DYNAMIC MESSAGE SIGNS
ITS-020-1(114)--25-97
LETTING DATE 4/21/2009

WOODBURY CO.

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Iowa Department of Transportation
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

PRIMARY ROAD SYSTEM
WOODBURY COUNTY

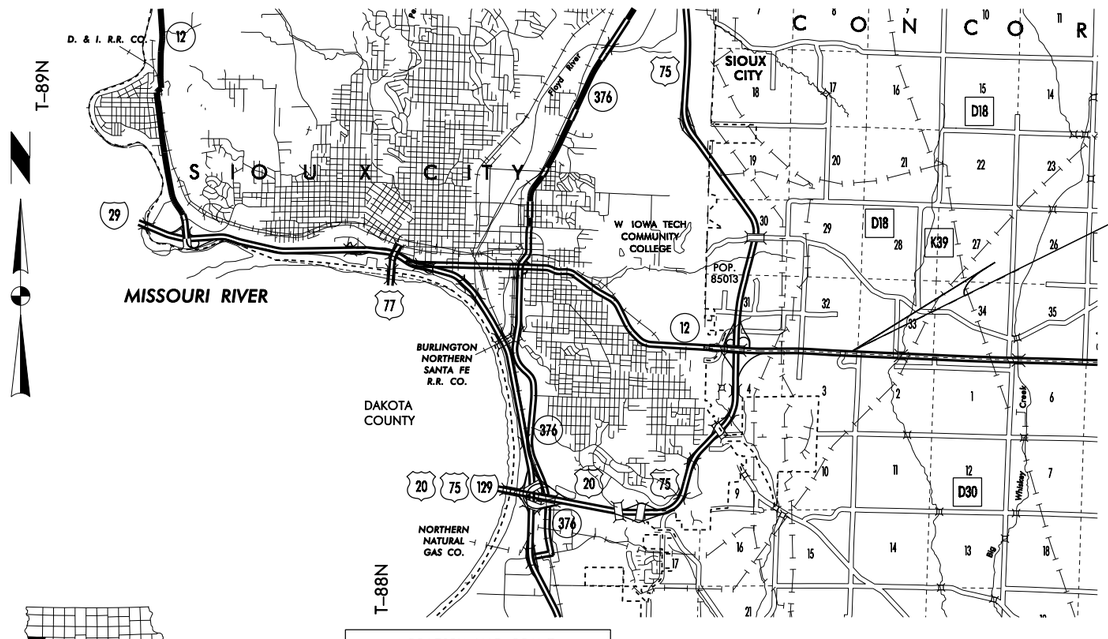
DYNAMIC MESSAGE SIGNS

OVER WESTBOUD US 20
1 MILE EAST OF THE US 75 INTERCHANGE
IN SIOUX CITY

The Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, series 2001, plus General Supplemental Specifications; and applicable Supplemental Specifications, Developmental Specifications, and Special Provisions, shall apply to construction on this project.

Value Engineering Saves. Refer to Article 1105.15 of the Specifications.

NO MILEAGE SUMMARY



PROJECT LOCATION
STA. 523+00

LOCATION MAP SCALE
0 1 2 3
Miles

REVISIONS

TOTAL 23
PROJECT INDENTIFICATION NUMBER
09-00-000-010
PROJECT NUMBER
ITS-020-1(114)--25-97
R.O.W. PROJECT NUMBER

INDEX OF SHEETS

INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.01	JEREMEY J. VORTHERMS	Primary Signature Block
V.01	JAMES R. HAUBER	Structural

LICENSED PROFESSIONAL ENGINEER
Jeremey J. Vortherms
15310
IOWA

I hereby certify that this plan 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 01/31/09
Date
Jeremey J. Vortherms
Printed or Typed Name

My license renewal date is December 31, 20 09

Pages or sheets covered by this seal:
A.1, B1-B.3, C.1-C.4, N.1-N.10Ø

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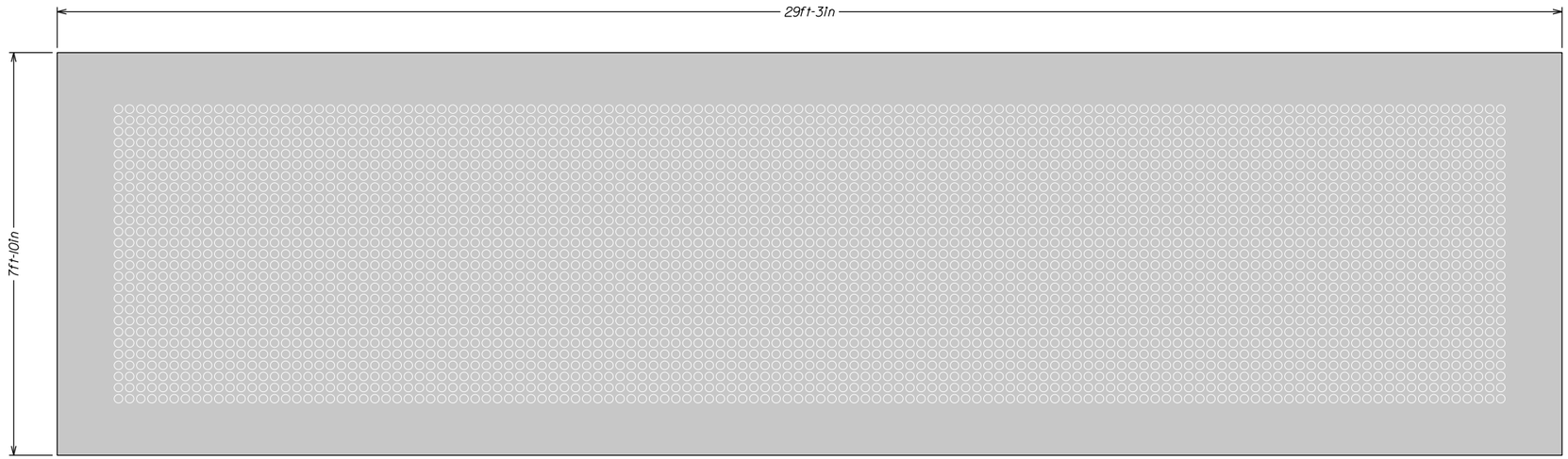
1/31/2009

DIMENSIONAL INFORMATION

Manufacturer: Daktronics
Model Number: VF-1000-27X125-18-W
Type: Full Matrix
Pixels: 125 x 27 (width x height)

Height: 7'10"
Width: 29'3"
Depth: 3'11"
Weight: 3950 lbs

Locations: 84



TRANPORTATION REQUIREMENTS

All material and equipment necessary to transport the sign to or from the storage site shall be furnished by the Contractor.

The sign shall be transported in the upright posititon. At no point in time shall the sign be laid on its side, front, or back.

To avoid damage to the sign during tranport, consult the sign manufacturer to determine the correct method to secure the sign to the trailer. Any damage incurred duing transportation shall be the responsibility of the Contractor.

STORAGE REQUIREMENTS

All material and equipment necessary to store the sign at the designated site shall be furnished by the Contractor.

The sign shall be stored upright and level. At no point in time shall the sign be laid on its side, front, or back.

The sign must be blocked up at least three inches from the ground. When the sign is not to be stored on concrete, extra blocking should be used to account for settlement.

To avoid damaging the bottom skin of the housing, blocking shall be placed directly beneath the sign's internal structural supports.

Remove all blocking from the DMS after installation on the sign truss.

If the sign is to be transported and temporarily stored at the Contractor's site of choice, it needs to be secured at all times to prevent tipping. Secure the DMS with dead man anchors or other suitable methods. Ensure that the DMS is not marred by whatever method is chosen. Tipping may be caused by any number of reasons, but high winds and other weather related events are the primary concern while the DMS is on the ground.

ATTACHMENT HARDWARE

All materials necessary to attach the DMS to the support structure will be furnished with the DMS.

Dry fit the DMS to the sign truss to determine the actual attachment bracket locations. Adjust the brackets to avoid conflicts between the U Bolts and the internal members of the sign truss. Drill the bolt holes in the Z bracket on the back of the DMS after conflicts are resolved.

After installation of the DMS onto the truss, ensure that all unused hardware (bolts, nuts, washers, etc), construction materials, tools and such are removed from the structure. The Contractor is liable for any damages that result from materials falling into traffic.

LIFTING REQUIREMENTS

The following procedures should be followed when lifting the sign for either removal or installation. This includes lifting the sign from the storage site to the trailer or the reverse, and from the trailer to the support structure or the reverse.

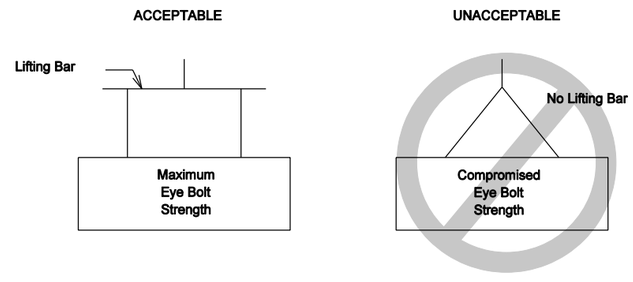
Before beginning, make sure that the crane is rated to lift the weight of the sign.

Any damage incurred during lifting shall be the responsibility of the Contractor. The information presented below is from the literature provided by each manufacturer. Consult the manufaturer for complete lifting requirements.

** Daktronics Signs **

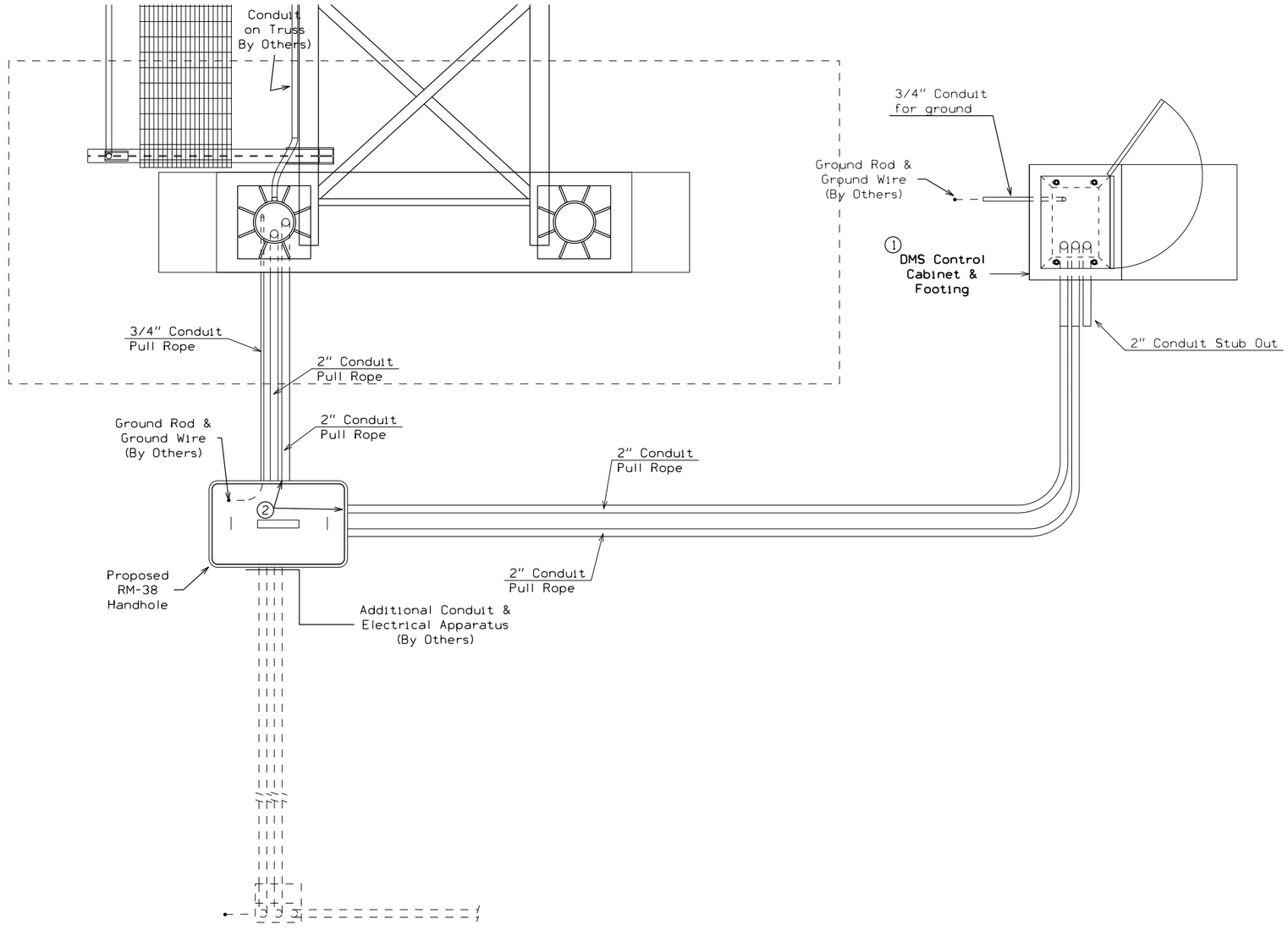
When removing an existing sign, the eyebolts used to lift the sign will need to be furnished by the Contractor. New signs will arrive equipped with eyebolts to be used to lift the unit. Take special care to ensure that the rated load of the eyebolts is not exceeded. Consult Daktronics for specific information about the eyebolts.

The figures below illustrate the correct (left example) and the incorrect (right example) method of lifting a sign. Lift the sign with the lifting bar as shown on the left. Use every lifting point (eyebolt) provided. Not doing so may cause the eyebolts to fail.



After installation, plug and seal the eyebolt openings as per the manufacturer's requirements. Any damage incurred by improperly sealed openings shall be the responsibilty of the Contractor.

LARGE DYNAMIC MESSAGE SIGN TYPICAL DIMENSIONS



PLAN VIEW

SITE INSTALLATION NOTES:

In addition to the sign truss footing, the Contractor is to install the control cabinet footing, control cabinet, handhole, and conduit between the handhole and each footing.

All wiring for communications, electrical service, and grounding will be completed by the DOT.

The DOT will furnish the control cabinet which is to be installed.

For future reference, mark the locations of all conduit entering the sign truss footing and the control cabinet footing. Locate marks on the side which the conduit enters, near the top, to ensure visibility after backfilling and shaping.

Install handhole and conduit as per sections 2523.01, 2523.09, 2523.10, 2523.11, and 2523.13.

Complete site restoration as per section 2523.18

(1) Refer to other drawings for specific details of the footing.

(2) Install socket type, bell ends on all conduits entering the handhole.

