STATE	PROJECT N0.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	1	50
F.A. NO.	STP-C529(001)			

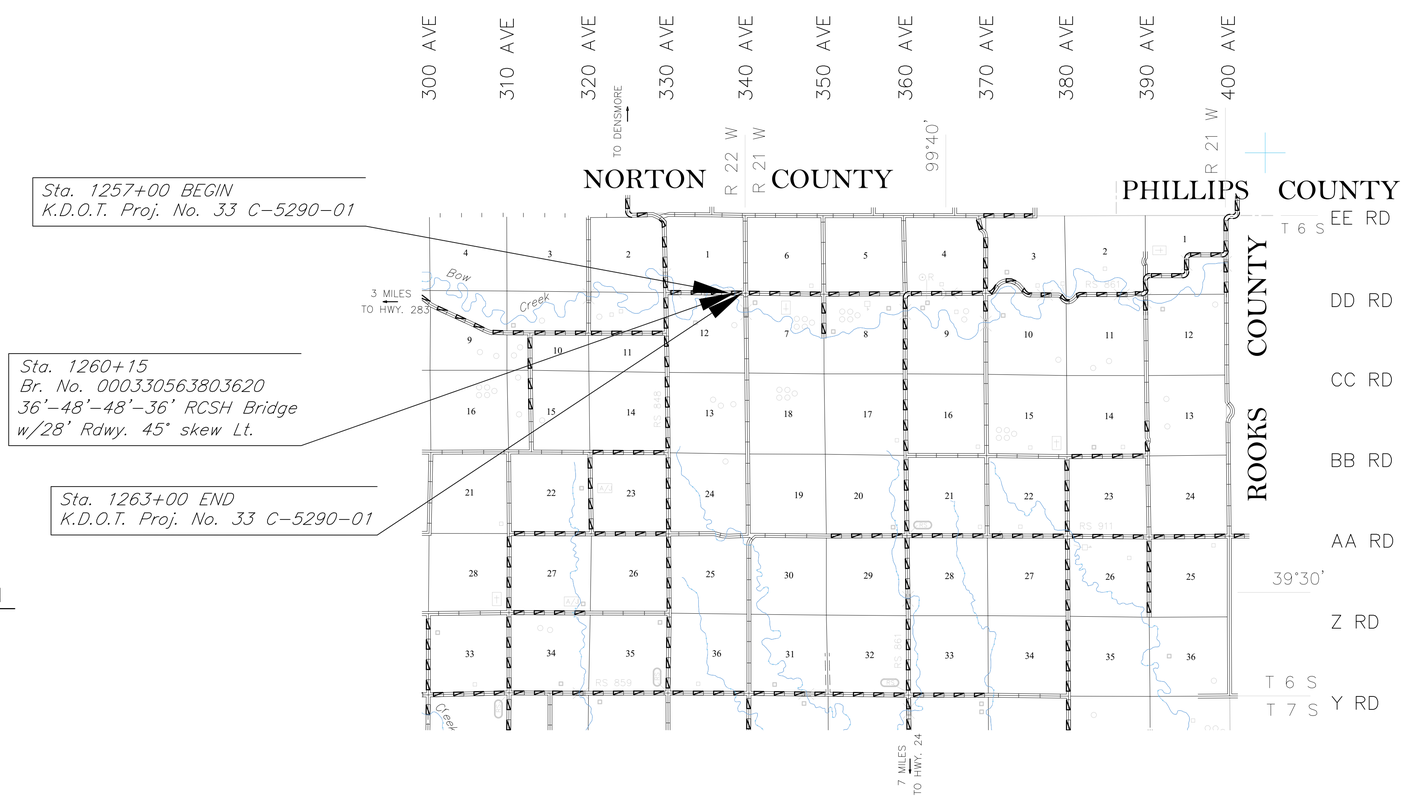
INDEX OF SHEETS

Sheet No.	
1	Title Sheet
2	Typical Grading Section
3	Plan Profile
4-8	Guardrail Details
9	Contour
10-18	Bridge Details
19	Slope Protection
20	Standard Pile Details
21	Bridge Excavation
22	Supports & Spacers for Reinforcing Steel
23	Summary of Quantities
24-33	Temporary Erosion and Pollution Control
34	Seeding
35-41	Traffic Control
42-50	Cross Sections

STATE OF KANSAS
DEPARTMENT OF TRANSPORTATION
PLAN AND PROFILE OF PROPOSED
33 C-5290-01
FEDERAL AID PROJECT
GRAHAM COUNTY

GRADING
BRIDGE
SEEDING

Note: This project will be closed to all traffic during construction.

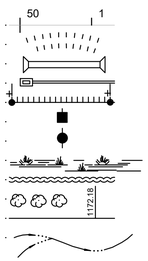


DESIGN DESIGNATION

AADT(2019)	10
AADT(2039)	15
DHV	
D	
T	
V	45 mph
C of A	None
Clear Zone	10 feet

CONVENTIONAL SIGNS

COUNTY LINE		CENTER LINE OF PROJECT	
CITY LIMITS		TERRACE	
STATE OR NATIONAL LINE		CULVERTS	
TOWNSHIP, SECTION or GRANT LINE		DROP INLET & STORM SEWER	
PROPERTY LINE		ACCESS CONTROL	
HIGHWAY FENCE		POWER POLE	
EXISTING FENCE		TELEPHONE POLE	
GUARDRAIL		MARSH	
CONSTRUCTION LIMITS		HEDGE	
RIGHT OF WAY LINE		TREES	
TRAVELED WAY		PROFILE ELEVATION	
RAILROADS		STREAM or CREEK	



GROSS LENGTH OF PROJECT	600.00	FT.
EXCEPTIONS	0.00	FT.
ADDITIONS	0.00	FT.

NET LENGTH OF PROJECT	600.00	FT.	0.114	MILES
NET LENGTH OF BRIDGES	171.54	FT.	0.032	MILES
NET LENGTH OF ROAD	428.46	FT.	0.081	MILES



PLANS PREPARED BY:
PENCO ENGINEERING, P.A.
PLAINVILLE, KANSAS

RECOM. FOR APPROVAL-DATE

WAYNE PFEIFER
ROAD SUPERVISOR

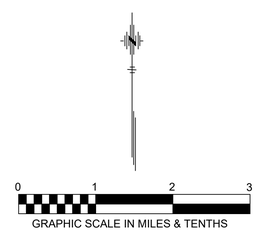
Approved: Apr 16, 2025
Date

State Transportation Engineer

By:

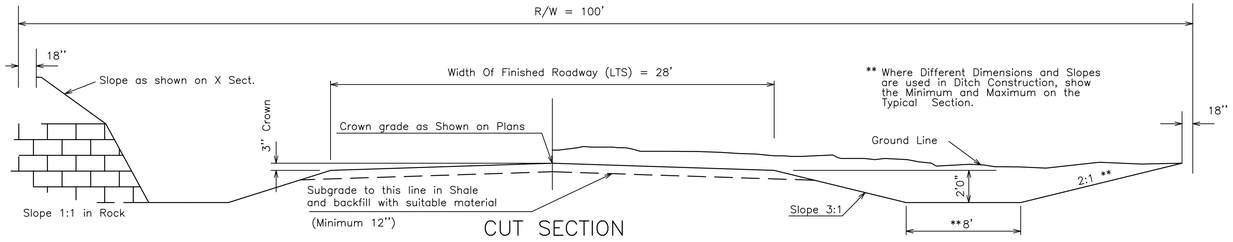
Chief, Bureau of Local Projects

KANSAS DEPARTMENT OF TRANSPORTATION



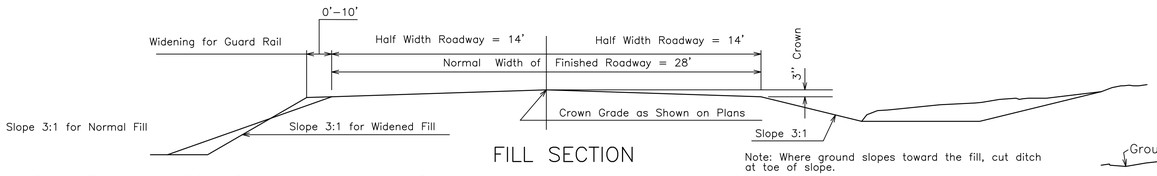
X:\oc2\kdot\K05290-Graham-Off#10\ACAD\Title_1.dwg\Title_1 - Layout1 11/1/2024 3:44 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	2	50



CUT SECTION

NOTE: For overbreakage in limestone, sandstone or shale see Special Provisions

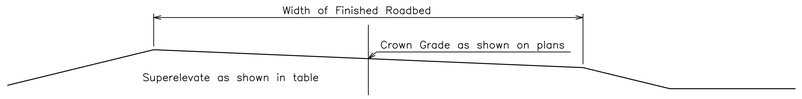


FILL SECTION

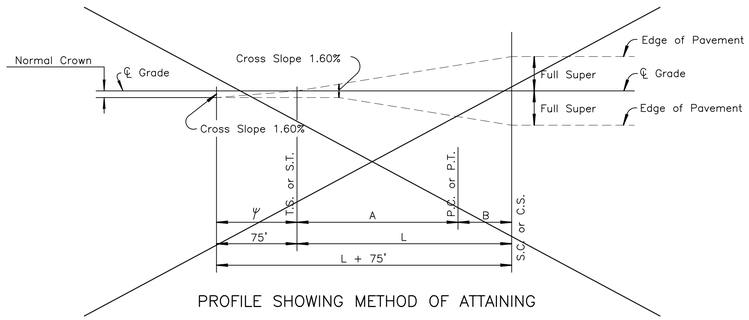
Note: Where ground slopes toward the fill, cut ditch at toe of slope.

Shoulder Slopes at ends of Guard Rail should be no steeper than 3:1.

When fill exceeds 6' Shoulder Slopes may be steepened

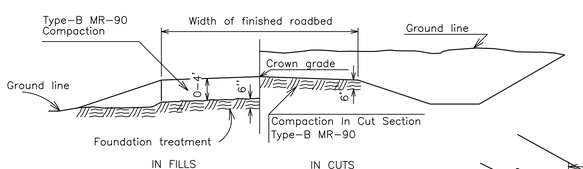


SUPERELEVATED SECTION



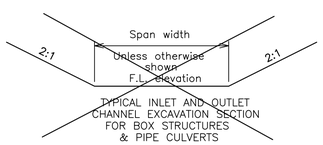
PROFILE SHOWING METHOD OF ATTAINING SUPERELEVATION

Sta. P.I. Curve	Radius	Design Speed	Super %	Transition – (Lin.Ft.)		
				L	A	B

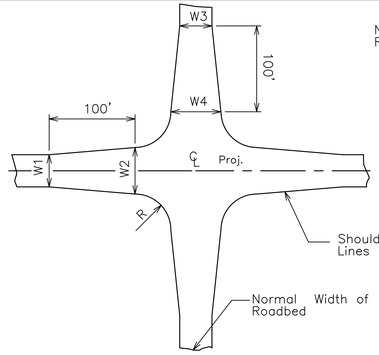


ALL EMBANKMENT SHALL BE COMPACTED EXCEPT DITCHPLUGS AND WASTE BERMS.

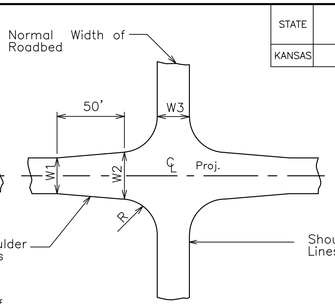
FOUNDATION TREATMENT AND COMPACTION OF EARTHWORK



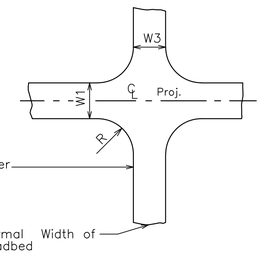
TYPICAL INLET AND OUTLET CHANNEL EXCAVATION SECTION FOR BOX STRUCTURES & PIPE CULVERTS



TYPE-A

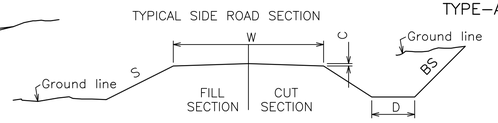


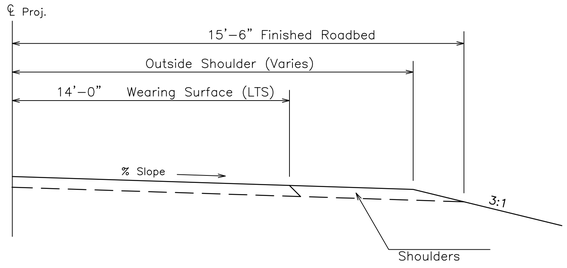
TYPE-B



TYPE-C

TYPICAL INTERSECTION DETAILS

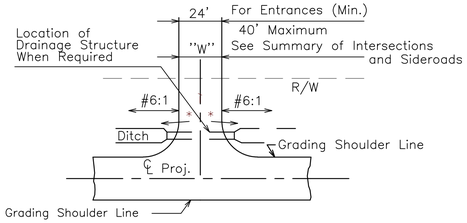




TYPICAL 1/2 SECTION SURFACING

SUMMARY OF INTERSECTIONS AND SIDEROADS												
STATION	SIDE OR QUADRANT	TYPE	W	W1	W2	W3	W4	R	C	S	D	BS

Light-Type Shale surfacing (6") by Graham County with their own forces and funds.

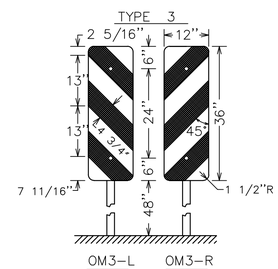


TYPICAL SIDE ROAD OR ENTRANCE DETAIL

* On side roads and entrances which slope toward the roadway, construct a low point approx. 6" deep to divert surface drainage into the roadway ditch.

On ditch plugs and side roads or entrances without drainage structures use 8 : 1 slopes where feasible.

OBJECT MARKER



SUMMARY OF OBJECT MARKERS AND SIGNS						
STATION TO STATION	SIDE	TYPE OF STRUCT.	TYPE OF SIGN	OBJECT MARKER		REMARKS
				TYPE	NO.	
1259+13	Lt.	Bridge	Obj. Marker	OM-3L	1	
1259+42	Rt.	Bridge	Obj. Marker	OM-3R	1	
1260+88	Lt.	Bridge	Obj. Marker	OM-3R	1	
1261+17	Rt.	Bridge	Obj. Marker	OM-3L	1	
Total					4	
Ø As you face bridge end from approach						
*Back-to-Back [Sign(s) on Both Sides of Post]						

GENERAL NOTES

All signs shown on the plans, and other signs furnished and installed by the LPA with their own forces and funds will be installed in conformance with the Manual on Uniform Traffic Control Devices (latest edition).

LPA to furnish all easements and additional right of way (unless otherwise noted).

Public and private utility facilities will be adjusted by others as needed to fit the new construction unless noted otherwise on the plans or in the proposal.

Refer to KDOT Standard Drawing No. BR 100 for excavation limits for constructing box culverts.

All Sign, Fastener, and Post materials must meet the requirements of the latest edition of the KDOT Standard Specifications for State Road and Bridge Construction.

Install Object Markers Type OM3-(R)(L) at each corner of all span bridges and when indicated on the plans at box structures. Install with the inside edge of the marker in line with the inside clearance line of the structure.

NO.	DATE	REVISIONS	BY	APP'D
7	01-08-15	Revised superelevation diagram, updated misc. notes.	TLS	RJS
6	11-9-04	Changed "Culvert" to "Structure"	DMK	RJS
5	12-1-03	Rem. Delin.'s/Add Typ. Sect./Changed OM notes	DMK	RJS
4	5-14-03	Rev. Contractor note in Gen. Notes	DMK	RJS

KANSAS DEPARTMENT OF TRANSPORTATION

TYPICAL GRADING SECTION

~~LP907~~

FHWA APPROVAL		APP'D	RJS
DESIGNED	DETAILED DMK	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK. RJS	QUAN.CK.	TRACE CK.

K:\acz\kdot\105290-Graham-01\#10\ACAD\lp907.dwg\lp907 - Layout1 11/1/2024 3:44 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	3	50

UTILITIES

Power: Prairie Land Electric Coop
PO Box 360
Norton, KS 67654
1-785-877-3323

Telephone: Nex-Tech/Rural Telephone Co.
Lenora, KS 67645
1-877-567-7872

N ¼ Cor Sec 12, T6S, R22W
Found ½" uncapped rebar
1. Top of corner gate post
2. Top of corner gate post
3. Sta. 1240+99.05
N:748039.85 E:4422988.62

Ref.
0.4' Deep
70.2 NNE
71.5' NNW

POT Sta. 1255+00.00
1. Office Set
2. Project Center Line = Section Line
3. No other ties available
N:748022.40 E:4424389.46

POT Sta. 1265+00.00
1. Office Set
2. Project Center Line = Section Line
3. No other ties available
N:748009.94 E:4425389.38

NE Cor Sec 12, T6S, R22W
Found ⅝" uncapped rebar @ Surface
1. Spk & double washer in the top of a corner fence post
2. Top corner fence post
3. Spk & double washer in the top of a corner fence post
4. Sta. 1267+19.04
N:748007.21 E:4425608.40

Ref.
41.2' NE
47.7' SW
47.2' NW

PROJECT SURVEY CONTROL

PROJECT COORDINATE SYSTEM: KRCS
HORIZONTAL DATUM: NAD83(2011) Kansas Regional Coordinate System Zone 4 Hays, using Geoid 18(Conus)

VERTICAL DATUM: North American Vertical Datum (NAVD) 1988

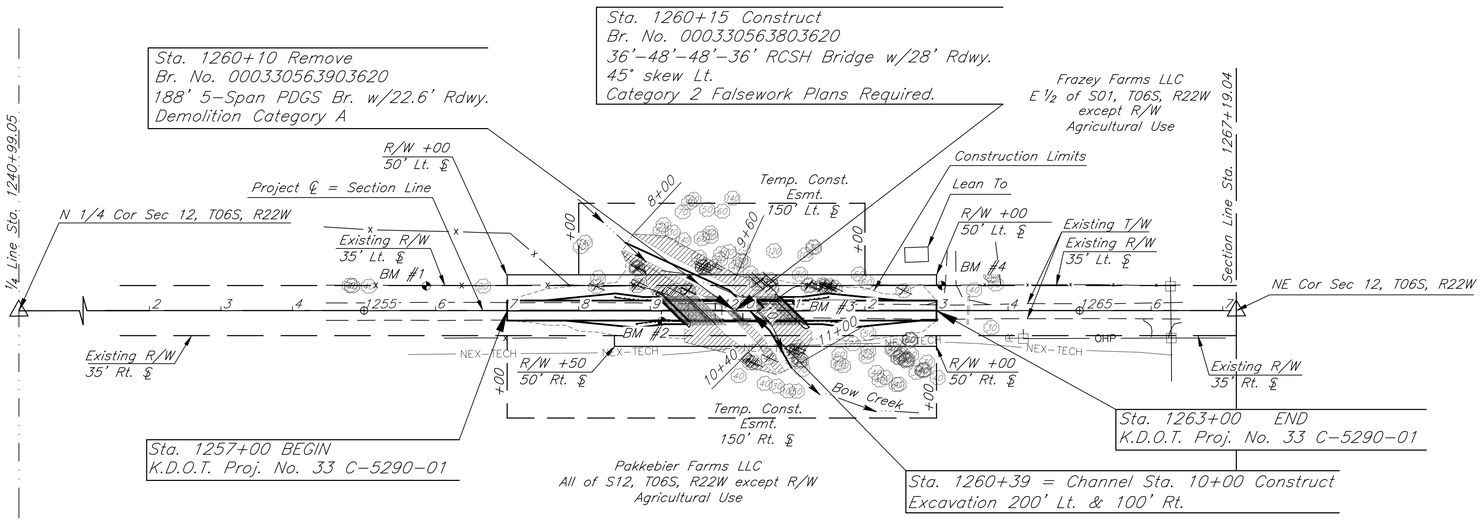
DATUM BENCMARK: ⅝" Rebar w/Green plastic cap designated as BM #1 Sta. 1255+87, 34' Lt. Project ℄, 1' South of fence post = 2193.69'.

NOTE: The Contractor shall remove the existing 188.0' 5 Span PDGS (Br. No. 0003305639036 20) with 22.6' rdwy. width. The Contractor shall stockpile tee-beams in salvageable condition for county to remove with their own funds and forces. All other materials shall become the property of the Contractor and be removed from the site.

The Contractor shall excavate the channel and complete the embankments prior to construction of the RCSH bridge.

Existing Bridge consists of: prestressed concrete double tee-beams, concrete caps, concrete piling, and concrete abutments.

The Contractor shall construct the shoulder widening and install 25 ft. of Steel Plate Guard Rail (Galv.) and Guard Rail End Terminal at each quadrant of the new RCSH Bridge, Sta. 1260+15. See Sheet No. 4-8 for details.

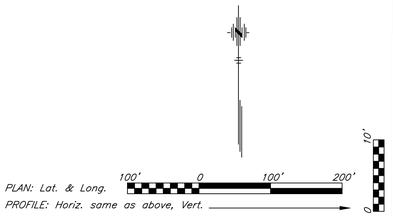


BM#1 ⅝"x24" rebar with green plastic cap stamped "CONTROL PENCO"
Sta. 1255+87.06 34.4' Lt. Elev.=2193.69
N:748055.69 E:4424476.94

BM#2 "X" cut in top of Southwest Wing
Sta. 1259+15.99 15.0' Rt. Elev.=2199.65
N:748002.23 E:4424805.23

BM#3 "X" Cut in top of Northeast Wing
Sta. 1261+04.01 12.6' Lt. Elev.=2199.50
N:748027.48 E:4424993.58

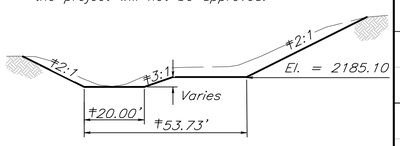
BM#4 ⅝"x24" rebar with green plastic cap stamped "CONTROL PENCO"
Sta. 1263+07.32 35.1' Lt. Elev.=2203.81
N:748047.46 E:4425197.15



Note: All disposal sites must be approved by the Kansas Department of Health and Environment. Material either stockpiled or disposed of in a flood plain would require a Kansas State Board of Agriculture permit. Any material dumped in waters of the United States or wetlands is subject to U.S. Corps of Engineers permitting regulations.

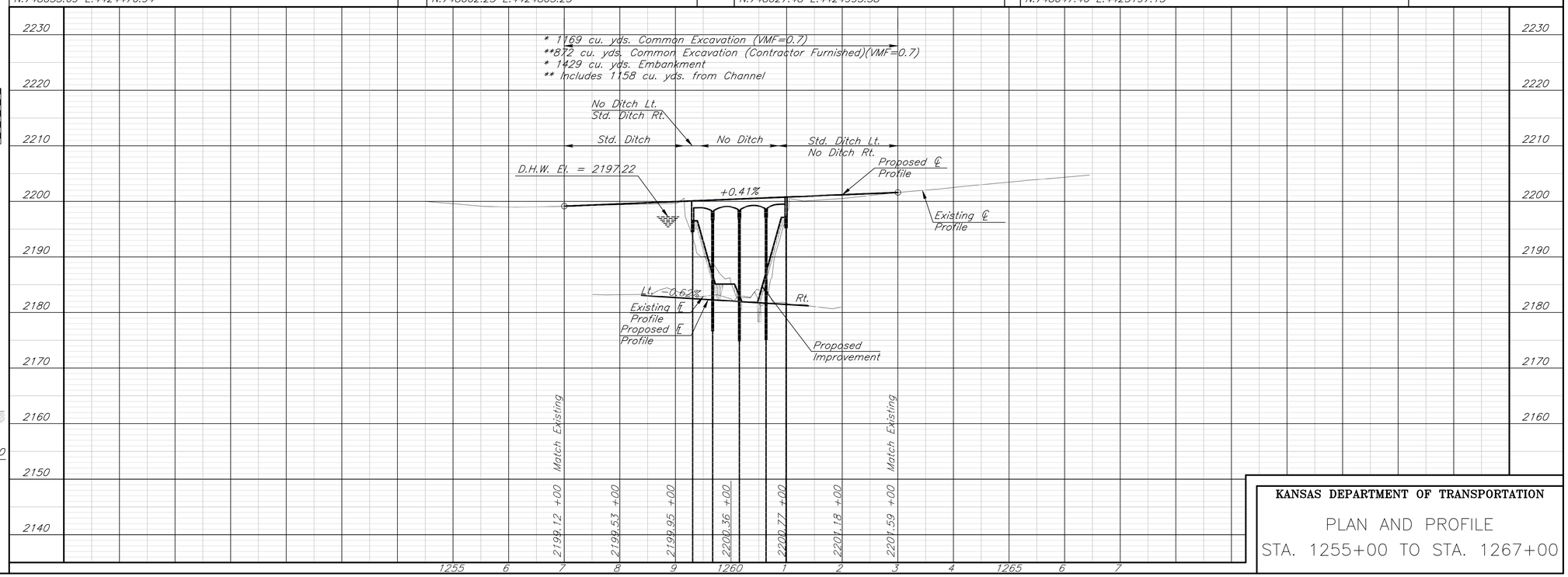
Any material buried or stockpiled beyond approved construction limits would require additional archeological investigations unless buried in a previously approved borrow location.

Borrow areas provided by the Contractor shall be approved by the Engineer as to suitability of material and location. Special care shall be taken in this approval to minimize the increase of siltation and turbidity of streams, lakes, and reservoirs and to avoid interference with the movement of migratory fish. Areas which, in the opinion of the Engineer, may leave an unsightly appearance to the project will not be approved.



TYPICAL CHANNEL SECTION
Sta. 9+60 to Sta. 10+40

‡Normal to Channel



KANSAS DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE

STA. 1255+00 TO STA. 1267+00

X:\oc2\vdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\PP100 1/9/2025 6:54 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	4	50

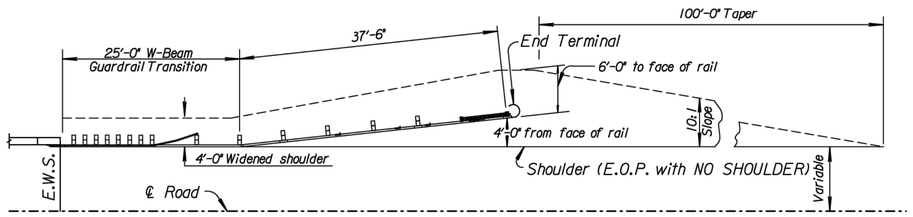
NOTE: Layouts 1, 2, 3, and 4 will be symmetric for any quadrant unless otherwise shown in the plans.

When using Rubrail, attach Std. Drawings No. RD611, RD616 and RD615 (parallel) or RD615A (flared).

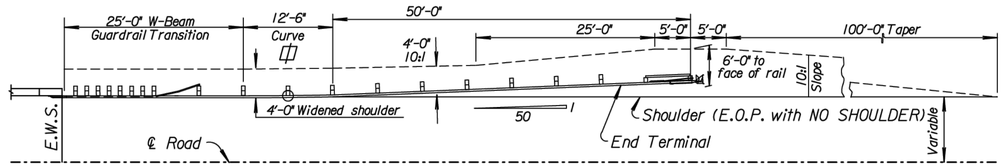
When using Thrie beam, attach Std. Drawings no. RD611 and RD608 or RD613.

Attach Std. Drawing No. RD617 (parallel) or RD 617A (flared) for post over box less than full depth.

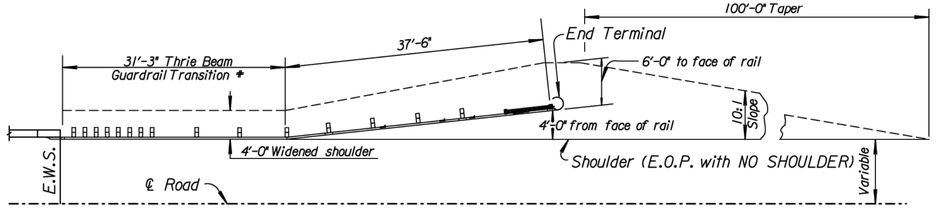
◫ Radius = 625.08'



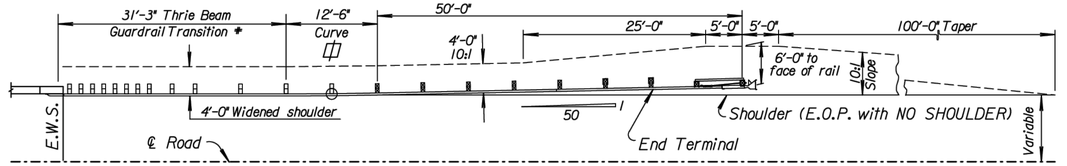
FLARED DESIGN - RUB RAIL (Layout 1)



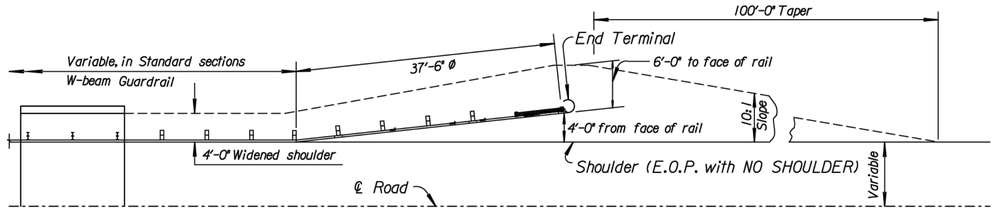
PARALLEL DESIGN - RUB RAIL (Layout 2)



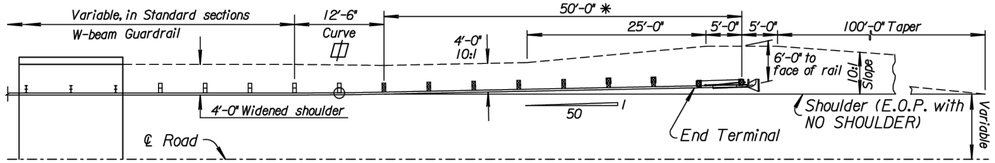
FLARED DESIGN - THRIE BEAM (Layout 3)



PARALLEL DESIGN - THRIE BEAM (Layout 4)



FLARED DESIGN (Layout 5)



PARALLEL DESIGN (Layout 6)

TYPICAL ALIGNMENT OF GUARDRAIL AT CULVERTS & BOX BRIDGES

ALLOWABLE END TERMINALS

TYPE	Layout 1	2	3	4	5	6	Required Standard Drawing
SRT	X		X		X		*RD606*
FLEAT	X		X		X		*RD606*
SKT		X		X		X	*RD606*

SUMMARY OF STEEL PLATE GUARDRAIL

Location	Side	Layout No.	Layout Lin. Ft. *	Additional Standard Sections Lin. Ft.	Total Pay Length Lin. Ft.	Layout 1 or 3 Gd. Rail End Term. (SRT) Alt. #1 Each	Layout 1 or 3 Gd. Rail End Term. (FLEAT) Alt. #2 Each	Layout 2, 4, or 6 Gd. Rail End Term. (SKT) Each	Layout 5 Gd. Rail End Term. (SRT) Alt. #1 Each	Layout 5 Gd. Rail End Term. (FLEAT) Alt. #2 Each	
Sta. 1258+53.08	Lt.	1	25		25	1	1				
to 1259+15.58											
Sta. 1258+81.08	Rt.	1	25		25	1	1				
to 1259+43.58											
Sta. 1260+86.42	Lt.	1	25		25	1	1				
to 1261+48.92											
Sta. 1261+14.42	Rt.	1	25		25	1	1				
to 1261+76.92											
TOTAL LENGTH					100	4	4				

*See Guardrail Auxiliary Details (RD606) for Measurement Details. Does Not Include End Terminal.

NO.	DATE	REVISIONS	BY	APP'D
12	02-21-19	Updated per Road Memo 18-02	WFL	MJS
11	10-30-17	Removed X-Lite	WFL	MJS
10	01-06-15	Added X-Lite, Removed ET-PLUS	TLS	RJS
9	11-9-05	Added length for Thrie Beam transition	REA	RJS

KANSAS DEPARTMENT OF TRANSPORTATION

TYPICAL ALIGNMENT OF GUARDRAIL INSTALLATIONS

LP620

FHWA APPROVAL		APP'D.	MJS
DESIGNED	DETAILED TLS	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK. RJS	QUAN.CK.	TRACE CK.

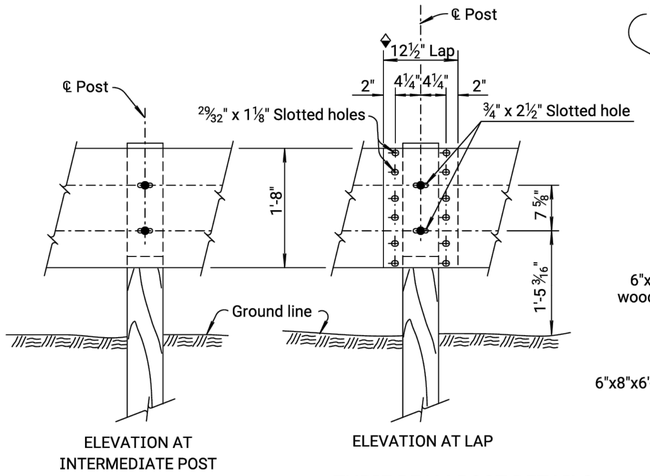
Plotted : 21-FEB-2019 14:53

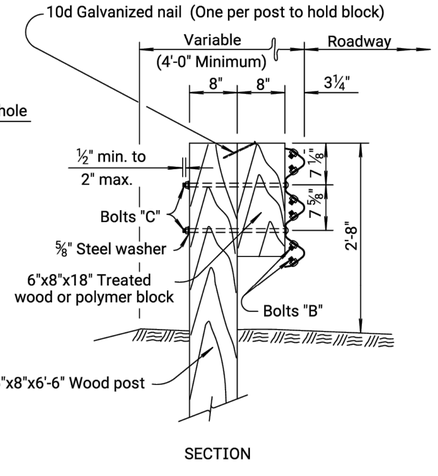
Drawn By : mushock
File : lp620.dgn

Notes to Designer: For posts installed in pavement thicker than 8" or posts installed in rock formations refer to AASHTO's Roadside Design Guide for details then revise this drawing and all supporting drawings appropriately.

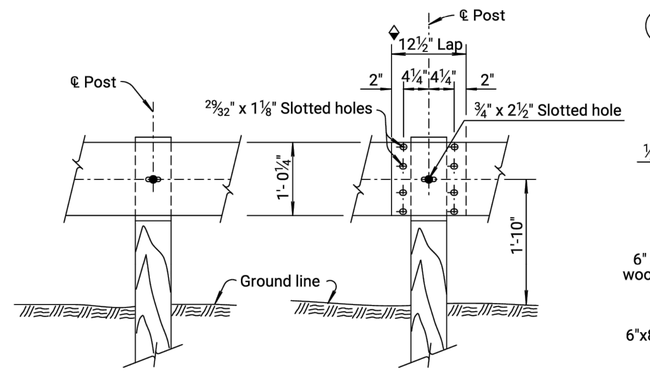
Plotted by : Kylee.Sims@ks.gov 2-AUG-2022 15:32
File : rd611.dgn

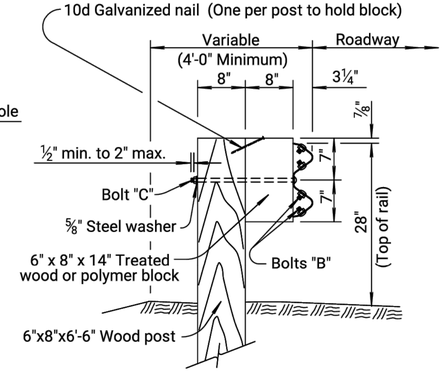
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	15	50





THRIE BEAM POST DETAILS





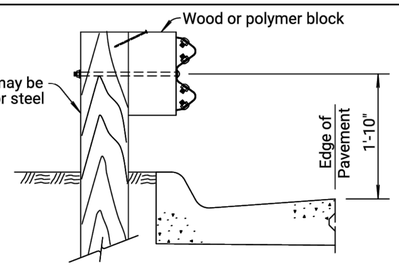
W-BEAM POST DETAILS

♦ Lap guardrail splices, including terminal connector, in the direction of traffic. Where traffic is temporarily carried in the opposite direction of final configuration, lap rail splices in the direction of permanent traffic.

WOOD POSTS

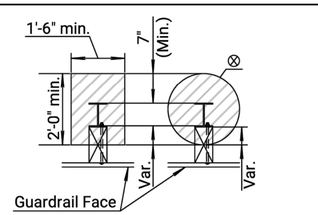
GENERAL NOTES (Wood Posts)

Give all wood posts and wood blocks a preservative treatment, see standard specifications. Thoroughly saturate all cuts, injuries and bolt holes on wood posts and blocks with preservative. Use only one type of preservative treatment on a project. Use S4S rectangular posts and wood blocks, see standard specifications. Use only one post/blockout type within guardrail run, this excludes the the guardrail end terminals. Set guardrail posts by digging or by driving. Use post caps to protect the post from crushing during driving operations. Contractor must notify Engineer at the earliest time when a non-removable manmade object (footing, pipe, etc.) is encountered and prevents installation of a full length post. Contractor must obtain Engineer approval prior to cutting post shorter than 6'-6". Approved polymer blockouts may be substituted for wood blockouts. Only one type of blockout is permitted on each guardrail installation. This excludes the guardrail end terminals unless certified by the manufacturer. All dimensions are nominal and are subject to manufacturing tolerances. Excavation including rock, shale, and other materials for erection of Guardrail is subsidiary to various bid items for which payment is made. Where guardrail posts are installed in pavement, form openings in the pavement for the guardrail posts.



DETAIL OF PLACEMENT AT CURB

Note: When face of guardrail is aligned with the face of a curb, measure the height of rail from the pavement surface at the curb/pavement joint as shown. Use a laydown type curb where the face of the guardrail is not located at the face of the curb.

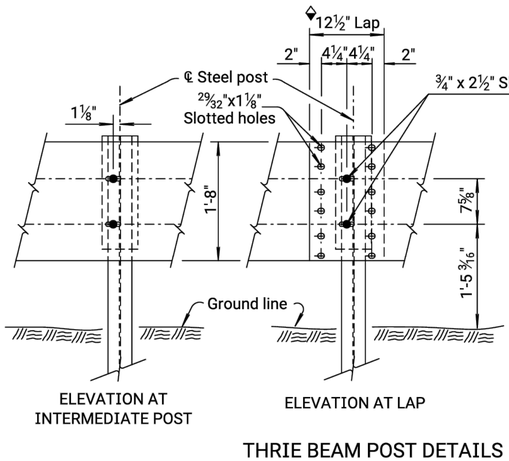


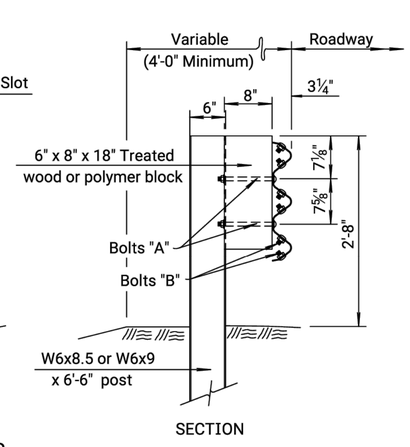
POSTS IN PAVEMENT PLAN
(ALTERNATE GEOMETRIES)
Applies to All Wood and All Steel Posts
(Steel Posts Shown)

▨ Slurry Grout (Low Strength). See KDOT's Standard Specifications

⊗ Diameter may vary from 1'-6" (min.) to 2'-0".

Note: Low Strength Grout must have a 28-day compressive strength of 120 psi or less. All work and materials related to posts in pavement are subsidiary to other guardrail bid items. Rectangular geometry shown in Posts in Pavement detail. Circular geometry, as shown on this sheet, may be used at the Contractor's option.





