

MUSCATINE CO.

SLIDE REPAIR

LETTING DATE  
03-15-2022

STPN-006-8(41)--2J-70



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C.2	Tabulations
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<b>J Sheets</b>	<b>Traffic Control and Staging Sheets</b>
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PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

MUSCATINE COUNTY

SLIDE REPAIR

1.2 m1 E of Co Rd X46 to 1.1 m1 W of IA 38 (2 Locations)

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



For Project Location Map  
Refer to Sheet No. A.02

REVISIONS

TOTAL	
18	
PROJECT IDENTIFICATION NUMBER	
19-70-006-010	
PROJECT NUMBER	
STPN-006-8(41)--2J-70	
R.O.W. PROJECT NUMBER	
STPN-006-8(42)--2J-70	

DESIGN DATA RURAL				
2019	AADT	1870	V.P.D.	
20--	AADT	--	V.P.D.	
20--	DHV	--	V.P.H.	
TRUCKS		7	%	
Total				
Design ESALs		--		

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	Paul W. Flattery	Primary Signature Block
CS.1	Mark A. Dell	Geotechnical Design

ROADWAY DESIGN	
	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.
	01-04-2022 Date
	Signature
	Printed or Typed Name
My license renewal date is December 31, 2023	
Pages or sheets covered by this seal: A.1-A.2, C.1-C.2, D.1-D.5, J.1	



ESTIMATED PROJECT QUANTITIES AND REFERENCE NOTES

Roadway Items : Roadway Items

Item no.	Item Code	Item	Unit	Quantities	Estimate Reference Notes
				Estimated	
				Roadway Items	
1	2102-2710090	EXCAVATION, CLASS 10, WASTE	CY	261	See Tab. 103-12 in the CS Sheets and the Q Sheets for locations and details.  Overhaul will not be measured or paid for, but shall be considered incidental to excavation on this project.
2	2505-6000111	HIGH TENSION CABLE GUARDRAIL	LF	350	See Tab. 108-9A for locations and details.
3	2505-6000121	HIGH TENSION CABLE GUARDRAIL, END ANCHOR	EACH	2	
4	2507-2638620	MACADAM STONE SLOPE PROTECTION	SY	240	See Tab. 103-12 in the CS Sheets and the Q Sheets for locations and details.
5	2507-3250005	ENGINEERING FABRIC	SY	526	See Tab. 100-23 and Tab. 103-12 in the CS Sheets and the Q Sheets for locations and details.
6	2507-6800021	REVETMENT, CLASS B	TON	220	See Tab. 103-12 in the CS Sheets and the Q Sheets for locations and details.
7	2507-6800061	REVETMENT, CLASS E	TON	34	See Tab. 100-23 in the CS Sheets and the Q Sheets for locations and details.
8	2507-8029000	EROSION STONE	TON	465	See Tab. 103-12 in the CS Sheets and the Q Sheets for locations and details.
9	2526-8285000	CONSTRUCTION SURVEY	LS	1	
10	2528-8445110	TRAFFIC CONTROL	LS	1	
11	2533-4980005	MOBILIZATION	LS	1	

## PROJECT DESCRIPTION

This project is for repairs at 2 locations on US 6 in Muscatine County. The first site will involve installing a rock flume for scour protection and the second site will involve repairing the foreslope and adding scour protection and cable guardrail.

100-1D  
10-18-05

## STANDARD ROAD PLANS

105-4  
10-18-11

The following Standard Road Plans apply to construction work on this project.

[illegible]

## HIGH TENSION CABLE GUARDRAIL

① Lane(s) to which the installation is adjacent.

Refer to BA-351.

108-9A  
04-20-10

[illegible]

**UTILITIES**  
**(NOT A POINT 25 PROJECT)**

This is NOT a POINT 25 project and is not subject to the provisions of IAC 761-115.25.

262-6  
0-18-05

100-23  
04-17-18

ROCK EROSION CONTROL

Refer to EC-301 and Detail 570-8

Location				L	W	Rock Erosion Control (REC)					Material Bid Quantities			Remarks
Road Identification	Begin Station	End Station	Side			Type 1	Type 2	Type 3	Type 4	Type 5	Eng. Fabric	Class E Revetment	Erosion Stone	
						Rock Ditch Check	Rock Ditch	Rock Flume	Rock Splash Basin	Rock Slope Protection	SY	TON	TON	
US 6	699+49.00	699+74.00	Rt	43	6			x			32.0	34.0		

103-12  
MOD

SLIDE REPAIR

Site No.	Location		Side	Class 13 Excavation Waste	Embankment-in-Place	Excavation, Class 10		Class "B" Revetment	Engineering Fabric	Erosion Stone	Gra. Material Blankets & Subdrain	Macadam Stone Slope Protection	Topsoil		Remarks
	Begin Sta.	End Sta.				Roadway and Borrow	Waste						Furnish & Spread	Strip, Salvage & Spread	
						CY	CY						CY	CY	
2	901+70.00	902+40.00					261	220	494	465		240			

GEOTECHNICAL DESIGN

LICENSED PROFESSIONAL ENGINEER

Mark A. Dell

21208

IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature

Mark A. Dell

Date

8/30/21

Printed or Typed Name

Mark A. Dell

My license renewal date is December 31, 2021

Pages or sheets covered by this seal:

CS.1, Q.1-4, W.1-3

FILE NO.