SITE INSTALLATION DETAILS FOR DYNAMIC MESSAGE SIGNS

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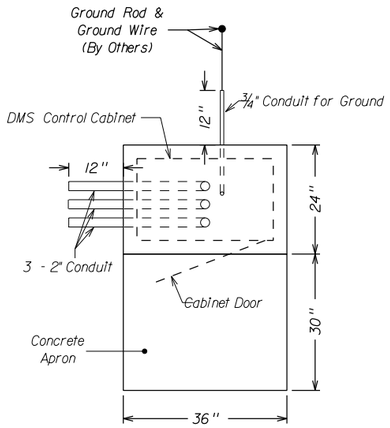
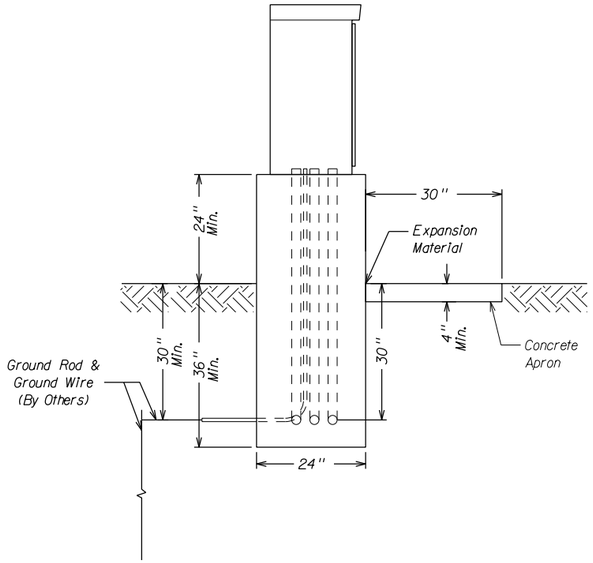
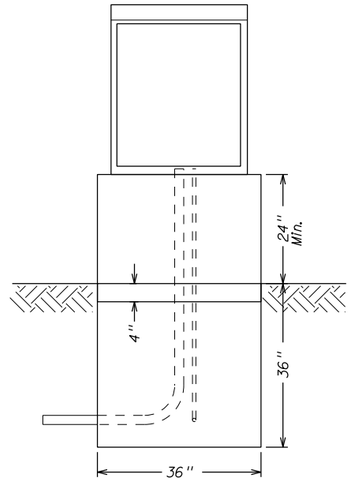
ENGLISH 22Q Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER B.2



Top View



Side View



Front View

Center DMS Cabinet on footing and attach with pull out anchors. Refer to IM 453.09 for approved anchors.

Center conduits in the footing. Prior to pouring the footing, confirm that no conflicts exist between the conduit placement and the control cabinet. Maintain at least 2" of clearance to the edge of the control cabinet.

Cap all open ends of conduit before backfilling. For future reference, mark the locations of all conduit entering the footing on the side which the conduit enters. Locate marks near the top to ensure they remain visible after backfilling and shaping.

Install socket type bell ends on conduit protruding from the footing. Finished conduit (including bell end) is to protrude 5 to 6 inches from the top of footing.

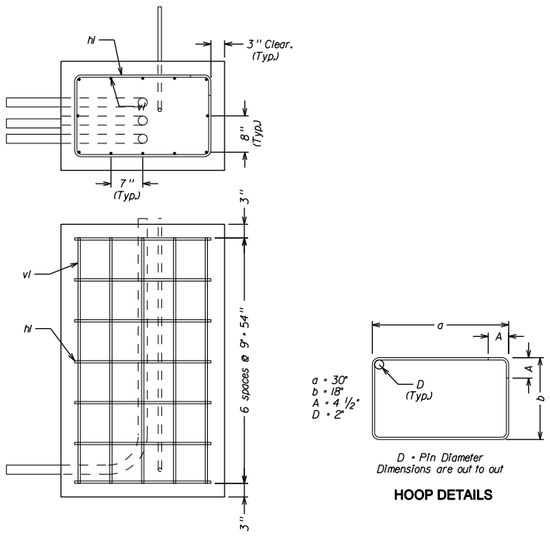
Use Class C Structural Concrete for the footing. Meet the requirements of section 2403 for placement of the concrete. The top of the footing is to be level, and the top edges rounded with an edger.

Provide forms of sufficient strength to prevent warping, bulging, of other deflections. Refer to Section 2403.07 E for addtional requirements.

Epoxy reinforcement to meet the requirements of section 2404.

Conduit to meet the requirements of section 2323.10.

Excavation, backfilling, and site restoration to meet the requirements of sections 2523.09, 2523.13, and 2523.18, respectively.



HOOP DETAILS

Reinforcing Details

EPOXY REINFORCMENT QUANTITIES per footing				
BAR	QTY	SIZE	LENGTH	WEIGHT
v1	12	#4	54	36.1
h1	7	#4	105	40.9
Total Weight				77.0

CONCRETE QUANTITIES per footing location	
Footing	1.11 cu yd
Pad	0.09 cu yd

DMS CONTROL CABINET FOOTING DETAILS

ESTIMATED PROJECT QUANTITIES

100-1A
07-15-97

Item No.	Item Code	Item	Unit	Total	As Built Quan.
1	2102-0425070	SPECIAL BACKFILL	TON	285.6	
2	2102-2625000	EMBANKMENT-IN-PLACE	CY	360.8	
3	2102-2713090	EXCAVATION, CL 13, WASTE	CY	166.6	
4	2122-5500080	PAVED SHLD, HMA, 8"	SY	770	
5	2402-2720000	EXCAVATION, CL 20	CY	92.1	
6	2403-0100000	STRUCT CONC (MISCELLANEOUS)	CY	40.4	
7	2404-7775005	REINFORC STEEL, EPOXY COATED	LB	4032	
8	2505-6000111	HIGH TENSION CABLE G'RAIL	LF	743.7	
9	2505-6000121	HIGH TENSION CABLE G'RAIL, END ANCHOR	EACH	6	
10	2505-6000131	HIGH TENSION CABLE G'RAIL,SPARE PART KIT	EACH	1	
11	2510-6745850	RMVL OF PAV'T	SY	513.4	
12	2528-8445110	TRAFFIC CONTROL	LS	1	
13	2528-9290004	CHANGEABLE MESSAGE SIGN, PORTABLE	CDAY		
14	2533-4980005	MOBILIZATION	LS	1	
15	2599-9999005	OVERHEAD SIGN SUPPORT STRUCTURE, 75'	EACH	1	
16	2599-9999005	DMS INSTALLATION, 125 X 27 PIXEL SIGN (LARGE DMS)	EACH	1	
17	2599-9999018	HIGH TENSION CABLE G'RAIL, HMA MOW STRIP	SY	113.3	

STANDARD ROAD PLANS

105-4
10-16-07

The following Standard Road Plans shall be considered applicable to construction work on this project.

Number	Date	Sheets	Title
RD-65	10-17-06	1	Special Signs for Traffic Control
RE-88	04-15-08	2	High Tension Cable Guardrail
RH-42	10-21-08	1	Paved Shoulder 8" Hot Mix Asphalt (Adjacent to PCC Pavement)
RL-14A	10-17-06	2	Guardrail Grading
RM-33	10-03-00	1	Electrical Installation Details (Roadway Ducts)
RM-38	04-27-99	1	Junction Box (Fiber Reinforced Concrete)
TC-1	10-17-06	1	Work not Affecting Traffic
TC-402	10-21-08	1	Shoulder Closure
TC-418	10-21-08	1	Lane Closure on Divided Highway
TC-451	10-21-08	1	Temporary Road Closure on Divided Highway

ESTIMATE REFERENCE INFORMATION

100-4A
10-29-02

Item No.	Item Code	Description
1	2102-0425070	SPECIAL BACKFILL Item is for constructing new median shoulders. Refer to Typical 7115 on sheet C.04.
2	2102-2625000	EMBANKMENT-IN-PLACE Item includes quantities associated with construction of an HMA Mow Strip, and median grading. Median Grading = 330.6 CY Refer to Typical 7115 on sheet C.04 and cross section sheets. HMA Mow Strip = 30.2 CY Refer to Typical 7199 on sheet C.03.
3	2102-2713090	EXCAVATION, CL 13, WASTE Item is for the removal of the existing median shoulders. Refer to Typical 7115 Sheet C.04.
4	2122-5500080	PAVED SHLD, HMA, 8" Item is for constructing new median shoulders. Refer to Typical 7115 on sheet C.04.
5 6 7	2402-2720000 2403-0100000 2404-7775005	EXCAVATION, CL 20 STRUCT CONC (MISCELLANEOUS) REINFORC STEEL, EPOXY COATED Items are for the installation of (1) new overhead sign truss. Refer to tabulation OVERHEAD for location and details. Refer to site detail sheets for specific site requirements.
8 9	2505-6000111 2505-6000121	HIGH TENSION CABLE G'RAIL HIGH TENSION CABLE G'RAIL, END ANCHOR Refer to tabulation 108-9A locations and details. Refer to site detail sheets for specific site requirements.
10	2505-6000131	HIGH TENSION CABLE G'RAIL,SPARE PART KIT Item is for furnishing repair parts to the DOT for the installed High Tension Cable Guardrail system. Spare Part Kits shall be delivered to the location specified by the Engineer, but will most likely be the Sioux City - Leeds maintenance facility.
11	2510-6745850	REMOVAL OF PAVEMENT Item is for the removal of the existing median shoulders. Refer to Typical 7115 Sheet C.04.
12	2528-8445110	TRAFFIC CONTROL Traffic control notes and details are found on the site detail sheets.
13	2528-9290004	CHANGEABLE MESSAGE SIGN, PORTABLE The Contractor is to furnish any signs necessary for traffic control. Refer the Standard Road Plans for requirements.
14	2533-4980005	MOBILIZATION Incidental to this bid item is the seeding for site restoration of disturbed areas. Refer to note 232-3A for details.
15	2599-9999005	OVERHEAD SIGN SUPPORT STRUCTURE, 75' Item is for the fabrication and installation of a steel sign truss. Refer to the V sheets for dimensions and details. These items are covered by Section 2423 of the DOT specifications.

ESTIMATE REFERENCE INFORMATION

100-4A
10-29-02

Item No.	Item Code	Description
16	2599-9999005	DMS INSTALLATION, 125 X 27 PIXEL, LARGE DMS The work performed under this bid item shall consist of furnishing all labor, apparatus, and materials to construct, install, and place in operation, a complete dynamic message sign (DMS) system. The Contractor shall furnish and install all components of the system not furnished by the DOT or utility company serving the DMS system, including all incidental items appurtenant to the operation of the system. For general purposes, the installation of the DMS includes, but is not limited to: - attaching the DMS to the sign truss, - construction of the control cabinet footing, - installation of the control cabinet, - installation of the handhole, and - installation of the conduit between the handhole and each footing. Note that no wiring or electrical service work is required. This work will be completed by the DOT. For this project, the Large DMS vendor is Daktronics, Inc. of Brookings, South Dakota. The following items will be provided by the DOT, or the DMS vendor: DMS, DMS-to-sign truss attachment brackets, and control cabinet. All arrangements to initiate and accept delivery of the DOT furnished equipment shall be coordinated with the Engineer. Delivery shall be witnessed by the Engineer, and proof of delivery shall be required for all items. Proof of delivery shall consist of an invoice that clearly identifies each item being delivered, signed by the following: the accepting party, the delivering party, and the witness. Upon acceptance of equipment, the Contractor shall be 100% liable for safe handling, storage, and installation of the equipment. Any damaged equipment shall be replaced at the Contractor's expense, without additional compensation. MEASUREMENT: Then Engineer will count the number of Overhead DMS signs installed. PAYMENT: The Contractor shall be paid the contract unit price for each Overhead DMS sign installed.
17	2599-9999018	HIGH TENSION CABLE G'RAIL, HMA MOW STRIP This item shall consist of installing a Hot Mix Asphalt pad along the installation line of a High Tension Cable Guardrail installation. The HMA mow strip is intended to prevent the accumulation of debris and vegetation which may interfere with the function and/or maintenance of the installation. The HMA mix shall conform to the requirements of detour pavment in Section 2304 of the specifications. Refer to typical 7199 for locations and details. Measurement: The Engineer shall measure the area of the HMA Mow Strip installed. Payment: The Contractor shall be paid the contract unit price for the area installed. This payment shall be full compensation for furnishing all material, equipment, and labor and for the performance of all work necessary to provide a finished mow strip.

04-15-08 232-3A

EROSION CONTROL: (Rural Seeding)

Following completion of work in a disturbed area, the area shall be seeded, fertilized, and mulched as follows:

SEEDING:

3 lbs. of Fescue or Fawn per 1000 sq. ft.

FERTILIZER:

17 lbs. of 13-13-13 (or equivalent) commercial fertilizer per 1000 sq. ft.

MULCH:

70 lbs. of dry cereal straw per 1000 sq. ft. All mulch shall be consolidated into the soil with a mulch stabilizer.

The preparation of the seedbed and the furnishing and application of seed, fertilizer, and mulch shall be considered incidental to mobilization and no extra compensation will be allowed.

Contractor is to furnish equipment necessary to lift the DMS. DOT equipment is not permitted to be used.

Shop drawing submittals will be allowed to be made electronically in order to expedite material ordering, if desired.

Drawings shall be submitted via PDF if an electronic submittal is made. Drawings will be reviewed and returned in PDF format regardless of format submitted.

Submittals shall be coordinated with the Resident Construction Engineer.

Electronic drawings may be sent to:
Jeremey.Vortherms@dot.iowa.gov

TABULATION OF MATERIALS FOR OVERHEAD SIGN SUPPORT STRUCTURES

OVERHEAD
09-25-02

STRUCTURE TYPE/LENGTH	LOCATION		DIR OF TRAVEL	MEDIAN FOOTING OFFSET (Ft)	OUTSIDE FOOTING OFFSET (Ft)	DIMENSION 'L'		FOOTING TYPE (SEE ROAD STANDARD)	FOUNDATION QUANTITIES			
	MILEPOST	STATION				MEDIAN (Ft)	OUTSIDE (Ft)		EXCAVATION (CLASS 20) (Cu Yd)	REINFORCING STEEL (Lb)	REINFORCING EPOXY-COATED STEEL (Lb)	STRUCTURAL CONCRETE (Cu Yd)
DMS #84		523+00	WB	37	112	3	3		92.1		4032	40.44
TOTALS												

NOTE: The 'L' dimension and the quantities shown in the table above are for estimating purposes only. The Contractor will verify the 'L' dimension based on actual field conditions and foreslopes before ordering any material to construct the footings.

HIGH TENSION CABLE GUARDRAIL

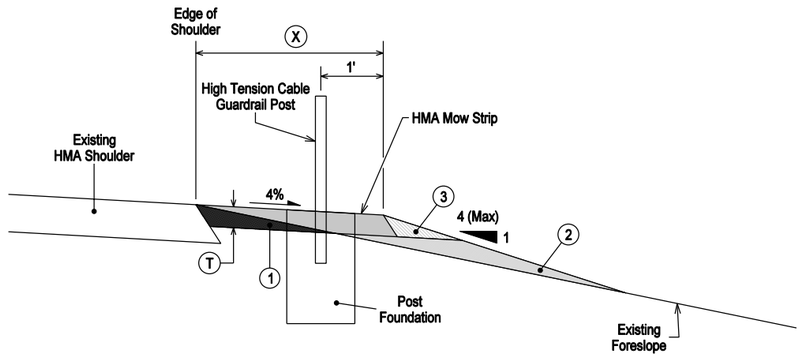
(1) Lane(s) to which the installation is adjacent.

Refer to Standard Road Plan RE-88.

