

**Section V**  
**Drawings and AREMA Exhibits**

## Index

Drawing Title	Drawing No.
Boussinesq Surcharge Pressure Due to E80 Live Load (psf) for Shoring Parallel to the Track	Chart A
Lateral Pressure Diagram	AREMA Figure 8-20-1
Pressure Distribution for Strip Load	AREMA Figure 8-20-2
Pressure Distribution for Line Load	AREMA Figure 8-20-3
Steel Deck Plate Girder Span with Concrete Deck	BR101
Steel Beam Span with Concrete Deck	BR102
Pre-stressed Pre-cast Concrete Box Girder Span with or without Concrete Deck	BR103
Pre-stressed Pre-cast Concrete AASHTO Type Team Span With Concrete Deck	BR104
Cast-In-Place Concrete Box Girder Span Conventional Reinforced	BR105
Cast-In-Place Post-Tensioned Concrete Box Girder Span	BR106
Steel Through Plate Girder Span with Concrete Deck	BR107
Steel Through Plate Girder Span With Steel Deck	BR108
Bonding Details for Multiple Pre-Stressed Pre-Cast Concrete Girders	BR109
Chain Link Railing Details	BR110
Tubular Hand Railing Details	BR111
Picket Hand Railing Details	BR112
Deck Drain Details	BR113
Flashing Details for Waterproofing	BR114
Waterproofing Details	BR115
Collision Impact Devices and Sacrificial Beam	BR116
Track Shield Details	BR117
Frame Protection Details-1	BR118
Frame Protection Details-2	BR119
Barriers and Clearances to be provided at Highway, Street, and Pedestrian Overpasses	BR120
Barriers, Fences and Splash Boards to be provided at Highway, Street, and Pedestrian Overpasses	BR121
General Shoring Requirements	BR122
Double Inside Guard Rail	BR123
Roadbed Section for Wood Tie Track Construction	RB207
Typical Sections at Abutment Slope	RB208

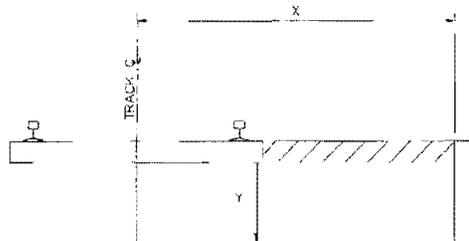
### Chart A

Boussinesq Surcharge Pressure Due to E80 Live Load (psf) For Shoring Parallel to the Track

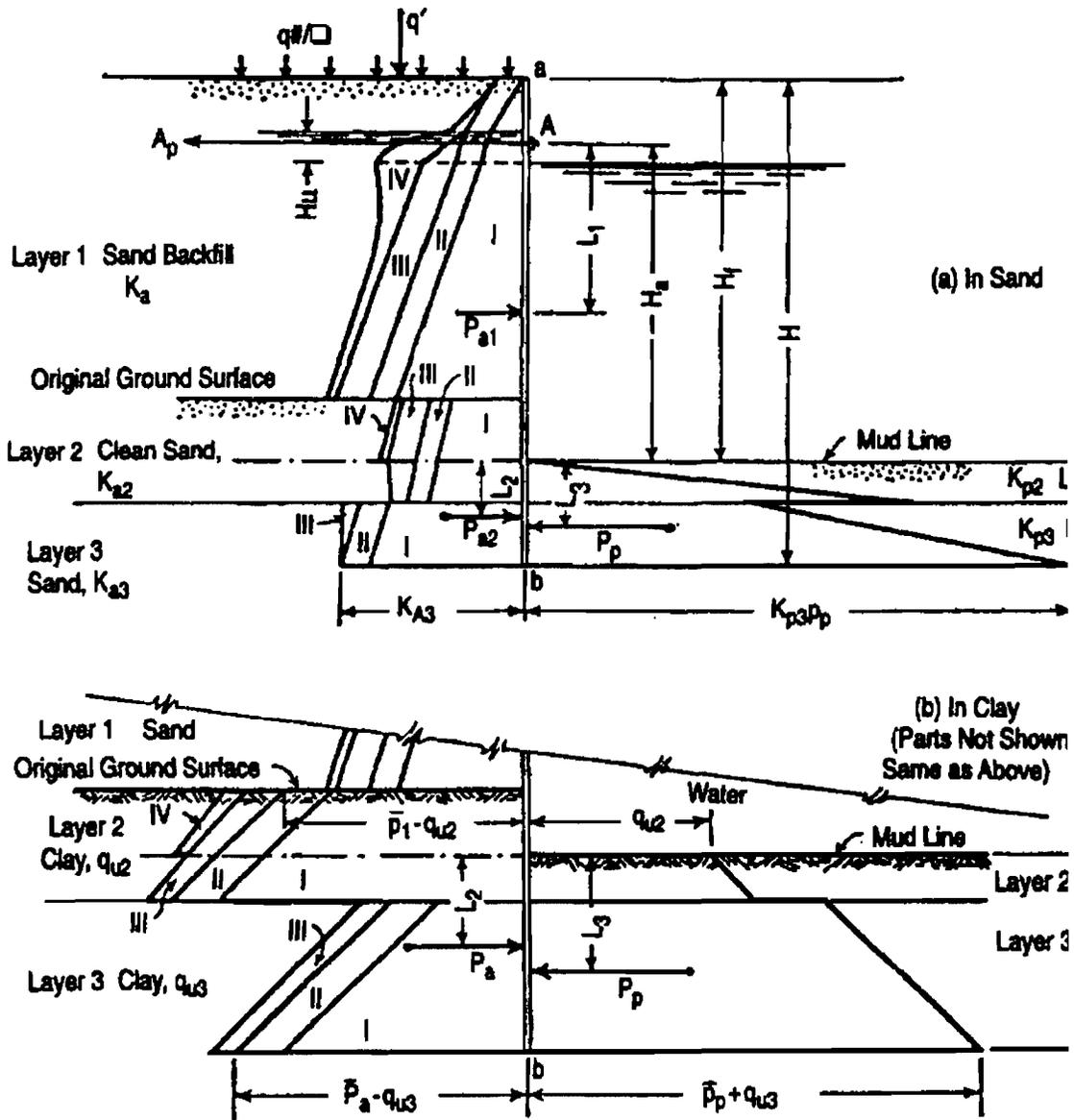
Depth (y) Below Base of Rail (ft.)	Distance (x) from Track Side of Shoring System to Track Centerline (ft)																		
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
1	157	131	112	97	84	74	66	59	53	48	43	40	36	33	31	28	26	25	
2	299	252	216	188	164	145	129	115	104	94	86	78	72	66	61	57	52	49	
3	415	355	307	268	236	210	187	168	152	138	126	115	106	97	90	84	78	72	
4	499	434	380	335	298	266	239	215	195	178	163	149	137	127	118	109	102	95	
5	552	489	434	387	347	312	282	256	233	214	196	180	167	154	143	133	124	116	
6	577	520	469	424	384	348	317	290	266	244	225	208	193	179	166	155	145	136	
7	579	532	487	446	408	374	344	316	291	269	249	231	215	200	187	175	164	154	
8	565	527	491	455	422	390	362	335	311	289	269	251	234	219	205	192	181	170	
9	539	512	483	454	426	398	372	348	325	304	284	266	249	234	220	207	195	184	
10	506	488	468	445	422	399	376	354	333	313	295	278	261	246	232	219	207	196	
11	469	460	447	430	412	394	374	355	337	319	302	285	270	256	242	229	218	206	
12	432	429	422	411	398	384	368	352	336	320	305	290	276	262	249	237	225	215	
13	395	398	396	390	381	371	359	346	332	319	305	292	279	266	254	242	231	221	
14	360	367	369	367	362	355	346	336	326	314	302	291	279	268	257	246	235	225	
15	327	337	342	343	342	338	332	325	317	307	298	288	277	267	257	247	238	228	
16	297	308	316	320	322	320	317	312	306	299	291	283	274	265	256	247	239	230	
17	269	282	291	298	301	302	301	299	295	289	283	276	269	261	254	246	238	230	
18	244	258	268	276	281	284	285	284	282	279	274	269	263	257	250	243	236	229	
19	221	235	247	256	262	267	269	270	269	267	264	260	256	251	245	239	233	227	
20	201	215	227	237	244	250	254	256	256	256	254	251	248	244	239	235	229	224	
21	182	196	209	219	227	234	238	242	243	244	243	242	240	237	233	229	225	220	
22	166	180	192	202	211	218	224	228	231	232	233	232	231	229	226	223	220	216	
23	151	164	176	187	196	204	210	215	218	221	222	223	222	221	219	217	214	211	
24	138	151	162	173	182	190	197	202	206	209	212	213	213	213	212	210	208	206	
25	126	138	150	160	169	177	184	190	195	199	201	203	204	205	204	203	202	200	
26	115	127	138	148	157	165	173	179	184	188	191	194	195	196	197	196	195	194	
27	106	117	127	137	146	154	162	168	173	178	182	185	187	188	189	189	189	188	
28	97	108	118	127	136	144	151	158	163	168	172	176	178	180	182	182	183	182	
29	89	99	109	118	127	135	142	148	154	159	163	167	170	172	174	175	176	176	
30	82	92	101	110	118	126	133	139	145	150	155	159	162	165	167	168	169	170	

**Notes:**

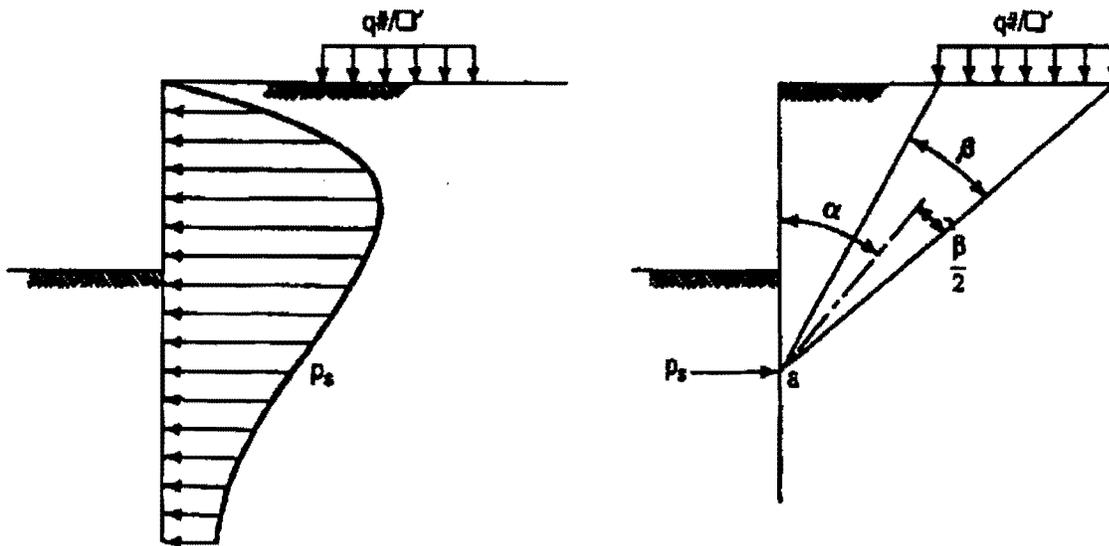
1. This chart assumes the top of shoring elevation is equal to the base of rail elevation. Additional surcharge due to the earth load above top of shoring must be added if this is not the case.
2. Use the Boussinesq equation to calculate pressures past 29 ft. or deeper than 30 ft. (see Section IV, item 8.1)
3. No shoring is allowed within 12'-0" of track centerline



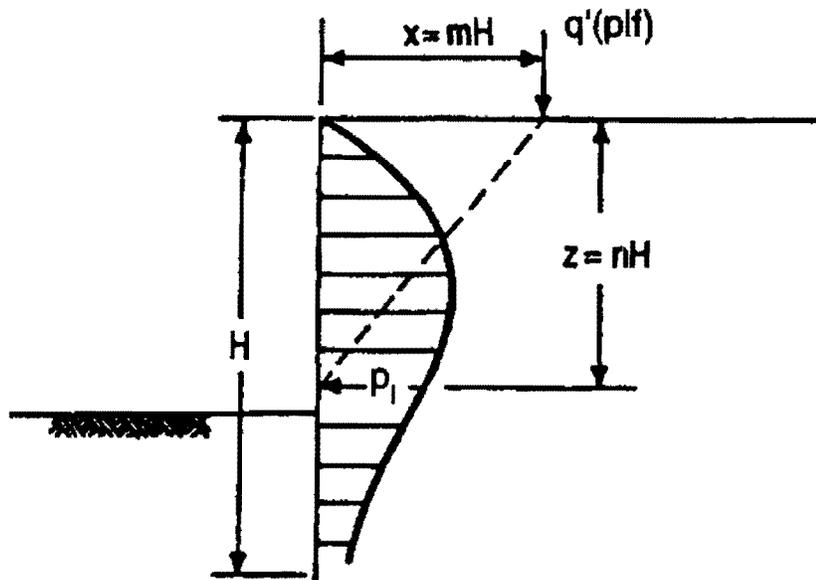
AREMA Figure 8-20-1 - Lateral Pressure Diagrams

