Appendix C
Highway 89 Cockscomb Cut
Projected Pipeline Road Cut Calculations

TABLE C-1
HIGHWAY 89 COCKSCOMB CUT
PROJECTED PIPELINE ROAD CUT CALCULATIONS

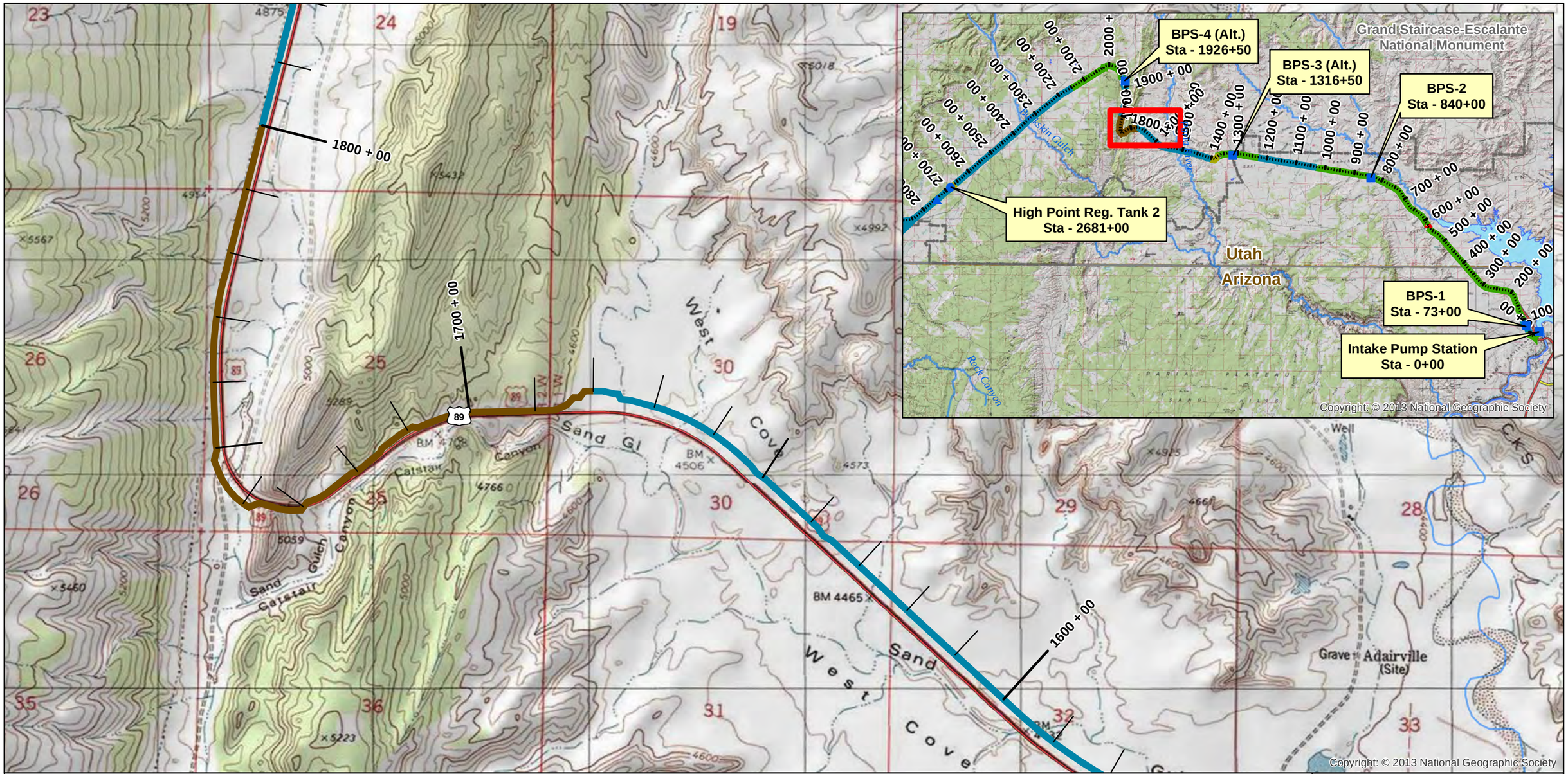
Cross Section	Station No.	Length (ft)*	Cut Area (ft^2)	Volume (ft^3)**	Volume (yd^3)
N	1689+80	158	320	50,560	1,873
O	1691+38	237.5	1,300	308,750	11,435
P	1694+55	264	1,197	316,008	11,704
R***	1696+66	264	254	67,056	2,484
Q***	1699+83	317	240	76,080	2,818
S	1703+00	396	4,056	1,606,176	59,488
T	1707+75	448.5	515	230,978	8,555
U	1711+97	237.5	2,470	586,625	21,727
V	1712+50	211.5	0	0	0
W	1716+20	422.5	0	0	0
X	1720+95	660	0	0	0
Y	1729+40	660	0	0	0
Z	1734+15	475	1,960	931,000	34,480
TOTAL				**4,173,233**	**154,564**

***** Length = ½ distance between each section station.

Example: Section O: L = ½(1691+38 – 1689+80) + ½(1694+55 – 1691+38)
Section N: L = (2)(1/2)(1691+38 – 1689+80)
Section Z: L = (2)(1/2)(1734+15 – 1729+40)

** Volume = Length x Cut Area.
Cut Area is approximated as either a triangle or a parallelogram and balances cut and fill.