THRIE BEAM POST DETAILS

♦ Lap guardrail splices, including terminal connector, in the direction of traffic. Where traffic is temporarily carried in the opposite direction of final configuration, lap rail splices in the direction of permanent traffic.

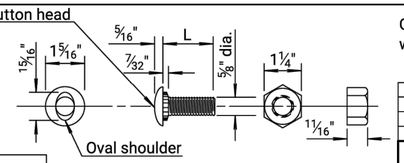
W-BEAM POST DETAILS

STEEL POSTS

GENERAL NOTES (Steel Posts)

Use grade of steel for steel posts that meets the requirements of the standard specifications. Hot dip galvanize the posts after fabrication, see standard specifications. Use only one post/blockout type within guardrail run, this excludes the guardrail end terminals. For wood/polymer blockout requriements see standard specifications. Approved polymer blockouts may be substituted for wood blockouts. Only one type of blockout is permitted on each guardrail installation. This excludes the guardrail end terminals. Set guardrail posts by digging or by driving. Use post caps to protect the post from crushing during driving operations. Contractor must notify Engineer at the earliest time when a non-removable manmade object (footing, pipe, etc.) is encountered and prevents installation of a full length post. Contractor must obtain Engineer approval prior to cutting post shorter than 6'-6" except as allowed on Standard Drawing RD617. All dimensions are nominal and are subject to manufacturing tolerances. Excavation including rock, shale, and other materials for erection of Guardrail is subsidiary to various bid items for which payment is made. Where guardrail posts are installed in pavement, form openings in the pavement for the guardrail posts.

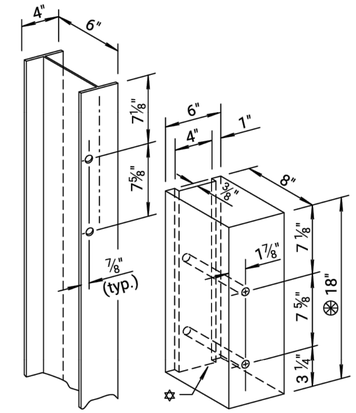
BOLT SIZE SCHEDULE	
Bolt	L
A	8 ½"
B	1 ¼"
C	18"



BOLT & NUT DETAILS

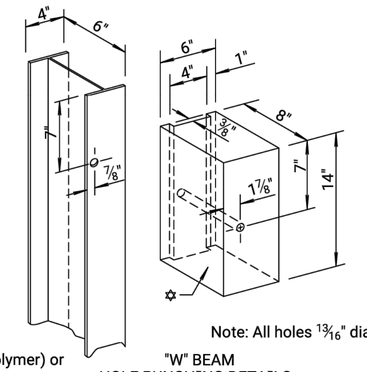
Galvanize all bolts, nuts, and washers in accordance with the KDOT's Standard Specifications.

See Standard Drawing RD613 for Thrie-Beam Transition Section Details.



Note: All holes 13/16" dia.

THRIE BEAM
HOLE PUNCHING DETAILS



Note: All holes 13/16" dia.

✡ Non-Metallic (Polymer) or Treated Wood Block

"W" BEAM
HOLE PUNCHING DETAILS

NO.	DATE	REVISIONS	BY	APP'D
13	09-05-18	Added Det., Post In Pavement	A.L.R.	T.T.R.
12	12-14-10	Revised notes, 28" w-be	S.W.K.	J.O.B.
11	06-30-04	Remove steel blockout and notes	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

GUARDRAIL POST DETAILS

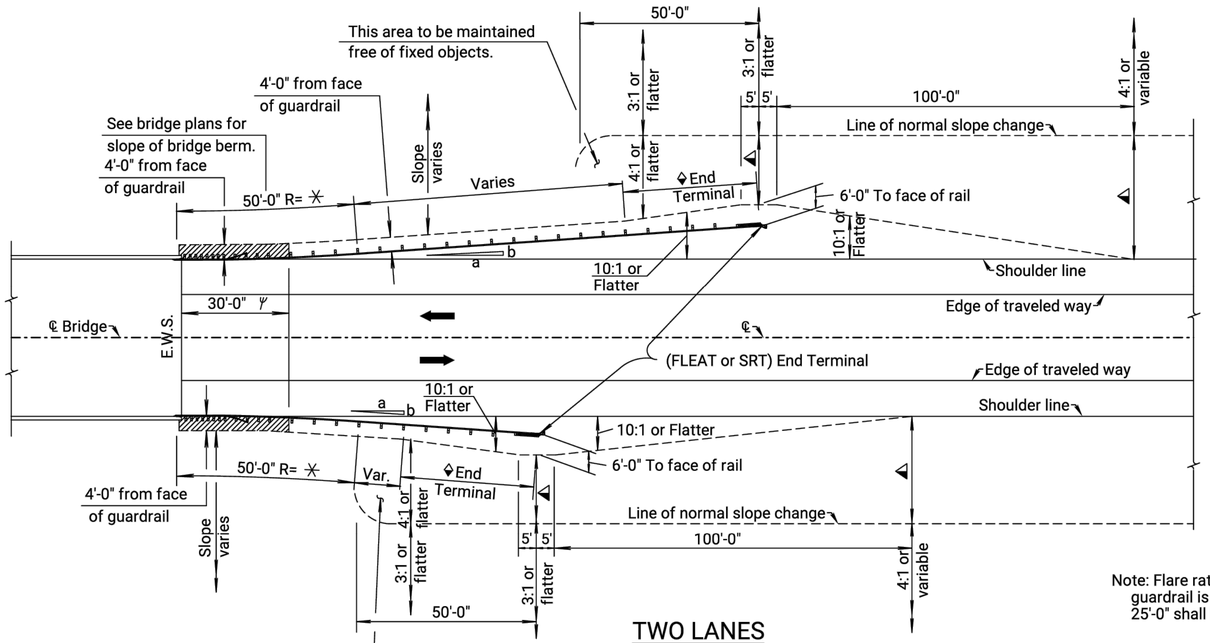
RD611

FHWA APPROVAL	09-25-18	APP'D.	Scott. W. King
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

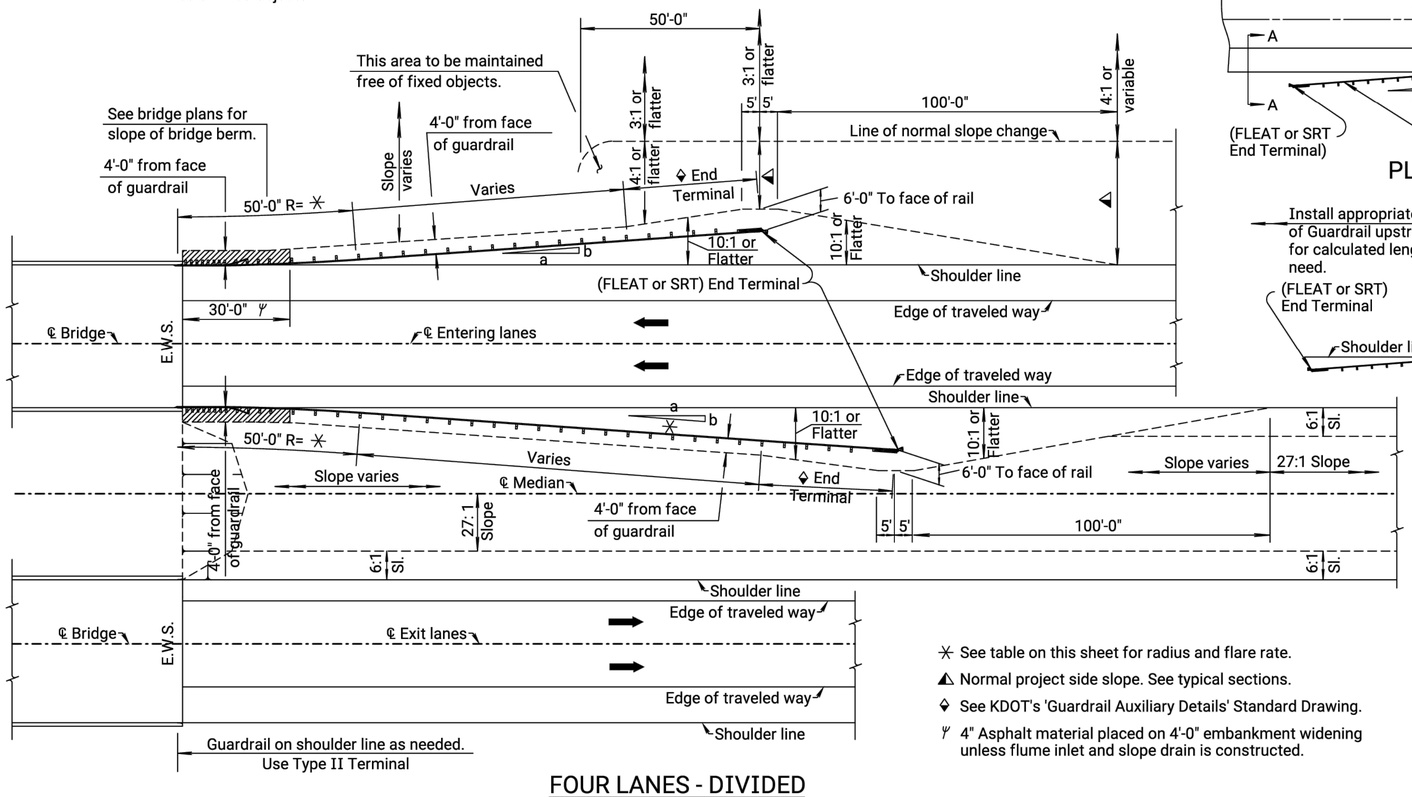
KDOT Graphics Certified 08-01-2022

KDOT Graphics Certified

Notes to Designer: Guardrail length of need shall be determined in accordance with the AASHTO Roadside Design Guide using
L_1= 25' for flare rate of a:b and L_1=12.5' for flare rate of 2a:b for a typical installation as shown on this sheet.
This sheet shall be used when the flared guardrail design for typical layout shown (FLEAT or SRT) is selected.
Material for asphalt widening shall be included in the plan quantities.



TWO LANES



FOUR LANES - DIVIDED

DESIGN PARAMETERS				
Design Speed (mph)	Flare Rate (a:b)	Radius (R)	Flare Rate (2a:b)	Radius (R)
70	15:1	375.55'	30:1	375.14'
60	14:1	350.59'	26:1	325.16'
55	12:1	300.69'	24:1	300.17'
50	11:1	275.76'	21:1	262.70'
45	10:1	250.83'	18:1	225.23'
40	8:1	201.04'	16:1	200.26'

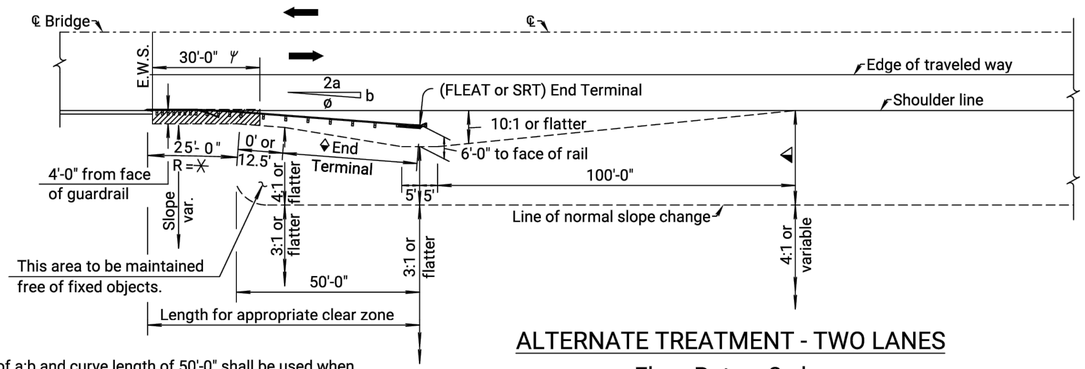
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	6	50

GENERAL NOTE

For guardrail and rubrail sections, details, and general notes see KDOT's 'W-Beam with Rubrail Bridge Approach Transition Details' Standard Drawings. For post details see KDOT's 'Guardrai Post Details' Standard Drawings

The ratio of a:b may be specified as zero for long runs of guardrail in high fill areas.

Widening, slopes & transition for Four Lane will be similar to that shown on two lane detail.

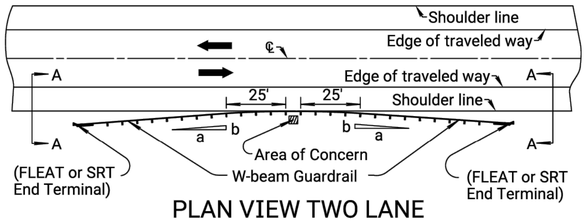


ALTERNATE TREATMENT - TWO LANES

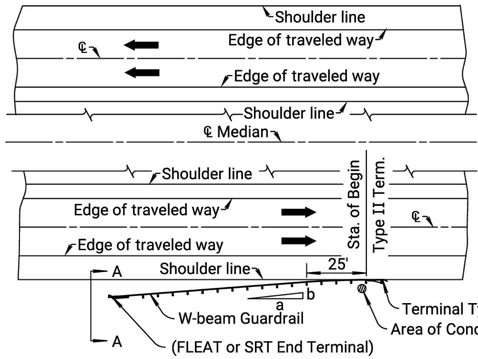
Flare Rate = 2a:b

(GUARDRAIL LENGTHS OF 62.5' AND 75')

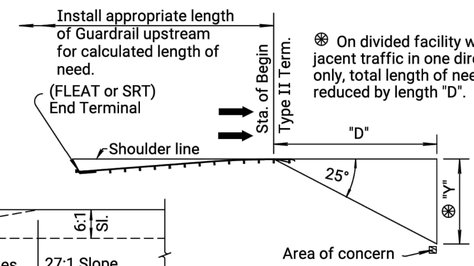
Note: Flare rate of a:b and curve length of 50'-0" shall be used when guardrail is beyond shy line, flare rate of 2a:b and curve length of 25'-0" shall be used when guardrail is located inside the shy line.



PLAN VIEW TWO LANE

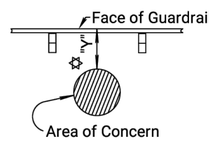


PLAN VIEW FOUR LANE



✻ On divided facility with adjacent traffic in one direction only, total length of need may reduced by length "D".

✡ Guardrail shall be nested and post spacing reduced to one half of normal spacing when "Y" is less than 5'. Ridid barrier shall be used when "Y" is less than 3'-3".



ENLARGEMENT - AREA OF CONCERN

DETAILS OF GUARDRAIL PROTECTION AT ROADSIDE OBSTACLE

✳ See table on this sheet for radius and flare rate.

◭ Normal project side slope. See typical sections.

⧫ See KDOT's 'Guardrail Auxiliary Details' Standard Drawing.

𝍐 4" Asphalt material placed on 4'-0" embankment widening unless flume inlet and slope drain is constructed.

NO.	DATE	REVISIONS	BY	APP'D
08	06-05-18	Removed Flare-beyond-the-Flare	A.L.R.	T.T.R.
07	05-15-17	Removed X-LITE	A.L.R.	S.W.K.
06	07-02-09	Added roadside obstacle details	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

W-BEAM WITH RUBRAIL BRIDGE APPROACH TRANSITION TYPICAL ALIGNMENTS (FLARED)

RD615A

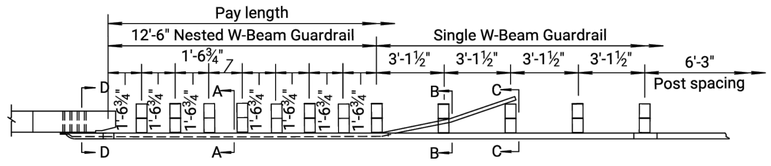
FHWA APPROVAL		06-19-18	APP'D.	Scott W. King
DESIGNED	DETAILED	QUANTITIES	TRACED	
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.	

KDOT Graphics Certified 05-16-2022

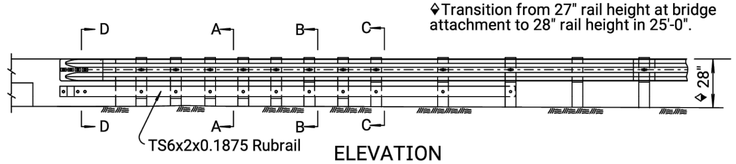
KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 11-JUN-2022 00:59
File : rd615a.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	7	50

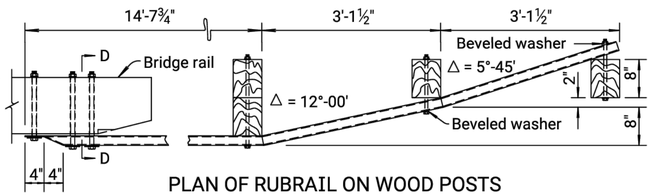


PLAN

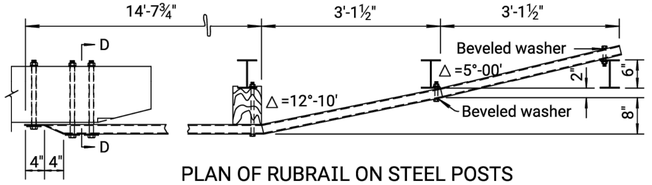


◆Transition from 27" rail height at bridge attachment to 28" rail height in 25'-0".

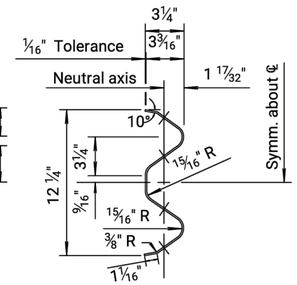
ELEVATION



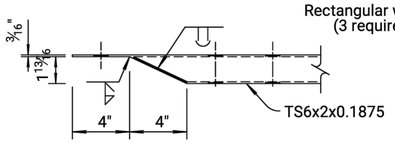
PLAN OF RUBRAIL ON WOOD POSTS

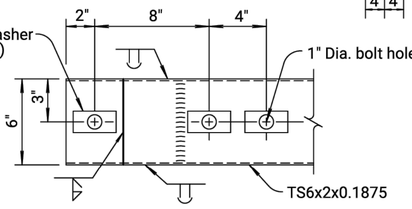


PLAN OF RUBRAIL ON STEEL POSTS

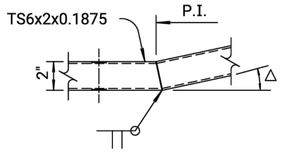


SECTION THRU TYPICAL W-BEAM RAIL ELEMENT

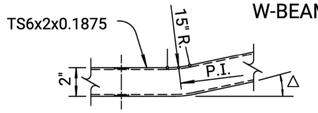




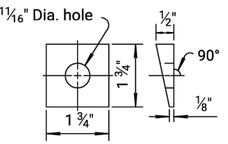
TYPICAL END RUB RAIL DETAILS



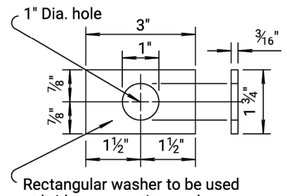
SHOP WELDED OPTION



SHOP BENT OPTION

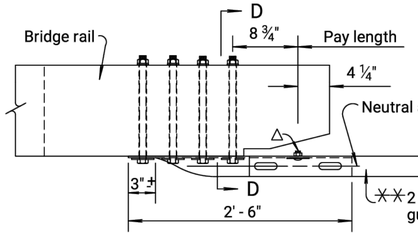


BEVELED WASHER

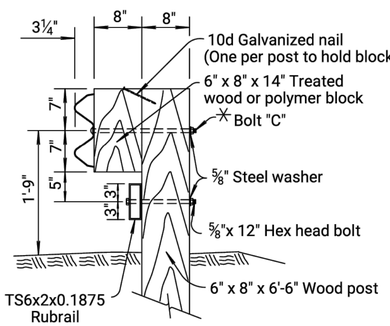


Rectangular washer to be used at bridge connections only.

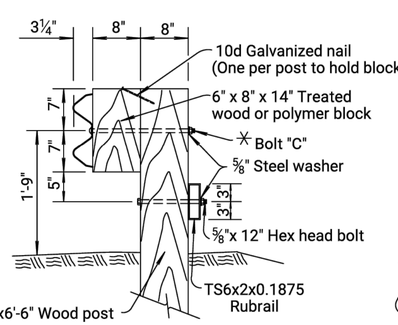
RECTANGULAR WASHER
(Other approved washer may be used.)



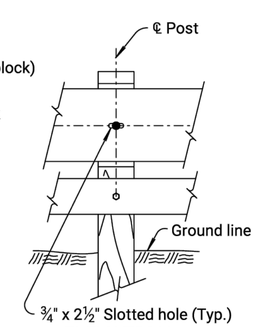
SECTION A-A



SECTION B-B



SECTION C-C



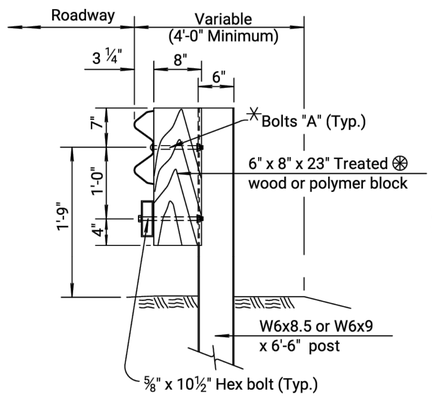
ELEVATION
WITH RUBRAIL

PLAN SPECIAL END SHOE

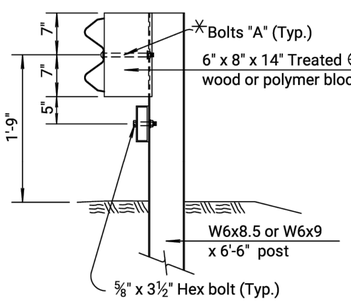
△ Where feasible a ⅝" bolt & washer (13#4" x 3") shall be installed in the 3#4" x 21#2" post bolt slot. This shall be in addition to the eight regular splice bolts.

ELEVATION SPECIAL END SHOE

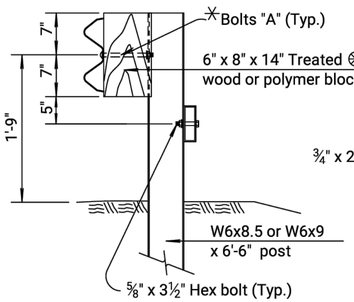
WOOD POSTS



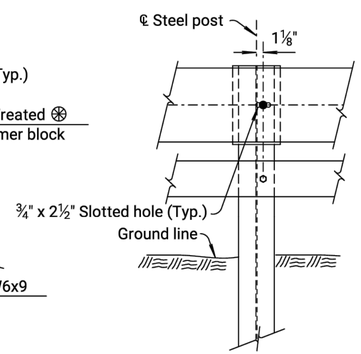
SECTION A-A



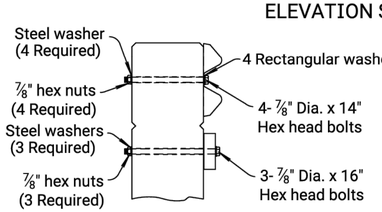
SECTION B-B



SECTION C-C



ELEVATION
WITH RUBRAIL



SECTION D-D

STEEL POSTS

⊛ Blocks used with steel posts shall be grooved to fit over the flange of the post and may be Wood or Polymer.

✳ See Standard Drawing RD611 for details of Bolts A, & C.

GENERAL NOTE

Include all material and work for this installation in the pay item "Steel Plate Guardrail" paid by the lineal foot.

Use 10 or 12 gauge steel guardrail elements unless otherwise called out, see standard specifications.

Bridge Rail Transition consists of one 12'-6" W-beam section nested in back of one 25'-0" section. Furnished remaining rail elements in either 12'-6" or 25'-0" sections.

Guardrail parts furnished under this specification shall be interchangeable with similar parts regardless of the source or manufacturer.

Shop fabricate tubular steel rubrail from ASTM A36 structural steel, form angles in rubrail by shop bending or welding. Rubrail is subsidiary to the bid item "Steel Plate Guardrail".

Galvanize rail elements, post fittings, bolts, nuts, washers and anchor bolts after fabrication in accordance with the standard specifications.

Shop or field drill holes in posts and/or tubular steel rubrail for attachment. When holes are field drilled touch up any damage to the galvanized coating with zinc based paint.

Shop bend rail when radius is less than 150'.

Fabricate Special End Shoe from 10 gauge steel in accordance with standard specifications.

The Special End Shoe has the same section as guardrail and is subsidiary to guardrail.

Lap guardrail splices, including Special End Shoe, in the direction of traffic. Where traffic is temporarily carried in the opposite direction of final configuration, lap rail splices in the direction of permanent traffic.

See Std. Drawing RD611 for additional details of posts not shown on this sheet.

✳✳ One section of the two shall be considered as subsidiary to the bid item "Steel Plate Guardrail".

NO.	DATE	REVISIONS	BY	APP'D
14	12-14-10	Revised notes 28' rail height	S.W.K.	J.O.B.
13	04-02-08	Removed Galvanized callout	S.W.K.	J.O.B.
12	02-06-07	Corrected spelling error	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

W-BEAM WITH RUBRAIL BRIDGE APPROACH TRANSITION DETAILS

RD616

FHWA APPROVAL		01-11-11	APP'D.	James O. Brewer
DESIGNED	DETAILED		QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.		QUAN.CK.	TRACE CK.

KDOT Graphics Certified 05-11-2022

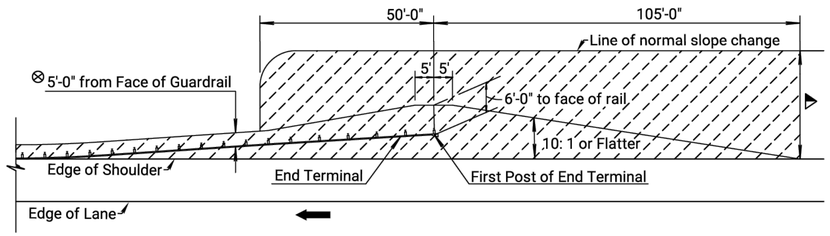
KDOT Graphics Certified

Plotted by: KDOT#CADD.Support_ks.gov 11-JUN-2022 01:00
File : rd616.dgn

Note to Designer - Design guardrail installations using guidance shown on KDOT's 'Guardrail Typical Alignments' Standard Drawings. 'Flared' guardrail installations are preferred over 'Parallel' or 'Zero Flare' installations. Where 'Flared' or 'Parallel' installations are used, the flare rate of the guardrail end terminal typically matches the flare rate of the remaining guardrail installation. For 'Zero Flare' installations, 'Parallel' guardrail end terminals should be designed using typical flare rates of 50:1 or flatter for the length of the end terminal. However, while 50:1 or flatter flare rates are typical for 'Parallel' guardrail end terminals, these end terminals may be flared as steep as 26:1 or flatter in order to offset the end terminal head as far from the edge of the through traveled lane as practicable.

GUARDRAIL CLEAR AREA

Applies to all guardrail installations unless otherwise shown in the plans.



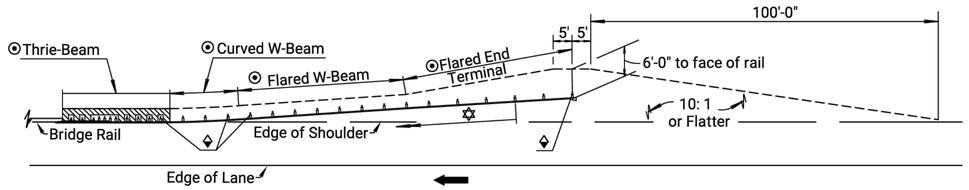
Keep Area Free of Stockpiled Material, Equipment, or Other Obstacles, Such as Temporary Signs, Regardless of Crash Worthiness. This Clear Area Extends 105 Feet in Advance of and 50 Feet behind the First Post of the Guardrail End Terminal and Then, in Order to Maintain Full Post Spacing, Continues 5 Feet behind the Face of the Guardrail through the W-Beam Portion of the Installation as Shown in the 'Guardrail Clear Area' Detail on this Sheet.

Normal Project Side Slope.

Deflection Distance for Normal Post Spacing

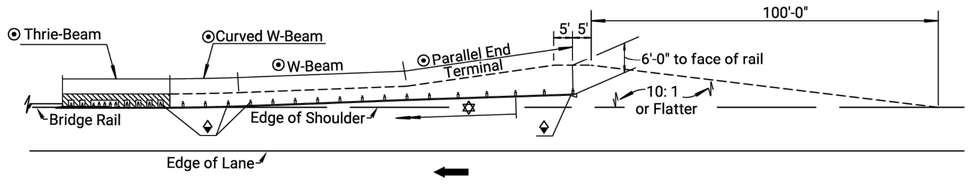
FLARED GUARDRAIL DETAIL

Applies to CGS AND MGS (MGS Shown)



PARALLEL GUARDRAIL DETAIL

Applies to CGS AND MGS (MGS Shown)



See Guardrail Layout Sheets for Details

On Guardrail Layout Sheets, Show Station AND Offset from the Roadway Alignment to the Face of Post at these Locations.

Length of Need (Begins at Post 3)

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	8	50

GENERAL NOTES

Install the guardrail end terminals according to the Manufacturer's Installation Manual. The Contractor will furnish a copy of the Manufacturer's Installation Manual to the Engineer prior to the start of the installation.

Use approved steel (preferred) or wood posts provided by the Manufacturer. The guardrail end terminal post type may be independent of the post type used in the remainder of the installation. However, no mixing of post types is permitted in the remaining w-beam and thrie-beam installation.

Use approved polymer (preferred) or wood blockouts provided by the Manufacturer. The guardrail end terminal blockout size and type may be independent of the blockout size and type used in the remainder of the installation. For blockout size and types for the remaining w-beam and thrie-beam portion of the installation see the details shown on KDOT's 'Guardrail Post Details' and 'Guardrail Thrie-Beam Transition Details' Standard Drawings.

Apply retroreflective sheeting to the end terminal impact head before installation.

Tighten all cable anchor assemblies as per the Manufacturer's Installation Manual.

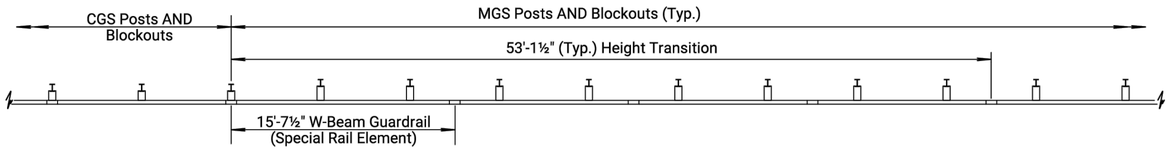
Lap w-beam and thrie-beam guardrail splices, in the direction of permanent traffic, even where temporary traffic may be carried in the opposite direction of the final traffic configuration. Lap end terminal splices per the Manufacturer's Installation Manual in the direction of permanent traffic, even where temporary traffic may be carried in the opposite direction of the final configuration.

The minimum length of w-beam guardrail required between the thrie-beam transition and the guardrail end terminal is 12'-6" for all installations; unless otherwise stated in the Manufacturer's Installation Manual.

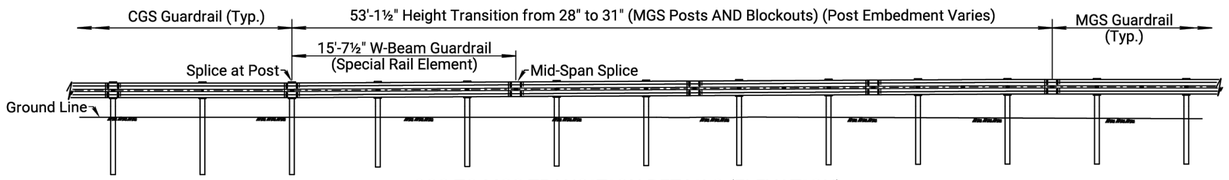
Where pavement with a thickness less than or equal to 8" is encountered during installation, use the details shown on KDOT's 'Guardrail Post Details' Standard Drawings to provide openings in the pavement for the guardrail posts. Where pavement with a thickness greater than 8" or geologic rock is encountered during installation, follow the Manufacturer's Installation Manual for guidance. Where the Manufacturer's Installation Manual does not address pavement with a thickness greater than 8" or geologic rock, contact the manufacturer for instructions or install the guardrail posts as directed by the Engineer.

All work and materials required for w-beam and thrie-bean guardrail installations are paid for under the appropriate bid items for either CGS or MGS guardrail depending on the type of installation.

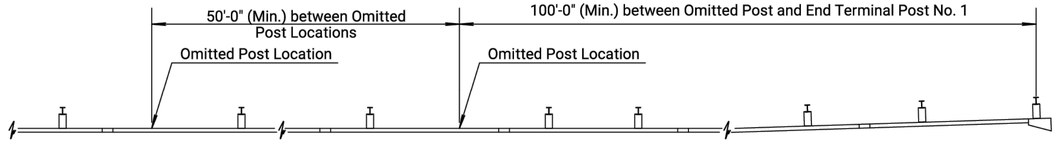
All work and materials required for guardrail end terminal installations are paid for under the bid item for the selected guardrail end terminal. See the table on this sheet for the appropriate end terminal bid item information.



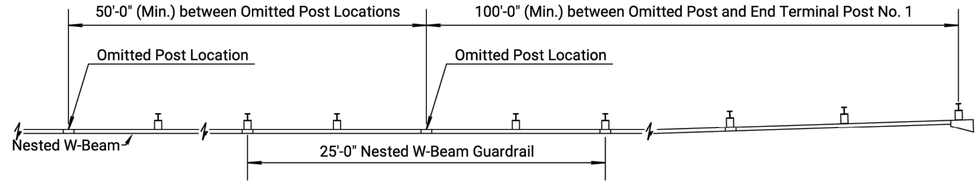
CGS TO MGS TRANSITION DETAILS (PLAN)



CGS TO MGS TRANSITION DETAILS (ELEVATION)



MGS OMITTED POST DETAIL



CGS OMITTED POST DETAIL

MIDWEST GUARDRAIL SYSTEM (MGS) END TERMINALS

END TERMINAL BID ITEM	FLARED OR PARALLEL	MOUNTING HEIGHT	CRASH TESTING CRITERIA	STEEL POST DESIGN AVAILABLE	WOOD POST DESIGN AVAILABLE	ENERGY ABSORBING	MANUFACTURER	DESIGN LENGTH	MANUFACTURER SYSTEM LENGTH
Guardrail End Terminal (MGS-FLEAT)	Flared	31"	NCHRP 350	Yes	Yes	Yes	Road Systems	40'-7½"	37'-6"
Guardrail End Terminal (MGS-SRT)	Flared	31"	NCHRP 350	Yes	Yes	No	Trinity Industries	40'-7½"	37'-6"
Guardrail End Terminal (MGS-MSKT)	Parallel	31"	MASH	Yes	No	Yes	Road Systems	46'-10½"	46'-10½"
Guardrail End Terminal (MGS-SOFTSTOP)	Parallel	31"	MASH	Yes	No	Yes	Trinity Industries	46'-10½"	50'-9½"

CONVENTIONAL GUARDRAIL SYSTEM (CGS) END TERMINALS

END TERMINAL BID ITEM	FLARED OR PARALLEL	MOUNTING HEIGHT	CRASH TESTING CRITERIA	STEEL POST DESIGN AVAILABLE	WOOD POST DESIGN AVAILABLE	ENERGY ABSORBING	MANUFACTURER	DESIGN LENGTH	MANUFACTURER SYSTEM LENGTH
Guardrail End Terminal (FLEAT)	Flared	28"	NCHRP 350	Yes	Yes	Yes	Road Systems	37'-6"	37'-6"
Guardrail End Terminal (SRT)	Flared	28"	NCHRP 350	Yes	Yes	No	Trinity Industries	37'-6"	37'-6"
Guardrail End Terminal (SKT)	Parallel	28"	NCHRP 350	Yes	Yes	Yes	Road Systems	50'-0"	50'-0"

NO.	DATE	REVISIONS	BY	APP'D
2	9-5-18	ADD. OMITTED POST AND TRANS. DETAILS	A.L.R.	T.T.R.
1	6-5-18	INITIAL RELEASE	A.L.R.	T.T.R.

KANSAS DEPARTMENT OF TRANSPORTATION

GUARDRAIL AUXILIARY DETAILS

RD606

FHWA APPROVAL	9-25-18	APP'D.	SCOTT W. KING
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

KDOT Graphics Certified 09-26-2018

KDOT Graphics Certified

Plotted 26-SEP-2018 13:42

Drawn By : arockers
File : rd606.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	9	50

Channel Alignment
Channel Sta. =10+00= ℄ Sta. 1260+39

8+00
9+60
159°34'
1260
10+00
1
10+40
165°10'
11+00

N ¼ Cor Sec 12, T6S, R22W
Found ½" uncapped rebar
1. Top of corner gate post
2. Top of corner gate post
3. Sta. 1240+99.05
N:748039.85 E:4422988.62

Ref.
0.4' Deep
70.2 NNE
71.5' NNW

POT Sta. 1255+00.00
1. Office Set
2. Project Center Line = Section Line
3. No other ties available
N:748022.40 E:4424389.46

POT Sta. 1265+00.00
1. Office Set
2. Project Center Line = Section Line
3. No other ties available
N:748009.94 E:4425389.38

NE Cor Sec 12, T6S, R22W
Found ⅝" uncapped rebar @ Surface
1. Spk & double washer in the top of a corner fence post
2. Top corner fence post
3. Spk & double washer in the top of a corner fence post
4. Sta. 1267+19.04
N:748007.21 E:4425608.40

Ref.
41.2' NE
47.7' SW
47.2' NW

Sta. 1260+10 Remove
Br. No. 000330563903620
188' 5-span PDGS Br. w/22.6' Rdwy.
Demolition Category A

Sta. 1260+15 Construct
Br. No. 000330563803620
36'-48'-48'-36' RCSH Bridge w/28.0' Rdwy.
45° skew Lt.
Category 2 Falsework Plans Required.

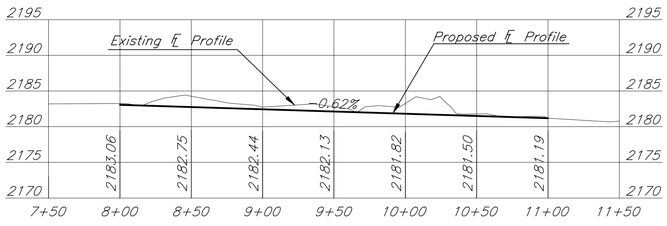
NOTE: The Contractor shall remove the existing 188.0' 5 Span PDGS (Br. No. 0003305639036 20) with 22.6' rdwy. width. The Contractor shall stockpile tee-beams in salvageable condition for county to remove with their own funds and forces. All other materials shall become the property of the Contractor and be removed from the site.

The Contractor shall excavate the channel and complete the embankments prior to construction of the RCSH bridge.

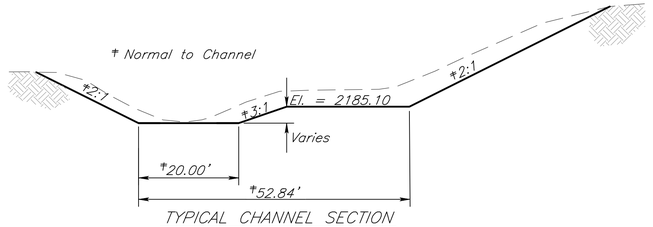
Existing Bridge consists of: prestressed concrete double tee-beams, concrete caps, concrete piling, and concrete abutments.

The Contractor shall construct the shoulder widening and install 25 ft. of Steel Plate Guard Rail (Galv.) and Guard Rail End Terminal at each quadrant of the new RCSH Bridge, Sta. 1260+15. See Sheet No. 4-8 for details.

