHECK DAMS ONLY AND NOT FOR PERMANENT INSTALLATIONS.
5. THE PAY ITEM NUMBER FOR ROCK CHECK DAM (EA) IS 208-00041.

7 ROCK CHECK DAM
NOT TO SCALE



SILT FENCE
(Not To Scale)

1 SILT FENCE
NOT TO SCALE



4 CULVERT OUTLET RIP-RAP PROTECTION: END VIEW
NOT TO SCALE

NO.	DATE	REVISION	BY	APVD

DSGN | DR | CHK | APVD

ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202

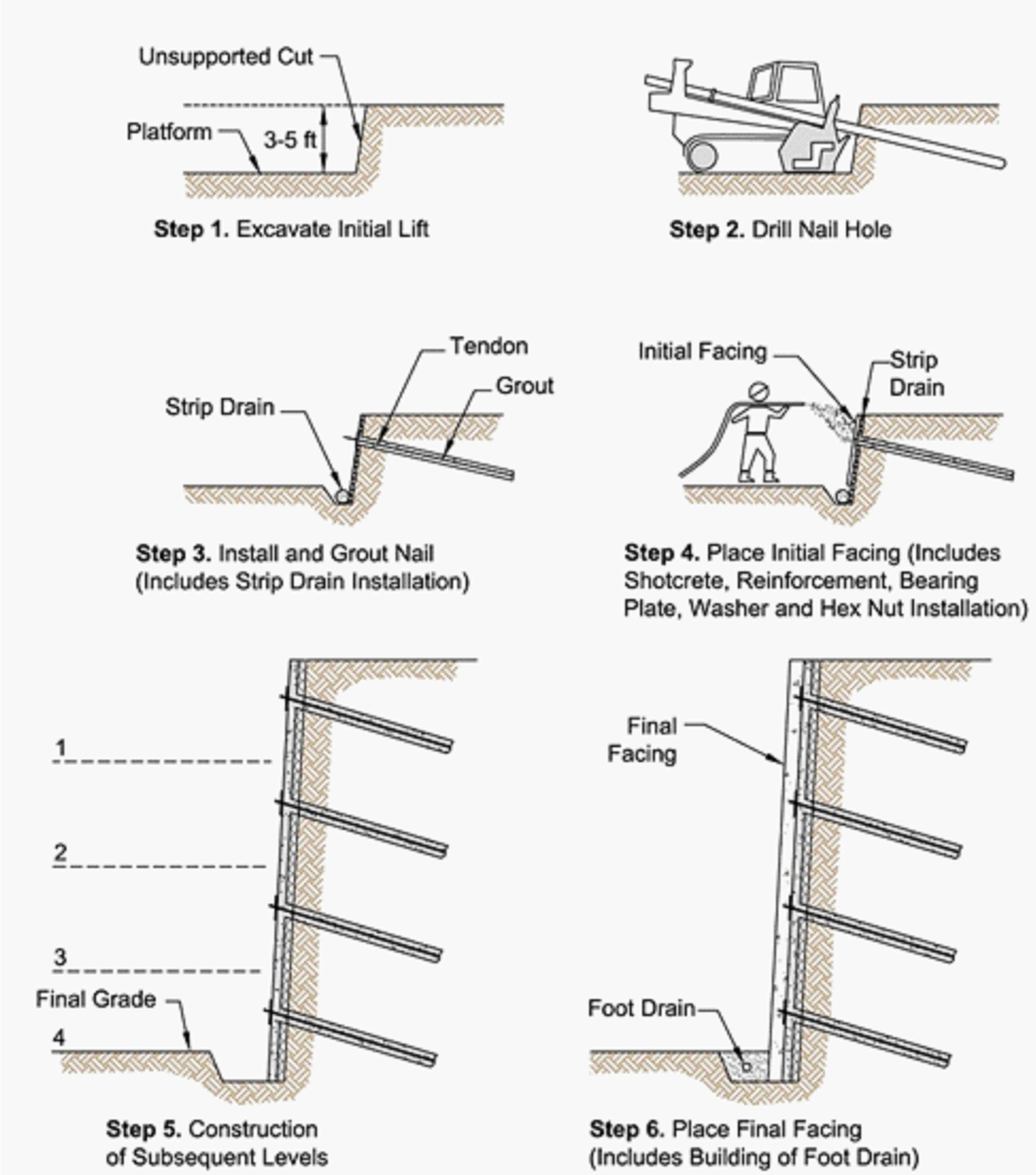
ROCKY MOUNTAIN
4601 DTC BLVD., SUITE 130
DENVER, CO 80237