*** Sequencing is correct.



Rock Hazards

- Low Risk
- Possible Gypsum
- Gypsum Observed
- Expansive Potential
- Rockfall Hazard
- Rockfall Hazard / Possible Gypsum
- Rockfall Hazard / Gypsum Observed
- Rockfall Hazard / Slope Stability
- Rockfall Hazard / Steeply Dipping Bedrock
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- Interstate
- US Highway
- ST Highway
- Hwy
- Major Road
- Lakes & Reservoirs
- Major Rivers & Streams
- National Park/Monument
- State Boundaries

FERC Project Number:
12966-001
BLM Serial Numbers:
AZA-34941
UTU-85472

N

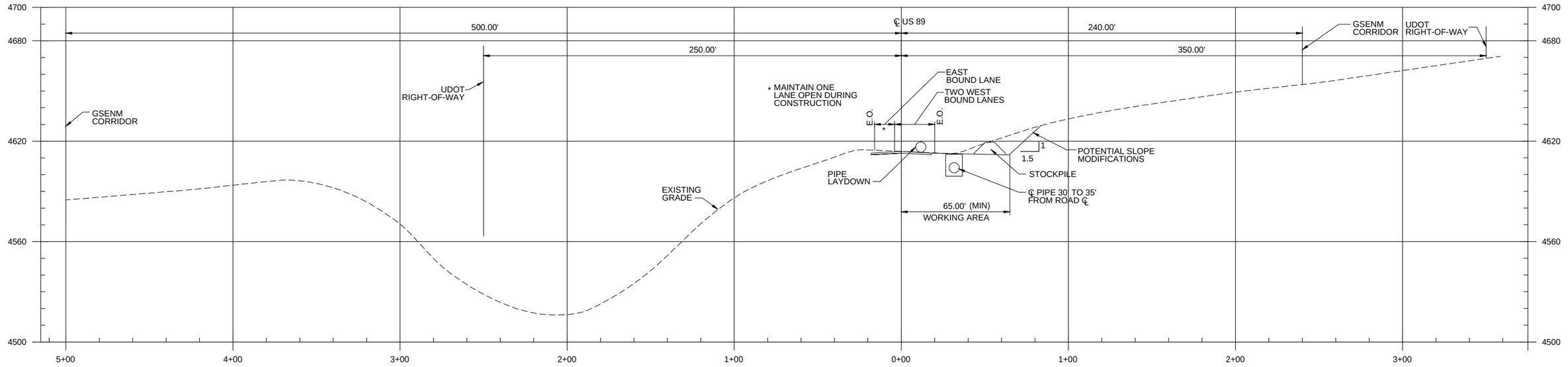
0 1.25 2.5 5 7.5 10 Miles

Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

UDWRe **Figure C-1** MWH

Lake Powell Pipeline Project
Highway 89 Cockscomb Cut



N
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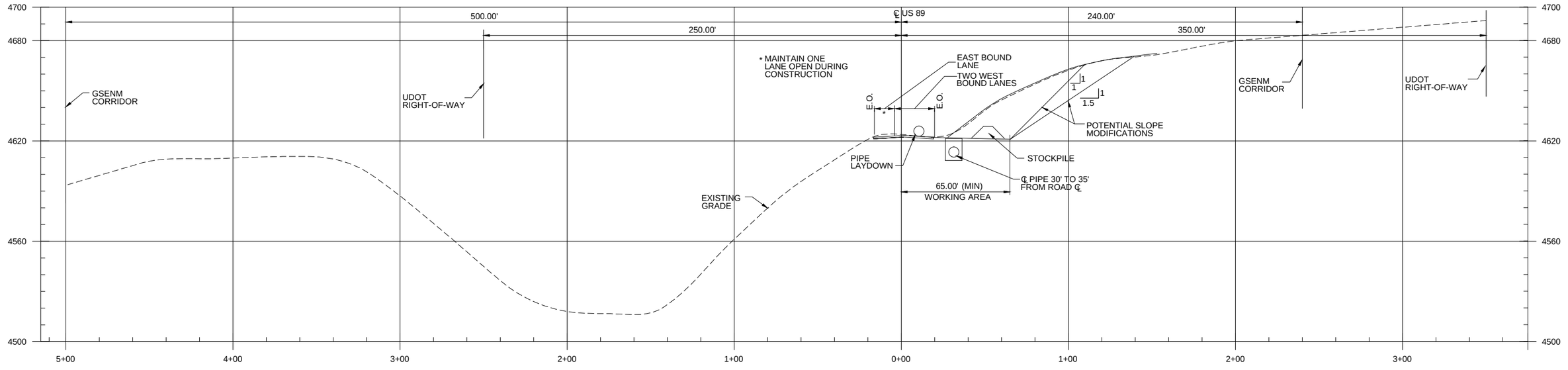
SECTION
STA 1689+80