108-9A
04-15-08

No.	(1) Direction of Traffic	Location: Station	Location: Side	Dimensions: Offset, D_O Ft.	Dimensions: Approach, C_A Ft.	Dimensions: Obstacle, C_O Ft.	Dimensions: Trailing, C_T Ft.	Protection Length ($C_A+C_O+C_T$) Ft.	End Anchor No.	Remarks
	EB	520+44.1 to 523+10.0	Med	2	249.9	16		265.9	2	
	WB	522+90.0 to 525+55.9	Med	2	249.9	16		265.9	2	
	WB	522+95.0 to 525+06.9	Out	2	195.9	16		211.9	2	
								743.7	6	

7199
12-12-06



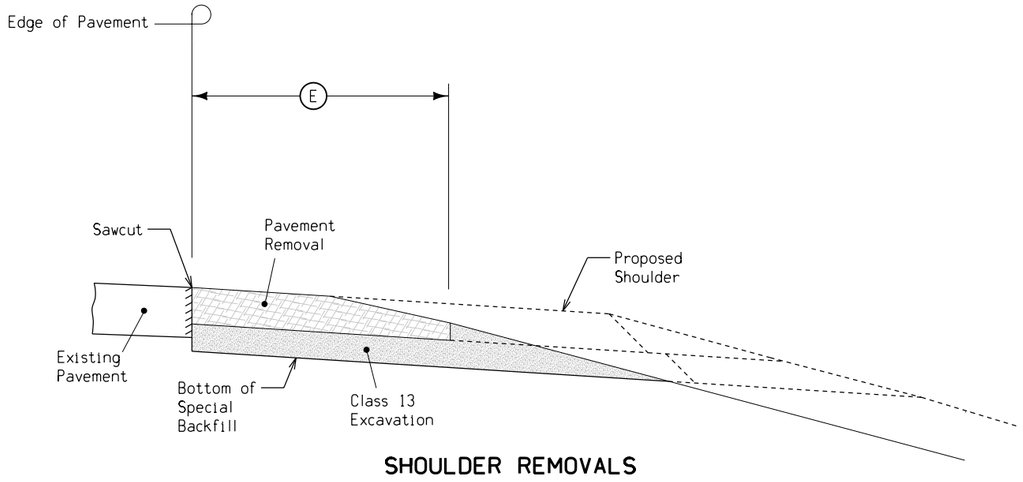
(1) Remove existing fillet.
(2) New embankment placed prior to HMA Mow Strip.
(3) New embankment placed after HMA Mow Strip.
(4) Bid Items

Items (1) (2) & (3) shall be included in the price bid for Embankment in Place.

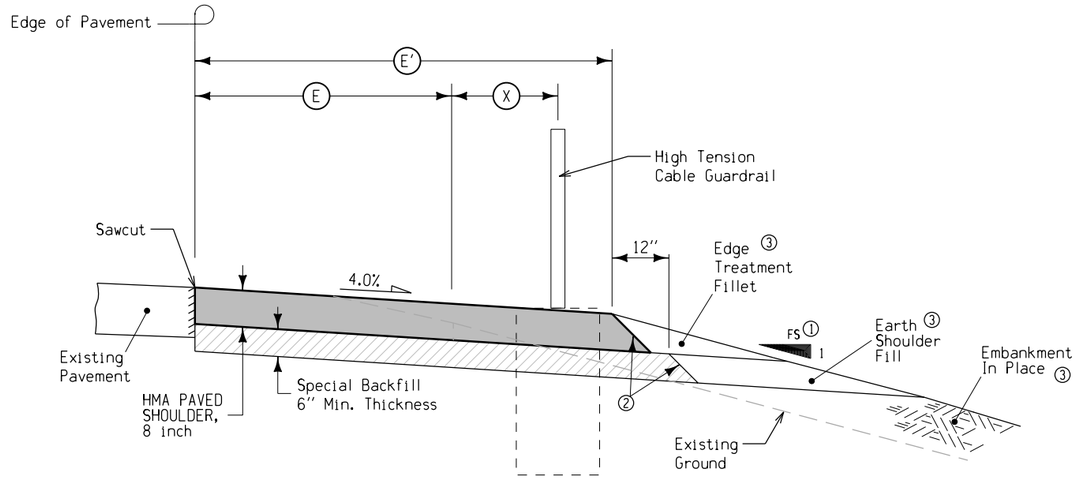
TYPICAL SECTION HOT MIX ASPHALT MOW STRIP FOR HIGH TENSION CABLE GUARDRAIL ADJACENT TO PAVED SHOULDER

Location: Road Identification	Location: Station To Station		Location: Dir.	Location: Side	X Feet	T Inches	Quantities (4): Embankment in Place CY	Quantities (4): HMA Mow Strip SY
WB - Outside	522+35	525+75	WB	LT	3	8	30.2	113.3

7115
MODIFIED



SHOULDER REMOVALS



SHOULDER CONSTRUCTION

LOCATION			SIDE	E'	E	X	SHOULDER REMOVAL		SHOULDER CONSTRUCTION					
ROAD IDENTIFICATION	STATION TO STATION			Feet	Feet	Feet	PAVEMENT REMOVAL Sq. Yds ④	CLASS 13 EXCAVATION Cu. Yds ④	EMBANKMENT IN PLACE Cu. Yds ④	SPECIAL BACKFILL Tons ④	SURFACE AREA Sq. Yds. ④	HMA BASE Tons	TACK COAT Gals.	ASPHALT BINDER Tons
US 20 - EB	519+85	523+70	MED	6	9	2	256.7	94.0	64.5	142.8	385	167.5	19.3	10.1
US 20 - WB	522+30	526+15	MED	6	9	2	256.7	72.6	266.1	142.8	385	167.5	19.3	10.1
							513.4	166.6	330.6	285.6	770	335	38.6	20.2

(E) Design Shoulder Width
(E') Paved Width
(X) HTC Offset

① Refer to XS for foreslope rate.
② Approximately 1:1 Slope
③ Embankment, Earth Shoulder Fill, and Edge Treatment Fillet quantities will be paid for as Embankment in Place.
④ Bid Items

TYPICAL SECTION
8" THICK HMA PAVED SHOULDER

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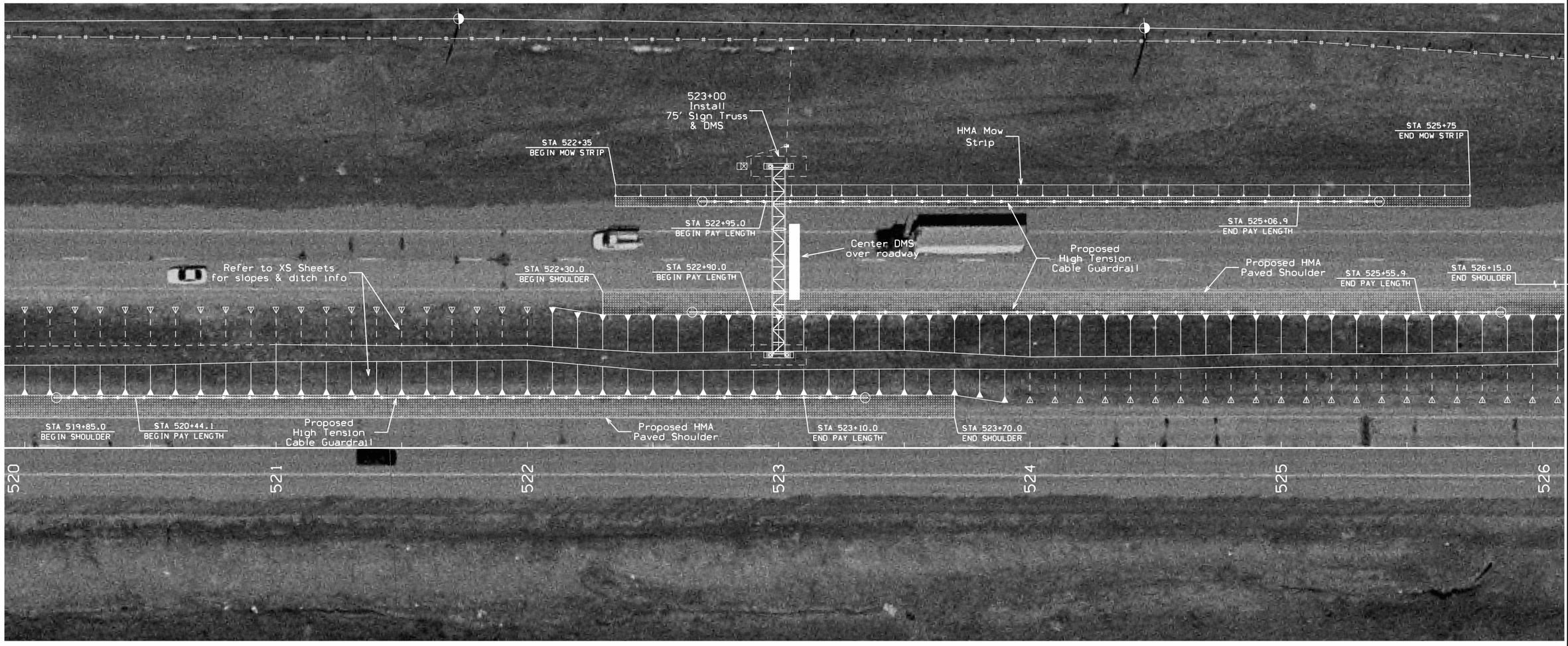
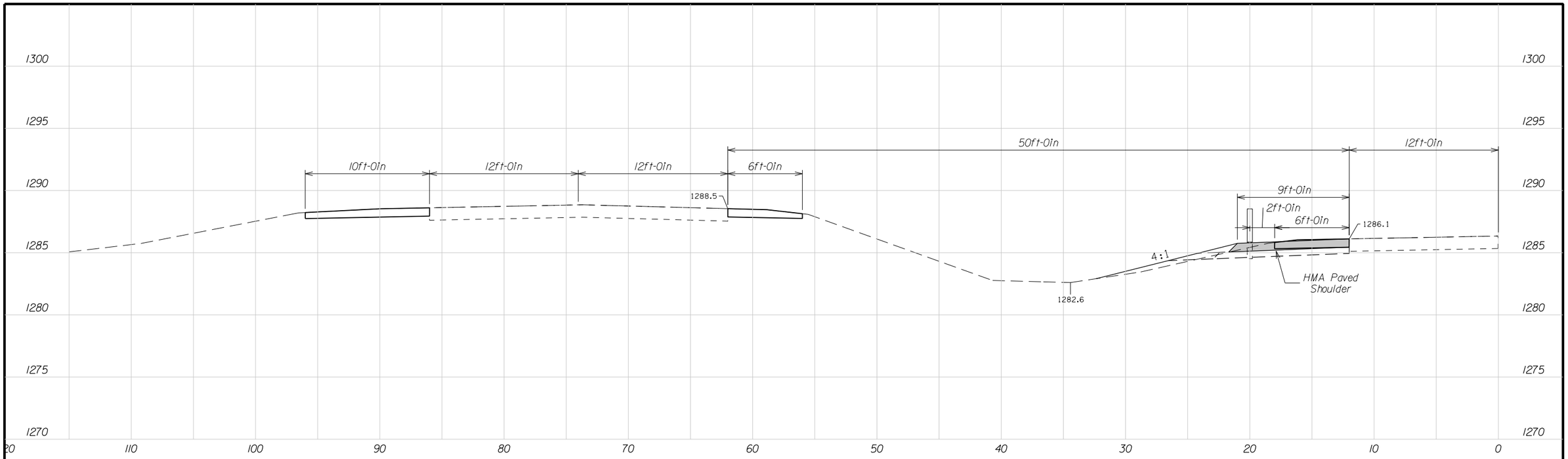


0 20
FEET

SITE DETAILS FOR DMS #84
US 20 WESTBOUND
SIOUX CITY - WOODBURY CO.

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.1



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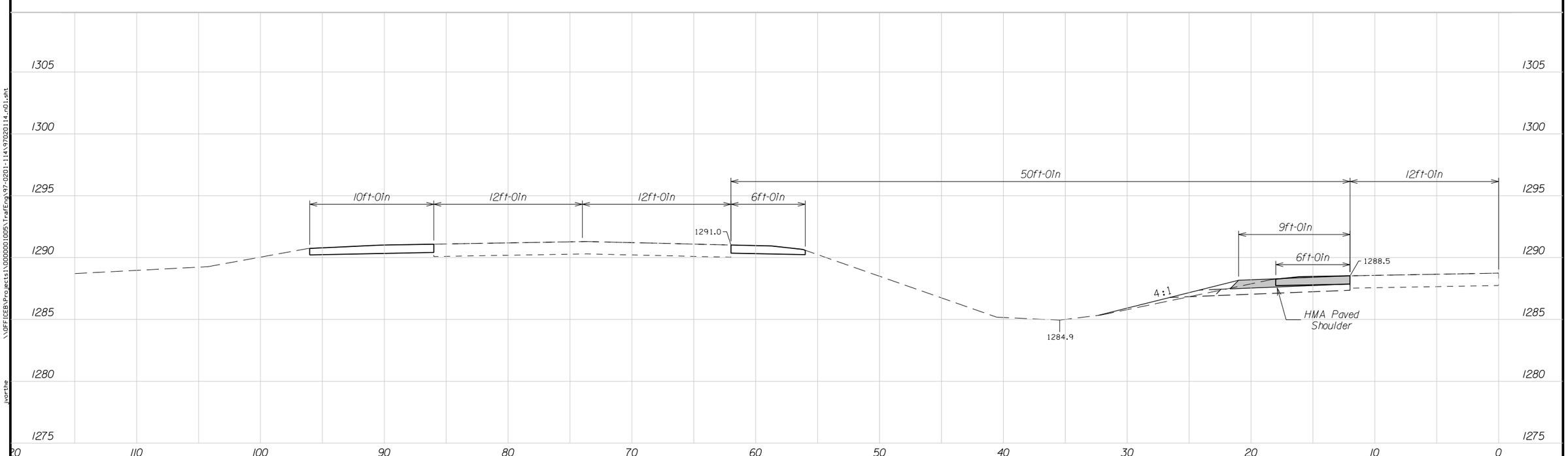

STA 520+00

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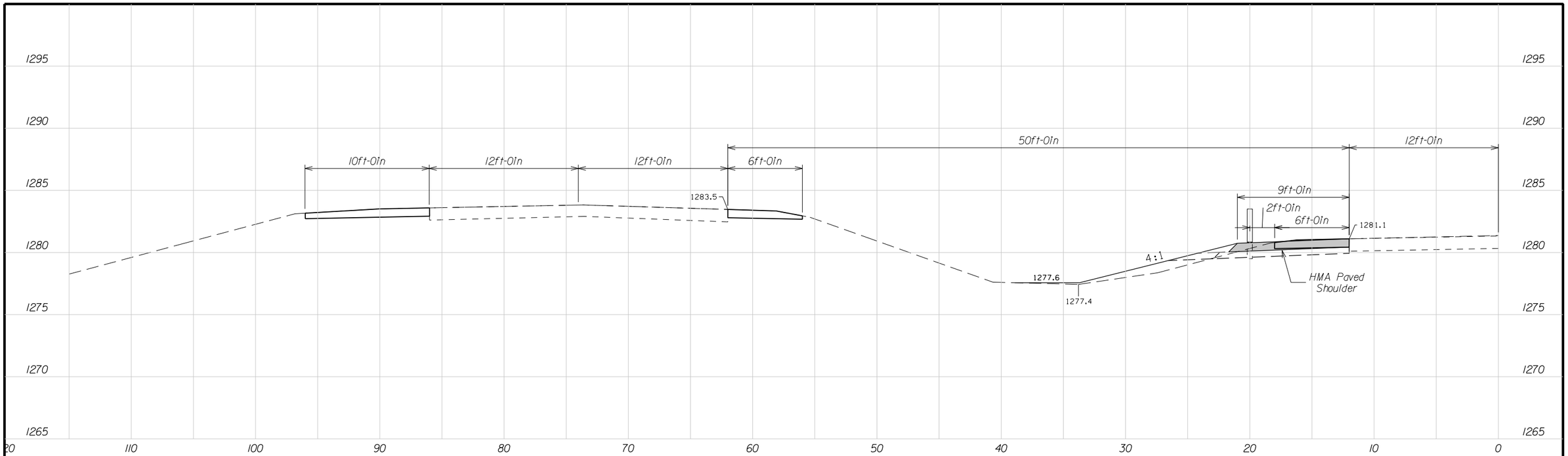
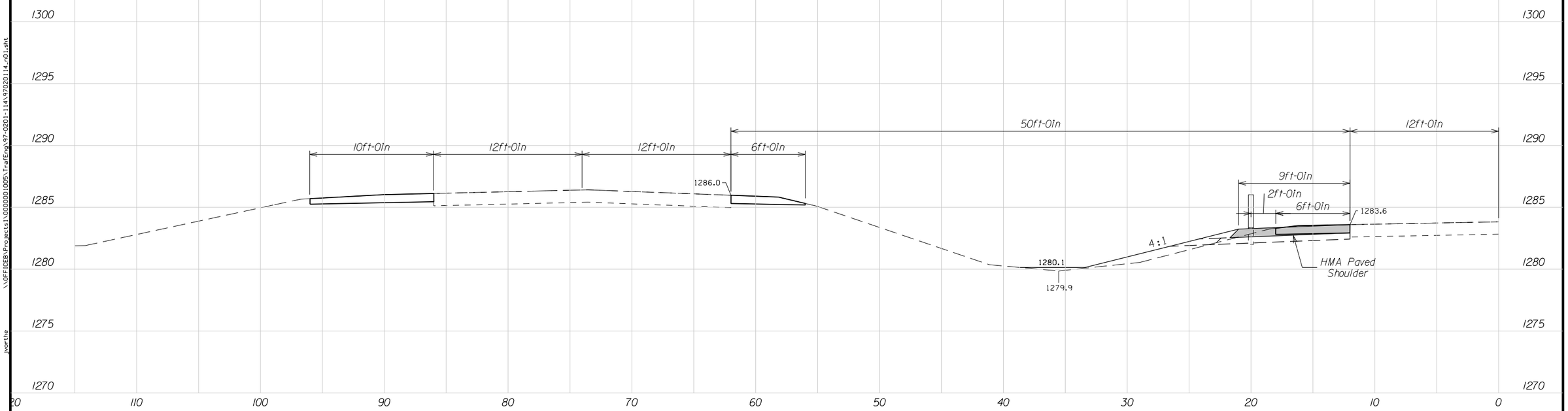
1/31/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.2



