

Division 2000: Pavement Systems

DIVISION 2000 PAVEMENT SYSTEMS**TABLE OF CONTENTS**

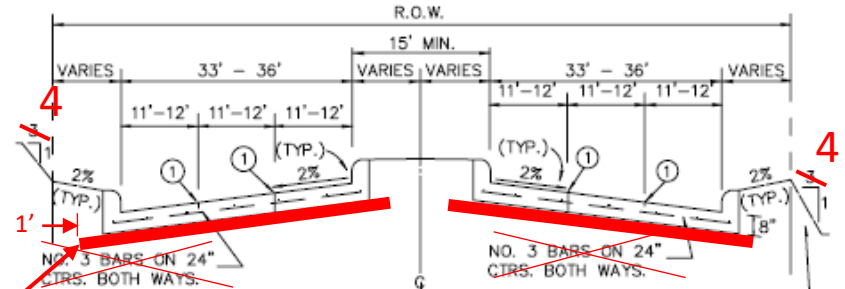
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8" minimum stabilized subgrade per section 301 and as approved or specified by owner

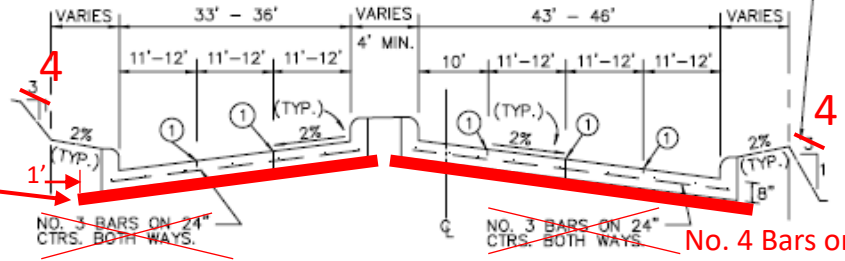
Make sure the format, text size, arrow size, etc. is consistent on the page.

Show subgrade box on all Division 2000 drawings.



REGULAR SECTION
N.T.S.

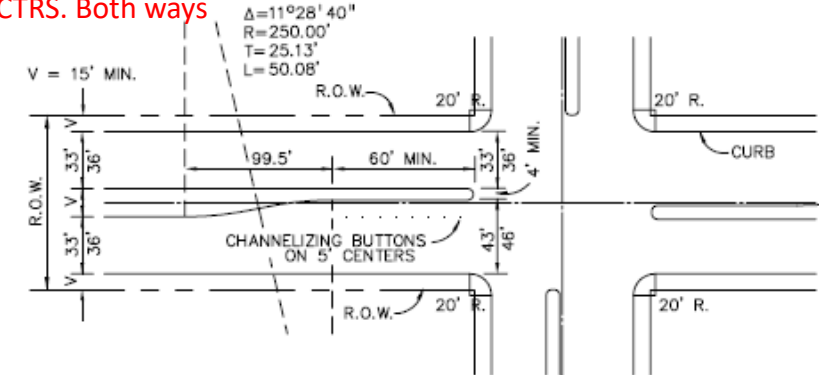
No. 4 Bars on 18" CTRS.
Both ways



LEFT TURN SECTION
N.T.S.

No. 4 Bars on 18" CTRS. Both ways

No. 4 Bars on 18" CTRS. Both ways



PLAN
N.T.S.

NOTES:

1. MIN. PAVEMENT DEPTH AND STRENGTH SHALL BE 8" - CLASS "C" OR "PC", OR AS SPECIFIED BY OWNER.
2. MIN. CURB HEIGHT AND WIDTH SHALL BE 6", OR AS SPECIFIED BY OWNER.
3. ~~ALTERNATE REINFORCEMENT SHALL BE #4 BARS ON 30" CENTERS BOTH WAYS.~~

① SAWED LONGITUDINAL CONTRACTION JOINT OR CONSTRUCTION JOINT.

1... "min. HMAC thickness shall be 2" type D surface course over 8" type B binder course."

3. Alternative materials, subgrade, thickness, and steel may be utilized with more detailed study and analysis and as approved by owner

4. Reference section 301 if lime stabilized subgrade is utilized.

5. Reference Chapter 4 (Design of on-road facilities) AASHTO Guide for the development of bicycle facilities, 2012 or as updated.

Replace Plan with a more general layout to include crosswalks, ADA ramps, striping, and possibly additional lane width for bicycle lanes per TxDOT

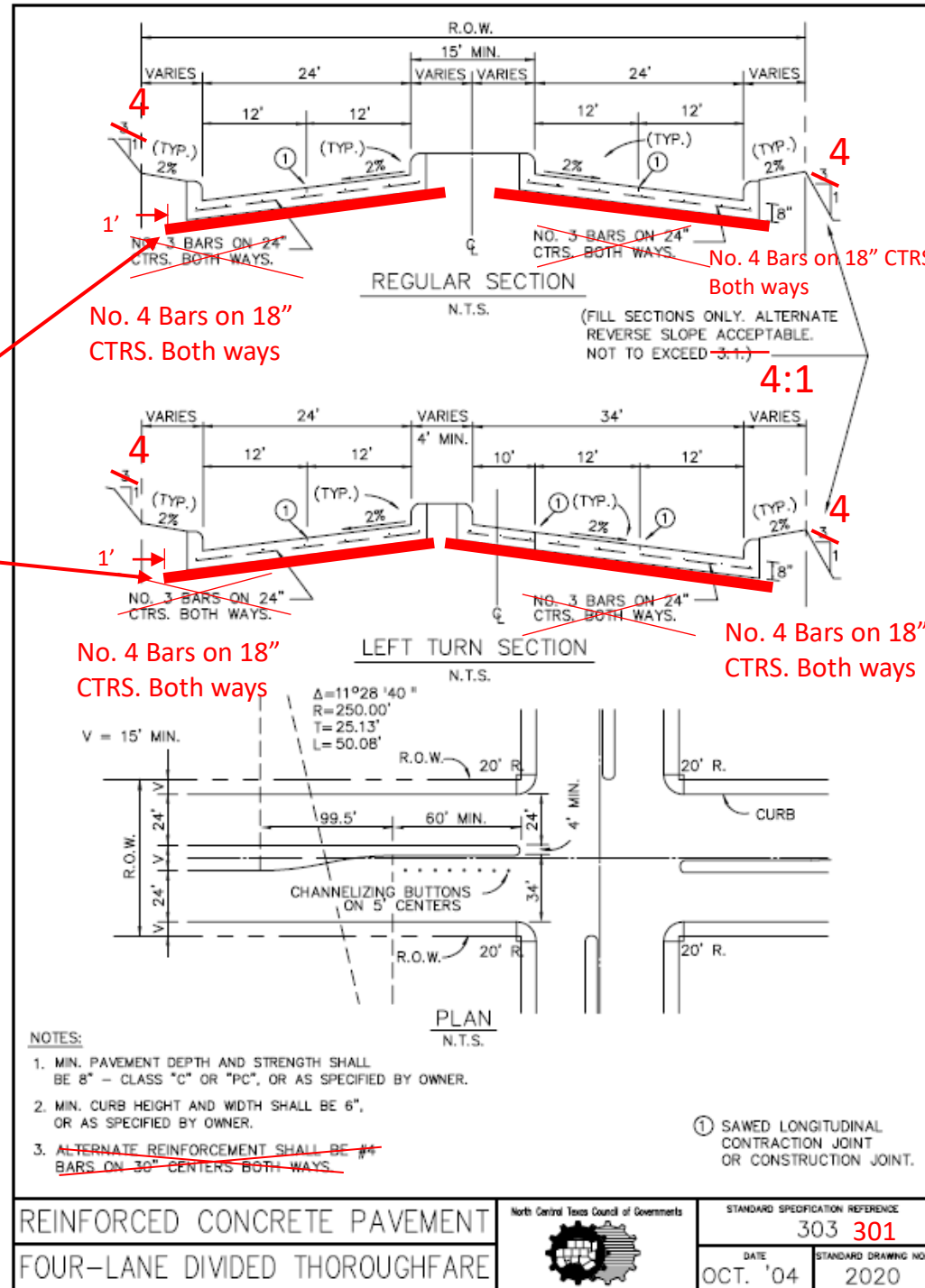
8" minimum stabilized subgrade per section 301 and as approved or specified by owner

1... "min. HMAC thickness shall be 2" type D surface course over 8" type B binder course."

3. Alternative materials, subgrade, thickness, and steel may be utilized with more detailed study and analysis and as approved by owner

4. Reference section 301 if lime stabilized subgrade is utilized

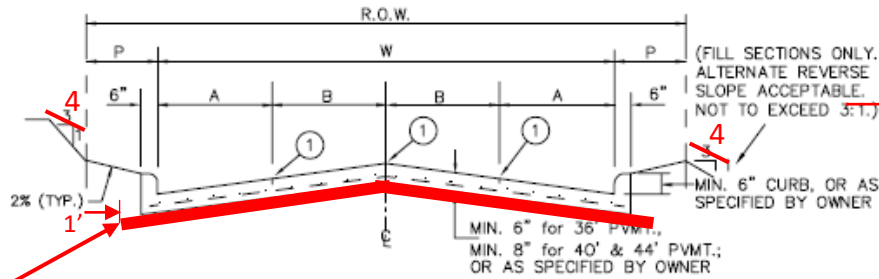
5. See detail 2170 for sidewalks



Make sure the format, text size, arrow size, etc. is consistent on the page.

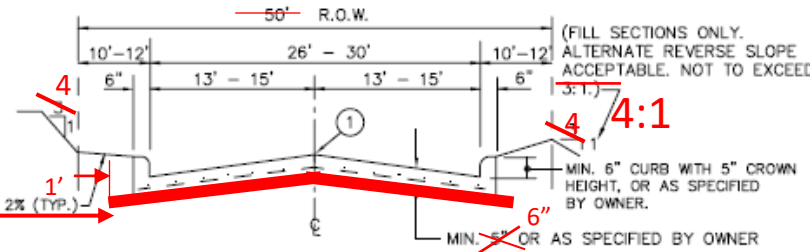
Show subgrade box on all Division 2000 drawings.

Replace Plan with a more general layout to include crosswalks, ADA ramps, striping, and possibly additional lane width for bicycle lanes per TxDOT



STREET WIDTH(W)	A	B	R.O.W. WIDTH	P	CROWN HEIGHT
36'	8'	10'	VARIES	VARIES	6"
40'	8' OR 10'	10' OR 12'	VARIES	VARIES	6"
44'	11'	11'	VARIES	VARIES	8"

FOUR TRAVEL LANES OR
TWO TRAVEL LANES & TWO PARKING LANES
N.T.S.



ONE TRAVEL LANE & TWO PARKING LANES
N.T.S.

① INDICATES SAWED LONGITUDINAL CONTRACTION OR CONSTRUCTION JOINT.

NOTES :

- ALL REINFORCEMENT SHALL BE ~~3~~⁴ BARS ON ~~30~~¹⁸ CENTERS BOTH WAYS, EXCEPT WHERE NOTED.
- ALTERNATE REINFORCEMENT SHALL BE ~~#4~~ BARS ON 30" CENTERS BOTH WAYS.
- PAVEMENT STRENGTH SHALL CONFORM TO CLASS "C" OR "PC" CONCRETE, OR AS SPECIFIED BY THE OWNER.

- Straight crown or parabolic crown as approved by owner
- See detail 2170 for sidewalks

8" minimum stabilized subgrade per section 301 and as approved or specified by owner

6" stabilized subgrade per section 301 for 30' or less or specified by owner

2. Alternative materials, subgrade, thickness, and steel may be utilized with more detailed study and analysis and as approved by owner

3... "min. HMAC thickness shall be 2" type D surface course over 8" type B binder course."

REINFORCED CONCRETE PAVEMENT

2- & 4-LANE UNDIVIDED THOROUGHFARE

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

303 301

DATE

OCT. '04

STANDARD DRAWING NO.

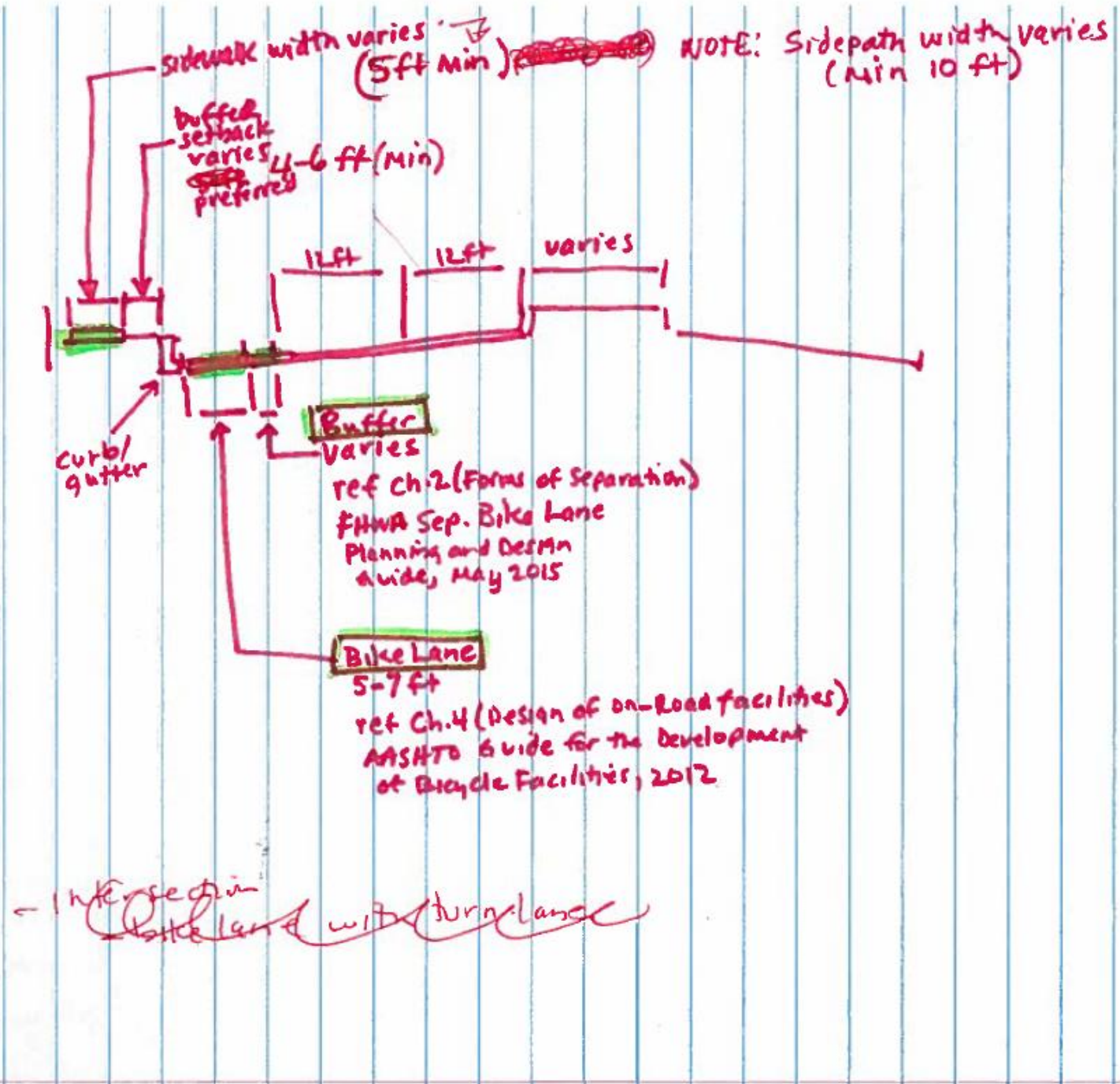
2030

Show a shared use path on the right side of the section details. Add note describing that two different options for multimodal transportation are being shown but installation should be specified by owner.

Shared path width is a minimum of 10'.

Everywhere with ASHTO note should say refer to note 5 and make it one note at the end.

Add "Separate curb/gutter as necessary (reference drawings 2120)" to callouts for curb/gutter



If there's a required bike lane the buffer should be 1'-3' depending on the speed.

Sidewalks should be 5' as directed by city but can be reduced to a minimum of 3' sidewalk with 5' bulb out.

Chris will send markup of plan view.

Put the plan views on a separate page (2015 and 2025).

Show a plan view with bike lanes and without.

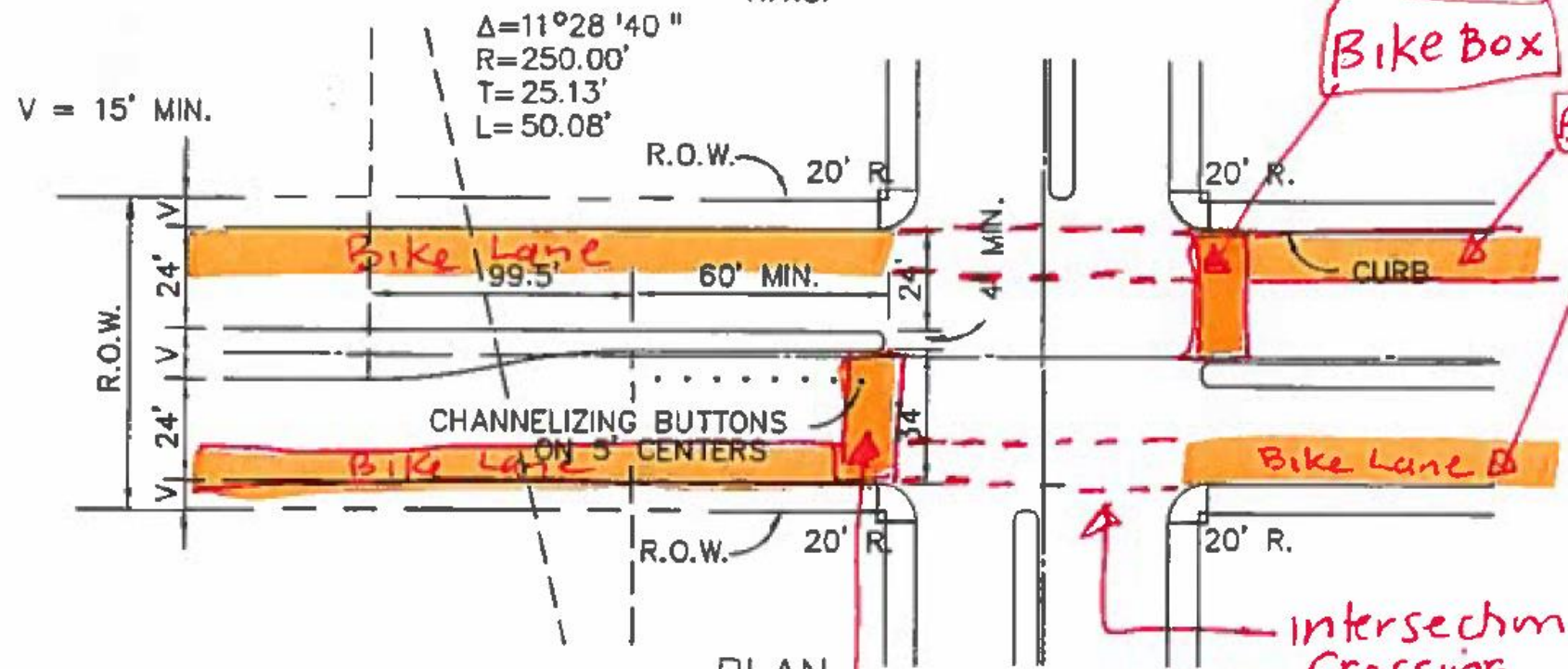
Remove bike box on plan view and get rid of ASHTO reference.

Add curb ramp, cross walk markings, and make sure the median nose is not in the cross walk on the plan view.

The radius for the curb on the plan view should be 30'.

LEFT TURN SECTION

N.T.S.



NOTES:

1. MIN. PAVEMENT DEPTH AND STRENGTH SHALL BE 8" - CLASS "C" OR "PC", OR AS SPECIFIED BY OWNER.
2. MIN. CURB HEIGHT AND WIDTH SHALL BE 6", OR AS SPECIFIED BY OWNER.
3. ALTERNATE REINFORCEMENT SHALL BE #4 BARS ON 30" CENTERS BOTH WAYS.

Bike Box varies ref. NACTO Urban Bikeway Design Guide (Intersections chapter)

ref. NACTO Urban Bikeway Design Guide (Intersections chapter)

- ① SAWED LONGITUDINAL CONTRACTION JOINT OR CONSTRUCTION JOINT.

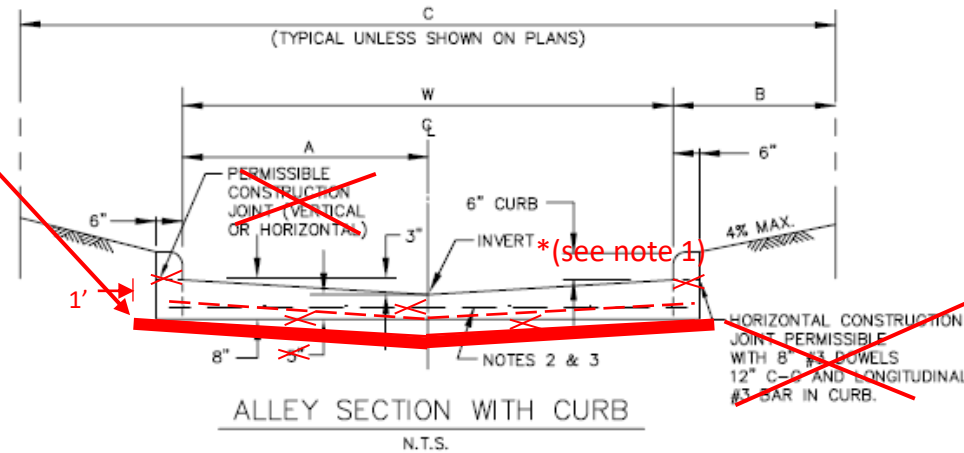
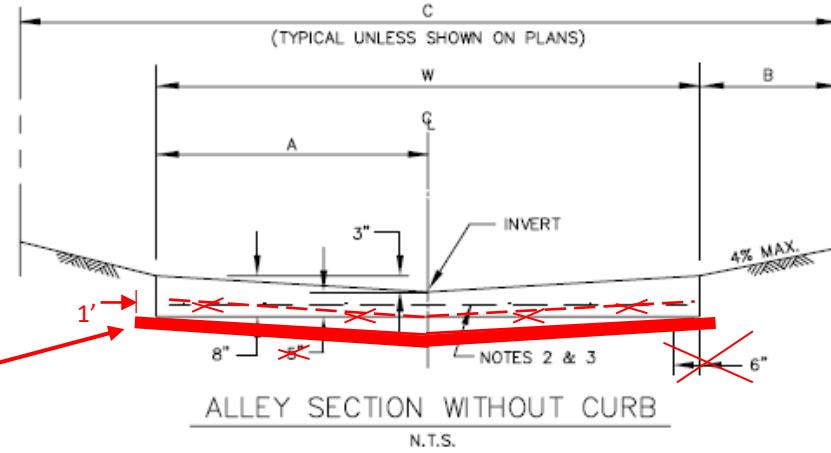
Ref. FHWA Federal Highway Administration IA-18

8" minimum stabilized subgrade per section 301 and as approved or specified by owner

1. Crown section may be used in lieu of invert with provision of an adequate drainage design and as approved by owner

3. Alternative subgrade, thickness, and steel may be utilized with more detailed study and analysis and as approved by owner

6. See detail 2170 for sidewalks



NOTES:

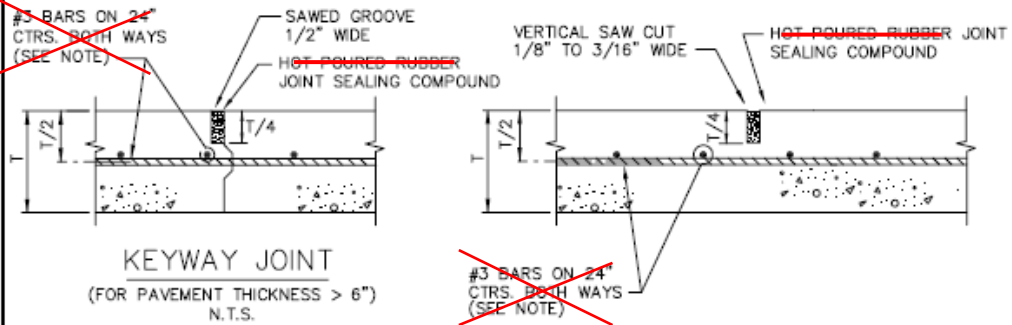
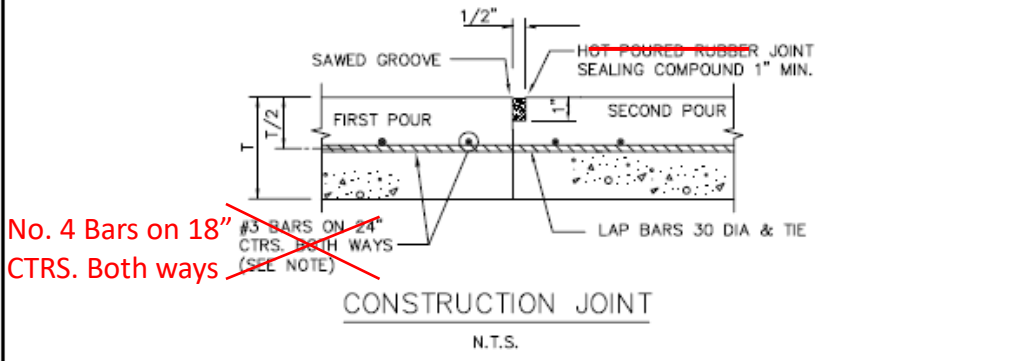
- ~~1. PROVIDE SAWS TRANSVERSE CONTRACTION JOINTS NOT MORE THAN 20' C-C. 18" C-C~~
2. REINFORCED WITH NO. 3 BARS AT 24" C-C BOTH WAYS. Or as approved by owner
- ~~3. ALTERNATE REINFORCEMENT - NO. 4 BARS AT 36" C-C BOTH WAYS.~~
4. EXPANSION JOINTS TO BE PLACED AT ALL INTERSECTIONS AND NOT TO EXCEED 600' BETWEEN JOINTS.
5. CONCRETE SHALL BE CLASS "C" OR "PC", OR AS SPECIFIED BY OWNER.

ALLEY WIDTH (W)	A	B	R.O.W. WIDTH (C)
10'	5'	2'-6"	15'
12'	6'	2'-6"	17'
16'	8'	2'-6"	21'
20'	10'	2'-6"	25'

No. 4 Bars on 18"
CTRS. Both ways

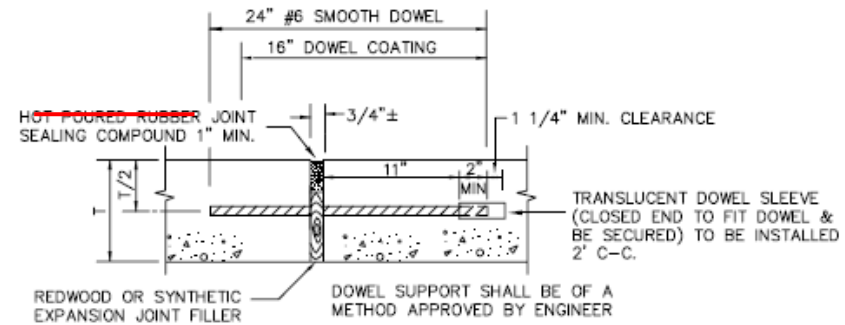
No. 4 Bars on 18"
CTRS. Both ways

1. Apply backer rod as approved by owner



No. 4 Bars on 18"
CTRS. Both ways

NOTE:
~~ALTERNATE REINFORCEMENT~~
~~#4 BARS ON 30" CTRS.~~
~~BOTH WAYS.~~



Show backer rod in detail, compare to Coppel detail 2050.

REINFORCED CONCRETE PAVEMENT

JOINTS

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

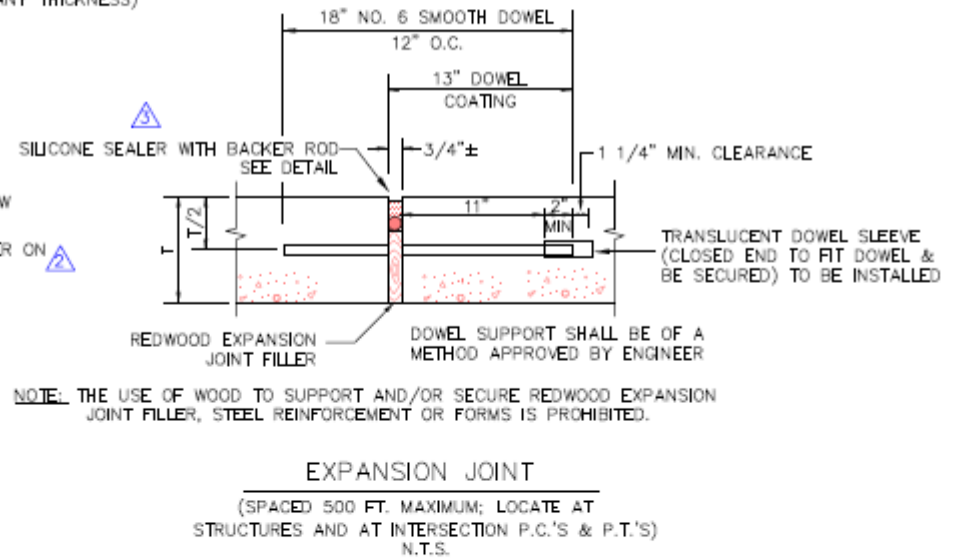
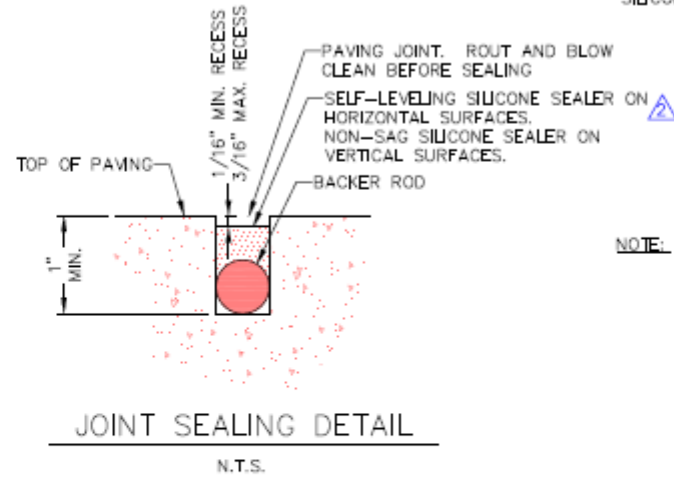
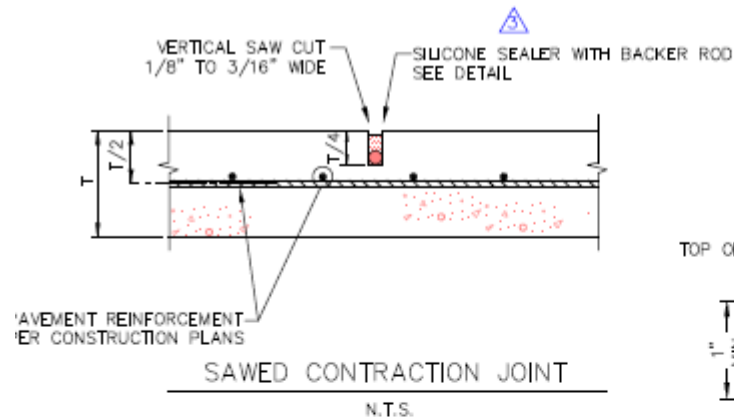
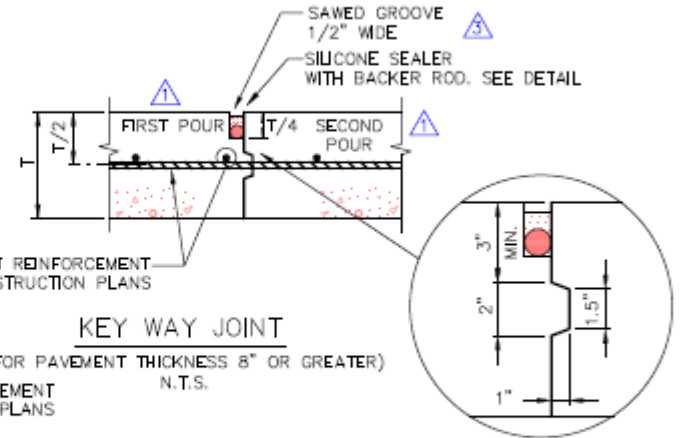
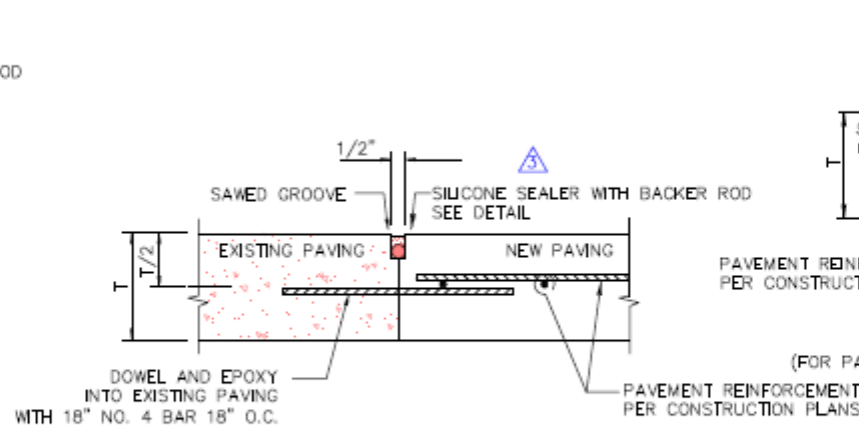
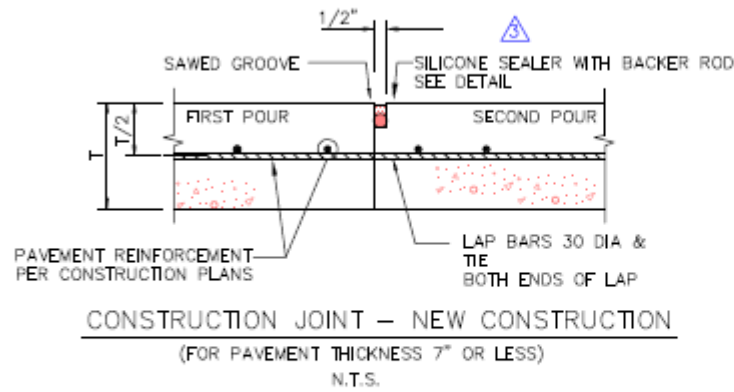
303.5.4.