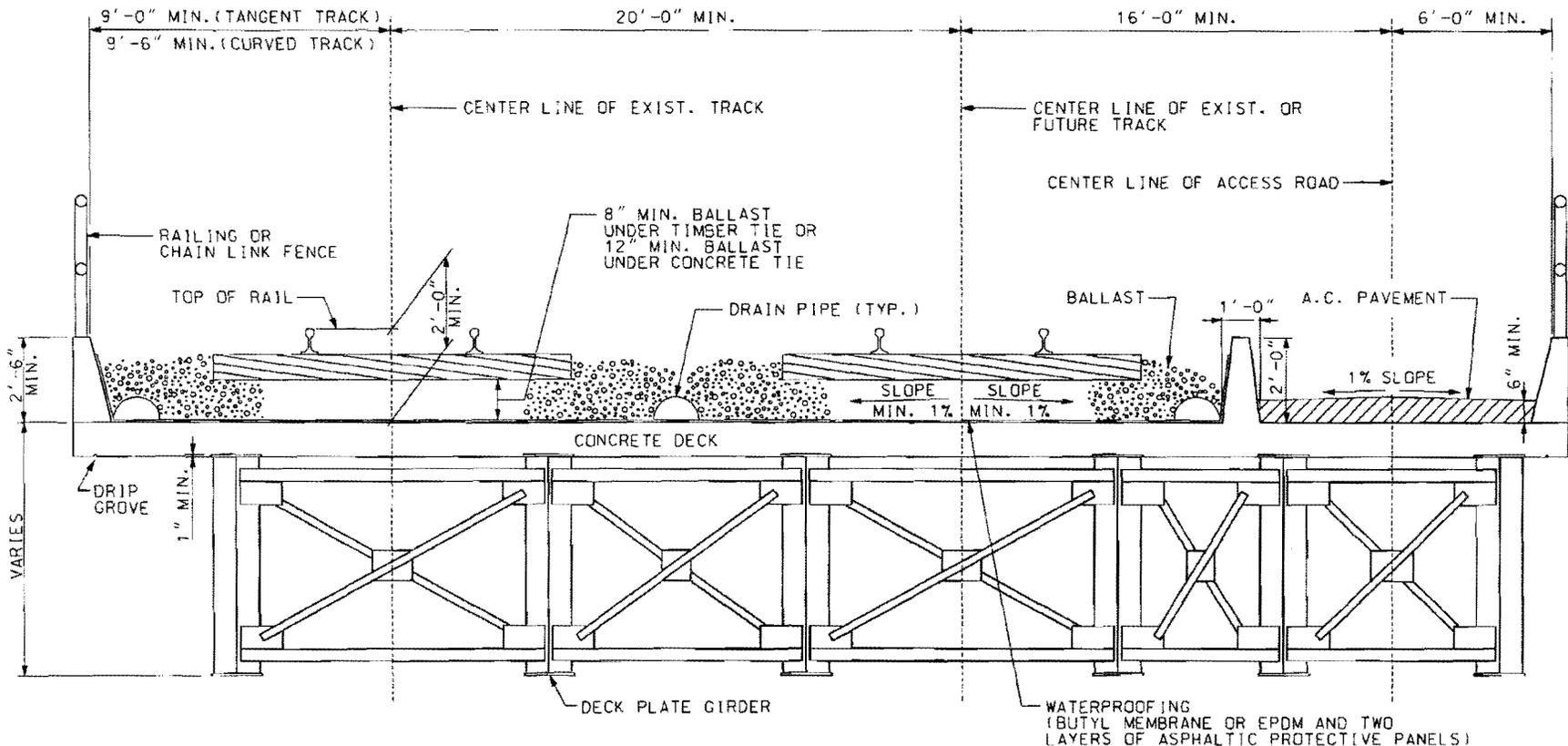


AREMA Figure 8-20-2 - Pressure Distribution for Strip Load



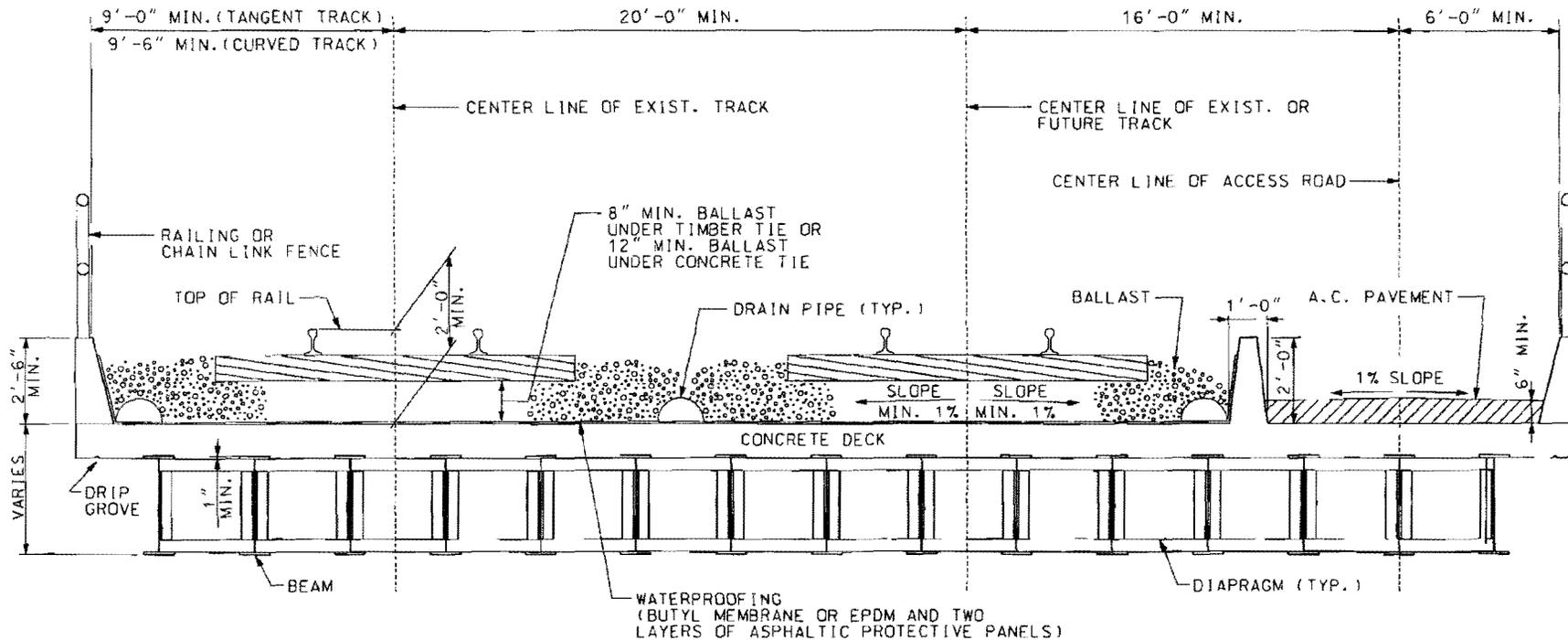
AREMA Figure 8-20-3 - Pressure Distribution for Line Load





STEEL DECK PLATE GIRDERS WITH CONCRETE DECK  
NO SCALE

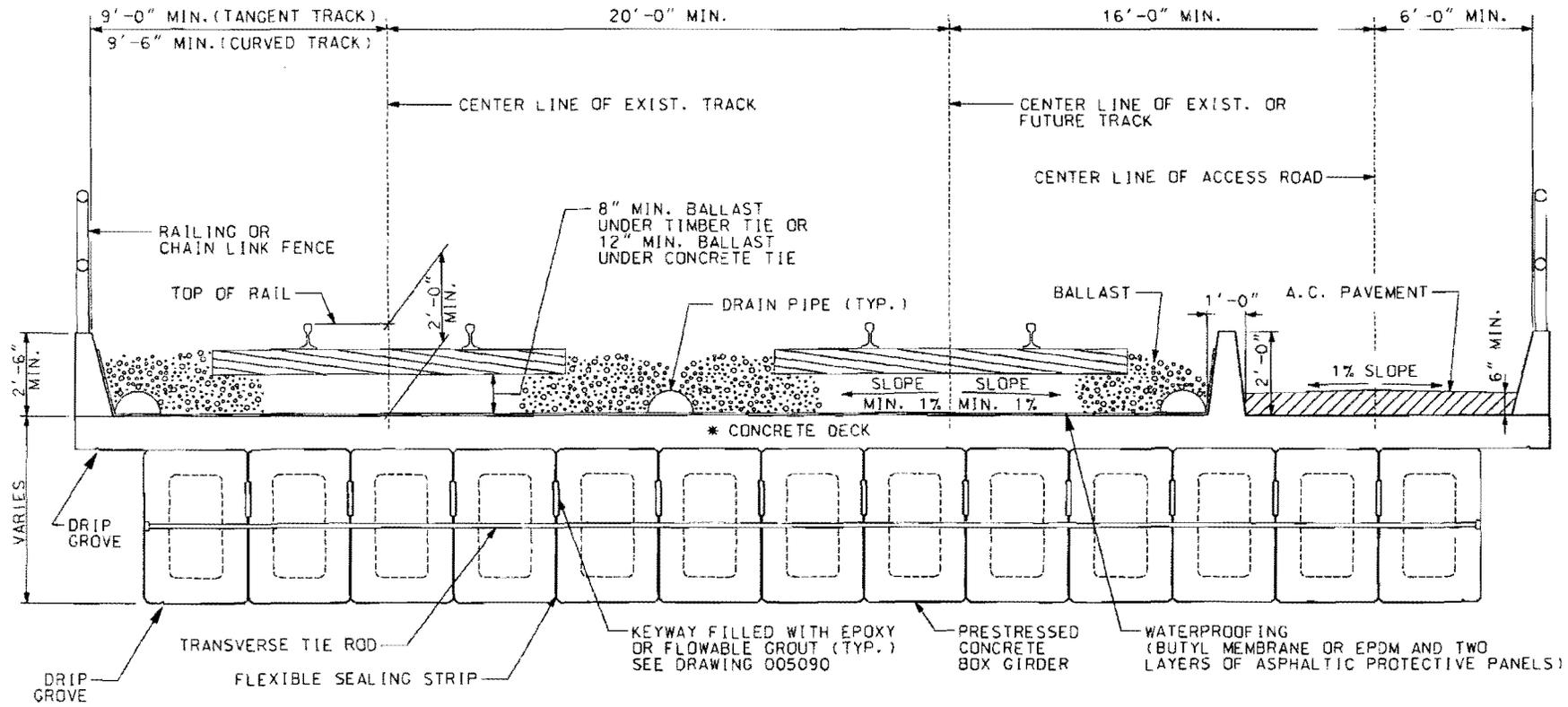
REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	STEEL DECK PLATE GIRDER SPAN WITH CONCRETE DECK			
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	CHECKED BY	SCALE	FILE	DRAWING NO.
	RGT	1/27/05		1
	NTS			005082



STEEL BEAMS WITH CONCRETE DECK  
NO SCALE

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	STEEL BEAM SPAN WITH CONCRETE DECK			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY NTS	SCALE	FILE	DRAWING NO. 005083



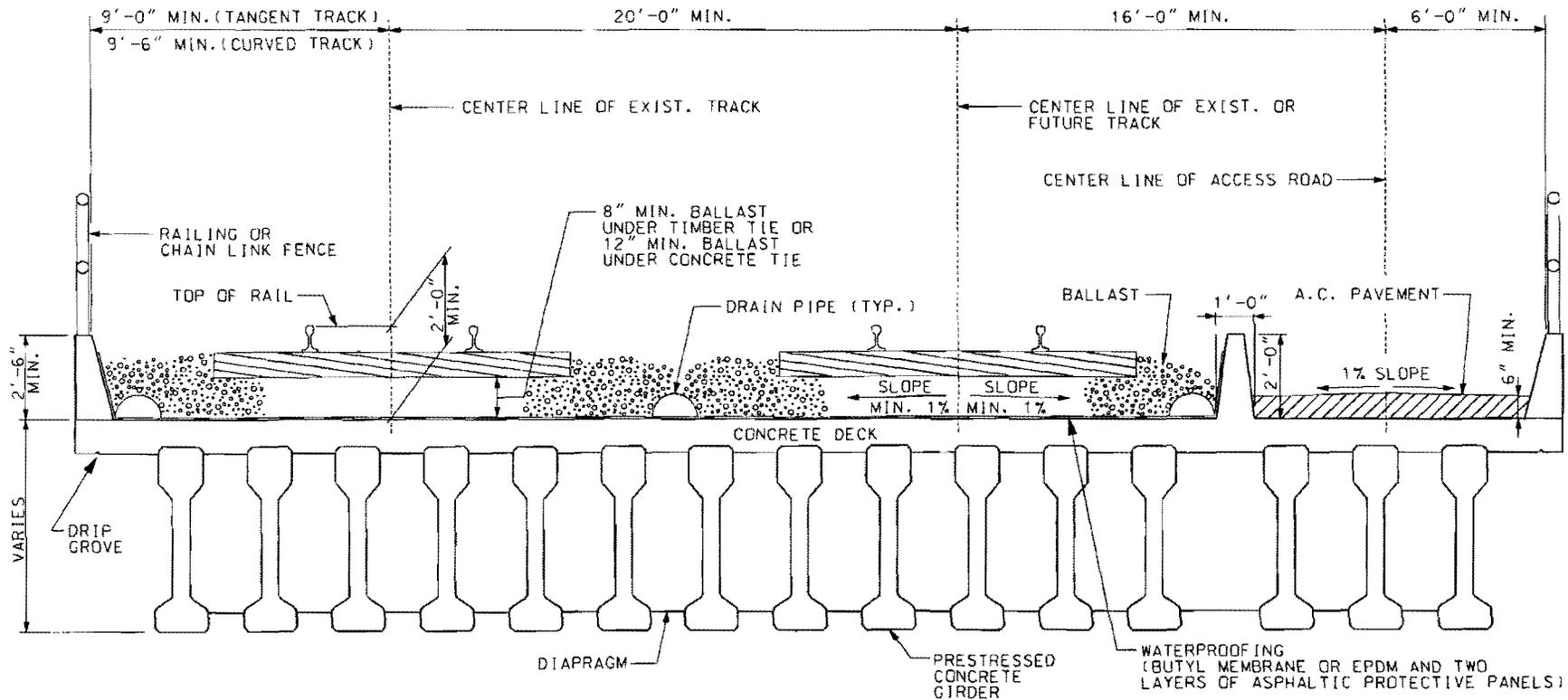


**PRECAST CONCRETE BOX GIRDERS WITH CAST IN PLACE CONCRETE DECK**  
NO SCALE

\* CONCRETE DECK IS OPTIONAL

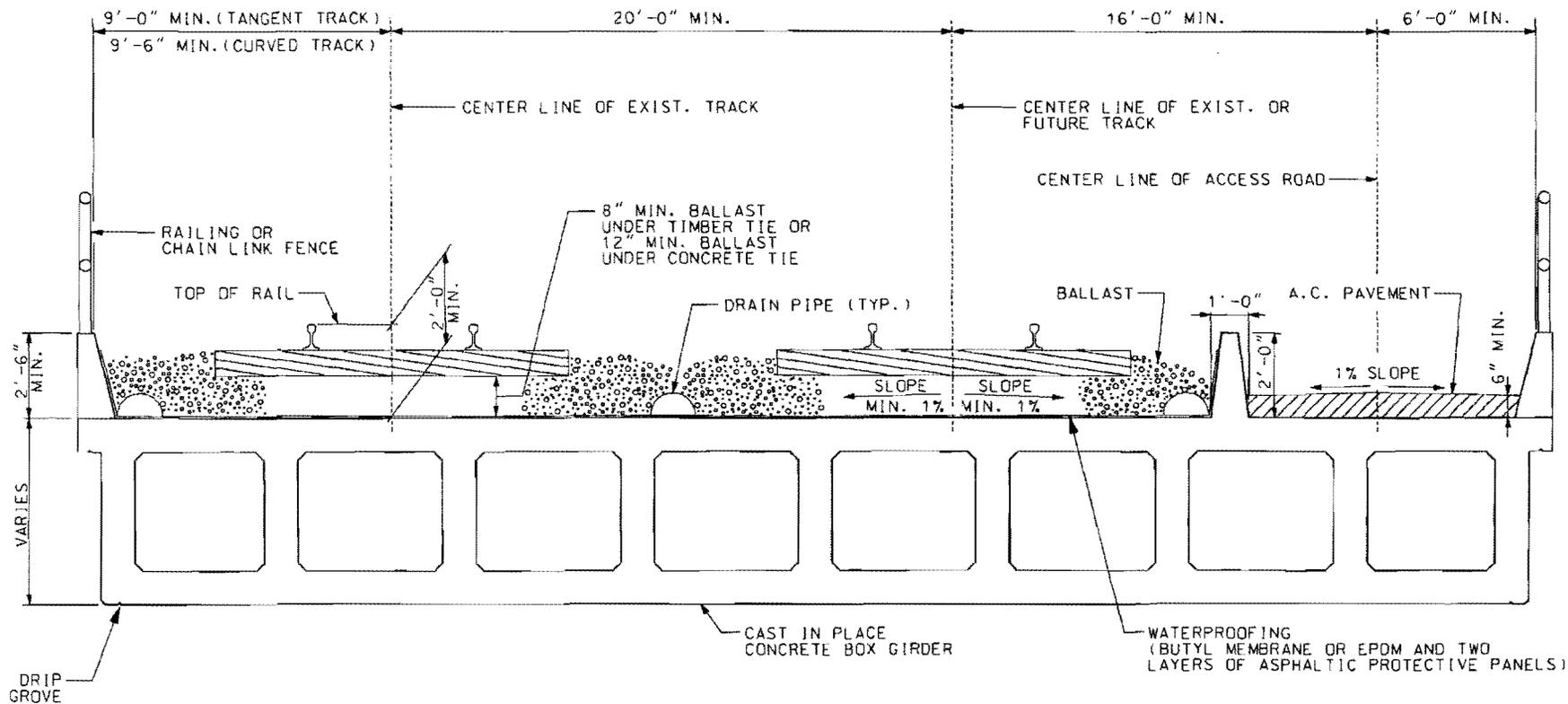
REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	PRE-STRESSED PRE-CAST CONCRETE BOX GIRDER SPAN WITH OR WITHOUT CONCRETE DECK			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY NTS	SCALE	FILE	DRAWING NO. 005084





