

INDEX OF SHEETS	
No.	DESCRIPTION
A Sheets	Title Sheets
A.1	Title Sheet
A.2	Location Map Sheet
C Sheets	Quantities and General Information
C.1 - 3	Estimated Project Quantities and Reference Notes
C.4	Project Description, Standard Road Plans, General Notes, and Tabulations
C.5	District 4 Guardrail Inventory
J Sheets	Traffic Control and Staging Sheets
J.1	Traffic Control Plan
J.2	District 4 Allowable Lane Closures
U Sheets	500 Series, Mod.Stds. and Detail Sheets
U.1 - 2	500 Series, Modified Standards and Detail Sheets



PLANS OF PROPOSED IMPROVEMENT ON THE
INTERSTATE ROAD SYSTEM
Cass\Adair\Madison\Dallas Counties
On-Call Cable Guardrail Repair
Pottawattamie Co to 1 mi W of Jordan Creek Pkwy

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



REVISIONS

PROJECT IDENTIFICATION NUMBER	TOTAL
	11
26-15-080-020	
PROJECT NUMBER	
IMN-080-1(582)50--0E-15	
R.O.W. PROJECT NUMBER	

CASS COUNTY			
DESIGN DATA RURAL			
2024	AADT	22,900	V.P.D.
20 --	AADT	--	V.P.D.
20 --	DHV	--	V.P.H.
TRUCKS		43.4	%
Total			
Design ESALs		--	

ADAIR COUNTY			
DESIGN DATA RURAL			
2024	AADT	25,500	V.P.D.
20 --	AADT	--	V.P.D.
20 --	DHV	--	V.P.H.
TRUCKS		39.4	%
Total			
Design ESALs		--	

MADISON COUNTY			
DESIGN DATA RURAL			
2024	AADT	28,500	V.P.D.
20 --	AADT	--	V.P.D.
20 --	DHV	--	V.P.H.
TRUCKS		35.9	%
Total			
Design ESALs		--	

DALLAS COUNTY			
DESIGN DATA RURAL			
2024	AADT	30,800	V.P.D.
20 --	AADT	--	V.P.D.
20 --	DHV	--	V.P.H.
TRUCKS		33.5	%
Total			
Design ESALs		--	