DATE

STANDARD DRAWING NO.

OCT. '04

2050



19. Central Texas Council of Governments



NOTE: STANDARDS ARE ADOPTED FROM THE NCTCOG STANDARD DRAWINGS DATED NOV. '96, WITH LOCAL EXCEPTIONS.

NO.	LOCAL EXCEPTION	BY	DATE
1	DELETE "SELF-LEVELING" FROM CALLOUT.	SWL	AUG. '19
2	ADD TO USE NON-SAG SEALANT ON VERTICAL CURB SURFACES.	JB	APR. '19
3	ADD "FIRST POUR" AND "SECOND POUR" TO KEY WAY JOINT DETAIL.	SWL	JUL. '19



STANDARD CONSTRUCTION DETAILS

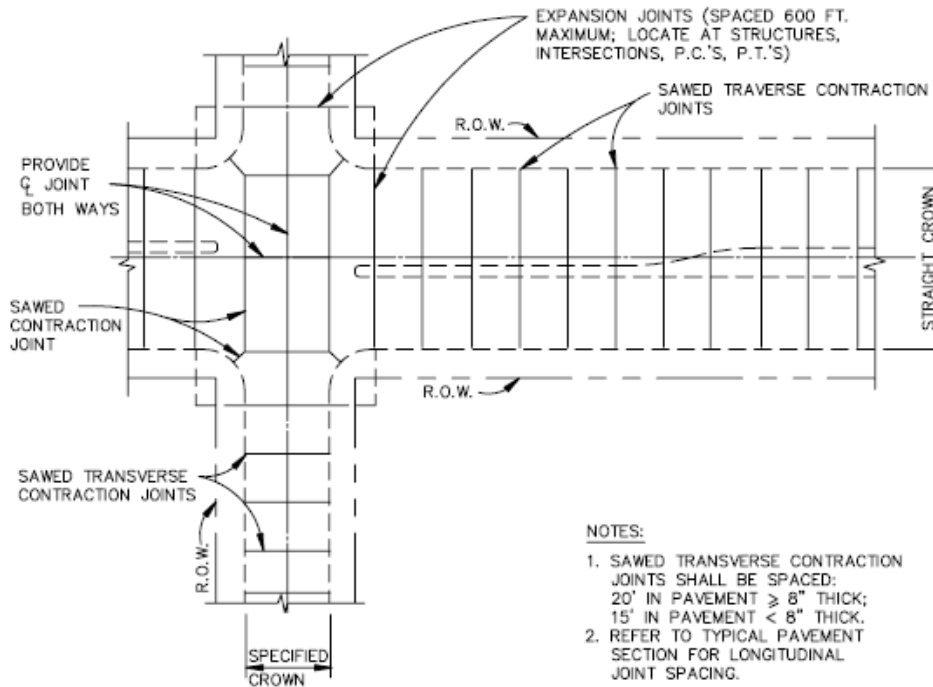
REINFORCED CONCRETE PAVEMENT
PAVEMENT JOINTS

CITY OF COPPELL DALLAS COUNTY, TEXAS

STD. SPEC.
REFERENCE

303, 401.
STANDARD DETAIL

2050



NOTES:

1. SAWED TRAVERSE CONTRACTION JOINTS SHALL BE SPACED:
20' IN PAVEMENT \geq 8" THICK;
15' IN PAVEMENT $<$ 8" THICK.
2. REFER TO TYPICAL PAVEMENT SECTION FOR LONGITUDINAL JOINT SPACING.

SPACING DIAGRAM FOR TRANSVERSE JOINTS

N.T.S.

Add contraction joints like in Coppell 2060 detail.

*cleanup lines through median

REINFORCED CONCRETE PAVEMENT

TRANSVERSE JOINT SPACING

North Central Texas Council of Governments



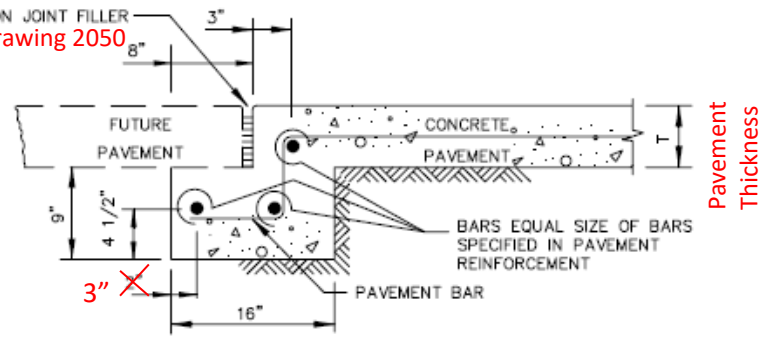
STANDARD SPECIFICATION REFERENCE

303.5.4.

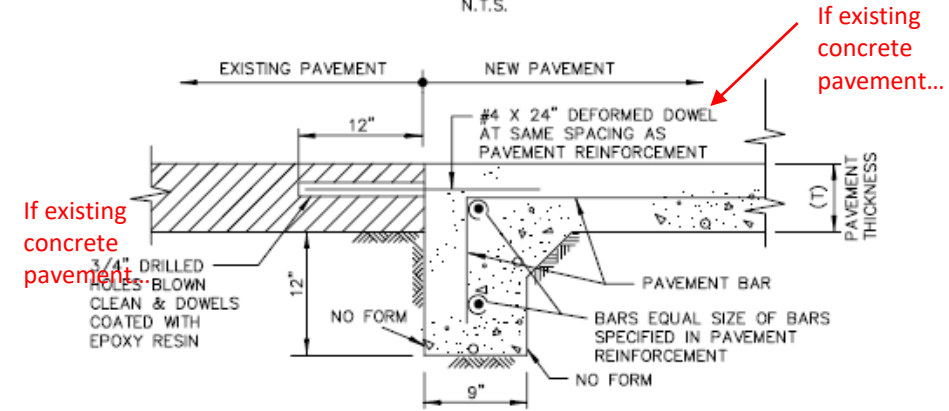
DATE
OCT. '04

STANDARD DRAWING NO.
2060

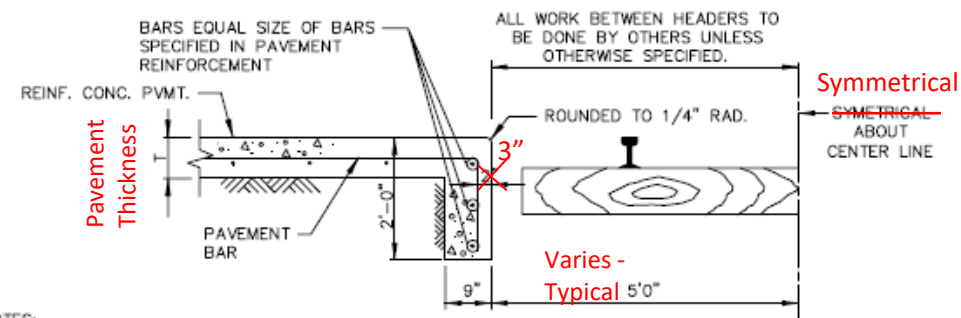
EXPANSION JOINT FILLER
Reference drawing 2050



STREET HEADER FOR FUTURE PAVEMENT
N.T.S.



STREET HEADER AT EXISTING PAVEMENT
N.T.S.



- NOTES:
1. PAVEMENT BARS TO BE BENT DOWN INTO HEADER.
2. HEADER AND PAVEMENT TO BE MONOLITHIC.

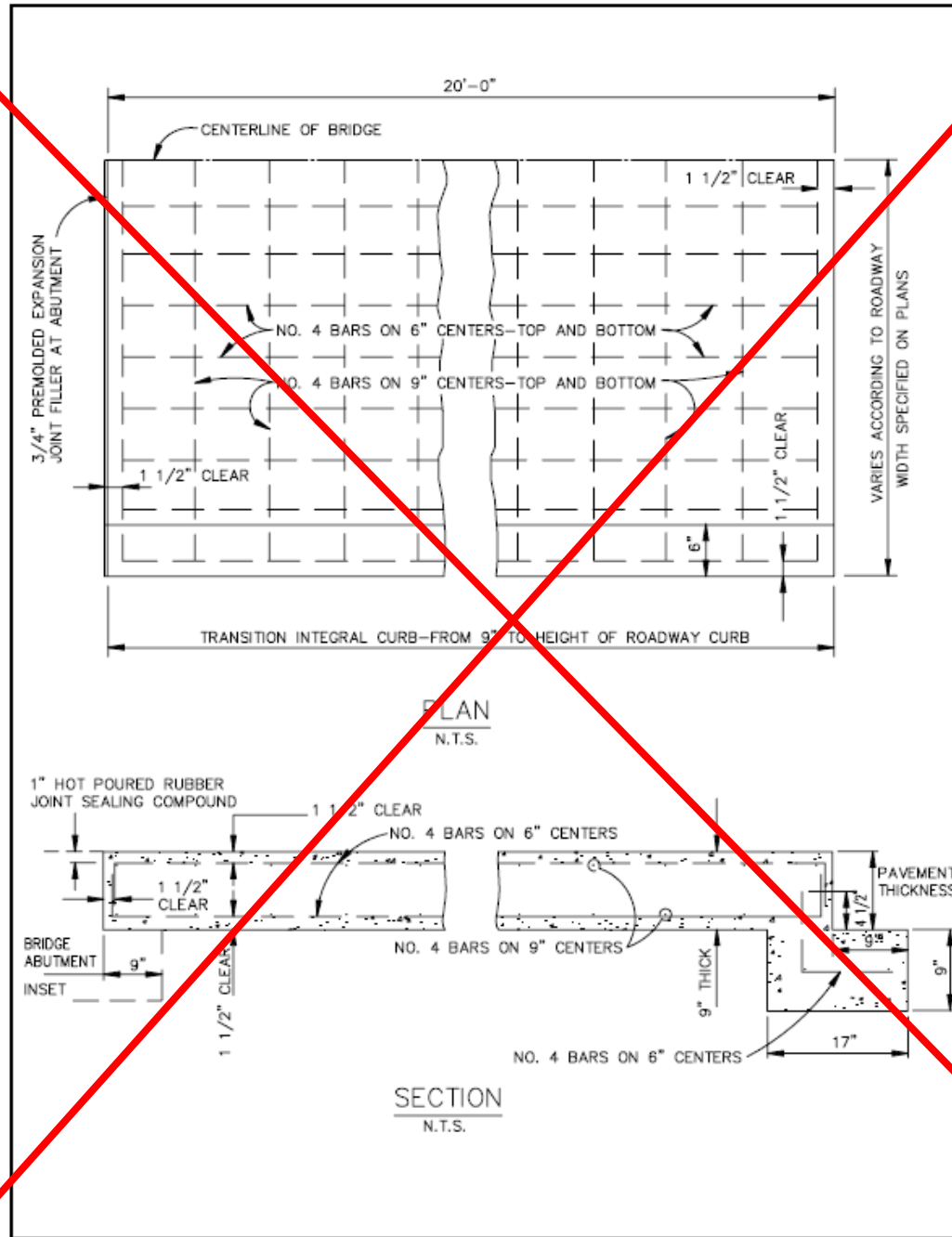
STREET HEADER AT RAILROAD
N.T.S.

Scale down the top 2 drawings to the same scale as the bottom one


“Ensure compliance with railroad requirements.”

“Coordinate with owner of railroad.”

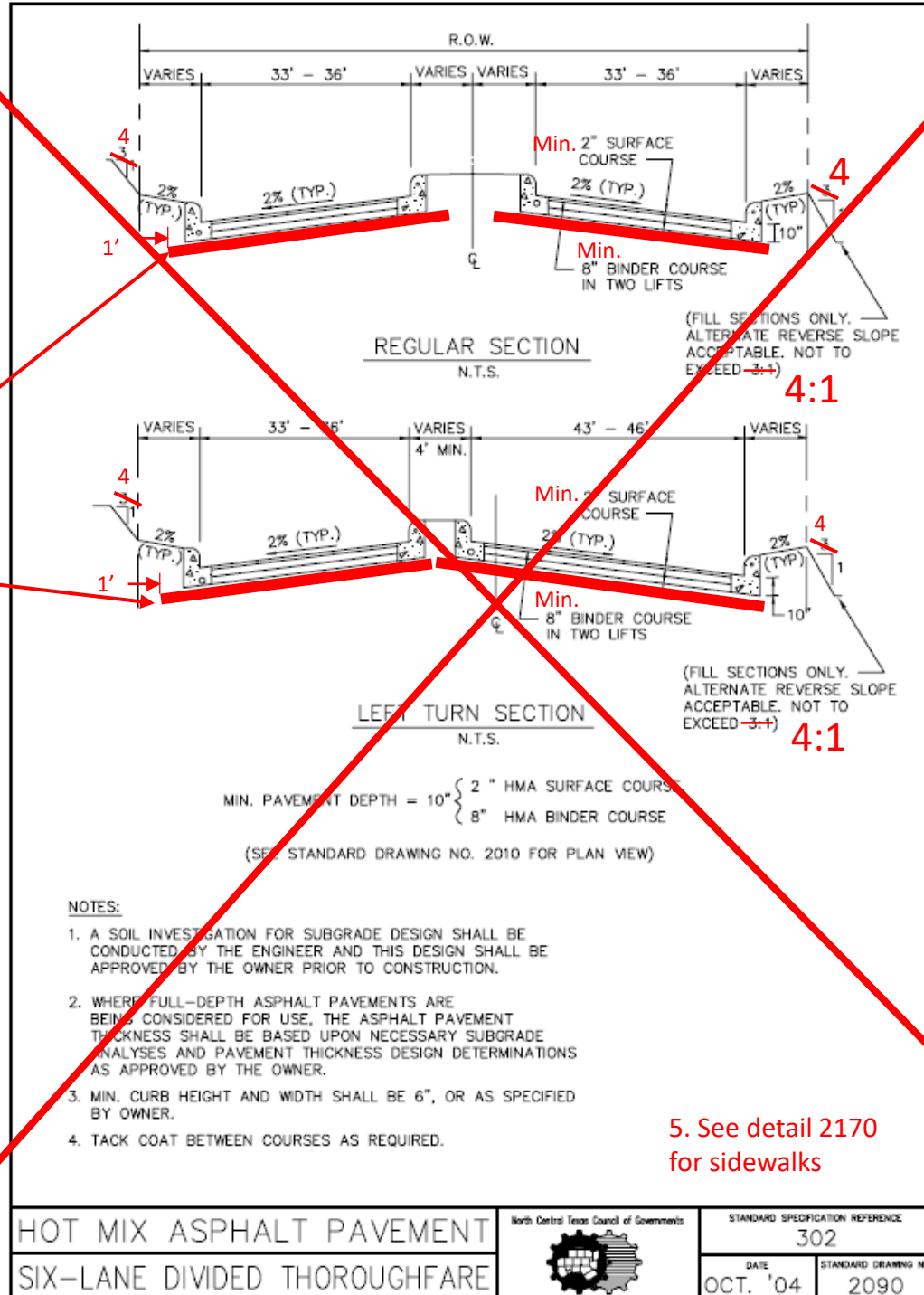
“Pavement elevation should match closely to top of rail.”



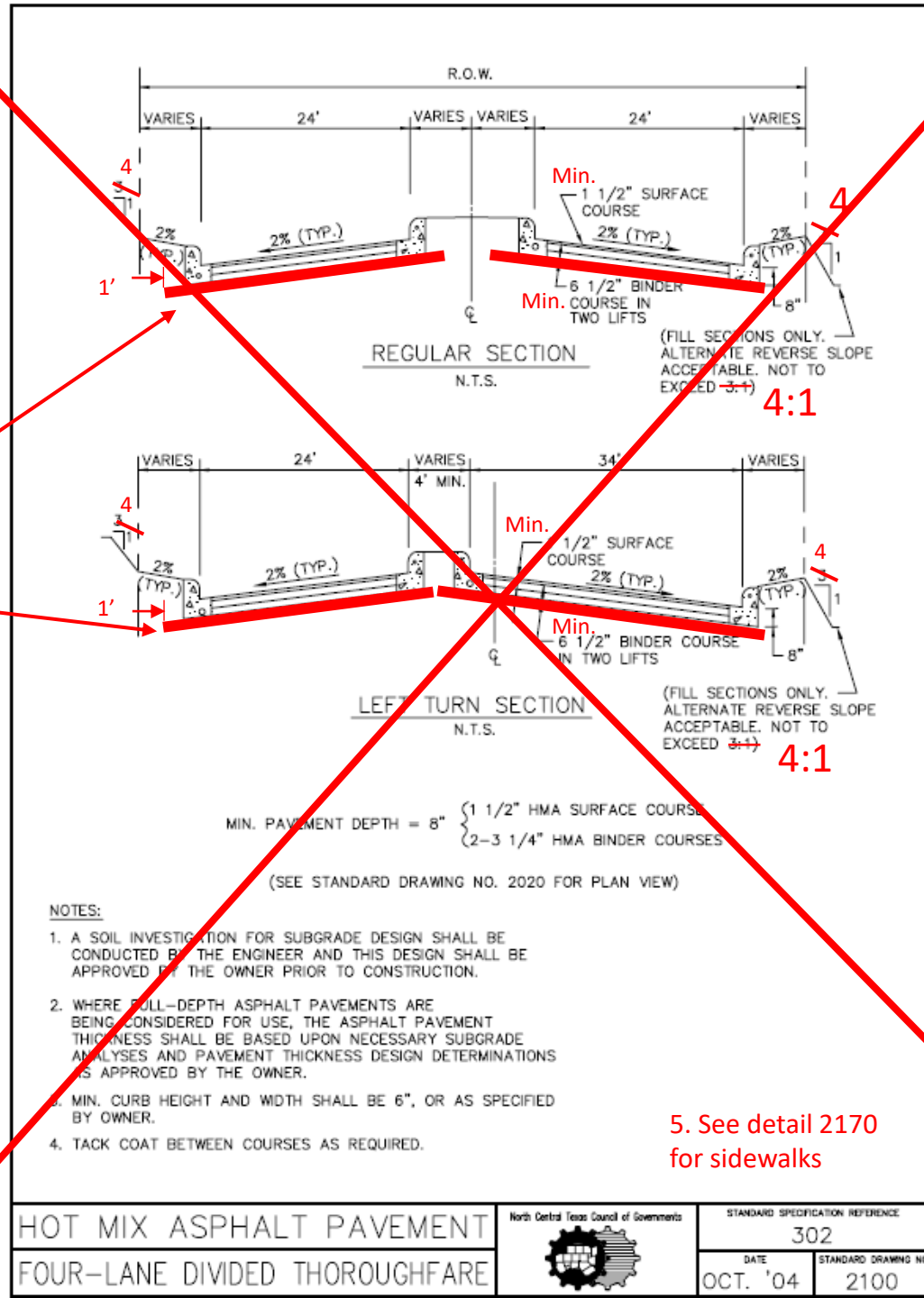
Remove detail and reference TxDOT detail in specs if needed

REINFORCED CONCRETE PAVEMENT	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 303
BRIDGE APPROACH SLAB		DATE: OCT. '04 STANDARD DRAWING NO.: 2080

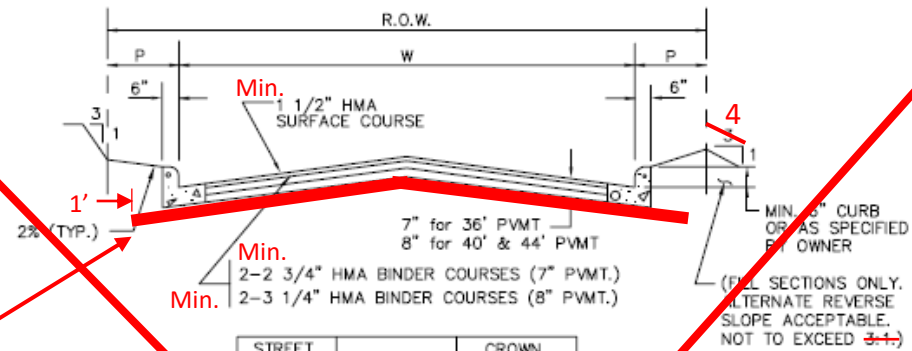
8" minimum stabilized subgrade per section 301 and as approved or specified by owner



8" minimum stabilized subgrade per section 301 and as approved or specified by owner

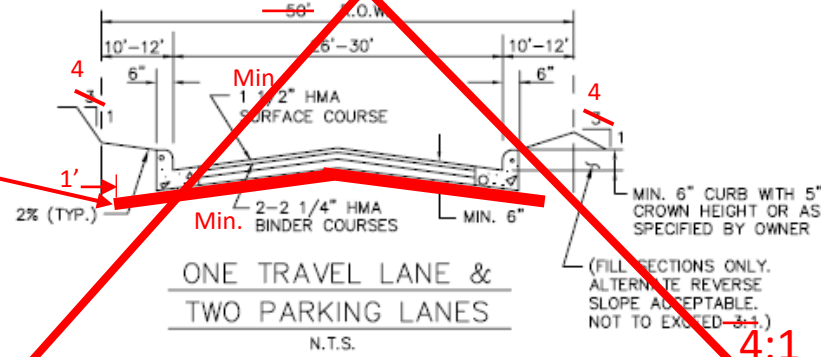


8" minimum stabilized subgrade per section 301 and as approved or specified by owner



STREET WIDTH(W)	P	CROWN HEIGHT
36'	VARIES	6"
40'	VARIES	6"
44'	VARIES	8"

FOUR TRAVEL LANES OR
TWO TRAVEL LANES &
TWO PARKING LANES
N.T.S.



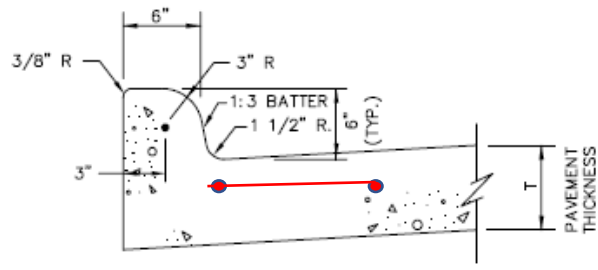
ONE TRAVEL LANE &
TWO PARKING LANES
N.T.S.

NOTES:

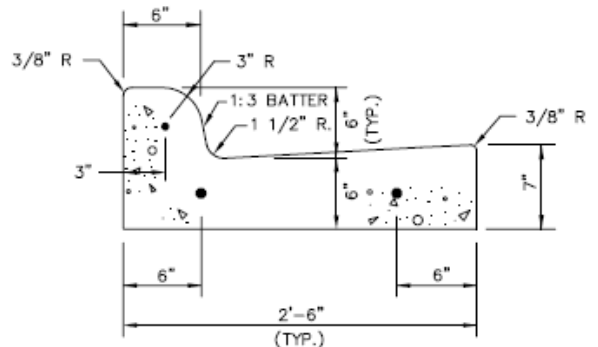
1. A SOIL INVESTIGATION FOR SUBGRADE DESIGN SHALL BE CONDUCTED BY THE ENGINEER THIS DESIGN SHALL BE APPROVED BY THE OWNER PRIOR TO CONSTRUCTION.
2. WHERE FULL-DEPTH ASPHALT PAVEMENTS ARE BEING CONSIDERED FOR USE, THE ASPHALT PAVEMENT THICKNESS SHALL BE BASED UPON NECESSARY SUBGRADE ANALYSES AND PAVEMENT THICKNESS DESIGN DETERMINATIONS AS APPROVED BY THE OWNER. THICKNESSES SHOWN ARE TYPICAL.
3. TACK COAT BETWEEN COURSES AS REQUIRED.

4. Straight crown or parabolic crown as approved by owner

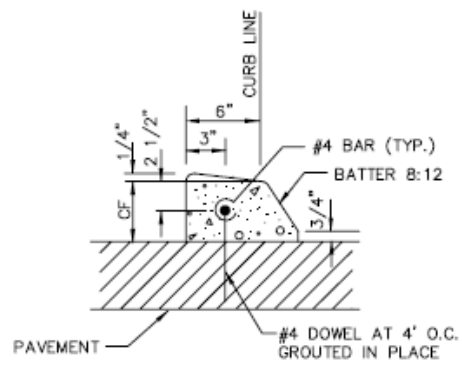
5. See detail 2170 for sidewalks



INTEGRAL CURB & GUTTER
N.T.S.



SEPARATE CURB & GUTTER
N.T.S.



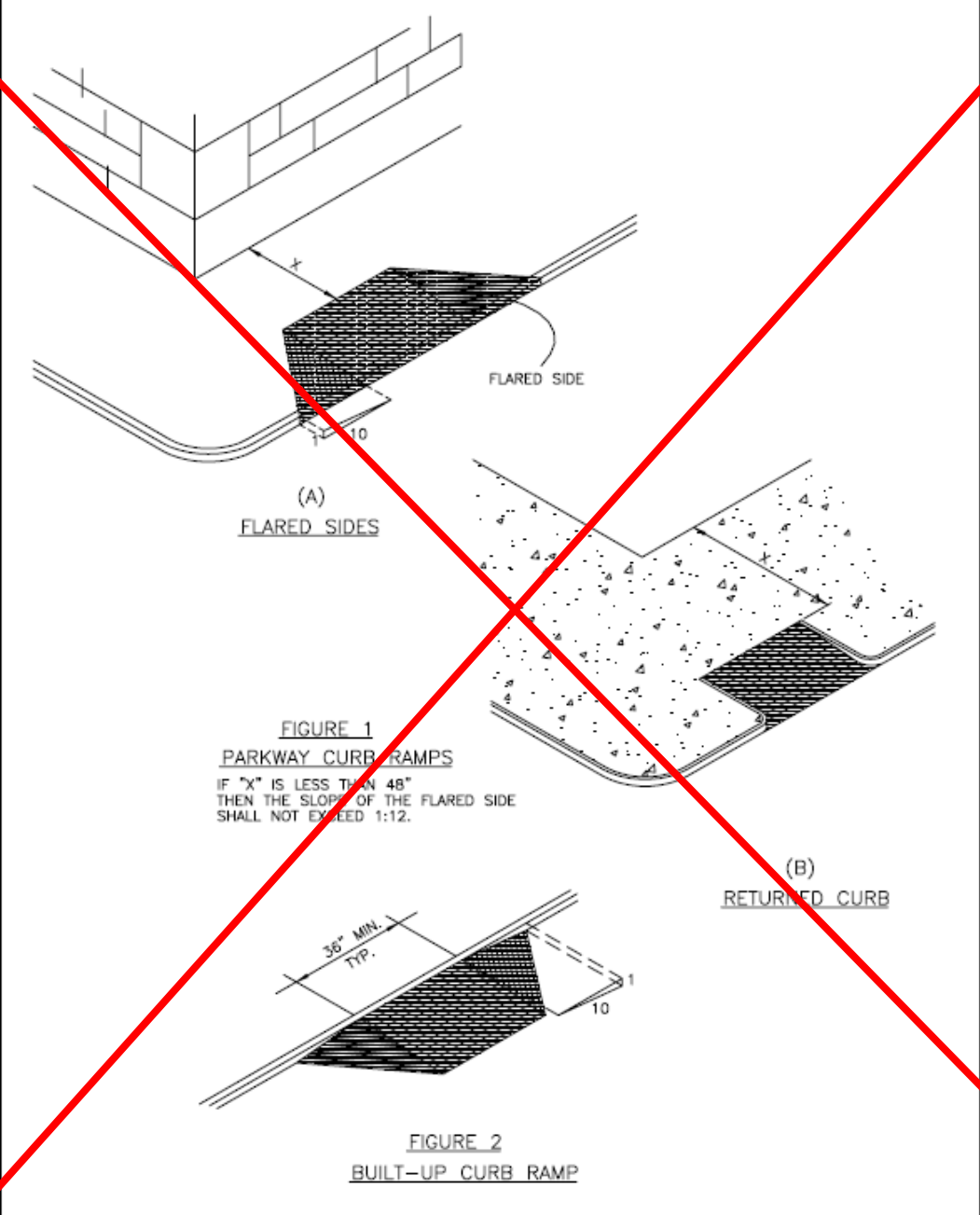
DOWELED CURB
N.T.S.

- NOTES:
1. REINFORCEMENT SHALL BE NO. 4 BARS, UNLESS OTHERWISE SPECIFIED.
 2. CONCRETE SHALL BE CLASS "C" OR "PC".
 3. "CF" IS 6" UNLESS OTHERWISE SPECIFIED.
 4. ALL CURBS ARE CONSTRUCTED OF PORTLAND CEMENT CONCRETE UNLESS OTHERWISE SHOWN.
 5. GRADE SHALL BE MEASURED AT BACK OF CURB.


Make a note and graphical change on integral curb and gutter detail to show rebar.

Make rebar the same size in all details and callout as #4 bars.





reference TxDOT PED-18
<https://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm>

CURB RAMPS	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE	
		DATE OCT. '04	STANDARD DRAWING NO. 2125A

CURB RAMPS NOTES:

GENERAL REQUIREMENTS

CURB RAMPS SHALL BE CONSTRUCTED AS PER THE REQUIREMENTS AND SPECIFICATIONS OF THE TEXAS ACCESSIBILITY STANDARDS AND THE ADA & ABA ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES. (FEDERAL REGISTER/ VOL. 69, NO. 141, FRIDAY, JULY 23, 2004)

LOCATION:

CURB RAMPS UNDER THESE PROVISIONS, SHALL BE WHEREVER AN ACCESSIBLE ROUTE CROSSES A CURB.

SLOPE:

SLOPES ON CURB RAMPS SHALL BE MEASURED AS FOLLOWS: (Y:X = VERTICAL:HORIZONTAL)

- A) TRANSITIONS FROM RAMPS TO WALKS, GUTTERS, OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES.
- B) MAXIMUM SLOPES OF ADJOINING GUTTERS, ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB OR ACCESSIBLE ROUTE SHALL NOT EXCEED 1:20.
- C) THE LEAST POSSIBLE SLOPE SHALL BE USED FOR ANY RAMP. THE MAXIMUM SLOPE OF A RAMP IN NEW CONSTRUCTION SHALL BE 1:12. THE MAXIMUM RISE FOR ANY RUN SHALL BE 30" (760 MM). CURB RAMPS AND RAMPS TO BE CONSTRUCTED ON EXISTING SITES OR IN EXISTING BUILDINGS OR FACILITIES MAY HAVE SLOPES AND RISES IF SPACE LIMITATIONS PROHIBIT THE USE OF A 1:12 SLOPE OR LESS, AS FOLLOWS:
 - 1. A SLOPE BETWEEN 1:10 AND 1:12 IS ALLOWED FOR A MAXIMUM RISE OF 6".
 - 2. A SLOPE BETWEEN 1:8 AND 1:10 IS ALLOWED FOR A MAXIMUM OF 3" A SLOPE STEEPER THAN 1:8 IS NOT ALLOWED.

RAMP WIDTH:

THE MINIMUM WIDTH OF A CURB RAMP SHALL BE 36" EXCLUSIVE OF FLARED SIDES.

SURFACE:

SURFACES OF CURB RAMPS, SHALL BE STABLE FIRM, AND SLIP RESISTANT. SURFACE TEXTURES SHALL CONSIST OF EXPOSED CRUSHED STONE AGGREGATE, ROUGHENED CONCRETE, RUBBER, RAISED ABRASIVE STRIPS, OR GROOVES. EXTENDING THE FULL WIDTH AND DEPTH OF THE CURB RAMP. SURFACES THAT ARE RAISED, ETCHED, OR GROOVED IN A WAY THAT WOULD ALLOW WATER TO ACCUMULATE ARE PROHIBITED. FOR PURPOSES OF WARNING, THE FULL WIDTH AND DEPTH OF CURB RAMPS SHALL HAVE A LIGHT REFLECTIVE VALUE AND TEXTURE THAT SIGNIFICANTLY CONTRASTS WITH THAT OF ADJOINING PEDESTRIAN ROUTES.

SIDES OF CURB RAMPS:

IF A CURB RAMP IS LOCATED WHERE PEDESTRIANS MUST WALK ACROSS THE RAMP, OR WHERE IT IS NOT PROTECTED BY HANDRAILS OR GUARDRAILS, IT SHALL HAVE FLARED SIDES. THE MAXIMUM SLOPE OF THE FLARE SHALL BE 1:10 (SEE FIG. 1 (A)) CURB RAMPS WITH RETURNED CURBS MAY BE USED WHERE PEDESTRIANS WOULD NOT WALK ACROSS THE RAMP. (SEE FIG. 1 (B))

BUILT-UP RAMPS:

BUILT-UP CURB RAMPS SHALL BE LOCATED SO THEY DO NOT PROJECT INTO VEHICULAR TRAFFIC LANES (SEE FIG. 2)

OBSTRUCTIONS:

CURB RAMPS SHALL BE LOCATED OR PROTECTED TO PREVENT THEIR OBSTRUCTION BY PARKED VEHICLES.

LOCATION AT MARKED CROSSINGS:

CURB RAMPS AT MARKED CROSSINGS SHALL BE WHOLLY CONTAINED WITHIN THE MARKINGS, EXCLUDING ANY FLARED SIDES.

