BRIDGE RAIL
Guide
2005

Contents

Bridge Rail Guide 2005

Section 1 W-BEAM BRIDGE RAILS

Section 2 THRIE-BEAM BRIDGE RAILS

Section 3 METAL TUBE BRIDGE RAILS

Section 4 VERTICAL CONCRETE PARAPET

Section 5 F-SHAPE CONCRETE BARRIER

Section 6 TIMBER BRIDGE RAILS

INDEX

Contents

Bridge Rail Guide 2003

TEST LEVEL INDEX

Test Level	Impact Speed	Vehicle Type
TL-1	50 kph/30 mph	820kg Car; 2000kg Pickup
TL-2	70 kph/45 mph	820kg Car; 2000kg Pickup
TL-3	100 kph/62 mph	820kg Car; 2000kg Pickup
TL-4	100 kph/62 mph 80 kph/50 mph	820kg Car; 2000kg Pickup 8,000kg Single Unit Truck
TL-5	100 kph/62 mph 80 kph/50 mph	820kg Car; 2000kg Pickup 36,000kg Tractor Trailer
TL-6	100 kph/62 mph 80 kph/50 mph	820kg Car; 2000kg Pickup 36,000kg Tanker Truck

Comments or changes may be forwarded to Martha.Nevai@fhwa.dot.gov.

This project was funded by: FHWA California Division; FHWA HQ Structures; FHWA Federal Lands Division; Caltrans.

Information contained within this guide should be verified with the contact agency for accuracy prior to use.

Updated bridge rail guide can be found at: http://www.fhwa.dot.gov/bridge/bridgerail/

INDEX

1. W-Beam Bridge Rail

Texas T101

Side Mount W Beam

Box Beam Rail

Type T6 - Tubular W Beam

W-Beam Retrofit

2. Thrie-Beam Bridge Rail

Delaware Thrie-Beam Retrofit Railing

Michigan Bridge Railing, Thrie-Beam Retrofit (R4 Type)

Missouri Thrie-Beam and Channel, Top Mounted

Nebraska Tubular Thrie-Beam Bridge Rail

Oregon Thrie-Beam Side Mount

Washington 10-Gauge Thrie-Beam Retrofit

3. Metal Tube Bridge Rail

Aluminum Tube Bridge Rail

Foothills Parkway Aluminum Bridge

Standard 1-Bar Metal Rail

Steel Tube Bridge Rail Attached to Bottom of Deck

Texas Energy-Absorbing Bridge Rail

Steel Tube Bridge Rail Attached to Side of Deck

California Type 18

California Side Mount Type 115 Rail

California Type 116 Rail

California Type 117 Rail

INDEX

Illinois 2399-Type Side Mount

2-Tube Side Mount

Steel Tube Bridge Rail Attached to Top of Deck

Texas Type 421 Aesthetic Bridge Rail

Washington, D.C. Historic Bridge Rail Retrofit

Alaska Rail - Curb Mounted

California Type 9 (AASHTO BR2)

California ST-10 Rail

Bridge Railing, Aesthetic Parapet Type BR 27D

Minnesota Combination Bridge Rail, Design #3

Type C202

Steel Tube Bridge Rail Attached to Curb

George Washington Parkway Steel Bridge Rail

Illinois 2399 - Curb Mount

Michigan Multi Tube Bridge Railing

Bridge Railing, 2-Tube

NETC 2-Rail Curb-Mounted Railing

Two-Rail Barrier

Three-Rail Barrier Top Deck Flush Mount

Four-Rail Barrier

Five-Rail Barrier

Oregon 2-Tube Curb Mount

Oregon 3-Tube Curb Mount

Wyoming 2-Tube Steel Railing

Wyoming 2-Tube, Curb-Mounted

4. Vertical Concrete Parapet

32" New Jersey Shape Concrete Barrier

Type 80 and 80 SW Concrete Barrier

Baltimore Washington Parkway Stone Rail

Federal Lands Modified Kansas Corral Bridge Rail

Natchez Trace Concrete Bridge Rail

New Jersey Barrier

Vertical Parapet with Single-Pipe Aluminum Handrail

Vertical Parapet with Two-Pipe Aluminum Handrail

INDEX

Vertical Parapet with Security Fence

Iowa Concrete Open Railing

Iowa Concrete Block Railing Retrofit

Modified Kansas Corral Rail

Kansas 32" Corral Rail

42" Single Slope Concrete Barrier

Concrete Beam and Post

Nebraska Open Concrete Bridge Rail

TR1 Modified Bridge Rail

Parapet Flush Mount

Parapet Sidewalk Mount

Type T501SW

Type C411

Type T203

Texas Type T411 Aesthetic Rail

Texas TT Rail

NJ Barrier

Vertical Concrete Parapet with Aluminum Tube Bridge Rail

New Jersey Concrete Barrier

Type 26 Concrete Barrier with Sidewalk

Type 732 Concrete Barrier

Type 736 Concrete Barrier

Type 742 Concrete Barrier

Aluminum Tube Bridge Rail

LB Foster Precast NJ Shape, Bolted Down

California Type 20

New Jersey Barrier with Rail

New Jersey Barrier with 22" Steel Bicycle Rail

Bicycle Rail Attachment to Safety Shape Concrete Rail

New Jersey Safety Shape Parapet

Type HT

INDEX

5. F-Shape Concrete Barrier/Single Slope

32" F-Shape

42" F-Shape

Soundwall/F-Shape

Vertical Face Guide, 34" Retrofit

Vertical Face Guide, 42" Retrofit

6. Timber Bridge Rail

Timber Rail 3 Bridge Rail

Panel-Lam Timber Vehicle Bridge Rail

Curb-Type Glu-Lam Rail for Longitudinal Timber Decks

Glu-Lam Rail with Steel Box Attachment, side mount

Glu-Lam Timber Rail with Curb, GC8000 design

Timber Curbs for Longitudinal Timber Decks

W-Beam Breakaway Timber Post Railing

Steel Thrie-Beam Rail, side mount

Steel Thrie-Beam Rail with Upper Channel, TCB8000 design

W-Beam Breakaway Steel Post Railing

Section 1

W-BEAM BRIDGE RAIL

Section 1

W-BEAM BRIDGE RAIL

Name	Location	Test Level
Texas T101	Federal Lands	TL-2
Side Mount W Beam	Michigan	TL-3
Box Beam Rail	Ohio	TL-2
Type T6 - Tubular W-Beam	Texas	TL-2
W-Beam Retrofit	West Virginia	TL-2

W-Beam Bridge Rail

Texas T101 Transition Rail

Height:
32"

Cost per linear foot:
$90

Test level:
TL-2

Utilized in:
Federal Lands

Contact:
Mark Clabaugh, P.E.
Federal Lands Bridge Office
21400 Ridgetop Circle
Sterling, VA 20166
(703) 404-6235

W-Beam Bridge Rail

Texas T101

Plans Not Yet Available.

W-Beam Bridge Rail

Side Mount W Beam

Height:
28"

Cost per linear foot:
$65

Test level:
TL-3

Utilized in:
Michigan

Contact:
Steve Beck
Michigan Dept
of Transportation
State Transportation Building
425 W. Ottawa Street
P.O. Box 30050
Lansing, MI 48909
(517) 373-0097

W-Beam Bridge Rail

Side Mount W Beam

Plans Not Yet Available.

W-Beam Bridge Rail

Box Beam Rail (W-Beam Backed with Steel Beam)

Height:
27"

Cost per linear foot:
$41

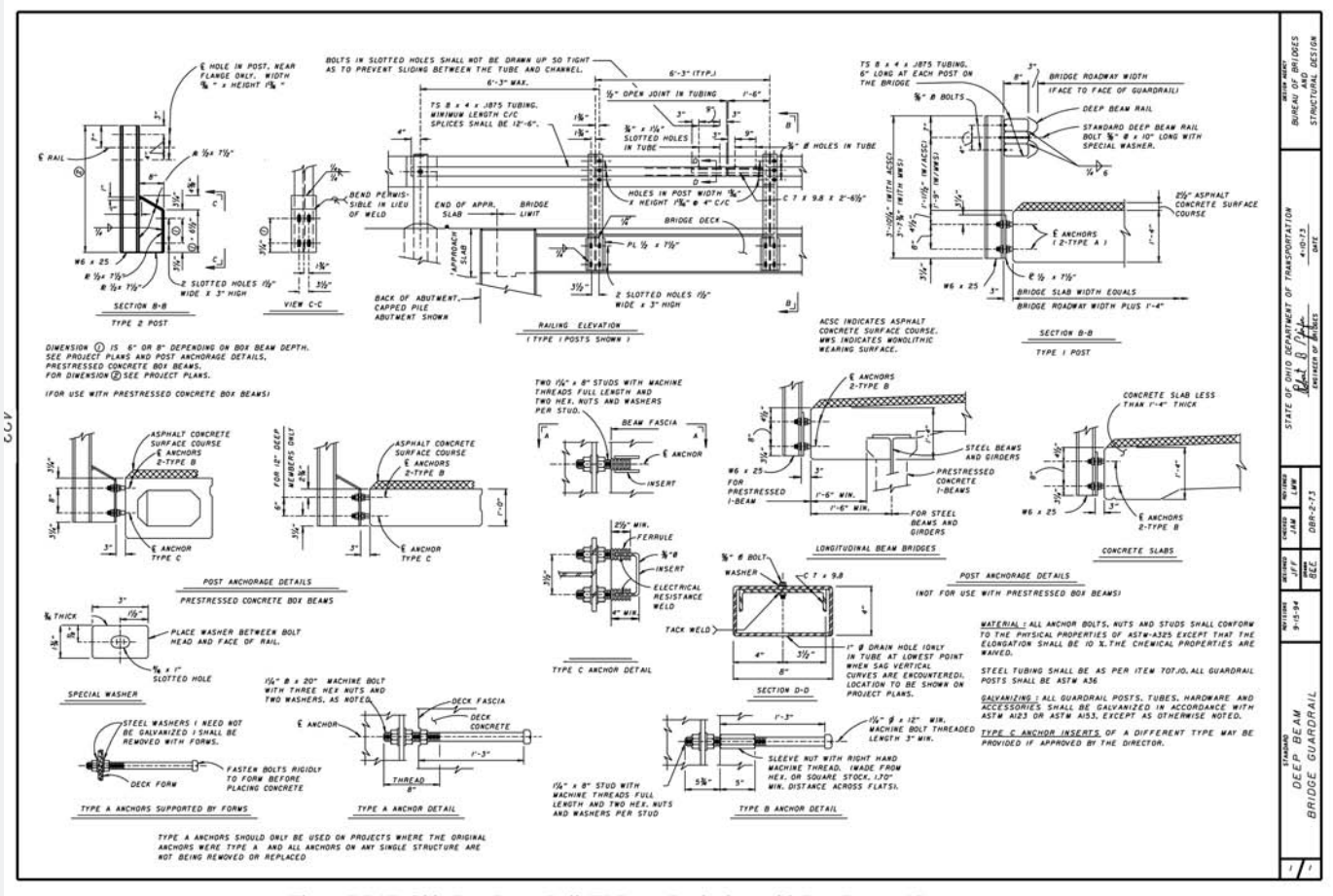
Test level:
TL-2

Utilized in:
Ohio

Contact:
Matt Shamis
Federal Highway Administration- Ohio Division
200 North High Street
Room 328
Columbus, OH 43215
(614) 280-6847

W-Beam Bridge Rail

Box Beam Rail (W-Beam Backed with Steel Beam)



W-Beam Bridge Rail

Type T6 - Tubular W-Beam

Height:
27"

Cost per linear foot:
$38

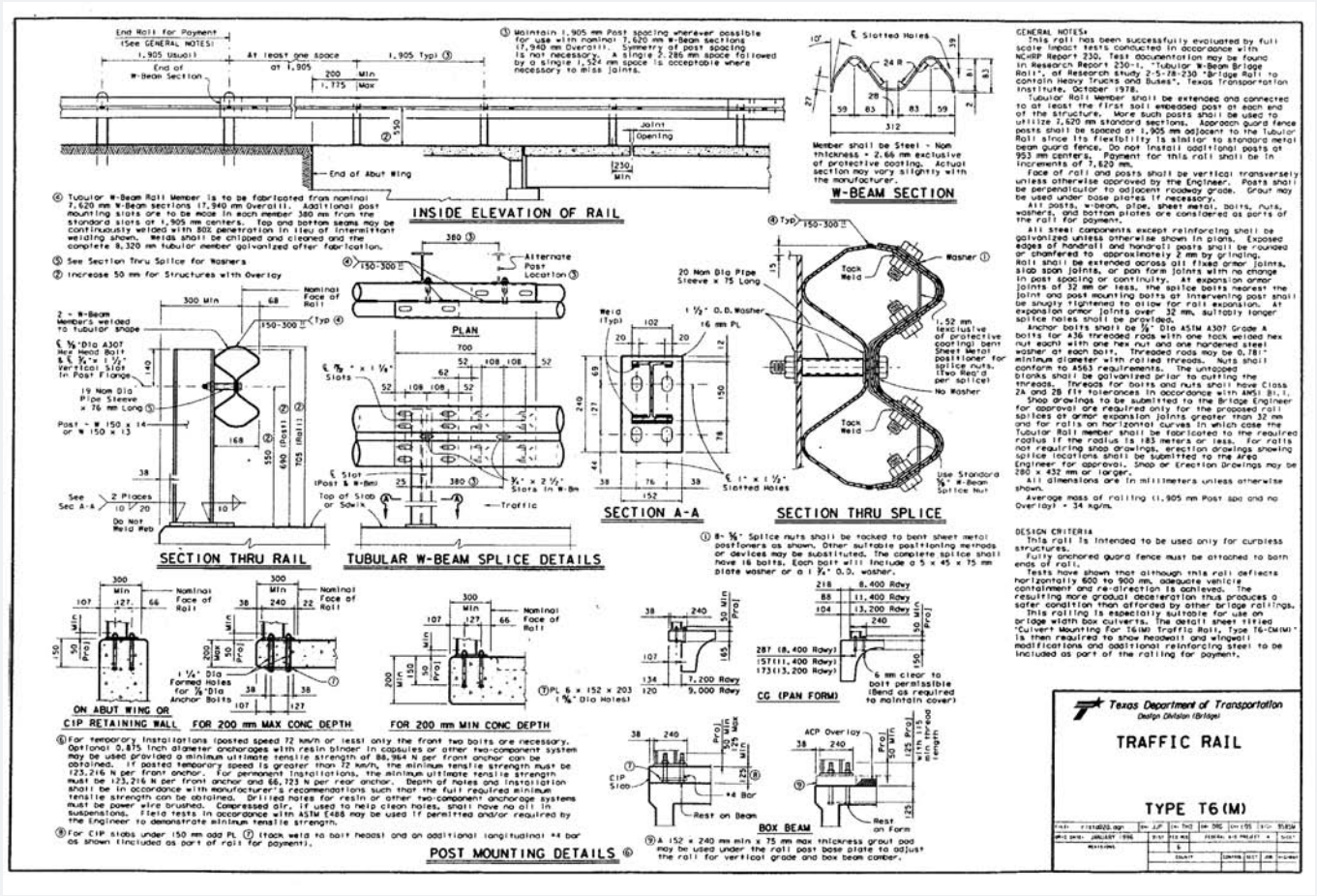
Test level:
TL-2

Utilized in:
Texas

Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178

W-Beam Bridge Rail

Type T6 - Tubular W-Beam



W-Beam Bridge Rail

W-Beam Retrofit

Height:
28.5"

Cost per linear foot:
$__

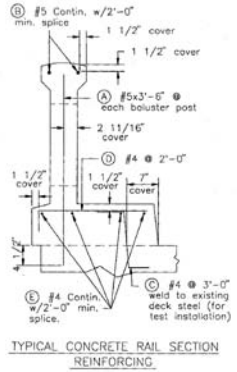
Test level:
TL-2

Utilized in:
West Virginia

Contact:
Jim Shook
West Virginia Dept
of Transportation
Building 5
1900 Kanawha Blvd E
Charleston, WV 25305
(304) 558-9747

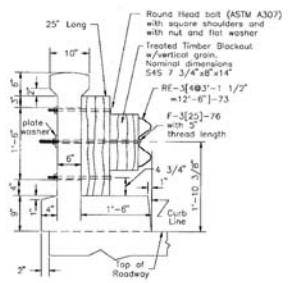
W-Beam Bridge Rail

W-Beam Retrofit



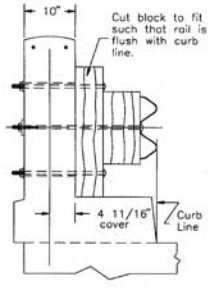
TYPICAL CONCRETE RAIL SECTION
REINFORCING

Figure 1. Drawings for concrete baluster bridge railing.



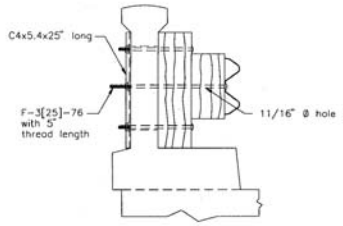
TYPICAL CONCRETE RAIL SECTION
WITH W-BEAM RETROFIT
WHEN ℄ 5/8"ø BOLT
CAN NOT GO THROUGH CONCRETE RAILING VOID

Figure 2. Drawings for W-beam retrofit for concrete baluster bridge railing.



SECTION AT
END OF RAILING

Figure 2. Drawings for W-beam retrofit for concrete baluster bridge railing (continued).



TYPICAL CONCRETE RAIL SECTION
WITH W-BEAM RETROFIT
WHEN ℄ 5/8"ø BOLT
CAN GO THROUGH CONCRETE RAILING VOID

Figure 2. Drawings for W-beam retrofit for concrete baluster bridge railing (continued).

Section 2

THRIE-BEAM BRIDGE RAIL

Section 2

THRIE-BEAM BRIDGE RAIL

Name	Location	Test Level
Delaware Thrie-Beam Retrofit Railing	Delaware	TL-4
Michigan Bridge Railing, Thrie-Beam Retrofit (R4 Type)	Michigan	TL-4
Missouri Thrie-Beam Rail and Channel, Top-Mounted	Missouri	TL-3
Nebraska Tubular Thrie-Beam Bridge Rail	Nebraska	TL-3
Oregon Thrie-Beam Side Mount	Oregon	TL-2
Washington State 10 Gauge Thrie-Beam Retrofit	Washington	TL-2

Thrie-Beam Bridge Rail

Delaware Thrie-Beam Retrofit Railing

Height:
32"

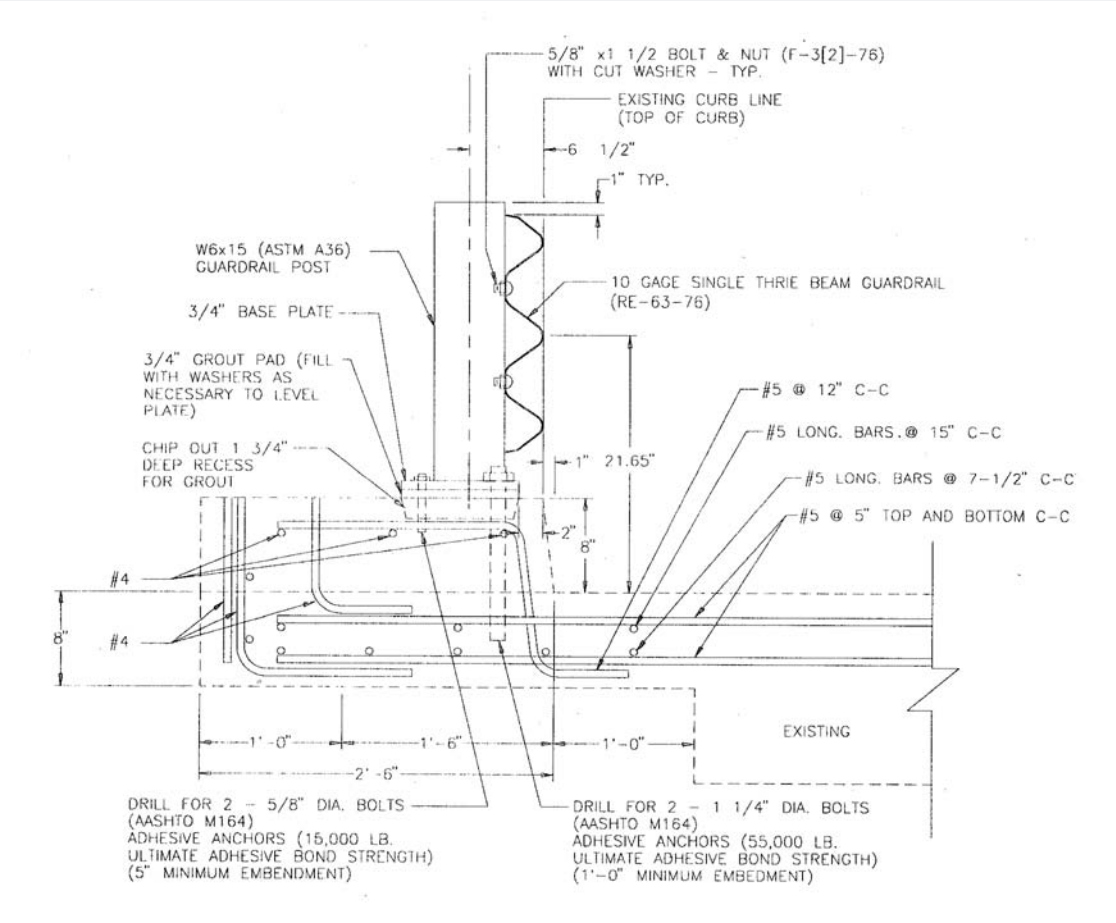
Cost per linear foot:
$__

Test level:
TL-4

Utilized in:
Delaware

Contact:
Jiten Soneji
Delaware Departmentt
of Transportation
800 Bay Road
P.O. Box 778
Dover, DE 19903
(302) 760-2299

Delaware Curb Mounted Thrie-Beam Retrofit Railing



Thrie-Beam Bridge Rail

Michigan Bridge Railing, Thrie-Beam Retrofit (R4 Type)

Height:
34"

Cost per linear foot:
$25

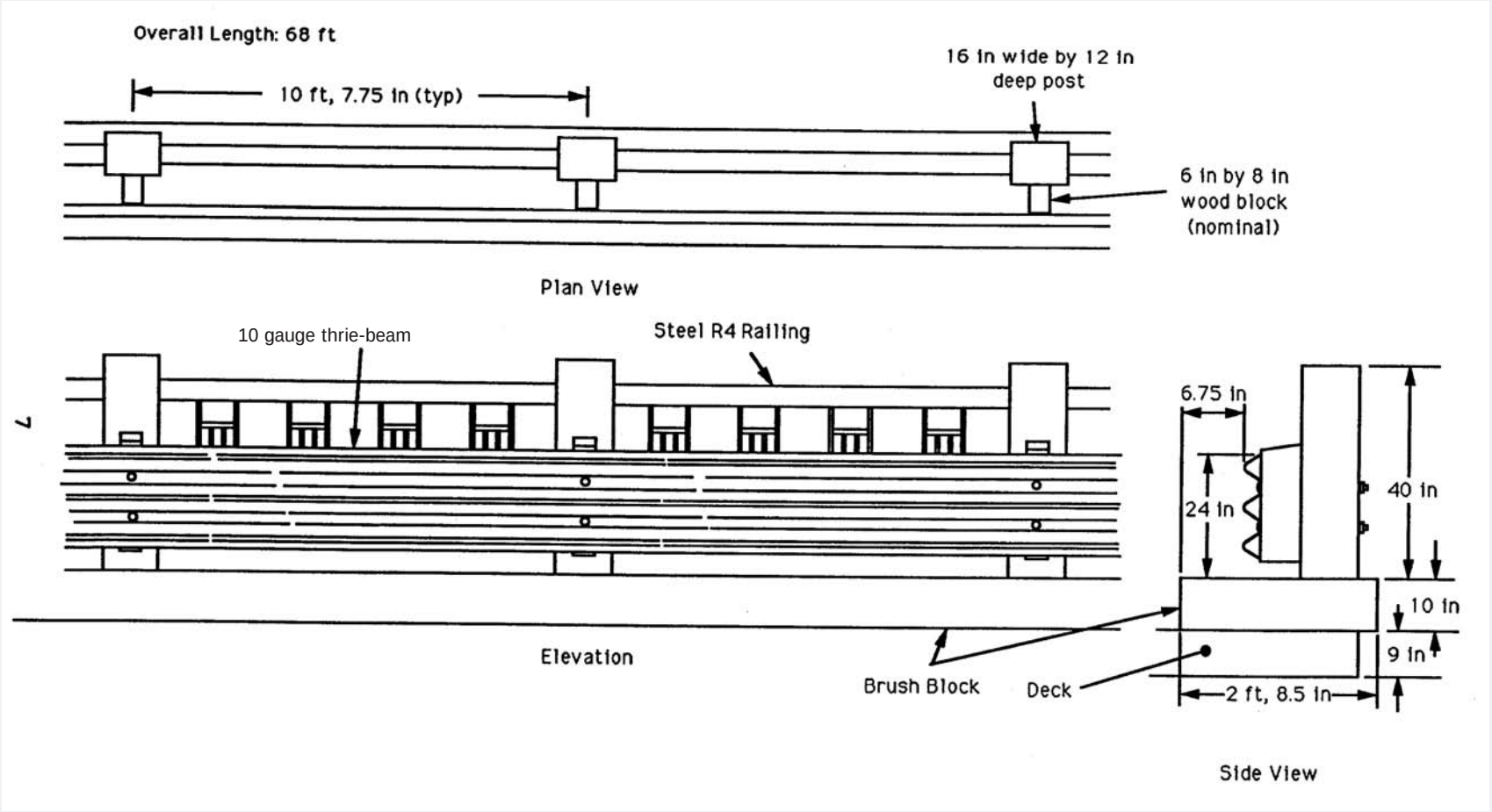
Test level:
TL-4

Utilized in:
Michigan

Contact:
Steve Beck
Michigan Dept
of Transportation
State Transportation Building
425 W. Ottawa Street
P.O. Box 30050
Lansing, MI 48909
(517) 373-0097

Thrie-Beam Bridge Rail

Michigan Bridge Railing, Thrie-Beam Retrofit (R4 Type)



Thrie-Beam Bridge Rail

Missouri Thrie-Beam Rail and Channel, Top Mounted

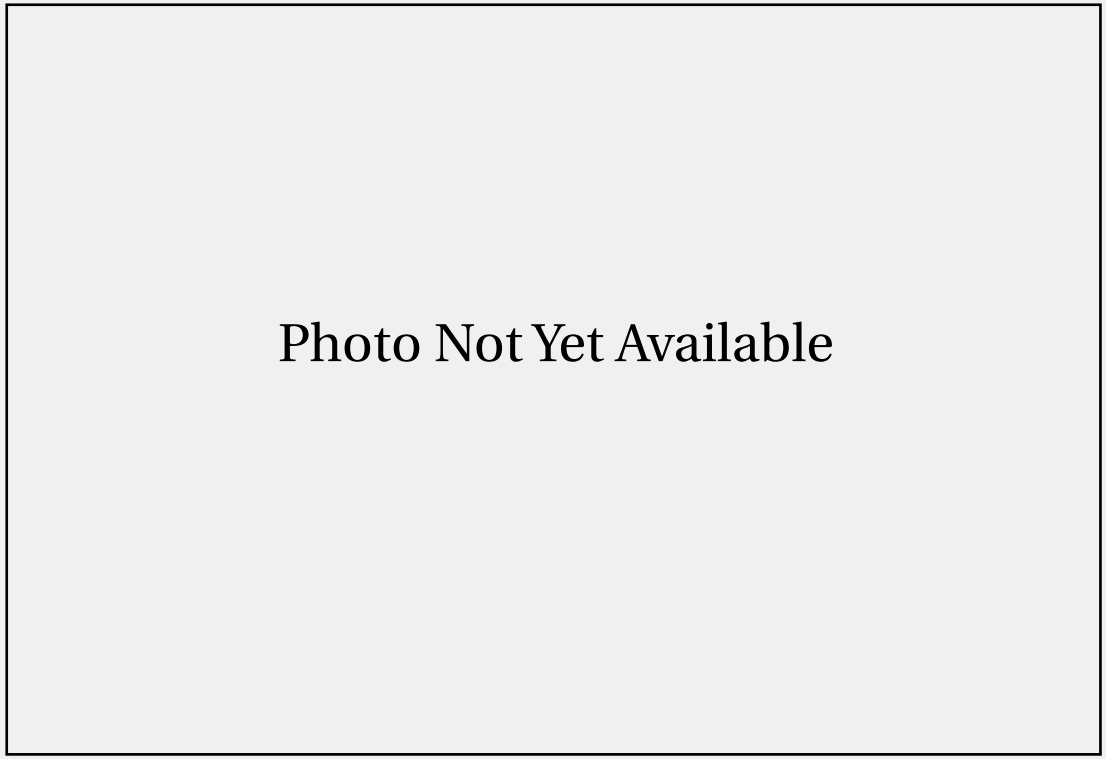
Height:
30.5"

Cost per linear foot:
$100-125

Test level:
TL-3

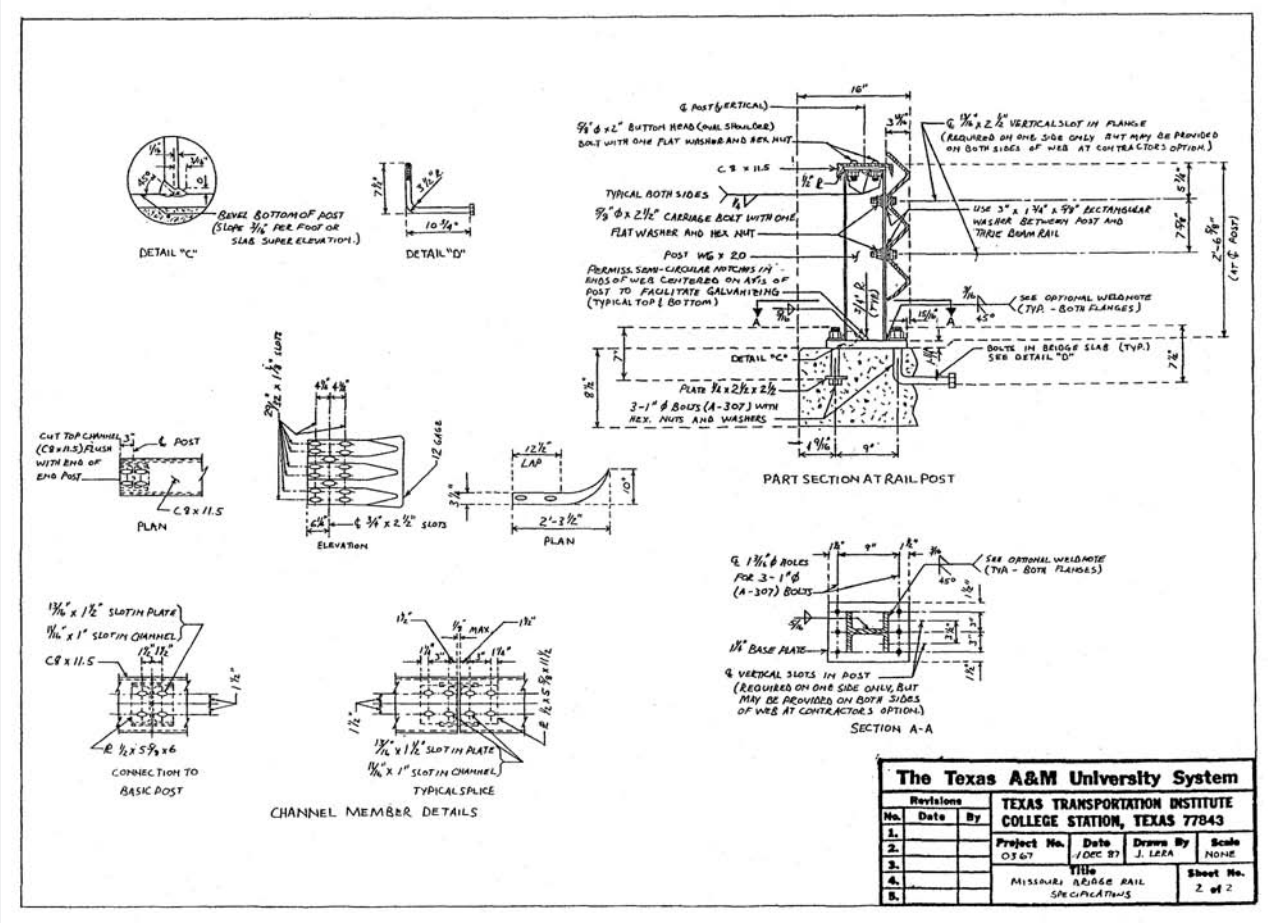
Utilized in:
Missouri

Contact:
Peter Clogston, P.E.
Federal Highway Admin,
Missouri Division Office
209 Adams Street
Jefferson City, MO 65101
(573) 638-2613



Thrie-Beam Bridge Rail

Missouri Thrie-Beam Rail and Channel, Top Mounted



Thrie-Beam Bridge Rail

Nebraska Tubular Thrie-Beam Bridge Rail

Height:
32"

Cost per linear foot:
$__

Test level:
TL-3

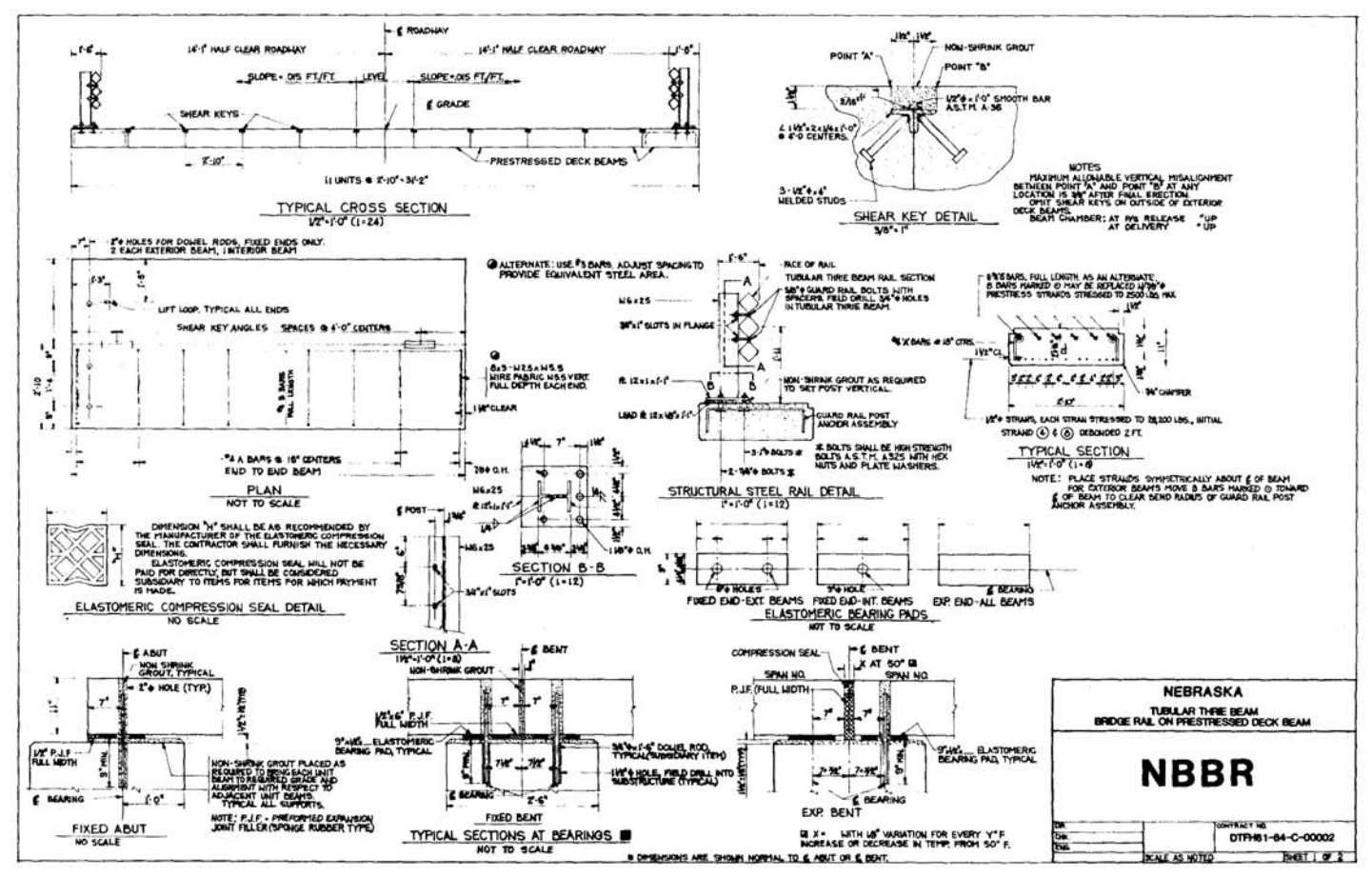
Utilized in:
Nebraska

Contact:
Federal Highway Administration
100 Centennial Mall-North
Room 220
Lincoln, NE 68508
(402) 437-5977

Photo Not Yet Available

Thrie-Beam Bridge Rail

Nebraska Tubular Thrie-Beam Bridge Rail



Thrie-Beam Bridge Rail

Oregon Thrie-Beam Side Mount

Height:
29"

Cost per linear foot:
$63.60

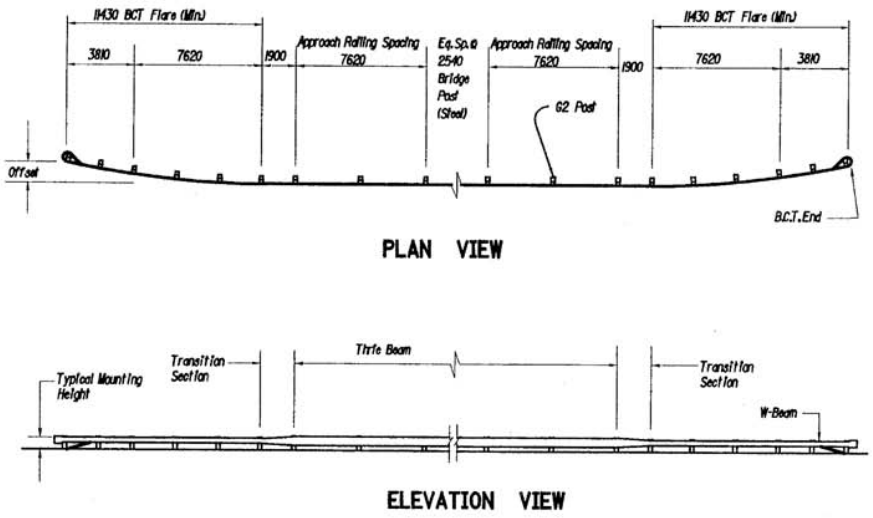
Test level:
TL-2

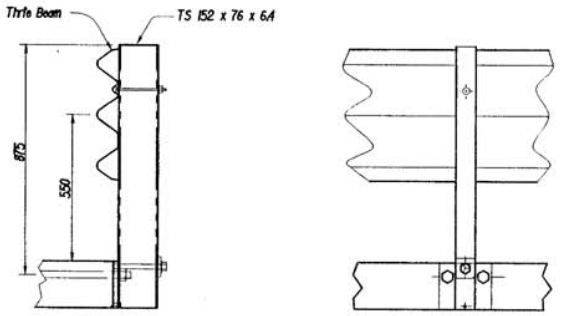
Utilized in:
Oregon

Contact:
Antony P. Stratis, P.E.
Tech Center Bridge Manager
Region 1
123 NW Flanders Street
Portland, OR 97209
(503) 731-8490

Thrie-Beam Bridge Rail

Oregon Thrie-Beam Side Mount





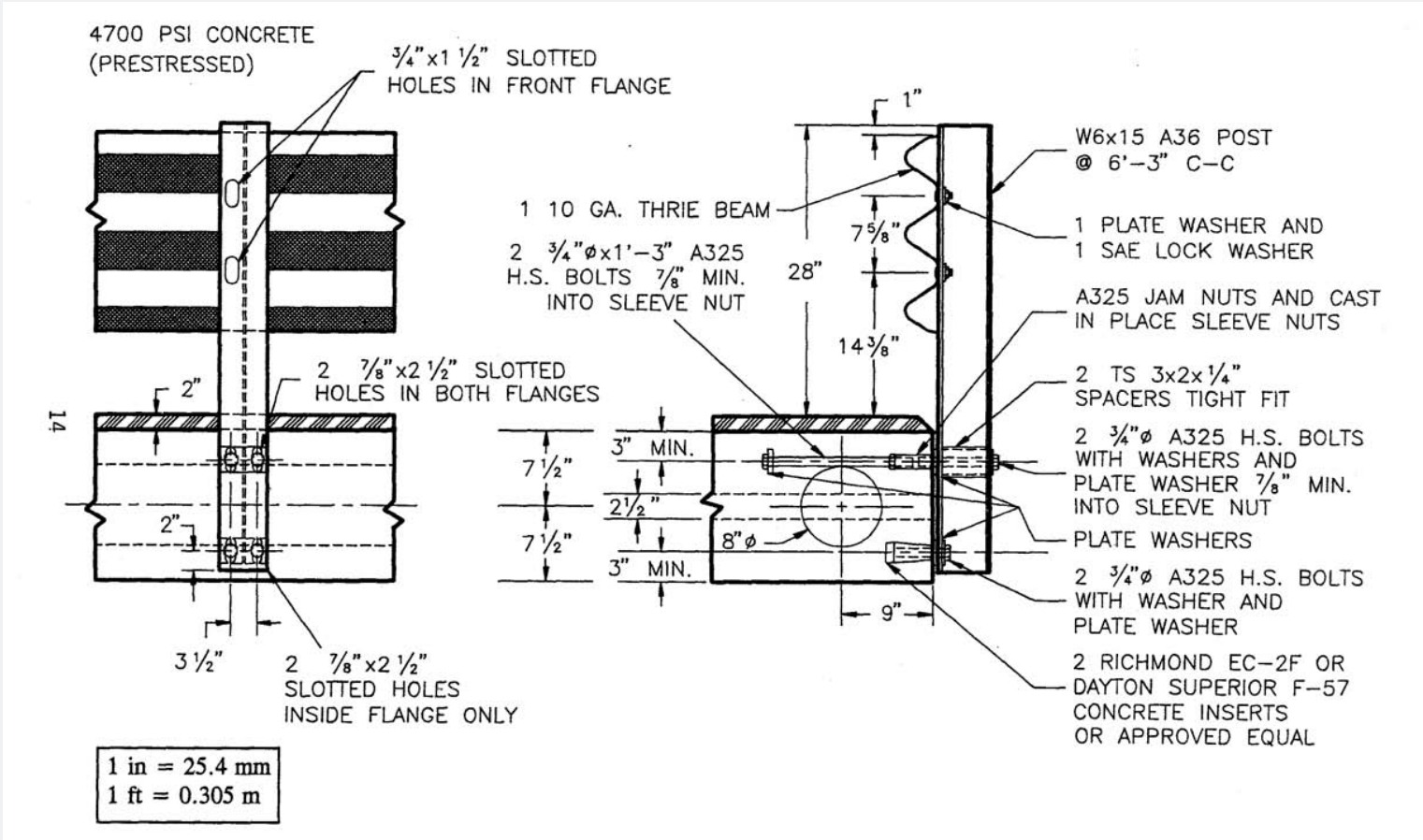
All Dimensions Shown Are mm unless Otherwise Noted.