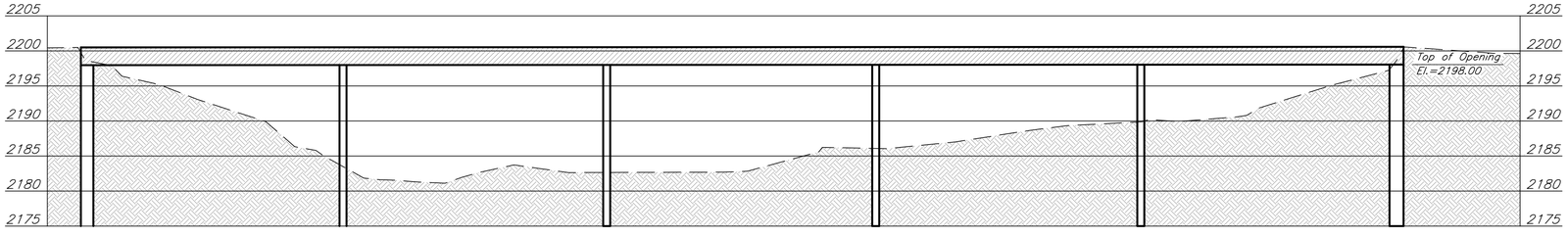
Project ℄ = Section Line
Temp. Const. Esmt. 150' Lt. ℄
Lean To
Frazey Farms LLC
E ½ of S01, T06S, R22W
except R/W
Agricultural Use
R/W +00 50' Lt. ℄
Exist R/W 35' Lt. ℄
N ¼ Cor Sec 12, T06S, R22W
BM #1
BM #3
BM #4
BM #2
NE Cor Sec 12, T06S, R22W
Existing R/W 35' Lt. ℄
Existing T/W
1255
1265
Existing R/W 35' Rt. ℄
NEX-TECH
OHP
R/W +50 50' Rt. ℄
Construction Limits
R/W +00 50' Rt. ℄
Existing R/W 35' Rt. ℄
¼ Line Sta. 1240+99.05
Section Line Sta. 1267+19.04
Sta. 1257+00 BEGIN
K.D.O.T. Proj. No. 33 C-5290-01
Sta. 1263+00 END
K.D.O.T. Proj. No. 33 C-5290-01
Pakkebier Farms LLC
All of S12, T06S, R22W except R/W
Agricultural Use
Temp. Const. Esmt. 150' Rt. ℄
Bow Creek
Sta. 1260+39 = Channel Sta. 10+00
Construct Excavation 200' Lt. & 100' Rt.



CHANNEL PROFILE & GRADE



TYPICAL CHANNEL SECTION
Sta. 9+60 to Sta. 10+40



SKETCH OF EXISTING STRUCTURE
Existing Waterway Opening = 1876 sq. ft.
Sta. 1260+10

50' 0 50' 100'
Graphic Scale in Feet
Scale: 1"= 50' Plan
Contour Interval = 2'

BM#1 5/8"x24" rebar with green plastic cap stamped "CONTROL PENCO"
Sta. 1255+87.06 34.4' Lt. Elev.=2193.69
N:748055.69 E:4424476.94

BM#2 "X" cut in top of Southwest Wing
Sta. 1259+15.99 15.0' Rt. Elev.=2199.65
N:748002.23 E:4424805.23

BM#3 "X" Cut in top of Northeast Wing
Sta. 1261+04.01 12.6' Lt. Elev.=2199.50
N:748027.48 E:4424993.58

BM#4 5/8"x24" rebar with green plastic cap stamped "CONTROL PENCO"
Sta. 1263+07.32 35.1' Lt. Elev.=2203.81
N:748047.46 E:4425197.15

CONTOUR MAP

PENCO ENGINEERING, P.A.
PLAINVILLE, KANSAS

DESIGNED BY: JJD	SCALE: As Shown
DRAWN BY: AMN	PROJ. NO.: 33 C-5290-01
CHECKED BY: CRB	DATE: 2025

X:\ec2\kdot\K05290-Graham-0H#10\ACAD\EG_5290_Design.dwg\CONTOUR50 1/9/2025 6:57 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	10	50

BRIDGE QUANTITIES

Location	Excavation		Concrete (Grade 4.0) (AE)	Concrete (Grade 4.0) (AE)(SW)	Reinf. Steel (GR. 60)	Slope Protection (Shot Rock)	≠ Pile (Steel) (HP10x42)	Contractor Furnished PDA
	Class I	Class II						
	CUYD	CUYD	CUYD	CUYD	LBS	CUYD	LNFT	EACH
Abutment #1	66.1			**	**	140	335	1
Pier #1	15.2	76.1	55.9		2204		420	
Pier #2	0	92.5	61.5		2423	34	420	
Pier #3	19.1	90.7	61.5		2423		430	1
Abutment #2	65.2			**	**	139	350	
Total Substructure					7050			
Total Superstructure				356.6	103070			
TOTAL	166	259	178.9	356.6	110120	313	1955	2

**Quantities are included in the Superstructure Quantity.

≠ NOTE: Only Steel HP 10 x 42 Piles shall be used on this project.

Summary of Piling	
Abutment No. 1	4 @ 65', 1 @ 75' for PDA
Pier No. 1	6 @ 70'
Pier No. 2	6 @ 70'
Pier No. 3	5 @ 70', 1 @ 80' for PDA
Abutment No. 2	5 @ 70'

GENERAL NOTES

BRIDGE EXCAVATION: Elevation 2185.10' shall designate the Excavation Boundary Plane of Class I and Class II Excavation; Class I above the plane, Class II below the plane. See the Bridge Excavation sheet for the limits of pay excavation.

EMBANKMENTS: Complete the embankment at the abutments as shown on the Bridge Excavation sheet prior to driving the abutment piling or commencing with the abutment footing excavation.

SLOPE PROTECTION (Shot Rock): Place Slope Protection (Shot Rock) to the limits and thicknesses shown on the plans or as directed by the Engineer. Place geotextile under the rock/rubble embankment on the berm and berm slopes.

PILING: Drive all piling to penetrate or bear upon the shale formation. Driving shall stop when in the opinion of the Engineer additional driving may damage the piling. Drive all piling to the Pile Driving Formula Load of:

Abutment No. 1	46 Tons
Pier No. 1	93 Tons
Pier No. 2	93 Tons
Pier No. 3	93 Tons
Abutment No. 2	46 Tons

As a minimum drive each pile to the load and penetration, but in no case shall the pile be driven to more than 110% of Pile Driving Formula Driving Load.

CONCRETE: Superstructure concrete is bid as Concrete (Grade 4.0)(AE)(SW). Substructure concrete is bid as Concrete (Grade 4.0)(AE). The Contractor may use Concrete (Grade 4.0) in the footings. Bevel all exposed edges of all concrete with a ¾" inch triangular molding, except as otherwise noted on the plans. Construction joints are optional with the Contractor, but if used, place only at locations shown, or at locations approved by the Engineer.

REINFORCING STEEL: All reinforcing steel dimensions are to the centerline of bars unless otherwise noted. All reinforcing steel, except the spiral bars, shall conform to the requirements of ASTM A615, Grade 60. Spiral bars may meet the requirements of either ASTM A615 (Gr. 40 or 60) or A82, and are included in the bid item "Reinforcing Steel (Gr. 60)".

FALSEWORK PLANS: A licensed Professional Engineer shall design the falsework details. Details shall bear the seal of a licensed Professional Engineer. See the Bridge Design Manual, Section 5.1 "Review and Approval of Falsework Plans", for a listing of items to be included on the falsework plan. Submit three sets of details in compliance with KDOT Specifications to the Owner's designated Engineer for review and distribution.

FALSEWORK INSPECTION: This project has falsework plan requirements which are considered "Category 2" by KDOT specifications. If falsework deficiencies or variations from the approved and sealed plans are found, the falsework design Engineer of Record will provide written approval of the changes. If for the convenience of the Contractor the falsework becomes "Category 1" by the use of non-typical supports; then the inspection and review requirement of "Category 1" will be fully enforced, but at no cost to the Owner. "Category 2" falsework inspection is not paid for directly, but is subsidiary to other bid items.

FALSEWORK: Leave the falsework in place for the entire unit until 15 days after the last concrete pour for the unit or longer as directed by the Engineer.

CAMBER: Provide camber as shown on the Camber Diagram unless the Contractor uses either long span steel beam falsework (concrete dead load deflection greater than ¼ inch) or timber falsework with greater than 12'-0" clear span. If either case exists, submit falsework plans that show the additional required camber.

CORRAL RAIL: Build the corral rail after the falsework is struck.

CONSTRUCTION LOADS: Limited traffic is permitted on the new sub-deck, one-course deck or any concrete overlay during the curing period, keep any exposed deck wet during the curing period. See KDOT Specifications Section 710 Tables 710-1 & 710-2 for additional information.

PILING SPLICE LOCATION: Integral pile splice locations and weld testing criteria for Abutments and Piers will follow the "Standard Pile Details" Sheet (BR110).

BACKFILL COMPACTION: Compact backfill at the abutments.
Note: The Contractor shall place a header board at each EWS in accordance with Section 710.3.c.1 of the Specifications for Bridges With Tied Approaches. This work shall not be paid for directly, but shall be subsidiary to other items of the contract

CONCRETE PLACING SEQUENCE: The sequence of placing concrete in the slab and curbs shall be as shown, or the Contractor may submit an alternate placing sequence for review. Submit the alternate placing sequence to the Owner's designated Engineer at the Preconstruction Conference. Include the proposed rate of concrete placement in C.Y./h, the plant capacity, placement direction, construction joint location, a description of the equipment used in placing the concrete, proposed admixtures, and the quantity of concrete in each placing segment. Any additional cost for the Contractor's alternate plan of placing concrete, including admixtures, shall be at the Contractor's expense and shall be considered subsidiary to the bid item, "Concrete (Grade 4.0) (AE) (SW)". Approval of the Contractor's alternate sequence is required prior to placement of concrete in the deck.

DEMOLITION PLANS: This is a Category A Demolition. Submit detailed Demolition Plans to the Owner's designated Engineer for review and distribution per KDOT Specifications. No Demolition work will begin without approved Demolition Plans. A Licensed Professional Engineer is not required.

REMOVAL OF EXISTING STRUCTURE: Removal of existing structure is included in the bid item, "Removal of Existing Structures", Lump Sum.

DECK FINISHING: Set the finishing machine parallel to the skew for striking off and screeding the concrete. Screeding normal to the centerline of the bridge will not be allowed.

BRIDGE DECK FINISHING: Give the surface a suitable texture by transverse grooving parallel to the skew of the bridge with a tining float having a single row of fins. Make the grooving approximately 3/16 inch in width at ¾ inch centers, with a depth approximately ⅛ inch.

BRIDGE DECK CURING: Within 15 minutes, or as soon as the surface water disappears, apply 2 coats of Type 2 white liquid membrane forming compound at a minimum rate per coat of 1 gallon per 200 square feet of concrete surface. Place the second coat at right angles to the first coat. Protect the curing membrane against marring for a minimum of 7 days. The Engineer may limit work during this 7-day period.

CONTRACTOR FURNISHED PDA: Use the Pile Driving Analyzer equipment at the locations shown on the Construction Layout. Use Pile Driving Analyzer equipment and methods compliant with KDOT Special Provision. The piling shall remain in place as permanent piling. Drive the piling to the resistance value of 71 for Abutments and 143 for Piers (Strength I divided by Phi).

At any location where problems are experienced, pile damage is suspected, or the Pile Driving Formula Load occurs significantly above the design pile tip elevation, the Owner's designated Engineer may request that the Pile Driving Analyzer (PDA) equipment be used.

ASBESTOS INFORMATION: Samples of this structure were tested to determine the amount of Asbestos Containing Materials (ACM) present in the components. The results are below:

Concrete	0%
Date of Report	N/A

For any result greater than 1%, abatement shall be performed according to KDOT Specifications. Results less than 1% require no abatement.

DESIGN DATA

DESIGN SPECIFICATIONS:
AASHTO Specifications, 2020 Edition and latest Interim Specifications. Load and Resistance Factor Design.

DESIGN LOADING: HL-93 Design Dead Load includes an allowance of 25 psf for a future wearing surface.

UNIT STRESSES:

Concrete (Grade 4.0)	f'c = 4 ksi
Concrete (Grade 4.0)(AE)	f'c = 4 ksi
Concrete (Grade 4.0)(AE)(SW)	f'c = 4 ksi
Reinforcing Steel (Grade 60)	fy = 60 ksi

LRFD PILE DESIGN LOAD:

Design Loading (Tons/Pile)	Strength I	Service	Phi
Abutment 1&2	46	33	0.65
Piers 1,2,&3	93	68	0.65

LRFR RATING FACTORS		
Truck \ Rating Level	Inventory	Operating
HL-93 Loading	1.60	2.08
NRL Loading		2.41
2020 Manual for Bridge Evaluation		

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 000330563803620 Sta. 1260+15

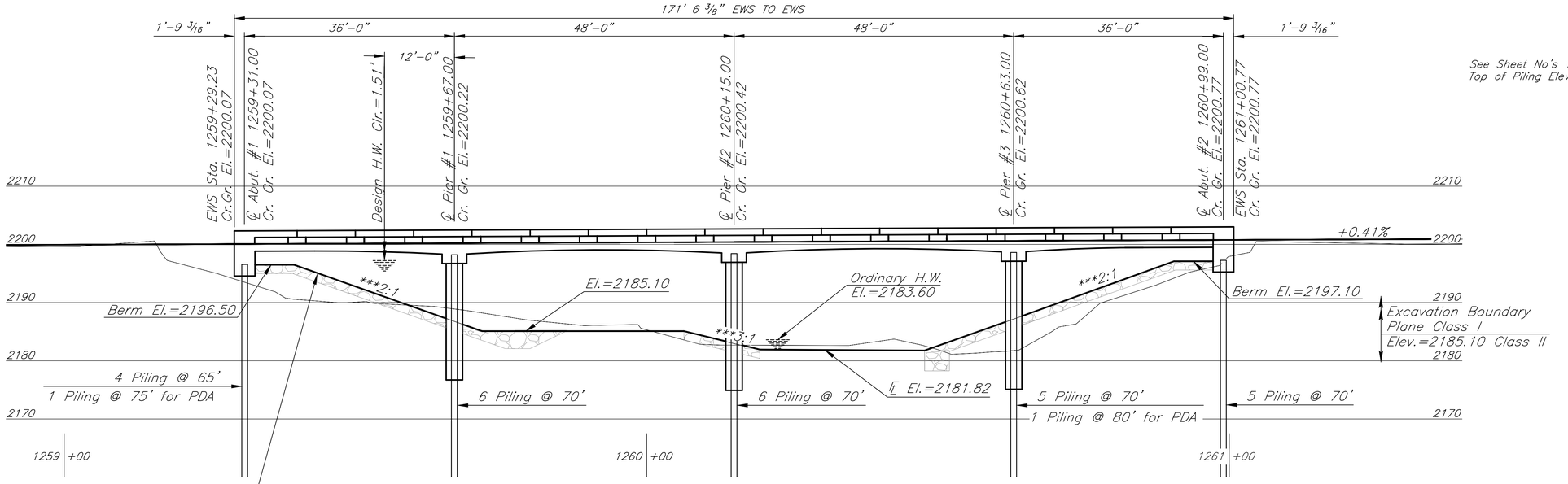
GENERAL NOTES AND QUANTITIES

Proj. No. 33 C-5290-01 Graham Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED DRT	DETAILED DRT	QUANTITIES DRT	CADD RCJ
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

X:\ac2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\EG_5290_Design - Bridge Quantities 4/8/2025 2:51 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	11	50



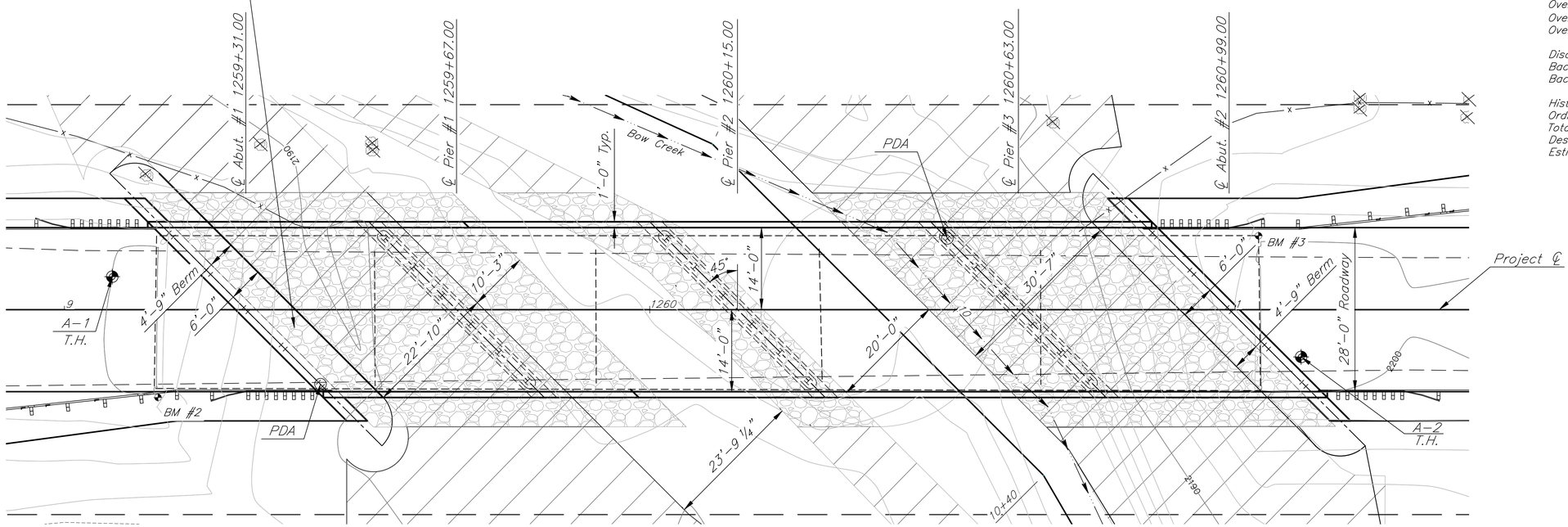
See Sheet No's 13 & 14 for Top of Piling Elevations.

*** Normal to Channel

ELEVATION

36'-48'-48'-36' R.C. Haunched Slab
Pile Bent Abutments, Pile Bent Piers
28' Rdwy. 45° Skew Lt.

Slope Protection (Shot Rock)(18")(Typ.) See Sheet No. 19



PLAN

BM#2 "X" cut in top of Southwest Wing
Sta. 1259+15.99 15.0' Rt. Elev.=2199.65
N:748002.23 E:4424805.23

BM#3 "X" Cut in top of Northeast Wing
Sta. 1261+04.01 12.6' Lt. Elev.=2199.50
N:748027.48 E:4424993.58

N

0 10' 20'

Graphic Scale in Feet

DRAINAGE DATA

Drainage Area	243.0 Sq. Mi.
Design Frequency	100 Years
Design Discharge (Q_{100})	14400 cfs
Design High Water Elevation	2197.22 ft.
Design Backwater	-1.18 ft.
Design Backwater Elevation	2197.81 ft.
Overtopping Elevation (Sta. 1257+00)	2199.12 ft.
Overtopping Discharge (Q_{200})	19100 cfs
Overtopping Frequency	200 Years
Discharge at Q_{100}	14400 cfs
Backwater at Q_{100}	-1.18 ft.
Backwater Elevation at Q_{100}	2197.81 ft.
Historic High Water Elevation	Unknown ft.
Ordinary High Water Elevation	2183.60 ft.
Total Waterway Provided	1761 Sq. Ft.
Design Waterway Provided	1494 Sq. Ft.
Estimated O.H.W. Discharge	30 cfs

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 000330563803620 Sta. 1260+15

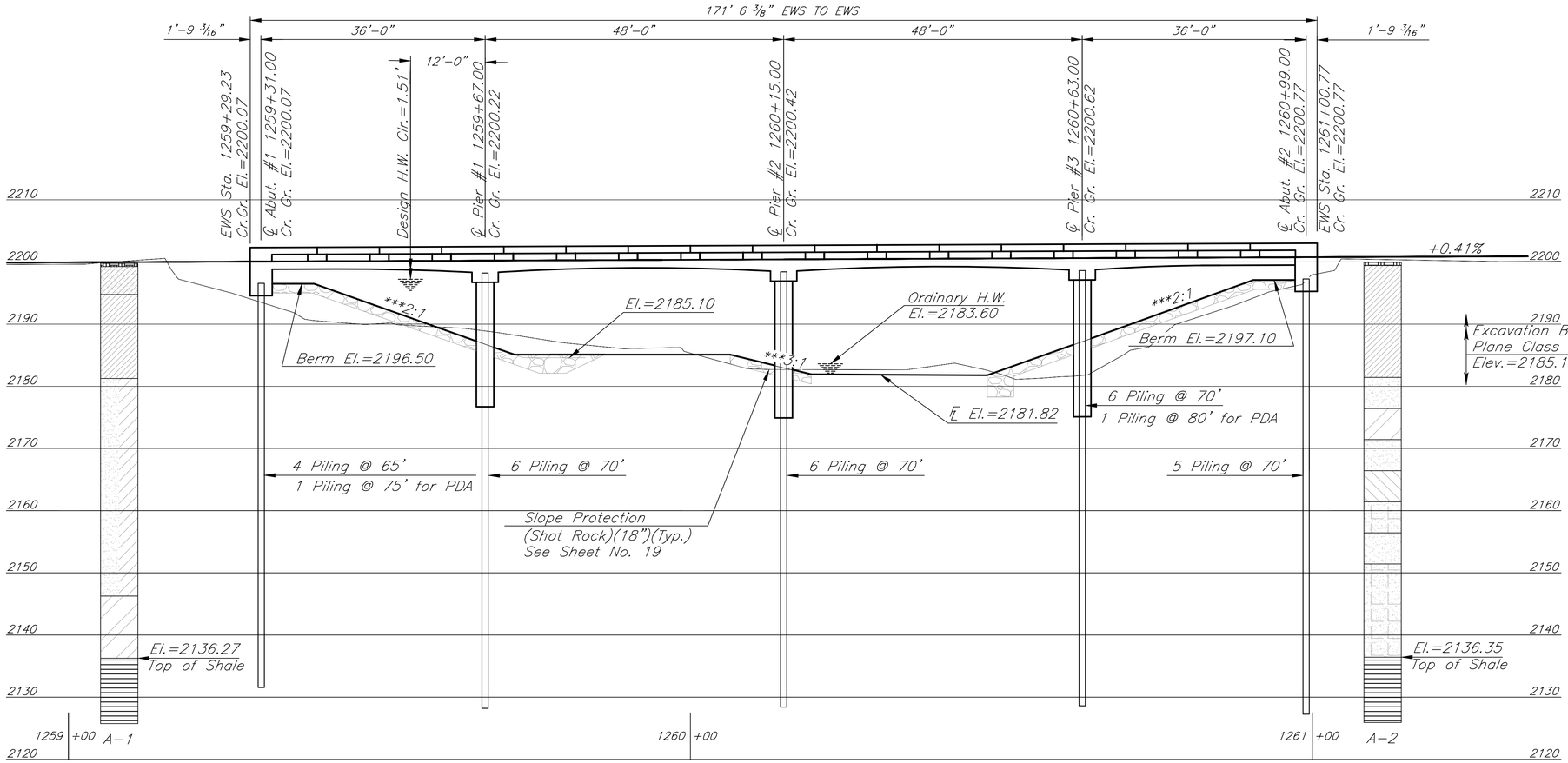
CONSTRUCTION LAYOUT

Proj. No. 33 C-5290-01 Graham Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

X:\ac2\kdot\KD5290-Graham-Off#101\ACAD\EG_5290_Design.dwg\CONSTRUCTION LAYOUT 1/9/2025 5:57 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	12	50



See Sheet No's 13 & 14 for Top of Piling Elevations.

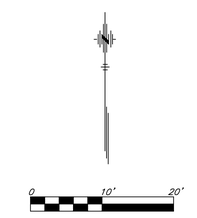
STANDARD GEOLOGICAL SYMBOLS

- Top Soil
- Lean Clay/ Sand
- Lean Clay
- Sand/Clay
- Fat Clay
- Shale
- Sand
- Fat Clay/ Sand
- Clayey Sand

ELEVATION

36'-48'-48'-36' R.C. Haunched Slab
Pile Bent Abutments, Pile Bent Piers
28' Rdwy. 45° Skew Lt.

*** Normal to Channel



Graphic Scale in Feet

BM#2 "X" cut in top of Southwest Wing
Sta. 1259+15.99 15.0' Rt. Elev.=2199.65
N:748002.23 E:4424805.23

BM#3 "X" Cut in top of Northeast Wing
Sta. 1261+04.01 12.6' Lt. Elev.=2199.50
N:748027.48 E:4424993.58

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 000330563803620 Sta. 1260+15

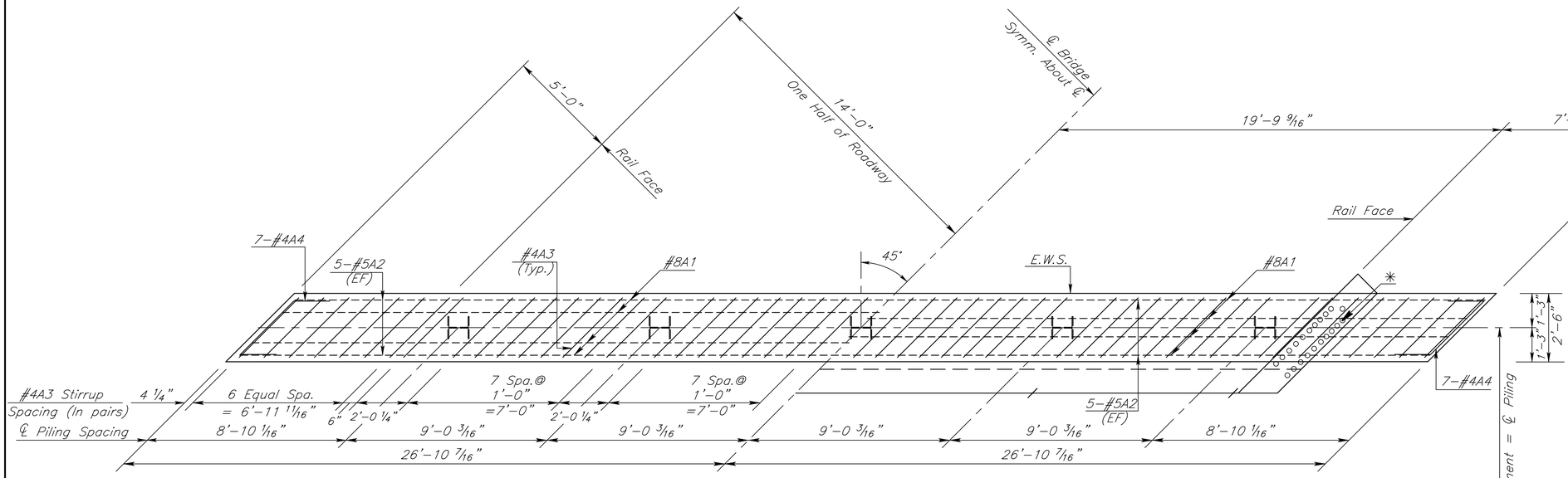
GEOLOGY

Proj. No. 33 C-5290-01 Graham Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

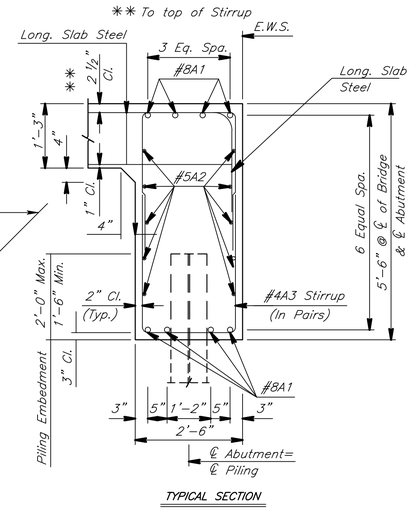
X:\oc2\kdot\K05290-Graham-Off#10\ACAD\EG_5290_Design.dwg\Geology 1/9/2025 5:16 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	13	50



REINFORCING STEEL IN BOTTOM OF ABUTMENT

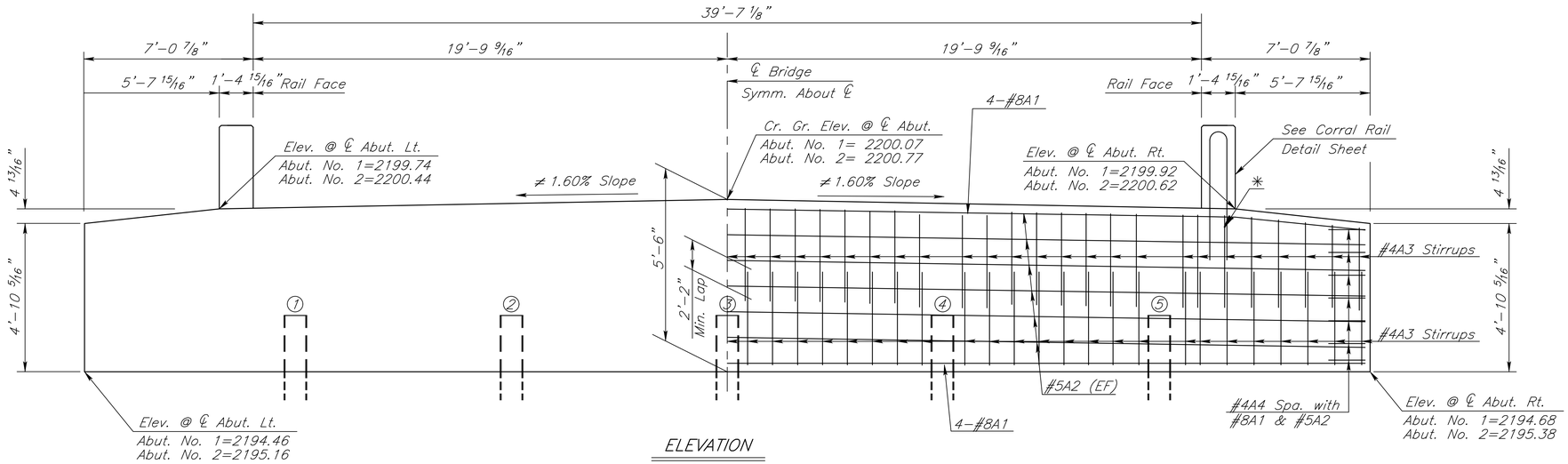
REINFORCING STEEL IN TOP OF ABUTMENT



TYPICAL SECTION

PLAN

*Adjust stirrup to avoid * conflict with rail bars.*



ELEVATION

(Along ℄ Abutment)

ABUTMENT PILE LOADING

Design

Strength I – 46 Tons/Pile

⊕ Top of Pile Elevation		
Pile No.	Abutment #1	Abutment #2
1	2196.49	2197.19
2	2196.54	2197.24
3	2196.57	2197.27
4	2196.60	2197.30
5	2196.65	2197.35

⊕ Note: Top of piling elevations are based on 2'-0" maximum embedment.

LEGEND

EF = Each Face

≠ Perpendicular to ℄ Roadway

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. 000330563803620 Sta. 1260+15

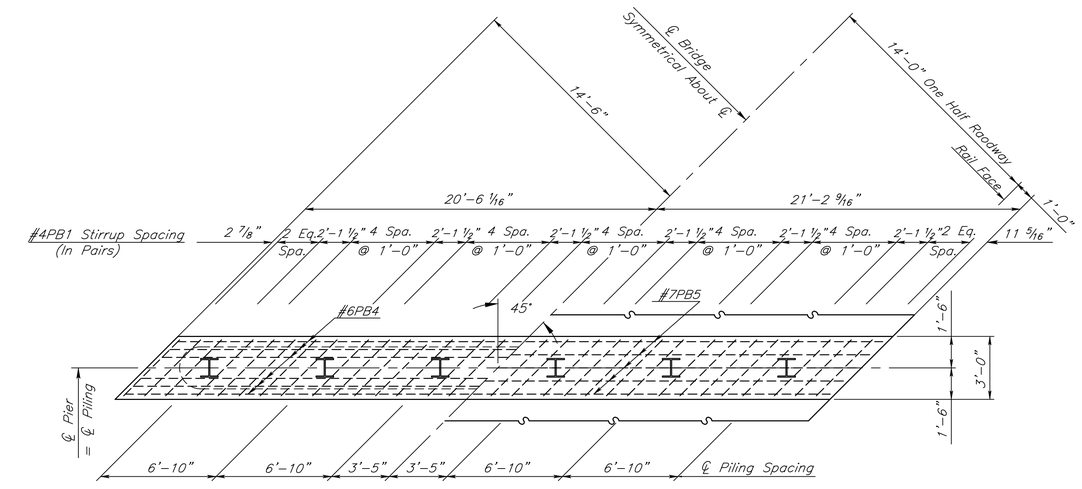
ABUTMENT DETAILS

Proj. No. 33 C-5290-01 Graham Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

X:\oc2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\EG_5290_Design - Abutment 1/9/2025 5:16 PM

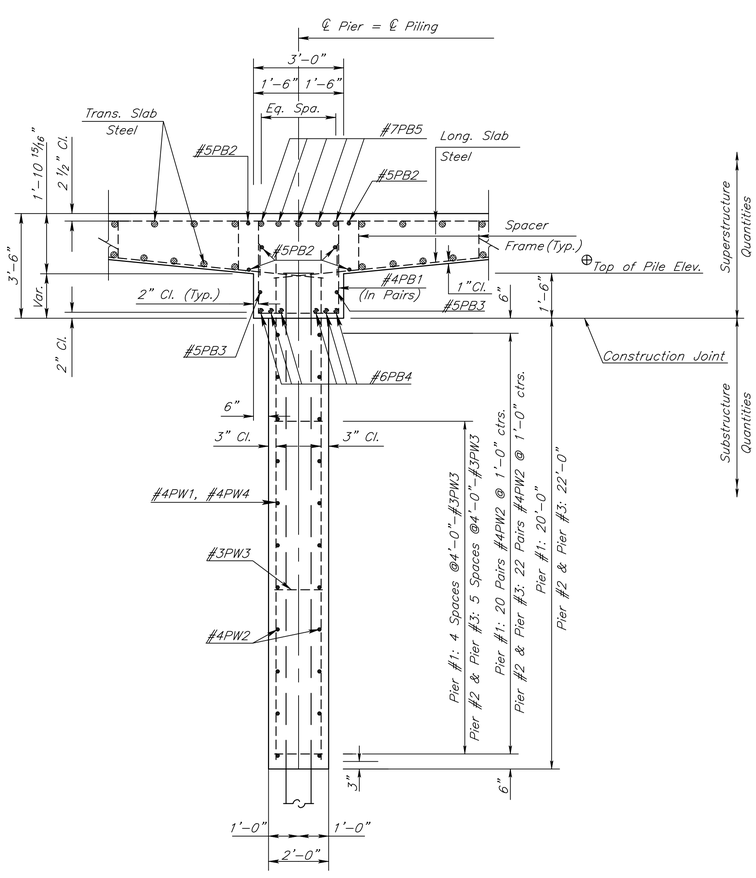
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	14	50



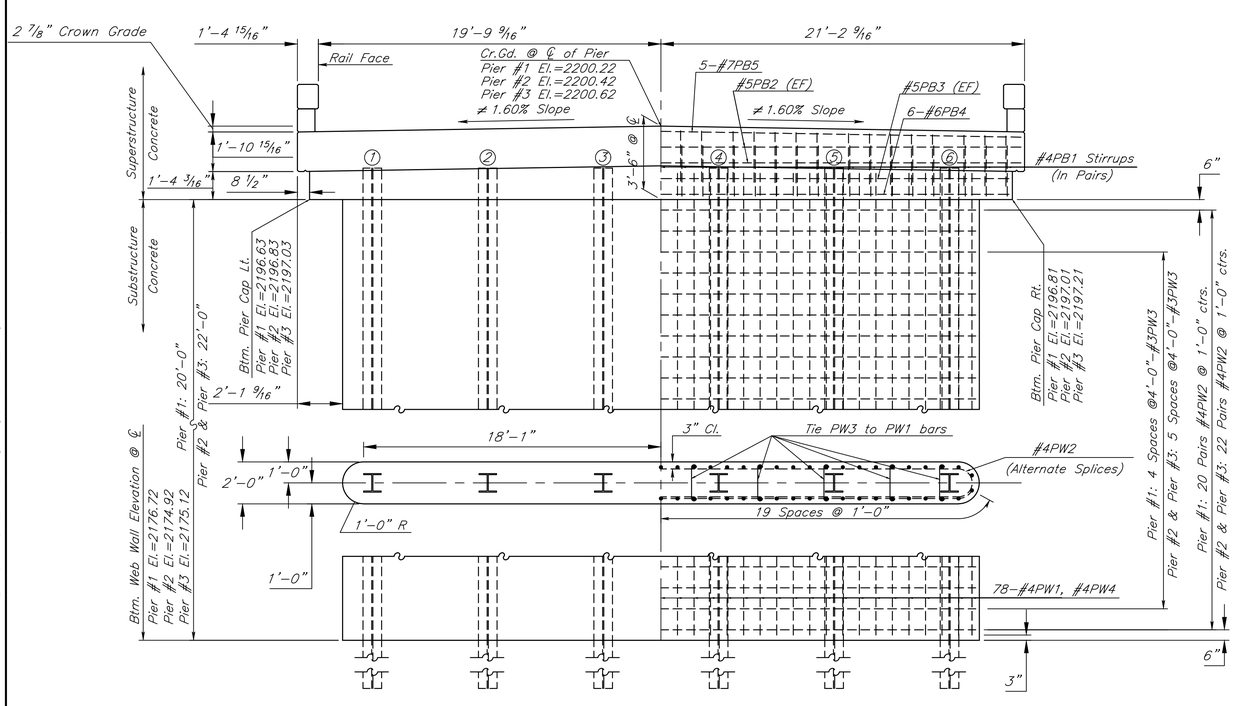
HALF PLAN REINFORCING STEEL IN BTM. OF CAP

HALF PLAN REINFORCING STEEL IN TOP OF CAP

PLAN



SECTION THRU PIER BEAM



HALF ELEVATION

HALF ELEVATION OF REINFORCING STEEL

ELEVATION

⊕ Top of Pile Elevation

Pile No.	Pier #1	Pier #2	Pier #3
1	2198.15	2198.35	2198.55
2	2198.18	2198.38	2198.58
3	2198.21	2198.41	2198.61
4	2198.23	2198.43	2198.63
5	2198.26	2198.46	2198.66
6	2198.29	2198.49	2198.69

⊕ Note: Top of pile elevation is based on 1'-6" embedment into the pier beam.