DIAGONAL CURB RAMPS:

IF DIAGONAL (OR CORNER TYPE) CURB RAMPS HAVE RETURNED CURBS OR OTHER WELL DEFINED EDGES, SUCH EDGES SHALL BE PARALLEL TO THE DIRECTION OF PEDESTRIAN FLOW. THE BOTTOM OF DIAGONAL CURB RAMPS SHALL HAVE 48" (1220 MM) MINIMUM. IF DIAGONAL CURB RAMPS ARE PROVIDED AT MARKED CROSSINGS, THE 48" (1220 MM) CLEAR SPACE SHALL BE WITHIN THE MARKINGS. IF DIAGONAL CURB RAMPS HAVE FLARED SIDES, THEY SHALL ALSO HAVE AT LEAST A 24" (610 MM) LONG SEGMENT OF STRAIGHT CURB LOCATED ON EACH SIDE OF THE CURB RAMP AND WITHIN THE MARKED CROSSING. ANY RAISED ISLANDS IN CROSSINGS SHALL BE CUT THROUGH LEVEL WITH THE STREET OR HAVE CURB RAMPS AT BOTH SIDES AND A LEVEL AREA AT LEAST 48" (1220 MM) LONG BETWEEN THE CURB RAMPS IN THE PART OF THE ISLAND INTERSECTED BY THE CROSSINGS.

CONSTRUCTION

- (A.) THE CONTRACTOR SHALL SAWCUT, REMOVE AND DISPOSE OFF-SITE THE REQUIRED EXISTING CONCRETE SIDEWALK, CURB AND GUTTER, TO CONSTRUCT THE PROPOSED RAMPS.
- (B.) CONCRETE SIDEWALKS AND RAMPS SHALL BE MINIMUM 4" THICK, 4000 PSI, 5 SACK CONCRETE, REINFORCED WITH #3 BARS AT 14" CENTERS BOTH WAYS, PLACED OVER A 2" THICK SAND CUSHION EMBEDMENT.
- (C.) THE CONTRACTOR SHALL USE 1" PREMOLDED EXPANSION JOINT MATERIAL BETWEEN THE PROPOSED SIDEWALKS AND RAMPS AT THE BACK OF CURBS, AND AT JOINTS AT NO EXTRA PAY.
- (D.) DUMMY JOINT REQUIRED EVERY 4' IN 4' WIDE SIDEWALKS AND EVERY 5' IN 6' WIDE SIDEWALK.

Update and remove 2125A or update to reference other detail

CURB RAMPS

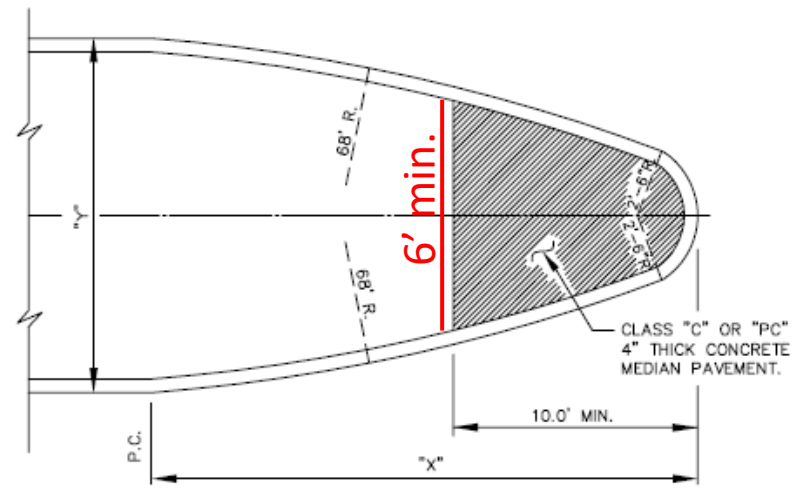
North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

DATE
OCT. '04

STANDARD DRAWING NO.
2125B



DIMENSIONS OF MEDIAN NOSE

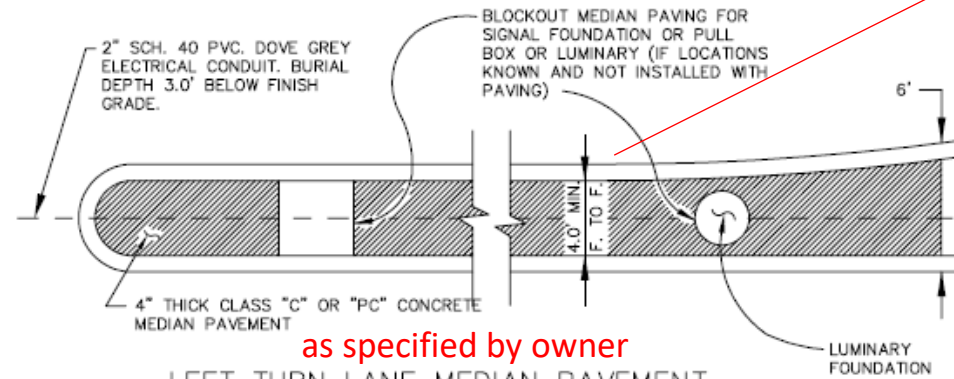
Y = 15'	X = 27.6'
Y = 16'	X = 28.8'
Y = 17'	X = 29.9'
Y = 18'	X = 30.9'

CONCRETE NOSE FOR MEDIAN ISLAND

N.T.S.

NOTE:

MEDIAN PAVING SHALL EXTEND TO POINT WHERE MEDIAN IS 6' WIDE. IF MEDIAN IS 6' WIDE, PAVING SHALL EXTEND 15' FROM NOSE. FOR MEDIANS WIDER THAN 6' PAVING SHALL EXTEND 10' FROM NOSE. ALL DISTANCES ARE MINIMUM.



LEFT TURN LANE MEDIAN PAVEMENT

N.T.S.

Move arrows to outside lines or change to "B. to B."

Move arrows to inside lines

MEDIAN ISLAND PAVEMENT

NOSE & LEFT TURN LANE

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

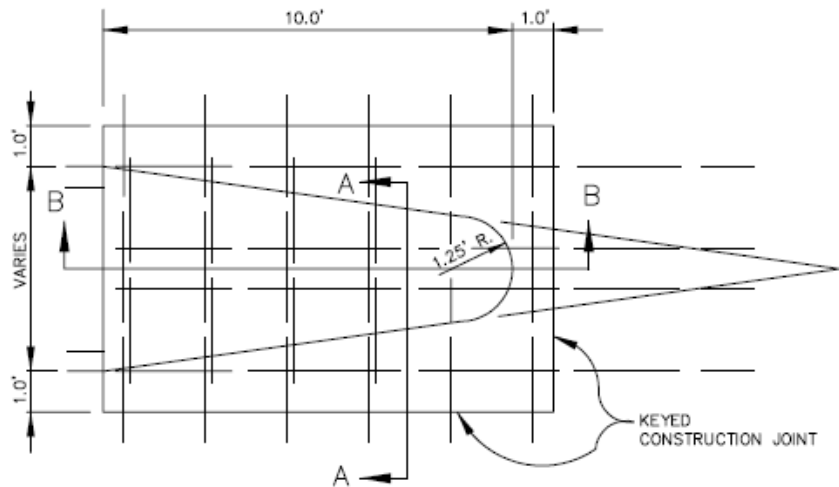
305.3

DATE

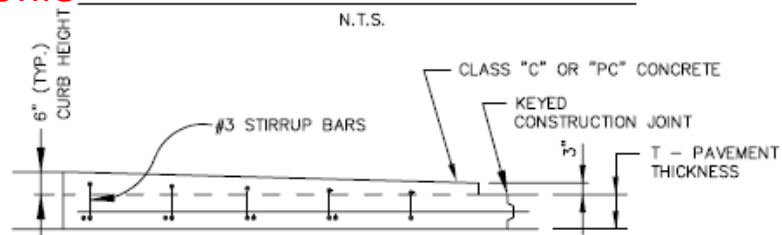
OCT. '04

STANDARD DRAWING NO.

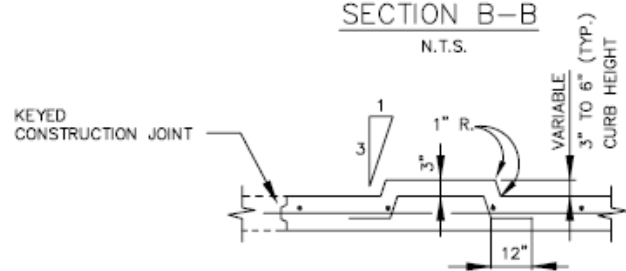
2130



Low profile MONOLITHIC CONCRETE MEDIAN NOSE
N.T.S.



SECTION B-B
N.T.S.



SECTION A-A
N.T.S.

As specified
by owner

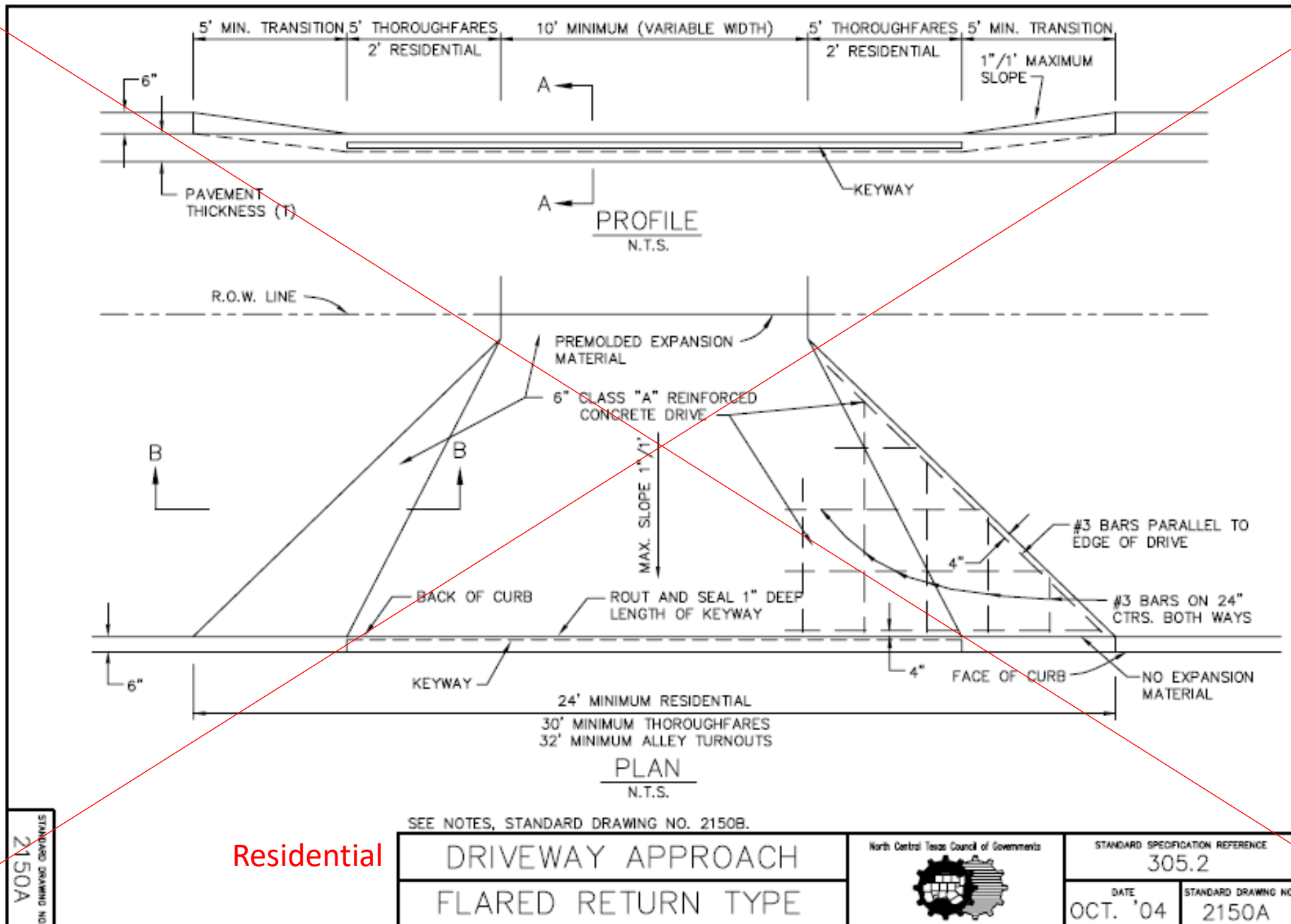
NOTE:
REINFORCEMENT BARS SHALL
MATCH THOSE IN PAVEMENT.

Use
Arlington
Drawings for
residential
driveway
approaches

Eliminate
keyway
joint

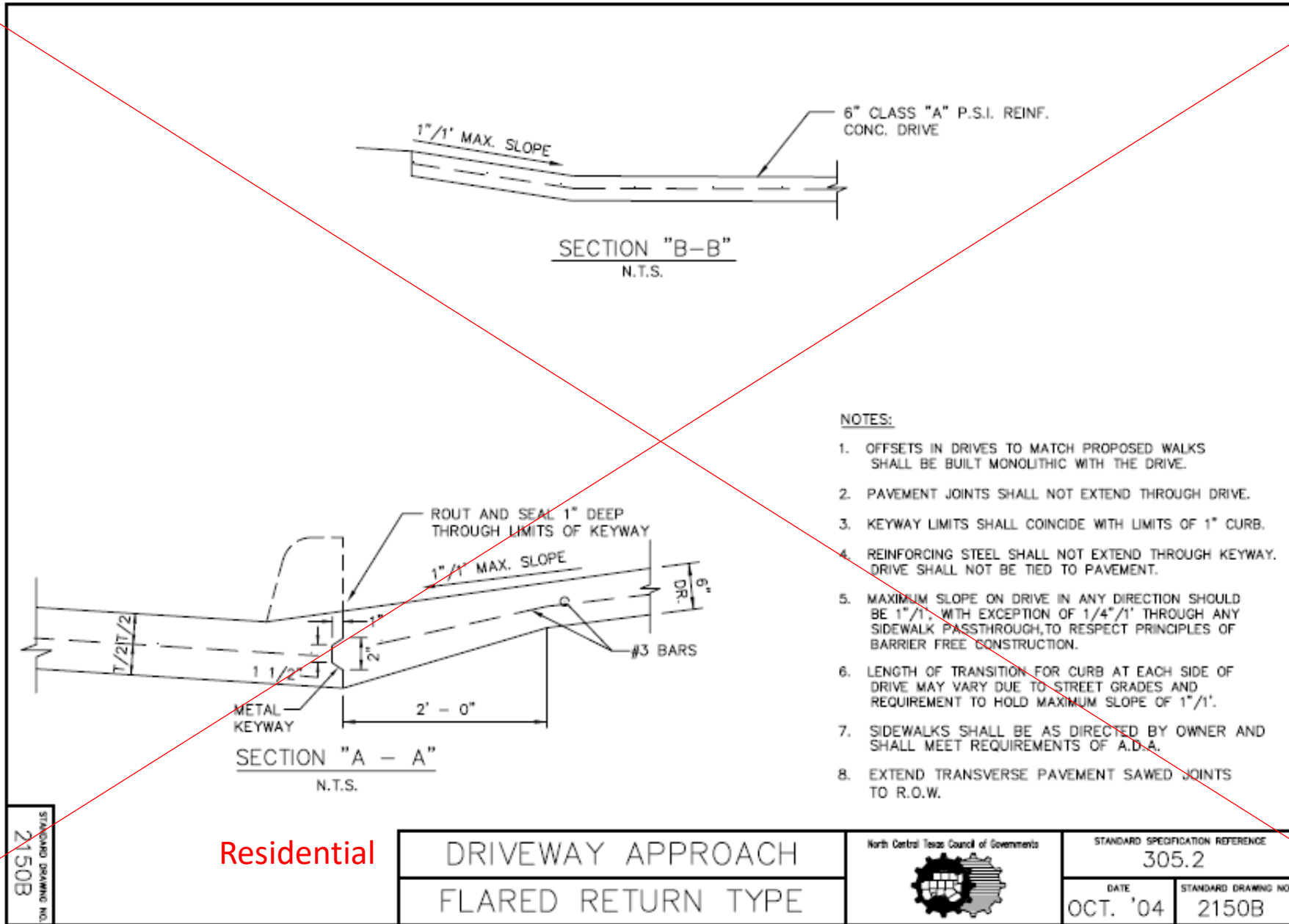
Update
2150, 2155,
2160 and to
include
residential,
commercial
and alley
approach

Show
doweling
as option



Use
Arlington
Drawings for
residential
driveway
approaches

Update
2150, 2155,
2160 and to
include
residential,
commercial
and alley
approach



STANDARD DRAWING NO.
2150B

Residential

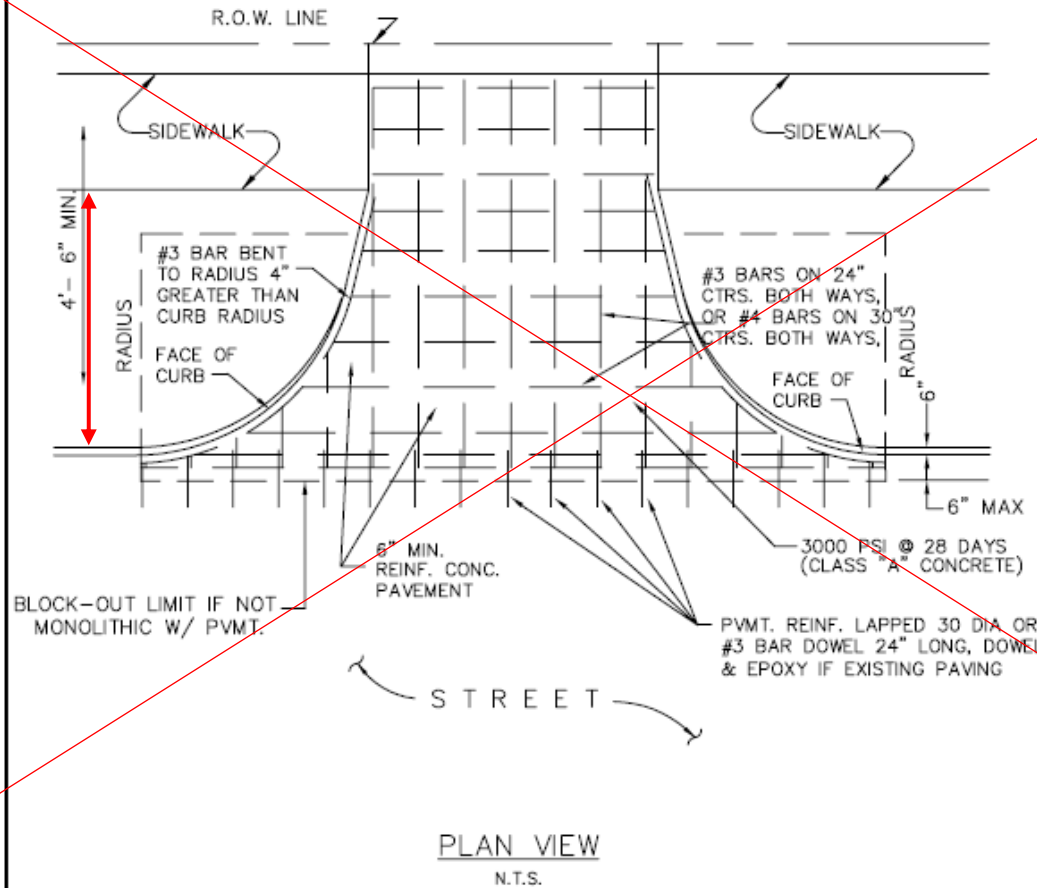
DRIVEWAY APPROACH
FLARED RETURN TYPE



STANDARD SPECIFICATION REFERENCE
305.2
DATE
OCT. '04
STANDARD DRAWING NO.
2150B

Use
Arlington
Drawings for
residential
driveway
approaches

Add cross section view like 2150A

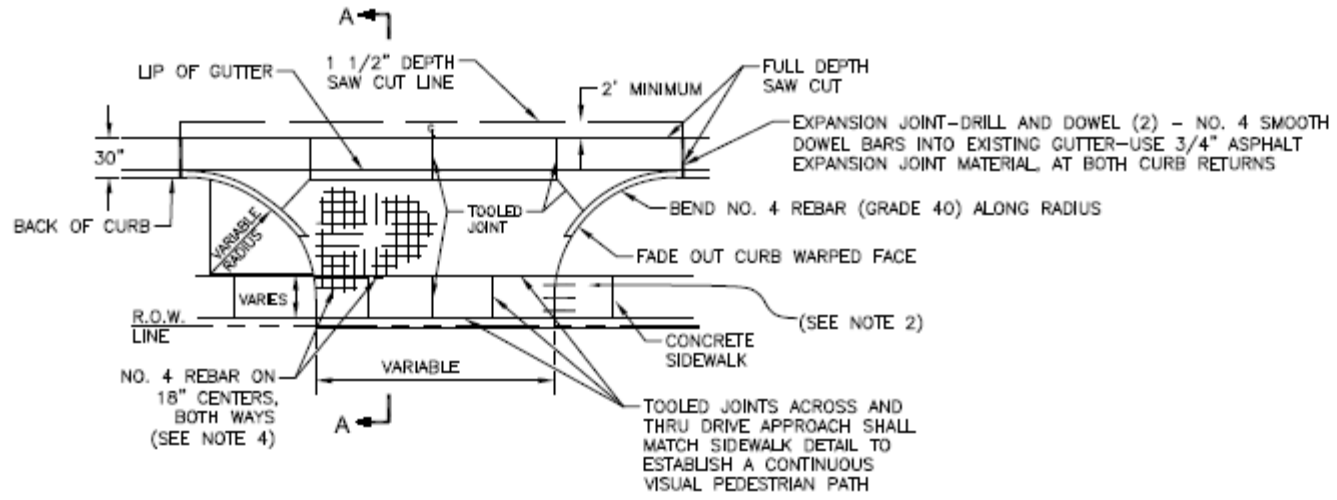


Residential

Update
2150, 2155,
2160 and to
include
residential,
commercial
and alley
approach

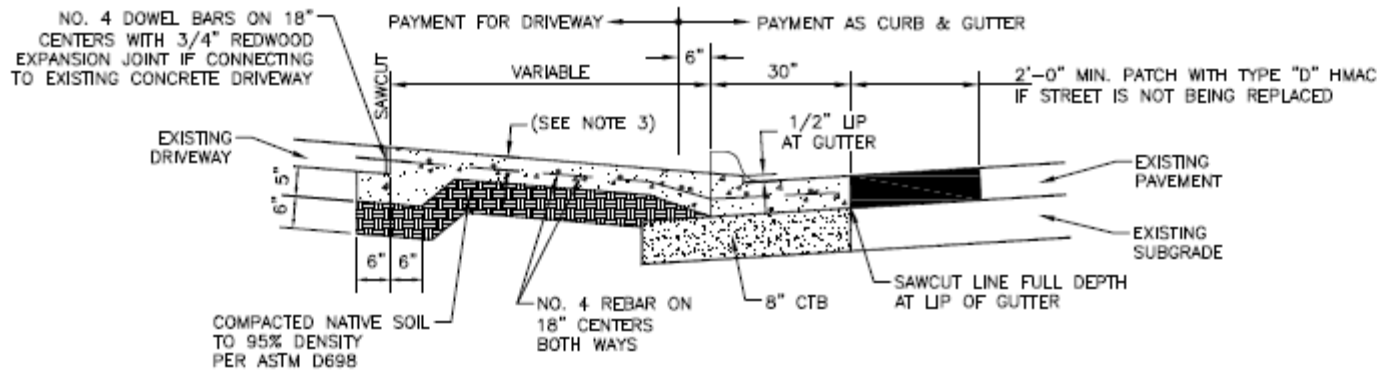
DRIVEWAY APPROACH RADIUS RETURN TYPE	North Central Texas Council of Governments 	STANDARD SPECIFICATION REFERENCE	
		DATE OCT. '04	STANDARD DRAWING NO. 2155

Use
Arlington
Drawings
for
residential
driveway
approaches



TYPICAL DRIVE APPROACH CONNECTING
TO ASPHALT STREETS WITH
CURB AND GUTTER

NTS REV: 8/15/17



SECTION 'A-A'
NTS

NOTES:

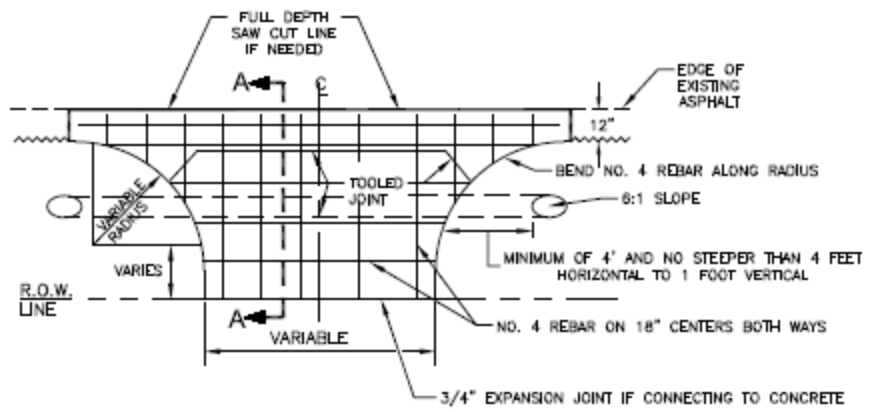
1. THE SLOPE OF THE DRIVE WHERE SIDEWALKS CROSS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%.
2. REMOVE ANY EXISTING SIDEWALK AT NEAREST JOINT AND CONNECT REPLACED SECTION TO DRIVE WITH (3) - NO. 4 SMOOTH DOWEL BARS ON 18" CENTERS WITH 3/4" REDWOOD EXPANSION JOINT, WITH 1" REMOVABLE CAP STRIP. SEAL WITH SELF LEVELING GRAY SILICONE SEALANT.
3.

	SLOPE (MAX)*	SLAB THICKNESS
RESIDENTIAL	6%	5"
ALL OTHERS	3%	6"
4. MAXIMUM SLOPE DESIGNATED FOR NEW DEVELOPMENT CONSTRUCTION ONLY AND DOES NOT APPLY TO CAPITAL IMPROVEMENT RECONSTRUCTION OR REBUILD PROJECTS.

(ALSO SEE THE DESIGN CRITERIA MANUAL FOR OTHER SPECIFIC CRITERIA.)
4. ALL CONNECTIONS TO STATE RIGHT-OF-WAY SHALL USE TXDOT DETAILS.
5. FOR CITY CAPITAL IMPROVEMENT PROJECTS, MEASUREMENT FOR DRIVEWAY QUANTITY BEGINS 6" FROM BACK OF CURB. MEASUREMENT OF CURB & GUTTER QUANTITY IS THROUGH THE DRIVE APPROACH.
6. ALL CURB AND GUTTER SHALL BE 30" UNLESS OTHERWISE DIRECTED BY THE CITY.
7. CONCRETE SHALL BE CLASS C, 5 1/2 SACK AND HAVE COMPRESSIVE STRENGTH OF 3600 PSI @ 28 DAYS.
8. IF STREET IS BEING REPLACED, PAVEMENT THICKNESS SHALL BE 6" FOR RESIDENTIAL AND 8" FOR COLLECTOR OR LARGER.

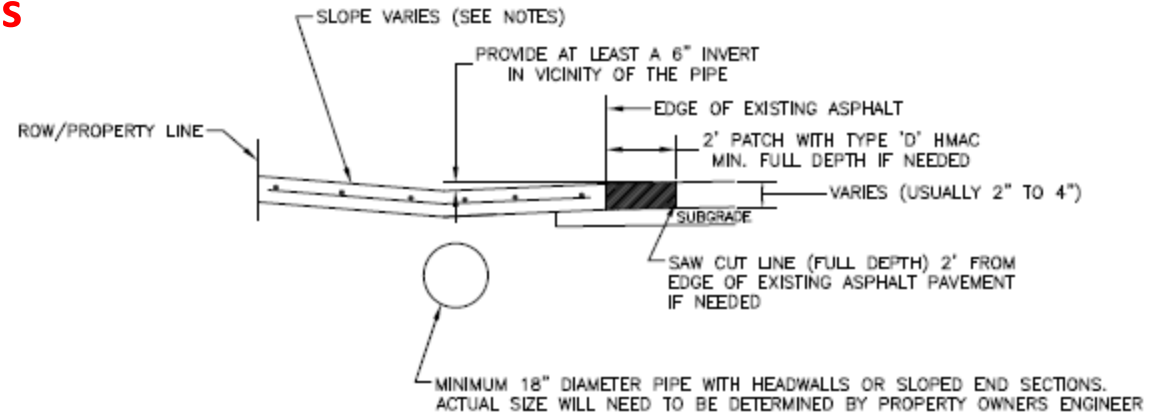
CITY OF ARLINGTON, TEXAS		
TYPICAL DRIVE APPROACH CONNECTING TO ASPHALT STREETS WITH CURB AND GUTTER		
DATE:	SCALE: FTS	SHEET OF
DESIGNED BY:	DRAWN BY:	CHECKED BY:

Use
Arlington
Drawings
for
residential
driveway
approaches



TYPICAL DRIVE APPROACH CONNECTING
TO EXISTING RURAL TYPE
ASPHALT STREETS

NTS REV: 8/22/17



SECTION A-A
NTS

NOTES:

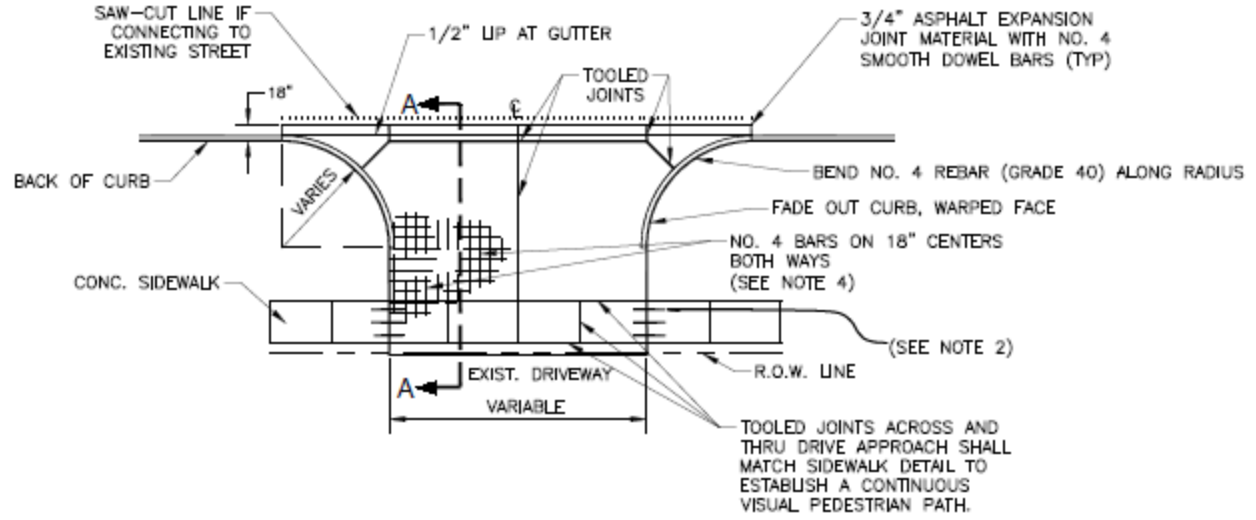
1. THE SLOPE OF THE DRIVE WHERE SIDEWALKS CROSS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%.
2.

RESIDENTIAL	SLOPE (MAX)*	SLAB THICKNESS
	6%	5"
ALL OTHERS	3%	6"
- * MAXIMUM SLOPE DESIGNATED FOR NEW DEVELOPMENT CONSTRUCTION ONLY AND DOES NOT APPLY TO CAPITAL IMPROVEMENT RECONSTRUCTION OR REBUILD PROJECTS.

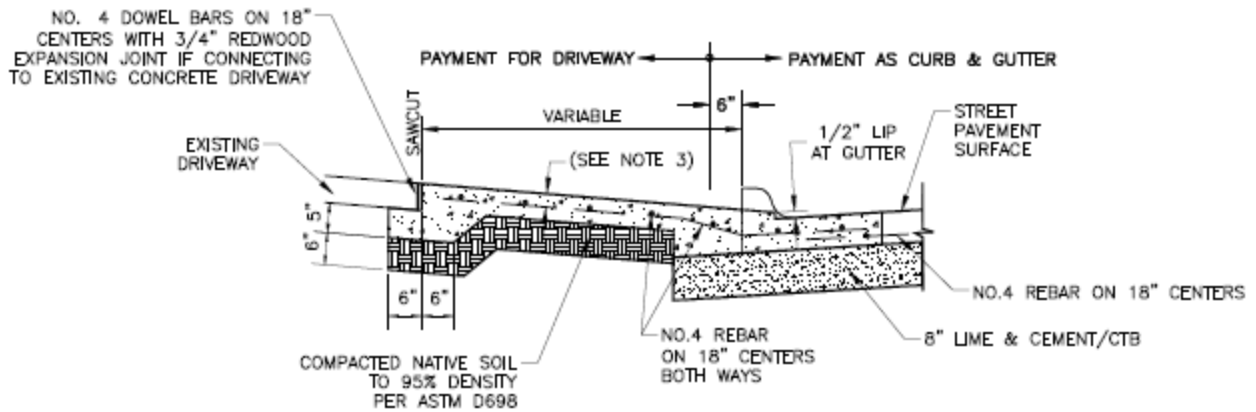
(ALSO SEE THE DESIGN CRITERIA MANUAL FOR OTHER SPECIFIC CRITERIA.)
3. ALL CONNECTIONS TO STATE RIGHT-OF-WAY SHALL USE TXDOT DETAILS.
4. CONCRETE SHALL BE CLASS C, 5 1/2 SACK AND HAVE COMPRESSIVE STRENGTH OF 3600 PSI @ 28 DAYS.
5. MINIMUM VELOCITY THROUGH PIPE IS 2.5fps. MINIMUM SLOPE IN PIPE IS 0.5% UNLESS OTHERWISE DESIGNED TO MEET MINIMUM SLOPE REQUIREMENTS.
6. IN SOME CASES A SWALE MAY BE PROVIDED IN LIEU OF THE PIPE. THE PROPERTY OWNER AND OWNER'S ENGINEER WILL NEED TO DETERMINE IF A SWALE CAN BE USED IN LIEU OF A PIPE.