O
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SECTION
STA 1691+38

HORZ 0 30 60
VERT 0 3 6
SCALE IN FEET

UTAH DIVISION OF WATER RESOURCES
LAKE POWELL PIPELINE PROJECT

UDWRe MWH.

FIGURE
C-2

HIGHWAY 89 COCKSCOMB CUT
CROSS SECTIONS

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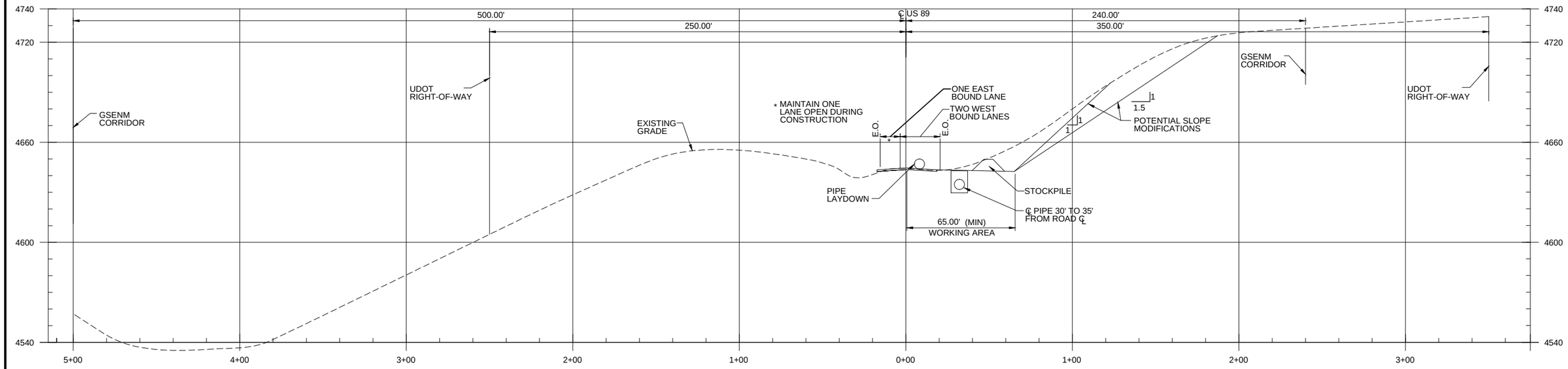

P
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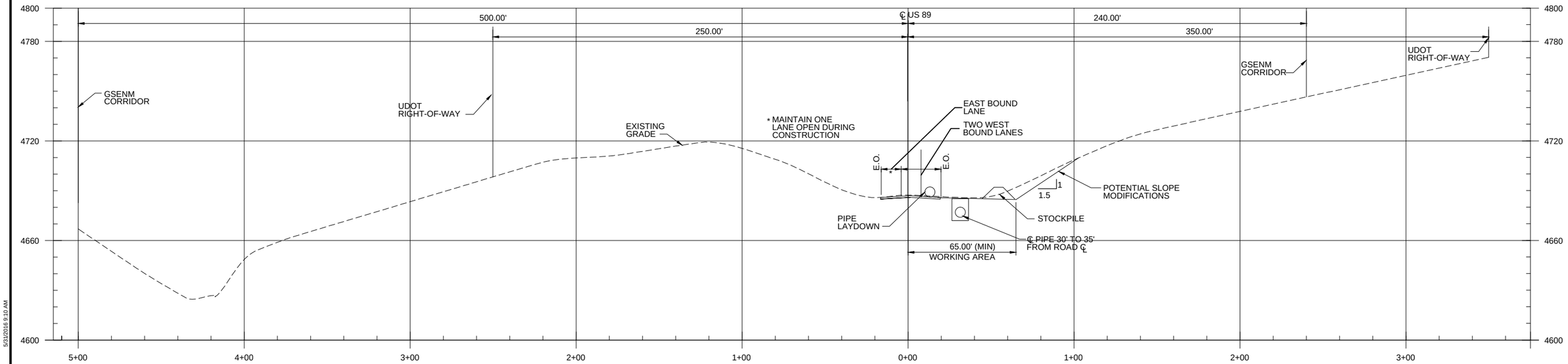
SECTION
STA 1694+55



Q
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SECTION
STA 1699+83

HORZ 0 30 60
VERT 0 3 6
SCALE IN FEET

UTAH DIVISION OF WATER RESOURCES
LAKE POWELL PIPELINE PROJECT

UDWRe MWH.