PIER PILE LOADING

Design

Strength I – 93 Tons/Pile

LEGEND

EF = EACH FACE

≠ Perpendicular to ℄ of Roadway

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. 000330563803620 Sta. 1260+15

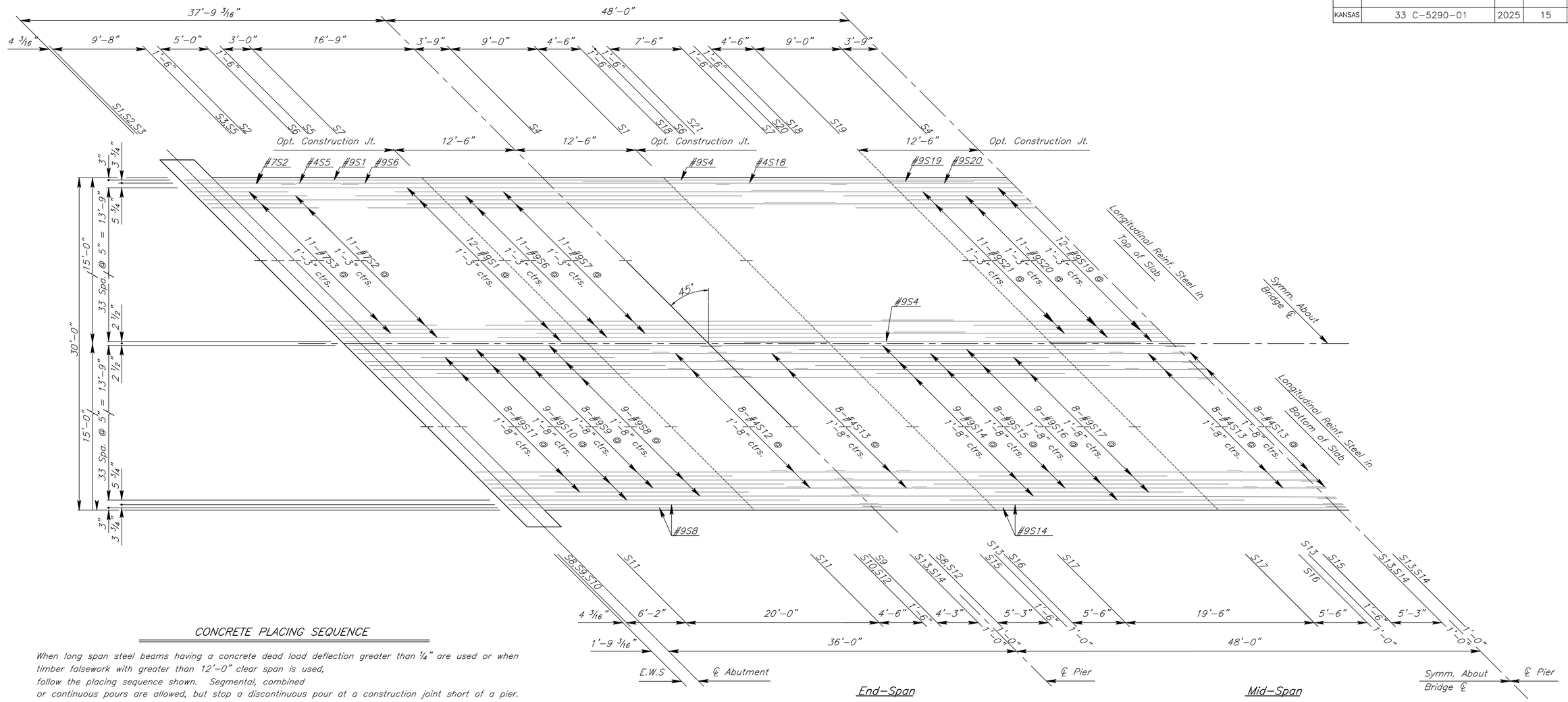
PIER DETAILS

Proj. No. 33 C-5290-01 Graham Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

X:\ac2\kdot\KD5290-Graham-01\#10\ACAD\EG_5290_Design.dwg\EG_5290_Design - Pier 12/10/2024 2:56 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	15	50

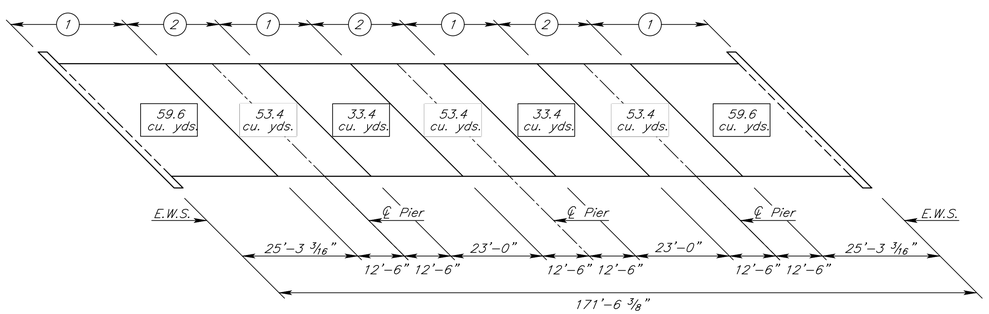


CONCRETE PLACING SEQUENCE

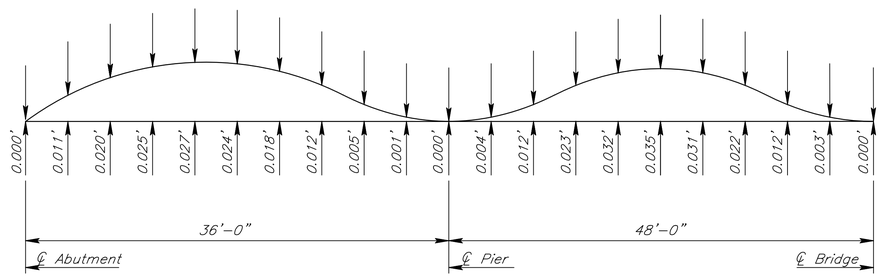
When long span steel beams having a concrete dead load deflection greater than 1/4" are used or when timber falsework with greater than 12'-0" clear span is used, follow the placing sequence shown. Segmental, combined or continuous pours are allowed, but stop a discontinuous pour at a construction joint short of a pier.

When timber falsework with 12'-0" or less clear span is used, the Contractor, subject to the approval of the Engineer, may use a continuous pour or may discontinue the pour at any construction joint shown.

The Contractor may place the corral rail continuously from one end of the bridge to the other.



HALF PLAN



DEAD LOAD CAMBER DIAGRAM AT TENTH POINTS

Long Term Deflections = Initial Deflections x 3.5
(Initial Deflections Based on $E_C = 3.644 \times 10^6$ p.s.i.)
Dead Load Camber reduced by 45% due to skew.

Note:
See longitudinal section for transverse reinforcing steel.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 000330563803620 Sta. 1260+15

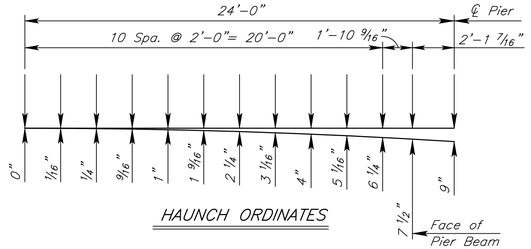
SUPERSTRUCTURE DETAILS

Proj. No. 33 C-5290-01 Graham Co.

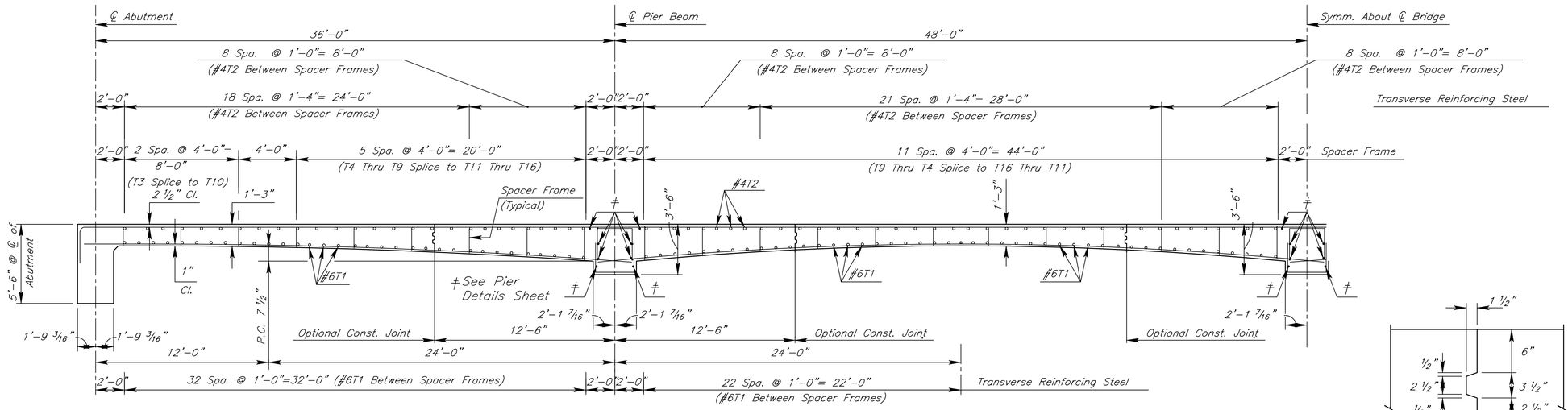
SHEET NO. OF	SCALE	APP'D	
DESIGNED DRT	DETAILED DRT	QUANTITIES DRT	CADD RCJ
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

X:\ac2\kdot\KD5290-Graham-Off#10\ACAD\Bridge Details\Bridge Details.dwg\Bridge Details - Super 1 11/1/2024 4:11 PM

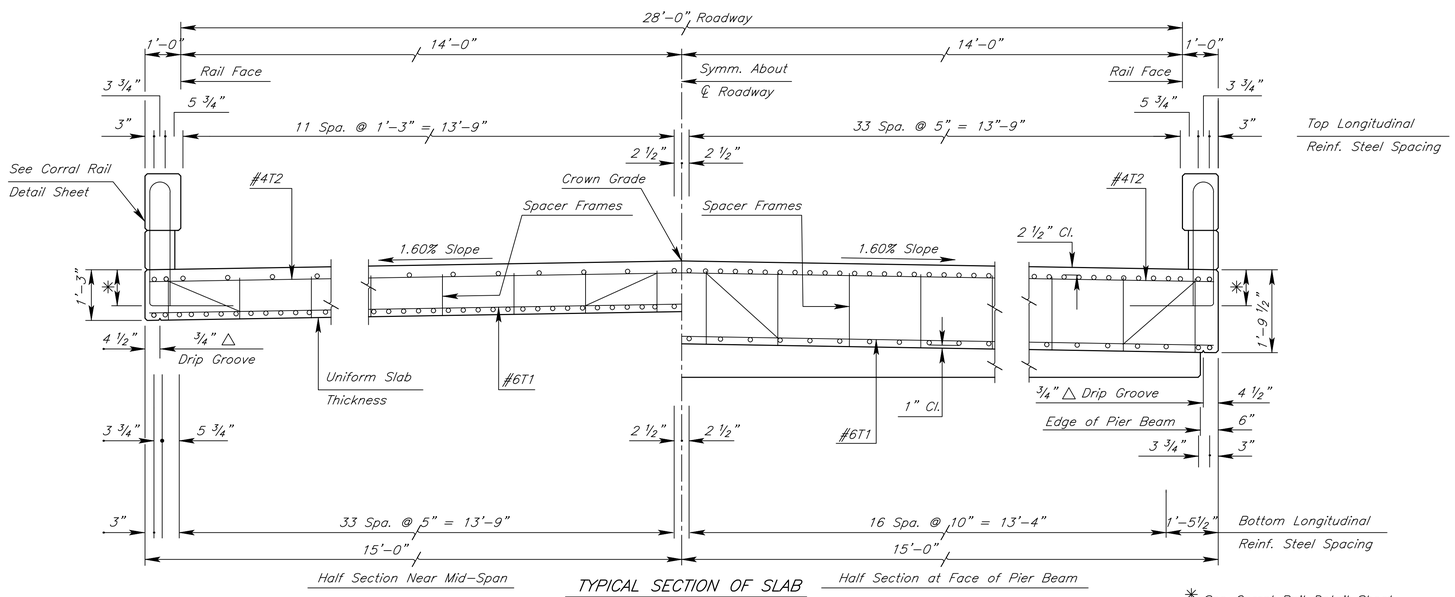
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	16	50



HAUNCH ORDINATES



HALF LONGITUDINAL SECTION ALONG ℄ BRIDGE



TYPICAL SECTION OF SLAB
(End Span Shown)

✳ See Corral Rail Detail Sheet.

TRANSVERSE SLAB CONSTRUCTION JOINT
(Optional)

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 000330563803620 ℄ Sta. 1260+15

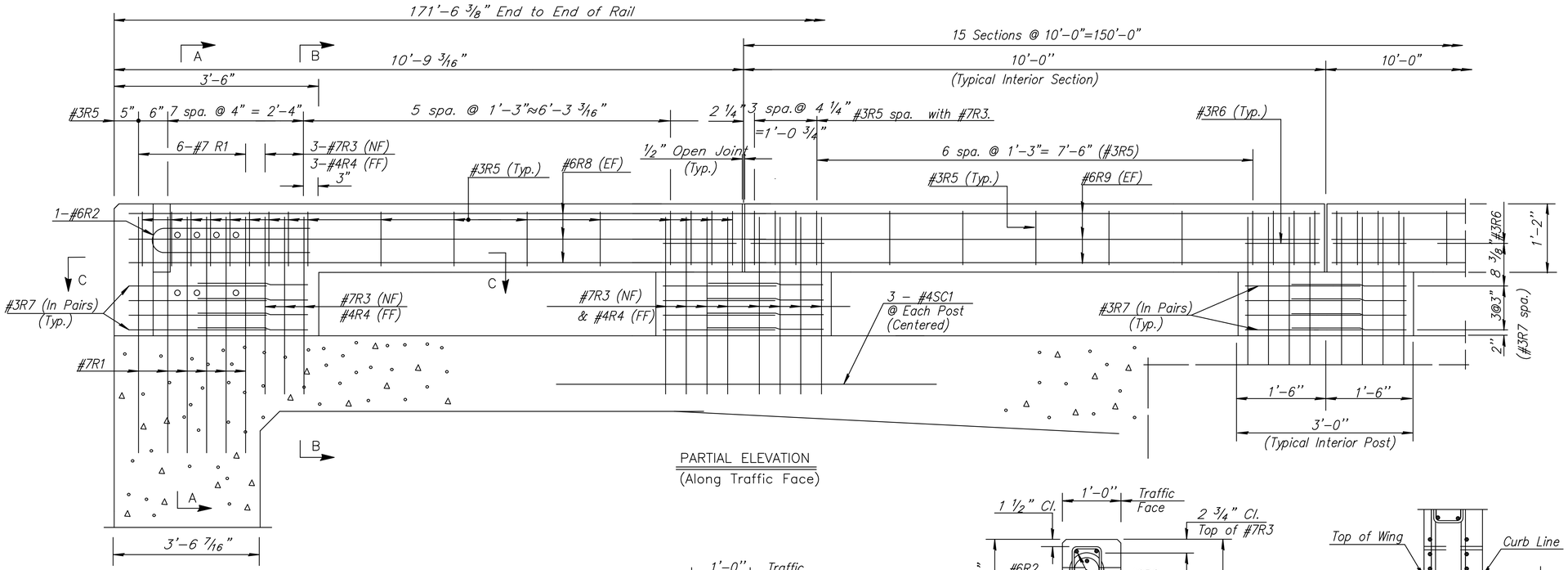
SUPERSTRUCTURE DETAILS

Proj. No. 33 C-5290-01 Graham Co.

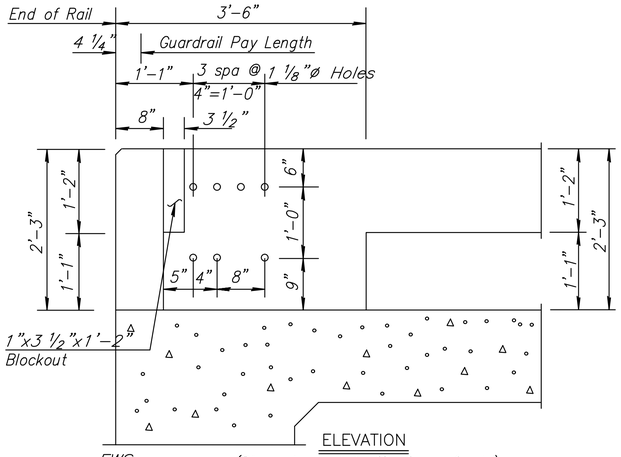
SHEET NO. OF	SCALE	APP'D	
DESIGNED DRT	DETAILED DRT	QUANTITIES DRT	CADD RCJ
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

X:\oc2\kdot\K05290-Graham-01\#10\ACAD\Bridge Details.dwg\Bridge Details - Super 2 11/1/2024 4:11 PM

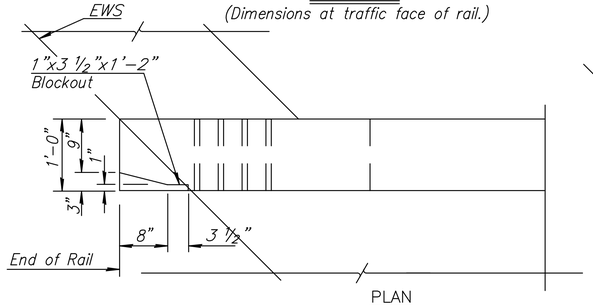
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	17	50



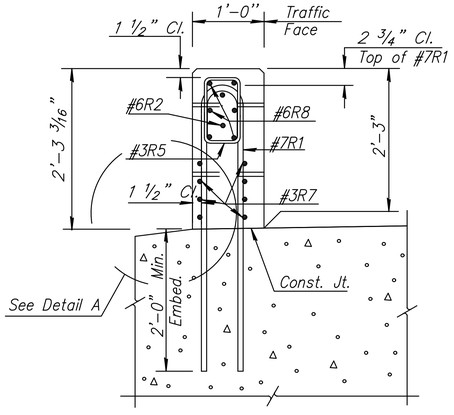
PARTIAL ELEVATION
(Along Traffic Face)



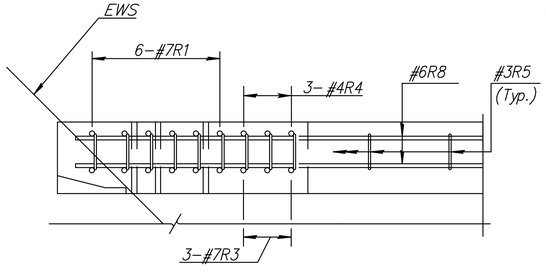
ELEVATION
(Dimensions at traffic face of rail.)



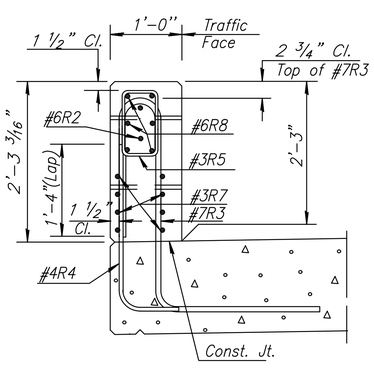
PLAN



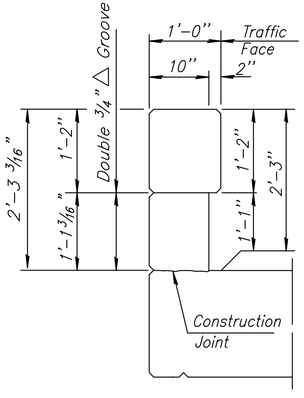
SECTION A-A



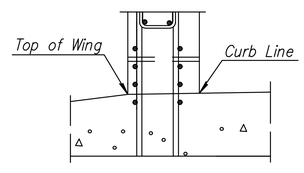
SECTION C-C



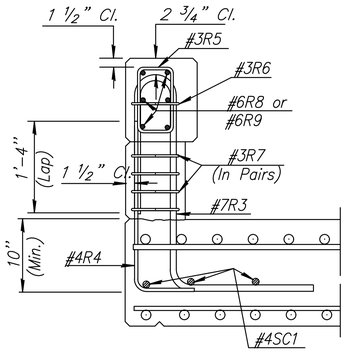
SECTION B-B



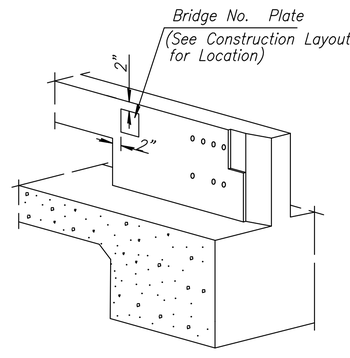
TYPICAL INTERIOR POST



DETAIL A
(For bridges w/o an approach slab curb, detail top of wing at curb line as shown)



SECTION THRU POST



BRIDGE NUMBER PLATE PLACEMENT DETAIL
(If Required)

LEGEND
NF = Near Face
FF = Far Face
EF = Each Face

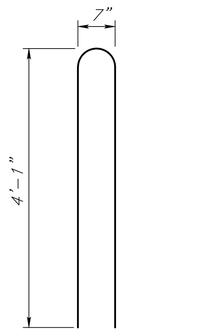
NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1	6-30-05	Current Release		

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 000330563803620 Sta. 1260+15
27" KANSAS CORRAL RAIL
(W-BEAM WITH RUBRAIL)
R.C. HAUNCHED SLAB (Without Curb)
Proj. No. 33 C-5290-01 Graham Co.

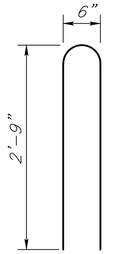
SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

X:\ac2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\EG_5290_Design - Corral Rail 12/10/2024 2:57 PM

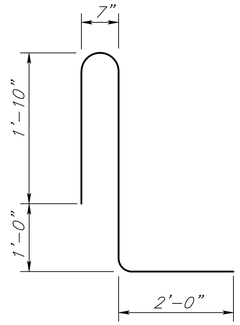
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	18	50



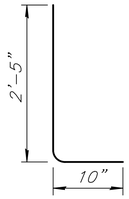
R1



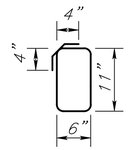
R2



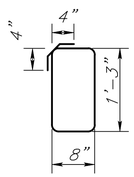
R3



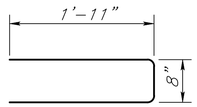
R4



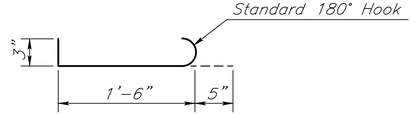
R5



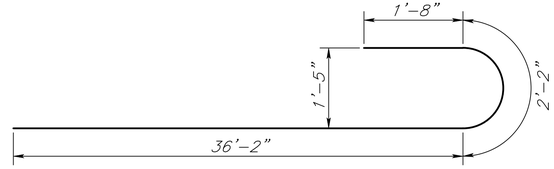
R6



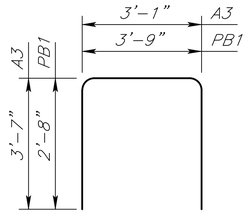
R7



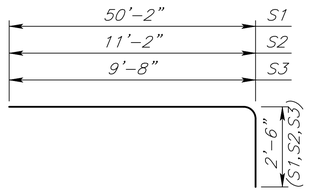
PW3



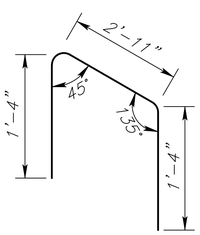
PW2



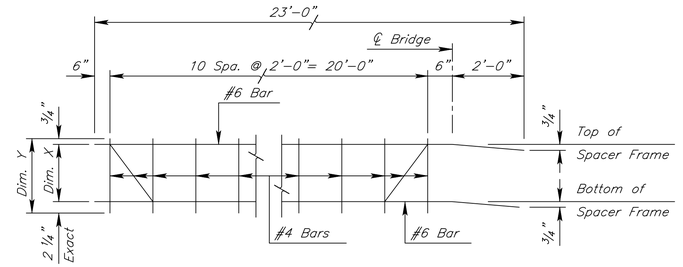
A3 & PB1



S1, S2 & S3

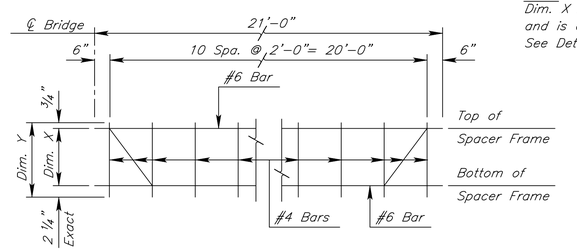


A4

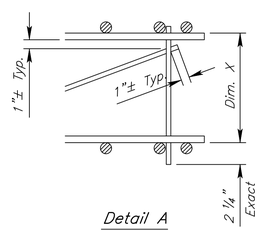


T10 Thru T16 Welded Spacer Frames

Note:
Dim. X is out to out and is an exact dim. See Detail A.



T3 Thru T9 Welded Spacer Frames



Detail A

BENDING DIAGRAMS
(All dimensions are out to out of bars.)

BILL OF REINFORCING STEEL
Grade 60

	Straight Bars				Bent Bars			
	Mark	Size	Number	Length	Mark	Size	Number	Length
Substructure	PW1	#4	78	21'-0"	PW2	#4	128	40'-0"
	PW4	#4	156	23'-0"	PW3	#3	170	2'-2"

BILL OF REINFORCING STEEL
Grade 60

	Straight Bars				Bent Bars			
	Mark	Size	Number	Length	Mark	Size	Number	Length
Abutment - Deck - Rail	S4	#9	8	40'-6"	S1	#9	52	52'-8"
	S6	#9	48	40'-0"				
	S7	#9	44	44'-6"	R1	#7	24	8'-5"
	S8	#9	44	38'-5"	R3	#7	268	6'-11"
	S9	#9	32	32'-2"	S2	#7	48	13'-8"
	S10	#9	36	30'-8"	S3	#7	44	12'-2"
	S11	#9	32	20'-0"				
	S14	#9	44	50'-0"	R2	#6	4	5'-10"
	S15	#9	32	35'-6"				
	S16	#9	36	30'-6"	A3	#4	192	10'-3"
	S17	#9	32	19'-6"	A4	#4	28	5'-7"
	S19	#9	26	25'-6"	R4	#4	268	3'-3"
	S20	#9	24	37'-6"				
	S21	#9	22	55'-6"	R5	#3	458	3'-6"
					R6	#3	64	4'-6"
	A1	#8	16	53'-3"	R7	#3	288	4'-6"
	R8	#6	24	10'-5"	T3-T16	⊗		⊗
	R9	#6	180	9'-8"				
	T1	#6	114	42'-0"				
	A2	#5	20	53'-3"				
Superstructure	S5	#4	4	8'-0"				
	S12	#4	32	7'-9"				
	S13	#4	64	8'-9"				
	S18	#4	4	13'-6"				
	SC1	#4	96	6'-6"				
	T2	#4	88	42'-0"				
Pier Beam	PB5	#7	15	42'-0"	PB1	#4	186	9'-1"
	PB4	#6	18	40'-6"				
	PB2	#5	18	42'-0"				
	PB3	#5	6	40'-6"				

⊗ See Bending Diagram

⊗ SPACER FRAMES

Mark	No. Ea.	Dim. X	Dim. Y
T3, T10	6	9 1/8"	1'-0 1/8"
T4, T11	6	9 3/16"	1'-0 3/16"
T5, T12	6	9 11/16"	1'-0 11/16"
T6, T13	6	10 11/16"	1'-1 11/16"
T7, T14	6	1'-0 3/16"	1'-3 3/16"
T8, T15	6	1'-2 3/16"	1'-5 3/16"
T9, T16	6	1'-4 11/16"	1'-7 11/16"

Weight of spacer frames included in the weight of reinforcing steel.

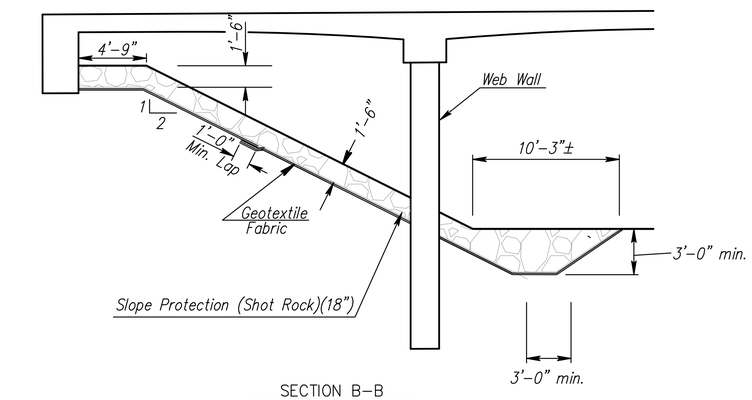
NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. 000330563803620 Sta. 1260+15
BILL OF REINFORCING STEEL
AND
BENDING DIAGRAMS
Proj. No. 33 C-5290-01 Graham Co.

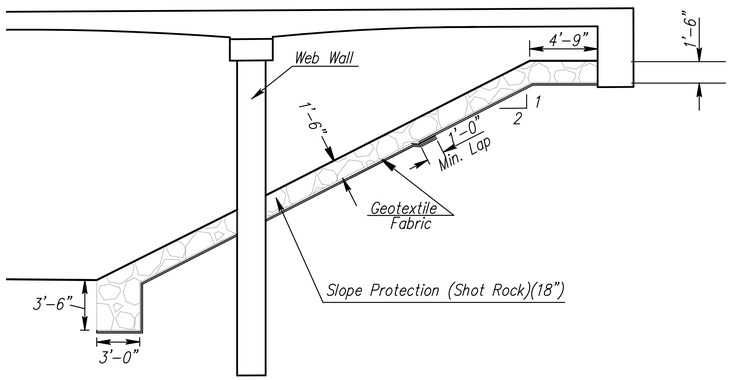
SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

X:\oc2\kdot\K05290-Graham-OH#10\ACAD\Bridge Details\Bridge Details.dwg\Bridge Details - Rein Steel 11/1/2024 4:12 PM

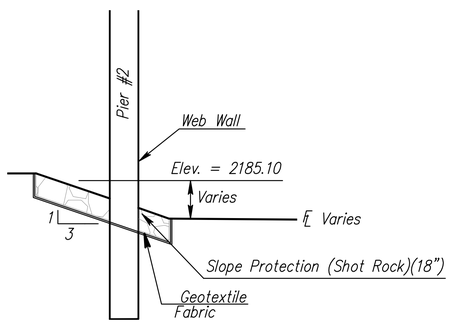
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	19	50



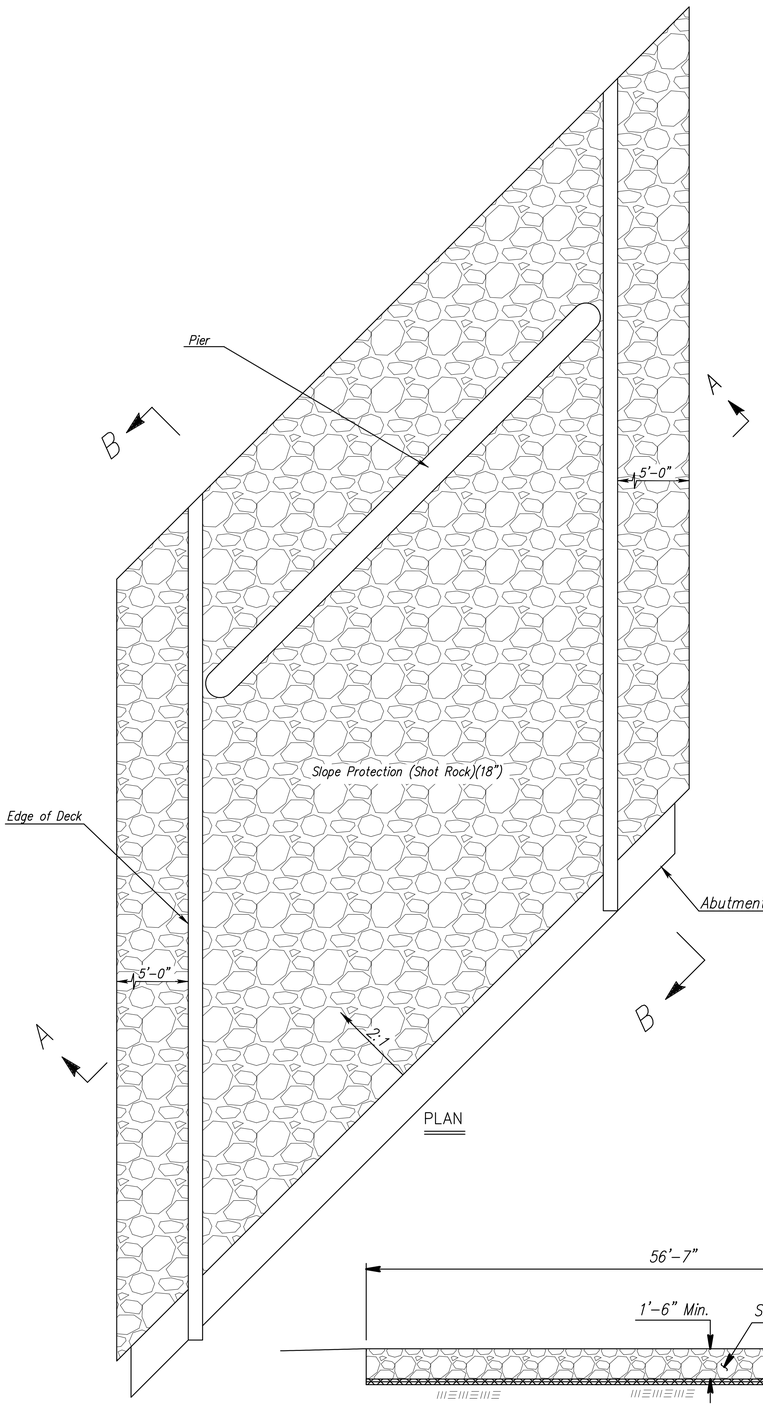
SECTION B-B
West Embankment



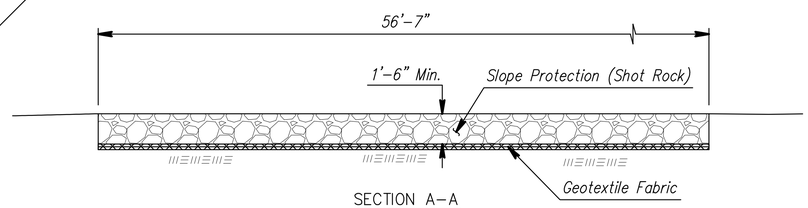
SECTION B-B
East Embankment



PIER 2
TYPICAL SECTION



PLAN



SECTION A-A

GENERAL NOTES

1. Limits of slope protection are as shown and centered along centerline of the slab.
2. Excavation and grading for placement of slope protection and all work and material to install geotextile fabric shall be subsidiary to slope protection.
3. Slope protection shall be underlain with geotextile fabric. Fabric damaged or displaced during construction shall be replaced at no cost to KDOT. Fabric shall be installed and secured as recommended by the fabric manufacturer. One (1) copy of the fabric manufacturer's installation procedure shall be submitted to the Engineer. The installation procedure shall show details of the splices, overlaps, and pin layout. Minimum overlap of geotextile shall be 1 ft. Fabric shall be anchored along edges and splices at a maximum of 3 foot centers with staples or pins (w/washers). Interior area of fabric shall be pinned or stapled as recommended by the manufacturer but not more than 5 foot centers. Pins or staples shall be a minimum of 12 inches in length. Geotextile fabric shall meet the requirements of KDOT Specifications.
4. The Contractor shall place the rock from the bottom to the top of the slope. Place the rock in a manner which produces a reasonably well graded mass of rock without segregation of the material sizes. Placement, measurement, and payment shall conform to KDOT Specifications for Slope Protection.
5. The maximum size of the shot rock will be limited to a thickness of 18".

SLOPE PROTECTION (Shot Rock)			
Sta. to Sta.		Side	Cu. Yds.
1259+33	1259+83	℄	140
1260+06	1260+20	℄	34
1260+38	1260+97	℄	139
TOTAL			313

QUANTITIES		
	Slope Protection (Shot Rock) Cu. Yds.	Geotextile Fabric Sq. Yds. For Information Only
		575

NO.	DATE	REVISIONS	BY	APP'D

Br. No. 000330563803620

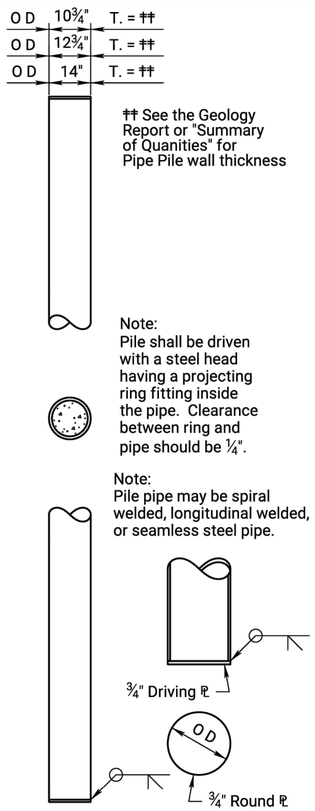
BRIDGE BERM AND
SLOPE PROTECTION
STRAIGHT WINGWALL ABUTMENT

FHWA APPROVAL		APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

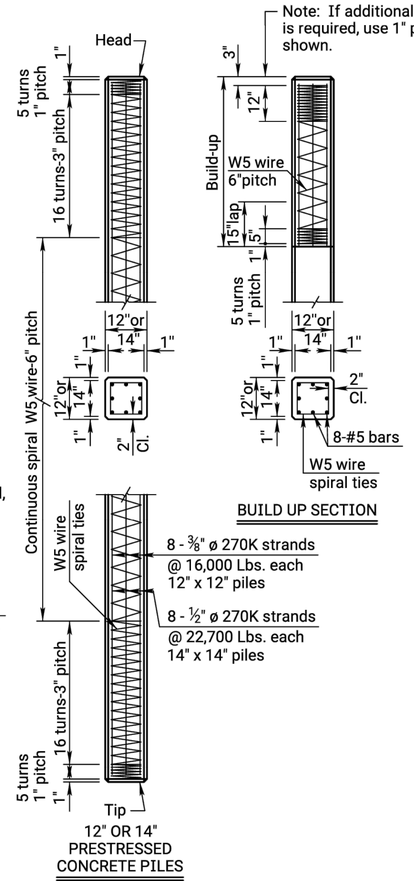
2/4/2025 9:43 AM

X:\ac2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\EG_5290_Design - Slope Protection

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	20	50

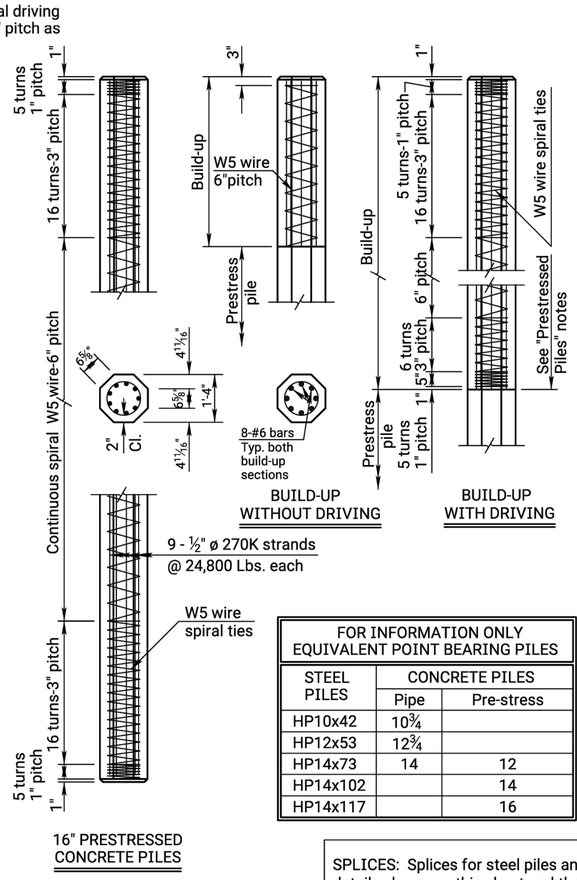


PLAIN ROUND
CAST-IN-PLACE CONCRETE PILES



12" OR 14"
PRESTRESSED
CONCRETE PILES

BUILD UP SECTION



16" PRESTRESSED
CONCRETE PILES

BUILD-UP
WITHOUT DRIVING

BUILD-UP
WITH DRIVING

FOR INFORMATION ONLY EQUIVALENT POINT BEARING PILES		
STEEL PILES	CONCRETE PILES	
	Pipe	Pre-stress
HP10x42	10¾	
HP12x53	12¾	
HP14x73	14	12
HP14x102		14
HP14x117		16

GENERAL NOTES

PRESTRESSED PILES: Fabricate prestressed concrete pile splices in accordance with the Manufacturer's recommendations subject to the approval of the Engineer.

Method of attachment of pile to build-up may be by any of the methods given in the notes on "Alternate Methods." If mild reinforcing steel is used for attachment, the area shall be no less than that used in the build-up.