CITY OF ARLINGTON, TEXAS		
TYPICAL DRIVE APPROACH CONNECTING TO EXISTING RURAL TYPE ASPHALT STREETS		
DATE	SCALE: NTS	SHEET OF
DESIGNED BY:	DRAWN BY:	CHECKED BY:

Use
Arlington
Drawings
for
residential
driveway
approaches



TYPICAL DRIVE APPROACH
ON A CONCRETE STREET
NTS REV: 1/17/20



SECTION 'A-A'
NTS

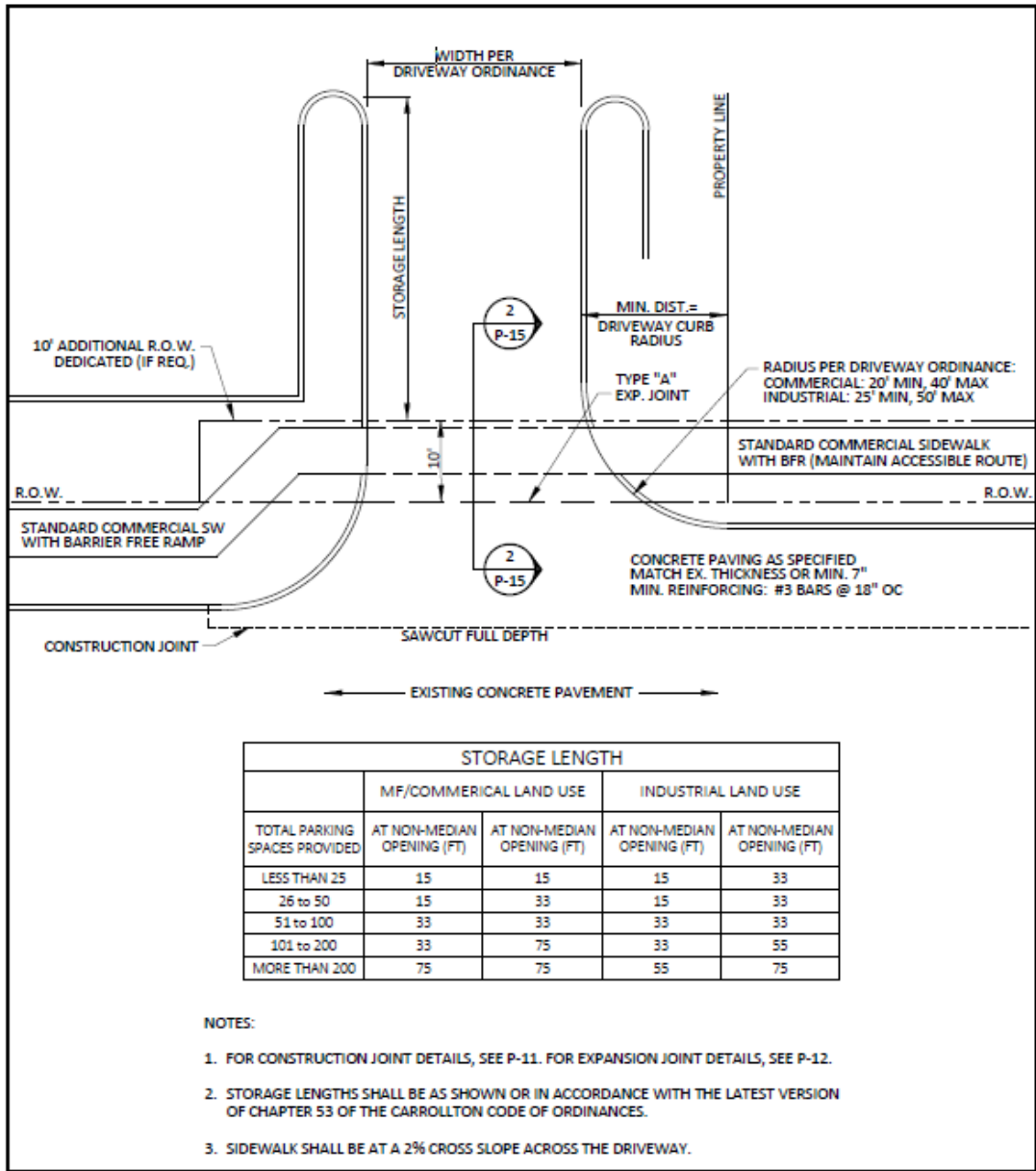
NOTES:

1. THE SLOPE OF THE DRIVE WHERE SIDEWALKS CROSS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%.
2. REMOVE ANY EXISTING SIDEWALK AT NEAREST JOINT AND CONNECT REPLACED SECTION TO DRIVE WITH (3) - NO. 4 SMOOTH DOWEL BARS ON 18" CENTERS WITH 3/4" REDWOOD EXPANSION JOINT WITH 1" REMOVABLE CAP STRIP. SEAL WITH SELF LEVELING GRAY SILICONE SEALANT.
3.

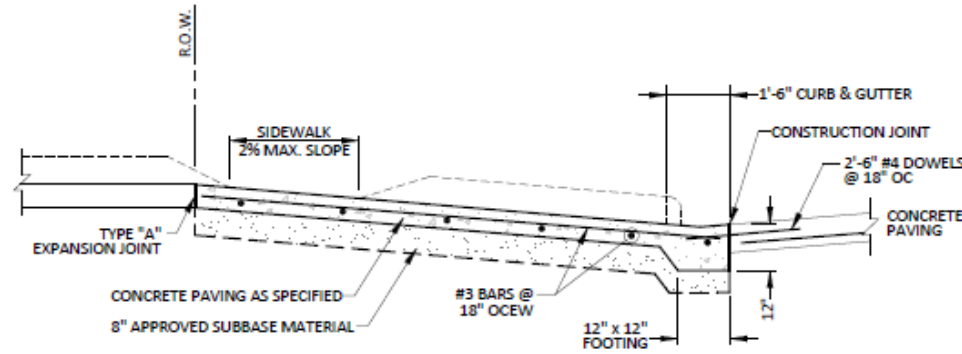
	SLOPE (MAX)	SLAB THICKNESS
RESIDENTIAL	6%	5"
ALL OTHERS	3%	6"
- * MAXIMUM SLOPE DESIGNATED FOR NEW DEVELOPMENT CONSTRUCTION ONLY AND DOES NOT APPLY TO CAPITAL IMPROVEMENT RECONSTRUCTION OR REBUILD PROJECTS.
(ALSO SEE THE DESIGN CRITERIA MANUAL FOR OTHER SPECIFIC CRITERIA.)
4. ALL CONNECTIONS TO STATE RIGHT-OF-WAY SHALL USE TxDOT DETAILS.
5. FOR PAYMENT, MEASUREMENT FOR DRIVEWAY QUANTITY BEGINS 6" FROM BACK OF CURB.
6. CONCRETE SHALL BE CLASS C, 5 1/2 SACK AND HAVE COMPRESSIVE STRENGTH OF 3600 PSI @ 28 DAYS.
7. IF CONSTRUCTING A DRIVEWAY ON AN EXISTING CONCRETE STREET, SAW-CUT (FULL DEPTH) AND CONNECT WITH EPOXY TIE BAR BUTT JOINT.
8. ALL REDWOOD EXPANSION JOINTS SHALL BE SEALED WITH SELF LEVELING GRAY SILICONE SEALANT.

CITY OF ARLINGTON, TEXAS		
TYPICAL DRIVE APPROACH ON A CONCRETE STREET		
DATE:	SCALE: FTS	SHEET OF
DESIGNED BY:	DRAWN BY:	CHECKED BY:

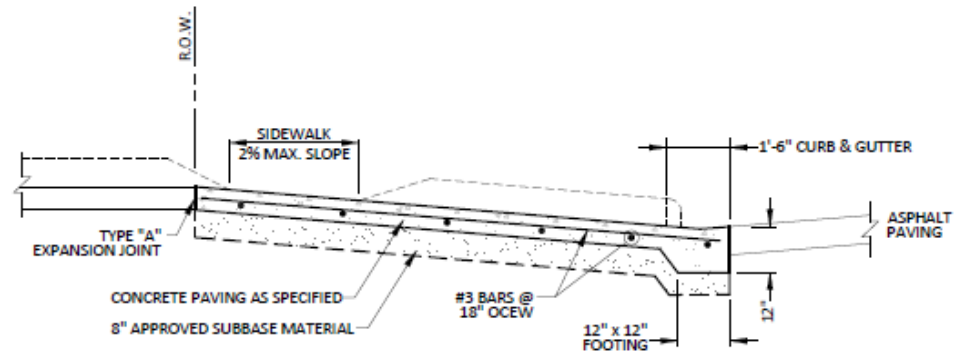
Use
Carrollton
Drawings
for
commercial
driveway
approaches



Use
Carrollton
Drawings
for
commercial
driveway
approaches



COMMERCIAL APPROACH (CONCRETE PAVING)



COMMERCIAL APPROACH (ASPHALT PAVING)

NOTE:
SEE P-18 FOR BARRIER FREE RAMP DETAIL.



GENERAL DESIGN STANDARDS
PAVING DETAILS

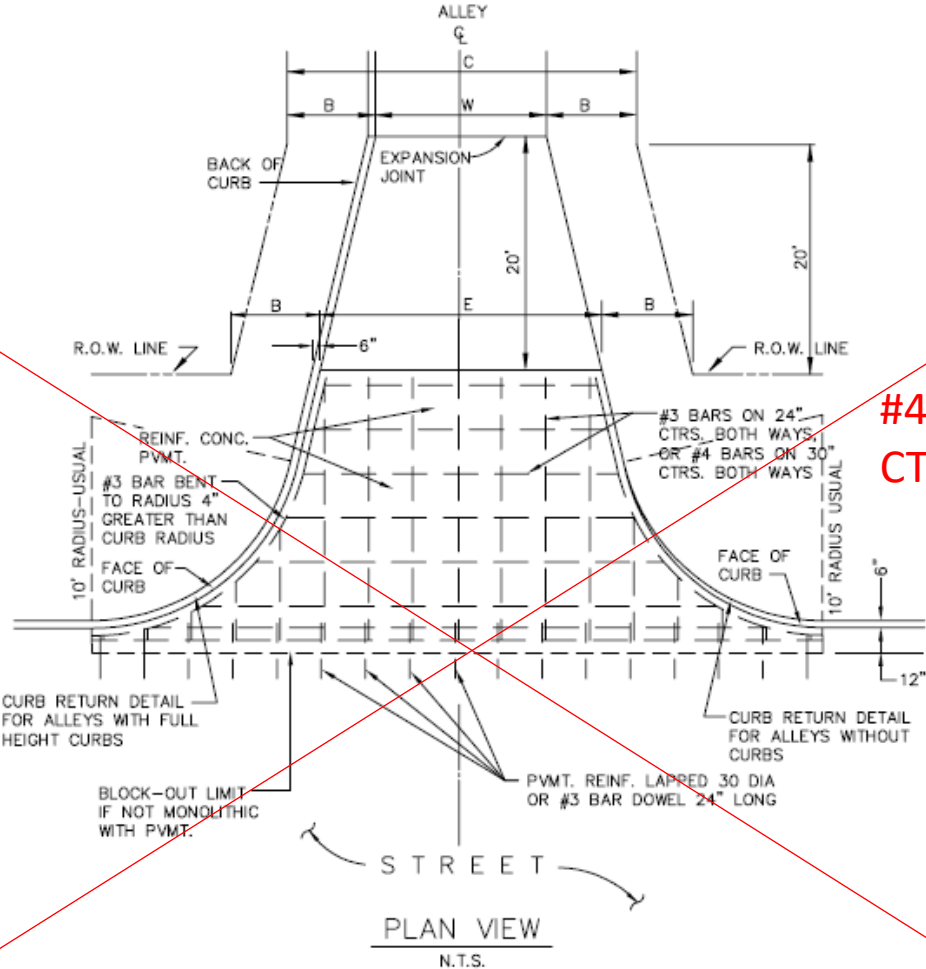
SCALE: NTS DATE: 05/2017
SHEET 2 OF 2

COMMERCIAL DRIVE APPROACH
CROSS SECTIONS

P-15
ENGINEERING
DEPARTMENT

Use Coppell Drawings for Alley driveway approaches

Update 2150, 2155, 2160 and to include residential, commercial and alley approach



#4 Bars on 18" CTRS?

Over 12% grade break is not recommended?

ALLEY WIDTH (W)	R.O.W. WIDTH (C)	B	E
10'	15'	2' - 6"	12'
12'	17'	2' - 6"	14'
16'	21'	2' - 6"	18'
20'	25'	2' - 6"	22'

Commercial Driveway

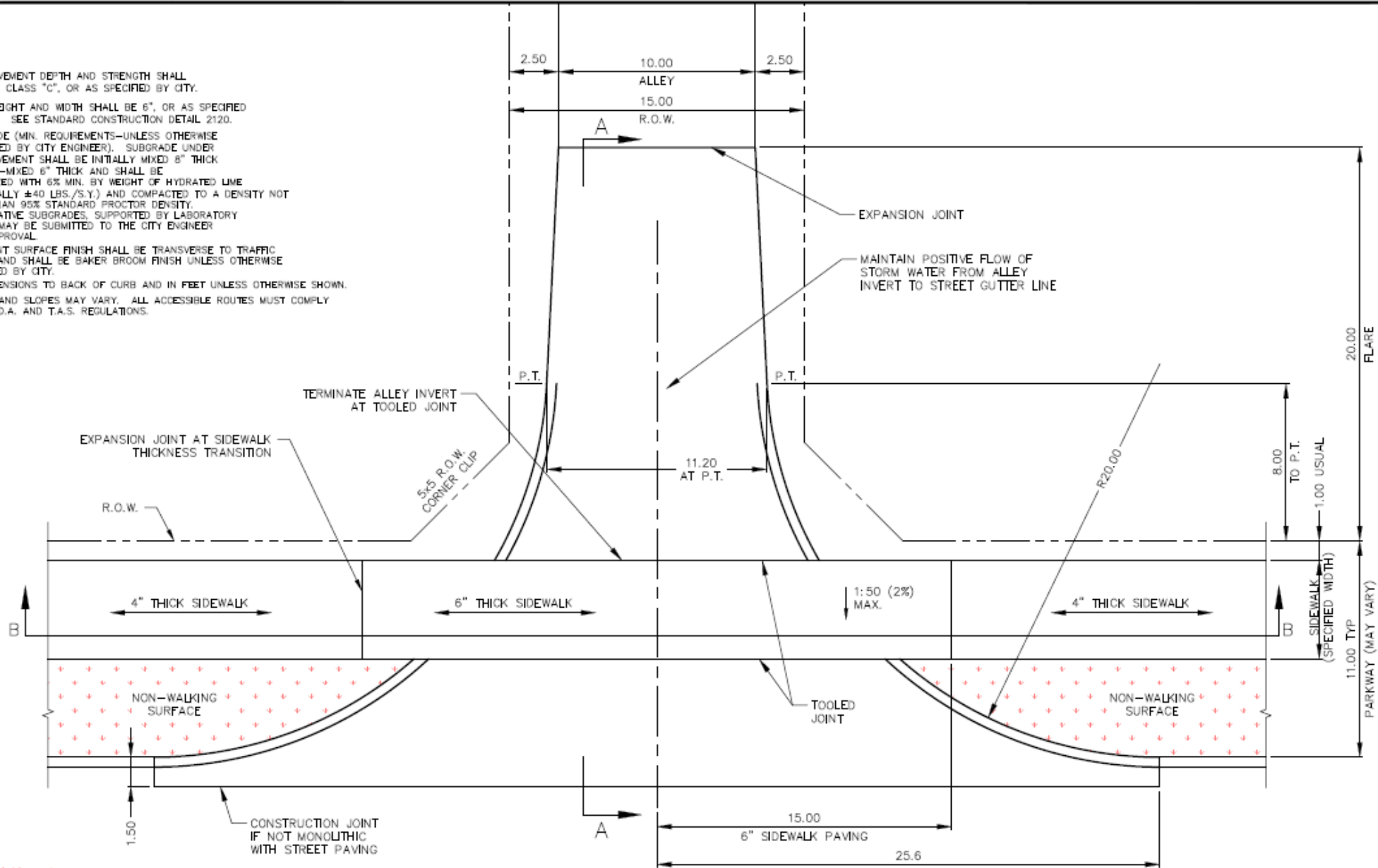
~~ALLEY~~ APPROACH
RADIUS RETURN TYPE



STANDARD SPECIFICATION REFERENCE
305.2
DATE
OCT. '04
STANDARD DRAWING NO.
2160

NOTES:

1. MIN. PAVEMENT DEPTH AND STRENGTH SHALL BE 6" - CLASS "C", OR AS SPECIFIED BY CITY.
2. CURB HEIGHT AND WIDTH SHALL BE 6", OR AS SPECIFIED BY CITY. SEE STANDARD CONSTRUCTION DETAIL 2120.
3. SUBGRADE (MIN. REQUIREMENTS—UNLESS OTHERWISE APPROVED BY CITY ENGINEER). SUBGRADE UNDER ALL PAVEMENT SHALL BE INITIALLY MIXED 8" THICK AND RE-MIXED 6" THICK AND SHALL BE STABILIZED WITH 6% MIN. BY WEIGHT OF HYDRATED LIME (GENERALLY ± 40 LBS./S.Y.) AND COMPACTED TO A DENSITY NOT LESS THAN 95% STANDARD PROCTOR DENSITY. ALTERNATIVE SUBGRADES, SUPPORTED BY LABORATORY TESTS, MAY BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.
4. PAVEMENT SURFACE FINISH SHALL BE TRANSVERSE TO TRAFFIC LANES AND SHALL BE BAKER BROOM FINISH UNLESS OTHERWISE SPECIFIED BY CITY.
5. ALL DIMENSIONS TO BACK OF CURB AND IN FEET UNLESS OTHERWISE SHOWN.
6. WIDTHS AND SLOPES MAY VARY. ALL ACCESSIBLE ROUTES MUST COMPLY WITH A.D.A. AND T.A.S. REGULATIONS.



Use Coppel Drawings for Alley approaches

North Central Texas Council of Governments



NOTE: STANDARDS ARE ADOPTED FROM THE NCTCOG STANDARD DRAWINGS DATED NOV. '96, WITH LOCAL EXCEPTIONS.

NO.	LOCAL EXCEPTION	BY	DATE



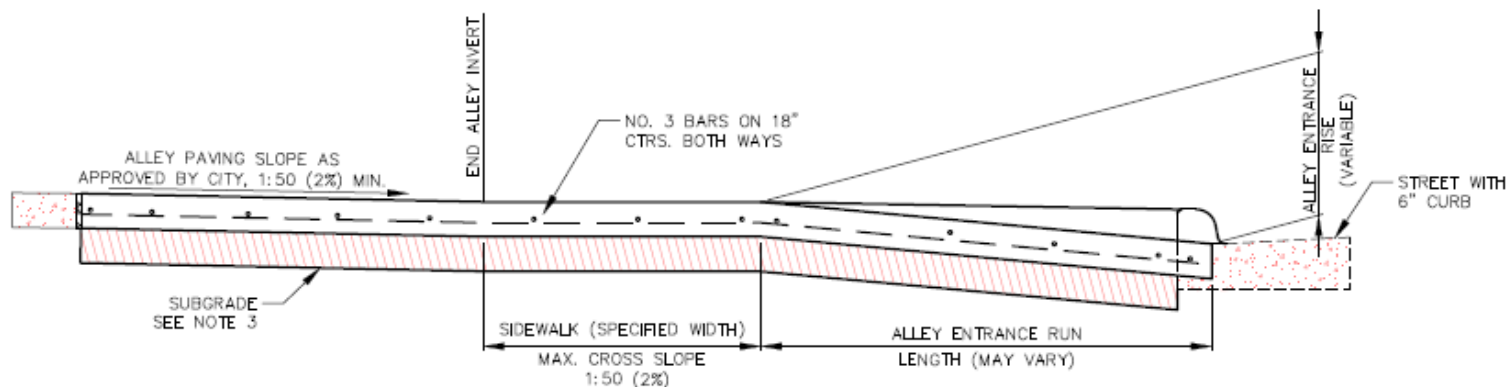
STANDARD CONSTRUCTION DETAILS

ALLEY APPROACH
RADIUS RETURN TYPE

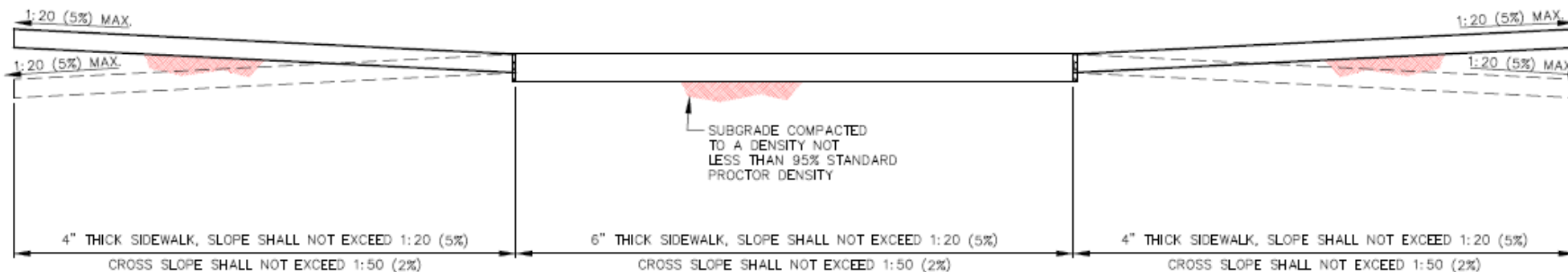
CITY OF COPPELL DALLAS COUNTY, TEXAS

STD. SPEC. REFERENCE
301., 303., 305.
STANDARD DETAIL
2160-1

Use Coppel
Drawings
for Alley
approaches



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

NOTES:

1. MIN. PAVEMENT DEPTH AND STRENGTH SHALL BE 6" - CLASS "C", OR AS SPECIFIED BY CITY.
2. CURB HEIGHT AND WIDTH SHALL BE 6", OR AS SPECIFIED BY CITY. SEE STANDARD CONSTRUCTION DETAIL 2120.
3. SUBGRADE (MIN. REQUIREMENTS-UNLESS OTHERWISE APPROVED BY CITY ENGINEER). SUBGRADE UNDER ALL PAVEMENT SHALL BE INITIALLY MIXED 8" THICK AND RE-MIXED 6" THICK AND SHALL BE STABILIZED WITH 6% MIN. BY WEIGHT OF HYDRATED LIME (GENERALLY ±40 LBS./S.Y.) AND COMPACTED TO A DENSITY NOT LESS THAN 95% STANDARD PROCTOR DENSITY. ALTERNATIVE SUBGRADES, SUPPORTED BY LABORATORY TESTS, MAY BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.

North Central Texas Council of Governments



NOTE: STANDARDS ARE ADOPTED FROM THE NCTCOG STANDARD DRAWINGS DATED NOV. '96, WITH LOCAL EXCEPTIONS.

NO.	ADDED NOTES	LOCAL EXCEPTION	SWL	JUL '14
			BY	DATE



STANDARD CONSTRUCTION DETAILS

ALLEY APPROACH
RADIUS RETURN TYPE

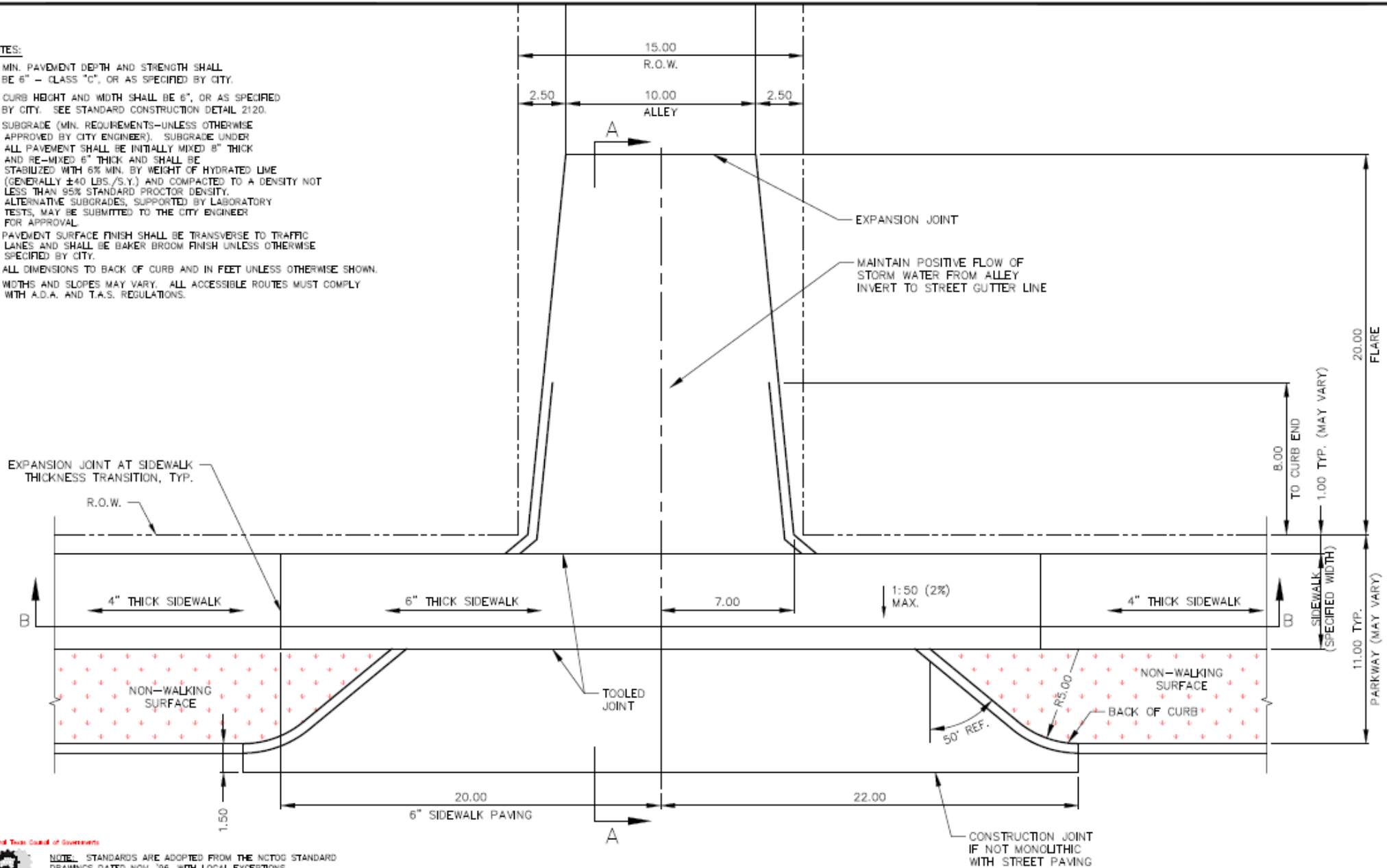
CITY OF COPPELL DALLAS COUNTY, TEXAS

STD. SPEC.
REFERENCE
301., 303., 305.

STANDARD DETAIL
2160-2

NOTES:

1. MIN. PAVEMENT DEPTH AND STRENGTH SHALL BE 6" - CLASS "C", OR AS SPECIFIED BY CITY.
2. CURB HEIGHT AND WIDTH SHALL BE 6", OR AS SPECIFIED BY CITY. SEE STANDARD CONSTRUCTION DETAIL 2120.
3. SUBGRADE (MIN. REQUIREMENTS—UNLESS OTHERWISE APPROVED BY CITY ENGINEER). SUBGRADE UNDER ALL PAVEMENT SHALL BE INITIALLY MIXED 8" THICK AND RE-MIXED 6" THICK AND SHALL BE STABILIZED WITH 6% MIN. BY WEIGHT OF HYDRATED LIME (GENERALLY ±40 LBS./S.Y.) AND COMPACTED TO A DENSITY NOT LESS THAN 95% STANDARD PROCTOR DENSITY. ALTERNATIVE SUBGRADES, SUPPORTED BY LABORATORY TESTS, MAY BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.
4. PAVEMENT SURFACE FINISH SHALL BE TRANSVERSE TO TRAFFIC LANES AND SHALL BE BAKER BRUSH FINISH UNLESS OTHERWISE SPECIFIED BY CITY.
5. ALL DIMENSIONS TO BACK OF CURB AND IN FEET UNLESS OTHERWISE SHOWN.
6. WIDTHS AND SLOPES MAY VARY. ALL ACCESSIBLE ROUTES MUST COMPLY WITH A.D.A. AND T.A.S. REGULATIONS.



Use Coppell Drawings for Alley approaches

North Central Texas Council of Governments



NOTE: STANDARDS ARE ADOPTED FROM THE NCTCOG STANDARD DRAWINGS DATED NOV. '96, WITH LOCAL EXCEPTIONS.

NO.	LOCAL EXCEPTION	BY	DATE



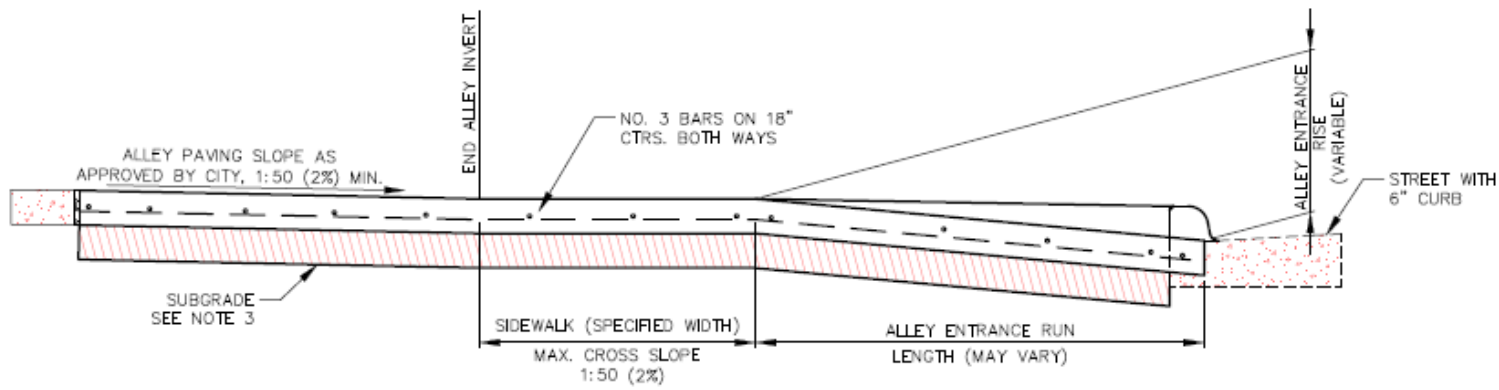
STANDARD CONSTRUCTION DETAILS

ALLEY APPROACH REPLACEMENT
FLARED TYPE

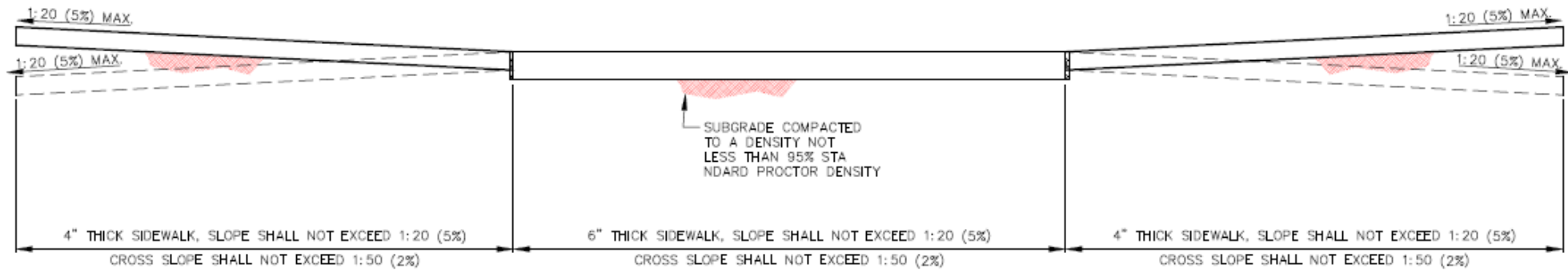
CITY OF COPPELL DALLAS COUNTY, TEXAS

STD. SPEC. REFERENCE
301., 303., 305.
STANDARD DETAIL
2165-1

Use Coppel Drawings for Alley approaches



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

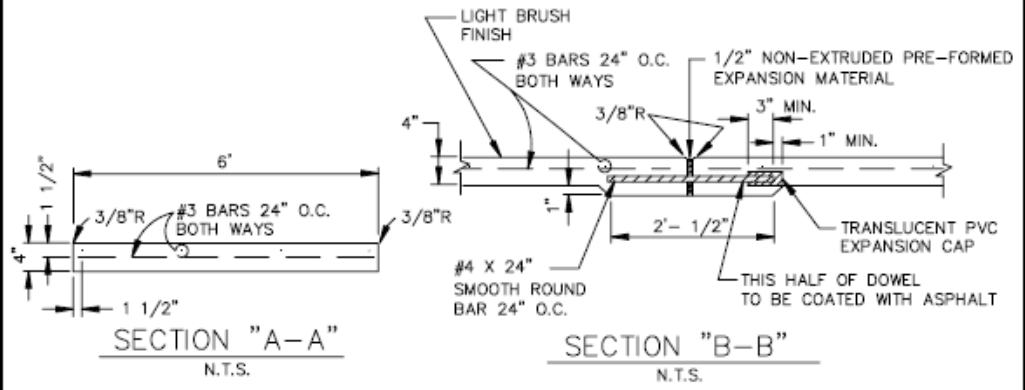
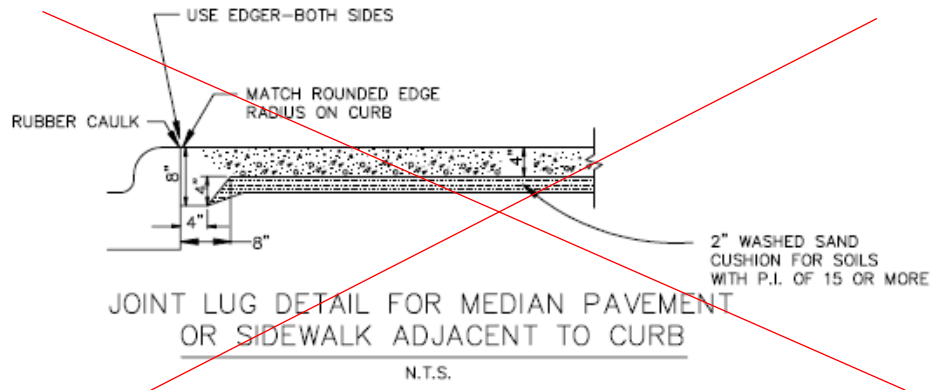
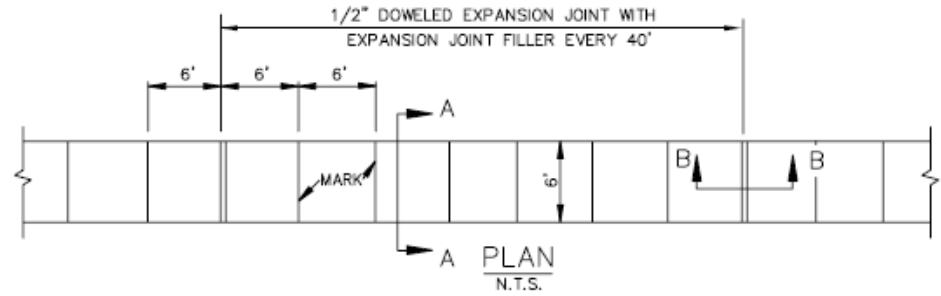
- NOTES:
1. MIN. PAVEMENT DEPTH AND STRENGTH SHALL BE 6" - CLASS "C", OR AS SPECIFIED BY CITY.
 2. CURB HEIGHT AND WIDTH SHALL BE 6", OR AS SPECIFIED BY CITY. SEE STANDARD CONSTRUCTION DETAIL 2120.
 3. SUBGRADE (MIN. REQUIREMENTS-UNLESS OTHERWISE APPROVED BY CITY ENGINEER). SUBGRADE UNDER ALL PAVEMENT SHALL BE INITIALLY MIXED 5" THICK AND RE-MIXED 6" THICK AND SHALL BE STABILIZED WITH 6% MIN. BY WEIGHT OF HYDRATED LIME (GENERALLY ±40 LBS./S.Y.) AND COMPACTED TO A DENSITY NOT LESS THAN 95% STANDARD PROCTOR DENSITY. ALTERNATIVE SUBGRADES, SUPPORTED BY LABORATORY TESTS, MAY BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.