FIGURE
C-3

HIGHWAY 89 COCKSCOMB CUT
CROSS SECTIONS

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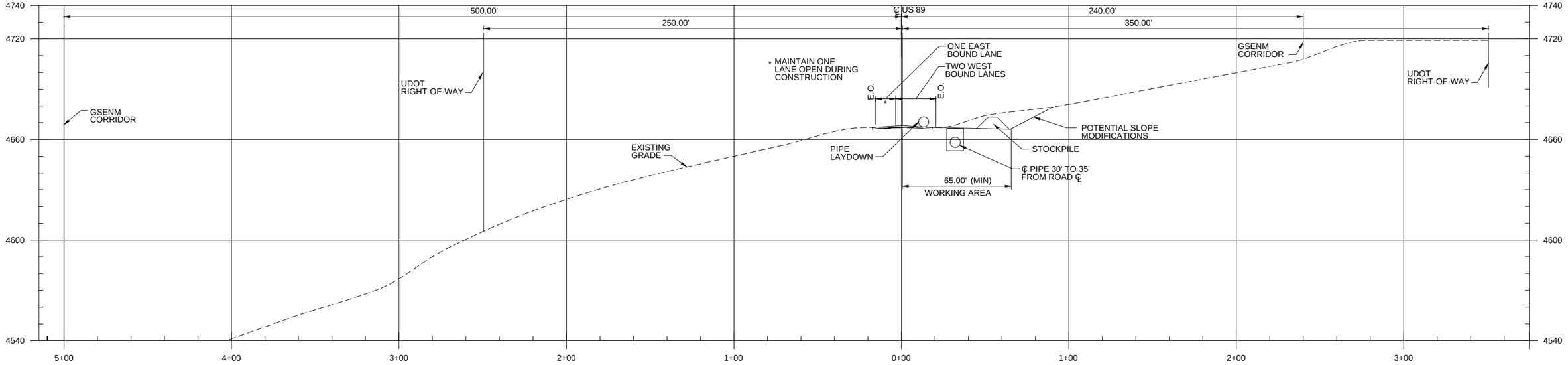

R
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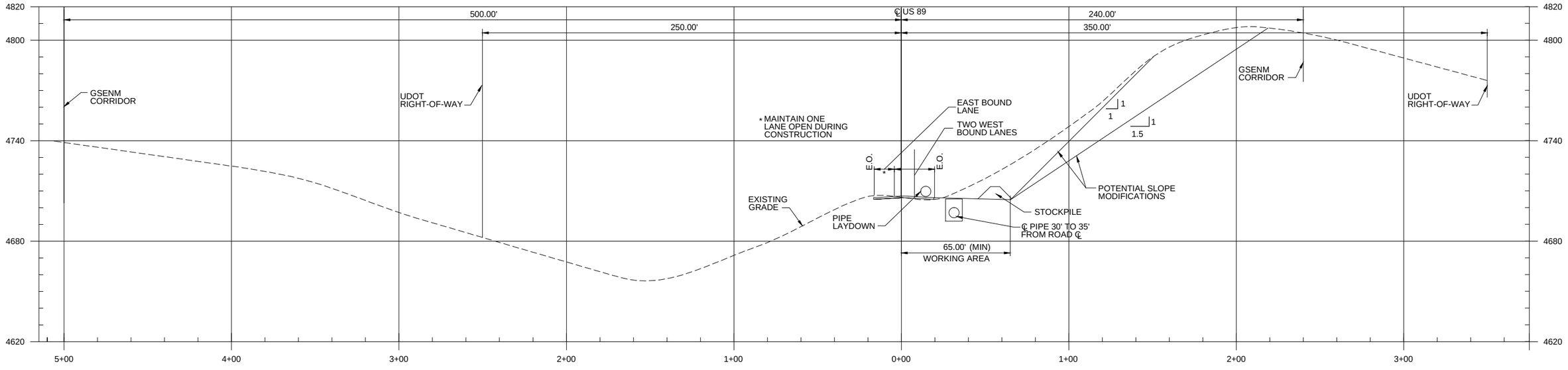
SECTION
STA 1696+66



S
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SECTION
STA 1703+00

HORZ 0 30 60
VERT 0 3 6
SCALE IN FEET

UTAH DIVISION OF WATER RESOURCES
LAKE POWELL PIPELINE PROJECT

UDWRe MWH.