ENGLISH

DESIGN TEAM MEGIVERN\DELL\MOYLE

MUSCATINE COUNTY

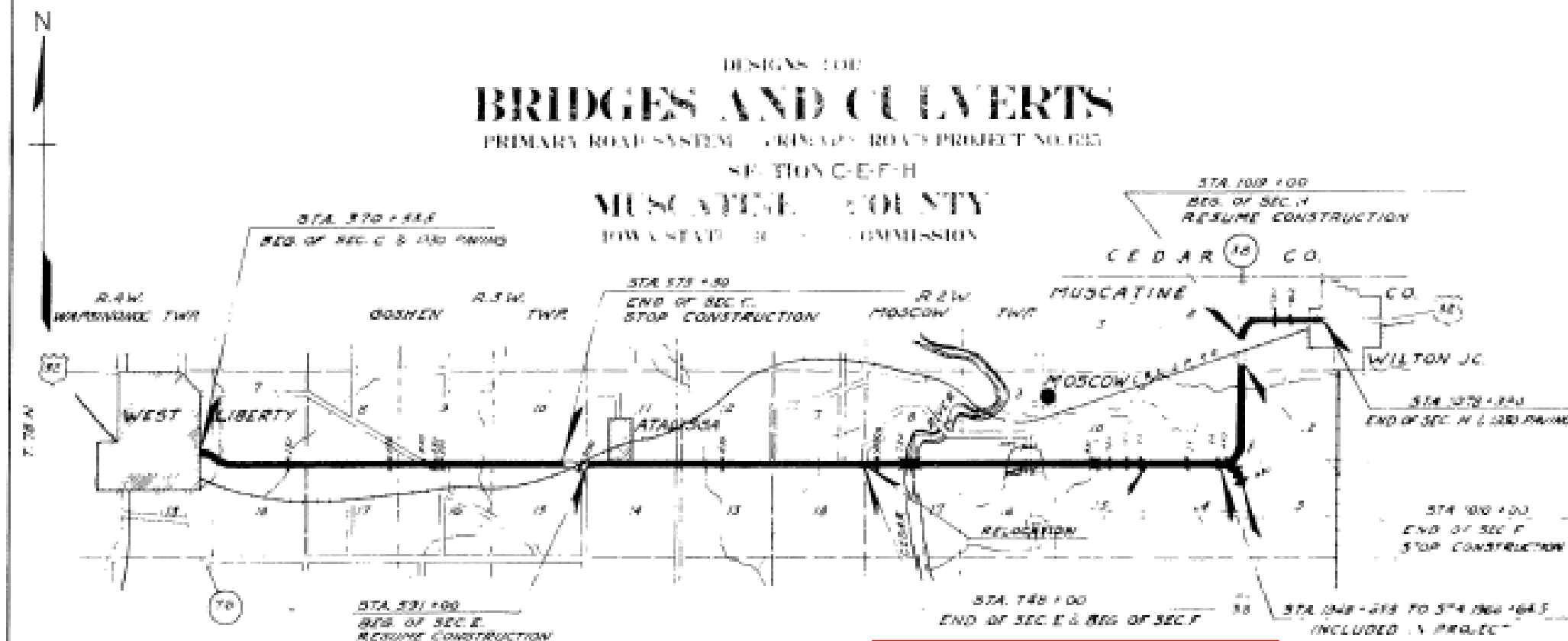
PROJECT NUMBER STPN-006-8(41)--2J-70

SHEET NUMBER CS.1

8/30/2021 7:07:29 AM gmoyle c:\pw\_work\pwwork\gmoyle\00934169\70006041.xlsm



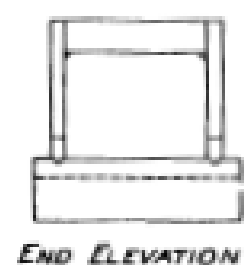
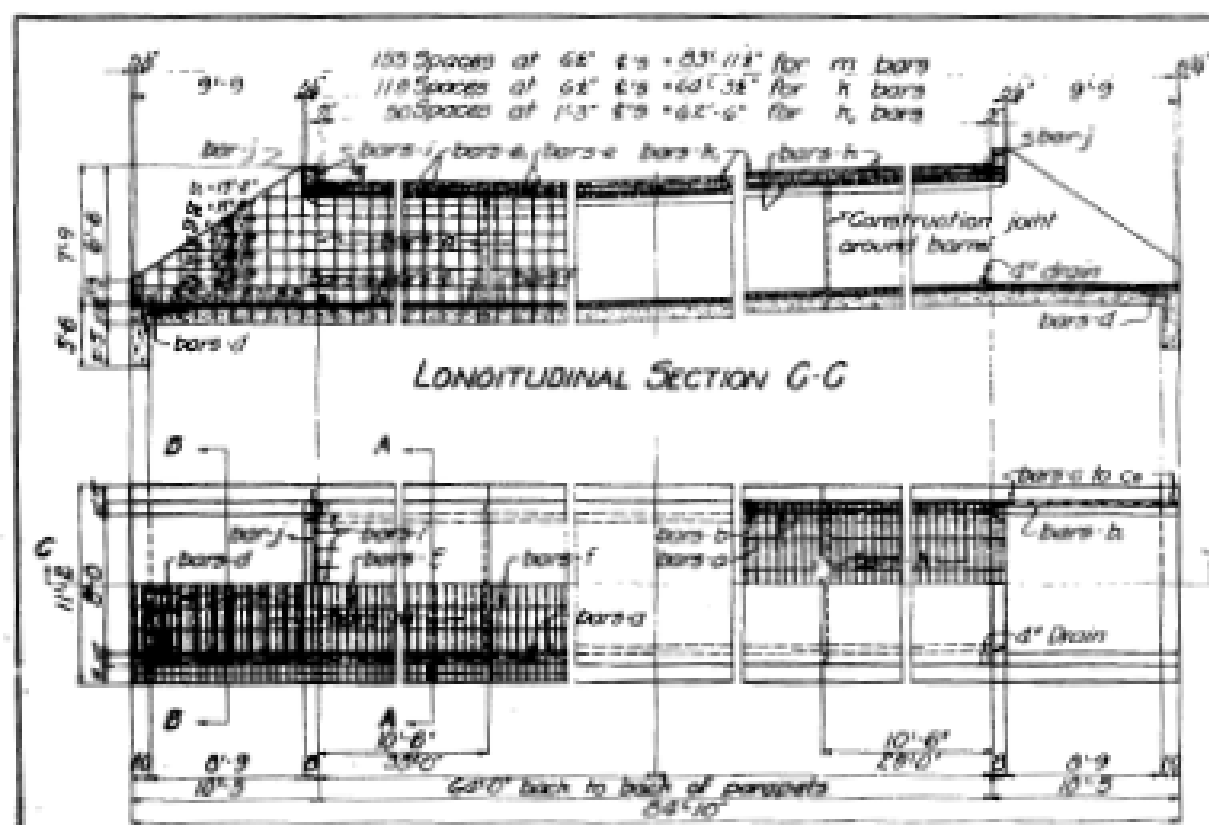
FROM A SCOTTISH ... COMMISSIONER

[illegible]

This Sheet  
For Information Only

CONVENTIONAL	SALES
City Limits	_____
County Lines	_____
Section Lines	_____
Railroads	_____
Highways	_____
Waterways	_____
Topographical Lines	_____

Approved: \_\_\_\_\_ Date: \_\_\_\_\_  
Chief Engineer - Island Highway Commission  
Municipal Co. Bureau Eng. Dept.