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

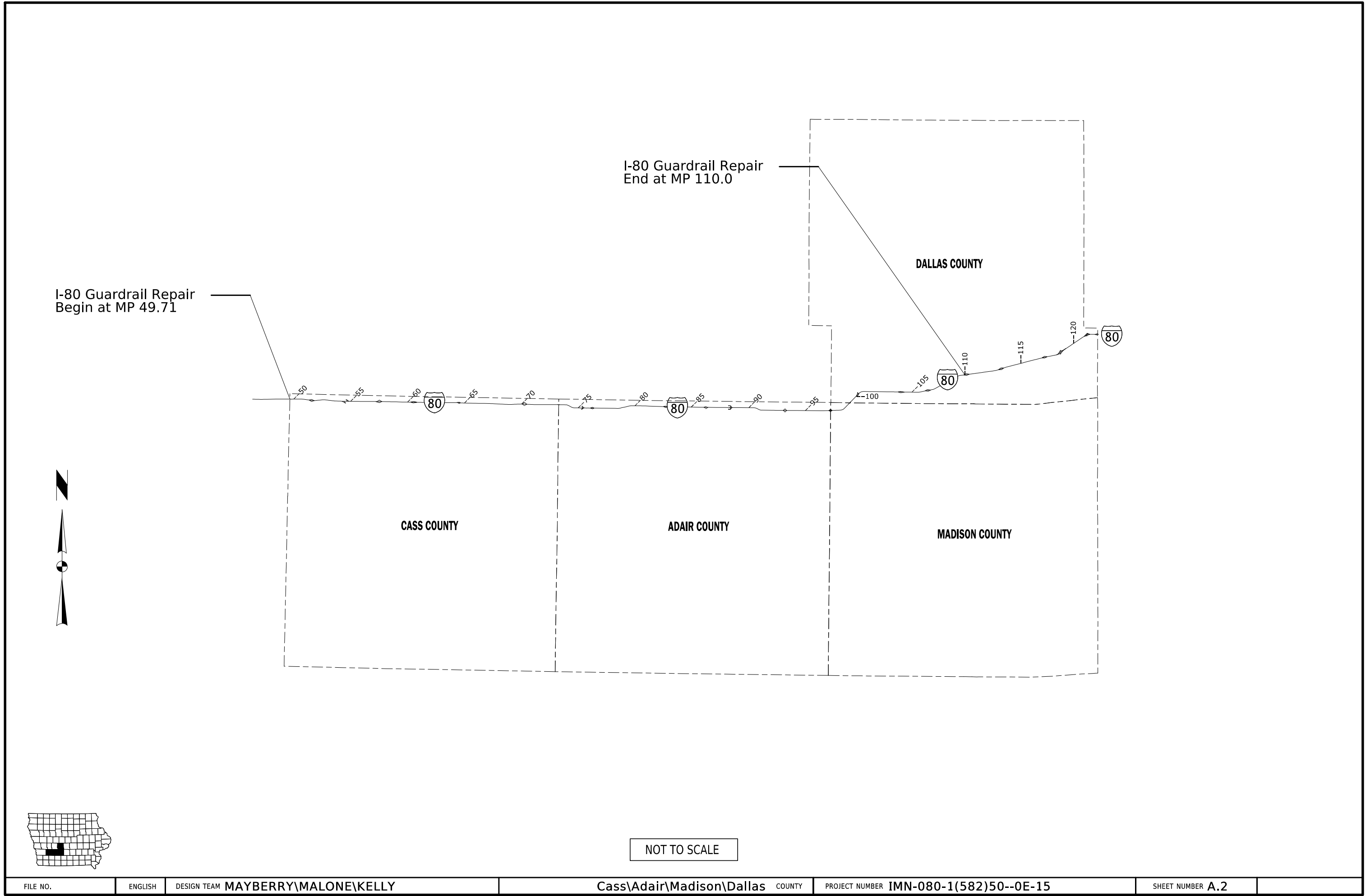
Date

Travis R. Malone

Printed or Typed Name

My license renewal date is December 31, 2026

Pages or sheets covered by this seal: ALL



ESTIMATED PROJECT QUANTITIES AND REFERENCE NOTES

Roadway Items : Roadway Items

Item no.	Item Code	Item	Unit	Quantities	Estimate Reference Notes
				Estimated	
				Roadway Items	
1	2505-4008300	STEEL BEAM GUARDRAIL	LF	60	In the Standard Specifications replace the description under Method of Measurement, 2505.04, A.1. Steel Beam Guardrail, with the following: "Linear feet of steel beam guardrail constructed." Item includes removal and disposal of damaged guardrail components by the contractor.
2	2505-4008410	STEEL BEAM GUARDRAIL BARRIER TRANSITION SECTION, BA-201	EACH	2	
3	2505-4021020	STEEL BEAM GUARDRAIL END ANCHOR, W-BEAM	EACH	2	
4	2505-4021720	STEEL BEAM GUARDRAIL TANGENT END TERMINAL, BA-205	EACH	2	
5	2505-4021721	STEEL BEAM GUARDRAIL FLARED END TERMINAL, BA-206	EACH	2	
6	2505-6001010	LINE POST, REPAIR	EACH	300	This bid item includes is high tension cable guardrail systems.
7	2505-6001012	LINE POST, REPLACE	EACH	375	This bid item includes high tension cable guardrail systems.
8	2505-6001014	LINE POST FOUNDATION, REPLACE	EACH	45	Dependent upon the weather conditions, time of year, and condition of the existing line post foundation as determined by the Engineer, the contractor shall remove and replace the damaged foundation. Refer to Developmental Specification DS-23036.
9	2505-6001020	END ANCHOR, REPAIR	EACH	10	
10	2505-6001022	END ANCHOR - SPECIAL, REPAIR	EACH	3	
11	2505-6001024	END ANCHOR, RESET	EACH	10	
12	2505-6001030	TURNBUCKLE, REPLACE	EACH	5	Refer to Developmental Specification DS-23036. Existing Gibraltar turnbuckles and end anchor tensioning fittings are either 3/4" diameter or 1" diameter. All replacement Gibraltar turnbuckles and end anchor tensioning fittings shall be 1" diameter. Replacement of existing 3/4" diameter turnbuckles and end anchor tensioning fittings with 1" diameter turnbuckles and end anchor tensioning fittings will be paid for as "Turnbuckle Replace". (Gibraltar lists these items as "Cable Splice Fitting & Terminal Fitting".) Replacement of anchor cable adjusters and turnbuckles for Trinity type system shall also be paid for as "Turnbuckle Replace". In the event that the cable release anchor base plate post does not accept new 1" diameter adjusters, replacement of the anchor pad (base plate post), concrete footing/reinforcing steel, and anchor post will be paid for as one "End Anchor Repair".
13	2505-6001040	HIGH TENSION CABLE GUARDRAIL, REPLACE	LF	190	

Item no.	Item Code	Item	Unit	Quantities	Estimate Reference Notes
				Estimated	
				Roadway Items	
14	2533-4980020	MOBILIZATION, ON-CALL Mobilization for High Tension	EACH	10	This bid item includes high tension cable guardrail systems.
15	2533-4980020	MOBILIZATION, ON-CALL Mobilization for Low Tension	EACH	3	This bid item includes low tension cable guardrail systems.
16	2599-9999005	('EACH' ITEM) Anchor Tab Welding Repair	EACH	3	This item includes all equipment, material, and labor for an Anchor Tab Welding
17	2599-9999005	('EACH' ITEM) LANE CLOSURE DAY OR NIGHT	EACH	3	<p>LANE CLOSURE DAY OR NIGHT</p> <p>Developmental Specification Section 23036.05, J is modified by this items. Lane closure restrictions will be in accordance with J Sheets.</p> <p>Method of Measurement: By count for each lane closure.</p> <p>Basis of Payment: The contractor shall be paid for each lane closure. Payment is full compensation for furnishing all equipment and labor required to setup and takedown a lane closure.</p>
18	2599-9999005	('EACH' ITEM) LINE POST FOUNDATION, CONSTRUCT	EACH	3	<p>LINE POST FOUNDATION, CONSTRUCT</p> <p>Dependent upon the weather conditions, time of year, and condition of the existing line post foundation as determined by the Engineer, the contractor shall construct a new foundation.</p> <p>Method of Measurement: By count for each line post foundation constructed.</p> <p>Basis of Payment: The contractor shall be paid for each line post foundation constructed. Payment is full compensation for furnishing all equipment, materials, and labor required to construct a line post foundation.</p>
19	2599-9999005	('EACH' ITEM) LINE POST FOUNDATION, REMOVE AND BACKFILL	EACH	3	<p>LINE POST FOUNDATION, REMOVE AND BACKFILL</p> <p>Dependent upon the weather conditions, time of year, and condition of the existing line post foundation as determined by the Engineer, the contractor shall remove the foundation and properly backfill with compacted material.</p> <p>Method of Measurement: By count for each line post foundation removed and backfilled.</p> <p>Basis of Payment: The contractor shall be paid for each line post foundation removed and properly backfilled. Payment is full compensation for furnishing all equipment, materials, and labor required to remove and dispose the old foundation and backfill the hole.</p>
20	2599-9999005	('EACH' ITEM) Line Post Repair (Low Tension)	EACH	10	This bid item includes low tension cable guardrail systems.
21	2599-9999005	('EACH' ITEM) Line Post Replace (Low Tension)	EACH	10	
22	2599-9999005	('EACH' ITEM) Repair End Anchor (Low Tension)	EACH	3	
23	2599-9999005	('EACH' ITEM) Traffic Control	EACH	13	<p>All repairs require Traffic Control. Minimum Traffic Control set up shall comply with TC-402 "Work Within 15 ft of Traveled Way".</p> <p>This item to be used in conjunction with "On-Call Mobilization".</p>
24	2599-9999009	('LINEAR FEET' ITEM) Low Tension Cable Guardrail, Replace	LF	25	This bid item includes low tension cable guardrail systems.