FIGURE D.1 Side-Mounted Thrie-Beam Bridge Railing

Rail Height	810 mm			
Test Vehicle	902-kg Car	1022-kg Car	1022-kg Car	9080-kg Bus
Impact Speed km/h	99	94	97	72
Impact Angle Degrees	14.1	16.0	16.0	7.7

Thrie-Beam Bridge Rail

Oregon Thrie-Beam Side Mount



Thrie-Beam Bridge Rail

Washington 10 Gauge Thrie-Beam Retrofit (curb mounted)

Height:
30"

Cost per linear foot:
$40

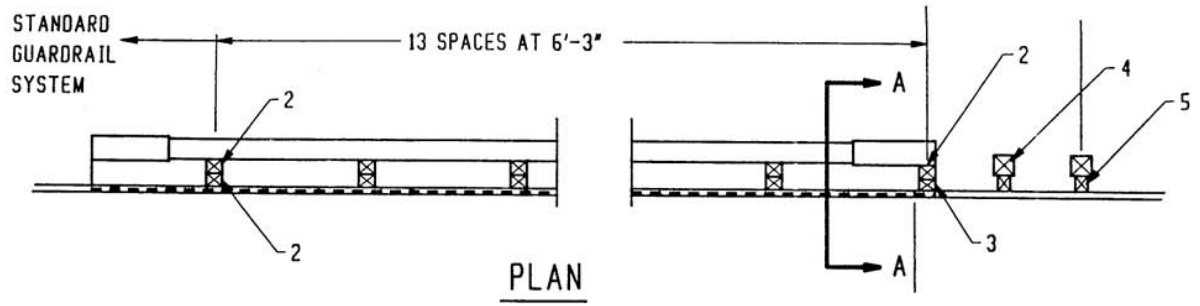
Test level:
TL-2

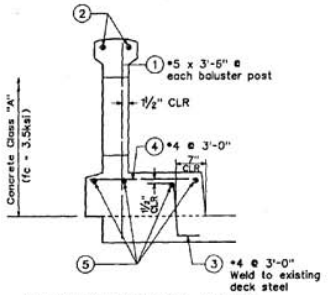
Utilized in:
Washington State

Contact:
Scott Sargent
WSDOT Bridge and
Structures Office
P.O. Box 47340
Olympia, WA 98504-7340
(360) 705-7753

Thrie-Beam Bridge Rail

Washington 10 Gauge Thrie-Beam Retrofit





TYPICAL BALUSTER RAIL SECTION
REINFORCING

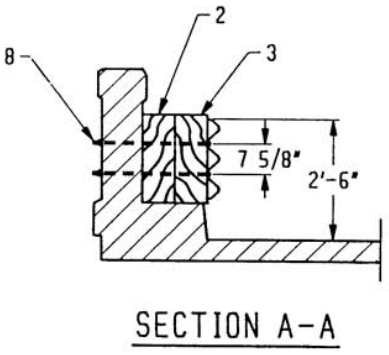
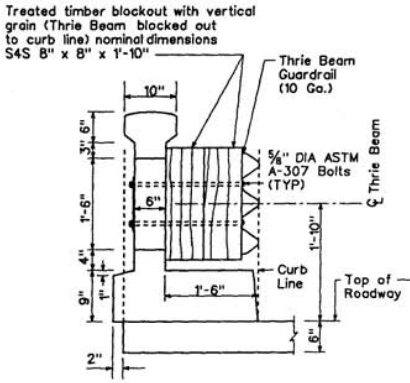
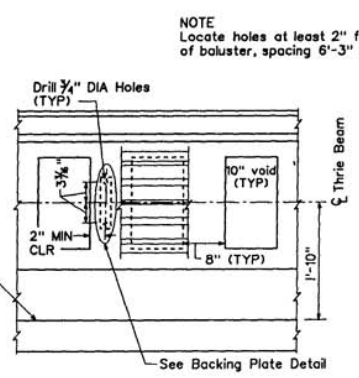


FIGURE 8: WASHINGTON 10 GAGE THRIE BEAM RETROFIT FOR BALUSTERS CURB/SIDEWALK



TYPICAL BALUSTER RAIL SECTION



ELEVATION OF BALUSTER

Section 3

METAL TUBE BRIDGE RAIL

Section 3 METAL TUBE BRIDGE RAIL

Subsection	Name	Location	Test Level
Aluminum Tube Bridge Rails	Foothills Parkway Aluminum Bridge	Federal Lands	TL-2
	Standard 1-Bar Metal Rail	North Carolina	TL-2
Steel Tube Bridge Rails Attached to Bottom of Deck	Texas Energy-Absorbing Bridge Rail	Texas	TL-3
Steel Tube Bridge Rails Attached to Side of Deck	California Type 18	California	TL-3
	California Side Mount Type 115 Rail	California	TL-2
	California Type 116 Rail	California	TL-2
	California Type 117 Rail	California	TL-2
	Illinois 2399- Type Side Mount	Illinois	TL-4
	2-Tube Oregon Side Mount	Oregon	TL-4

Section 3 METAL TUBE BRIDGE RAIL

Subsection	Name	Location	Test Level
Steel Tube Bridge Rails Attached to Top of Deck	Texas Type 421 Aesthetic Rail	Texas	TL-2
	Washington, DC Historic Bridge Rail Retrofit (Curb Mount)	Washington, DC	TL-2
Steel Tube Bridge Rails Attached to Parapet	Alaska Rail - Curb Mounted	Alaska	TL-4
	California Type 9 (AASHTO BR2)	California	TL-2
	California ST-10 Rail	California	TL-4
	Bridge Railing, Aesthetic Parapet Type BR 27D	Michigan	TL-4
	Minnesota Combination Bridge Rail Design #3	Minnesota	TL-4
	Type C202	Texas	TL-5

Section 3 METAL TUBE BRIDGE RAIL

Subsection	Name	Location	Test Level
Curb Mounted Steel Tube Bridge Rails	George Washington Parkway Steel Bridge Rail	Federal Lands	TL-2
	Illinois 2399 - Curb Mount	Illinois	TL-4
	Michigan Multi Tube Bridge Railing	Michigan	TL-4
	Bridge Railing, 2 Tube	Michigan	TL-4
	NETC 2-Rail Curb-Mounted Railing	New England	TL-4
	Two-Rail Barrier	New York	TL-4
	Three-Rail Barrier Top Deck Flush Mount	New York	TL-4
	Four-Rail Barrier	New York	TL-4
	Five-Rail Barrier	New York	TL-4

Section 3 METAL TUBE BRIDGE RAIL

Subsection	Name	Location	Test Level
Steel Tube Bridge Rails Attached to Curb	Oregon 2-Tube Curb Mount	Oregon	TL-2
	Oregon 3-Tube Curb Mount	Oregon	TL-4
	Wyoming 2-Tube Steel Railing	Wyoming	TL-4
	Wyoming 2-Tube, Curb-Mounted	Wyoming	TL-3

Section 3

Aluminum Tube Bridge Rail

Foothills Parkway Aluminum Bridge Rail

Height:
33"

Cost per linear foot:
$75

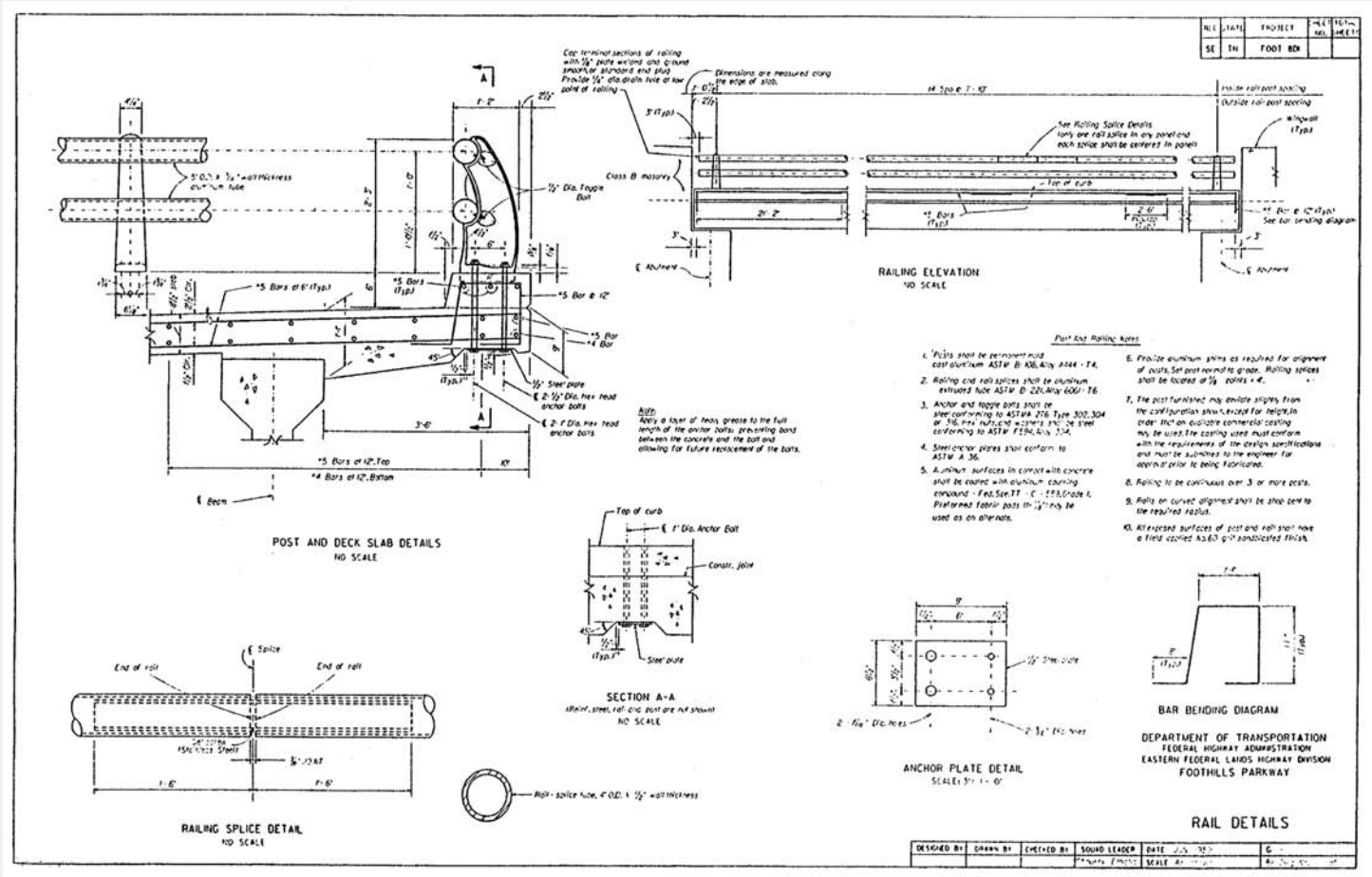
Test level:
TL-2

Utilized in:
Federal Lands

Contact:
Mark Clabaugh, P.E.
Federal Lands Bridge Office
21400 Ridgetop Circle
Sterling, VA 20166
(703) 404-6235

Aluminum Tube Bridge Rail

Foothills Parkway Aluminum Bridge Rail



Aluminum Tube Bridge Rail

Standard 1-Bar Metal Rail

Height:
32"

Cost per linear foot:
$110

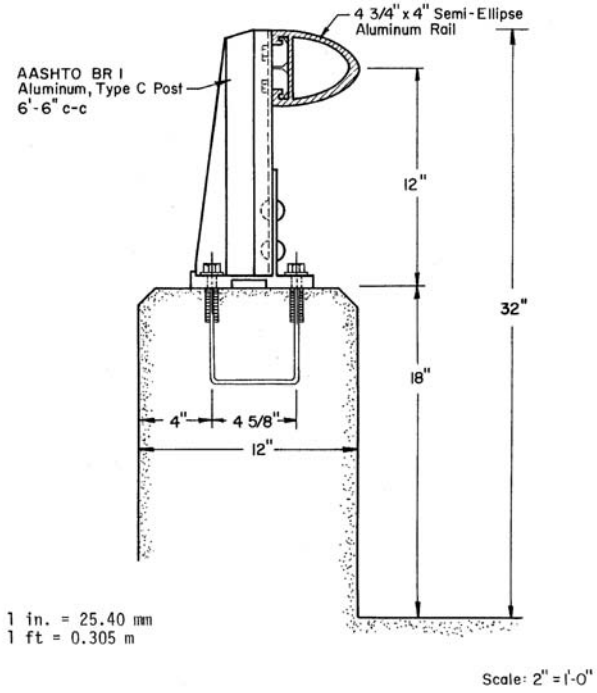
Test level:
TL-2

Utilized in:
North Carolina

Contact:
John Emerson, P.E.
North Carolina Dept
of Transportation
1500 Mail Service Center
Raleigh, NC 27699
(919) 733-4362

Aluminum Tube Bridge Rail

Standard 1-Bar Metal Rail



NORTH CAROLINA

Cross Section of North Carolina One-Bar
Aluminum on Concrete Parapet.

Steel Tube Bridge Rail Attached to Bottom of Deck

Texas Energy Absorbing Bridge Rail

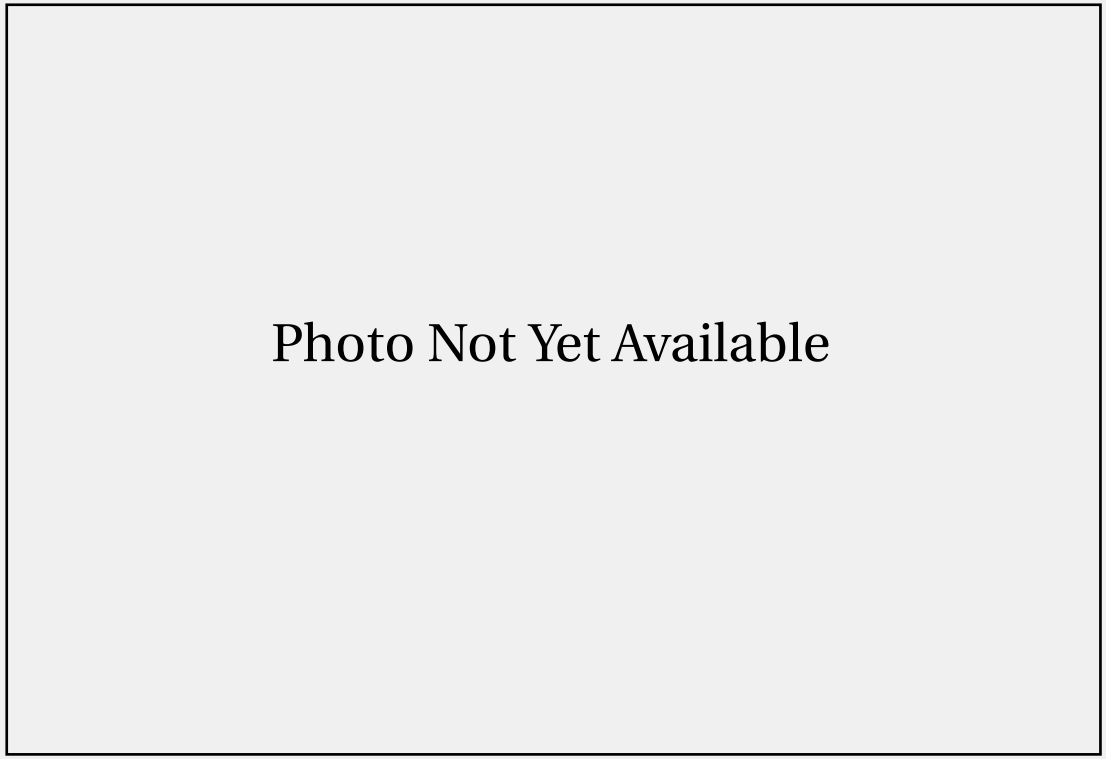
Height:
27"

Cost per linear foot:
$__

Test level:
TL-3

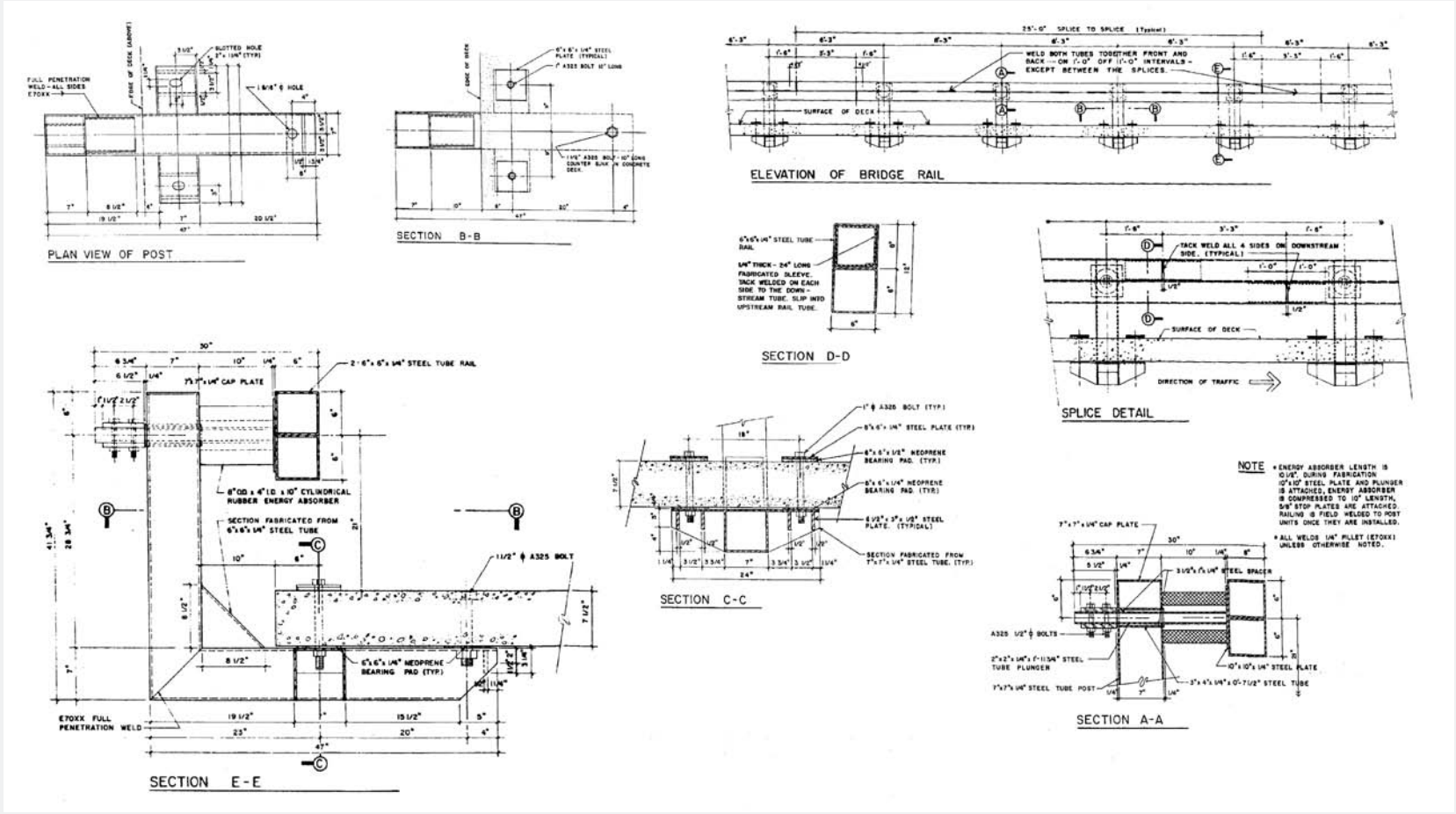
Utilized in:
Texas

Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178



Steel Tube Bridge Rail Attached to Bottom of Deck

Texas Energy Absorbing Bridge Rail



Steel Tube Bridge Rail Attached to Side of Deck

California Type 18

Height:
36"

Cost per linear foot:
$__

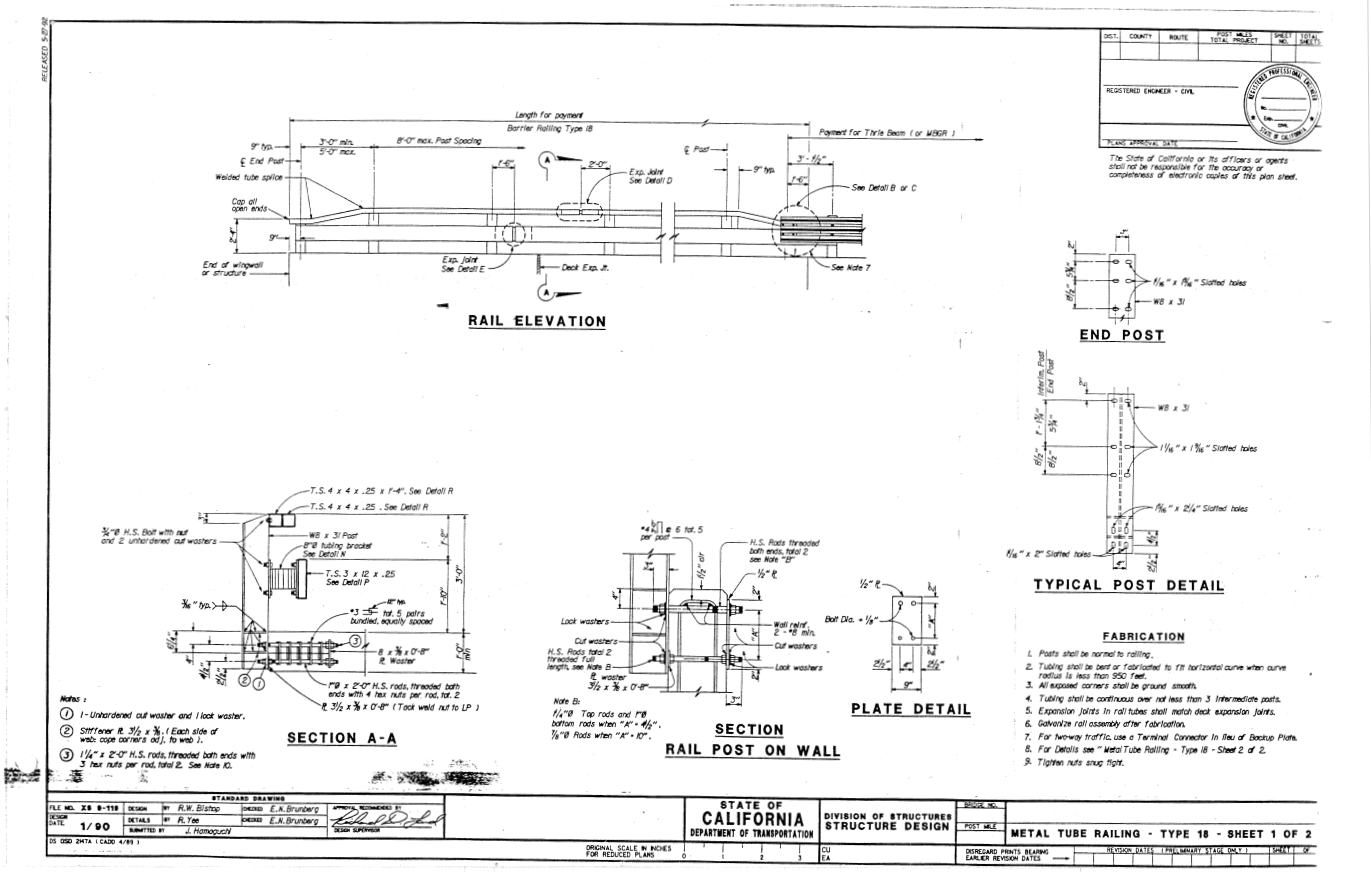
Test level:
TL-2

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

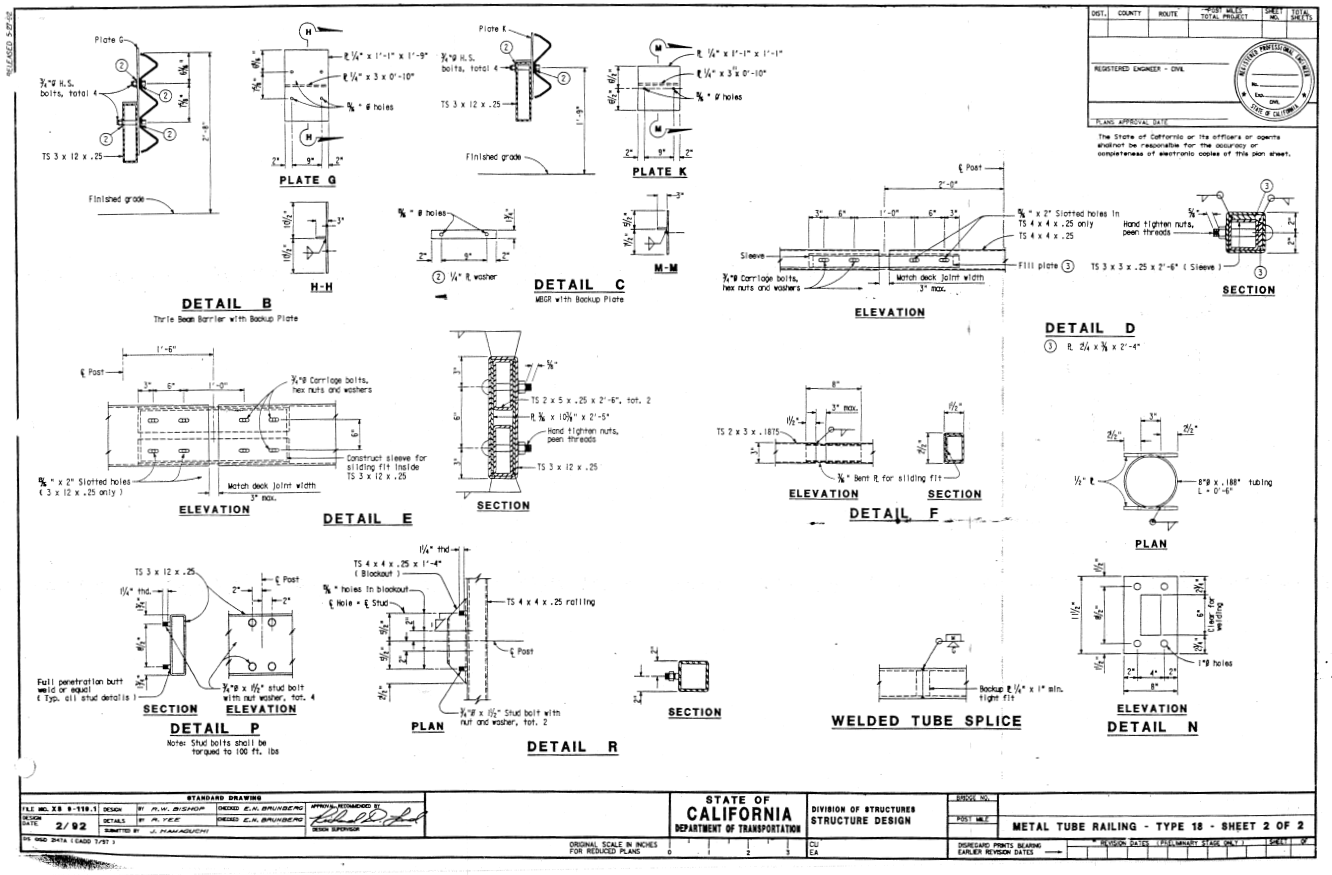
Steel Tube Bridge Rail Attached to Side of Deck

California Type 18



Steel Tube Bridge Rail Attached to Side of Deck

California Type 18



Steel Tube Bridge Rail Attached to Side of Deck

California Side Mount Type 115 Rail

Height:
30"

Cost per linear foot:
$__

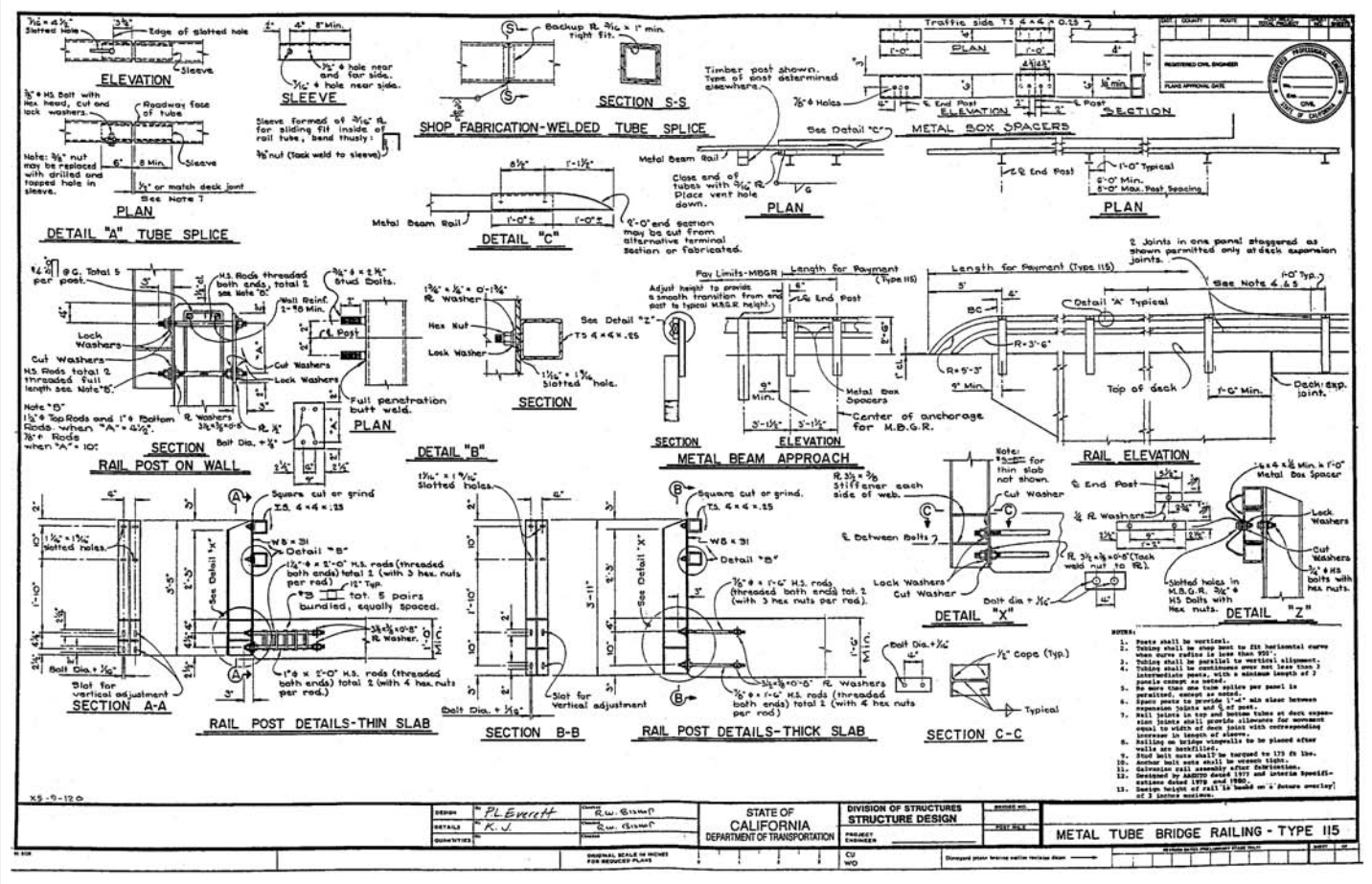
Test level:
TL-2

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Steel Tube Bridge Rail Attached to Side of Deck

California Side Mount Type 115 Rail



Steel Tube Bridge Rail Attached to Side of Deck

California Type 116 Rail

Height:
42"

Cost per linear foot:
$__

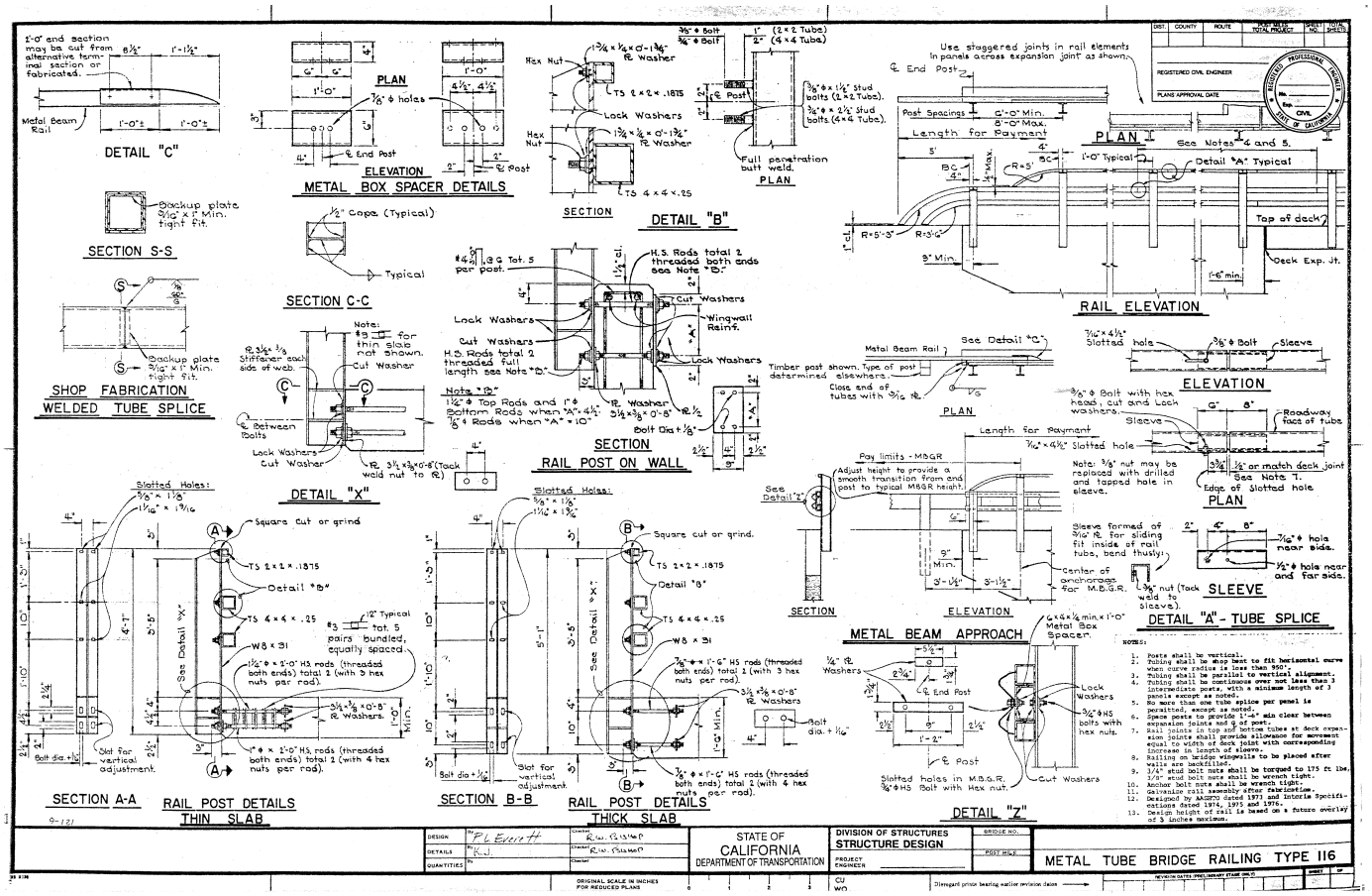
Test level:
TL-2

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Steel Tube Bridge Rail Attached to Side of Deck

California Type 116 Rail



Steel Tube Bridge Rail attached to Side of Deck

California Type 117 Rail

Height:
54"

Cost per linear foot:
$__

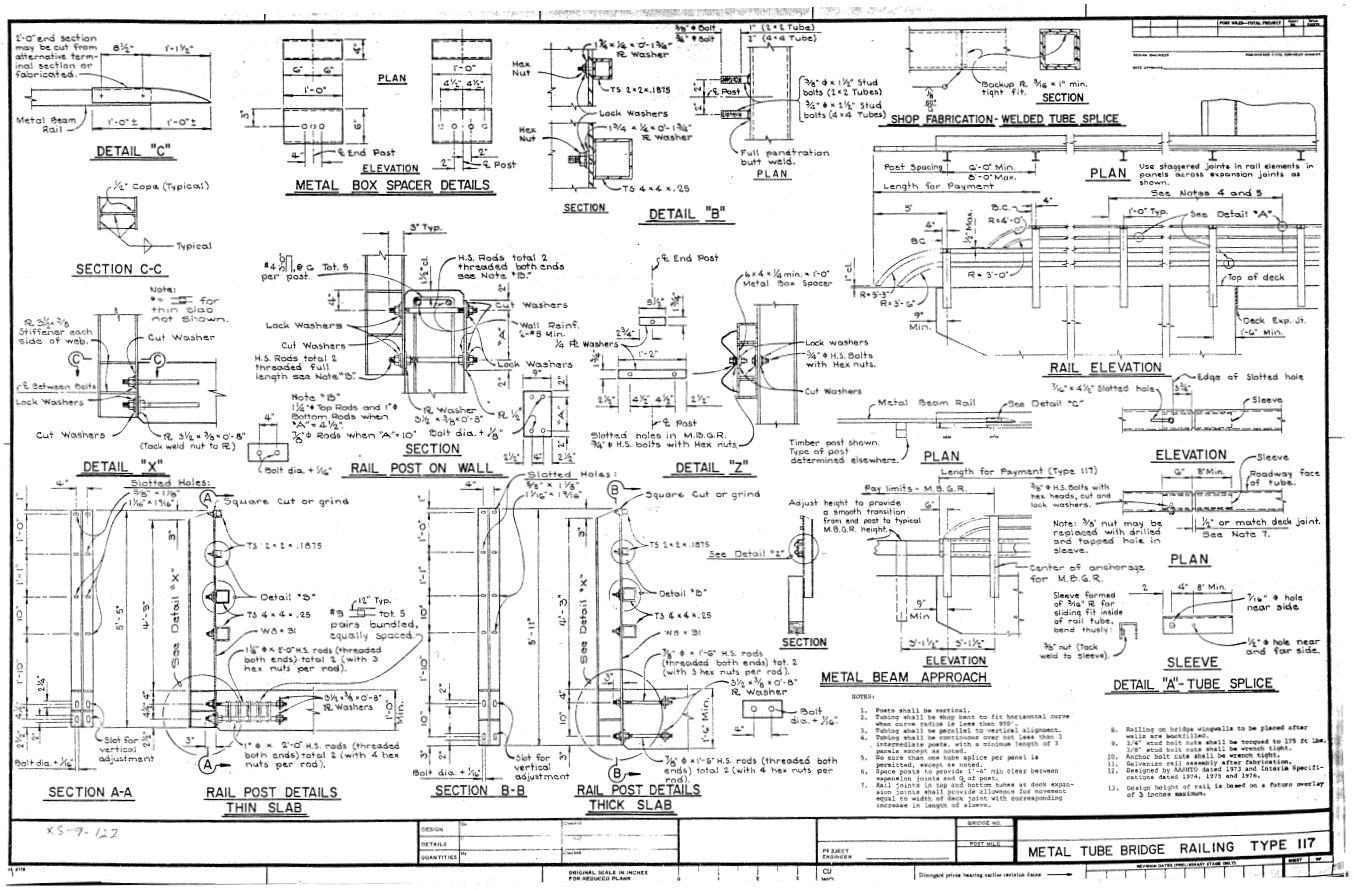
Test level:
TL-2

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Steel Tube Bridge Rail Attached to Side of Deck

California Type 117 Rail



Steel Tube Bridge Rail Attached to Side of Deck

Illinois 2399 - Type Side Mount

Height:
32"

Cost per linear foot:
$75

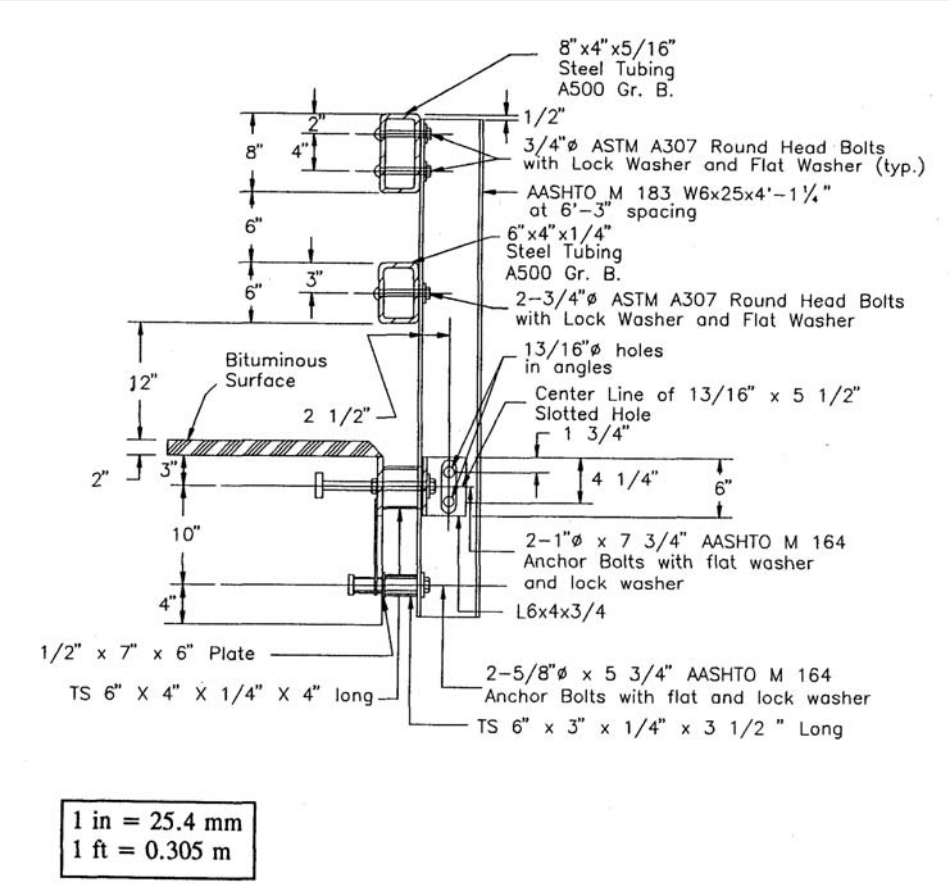
Test level:
TL-4

Utilized in:
Illinois

Contact:
Thomas J. Domagalski
Illinois Dept of Transportation
2300 South Dirksen Parkway
Room 240
Springfield, IL 62764
(217) 782-2125

Steel Tube Bridge Rail Attached to Side of Deck

Illinois 2399 - Type Side Mount



Steel Tube Bridge Rail, Attached to Side of Deck

Oregon 2-Tube Side Mount

Height:
32"

Cost per linear foot:
$77

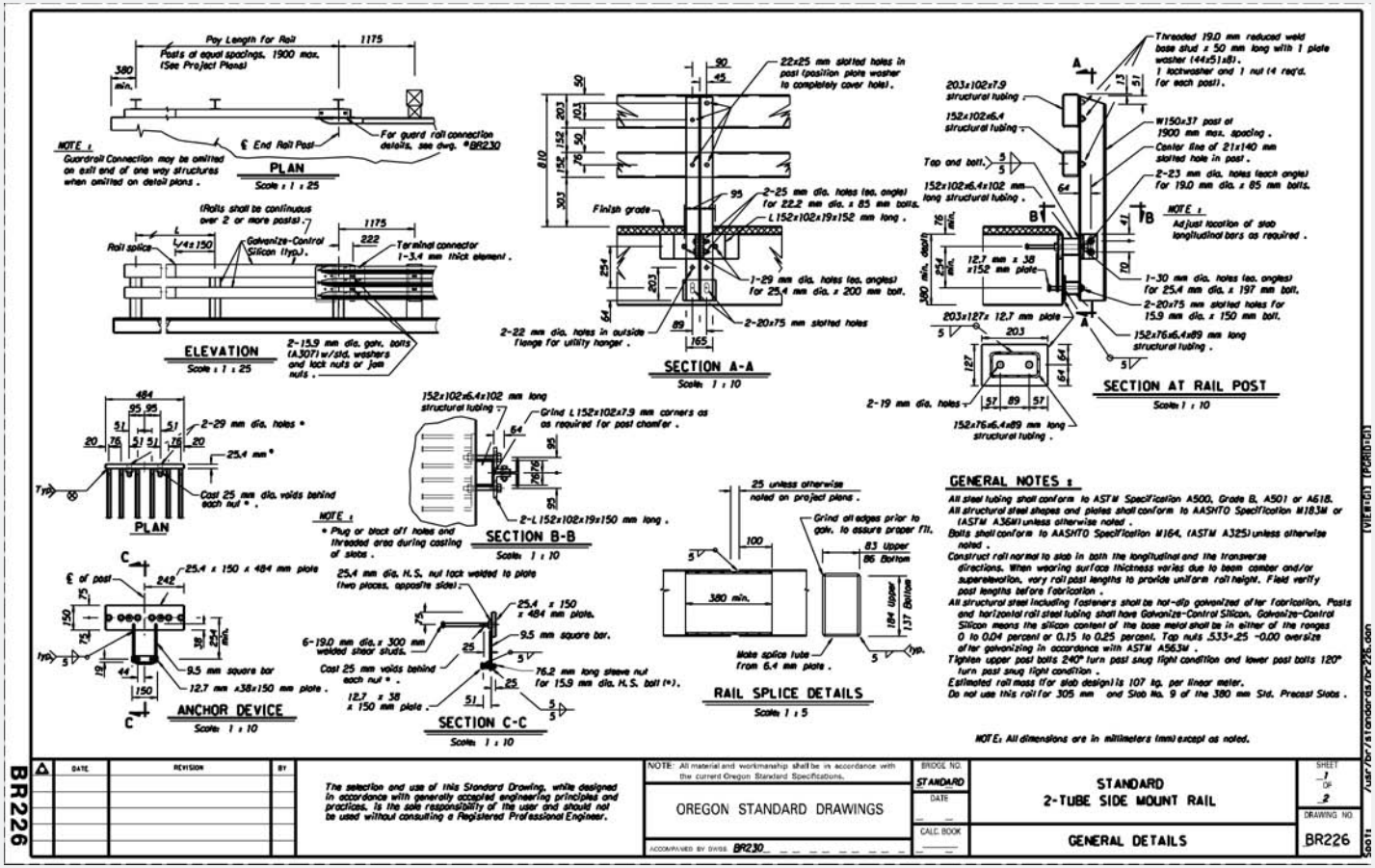
Test level:
TL-4

Utilized in:
Oregon

Contact:
Antony P. Stratis, P.E.
Tech Center Bridge Manager
Region 1
123 NW Flanders Street
Portland, OR 97209
(503) 731-8490

Steel Tube Bridge Rail, Attached to Side of Deck

Oregon 2-Tube Side Mount



Steel Tube Bridge Rail Attached to Top of Deck

Texas Type 421 Aesthetic Rail

Height:
32"

Cost per linear foot:
$__

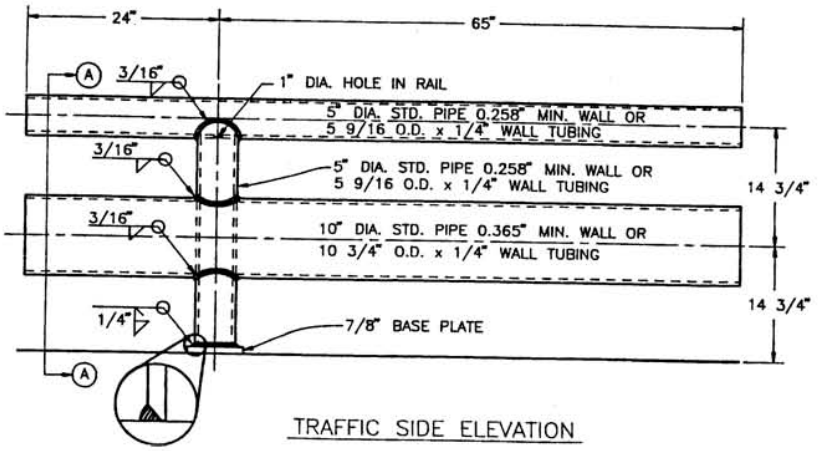
Test level:
TL-2

Utilized in:
Texas

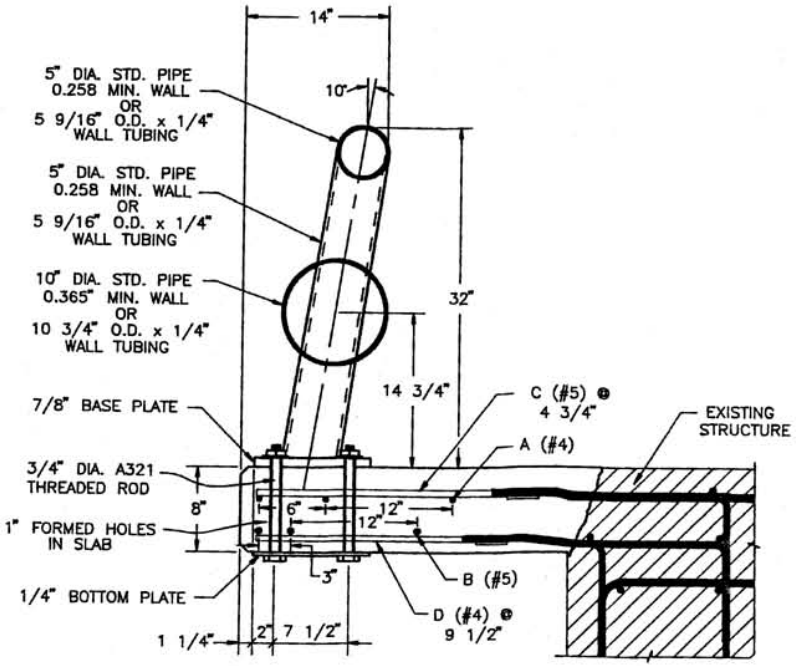
Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178

Steel Tube Bridge Rail Attached to Top of Deck

Texas Type 421 Aesthetic Rail



TRAFFIC SIDE ELEVATION



Cross section of T421 bridge rail.