TRANSFER TRAIL & UPPER TRANSFER TRAIL
PRELIMINARY DESIGN
COUNTY OF GARFIELD, COLORADO

DETAIL SHEET

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE MARCH 15, 2019
FILE
DWG
SHEET 7 OF 8



SOIL NAIL WALL NOTE

PRIOR TO IMPROVING ANY PORTIONS OF TRANSFER TRAIL, RMR WILL CONDUCT A FULL SITE SURVEY AND GEO-TECHNICAL ANALYSIS. FROM THESE, RMR WILL DEVELOP FINAL ENGINEERED DRAWINGS FOR THE IMPROVEMENTS. DURING THE IMPROVEMENTS TO TRANSFER TRAIL RMR DOES NOT ANTICIPATE GROUND CONDITIONS TO REQUIRE EARTH-RETAINING STRUCTURES. IF GEOTECHNICAL ANALYSIS IDENTIFIES AREAS THAT REQUIRE GROUND SUPPORT RMR MAY USE SOIL NAIL WALLS AS EARTH-RETAINING STRUCTURES. EARTH-RETAINING STRUCTURES WILL BE CONSIDERED IN AREAS WHERE THERE WOULD OTHERWISE BE A SIGNIFICANT AMOUNT OF CUT SLOPE. AN EXAMPLE OF HOW SOIL NAIL WALLS COULD BE CONSTRUCTED IS SHOWN BELOW.

SOIL NAIL WALLS ARE A PERMANENT EARTH-RETAINING STRUCTURE COMMONLY USED FOR ROADWAY PROJECTS IN THE UNITED STATES. SOIL NAIL WALLS ARE CONSTRUCTED USING A TOP-DOWN CONSTRUCTION SEQUENCE. THE GROUND IS EXCAVATED IN LIFTS, NORMALLY RANGING FROM 3 TO 5 FEET, BUT CAN BE GREATER IN SOME SOILS. NAILS ARE INSTALLED WITH SIMILAR VERTICAL SPACING. SOIL NAILS ARE THEN GROUTED IN PLACE. AN INITIAL FACING IS PLACED OVER THE FIRST ROW OF NAILS BEFORE THE NEXT LIFT IS EXCAVATED. THIS PROCESS PROGRESSES UNTIL THE FINAL STABILIZED HEIGHT IS REACHED. ONCE ALL THE NAILS ARE INSTALLED AND GROUTED, A FINAL FACE IS APPLIED. THIS FINAL FACE CAN BE FINISHED IN A VARIETY OF METHODS TO BLEND IN AESTHETICALLY WITH THE NEIGHBORING HILL SIDES.

RETAINING WALL NOTES

EXCAVATION - THE DEPTH OF THE INITIAL EXCAVATION LIFT (UNSUPPORTED CUT) MAY RANGE BETWEEN 2.5 AND 7 FT, BUT IS TYPICALLY 3 TO 5 FT AND REACHES SLIGHTLY BELOW THE ELEVATION WHERE THE FIRST ROW OF NAILS WILL BE INSTALLED. THE EXCAVATION FACE MUST HAVE THE ABILITY TO REMAIN UNSUPPORTED, UNTIL THE NAILS AND INITIAL FACE ARE INSTALLED, TYPICALLY ONE TO TWO DAYS. THE TYPE OF SOIL THAT IS EXCAVATED MAY LIMIT THE DEPTH OF THE EXCAVATION LIFT. THE EXCAVATED PLATFORM MUST BE OF SUFFICIENT WIDTH TO PROVIDE SAFE ACCESS FOR THE SOIL NAIL INSTALLATION EQUIPMENT.

DRILLING OF NAIL HOLES - DRILL HOLES ARE ADVANCED USING SPECIALIZED DRILLING EQUIPMENT OPERATED FROM THE EXCAVATED PLATFORM. THE DRILL HOLES TYPICALLY REMAIN UNSUPPORTED.

NAIL INSTALLATION AND GROUTING - TENDONS ARE PLACED IN THE DRILLED HOLE. A TREMIE GROUT PIPE IS INSERTED IN THE DRILL HOLE ALONG WITH THE TENDON; AND THE HOLE IS FILLED WITH GROUT, PLACED UNDER GRAVITY OR A NOMINAL, LOW PRESSURE (LESS THAN 5 TO 10 PSI). IF HOLLOW BARS ARE USED, THE DRILLING AND GROUTING TAKE PLACE IN ONE OPERATION.