Item no.	Item Code	Item	Unit	Quantities	Estimate Reference Notes
				Estimated	
				Roadway Items	

PROJECT DESCRIPTION	100_01D 8/15/22
On-call guardrail repair of high-tension median cable guardrail at various locations on I-80 from the Pottawattamie County line to the Dallas/Polk County line.	

STANDARDS			105_04 4/21/26
The following Standards apply to construction work on this project.			
Number	Date	Title	
TC-1	10-15-19	Work Not Affecting Traffic (Two-Lane or Multi-Lane)	
TC-402	04-18-23	Work Within 15 ft of Traveled Way	
TC-418	04-18-23	Lane Closure on Divided Highway	
TC-420	10-16-18	Lane Closure at Ramps	

NR SPECIAL
NOTIFICATION REQUIREMENTS
<p><i>Repair Request Notification</i> Repair Requests will be made per the Developmental Specifications. The Engineer will e-mail a work order summarizing all the repair locations to the Contractor.</p> <p><i>Repair Completion Notification</i> The Contractor is required to complete all repairs on a work order and then notify the Engineer by e-mail that the work order is complete. Furnish repair logs and other supporting documentation with the completion notification e-mail. Upon receipt of the repair completion notification, the Engineer will confirm repairs have been accomplished in a satisfactory manner.</p> <p><i>Insufficient Repair Notification</i> The Engineer will notify the Contractor by e-mail of insufficient repairs on a work order including the locations and type of deficiency. Once the Contractor corrects the insufficient repairs, a second repair completion notification is required to be sent to the Engineer.</p>

UTILITIES (NOT A POINT 25 PROJECT)	262_06 9/28/22
This is NOT a POINT 25 project and is not subject to the provisions of IAC 761-115.25.	

DISTRICT 4 - CABLE GUARDRAIL INVENTORY							
County	Route	Direction	Type	Begin MP	Anchor Type	End MP	Anchor Type