PRECAST CONCRETE BEAMS WITH CAST IN PLACE CONCRETE DECK  
NO SCALE

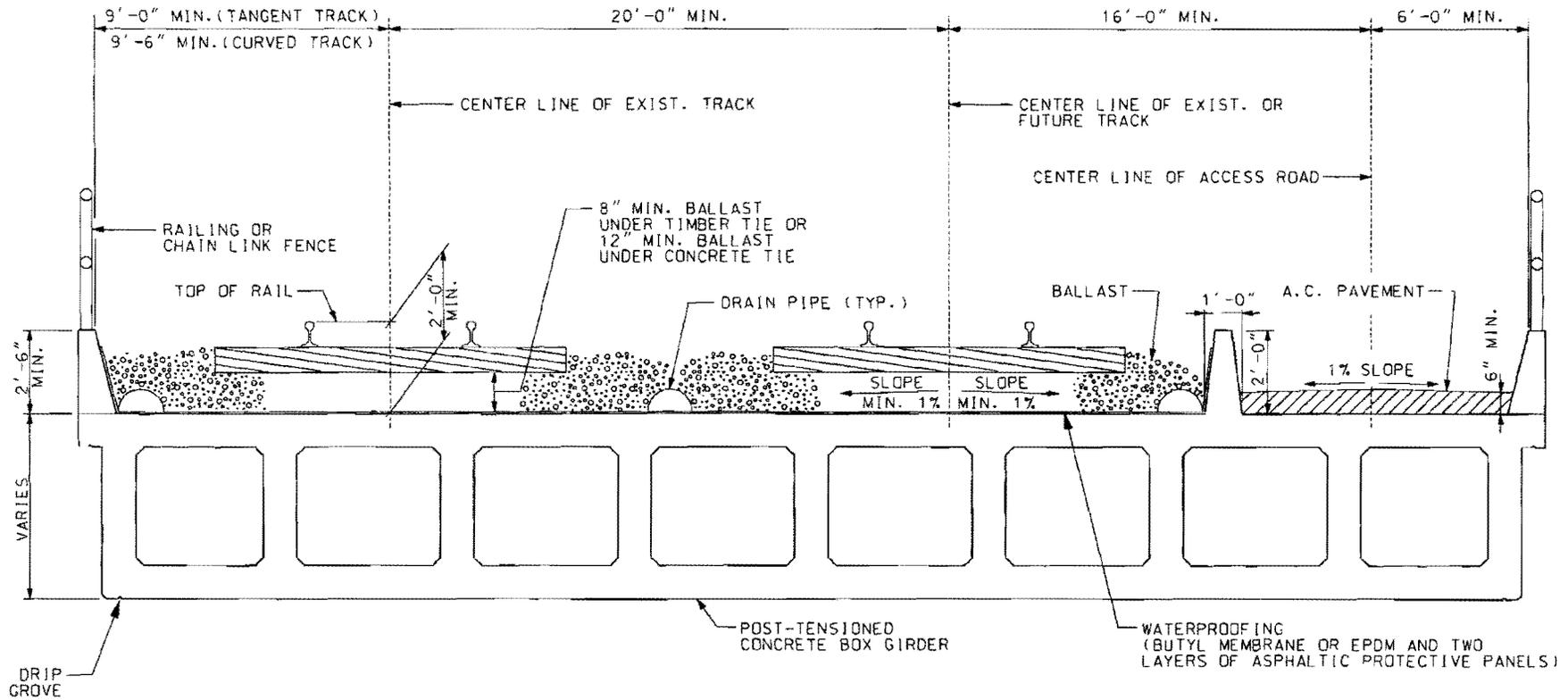
REVISIONS		EXHIBIT A			
		THE KANSAS CITY SOUTHERN RY. CO.			
PRE-STRESSED PRE-CAST AASHTO- TYPE BEAM SPAN WITH CONCRETE DECK					
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	RGT	1/27/05		1	
	CHECKED BY	SCALE	FILE	DRAWING NO.	
	NTS			005085	



CONVENTIONAL REINFORCED CONCRETE BOX GIRDERS  
NO SCALE

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	CAST-IN PLACE CONCRETE BOX GIRDER SPAN CONVENTIONAL REINFORCED			
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	CHECKED BY NTS	SCALE	FILE	DRAWING NO. 005086

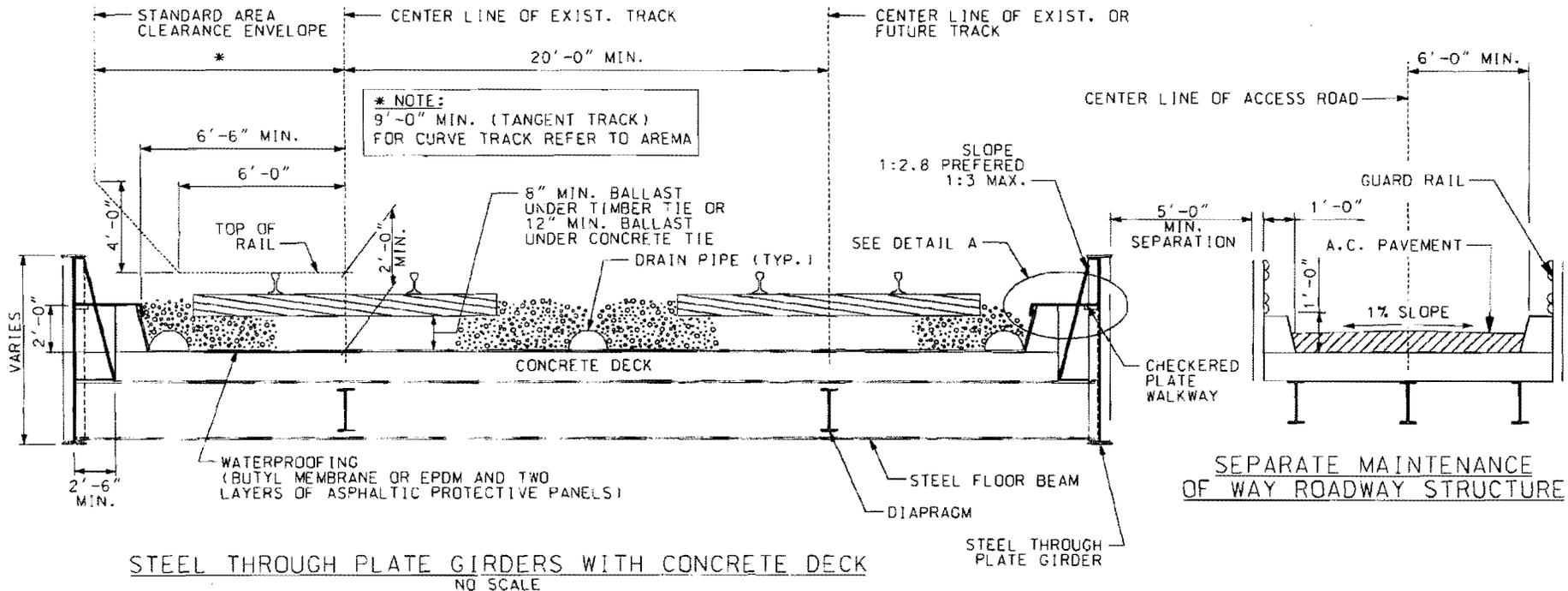




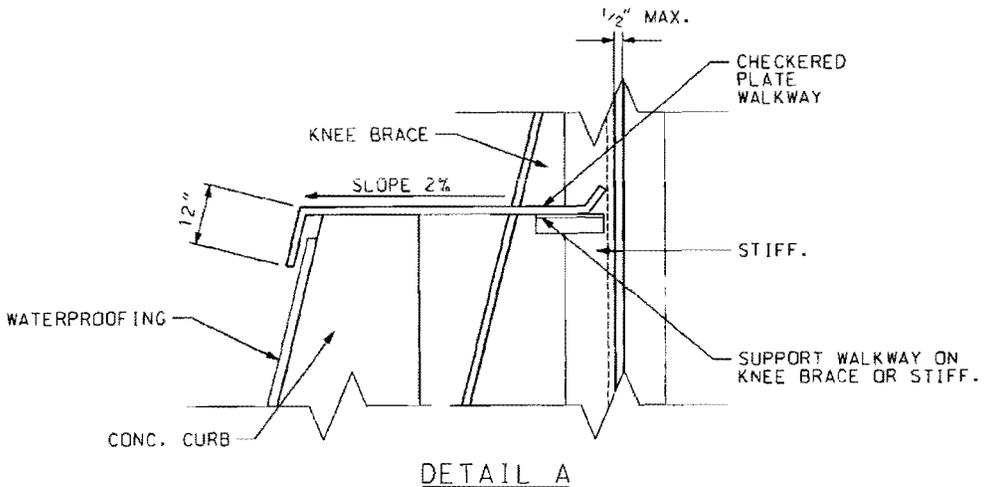
POST-TENSIONED CONCRETE BOX GIRDERS  
NO SCALE

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	CAST-IN PLACE POST-TENSIONED CONCRETE BOX GIRDER SPAN			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005087





SEPARATE MAINTENANCE OF WAY ROADWAY STRUCTURE



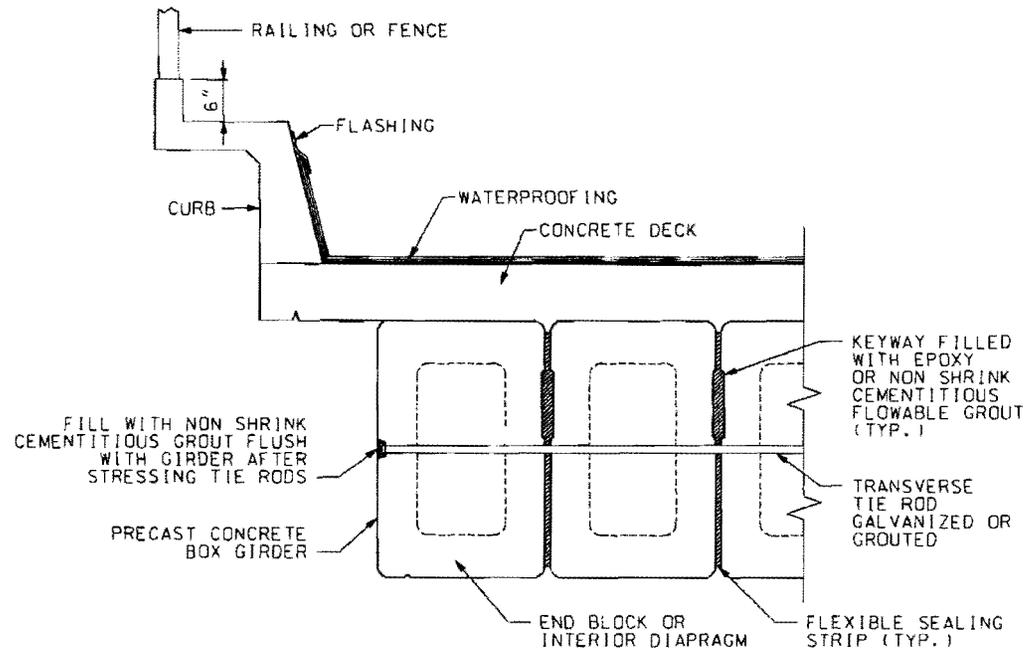
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	THE KANSAS CITY SOUTHERN RY. CO.			
	STEEL THROUGH PLATE GIRDER SPAN WITH CONCRETE DECK			
	DRAWN BY	DATE	VAL. SEC.	SHEET NO.
	CHECKED BY	SCALE	FILE	DRAWING NO.
	RGT	1/27/05		1
	NTS			005088

PROCEDURE FOR GROUTING BETWEEN GIRDERS  
(EPOXY GROUT)

1. BEFORE SETTING GIRDERS, THOROUGHLY WIRE BRUSH THE ENTIRE CONTACT SURFACES OF EACH GIRDER.
2. INSTALL 2 LAYERS OF 3" x 4" FLEXIBLE SEALING STRIPS (POLY-URETHANE-ETHER TYPE DENSITY 1.5) AT THE BOTTOM OF THE GAP AND AROUND TIE ROD HOLES AND ENDS OF GIRDERS TO PREVENT GROUT LEAKAGE. THE MAXIMUM GAP BETWEEN GIRDERS SHOULD BE 3/4".
3. INSTALL TIE RODS AND TENSION 50%.
4. PLACE 4" SAND ON TOP OF SEALING STRIPS TO PROTECT SEALING STRIPS FROM EPOXY HEAT.
5. FILL THE GAP WITH DRY CLEAN PEA GRAVEL (1/2" MAXIMUM SIZE). IN COLD WEATHER, HEAT THE PEA GRAVEL.
6. POUR EPOXY GROUT TO FILL ALL VOIDS IN GAP. THIS MAY TAKE 2 TO 3 SUCCESSIVE POURINGS.
7. TENSION TIE RODS 100%.

PROCEDURE FOR GROUTING BETWEEN GIRDERS  
(NON SHRINK CEMENTITIOUS FLOWABLE GROUT)

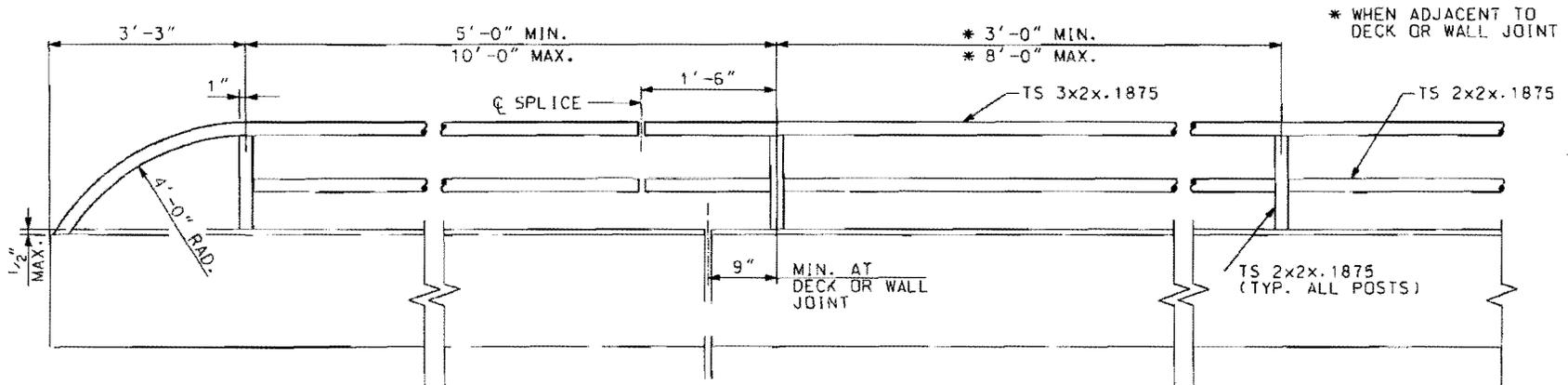
1. BEFORE SETTING GIRDERS, THOROUGHLY WIRE BRUSH THE ENTIRE CONTACT SURFACES OF EACH GIRDER.
2. INSTALL 2 LAYERS OF 3" x 4" FLEXIBLE SEALING STRIPS (POLY-URETHANE-ETHER TYPE DENSITY 1.5) AT THE BOTTOM OF THE GAP AND AROUND TIE ROD HOLES AND ENDS OF GIRDERS TO PREVENT GROUT LEAKAGE. THE MAXIMUM GAP BETWEEN GIRDERS SHOULD BE 3/4".
3. INSTALL TIE RODS AND TENSION 50%.
4. PLACE FLOWABLE NON SHRINK CEMENTITIOUS GROUT BETWEEN GIRDERS. (GROUT TO BE MIXED TO A POURABLE CONSISTENCY. THE MATERIAL SHALL BE MIXED TO A COMBINATION BETWEEN FLOWABLE AND FLUID SO AS NOT TO FORM AIR POCKETS BETWEEN GIRDERS WHILE BEING POURED).
5. AFTER GROUT HAS REACHED A COMPRESSIVE STRENGTH OF 3000 P.S.I., TENSION TIE RODS 100%.