ALL REINFORCING STEEL QUANTITIES									
Description	Bar	Length	Area	Weight	Description	Bar	Length	Area	Weight
Right Vertical	a	130	1.0	20.0	Right Long Center	b	24	1.0	2.0
Left Vertical	b	24	1.0	2.0	Left Long Center	c	24	1.0	2.0
Right Long Center	c	24	1.0	2.0	Right Long End	d	20	1.0	2.0
Left Long Center	d	20	1.0	2.0	Left Long End	e	16	1.0	1.0
Right Long End	e	16	1.0	1.0	Right Long Center	f	16	1.0	1.0
Left Long End	f	16	1.0	1.0	Left Long Center	g	16	1.0	1.0
Right Long Center	g	16	1.0	1.0	Right Long End	h	12	1.0	1.0
Left Long Center	h	12	1.0	1.0	Left Long End	i	12	1.0	1.0
Right Long End	i	12	1.0	1.0	Right Long Center	j	12	1.0	1.0
Left Long End	j	12	1.0	1.0	Left Long Center	k	12	1.0	1.0
Right Long Center	k	12	1.0	1.0	Right Long End	l	12	1.0	1.0
Left Long Center	l	12	1.0	1.0	Left Long End	m	12	1.0	1.0
Right Long End	m	12	1.0	1.0	Right Long Center	n	12	1.0	1.0
Left Long Center	n	12	1.0	1.0	Left Long End	o	12	1.0	1.0
Right Long End	o	12	1.0	1.0	Right Long Center	p	12	1.0	1.0
Left Long Center	p	12	1.0	1.0	Left Long End	q	12	1.0	1.0
Right Long End	q	12	1.0	1.0	Right Long Center	r	12	1.0	1.0
Left Long Center	r	12	1.0	1.0	Left Long End	s	12	1.0	1.0
Right Long End	s	12	1.0	1.0	Right Long Center	t	12	1.0	1.0
Left Long Center	t	12	1.0	1.0	Left Long End	u	12	1.0	1.0
Right Long End	u	12	1.0	1.0	Right Long Center	v	12	1.0	1.0
Left Long Center	v	12	1.0	1.0	Left Long End	w	12	1.0	1.0
Right Long End	w	12	1.0	1.0	Right Long Center	x	12	1.0	1.0
Left Long Center	x	12	1.0	1.0	Left Long End	y	12	1.0	1.0
Right Long End	y	12	1.0	1.0	Right Long Center	z	12	1.0	1.0
Left Long Center	z	12	1.0	1.0	Left Long End	aa	12	1.0	1.0
Right Long End	aa	12	1.0	1.0	Right Long Center	ab	12	1.0	1.0
Left Long Center	ab	12	1.0	1.0	Left Long End	ac	12	1.0	1.0
Right Long End	ac	12	1.0	1.0	Right Long Center	ad	12	1.0	1.0
Left Long Center	ad	12	1.0	1.0	Left Long End	ae	12	1.0	1.0
Right Long End	ae	12	1.0	1.0	Right Long Center	af	12	1.0	1.0
Left Long Center	af	12	1.0	1.0	Left Long End	ag	12	1.0	1.0
Right Long End	ag	12	1.0	1.0	Right Long Center	ah	12	1.0	1.0
Left Long Center	ah	12	1.0	1.0	Left Long End	ai	12	1.0	1.0
Right Long End	ai	12	1.0	1.0	Right Long Center	aj	12	1.0	1.0
Left Long Center	aj	12	1.0	1.0	Left Long End	ak	12	1.0	1.0
Right Long End	ak	12	1.0	1.0	Right Long Center	al	12	1.0	1.0
Left Long Center	al	12	1.0	1.0	Left Long End	am	12	1.0	1.0
Right Long End	am	12	1.0	1.0	Right Long Center	an	12	1.0	1.0
Left Long Center	an	12	1.0	1.0	Left Long End	ao	12	1.0	1.0
Right Long End	ao	12	1.0	1.0	Right Long Center	ap	12	1.0	1.0
Left Long Center	ap	12	1.0	1.0	Left Long End	aq	12	1.0	1.0
Right Long End	aq	12	1.0	1.0	Right Long Center	ar	12	1.0	1.0
Left Long Center	ar	12	1.0	1.0	Left Long End	as	12	1.0	1.0
Right Long End	as	12	1.0	1.0	Right Long Center	at	12	1.0	1.0
Left Long Center	at	12	1.0	1.0	Left Long End	au	12	1.0	1.0
Right Long End	au	12	1.0	1.0	Right Long Center	av	12	1.0	1.0
Left Long Center	av	12	1.0	1.0	Left Long End	aw	12	1.0	1.0
Right Long End	aw	12	1.0	1.0	Right Long Center	ax	12	1.0	1.0
Left Long Center	ax	12	1.0	1.0	Left Long End	ay	12	1.0	1.0
Right Long End	ay	12	1.0	1.0	Right Long Center	az	12	1.0	1.0
