Exception Request No.: 77 (Rev 1)
Section: WBR3
Town: Woodstock
Highway: US 3 (Tier 2)
Station: 1699+00 to 1704+50
Drawing No.: WBR3 C126
Survey Report Reference No.: WBR3 C121 to C122
Exception Type: Alignment in Pavement
Crossing Over Existing Utility/Drainage

Traffic Information

NHS: No
ADT: 1300
Traffic Control Type: Alt 1-way
Traffic Control Duration: Traffic control duration is estimated to be 7 days for the proposed installation. If the requested exceptions for the alignment and splice enclosure in pavement are not granted, NPT expects an additional 6 days of work requiring traffic control. If the requested exception to cross over the drainage structure is not granted, NPT expects an additional 1-2 weeks of work requiring traffic control to install the ductbank below the culvert at this location.

Summary of Justification for Exception

NPT is requesting an exception from the UAM guidelines for the location of the cable trench in the pavement on US 3, Daniel Webster Highway from station 1699+00 to 1704+50 of the NPT WBR3 Underground Alignment, sheet WBR3. (See Exhibit A.) Construction outside the pavement is not practicable due to limited ROW space outside the pavement and beyond the existing guardrail, and conflicts with utility poles. NPT does not have the necessary property rights to construct outside the NHDOT ROW.

In addition, our exception request in this area includes a crossing above an existing 36-inch RCP culvert at station 1703+25±. There is 8.5 feet of cover over the culvert. The proposed alignment will be set over the existing utility to avoid road closures or other significant traffic impacts, unreasonable costs associated with a deeper excavation and increased construction width which will extend the duration of construction and traffic impacts.

Technical Discussion of Justification of Exception

Alignment in Pavement
The roadway alignment at this location is constrained by guardrails on the east side of US 3 with moderate to steep slopes beyond the guardrails. There are also multiple existing overhead utility poles located behind the guardrail, preventing the alignment from being installed beyond the guardrail due to limited ROW space. Even if NPT were to remove the guardrail during construction, this would not provide sufficient room for construction within the NHDOT ROW.

In the area from 1699+00 to 1701+50 there are two utility poles, one behind the guardrail and one at the end of the guardrail. Even with relocation of the utility poles there is not sufficient space to install the ductbank while maintaining a 5-foot offset from the guardrail and the utility pole. In addition,

modification of the utility poles in this area would require modification of guying on private property outside of the NHDOT ROW.

In the area from 1702+50 to 1704+35 there is a utility pole located behind the guardrail. Even with relocation of the utility poles there is not sufficient space to install the ductbank while maintaining a 5-foot offset from the guardrail and the utility pole.

We also evaluated placing the cable trench alignment on the western side of the road in this area; however, there are construction constraints on the western side of the road, including mature trees in front of residential properties, moderate to steep slopes and houses located on the ROW line, and passing through multiple residential driveways. In addition, moving the alignment to the western side of the road would require two additional highway crossings. NPT submits that any benefits of moving to the opposite side of the road are negated by the additional traffic impacts and additional delays associated with the construction of the road crossings.

Crossing over Existing Utility/Drainage
NPT's exception request includes crossing above an existing 36" RCP culvert on US 3, Daniel Webster Highway at STA 1703+25±. There is 8.5 feet of cover over the culvert. The attached Exhibits A and B have been provided for this location to illustrate the constraints associated with installing the ductbank below the existing culvert.

The vertical positioning of the cable trench is constrained by the depth of the existing culvert. (See Exhibit B). Crossing under the existing culvert to meet the required 2-foot minimum separation will require a greater separation of the conduits and cable to accommodate shoring and thermal design criteria for the electric cables resulting from the additional depth. This trench width and additional offsets necessary for construction would likely require either complete road closures or result in significant traffic impacts, including extended duration of construction within roadway to allow for sheeting installation and removal and extensive excavation due to the depth and width of the trench. We estimate that these construction alternatives will add one to two weeks to the traffic impacts. Finally, we estimate the increase in cost associated with crossing underneath the 36" culvert would be approximately $130,000. (See Exhibit C.) Road closures are not needed for the proposed installation, which thereby minimizes traffic impacts and attendant safety issues.

NPT has also evaluated a trenchless option to pass under the culvert. The trenchless installation will be unreasonably costly (a net estimated increase of $2,069,100 to cross under the culvert). (See cost estimate attached in Exhibit C.) Also, traffic impacts would be increased for a trenchless installation due to the addition of trenchless work areas and the extended duration of installation.

Excavation limits and work areas are shown on the attached drawings. See Exhibits A and B. During construction, one lane will remain open to traffic at all times.