Cass	I-80	EB	Gibraltar	49.72	CRP	50.27	CRP
Cass	I-80	EB	Gibraltar	50.27	CRP	50.36	GT
Cass	I-80	EB	Gibraltar	50.50	CRP	50.59	CRP
Cass	I-80	WB	Gibraltar	50.74	CRP	51.28	CRP
Cass	I-80	WB	Gibraltar	51.28	CRP	51.67	CRP
Cass	I-80	EB	Gibraltar	51.58	CRP	51.85	CRP
Cass	I-80	EB	Gibraltar	51.92	CRP	52.47	CRP
Cass	I-80	EB	Gibraltar	52.47	CRP	52.57	GT
Cass	I-80	WB	Gibraltar	52.69	GT	53.27	CRP
Cass	I-80	WB	Gibraltar	53.27	CRP	54.00	CRP
Cass	I-80	EB	Gibraltar	54.05	CRP	54.55	CRP
Cass	I-80	WB	Gibraltar	54.62	CRP	54.68	CRP
Cass	I-80	EB	Gibraltar	54.55	CRP	54.96	CRP
Cass	I-80	EB	Gibraltar	55.00	CRP	55.59	CRP
Cass	I-80	EB	Gibraltar	55.59	CRP	56.15	CRP
Cass	I-80	EB	Gibraltar	56.15	CRP	56.50	GT
Cass	I-80	EB	Gibraltar	56.57	CRP	56.76	CRP
Cass	I-80	EB	Gibraltar	56.81	CRP	57.38	CRP
Cass	I-80	EB	Gibraltar	57.38	CRP	57.54	CRP
Cass	I-80	EB	Gibraltar	57.52	CRP	57.93	CRP
Cass	I-80	WB	Gibraltar	57.56	CRP	57.61	CRP
Cass	I-80	EB	Gibraltar	57.93	CRP	58.24	CRP
Cass	I-80	EB	Gibraltar	58.33	CRP	58.77	CRP
Cass	I-80	EB	Gibraltar	58.77	CRP	59.25	CRP
Cass	I-80	EB	Gibraltar	59.25	CRP	59.76	CRP
Cass	I-80	EB	Gibraltar	59.76	CRP	60.30	CRP
Cass	I-80	EB	Gibraltar	60.40	CRP	60.53	GT
Cass	I-80	EB	Gibraltar	60.62	CRP	61.10	GT
Cass	I-80	EB	Gibraltar	61.18	CRP	61.42	CRP
Cass	I-80	EB	Gibraltar	61.53	CRP	62.02	CRP
Cass	I-80	EB	Gibraltar	62.02	CRP	62.48	CRP
Cass	I-80	WB	Gibraltar	62.32	CRP	62.38	CRP
Cass	I-80	EB	Gibraltar	62.48	CRP	62.95	CRP
Cass	I-80	EB	Gibraltar	62.95	CRP	63.42	CRP
Cass	I-80	EB	Gibraltar	63.42	CRP	63.63	CRP
Cass	I-80	WB	Gibraltar	63.74	CRP	64.21	CRP
Cass	I-80	WB	Gibraltar	64.21	CRP	64.56	CRP
Cass	I-80	WB	Gibraltar	64.63	GT	64.69	CRP
Cass	I-80	WB	Gibraltar	64.80	CRP	65.03	CRP
Cass	I-80	EB	Gibraltar	65.09	CRP	65.51	CRP
Cass	I-80	EB	Gibraltar	65.62	CRP	66.08	CRP
Cass	I-80	EB	Gibraltar	66.08	CRP	66.33	CRP
Cass	I-80	WB	Gibraltar	66.31	CRP	66.78	CRP
Cass	I-80	WB	Gibraltar	66.78	CRP	67.26	CRP
Cass	I-80	WB	Gibraltar	67.26	CRP	67.73	CRP
Cass	I-80	WB	Gibraltar	67.73	CRP	68.20	CRP
Cass	I-80	EB	Gibraltar	68.14	CRP	68.68	GT
Cass	I-80	EB	Gibraltar	68.75	CRP	68.88	CRP
Cass	I-80	EB	Gibraltar	68.98	CRP	69.32	CRP
Cass	I-80	WB	Gibraltar	69.31	CRP	69.81	CRP
Cass	I-80	WB	Gibraltar	69.82	CRP	70.36	CRP
Cass	I-80	EB	Gibraltar	70.26	CRP	70.52	CRP
Cass	I-80	EB	Gibraltar	70.58	CRP	71.05	CRP
Cass	I-80	EB	Gibraltar	71.05	CRP	71.52	CRP
Cass	I-80	EB	Gibraltar	71.52	CRP	72.00	GT
Cass	I-80	EB	Gibraltar	72.07	CRP	72.56	CRP
Cass	I-80	EB	Gibraltar	72.56	CRP	73.27	CRP
Adair	I-80	EB	Gibraltar	73.36	CRP	73.66	CRP
Adair	I-80	WB	Gibraltar	73.66	CRP	74.99	CRP
Adair	I-80	WB	Gibraltar	75.00	CRP	75.86	CRP
Adair	I-80	EB	Gibraltar	75.29	CRP	75.35	CRP
Adair	I-80	EB	Gibraltar	75.91	CRP	76.34	CRP
Adair	I-80	WB	Gibraltar	76.31	CRP	76.82	CRP
Adair	I-80	WB	Gibraltar	76.83	CRP	78.23	CRP

DISTRICT 4 - CABLE GUARDRAIL INVENTORY							
County	Route	Direction	Type	Begin MP	Anchor Type	End MP	Anchor Type

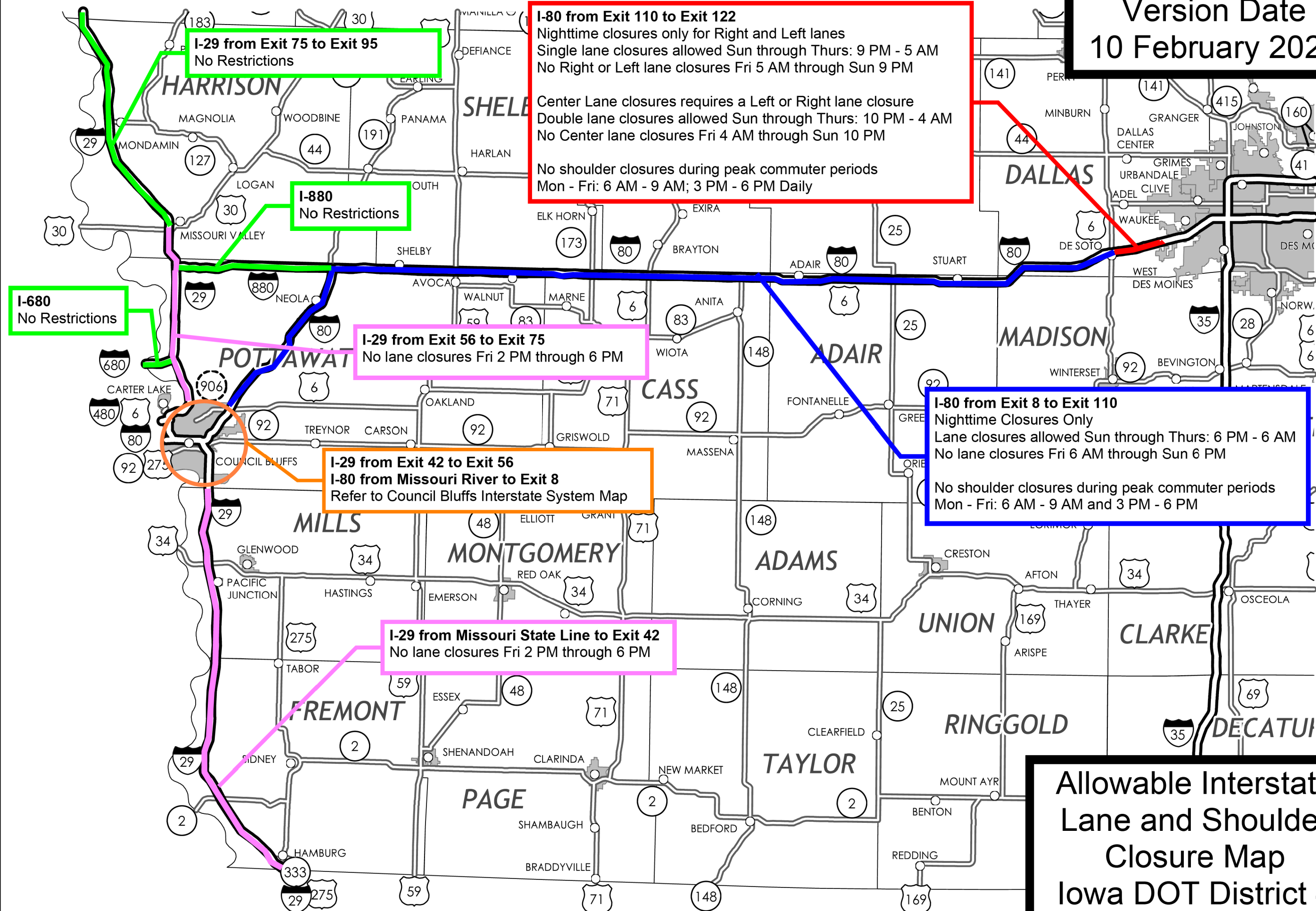
[illegible]