FIGURE
C-4

HIGHWAY 89 COCKSCOMB CUT
CROSS SECTIONS

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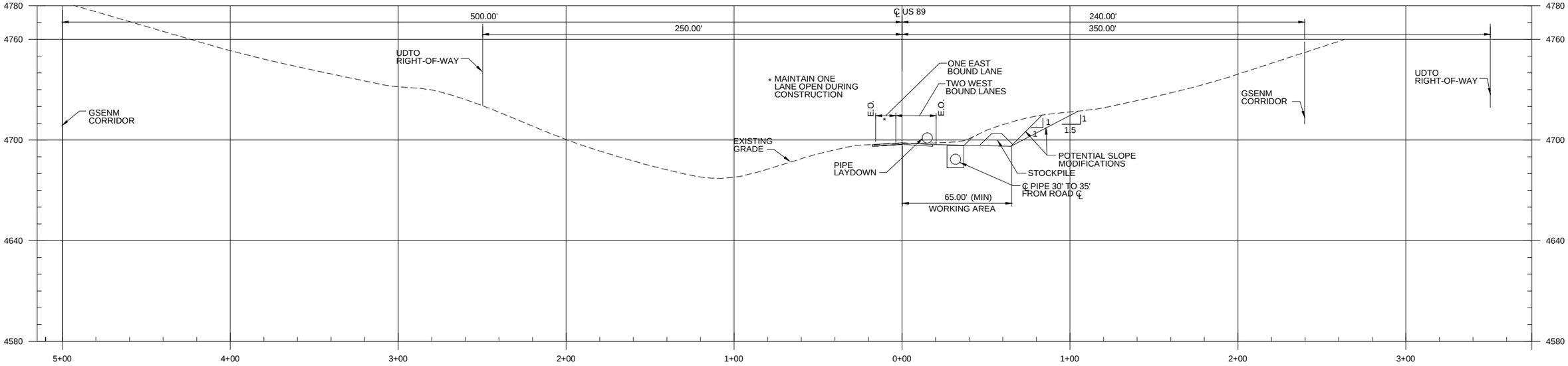

T
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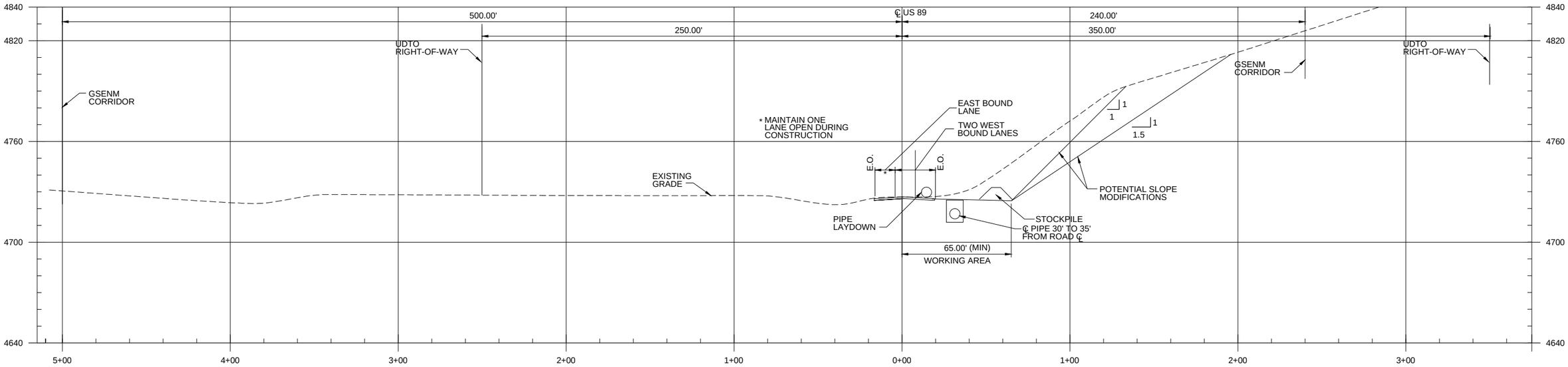
SECTION
STA 1707+75



U
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SECTION
STA 1711+97

HORZ 0 30 60
VERT 0 3 6
SCALE IN FEET

UTAH DIVISION OF WATER RESOURCES
LAKE POWELL PIPELINE PROJECT

UDWRe MWH.