STA 521+50



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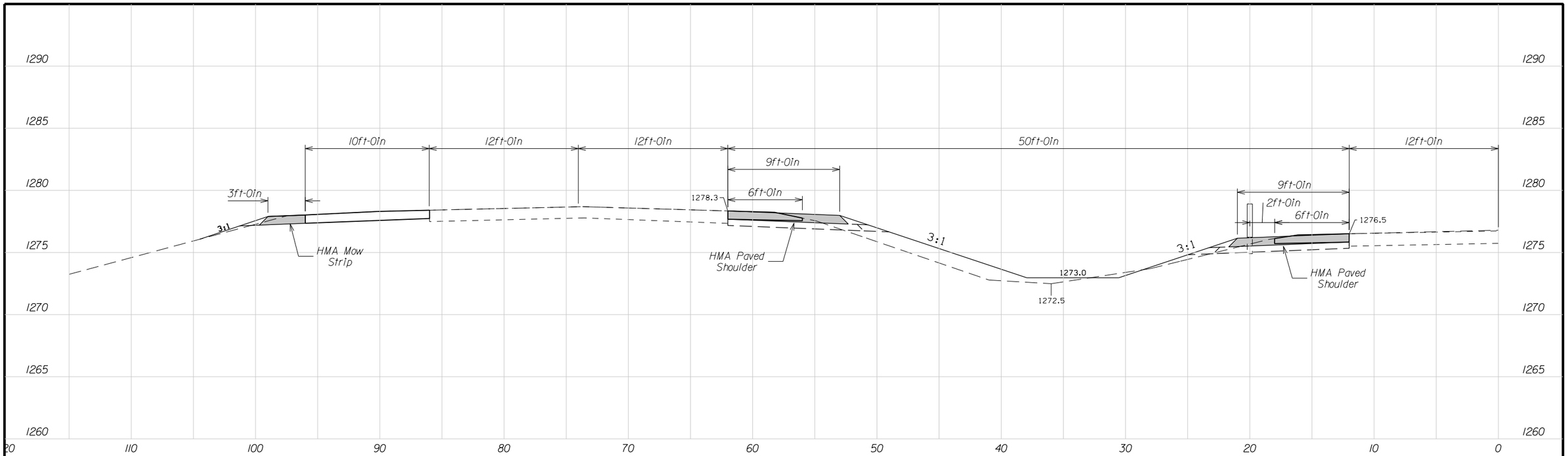
jvorthe

1/31/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.3



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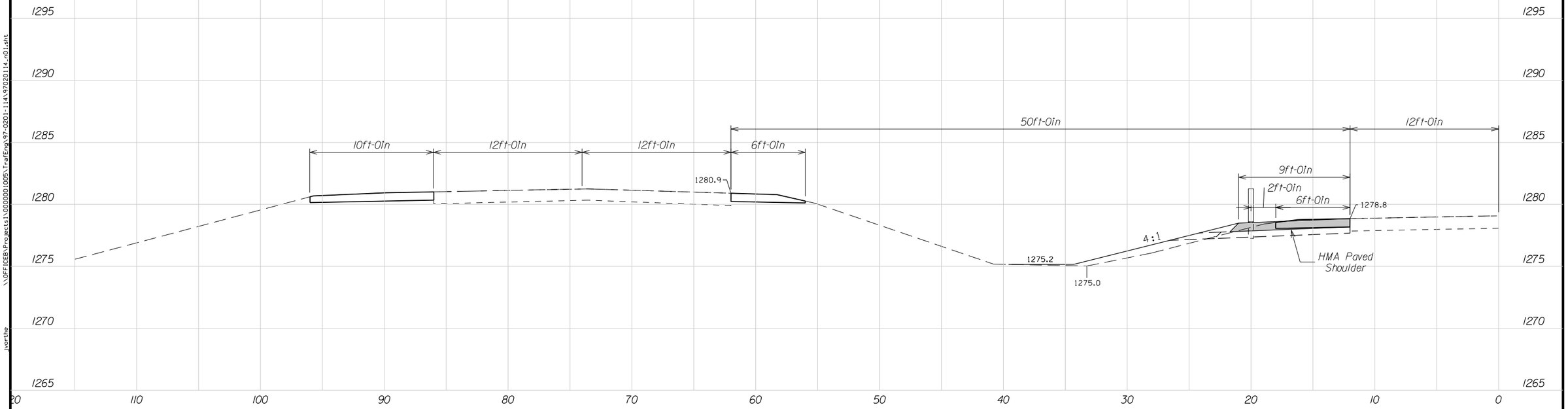

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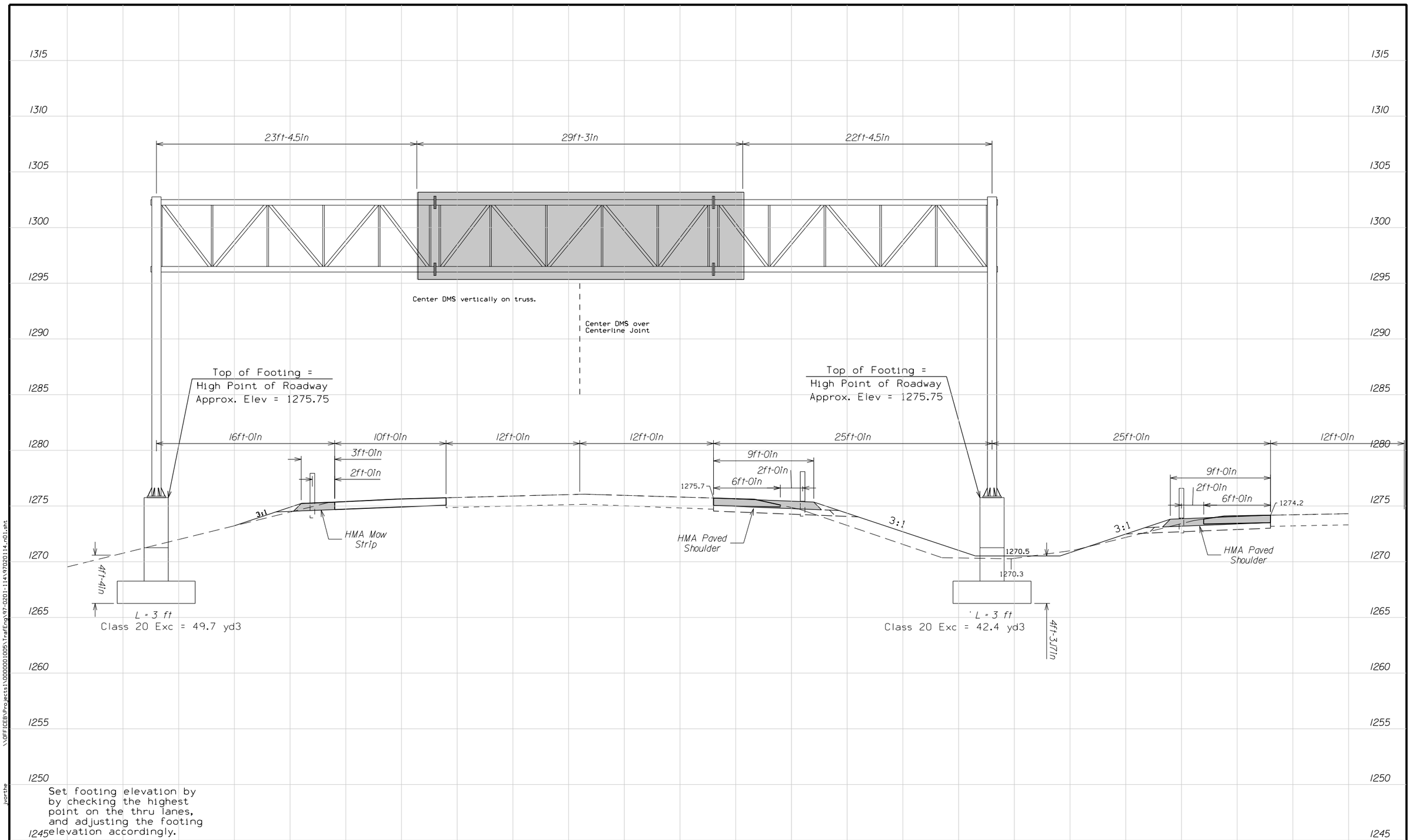
1/31/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.4



Set footing elevation by by checking the highest point on the thru lanes, and adjusting the footing elevation accordingly.

SITE #84 | US 20 WESTBOUND WOODBURY COUNTY | STA 523+00 PROPOSED 75' TRUSS

Cross Section is looking east (upstationing), which is against traffic.

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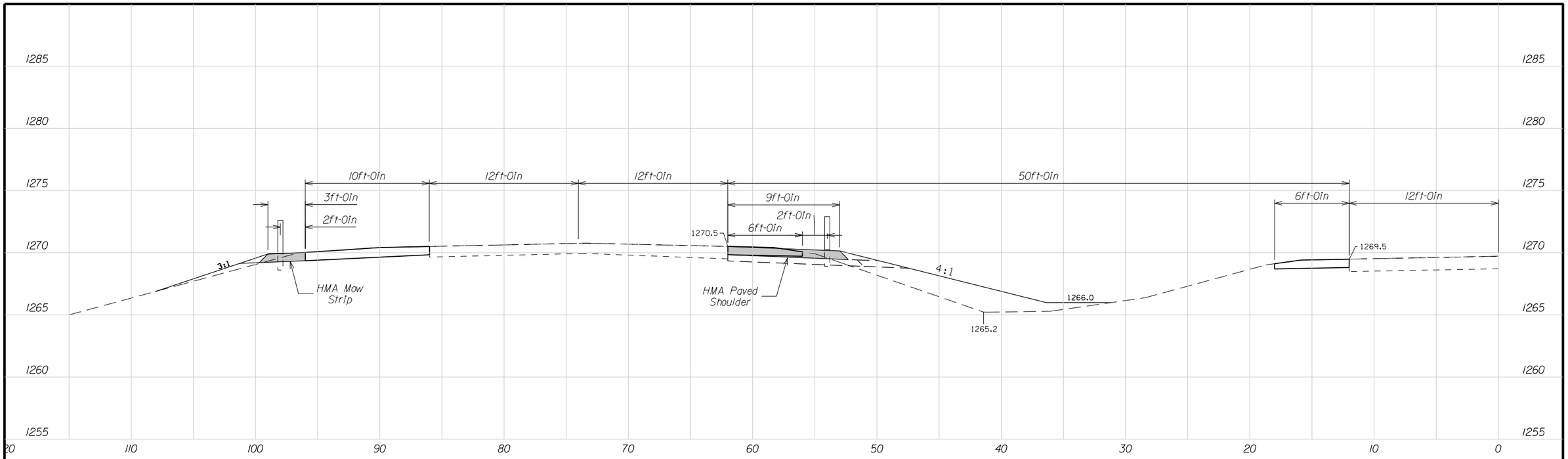
1/31/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.5



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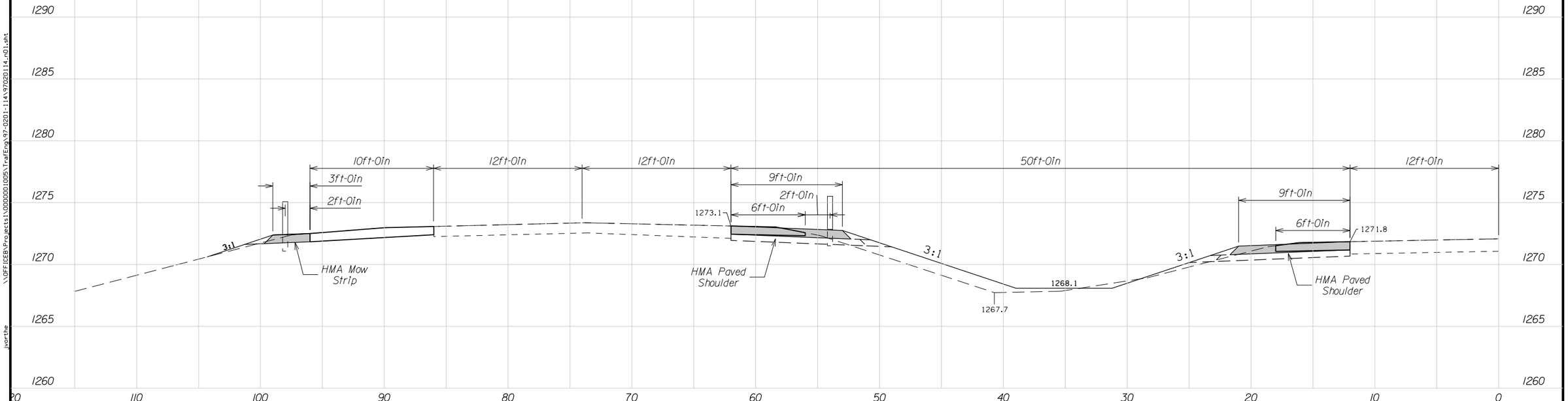