<div>TRAFFIC CONTROL PLAN</div> <div>1. Maintain at least one lane of traffic in each direction at all times. 2. All repairs are expected to be completed with closures per the TC series of the Standard Road Plans. 3. Traffic control for this project shall be in accordance with the TC series of the Standard Road Plans on Tabulation 105-4. Refer to current Standard Specifications for additional information. 4. The contractor shall coordinate traffic control with other projects in the area. I-80 traffic control: Pottawattamie County line to 1.0 mile West of Jordan Creek Parkway: Nighttime closures only. See Sheet J.2 for lane and shoulder closure times.</div>	108_23A 8/15/22
---	--------------------

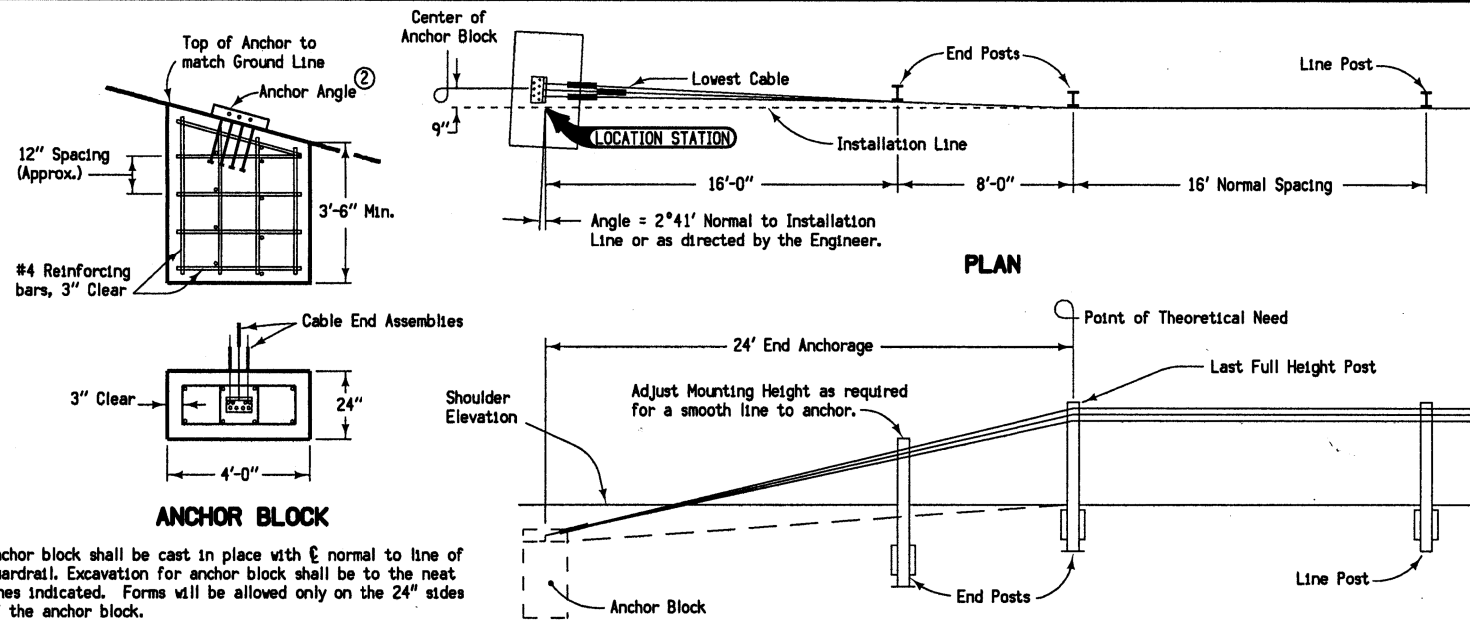
511 TRAVEL RESTRICTIONS									108_25 3/28/24
Line No.	Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No. or Structure ID or FHWA No.	Type of Restriction	Remarks
1.0	I-80	Both	Cass	Cass, Adair, Madison, and Dallas Counties		Traffic Control Device		Horizontal	