<u>Impacts</u>

Alignment in Pavement
The design, as proposed, will not adversely affect the design, construction, stability, traffic, safety, environmental commitments, maintenance, or operation of the highway. The alignment has been located 5-feet off the edge of the guardrail, to avoid future conflicts with guardrail repairs or replacement or disruption to the existing guardrail system. The installation of the ductbank and

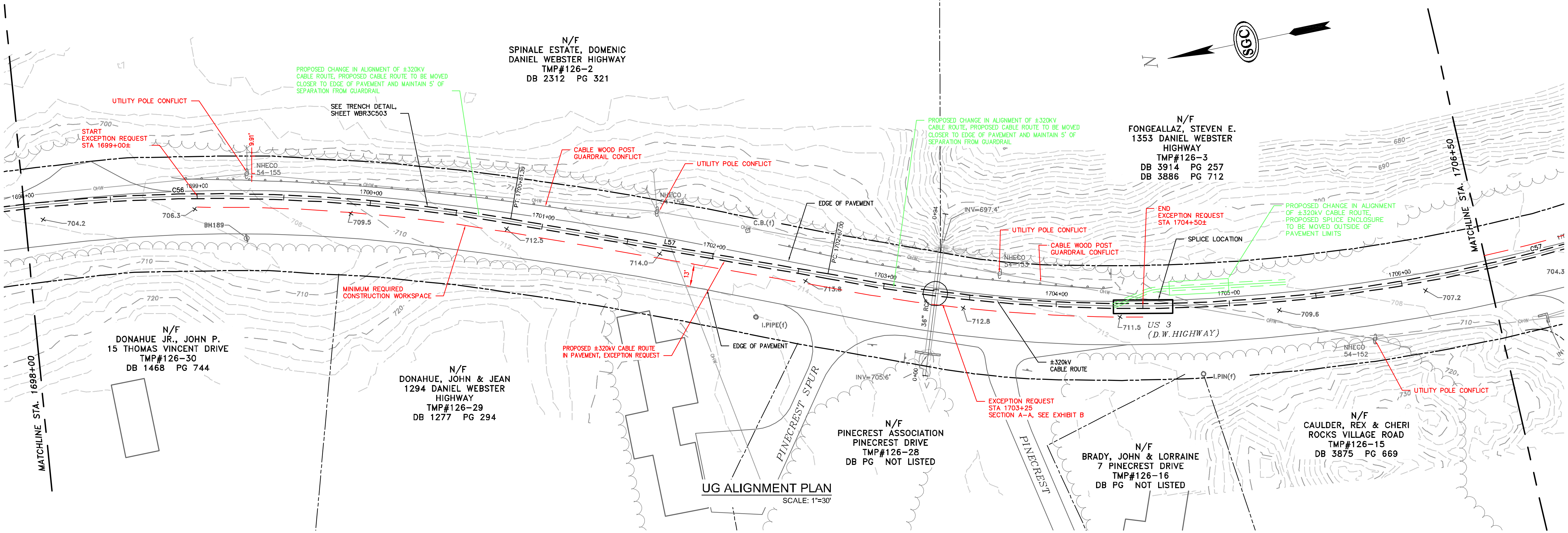
pavement restoration will be designed and constructed in accordance with conditions outlined in the NHDOT's April 3, 2017 letter to the New Hampshire Site Evaluation Committee. The installation's proposed depth meets NHDOT's criteria relating to the structural box to minimize any potential conflicts with maintenance and future highway projects. A traffic control plan has been submitted to the NHDOT for this design and complies with the Manual on Uniform Traffic Control Devices.