FIGURE
C-5

HIGHWAY 89 COCKSCOMB CUT
CROSS SECTIONS

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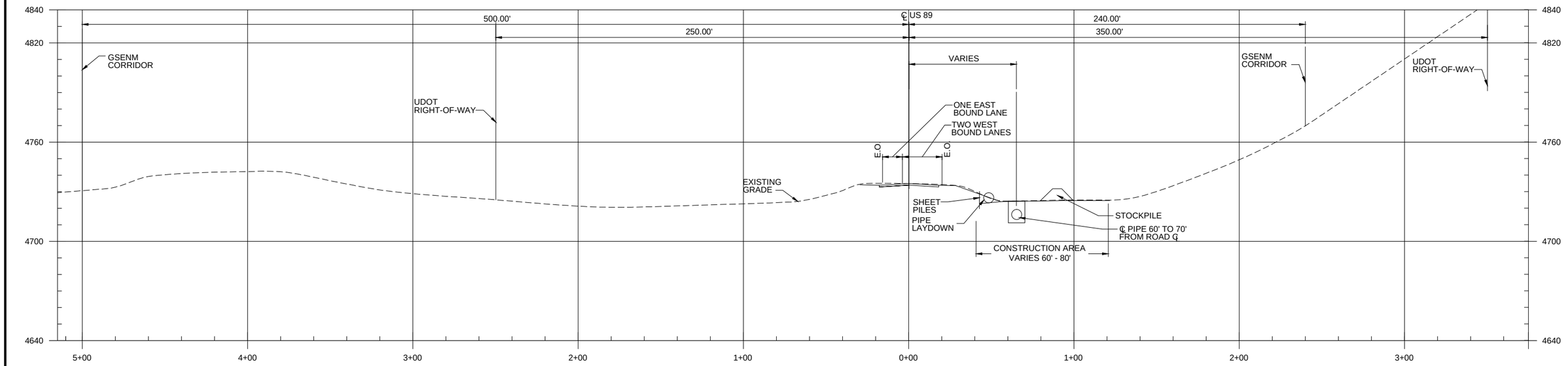

V
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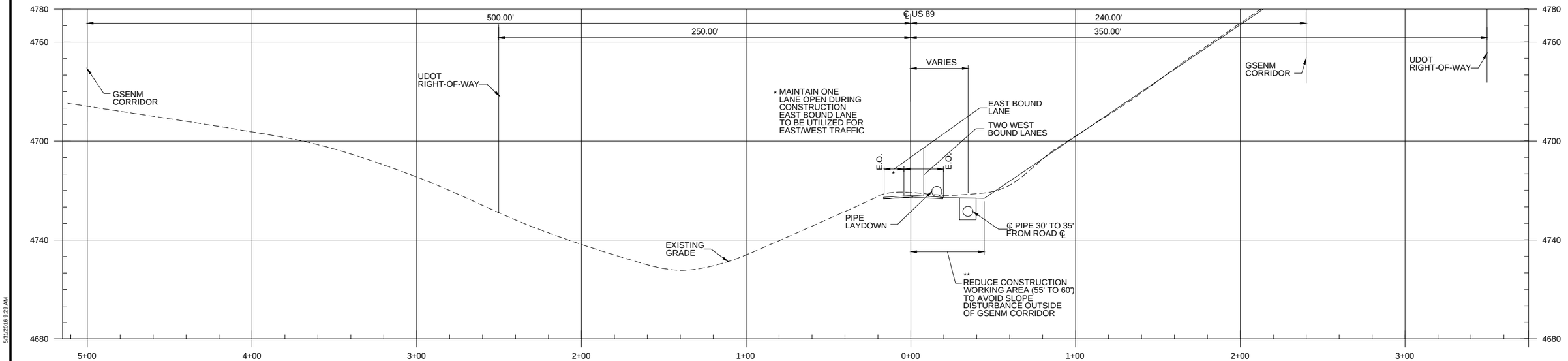
SECTION
STA 1712+50



W
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SECTION
STA 1716+20

UTAH DIVISION OF WATER RESOURCES
LAKE POWELL PIPELINE PROJECT

UDWRe MWH.