COORDINATED OPERATIONS		111_01 10/14/22
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.		
Project	Type of Work	
IM-080-3(291)118--13-25	Traffic Signs	
IMN-080-1(571)50--0E-15	Clearing and Grubbing	
IMN-080-1(579)50--0E-15	Clearing and Grubbing	
IMN-080-2(258)70--0E-15	Recon - Bridge Deck Replacement	
IMN-080-2(267)83--0E-01	Bridge Repair	
IMN-080-3(293)118--0E-25	Erosion Control	
IMN-080-3(305)117--0E-25	Bridge Repair	
IMN-080-3(346)110--0E-25	Wetland Bank Mitigation	
IMN-080-3(347)110--0E-25	Stream Bank Mitigation	
IMX-080-1(533)55--02-15	HMA Resurfacing	
IMX-080-1(562)50--02-15	HMA Resurfacing	
IMX-080-2(268)75--02-01	Recon - Bridge Deck Replacement	
IMX-080-2(269)93--02-01	Recon - Bridge Deck Replacement	
IMX-080-3(323)110--02-25	Bridge Replacement-PPCB	
IMX-080-3(331)110--02-25	Grading	
IMX-080-3(336)113--02-25	Bridge Deck Overlay	
ITS-080-3(361)110--25-25	ITS Infrastructure	
ITS-080-3(362)110--25-25	ITS Integration	
ITS-080-3(363)110--25-25	Intelligent Work Zone (IWZ)	
MBIN-080-4(515)110--0M-25	HMA Resurfacing	
MPIN-080-1(723)121--0N-25	PCC Patching	
NHS-080-3(290)118--11-25	PCC Pavement - Grade and New	
NHS-080-3(292)121--11-25	Bridge Replacement-PPCB	

Version Date
10 February 2023



Allowable Interstate
Lane and Shoulder
Closure Map
Iowa DOT District 4



Cable end assemblies shall be installed based on the length of run as follows:

Less than 500' - Use a spring type compensating device on one end and a turnbuckle on the opposite end of each individual cable.

500' to 1000' - Use a spring type compensating device plus a turnbuckle on each end of each individual cable.

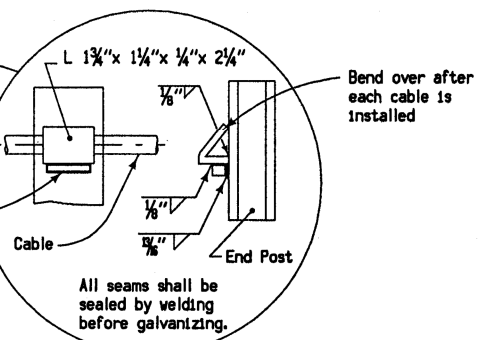
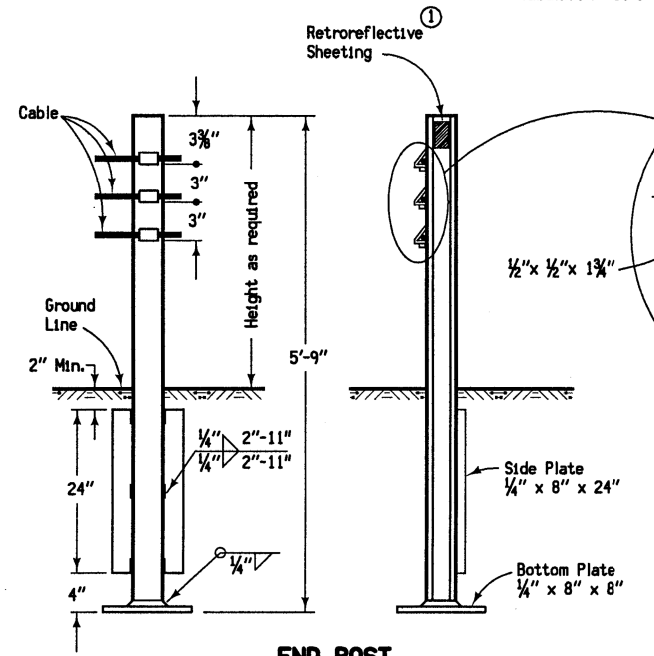
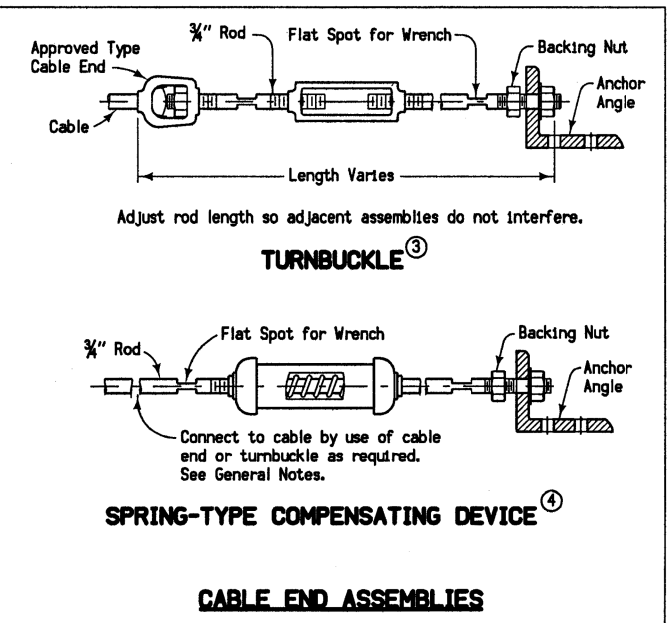
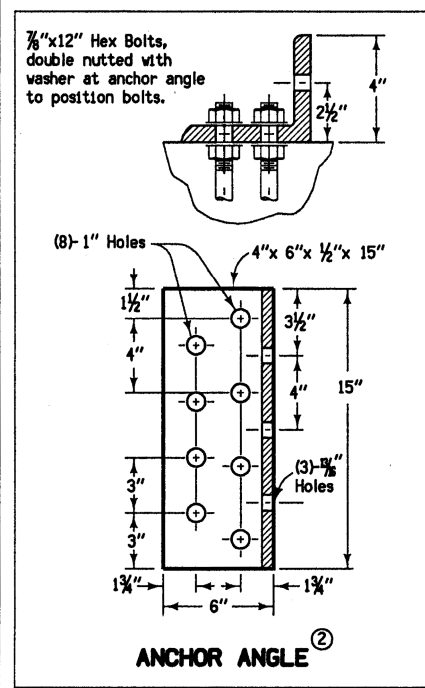
- Apply Type III or IV retroreflective sheeting to both end posts of the anchor at the beginning of an installation and at the end of an installation. The sheeting shall provide a minimum surface area of 7 square inches and shall match the color of the adjacent edge line. Attach sheeting to that side of the post from which impacts are most likely to occur. Where impacts are likely to occur from either direction, attach sheeting to both sides of the post.
- No welding of the galvanized anchor angle and attached hardware is allowed.
- Turnbuckles are used to properly tension each cable, depending on the ambient temperature at the time of adjustment — refer to table, this sheet. Apply tension at one end of cable only. Turnbuckles shall be of the open type and shall each provide for a minimum take-up of 12 inches.
- Spring-type compensating devices maintain proper cable tension at various temperature conditions. Devices shall provide for a minimum travel of 5 inches and shall have a spring rate of 450 + 50 lbs. per inch.