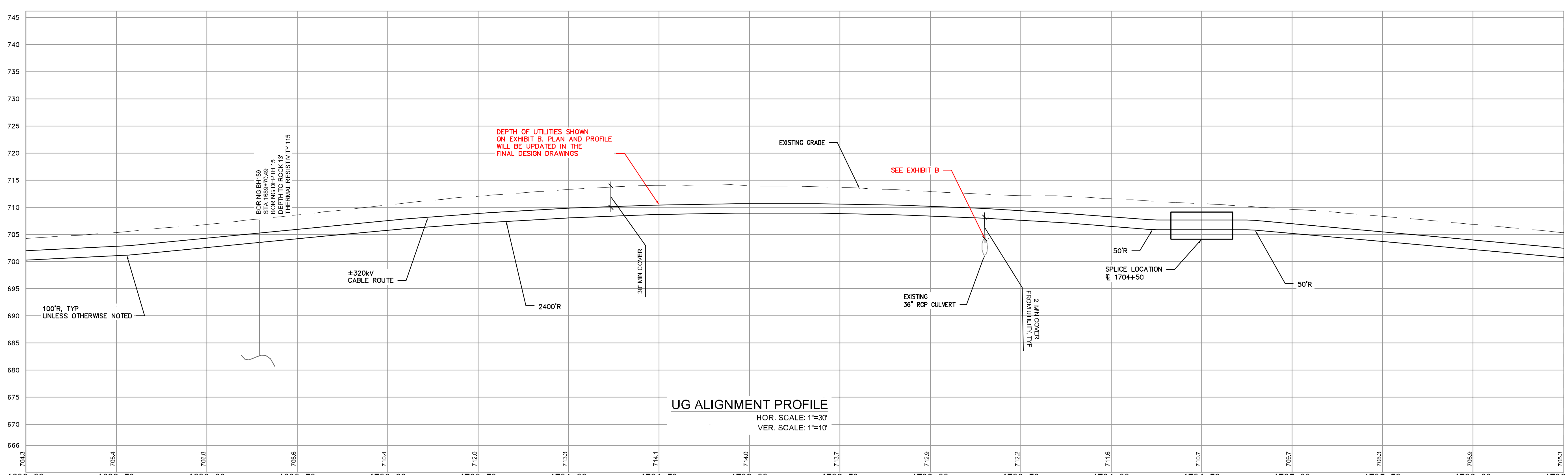
Crossing Over Existing Utility/Drainage
At all locations where the new ductbank is constructed over an existing drainage structure or utility, NPT will encase the facility in a concrete ductbank reinforced with rebar for a length to exceed a 2:1 slope from the bottom/center of the drainage structure (or utility) to the surface. At a minimum, this will involve a 20-foot reinforced section on each side of the crossing to form a self-sustaining bridge that will allow for excavation under the duct bank for purposes of future maintenance of existing utilities or drainage structures. This reinforced concrete duct bank shall be designed by a Professional Engineer licensed in the State of New Hampshire. In connection with future maintenance activities, especially related to the culvert, NPT will provide any and all required support, including but not limited to, providing crews to assist while work is being conducted in the vicinity of the culvert.

<u>Supporting Documentation</u>

Alignment in Pavement
See attached Exhibits A showing a plan and section.

Crossing Over Existing Utility/Drainage
See attached Exhibits A and B showing a plan, profile and section for the proposed installation, and Exhibit C for cost estimates.


N/F
SPINALE ESTATE, DOMENIC
DANIEL WEBSTER HIGHWAY
TMP#126-2
DB 2312 PG 321
PROPOSED CHANGE IN ALIGNMENT OF ±320KV CABLE ROUTE, PROPOSED CABLE ROUTE TO BE MOVED CLOSER TO EDGE OF PAVEMENT AND MAINTAIN 5' OF SEPARATION FROM GUARDRAIL
UTILITY POLE CONFLICT
START EXCEPTION REQUEST STA 1699+00±
SEE TRENCH DETAIL, SHEET WBR3C503
CABLE WOOD POST GUARDRAIL CONFLICT
UTILITY POLE CONFLICT
EDGE OF PAVEMENT
MINIMUM REQUIRED CONSTRUCTION WORKSPACE
PROPOSED ±320kV CABLE ROUTE IN PAVEMENT, EXCEPTION REQUEST
EDGE OF PAVEMENT
N/F
DONAHUE JR., JOHN P.
15 THOMAS VINCENT DRIVE
TMP#126-30
DB 1468 PG 744
N/F
DONAHUE, JOHN & JEAN
1294 DANIEL WEBSTER HIGHWAY
TMP#126-29
DB 1277 PG 294
MATCHLINE STA. 1698+00
PINECREST SPUR
N/F
PINECREST ASSOCIATION
PINECREST DRIVE
TMP#126-28
DB PG NOT LISTED
PINECREST
UG ALIGNMENT PLAN
SCALE: 1"=30'
PROPOSED CHANGE IN ALIGNMENT OF ±320KV CABLE ROUTE, PROPOSED CABLE ROUTE TO BE MOVED CLOSER TO EDGE OF PAVEMENT AND MAINTAIN 5' OF SEPARATION FROM GUARDRAIL
N/F
FONGEALLAZ, STEVEN E.
1353 DANIEL WEBSTER HIGHWAY
TMP#126-3
DB 3914 PG 257
DB 3886 PG 712
END EXCEPTION REQUEST STA 1704+50±
PROPOSED CHANGE IN ALIGNMENT OF ±320kV CABLE ROUTE, PROPOSED SPLICE ENCLOSURE TO BE MOVED OUTSIDE OF PAVEMENT LIMITS
SPLICE LOCATION
UTILITY POLE CONFLICT
CABLE WOOD POST GUARDRAIL CONFLICT
±320kV CABLE ROUTE
US 3
(D.W. HIGHWAY)
EXCEPTION REQUEST STA 1703+25 SECTION A-A, SEE EXHIBIT B
N/F
BRADY, JOHN & LORRAINE
7 PINECREST DRIVE
TMP#126-16
DB PG NOT LISTED
UTILITY POLE CONFLICT
N/F
CAULDER, REX & CHERI
ROCKS VILLAGE ROAD
TMP#126-15
DB 3875 PG 669
MATCHLINE STA. 1706+50
N