Left Long Center	az	12	1.0	1.0	Left Long End	ba	12	1.0	1.0
Right Long End	ba	12	1.0	1.0	Right Long Center	bb	12	1.0	1.0
Left Long Center	bb	12	1.0	1.0	Left Long End	bc	12	1.0	1.0
Right Long End	bc	12	1.0	1.0	Right Long Center	bd	12	1.0	1.0
Left Long Center	bd	12	1.0	1.0	Left Long End	be	12	1.0	1.0
Right Long End	be	12	1.0	1.0	Right Long Center	bf	12	1.0	1.0
Left Long Center	bf	12	1.0	1.0	Left Long End	bg	12	1.0	1.0
Right Long End	bg	12	1.0	1.0	Right Long Center	bh	12	1.0	1.0
Left Long Center	bh	12	1.0	1.0	Left Long End	bi	12	1.0	1.0
Right Long End	bi	12	1.0	1.0	Right Long Center	bj	12	1.0	1.0
Left Long Center	bj	12	1.0	1.0	Left Long End	bk	12	1.0	1.0
Right Long End	bk	12	1.0	1.0	Right Long Center	bl	12	1.0	1.0
Left Long Center	bl	12	1.0	1.0	Left Long End	bm	12	1.0	1.0
Right Long End	bm	12	1.0	1.0	Right Long Center	bn	12	1.0	1.0
Left Long Center	bn	12	1.0	1.0	Left Long End	bo	12	1.0	1.0
Right Long End	bo	12	1.0	1.0	Right Long Center	bp	12	1.0	1.0
Left Long Center	bp	12	1.0	1.0	Left Long End	bq	12	1.0	1.0
Right Long End	bq	12	1.0	1.0	Right Long Center	br	12	1.0	1.0
Left Long Center	br	12	1.0	1.0	Left Long End	bs	12	1.0	1.0
Right Long End	bs	12	1.0	1.0	Right Long Center	bt	12	1.0	1.0
Left Long Center	bt	12	1.0	1.0	Left Long End	bu	12	1.0	1.0
Right Long End	bu	12	1.0	1.0	Right Long Center	bv	12	1.0	1.0
Left Long Center	bv	12	1.0	1.0	Left Long End	bw	12	1.0	1.0
Right Long End	bw	12	1.0	1.0	Right Long Center	bx	12	1.0	1.0
Left Long Center	bx	12	1.0	1.0	Left Long End	by	12	1.0	1.0
Right Long End	by	12	1.0	1.0	Right Long Center	bz	12	1.0	1.0
Left Long Center	bz	12	1.0	1.0	Left Long End	ca	12	1.0	1.0
Right Long End	ca	12	1.0	1.0	Right Long Center	cb	12	1.0	1.0
Left Long Center	cb	12	1.0	1.0	Left Long End	cc	12	1.0	1.0
Right Long End	cc	12	1.0	1.0	Right Long Center	cd	12	1.0	1.0
Left Long Center	cd	12	1.0	1.0	Left Long End	ce	12	1.0	1.0
Right Long End	ce	12	1.0	1.0	Right Long Center	cf	12	1.0	1.0
Left Long Center	cf	12	1.0	1.0	Left Long End	cg	12	1.0	1.0
Right Long End	cg	12	1.0	1.0	Right Long Center	ch	12	1.0	1.0
Left Long Center	ch	12	1.0	1.0	Left Long End	ci	12	1.0	1.0
Right Long End	ci	12	1.0	1.0	Right Long Center	cj	12	1.0	1.0
Left Long Center	cj	12	1.0	1.0	Left Long End	ck	12	1.0	1.0
Right Long End	ck	12	1.0	1.0	Right Long Center	cl	12	1.0	1.0
Left Long Center	cl	12	1.0	1.0	Left Long End	cm	12	1.0	1.0
Right Long End	cm	12	1.0	1.0	Right Long Center	cn	12	1.0	1.0
Left Long Center	cn	12	1.0	1.0	Left Long End	co	12	1.0	1.0
Right Long End	co	12	1.0	1.0	Right Long Center	cp	12	1.0	1.0
Left Long Center	cp	12	1.0	1.0	Left Long End	cq	12	1.0	1.0
Right Long End	cq	12	1.0	1.0	Right Long Center	cr	12	1.0	1.0
Left Long Center	cr	12	1.0	1.0	Left Long End	cs	12	1.0	1.0
Right Long End	cs	12	1.0	1.0	Right Long Center	ct	12	1.0	1.0
Left Long Center	ct	12	1.0	1.0	Left Long End	cu	12	1.0	1.0
Right Long End	cu	12	1.0	1.0	Right Long Center	cv	12	1.0	1.0
Left Long Center	cv	12	1.0	1.0	Left Long End	cw	12	1.0	1.0
Right Long End	cw	12	1.0	1.0	Right Long Center	cx	12	1.0	1.0
Left Long Center	cx	12	1.0	1.0	Left Long End	cy	12	1.0	1.0
Right Long End	cy	12	1.0	1.0	Right Long Center	cz	12	1.0	1.0
Left Long Center	cz	12	1.0	1.0	Left Long End	da	12	1.0	1.0