North Central Texas Council of Governments

 NOTE: STANDARDS ARE ADOPTED FROM THE NCTCOG STANDARD DRAWINGS DATED NOV. '96, WITH LOCAL EXCEPTIONS.

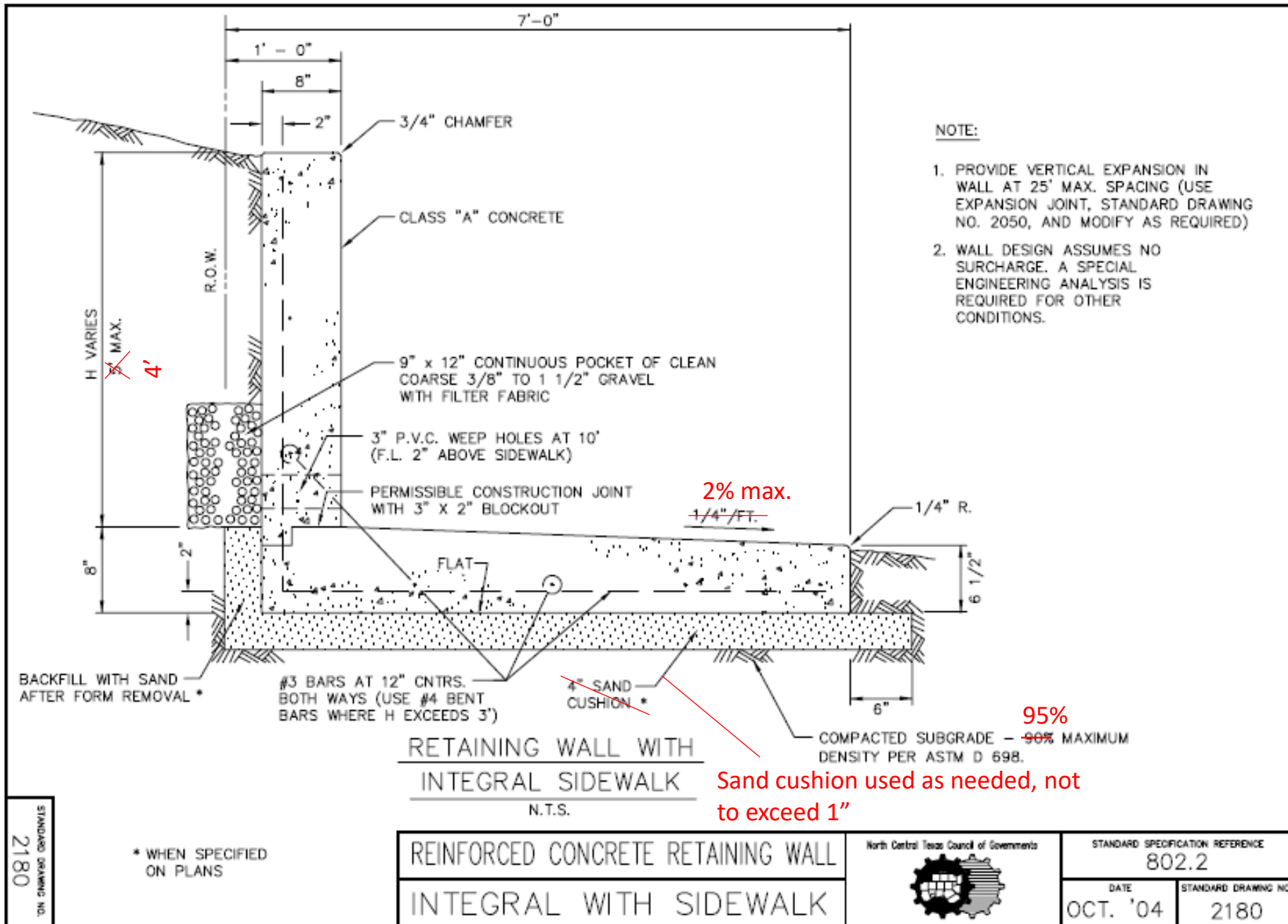
NO.	ADDED NOTES	LOCAL EXCEPTION	BY	DATE
			SWL	JUL '14

	STANDARD CONSTRUCTION DETAILS	STD. SPEC. REFERENCE
	ALLEY APPROACH REPLACEMENT FLARED TYPE	301., 303., 305.
	CITY OF COPPELL DALLAS COUNTY, TEXAS	STANDARD DETAIL 2165-2



- NOTE:
1. REFER TO STANDARD SPECIFICATION ITEM 305.2 FOR ALTERNATE REINFORCEMENT.
 2. CROSS SLOPE OF SIDEWALK SHALL BE ~~1/4" PER FT. MIN. TO 3/8" PER FT. MAX.~~ **2% max.**
 3. OTHER THAN 6'-0" SIDEWALK WIDTH MAY BE SPECIFIED BY OWNER.
 4. SIDEWALK SHALL BE CLASS "A" CONCRETE UNLESS OTHERWISE SPECIFIED BY OWNER. **Class C**
 5. ALL HONEYCOMB IN BACK OF CURB TO BE TROWEL-PLASTERED BEFORE POURING SIDEWALK.
 6. LUG MAY BE FORMED BY SHAPING SUBGRADE TO APPROXIMATE DIMENSIONS SHOWN.

REINFORCED CONCRETE SIDEWALKS	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE	
		305.2	
JOINTS AND SPACING		DATE	STANDARD DRAWING NO.
		OCT. '04	2170



GENERAL NOTES:

1. REINFORCED CONCRETE PAVEMENT:
 - A. ALL CURBS SHALL BE PLACED INTEGRAL WITH PAVEMENT UNLESS OTHERWISE APPROVED BY THE OWNER.
 - B. CURBS SHALL MEET THE SAME COMPRESSIVE STRENGTH AS SPECIFIED FOR THE PAVEMENT.
 - C. BAR LAPS SHALL BE 30 DIAMETERS.
 - D. REINFORCING BARS SHALL BE SUPPORTED BY CHAIRS OR OTHER DEVICES APPROVED BY THE OWNER.

2. SUBGRADE: (UNLESS OTHERWISE SPECIFIED BY OWNER)
 - A. SUBGRADE UNDER ALL PAVEMENTS SHALL BE STABILIZED TO A MINIMUM DEPTH OF 6" WITH HYDRATED LIME OR CEMENT WHEN THE P.I. OF THE INPLACE MATERIAL IS GREATER THAN 15. LABORATORY TESTS MUST BE PERFORMED TO DETERMINE THE AMOUNT OF LIME OR CEMENT REQUIRED TO LOWER THE P.I. TO 15 OR BELOW. SATURATION P.I. (PH \geq 12.4) WILL BE THE LIMIT WHEN A SOIL'S P.I. CANNOT BE BROUGHT TO 15 OR LOWER.

 - B. WHERE THE INPLACE MATERIAL HAS A P.I. OF LESS THAN 15, THE SUBGRADE SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 6" AND RECOMPACTED.

3. IF THE ROADWAY IS A DESIGNATED BIKE ROUTE OR BIKE USAGE IS ANTICIPATED, REFER TO NCTCOG'S REGIONAL BICYCLE AND PEDESTRIAN FACILITIES DESIGN MANUAL FOR DESIGN GUIDANCE.

C. Where sulfates are present, consult a geotechnical engineer for recommended subgrade treatment

If the PI is 15 or greater lime shall be used, if the PI is less than 15 cement shall be used or as recommended by a geotech engineer

American Association of State Highway and Transportation Officials **AASHTO Guide for the Development of Bicycle Facilities (2012, 4th Edition)** or the Texas Manual on Uniform Traffic Control Devices (TMUTCD) :
https://mutcd.fhwa.dot.gov/resources/state_info/texas/tx.htm

PAVEMENT SYSTEMS

GENERAL NOTES

North Central Texas Council of Governments



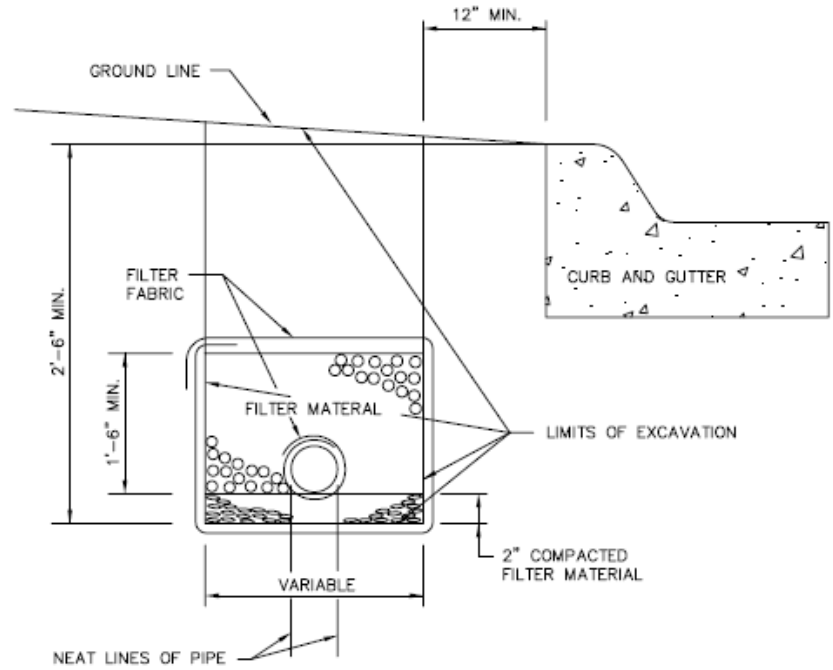
STANDARD SPECIFICATION REFERENCE

302,303

DATE
OCT. '04

STANDARD DRAWING NO.
~~2190~~

2115



SECTION
N.T.S.

LIMITS OF EXCAVATION

DEPTH OF TRENCH (FT.)	DIST. IN FT. OUTSIDE NEAT LINES OF PIPE SUBDRAIN
0 TO 6	1.00
6 TO 10	1.50
10 TO 15	2.00
OVER 15	2.50

FILTER MATERIAL SPECIFICATIONS

SIEVE SIZE	PERCENTAGE RETAINED ON SIEVE	
	TYPE A	TYPE B
1 1/2	---	0 - 10
3/4	0 - 10	20 - 40
3/8	15 - 35	---
NO. 4	35 - 55	40 - 60

TYPES OF PIPE ACCEPTABLE FOR USE AS SUBDRAIN

- ~~1. PERFORATED CORRUGATED METAL PIPE.~~
2. PERFORATED PVC PIPE.
3. PERFORATED POLYETHYLENE PIPE.

MATERIAL FINER THAN NO. 4 SIEVE

4	---
20	35 - 65
50	75 - 100

SUBDRAINS

PAVEMENT SUBGRADE

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

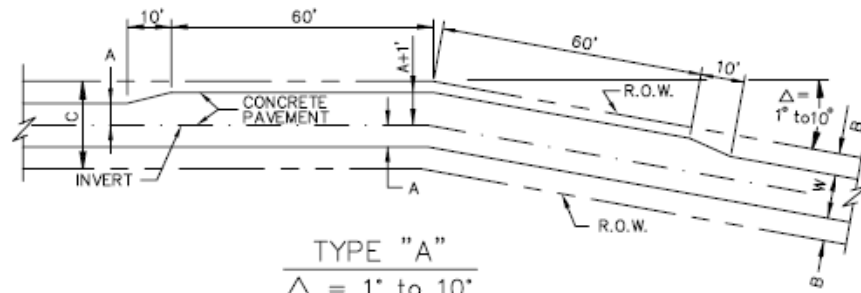
301

DATE

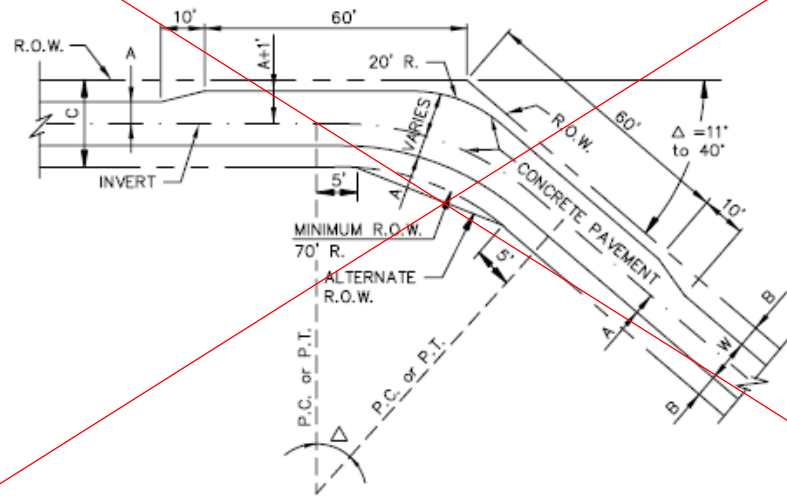
OCT. '04

STANDARD DRAWING NO.

2200



TYPE "A"
 $\Delta = 1'' \text{ to } 10''$
 N.T.S.



TYPE "B"
 $\Delta = 11'' \text{ to } 40''$
 N.T.S.

NOTES:

1. DIMENSIONS W, C, A, AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. DWG. NO. 2040.

ALLEY GEOMETRICS

TYPE "A" & TYPE "B"

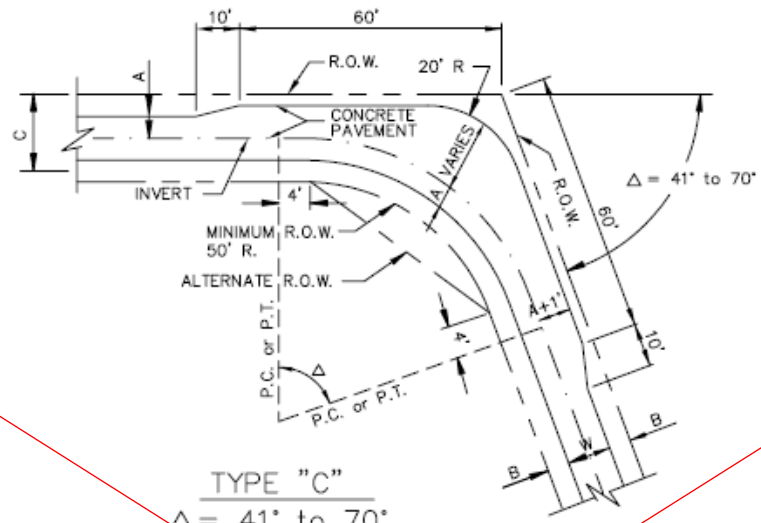
North Central Texas Council of Governments



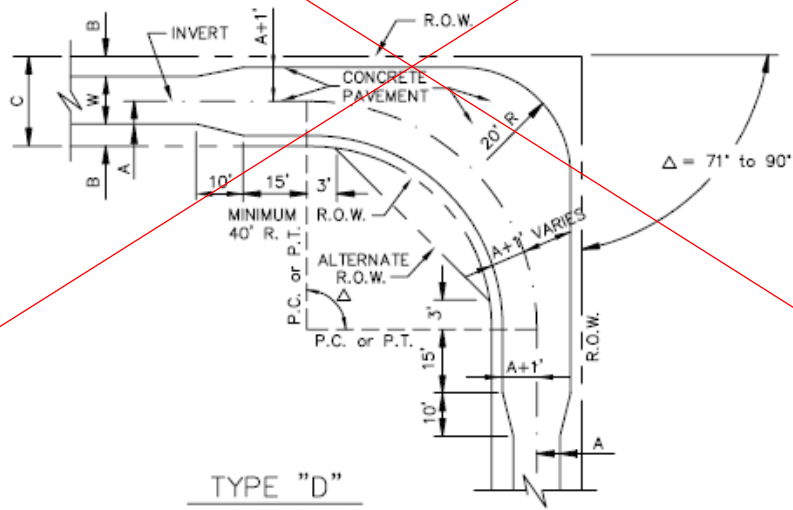
STANDARD SPECIFICATION REFERENCE
 303.5

DATE
 OCT. '04

STANDARD DRAWING NO.
 2210



TYPE "C"
 $\Delta = 41^\circ \text{ to } 70^\circ$
 N.T.S.



TYPE "D"
 $\Delta = 71^\circ \text{ to } 90^\circ$
 N.T.S.

NOTES:

1. DIMENSIONS W, C, A, AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. DWG. NO. 2040.

ALLEY GEOMETRICS

TYPE "C" & TYPE "D"

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

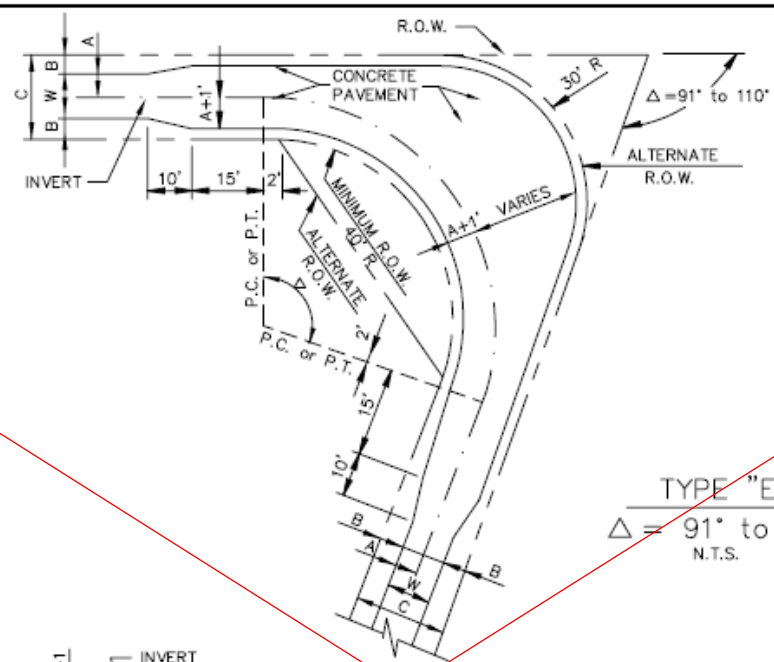
303.5

DATE

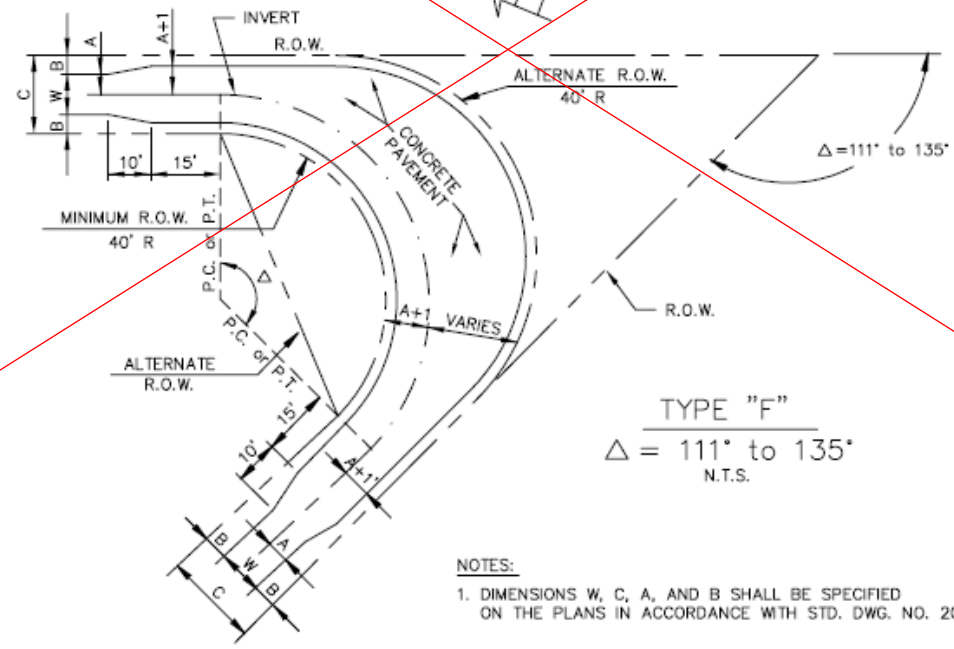
OCT. '04

STANDARD DRAWING NO.

2220



TYPE "E"
 $\Delta = 91^\circ \text{ to } 110^\circ$
 N.T.S.



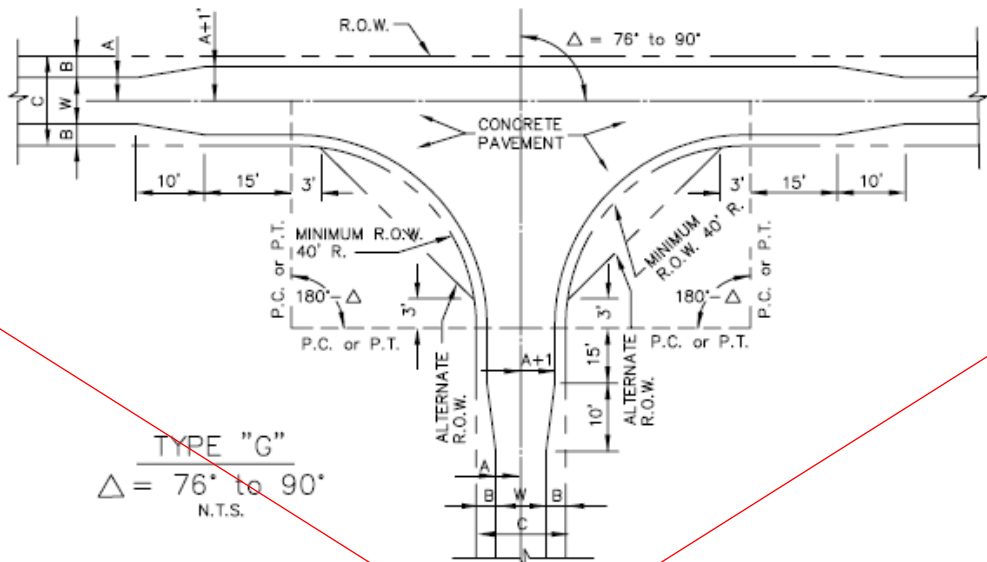
TYPE "F"
 $\Delta = 111^\circ \text{ to } 135^\circ$
 N.T.S.

NOTES:
 1. DIMENSIONS W, C, A, AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. DWG. NO. 2040.

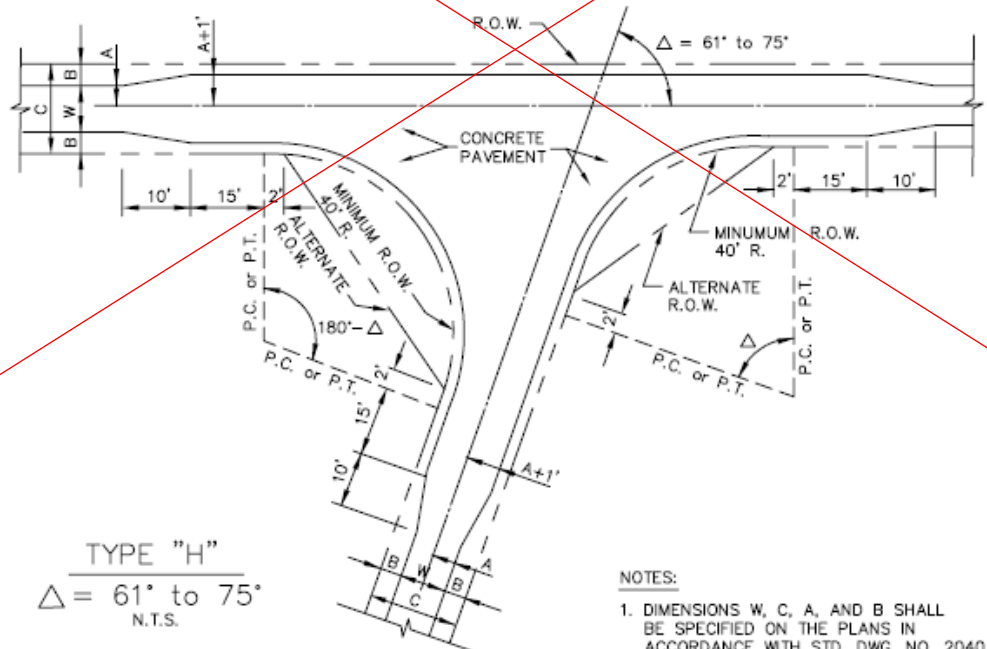
ALLEY GEOMETRICS
 TYPE "E" & TYPE "F"



STANDARD SPECIFICATION REFERENCE	
303.5	
DATE	STANDARD DRAWING NO.
OCT. '04	2230



TYPE "G"
 $\Delta = 76^\circ \text{ to } 90^\circ$
 N.T.S.



TYPE "H"
 $\Delta = 61^\circ \text{ to } 75^\circ$
 N.T.S.

NOTES:
 1. DIMENSIONS W, C, A, AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. DWG. NO. 2040.

ALLEY GEOMETRICS

TYPE "G" & TYPE "H"

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

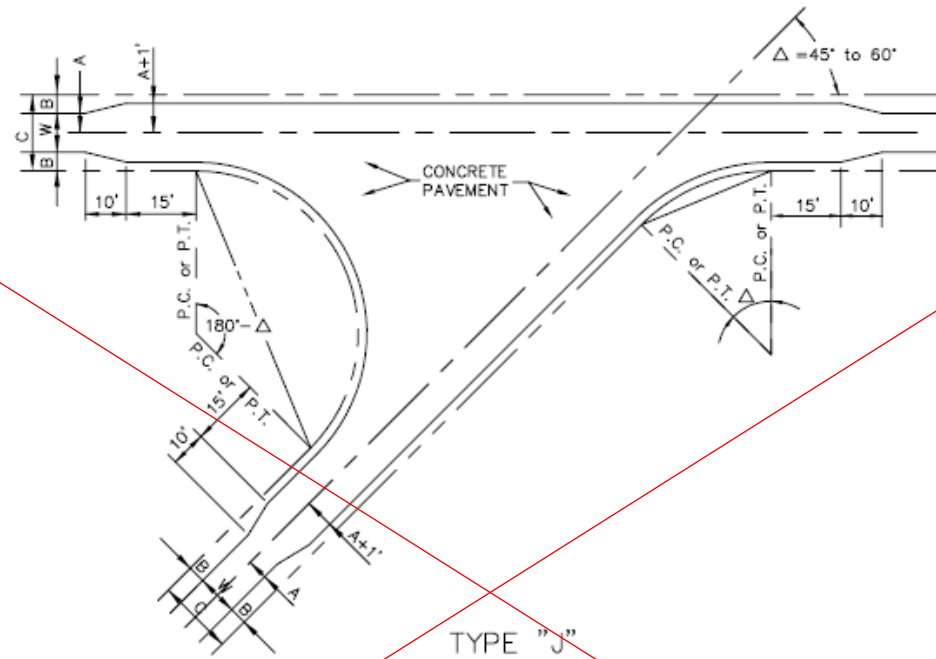
303.5

DATE

OCT. '04

STANDARD DRAWING NO.

2240



TYPE "J"
 $\Delta = 45^\circ$ to 60°
 N.T.S.

NOTES:

1. DIMENSIONS W, C, A, AND B SHALL BE SPECIFIED ON THE PLANS IN ACCORDANCE WITH STD. DWG. NO. 2040.

ALLEY GEOMETRICS

TYPE "J"

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

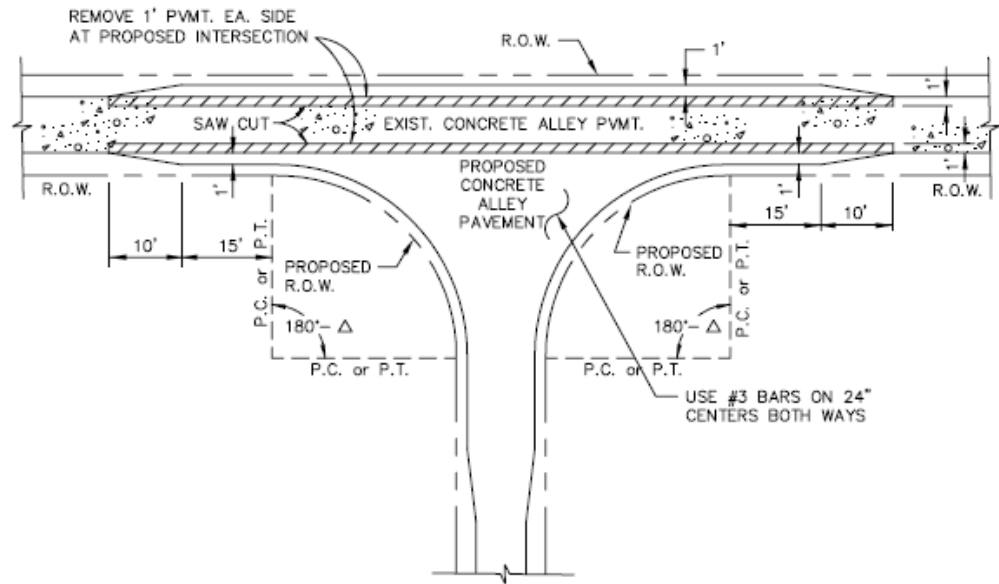
303.5

DATE

OCT. '04

STANDARD DRAWING NO.

2250



INTERSECTION OF PROPOSED ALLEY
WITH EXISTING ALLEY PAVEMENT
N.T.S.

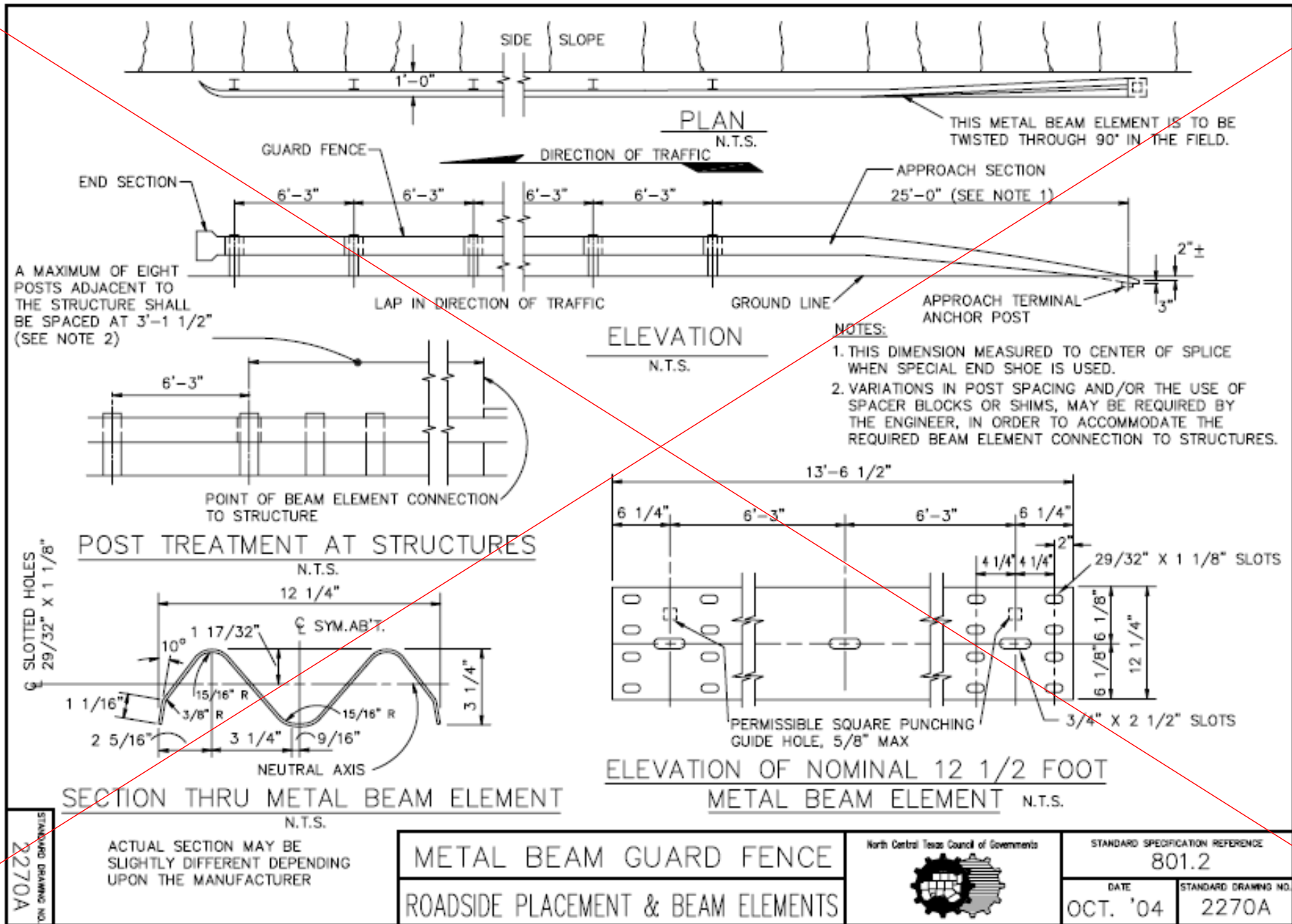
NOTE:
GEOMETRICS OF PROPOSED ALLEY SHALL
BE SHOWN ON THE PLANS IN ACCORDANCE
WITH TYPE "G", "H", OR "J".