DEPTH OF UTILITIES SHOWN ON EXHIBIT B. PLAN AND PROFILE WILL BE UPDATED IN THE FINAL DESIGN DRAWINGS
EXISTING GRADE
SEE EXHIBIT B
BORING BH189 STA 1699+70.49 BORING DEPTH 15' DEPTH TO ROCK 13' THERMAL RESISTIVITY 115
±320kV CABLE ROUTE
100'R, TYP UNLESS OTHERWISE NOTED
2400'R
30" MIN COVER
EXISTING 36" RCP CULVERT
2' MIN COVER FROM UTILITY TYP
50'R
SPLICE LOCATION ℄ 1704+50
50'R
UG ALIGNMENT PROFILE
HOR. SCALE: 1"=30'
VER. SCALE: 1"=10'
1698+00 1698+50 1699+00 1699+50 1700+00 1700+50 1701+00 1701+50 1702+00 1702+50 1703+00 1703+50 1704+00 1704+50 1705+00 1705+50 1706+00 1706+50

HOR. SCALE: 1" = 30'

VERT. SCALE: 1" = 10'

PRELIMINARY - NOT FOR CONSTRUCTION

NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
0	EXCEPTION REQUEST	05/22/17	TDD	MRR	TMH

SGC Engineering, LLC

PAR ELECTRICAL CONTRACTORS, INC.

THE NORTHERN PASS

Transmission Business

EXCEPTION 77 - ALIGNMENT IN PAVEMENT AND CROSSING OVER EXISTING UTILITY/DRAINAGE: NPT WBR3 - UNDERGROUND ALIGNMENT WBR3 SECTION - STA 1699+00 TO STA 1704+50