Right Long End	da	12	1.0	1.0	Right Long Center	db	12	1.0	1.0
Left Long Center	db	12	1.0	1.0	Left Long End	dc	12	1.0	1.0
Right Long End	dc	12	1.0	1.0	Right Long Center	dd	12	1.0	1.0
Left Long Center	dd	12	1.0	1.0	Left Long End	de	12	1.0	1.0
Right Long End	de	12	1.0	1.0	Right Long Center	df	12	1.0	1.0
Left Long Center	df	12	1.0	1.0	Left Long End	dg	12	1.0	1.0
Right Long End	dg	12	1.0	1.0	Right Long Center	dh	12	1.0	1.0
Left Long Center	dh	12	1.0	1.0	Left Long End	di	12	1.0	1.0
Right Long End	di	12	1.0	1.0	Right Long Center	dj	12	1.0	1.0
Left Long Center	dj	12	1.0	1.0	Left Long End	dk	12	1.0	1.0
Right Long End	dk	12	1.0	1.0	Right Long Center	dl	12	1.0	1.0
Left Long Center	dl	12	1.0	1.0	Left Long End	dm	12	1.0	1.0
Right Long End	dm	12	1.0	1.0	Right Long Center	dn	12	1.0	1.0
Left Long Center	dn	12	1.0	1.0	Left Long End	do	12	1.0	1.0
Right Long End	do	12	1.0	1.0	Right Long Center	dp	12	1.0	1.0
Left Long Center	dp	12	1.0	1.0	Left Long End	dq	12	1.0	1.0
Right Long End	dq	12	1.0	1.0	Right Long Center	dr	12	1.0	1.0
Left Long Center	dr	12	1.0	1.0	Left Long End	ds	12	1.0	1.0
Right Long End	ds	12	1.0	1.0	Right Long Center	dt	12	1.0	1.0
Left Long Center	dt	12	1.0	1.0	Left Long End	du	12	1.0	1.0
Right Long End	du	12	1.0	1.0	Right Long Center	dv	12	1.0	1.0
Left Long Center	dv	12	1.0	1.0	Left Long End	dw	12	1.0	1.0
Right Long End	dw	12	1.0	1.0	Right Long Center	dx	12	1.0	1.0
Left Long Center	dx	12	1.0	1.0	Left Long End	dy	12	1.0	1.0
Right Long End	dy	12	1.0	1.0	Right Long Center	dz	12	1.0	1.0
Left Long Center	dz	12	1.0	1.0	Left Long End	ea	12	1.0	1.0
Right Long End	ea	12	1.0	1.0	Right Long Center	eb	12	1.0	1.0
Left Long Center	eb	12	1.0	1.0	Left Long End	ec	12	1.0	1.0
Right Long End	ec	12	1.0	1.0	Right Long Center	ed	12	1.0	1.0
Left Long Center	ed	12	1.0	1.0	Left Long End	ee	12	1.0	1.0
Right Long End	ee	12	1.0	1.0	Right Long Center	ef	12	1.0	1.0
Left Long Center	ef	12	1.0	1.0	Left Long End	eg	12	1.0	1.0
Right Long End	eg	12	1.0	1.0	Right Long Center	eh	12	1.0	1.0
Left Long Center	eh	12	1.0	1.0	Left Long End	ei	12	1.0	1.0
Right Long End	ei	12	1.0	1.0	Right Long Center	ej	12	1.0	1.0
Left Long Center	ej	12	1.0	1.0	Left Long End	ek	12	1.0	1.0
Right Long End	ek	12	1.0	1.0	Right Long Center	el	12	1.0	1.0
Left Long Center	el	12	1.0	1.0	Left Long End	em	12	1.0	1.0
Right Long End	em	12	1.0	1.0	Right Long Center	en	12	1.0	1.0
Left Long Center	en	12	1.0	1.0	Left Long End	eo	12	1.0	1.0
Right Long End	eo	12	1.0	1.0	Right Long Center	ep	12	1.0	1.0
Left Long Center	ep	12	1.0	1.0	Left Long End	eq	12	1.0	1.0
Right Long End	eq	12	1.0	1.0	Right Long Center	er	12	1.0	1.0
Left Long Center	er	12	1.0	1.0	Left Long End	es	12	1.0	1.0
Right Long End	es	12	1.0	1.0	Right Long Center	et	12	1.0	1.0
Left Long Center	et	12	1.0	1.0	Left Long End	eu	12	1.0	1.0
Right Long End	eu	12	1.0	1.0	Right Long Center	ev	12	1.0	1.0
Left Long Center	ev	12	1.0	1.0	Left Long End	ew	12	1.0	1.0
Right Long End	ew	12	1.0	1.0	Right Long Center	ex	12	1.0	1.0
Left Long Center	ex	12	1.0	1.0	Left Long End	ey	12	1.0	1.0
Right Long End	ey	12	1.0	1.0	Right Long Center	ez	12	1.0	1.0
Left Long Center	ez	12	1.0	1.0	Left Long End	fa	12	1.0	1.0
Right Long End	fa								