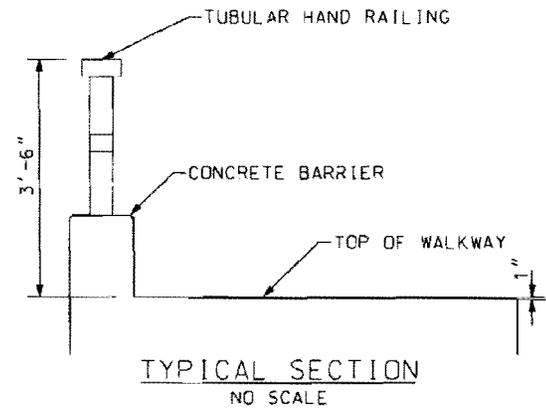
MULTIPLE PRESTRESSED  
CONCRETE GIRDER BONDING DETAIL  
NO SCALE

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	BONDING DETAILS FOR MULTIPLE PRE-STRESSED PRE-CAST CONCRETE GIRDERS			
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	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005090

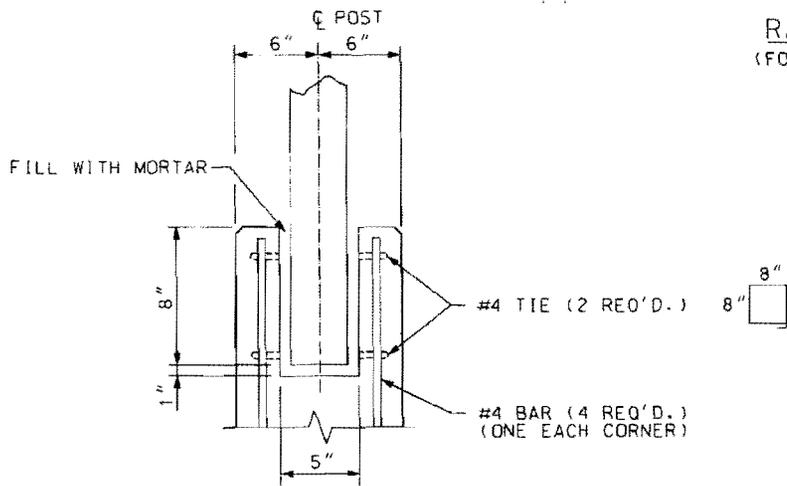




**RAILING ELEVATION**  
(FOR USE IN RURAL LOCATIONS)  
NO SCALE



**TYPICAL SECTION**  
NO SCALE

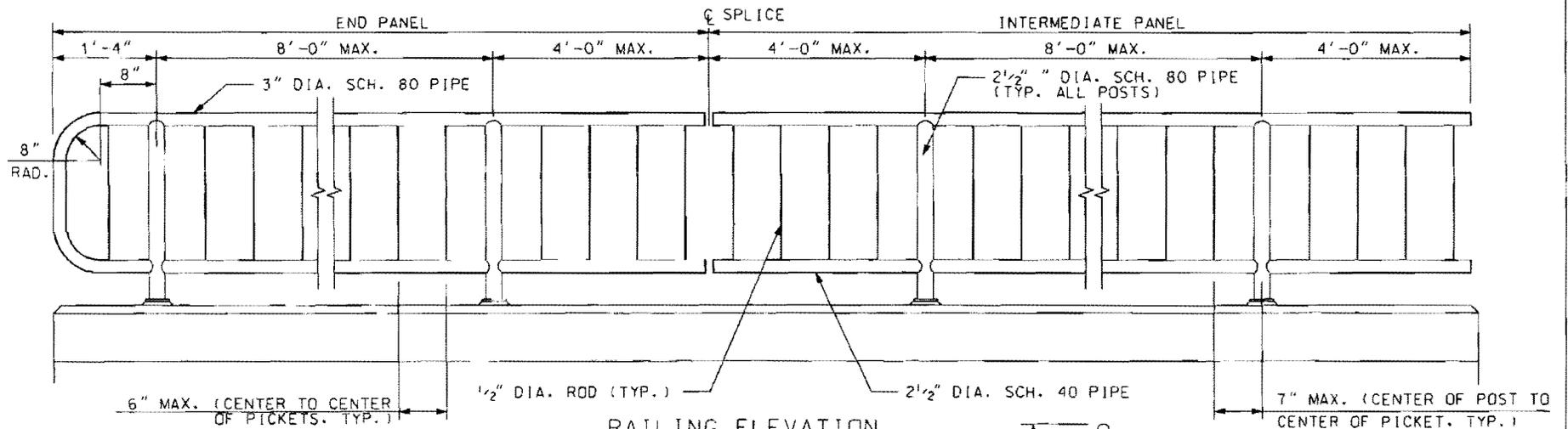


**POST ANCHORAGE DETAIL**  
NO SCALE

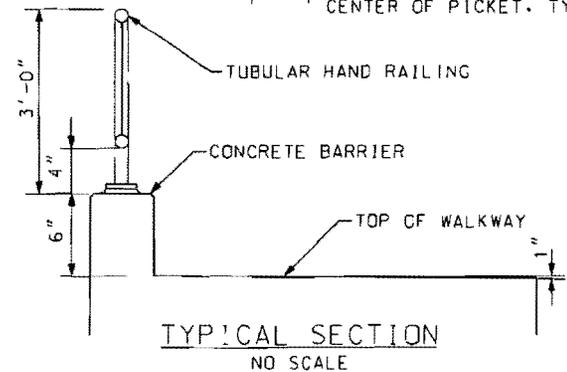
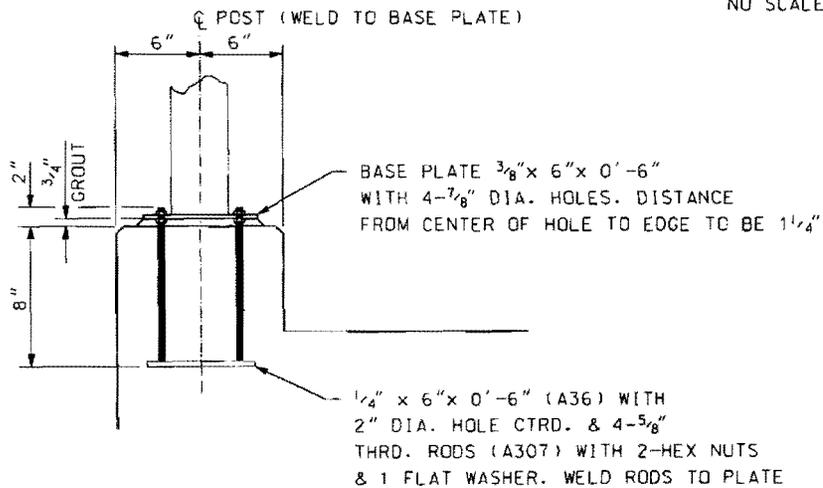
**NOTES:**

1. GALVANIZE RAIL ASSEMBLY AFTER FABRICATION.
2. POSTS SHALL BE VERTICAL.
3. PROVIDE RAILING CONNECTION DETAILS.
4. PROVIDE SPLICE AND EXPANSION JOINT DETAILS.

REVISIONS		EXHIBIT A		
THE KANSAS CITY SOUTHERN RY. CO.				
<b>TUBULAR HAND RAILING DETAILS</b>				
	DRAWN BY	DATE	VAL. SEC.	SHEET NO.
	RGT	1/27/05		1
	CHECKED BY	SCALE	FILE	DRAWING NO.
		NTS		005092



RAILING ELEVATION  
(FOR USE IN RURAL LOCATIONS)  
NO SCALE

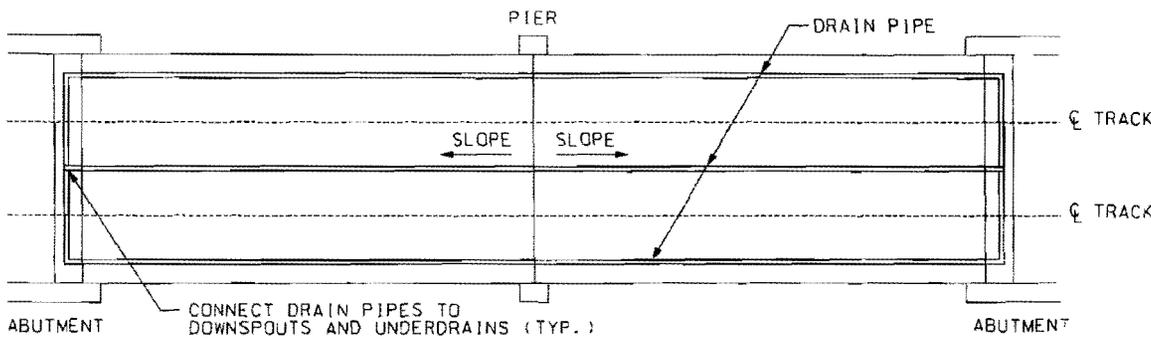


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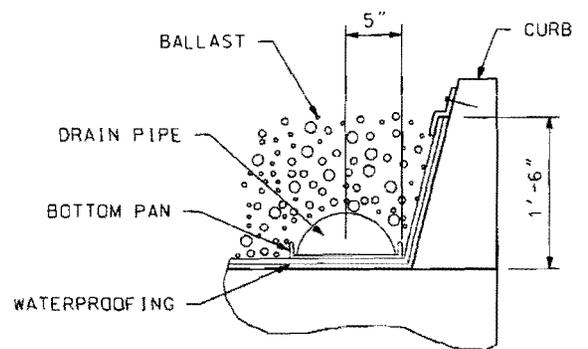
1. GALVANIZE RAIL ASSEMBLY AFTER FABRICATION.
2. POSTS SHALL BE VERTICAL.
3. PROVIDE RAILING CONNECTION DETAILS.
4. PROVIDE SPLICE AND EXPANSION JOINT DETAILS.

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	PICKET HAND RAILING DETAILS			
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	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005093

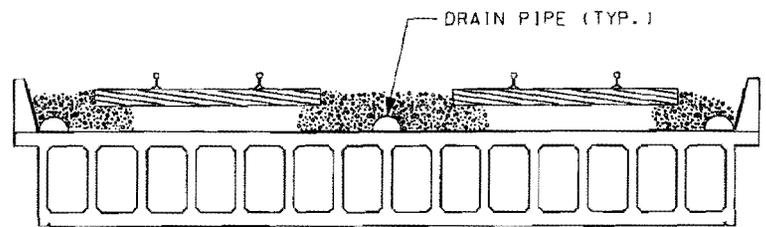




DECK PLAN  
NO SCALE

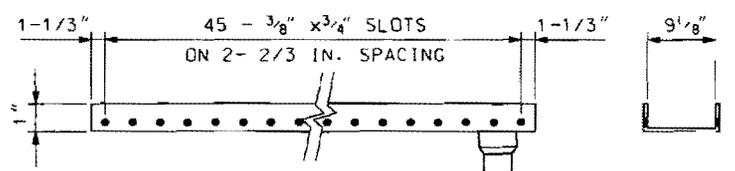
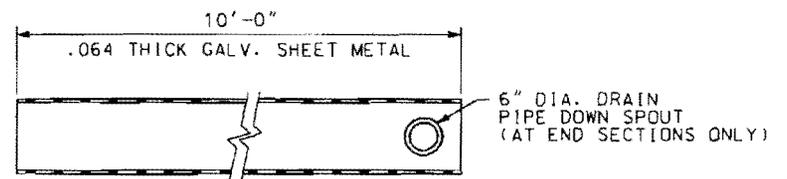


LOCATION OF DRAIN PIPE  
NO SCALE

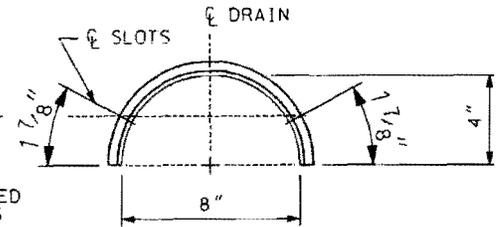
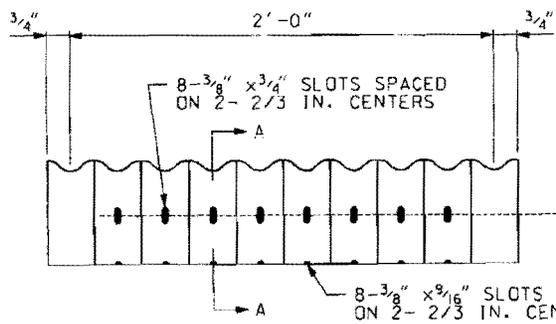


TYPICAL DECK SECTION  
NO SCALE

NOTE: LAP DRAIN PIPE ONE CORRUGATION AT EACH END.