FIGURE
C-6

HIGHWAY 89 COCKSCOMB CUT
CROSS SECTIONS

HORZ 0 30 60
VERT 0 3 6
SCALE IN FEET

5/31/2016 9:29 AM BEACHR
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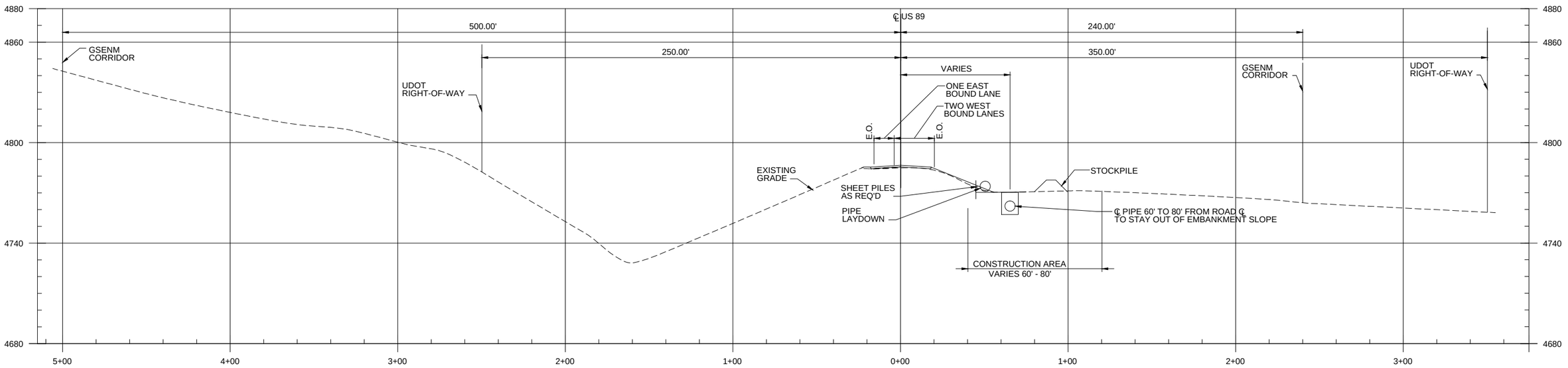

X
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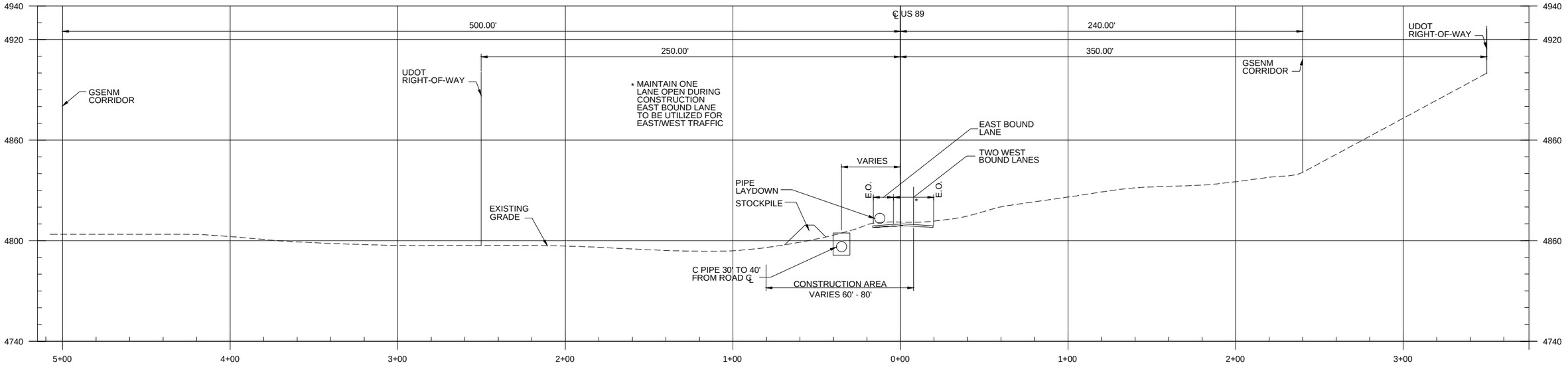
SECTION
STA 1720+95



Y
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SECTION
STA 1729+40

UTAH DIVISION OF WATER RESOURCES
LAKE POWELL PIPELINE PROJECT

UDWRe MWH.

FIGURE
C-7

HORZ 0 30 60
VERT 0 3 6
SCALE IN FEET

HIGHWAY 89 COCKSCOMB CUT
CROSS SECTIONS

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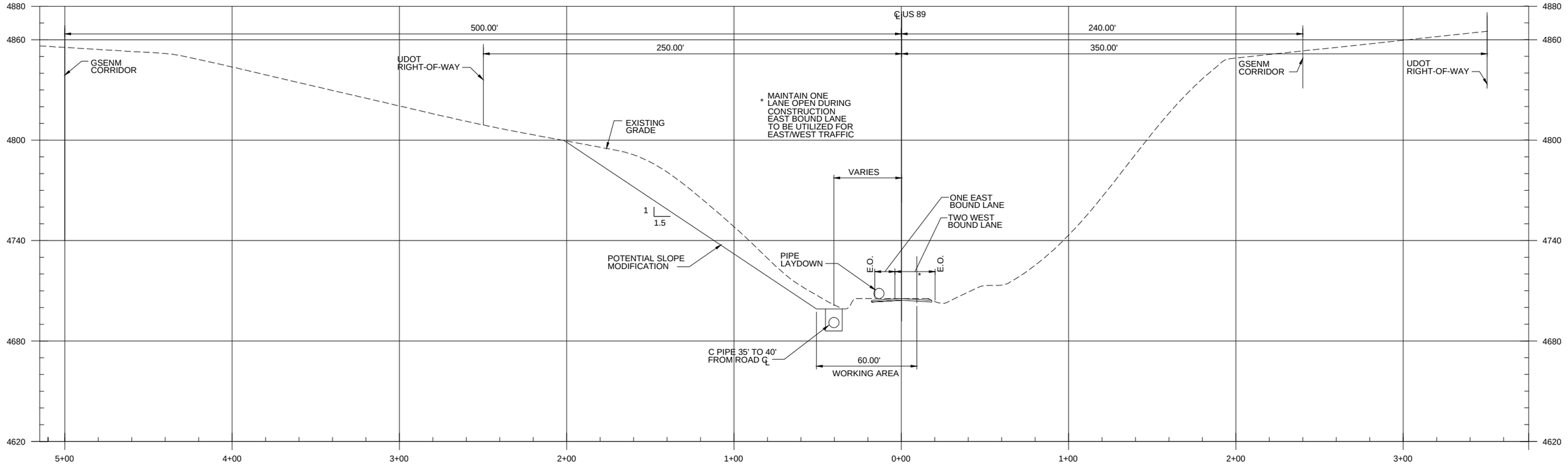