Make sure this
matches the
updated Alley
Approaches from
Coppell

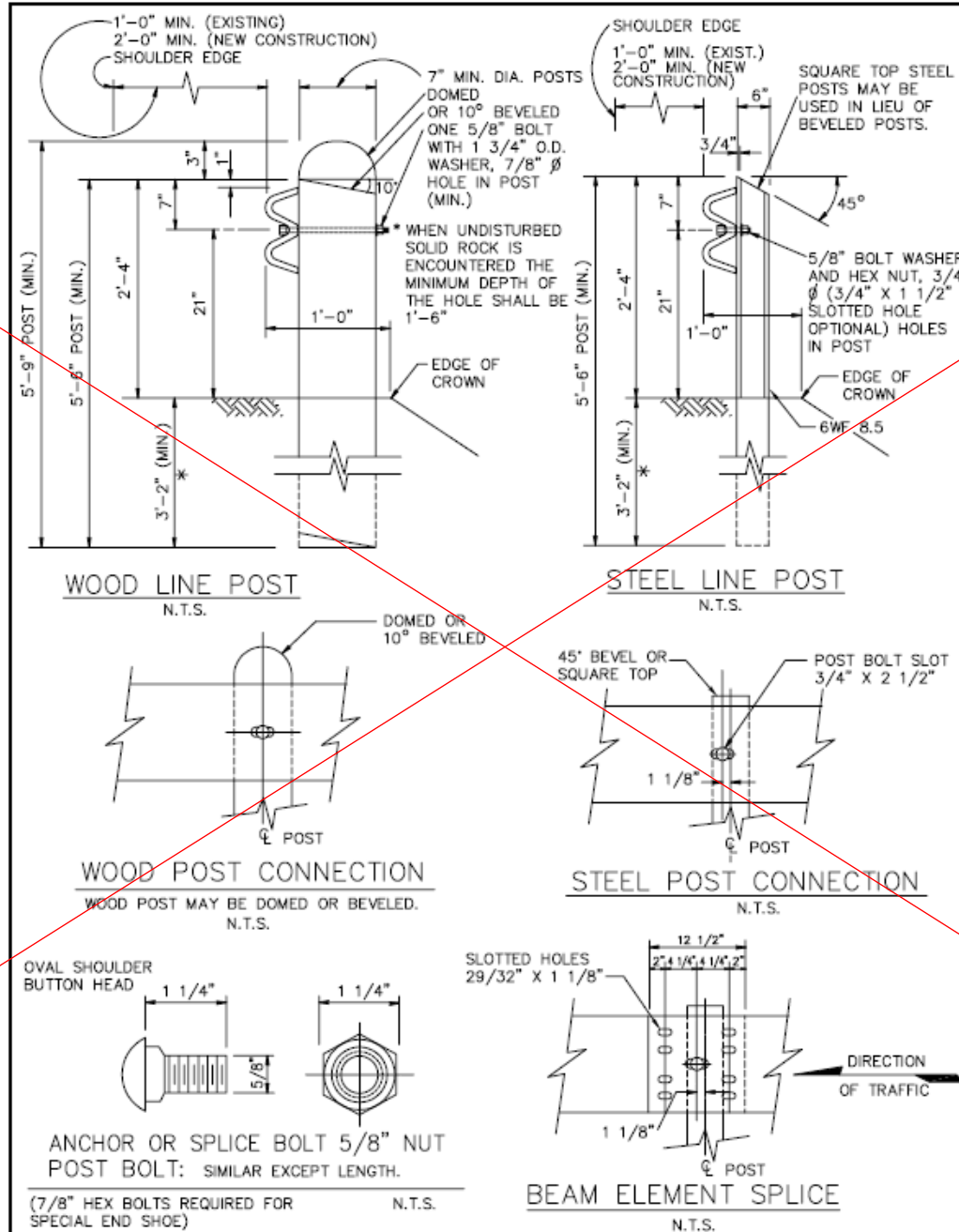
ALLEY INTERSECTION
PROPOSED TO EXISTING



STANDARD SPECIFICATION REFERENCE	
303.5	
DATE	STANDARD DRAWING NO.
OCT. '04	2260



Remove and reference the TxDOT Metal Beam Guard Fence



Remove and
reference the
TxDOT Metal
Beam Guard
Fence

METAL BEAM GUARD FENCE

LINE POST & CONNECTIONS

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

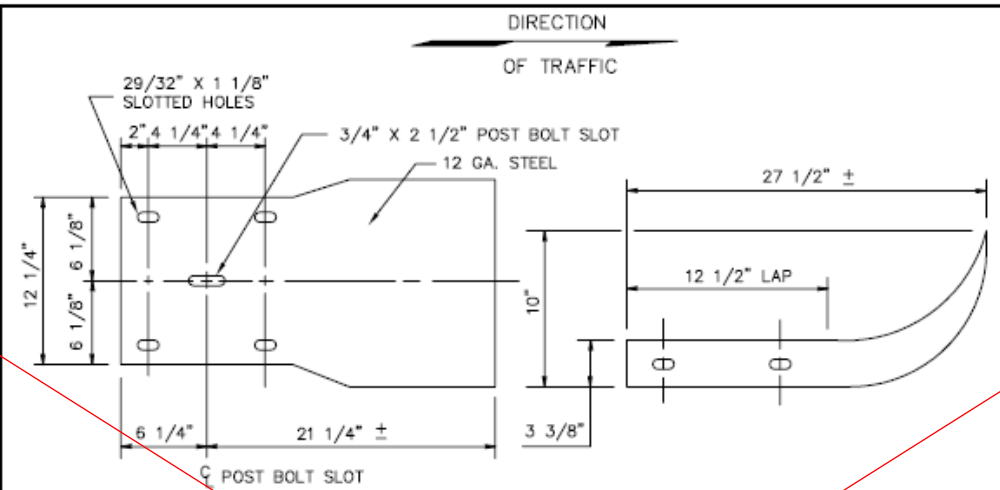
801.2

DATE

OCT. '04

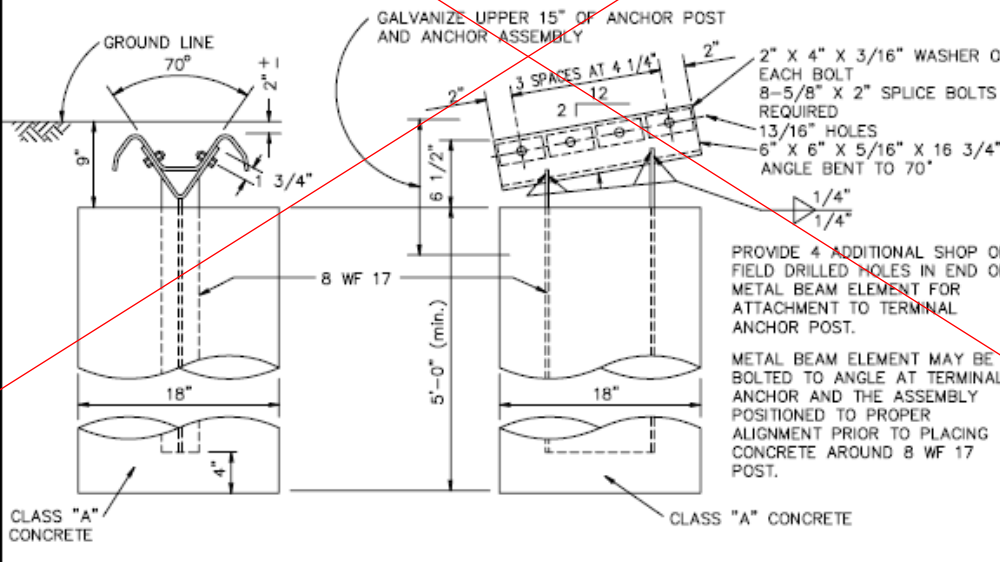
STANDARD DRAWING NO.

2270B



END SECTION – AWAY FROM DIRECTION OF TRAFFIC

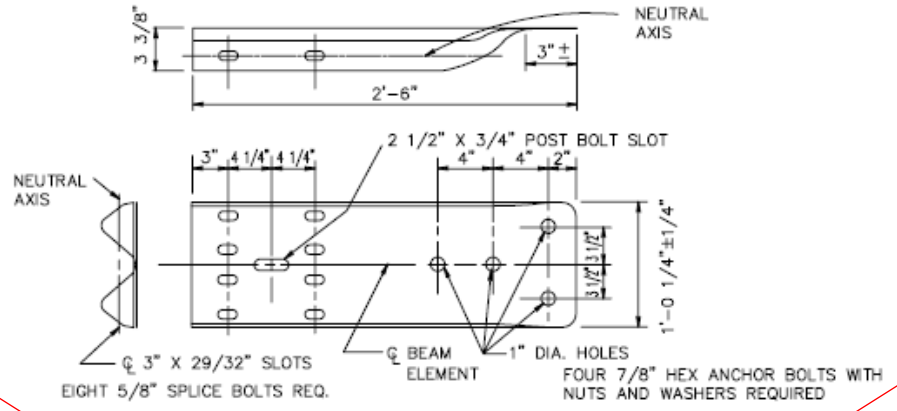
N.T.S.



TERMINAL ANGLE ANCHOR POST

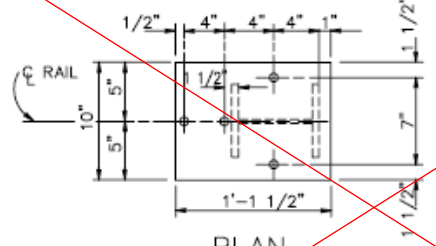
N.T.S.

Remove and reference the TxDOT Metal Beam Guard Fence



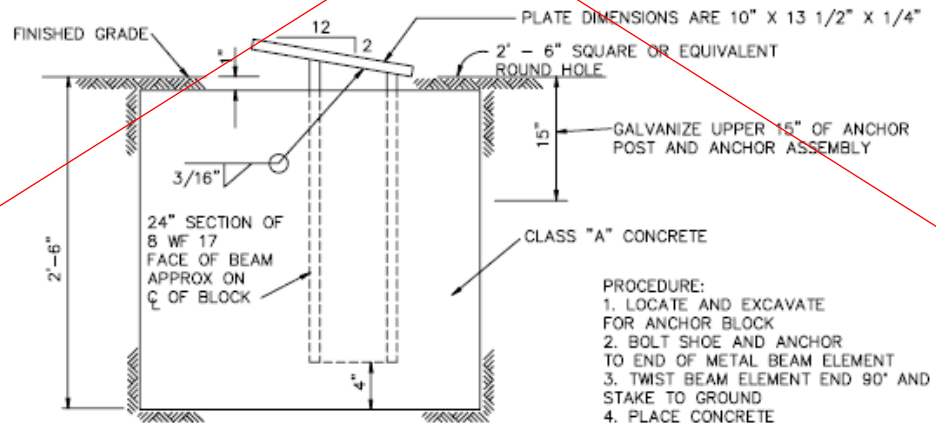
SPECIAL END SHOE

N.T.S.



PLAN

N.T.S.



ELEVATION

N.T.S.

SPECIAL END SHOE ANCHOR POST

Remove and reference the TxDOT Metal Beam Guard Fence

METAL BEAM GUARD FENCE

SPECIAL END SHOE & ANCHOR POST

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE
801.2

DATE
OCT. '04

STANDARD DRAWING NO.
2270D

METAL BEAM GUARD FENCE
GENERAL NOTES

1. EXCEPT WHERE USED AT STRUCTURES THAT ARE NARROWER THAN CROWN WIDTH OR WHERE OTHERWISE INDICATED ON PLANS, THE FACE OF THE GUARD FENCE SHALL BE LOCATED A MINIMUM OF ONE FOOT FROM THE SHOULDER EDGE ON EXISTING ROADWAYS AND A MINIMUM OF TWO FEET FROM THE SHOULDER EDGE ON NEW CONSTRUCTION. THE EXACT POSITION SHALL BE AS SHOWN ELSEWHERE ON THE PLANS OR AS DIRECTED BY THE ENGINEER. BEAM ELEMENTS SHALL BE TRANSITIONED TO A SMOOTH CONNECTION WITH OTHER STRUCTURES OR BEAM ELEMENTS AS SHOWN ELSEWHERE ON PLANS.
2. AT THE OPTION OF THE CONTRACTOR THE METAL BEAM ELEMENTS FOR THE GUARD FENCE MAY BE FURNISHED IN EITHER 12 1/2' OR 25' FOOT NOMINAL LENGTHS. BEAM ELEMENTS SHALL BE FURNISHED WITH POST BOLT SLOTS FOR 5/8" DIAMETER BOLT CONNECTIONS TO POSTS.
3. BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 3/4" BEYOND IT.
4. THE TOP OF THE TERMINAL ANCHOR POST ASSEMBLY AND ALL STEEL FITTINGS THEREON SHALL BE GALVANIZED AS SHOWN.
5. WHERE ROCK IS ENCOUNTERED OR WHERE SHOWN ON THE PLANS, THE DIAMETER OF THE HOLES AND THE MATERIAL FOR BACKFILLING SHALL BE AS DIRECTED BY THE ENGINEER. TIMBER POSTS SHALL NOT BE SET IN CONCRETE.
6. THE TERMINAL ANCHOR POST SHALL BE SET IN CLASS "A" CONCRETE. CONCRETE SHALL BE SUBSIDIARY TO THE BID ITEM "METAL BEAM GUARD FENCE."
7. TIMBER POSTS MAY BE BEVELED AT APPROXIMATELY 10 DEGREES ON THE TOP OR BOTH ENDS WITH HIGH SIDE OF TOP OF POST PLACED TOWARD THE ROADWAY OR THEY MAY BE DOMED.
8. AN ANCHOR OTHER THAN TO A TERMINAL ANCHOR POST SHALL CONSIST OF A CONNECTION SIMILAR TO THE BEAM ELEMENT SPLICE OR SIMILAR TO THE SPECIAL END SHOE.
9. SPECIAL FABRICATION WILL BE REQUIRED IN INSTALLATIONS HAVING A CURVATURE OF LESS THAN 150' RADIUS.
10. WOOD POSTS MUST BE TREATED IN MANNER APPROVED BY THE ENGINEER.
11. THE SPECIAL END SHOE ANCHOR MAY BE USED WITH THE 18" X 5'-0" CONCRETE FOOTING OR THE ANGLE ANCHOR MAY BE USED WITH THE 2'-6" SQUARE OR EQUIVALENT CONCRETE FOOTING.
12. ALL METAL ELEMENTS WILL BE 12 GAUGE STEEL UNLESS STATED OTHERWISE ON PLANS.

Remove and
reference the
TxDOT Metal
Beam Guard
Fence

METAL BEAM GUARD FENCE
GENERAL NOTES

North Central Texas Council of Governments



STANDARD SPECIFICATION REFERENCE

801.2

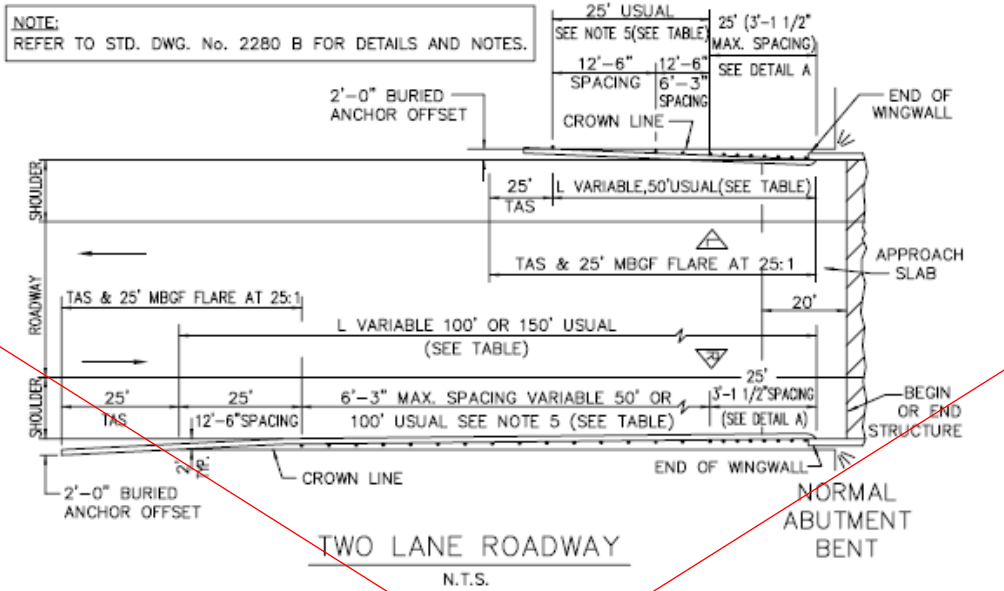
DATE

OCT. '04

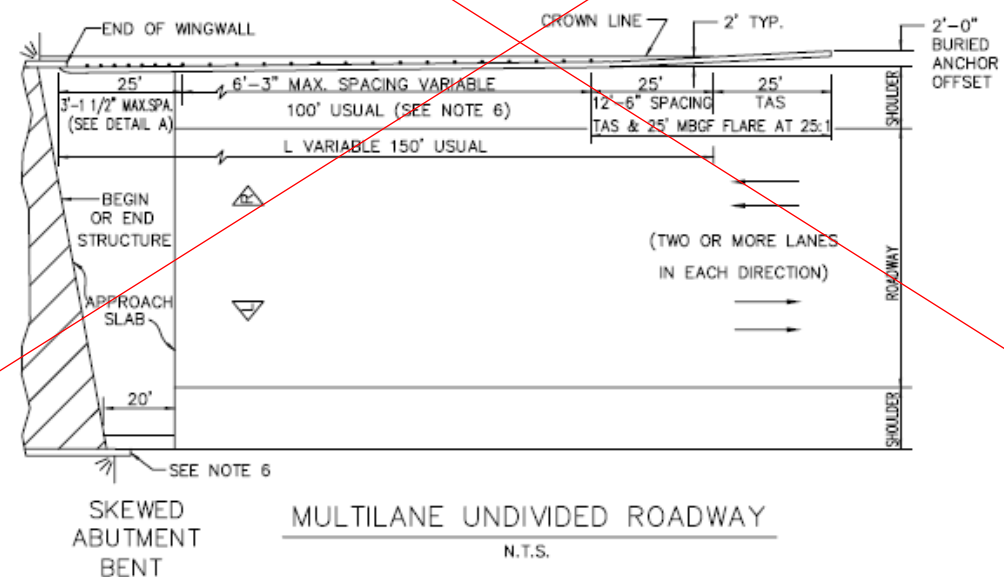
STANDARD DRAWING NO.

2270E

NOTE:
REFER TO STD. DWG. No. 2280 B FOR DETAILS AND NOTES.



TAS: TERMINAL ANCHOR SECTION



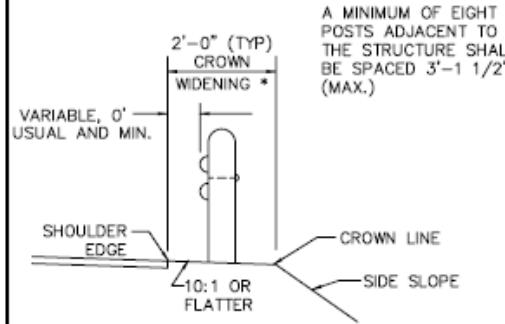
CROWN WIDTH BRIDGE
(SEE NOTE 7 FOR RESTRICTIVE WIDTH BRIDGE)

Remove and
reference the
TxDOT Metal
Beam Guard
Fence

METAL BEAM GUARD FENCE
TWO-WAY TRAFFIC BRIDGE END



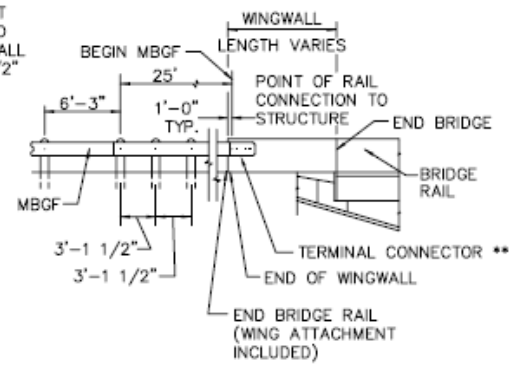
STANDARD SPECIFICATION REFERENCE
801.2
DATE
OCT. '04
STANDARD DRAWING NO.
2280A



TYPICAL CROSS SECTION
N.T.S.

* APPLIES TO CONSTRUCTION ON NEW ALIGNMENT OR WHERE EXISTING ROADWAY CROSS SECTION IS TO BE WIDENED TO INCREASE ROADWAY WIDTH. DOES NOT APPLY TO REHABILITATION WORK WHERE EXISTING ROADWAY CROWN WIDTH IS TO BE RETAINED.

A MINIMUM OF EIGHT POSTS ADJACENT TO THE STRUCTURE SHALL BE SPACED 3'-1 1/2" (MAX.)



POST TREATMENT AT STRUCTURES
DETAIL A
N.T.S.

** TYPICAL CONNECTION—SEE BRIDGE RAIL OR OTHER PLAN SHEETS FOR DETAILS OF MBGF TO BRIDGE RAIL CONNECTION.

LENGTH Ⓞ OF NEED, L, FT.

TWO LANE HIGHWAYS				MULTILANE UNDIVIDED HWYS.	
750 or less ADT	more than 750 ADT	all ADT's		all ADT's	
◀ side	▶ side	◀ side	▶ side	◀ side	▶ side
50 Ⓞ	100	50 Ⓞ	150	0	150

Ⓞ LENGTHS ARE FOR TYPICAL CROSS SECTIONAL & PLACEMENT CONDITIONS. FOR UNUSUAL CONDITIONS, A CUSTOM DESIGN SHOULD BE DEVELOPED.
◀ INDICATES LEFT SIDE OF TRAFFIC APPROACHING BRIDGE.
▶ INDICATES RIGHT SIDE OF TRAFFIC APPROACHING BRIDGE.

DESIGN NOTES:

- THE T.A.S. AND TYPICALLY ADJACENT 25' MBGF SHOULD BE FLARED FROM THE SHOULDER EDGE AT 25:1 TO PROVIDE A 2' USUAL OFFSET TO BURIED ANCHOR.
- WHERE LENGTH (L) OF MBGF IS 50 FEET, POST SPACING SHALL BE AS DETAILED HEREON (SEE PLAN LAYOUT FOR TWO LANE (RURAL) HIGHWAY), LEFT SIDE OF TRAFFIC APPROACHING BRIDGE. WHERE LENGTH (L) OF MBGF IS 75 FEET OR MORE, POST SPACING SHALL BE 3'-1 1/2" FOR THE 25' SECTION ADJACENT TO THE BRIDGE, 12'-6" FOR THE 25' SECTION ADJACENT TO THE T.A.S. AND 6'-3" FOR THE REMAINING INTERVENING LENGTH.
- THE SLOPE BETWEEN THE CROWN LINE AND OUTSIDE EDGE OF SHOULDER SHOULD BE 10:1 OR FLATTER. THE CROWN SHOULD BE WIDENED TO ACCOMMODATE MBGF. TYPICALLY THE CROWN LINE SHOULD BE 2 FEET FROM THE OUTSIDE SHOULDER EDGE (SEE TYPICAL CROSS SECTION).
- FOR RESTRICTIVE WIDTH BRIDGES, A 25 FOOT TANGENT SECTION OF MBGF SHOULD CONNECT TO THE WINGWALL. THE ADJOINING MBGF THAT LIES WITHIN THE ROADWAY (LANE & SHOULDER AREAS) CROWN SHOULD BE FLARED AT THE RATE OF 25:1 (LONGITUDINAL:LATERAL). LENGTH SHOULD BE GOVERNED BY TABULATED VALUES OR THE LENGTH NECESSARY TO LOCATE THE BURIED ANCHOR AT A 2-FOOT OFFSET FROM SHOULDER EDGE, WHICHEVER IS GREATER.
- AVERAGE DAILY TRAFFIC (ADT) IS FOR THE CURRENT YEAR. WHERE SIGNIFICANT TRAFFIC VOLUME GROWTH IS ANTICIPATED ON LOW VOLUME (0-750 ADT) HIGHWAYS, USE LENGTHS SHOWN FOR HIGHER VOLUME CATEGORY.
- PROVIDE MINIMUM 50 FT. MBGF PLUS T.A.S. FOR FOUR LANE UNDIVIDED HIGHWAYS. FOR FOUR LANE HIGHWAYS WITH A FLUSH MEDIAN OR FOR HIGHWAYS WITH SIX OR MORE LANES, MBGF IS NOT A REQUIRED BRIDGE END TREATMENT. HOWEVER, OTHER NEARBY HAZARDS MAY WARRANT SHIELDING WITH MBGF.

GENERAL NOTES:

- FOR METAL BEAM GUARD FENCE DETAILS AND METHOD OF TERMINATION, SEE STD. DWGS. No. 2270A - 2270E.
- VARIATIONS IN POST SPACINGS AND/OR THE USE OF SPACER BLOCKS OR SHIMS MAY BE REQUIRED BY THE ENGINEER IN ORDER TO ACCOMMODATE THE REQUIRED BEAM ELEMENT CONNECTION TO STRUCTURES.
- QUANTITIES OF METAL BEAM GUARD FENCE (MBGF) AT INDIVIDUAL BRIDGE ENDS ARE SHOWN ELSEWHERE IN THE PLANS.

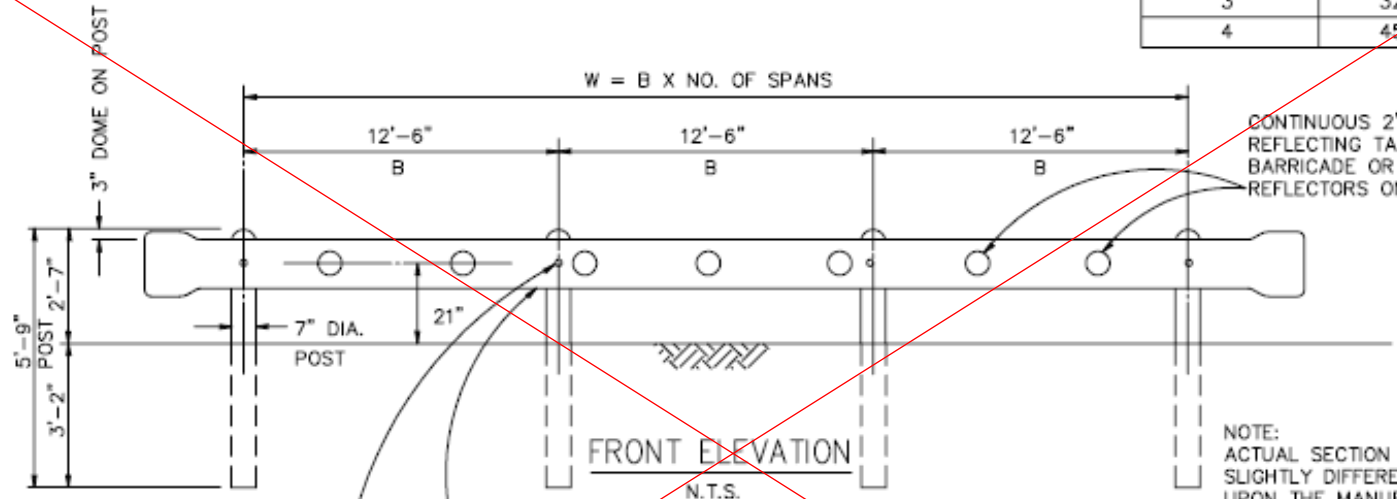
Remove and reference the TxDOT Metal Beam Guard Fence

METAL BEAM GUARD FENCE
TWO-WAY TRAFFIC BRIDGE END



STANDARD SPECIFICATION REFERENCE
801.2
DATE
OCT. '04
STANDARD DRAWING NO.
2280B

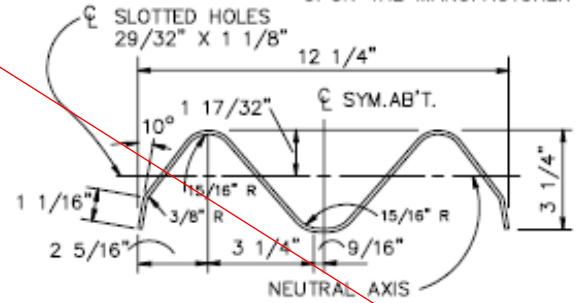
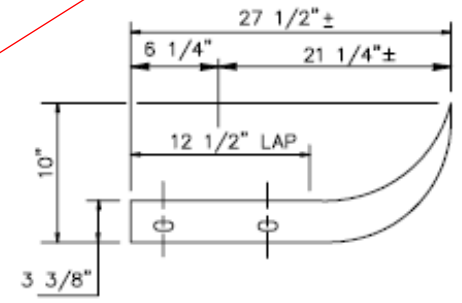
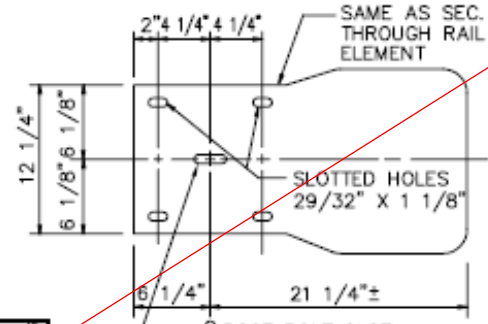
NO. OF SPANS	ROADWAY SECTION WIDTH
2	18' to 31'
3	32' to 44'
4	45' to 56'



FASTEN TO POST WITH ONE 5/8" BOLT WITH 1 3/4" O.D. WASHER BEHIND POST, 7/8" Ø HOLE IN POST.

METAL BEAM GUARD FENCE SHALL BE GALVANIZED STEEL (12 GA.)

NOTE: ACTUAL SECTION MAY BE SLIGHTLY DIFFERENT DEPENDING UPON THE MANUFACTURER



STANDARD DRAWING
2290

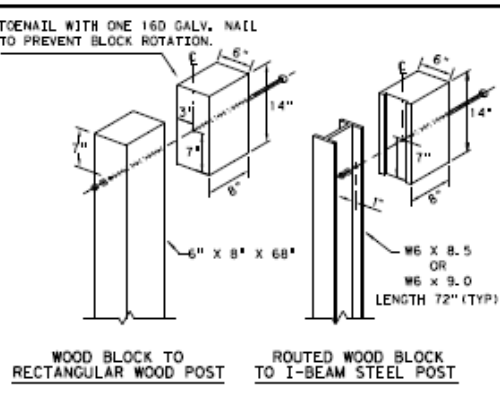
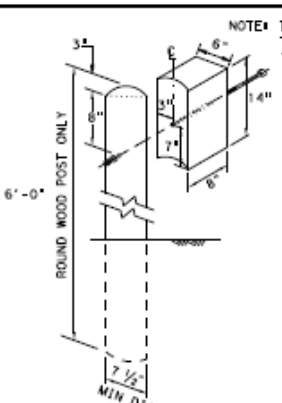
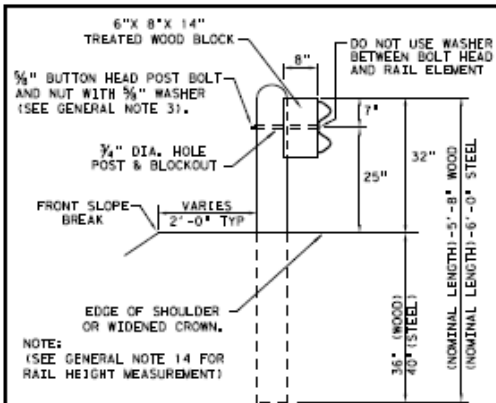
TERMINAL SECTION
N.T.S.