Contract Item: Guardrail, End Anchorage, Cable

Tabulation: 108-9

Materials included in the Contract Item:

- 1 Anchor Angle and Hardware
- 1.19 cubic yards concrete
- 59 lbs. of reinforcing steel (approx.)
- 3 Cable End Assemblies



CABLE TENSION ADJUSTMENTS FOR TEMPERATURE VARIATIONS													
Temperature Range Degrees F	120 to 110	109 to 100	99 to 90	89 to 80	79 to 70	69 to 60	59 to 50	49 to 40	39 to 30	29 to 20	19 to 10	9 to 0	-1 to -20
Spring Compression Inches *	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4 1/4

* From the unloaded position in each spring

Iowa Department of Transportation

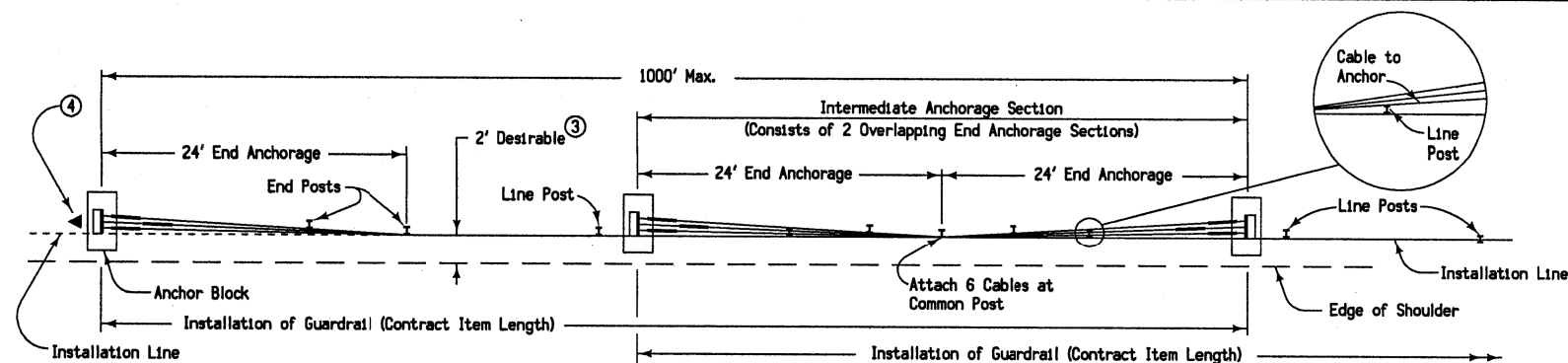
REVISIONS: General re-write for clarity. Added note to tension one end only. Removed base plate from line post.