ALTERNATE METHODS: Method of attachment of a pile to build-up may be by any of the following methods:

1. Cut off at least 2'-0" of pile and expose a minimum of 2'-0" of strands.
2. Cast 8-#6, or 8-#5 bars (equally spaced) into pile head. All bars shall extend into pile head and project from pile head a minimum of 2'-0".
3. Drill 8 holes in pile head (equally spaced) for installation of 8 grouted dowel bars of same size and length as in 2.
4. Provide cored holes for bars as in 3.

No bars or strands are to extend from head of pile or build-up into footing or pile cap unless approved by the Engineer.

TEST PILES: Drive test piles where called for on the bridge plans. The test piles located within the limits of the substructure will become a part of the bridge pile system.

DRIVING FORMULA: Driving formula shall conform to the Standard Specifications.

MEASUREMENT AND PAYMENT: Measurement and payment for all piles shall comply with the Standard Specifications.

REINFORCEMENT: Use reinforcing steel conforming to ASTM A615, Grade 60. Hoops and spirals may be either plain or deformed bars.

PRESTRESSING STEEL: Use uncoated seven-wire low relaxation prestressing strand conforming to ASTM A416, Gr. 270.

STEEL PILE: Steel pile shall conform to the requirements of the Standard Specifications.

PILE POINTS: Pile points shall conform to the dimensions shown and to requirements of the Standard Specifications.

SPECIFICATIONS: Standard Specifications for State Road and Bridge Construction as currently used by the Kansas Department of Transportation.

CONCRETE: Concrete for cast-in-place shall be f'c = 3,500 PSI. Concrete for prestressed shall be f'c = 5,000 PSI.

WELDING: All field welding shall meet the requirements of the Standard Specifications.

Use only Shielded Metal Arch Welding SMAW (stick welding) for pile splices.

Use only low hydrogen E7018, 7016, or 7015 series welding rod (electrode) for all welding applications during pile splicing.

New electrodes are to be purchased for each KDOT project. The electrodes shall arrive on the project in factory hermetically sealed containers, opened and labeled with indelible ink in front of the engineer. The label shall include the current date and the project number. If the container seal is questionable or shows signs of damage the electrode is to be dried in an oven at least one hour at a temperature of 700°F to 800°F.

Upon removal from intact hermetically sealed factory packaging or the drying oven the electrode is to be placed in a storage oven with a minimum temperature of 250°F.

When electrodes are removed from the hermetically sealed container or storage oven and exposed to the atmosphere for less than 4 hours place into the storage oven for at least 4 hours before removing for use.

If electrode is exposed to the atmosphere for 4 hours or more (or 9 hours for moisture resistant electrodes designated with an R in their labeling) then electrode can be dried in a drying oven at a temperature of 450°F to 550°F.

If the electrode is exposed to the atmosphere for 4 hours or more a second time or the rod becomes wet discard rod.

CAST-IN-PLACE SHELLS: Steel shells for cast-in-place concrete piles shall conform to the requirements of the Standard Specifications.

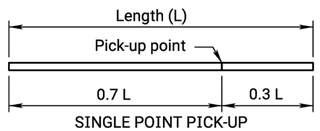
All piles driven without a mandrel shall be of the minimum thicknesses shown. Piles driven with a mandrel shall be of sufficient strength and thickness to withstand driving without injury and to resist harmful distortion and/or buckling due to soil pressure after the mandrel is removed.

Remove, replace or correct to the satisfaction of the Engineer improperly driven, broken or otherwise defective pipe piles. Otherwise drive an additional pile at no extra cost.

The Contractor shall maintain a light suitable for visual inspection of the pile on the job at all times prior to and during the filling of the pipe.

PAINT: All paint shall comply with the Standard Specifications, or as specified on the plans.

MILL TEST REPORTS: Steel piles test reports and steel shell test reports shall comply with the Standard Specifications.



PICK-UP POINTS FOR PRESTRESSED PILING

Max. length - 55' single point pick-up
Max. length - 80' double point pick-up

Note: Piles shall be marked at Pick-up points to indicate proper points for attaching handling lines.





SHELL PILE POINT



CAST STEEL PILE POINT

The pile point shall be a one-piece unit of cast steel. Weld pile points in accordance with manufacturer's recommendations to each steel pile before driving.

Weld Symbology Definition

Use grinder to bevel edges of splice as shown in weld symbology and drawing. In addition to bevels, produce clean, bare, and shiny surfaces at and around the splice welding location.

Lay full penetration root weld from beveled side of splice.

Back gouge root weld from side opposite of root welding application making sure to remove all foreign materials, porous steel, and inclusions from root weld. Finish welding the non beveled side of the splice.

Finish welding beveled side of the splice while removing slag, foreign materials, porous steel, and inclusions in between welding passes, use of a grinder may be needed.

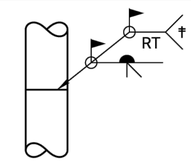
Verify that enough filler metal has been correctly placed in all weld locations to obtain a flush or convex surface with no concavity produced upon completion of the final welds.

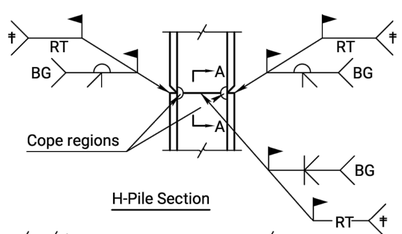
SPLICES: Splices for steel piles and shell piling shall be in accordance with details shown on this sheet and the Standard Specifications.

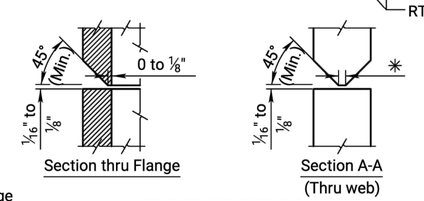
For integral pile bent abutments and piers, if a pile splice is required, do not locate the pile splice within a region extending 2'-0" above and 10'-0" below the bottom of the concrete web wall. For abutments, locate the pile splice at least 10'-0" below top of fill.

With the approval of the Engineer, one splice per bent may be allowed in the region described above without testing. If additional splices are anticipated, based on the geology, the Contractor prior to driving, will locate the splice so that the splice will not fall within the regions described above.

† For integral pile bent abutments and piers, if a splice is located within the regions described above, then the Contractor will test the welds by Radiograph (RT) test methods. Repair and retest any welds not passing the test(s). Each weld tested will have written confirmation of results. Report these results to the Engineer. This work is not paid for directly, but is subsidiary to "Piles".







✳ Minimum as required by welding process.

BG = Backgouge

PILE SPLICE DETAILS

NO.	DATE	REVISIONS	BY	APP'D
04	08-16-18	Add splice web section, clarify note	M.L.L.	J.P.J.
03	09-15-15	Clarify Notes	J.P.J.	C.E.R.
02	06-18-12	Clarify f'c, rod type, use and weld	J.P.J.	T.L.F.

KANSAS DEPARTMENT OF TRANSPORTATION

STANDARD PILE DETAILS

BR110

FHWA APPROVAL		10-04-12	APP'D.	Terry L. Fleck
DESIGNED	J.P.J.	DETAILED	QUANTITIES	TRACED R.A.A.
DESIGN CK.		DETAIL CK.	QUAN.CK.	TRACE CK.

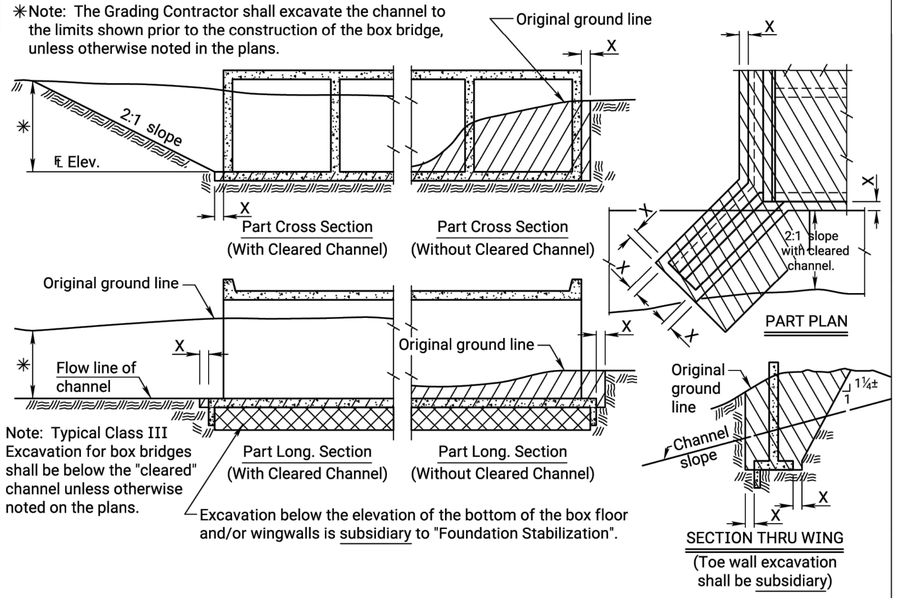
KDOT Graphics Certified 06-20-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 25-JUN-2022 00:07
File : br110.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	21	50

✳Note: The Grading Contractor shall excavate the channel to the limits shown prior to the construction of the box bridge, unless otherwise noted in the plans.

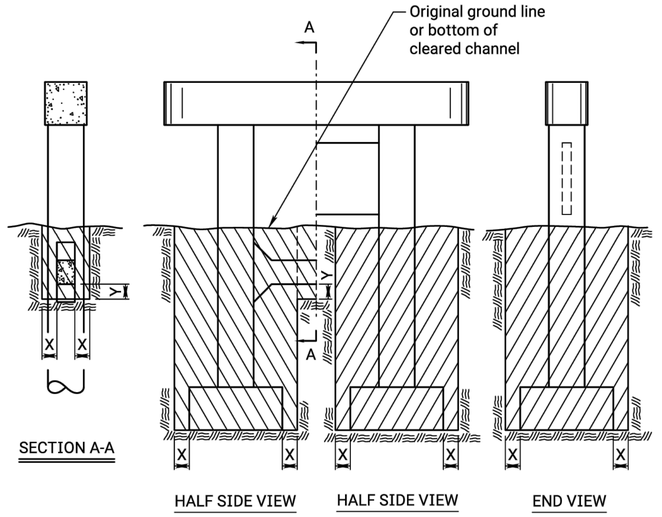


Note: Typical Class III Excavation for box bridges shall be below the "cleared" channel unless otherwise noted on the plans.

Excavation below the elevation of the bottom of the box floor and/or wingwalls is subsidiary to "Foundation Stabilization".

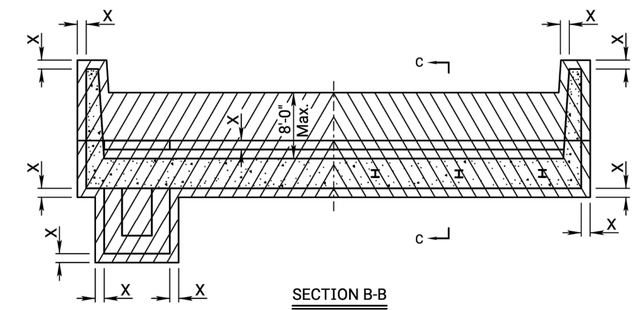
EXCAVATION DETAILS FOR REINFORCED CONCRETE BOX CULVERT

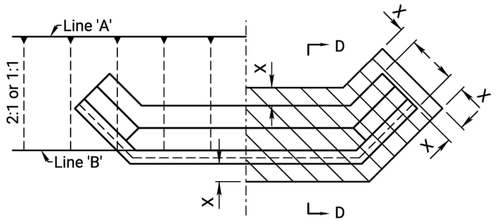
Note: Excavation for culverts less than bridge length and the additional excavation for "Embedded Structures" shall not be paid for as Class III Excavation, but shall be subsidiary to Grade 4.0 Concrete.

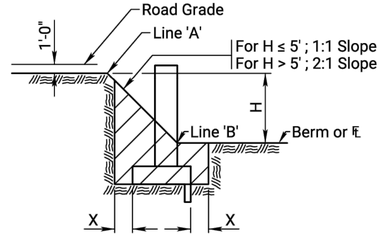


EXCAVATION DETAILS FOR TYPICAL PIERS

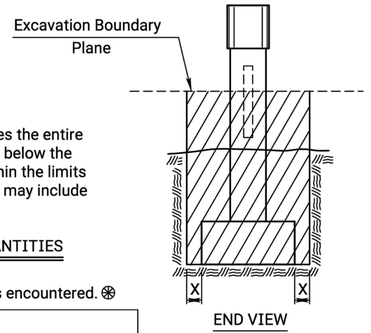
See detail when rock or shale (rock) is encountered. ❀







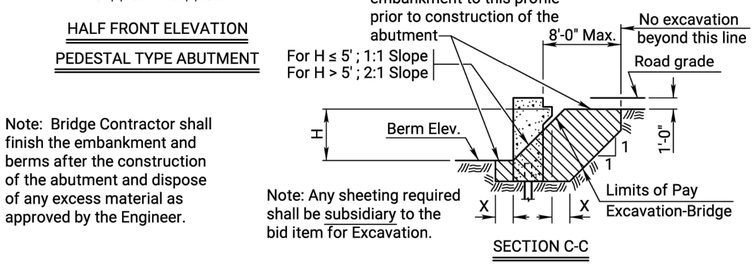
EXCAVATION DETAILS FOR ABUTMENTS WITH FLARED WINGWALLS



Note: Class II Excavation includes the entire volume of whatever nature found below the "Excavation Boundary Plane", within the limits specified for measurement. This may include water or air.

CLASS II EXCAVATION QUANTITIES

See detail when rock or shale (rock) is encountered. ❀

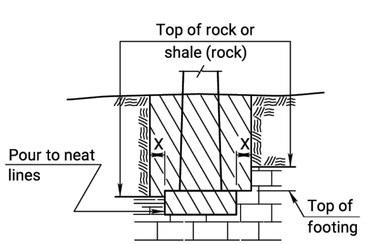


Note: Bridge Contractor shall finish the embankment and berms after the construction of the abutment and dispose of any excess material as approved by the Engineer.

Note: Any sheeting required shall be subsidiary to the bid item for Excavation.

EXCAVATION DETAILS FOR TYPICAL ABUTMENTS

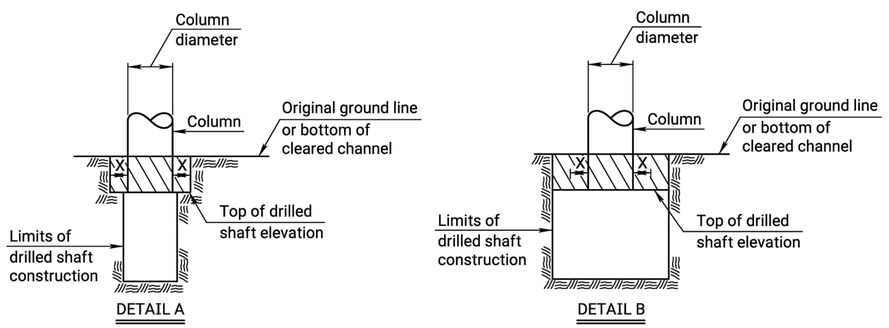
See detail when rock or shale (rock) is encountered. ❀



❀ EXCAVATION DETAIL FOR FOOTINGS IN ROCK OR SHALE (ROCK)

(Piers and Abutments)

Note: Excavation below top of rock, hard shale or below top of footing, whichever is lower, shall be to neat lines of the concrete construction.



DRILLED SHAFT DETAILS

Note: Whenever the limits of the drilled shaft construction are greater than the Column Diameter + 2X, the limits of Class I, II or III Excavation shall be the limits of the drilled shaft construction. (See Detail B)

Note: All bridge excavation shall be computed on the basis of the cross-hatch areas and boundary lines indicated on this sheet and the Excavation Boundary Plane on the Construction Layout.

Sides of trenches in hard or compacted soil including embankments shall be shored, sheeted, braced or otherwise supported when the trench is more than 5 feet in depth and 8 feet or more in length. In lieu of the shoring, the sides of the trench above the 5 foot level may be sloped to preclude collapse. The slope for average soils shall be 1:1. If the angle of repose of the soil is less, flatter slopes shall be required.

Dimension "X" shall be 2'-0" unless indicated otherwise on the general plans.

Dimension "Y" shall be 1'-6" unless indicated otherwise on the general plans.

NO.	DATE	REVISIONS	BY	APP'D
06	08-15-12	Embedment Excavation Subsidiary	J.P.J.	T.L.F.
05	05-15-12	Revised Wing Excavation	J.P.J.	T.L.F.
04	03-03-10	Revised Wing Excavation	J.P.J.	T.L.F.

KANSAS DEPARTMENT OF TRANSPORTATION

BRIDGE EXCAVATION (LRFD)

BR100B

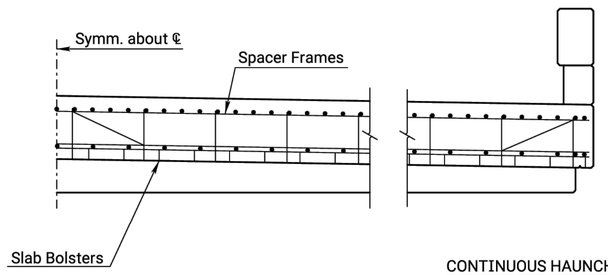
FHWA APPROVAL		04-17-10	APP'D.	Terry L. Fleck
DESIGNED	DETAILED	R.D.R.	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	L.R.R.	QUAN.CK.	TRACE CK.

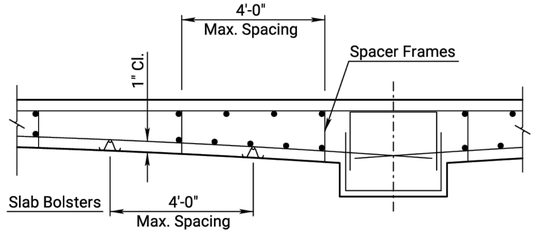
KDOT Graphics Certified 06-20-2022

KDOT Graphics Certified

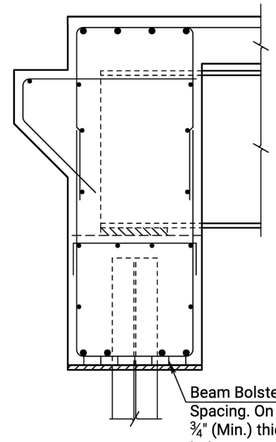
Plotted by : KDOT#CADD.Support_ks.gov 25-JUN-2022 00:03
File : br100b.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	22	50

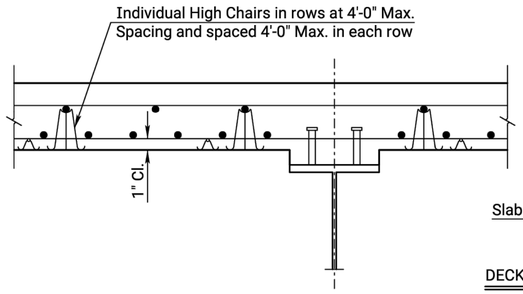


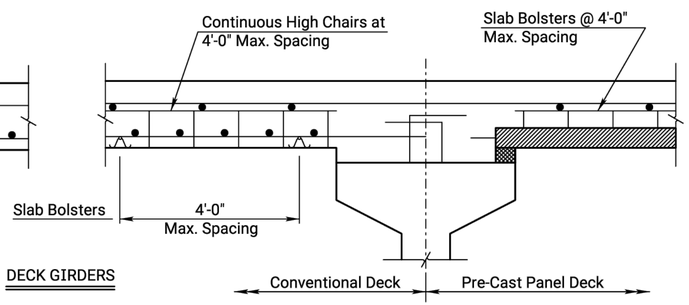


CONTINUOUS HAUNCHED SLAB

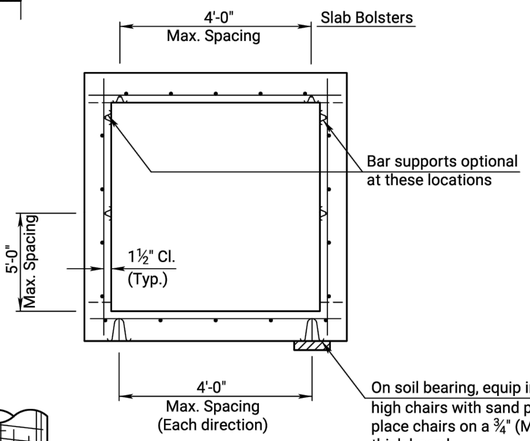


ABUTMENT

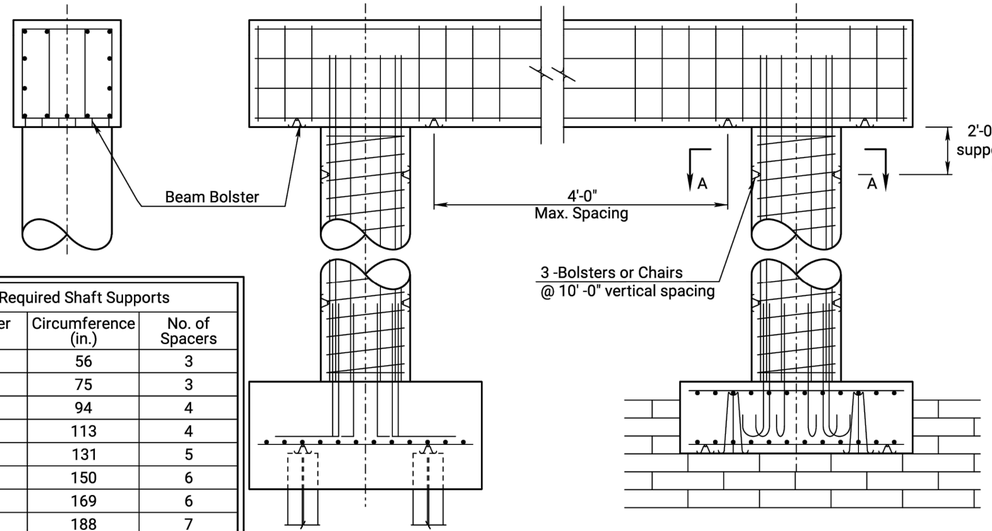




DECK GIRDERS

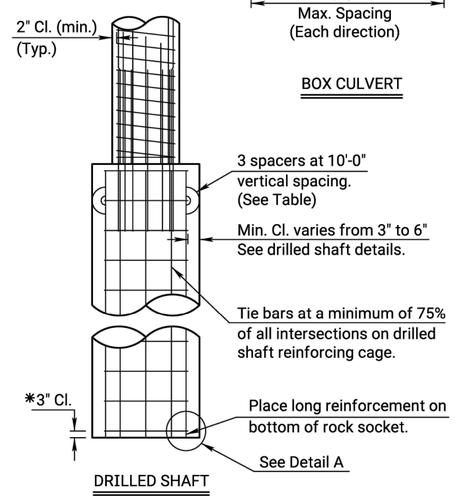


BOX CULVERT

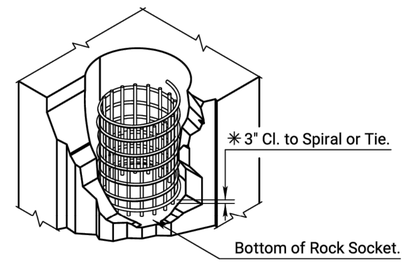


PIER

Required Shaft Supports		
Diameter (in.)	Circumference (in.)	No. of Spacers
18	56	3
24	75	3
30	94	4
36	113	4
42	131	5
48	150	6
54	169	6
60	188	7
66	207	7
72	226	8
78	244	9
84	263	9
90	282	10
96	301	11
102	320	11
108	339	12

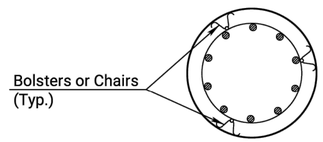


DRILLED SHAFT



DETAIL A

✳Note: Longitudinal reinforcing steel is placed on the bottom of the rock socket. Maintain 3" clearance from the bottom of rock socket to the first spiral or tie bar.



SECTION A-A

GENERAL NOTES

Reference is made to the latest edition of the CRSI "Manual of Standard Practice" for recommended industry practices concerning reinforcing steel.

Use only the following types of bar supports:

1) Wire Bar Supports:

   a) Epoxy coated reinforcing: Class 1 Protection
   b) Non-epoxy coated reinforcing: Class 1, 2, or 3 Protection

2) Plastic Bar Supports

3) Supplementary bars

When securing epoxy coated reinforcement, use tie wires or metal clips that are epoxy or plastic coated.

Do not weld reinforcing steel to bar supports or to other reinforcing steel. Shop weld spacer frames for haunched slabs.

Tie bars at all intersections around the perimeter of each mat and at not less than 2'-0" centers or at every intersection, whichever is greater.

Where more than one length of bar support is required, lap the end legs so they are locked or tied together.

Use proper height supports to maintain the distance between the reinforcing and the formed surface or the top surface of deck slabs within ¼" of that indicated on the plans.

Spacings shown are maximums. Use sufficient supports, as determined by the Engineer, to retain the reinforcing steel in position.

Construct any platforms, required for the support of workers and/or equipment during concrete placement, directly on the forms and not on the reinforcing steel.

Designs and arrangements of Supports or Spacers other than as shown on this sheet, may be used with the permission of the Engineer.

NO.	DATE	REVISIONS	BY	APP'D
05	11-10-10	Column Bar Supports Required	J.P.J.	T.L.F.
04	12-01-05	Drilled Shaft Spiral Steel Placement	J.P.J.	K.F.H.
03	08-21-00	Added Pre-Cast Panel Detail	R.A.M.	K.F.H.

KANSAS DEPARTMENT OF TRANSPORTATION

SUPPORTS AND SPACERS FOR REINFORCING STEEL

BR120

FHWA APPROVAL		11-17-10	APP'D.		Terry L. Fleck
DESIGNED	R.A.M.	DETAILED	R.A.A.	QUANTITIES	TRACED R.A.A.
DESIGN CK.	L.R.R.	DETAIL CK.	R.A.M.	QUAN.CK.	TRACE CK. R.A.M.

KDOT Graphics Certified 06-20-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 25-JUN-2022 00:07
File : br120.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	23	50

GUARDRAIL; STEEL PLATE

Sta. to Sta.	Side	LNFT
Sta. 1258+52.08		
to 1259+14.58	Lt.	25
Sta. 1258+82.08		
to 1259+44.58	Rt.	25
Sta. 1260+85.42		
to 1261+47.92	Lt.	25
Sta. 1261+15.42		
to 1261+77.92	Rt.	25
Total		100

GUARDRAIL END TERMINAL

Sta. to Sta.	Side	(SRT) Alt. #1 Each	(FLEAT) Alt. #2 Each
Sta. 1258+52.08			
to 1259+14.58	Lt.	1	1
Sta. 1258+82.08			
to 1259+44.58	Rt.	1	1
Sta. 1260+85.42			
to 1261+47.92	Lt.	1	1
Sta. 1261+15.42			
to 1261+77.92	Rt.	1	1
Total		4	4

EARTHWORK

Sta. to Sta.		Excavation yd³			Compaction yd³	
		Rock	Contractor Furnished	Common	Type AA MR5-5	Type B MR-90
1257+00	1263+00		872	11		1005
8+00	11+00			1158		424
TOTAL			872	1169		1429

DRAINAGE STRUCTURES

Station	Side	Size	Type	Conc. Cl. "A" yd³	Reinf. Steel lb	*Entrance Pipe (feet)	*Cross Road Pipe (feet)	≠End Sections (Each)
TOTAL								

* Type CSP, ACSP, CAP
≠ Type CS, ACS, or CA

REMOVAL OF EXISTING STRUCTURES
(For Information Only)

Station	Side	Type
1260+10	CL	188' 5-Span PDGS Br.
		w/22.6' Rdwy.
		Br. No. 000330563903620

REMOVAL OF LARGE TREES
(For Information Only)

Size(Circumference)	No.
100"	1
80"	2
70"	1
60"	1
50"	8
40"	3
30"	5

RECAPITULATION OF ROAD QUANTITIES

ITEMS	QUANTITY	UNITS
Field Office and Laboratory (Type C)	1	EACH
Foundation Stabilization (Set Price)	1	CUYD
Mobilization	Lump Sum	LSUM
Mobilization (DBE)	Lump Sum	LSUM
Removal of Existing Structures	Lump Sum	LSUM
Concrete for Seal Course (Set Price)	1	CUYD
Curing Enviroment	Lump Sum	LSUM
Clearing and Grubbing	Lump Sum	LSUM
Common Excavation (Rural Small)	1169	CUYD
Common Excavation (Contractor Furnushed)	872	CUYD
Compaction of Earthwork (Type B)(MR-90)	1429	CUYD
Water (Grading)(Set Price)	1	MGAL
Guardrail; Steel Plate	100	LNFT
Guardrail End Terminal (SRT) Alt. #1	4	EACH
Guardrail End Terminal (FLEAT) Alt. #2	4	EACH
Signing Object Marker (Type 3)	4	EACH
Temporary Surfacing Material (Aggregate)(Set Price)	1	CUYD

NOTE:

For Recapitulation of Bridge Quantities, See Sheet No. 10.
For Temporary Erosion and Pollution Control Quantities, See Sheet No. 24.
For Summary of Seeding Quantities, See Sheet No. 34.
For Traffic Control Quantities, See Sheet No. 41
Construction Staking by County's Consultant.

PENCO ENGINEERING, P.A.

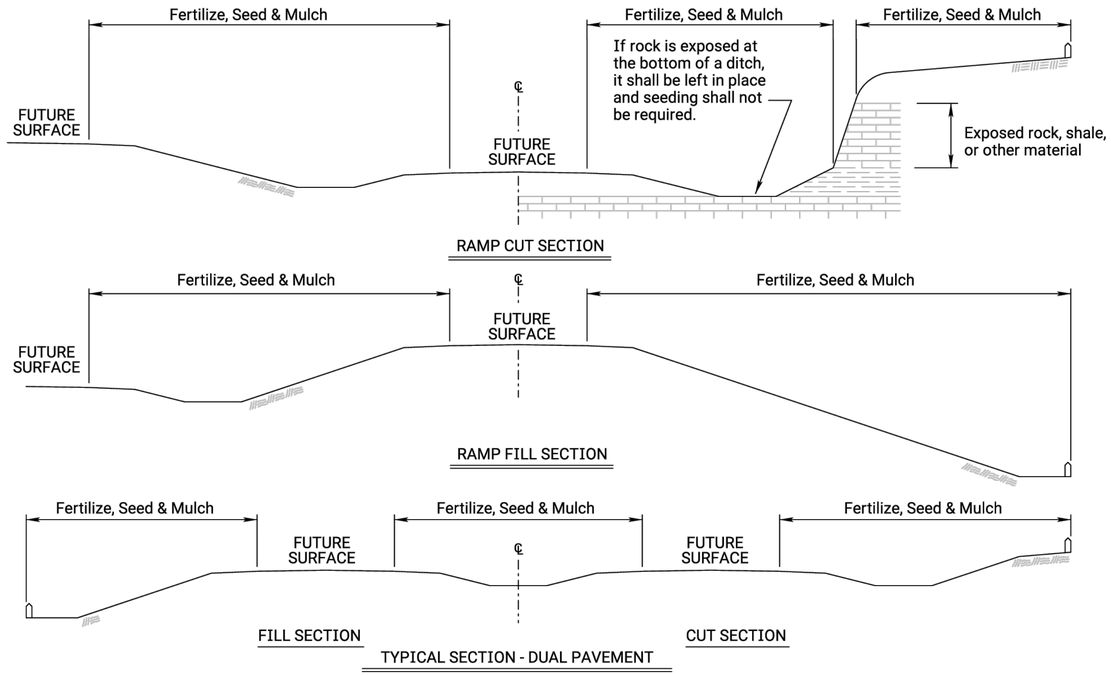
SUMMARY OF QUANTITIES

DESIGNED BY: JJD	SCALE: As Shown
DRAWN BY: AMN	PROJ. NO.: 33 C-5290-01
CHECKED BY: CRB	DATE: 2025

1/9/2025 5:24 PM

X:\loc2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\EG_5290_Design - Summary of Quantities

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	24	50



FERTILIZER: A ratio and application rate that equals or exceeds the required minimum rate per acre of N, P_2O_5, K_2O listed in Summary of Quantities will be acceptable.

✱ - N = Nitrogen Rate of Application
✱✱ - P_2O_5 = Phosphorous Rate of Application
✱✱✱ - K_2O = Potassium Rate of Application

The Contractor will be required to finish areas of excavation, borrow and embankment in accordance with the specifications. Areas that require installation or construction of temporary water pollution control items will be finished in reasonable close conformity to the alignment, grade and cross section shown on the plans or as established by the Engineer.

CLT = Construction Limit Tract. This area is defined by the entire disturbed area of the project that requires seeding and erosion control measures to be placed. Any impervious areas (i.e. pavement, gravel, riprap, etc.) shall not be included in this measurement.

Slope = Defined by the area of the project that requires Class 1 erosion control material to be placed. This area shall be seeded using the Soil Erosion Mix prior to placement of the material. Drilling seed is preferred, however, broadcasting is acceptable if drilling is not possible.

Channel = Defined by the area of the project that requires Class 2 erosion control material to be placed. This area shall be seeded using the Soil Erosion Mix prior to placement of the material. Drilling seed is preferred, however, broadcasting is acceptable if drilling is not possible.

GENERAL NOTES

The entire disturbed area, excepting the paved or surfaced areas, steep rocky slopes and areas of undisturbed native sod or other desirable vegetation shall be fertilized (limed when required), seeded, and mulched. Soil preparation shall conform to the Standard Specifications.

Temporary seeding shall be done during any time of the year that the soil can be cultivated. After the temporary seeding has been completed on the entire project, permanent seeding shall be done during the normal seeding season.

MULCHING: Mulch shall be spread uniformly over all disturbed areas and punched in the soil, unless otherwise noted on the plans. The rate of application per acre, thickness in place, for the mulching materials is generally as follows:

1¾ - 2¼ Tons per Acre = 1½" loose depth spread uniformly over acre.

Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.

Other vegetative mulches are acceptable only with the Engineer's concurrence.

The above rate is a guide. It will be at the discretion of the Engineer to determine what rate is sufficient for adequate protection of newly seeded areas.

SUMMARY OF SEEDING / EROSION CONTROL QUANTITIES

P.L.S. RATE/ ACRE		ACRES		BID ITEM	QUANTITY	UNIT
CLT	SL/CH	CLT	SL/CH			
150	150	1.5	0.2	Temporary Fertilizer (16-20-0)	255.0	LB
20		1.5		Temporary Seed (Canada Wildrye)	30.0	LB
45		1.5		Temporary Seed (Grain Oats)	67.5	LB
45		1.5		Temporary Seed (Sterile Wheatgrass)	67.5	LB
	47.8		0.2	Soil Erosion Mix	9.6	LB
				Erosion Control (Class 1, Type C)	1128	SQ YD
				Erosion Control (Class 2, Type E)		SQ YD
				Sediment Removal (Set Price)	1	CU YD
				Synthetic Sediment Barrier		LF
				Temporary Berm (Set Price)	1	LF
				Temporary Ditch Check (Rock)	25	CU YD
				Temporary Inlet Sediment Barrier		EACH
				Temporary Sediment Basin		CU YD
				Temporary Slope Drain		LF
				Temporary Stream Crossing		EACH
				Biodegradable Log (9")		LF
				Biodegradable Log (12")	200	LF
				Biodegradable Log (20")	80	LF
				Filter Sock (✱✱✱✱)		LF
				Geotextile (Erosion Control)	500	SQ YD
				Silt Fence		LF
				SWPPP Design †	1	LS
				SWPPP Inspection †	24	EACH
				Water Pollution Control Manager †	24	EACH
900 lbs / acre		1.5		Mulch Tacking Slurry	2025.0	LB
2 tons / acre		1.5		Mulching	4.5	TON
				Water (Erosion Control) (Set Price)	1	MGAL

NOTE: Projects less than 1 acre shall be bid as "Seeding" by the lump sum. See Permanent Seeding Summary of Seeding Quantities sheet LA850 for further details.

Geotextile (Erosion Control) shall be removed prior to placement of permanent slope protection.

Regreen and Quick Guard are the approved sterile wheatgrass products.

† If the total disturbed area of the project, not just the seeding area, is 1 acre or more, then these bid items must be included.

✱✱✱✱ List size of material.

The amount of mulch and mulch tacking slurry in the bid quantities is estimated. (mulch and slurry mulch estimated calculations are as follows: Mulch = Areas of Seeding x 1.5 x 2 Tons/acre; Mulch Tacking Slurry = Areas of Seeding x 1.5 x 900 lbs/acre) The estimated quantity includes mulching associated with temporary and permanent seeding operations. The total mulch and mulch tacking slurry requirements shall be determined in the field. The bid item for mulching and mulch tacking slurry shall be paid for according to the Standard Specifications.

Quantities for all erosion control items are estimated to give full flexibility for compliance with the NPDES permit. Final quantities will be determined in the field.

SOIL EROSION MIX

PLS RATE	NAME	QTY (lb)
1.0	Seed (Blue Grama Grass)(Lovington)	0.20
24.5	Seed (Buffalo Grass)(Treated)	4.90
6.3	Seed (Side Oats Grama Grass)(El Reno)	1.26
10	Seed (Sterile Wheatgrass)(Regreen/Quickguard)	2.00
6.0	Seed (Western Wheatgrass)(Barton)	1.20
47.8	Total (lb)	9.56

The Soil Erosion Mix is to be placed under the Class 1 and/or Class 2 erosion control material.

The Soil Erosion Mix consists of the Shoulder Area of the Permanent Seed Mix used on the project.

NO.	DATE	REVISIONS	BY	APP'D
03	08-03-20	Added Note	M.R.D.	M.L.
02	12-01-17	Revised Standard	M.R.D.	S.H.S.
01	06-01-17	Revised Standard	M.R.D.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL

~~LA852A~~

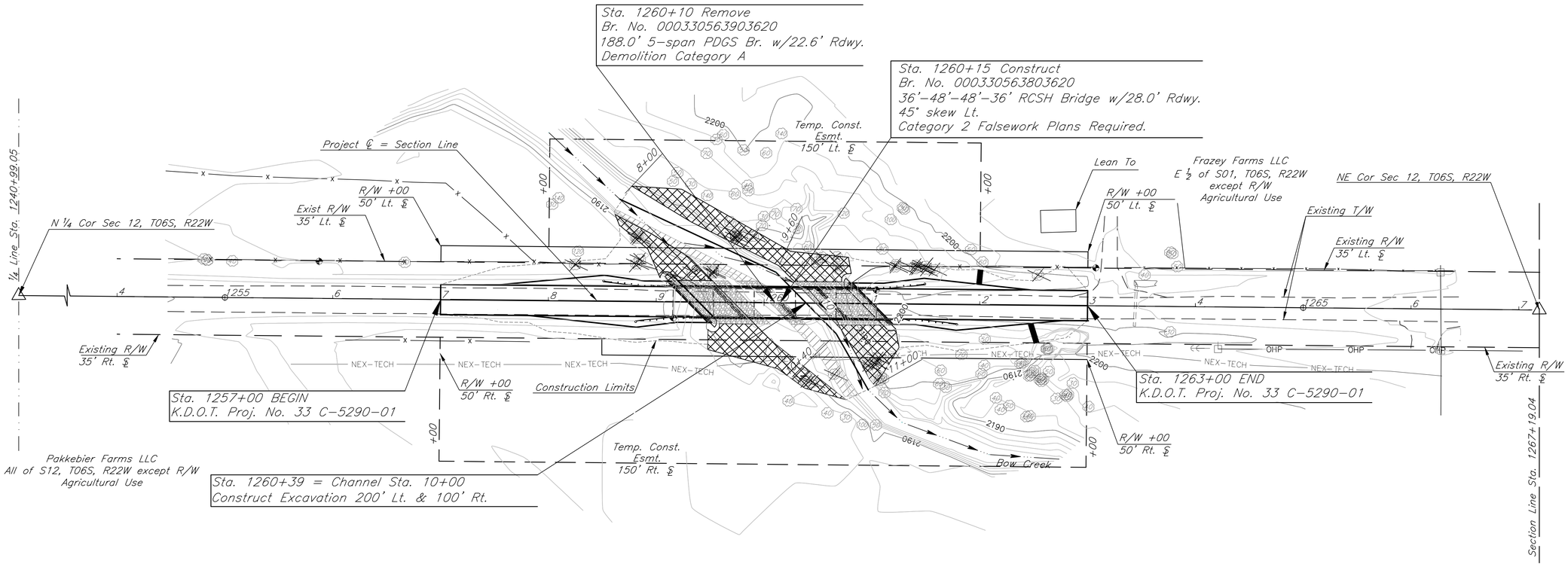
FHWA APPROVAL		01-26-18	APP'D.	Scott H. Shields	
DESIGNED	M.R.D.	DETAILED	M.R.D.	QUANTITIES	TRACED
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.	TRACE CK.