Steel Tube Bridge Rail Attached to Top of Deck

Washington, DC Historic Bridge Rail Retrofit (Curb Mount)

Height:
27"

Cost per linear foot:
$__

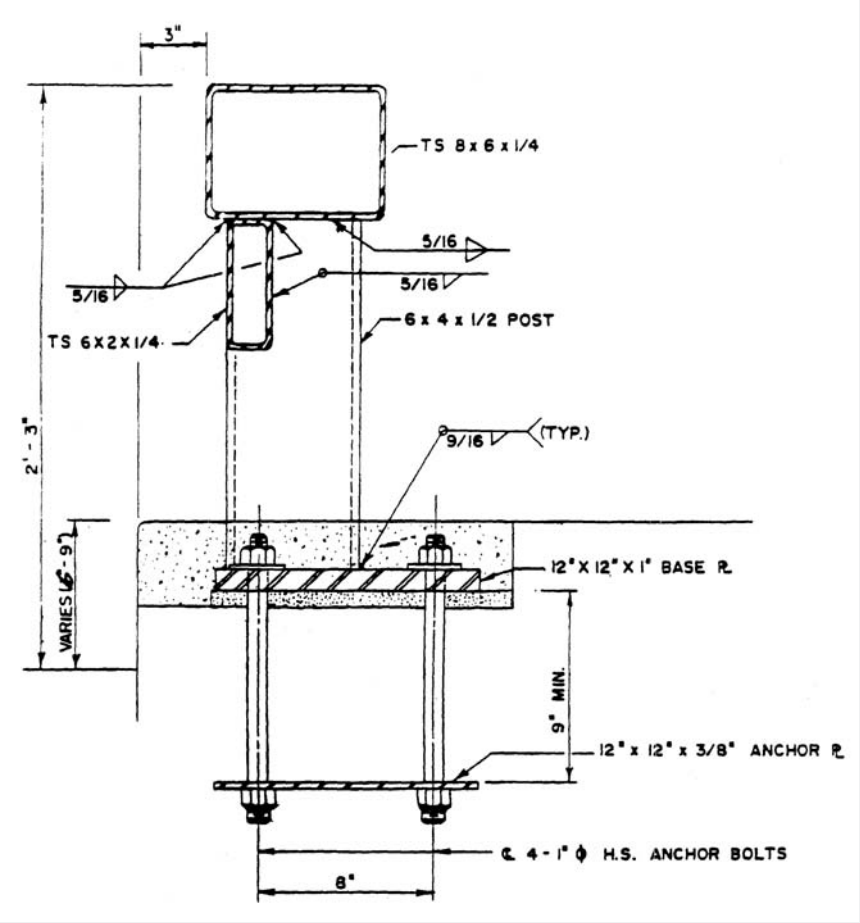
Test level:
TL-2

Utilized in:
Washington, DC

Contact:
Robert McNeely
District Dept of Transportation
1403 W Street, NW
Washington, DC 20009
(202) 438-7770

Steel Tube Bridge Rail Attached to Top of Deck

Washington, DC Historic Bridge Rail Retrofit (Curb Mount)



Steel Tube Bridge Rail Attached to Parapet

Alaska Rail - Curb Mounted

Height:
32"

Cost per linear foot:
$90

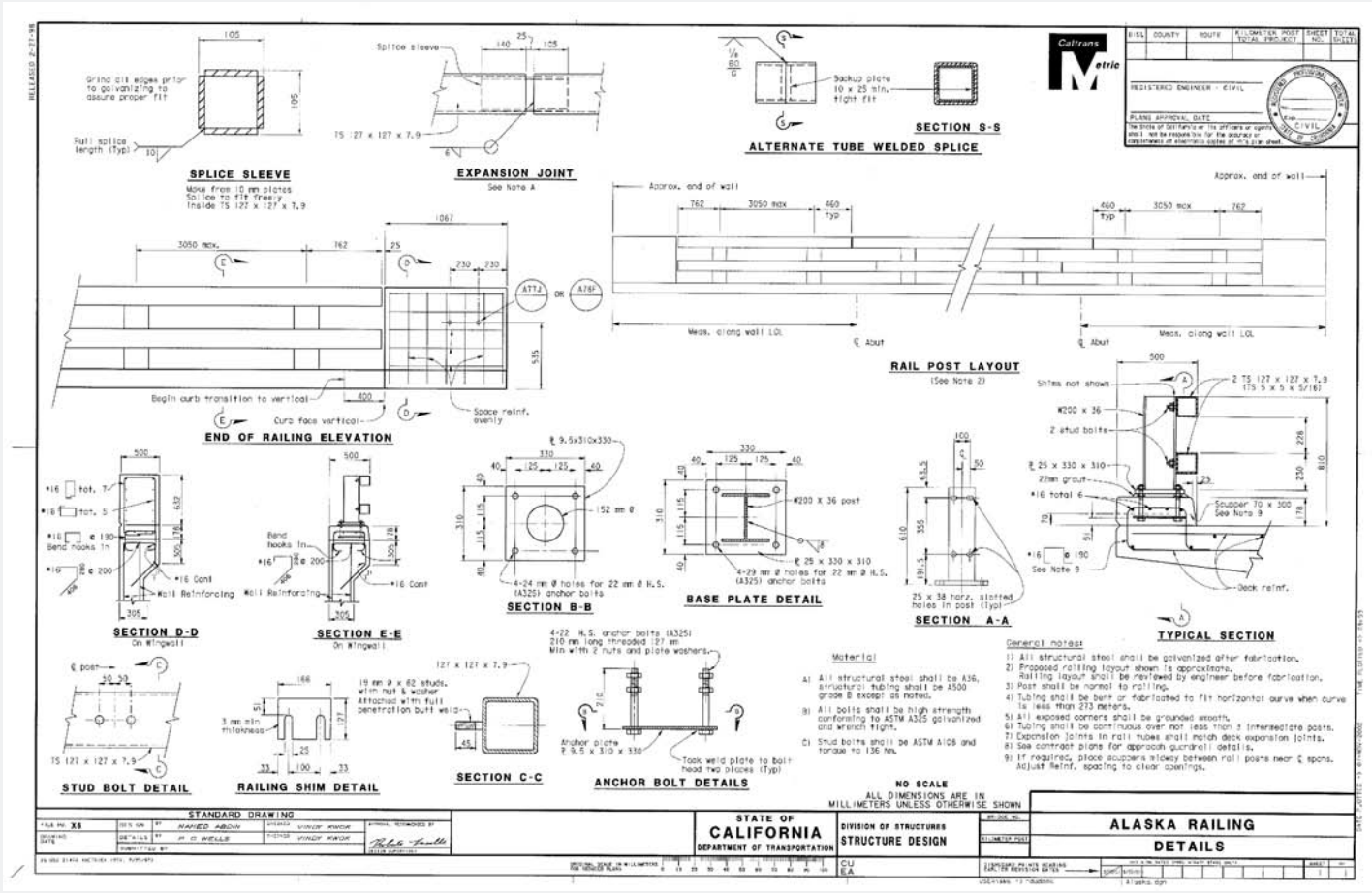
Test level:
TL-4

Utilized in:
Alaska

Contact:
Richard Pratt
Alaska Dept of Transportation
3132 Channel Drive
Juneau, AK 99801
(907) 465-2975

Steel Tube Bridge Rail Attached to Parapet

Alaska Rail - Curb Mount



Steel Tube Bridge Rail Attached to Parapet

California Type 9 (AASHTO BR2)

Height:
27"

Cost per linear foot:
$__

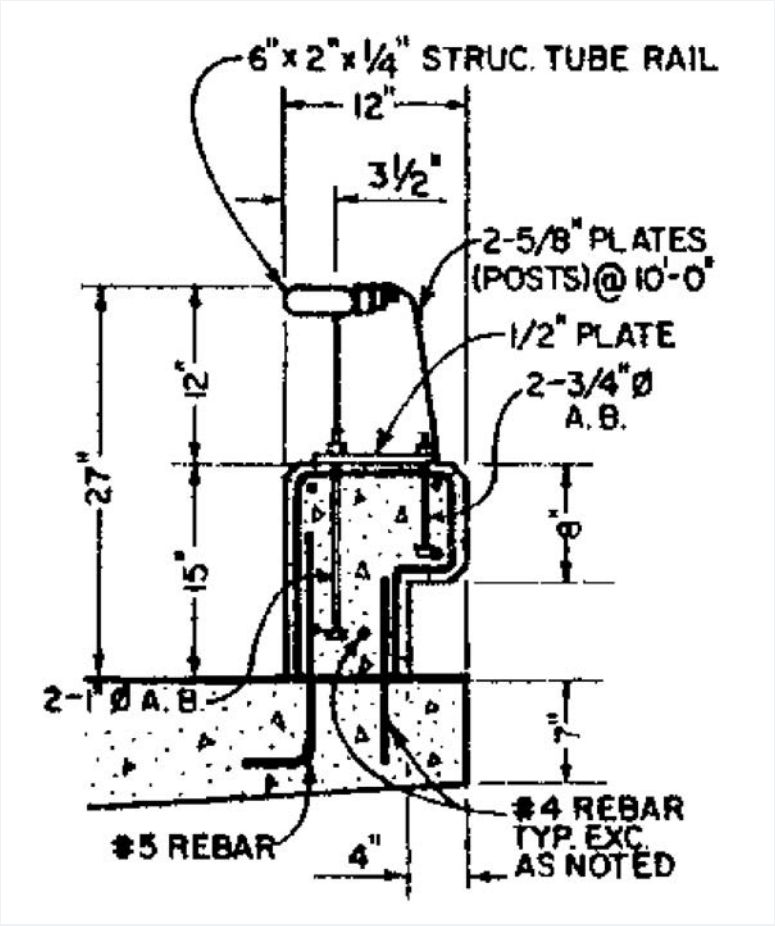
Test level:
TL-2

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Steel Tube Bridge Rail Attached to Parapet

California Type 9 (AASHTO BR2)



Steel Tube Bridge Rail Attached to Parapet

California ST-10 Rail

Height:
33"

Cost per linear foot:
$120

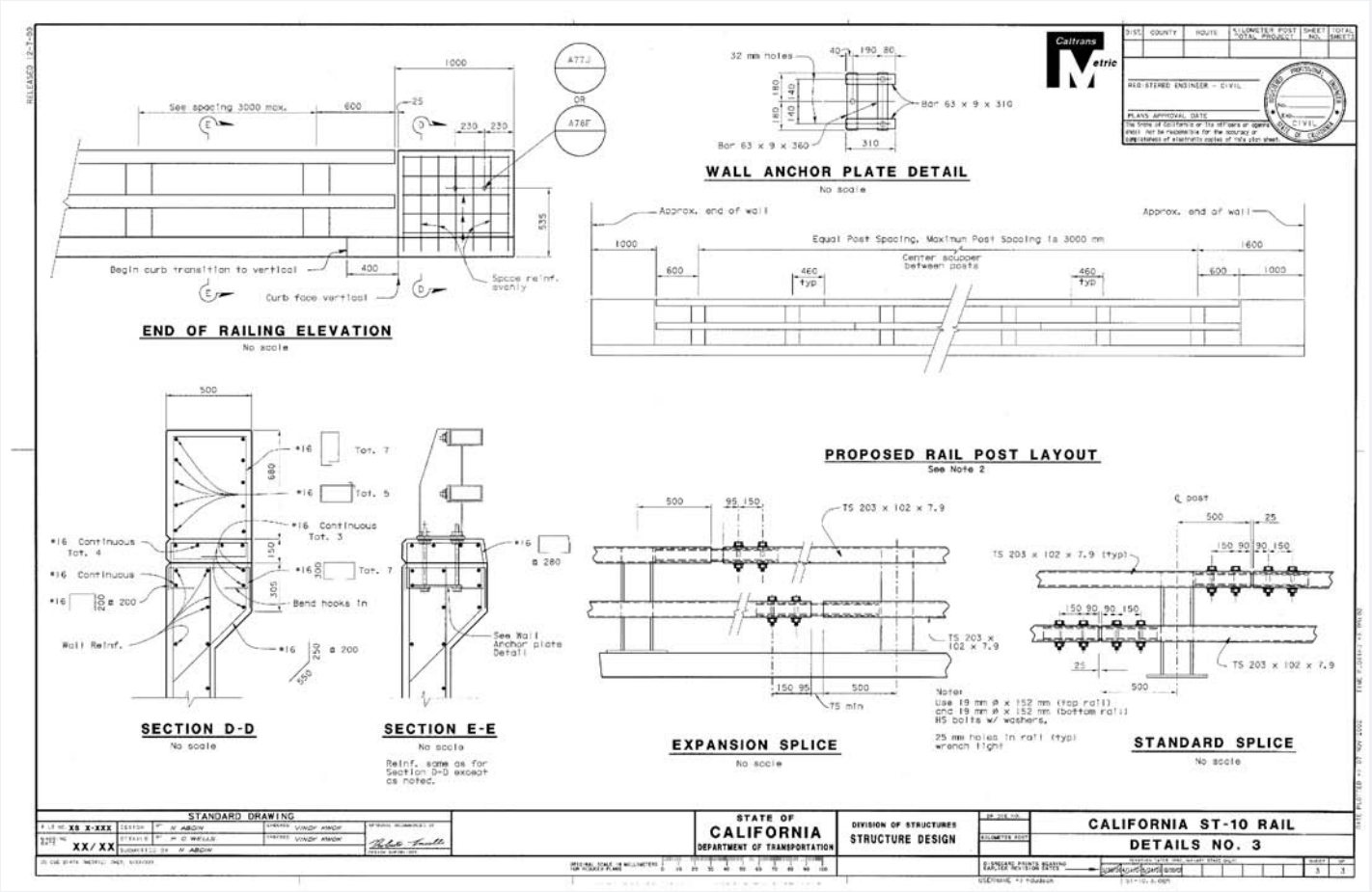
Test level:
TL-4

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

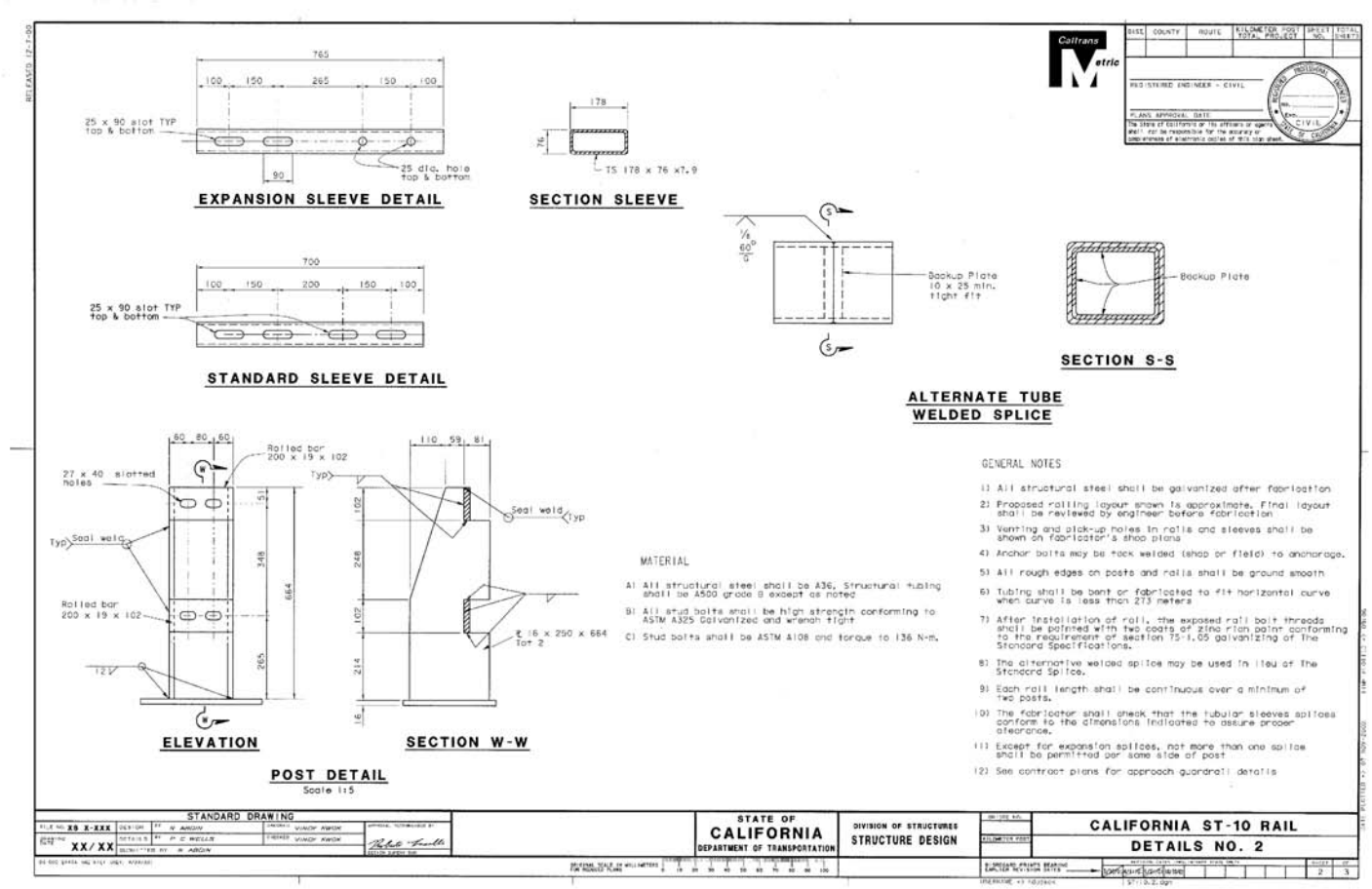
Steel Tube Bridge Rail Attached to Parapet

California ST-10 Rail



Steel Tube Bridge Rail Attached to Parapet

California ST-10 Rail



Steel Tube Bridge Rail Attached to Parapet

Bridge Railing, Aesthetic Parapet Type BR 27D

Height:
42"

Cost per linear foot:
$120

Test level:
TL-4

Utilized in:
Michigan

Contact:
Steve Beck
Michigan Dept
of Transportation
State Transportation Building
425 W. Ottawa Street
P.O. Box 30050
Lansing, MI 48909
(517) 373-0097

Bridge Railing, Aesthetic Parapet Type BR 27D

Plans Not Yet Available.

Steel Tube Bridge Rail Attached to Parapet

Minnesota Combination Bridge Rail, Design #3

Height:
36"

Cost per linear foot:
$75

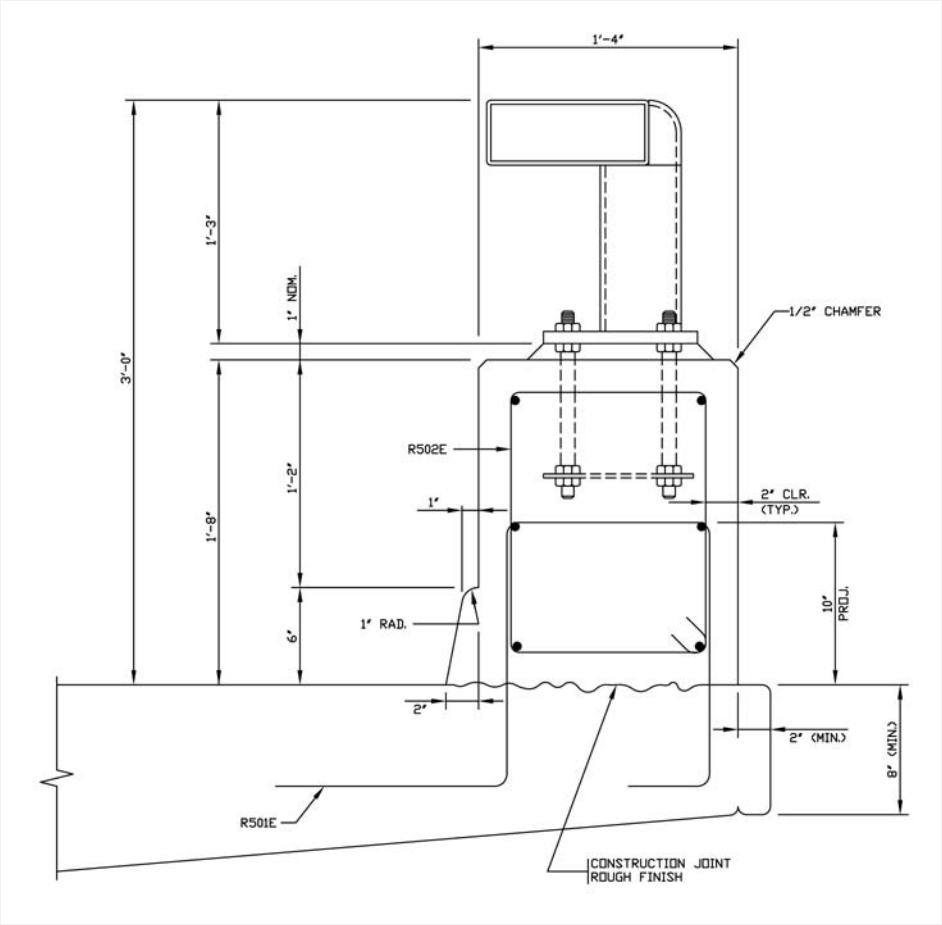
Test level:
TL-4

Utilized in:
Minnesota

Contact:
Raymond Cekalla
Minnesota DOT Bridge Office
3485 Hadley Avenue North
Mail Stop 610
Oakdale, MN 55128-3307
(651) 747-2172

Steel Tube Bridge Rail Attached to Parapet

Minnesota Combination Bridge Rail, Design #3



Steel Tube Bridge Rail Attached to Parapet

Type C202

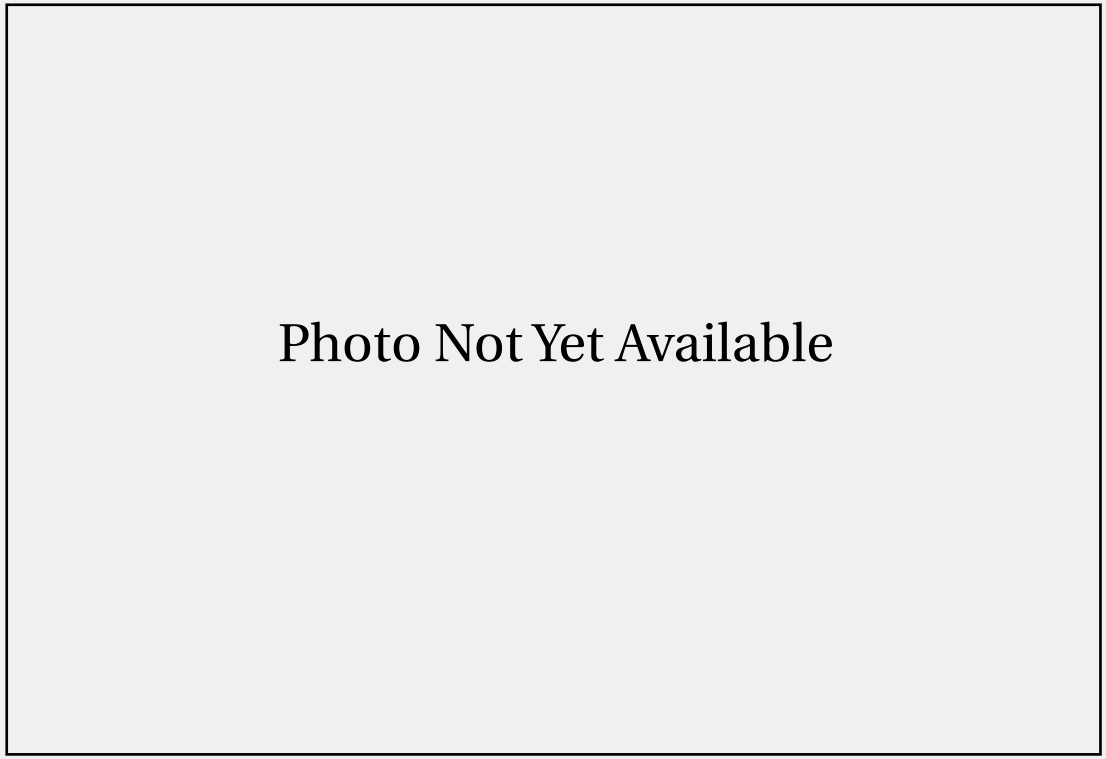
Height:
54"

Cost per linear foot:
$__

Test level:
TL-5

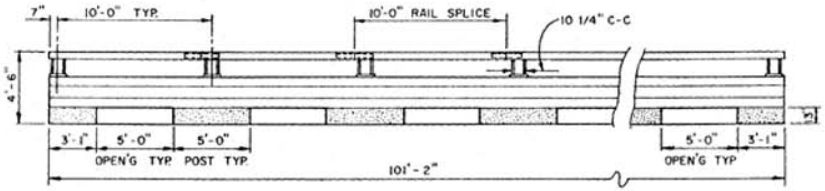
Utilized in:
Texas

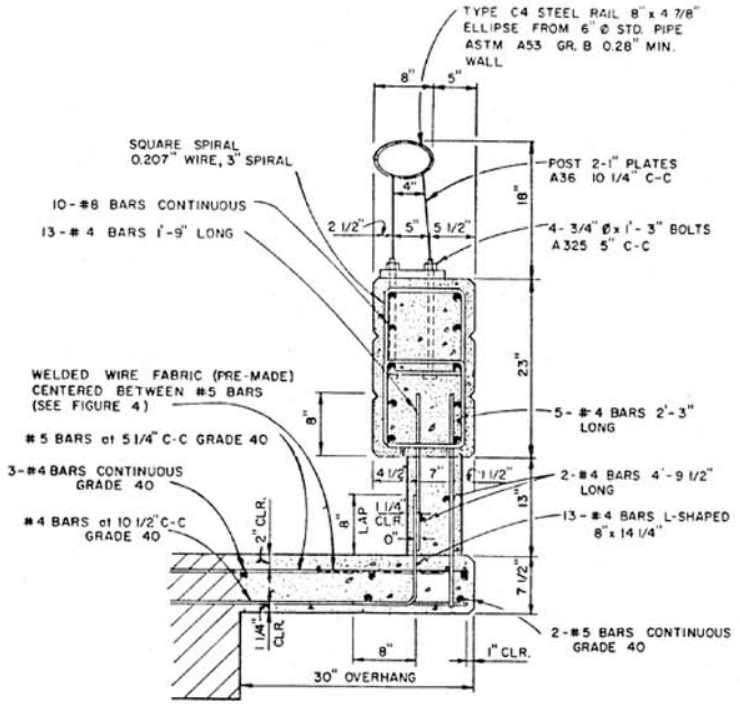
Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178



Steel Tube Bridge Rail Attached to Parapet

Type C202





Cross Section of the Modified C202 Bridge Rail.

Curb Mounted Steel Tube Bridge Rail

George Washington Parkway Steel Bridge Rail

Height:
42"

Cost per linear foot:
$200

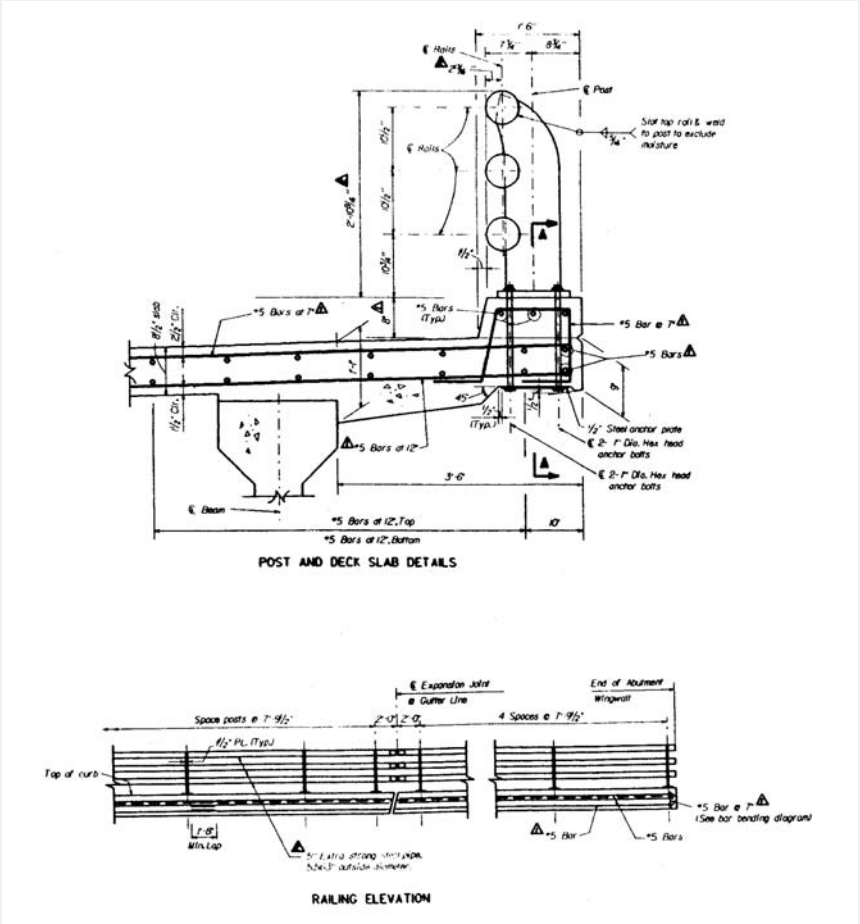
Test level:
TL-3

Utilized in:
George Washington Parkway, Virginia

Contact:
Mark Clabaugh, P.E.
Federal Lands Bridge Office
21400 Ridgetop Circle
Sterling, VA 20166
(703) 404-6235

Curb Mounted Steel Tube Bridge Rail

George Washington Parkway Steel Bridge Rail



Curb Mounted Steel Tube Bridge Rail

Illinois 2399 - Curb Mount

Height:
32"

Cost per linear foot:
$75

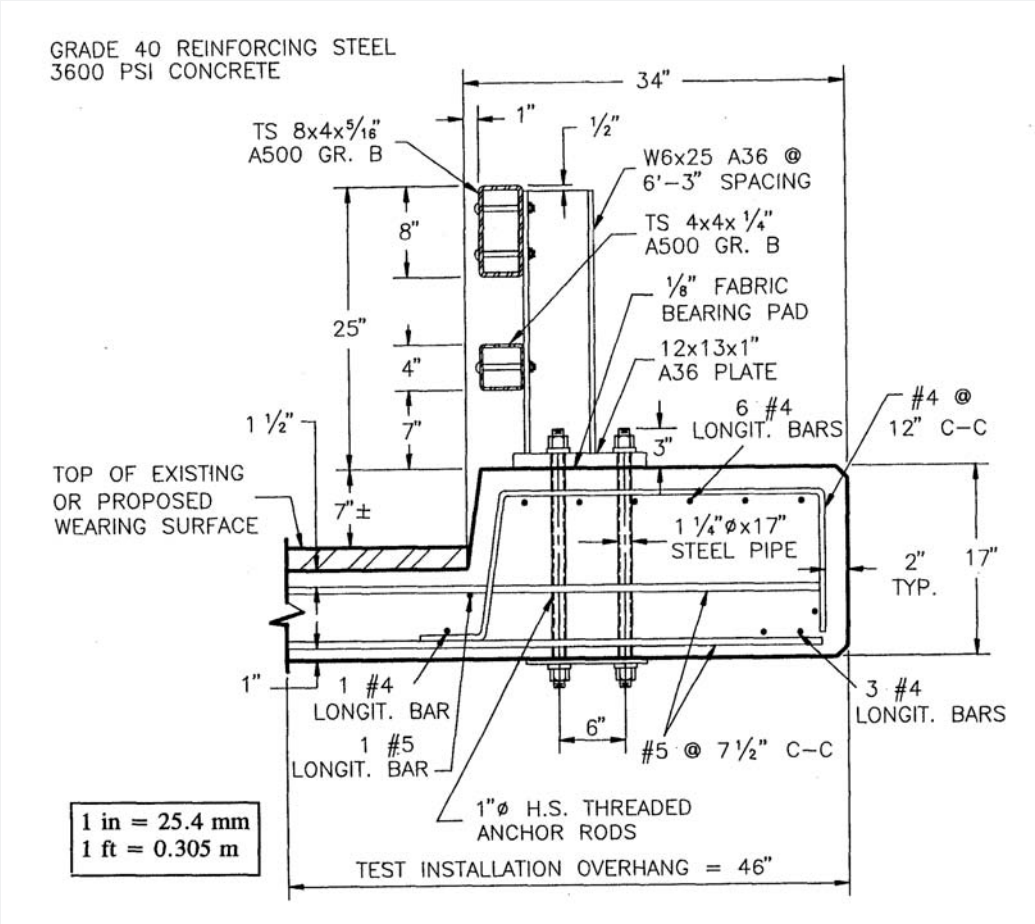
Test level:
TL-4

Utilized in:
Illinois

Contact:
Thomas J. Domagalski
Illinois Dept of Transportation
2300 South Dirksen Parkway
Room 240
Springfield, IL 62764
(217) 782-2125

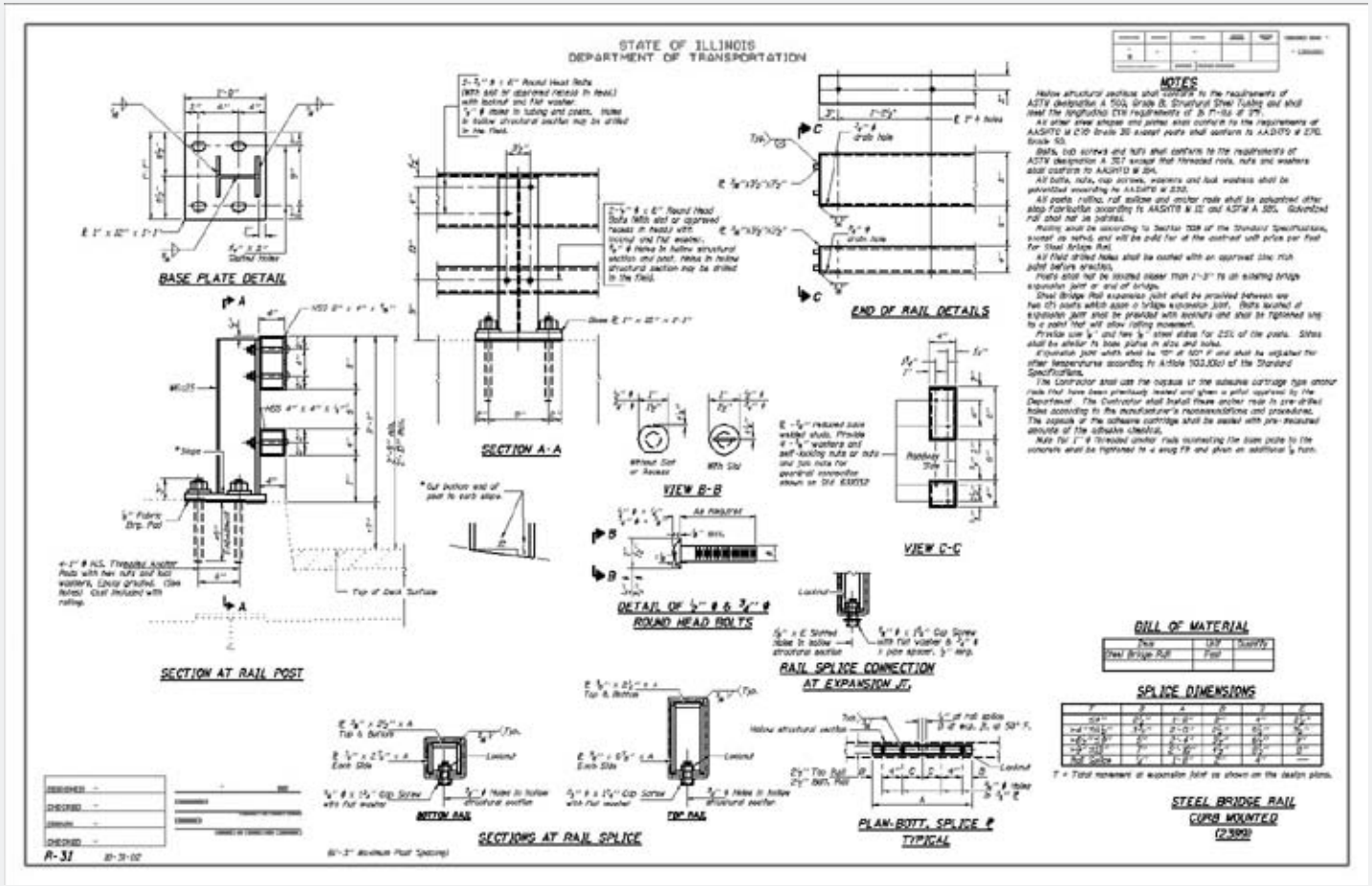
Curb Mounted Steel Tube Bridge Rail

Illinois 2399 - Curb Mount



Curb Mounted Steel Tube Bridge Rail

Illinois 2399 - Curb Mount



Steel Tube Bridge Rail Attached to Curb

Michigan Multi Tube Bridge Railing

Height:
42"

Cost per linear foot:
$150

Test level:
TL-4

Utilized in:
Michigan

Contact:
Steve Beck
Michigan Dept
of Transportation
State Transportation Building
425 W. Ottawa Street
P.O. Box 30050
Lansing, MI 48909
(517) 373-2090

Michigan Multi Tube Bridge Railing

Plans Not Yet Available.

Curb Mounted Steel Tube Bridge Rail

Bridge Railing, 2 Tube

Height:
32.5"

Cost per linear foot:
$100

Test level:
TL-4

Utilized in:
Michigan

Contact:
Steve Beck
Michigan Dept
of Transportation
State Transportation Building
425 W. Ottawa Street
P.O. Box 30050
Lansing, MI 48909
(517) 373-0097

Bridge Railing, 2 Tube

Plans Not Yet Available.

Curb Mounted Steel Tube Bridge Rail

NETC 2-Rail Curb-Mounted Railing

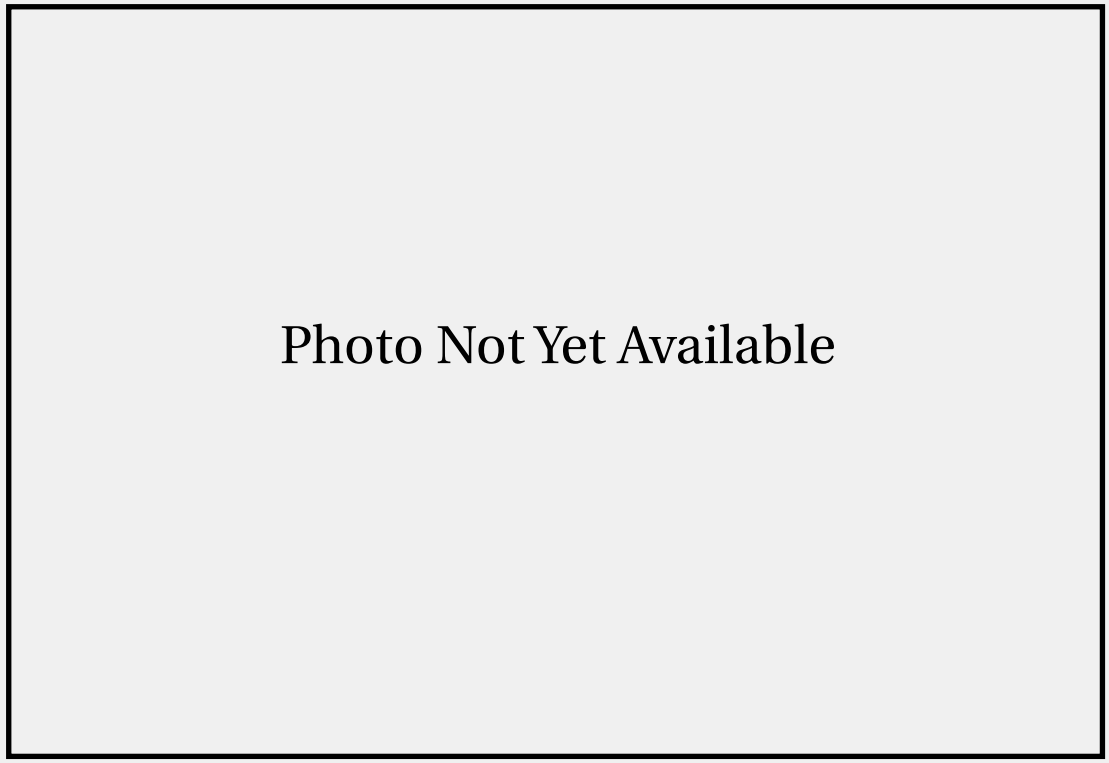
Height:
34"

Cost per linear foot:
$__

Test level:
TL-4

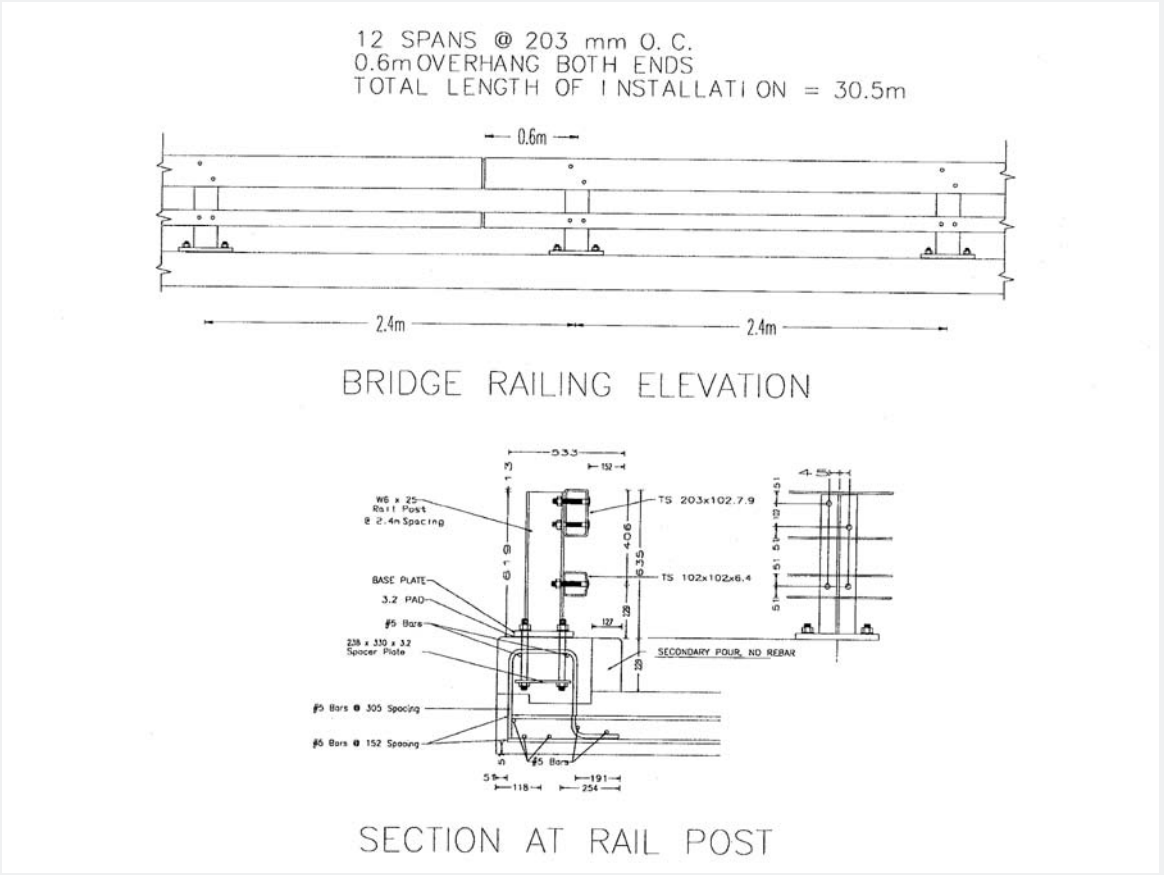
Utilized in:
Nebraska

Contact:
Gerald M. McCarthy
Connecticut
Transportation Institute
University of Connecticut
179 Middle Turnpike,
Unit 5202
Storrs, CT 06269
(860) 486-5400



Curb Mounted Steel Tube Bridge Rail

NETC 2-Rail Curb-Mounted Railing



Curb Mounted Steel Tube Bridge Rail

Two-Rail Barrier

Height:
32"

Cost per linear foot:
$243

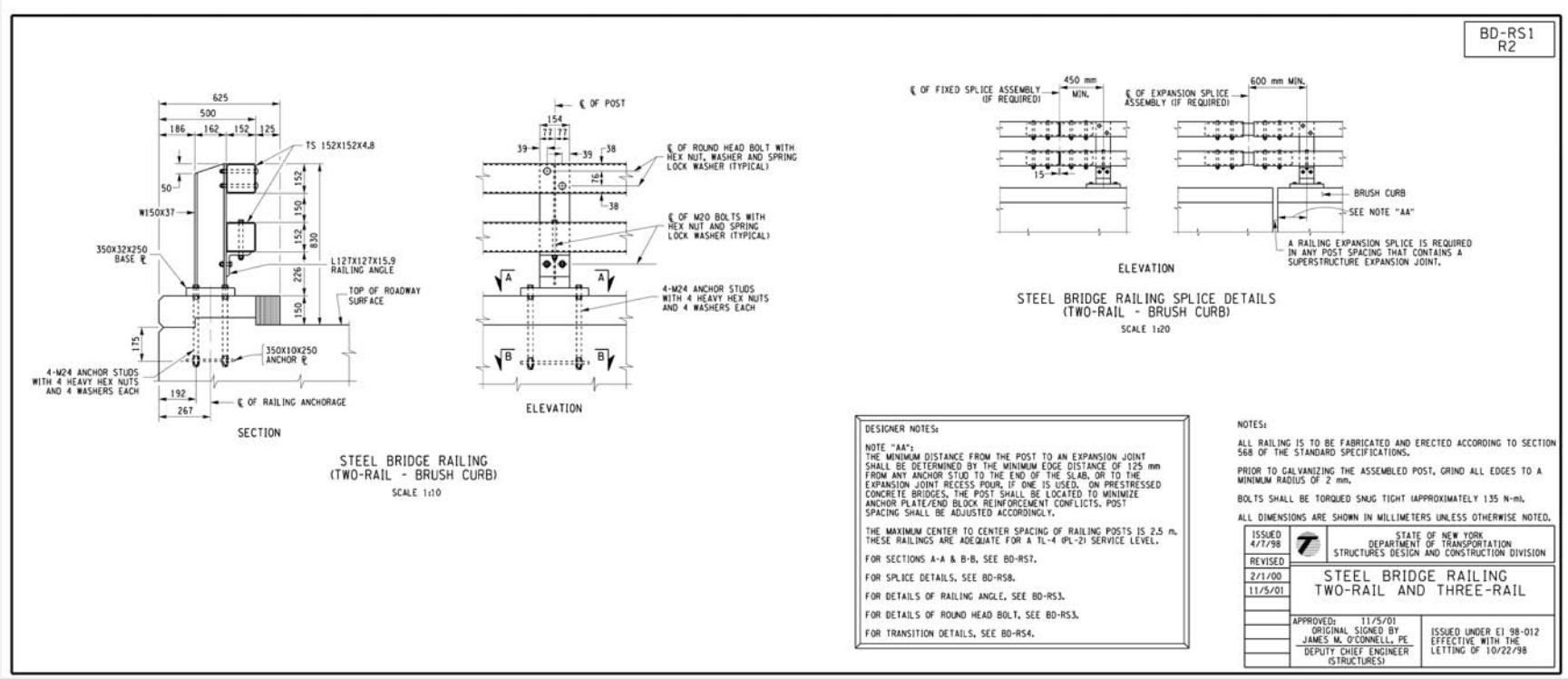
Test level:
TL-4

Utilized in:
New York

Contact:
Harry White
New York State Dept
of Transportation
1220 Washington Avenue
Albany, NY 12232
(518) 485-1148