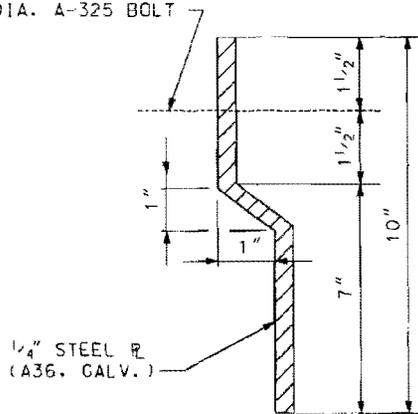
DETAIL - BOTTOM PLAN  
NO SCALE



DETAIL - DRAIN PIPE  
NO SCALE

REVISIONS		EXHIBIT A		
THE KANSAS CITY SOUTHERN RY. CO.				
DECK DRAIN DETAILS				
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	RGT	1/27/05		1
	CHECKED BY	SCALE	FILE	DRAWING NO.
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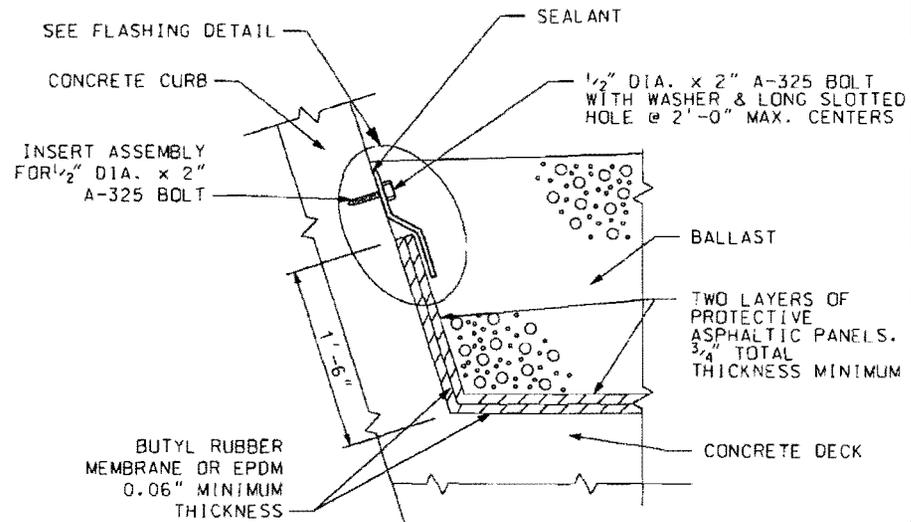
LONG SLOTTED HOLE @  
2'-0" MAX. CENTERS FOR  
1/2" DIA. A-325 BOLT



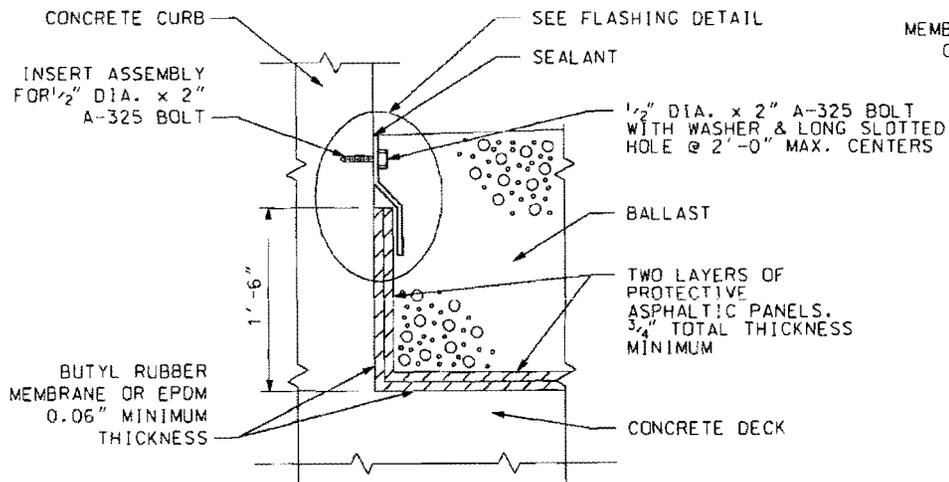
FLASHING DETAIL  
NO SCALE

NOTES:

1. ALL STRUCTURAL STEEL PLATES, BOLTS AND WASHERS SHALL BE GALVANIZED.
2. DISCONTINUE FLASHING OVER PIERS AND ABUTMENTS.



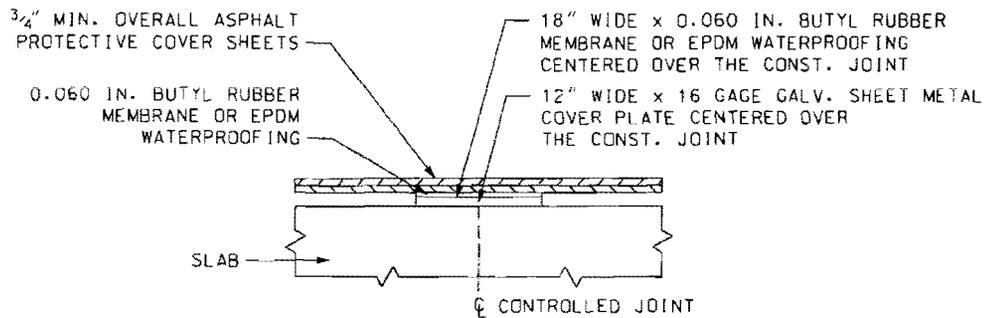
ALTERNATIVE 2  
NO SCALE



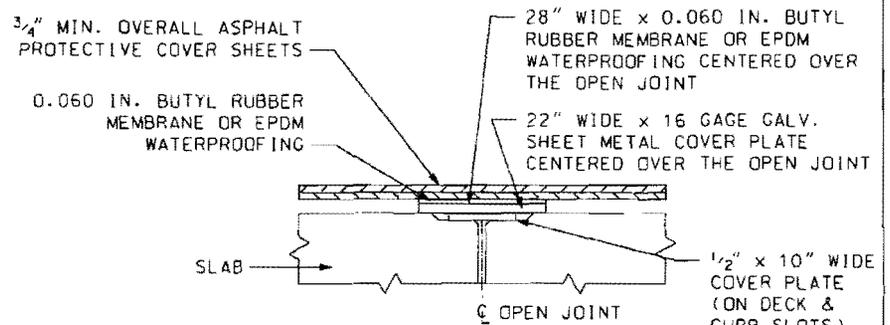
ALTERNATIVE 1  
NO SCALE

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	FLASHING DETAILS FOR WATER-PROOFING			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005095

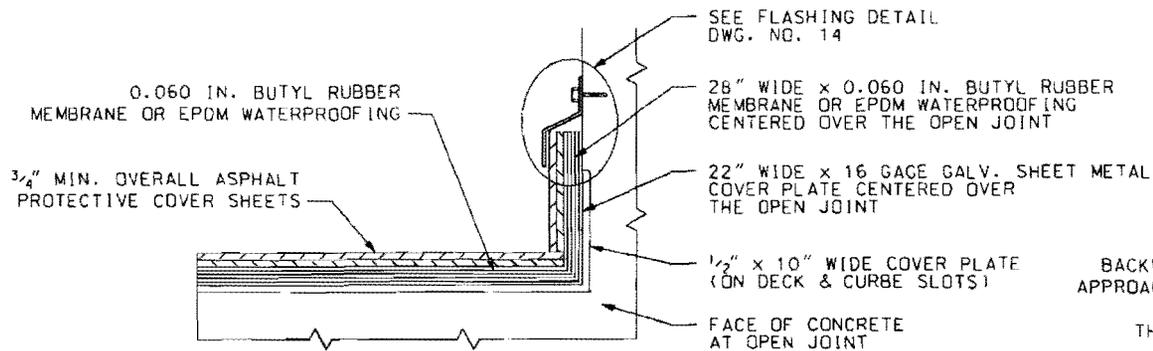




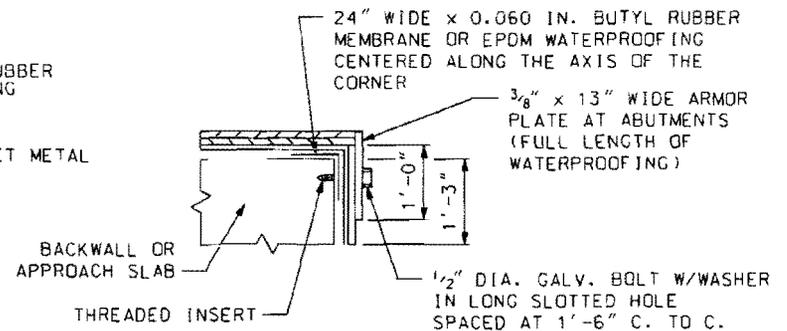
TYPICAL LONGITUDINAL SECTION  
AT CONTROLLED JOINT  
NO SCALE



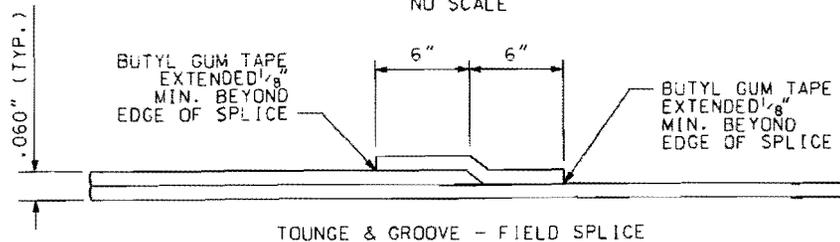
TYPICAL LONGITUDINAL SECTION  
AT CONTROLLED JOINT  
NO SCALE



TYPICAL TRANSVERSE SECTION  
AT OPEN JOINT  
NO SCALE

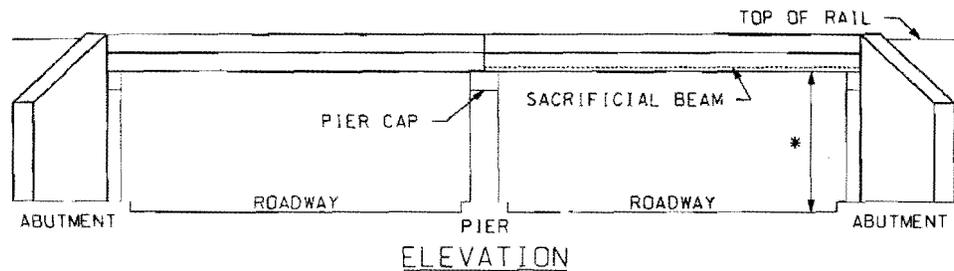
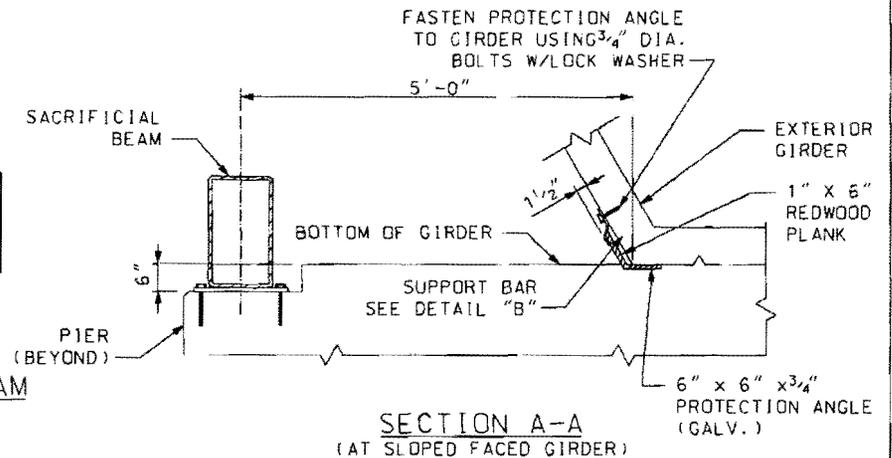
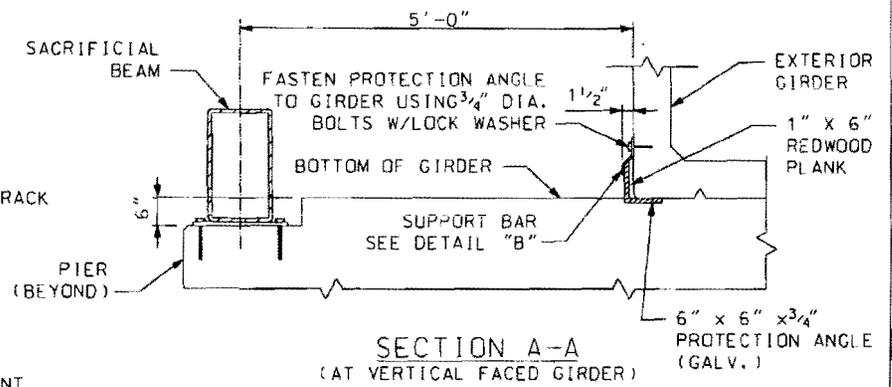
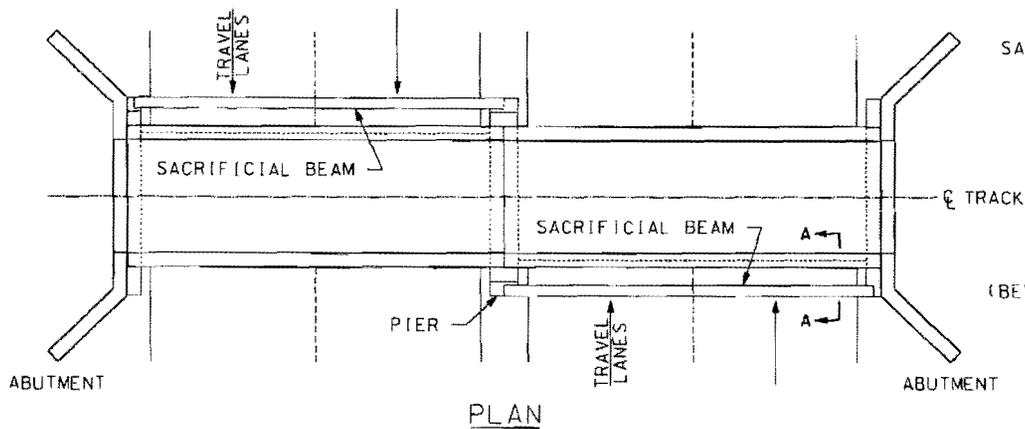


TYPICAL LONGITUDINAL SECTION  
AT END OF BACKWALL / APPROACH SLABS  
NO SCALE

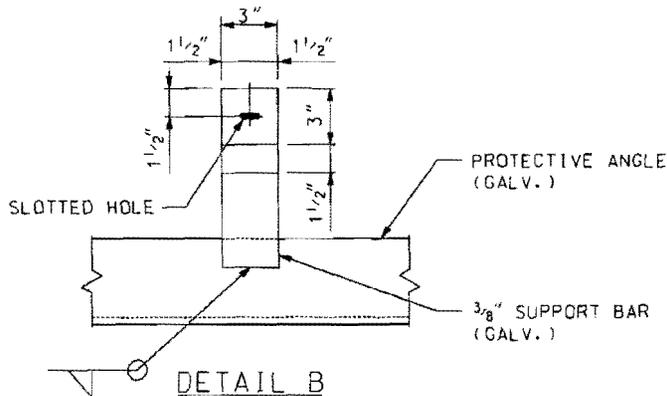


BUTYL RUBBER MEMBRANE OR EPDM  
WATERPROOFING SPLICE DETAIL  
NO SCALE

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	WATER-PROOFING DETAILS			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY NTS	SCALE	FILE	DRAWING NO. 005096

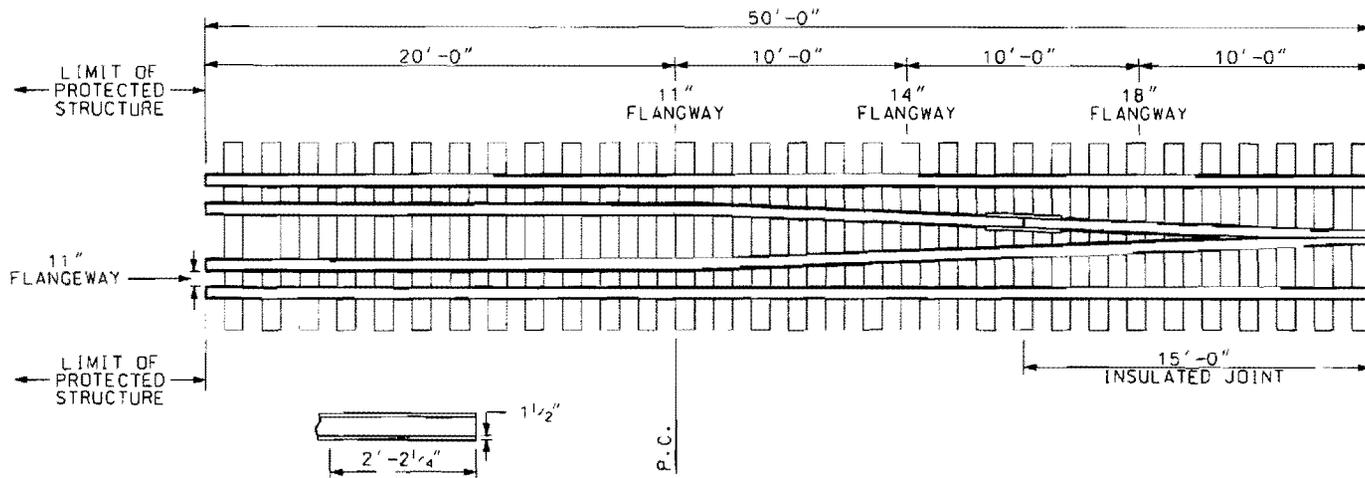


LAYOUT OF COLLISION IMPACT DEVICES & SACRIFICIAL BEAM  
\* MIN. VERTICAL CLEARANCE REFER TO TEXT



REVISIONS		EXHIBIT A			
THE KANSAS CITY SOUTHERN RY. CO.					
COLLISION IMPACT DEVICES AND SACRIFICIAL BEAM					
	DRAWN BY	DATE	VAL. SEC.	SHEET NO.	
	RGT	1/27/05		1	
	CHECKED BY	SCALE	FILE	DRAWING NO.	
		NTS		005097	

## GENERAL ARRANGEMENT



CUT RAIL BASE AT POINT END OF GUARD

**NOTES:**  
INSIDE GUARD RAILS SHALL BE MADE FROM SECOND HAND RAIL AND MAY BE OF THE SAME RAIL SECTION AS THE RUNNING RAILS BUT MUST NOT BE MORE THAN 23 LBS. LIGHTER THAN THE RUNNING RAILS.