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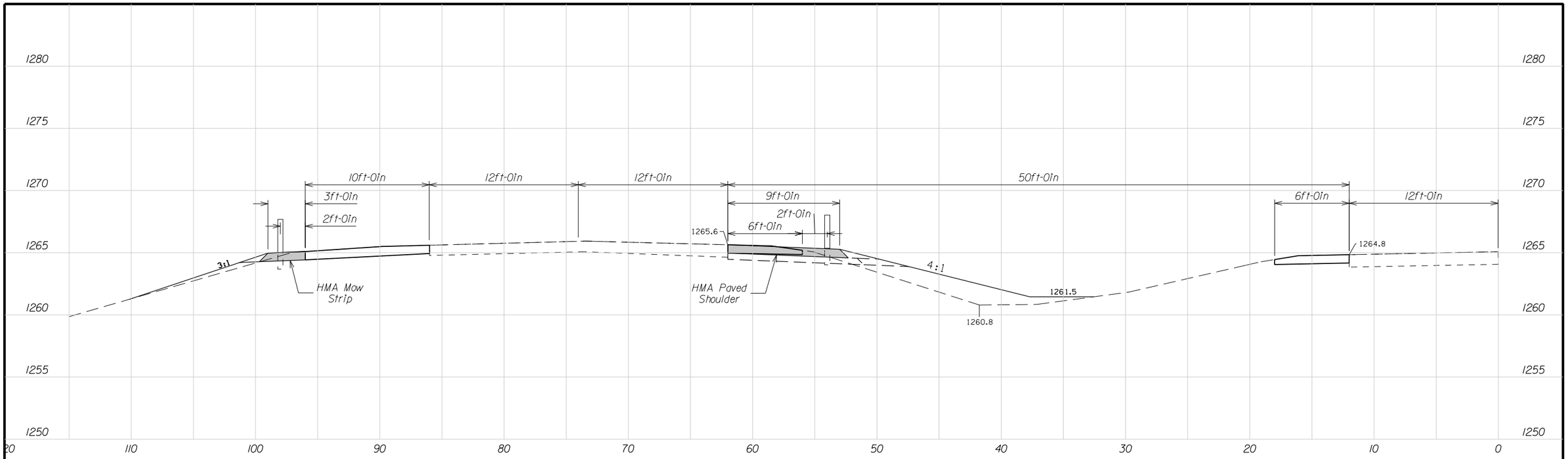
1/31/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.6



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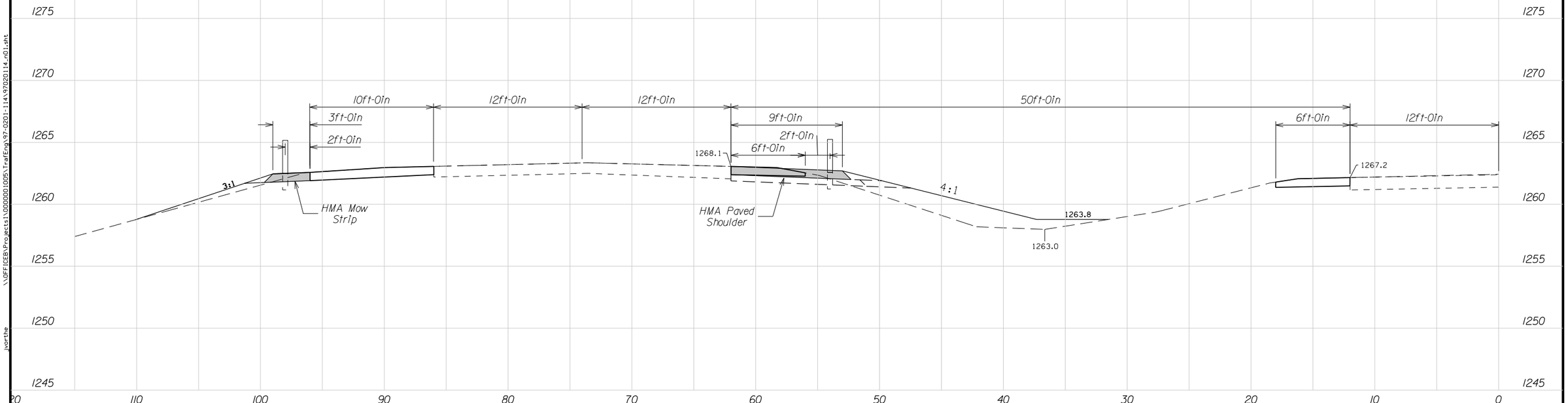

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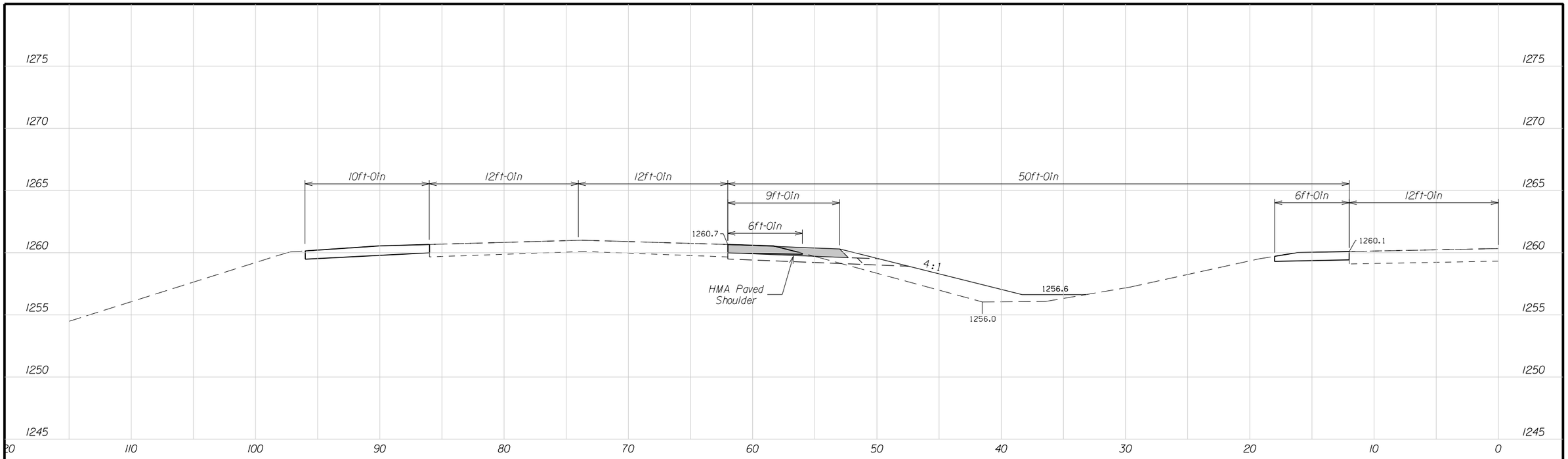
1/31/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.7



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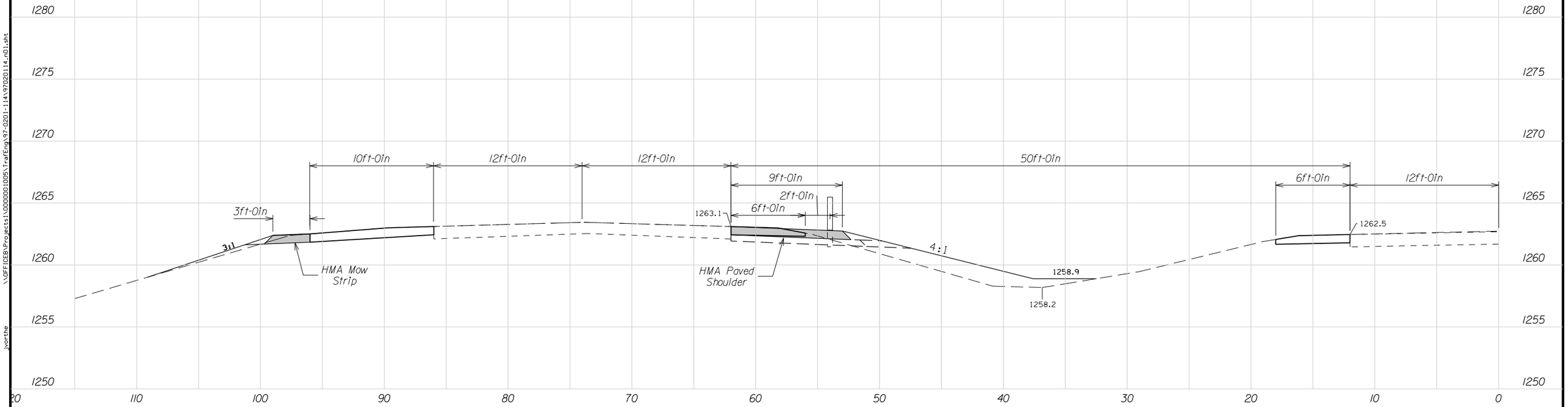

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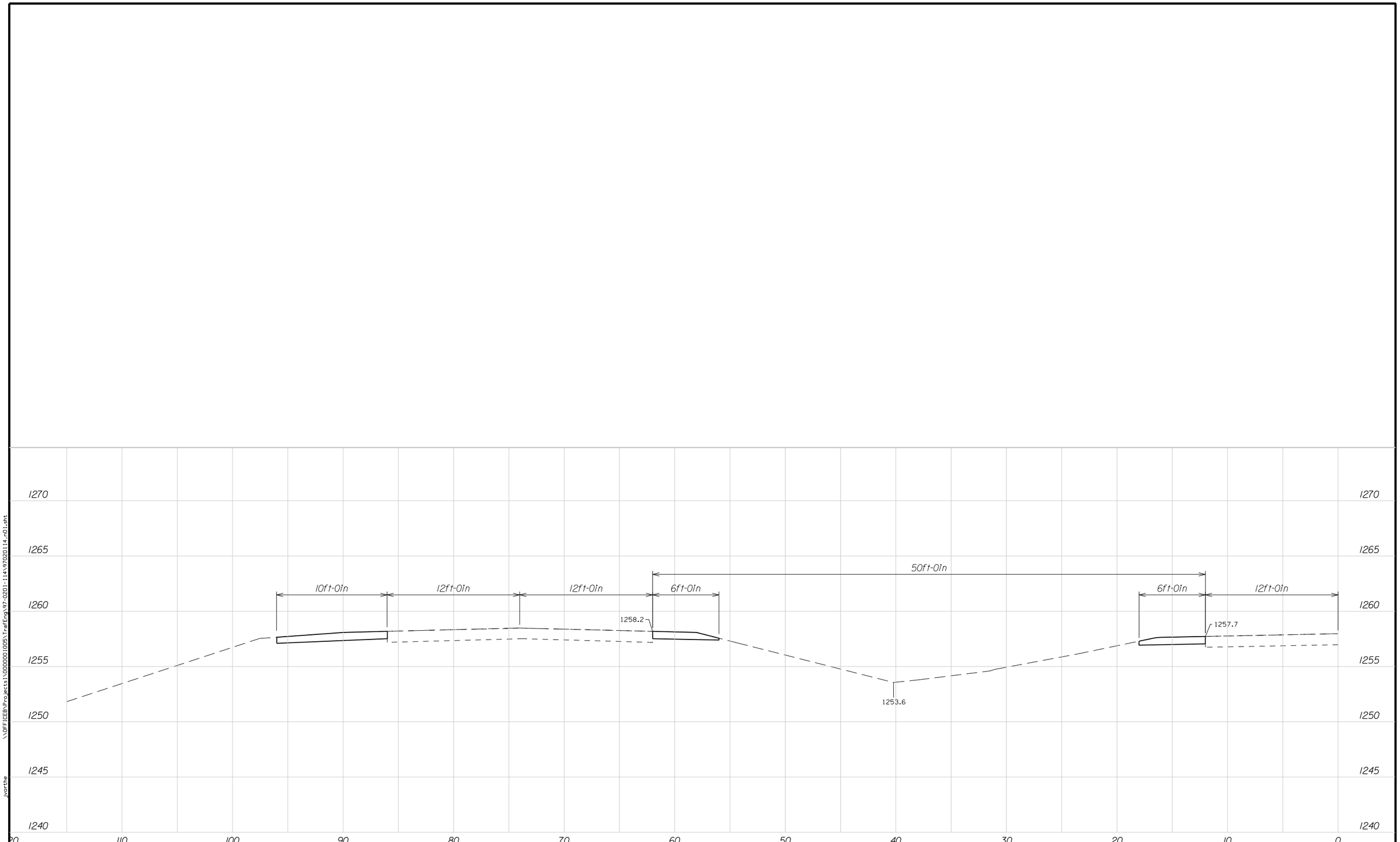
1/31/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.8



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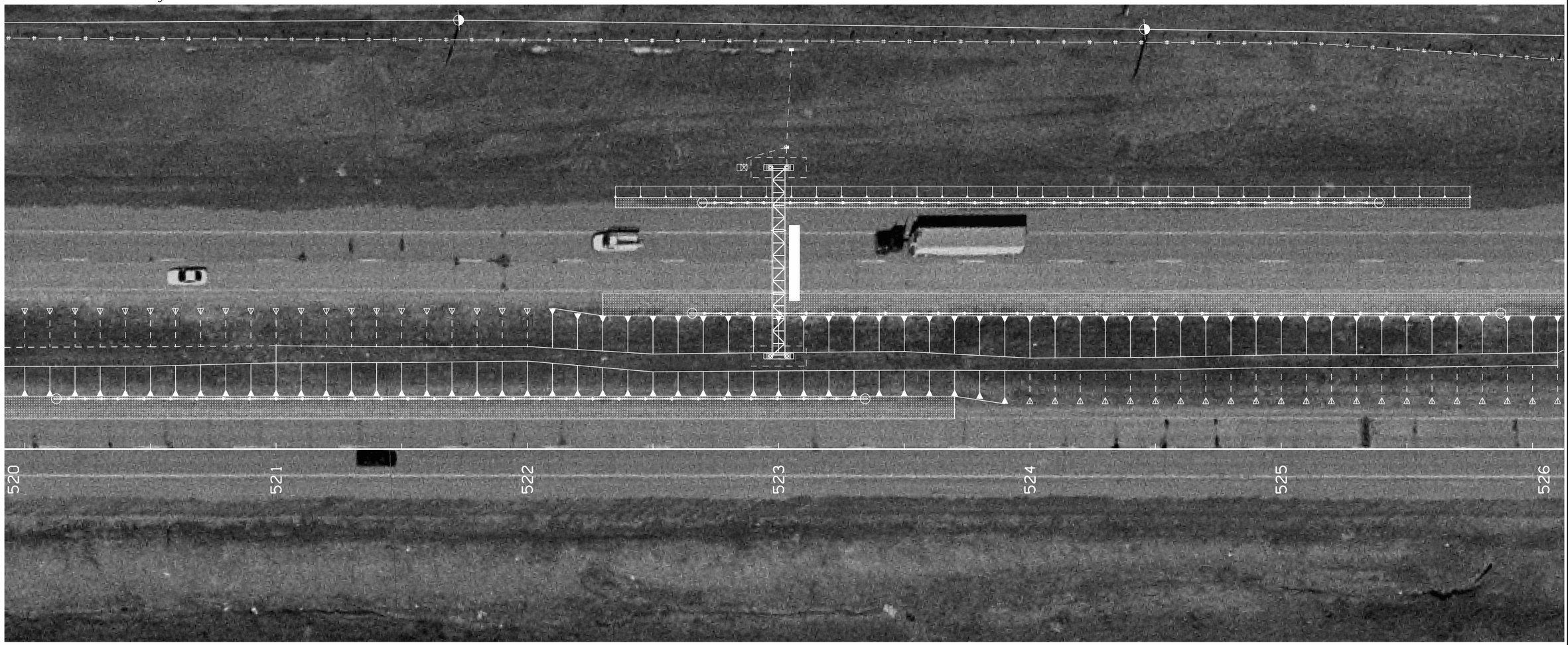
1/31/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM VORTHERMS	WOODBURY COUNTY	PROJECT NUMBER ITS-020-1(114)--25-97	SHEET NUMBER N.9	

SAMPLE STAGING SEQUENCE

Outside Footing
  Setup initial traffic control (lane closure)
  Footing construction
  Guardrail grading
  Guardrail installation
Median Footing
  Setup initial traffic control (lane closure)
  Footing construction
  Guardrail grading
  Guardrail installation
Install sign truss and DMS
Final seeding



GENERAL

Maintain two lanes of traffic in each direction except as noted:
- use a road closure (TC-451) to install the truss chords and DMS, and
- use lane clousures (TC-418 & TC-420) for site construction activities.

Install traffic control at this site in accordance with listed Standard Road Plans. For additional complementary information, refer to Part 6 of the Manual on Uniform Traffic Control Devices and to the current Standard Specifications.