Curb Mounted Steel Tube Bridge Rail

Two-Rail Barrier



Curb Mounted Steel Tube Bridge Rail

Three-Rail Barrier Top Deck Flush Mount

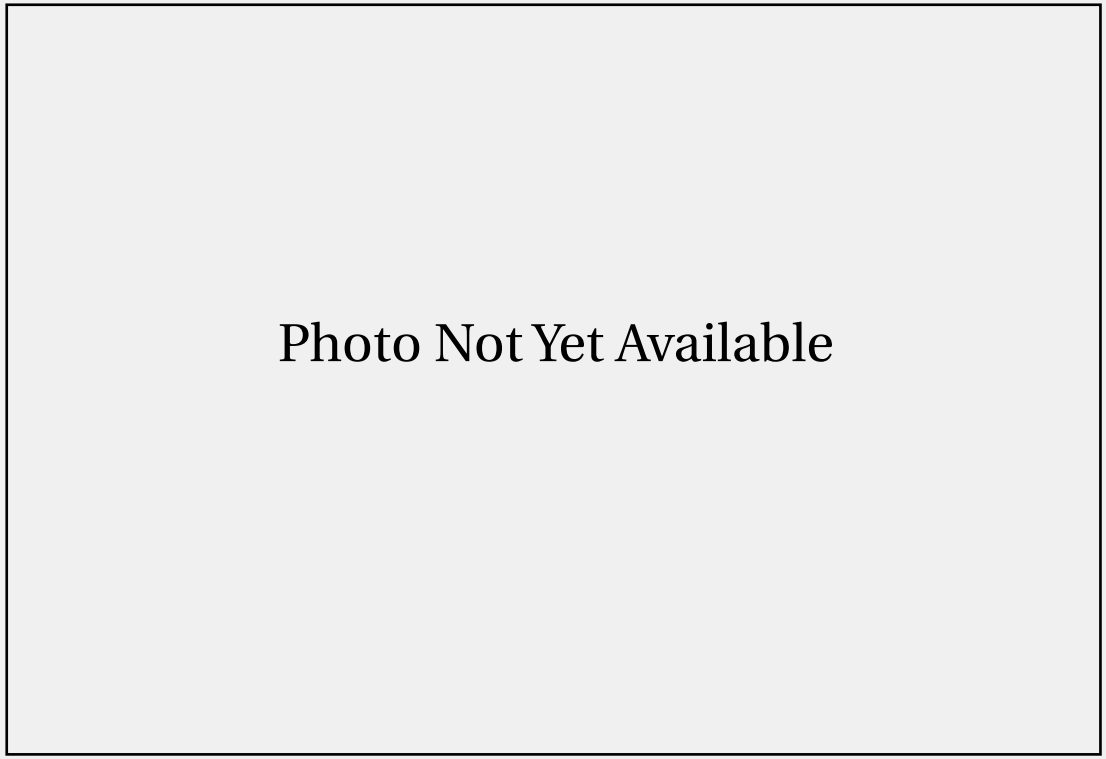
Height:
32"

Cost per linear foot:
$515

Test level:
TL-4

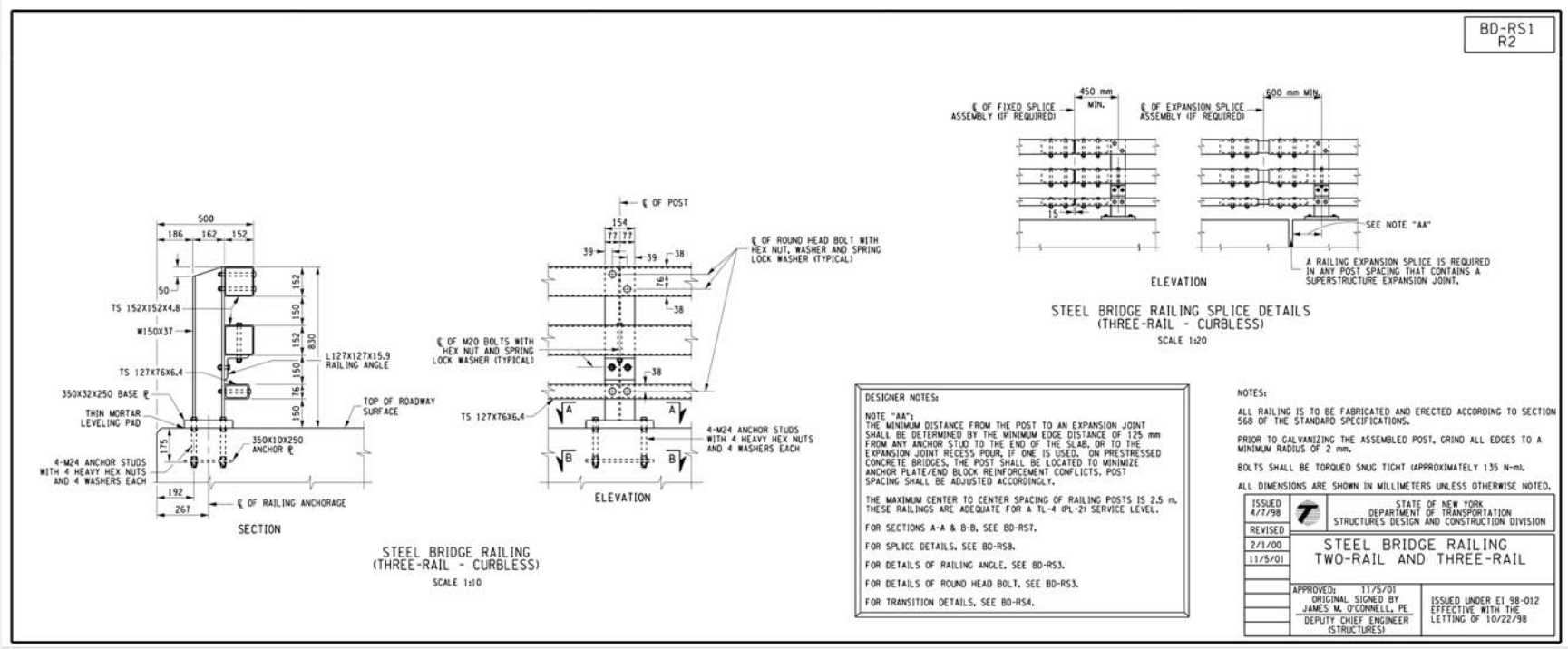
Utilized in:
New York

Contact:
Harry White
New York State Dept
of Transportation
1220 Washington Avenue
Albany, NY 12232
(518) 485-1148



Curb Mounted Steel Tube Bridge Rail

Three-Rail Barrier



Curb Mounted Steel Tube Bridge Rail

Four-Rail Barrier

Height:
42"

Cost per linear foot:
$515

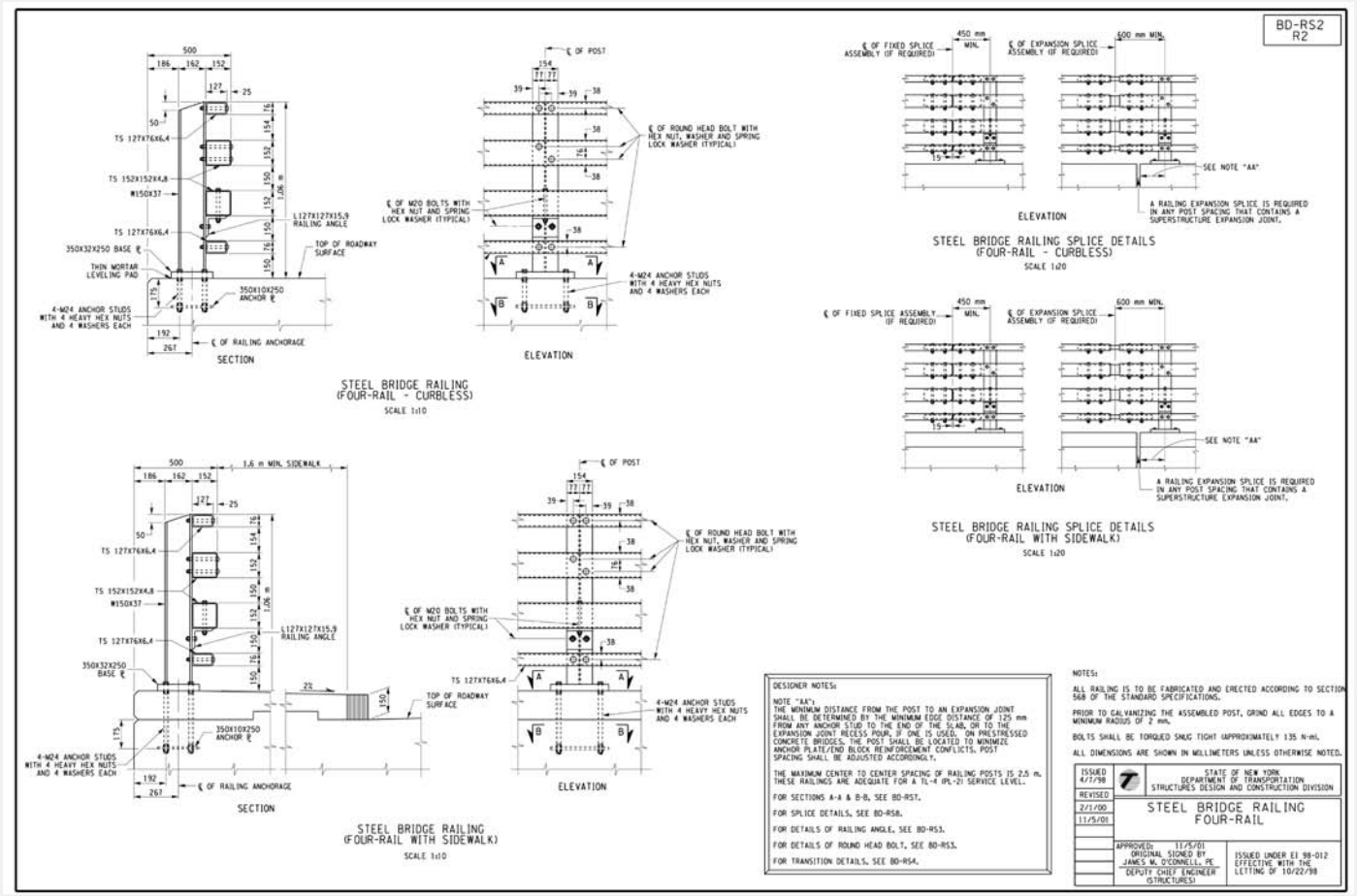
Test level:
TL-4

Utilized in:
New York

Contact:
Harry White
New York State Dept
of Transportation
1220 Washington Avenue
Albany, NY 12232
(518) 485-1148

Curb Mounted Steel Tube Bridge Rail

Four-Rail Barrier



Curb Mounted Steel Tube Bridge Rail

Five-Rail Barrier

Height:
56"

Cost per linear foot:
$382

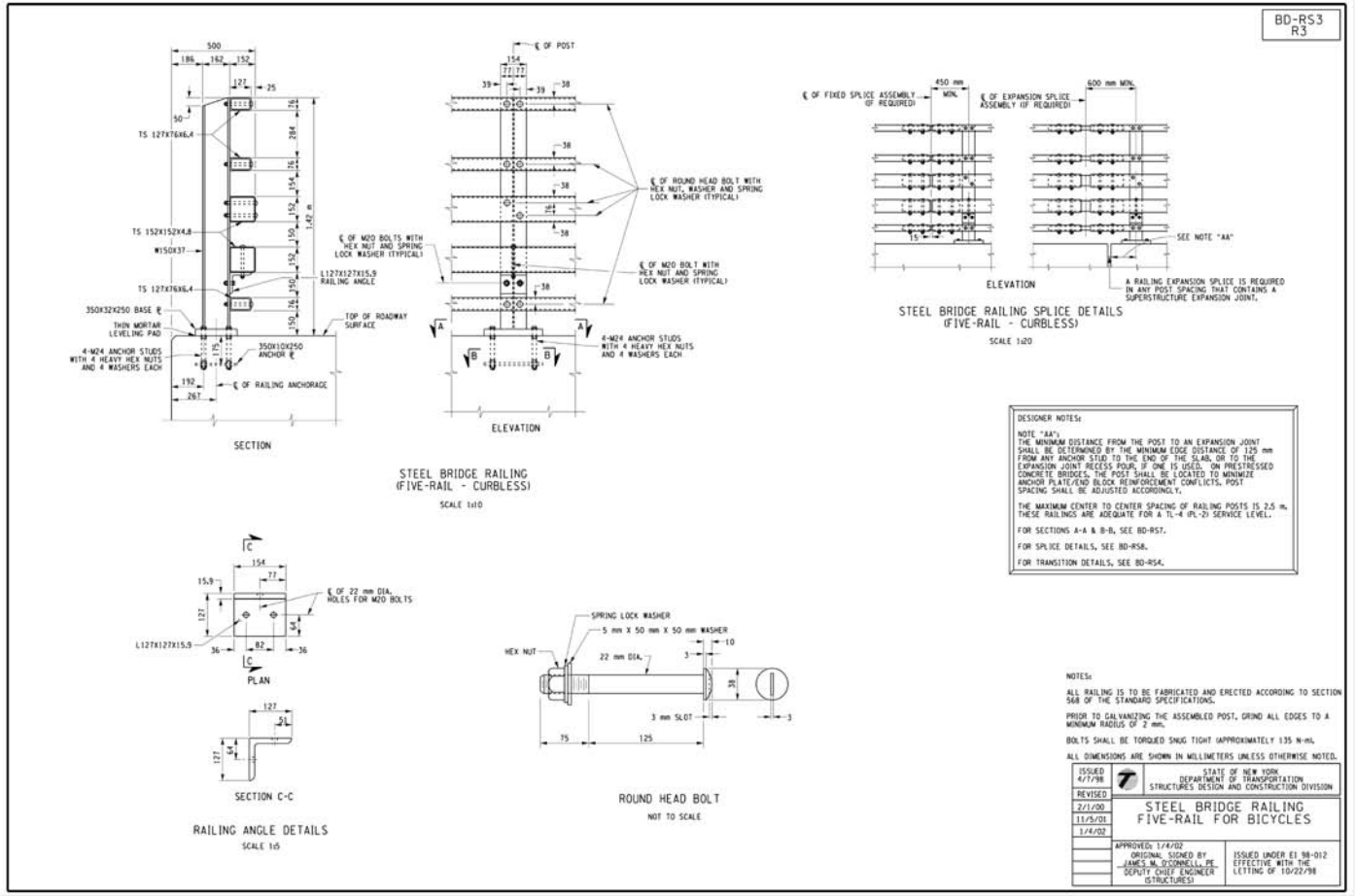
Test level:
TL-4

Utilized in:
New York

Contact:
Harry White
New York State Dept
of Transportation
1220 Washington Avenue
Albany, NY 12232
(518) 485-1148

Curb Mounted Steel Tube Bridge Rail

Five-Rail Barrier



Steel Tube Bridge Rail, Attached to Curb

Oregon 2-Tube Curb Mount

Height:
32"

Cost per linear foot:
$90

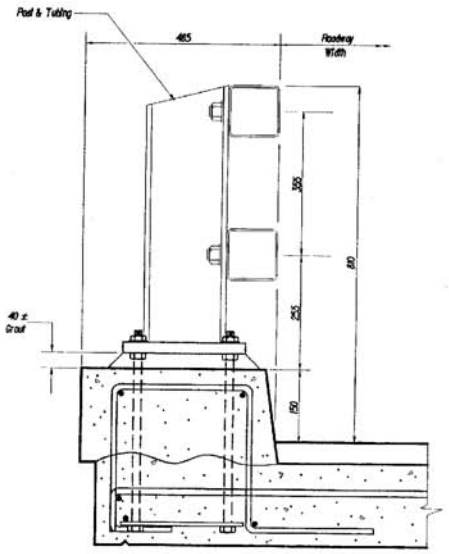
Test level:
TL-2

Utilized in:
Oregon

Contact:
Antony P. Stratis, P.E.
Tech Center Bridge Manager
Region 1
123 NW Flanders Street
Portland, OR 97209
(503) 731-8490

Steel Tube Bridge Rail, Attached to Curb

Oregon 2-Tube Curb Mount



CURB MOUNT-POST DETAIL

FIGURE D.5 2-Tube Curb-Mounted Bridge Railing

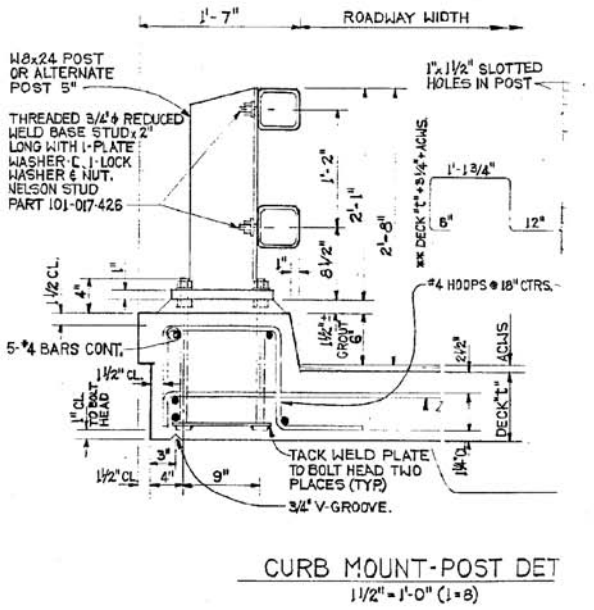


FIGURE D.5 Oregon 2-Tube Curb Mounted Bridge Railing

Rail Height	810 mm	
Test Vehicle	905-kg Car	2107-kg Car
Impact Speed km/h	94	97
Impact Angle Degrees	18.8	25

Steel Tube Bridge Rail, Attached to Curb

Oregon 3-Tube Curb Mount

Height:
42"

Cost per linear foot:
$80

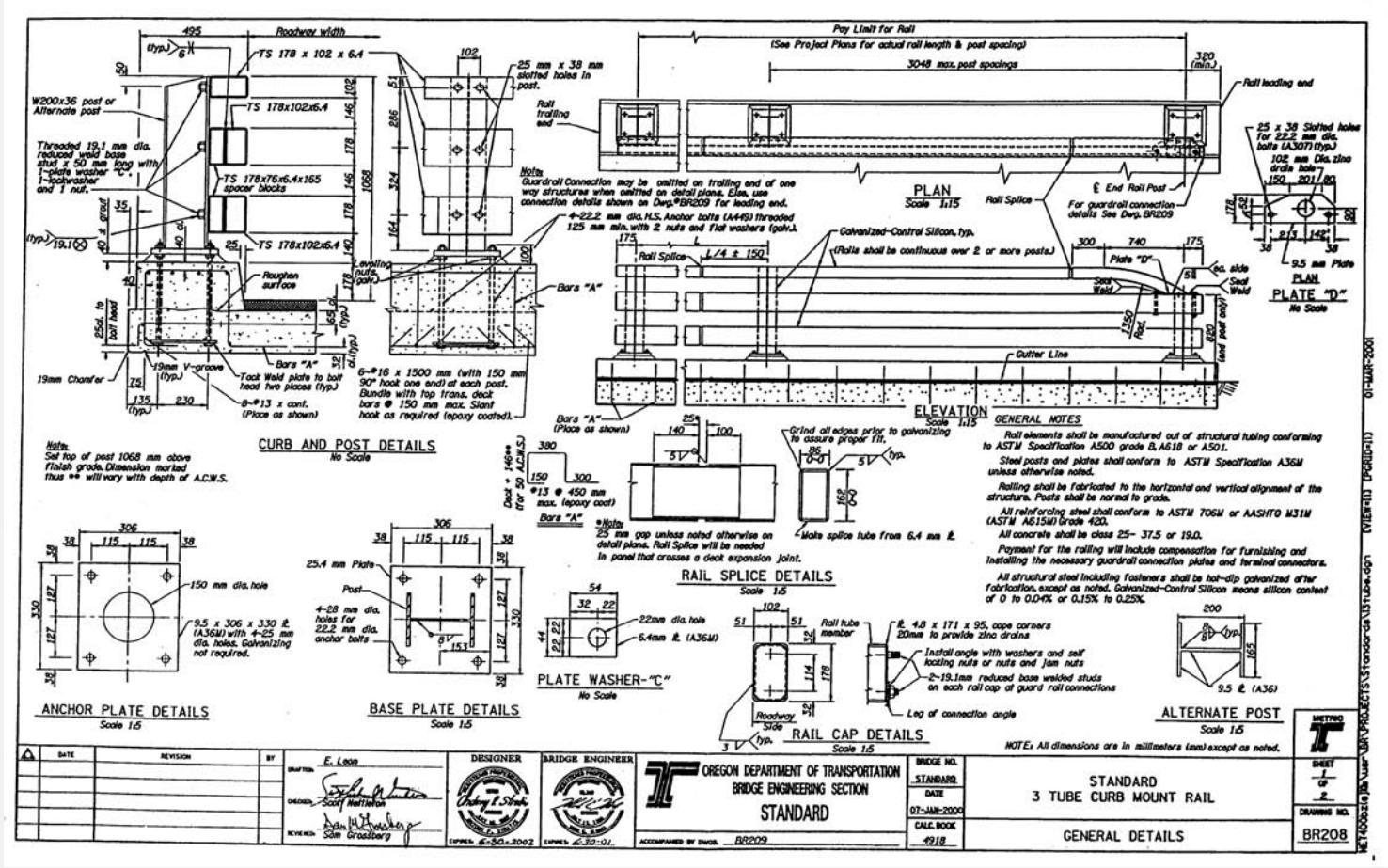
Test level:
TL-4

Utilized in:
Oregon

Contact:
Antony P. Stratis, P.E.
Tech Center Bridge Manager
Region 1
123 NW Flanders Street
Portland, OR 97209
(503) 731-8490

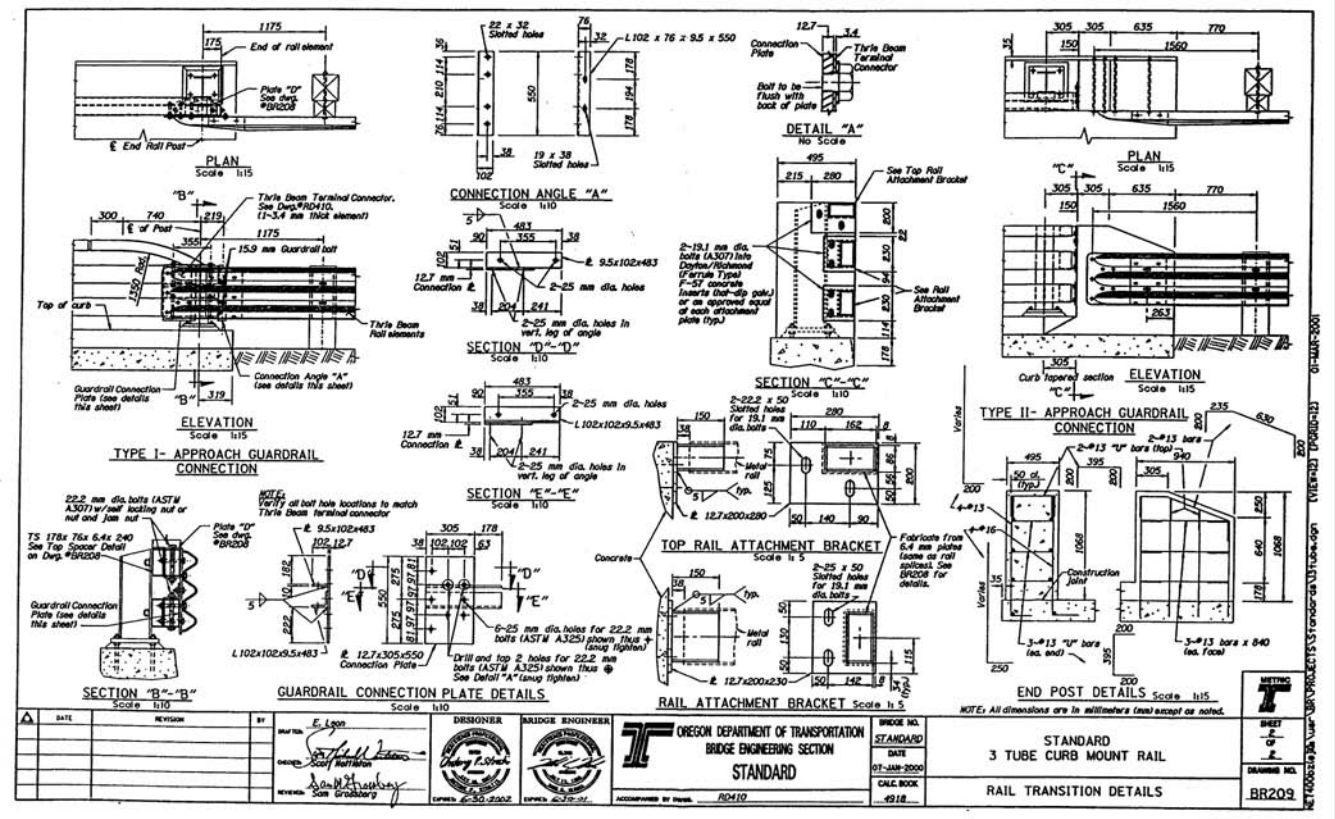
Steel Tube Bridge Rail, Attached to Curb

Oregon 3-Tube Curb Mount



Steel Tube Bridge Rail, Attached to Curb

Oregon 3-Tube Curb Mount



Steel Tube Bridge Rail, Attached to Curb

Wyoming 2-Tube Steel Railing

Height:
32"

Cost per linear foot:
$55

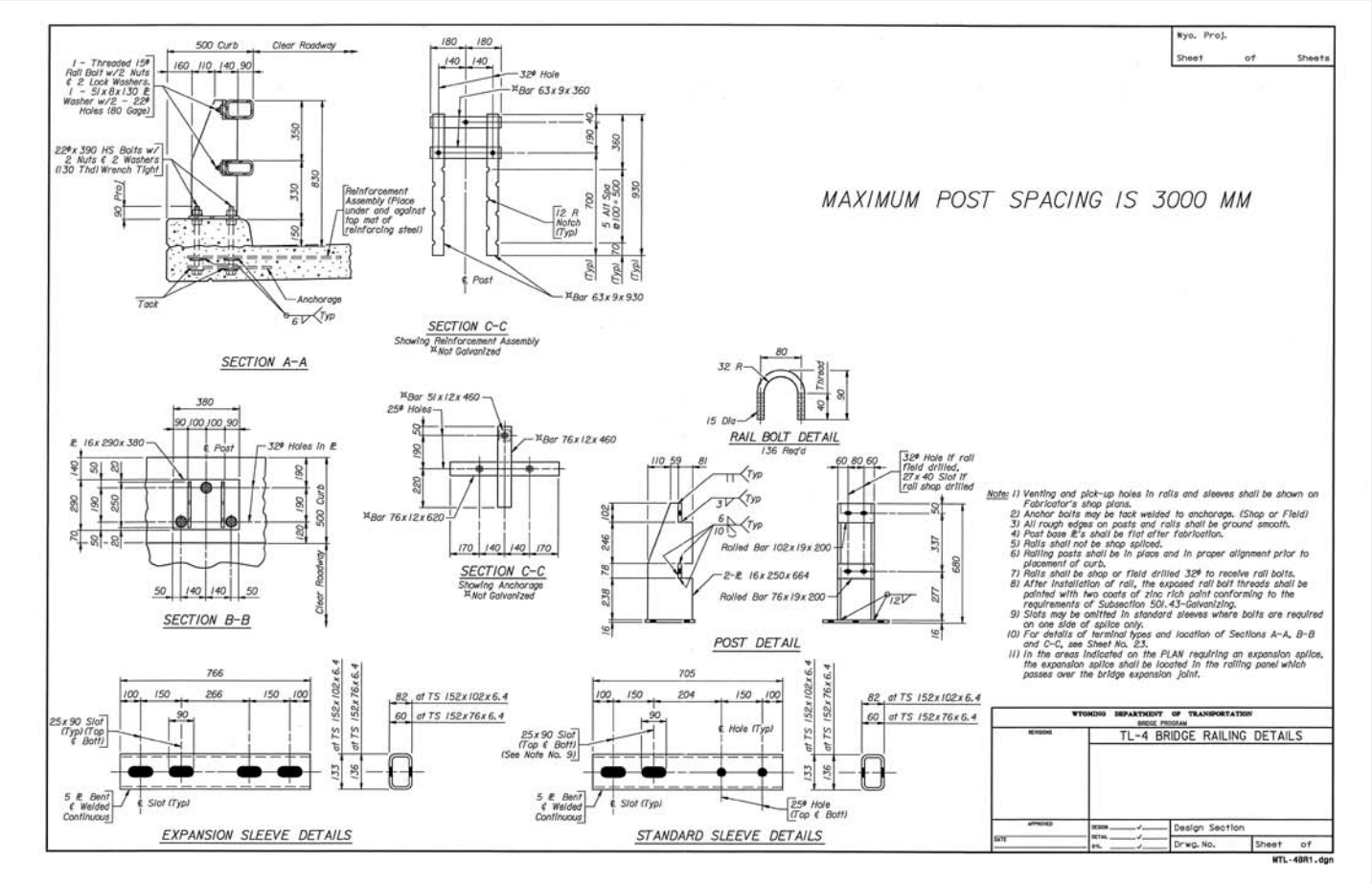
Test level:
TL-4

Utilized in:
Wyoming

Contact:
Lee Potter, P.E.
Federal Highway Admin,
Wyoming Division
2617 E. Lincolnway, Suite D
Cheyenne, WY 82001
(307) 772-2004 ext 146

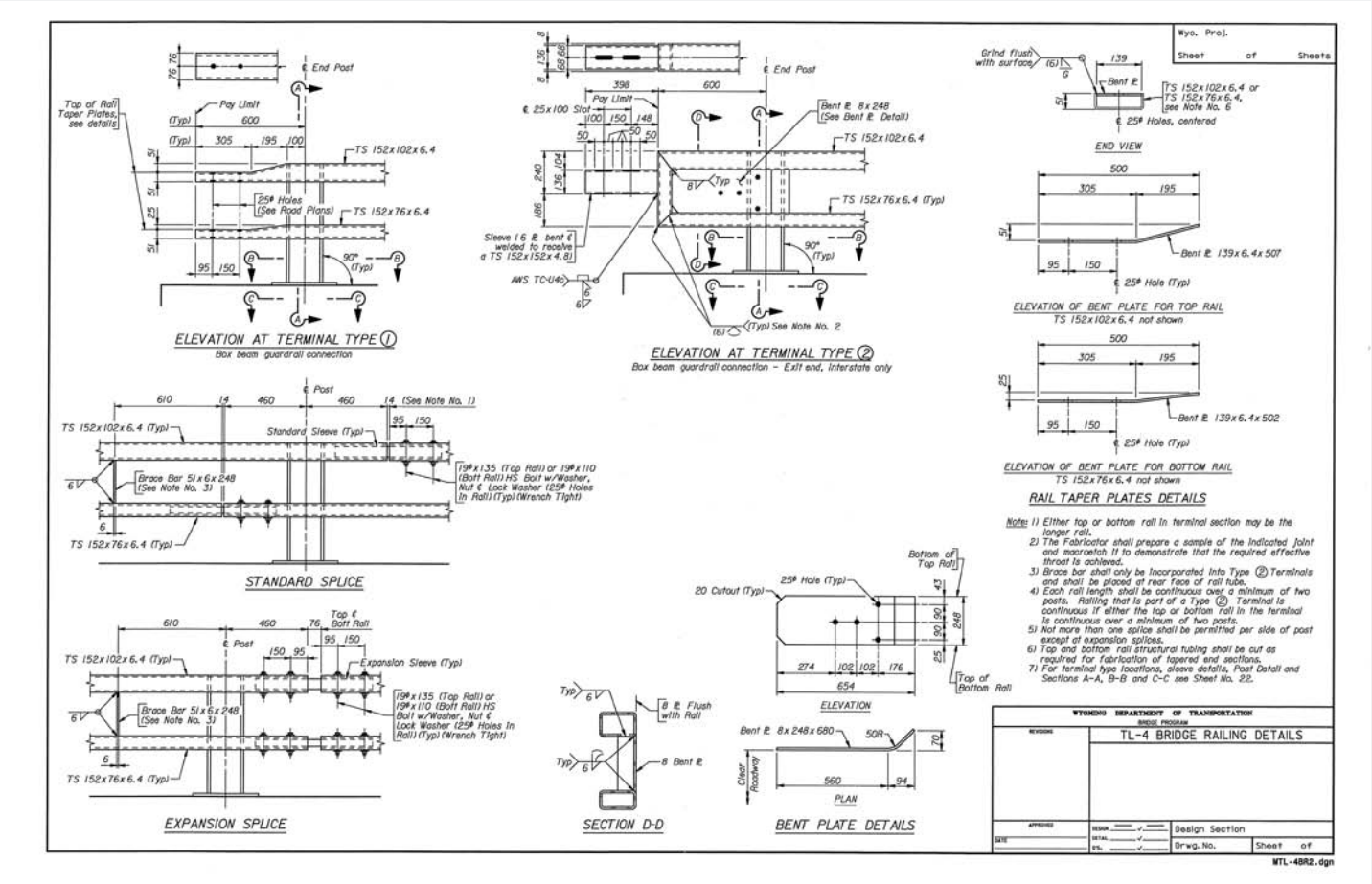
Steel Tube Bridge Rail, Attached to Curb

Wyoming 2-Tube Steel Railing



Steel Tube Bridge Rail, Attached to Curb

Wyoming 2-Tube Steel Railing



Steel Tube Bridge Rail, Attached to Curb

Wyoming 2-Tube, Curb-Mounted

Height:
29"

Cost per linear foot:
$53

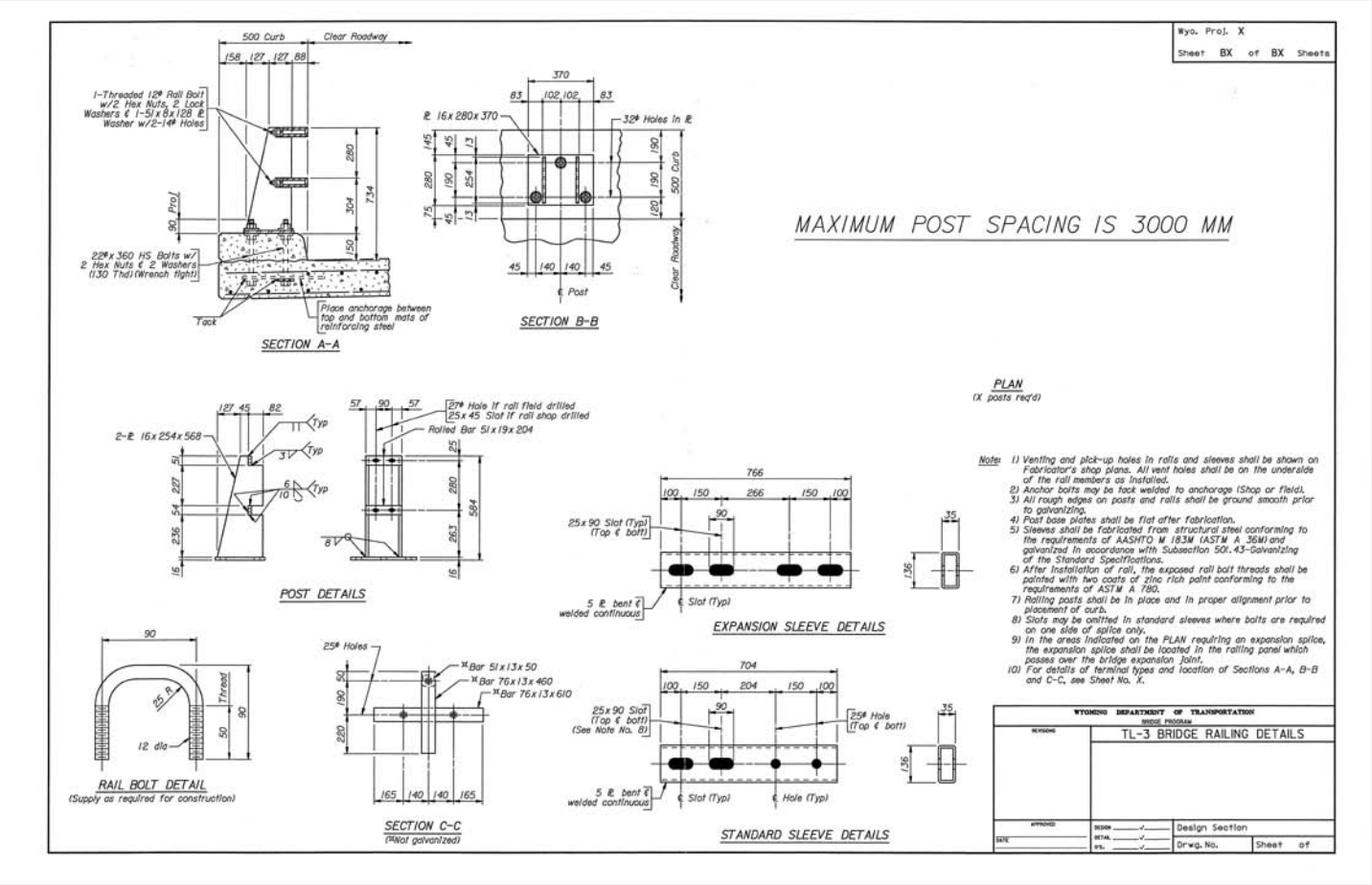
Test level:
TL-3

Utilized in:
Wyoming

Contact:
Lee Potter, P.E.
Federal Highway Admin,
Wyoming Division
2617 E. Lincolnway, Suite D
Cheyenne, WY 82001
(307) 772-2004 ext 146

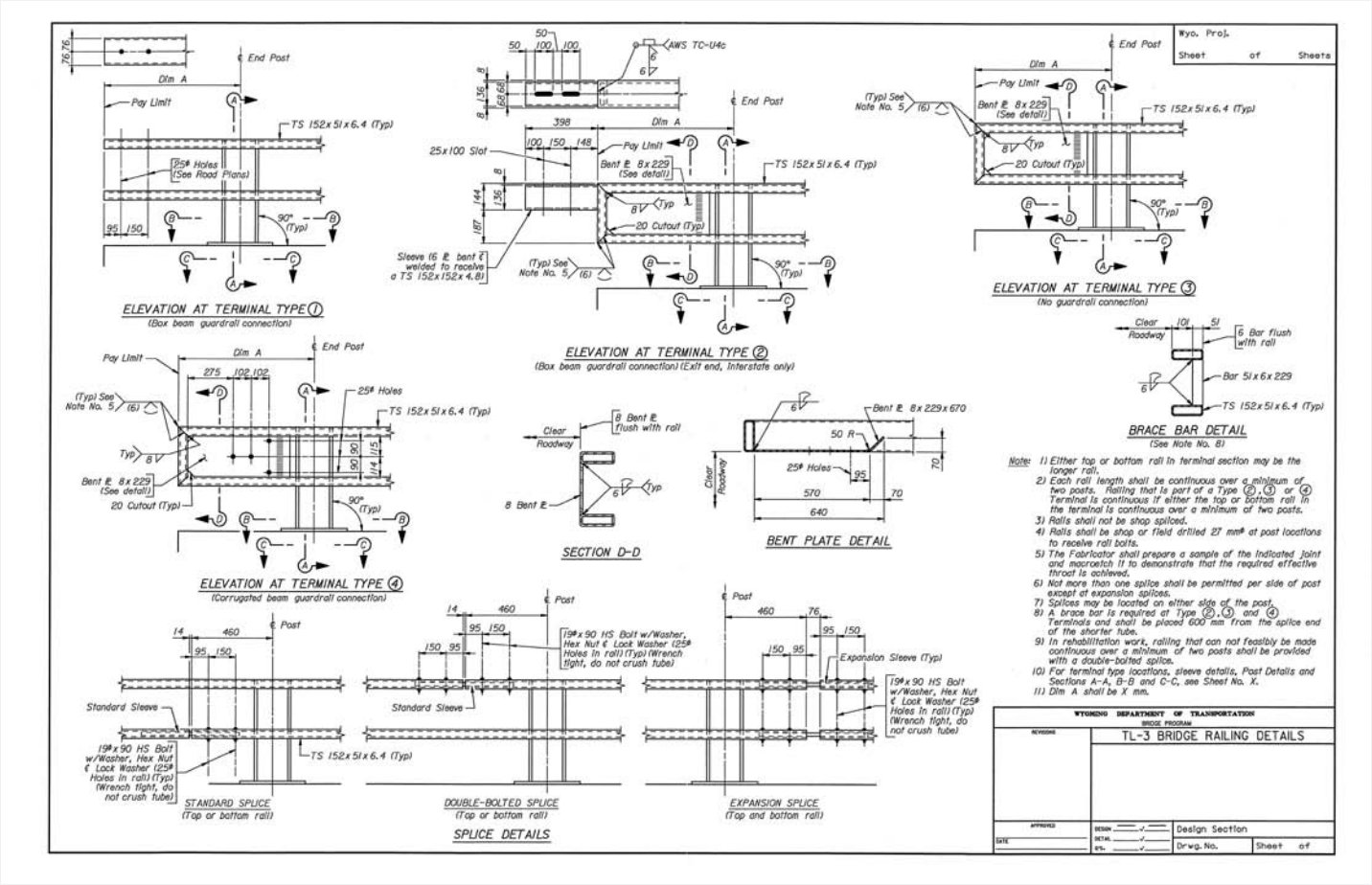
Steel Tube Bridge Rail, Attached to Curb

Wyoming 2-Tube, Curb-Mounted



Steel Tube Bridge Rail, Attached to Curb

2-Tube, Curb-Mounted



Section 4

VERTICAL CONCRETE PARAPET

Section 4 VERTICAL CONCRETE PARAPET

Name	Location	Test Level
32" New Jersey Shape Concrete Barrier	California	TL-4
Type 80 & 80 SW Concrete Barrier	California	TL-4
Baltimore Washington Parkway Stone Rail	Federal Lands	TL-2
Federal Lands Modified Kansas Corral Bridge Rail	Federal Lands	TL-2
Natchez Trace Concrete Bridge Rail	Federal Lands	TL-2
New Jersey Barrier	Georgia	TL-4
Vertical Parapet with Single-Pipe Aluminum Handrail	Georgia	TL-4
Vertical Parapet with Two-Pipe Aluminum Handrail	Georgia	TL-2

Section 4 VERTICAL CONCRETE PARAPET

Name	Location	Test Level
Vertical Parapet with Security Fence	Georgia	TL-4
Iowa Concrete Open Railing	Iowa	TL-2
Iowa Concrete Block Railing Retrofit	Iowa	TL-4
Modified Kansas Corral Rail	Kansas	TL-2
Kansas 32" Corral Rail	Kansas	TL-4
42" Single Slope Concrete Barrier	Missouri	TL-5
Concrete Beam and Post	Nebraska	TL-2
Nebraska Open Concrete Bridge Rail	Nebraska	TL-4
TR1 Modified Bridge Rail	Oklahoma	TL-2

Section 4 VERTICAL CONCRETE PARAPET

Subsection	Name	Location	Test Level
	Parapet Flush Mount	Oregon	TL-4
	Parapet Sidewalk Mount	Oregon	TL-4
	Type T501SW	Texas	TL-4
	Type C411	Texas	TL-2
	Type T203	Texas	TL-3
	Texas Type T411 Aesthetic Rail	Texas	TL-2
	Texas TT Rail	Texas	TL-6
	NJ Barrier	Missouri	TL-4
Vertical Concrete Parapet with Aluminum Tube Bridge Rail	New Jersey Concrete Barrier	California	TL-4
	Type 26 Concrete Barrier with Sidewalk	California	TL-2

Section 4 VERTICAL CONCRETE PARAPET

Subsection	Name	Location	Test Level
Vertical Concrete Parapet with Aluminum Tube Bridge Rail	Type 732 Concrete Barrier	California	TL-4
	Type 736 Concrete Barrier	California	TL-4
	Type 742 Concrete Barrier	California	TL-5
Aluminum Tube Bridge Rails	LB Foster Precast NJ Shape, Bolted Down	New Jersey	TL-4
	California Type 20	California	TL-3
New Jersey Barrier with Rail	New Jersey Barrier w/22" Steel Bicycle Rail	Georgia	TL-4
	Bicycle Rail Attachment to Safety Shape Concrete Rail	Minnesota	TL-4
	New Jersey Safety Shape Parapet	Nevada	TL-3
	Type HT	Texas	TL-5
	Type T501	Texas	TL-6

Section 4

Vertical Concrete Parapet

32" New Jersey Shape Concrete Barrier

Height:
32"

Cost per linear foot:
$47

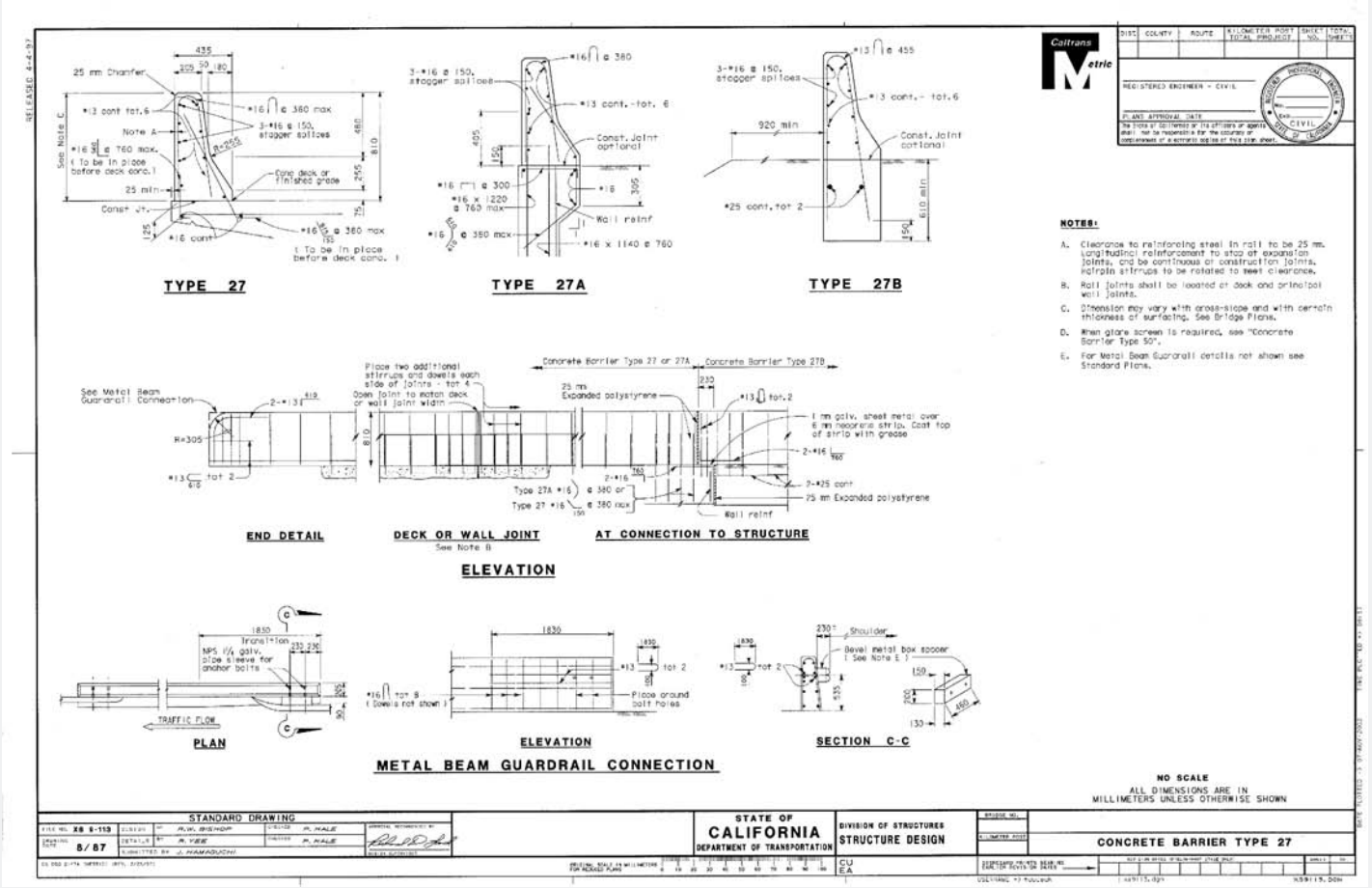
Test level:
TL-4

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Vertical Concrete Parapet

32" New Jersey Shape Concrete Barrier



Aluminum Tube Bridge Rail

Type 80 and 80 SW Concrete Barrier

Height:
32"