INSTALLATION OF STRIP DRAINS - STRIP DRAINS ARE INSTALLED ON THE EXCAVATION FACE, CONTINUOUSLY FROM THE TOP OF THE EXCAVATION TO SLIGHTLY BELOW THE BOTTOM OF THE EXCAVATION. THE STRIP DRAINS ARE PLACED BETWEEN ADJACENT NAILS AND ARE UNROLLED DOWN TO THE NEXT EXCAVATION LIFT.

CONSTRUCTION OF INITIAL SHOTCRETE FACING - BEFORE THE NEXT LIFT OF SOIL IS EXCAVATED, AN INITIAL FACING IS APPLIED TO THE UNSUPPORTED CUT. THE INITIAL FACING TYPICALLY CONSISTS OF A LIGHTLY REINFORCED 4-IN. THICK SHOTCRETE LAYER. THE REINFORCEMENT INCLUDES WELDED-WIRE MESH (WWM), WHICH IS PLACED IN THE MIDDLE OF THE FACING THICKNESS. HORIZONTAL AND VERTICAL BARS ARE ALSO PLACED AROUND THE NAIL HEADS FOR BENDING RESISTANCE. AS THE SHOTCRETE STARTS TO CURE, A STEEL BEARING PLATE IS PLACED OVER THE TENDON THAT IS PROTRUDING FROM THE DRILL HOLE. THE BEARING PLATE IS LIGHTLY PRESSED INTO THE FRESH SHOTCRETE. HEX NUTS AND WASHERS ARE THEN INSTALLED TO ENGAGE THE NAIL HEAD AGAINST THE BEARING PLATE. THE HEX NUT IS WRENCH-TIGHTENED WITHIN 24 HOURS OF THE PLACEMENT OF THE INITIAL SHOTCRETE. TESTING OF SOME OF THE INSTALLED NAILS TO PROOF-LOAD THEIR CAPACITY OR TO VERIFY THE LOAD-SPECIFIED CRITERION MAY BE PERFORMED BEFORE PROCEEDING WITH THE NEXT EXCAVATION LIFT. THE SHOTCRETE SHOULD ATTAIN ITS MINIMUM SPECIFIED 3-DAY COMPRESSIVE STRENGTH BEFORE PROCEEDING WITH SUBSEQUENT EXCAVATION LIFTS. FOR PLANNING PURPOSES, THE CURING PERIOD OF THE SHOTCRETE SHOULD BE CONSIDERED 72 HOURS.

CONSTRUCTION OF SUBSEQUENT LEVELS - STEPS 1 THROUGH 4 ARE REPEATED FOR THE REMAINING EXCAVATION LIFTS. AT EACH EXCAVATION LIFT, THE STRIP DRAIN IS UNROLLED DOWNWARD TO THE SUBSEQUENT LIFT. A NEW PANEL OF WWM IS THEN PLACED OVERLAPPING AT LEAST ONE FULL MESH CELL WITH THE WWM PANEL ABOVE. THE TEMPORARY SHOTCRETE IS CONTINUED WITH THE PREVIOUS SHOTCRETE LIFT.

CONSTRUCTION OF FINAL FACING - AFTER THE BOTTOM OF THE EXCAVATION IS REACHED AND NAILS ARE INSTALLED AND TESTED, THE FINAL FACING IS CONSTRUCTED. THE FINAL FACING MAY CONSIST OF CIP REINFORCED CONCRETE, REINFORCED SHOTCRETE, OR PREFABRICATED PANELS. WEEPHOLES, A FOOT DRAIN, AND DRAINAGE DITCHES ARE THEN INSTALLED TO DISCHARGE WATER THAT MAY COLLECT IN THE CONTINUOUS STRIP DRAIN. THE INCLUDED IMAGE SHOWS AN EXAMPLE OF A FINISHED SOIL NAIL WALL WITH TEXTURE.

NO.	DATE	REVISION	BY	APVD
DSGN	DR	CHK	APVD	

ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202

ROCKY MOUNTAIN
4601 DTC BLVD., SUITE 130
DENVER, CO 80237

TRANSFER TRAIL & UPPER TRANSFER TRAIL
PRELIMINARY DESIGN
COUNTY OF GARFIELD, COLORADO

RETAINING WALL DETAIL SHEET

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE MARCH 15, 2019
FILE
DWG