Protect the work areas with a lane closure before commencment of the following work activities:
- construction of the footing including excavation, forming, tying reinforcement, pouring concrete, and backfilling around the footing
- construction of the control cabinet foundation
- installation of conduit and wiring
- construction of the HMA mow strip
- installation of the high tension cable guardrail
- any other time when workers are present at the site for an extended duration
- grading of the guardrail blister

After the footing is completed (including backfill), protect the work area with a shoulder closure when workers are not present at the site.

After the guardrail is completed, no addtional traffic control will be required when workers are not present at the site.

Fully complete the first footing before starting the second footing. This includes all excavation, footing construction, and backfilling around the footing. Site grading and guardrail are not required to be finished before the next footing is started. However, simultaneous work on each footing may not be performed because of the lane closure requirement.

TRAFFIC CONTROL STANDARD ROAD PLANS

TC-1 TC-451
TC-402
TC-418

0 20
FEET

TRAFFIC CONTROL FOR DMS #84
US 20 WESTBOUND
SIOUX CITY - WOODBURY CO.

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jvorthe
2/24/2009

ENGLISH 720 Resolution	Iowa Department of Transportation	OFFICE OF TRAFFIC & SAFETY	DESIGN TEAM	COUNTY	PROJECT NUMBER	SHEET NUMBER N.10

ANCHOR BOLT NOTES:

PROCEDURE FOR TIGHTENING ANCHOR BOLT NUTS ON OVERHEAD SIGN TRUSS.

1) THIS WORK SHALL BE PERFORMED ONLY ON DAYS WITH WINDS LESS THAN 15 MPH. ALL TIGHTENING OF THE NUTS IS TO BE DONE IN THE PRESENCE OF THE INSPECTOR. ONCE THE TIGHTENING PROCEDURE IS STARTED IT MUST BE COMPLETED ON ALL OF THE BASE PLATE NUTS WITHOUT PAUSE OR DELAY.

2) PROPERLY SIZED WRENCHES DESIGNED FOR TIGHTENING NUTS AND/OR BOLTS SHALL BE USED TO AVOID ROUNDING OR OTHER DAMAGE TO THE NUTS. ADJUSTABLE END OR PIPE WRENCHES MAY NOT BE USED.

3) BASE PLATE, ANCHOR RODS AND NUTS ARE TO BE FREE OF ANY DIRT OR DEBRIS.

4) APPLY STICK WAX OR BEES WAX TO THE THREADS AND BEARING SURFACES OF THE ANCHOR BOLT, NUTS, AND WASHERS.

5) TIGHTEN TOP NUTS SO THEY FULLY CONTACT THE BASE PLATE. TIGHTEN LEVELING NUTS TO SNUG TIGHT CONDITION. SNUG TIGHT IS DEFINED AS THE FULL EFFORT OF ONE PERSON ON A WRENCH WITH A LENGTH EQUAL TO 14 TIMES THE BOLT DIAMETER BUT NOT LESS THAN 18 INCHES. APPLY THE FULL EFFORT AS CLOSE TO THE END OF THE WRENCH AS POSSIBLE. PULL FIRMLY BY LEANING BACK AND USING ENTIRE BODY WEIGHT ON THE END OF THE WRENCH UNTIL THE NUT STOPS ROTATING. USE A MINIMUM OF TWO SEPARATE PASSES OF TIGHTENING. SEQUENCE THE TIGHTENING IN EACH PASS SO THAT THE NUT ON THE OPPOSITE SIDE, TO THE EXTENT POSSIBLE, WILL BE SUBSEQUENTLY TIGHTENED UNTIL ALL OF THE NUTS IN THAT PASS HAVE BEEN TIGHTENED.

6) TIGHTEN TOP NUTS TO SNUG TIGHT AS DESCRIBED FOR THE LEVELING NUTS.

7) MATCH-MARK THE TOP NUTS AND BASE PLATE USING PAINT, CRAYON, OR OTHER APPROVED MEANS TO PROVIDE A REFERENCE FOR DETERMINING THE RELATIVE ROTATION OF THE NUT AND BASE PLATE DURING TIGHTENING. USING A STRIKING OR HYDRAULIC WRENCH, FURTHER TIGHTEN THE TOP NUTS IN TWO PASSES AS LISTED IN THE FOLLOWING TABLE. USE A SEQUENCE OF TIGHTENING IN EACH PASS SO THAT THE NUT ON THE OPPOSITE SIDE, TO THE EXTENT POSSIBLE, WILL BE SUBSEQUENTLY TIGHTENED UNTIL ALL NUTS IN THAT PASS HAVE BEEN TURNED. DO NOT ROTATE THE LEVELING NUT DURING THE TOP NUT TIGHTENING.

ANCHOR BOLT SIZE	FIRST PASS	SECOND PASS	TOTAL ROTATION
LESS THAN OR EQUAL TO $1\frac{1}{2}\Phi$"	1/6 TURN	1/6 TURN	1/3 TURN
GREATER THAN $1\frac{1}{2}\Phi$"	1/12 TURN	1/12 TURN	1/6 TURN

8) LUBRICATE, PLACE AND TIGHTEN THE JAM NUTS TO SNUG TIGHT.

DESIGN STRESSES:

DESIGN STRESSES FOR MATERIALS ARE IN ACCORDANCE WITH A.A.S.H.T.O STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGN, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2001 INCLUDING INTERMS UP TO 2006.

STAINLESS STEEL U-BOLT NOTES:

1) UNLESS OTHERWISE NOTED ON THE PLAN, ALL STAINLESS STEEL U-BOLTS SHALL BE FURNISHED WITH STAINLESS STEEL REGULAR HEXAGONAL NUTS, JAM NUTS AND WASHERS UNDER BOTH HEADS AND NUTS. STAINLESS STEEL U-BOLTS SHALL MEET REQUIREMENTS OF ASTM A320, TYPE 304 OR ASTM F593 GROUP 1, 2, OR 3 CONDITION A.

2) IN CASE STAINLESS STEEL LOCK WASHERS ARE USED IN LIEU OF JAM NUTS, THE REGULAR WASHERS UNDER NUTS ARE TO BE OMITTED.

STEEL NOTES:

ALL STEEL SHAPES, BARS, AND PLATES SHALL COMPLY WITH ASTM A36 EXCEPT MINOR PARTS APPROVED BY THE ENGINEER MAY COMPLY WITH ASTM A575 GRADE M1020. ALL STEEL PIPE SHALL COMPLY WITH THE REQUIREMENTS OF ASTM A53 GRADE B, TYPE E OR S.

ALL STEEL SECTIONS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. PROVIDE VENT HOLES FOR GALVANIZING.

STEEL WELDING SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE AWS SPECIFICATIONS D1.1, STRUCTURAL WELDING CODE-STEEL.

MAGNETIC PARTICLE TESTING SHALL BE PREFORMED ON THE POST TO BASE PLATE AND STIFFENER FILLET WELDS.

SPECIFICATIONS:

DESIGN: A.A.S.H.T.O. STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2001 INCLUDING INTERMS UP TO 2006; STATE STANDARD FATIGUE DESIGN. AMERICAN INSTITUTE OF STEEL CONSTRUCTION, THIRTEENTH EDTION.

CONSTRUCTION: IOWA D.O.T. STANDARD SPECIFICATIONS, SERIES 2001 PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

GENERAL NOTES:

ALL TRUSSES ARE DESIGNED FOR 30 lb/ft^2 WIND PRESSURE ON TRUSS MEMBERS AND 40 PSF ON DMS.

ALL PIPES, SHAPES, AND PLATES SHALL BE STRUCTURAL STEEL COMPLYING WITH THE ASTM SPECIFICATIONS NOTED.

SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL.

SHOP DRAWINGS SHALL INDICATE LEFT AND RIGHT SUPPORTS.

THE PRECISE ALIGNING AND ERECTING OF ALL COMPONENTS OF THE OVERHEAD SIGN TRUSS AND ITS SUPPORTS SHALL BE CONSIDERED ESSENTIAL. THE CONTRACTOR SHALL SUBMIT DOCUMENTATION TO THE ENGINEER SHOWING THAT THE VARIOUS COMPONENTS HAVE BEEN MEASURED AND ARE LOCATED WITHIN THE TOLERANCES LISTED BELOW.

FOUNDATIONS AND ANCHOR BOLTS:

1) EACH FOUNDATION SHALL BE ACCURATELY LOCATED, WITH THE CENTER OF THE TWO ANCHOR BOLT GROUPS NOT MORE THAN 1 INCH FROM THE PLAN LOCATION IN THE DIRECTION PARALLEL WITH AND PERPENDICULAR TO THE OVERHEAD TRUSS.

2) THE TWO FOUNDATIONS SHALL BE PARALLEL, WITH THE DISTANCES ALONG THE OVERHEAD TRUSS BETWEEN CENTERS OF FRONT AND REAR ANCHOR BOLT GROUPS DIFFERING BY NOT MORE THAN 1 INCH.

3) ELEVATIONS OF THE TOP OF EACH FOUNDATION SHALL BE WITHIN 1 INCH OF PLAN ELEVATION.

4) ANCHOR BOLT GROUPS SHALL BE LOCATED ACCURATELY BY TEMPLATE OR OTHER POSITIVE MEANS, WITH CENTERS OF ADJACENT ANCHOR BOLT GROUPS WITHIN $\frac{3}{16}$ INCH OF THE CORRECT DISTANCE APART.

5) ANCHOR BOLTS SHALL BE PLUMB WITHIN $\frac{1}{4}$ INCH PER FOOT FROM VERTICAL.

6) ANCHOR BOLTS SHALL PROJECT ABOVE TOP OF FOUNDATION WITHIN $\frac{1}{4}$ INCH OF THE PLAN DIMENSION.

7) WELDING OF ANCHOR BOLTS SHALL NOT BE ALLOWED. THE CONTRACTOR SHALL OBTAIN A TEMPLATE FROM THE MANUFACTURER / FABRICATOR FOR PROPER PLACEMENT OF THE ANCHOR BOLTS.

COMPLETED STEEL STRUCTURE:

1) EACH TRUSS SUPPORT COLUMN SHALL BE PLUMB WITHIN $\frac{1}{16}$ INCH PER FOOT OF VERTICAL IN TWO PERPENDICULAR DIRECTIONS.

2) STICK-OUT OF EACH TRUSS LOWER CHORD SHALL BE WITHIN $2\frac{3}{4}$ AND $5\frac{1}{2}$ INCHES MEASURED FROM OUTER U-BOLT TO INSIDE OF CHORD END PLATE.

3) THE TRUSS SHALL BE SQUARE WITHIN SUPPORTS. HORIZONTAL LINE BETWEEN CHORDS SHALL BE LEVEL WITHIN $\frac{1}{16}$ INCH PER FOOT OF HORIZONTAL, AND VERTICAL LINE BETWEEN CHORDS SHALL BE PLUMB WITHIN $\frac{1}{16}$ INCH PER FOOT OF VERTICAL.

STRUCTURAL DESIGN

LICENSED PROFESSIONAL ENGINEER
James R. Hauber
18418
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.

James Hauber — 12-30-08
Signature — Date

James R. Hauber
Printed or Typed Name

My license renewal date is December 31, 2010

Pages or sheets covered by this seal: V.1 THRU V.5

DESIGN FOR

GALVANIZED OVERHEAD SIGN TRUSS WITH GALVANIZED STEEL SUPPORTS

INDEX AND NOTES

STATION: 523+00.00 W.B. US20 — JANUARY, 2009

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 — FILE NO. 30393 — DESIGN NO. 809

DESIGN TEAM JRH/DAW | WOODBURY COUNTY | PROJECT NUMBER ITS-020-1(114)--25-97 | SHEET NUMBER V.1

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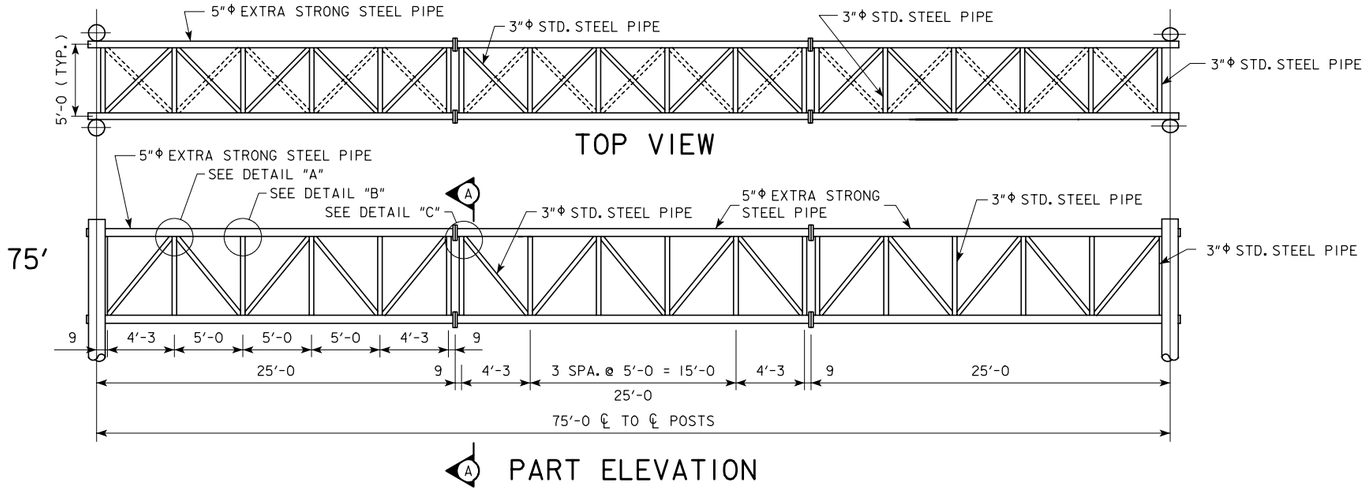
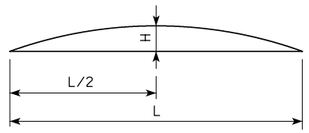
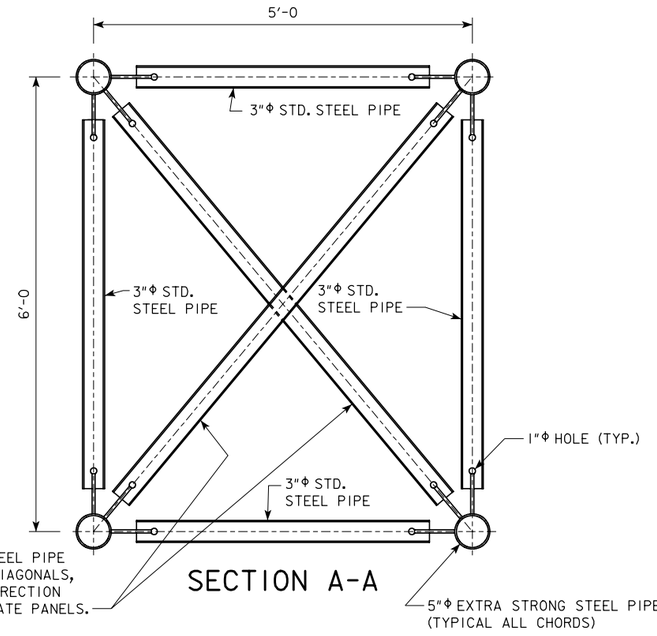