Cost per linear foot:
$150

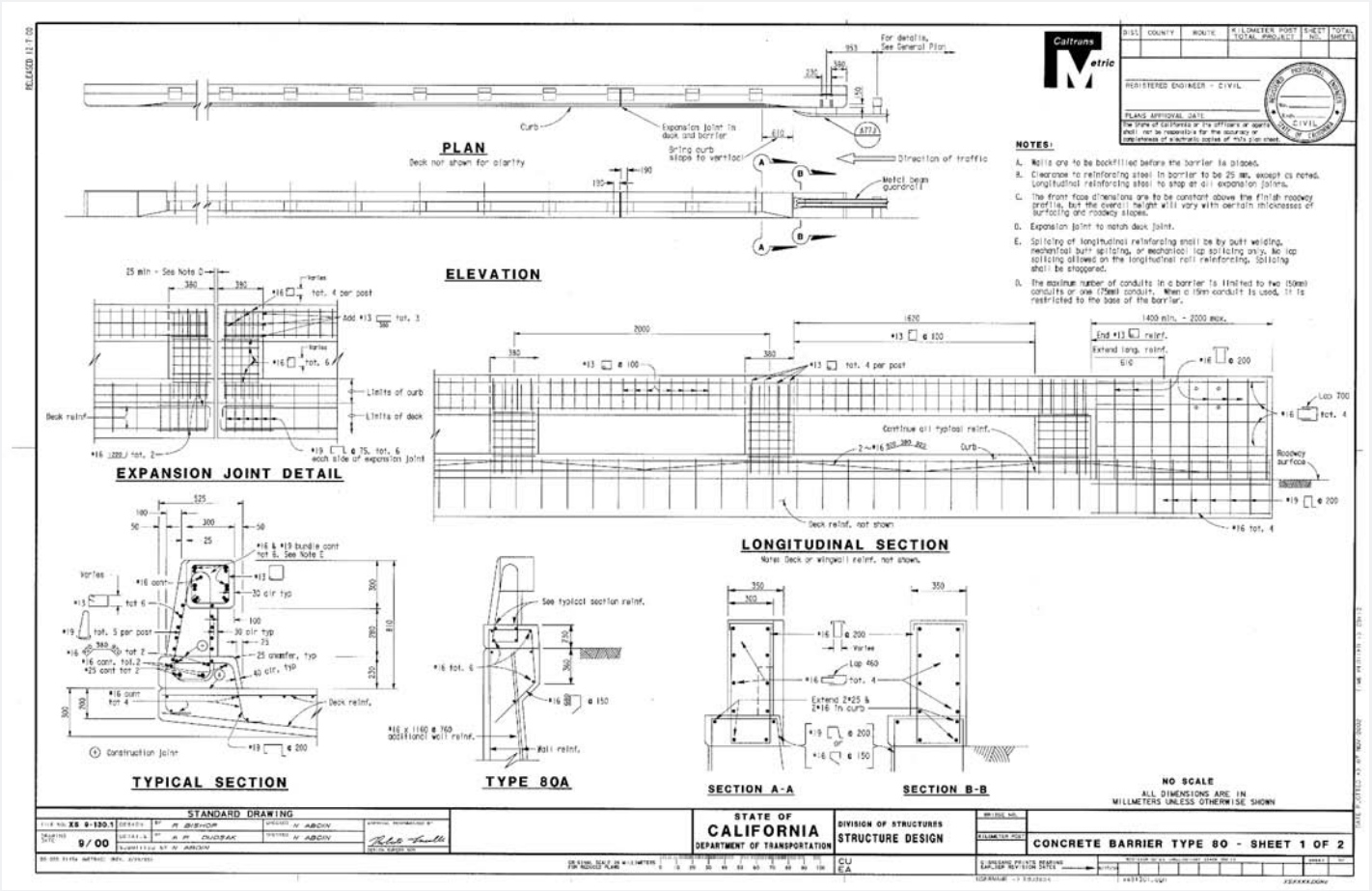
Test level:
TL-4

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

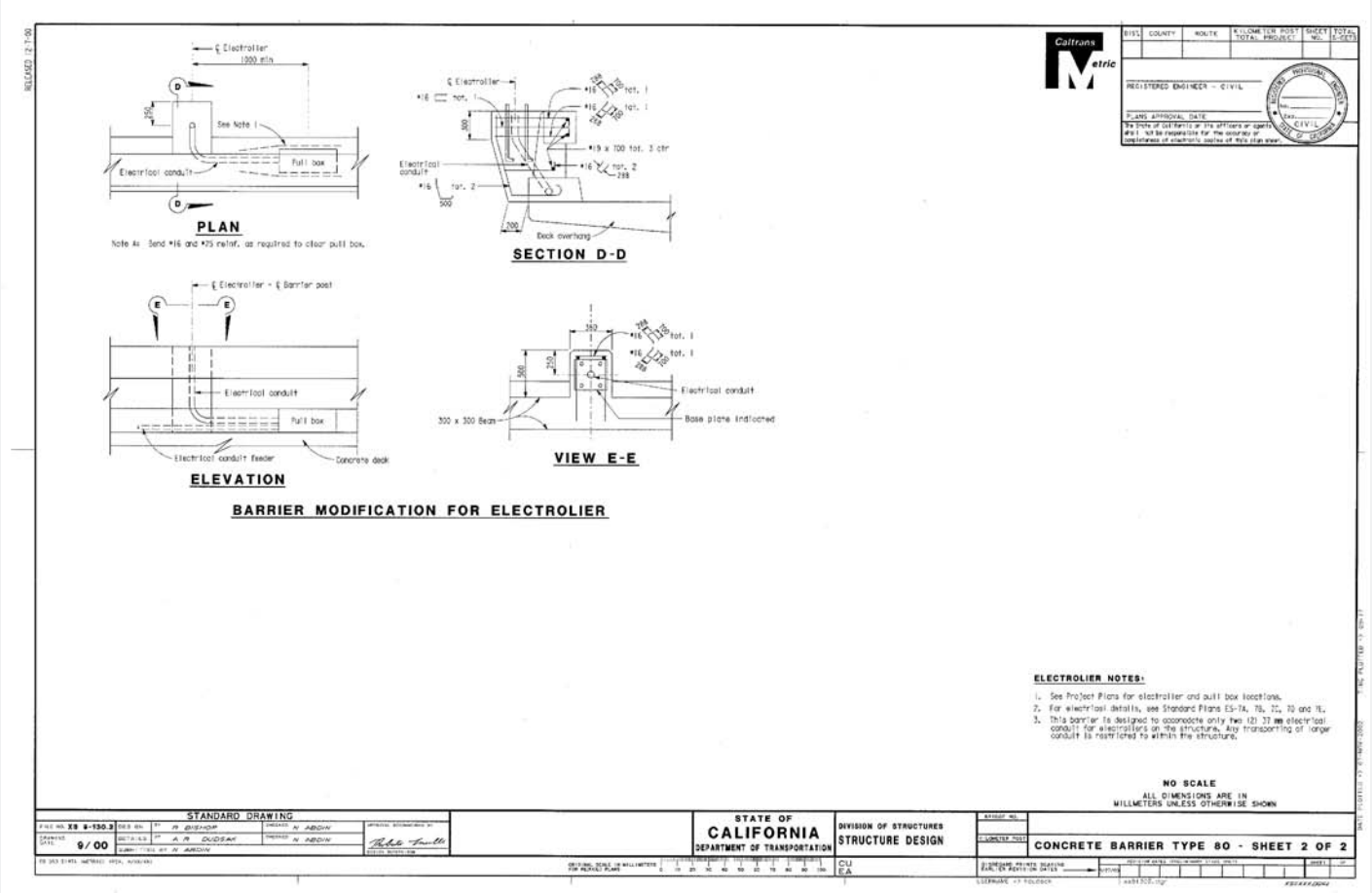
Aluminum Tube Bridge Rail

Type 80 and 80 SW Concrete Barrier



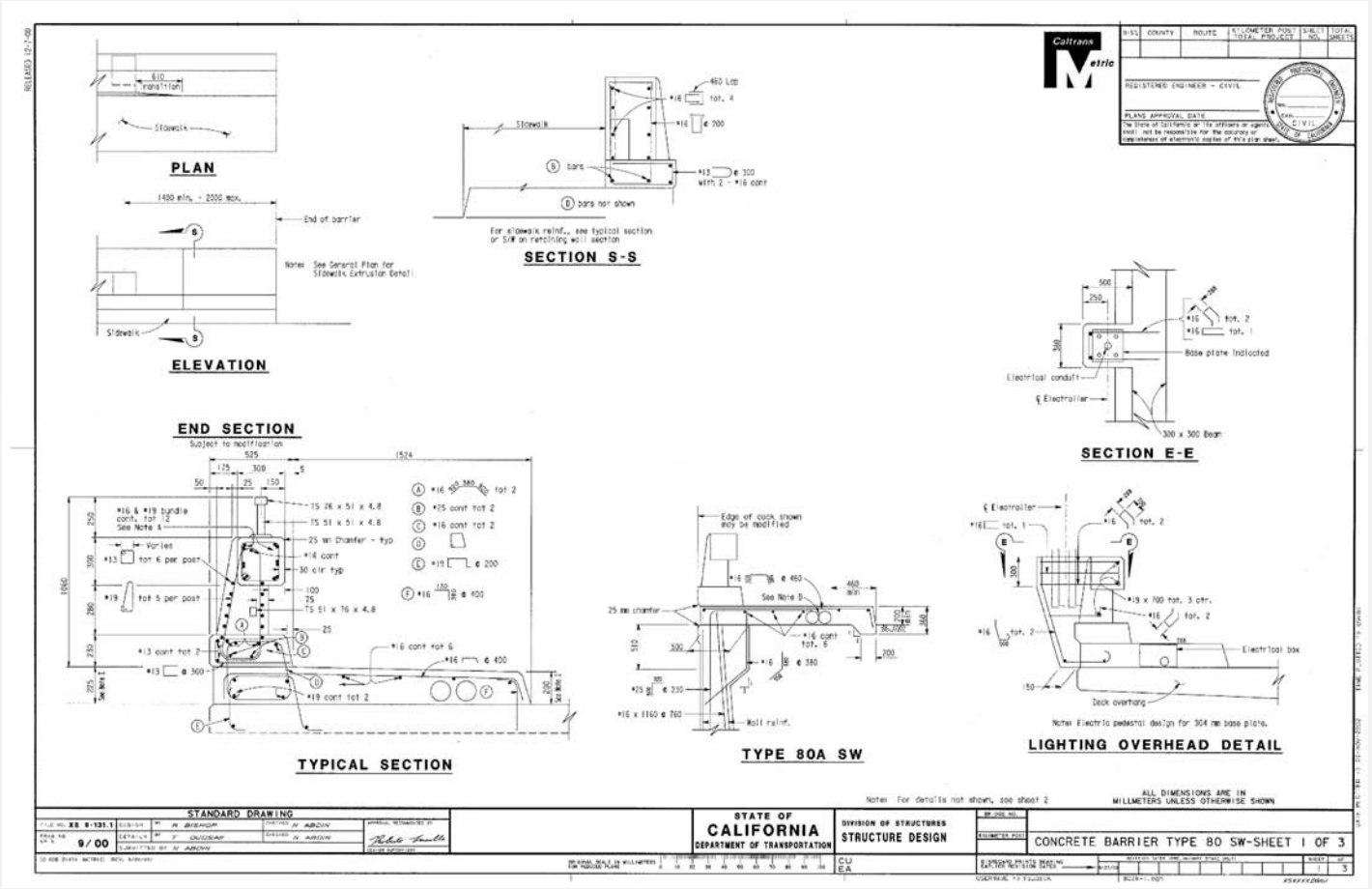
Aluminum Tube Bridge Rail

Type 80 and 80 SW Concrete Barrier



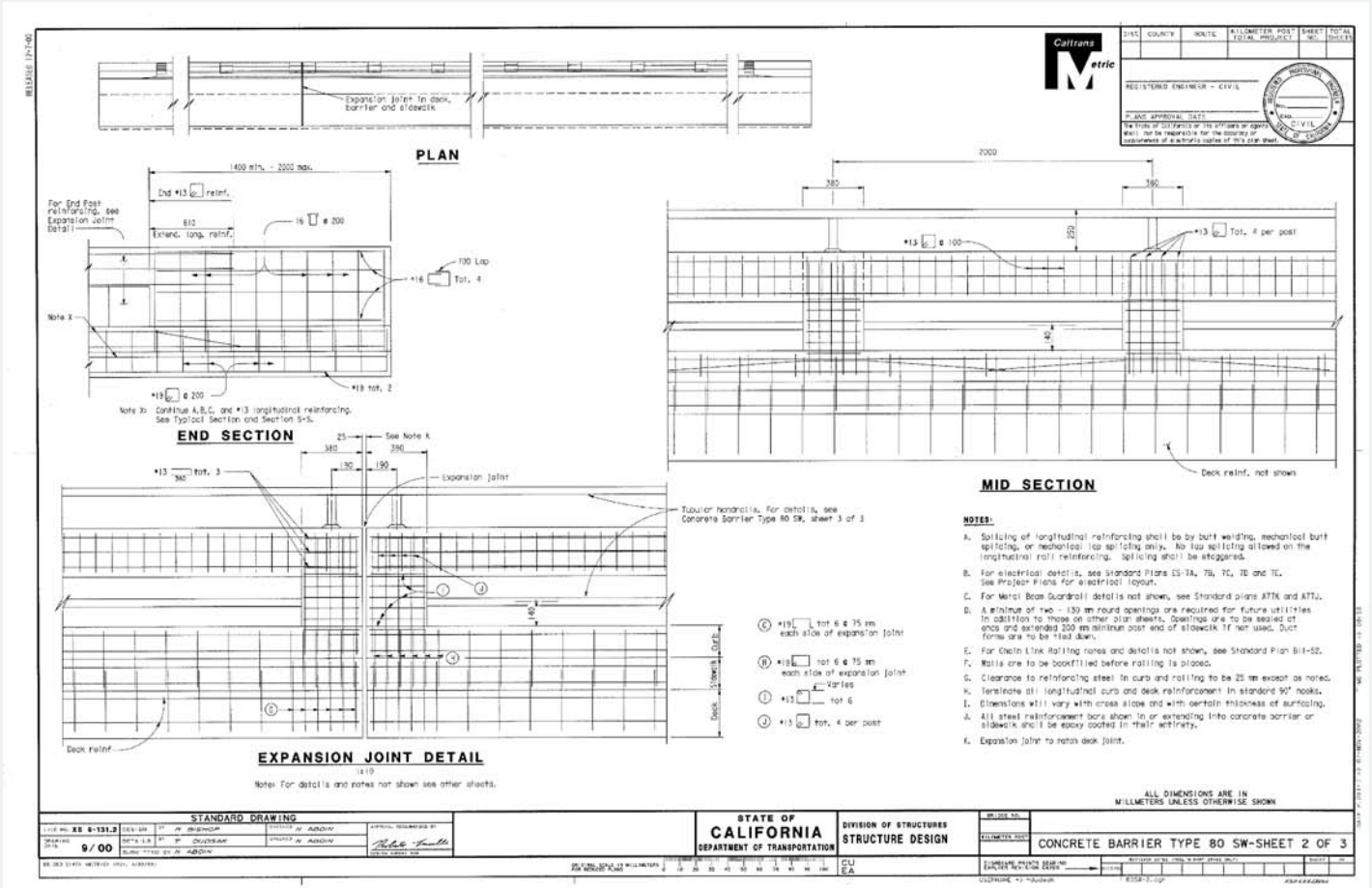
Aluminum Tube Bridge Rail

Type 80 and 80 SW Concrete Barrier



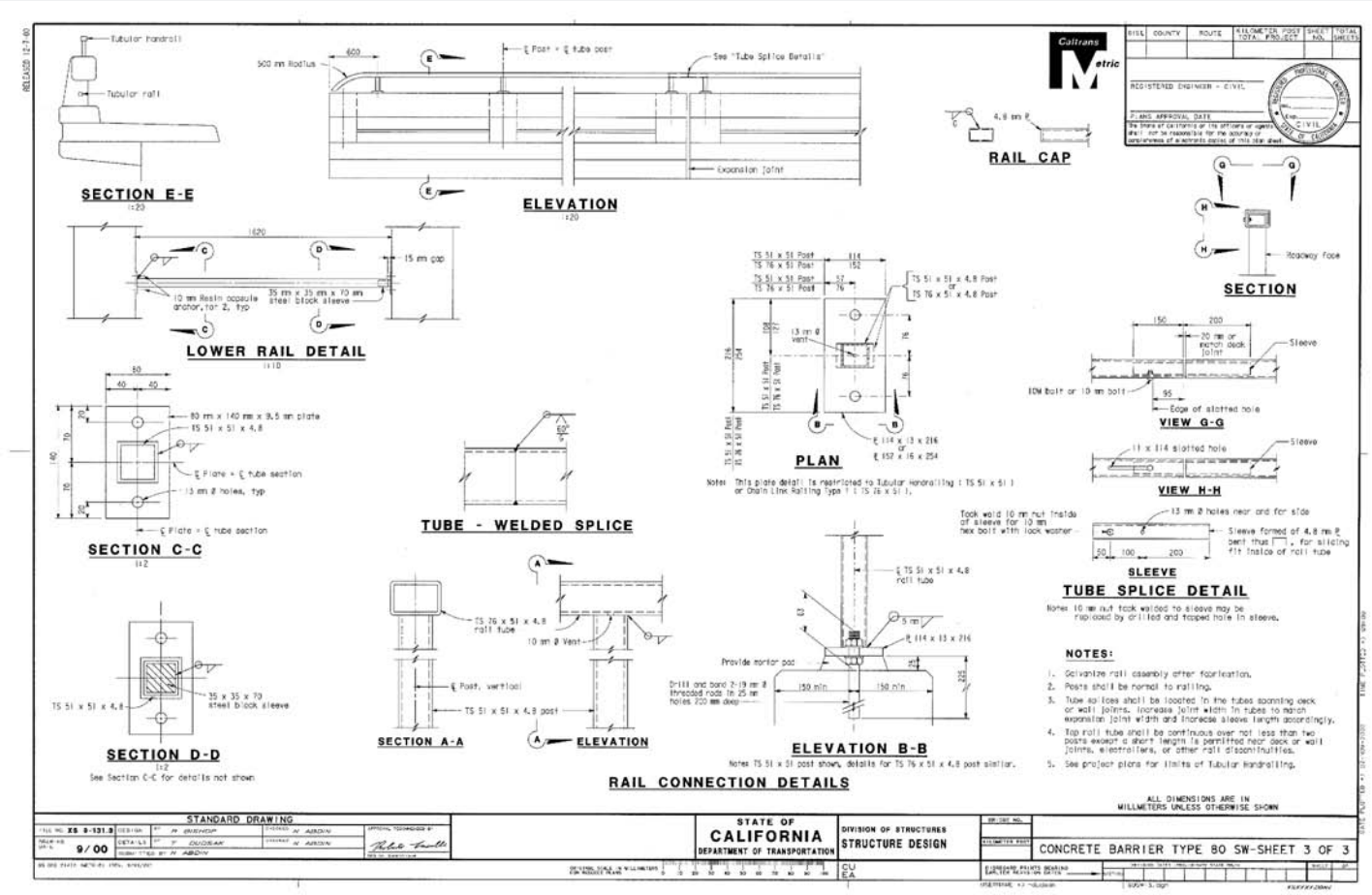
Aluminum Tube Bridge Rail

Type 80 and 80 SW Concrete Barrier



Aluminum Tube Bridge Rail

Type 80 and 80 SW Concrete Barrier



Vertical Concrete Parapet

Baltimore Washington Parkway Stone Rail

Height:
32"

Cost per linear foot:
$300

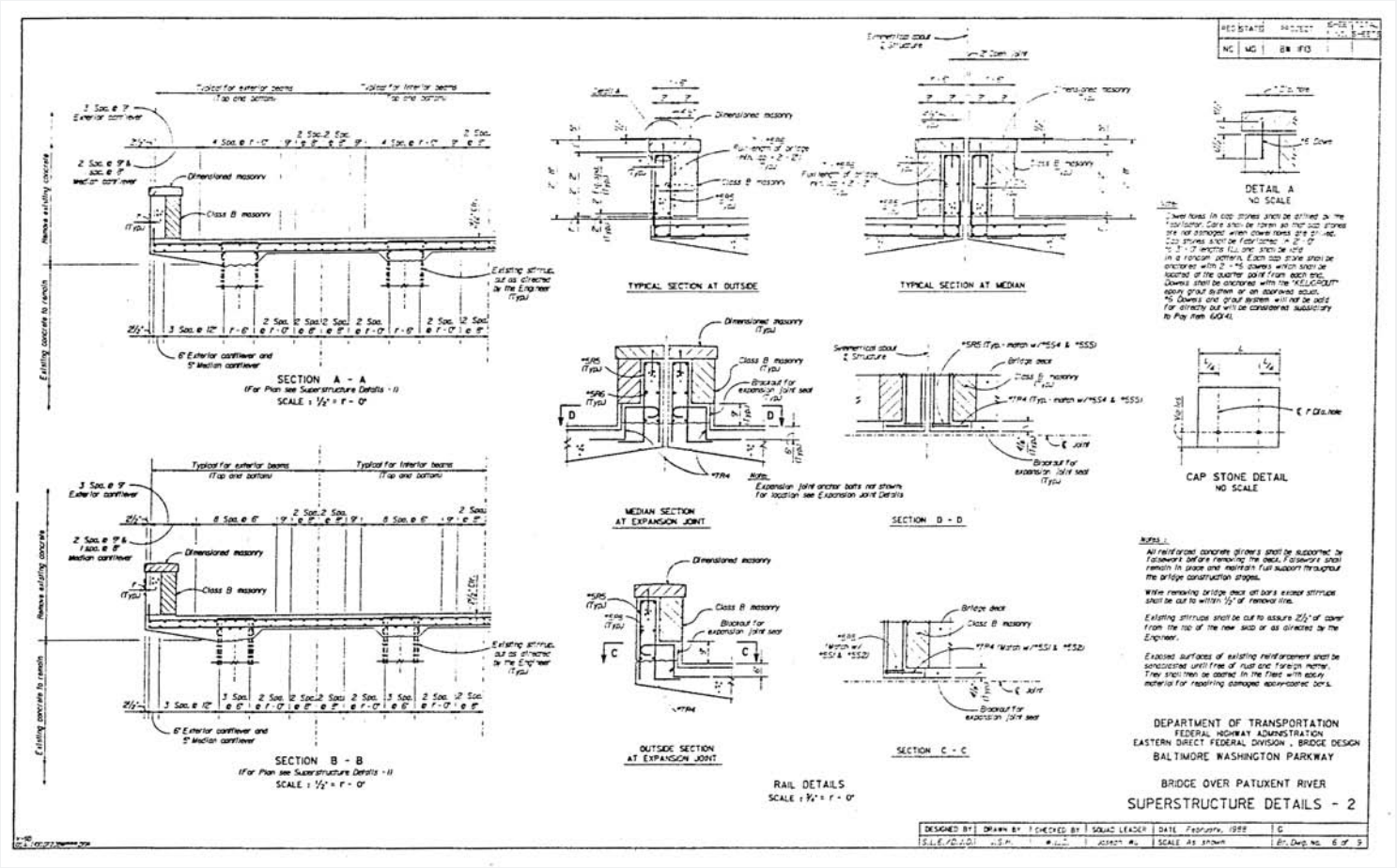
Test level:
TL-3

Utilized in:
Baltimore Washington Parkway, Maryland

Contact:
Mark Clabaugh, P.E.
Federal Lands Bridge Office
21400 Ridgetop Circle
Sterling, VA 20166
(703) 404-6235

Vertical Concrete Parapet

Baltimore Washington Parkway Stone Rail



Vertical Concrete Parapet

Federal Lands Modified Kansas Corral Bridge Rail

Height:
27"

Cost per linear foot:
$90

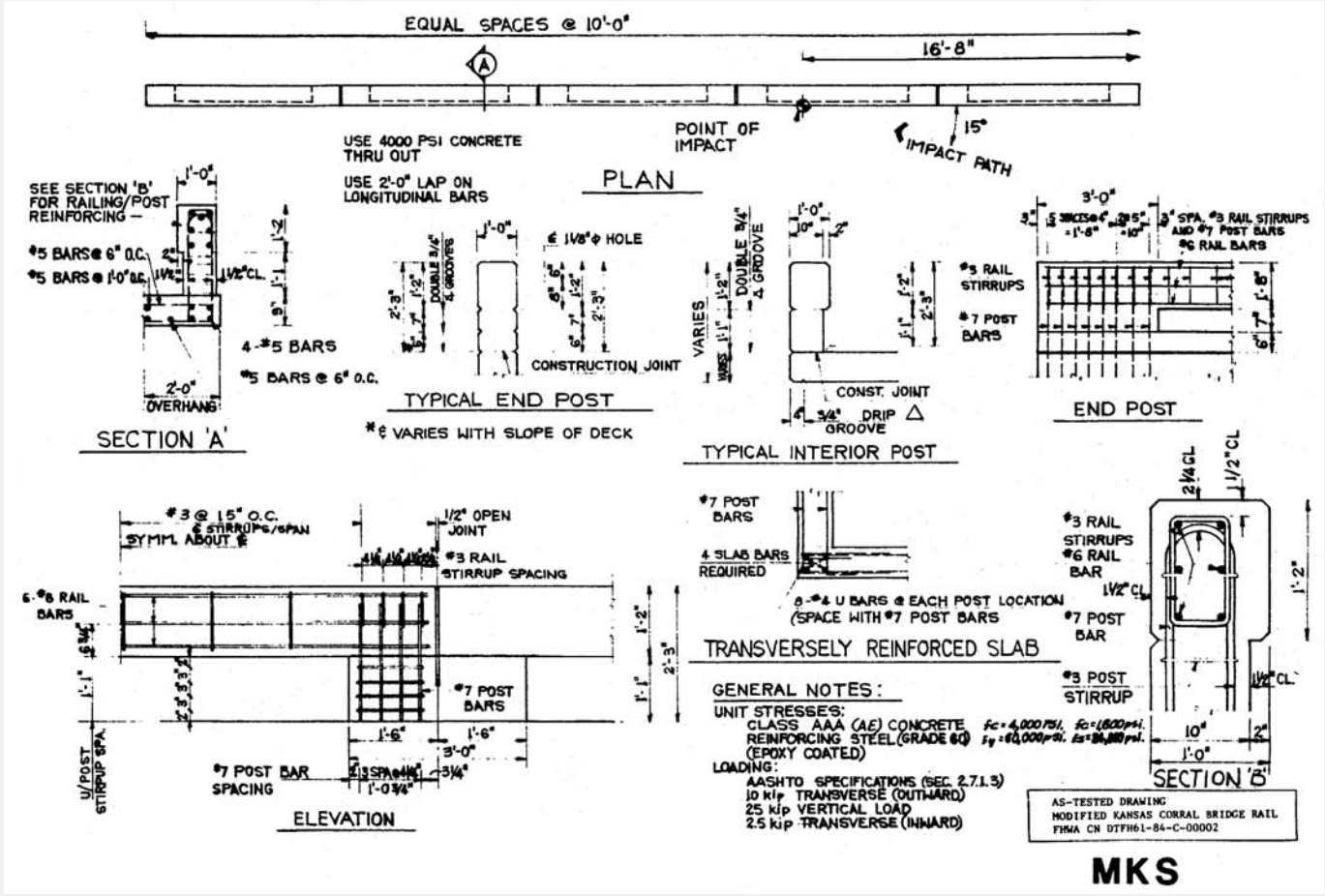
Test level:
TL-2

Utilized in:
Federal Lands

Contact:
Mark Clabaugh, P.E.
Federal Lands Bridge Office
21400 Ridgetop Circle
Sterling, VA 20166
(703) 404-6235

Vertical Concrete Parapet

Federal Lands Modified Kansas Corral Bridge Rail



Vertical Concrete Parapet

Natchez Trace Concrete Bridge Rail

Height:
32.5"

Cost per linear foot:
$90

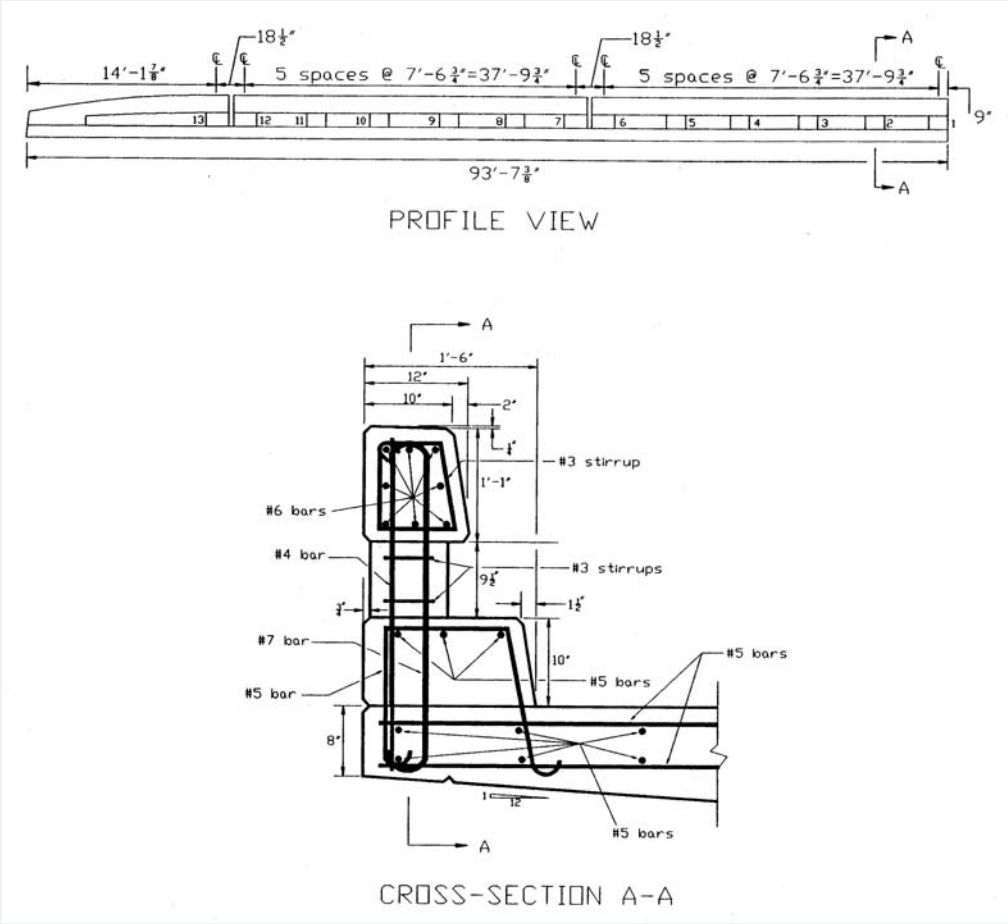
Test level:
TL-3

Utilized in:
Federal Lands

Contact:
Mark Clabaugh, P.E.
Federal Lands Bridge Office
21400 Ridgetop Circle
Sterling, VA 20166
(703) 404-6235

Vertical Concrete Parapet

Natchez Trace Concrete Bridge Rail



Vertical Concrete Parapet

New Jersey Barrier

Height:
32"

Cost per linear foot:
$34

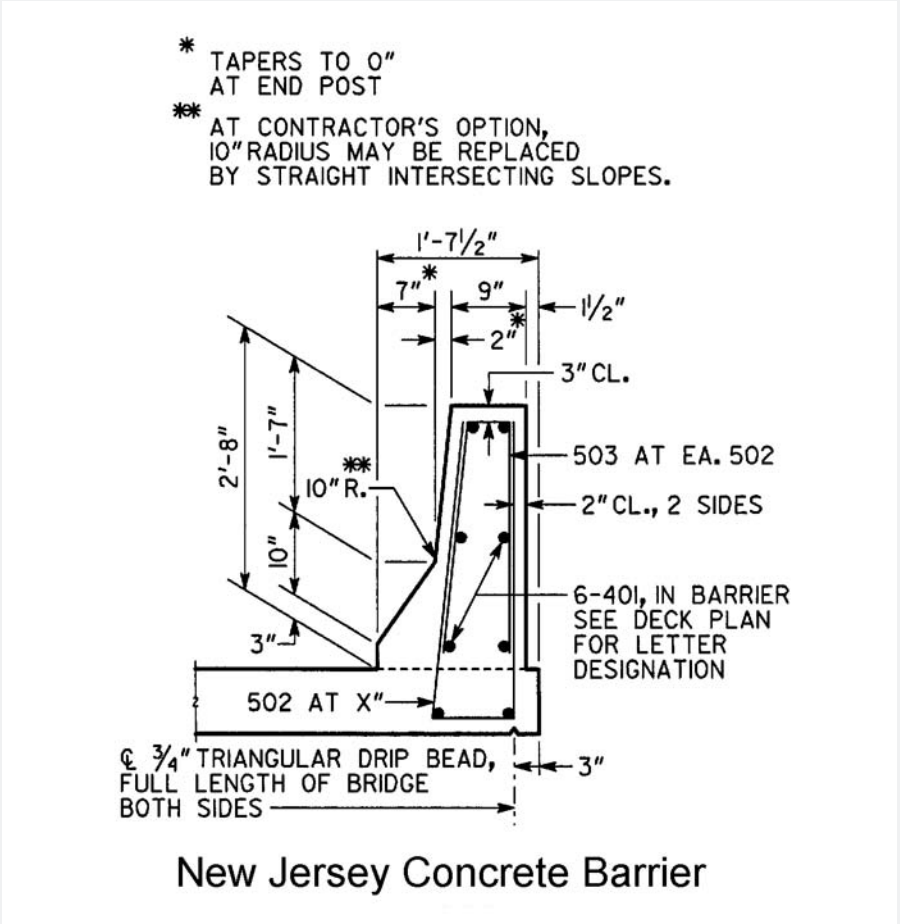
Test level:
TL-4

Utilized in:
Georgia

Contact:
Paul Liles
Georgia Dept of Transportation
No. 2 Capitol Square, SW
Atlanta, GA 30334
(404) 656-5280

Vertical Concrete Parapet

New Jersey Barrier



New Jersey Concrete Barrier

Vertical Concrete Parapet

Vertical Parapet with Single-Pipe Aluminum Handrail

Height:
42"

Cost per linear foot:
$80

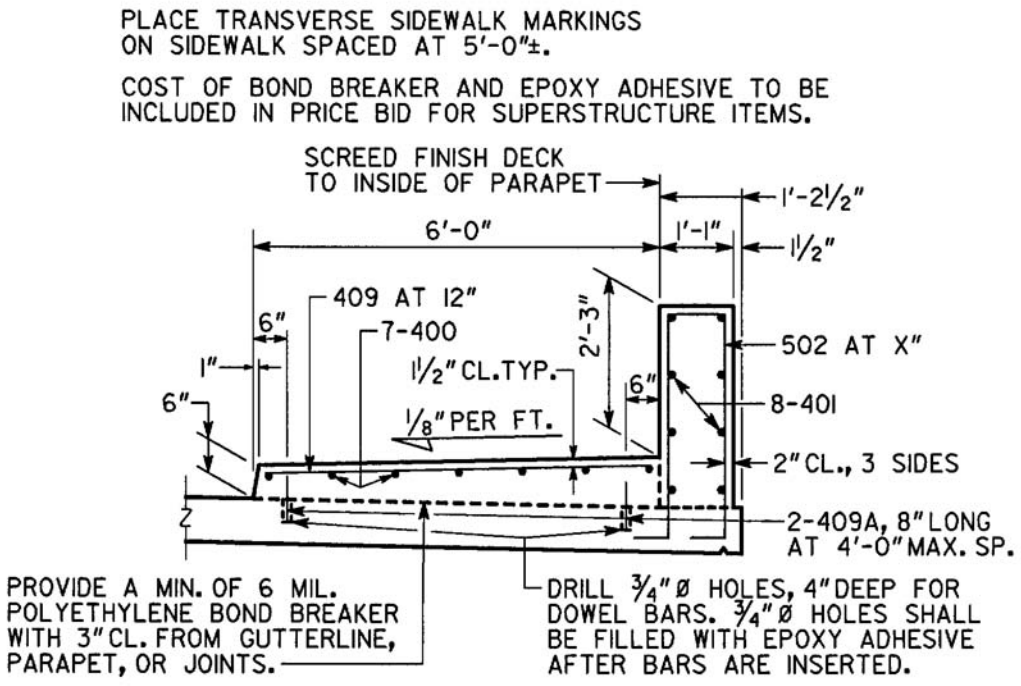
Test level:
TL-4

Utilized in:
Georgia

Contact:
Paul Liles
Georgia Dept of Transportation
No. 2 Capitol Square, SW
Atlanta, GA 30334
(404) 656-5280

Vertical Concrete Parapet

Vertical Parapet with Single-Pipe Aluminum Handrail



2'-3" Vertical Parapet and Sidewalk
(Used With 1'-3" Single Pipe Aluminum Hand Rail)

Vertical Concrete Parapet

Vertical Parapet with Two-Pipe Aluminum Handrail

Height:
42"

Cost per linear foot:
$90

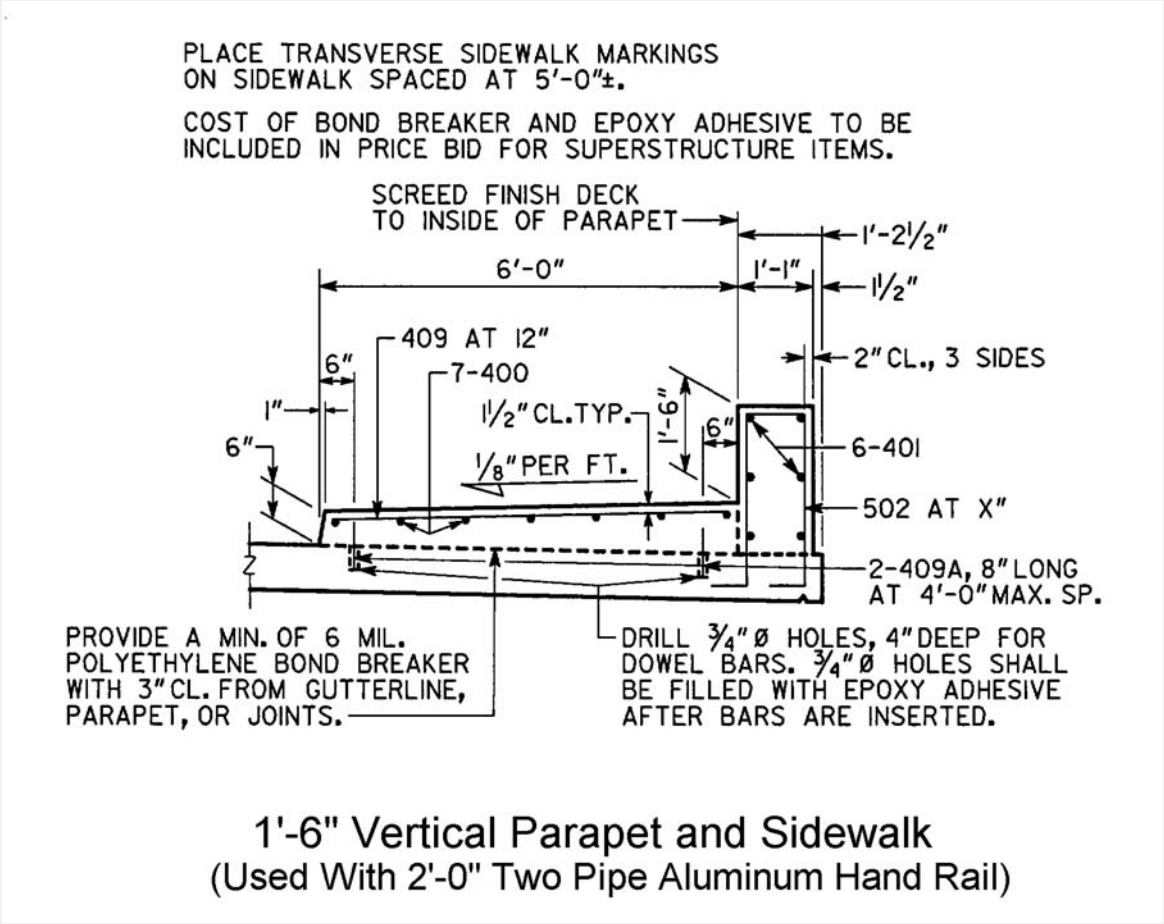
Test level:
TL-2

Utilized in:
Georgia

Contact:
Paul Liles
Georgia Dept of Transportation
No. 2 Capitol Square, SW
Atlanta, GA 30334
(404) 656-5280

Vertical Concrete Parapet

Vertical Parapet with Two-Pipe Aluminum Handrail



1'-6" Vertical Parapet and Sidewalk
(Used With 2'-0" Two Pipe Aluminum Hand Rail)

Vertical Concrete Parapet

Vertical Parapet with Security Fence

Height:
34"

Cost per linear foot:
$55

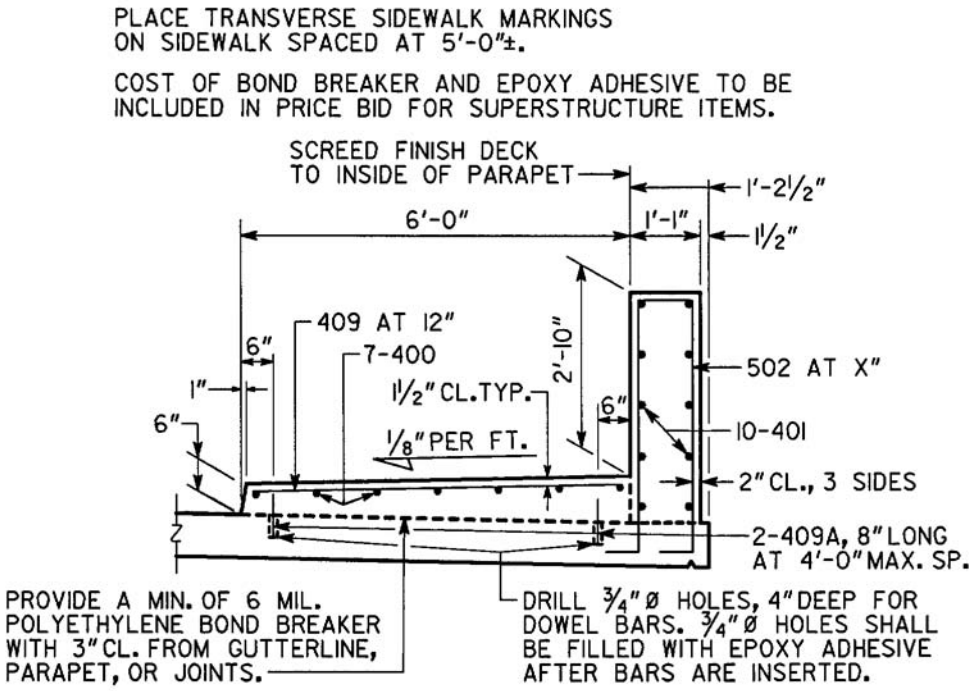
Test level:
TL-4

Utilized in:
Georgia

Contact:
Paul Liles
Georgia Dept of Transportation
No. 2 Capitol Square, SW
Atlanta, GA 30334
(404) 656-5280

Vertical Concrete Parapet

Vertical Parapet with Security Fence



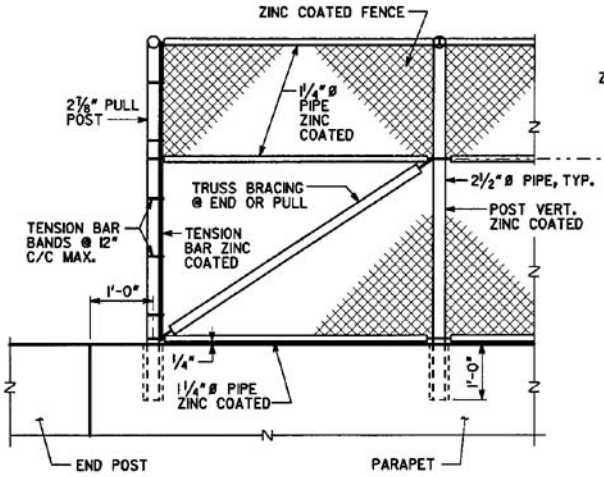
2'-10" Vertical Parapet and Sidewalk
(Used With Security Fence)

Vertical Concrete Parapet

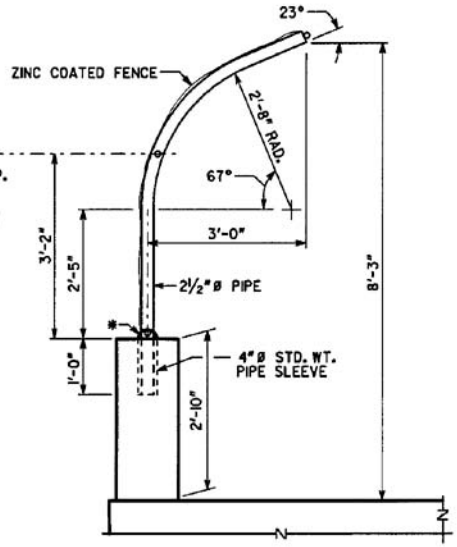
Vertical Parapet with Security Fence

FENCE NOTES:

1. FENCE SHALL BE 9 GAGE CHAIN LINK ZINC COATED TWO INCH SECURITY FENCE.
2. 4"Ø SLEEVE SHALL BE CAST IN THE PARAPET. NON-SHRINK GROUT SHALL BE ALLOWED TO CURE FOR THREE DAYS BEFORE FENCE FABRIC IS INSTALLED.
3. PROVIDE EXPANSION SLEEVE FOR ALL RAILS TO MATCH SUPERSTRUCTURE JOINTS.
4. FOR POST SPACING, SEE BRIDGE SHEET X.
5. FOR FURTHER DETAILS, SEE GEORGIA DOT SPECIFICATIONS SECTIONS 643 AND 894.
6. FABRIC SHALL BE FASTENED TO POST AT INTERVALS NOT GREATER THAN 14".



FENCE ELEVATION



FENCE POST DETAIL

* NON-SHRINK PORTLAND CEMENT GROUT, TROWEL TO PROVIDE POSITIVE DRAINAGE.