METAL BEAM BARRICADE
END OF ROAD

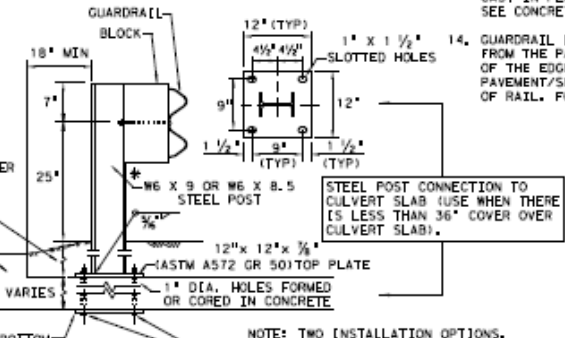
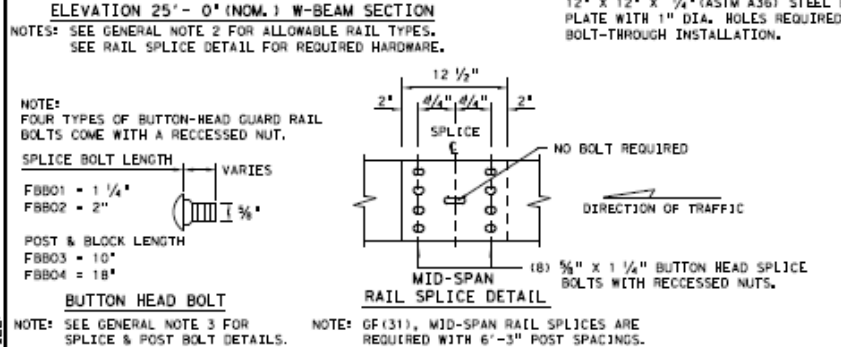
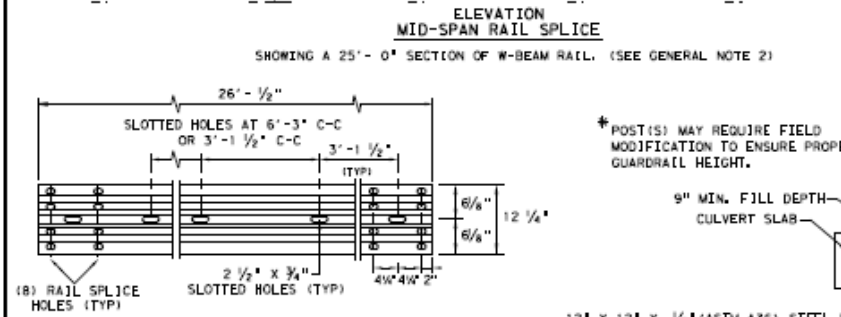
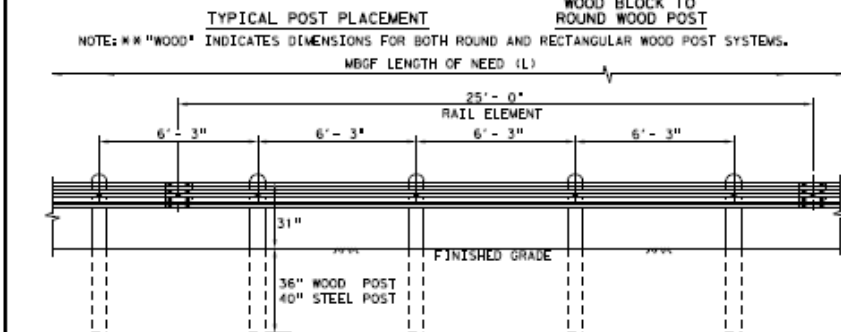


STANDARD SPECIFICATION REFERENCE
801.2
DATE
OCT. '04
STANDARD DRAWING NO.
2290

Remove and reference the TxDOT Metal Beam Guard Fence



- ### GENERAL NOTES
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
 2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
 3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 3/4" WASHER (FWC16g) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
 4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
 6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
 7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
 8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
 9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
 10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
 11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
 12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TxDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
 13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
 14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT SHOULDER SLOPE TO THE BACK OF RAIL. MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.



- NOTE: TRANSITIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS. SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS. SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.
- NOTE: TWO INSTALLATION OPTIONS.
1. **BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 3/4" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
 2. **EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 3/4" DIA, ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.
- NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

Design Division Standard

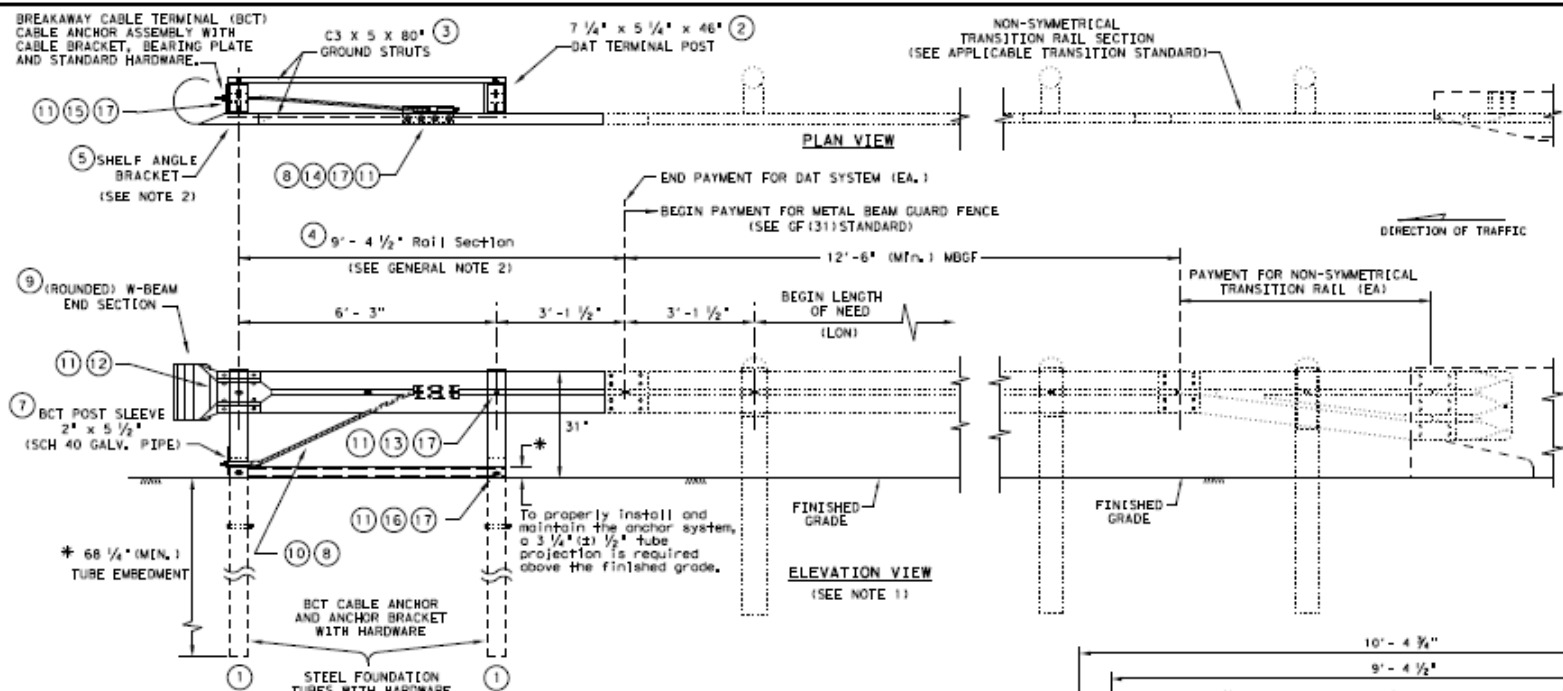
METAL BEAM GUARD FENCE

TL-3 MASH COMPLIANT

GF(31)-19

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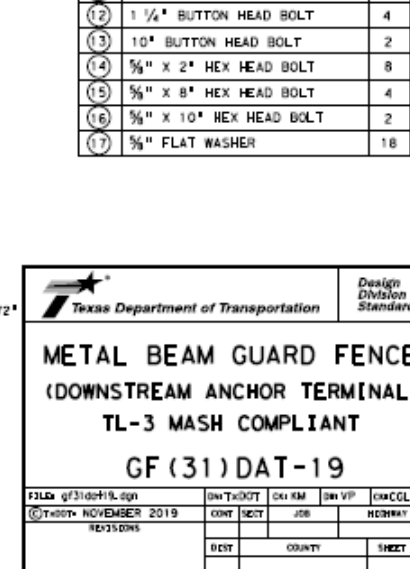
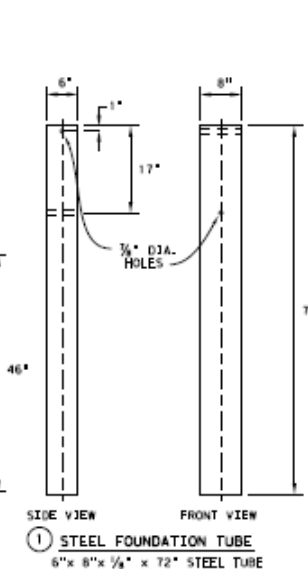
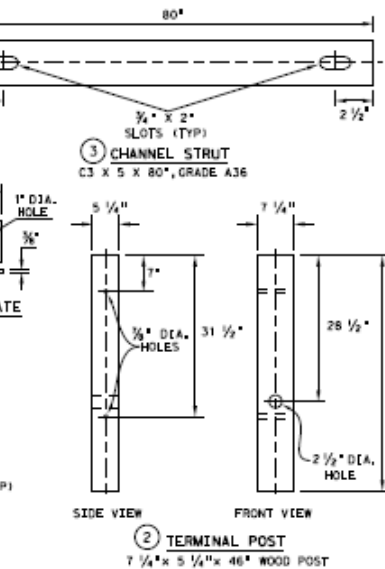
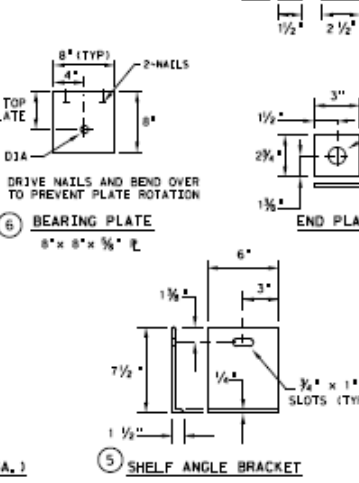
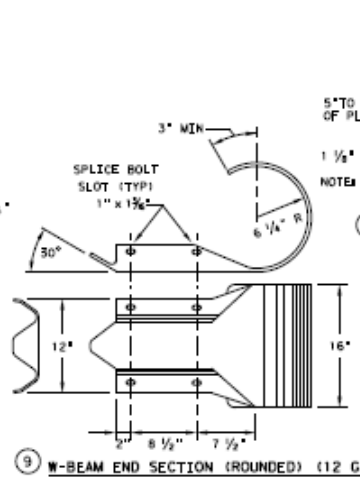
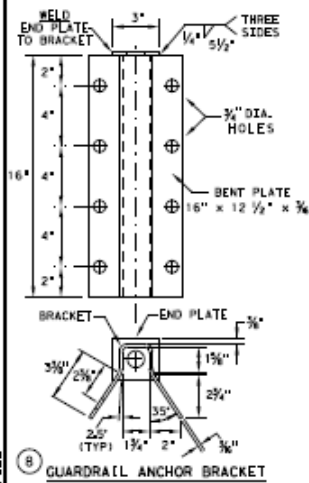


- GENERAL NOTES**
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
 2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
 3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3/4" ABOVE THE FINISHED GRADE.
 4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
 5. REFER TO GF (31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION
 IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

DOWNSTREAM ANCHOR TERMINAL (DAT)
 NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

#	(DAT) PARTS LIST	QTY
1	STEEL FOUNDATION TUBE	2
2	DAT TERMINAL POST	2
3	CHANNEL STRUT	2
4	TERMINAL RAIL ELEMENT	1
5	SHELF ANGLE BRACKET	1
6	BCT BEARING PLATE	1
7	BCT POST SLEEVE	1
8	GUARDRAIL ANCHOR BRACKET	1
9	(ROUNDED) W-BEAM END SECTION	1
10	BCT CABLE ANCHOR	1
11	RECESSED NUT, GUARDRAIL	20
12	1/4" BUTTON HEAD BOLT	4
13	10" BUTTON HEAD BOLT	2
14	3/8" X 2" HEX HEAD BOLT	8
15	3/8" X 8" HEX HEAD BOLT	4
16	3/8" X 10" HEX HEAD BOLT	2
17	3/8" FLAT WASHER	18

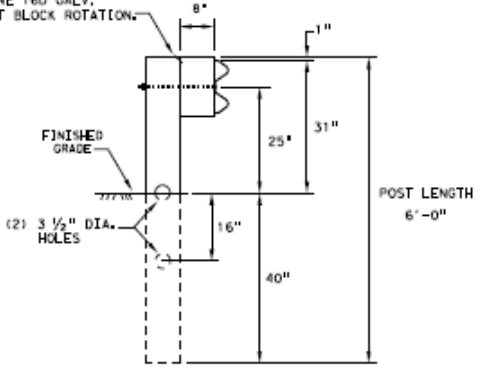


Texas Department of Transportation Design Division Standard

METAL BEAM GUARD FENCE (DOWNSTREAM ANCHOR TERMINAL) TL-3 MASH COMPLIANT GF (31) DAT-19

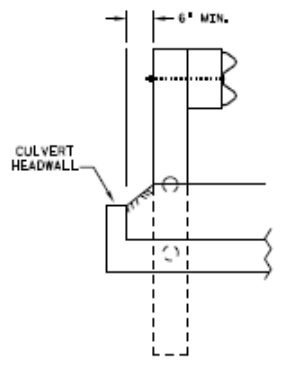
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NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.



RECTANGULAR CRT POST
(6" X 8" X 6' LONG)

(6) CRT REQUIRED
SEE ELEVATION DETAIL FOR LOCATIONS



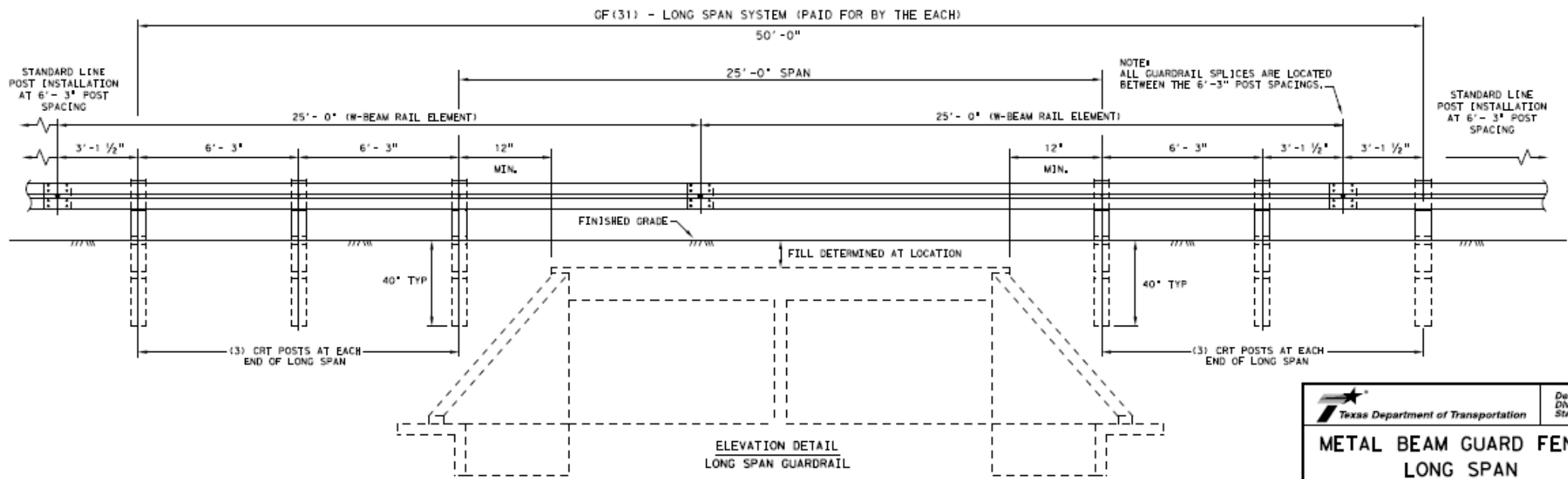
LATERAL OFFSET BETWEEN THE
GUARDRAIL AND THE CULVERT HEADWALL

GENERAL NOTES

1. THE TYPE OF LINE POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF THE TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET ALL REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12' - 6" OR 25' - 0" NOMINAL LENGTHS.
3. RAIL POST HOLES ARE OFFSET 3' - 1 1/2" FROM STANDARD GUARDRAIL TO ACCOMMODATE THE MIDSPAN SPLICING.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC160) AND NO MORE THAN 1" BEYOND IT.
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
7. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
8. REFER TO GF(31) STANDARD SHEET FOR ADDITIONAL DETAILS.
9. FLAME CUTTING OF HOLES IN GUARDRAIL SHALL NOT BE PERMITTED. IF YOU ENCOUNTER MIS-ALIGNED BOLT HOLES IN GUARDRAIL CONTACT THE DESIGN DIVISION FOR ADDITIONAL INFORMATION & OPTIONS.

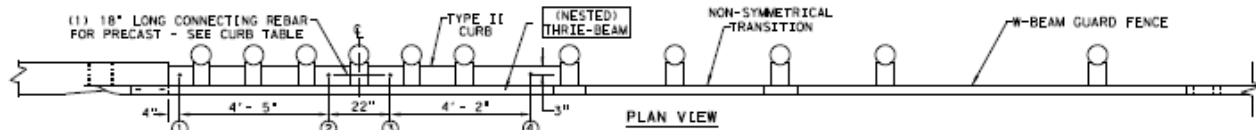
NOTE: SEE GF(31) STANDARD FOR
STANDARD LINE POSTS.

DIRECTION OF TRAFFIC



ELEVATION DETAIL
LONG SPAN GUARDRAIL

		Design Division Standard	
METAL BEAM GUARD FENCE LONG SPAN TL-3 MASH COMPLIANT			
GF(31)LS-19			
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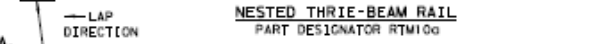
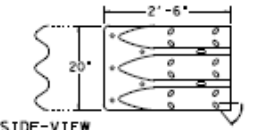
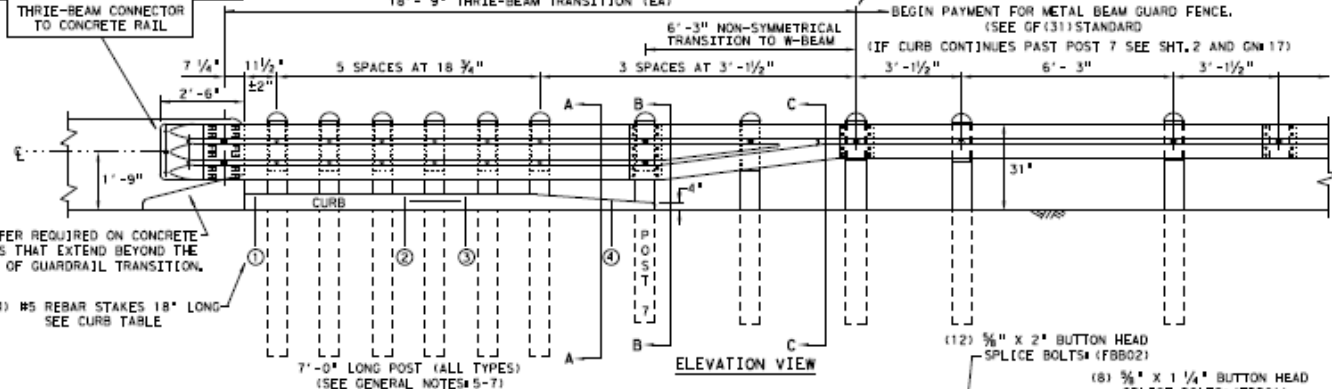


- (5) 3/8" DIA. HEAVY HEX HEAD BOLTS (ASTM A325 OR A449)
- (10) 1 1/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
- (15) 3/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563)

(4) (1" DIA. HOLES) IN CURB: SEE CURB TABLE

NOTE: HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL. LEAVE 1" OF BOLT LENGTH PAST THE 3/8" HEX NUT. TRIM AS REQUIRED.

NOTE: CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.

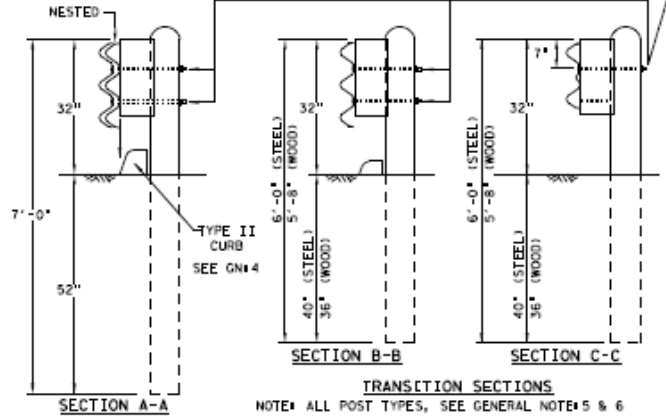


BRIDGE APPROACH - UPSTREAM: THE NESTED RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.

BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.

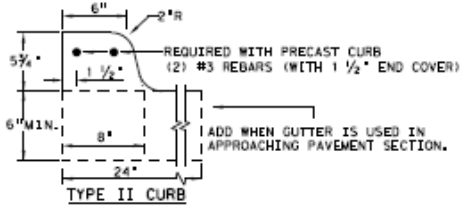
(2) 3/8" BUTTON HEAD POST BOLT & NUTS (FBB04) WITH (1) 3/8" FLAT WASHER (FWC14G) UNDER EACH NUT.

NOTE: ONLY (1) 3/8" BOLT REQUIRED AT THIS POST LOCATION.



THRIE-BEAM TERMINAL - CURB TABLE	
PRECAST CURB FULL LENGTH EQUALS 12' - 2". THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.	
CURB (1)	LENGTH 5' - 8"
CURB (2)	LENGTH 6' - 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7	
CONNECTING PRECAST CURB SECTIONS (1) & (2):	
FORM OR CORE (1" DIA. HOLE 9" LONG) INTO EACH CURB END. USE (1) #5 GR. 60 REBAR 18" LONG TO CONNECT BOTH CURBS.	
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE: FORM OR CORE FOUR (1" DIA. HOLES), SEE BOTH VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR. 60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.	

* NOTES: NOT NEEDED FOR CAST-IN-PLACE. SEE TYPE I CURB DETAIL FOR REBAR AND COVER REQUIREMENTS. PERCUSSION DRILLING IS NOT PERMITTED WITH TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.



NOTE: OPTIONS FOR TYPE II CURB:

1. PRECAST
2. CAST-IN-PLACE

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5-3/8") HEIGHT; SEE CURRENT CCGG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'-0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 3/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 3/8" WASHER (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TxDOT'S CONSTRUCTION DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION. (SEE SHT. 2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT. PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT. 2 FOR ADDITIONAL INFORMATION.

HIGH-SPEED TRANSITION
SHEET 1 OF 2

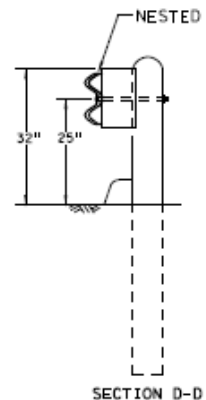
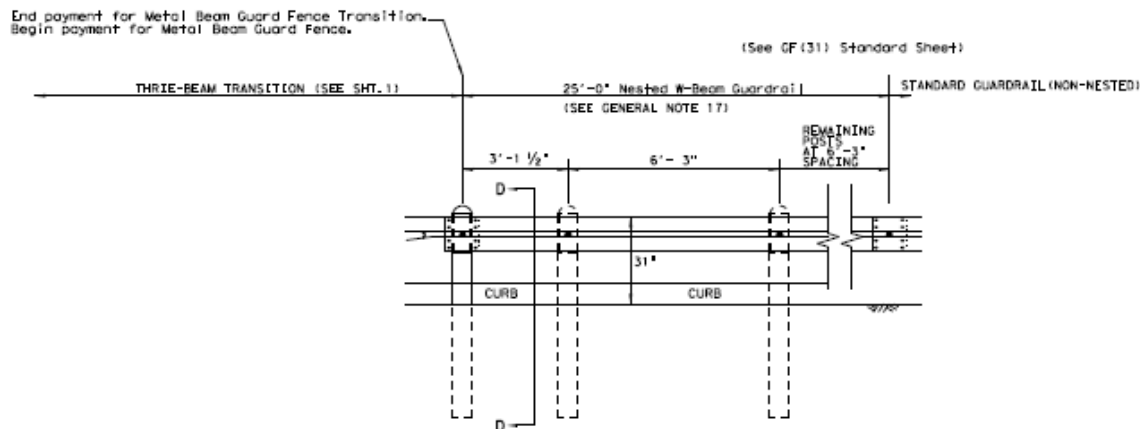
Texas Department of Transportation

Design Division Standard

**METAL BEAM GUARD FENCE
THRIE-BEAM TRANSITION
TL-3 MASH COMPLIANT
GF(31)TR TL-19**

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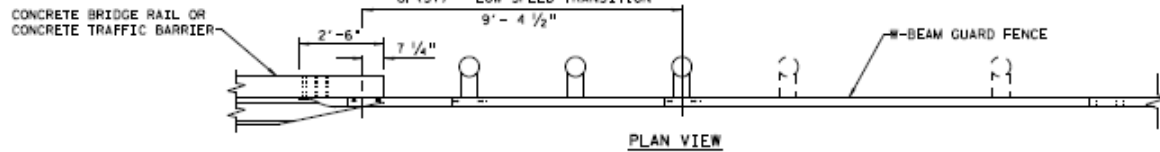
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



HIGH-SPEED TRANSITION

SHEET 2 OF 2

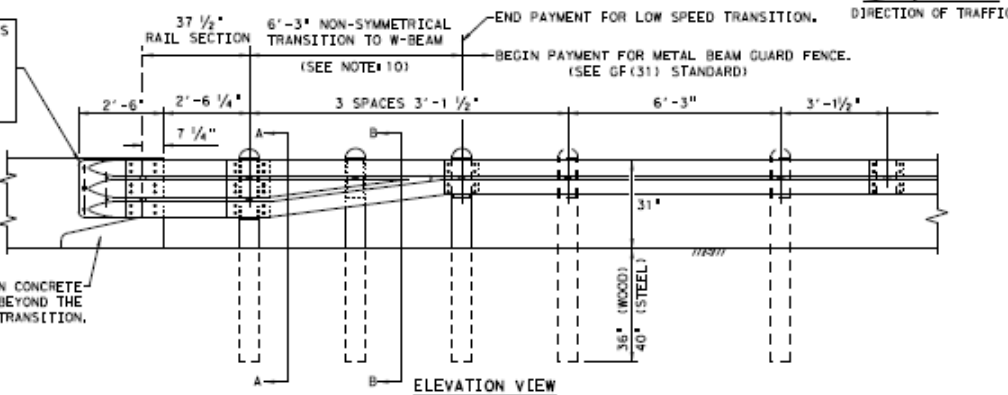
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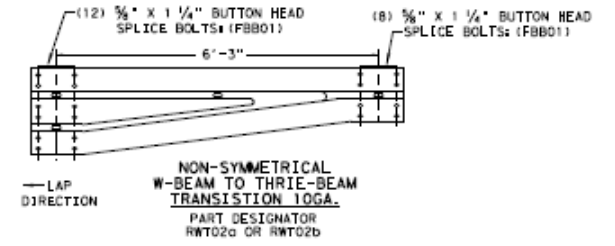
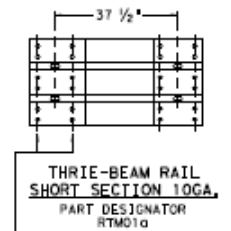
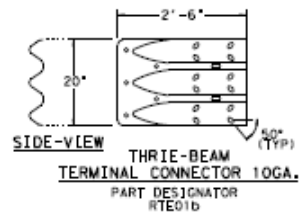
- (5) 5/8" DIA. HEAVY HEX HEAD BOLTS (ASTM A325 OR A449)
 - (10) 1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
 - (5) 5/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563)
- THREE-BEAM CONNECTOR TO CONCRETE RAIL

NOTE: HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL. LEAVE 1" OF BOLT LENGTH PAST THE 5/8" HEX NUT. TRIM AS REQUIRED.

NOTE: CHAMFER REQUIRED ON CONCRETE RAILS THAT EXTEND BEYOND THE FACE OF GUARDRAIL TRANSITION.



- GENERAL NOTES**
- THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31) STANDARD SHEET.
 - RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, 'METAL BEAM GUARD FENCE' EXCEPT AS MODIFIED IN THE PLANS.
 - FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, 'GALVANIZING.' FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
 - BUTTON HEAD 'POST BOLTS & NUTS' SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FNC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
 - POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
 - CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
 - WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
 - UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, 'COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE' MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT, MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
 - REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
 - FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE TRANSITION.

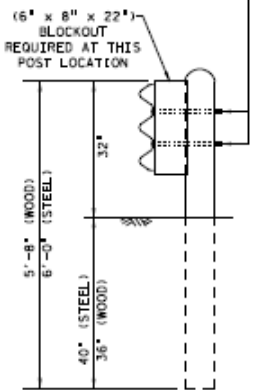


- (2) 5/8" BUTTON HEAD POST BOLTS & NUTS (FBB04)
- (1) 5/8" FLAT WASHER (FNC14a) UNDER EACH NUT

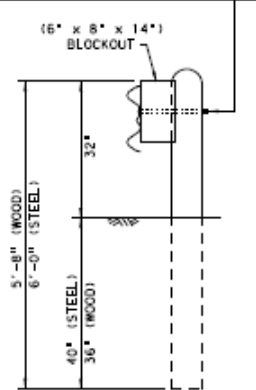
- (12) 5/8" x 1 1/4" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS (FBB01)
- (12) RECTANGULAR GUARDRAIL PLATE WASHERS (FWR03)

PLATE WASHER INSTRUCTIONS

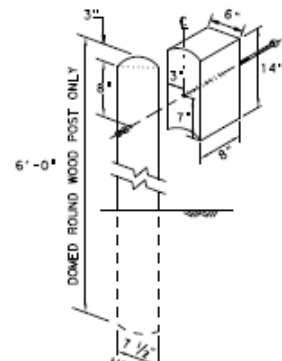
BRIDGE APPROACH - UPSTREAM: THE SHORT RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
 BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



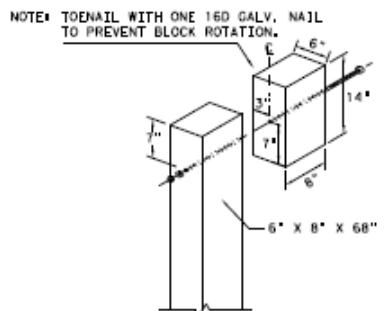
SECTION A-A



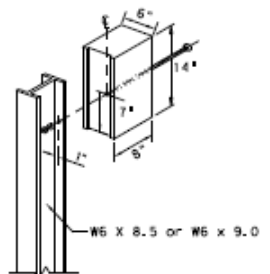
SECTION B-B



WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST



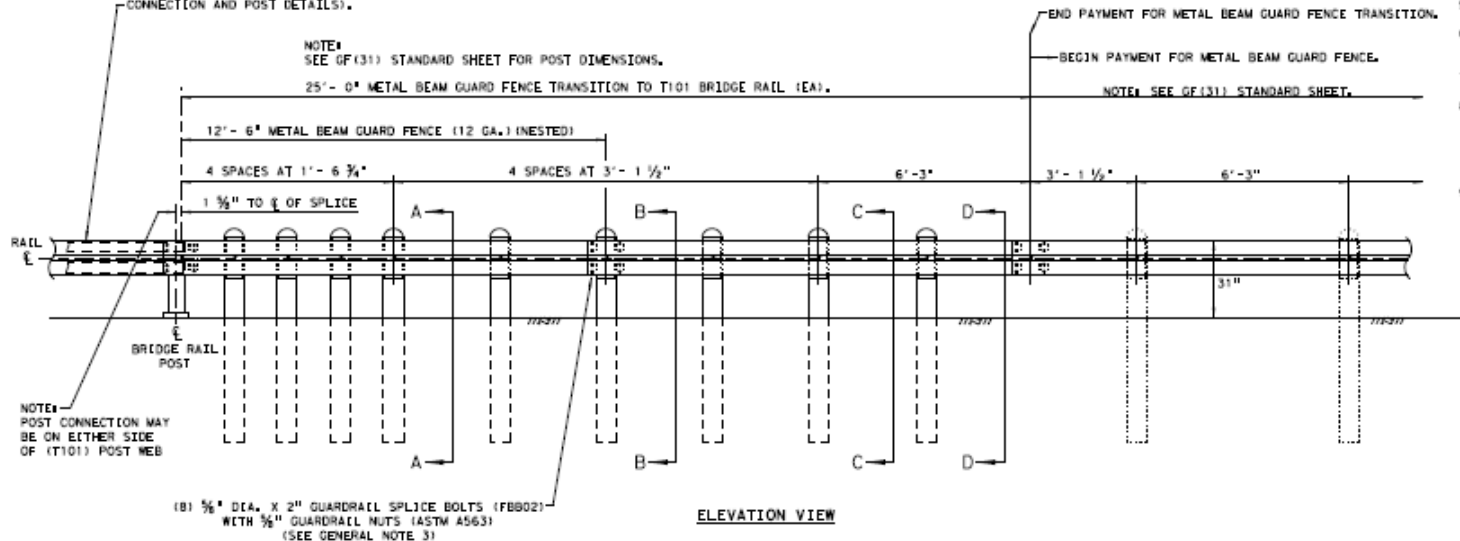
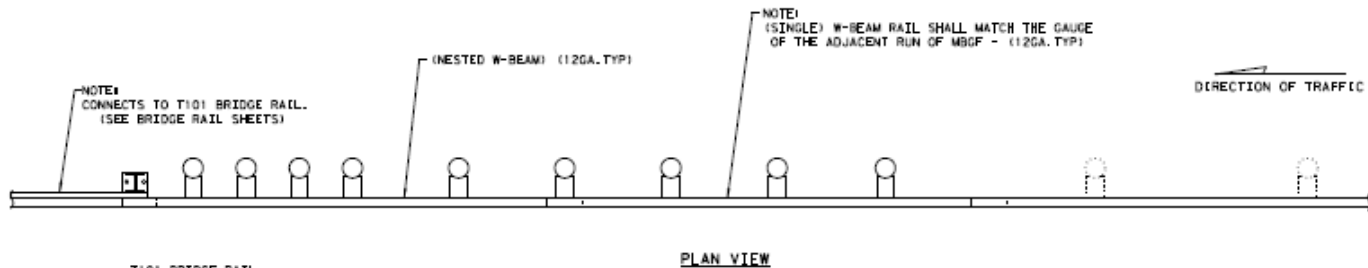
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: * "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