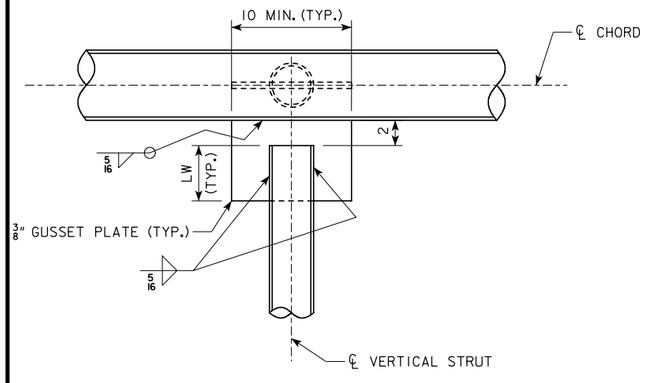
SPAN L	CAMBER H
75'	$1\frac{7}{8}$



CAMBER DIAGRAM



SECTION A-A



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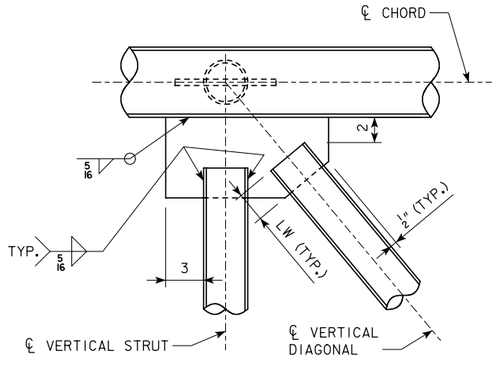

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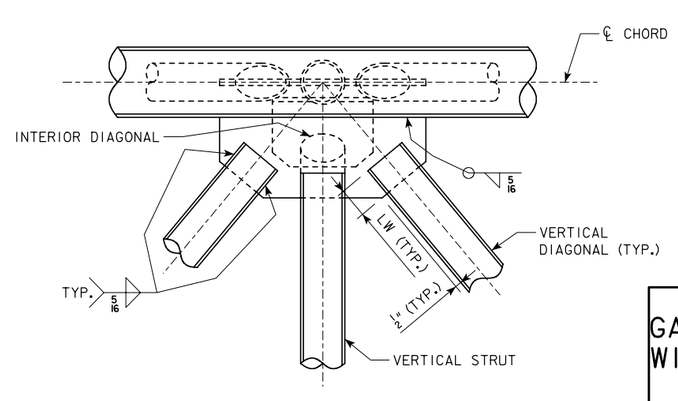


DETAIL "A"
FOR 3"Φ STD. STEEL PIPE
LW (MIN.) = $3\frac{1}{2}$"

DESIGN FOR
GALVANIZED OVERHEAD SIGN TRUSS WITH GALVANIZED STEEL SUPPORTS

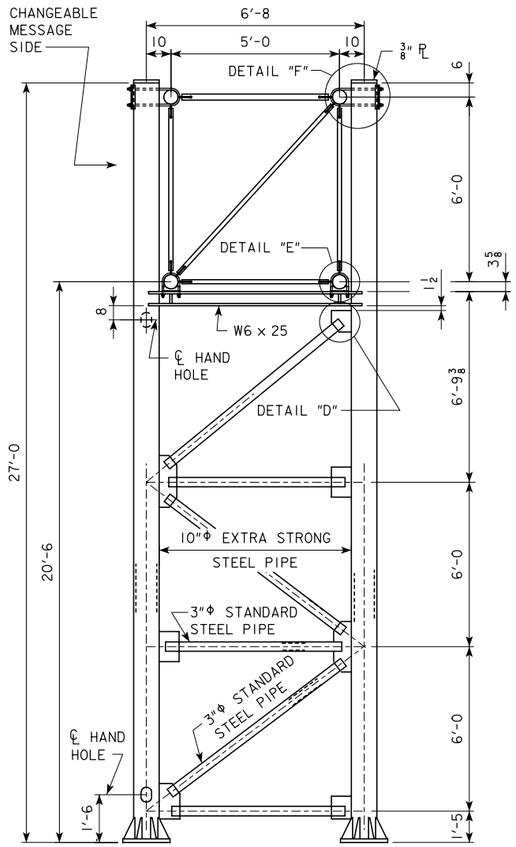
ELEVATION VIEWS

STATION: 523+00.00 W.B. US20 JANUARY, 2009

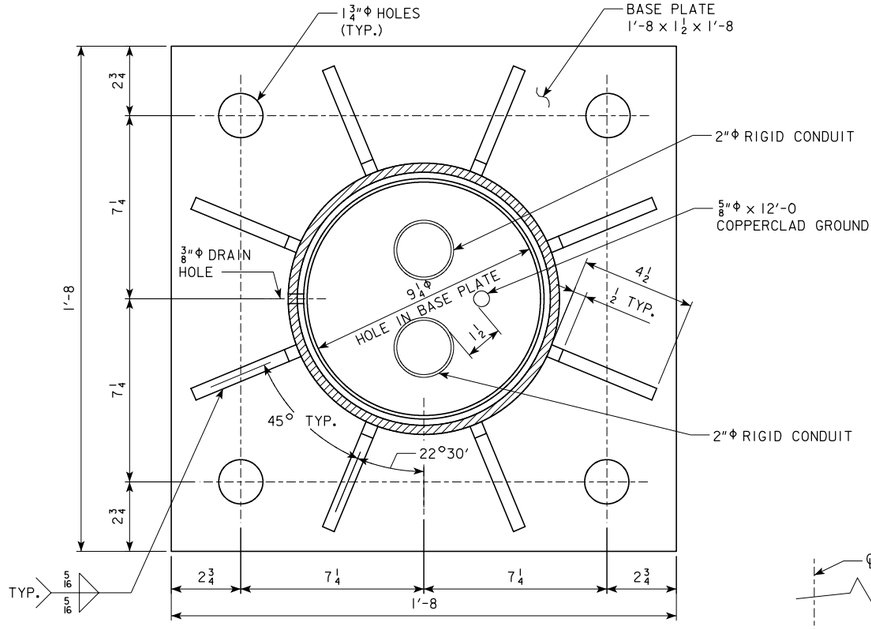
WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

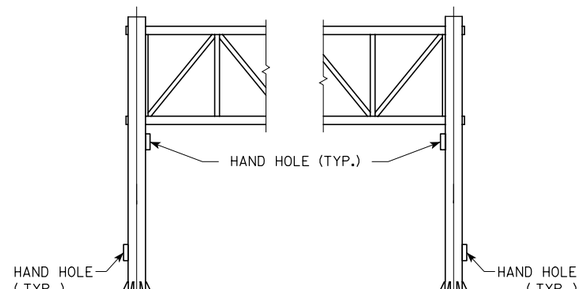
DESIGN SHEET NO. 2 OF 5 FILE NO. 30393 DESIGN NO. 809



END VIEW OF TRUSS SUPPORT

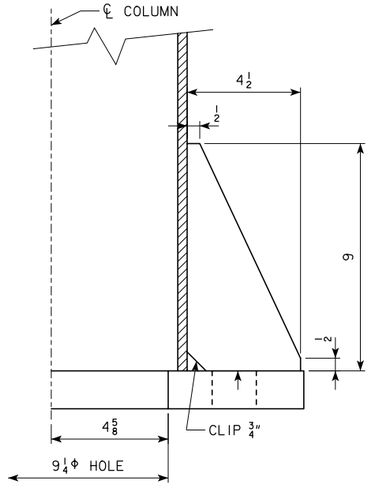


BASE PLATE PLAN

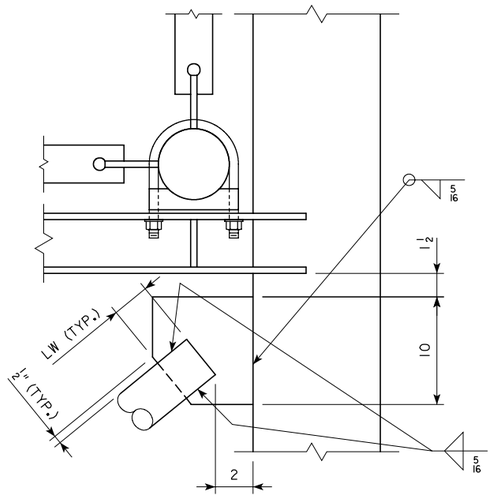


PART ELEVATION

NOTE: HAND HOLES SHALL BE IN BOTH END TRUSS SUPPORTS AND ON DYNAMIC MESSAGE SIDE ONLY.

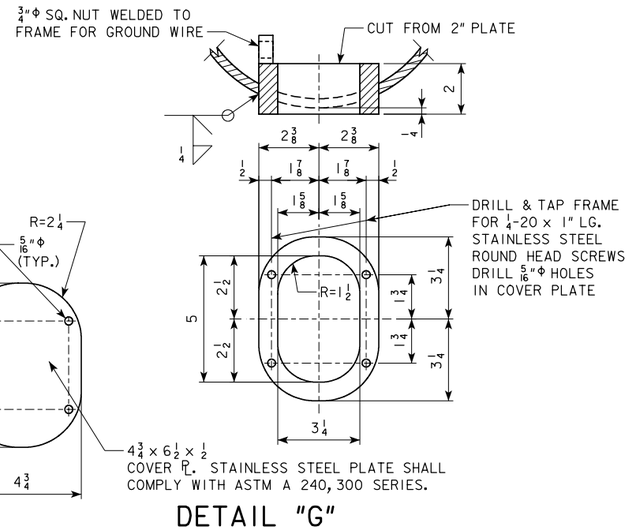


BASE CROSS-SECTION



DETAIL "D"

FOR 3"Φ STD. STEEL PIPE LW (MIN.) = 3 1/2"



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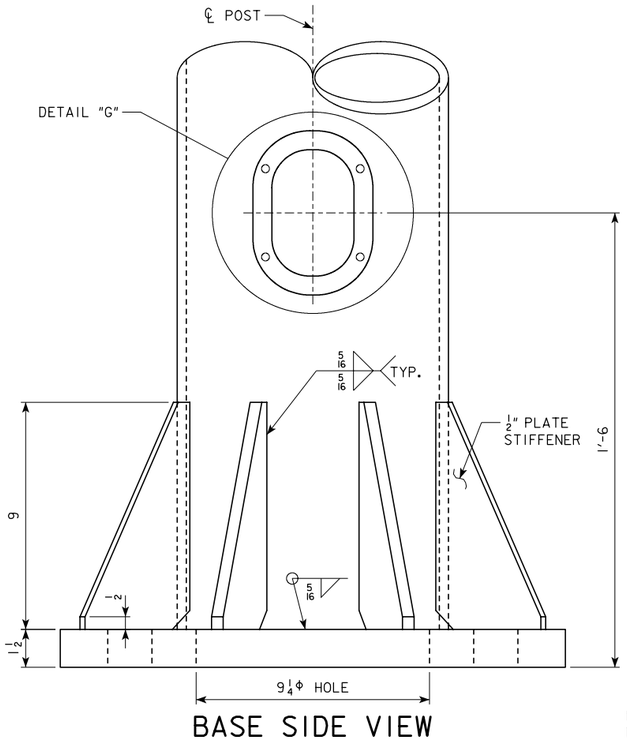


BASE SIDE VIEW

NOTE: SEE DESIGN SHEET 4 FOR DETAILS "E" & "F".

DESIGN FOR

GALVANIZED OVERHEAD SIGN TRUSS WITH GALVANIZED STEEL SUPPORTS

BASE PLATE DETAILS

STATION: 523+00.00 W.B. US20 JANUARY, 2009

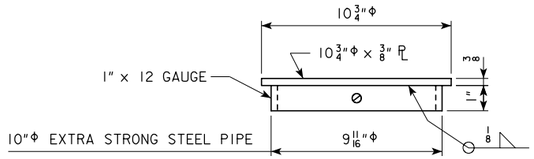
WOODBURY COUNTY

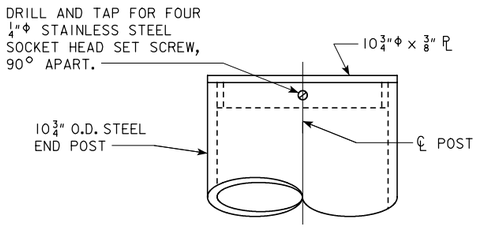
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 5 FILE NO. 30393 DESIGN NO. 809

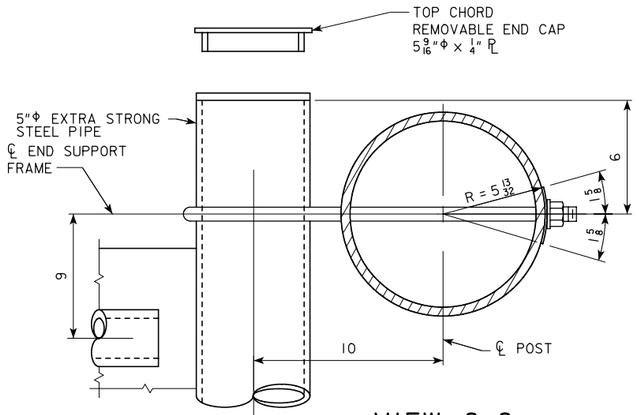
DESIGN TEAM JRH/DAW | WOODBURY COUNTY | PROJECT NUMBER ITS-020-1(114)--25-97 | SHEET NUMBER V.3

28-JAN-2009 07:11 dwrigh2 W:\Projects\0000001009\BRFinal\00000S394.brg 970809S003 \\NTPPRTSVR2\BrgPDF

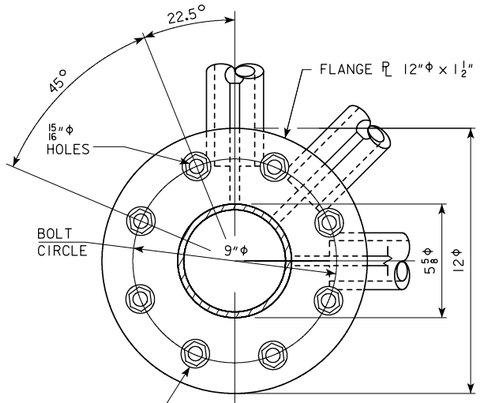


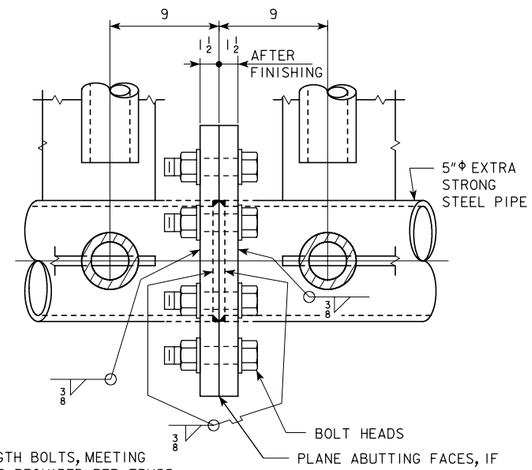


END POST TOP DETAIL



VIEW C-C

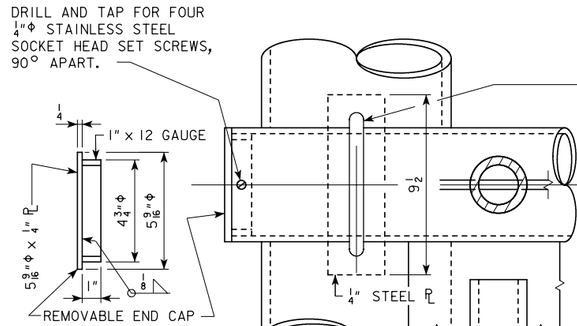




7/8" DIA. x 4 3/4" A-325 GALVANIZED HIGH STENGTH BOLTS, MEETING THE REQUIREMENTS OF ARTICLE 2408.39. 32 REQUIRED PER TRUSS SPLICE, 64 HARDENED WASHERS REQUIRED PER TRUSS SPLICE. HARDENED WASHER WILL BE PROVIDED UNDER BOTH HEAD AND NUT OF BOLT
32 - 7/8" DIA. HEAVY HEX NUTS REQUIRED PER TRUSS SPLICE. DRILL
8 - 15/16" DIA. HOLES IN EACH FLANGE. HIGH STRENGTH BOLT SHALL BE TENSIONED BY TURN-OF-NUT METHOD.