NO INSIDE GUARD RAIL LIGHTER THAN 70 LBS. SHALL BE USED.

INSIDE GUARD RAILS ARE TO BE FULLY TIE PLATED WITH SECOND HAND TIE PLATES, WHERE CLEARANCES PREVENTS THE USE OF TIE PLATES. HOOK TWIN PLATES CAN BE USED IN GUARD RAIL CONVERGENCE AREA.

MINIMUM CLEARANCE BETWEEN THE RUNNING RAIL PLATES AND THE GUARD RAIL PLATES MUST NOT BE LESS THAN 1".

INSTALL GUARD RAIL PLATES SO AS TO CANT THE GUARD RAIL OUTWARD TOWARD THE RUNNING RAIL, WHEN SINGLE SHOULDER FLAT GUARD RAIL PLATES ARE USED. INSTALL THE PLATES WITH THE SHOULDERS ON THE INSIDE TOWARD THE CENTER OF THE TRACK.

INSIDE GUARD RAILS TO BE SPIKED TO THEIR FULL LENGTH WITH 2 SPIKES PER TIE, WHERE NECESSARY, PARTICULARLY ON CURVES, DOUBLE SPIKE GUARD RAIL BOTH INSIDE AND OUT.

ALL GUARD RAIL JOINTS TO BE FULLY BOLTED AND WHEN AVAILABLE, SECOND HAND JOINTS SHOULD BE USED.

GUARD RAIL TO BE LAID WITH FULL RAIL (NO JOINTS) IN THE CURVED POSITION.

GRADE SEPARATION SUPPORTING MEMBER REFERS TO POSTS, COLUMNS, BENTS, PIERS, ABUTMENTS, ETC. SUPPORTING BRIDGES, VIADUCTS, ETC. OVER OR ADJACENT TO THE TRACK.

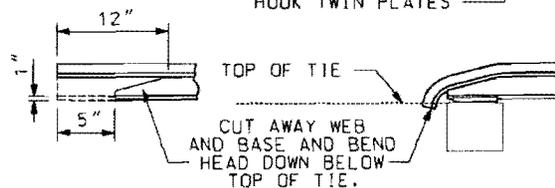
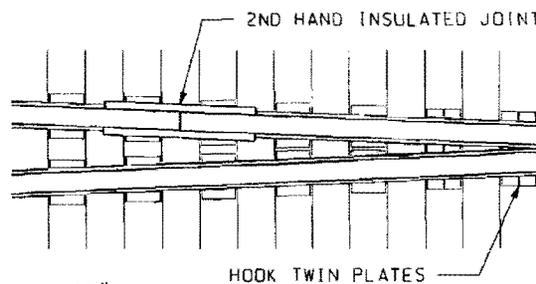
## INSTALLATION

**GRADE SEPARATION STRUCTURES:**  
DOUBLE INSIDE GUARD RAILS ARE TO BE INSTALLED ON ALL F.R.A. CLASS 4 AND 5 TRACK WHERE HORIZONTAL CLEARANCES ON BOTH SIDES ARE LESS THAN 18 FEET FROM THE CENTERLINE OF TRACK TO A SUPPORTING MEMBER. CLASS 2 CARRYING MORE THAN 20 M.G.T. TRAFFIC AND ALL CLASS 3 TRACK SHALL HAVE DOUBLE INSIDE GUARD RAILS INSTALLED WHERE HORIZONTAL CLEARANCE ON BOTH SIDES IS LESS THAN 12'-6" FROM THE CENTERLINE OF TRACK TO A STRUCTURE SUPPORTING MEMBER.

BRIDGES LOCATED ON CLASS 3, 4, AND 5 TRACK, ALONG WITH BRIDGES LOCATED ON CLASS 2 TRACK WITH OVER 20 M.G.T.

DOUBLE INSIDE GUARD RAILS ARE TO BE INSTALLED ON:  
ALL THROUGH OR DECK TRUSSES AND THROUGH PLATE GIRDER SPANS.

ALL BRIDGES THAT ARE 40 FEET OR HIGHER AND 150 FEET IN LENGTH, AND ON ALL BRIDGES 30 FEET OR MORE IN LENGTH WHERE CURVATURE EXCEEDS 5 DEGREES; UNLESS EXCEPTION IS APPROVED BY CHIEF ENGINEER.

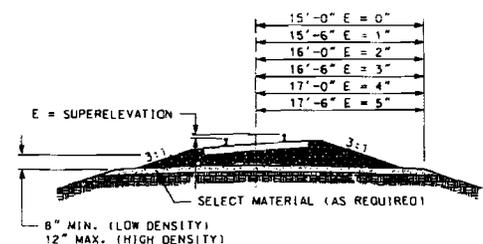
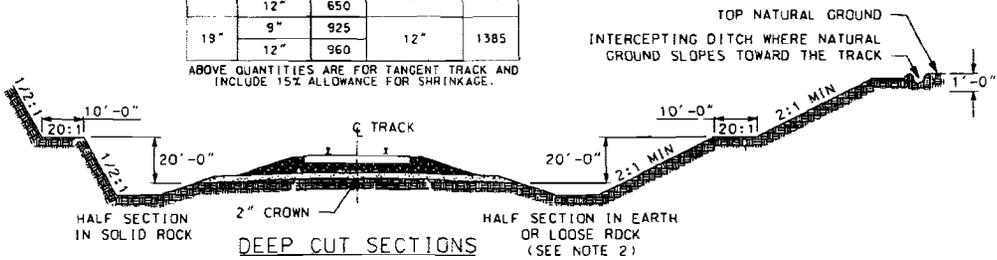


DEPRESSED RAIL HEAD DETAIL

REVISIONS	EXHIBIT A			
-	THE KANSAS CITY SOUTHERN RY. CO.			
<b>DOUBLE INSIDE GUARDRAIL</b>				
	DRAWN BY	DATE	VAL. SEC.	SHEET NO.
	RGT	1/27/05		1
CHECKED BY	SCALE	FILE	DRAWING NO.	
	NTS		005098	

MATERIAL REQUIRED FOR 1000 FEET OF SINGLE TRACK				
DEPTH	SHOULDER	CUBIC YARDS	DEPTH ABOVE TOP SUBGRADE	CUBIC YARDS
15"	9"	625	6"	700
	12"	650		
19"	9"	925	12"	1385
	12"	960		

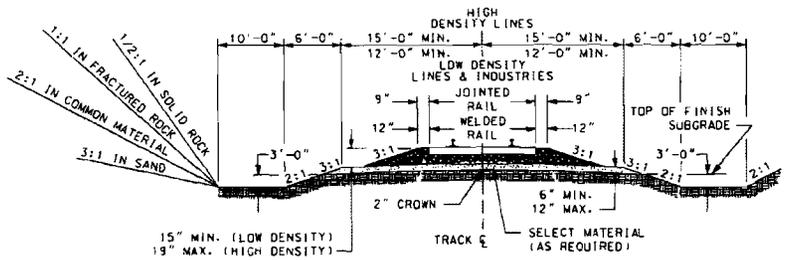
ABOVE QUANTITIES ARE FOR TANGENT TRACK AND INCLUDE 15% ALLOWANCE FOR SHRINKAGE.



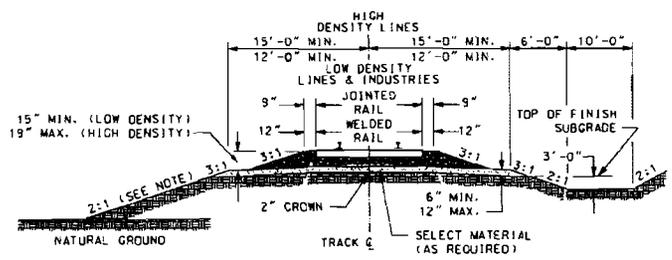
ROADBED SECTION AT CURVED TRACK  
FOR DETAILS NOT SHOWN, SEE CUT AND FILL SECTIONS ELSEWHERE ON THIS SHEET

NOTES:

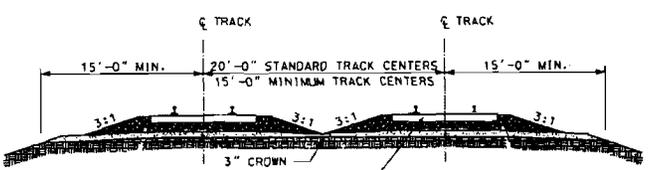
- THE DEPTH OF BALLAST AND DEPTH OF SELECTED MATERIAL SHALL BE DECIDED ON THE BASIS OF VOLUME OF TRAFFIC AND THE QUALITY OF SELECTED MATERIAL AND SUBGRADE DETERMINED BY THE RAILROAD'S ENGINEER SUBJECT TO THE APPROVAL OF THE CHIEF ENGINEER.
- SLOPES SHOWN FOR BANKS IN CUTS AND ON FILLS SHALL BE CONSIDERED STANDARD AND GENERALLY USED, BUT MAY BE MODIFIED AS REQUIRED BY LOCAL CONDITIONS AND CHARACTER OF MATERIAL.
- BALLAST MUST BE EQUALIZED IN ADVANCE OF DRESSING SO THAT FINAL SECTION WILL CONFORM TO SLOPE REQUIREMENTS AND CHARACTER OF MATERIAL.
- WHERE OFF-TRACK ROADWAY IS TO BE PROVIDED, ADD 6'-0" ADDITIONAL WIDTH TO THE ROADBED SECTION AT TOP OF SUBGRADE ELEVATION.
- ALL FILL SLOPES SHALL BE FACED WITH COVER OF MATERIAL SUITABLE FOR GROWING GRASS AND HAVING A THICKNESS OF APPROXIMATELY 6 INCHES. THE OUTER SURFACE OF THIS COVER SHALL COINCIDE WITH THE DESIGN SLOPE OF THE EMBANKMENT. MATERIAL FOR THIS COVER MAY BE OBTAINED FROM STRIPPING.
- FLOW LINE ON 0.2% MINIMUM GRADE DITCHES AND BENCHES.
- FLAT BOTTOM DITCHES ARE REQUIRED FOR HIGH DENSITY LINES. HOWEVER A "V" DITCH IS ACCEPTABLE FOR INDUSTRY TRACKS WHEN RIGHT-OF-WAY IS LIMITED AND WHERE LOCAL CONDITIONS AND CHARACTER OF MATERIAL SO REQUIRE.



ROADBED SECTIONS IN CUTS



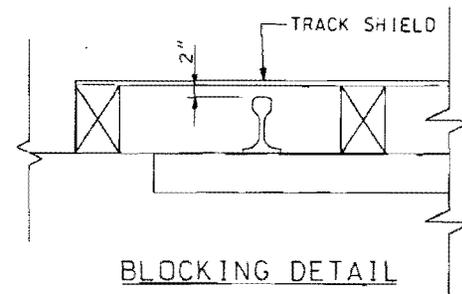
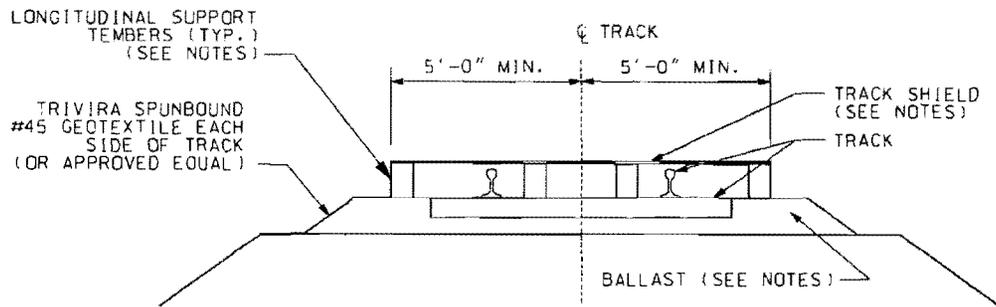
ROADBED SECTIONS AT FILLS



BALLAST SECTION FOR TWO TRACKS

REVISIONS		EXHIBIT A			
THE KANSAS CITY SOUTHERN RY. CO.					
ROADBED SECTION FOR WOOD TIE TRACK CONSTRUCTION					
DRAWN BY	RGT	DATE	1/27/05	VAL. SEC.	SHEET NO.
	CHECKED BY	NTS	SCALE	FILE	DRAWING NO.
					1
					005099



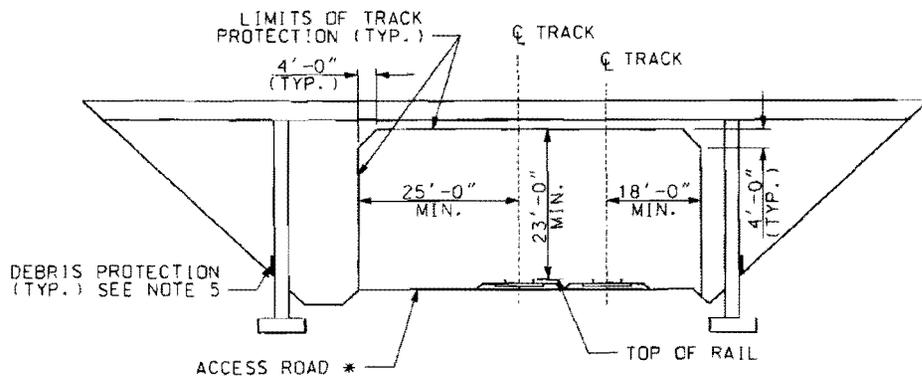


TRACK SHIELD DETAIL  
FOR DEBRIS FALLING FROM BRIDGE DECK REMOVAL  
(WHEN TRACK TIME WINDOW IS AVAILABLE)