Vertical Concrete Parapet

Iowa Concrete Open Railing

Height:
29"

Cost per linear foot:
$36

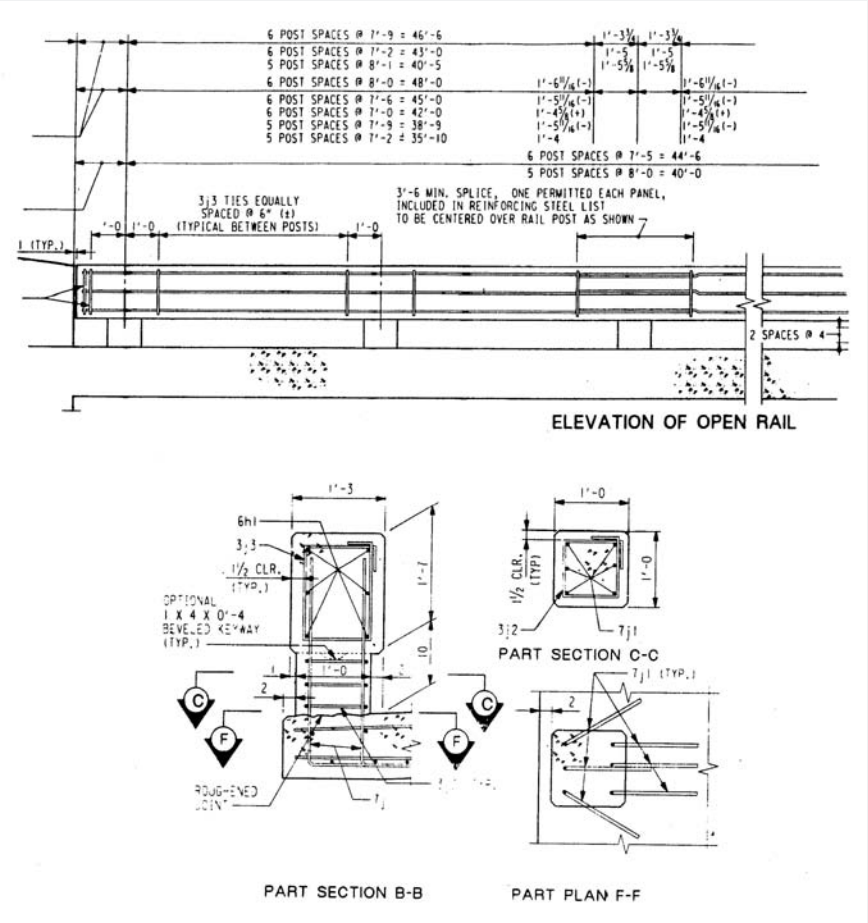
Test level:
TL-2

Utilized in:
Iowa

Contact:
Norman McDonald
Iowa Dept of Transportation
800 Lincoln Way
Ames, IA 50010
(515) 239-1101

Vertical Concrete Parapet

Iowa Concrete Open Railing



Vertical Concrete Parapet

Iowa Concrete Block Railing Retrofit

Height:
34"

Cost per linear foot:
$40

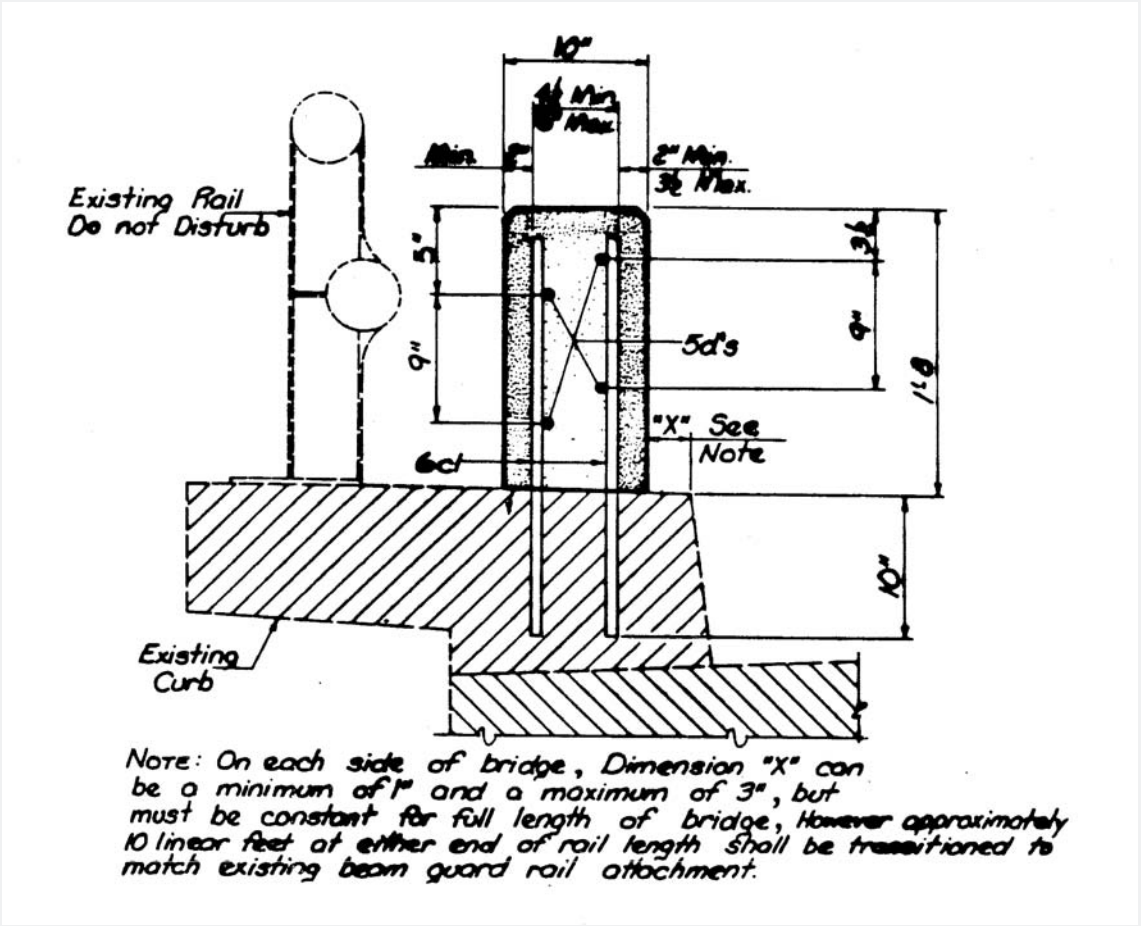
Test level:
TL-4

Utilized in:
Iowa

Contact:
Norman McDonald
Iowa Dept of Transportation
800 Lincoln Way
Ames, IA 50010
(515) 239-1101

Vertical Concrete Parapet

Iowa Concrete Block Railing Retrofit



Vertical Concrete Parapet

Modified Kansas Corral Rail

Height:
27"

Cost per linear foot:
$35 (w/out curb)
$41 (w/ curb)

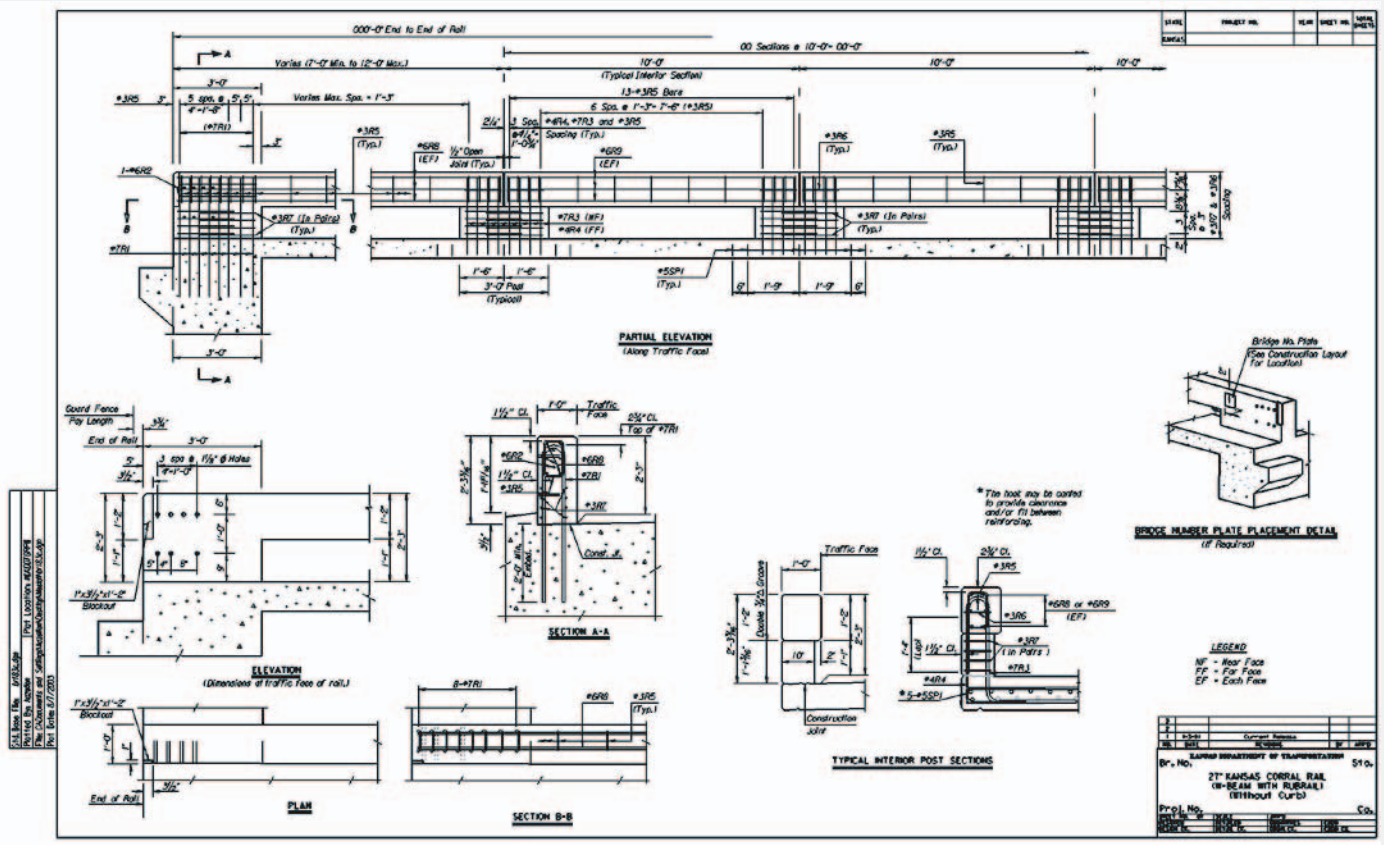
Test level:
TL-2

Utilized in:
Kansas

Contact:
Kenneth F. Hurst
Kansas DOT
700 Harrison, 13th Floor
Topeka, KS 66603-3754
(785) 296-3761

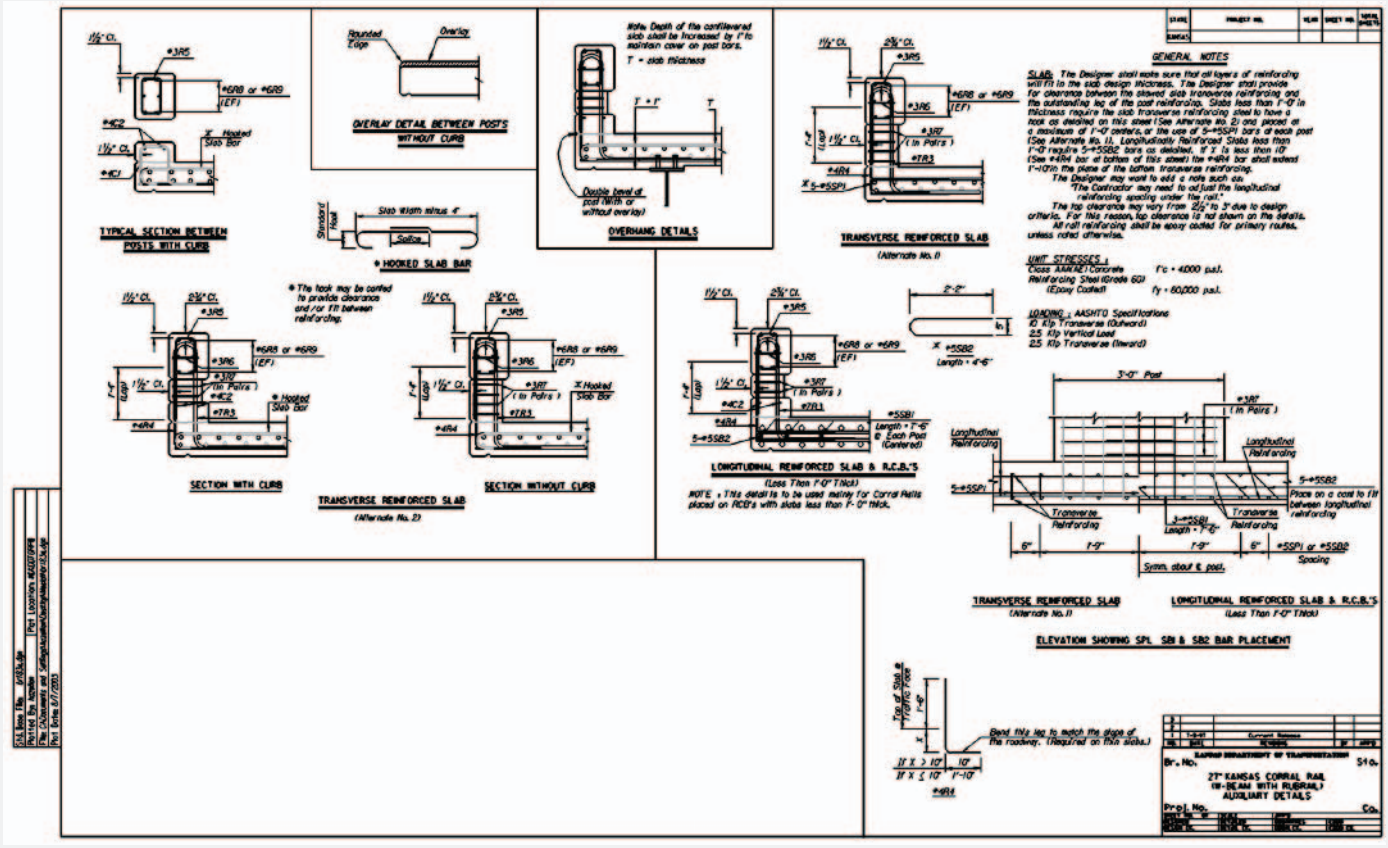
Vertical Concrete Parapet

Modified Kansas Corral Rail



Vertical Concrete Parapet

Modified Kansas Corral Rail



Vertical Concrete Parapet

Kansas 32" Corral Rail

Height:
32"

Cost per linear foot:
$42 (w/out curb)
$48 (w/ curb)

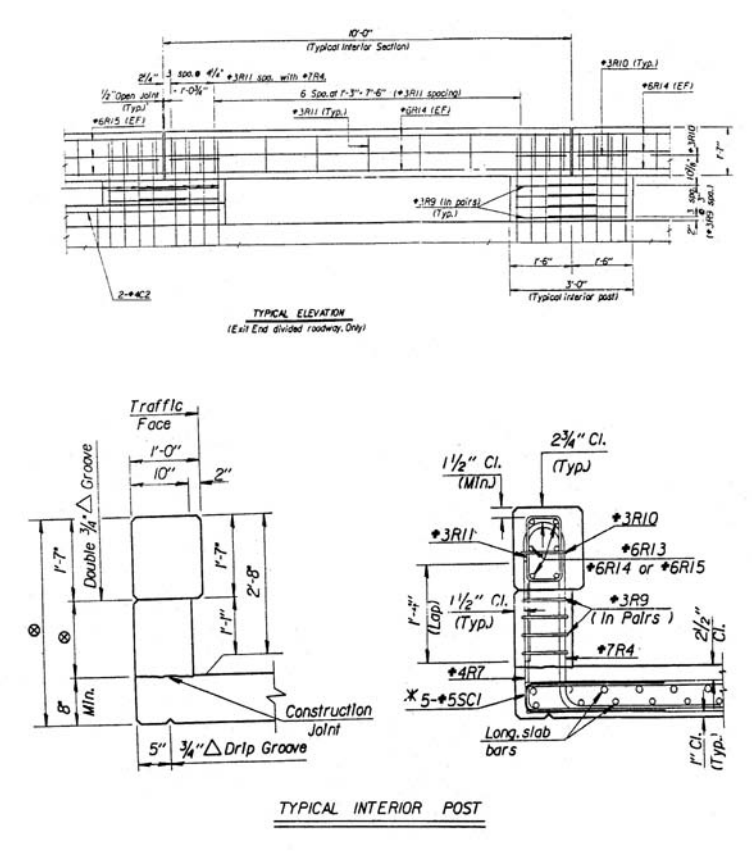
Test level:
TL-4

Utilized in:
Kansas

Contact:
Kenneth F. Hurst
Kansas DOT
700 Harrison, 13th Floor
Topeka, KS 66603-3754
(785) 296-3761

Vertical Concrete Parapet

Kansas 32" Corral Rail



Vertical Concrete Parapet

42" Single Slope Concrete Barrier

Height:
42"

Cost per linear foot:
$70-75

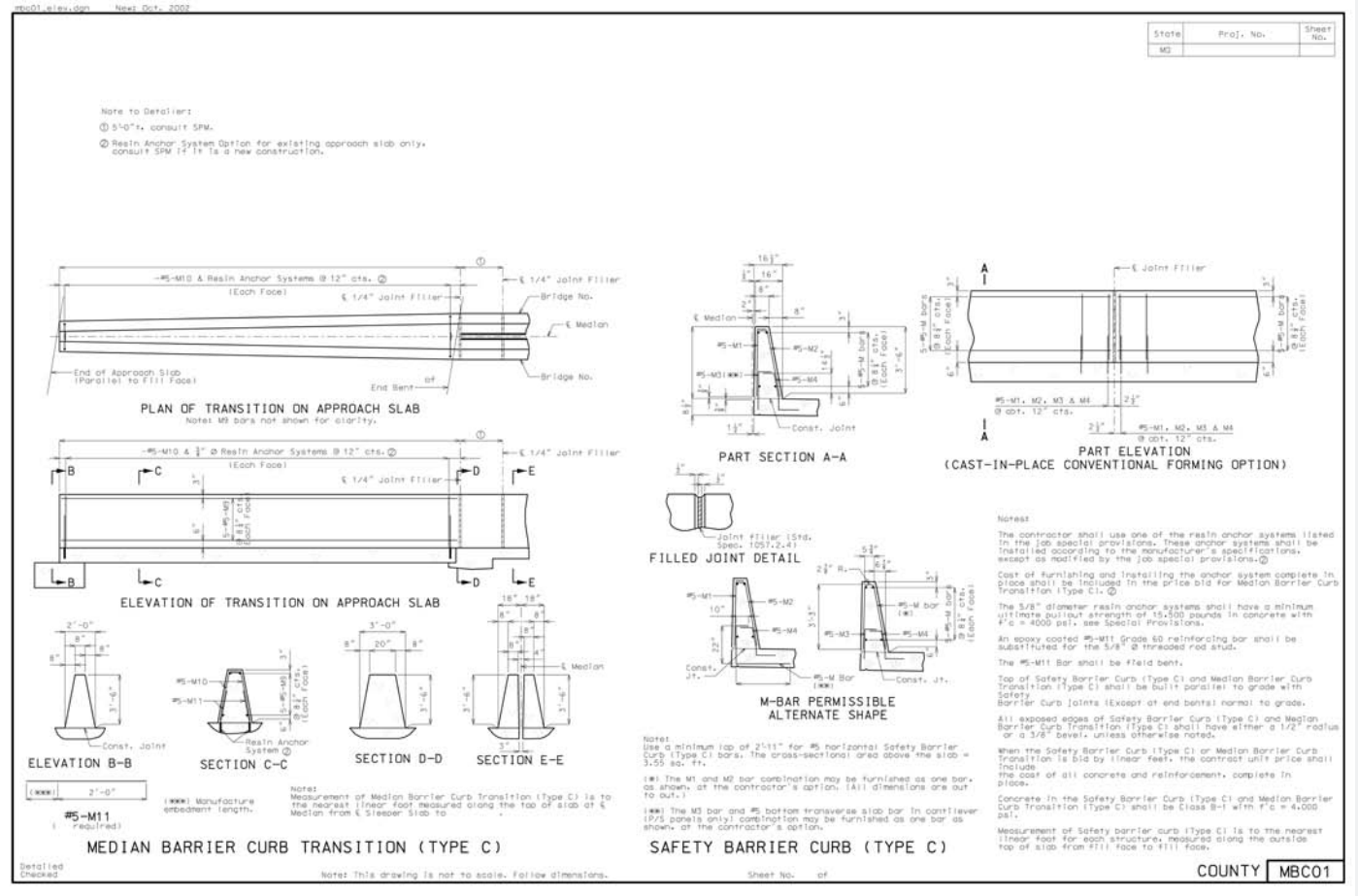
Test level:
TL-5

Utilized in:
Missouri

Contact:
Peter Clogston, P.E.
Federal Highway Admin,
Missouri Division Office
209 Adams Street
Jefferson City, MO 65101
(573) 638-2613

Vertical Concrete Parapet

42" Single Slope Concrete Barrier



Vertical Concrete Parapet

Concrete Beam and Post

Height:
29"

Cost per linear foot:
$__

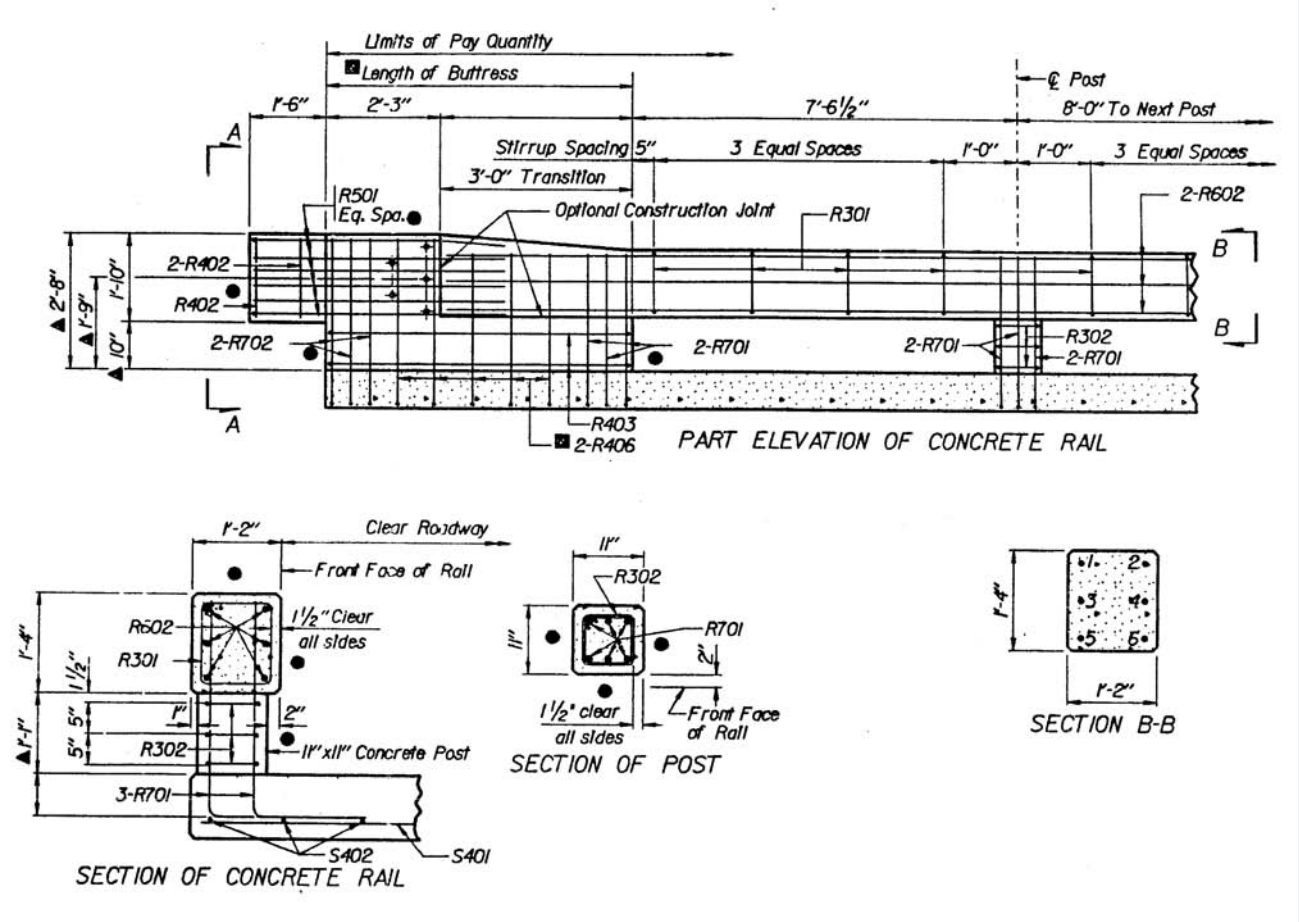
Test level:
TL-2

Utilized in:
Nebraska

Contact:
Milo D. Cress
Federal Highway Administration
100 Centennial Mall-North
Room 220
Lincoln, NE 68508
(402) 437-5977

Vertical Concrete Parapet

Concrete Beam and Post



Vertical Concrete Parapet

Nebraska Open Concrete Bridge Rail

Height:
29"

Cost per linear foot:
$__

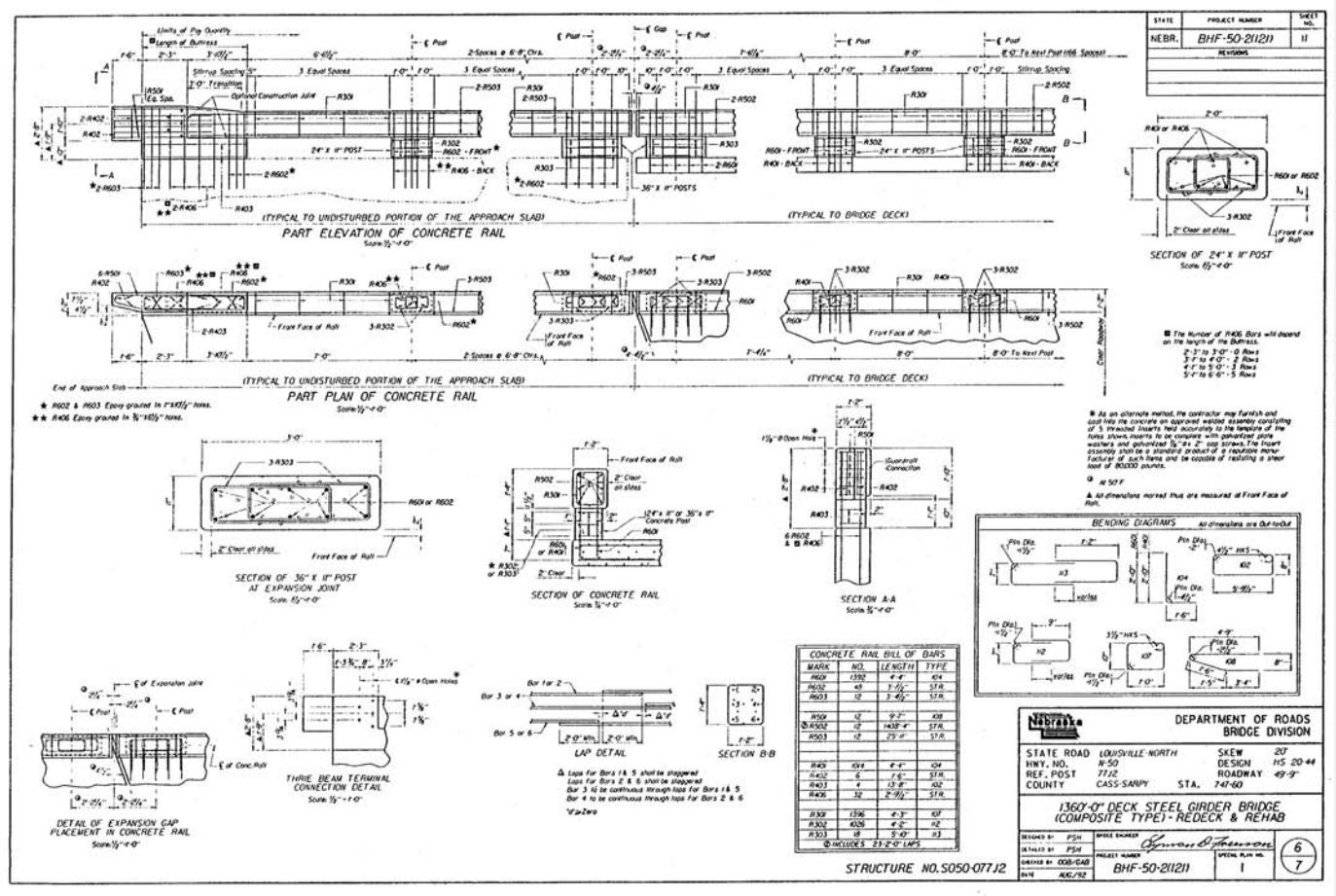
Test level:
TL-4

Utilized in:
Nebraska

Contact:
Milo D. Cress
Federal Highway Administration
100 Centennial Mall-North
Room 220
Lincoln, NE 68508
(402) 437-5977

Vertical Concrete Parapet

Nebraska Open Concrete Bridge Rail



Vertical Concrete Parapet

TR1 Modified Bridge Rail

Height:
29"

Cost per linear foot:
$35

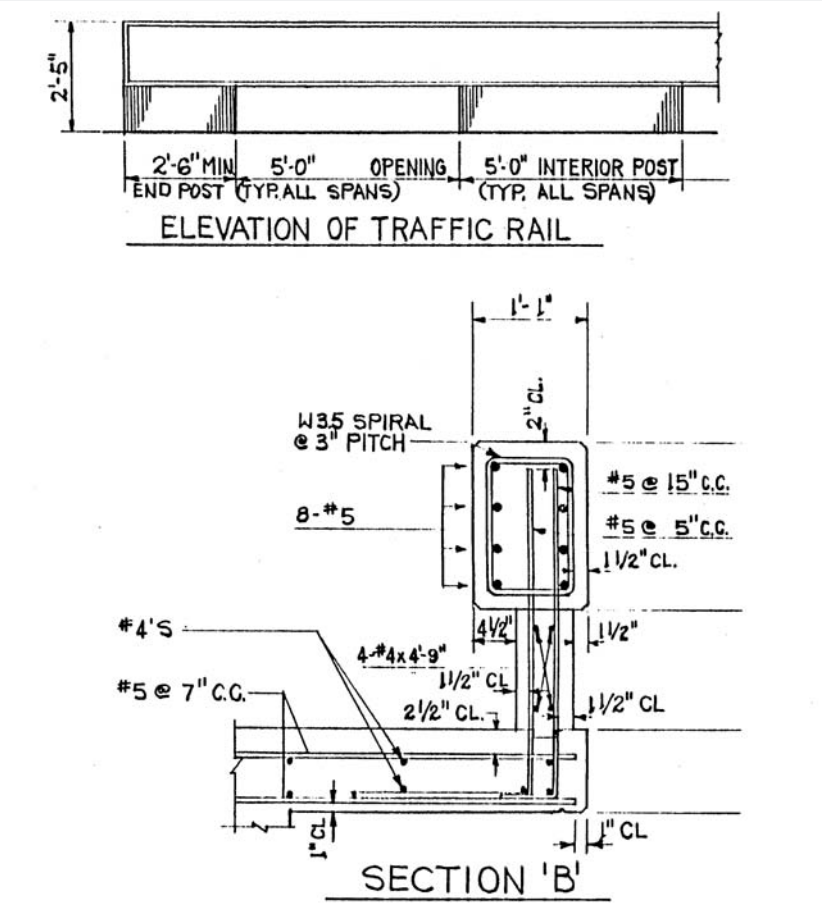
Test level:
TL-2

Utilized in:
Oklahoma

Contact:
Greg Allen
Oklahoma Dept
of Transportation
200 N.E. 21st Street
Oklahoma City, OK 73105
(405) 521-2606

Vertical Concrete Parapet

TR1 Modified Bridge Rail



Vertical Concrete Parapet

Parapet Flush Mount

Height:
54"

Cost per linear foot:
$92

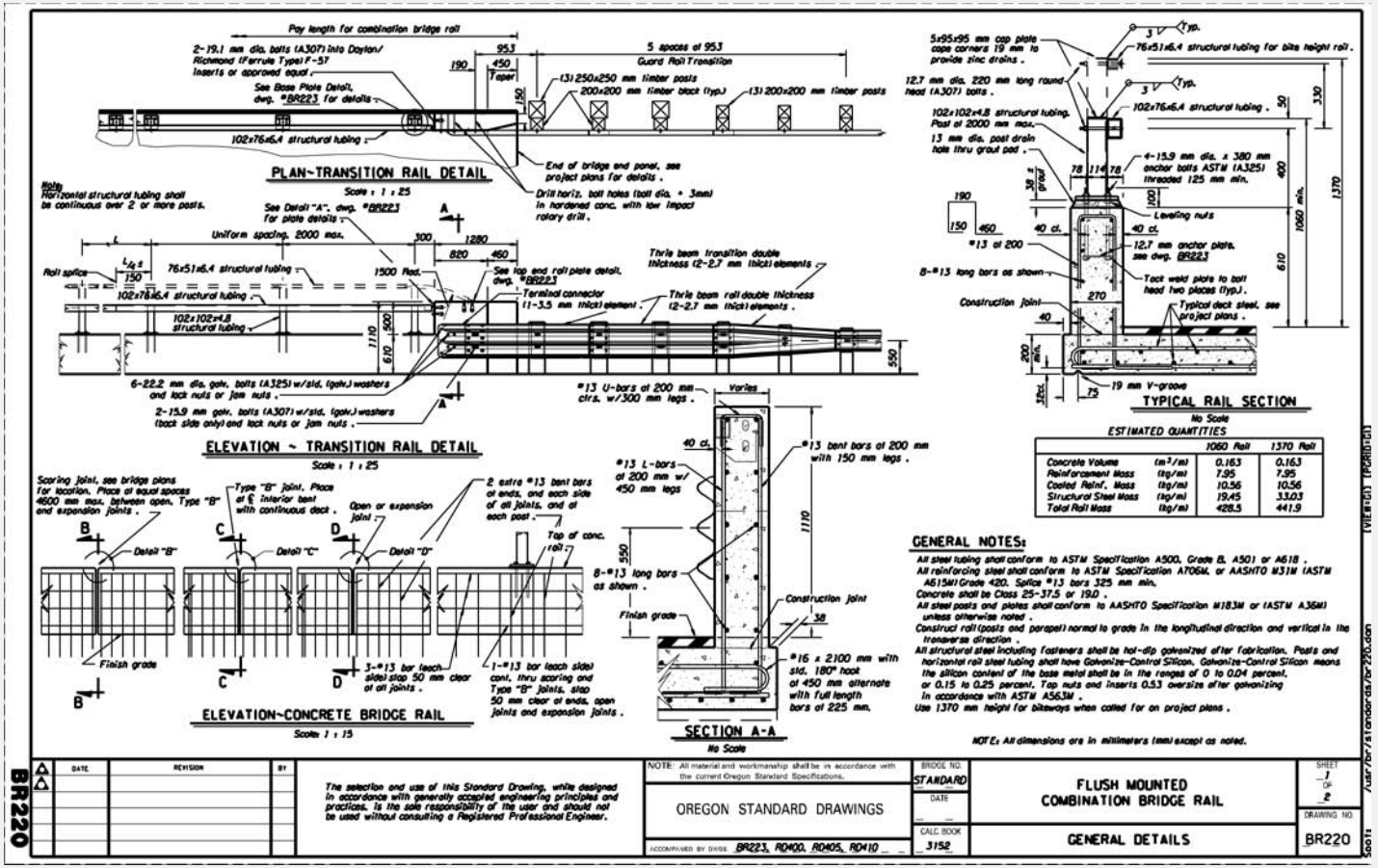
Test level:
TL-4

Utilized in:
Oregon

Contact:
Antony P. Stratis, P.E.
Tech Center Bridge Manager
Region 1
123 NW Flanders Street
Portland, OR 97209
(503) 731-8490

Vertical Concrete Parapet

Parapet Flush Mount



Vertical Concrete Parapet

Parapet Sidewalk Mount

Height:
54"

Cost per linear foot:
$92

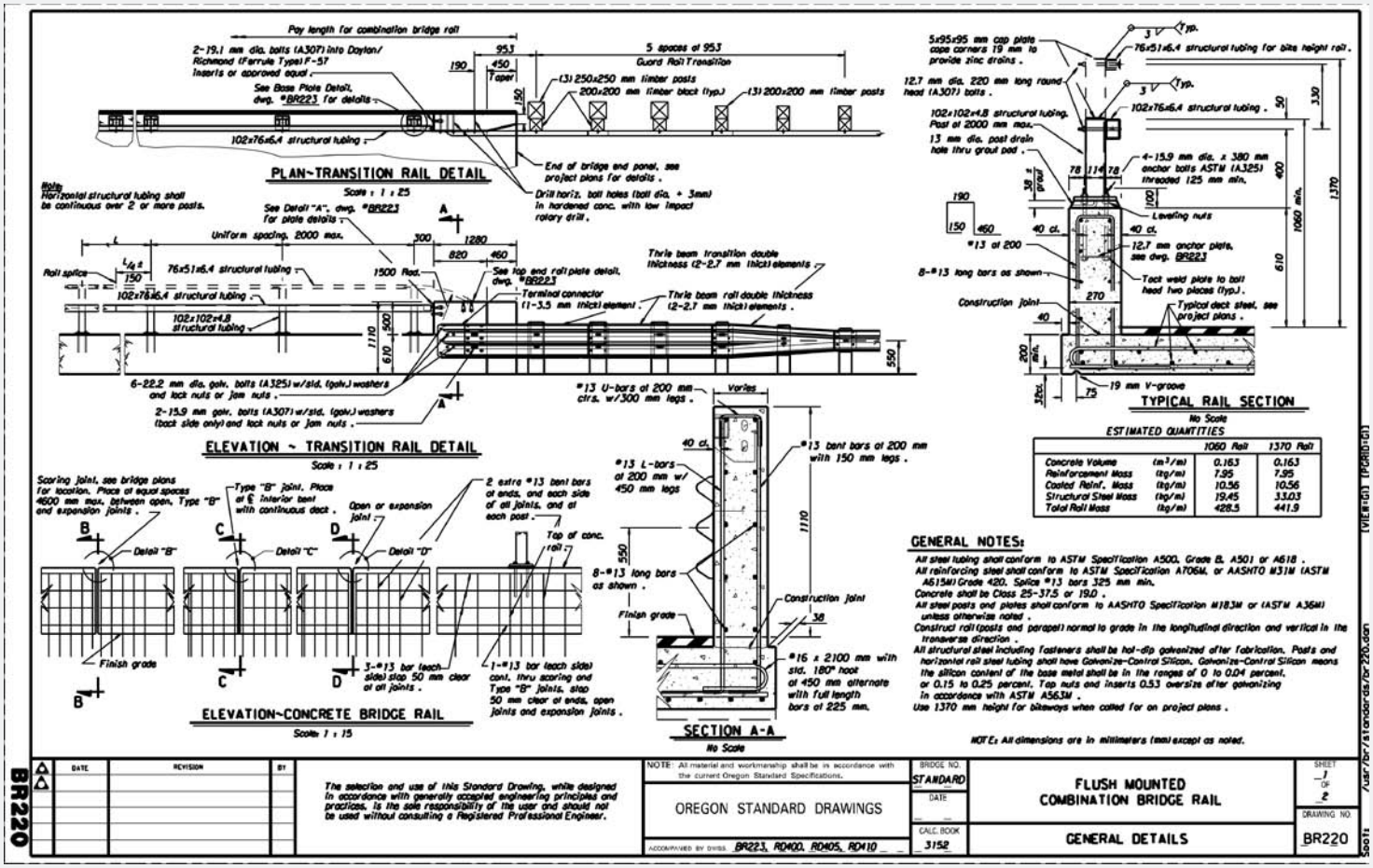
Test level:
TL-4

Utilized in:
Oregon

Contact:
Antony P. Stratis, P.E.
Tech Center Bridge Manager
Region 1
123 NW Flanders Street
Portland, OR 97209
(503) 731-8490

Vertical Concrete Parapet

Parapet Sidewalk Mount



New Jersey Barrier with Rail

Type T501SW

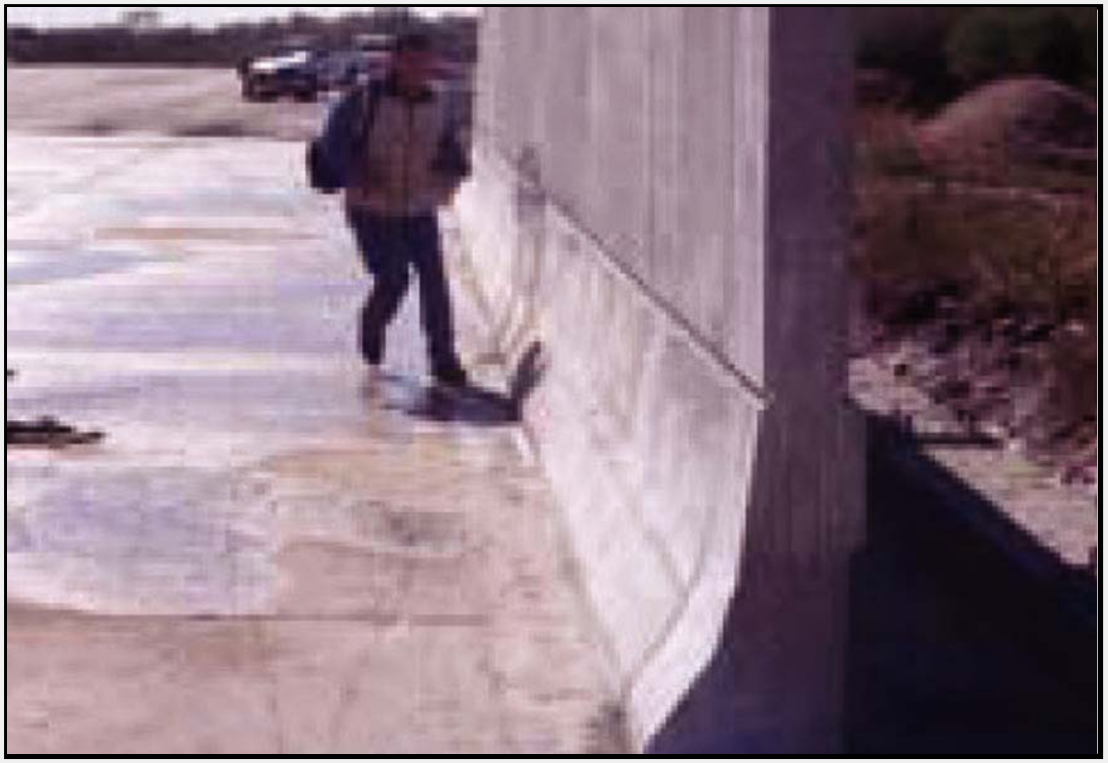
Height:
72"

Cost per linear foot:
$107

Test level:
TL-4

Utilized in:
Texas

Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178



New Jersey Barrier with Rail

Type T501SW

Plans Not Yet Available.