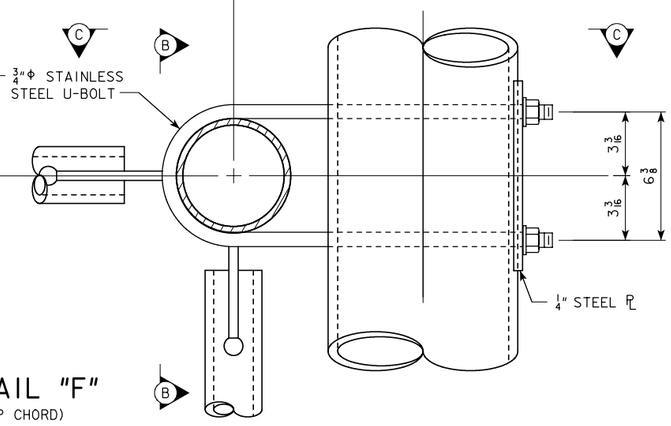
CHORD SPLICE

NOTE:
FLANGES MAY BE WELDED TO CHORD MEMBERS AFTER FINISHING PROVIDED PROPER ALIGNMENT IS SECURED.

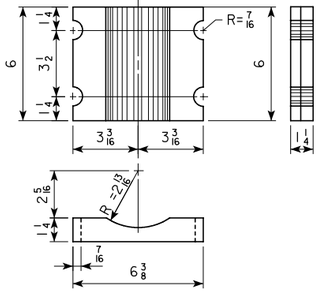


END CAP

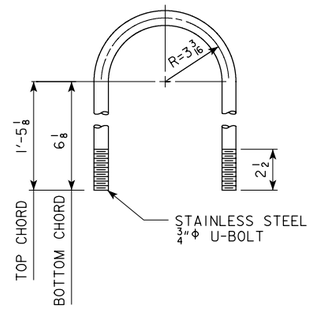
VIEW B-B



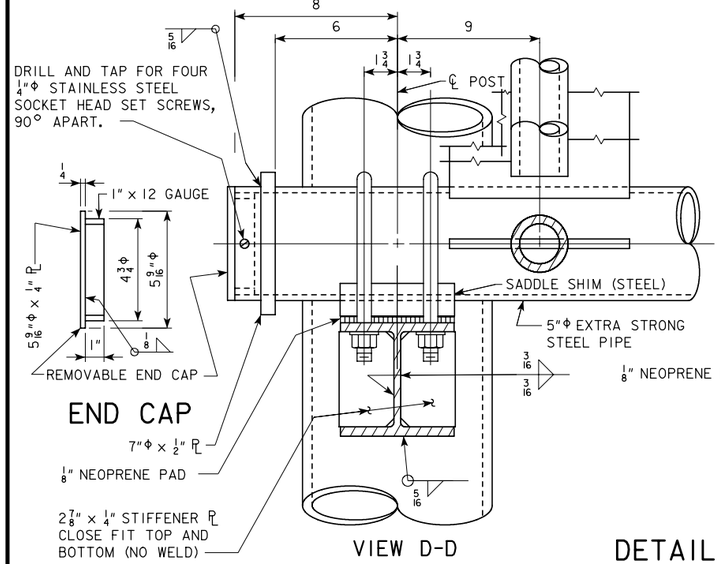
DETAIL "F"
(TOP CHORD)



SADDLE SHIM DETAIL

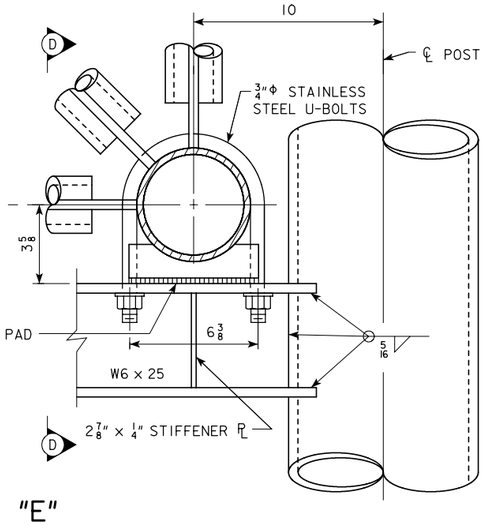


STAINLESS STEEL U-BOLT DETAIL



END CAP

VIEW D-D



DETAIL "E"
(BOTTOM CHORD)

NOTE: SEE DESIGN SHEET 3 FOR LOCATION OF DETAILS "E" & "F".

DESIGN FOR
GALVANIZED OVERHEAD SIGN TRUSS WITH GALVANIZED STEEL SUPPORTS

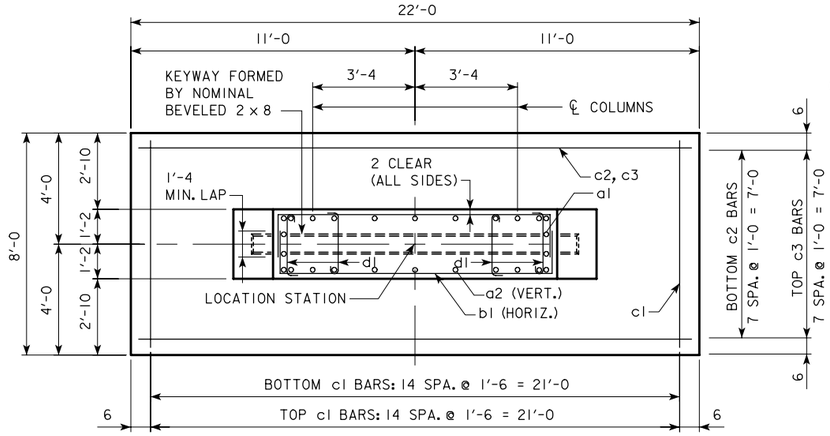
TRUSS SUPPORT & CHORD SPLICE DETAILS

STATION: 523+00.00 W.B. US20 JANUARY, 2009

WOODBURY COUNTY

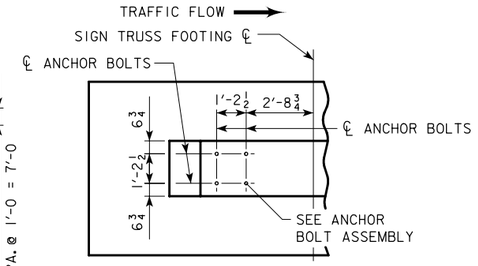
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30393 DESIGN NO. 809

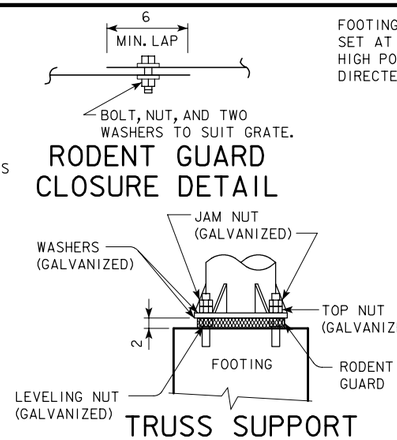


PLAN

(ANCHOR BOLT ASSEMBLIES NOT SHOWN.)

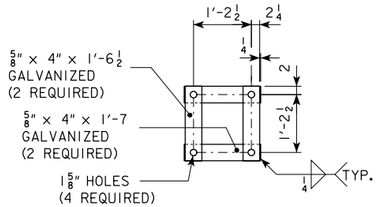


ANCHOR BOLT PLACEMENT DETAILS



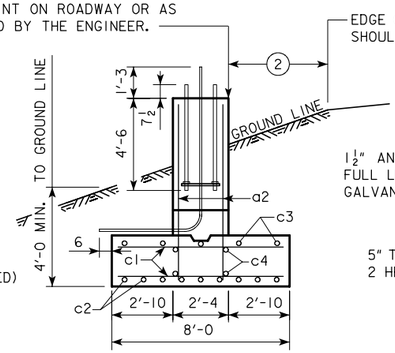
RODENT GUARD CLOSURE DETAIL

TRUSS SUPPORT CONNECTION DETAIL

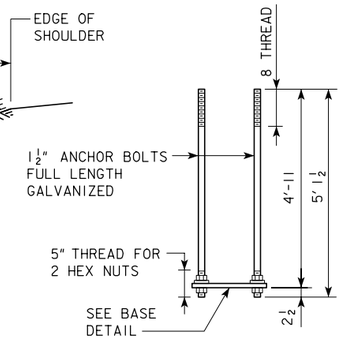


GALVANIZED BASE DETAIL

FOOTING ELEVATION IS TO BE SET AT SAME ELEVATION AS HIGH POINT ON ROADWAY OR AS DIRECTED BY THE ENGINEER.



END ELEVATION



GALVANIZED ANCHOR BOLT ASSEMBLY

GENERAL NOTES:

STRUCTURAL CONCRETE, CLASS C, SHALL BE USED FOR THE FOOTING.

EXCAVATION FOR FOOTING SHALL BE TO NEAT LINES AND CONCRETE SHALL BE PLACED AGAINST THE UNDISTURBED MATERIAL. ALL EXCAVATION FOR THE FOOTING SHALL BE DISPOSED OF IN THE AREA ADJACENT TO THE FOOTING AND SHAPED TO NORMAL GROUND CONTOUR, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. MAXIMUM DESIGN BEARING CAPACITY IS 1.0 TONS PER SQUARE FOOT.

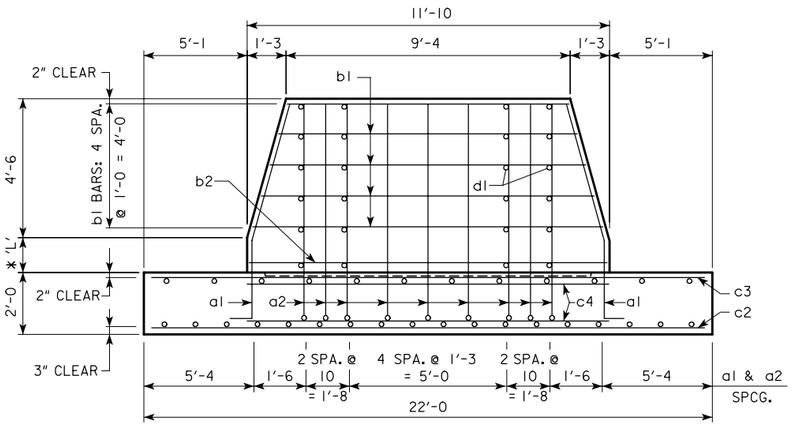
THE REQUIREMENTS PER FOOTING ARE TWO ANCHOR BOLT ASSEMBLIES INCLUDING SHIMS, NUTS (5 PER BOLT) AND WASHERS. REFER TO HARDWARE CLASSIFICATION TABLE FOR MATERIALS AND GALVANIZING REQUIREMENTS.

A RODENT GUARD SHALL BE PLACED BETWEEN THE CONCRETE FOOTING AND THE BASE PLATE, SEE MATERIALS I.M. 443.01.

PRICE BID FOR CONTRACT ITEMS SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY TO CONSTRUCT OVERHEAD SIGN FOOTING AS DETAILED HEREON. THE COST OF FURNISHING AND INSTALLING ANCHOR BOLT ASSEMBLIES, CONDUITS AND RODENT GUARD ARE TO BE INCLUDED IN THE UNIT PRICE BID FOR STRUCTURAL CONCRETE. CONTRACT ITEMS FOR OVERHEAD SIGN FOOTING CONSTRUCTION ARE:
EPOXY COATED REINFORCING STEEL, POUNDS
STRUCTURAL CONCRETE (MISCELLANEOUS), CUBIC YARDS
EXCAVATION, CUBIC YARDS OF CLASS SPECIFIED

(1) FOR FOOTINGS SUPPORTING SIGN TRUSSES WITH DYNAMIC MESSAGE SIGNS, PLACE 3/4" GROUND WIRE DUCT AND TWO 2" ACCESS DUCTS WITHIN THE ANCHOR BOLT CIRCLE CLOSEST TO THE DIRECTION OF THE APPROACHING TRAFFIC. EXTEND CONDUIT ENDS 6" PAST EDGE OF FOOTING ON SIDE AWAY FROM ROADWAY. LOCATION SHALL BE ON DETAIL PROJECT PLANS. ALL DUCTS SHALL MEET REQUIREMENTS FOR PLASTIC CONDUIT.

(2) SEE FOOTING TABULATION.



SIDE ELEVATION

(ANCHOR BOLT ASSEMBLIES NOT SHOWN.)

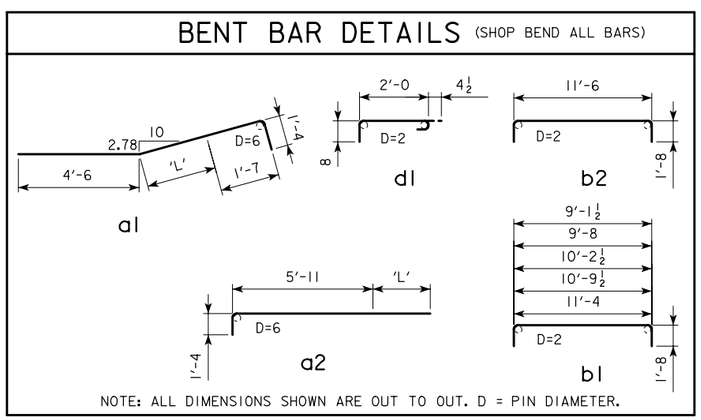
* 'L' SHALL NOT EXCEED 6'-0

CONCRETE PLACEMENT QUANTITIES

(ONE FOOTING)

ITEM	'L' = 0	EACH 1'-0 OF 'L'
WALL	4.12	1.02
FOOTING	13.04	
TOTAL (C.Y.)	17.16	1.02

BENT BAR DETAILS (SHOP BEND ALL BARS)



NOTE: ALL DIMENSIONS SHOWN ARE OUT TO OUT. D = PIN DIAMETER.

REINFORCING BAR LIST - EPOXY COATED

(ONE FOOTING)

	SIZE	SHAPE	'L' = 0 NO.	LENGTH	WEIGHT	SPACING	EACH 1'-0 OF 'L' NO.	LENGTH	WEIGHT
a1	8		8	7'-5	158	SEE DETAIL	8	1'-0 (A)	21
a2	8		18	7'-3	348	SEE DETAIL	18	1'-0 (A)	48
b1	4		10	Varies	91	1'-0	---	---	---
b2	4		---	---	---	---	2 (B)	14'-10	20
c1	6		30	7'-6	338	1'-6	---	---	---
c2	8		8	21'-6	459	1'-0	---	---	---
c3	6		8	21'-6	258	1'-0	---	---	---
c4	4		4	11'-10	32	SEE DETAIL	---	---	---
d1	4		20	3'-0 1/2	41	SEE DETAIL	4 (C)	3'-0 1/2	8
					TOTAL 1725 lbs				TOTAL 97 lbs

(A) ADDITIONAL LENGTH TO BAR a1 OR a2 FOR 'L' > 0

(B) TWO IN EACH 1'-0 OF 'L'.

(C) FOUR IN EACH 1'-0 OF 'L'.

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FOOTING DETAILS

STATION: 523+00.00 W.B. US20 JANUARY, 2009

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30393 DESIGN NO. 809

DESIGN TEAM JRH/DAW | WOODBURY COUNTY | PROJECT NUMBER ITS-020-1(114)--25-97 | SHEET NUMBER V.5

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