Z
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SECTION
STA 1734+15

HORZ 0 30 60
VERT 0 3 6
SCALE IN FEET

UTAH DIVISION OF WATER RESOURCES
LAKE POWELL PIPELINE PROJECT

UDWRe MWH.

FIGURE
C-8

HIGHWAY 89 COCKSCOMB CUT
CROSS SECTION

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Appendix D
BMPs for Geology and Soil Resources Protection

Appendix D
BMPs for Geology and Soils Resource Protection

All pipelines and associated features will be constructed in accordance with Best Management Practices (BMPs) to avoid any negative impacts on the surrounding areas. It is assumed that site specific BMPs for activities like mobilization, clearing and grubbing, earthwork, stockpile management, landscaping, erosion control, drainage work, temporary stream crossing construction, road construction, dewatering and trenching operations will be implemented during construction. Typical BMPs implemented include, but are not limited to, filter fences, straw bales, interceptor dikes, swales, sediment traps, detention basins, mulching, seeding and/or re-vegetation as applicable. In addition, erosion and sediment control BMPs may be used to prevent sediment and contaminants from entering groundwater. Table D-1 on Page D-2 lists some of the BMPs pertinent to geologic hazards and soils.

Note that these BMPs are intended only to serve as a general guideline for minimizing permanent impact to geologic and soil resources and may not be applicable to every construction scenario. The onsite engineer and/or appropriate regulators should determine the appropriateness of an individual BMP to the construction site.

Table D-1
Geology and Soil Resources Best Management Practices

	BMP	Description
1	Planning	If pipeline and penstock crossings of a fault are identified during detailed geotechnical investigations, additional design features will be considered to ensure pipeline integrity (e.g., flexible couplings, increased pipe wall thickness, pipe sleeves).
2	Planning and Surveying	Soils unsuitable for use as pipeline and penstock backfill will be wasted within the ROW.
3	Surveying	Boundary surveys of the edges of the ROW will be conducted prior to the start of construction. The outer boundaries will be clearly marked with stakes and colored flagging, placed about 100 feet apart or within sight of each adjacent flag. All ground-disturbing activities will be confined to the designated ROW.
4	Access Roads	During construction, all unpaved access roads used by construction personnel, equipment, and materials deliveries will be maintained. At the completion of construction, previously existing access roads will be restored to pre-construction conditions or better. Improvements made for construction will be left in place. In areas of silty soils, the roads will be restored to pre-construction conditions or better.
5	Construction	If blasting is determined to be necessary based on project design, a Blasting Plan will be prepared. . Any blasting will be conducted as unobtrusively as possible and managed to avoid damage to nearby facilities or properties.
6	Erosion and Sediment Control	Erosion and sediment control will be implemented using both non-structural and structural BMPs. Non-structural BMPs are methods or programs such as education, management and development practices, good housekeeping, and construction sequencing. Structural BMPs are physical devices or means for removing, reducing, retarding, or preventing targeted stormwater runoff constituents, pollutants, and contaminants from reaching receiving waters. Typical erosion and sediment control BMPs include: • Siltation or filter berms • Filter or silt fencing • Sediment barriers, e.g., sand bags, hay bales, straw wattles (straw bound into rolls or bales) • Rock or gravel mulches, wood chip, straw & bark mulches • Jute and synthetic netting
7	Soil Stockpile	For soil disturbing actions which will require reclamation, all available growth medium (topsoil) will be salvaged prior to surface disturbances. After completion of clearing and plant salvage activities, the available growth medium and remaining plant material will be windrowed along the edge of the ROW or placed in stockpiles Topsoil stripped from areas with different surface conditions will be stockpiled separately and later used to restore the same areas. All stockpiles will be kept within project ROW.