APPROVED BY DESIGN METHODS ENGINEER

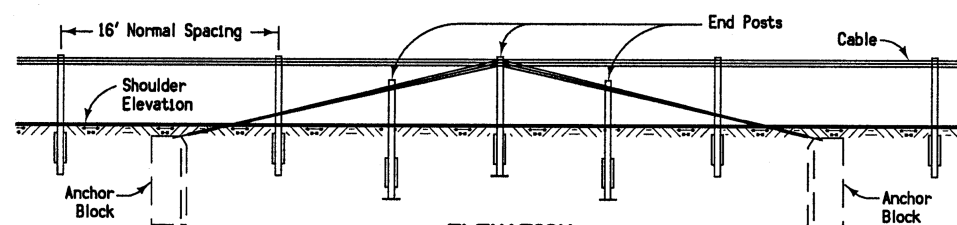
RE-29A

SHEET 1 of 1

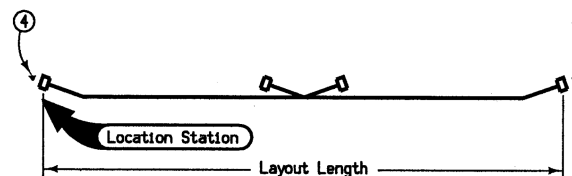
CABLE GUARDRAIL END ANCHORAGE



PLAN



ELEVATION

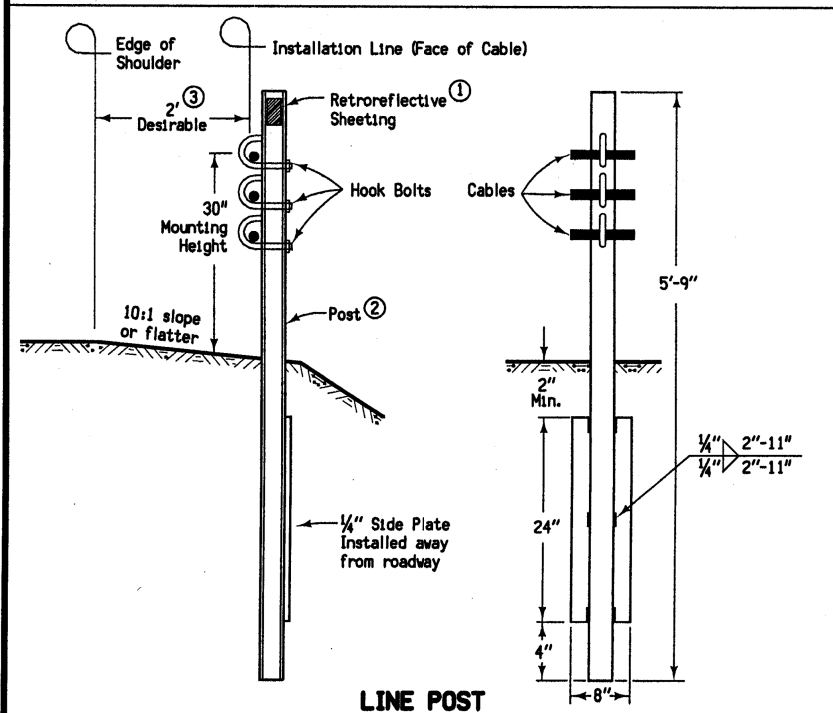


Post spacing shall be 12 feet for curves with radii between 442 and 721 feet. Post spacing shall be 16 feet for curves with radii greater than 721 feet.

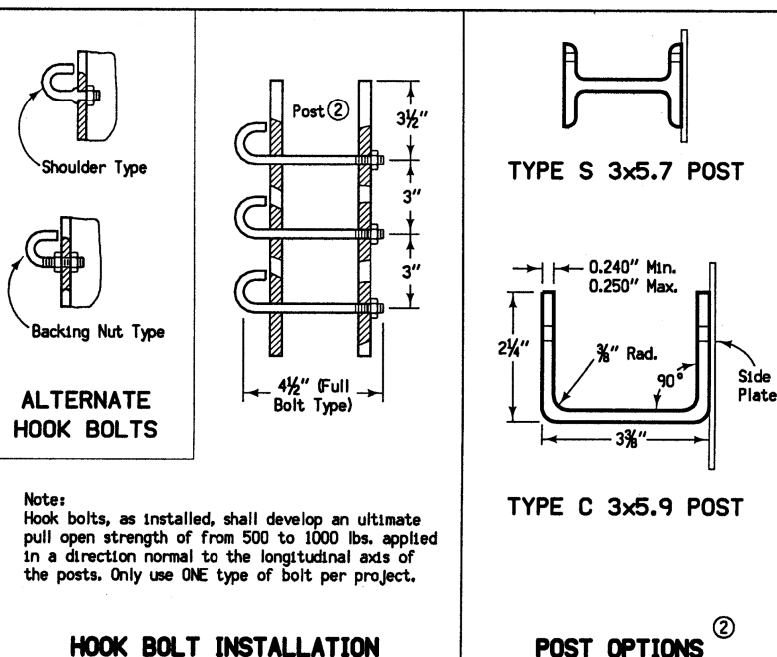
Posts may be driven - except end posts, which shall be set to proper location in pre-drilled holes and securely backfilled and compacted.

For runs over 1000', overlapping end anchorage shall be located to provide approximately equal length sections of guardrail. Maximum length between anchorages shall be 1000'.

- ① Apply Type III or IV retroreflective sheeting to the first three posts and the last three posts of each installation, and to every third post in between. The sheeting shall provide a minimum surface area of 7 square inches and shall match the color of the adjacent edge line. Attach sheeting to that side of the post from which impacts are most likely to occur. Where impacts are likely to occur from either direction, attach sheeting to both sides of the post.
- ② Either Type S 3x5.7 or Type C 3x5.9 meeting minimum cross section dimensions as shown may be used.
- ③ Installation line shall be on a 10:1 or flatter slope. To achieve this, it may be placed closer than 2 feet from the edge of shoulder.
- ④ Type 2 Object Marker (MUTCD OM2-1H). Two Object Markers required per installation. Object Markers shall be considered incidental to "Installation of Guardrail."



LINE POST



HOOK BOLT INSTALLATION

POST OPTIONS ②

Contract Items:
Installation of Guardrail
Guardrail, End Anchorage, Cable, RE-29A
Tabulation: 108-9

	REVISION
	13 10-16-07
	RE-29C
	SHEET 1 of 1
REVISIONS: General re-write for clarity. Added retroreflective sheeting requirements. Removed delineators.	
Deanna Mifflin APPROVED BY DESIGN METHODS ENGINEER	
CABLE GUARDRAIL	