KDOT Graphics Certified 06-18-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:04
File : la852a.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	25	50



EROSION CONTROL- CLASS 1, TYPE C				
STATION TO STATION	SIDE	LENGTH	WIDTH	SQ YARD
8+00 to 9+95	LT.	195'	VARIES	465.8
8+05 to 8+96	RT.	91'	VARIES	168.4
9+47 to 11+00	RT.	153'	VARIES	299.5
10+46 to 11+00	LT.	54'	VARIES	194.3
TOTAL EROSION CONTROL (CLASS 1, TYPE C) =				1128.0

EROSION CONTROL- CLASS 1, TYPE C

BIODEGRADABLE LOG (20")

50' 0 50' 100'

Graphic Scale in Feet
Scale: 1"= 50' Plan
Contour Interval = 2'

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

EROSION CONTROL SEEDING-SODDING

~~LA852A-EC~~

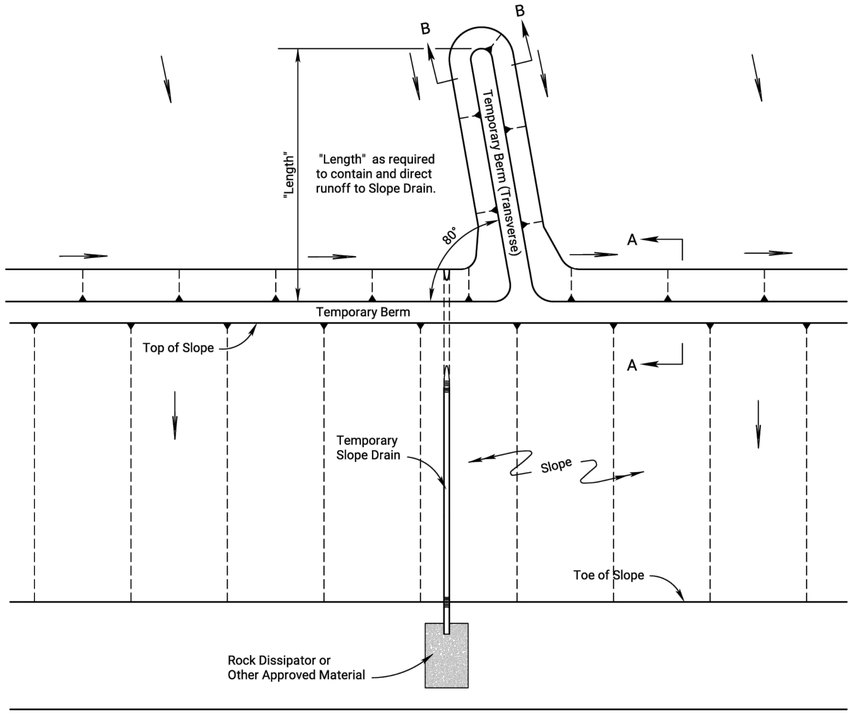
FHWA APPROVAL		01/04/2006	APP'D	Scott H. Shields			
DESIGNED	MRM	DETAILED	MRM	QUANTITIES		TRACED	MRM
DESIGN CK.	SHS	DETAIL CK.	SHS	QUAN. CK.		TRACE CK.	SHS

CADconform Certify This File

CADconform Certify This File

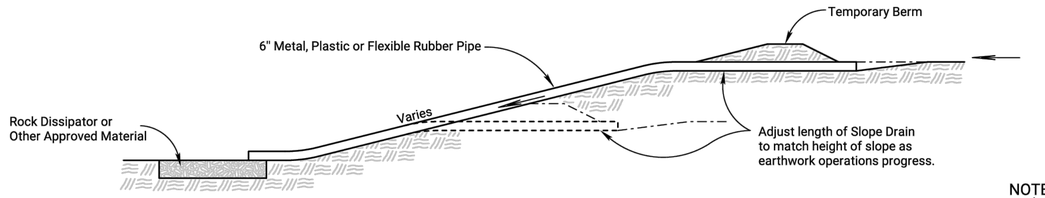
x:\ac2\kdot\X05290-Graham-01\#10\ACAD\EC_5290_Design.dwg\EC_5290_Design - LA852-EC 2/4/2025 9:52 AM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	26	50



TYPICAL PLAN VIEW OF TEMPORARY BERM AND TEMPORARY SLOPE DRAIN

NO SCALE



TYPICAL PROFILE OF TEMPORARY SLOPE DRAIN

NO SCALE

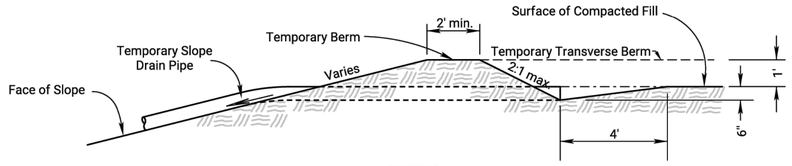
NOTES:

1) Temporary Slope Drain and Temporary Berm may be used on either project foreslopes or project backslopes.

2) Discharge of Slope Drains shall be into stabilized ditch or area, or into Sediment Basin.

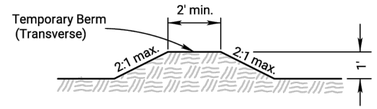
3) Pipe shall be secured in place as approved by Engineer.

4) Temporary Berms under 2,000 feet shall be bid by Set Price.



SECTION A-A

NO SCALE

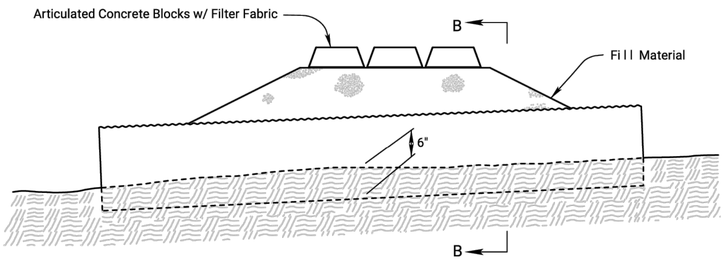


SECTION B-B

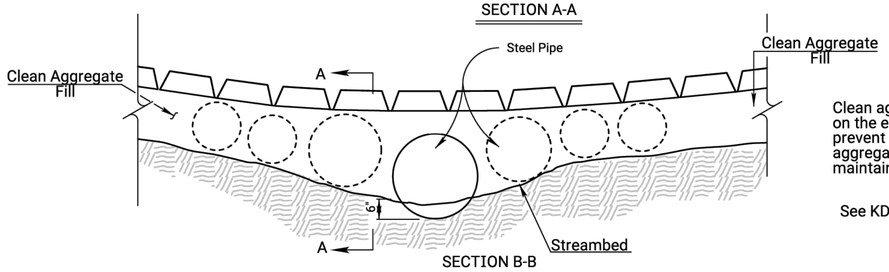
NO SCALE

TYPICAL PROFILE OF TEMPORARY BERM

NO SCALE



SECTION A-A



SECTION B-B

TEMPORARY STREAM CROSSING (ARTICULATED CONCRETE BLOCKS)

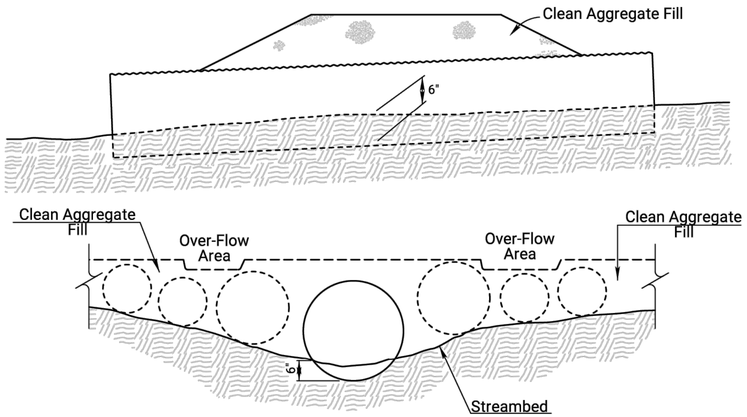
NO SCALE

Pipe size may vary.

Place 1 pipe buried 6" into stream bottom, in the lowest point of the channel to allow the passage of aquatic organisms, with additional pipes placed along the remainder of the stream channel bottom such that ordinary high water (OHW) flows designated in the Contract Documents shall flow through the pipes without overtopping the crossing.

Clean aggregate fill will extend a minimum of 50' on the entrance and exit side of the crossing to prevent tracking. The aggregate shall be clean aggregate and a minimum of 6" thick and will be maintained through the use of the crossing.

See KDOT Specifications for more information.



SECTION B-B

TEMPORARY STREAM CROSSING (AGGREGATE)

NO SCALE

Pipe size may vary.

Place 1 pipe buried 6" into stream bottom, in the lowest point of the channel to allow the passage of aquatic organisms, with additional pipes placed along the remainder of the stream channel bottom such that ordinary high water (OHW) flows designated in the Contract Documents shall flow through the pipes without overtopping the crossing.

Clean aggregate fill will extend a minimum of 50' on the entrance and exit side of the crossing to prevent tracking. The aggregate shall be clean aggregate and a minimum of 6" thick and will be maintained through the use of the crossing.

See KDOT Specifications for more information.

NO.	DATE	REVISIONS	BY	APP'D
03	01-21-22	Temp Stream Crossing - Clean Aggregate Fill Note Added	M.R.D.	M.L.
02	08-24-21	Temp Stream Crossing - Clean Aggregate Fill Note Added	M.R.D.	M.L.
01	06-11-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL TEMPORARY SLOPE DRAIN, TEMPORARY STREAM CROSSING (AGGREGATE)

LA852B

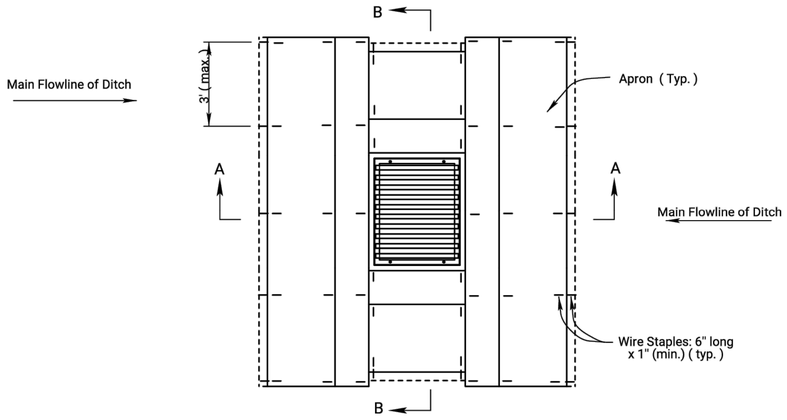
FHWA APPROVAL		01-21-22	APP'D.	Mervin Lare
DESIGNED	DETAILED		QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.		QUAN.CK.	TRACE CK.

KDOT Graphics Certified 06-17-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:09
File : la852b.dgn

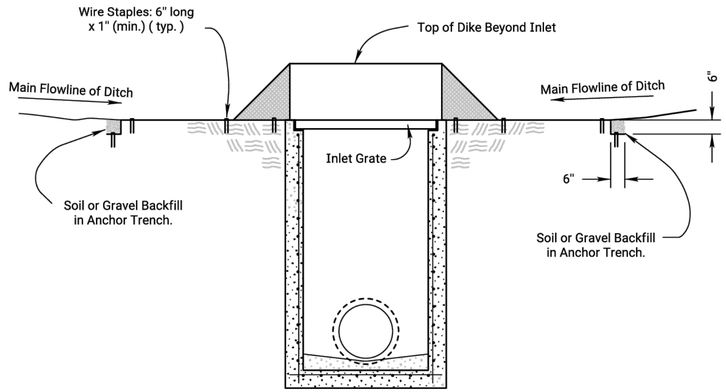
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	27	50



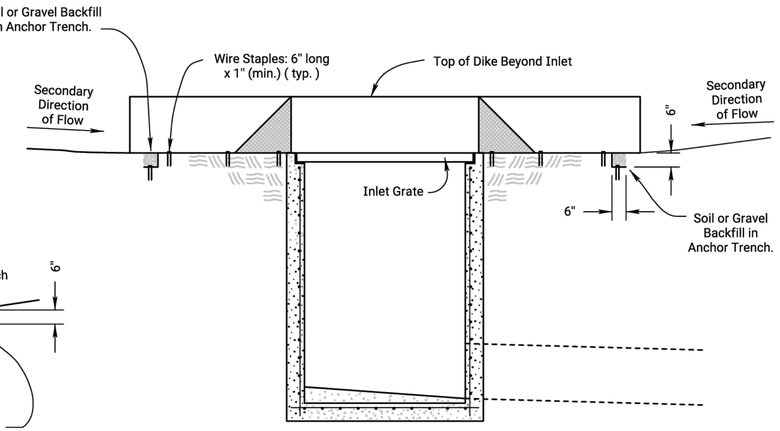
PLAN

TEMPORARY I NLET SEDI MENT BARRI ER
(TRI ANGULAR SI LT DI KE METHOD)

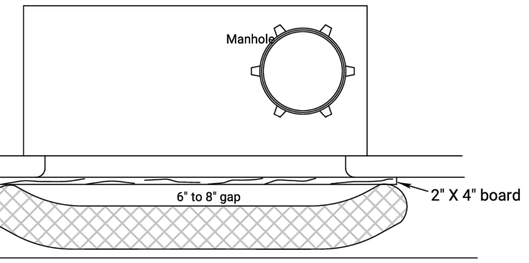
NO SCALE



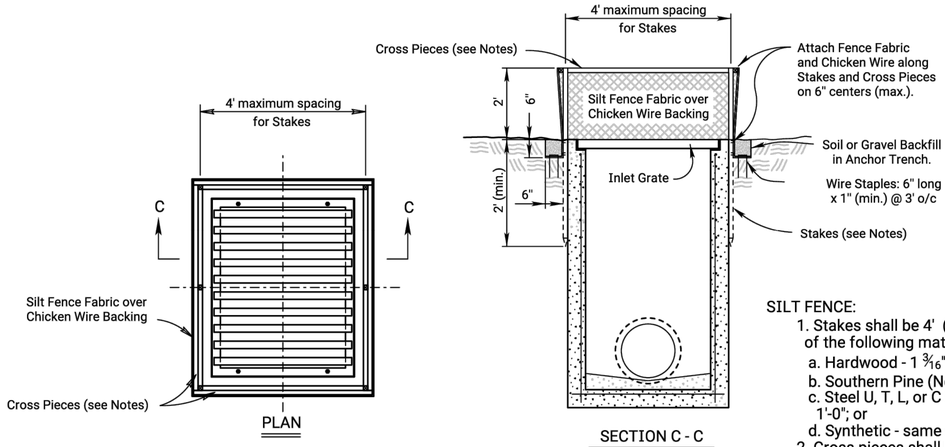
SECTION A - A



SECTION B - B



CURB INLET PROTECTION



PLAN

SECTION C - C

TEMPORARY I NLET SEDI MENT BARRI ER
(SI LT FENCE METHOD)

NO SCALE

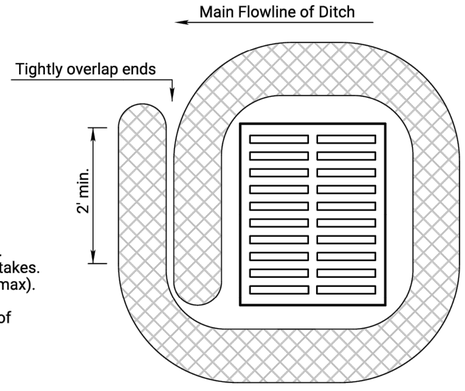
SILT FENCE:

1. Stakes shall be 4' (min.) long and of one of the following materials:
   a. Hardwood - 1 3/16" x 1 3/16";
   b. Southern Pine (No. 2) - 2 5/8" x 2 5/8";
   c. Steel U, T, L, or C Section - .95 lbs. per 1'-0"; or
   d. Synthetic - same strength as wood stakes.
2. Cross pieces shall be of same material as stakes.
3. Attach fence fabric securely on 6" centers (max).
4. Use of high flow material is acceptable.
5. Refer to plan sheets to estimate the length of silt fence required.

Bags = synthetic net (3mm mesh) or burlap bags

Rock = approximately 1" to 2" diameter

1. If multiple gravel bags are required, place them in such a way that no gaps are evident.
2. Height of bags (8" minimum diameter) must not be above top of curb.
3. Alternative products may be used other than gravel bags such as the "Gutter Buddy". Products must be approved by the Engineer.
4. Curb inlet protection will be measured and paid for as Filter Sock.



Drop inlet use
1'-6" TO 1'-8" diameter log

BIODEGRADABLE LOG/FILTER SOCK
DROP INLET PROTECTION

Note: 25% of log shall be keyed into ground during installation.

Stake every 4'

Material Requirements
Use 100% shredded mulch or other non-compost biodegradable material as fill for logs.
No compost or fines.
No hay or straw.
Do not use material which prohibits water infiltration.
Log Mesh: Use mesh with ¼" openings or larger. Mesh must allow water infiltration but also hold fill material in place.

NO.	DATE	REVISIONS	BY	APP'D
03	09-26-19	Changed Direction of Main Flowline of Ditch Arrow	M.R.D.	S.H.S.
02	03-10-15	Revised Standard	R.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL, TEMPORARY INLET SEDIMENT BARRIER (SILT FENCE) TEMP. INLET SEDIMENT BARRIER (T.S.D.) LA852C

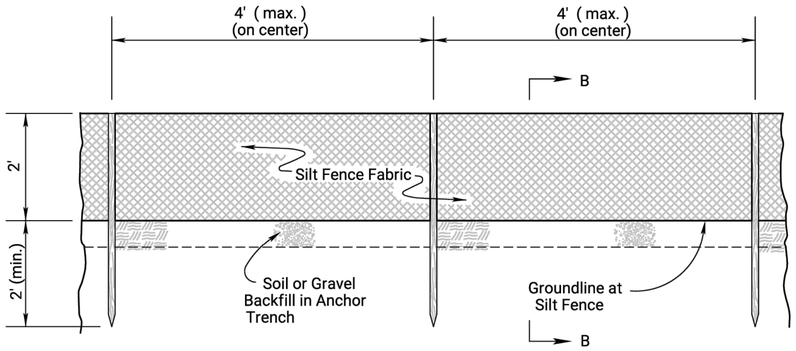
FHWA APPROVAL			03-10-15	APP'D.	Scott H. Shields		
DESIGNED	R.A.	DETAILED	R.A.	QUANTITIES	TRACED		
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.	TRACE CK.		

KDOT Graphics Certified 06-18-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:11
File : la852c.dgn

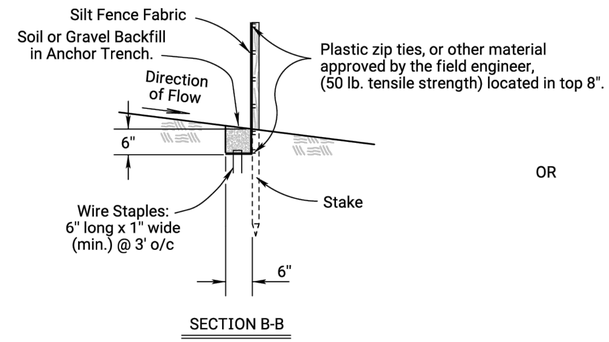
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	28	50



TYPICAL ELEVATION

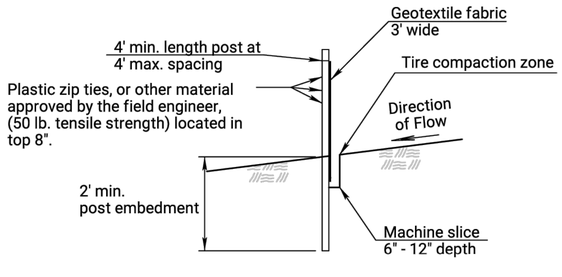
SILT FENCE BARRIER

NO SCALE

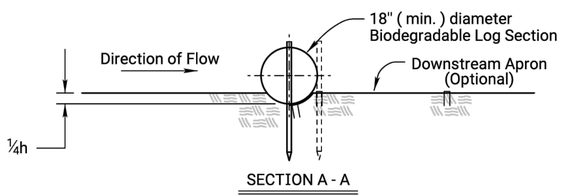


SECTION B-B

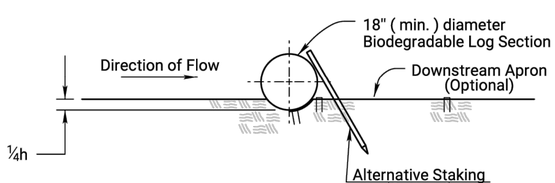
OR



SECTION B-B

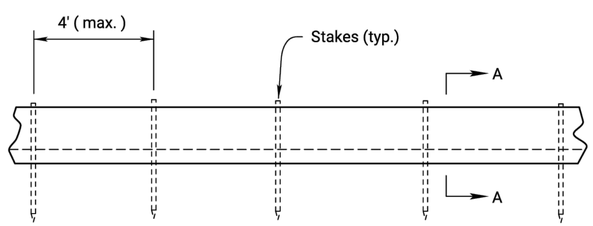


SECTION A - A



ALT. DETAIL

OPTIONAL



TYPICAL ELEVATION

BIODEGRADABLE LOG SLOPE INTERRUPTIONS

OR Filter Sock

INSTALLATION NOTES

SILT FENCE:

1. Stakes shall be 4' (min.) long and of one of the following materials:
   a. Hardwood - 1 3/16" x 1 3/16";
   b. Southern Pine (No. 2) - 2 5/8" x 2 5/8";
   c. Steel U, T, L, or C Section - .95 lbs. per 1'-0"; or
   d. Synthetic - same strength as wood stakes.
2. Attach fence fabric with 3 zip ties within the top 8" of the fence
   Alternate attachment methods may be approved by the Engineer on aperformance basis.
3. Use of high flow material is acceptable.
4. Refer to plan sheets to estimate the length of silt fence required.

BIODEGRADABLE LOG OR FILTER SOCK

1. Place biodegradable logs or filter sock tightly together minimum overlap of 18".
2. Wood stakes shall be 2" x 2" (nom.).
3. Refer to plan sheets to estimate length of biodegradable log and filter sock required.
4. Each log or sock (except compost filter socks) should be keyed into the ground at a minimum of 25% of its height. Compost filter socks should be placed on smooth prepared ground with no gaps between the sock and soil.
5. Length of stakes should be 2 times the height of the log at a minimum with minimum ground embedment equal to the height of the log / sock.

Biodegradable Log or Filter Sock Slope Interruptions

		PRODUCT		
		9" Sediment Log or 8" Filter Sock (ft)	12" Sediment Log or 12" Filter Sock (ft)	20" Sediment Log or 18" Filter Sock (ft)
Slope Gradient	≤4H:1V	40	60	80
	3H:1V	30	45	60

Deviations should be approved by the Field Engineer.

	BIODEGRADABLE LOG MATERIAL	
	LOW FLOW	HIGH FLOW
9"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber
12"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber
18"-20"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber

GENERAL NOTES

1) Slope interruptions shall be placed along contour lines, with a short section turned upgrade at each end of the barrier.
2) The maximum length of the slope interruptions shall not exceed 250 feet, and the barrier ends need to be staggered.
3) Interruptions damaged by Contractor's negligence, including improper maintenance or lack of maintenance, shall be repaired immediately by Contractor at no additional cost to KDOT.
4) Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.

NO.	DATE	REVISIONS	BY	APP'D
03	06-28-16	Revised Standard	R.A.	S.H.S.
02	03-01-15	Revised Standard	R.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL SLOPE INTERRUPTIONS BIODEGRADABLE LOG / SILT FENCE

LA852D

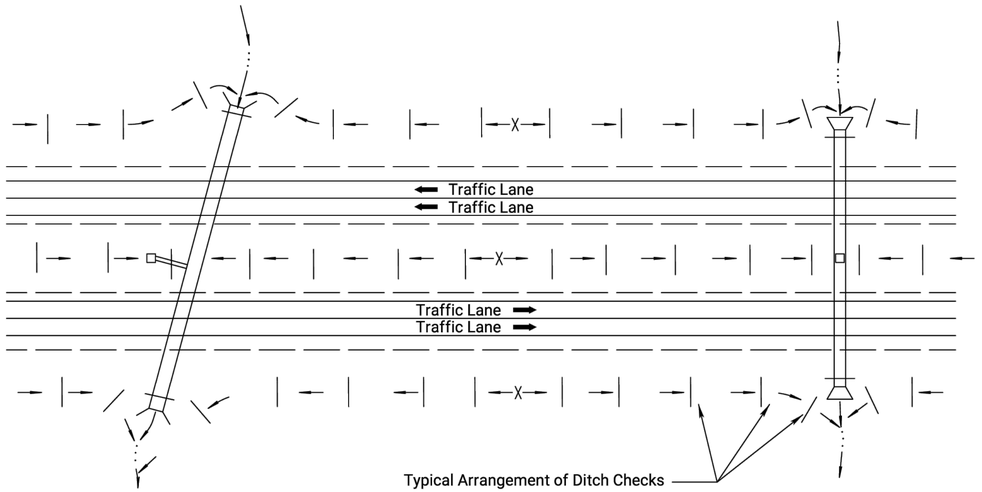
FHWA APPROVAL		09-14-16	APP'D.	Scott H. Shields	
DESIGNED	S.H.S.	DETAILED R.A.	QUANTITIES	TRACED	
DESIGN CK.	S.H.S.	DETAIL CK.	QUAN.CK.	TRACE CK.	

KDOT Graphics Certified 06-18-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:12
File : la852d.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	29	50



TYPICAL DITCH CHECK LAYOUT PLAN
NO SCALE

20" BIOLOG CHECK SPACING	
DITCH ℄ SLOPE (%)	SPACING INTERVAL (FEET)
1.0	125
2.0	60
3.0	40
4.0	30
5.0	25
NOTE: Use this spacing for all except Rock Ditch Checks.	

18" FILTER SOCK CHECK SPACING	
DITCH ℄ SLOPE (%)	SPACING INTERVAL (FEET)
1.0	110
2.0	55
3.0	35
4.0	25
5.0	20
NOTE: Use this spacing for all except Rock Ditch Checks.	

GENERAL NOTES

1) The choice of ditch check methods is at the option of the Contractor.

2) Use only rock checks in situations where the ditch slope is 6 percent or greater.

2) Ditch checks damaged by Contractor's negligence, including improper maintenance or lack of maintenance, shall be repaired by Contractor at no extra cost to KDOT.

NO.	DATE	REVISIONS	BY	APP'D
03	08-10-16	Revised Standard	R.A.A.	S.H.S.
02	06-28-16	Revised Standard	R.A.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL DITCH CHECKS

LA852E

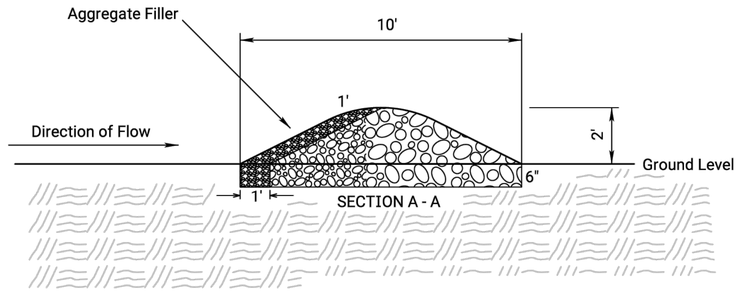
FHWA APPROVAL			09-14-16	APP'D.		Scott H. Shields	
DESIGNED	S.H.S.	DETAILED	R.A.A.	QUANTITIES		TRACED	R.A.A.
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.		TRACE CK.	S.H.S.

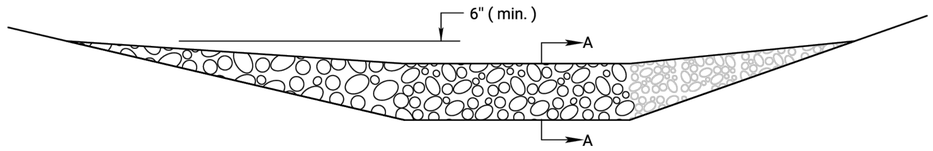
KDOT Graphics Certified 06-18-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:14
File : la852e.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	30	50





TYPICAL ELEVATION

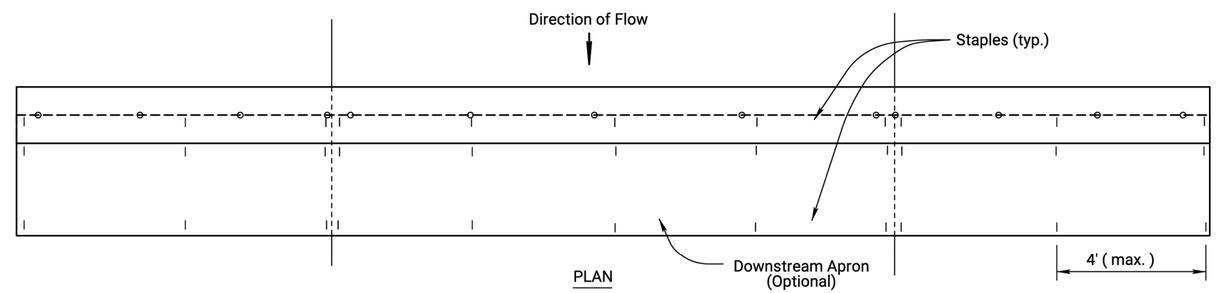
ROCK DITCH CHECK

NO SCALE

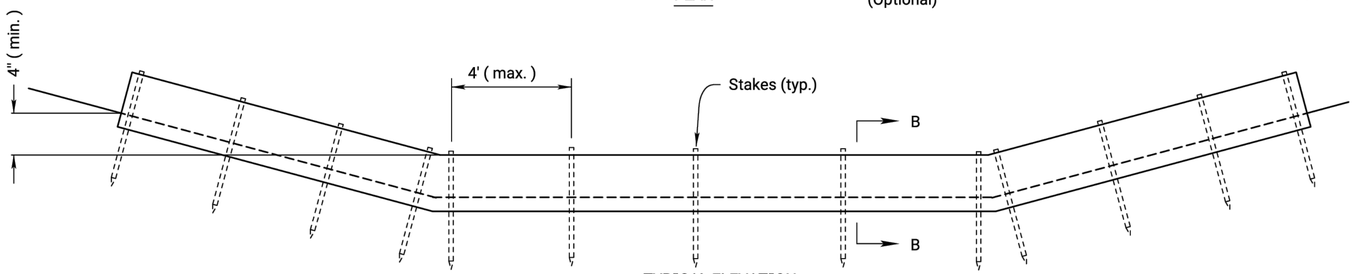
TEMPORARY ROCK DITCH CHECK SPACING	
DITCH ℄ SLOPE (%)	SPACING INTERVAL (FEET)
5.0	60
6.0	50
7.0	43
8.0	36
9.0	33
10.0	29
NOTE: Use this spacing for Rock Ditch Checks only.	

ROCK DITCH CHECK NOTES

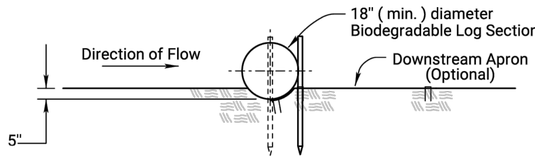
1. Rock shall be clean aggregate, D50-6" and aggregate filler.
2. Place rock in such manner that water will flow over, not around ditch check.
3. Do not use rock ditch checks in clear zone.
4. Excavation: The ditch area shall be reshaped to fill any eroded areas. Prior to placement of the rock, the ditch shall be excavated to the dimensions of the Rock Ditch Check and to a minimum depth of 6" (150mm). After placement of the rock, backfill and compact any over-excavated soil to ditch grade. This work shall be subsidiary to the bid item Temporary Ditch Check (Rock).
5. Aggregate excavated on site may be used as an alternate to the 6" rock, if approved by the Engineer.
6. The Engineer may approve the use of larger aggregates for the downstream portion of the check when conditions warrant their use.
7. When the use of larger rock is approved, D50-6" rock will be placed between the larger aggregate and the aggregate filler.
8. Aggregate filler will be placed on the upstream face of the ditch check. Aggregate filler will comply with Filter Course Type I, Division 1114.



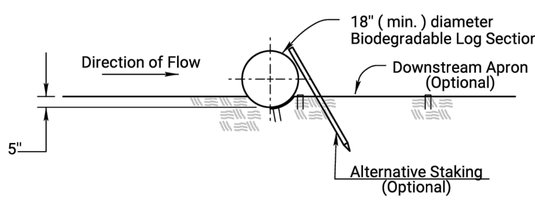
PLAN



TYPICAL ELEVATION



SECTION B - B



ALT. DETAIL
OPTIONAL

BIODEGRADABLE LOG DITCH CHECK

OR Filter Sock Ditch Check

NO SCALE

BIODEGRADABLE LOG DITCH CHECK NOTES

1. Use as many biodegradable log sections as necessary to ensure water does not flow around end of ditch check.
2. Overlap sections a minimum of 18".
3. Stakes shall be wood or steel according to Section 2114 of the Standard Specifications. Length of stakes shall be a minimum of 2 x the diameter of the log.
4. Use Erosion Control (Class 1) (Type C) as the downstream apron when required.
5. A downstream apron is required when directed by the Engineer. Apron material will be paid at the contract unit price.
6. Each log or sock (except compost filter socks) should be keyed into the ground at a minimum of 25% of its height. Compost filter socks should be placed on smooth prepared ground with no gaps between the sock and soil.

NO.	DATE	REVISIONS	BY	APP'D
03	11-19-20	Revised Standard	M.R.D.	M.L.
02	08-10-16	Revised Standard	R.A.A.	S.H.S.
01	10-21-15	Revised Standard	R.A.A.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL
ROCK DITCH CHECKS
BIODEGRADABLE LOG DITCH CHECKS

LA852G

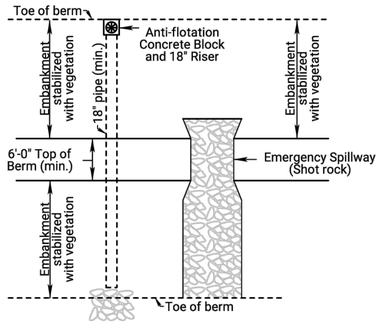
FHWA APPROVAL			11-19-20	APP'D.		Mervin Lare	
DESIGNED	M.L.	DETAILED	D.K.	QUANTITIES		TRACED	R.A.A.
DESIGN CK.	M.L.	DETAIL CK.	M.L.	QUAN.CK.		TRACE CK.	R.A.A.

KDOT Graphics Certified 06-20-2022

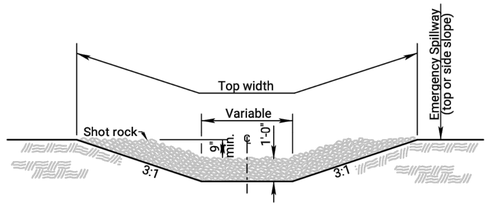
KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:16
File : la852g.dgn

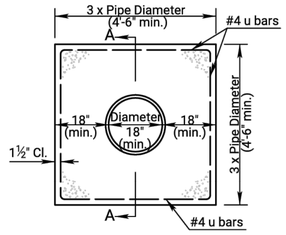
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	31	50



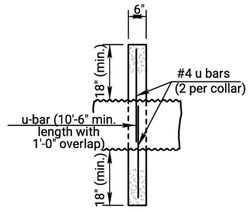
SEDIMENT STORAGE BASIN (PLAN)



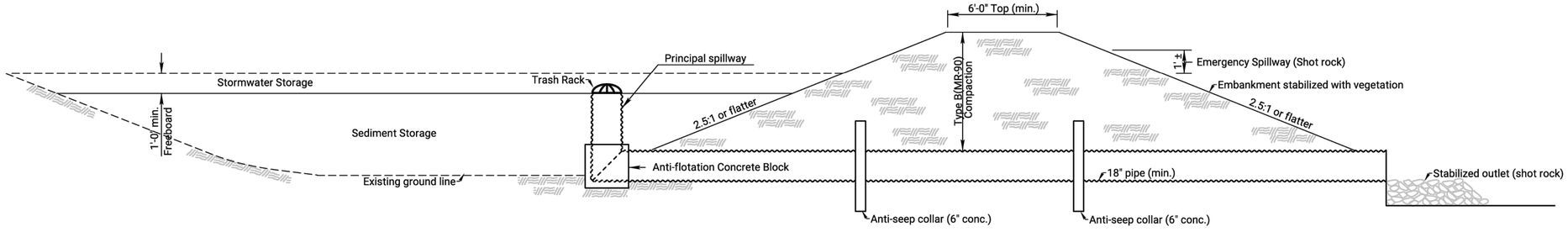
CROSS SECTION (EMERGENCY SPILLWAY)



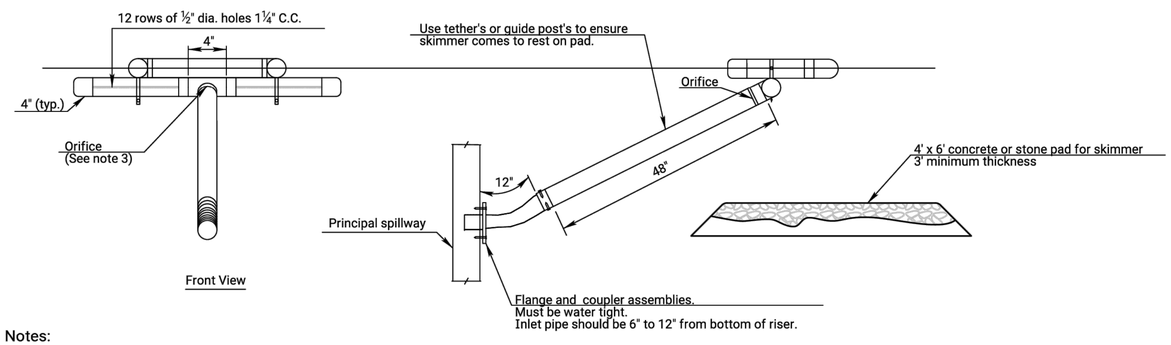
CONCRETE ANTI-SEEP COLLAR



SECTION A-A



SEDIMENT STORAGE BASIN (ELEVATION)



Notes:

1. All P.V.C. pipes are to be schedule 40.
2. HDPE flexible drain pipes is to be attached to the pond outlet structure with water-tight connections.
3. The orifice shall be sized of to provide drawdown time to 2 to 5 days and approved by the engineer.
4. Other skimmer designs maybe used that dewaters from the surface at a controlled rate. The design must be approved by the engineer.

SKIMMER DEWATERING DEVICE

NOTES:

1) Temporary Sediment Basins shall be constructed at locations as directed by the Engineer or as approved in the SWPPP Schedule. All work and materials necessary, including but not limited to, the fill material, compaction, drainage pipes, aggregates and all other incidentals necessary to construct the basin, shall be paid as "Temporary Sediment Basin".

2) Lengths and top dimensions shall be determined in the field by the Engineer.

3) Skimmer dewatering device required and must be used reguardless the size of the drainage area.