ESTABLISHED WIDTH OF  
RIGHT OF WAY 60 FT.

Ref to P.O.T. of  
Sta. 712 + 32.7

MOSCOW TWR  
T. 78N R. 2W.

Sec 7

JOHN SCHMIDT

John Schmidt 1.00 Acres  
Acquired March 19, 1930  
Consideration \$9825  
Title by Easement  
Book 16 Page 89  
County Recorder

AGS/VEE

ABSTRACT 67

2 Prop. Plumes  
Type "A"

CULTIVATED

2 Prop. Furnaces  
Type "B"

BOZEDOW

AT

2 Drop Flumes  
Type "D"

TIMBER PASTURE &amp; DRUSH

Used as Constructed  
Extended Outlet

POSTURE &amp; TIME

350.18

30 704  
9'x9' 100  
Comp. 8c  
DA - 2:  
Use 40

EDWARD DEERING

This Sheet  
For Information Only

## TRAFFIC CONTROL PLAN

108-23A  
08-01-08

Traffic on US 6 shall be maintained at all times.

## 511 TRAVEL RESTRICTIONS

108-25  
0-21-14

[illegible]

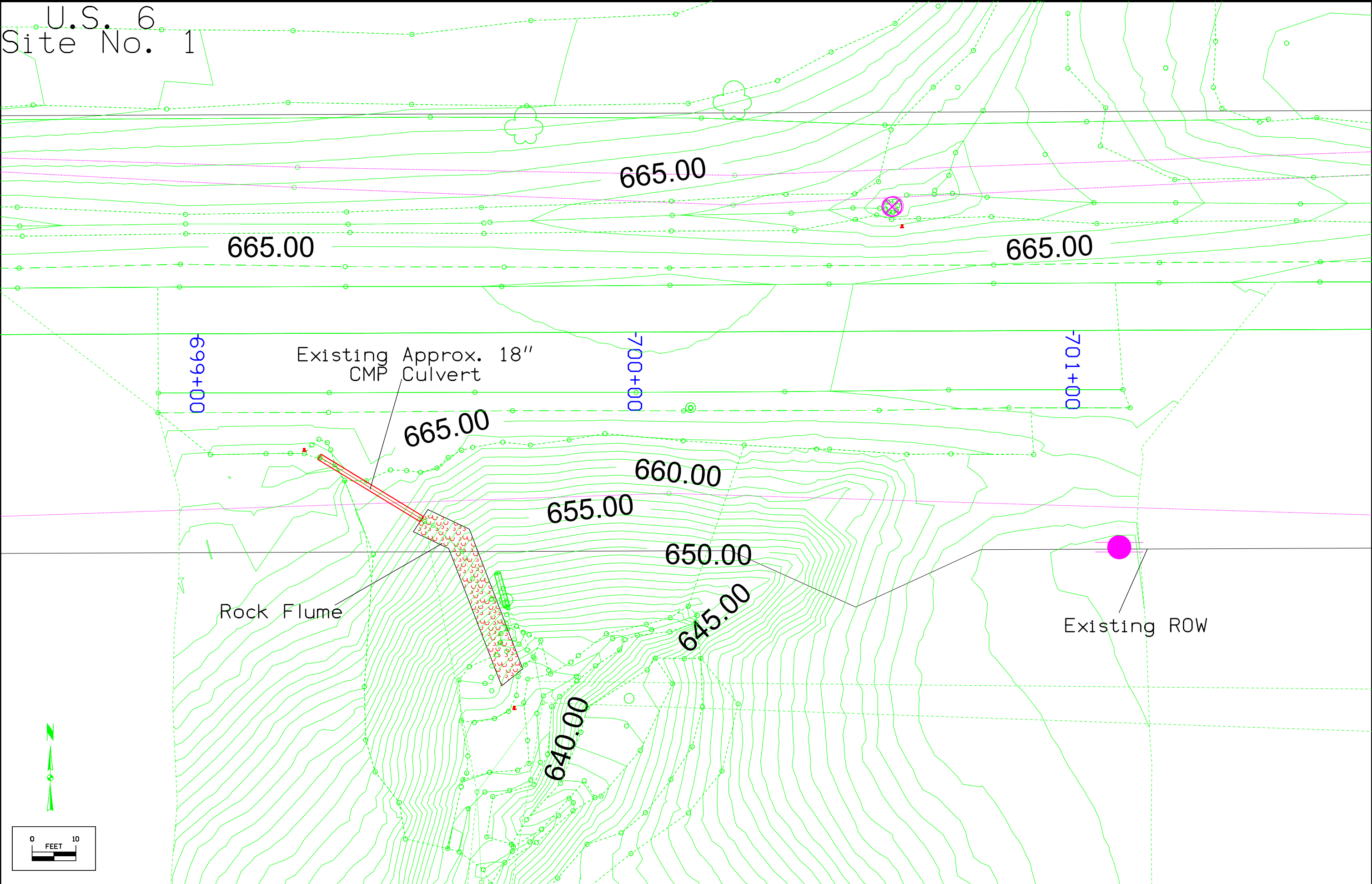
## COORDINATED OPERATIONS

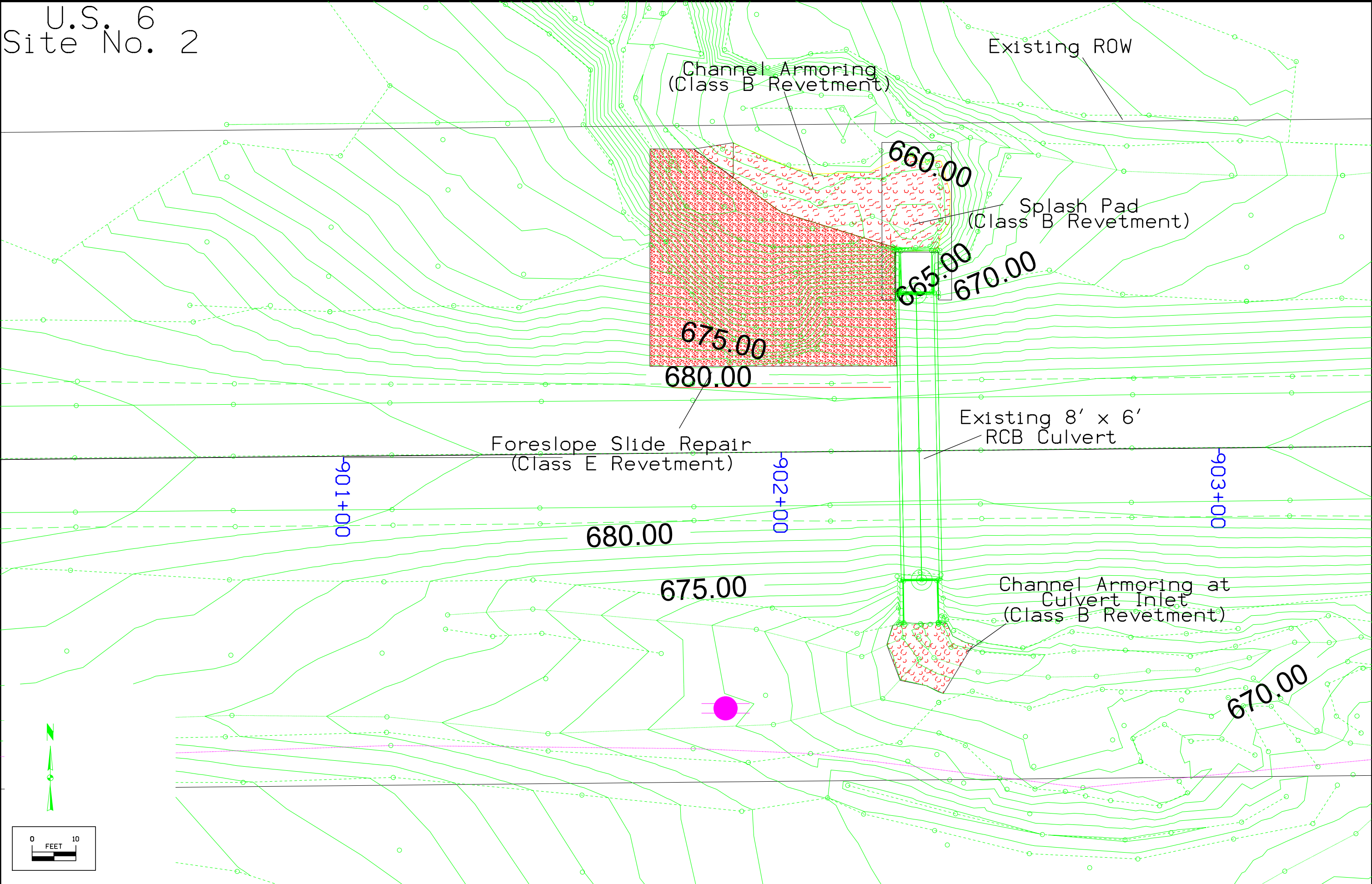
111-01  
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Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