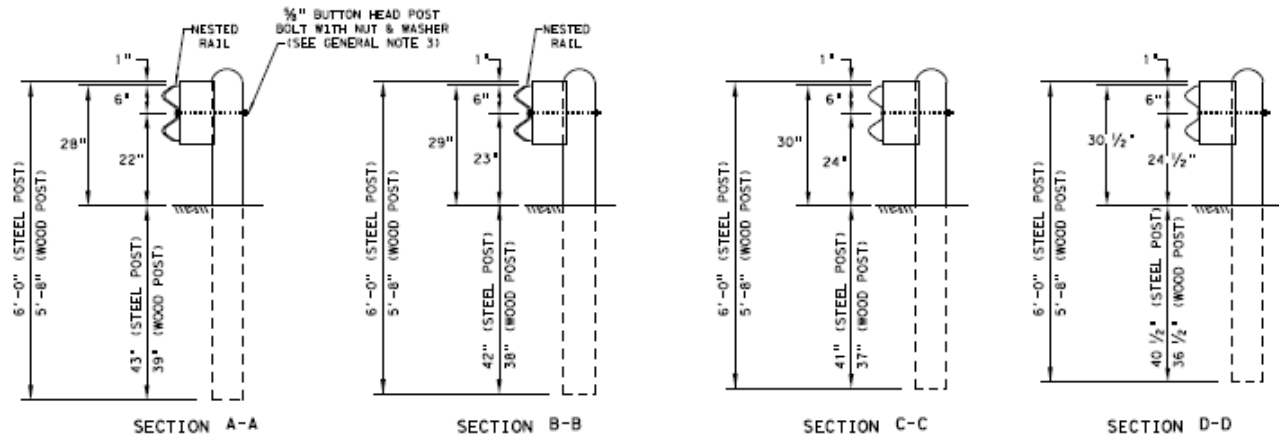
LOW-SPEED TRANSITION

		Design Division Standard	
METAL BEAM GUARD FENCE THREE-BEAM TRANSITION TL-2 MASH COMPLIANT GF(31) TR TL2-19			
FILED: gf31trtl219.dgn	DWG: TxDOT	CHK: KM	DWG: VP
DATE: NOVEMBER 2019	CONT: SECT	JOB:	HIGHWAY:
REVISIONS	DIST:	COUNTY:	SHEET NO:

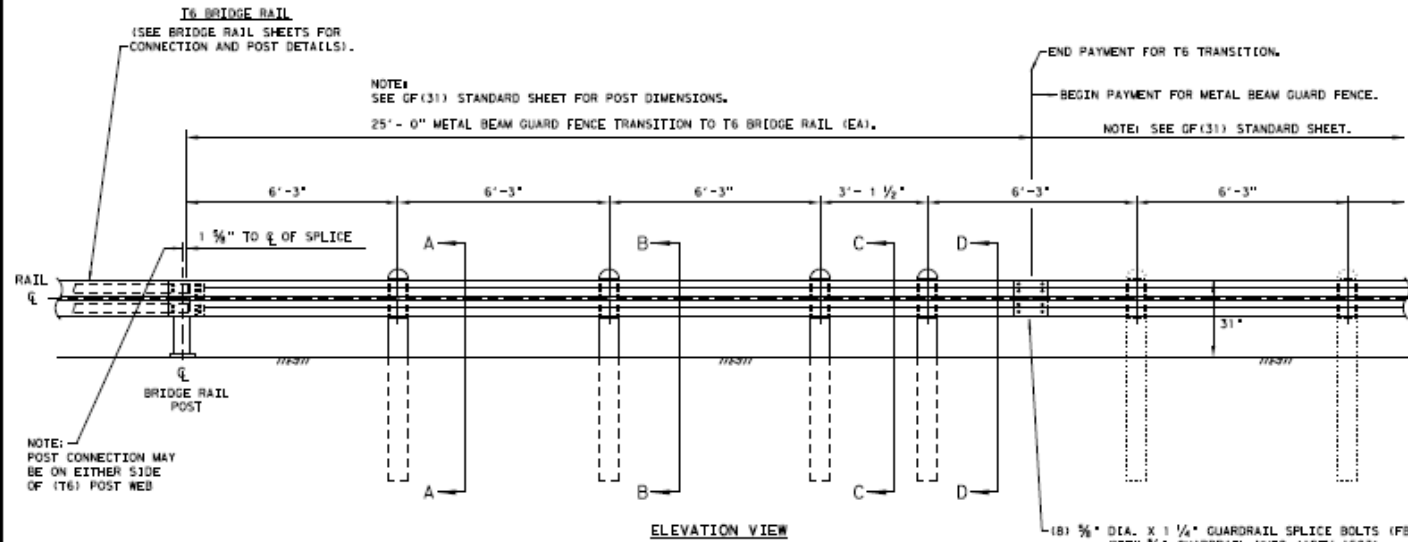
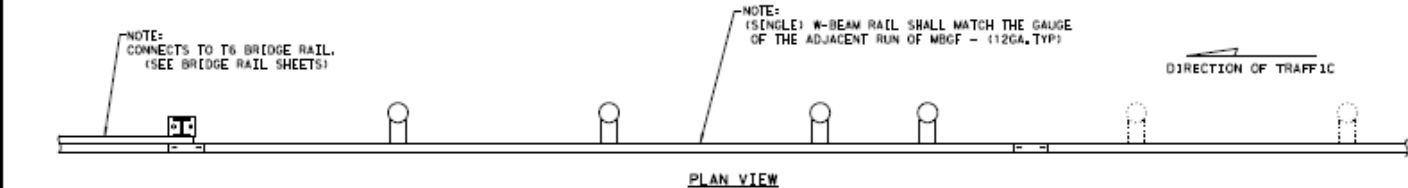


- GENERAL NOTES**
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
 2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NDAL) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE TRANSITION SECTIONS OF GUARDRAIL.
 3. BUTTON HEAD "POST" BOLTS (ASTM A307 OR A) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 3/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 3/8" X 1-1/4" WITH 3/8" NUTS (ASTM A563).
 4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
 5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
 6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE (512) 416-2678.
 7. POSTS SHALL NOT BE SET IN CONCRETE.
 8. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TxDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
 9. REFER TO STANDARD GF(31) AND APPLICABLE BRIDGE RAILING STANDARD FOR ADDITIONAL DETAILS.

* "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

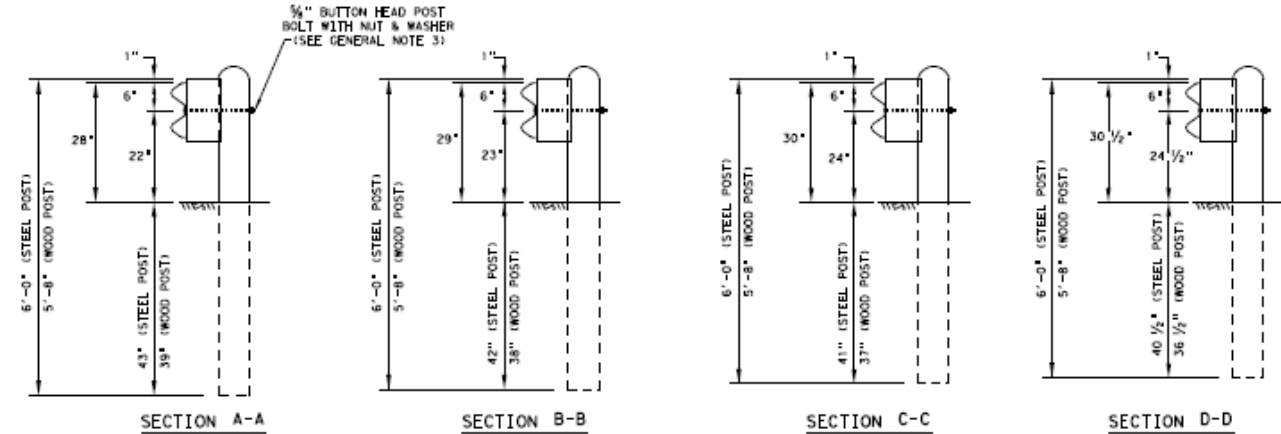


		Design Division Standard	
METAL BEAM GUARD FENCE TRANSITION (T101) GF(31)T101-19			
FILED gf31T101-19	DN TH/DOT	CHK KM	DN VP
NOVEMBER 2019	CON	SECT	JOB
REVISONS		DCR	COUNTY
		SHEET NO.	



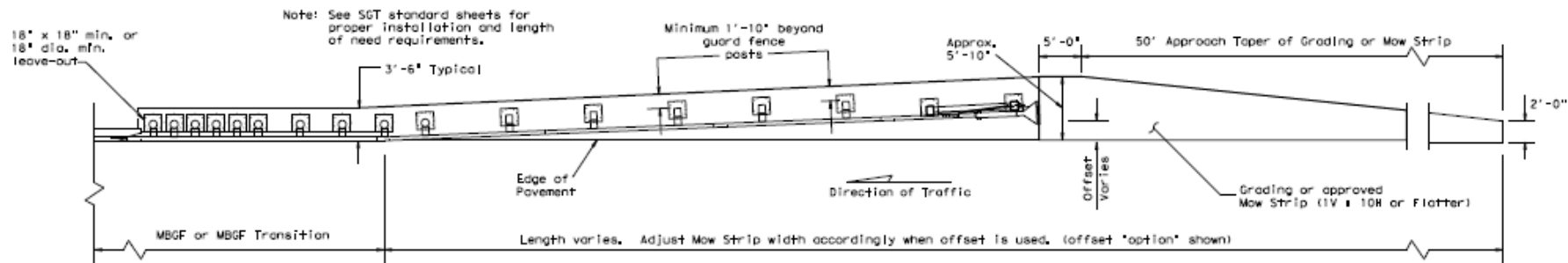
- GENERAL NOTES**
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
 2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (INCL.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE TRANSITION SECTIONS OF GUARDRAIL.
 3. BUTTON HEAD "POST" BOLTS (ASTM A307 OR A) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 3/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 3/8" X 1-1/4" WITH 3/8" NUTS (ASTM A563).
 4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
 5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
 6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
 7. POSTS SHALL NOT BE SET IN CONCRETE.
 8. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TxDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
 9. REFER TO STANDARD GF(31) & APPLICABLE BRIDGE RAILING STANDARD FOR ADDITIONAL DETAILS.

* "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



		Design Division Standard	
METAL BEAM GUARD FENCE TRANSITION (T6) GF(31)T6-19			
FILED g131-611.dgn NOVEMBER 2019	DWG/DOC CONT. SHEET	CHK/REV JOB	DRG/VP HBR/HRW
REVISIONS		DIST. COUNTY	SHEET NO.

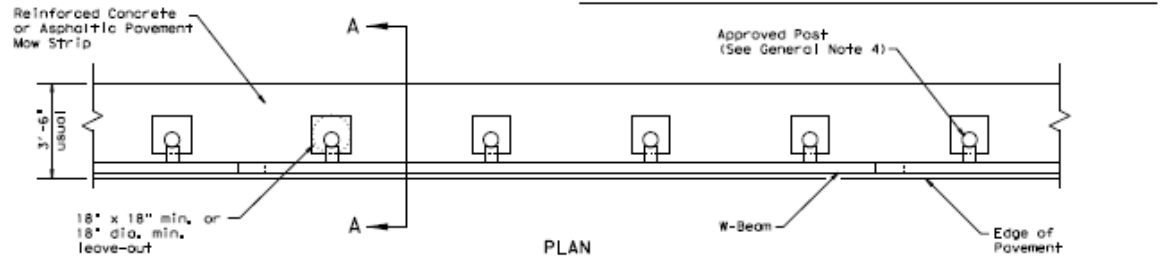
FILE:



GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

Notes: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.
Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

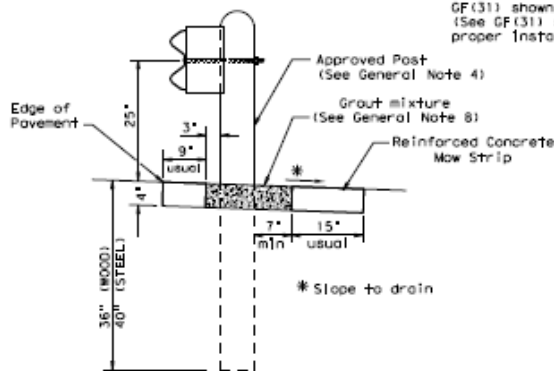


PLAN

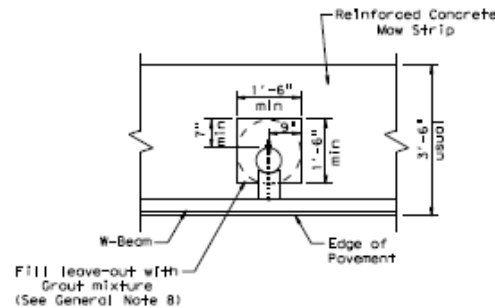
GF(31) shown with Mow Strip (See GF(31) standard sheet for proper installation)

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence and treatments. See applicable GF(31) MBCF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (#6 x 8.5 or #6 x 9.0), or 7 1/2" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

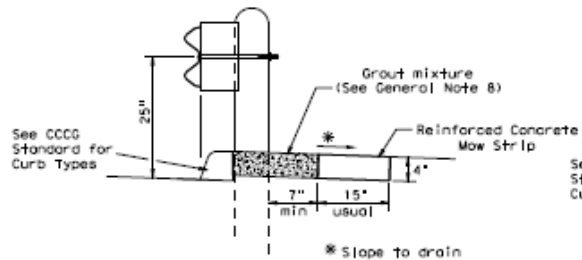


SECTION A-A
Typical



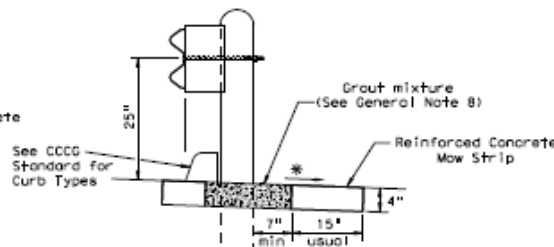
MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.



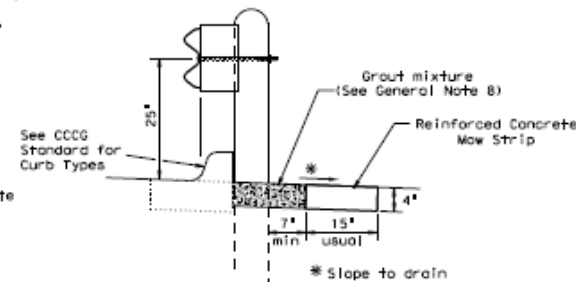
CURB OPTION (1)

This option will increase the post embedment throughout the system.



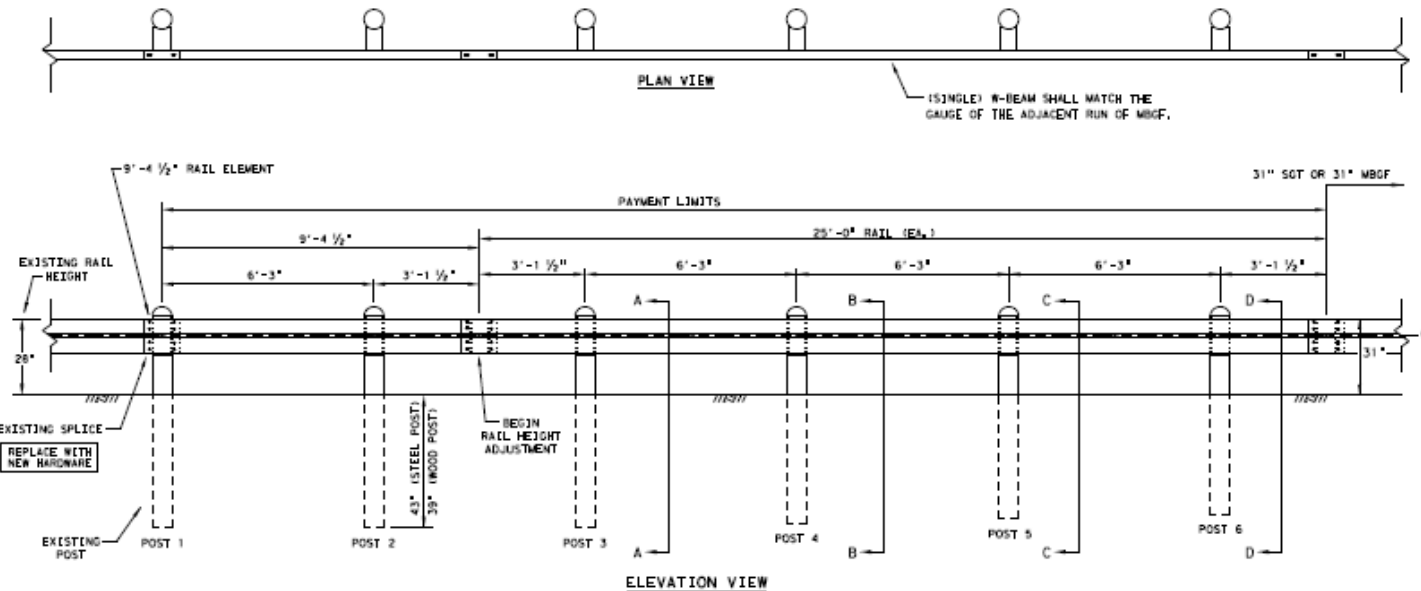
CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

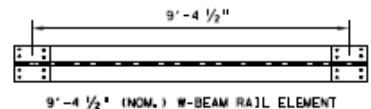
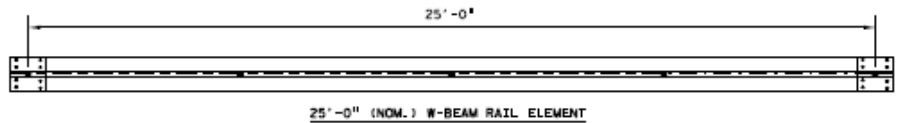
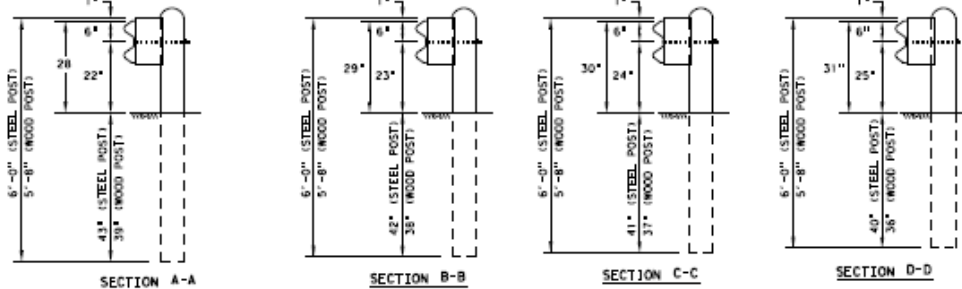
					Design Division Standard
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT GF(31)MS-19					
FILED	g31ms19.dgn	REVISED	DATE	BY	CHK/CL/AC
NOVEMBER 2019		CON	SECT	JOB	ROADWAY
REVISIONS					
DEST	COUNTY	SHEET NO.			



GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
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3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 3/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 3/8" X 1-1/4" WITH 3/4" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TxDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.

* "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

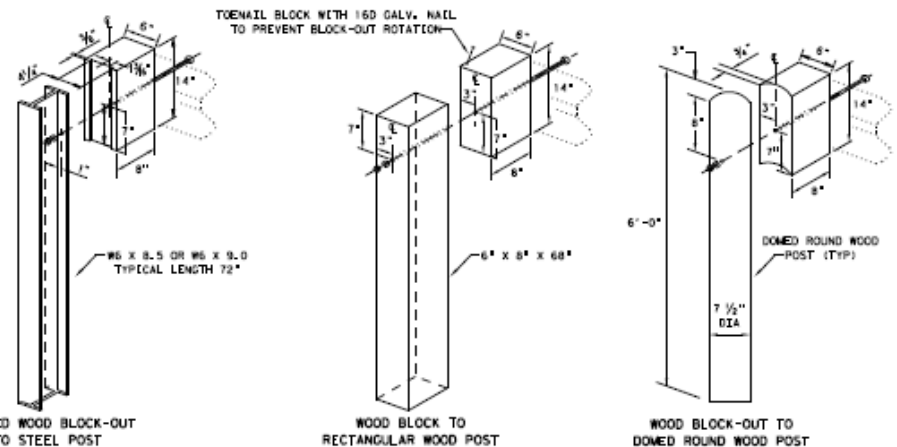


HARDWARE LIST	
QTY	DESCRIPTION
1	9'-4 1/2" W-BEAM RAIL ELEMENT 12GA.
1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
6	7 1/2" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
6	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
6	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
6	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
6	3/8" X 18" GUARDRAIL BOLTS WITH NUTS (FBB04)
6	3/8" ROUND WASHERS (ASTM F436) (FWC160)
6	3/8" X 10" GUARDRAIL BOLTS WITH NUTS (FBB03)
24	3/8" X 1-1/4" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

POST AND BLOCK-OUT TYPES AVAILABLE

FOR WOOD POST

FOR STEEL POST



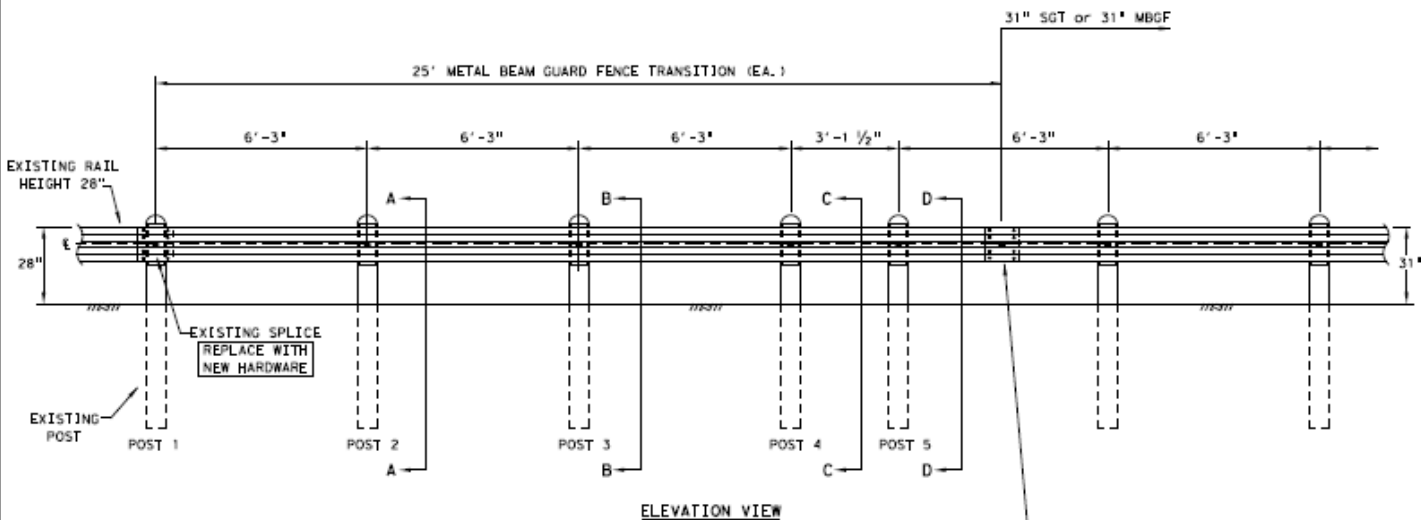
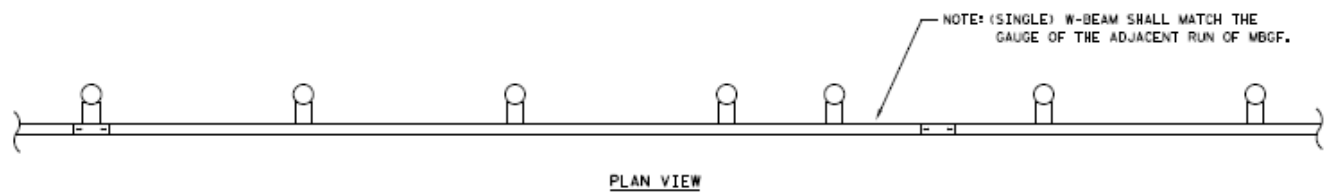
NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.

GUARDRAIL POST BOLTS (ASTM A307 GR. A)
 GUARDRAIL ROUND WASHERS (ASTM F436)
 GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
 GUARDRAIL SPLICE BOLTS (ASTM A307 GR. A)
 GUARDRAIL SPLICE NUTS (ASTM A563)

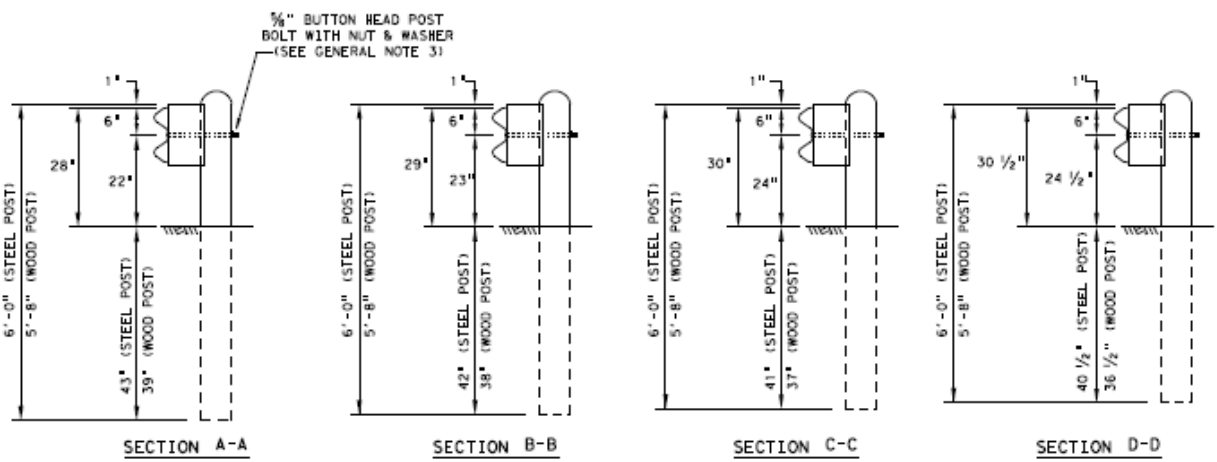
				Design Division Standard	
METAL BEAM GUARD FENCE RAIL HEIGHT ADJUSTMENT (28" TO 31") TL-3 MASH COMPLIANT RAIL-ADJ(A)-19					
TxDOT re led e s ©TxDOT NOVEMBER 2019 REVISED	DW TxDOT CONT SECT	CH KM JOB	DW VP COUNTY	DW COL/AG HIGHWAY	SHEET NO.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
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3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 5/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 5/8" X 1-1/4" WITH 5/8" NUTS (ASTM A563).
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7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TxDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.



* WOOD INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



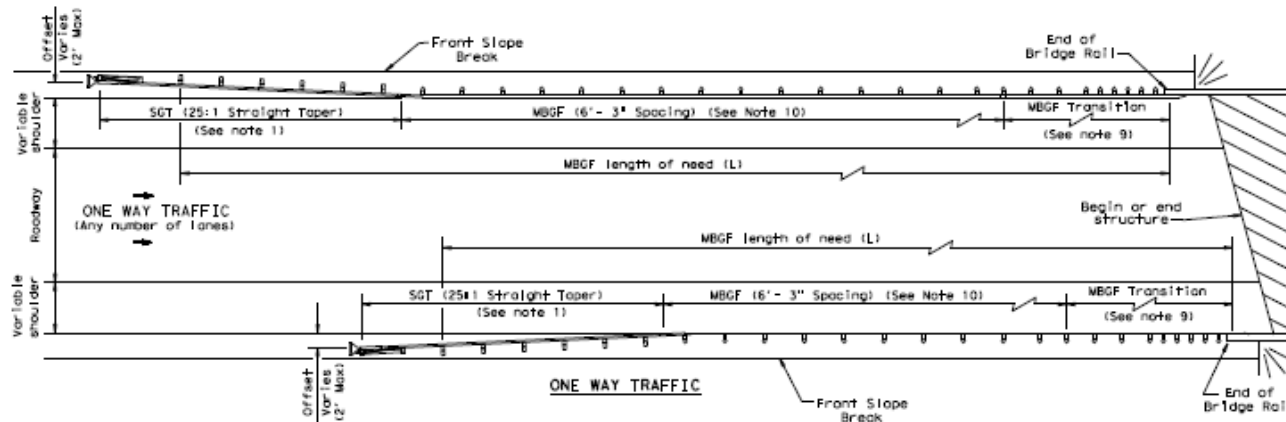
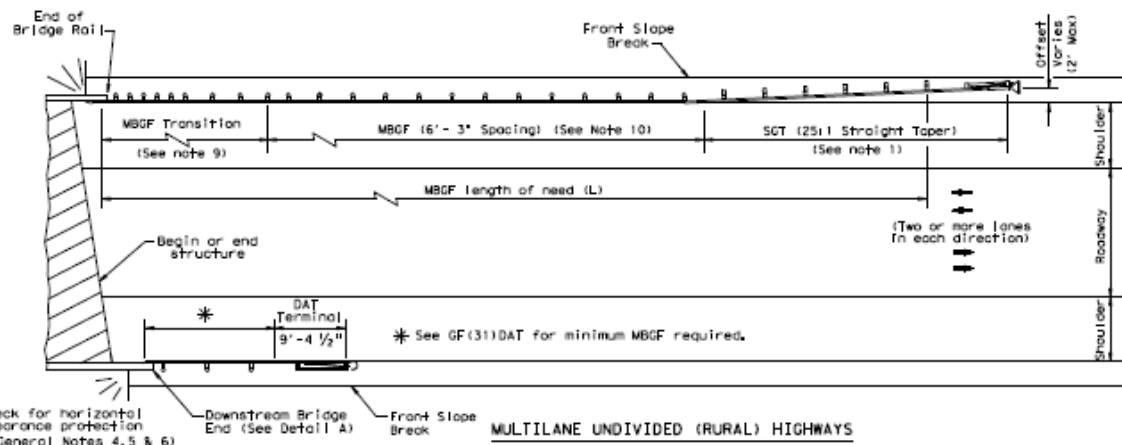
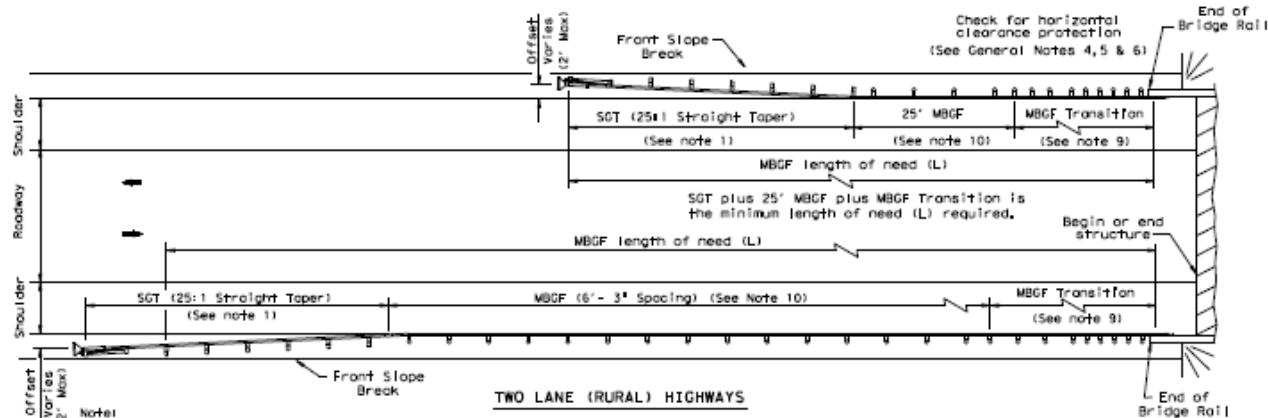
NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.
 GUARDRAIL POST BOLTS (ASTM A307 GR. A)
 GUARDRAIL ROUND WASHERS (ASTM F436)
 GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
 GUARDRAIL SPLICE BOLTS (ASTM A307 GR. A)
 GUARDRAIL SPLICE NUTS (ASTM A563)

HARDWARE LIST	
QTY	DESCRIPTION
1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
5	7 1/2" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
5	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
5	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
5	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
5	5/8" X 18" GUARDRAIL BOLTS AND NUTS (FBB04)
5	5/8" ROUND WASHERS (ASTM F436) (FNC160)
5	5/8" X 10" GUARDRAIL BOLTS AND NUTS (FBB03)
16	5/8" X 1-1/4" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

POST AND BLOCK-OUT TYPES AVAILABLE
 FOR WOOD POST
 FOR STEEL POST

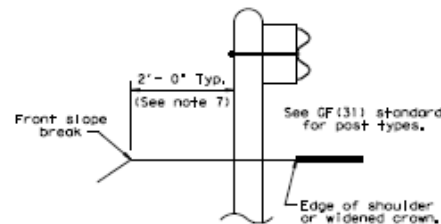
		Design Division Standard	
METAL BEAM GUARD FENCE RAIL HEIGHT ADJUSTMENT (28" TO 31") TL-3 MASH COMPLIANT RAIL-ADJ(B)-19			
FILED	rolladjb19	ON TxDOT	ON V.P.
NOVEMBER 2019	CONTRACT	JOB	ROADWAY
REVISIONS		COUNTY	SHEET NO.

1-11-1

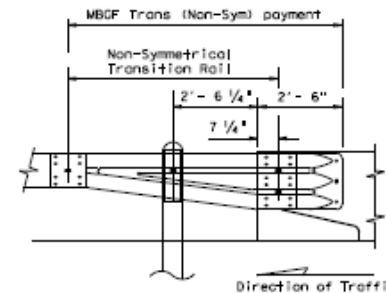


GENERAL NOTES

1. For more detail: See GF(31), SGT(13), GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) of individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal. See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'-0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section of MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge locations shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note: All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A
Showing Downstream Roll Attachment

		Design Division Standard	
BRIDGE END DETAILS (METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)			
BED-14			
FILE: bed14.dgn	DATE: 12/01/2011	BY: JWB	CHECKED: JWB
PROJECT: 10000000000000000000	SECTION: 10000000000000000000	COUNTY: 10000000000000000000	HEET NO: 10000000000000000000