SEDIMENT STORAGE BASIN LOCATIONS

STATION TO STATION	SIDE	REQUIRED STORAGE CAPACITY

NO.	DATE	REVISIONS	BY	APP'D
02	09-03-13	Added Skimmer Dewatering Device	M.R.M.	S.H.S.
01	07-17-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL SEDIMENT STORAGE BASIN

LA852H

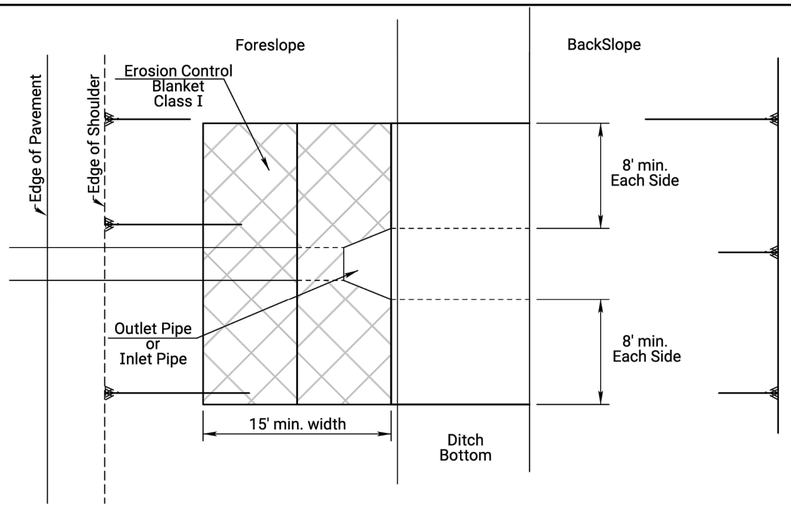
FHWA APPROVAL			09-24-13	APP'D.			
DESIGNED	B.B.	DETAILED	B.B.	QUANTITIES		TRACED	B.B.
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.		TRACE CK.	S.H.S.

KDOT Graphics Certified 06-20-2022

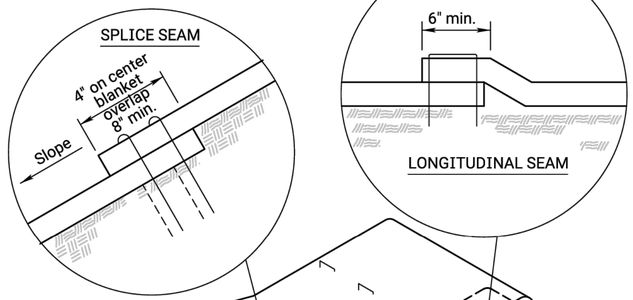
KDOT Graphics Certified

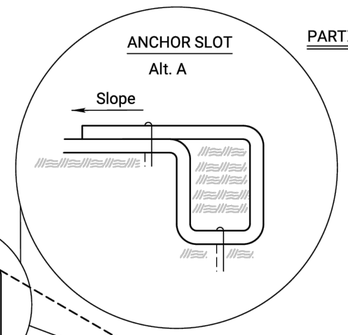
Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:18
File : la852h.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	32	50

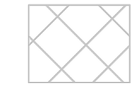


PARTIAL PLAN PIPE

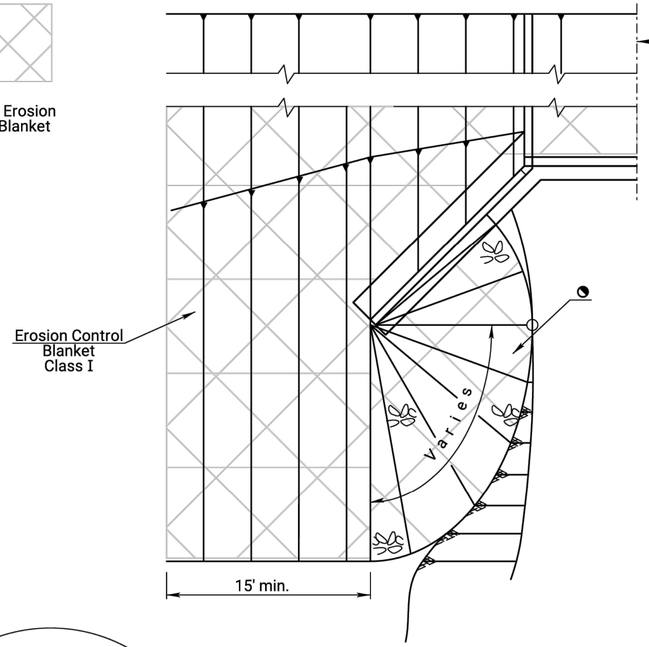




ISOMETRIC VIEW



Limits of Erosion Control Blanket



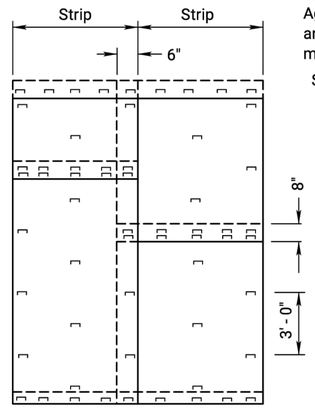
PARTIAL PLAN BOX CULVERT

◔ Erosion Control Class I may be omitted if the area is immediately covered by permanent slope protection (where directed by the plans).

INSTALLATION DETAILS FOR EROSION CONTROL CLASS 1

Erosion Control Blankets shall be laid loosely in the direction of the slope, beginning at the bottom of the slope. In order for blanket to be in contact with the soil, lay blanket loosely, avoiding stretching.

1. ANCHOR SLOTS: The top of the blanket should be "slotted in" at the top of the slope and anchored in place with anchors 6 inches apart. The slots should be 6 inches wide x 6 inches deep with the blanket anchored in the bottom of the slot, then backfilled, tamped and seeded.
2. LONGITUDINAL SEAMS: The edges of the blanket should overlap each other a minimum of 6 inches, with anchors catching the edges of both blankets.
3. SPLICE SEAM: When splices are necessary, overlap end a minimum of 8 inches in direction of water flow. Stagger splice seams.
4. TERMINAL FOLD: The bottom edge of the blanket shall be turned under a minimum of 4 inches, then anchored in place with anchors 9 inches apart.
5. TYPICAL ANCHORS: Anchor design shall be as recommended by the manufacturer.
6. STAPLE CHECK: ‡Establish Staples in 2 rows 4" on center apart. Staple Checks - shall be 30' apart.



PLAN VIEW - ANCHORING DIAGRAM

NOTE:
Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.

Single post ring and shank staple is acceptable.

NO.	DATE	REVISIONS	BY	APP'D
04	03-01-15	Revised Standard	R.A.A.	S.H.S.
03	02-23-15	Revised Standard	R.A.A.	S.H.S.
02	09-15-14	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

INSTALLATION DETAIL EROSION CONTROL CLASS 1 SLOPE PROTECTION

LA855

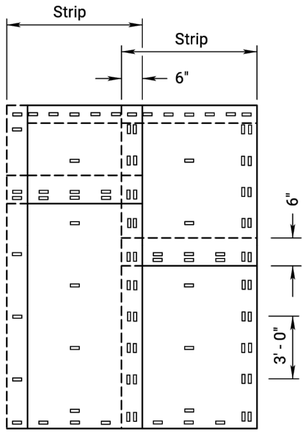
FHWA APPROVAL		03-10-15	APP'D.	Scott H. Shields
DESIGNED R.A.A.	DETAILED R.A.A.		QUANTITIES	TRACED R.A.A.
DESIGN CK.	DETAIL CK.		QUAN.CK.	TRACE CK. R.A.A.

KDOT Graphics Certified 06-20-2022

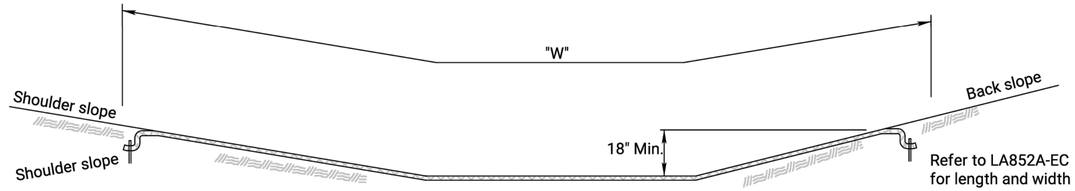
KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:21
File : la855.dgn

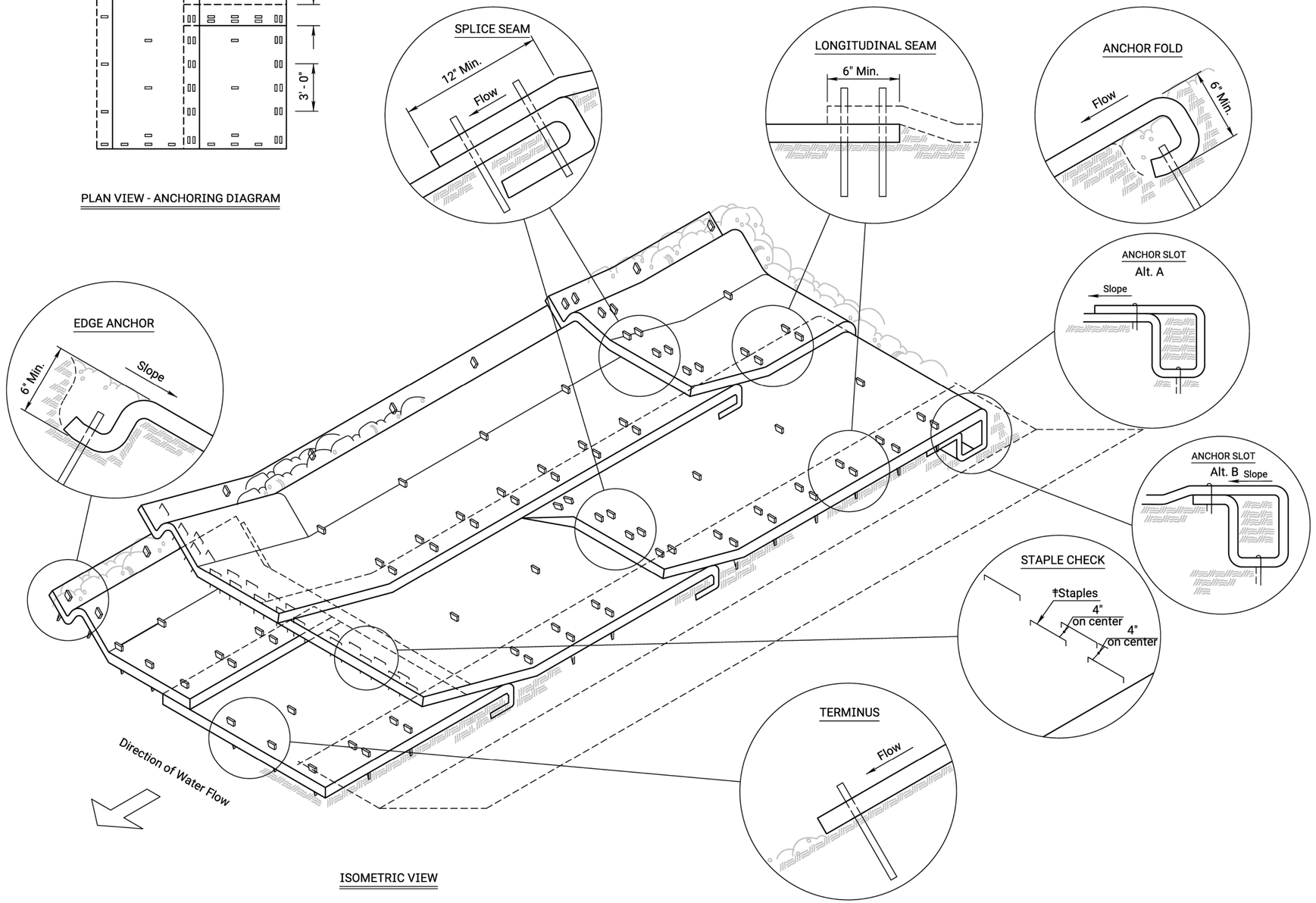
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	33	50



PLAN VIEW - ANCHORING DIAGRAM



CROSS SECTION (Ditch Lining)



ISOMETRIC VIEW

INSTALLATION DETAILS FOR EROSION CONTROL CLASS 2

Erosion Control Mats shall be laid loosely in the direction of the flow, with the first course at the centerline of channel, where applicable. In order for the mat to be in contact with the soil, lay the mat loosely, avoiding stretching.

1. ANCHOR FOLD: The top of the mat should be folded under, buried and secured with approved anchors placed 6 inches apart. The top edge of the mat should be buried in a slot, 6 inches wide x 6 inches deep; anchored in the bottom of the slot, backfilled, and the mat folded over the top as shown in detail.

2. LONGITUDINAL SEAMS: The adjacent edges of the mat should overlap a minimum of 6 inches, with anchors catching the edges of both mats.

3. SPLICE SEAM: When splices are necessary, overlap end a minimum of 12 inches in direction of water flow. Stagger splice seams.

4. STAPLE CHECK: ‡Establish Staples in 2 rows 4" on center apart. Staple Checks - shall be 30' apart.

5. EDGE ANCHOR: Lay outside edge of mat into trench at top of side slope. Anchor at 3 foot intervals along trench.

6. TERMINUS: The bottom edge of the mat shall be anchored in place with anchors spaced at 9 inch intervals along the terminating edge.

7. TYPICAL ANCHORS: Anchor design shall be as recommended by the manufacturer.

NO.	DATE	REVISIONS	BY	APP'D
04	09-25-15	Modified Staple Check	R.A.A.	S.H.S.
03	09-15-14	Revised Standard	R.A.A.	S.H.S.
02	03-01-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

INSTALLATION DETAIL
EROSION CONTROL CLASS 2
FLEXIBLE CHANNEL LINER

LA856

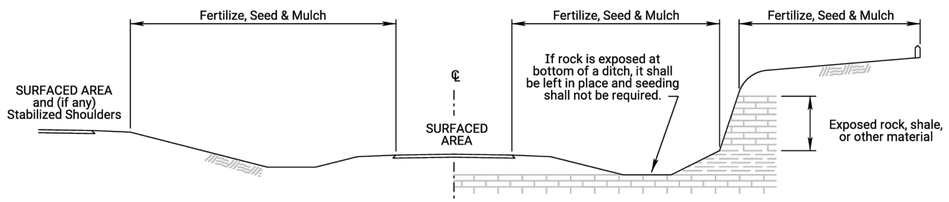
FHWA APPROVAL			11-02-15	APP'D.	Scott H. Shields		
DESIGNED	R.A.A.	DETAILED	R.A.A.	QUANTITIES		TRACED	R.A.A.
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.		TRACE CK.	

KDOT Graphics Certified 06-20-2022

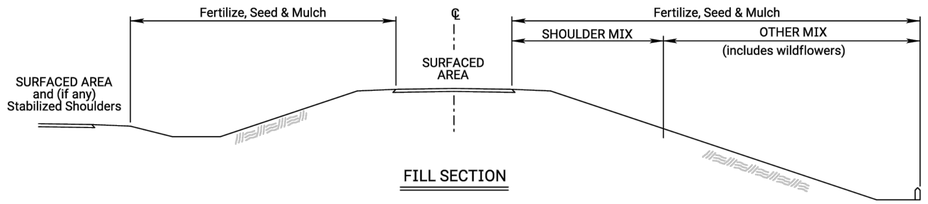
KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:22
File : la856.dgn

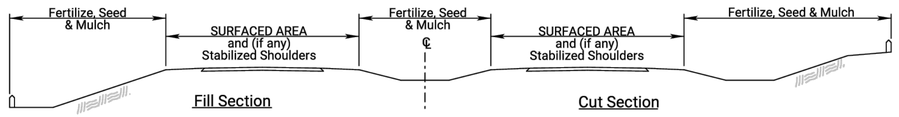
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	34	50



CUT SECTION



FILL SECTION



TYPICAL SECTION - DUAL PAVEMENT

GRASS & WILDFLOWER SEEDING SEASONS

COOL SEASON GRASSES	WARM SEASON GRASSES & WILDFLOWERS
February 15 thru April 20 August 15 thru September 30	November 15 thru June 1
SPECIES	SPECIES
Bluegrasses	Bermuda Grass
Brome Grasses	Big Bluestem
Canada Wildrye	Blue Grama
Fescues	Buffalo Grass
Prairie Junegrass	Indiangrass
Ryegrasses	Little Bluestem
Sterile Wheatgrass	Sand Bluestem
Tall Dropseed	Sand Dropseed
Western Wheatgrass	Sand Lovegrass
	Side Oats Grama
	Switchgrass
	Wildflower Mixes

When the area to be seeded is 1 acre or more, if Cool Season grasses are mixed with Warm Season grasses, seed the area during the Warm Season.

When the area to be seeded is less than 1 acre, seed the area any time of the year.

SODDING SEASONS

COOL SEASON GRASSES	WARM SEASON GRASSES
March 1 thru April 15 September 1 thru November 15	May 15 thru September 1
SPECIES	SPECIES
Bluegrass Sod	Buffalo Grass Sod
Fescue Sod	

If the soil is workable, the Engineer may allow placement of sod between November 15 and March 1. If sod is placed during this time, maintain the sod until 20 days after the beginning of the spring sodding season.

GENERAL NOTES

The entire disturbed area, excepting the paved or surfaced areas, steep rocky slopes and areas of undisturbed native sod or other desirable vegetation shall be fertilized (limed when required), seeded and mulched. Soil preparation shall conform to the Standard Specifications except as noted below.

All borrow areas shown on the plans are to be fertilized, seeded, and mulched. However, operation in borrow areas where crops are growing may be omitted when requested by the owner.

If temporary cover has provided stable slopes with no erosion, seed the permanent grasses into the existing cover. If there has been erosion that requires repair prior to seeding, then it may be necessary to regrade the area, resulting in bare ground.

FERTILIZER: A ratio and application rate that equals or exceeds the required minimum rate per acre of N, P_2O_5 , K_2O listed in Summary of Seeding Quantities will be acceptable.

MULCHING: Mulch shall be spread uniformly over all disturbed areas and punched in the soil, unless otherwise noted on the plans. The rate of application per acre, thickness in place, for the mulching material is generally as follows:

1¾ - 2¼ Tons per Acre = 1½" loose depth spread uniformly over acre.

Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.

Other vegetative mulches are acceptable only with the Engineer's concurrence.

The above rate is a guide. It will be at the discretion of the Engineer to determine what rate is sufficient for adequate protection of newly seeded areas.

NATIVE WILDFLOWER MIX 1

PLS RATE	NAME	QTY (lb)
0.3	Butterfly Milkweed	
0.3	Common Milkweed	
0.3	Black Eyed Susan	
0.5	Blanket Flower	
0.5	False Sunflower	
0.5	Lance-Leaf Coreopsis	
0.2	Maximilian Sunflower	
0.1	New England Aster	
0.2	Pinnate Prairie Coneflower	
0.2	Plains Coreopsis	
0.3	Purple Coneflower	
0.3	Upright Prairie Coneflower	
0.3	Dames Rocket	
0.3	Lemon Mint	
0.2	Pitcher Sage	
0.2	Wild Bergamot	
1.0	Illinois Bundleflower	
0.2	Common Evening Primrose	
0.1	Hoary Verbena	
0.8	Purple Prairie Clover	
0.3	Roundhead Lespedeza	
3.0	Showy Partridge Pea	
0.2	White Prairie Clover	
10.3	Total (lb)	

NATIVE WILDFLOWER MIX 2

PLS RATE	NAME	QTY (lb)
0.3	Butterfly Milkweed	
0.3	Black Eyed Susan	
0.5	Black Sampson Coneflower	
1.0	Blanket Flower	
0.2	Maximilian Sunflower	
0.2	Plains Coreopsis	
0.2	Upright Prairie Coneflower	
0.2	Western Yarrow	
0.3	Lemon Mint	
0.4	Pitcher Sage	
1.5	Illinois Bundleflower	
0.2	Common Evening Primrose	
1.0	Blue Wild Indigo	
0.4	Leadplant	
0.4	Purple Prairie Clover	
0.3	White Prairie Clover	
7.4	Total (lb)	

Package and deliver the wildflower seed separately from the grass seed mix. Package and deliver the Tall Drop Seed separately from the grass seed and the wildflower mix. Place the grass seed (except Tall Drop Seed) in the large seed box and drill (cover) seed ⅛" -¼". Place the wildflower seed in a separate seed box and drill (cover) seed $\frac{1}{16}$" maximum. Place the Tall Drop Seed in a separate (third) seed box and place the seed (using the seed drill) on the soil surface.

OPTION: Broadcast Tall Drop Seed on the soil surface.

SUMMARY OF SEEDING QUANTITIES

P.L.S. RATE/ACRE SHLDR	P.L.S. RATE/ACRE OTHER	ACRES SHLDR	ACRES OTHER	BID ITEM	QUANTITY	UNIT
50		1.5		Fertilizer (16-20-0)	75.0	LBS
1		1.5		Seed (Blue Grama Grass Seed)(Lovington)	1.5	LBS
24.5		1.5		Seed (Buffalo Grass Seed)(Treated)	36.8	LBS
6.3		1.5		Seed (Side Oats Grama Grass Seed)(El Reno)	9.5	LBS
10		1.5		Seed (Sterile Wheatgrass)(Regreen/Quick Guard)	15.0	LBS
6		1.5		Seed (Western Wheatgrass Seed)(Barton)	9.0	LBS
				Mulching ✳		

SHLDR = Seeded with the Shoulder Mix. Typically 15 feet for 2-lane roads and 30 feet for 4-lane roads. Includes outside roadsides, turfed portions of shoulders, and turfed portion of the median.

OTHER = Seeded with the "Other" Mix. Designated as all other turf areas, except the Shoulder. Usually includes a Native Wildflower Mix.

NOTE: Projects less than 1 acre shall be bid as "Seeding" by the lump sum. All disturbed areas shall be seeded, fertilized and mulched at the listed rate per acre. The acres are estimated.

Refer to the Standard Specifications, Division 900, Section 904 'Seeding', and Section 907 'Sodding', for the seeding and sodding seasons.

✳ See LA852A for mulching quantity. The quantity of mulch is estimated (Acres of Seeding X 1.5 X 2 Tons/Acre). The total mulch required shall be determined in the field. The bid item for mulching shall be paid for according to the Standard Specifications.

NO.	DATE	REVISIONS	BY	APP'D
02	11-25-20	Updated Seeding / Sodding Periods Charts	M.R.D.	M.L.
01	08-03-20	Revised Standard	M.R.D.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

PERMANENT SEEDING SUMMARY OF SEEDING QUANTITIES

~~LA850~~

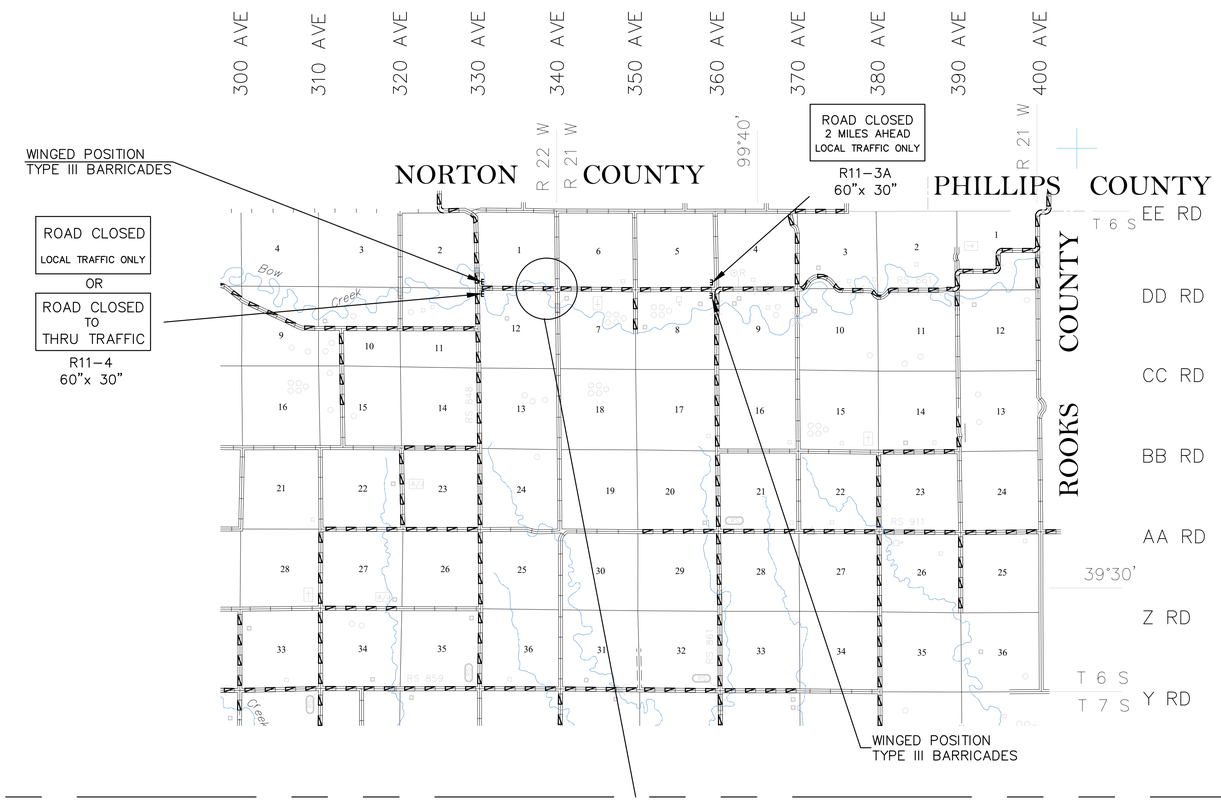
FHWA APPROVAL	05-06-19	APP'D.	Mervin Lare
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

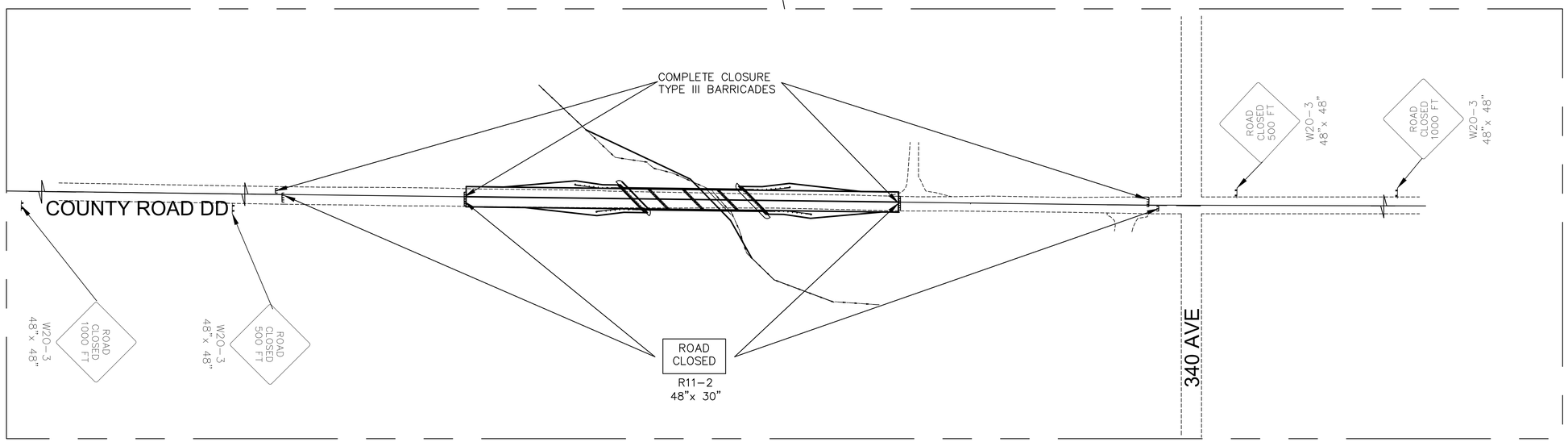
KDOT Graphics Certified 06-17-2022

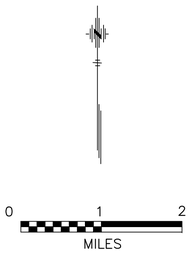
KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 1-JUL-2022 00:02
File : la850.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	35	50







TRAFFIC CONTROL PLAN

PENCO ENGINEERING, P.A.
PLAINVILLE, KANSAS

DESIGNED BY: JJD	SCALE: As Shown
DRAWN BY: AMN	PROJ. NO.: 33 C-5290-01
CHECKED BY: CRB	DATE: 2025

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	36	50

1) Design Speed: Those items delegated to temporary traffic control should be designed and installed using the posted/legal speed of the roadway prior to work starting.

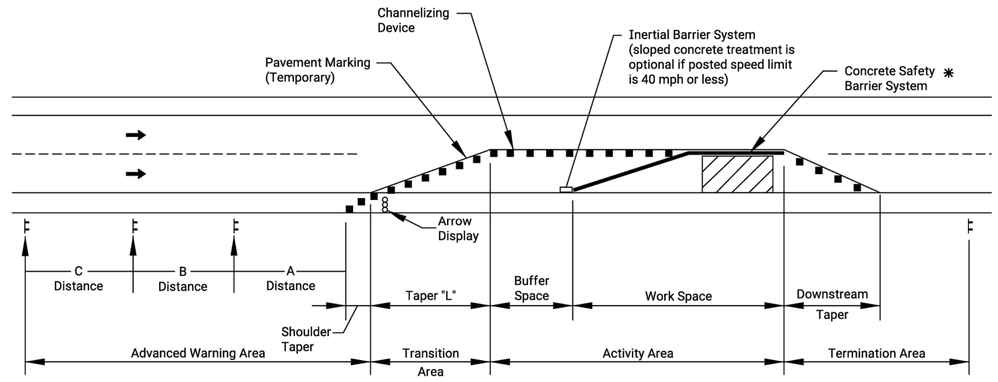
2) Minimum Lane Width: Lane widths shall be a minimum of 11' (measured between centerlines of pavement markings) or as shown on the plans, or as directed by the engineer. A lane width less than 11' may require restricted roadway width signing.

3) Consideration should be made to separate pedestrian and, if needed, bicycle movements from both work site activity and vehicular traffic. Unless a reasonable safe route that does not involve crossing the roadway can be provided, pedestrians should be appropriately directed with advance signing that encourages them to cross to the opposite side of the roadway. In urban and suburban areas with high vehicular traffic volumes, these signs should be placed at intersections (rather than midblock locations) so that pedestrians are not confronted with midblock work sites that will induce them to attempt skirting the work site or making a midblock crossing.

4) When existing pedestrian facilities are disrupted, closed, or relocated, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.

5) When the driving surface open to traffic is milled or is a temporary surface made of loose material, or when directed by the engineer a W8-15 (Grooved Pavement) or W8-7 (Loose Gravel) sign shall be used on mainline approaches. This sign should be placed a "C" distance after the W20-1 (Road Work Ahead) sign. A W8-15p motorcycle plaque shall be used to supplement the W8-15 or W8-7 signs. All signs shall be displayed as long as the condition is present.

6) Alternative temporary rumble strip options may be available. Please contact the Temporary Traffic Control Unit for more information at 785-296-1179 or 785-296-1183.



TYPICAL WORK ZONE COMPONENTS

✳ When concrete barrier system is used, portable channelizing devices are not needed along the tangent barrier section.

Minimum advance warning sign spacing (in feet):

SPEED (MPH) ✳	*A*	*B*	*C*
URBAN (40 MPH OR LOWER)	*100*	*100*	*100*
URBAN (45 MPH OR HIGHER)	*350*	*350*	*350*
RURAL (55 MPH OR LOWER)	*500*	*500*	*500*
RURAL (60 MPH OR HIGHER)	*750*	*750*	*750*
EXPRESSWAY/FREEWAY	*1000*	*1500*	*2640*

✳ Posted speed prior to work starting

The minimum spacing between signs shall be no less than 100', unless directed by the engineer.

The spacing between any signs may be increased beyond the minimum values in the table above as approved by the engineer in order to maximize visibility.

Taper Formulas:

L = WS for speeds of 45 MPH or more

$L = WS^2/60$ for speeds of 40 MPH or less

Where: L = Minimum length of taper in feet
S = Numericial value of posted speed prior to work starting in MPH
W = Width in offset feet

Shifting Taper=1/2 L
Shoulder Taper=1/3 L

Channelizer Placement:

(1) The spacing between devices in transition area (taper) should not exceed a distance in feet equal to 1/2 the posted speed limit in mph prior to work starting.

(2) The spacing between devices in the advanced warning area and the activity area should not exceed a distance in feet equal to two times the posted speed limit in mph prior to work starting.

(3) Channelizing devices shall be placed for optimum visibility, normally at right angles to the traffic flow.

(4) Place directional indicator barricades in series to direct traffic onto the new path. The arrow sign should not be visible to opposing traffic.

(5) Alternating diagonal orange and white striping must slope downward in the direction traffic is expected to pass.

Buffer Space

SPEED (MPH) ✳	*20*	*25*	*30*	*35*	*40*	*45*	*50*	*55*	*60*	*65*	*70*	*75*
LENGTH (ft)	*115*	*155*	*200*	*250*	*305*	*360*	*425*	*495*	*570*	*645*	*730*	*820*

✳ Posted speed prior to work starting

Neither work activity nor storage of equipment, vehicles, or material should occur in the buffer space. When a protection vehicle is placed in advance of the work space, only the space upstream of the vehicle constitutes the buffer space.

If temporary concrete safety barrier system is used to separate approaching traffic from the work space, the barrier system shall be considered part of the activity area. A full lane width should be available throughout the length of the buffer space. See typical work zone components above.

NO.	DATE	REVISIONS	BY	APP'D
02	03-13-18	W8-15p usage changed to Shall	R.W.B.	E.K.G.
01	08-18-15	Channelizer spacing info	R.W.B.	K.E.

KANSAS DEPARTMENT OF TRANSPORTATION

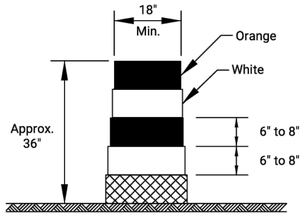
TRAFFIC CONTROL GENERAL NOTES

TE700

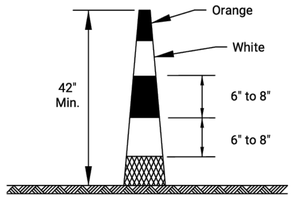
FHWA APPROVAL		03-13-18	APP'D.		Eric Kocher
DESIGNED	B.A.H.	DETAILED R.W.B.	QUANTITIES	TRACED	
DESIGN CK.		DETAIL CK.	QUAN.CK.	TRACE CK.	

Plotted by : KDOT#CADD.Support_ks.gov 4-JUN-2022 00:01
File : te700.dgn

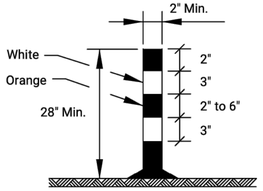
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	37	50



DRUM

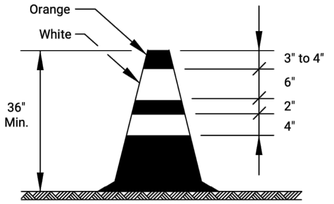


CONICAL DELINEATOR

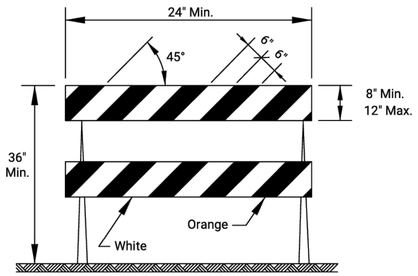


TUBULAR MARKER

Striping as shown for up to 42".

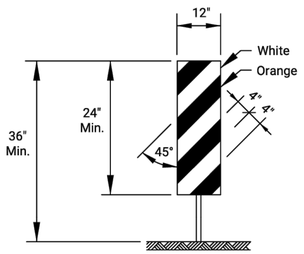


TRAFFIC CONE



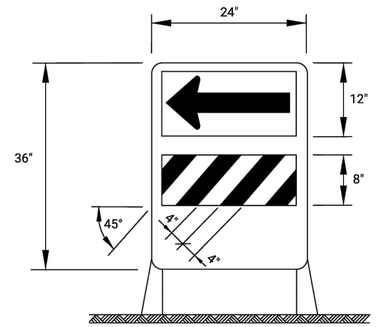
TYPE 2 BARRICADE

For rails less than 36" long, 4" wide stripes may be used. All stripes shall slope downward to the traffic side for channelization.



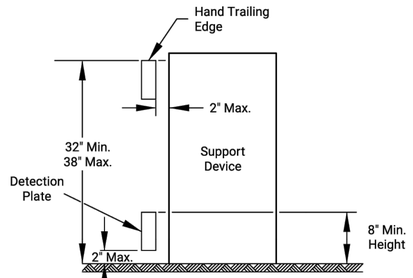
VERTICAL PANEL

The stripes shall slope downward to the traffic side for channelization.



DIRECTION INDICATOR BARRICADE

The stripes shall slope downward in the direction traffic is to pass. The direction indicator barricade shall be used in series to direct the motorist into the intended lane of travel.



PEDESTRIAN CHANNELIZER

1. Support device shall not project beyond the detection plate into the pathway.
2. Hand trailing edges and detection plates are optional for continuous walls.
3. Interconnect pedestrian channelizers to prevent displacement and to provide continuous guidance through or around work.
4. Alternate pathways shall be firm, stable, and slip resistant.
5. Treat height differentials > 1/2" in the surfaces of alternate paths with a firm, stable, and slip resistant temporary ramp having a slope of 12:1 or flatter and having a width equal to the alternate path.
6. Use alternating orange/white on interconnected devices.

Item	Location	Cross-overs	Shoofly Diversions	Tangents	Tapers	Ramps	Head to Head	Object Identifier	Lead-in Devices	Gores
Portable										
	Drums	Yes	Yes	Yes	Yes	Yes	(1)	Yes	Yes	Yes
	Conical Delineators	Yes	Yes	Yes	Yes	Yes	(1)	Yes	Yes	Yes
	Vertical Panels	(2)	(2)	(2)	(2)	(2)	(1,2)	Yes	(2)	(2)
	Direction Indicator Barricade	No	No	No	Yes	No	No	No	No	No
	Type 2 Barricade	(2)	(2)	(2)	(2)	No	No	Yes	No	No
	Traffic Cones	No	No	(4)	(4)	(4)	No	(4)	(4)	(4)
Fixed										
	Tubular Markers	(3)	(3)	(3)	No	(3)	Yes	No	Yes	Yes
	Vertical Panels	(3)	(3)	(3)	(3)	(3)	(3)	Yes	(2,3)	(2)

(1) Not allowed on centerline delineation along freeways or expressways.
(2) The stripes shall slope downward to the traffic side for channelization.
(3) May be used upon the approval of the engineer.
(4) Daytime operations only.

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL CHANNELIZING DEVICES

TE702

FHWA APPROVAL		06-01-15	APP'D.	Kristina Ericksen	
DESIGNED	L.E.R.	DETAILED R.W.B.	QUANTITIES	TRACED	
DESIGN CK.		DETAIL CK.	QUAN.CK.	TRACE CK.	

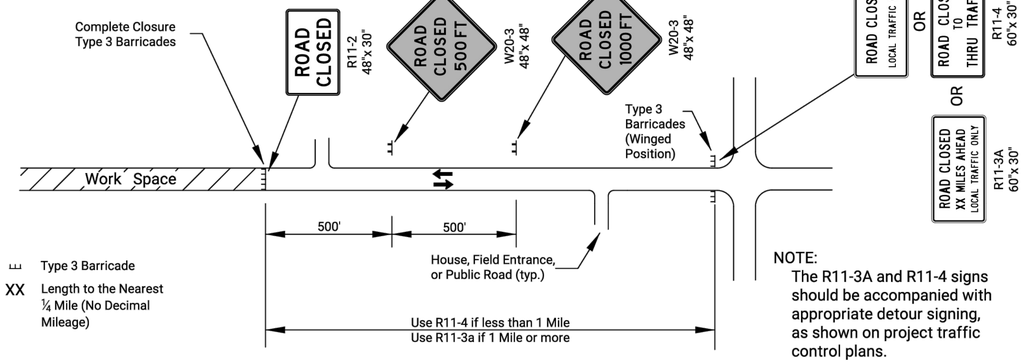
KDOT Graphics Certified 05-24-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 4-JUN-2022 00:23
File : te702.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	38	50

Note: Signs shown for one approach to work zone.