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U.S. 6  
Site No. 1





US 6, Muscatine Co.  
Site No. 1, near Station 699+71  
Scour Protection

GENERAL NOTES:

The design intent is to install a rock flume at the outlet of an existing 18-inch diameter CMP culvert located on the south (right) side of US 6. This culvert conveys water that flows within the south roadway ditch down into an existing drainage ravine. The culvert outlet is located within Iowa DOT Right of Way near Station 699+50 at an offset of about 43 feet right of roadway centerline. However, be aware that the rock flume will extend off of DOT ROW into State of Iowa property managed by the Iowa State Conservation Commission (DNR). Refer to the Q.1 Sheet for the plan location of the existing CMP culvert and proposed flume.

As a result of previous erosion, the end of the existing CMP culvert currently extends about 6 to 8 feet out beyond the face of the foreslope surrounding the pipe. Prior to constructing the rock flume, that portion of the eroded foreslope immediately surrounding the pipe shall be rebuilt up to the mid-point of the pipe using Erosion Stone underlain with Engineering Fabric.

The rock flume shall begin at the invert elevation of the outlet (660.5 feet) and extend downslope to about Elevation 639 feet. The 6-foot wide flume shall be constructed using Class E Revetment underlain with Engineering Fabric. Refer to the Standard Road Plan for Rock Erosion Control (EC-301) and the Rock Erosion Control tab (100-23) for additional details. Any exposed Erosion Stone shall be armored with Class E Revetment.

Some amount of clearing and grubbing will be necessary to reconstruct the foreslope and to construct the rock flume. However, removal of any existing vegetation shall be kept to a minimum.



US 6, Muscatine Co.  
Site No. 2, between Station 901+65 and 902+26  
Slide Repair and Scour Protection

GENERAL NOTES:

The design intent is to repair the foreslope slide that has occurred along the north side of the US 6 near the City of Moscow, Iowa, from Station 901+65 to Station 902+26. Be aware that the actual limits of the repair may be found to have changed (enlarged) at the time of construction due to continued slope movements.

The eastern limits of the proposed repair corresponds to the end segment of an existing 8'x 6' RCB culvert protruding from the foreslope at Station 902+30. The drainage channel below the culvert outlet has degraded so that the present channel bottom at the outlet is about 4 to 5 feet below the invert elevation of the culvert. The erosion has also migrated toward the roadway resulting in the slope instability.

To make the repair, cut benches in the existing foreslope and waste excavated material off-site. Place engineering fabric meeting Standard Specification 4196.01-3 on the benches, overlapping the edges of the laid fabric a minimum of 2 feet on the sides and ends. Place Erosion Stone on the fabric to rebuild the slope to an approximate 1.5:1 or slightly flatter angle of repose. Erosion Stone on the rebuilt foreslope shall then be capped with a 1-foot thick layer of Macadam Stone Base Materials (Gradation No. 13, without choke stone coarse). Due to the relative steepness of the rebuilt slope, minor benches in the Erosion Stone may be necessary prior to placing the Macadam Stone. The rebuilt foreslope shall transition back to the existing foreslope and channel bank geometries to the west of the repair.

To help maintain the integrity of the roadway, the foreslope shall be benched in segments having a maximum longitudinal (parallel to the roadway) length of 25 feet, starting at the bottom of the slope and working upward. The excavated benches shall not be left exposed overnight. Rather, each excavated/opened segment of the foreslope shall be rebuilt with the Erosion Stone prior to quitting for the day or continuing on to the next segment. Difficulties maintaining a stable slope during construction shall be immediately reported to the Engineer.

A portion of the channel near the rebuilt foreslope and at the RCB culvert outlet shall be armored using Class B Revetment to protect the new foreslope toe. The armoring shall have a minimum thickness of at least 3 feet, have a top elevation of about 660 feet and be underlain with Engineering Fabric. Refer to the cross-sections on the W sheets for details regarding excavation of the cut benches, the rebuilt foreslope and the toe armoring.

The channel armoring shall increase in thickness near the outlet of the RCB culvert to create a relatively level splash pad. The top of this pad shall match the invert elevation the outlet (approximate Elevation 662.79 feet) and have overall top plan dimensions of about 10 feet by 10 feet.

The channel shall also be armored at the inlet with a minimum 3-foot thickness of Class B Revetment underlain with Engineering Fabric. The armoring shall have a top elevation to match the inlet invert elevation (approximately 666 feet) and overall plan dimensions of about 15 feet by 15 feet.