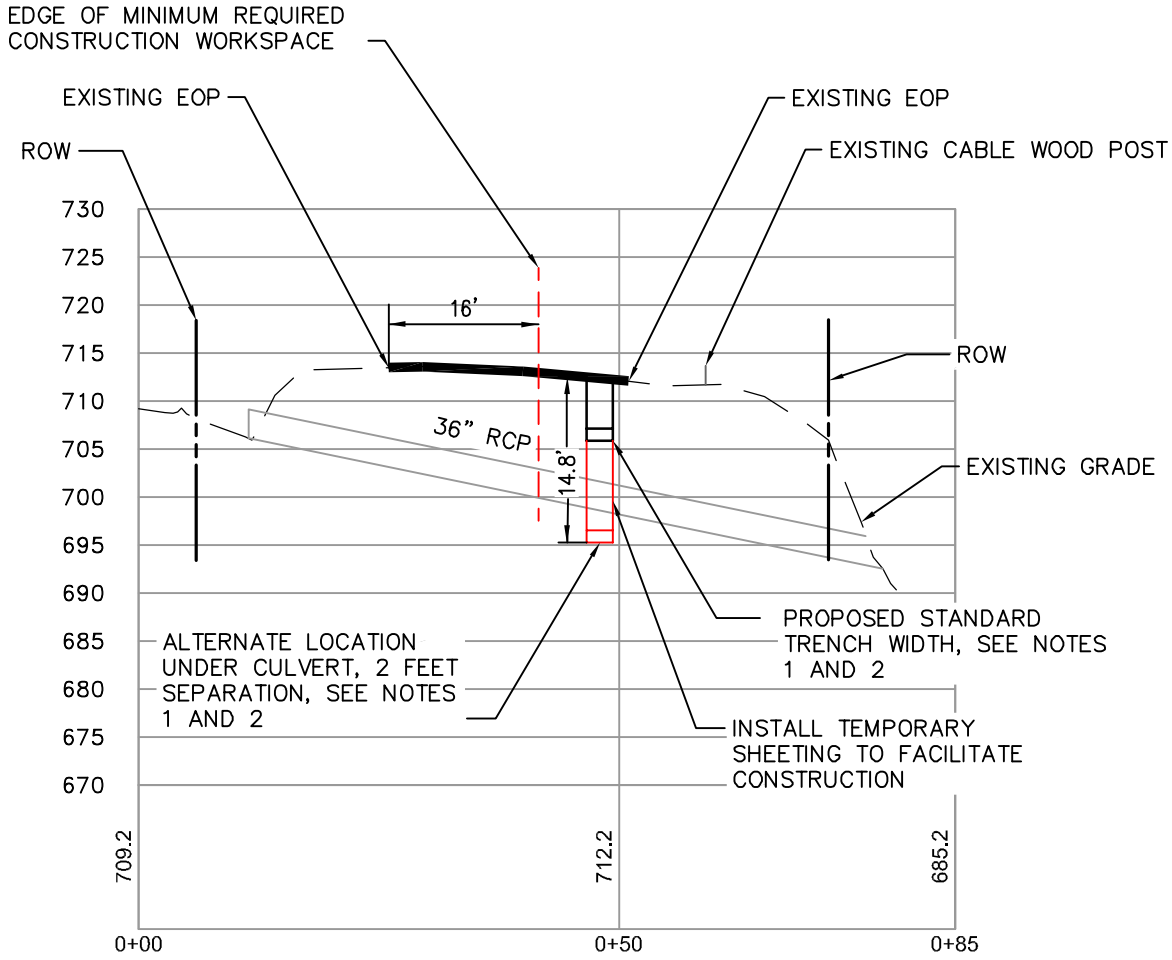
DATE: 05/2017

DES: MRR | CHK: TDD
DRW: BGC | APR: TMH

TOWN: WOODSTOCK

TRANSMISSION LINE: WBR3

EXHIBIT A



SECTION A-A

SCALE: 1"=20'

SCALE: 1" = 20'

20 10 0 20 40

NOTES:

1. TRENCH WIDTH SHOWN TO BE MAINTAINED USING TRENCH JACKS AND SHEETING.
2. PROPOSED CABLE ROUTE TO BE MOVED CLOSER TO EDGE OF PAVEMENT AND MAINTAIN 5 FEET OF SEPARATION FROM THE GUARDRAIL. CHANGE IN ALIGNMENT WILL PROVIDE ADDITIONAL ROOM FOR WORKSPACE AND MAINTENANCE OF TRAFFIC.

JOB NO.: 1384001

TITLE:

EXCEPTION 77
CROSSING OVER DRAINAGE STRUCTURE
WBR3 SECTION-STA 1703+25±
TOWN: WOODSTOCK

PREPARED FOR:

NH DOT
7 HAZEN DRIVE
CONCORD, NH

REVISIONS:

NO.	DATE	EXCEPTION REQUEST
0	05/23/2017	

SGC ENGINEERING, LLC
• Civil Design & Survey Engineering
• Environmental & Regulatory Permitting
• Electrical Power Systems Engineering
SERVING OUR CLIENTS IN THE U.S.A. & CANADA
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40 Harlow Street, Suite 2, Bangor, Maine 04401, Tel: 207-217-5769, Fax: 207-217-6018
14 School Street, Suite 203-5, Bristol, VT 05443, Tel: 802-735-0258
Galleria Tower 1, Suite 2478, 2700 Post Oak Boulevard, Houston, TX 77056

EXHIBIT NO.: B	DATE: 05/2017	DRAWN: BGC	SCALE: 1" = 20'

Exhibit C - Exception 77 Cost Estimates

Additional Cost for Trenching Under 36" RCP

Length	200			
Max Depth	14.8			
Min Depth	6.7'			
	Quantity	Units	Unit Price	Total
Trench Cost for Deeper Trench	200	LF	$800.00	$160,000.00
Deduct for Base Trench Cost	200	LF	$150.00	($30,000.00)
Net Additional Cost				$130,000.00

1. Cost assumes rock excavation not required.
2. Costs based on contractual unit pricing for the project.
3. 200 foot minimum length required for the trenching installation is required to accommodate the gradual slope necessary to accommodate the minimum bend.

Additional Cost for Installing HDD Under Culvert

Length	900			
Max Depth	20'			
Min Depth	6.7'			
	Quantity	Units	Unit Price	Total
HDD (2-8" Bores)	900	LF	$2,490.00	$2,241,000.00
Deduct for Base Trench Cost	900	LF	$150.00	($135,000.00)
Deduct for Surface Restoration	900	LF	$41.00	($36,900.00)
Net Additional Cost				$2,069,100.00

1. Cost assumes rock excavation not required.
2. Costs based on contractual unit pricing for the project.
3. 900 foot minimum length required for HDD installation to accommodate minimum bending requirements.