NOTE:
The R11-3A and R11-4 signs should be accompanied with appropriate detour signing, as shown on project traffic control plans.

FIGURE 1: TYPICAL SIGNING FOR ROAD CLOSURE (MAINLINE OR SIDE ROAD)

Note: Sign shown for one approach to intersection (work zone).

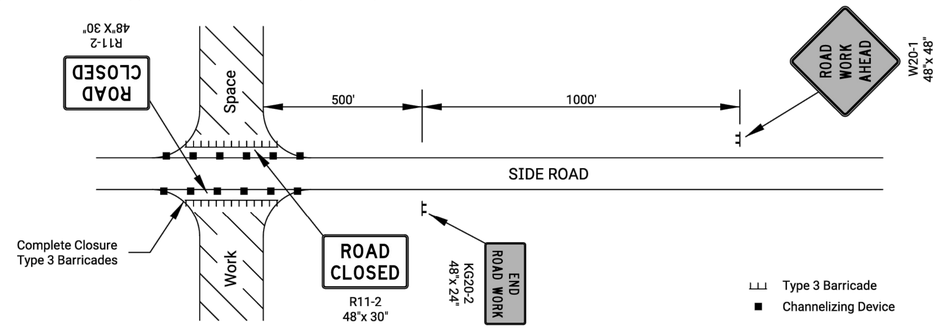


FIGURE 2: TYPICAL SIGNING FOR SIDE ROAD OPEN

Note: Signs shown for one approach to work zone.

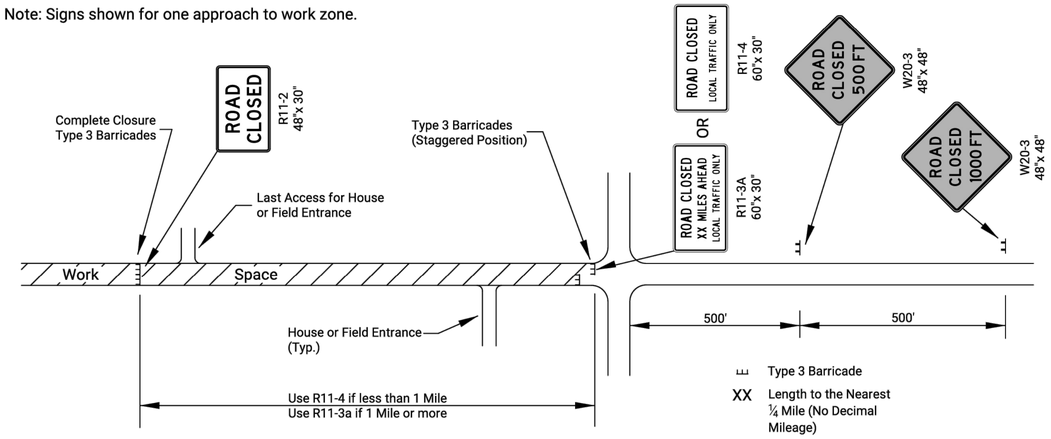


FIGURE 3: TYPICAL SIGNING FOR ROAD CLOSURE - LOCAL TRAFFIC ACCESS

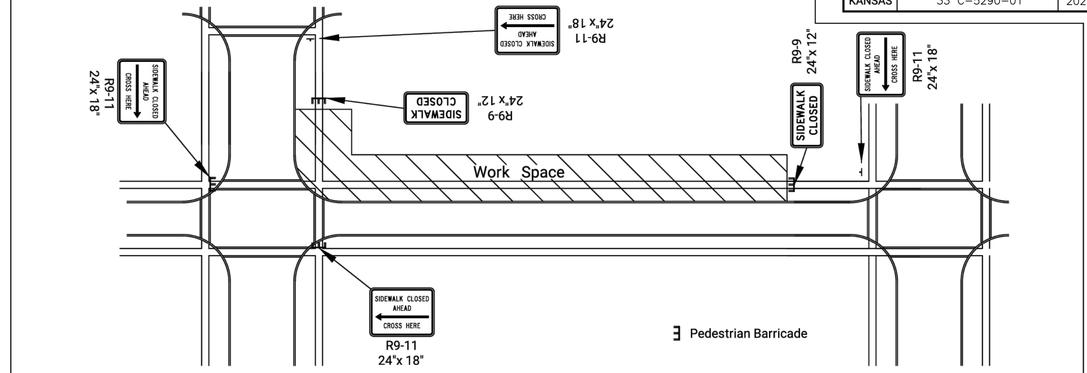
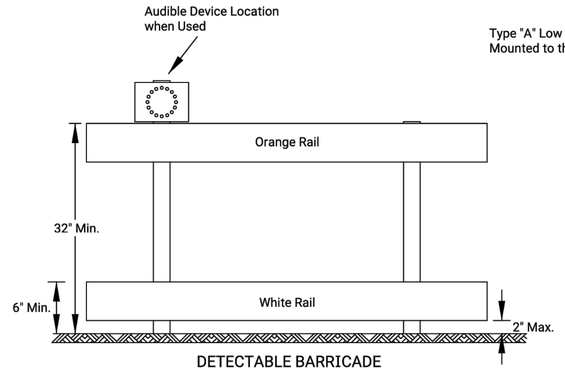
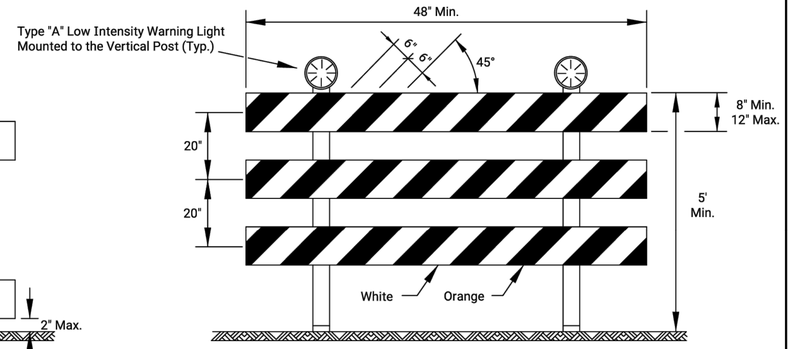


FIGURE 4: TYPICAL SIGNING FOR SIDEWALK CLOSED WITH OPPOSITE SIDEWALK AVAILABLE



DETECTABLE BARRICADE

1. Support device shall not project beyond the detection plate into the pathway.
2. Barricades shall be used to close the entire width of the pathway.
3. Do not use warning lights on pedestrian barricades.
4. Do not use warning lights on audible devices.



TYPE 3 BARRICADE WITH LIGHTS

Approved signs mounted on Type 3 barricades should not cover more than 50% of the top two rails or 33% of the total area of the three rails.

When barricades are placed end-to-end or staggered, a Type "A" low intensity warning light shall be mounted to the vertical post near each outside corner of the end barricades.

ROAD CLOSED GENERAL NOTES

As shown in Figure 1, at the point where thru traffic must detour and local traffic can proceed to the location where the roadway is completely closed, the R11-3a (ROAD CLOSED # MILES AHEAD LOCAL TRAFFIC ONLY) or R11-4 (ROAD CLOSED LOCAL TRAFFIC ONLY or ROAD CLOSED TO THRU TRAFFIC) sign shall be used with Type 3 barricades (winged position), placed on the shoulders of roadway.

As shown in Figure 3, when local traffic must be allowed access into the work zone, Type 3 barricades shall be longitudinally staggered to maintain the appearance of a closed roadway. A second line of end-to-end Type 3 barricades shall be placed just beyond the last access point in the work zone, to completely close the roadway.

The R11-4 (ROAD CLOSED TO THRU TRAFFIC or ROAD CLOSED LOCAL TRAFFIC ONLY) sign shall be used when the distance to the point of complete closure of the roadway is less than 1 mile.

The R11-3a (ROAD CLOSED # MILES AHEAD LOCAL TRAFFIC ONLY) sign shall be used when the distance to the point of complete closure of the roadway is 1 mile or greater.

The words "BRIDGE OUT" (or BRIDGE CLOSED) may be substituted for the words "ROAD CLOSED" on the R11-3a or R11-4 sign where applicable.

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL CLOSURES

TE704

FHWA APPROVAL			06-01-15	APP'D.		Kristina Ericksen	
DESIGNED	B.A.H.	DETAILED	R.W.B.	QUANTITIES		TRACED	
DESIGN CK.		DETAIL CK.		QUAN.CK.		TRACE CK.	

KDOT Graphics Certified 05-24-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 4-JUN-2022 00:02
File : te704.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	39	50

SIGN LAYOUT INFORMATION



KG20-2 — Std. Size Expwy/Freeway: 6" C, 48"x 24"



KG20-5 — Std. Size Expwy/Freeway: 6" C, 48"x 24"



KM4-20 — Std. Size: 3" C, 24"x 6" — Expwy/Freeway: 6" C, 48"x 12"



W7-3a — Mileage to be Determined by the Engineer.



W8-15 — Std. Size Expwy/Freeway: 8" D, 48"x 48"



W8-7 — Std. Size Expwy/Freeway: 8" D, 48"x 48"



W8-15p — Std. Size Expwy/Freeway: 30"x 24"



W8-17 — Std. Size Expwy/Freeway: 48"x 48"



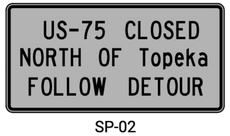
W8-11 — Std. Size Expwy/Freeway: 8" D, 48"x 48"



W8-17P (Optional) — Std. Size Expwy/Freeway: 30"x 24"



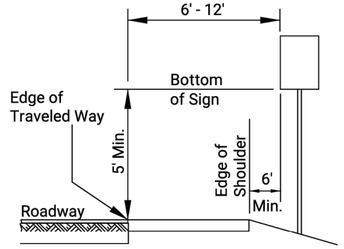
SP-01 (Special Sign) — Std. Size: 6" C — Expwy/Freeway: 10" D



SP-02 (Special Sign)

Std. Size		Expwy/Freeway	
Uppercase:	6" C	Uppercase:	10" D
Lowercase:	4.5" C	Lowercase:	8" D

All city names and street names on special signs and destination signs must have upper and lower case letters.

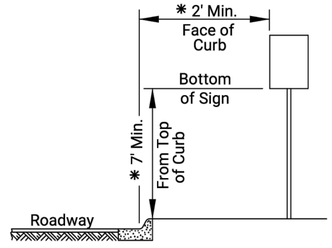


RURAL

1) Ground-mounted signs shall be mounted at a minimum height of 5' measured from the bottom of sign to the near edge of the pavement.

2) Large signs having an area exceeding 50 square feet installed on multiple breakaway posts shall be mounted a minimum of 7' above the ground.

3) The height of the secondary sign mounted below another sign may be 4' measured from the bottom of the sign to the near edge of the pavement. Signs shall not overlap each other.



URBAN

1) Signs shall be mounted at a minimum height of 7' measured from the bottom of sign to the near edge of the pavement.

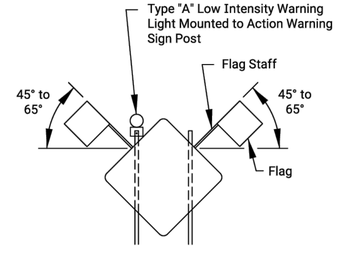
2) Neither portable nor permanent sign supports should be located on sidewalks or areas designated for pedestrian or bicycle traffic.

3) Signs mounted lower than 7' should not project more than 4" into pedestrian facilities.

4) The height from of the secondary sign mounted below another sign may be 6' measured from the bottom of sign to the near edge of the pavement. Signs shall not overlap each other.

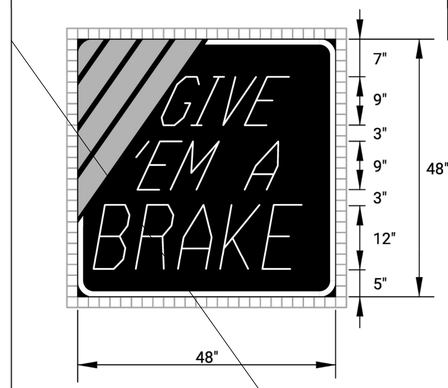
5) Large signs having an area exceeding 50 square feet installed on multiple breakaway posts shall be mounted a minimum of 7' above the ground.

* 6) Pedestrian detour signing shall be a minimum of 2' measured from the top of the pedestrian pathway to the bottom of the sign and shall not protrude into the walkway nor shall it project beyond the back of curb.



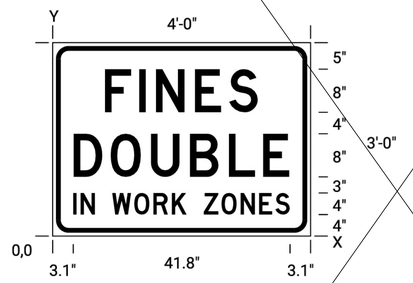
When the sign width is equal to or greater than 9', three or more wood posts may be used with a minimum of 4' between the centerline of each post. All signs less than 9' in width shall use a maximum of two wood posts.

In the case of hitting rock when driving posts
1. Shift the sign location. Do not violate minimum sign spacing.
2. With the engineer's approval, use acceptable alternative sign stands.



KI-104a

Sign Number	GIVE EM A BRAKE
Width x Height	4'-0" x 4'-0"
Border Width	1.0"
Corner Radius	4.0"
Stripe Width	3.0"
Mounting	Ground
Background	Type: Non-Reflective
	Color: Black
Legend/Border	Type: Reflective
	Color: White
Legend Font	Dutch 801 Roman SWC 25 Degree Slant
Stripes	Type: Reflective
	Color: Orange



KI-105a

Sign Number	FINES DOUBLE
Width x Height	4'-0" x 3'-0"
Border Width	0.9"
Corner Radius	3.0"
Mounting	Ground
Background	Type: Reflective
	Color: White
Legend/Border	Type: Non-Reflective
	Color: Black

Dimensions in inches — Spacings are to start of next letter

Y FONT	LETTER SPACINGS															HT LEN
23.0 D	X	F	I	N	E	S	X									8.0
	9.7	6.4	3.2	7.3	6.4	5.4	9.7									28.6
11.0 D	X	D	O	U	B	L	E	X								8.0
	3.9	6.9	7.5	7.3	7.3	6.4	4.9	3.9								40.3
4.0 D	X	I	N	X	W	O	R	K	X	Z	O	N	E	S	X	4.0
	3.1	1.6	2.7	3.2	4.3	3.8	3.6	2.8	3.2	3.4	3.8	3.6	3.2	2.7	3.1	41.8

Notes:

Typically, there are two sets of informational signs installed per project: one for each direction of traffic.

Install signs a minimum of 500' in advance of the road work ahead sign. The engineer may designate a more appropriate location if conditions dictate.

The informational signs are not to interfere with the traffic control signs for the project.

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SIGN INFORMATION

~~TE710~~

FHWA APPROVAL		06-01-15	APP'D.	Kristina Ericksen	
DESIGNED	R.W.B.	DETAILED	R.W.B.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN.CK.	TRACE CK.

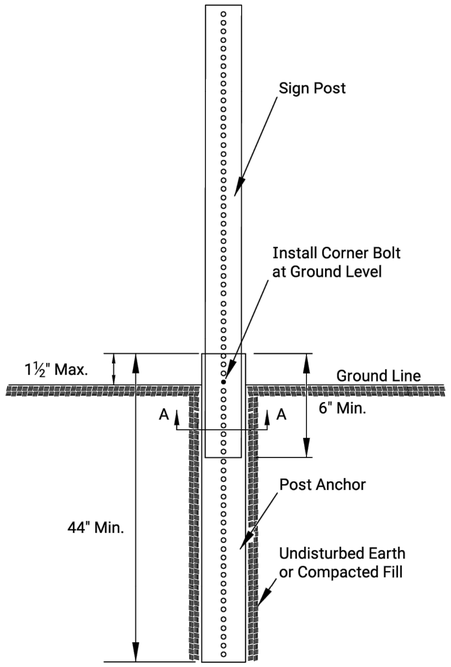
KDOT Graphics Certified 05-24-2022

KDOT Graphics Certified

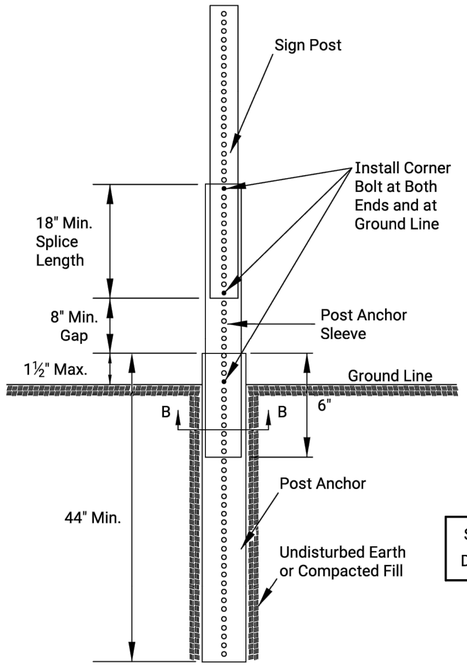
Plotted by : KDOT#CADD.Support_ks.gov 4-JUN-2022 00:04
File : te710.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	40	50

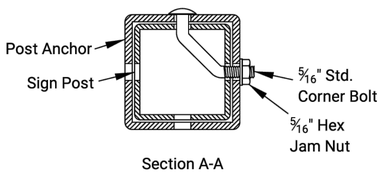
PERFORATED SQUARE STEEL TUBE (P.S.S.T.) POST SETUP



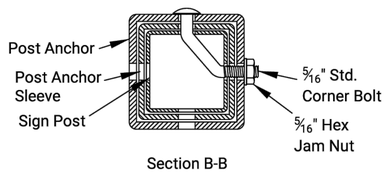
P.S.S.T. Detail



Telescoping P.S.S.T. Detail



Section A-A

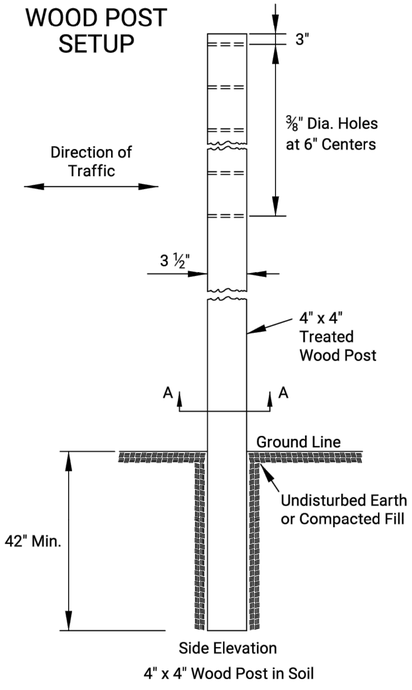


Section B-B

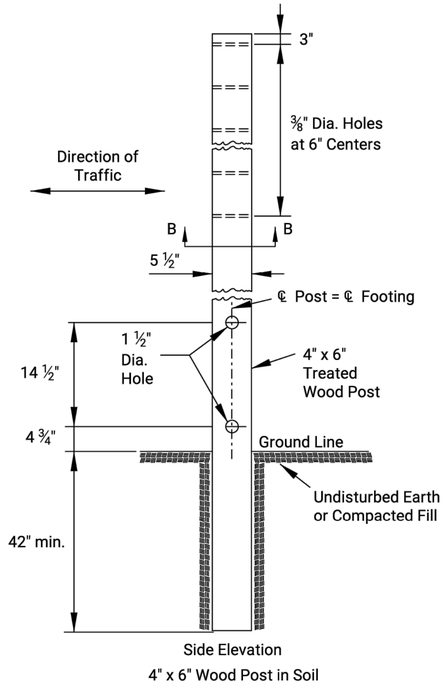
Details for 2", 2 ¼", or 2 ½" sign posts

Place bolts in the same corner along each sign post.

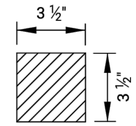
WOOD POST SETUP



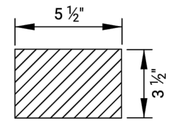
Side Elevation
4" x 4" Wood Post in Soil



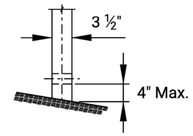
Side Elevation
4" x 6" Wood Post in Soil



Section A-A



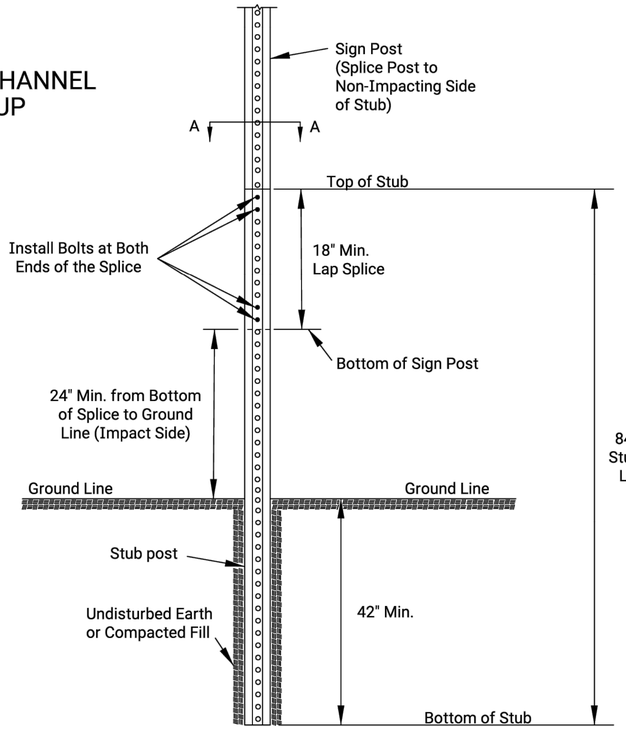
Section B-B



Front Elevation

See TE710 for Additional Details and Requirements

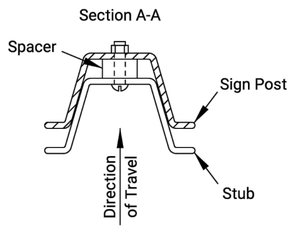
3 LB/F U-CHANNEL SETUP



Notes:

Place two bolts at both ends of the splice through the holes nearest the ends of the splice.

Use manufacturer recommended spacers over the bolts between the spliced pieces of U-Channel.



NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SIGN POSTS

TE712

FHWA APPROVAL		06-01-15	APP'D.	Kristina Ericksen	
DESIGNED	B.A.H.	DETAILED	R.W.B.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN.CK.	TRACE CK.

KDOT Graphics Certified 05-24-2022

KDOT Graphics Certified

Plotted by : KDOT#CADD.Support_ks.gov 4-JUN-2022 00:05
File : te712.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	41	50

SUMMARY OF TRAFFIC CONTROL DEVICES (EACH)

Work Zone Sign (Special)		
Sign No.	16.25 Sq.Ft. & Less	16.26 Sq.Ft. & Over

SUMMARY OF TRAFFIC CONTROL DEVICES (EACH PER DAY)

✳ Quantity most used on the project at any one time

Work Zone Signs ✳			
Sign No.	Size - Sq.Ft.		
	0-9.25	9.26-16.25	16.26 & Over
W20-3		4	
R11-2		4	
R11-3A		1	
R11-4		1	

Barricades ✳		Channelizing Devices ✳		
Type 3 (4' to 12')	Pedestrian	Fixed	Portable	Pedestrian
16				

Lighted Devices ✳	
Work Zone Warning Light (Type "A" Low Intensity)	20
Work Zone Warning Light (Red Type "B" High Intensity)	
Arrow Display	
Portable Changeable Message Sign	

Recapitulation of Quantities		
Item	Quantity	Unit
Work Zone Signs (0 to 9.25 Sq.Ft.)		Each Per Day
Work Zone Signs (9.26 to 16.25 Sq.Ft.)		Each Per Day
Work Zone Signs (16.26 Sq.Ft. & Over)		Each Per Day
Work Zone Barricades (Type 3 - 4' to 12')		Each Per Day
Work Zone Barricades (Pedestrian)		Each Per Day
Channelizer (Fixed)		Each Per Day
Channelizer (Portable)		Each Per Day
Channelizer (Pedestrian)		Each Per Day
Work Zone Warning Light (Type "A" Low Intensity)		Each Per Day
Work Zone Warning Light (Red Type "B" High Intensity)		Each Per Day
Arrow Display		Each Per Day
Portable Changeable Message Sign		Each Per Day
Pavement Marking (Temporary)		
4" Solid (Type I)		Sta./Line
4" Solid (Type II)		Sta./Line
4" Broken (8.0') (Type I)		Sta./Line
4" Broken (8.0') (Type II)		Sta./Line
4" Broken (3.0') (Type I)		Sta./Line
4" Broken (3.0') (Type II)		Sta./Line
4" Dotted Extension (Type I)		Sta./Line
4" Dotted Extension (Type II)		Sta./Line
Solid (Line Masking Tape)		Sta./Line
Broken (Line Masking Tape)		Sta./Line
Symbol (Type I)		Each
Symbol (Type II)		Each
Flexible Raised Pavement Marker (4" Broken (8.0'))		Sta./Line
Flexible Raised Pavement Marker (4" Broken (3.0'))		Sta./Line
Pavement Marking Removal		Lin. Ft.
Work Zone Sign (Special) (16.25 Sq. Ft. & Less)		Each
Work Zone Sign (Special) (16.26 Sq. Ft. & More)		Each
Rigid Raised Pavement Marker (Type I)		Each
Rigid Raised Pavement Marker (Type II)		Each
Traffic Signal Installation (Temporary)		Lump Sum
Traffic Control (Initial Set Up)		Lump Sum
Traffic Control	Lump Sum	Lump Sum
Flagger (Set Price)	1	Hour

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SUMMARY OF DEVICES RECAPITULATION OF QUANTITIES

TE795

FHWA APPROVAL		06-01-15	APP'D.		Kristina Ericksen
DESIGNED	B.A.H.	DETAILED	R.W.B.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN.CK.	TRACE CK.

KDOT Graphics Certified 05-24-2022

KDOT Graphics Certified

Sh. No.

Plotted by : KDOT#CADD.Support_ks.gov 4-JUN-2022 00:21
File : te795.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	42	50

X:\oc2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\Sta 1257+00.00 to Sta 1258+89.23 1/9/2025 6:38 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	43	50

2210
1261+10.77
2200
2190
Elev = 2200.81
10:1
t = 61
C = 0
2210
1261+00.77
2200
2190
Elev = 2200.77
10:1
F = 107 Ahead
F = 0 Back
C = 0
C = 0
2180
2210
1259+29.23
2200
2190
Elev = 2200.07
10:1
2180
F = 0 Ahead
F = 174 Back
C = 0
C = 0
2210
1259+19.23
2200
2190
Elev = 2200.02
10:1
t = 106
C = 0
2180

Road Cross Sections
Sta 1259+19.23 to Sta 1261+10.77
Scale: 1"=5'

X:\oc2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\Sta 1259+19.23 to Sta 1261+10.77
1/9/2025 6:41 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	44	50

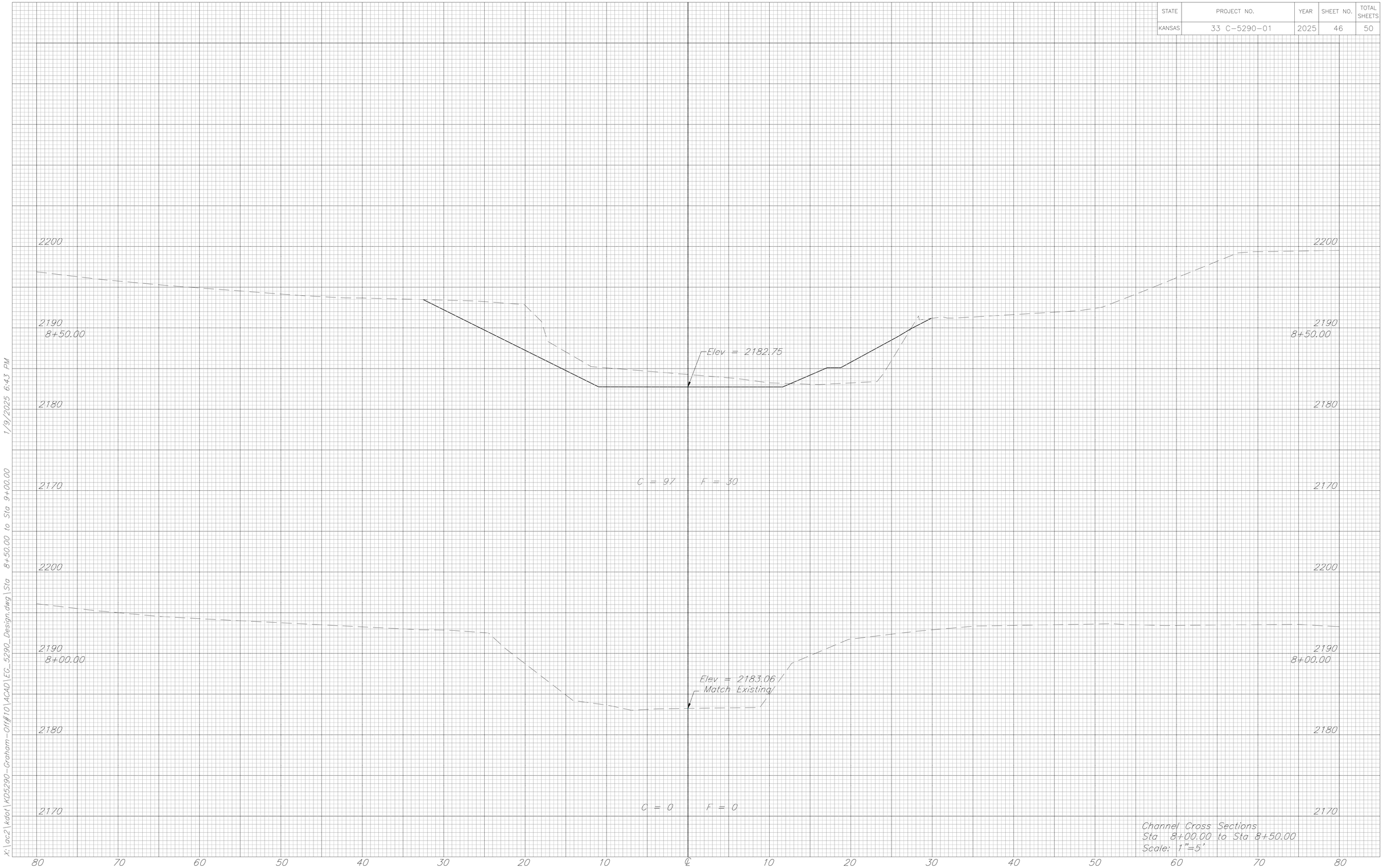
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	45	50

Road Cross Sections
Sta 1262+48.27 to Sta 1263+00.00
Scale: 1"=5'

1/9/2025 6:42 PM

X:\oc2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\Sta 1262+48.27 to Sta 1263+00.00

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	46	50



Channel Cross Sections
Sta 8+00.00 to Sta 8+50.00
Scale: 1"=5'

1/9/2025 6:43 PM

X:\oc2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\Sta 8+50.00 to Sta 9+00.00

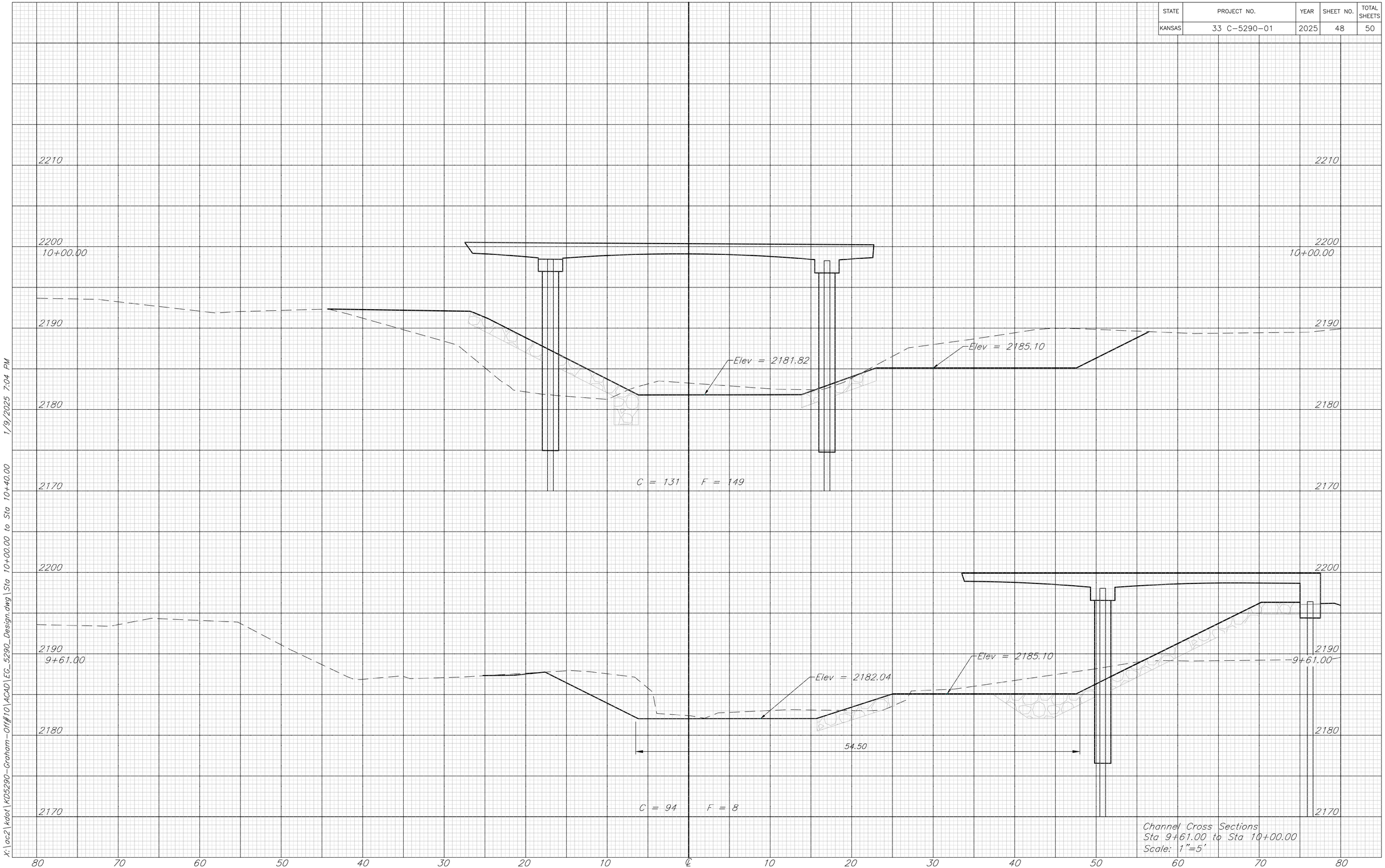
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	47	50



1/9/2025 6:45 PM

X:\oc2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\Sta 9+30.00 to Sta 9+60.00

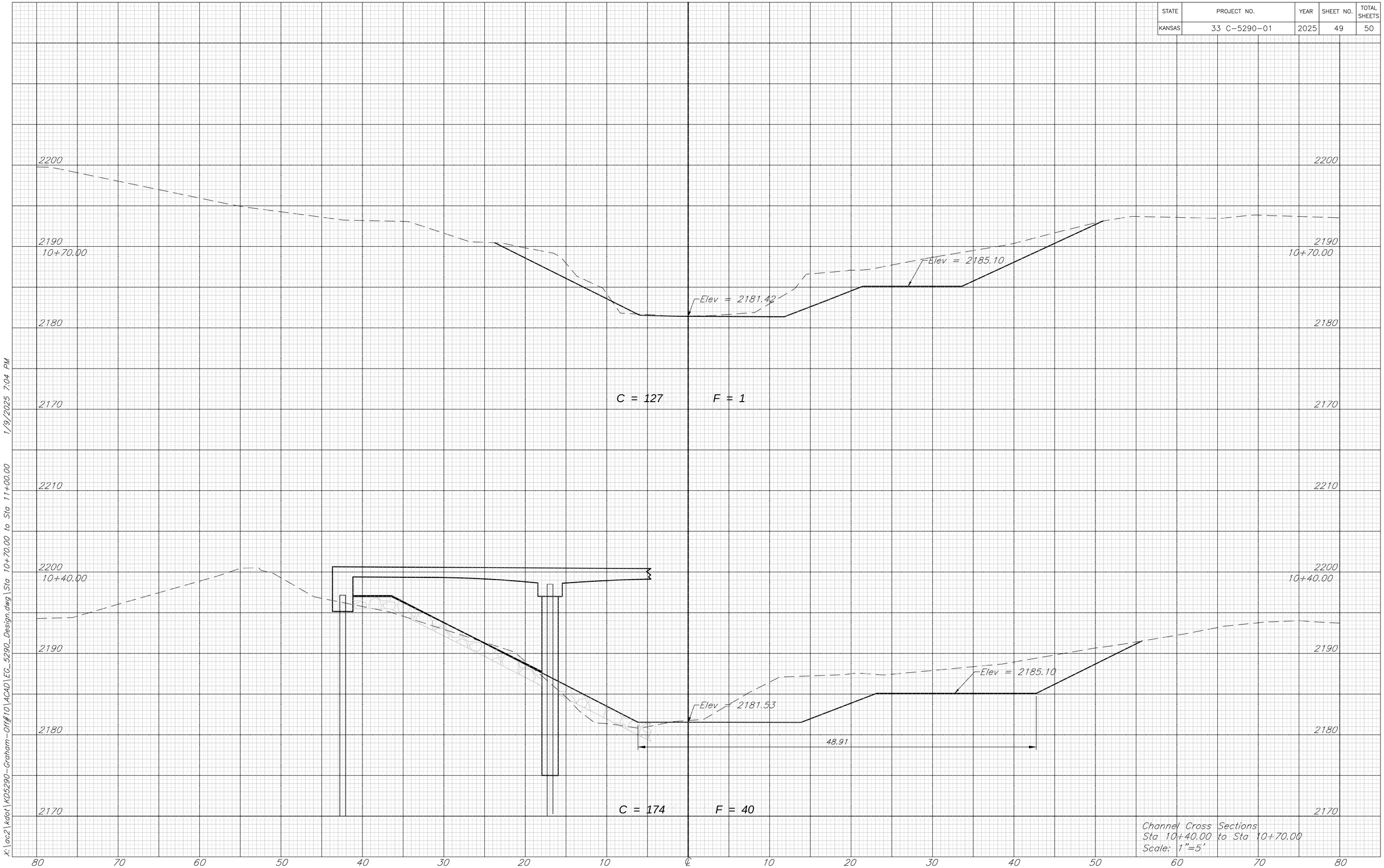
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	48	50



1/9/2025 7:04 PM

X:\acz2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\Sta 10+00.00 to Sta 10+40.00

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	49	50



Channel Cross Sections
Sta 10+40.00 to Sta 10+70.00
Scale: 1"=5'

1/9/2025 7:04 PM

X:\oc2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\Sta 10+70.00 to Sta 11+00.00

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	33 C-5290-01	2025	50	50

X:\ac2\kdot\KD5290-Graham-Off#10\ACAD\EG_5290_Design.dwg\EG_5290_Design - Sta 11+00.00 1/9/2025 6:47 PM

2200

2190
11+00.00

2180

2170

Elev = 2181.19
Match Existing

C = 0 F = 0

80 70 60 50 40 30 20 10 ℄ 10 20 30 40 50 60 70 80

Channel Cross Sections
Sta 11+00.00
Scale: 1"=5'