**NOTES:**

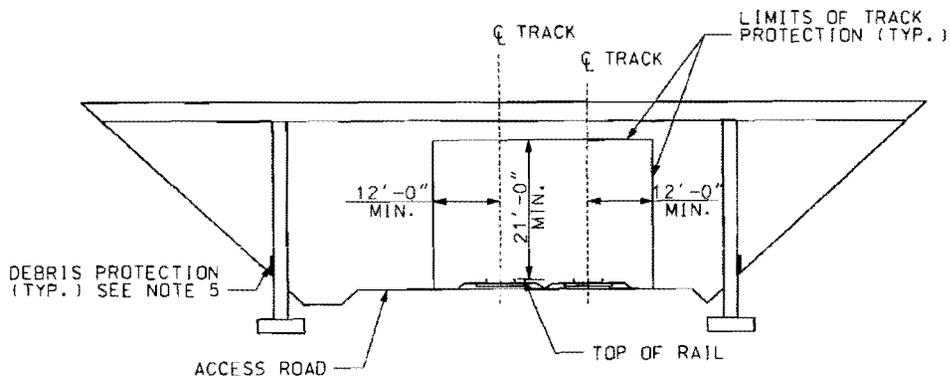
1. A FLAGMAN IS REQUIRED AT ALL TIMES DURING THE USE OF A TRACK SHIELD.
2. THE TRACK SHIELD SHALL BE DESIGNED BY THE CONTRACTOR AND SHALL BE OF SUFFICIENT STRENGTH TO SUPPORT THE ANTICIPATED LOADS, INCLUDING IMPACT. THE SHIELD SHALL PREVENT ANY MATERIALS, EQUIPMENT OR DEBRIS FROM FALLING ONTO THE RAILROAD TRACK. ADDITIONAL LAYERS OF MATERIAL SHALL BE FURNISHED AS NECESSARY TO PREVENT FINE MATERIALS OR DEBRIS FROM SIFTING DOWN UPON THE TRACK.
3. THE SHIELD SHOULD PREFERABLY BE PREFABRICATED AND FURNISHED WITH LIFTING HOOKS TO SIMPLY REMOVAL.
4. THE SHIELD SHALL BE OF SUFFICIENT STRENGTH TO SPAN BETWEEN IT'S SUPPORT WITHOUT BEARING UPON THE RAILS AND TO WITHSTAND DROPPING RUBBLE.
5. BEFORE REMOVAL, THE SHIELD SHALL BE CLEANED OF ALL DEBRIS AND FINE MATERIAL.
6. THE TRACK SHIELD SHALL EXTEND AT LEAST 20 FEET BEYOND THE LIMITS OF DEMOLITION TRANSVERSE TO THE EDGE OF THE BRIDGE.
7. LONGITUDINAL SUPPORT TIMBERS FOR THE SHIELD SHALL NOT EXTEND ABOVE THE TOP OF RAIL WHEN THE SHIELD IS REMOVED. BLOCKING FROM THE TOP OF RAIL TO THE BOTTOM OF THE SHIELD MAY BE ATTACHED TO THE SHIELD. REMAINING TIMBERS SHALL BE ANCHORED.
8. FOR TRAIN PASSAGE, THE RUBBLE SHALL BE REMOVED TO A MINIMUM OF 8'-6" FROM THE NEAREST RAIL AND TO AN ELEVATION NO HIGHT THAN THE TOP OF RAIL.
9. AT THE END OF THE DAY, THE RUBBLE SHALL BE REMOVED COMPLETELY TO A MINIMUM OF 10'-0" FROM THE NEAREST RAIL AND DOWN TO ORIGINAL GRADE.
10. CARE SHALL BE TAKEN TO NOT PLACE METAL ACROSS THE TRACK RAILS. RAILROAD COMMUNICATIONS ARE SENT THROUGH THE RAILS AND WILL BE DISRUPTED BY A SHORT BETWEEN RAILS.
11. DETAILS SHOWN APPLY FOR TIMBER TIES. SPECIAL DETAILS ARE REQUIRED FOR CONCRETE TIES.

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	TRACK SHIELD DETAIL			
	DRAWN BY	DATE	VAL. SEC.	SHEET NO.
	RGT	1/27/05		1
	CHECKED BY	SCALE	FILE	DRAWING NO.
		NTS		005100



BRIDGE ELEVATION  
STANDARD LIMITS OF PROTECTION FOR FRAME PROTECTION

\* IF NO ACCESS ROAD, USE MIN. DIMENSION FROM OTHER SIDE OF DETAIL.



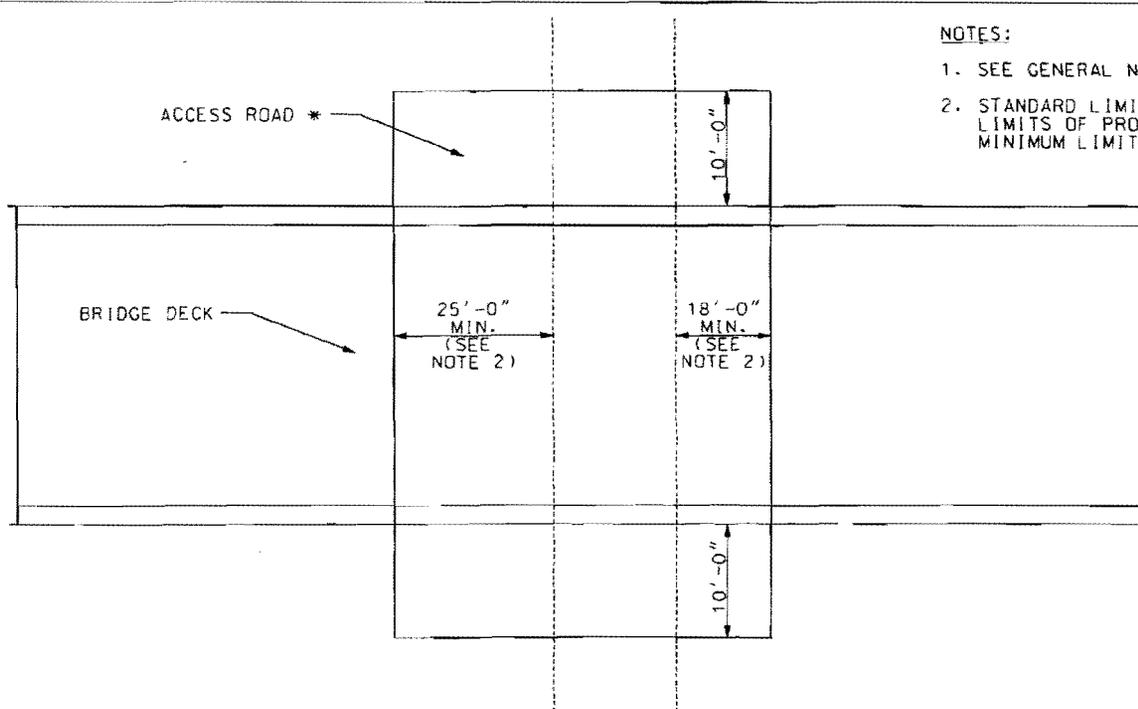
BRIDGE ELEVATION  
MINIMUM LIMITS OF PROTECTION FOR FRAME PROTECTION

(SPECIAL PERMISSION REQUIRED. SEE NOTE 1)

1. THE STANDARD LIMITS OF PROTECTION NOTED ARE THE MIN. CLEARANCES ALLOWED WITHOUT SPECIAL PERMISSION FROM THE RAILROAD. THE REDUCED CLEARANCES NOTED MAY BE ALLOWED BY THE RAILROAD. SPECIAL PERMISSION FOR THE REDUCED CLEARANCES IS REQUIRED FROM THE RAILROAD SERVICE UNIT SUPERINTENDENT.
2. THE PROTECTION FRAME SHALL, AS A MINIMUM, MATCH THE DEMOLITION LIMITS SHOWN AND EXTEND PAST THE BRIDGE WIDTH AS SHOWN ON THE ATTACHED DEMOLITION SHEET.
3. FOR ADDITIONAL CLEARANCE AND PROTECTION INFORMATION SEE STANDARD DRAWING NO. 005104.
4. THE PROTECTION FRAME SHALL PREVENT DEMOLITION DEBRIS, DUST AND FINE MATERIAL FROM FALLING ONTO THE RAILROAD TRACKS, ACCESS ROADS OR TRAINS. THE FRAME SHALL BE DESIGNED BY THE CONTRACTOR TO SUPPORT THE ANTICIPATED DEMOLITION LOADS AND IN ACCORDANCE WITH AREMA GUIDELINES FOR DESIGN OF FALSEWORK FOR STRUCTURES OVER THE RAILROAD.
5. DEBRIS PROTECTION IS REQUIRED NEAR THE BASE OF THE SIDE SLOPES AND ADJACENT TO ROADS USED BY DEMOLITION EQUIPMENT TO PREVENT DEBRIS FROM ROLLING ONTO THE TRACK, ACCESS ROAD OR DITCH. USE TIMBERS AS REQUIRED TO STOP LARGE PIECES OF ROLLING DEBRIS.
6. ANY ACTIVITY WITHIN 25 FEET OF THE NEAREST RAIL OF A TRACK REQUIRES A FLAGMAN.

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
FRAME PROTECTION DETAILS				
DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1 OF 2	
	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005101



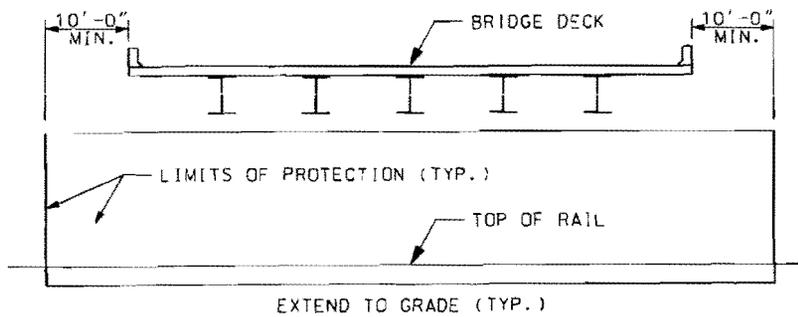


**NOTES:**

1. SEE GENERAL NOTES ON BRIDGE ELEVATION SHEET.
2. STANDARD LIMITS OF PROTECTION ARE SHOWN. FOR MINIMUM LIMITS OF PROTECTION DIMENSIONS, SEE BRIDGE ELEVATION. MINIMUM LIMITS OF PROTECTION.

**BRIDGE ELEVATION  
STANDARD LIMITS OF PROTECTION FOR FRAME PROTECTION**

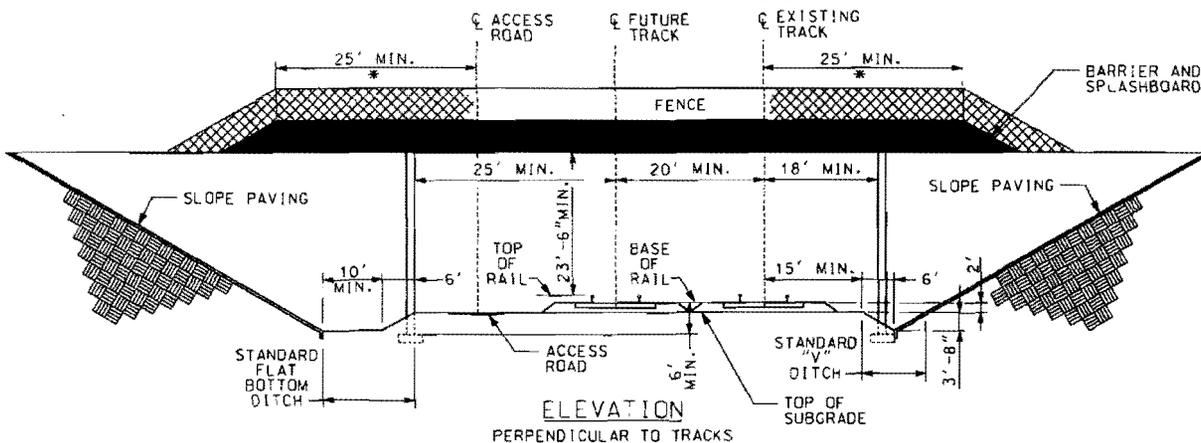
\* IF NO ACCESS ROAD, USE MIN. DIMENSION FROM OTHER SIDE OF DETAIL.



**BRIDGE DECK CROSS SECTION  
STANDARD LIMITS OF PROTECTION**

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
FRAME PROTECTION DETAILS				
DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 2 OF 2	
	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005102





\* FENCES, SPLASHBOARDS, OR SOLID BARRIERS IF REQUIRED SHALL EXTEND 25 FT. BEYOND CENTERLINE OF OUTER MOST TRACK OR ACCESS ROADWAY.

**GENERAL**  
FENCE SHALL BE PROVIDED AS INDICATED ON THE CROSS SECTIONS AND ELEVATION VIEW ON BOTH SIDES OF THE VIADUCT IN ALL NEW OR MODIFIED STRUCTURES.

SPLASHBOARDS OR SOLID 3'-6" HIGH BARRIER RAIL SHALL BE PROVIDED AS INDICATED ON THE CROSS SECTIONS AND ELEVATION VIEW ON BOTH SIDES OF THE VIADUCT IN ALL NEW OR MODIFIED STRUCTURES WHERE SNOW REMOVAL IS BEING PERFORMED.

LIGHTS ARE TO BE INSTALLED ON THE UNDERSIDE OF THE VIADUCT WHERE SHADOWS CAST BY THE STRUCTURE WOULD INTERFERE WITH RAILROAD OPERATIONS.

SLOPE PAVING SHALL BE PROVIDED WHERE END SLOPES EQUAL TO, OR EXCEED, 2 HORIZONTAL TO 1 VERTICAL.

FALSEWORK FOR CONSTRUCTION OF OVERHEAD STRUCTURES SHALL COMPLY TO AREMA GUIDELINES.

DEMOLITION OF EXISTING OVERHEAD STRUCTURES SHALL COMPLY TO KCSRC GUIDELINES.

TEMPORARY SHORING SHALL BE DESIGNED IN ACCORDANCE WITH KCSRC SHORING REQUIREMENTS.

APPLICANT SHALL BE RESPONSIBLE FOR IDENTIFICATION LOCATION, AND PROTECTION OF EXISTING UTILITIES.

CONTACT KCSRC'S "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO COMMENCING WORK TO DETERMINE LOCATION OF FIBER OPTICS.

EXCEPTIONS TO THESE STANDARDS MUST BE APPROVED BY KCSRC'S CHIEF ENGINEER DESIGN.

**CLEARANCES**  
MINIMUM VERTICAL CLEARANCE SHALL BE 23'-6" ABOVE THE PLANE OF TOP-OF-RAILS. ADDITIONAL CLEARANCE MAY BE REQUIRED FOR CONSTRUCTION PURPOSES OR IF SAG OF VERTICAL CURVE MUST BE ADJUSTED, OR IF FUTURE TRACK RAISE FOR FLOOD CONSIDERATIONS OR MAINTENANCE IS PROBABLE.

MINIMUM HORIZONTAL CLEARANCES, MEASURED AT RIGHT ANGLE FROM CENTERLINE OF TRACK, SHALL BE AS SHOWN IN ELEVATION VIEW.

MINIMUM CONSTRUCTION CLEARANCES SHALL BE 21 FEET VERTICAL ABOVE THE PLANE OF TOP-OF-RAILS AND 12 FEET HORIZONTAL AT RIGHT ANGLE FROM CENTERLINE OF TRACK.

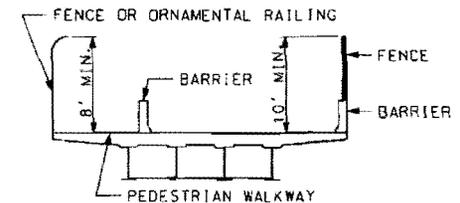
**FUTURE TRACKS**  
SPACE IS TO BE PROVIDED FOR ONE OR MORE FUTURE TRACKS AS REQUIRED FOR LONG RANGE PLANNING OR OTHER OPERATING REQUIREMENTS, WHERE PROVISION IS MADE FOR MORE THAN TWO TRACKS. SPACE IS TO BE PROVIDED FOR ACCESS ROAD ON BOTH SIDES OF TRACK.