Vertical Concrete Parapet

Type C411

Height:
42"

Cost per linear foot:
$75

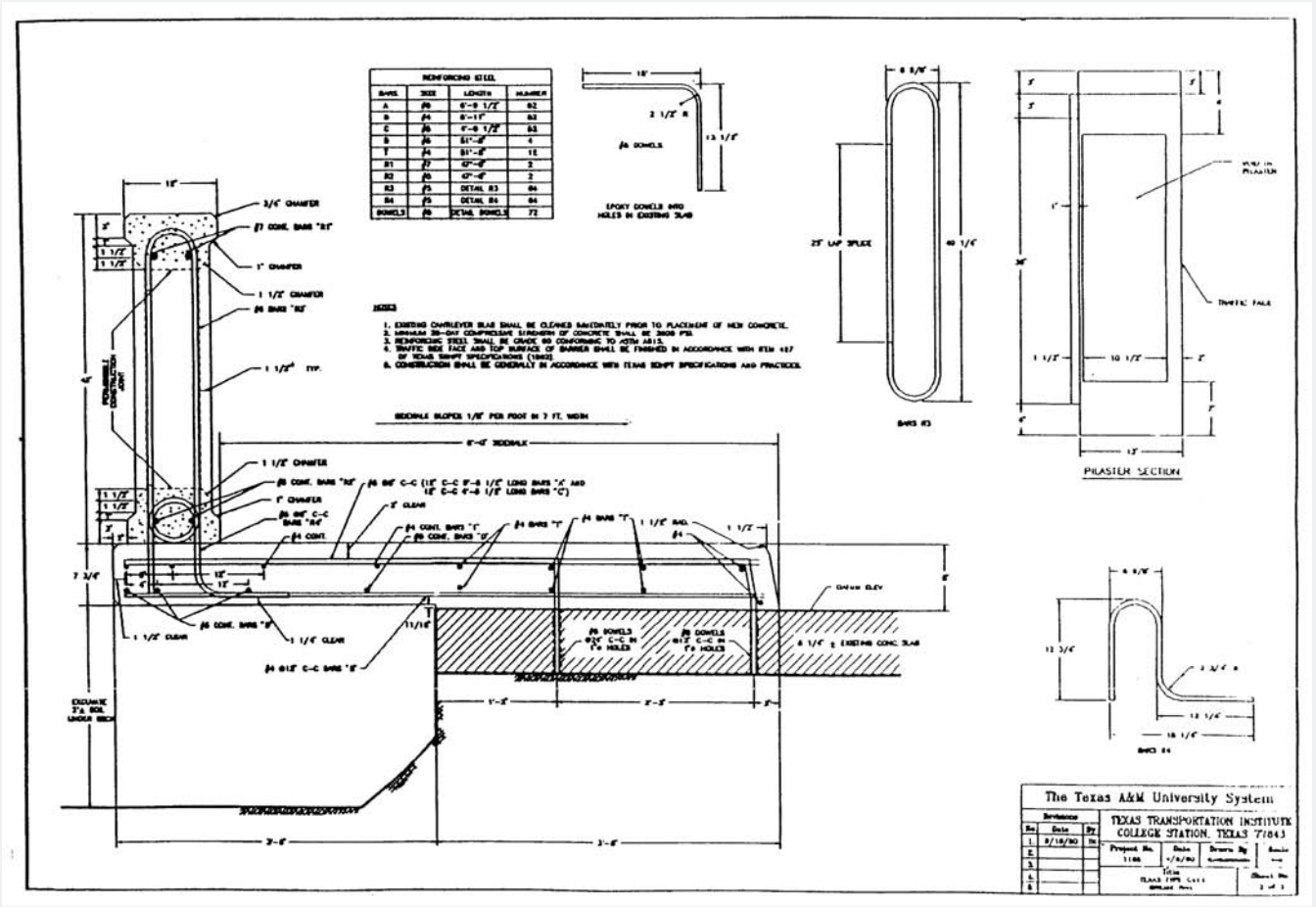
Test level:
TL-2

Utilized in:
Texas

Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178

Vertical Concrete Parapet

Type C411



Vertical Concrete Parapet

Type T203

Height:
27"

Cost per linear foot:
$38

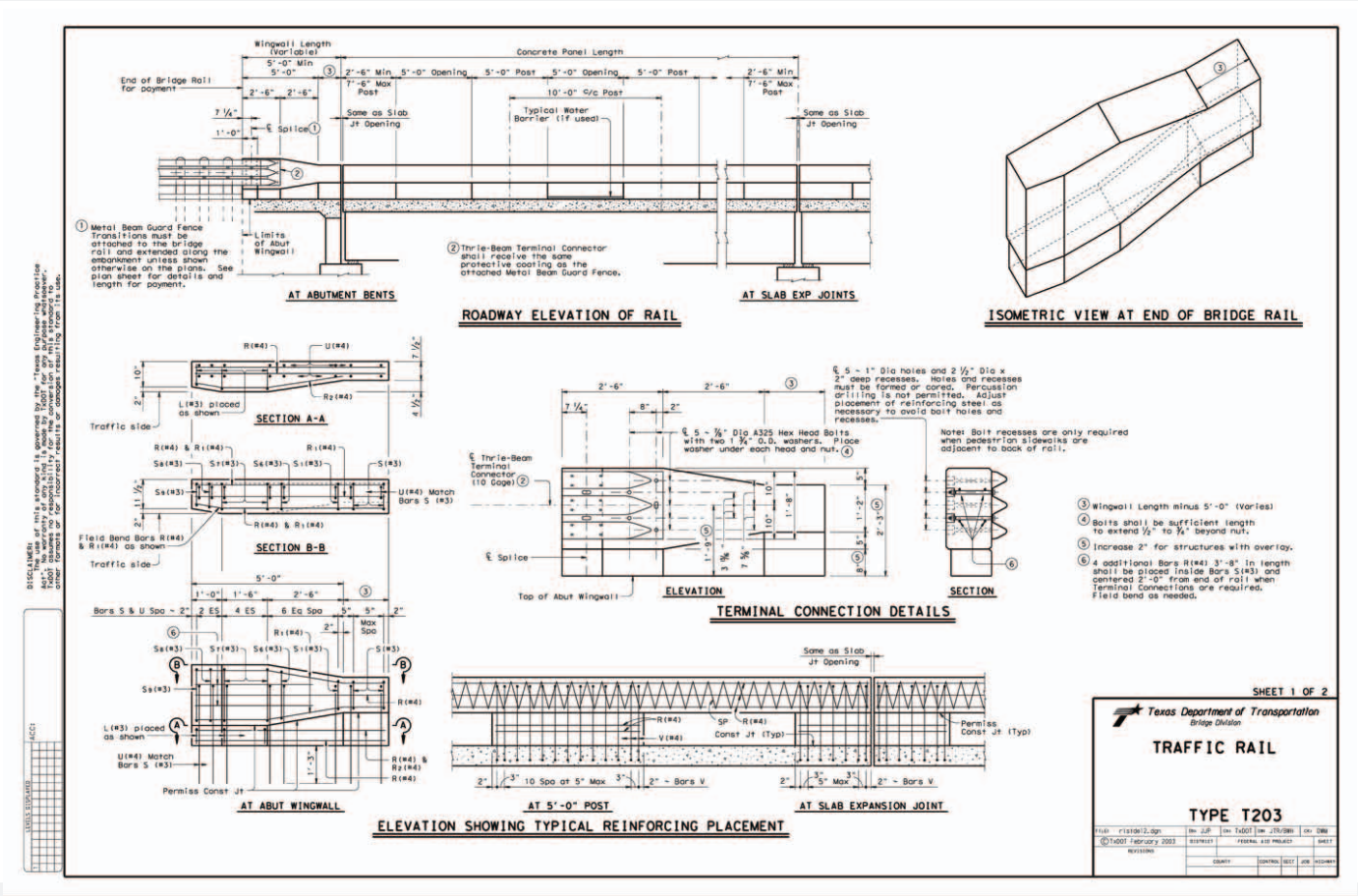
Test level:
TL-3

Utilized in:
Texas

Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178

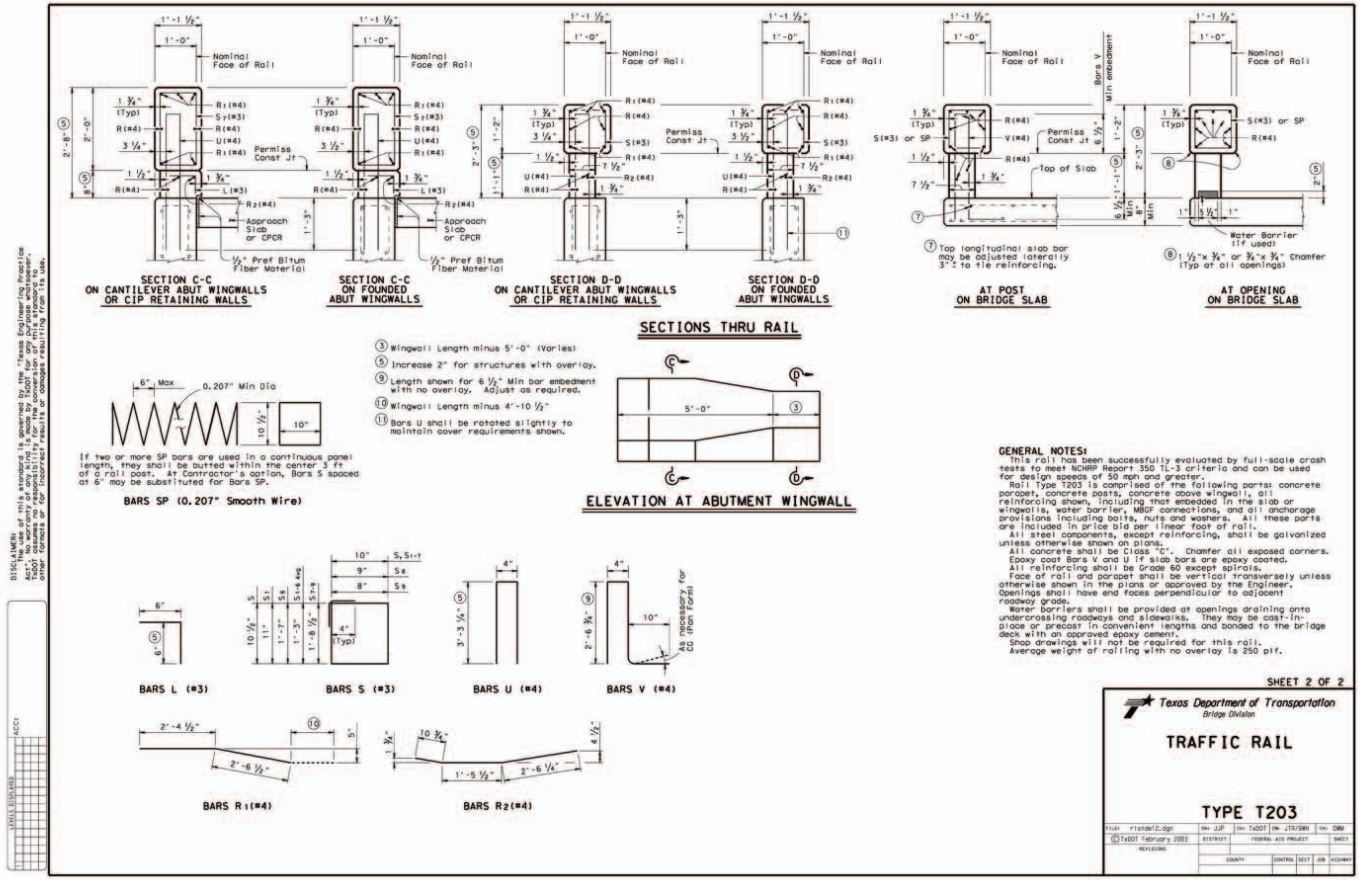
Vertical Concrete Parapet

Type T203



Vertical Concrete Parapet

Type T203



Vertical Concrete Parapet

Texas Type T411 Aesthetic Rail

Height:
32"

Cost per linear foot:
$75

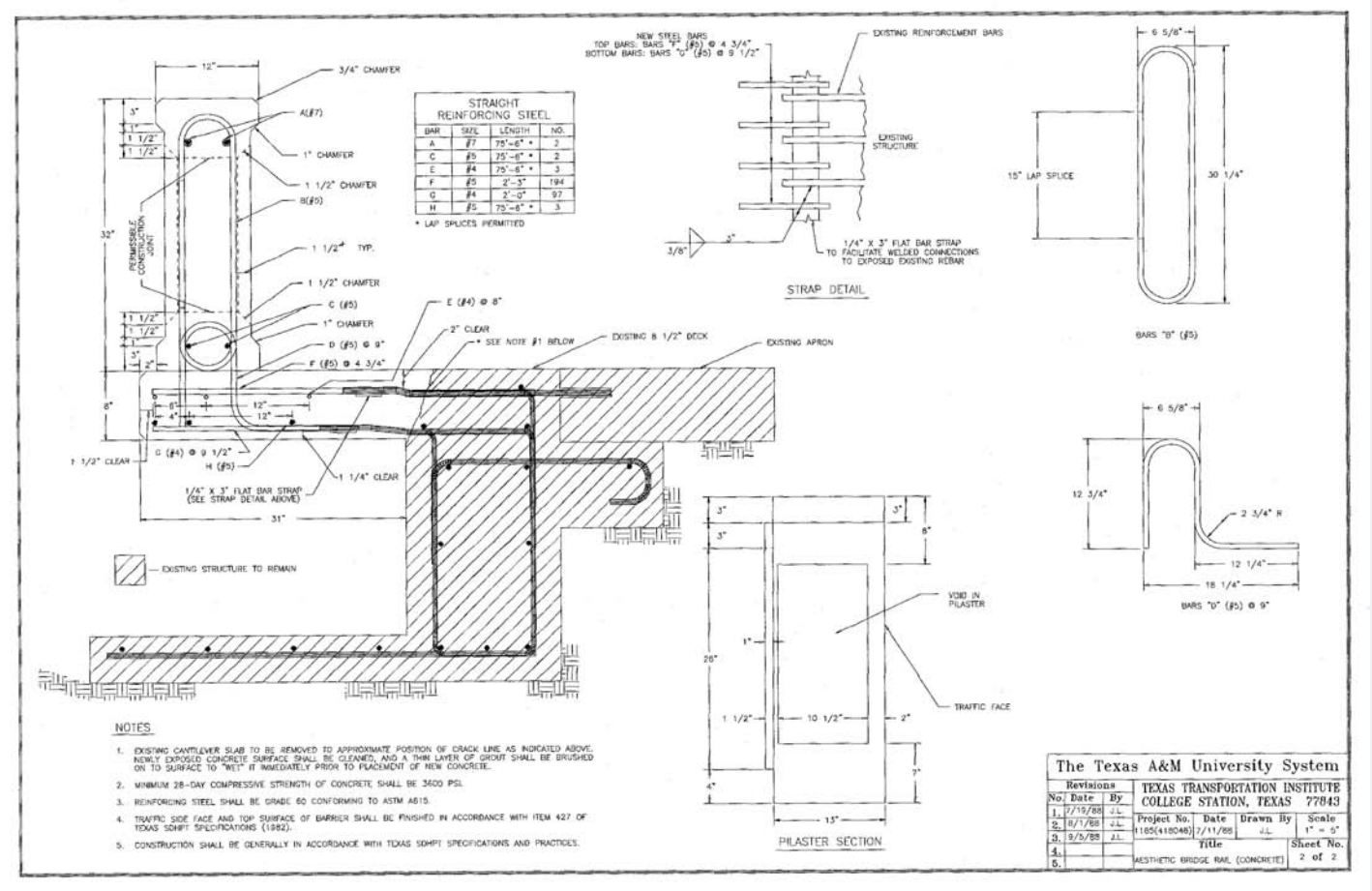
Test level:
TL-2

Utilized in:
Texas

Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178

Vertical Concrete Parapet

Texas Type T411 Aesthetic Rail



Vertical Concrete Parapet

Texas TT Rail

Height:
90"

Cost per linear foot:
$250

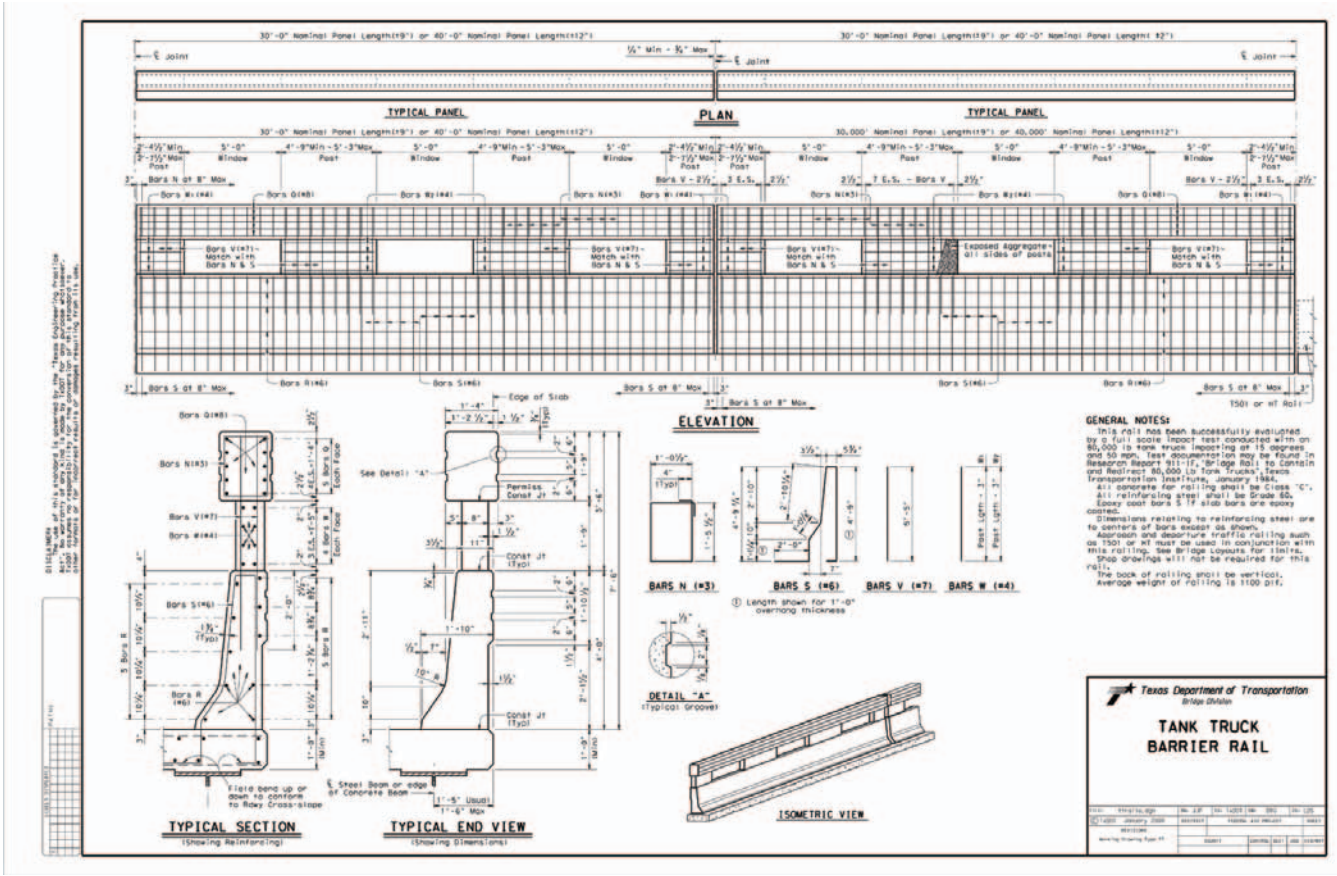
Test level:
TL-6

Utilized in:
Texas

Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178

Vertical Concrete Parapet

Texas TT Rail



Vertical Concrete Parapet

NJ Barrier

Height:
32"

Cost per linear foot:
$50-55

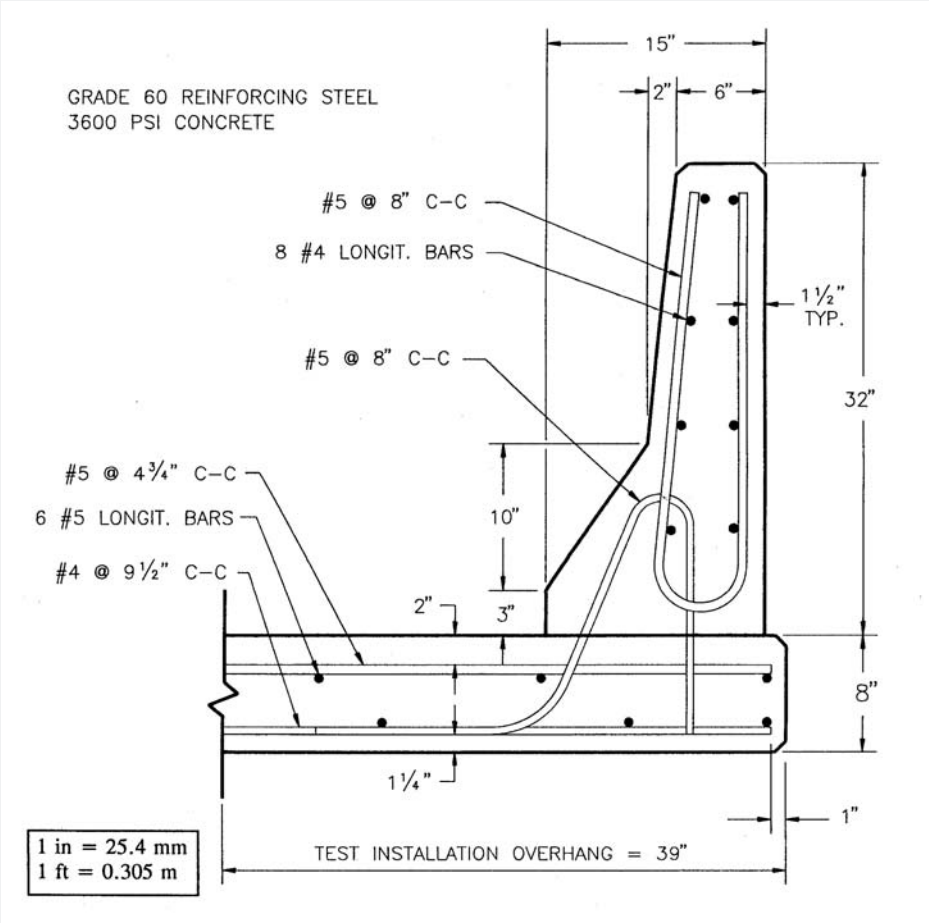
Test level:
TL-4

Utilized in:
Missouri

Contact:
Peter Clogston, P.E.
Federal Highway Admin,
Missouri Division Office, RA118
209 Adams Street
Jefferson City, MO 65101
(573) 638-2613

Vertical Concrete Parapet

NJ Barrier



Vertical Concrete Parapet with Aluminum Tube Bridge Rail

New Jersey Concrete Barrier

Height:
32"

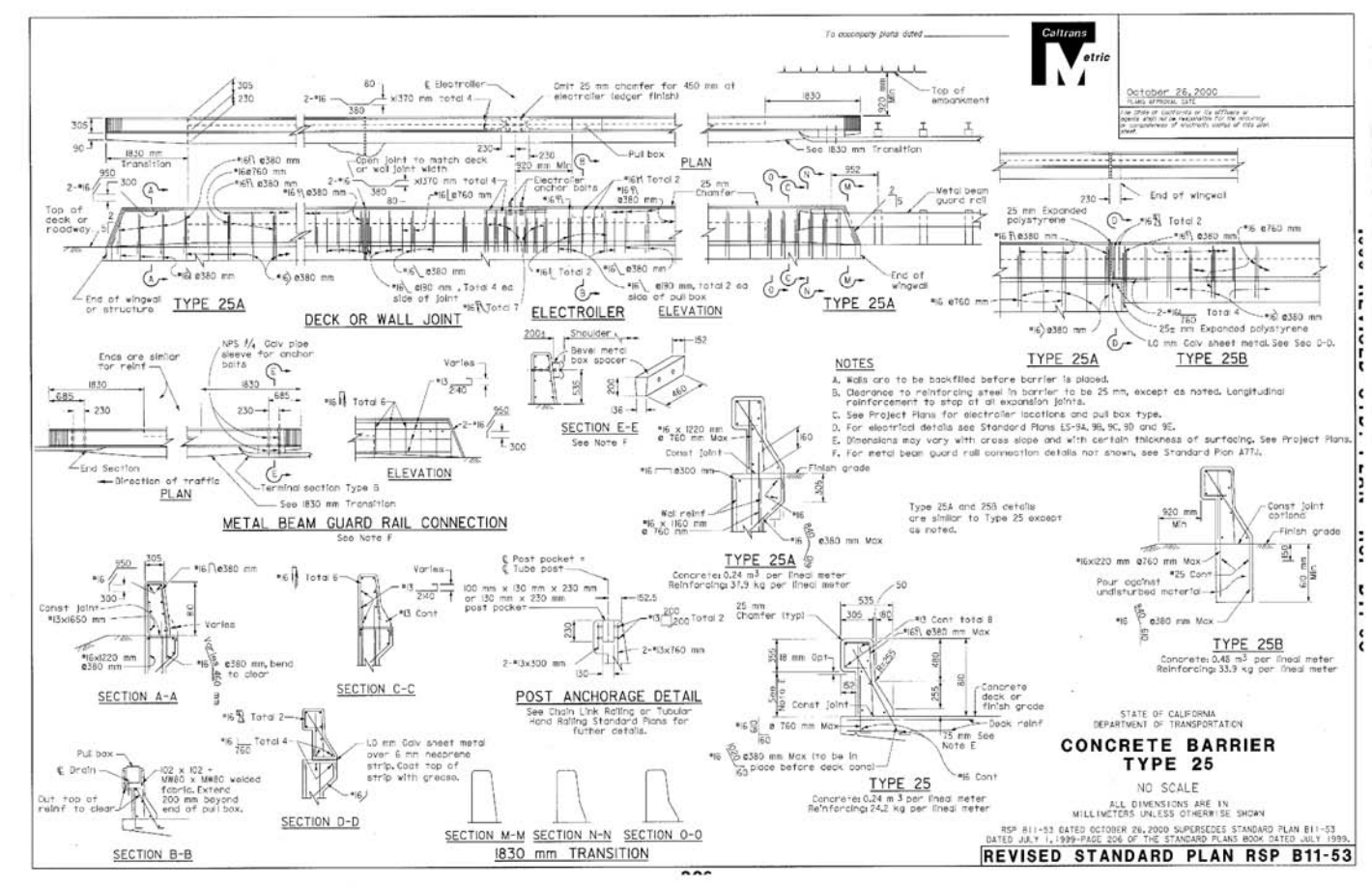
Cost per linear foot:
$50

Test level:
TL-4

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

New Jersey Concrete Barrier



Vertical Concrete Parapet with Aluminum Tube Bridge Rail

Type 26 Concrete Barrier with Sidewalk

Height:
36"

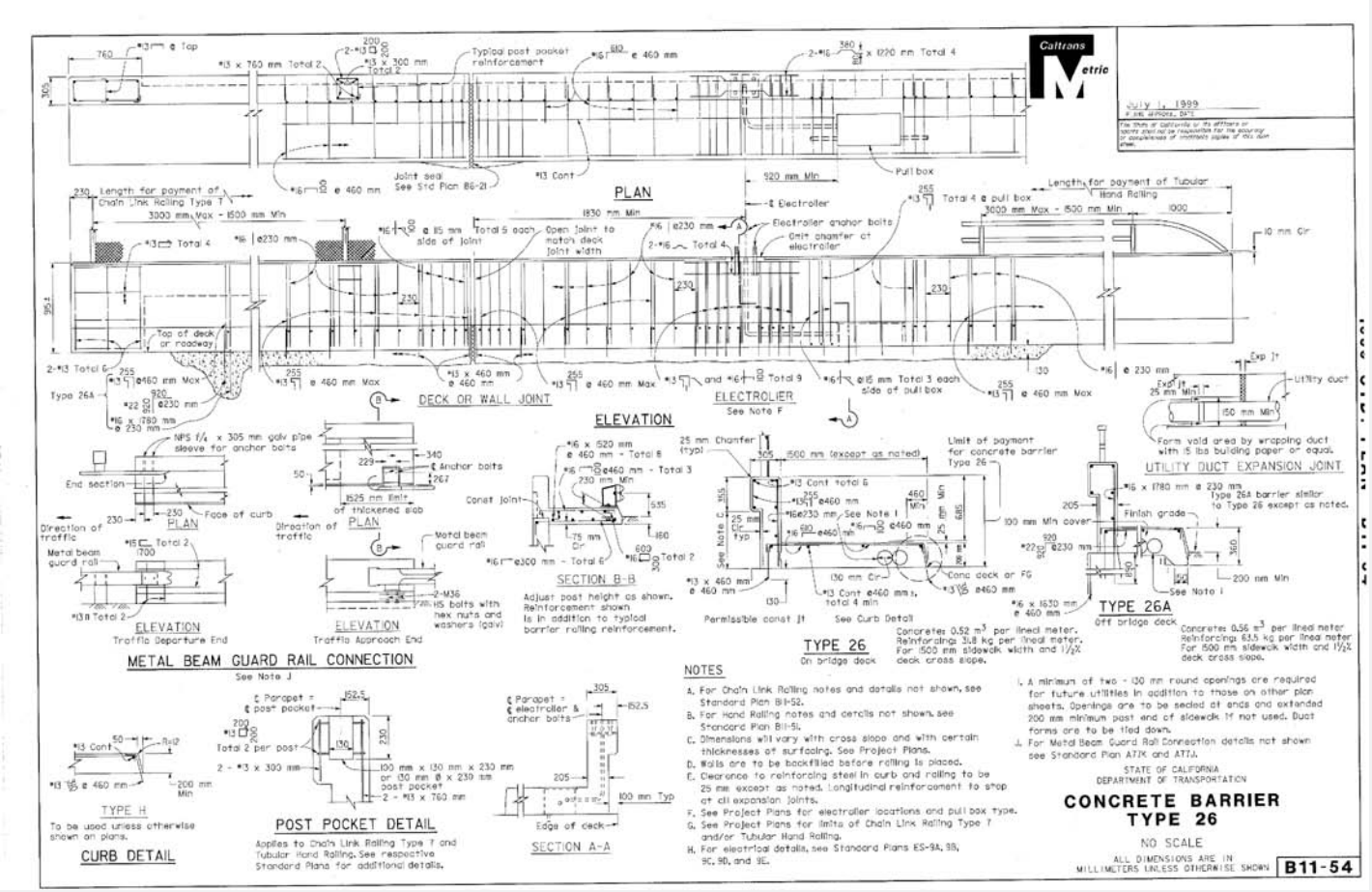
Cost per linear foot:
$90

Test level:
TL-2

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Type 26 Concrete Barrier with Sidewalk



Vertical Concrete Parapet with Aluminum Tube Bridge Rail

Type 732 Concrete Barrier

Height:
32"

Cost per linear foot:
$70

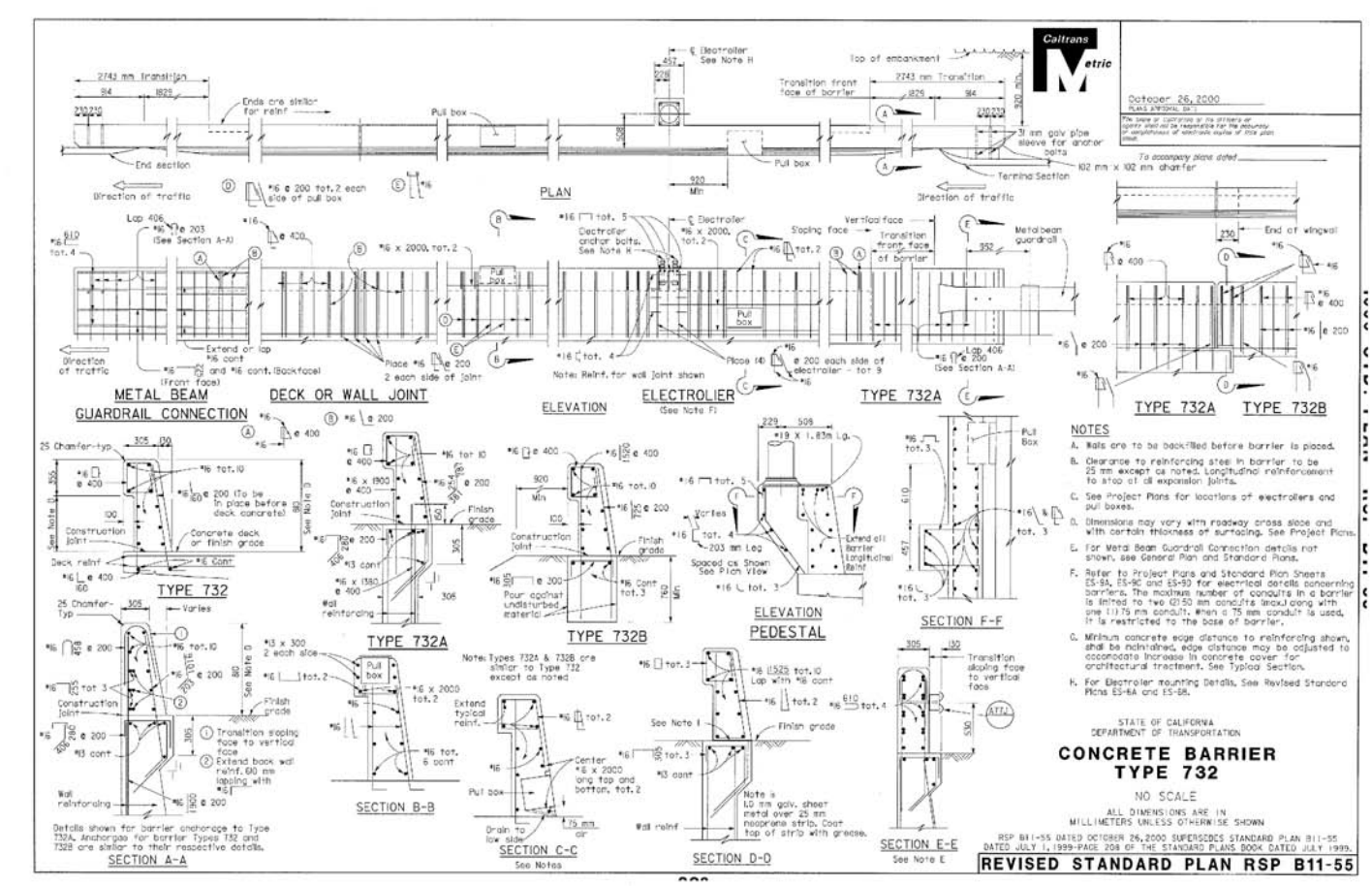
Test level:
TL-4

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Vertical Concrete Parapet with Aluminum Tube Bridge Rail

Type 732 Concrete Barrier



Vertical Concrete Parapet with Aluminum Tube Bridge Rail

Type 736 Concrete Barrier

Height:
36"

Cost per linear foot:
$70

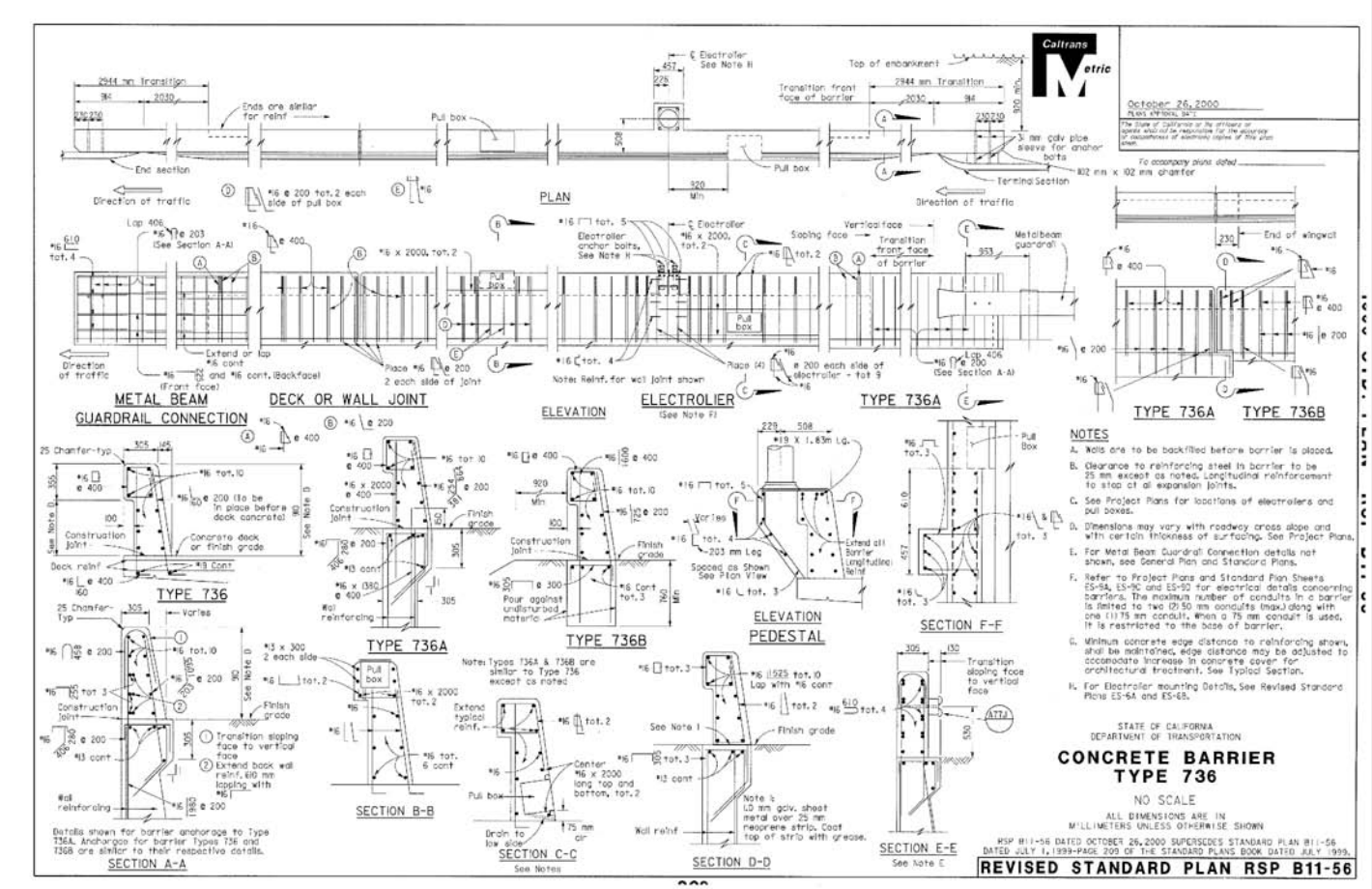
Test level:
TL-4

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Vertical Concrete Parapet with Aluminum Tube Bridge Rail

Type 736 Concrete Barrier



Vertical Concrete Parapet with Aluminum Tube Bridge Rail

Type 742 Concrete Barrier

Height:
42"

Cost per linear foot:
$85

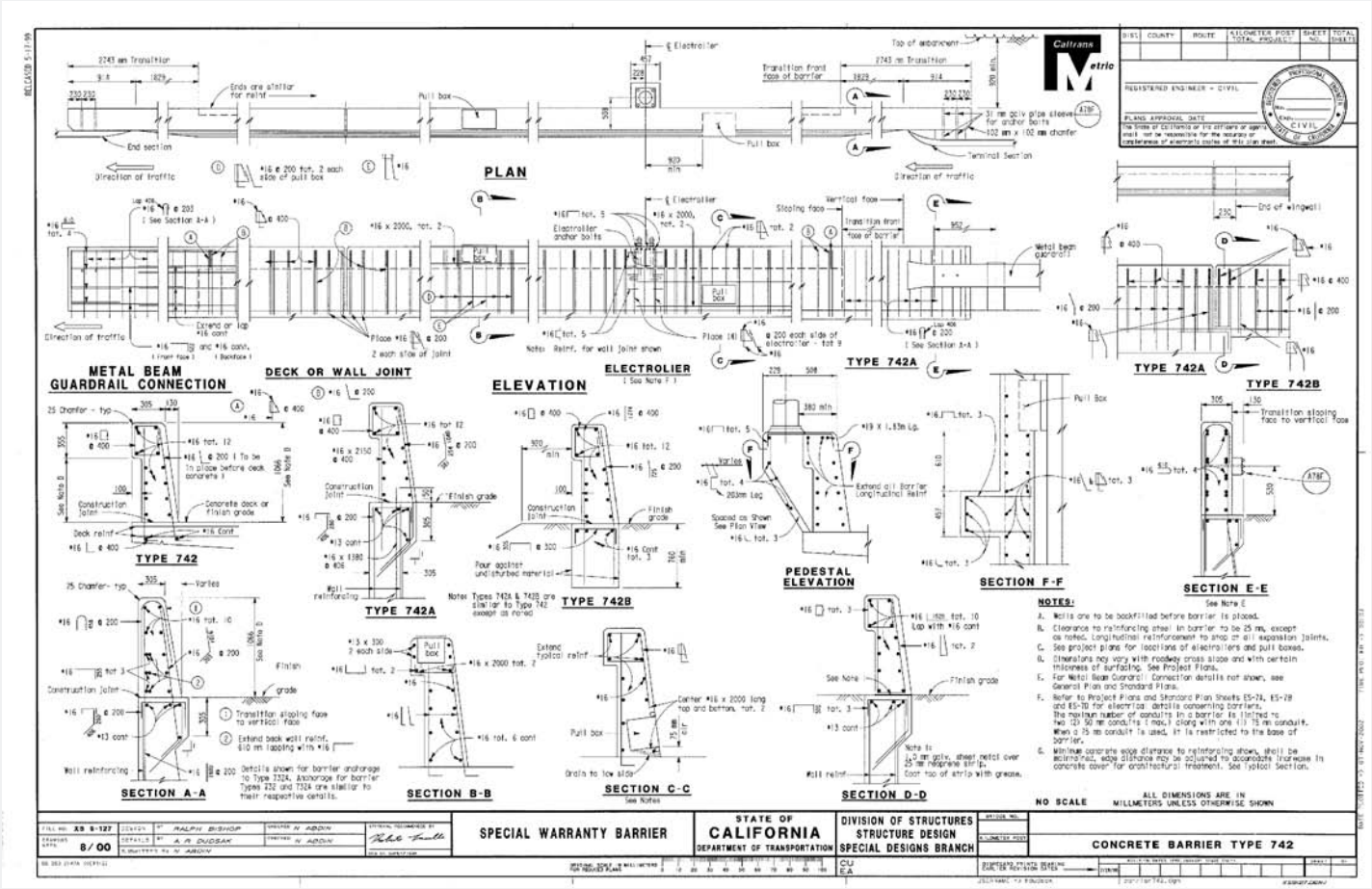
Test level:
TL-5

Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Vertical Concrete Parapet with Aluminum Tube Bridge Rail

Type 742 Concrete Barrier



Aluminum Tube Bridge Rail

LB Foster Precast NJ Shape, Bolted Down

Height:
34"

Cost per linear foot:
$__

Test level:
TL-4

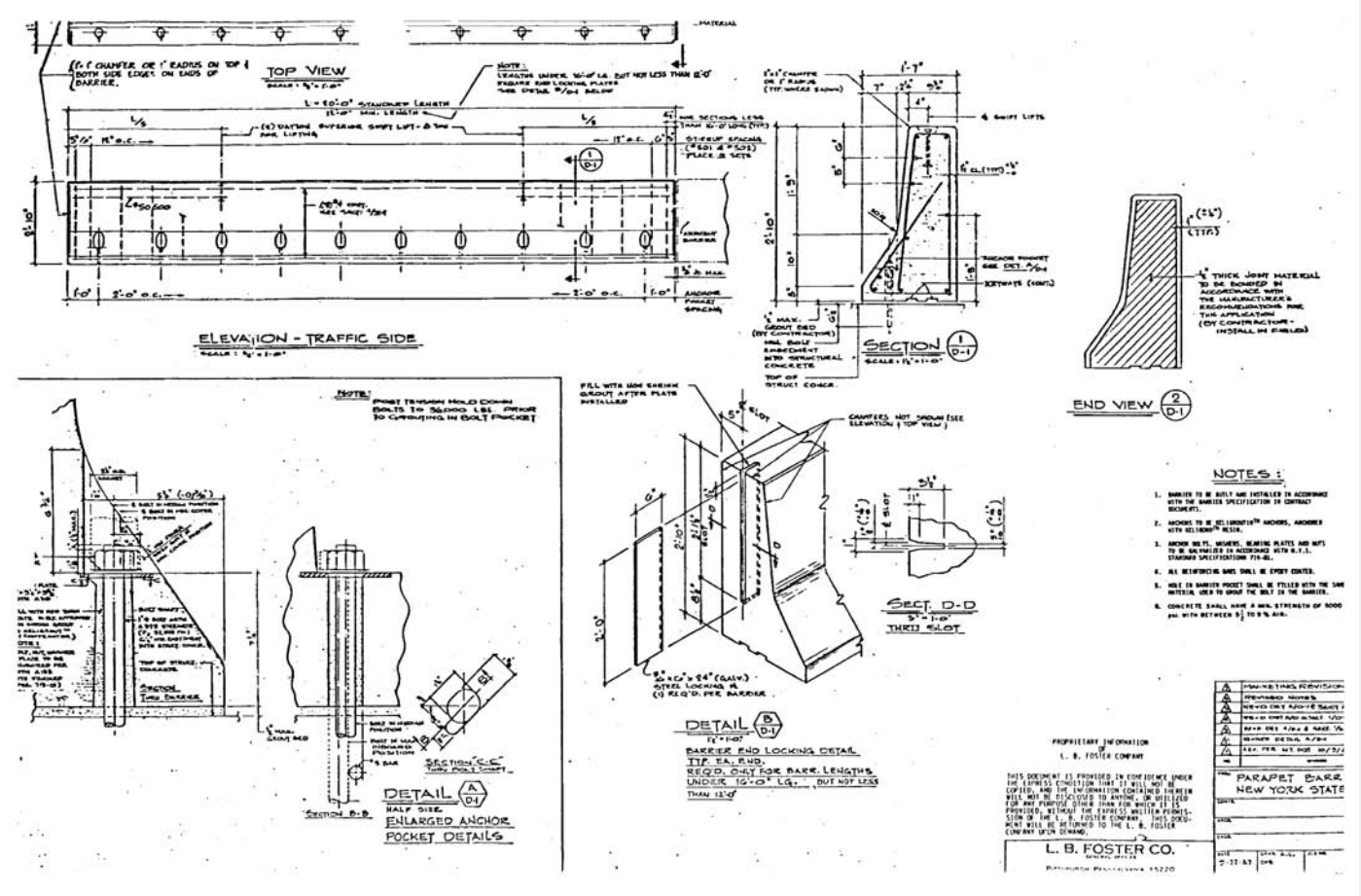
Utilized in:
New Jersey

Contact:
Jose Lopez
New Jersey Dept
of Transportation
1035 Parkway Avenue
Trenton, NJ 08625
(609) 530-2457

Photo Not Yet Available

Aluminum Tube Bridge Rail

LB Foster Precast NJ Shape, Bolted Down



Aluminum Tube Bridge Rail

California Type 20

Height:
39"

Cost per linear foot:
$__

Test level:
TL-3

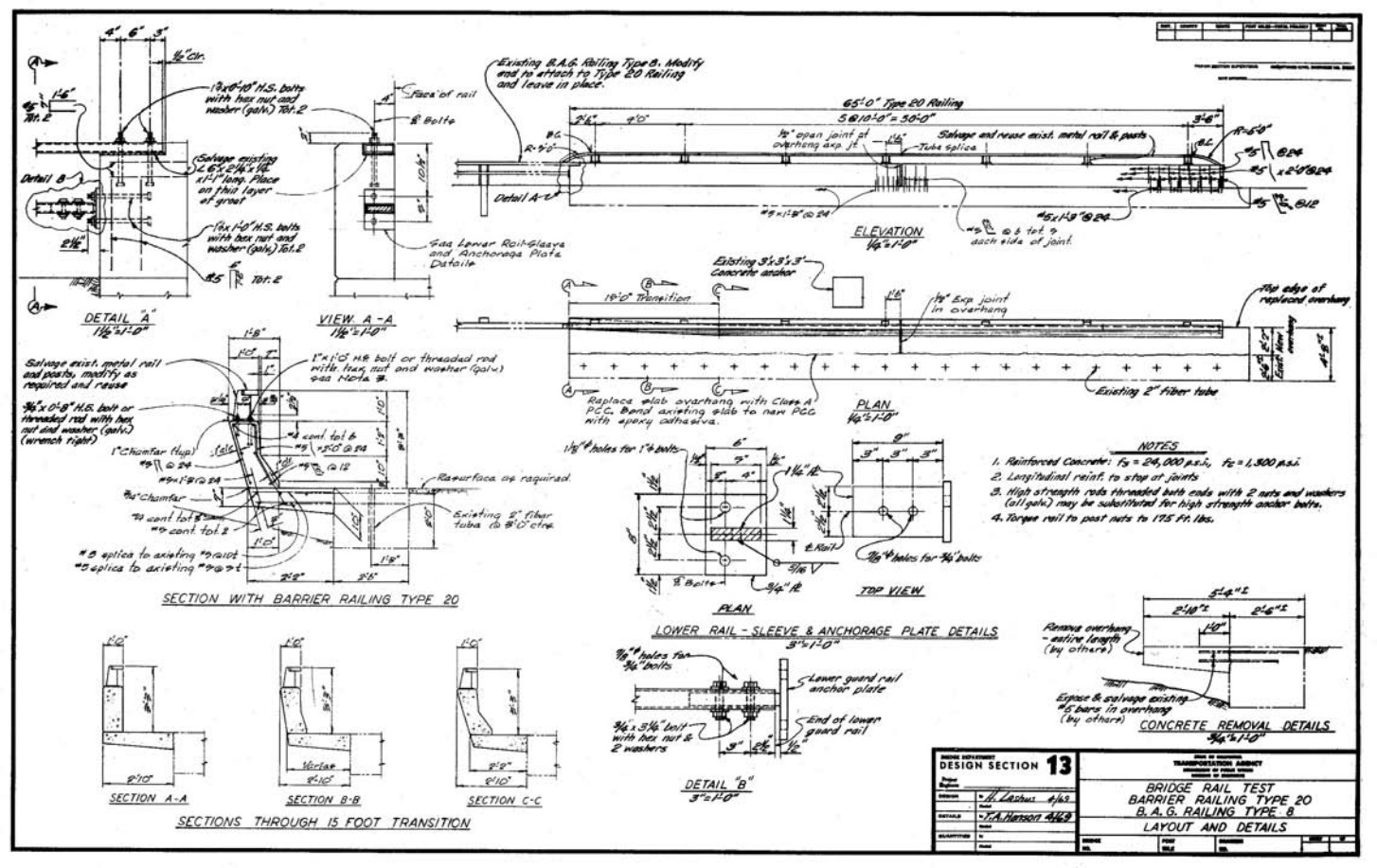
Utilized in:
California

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805

Photo Not Yet Available.