**PIERS**  
PIER PROTECTION WALLS SHALL BE PROVIDED IN ACCORDANCE WITH AREMA, CHAPTER 8, PART 2.1.5 FOR PIERS WITHIN 25 FEET OF THE CENTERLINE OF TRACK.

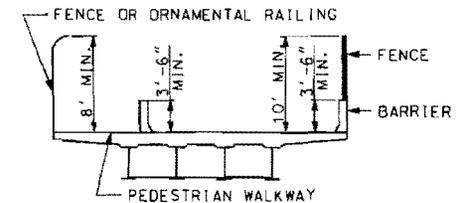
TOP OF FOOTINGS WITHIN 25 FT. FROM CENTERLINE OF TRACK SHALL BE A MINIMUM OF 6 FEET BELOW BASE OF RAIL AND A MINIMUM OF 1 FOOT BELOW FLOW LINE OF DITCH.

**DRAINAGE**  
DRAINAGE FROM THE OVERPASS SHALL BE DIVERTED AWAY FROM KCSRC'S TRACKS AND NOT DISCHARGED ONTO THE TRACKS OF ROADBED.

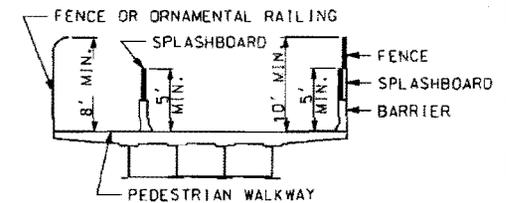
A STANDARD "V" SHAPED OR FLAT-BOTTOM DITCH SHALL BE PROVIDED ON EACH SIDE OF THE TRACKS AS NECESSARY. CULVERTS MAY BE INSTALLED ON OPPOSITE SIDE OF COLUMN FROM TRACK IN LIEU OF STANDARD RAILROAD DITCHES WHEN APPROVED BY CHIEF ENGINEER DESIGN. MAINTENANCE OF CULVERTS IS TO BE AT APPLICANT'S EXPENSE.



VIADUCT CROSS SECTION  
NO SNOW REMOVAL AREAS



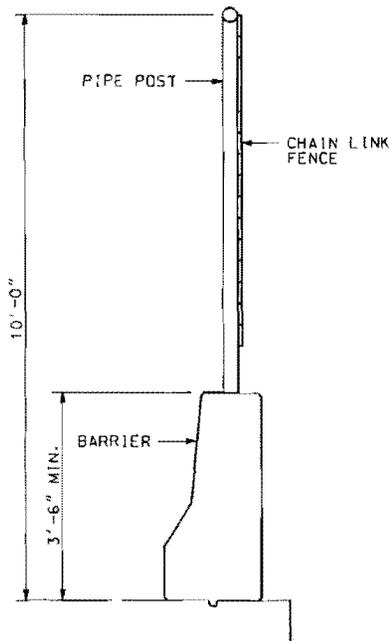
VIADUCT CROSS SECTION  
WITH 3'-6" SOLID BARRIER AND FENCE  
FOR SNOW REMOVAL AREAS



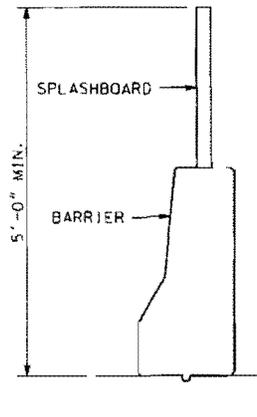
VIADUCT CROSS SECTION  
WITH SPLASH BOARD AND FENCE  
FOR SNOW REMOVAL AREAS

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	<b>BARRIERS AND CLEARANCES TO BE PROVIDED AT HIGHWAY, STREET AND PEDESTRIAN OVERPASSES</b>			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005103

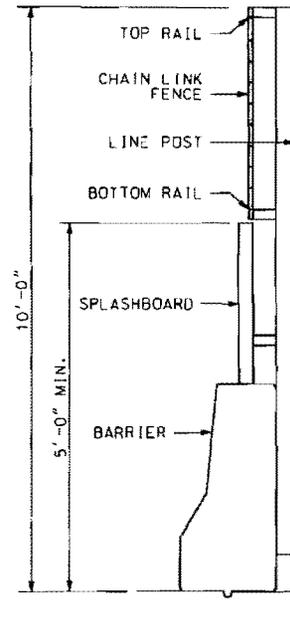




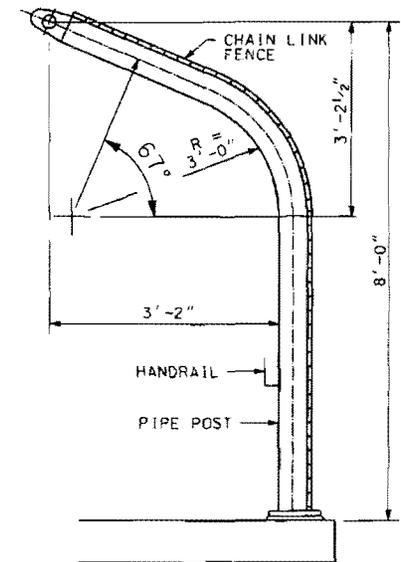
BARRIER WITH FENCE  
NO SCALE



BARRIER WITH SPLASHBOARD  
NO SCALE



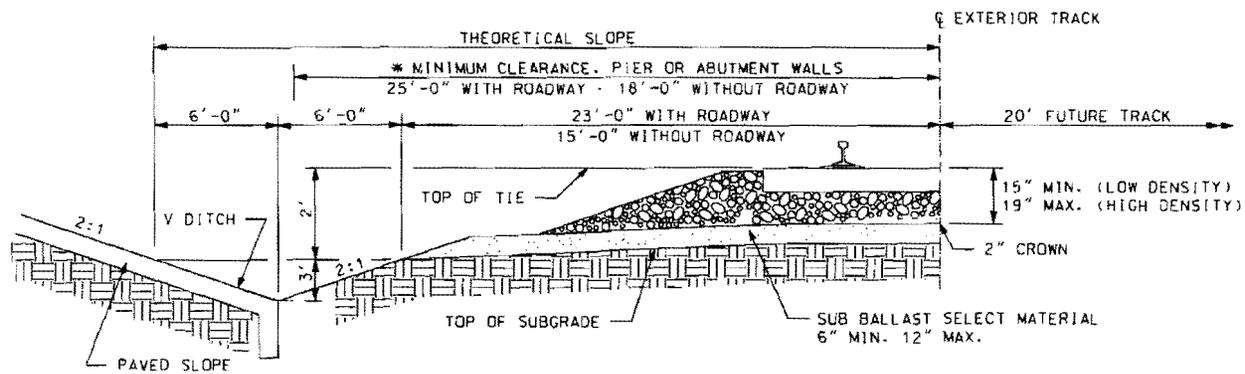
BARRIER WITH SPLASHBOARD AND FENCE  
NO SCALE



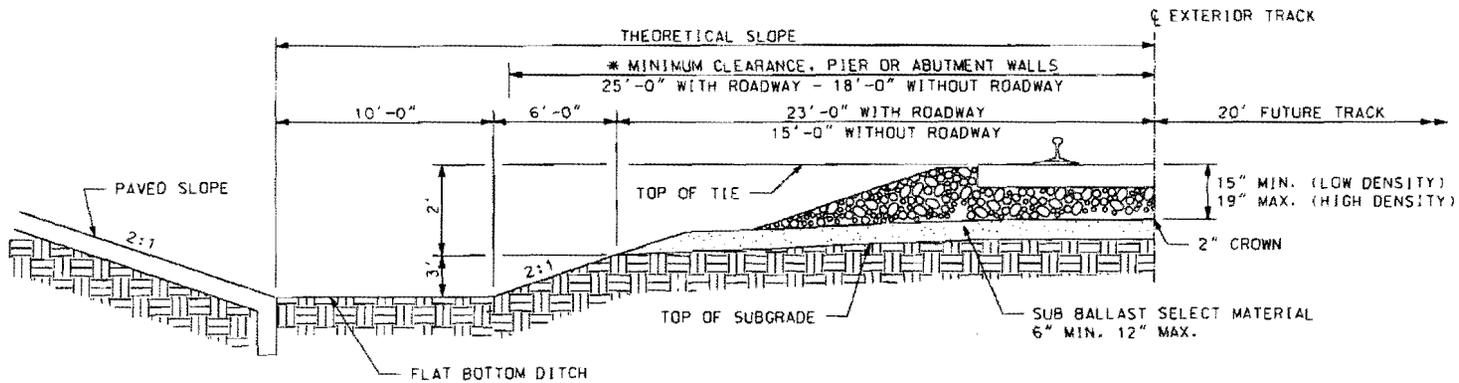
FENCE FOR WALKWAYS  
NO SCALE

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	BARRIERS, FENCES AND SPLASHBOARDS TO BE PROVIDED AT HIGHWAY, STREET AND PEDESTRAIN OVERPASSES			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005104





TYPICAL SECTION AT ABUTMENT SLOPES WITH STANDARD "V" DITCH



TYPICAL SECTION AT ABUTMENT SLOPES WITH STANDARD FLAT BOTTOM DITCH

NOTE: MINIMUM DITCH SIZES ARE SHOWN. DITCH SIZE TO BE INCREASED AS REQUIRED BY LOCAL CONDITIONS BASED ON HYDRAULIC STUDIES.

\* LOCATION OF PIER, BENT COLUMNS OR ABUTMENT WALLS SHOULD NOT INTERFERE WITH THE DRAINAGE IN THE AREA. IF MINIMUM STANDARD DITCHES ARE NOT PROVIDED IN THE LAYOUT, LONGITUDINAL CULVERTS SHOULD BE SHOWN THAT WILL HANDLE THE DRAINAGE AS REQUIRED BY THE HYDRAULIC STUDIES.

REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	TYPICAL SECTIONS AT ABUTMENT SLOPE			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005105



**TRACK PROTECTION SHORING:**

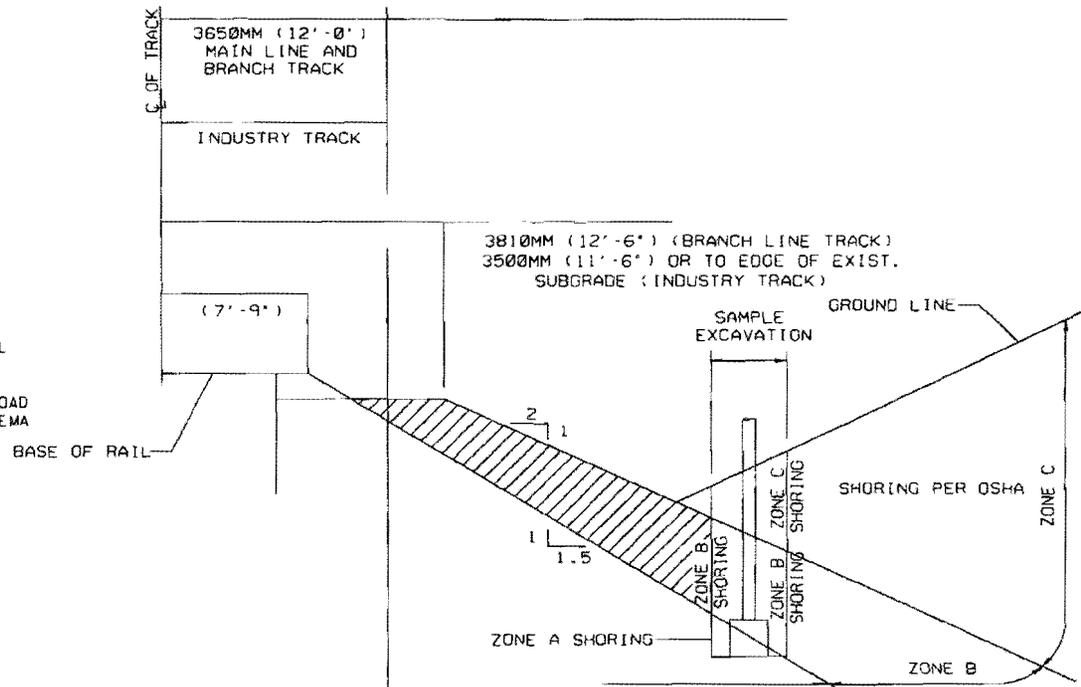
ALL DIMENSIONS ARE MEASURED PERPENDICULAR TO  $\phi$  OF TRACK.

PRIOR TO COMMENCING ANY WORK, THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE RAILROAD ENGINEER, DETAILED PLANS INDICATING THE NATURE AND EXTENT OF THE TRACK PROTECTION SHORING PROPOSED. THE CONTRACTOR SHALL PROVIDE AND INSTALL TRACK PROTECTION SHORING BEFORE COMMENCING EXCAVATION.

SHORING WITHIN ZONE A SHALL BE DESIGNED FOR COOPER E80 LIVE LOAD SURCHARGE, IN ADDITION TO ALL OTHER APPLICABLE LOADS. THE RAILROAD MAY IMPOSE MORE STRINGENT REQUIREMENTS AS CONDITIONS WARRANT.

FOR EXCAVATIONS WHICH ENCRDACH INTO RAILROAD LIVE LOAD SURCHARGE ZONE A, SHORING PLANS WILL BE ACCOMPANIED BY A COPY OF DESIGN CALCULATIONS, AND BOTH MUST BE STAMPED BY A REGISTERED PROFESSIONAL ENGINEER IN THE APPLICABLE STATE.

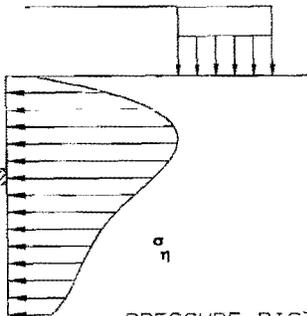
THE PRESSURE AT A GIVEN POINT OF A CONTINUOUS STRIP OF SURCHARGE LOAD  $q$  (psf) PARALLEL TO SHORING SHALL BE COMPUTED IN ACCORDANCE WITH AREMA SECTION 8.20.3.



SHORING MUST BE ONLY VERTICAL SHORING WILL BE PERMITTED FOR EXCAVATION IN THIS ZONE. (NO SLOPING CUTS.)  
 DESIGNED FOR RAILROAD LIVE LOAD SURCHARGE IN ADDITION TO OSHA STANDARDS FOR EXCAVATION.  
 APPLICABLE RAILROAD LIVE LOAD: COOPER E80  
 ALL SHORING TO COMPLY WITH OSHA REQUIREMENTS

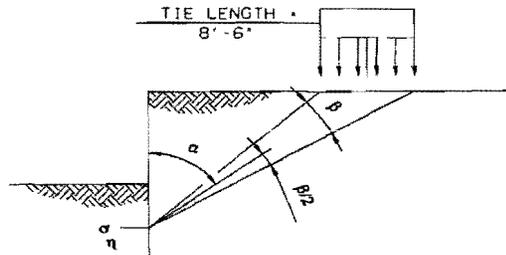
0 - 80,000 LBS  
 (5 FEET)(6.5 FEET)

TIE LENGTH



PRESSURE DISTRIBUTION FOR STRIP LOAD  
 (AREMA FIGURE 8.20-2)

TIE LENGTH  
 8'-6"



REVISIONS	EXHIBIT A			
	THE KANSAS CITY SOUTHERN RY. CO.			
	<b>GENERAL SHORING REQUIREMENTS</b>			
	DRAWN BY RGT	DATE 1/27/05	VAL. SEC.	SHEET NO. 1
	CHECKED BY	SCALE NTS	FILE	DRAWING NO. 005106