Aluminum Tube Bridge Rail

California Type 20



New Jersey Barrier with Rail

New Jersey Barrier with 22" Steel Bicycle Rail

Height:
54"

Cost per linear foot:
$68

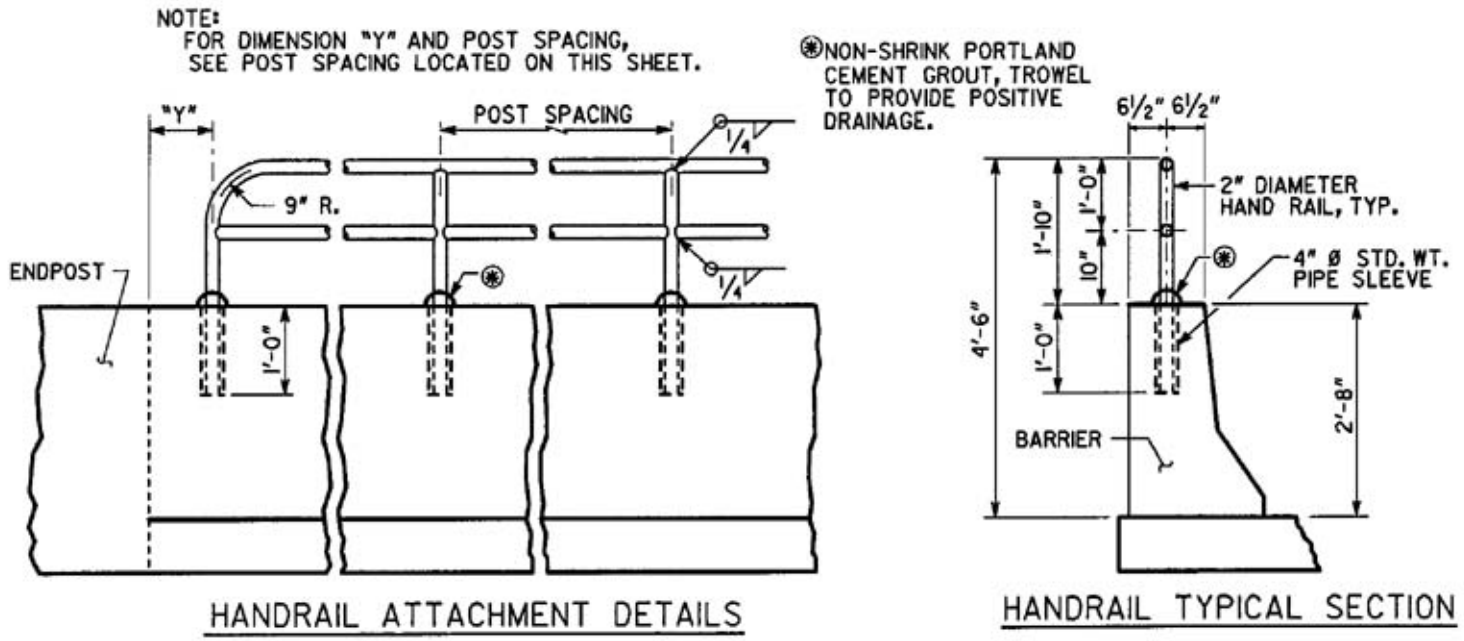
Test level:
TL-4

Utilized in:
Georgia

Contact:
Paul Liles
Georgia Dept of Transportation
No. 2 Capitol Square, SW
Atlanta, GA 30334
(404) 656-5280

New Jersey Barrier with Rail

New Jersey Barrier with 22" Steel Bicycle Rail



New Jersey Concrete Barrier with 1'-10" Steel Bicycle Rail

New Jersey Barrier with Rail

Bicycle Rail Attachment to Safety Shape Concrete Rail

Height:
54.5"

Cost per linear foot:
$75

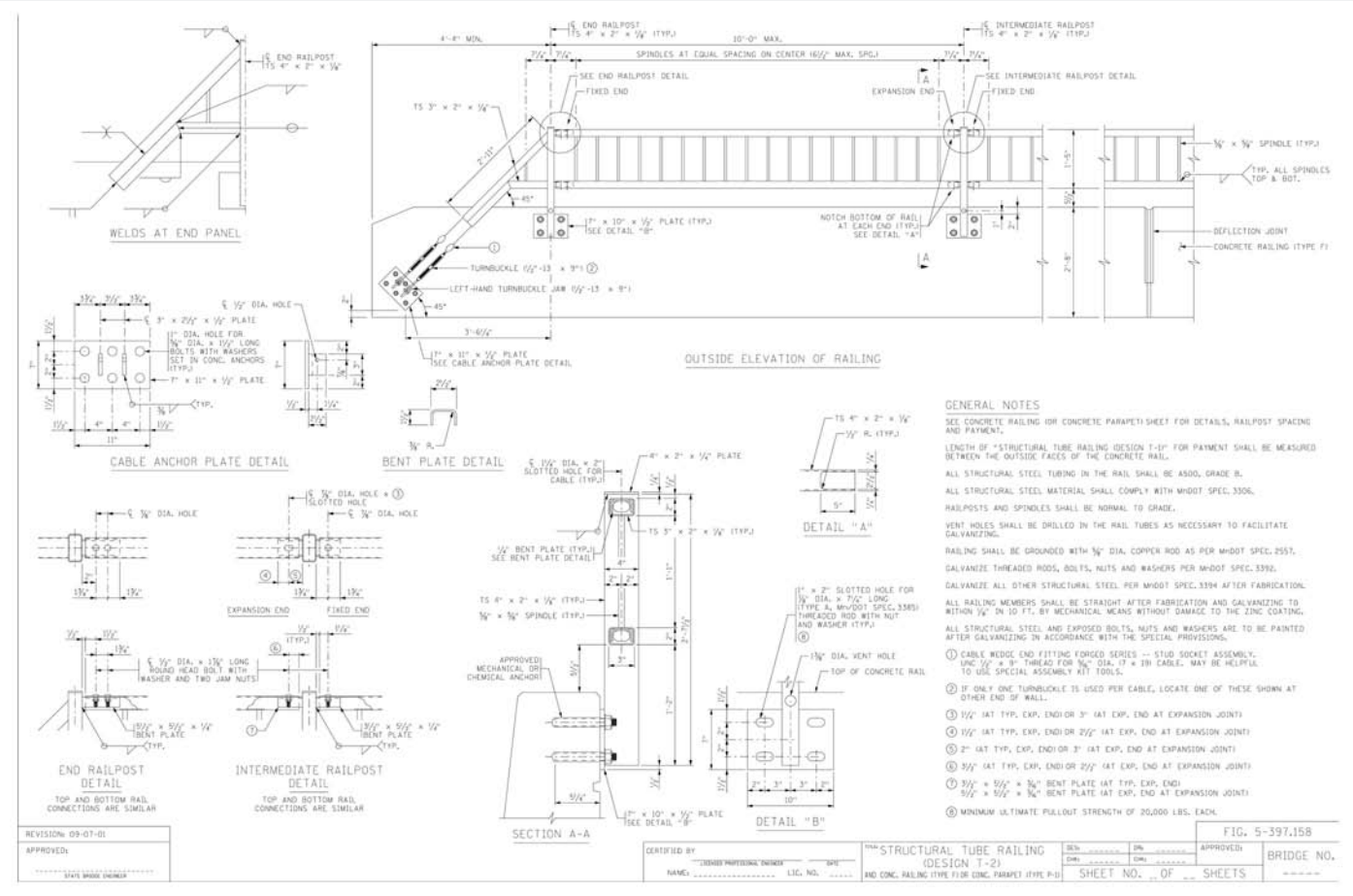
Test level:
TL-4

Utilized in:
Minnesota

Contact:
Raymond Cekalla
Minnesota DOT Bridge Office
3485 Hadley Avenue North
Mail Stop 610
Oakdale, MN 55128-3307
(651) 747-2172

New Jersey Barrier with Rail

Bicycle Rail Attachment to Safety Shape Concrete Rail



New Jersey Barrier with Rail

New Jersey Safety Shape Parapet

Height:
39"

Cost per linear foot:
$__

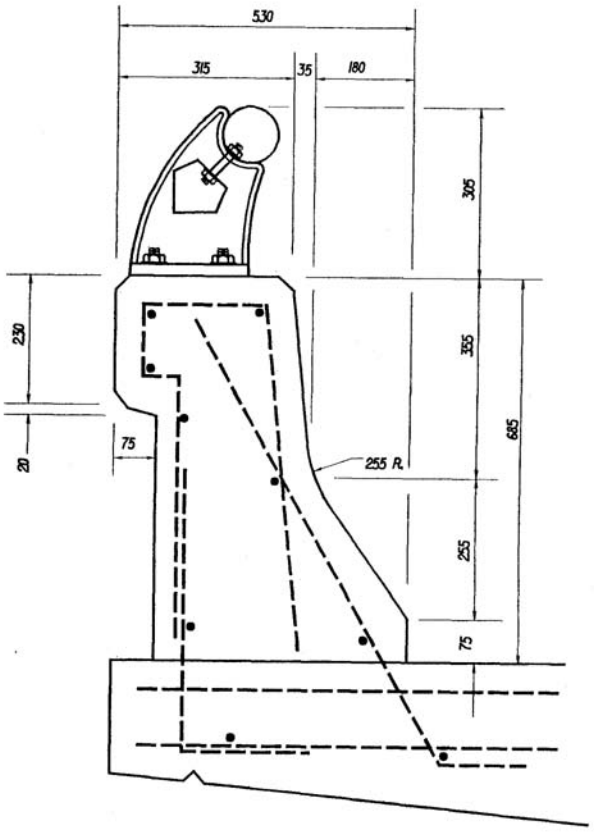
Test level:
TL-4

Utilized in:
Nevada

Contact:
Bill Crawford
Nevada Dept of Transportation
1263 South Stewart Street
Room 405
Carson City, NV 89712
(775) 888-7542

New Jersey Barrier with Rail

New Jersey Safety Shape Parapet



Rail Height			990 mm
Test Vehicle	868-kg Car	2111-kg Car	18,160-kg Bus
Impact Speed km/h	98	99	95
Impact Angle Degrees	19.3	24.9	16.4

All Dimensions Shown Are mm unless Otherwise Noted.

New Jersey Barrier with Rail

Type HT

Height:
50"

Cost per linear foot:
$95

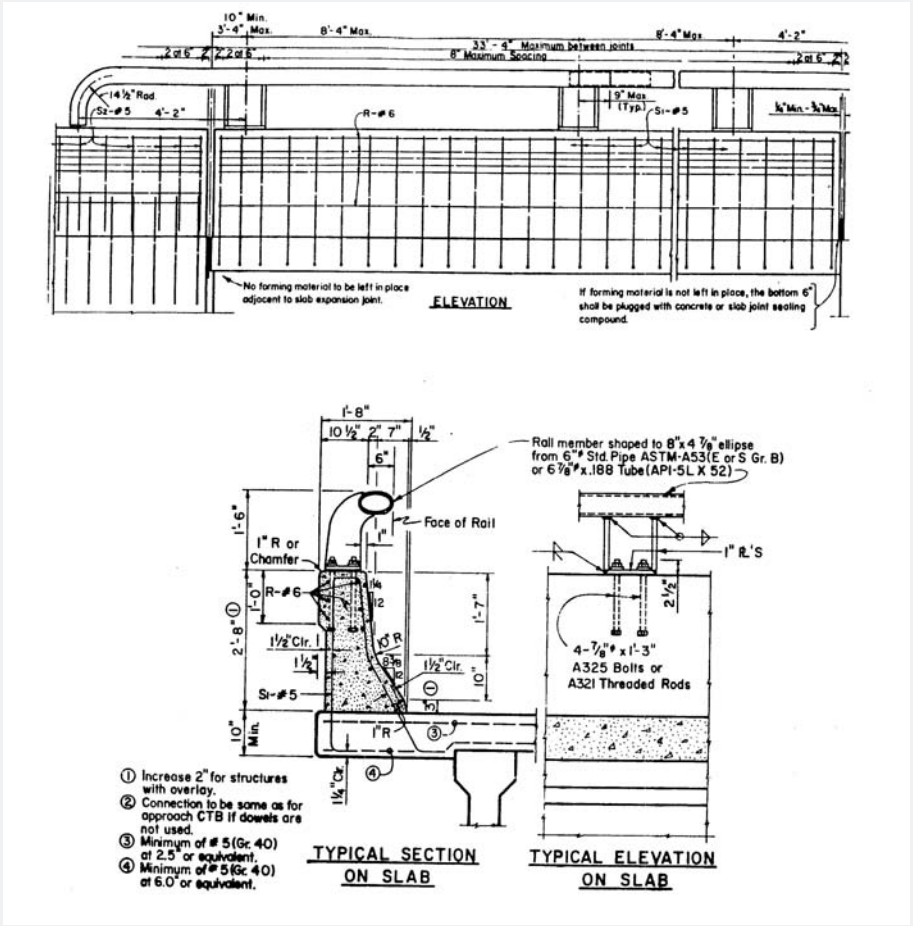
Test level:
TL-5

Utilized in:
Texas

Contact:
Mark Bloschock
Texas DOT Bridge Division
RA118
125 E. 11th Street
Austin, TX 78701-2483
(512) 416-2178

New Jersey Barrier with Rail

Type HT



Section 5

F-Shape Concrete Barrier

Section 5

F-SHAPE CONCRETE BARRIER

Name	Location	Test Level
32" F-Shape	Florida	TL-4
42" F-Shape	Florida	TL-5
Soundwall/F-Shape	Florida	TL-4
Vertical Face Guide, 34" Retrofit	Florida	TL-4
Vertical Face Guide, 42" Retrofit	Florida	TL-4

Section 5

F-Shape Concrete Barrier/Single Slope

32" F-Shape

Height:
32"

Cost per linear foot:
$35

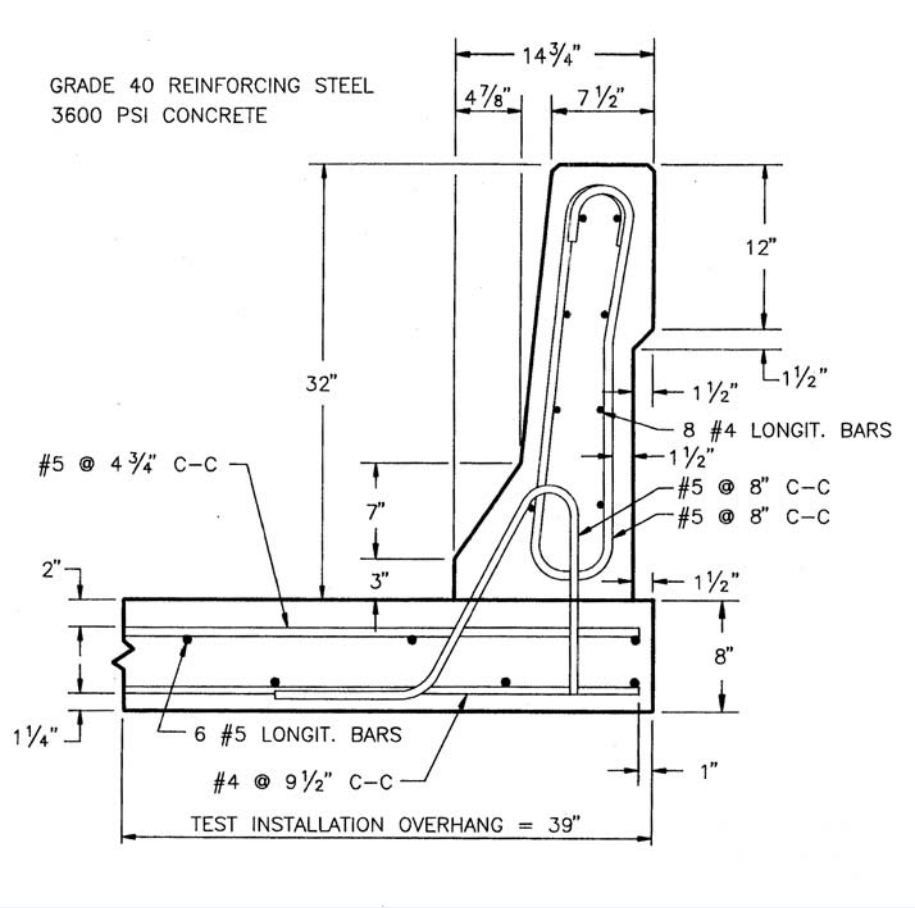
Test level:
TL-4

Utilized in:
Florida

Contact:
Charles Boyd
Florida Dept of Transportation
605 Suwannee Street
Mail Station 33
Tallahassee, FL 32399-0450
(850) 414-4275

F-Shape Concrete Barrier/Single Slope

32" F-Shape



F-Shape Concrete Barrier/Single Slope

42" F-Shape

Height:
42"

Cost per linear foot:
$45

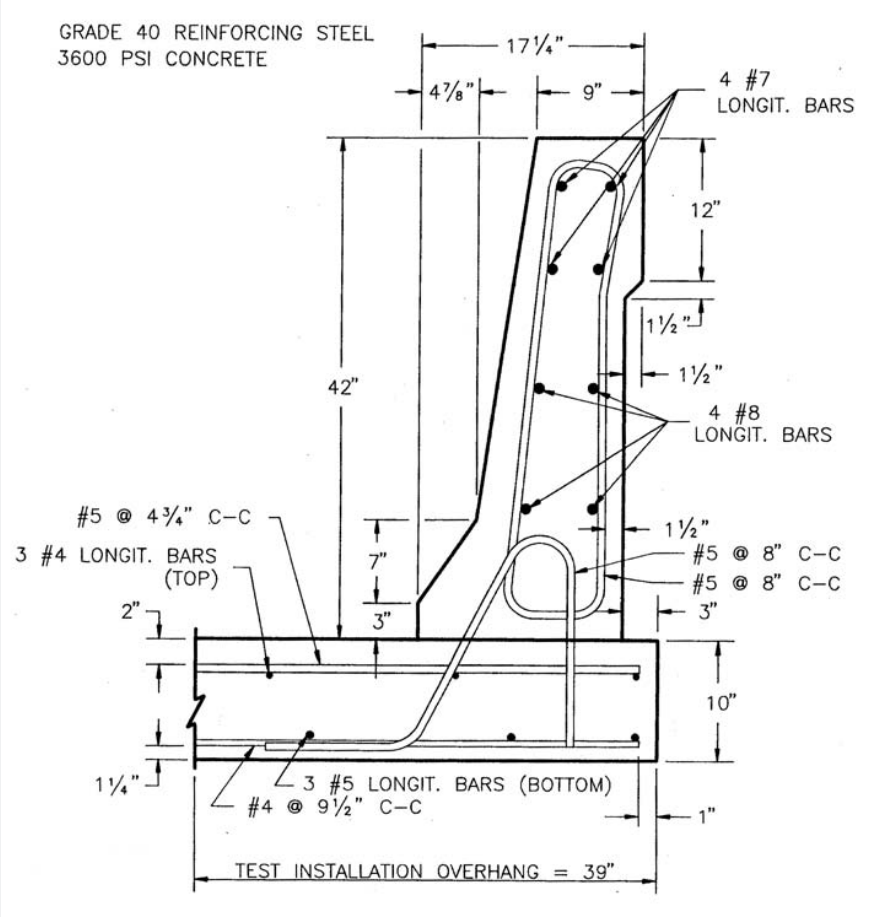
Test level:
TL-5

Utilized in:
Florida

Contact:
Charles Boyd
Florida Dept of Transportation
605 Suwannee Street
Mail Station 33
Tallahassee, FL 32399-0450
(850) 414-4275

F-Shape Concrete Barrier/Single Slope

42" F-Shape



F-Shape Concrete Barrier/Single Slope

Soundwall/F-Shape

Height:
8'

Cost per linear foot:
$200

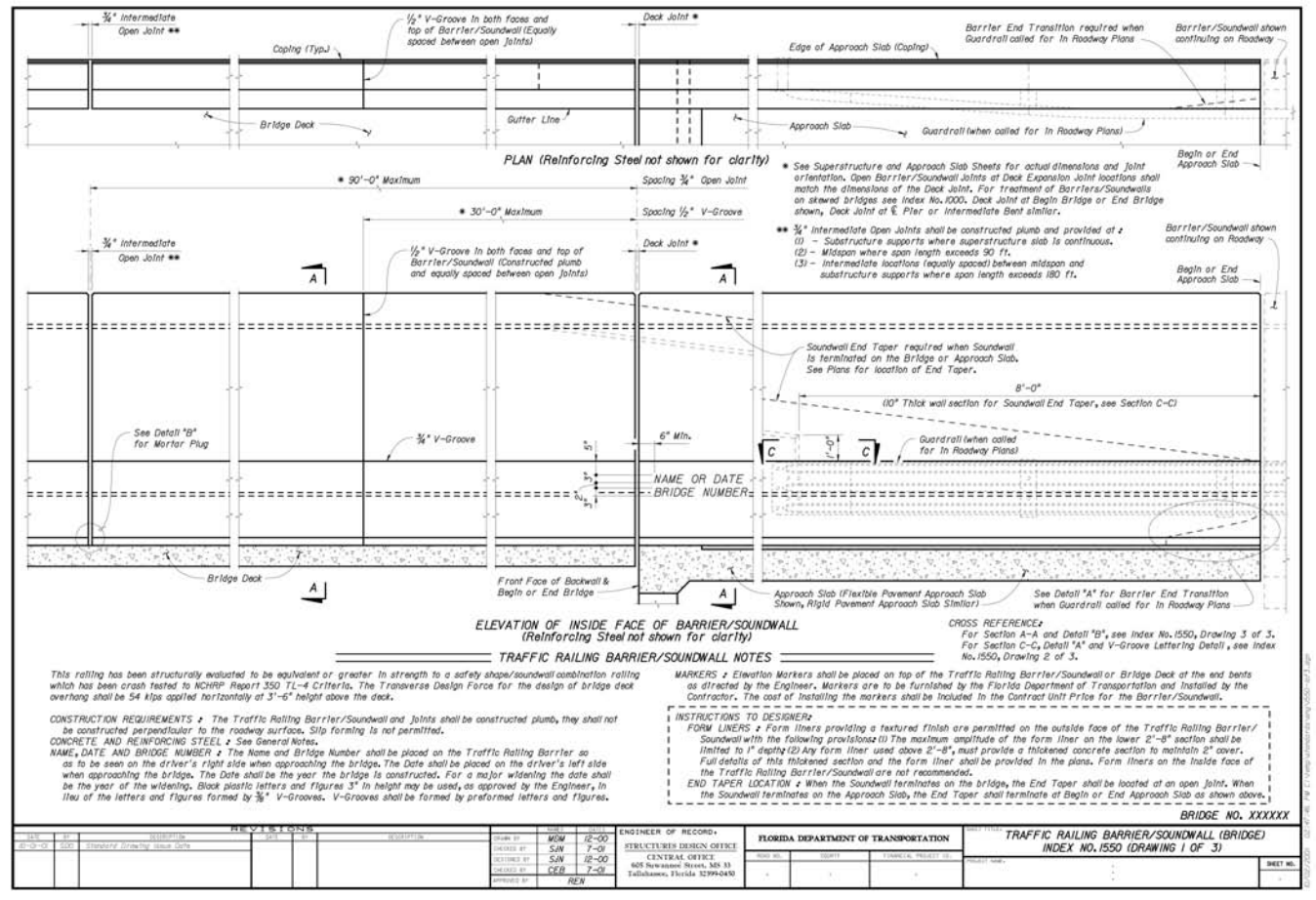
Test level:
TL-4

Utilized in:
Florida

Contact:
Charles Boyd
Florida Dept of Transportation
605 Suwannee Street
Mail Station 33
Tallahassee, Fl 32399-0450
(850) 414-4275

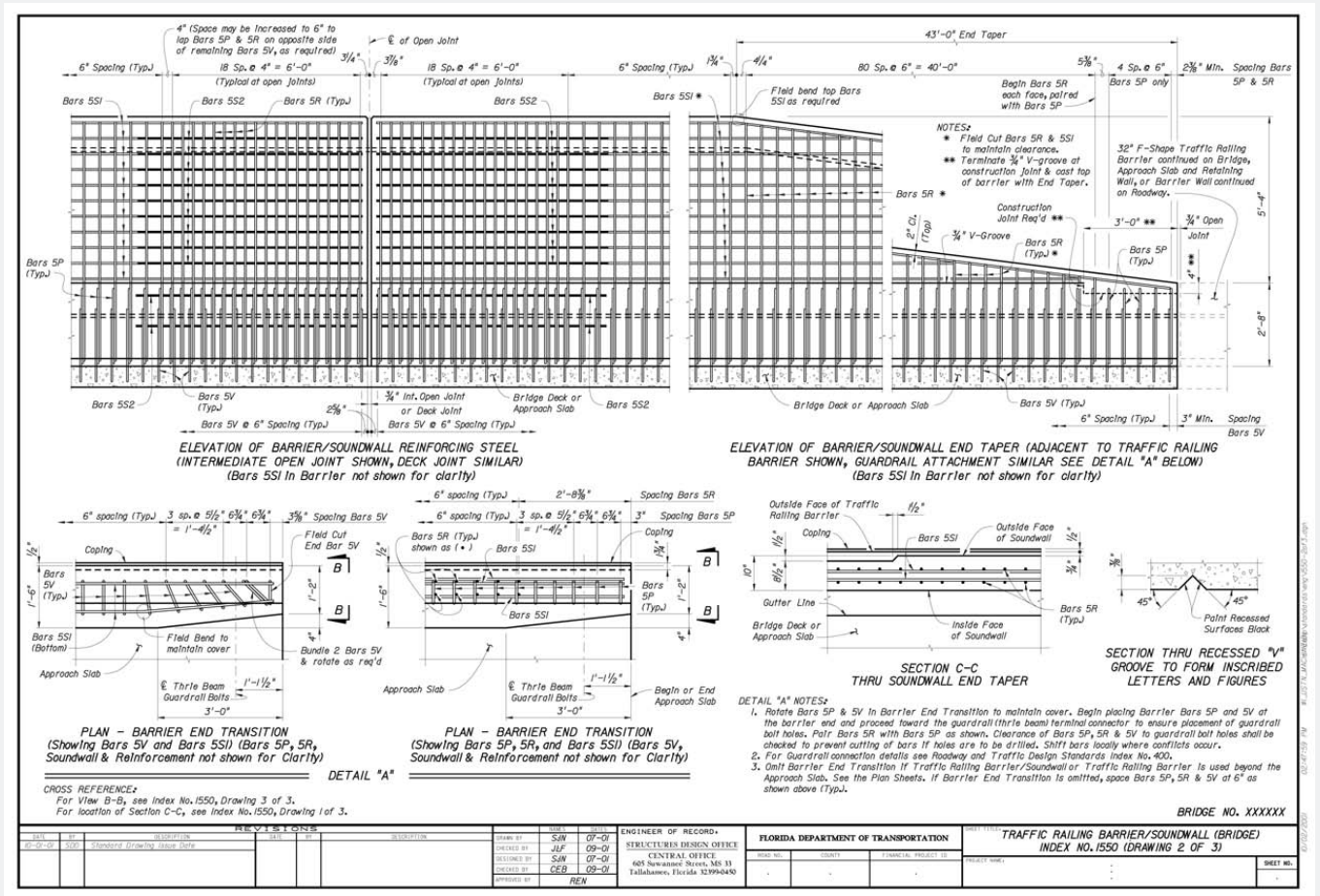
F-Shape Concrete Barrier/Single Slope

Soundwall/ F-Shape



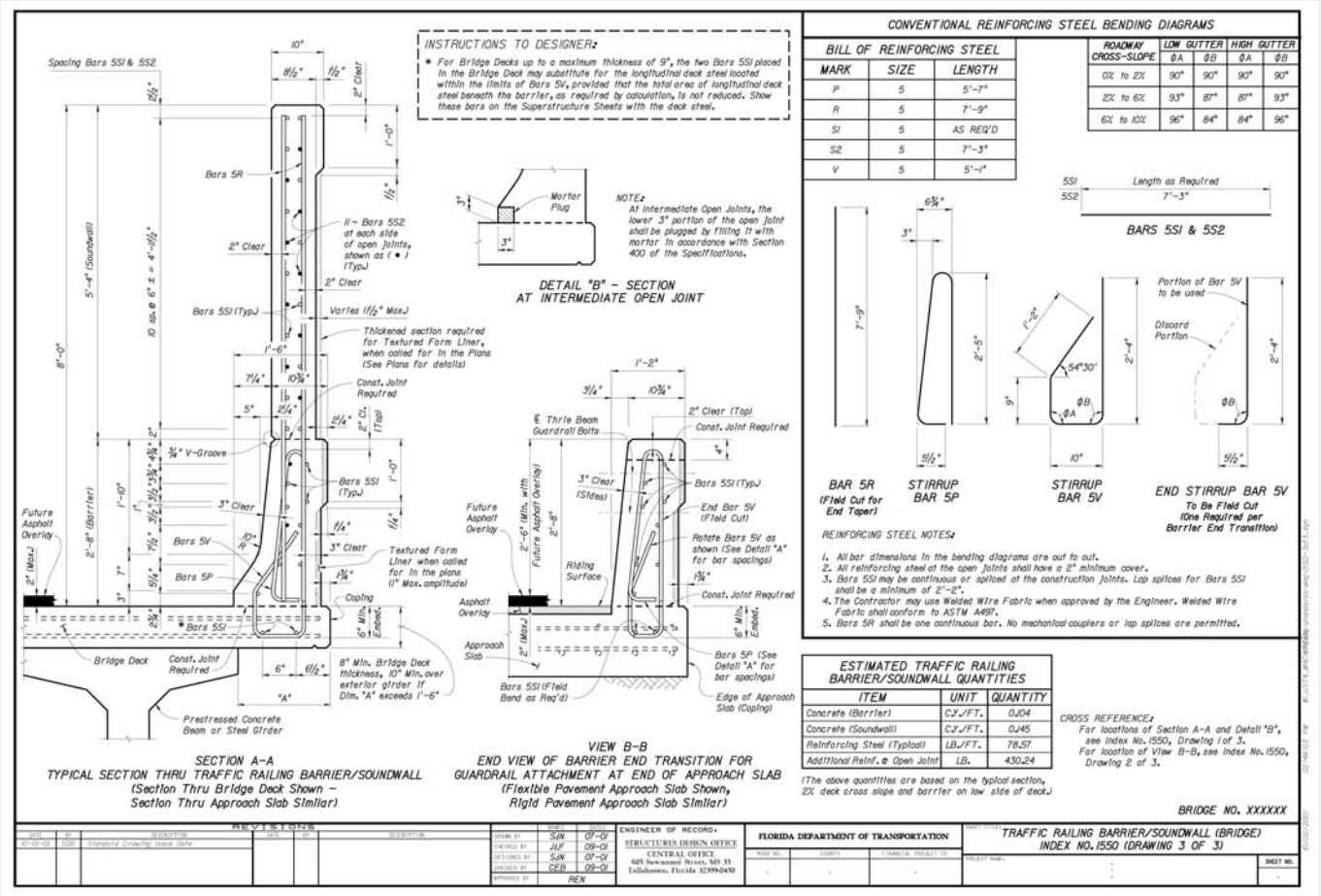
F-Shape Concrete Barrier/Single Slope

Soundwall/ F-Shape



F-Shape Concrete Barrier/Single Slope

Soundwall/ F-Shape



F-Shape Concrete Barrier/Single Slope

Vertical Face Guide, 34" Retrofit

Height:
34"

Cost per linear foot:
$40

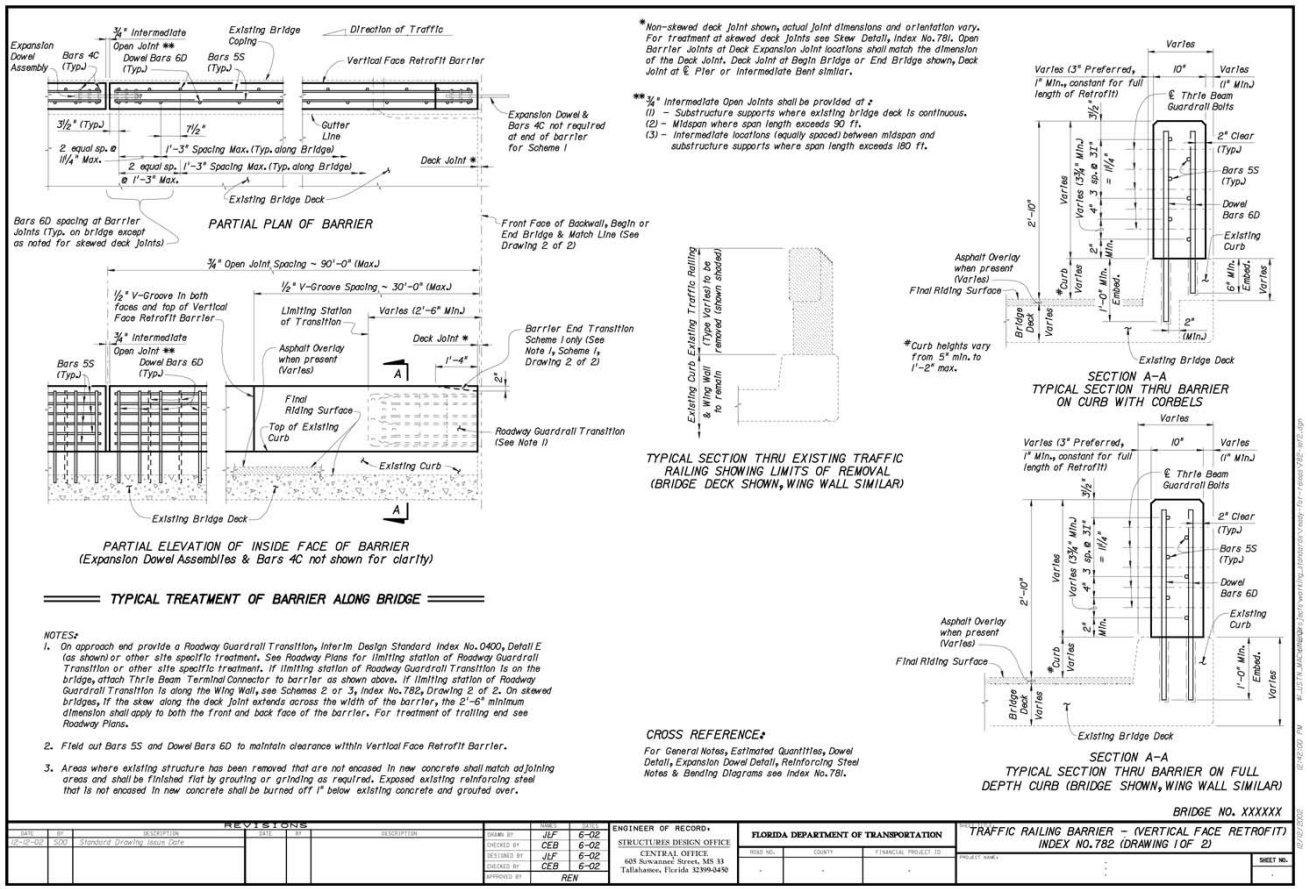
Test level:
TL-4

Utilized in:
Florida

Contact:
Charles Boyd
Florida Dept of Transportation
605 Suwannee Street
Mail Station 33
Tallahassee, FL 32399-0450
(850) 414-4275

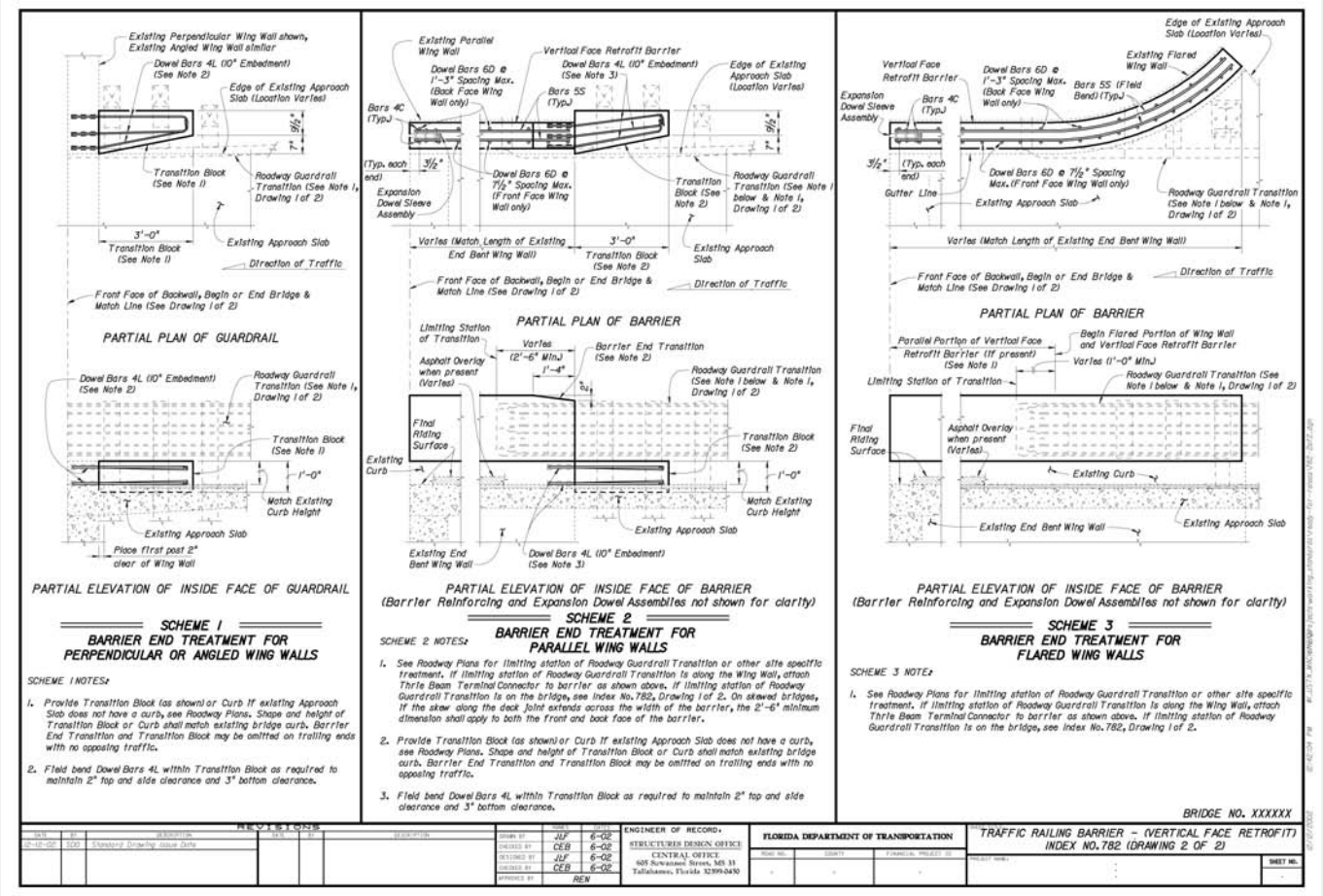
F-Shape Concrete Barrier/Single Slope

Vertical Face Guide, 34" Retrofit



F-Shape Concrete Barrier/Single Slope

Vertical Face Guide, 34" Retrofit



F-Shape Concrete Barrier/Single Slope

Vertical Face Guide, 42" Retrofit

Height:
42"

Cost per linear foot:
$55

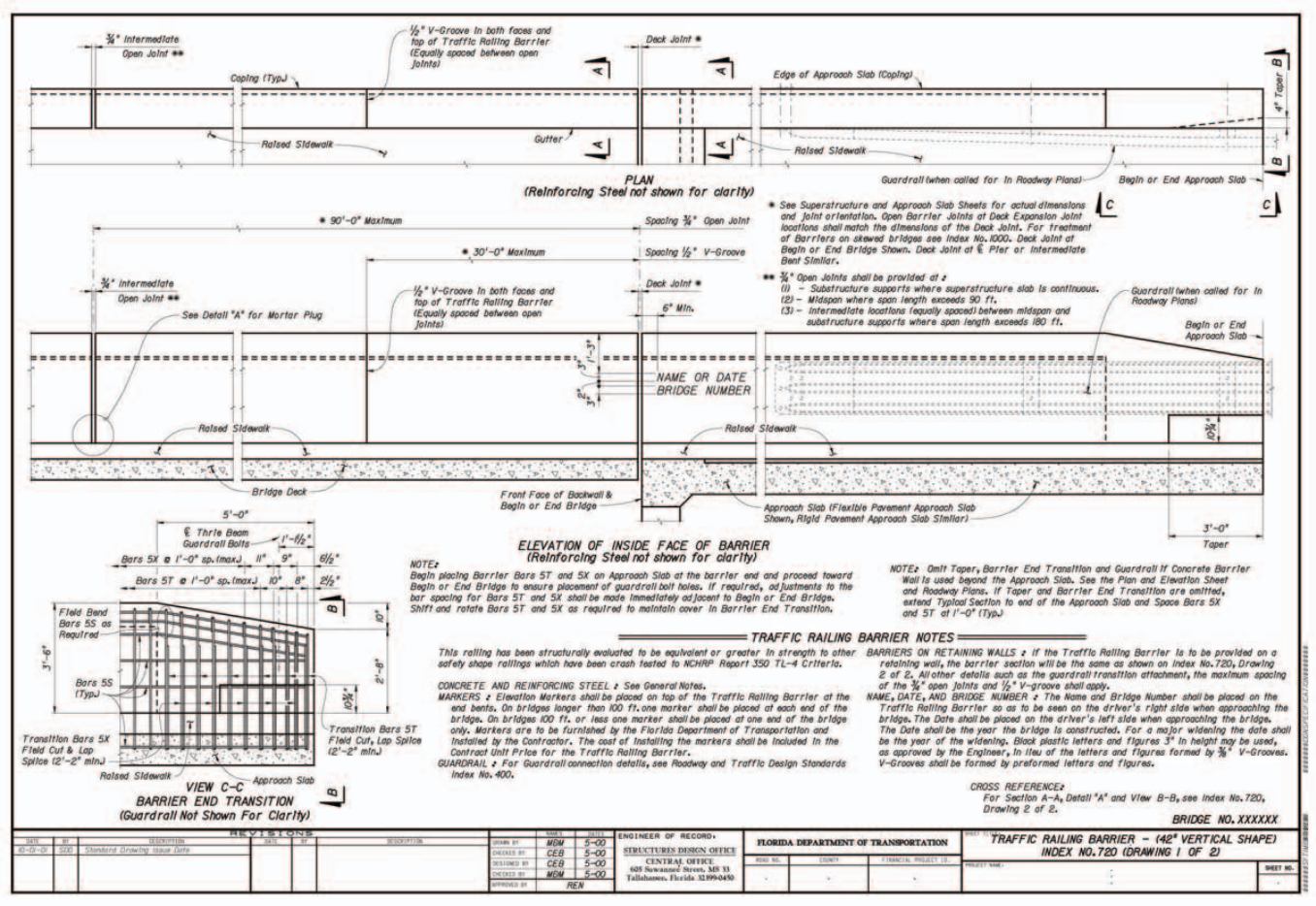
Test level:
TL-4

Utilized in:
Florida

Contact:
Charles Boyd
Florida Dept of Transportation
605 Suwannee Street
Mail Station 33
Tallahassee, FL 32399-0450
(850) 414-4275

F-Shape Concrete Barrier/Single Slope

Vertical Face Guide, 42" Retrofit



Section 6

TIMBER BRIDGE RAILS

Section 6

TIMBER BRIDGE RAIL

Name	Location	Test Level
Timber Rail 3 Bridge Rail	Oklahoma	TL-2
Panel-Lam Timber Vehicle Bridge Rail	?	TL-?
Curb-Type Glu-Lam Rail for Longitudinal Timber Decks	?	TL-1
Glu-Lam Rail with Steel Box Attachment, side mount	?	TL-2
Glu-Lam Timber Rail with Curb, GC8000 design	?	TL-4
Timber Curbs for Longitudinal Timber Decks	?	Below TL-1
W-Beam Breakaway Timber Post Railing	?	TL-1
Steel Thrie-Beam Rail, side mount	?	TL-2

Section 6

TIMBER BRIDGE RAIL

Name	Location	Test Level
Steel Thrie-Beam Rail with Upper Channel, TCB8000 design	?	TL-4
W-Beam Breakaway Steel Post Railing	?	TL-1

Timber Bridge Rail

Timber Rail 3 Bridge Rail

Height:
27"

Cost per linear foot:
$__

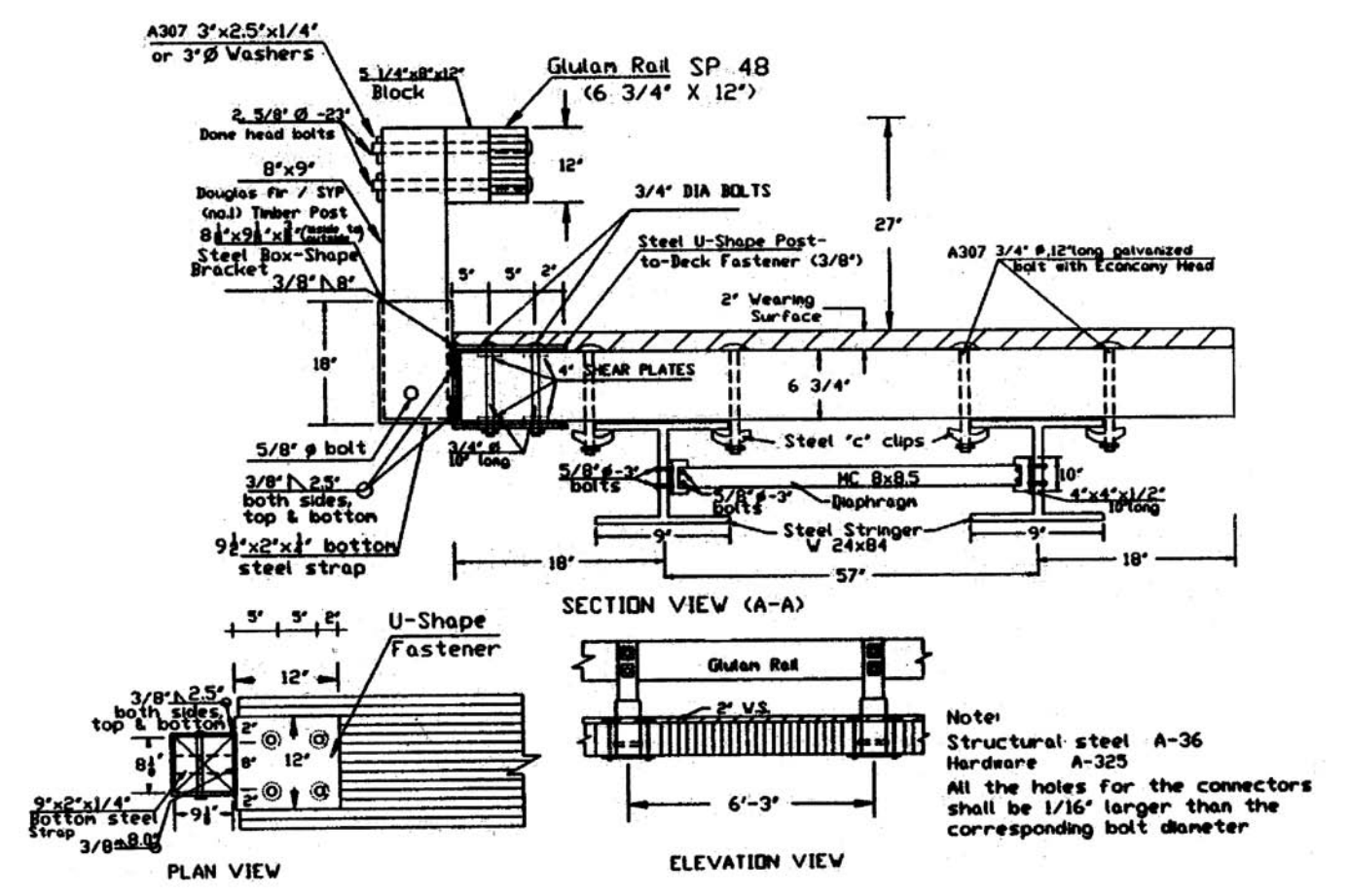
Test level:
TL-3

Utilized in:
__

Contact:
__

Timber Bridge Rail

Timber Rail 3 Bridge Rail



Timber Bridge Rail

Panel-Lam Timber Vehicle Bridge Rail

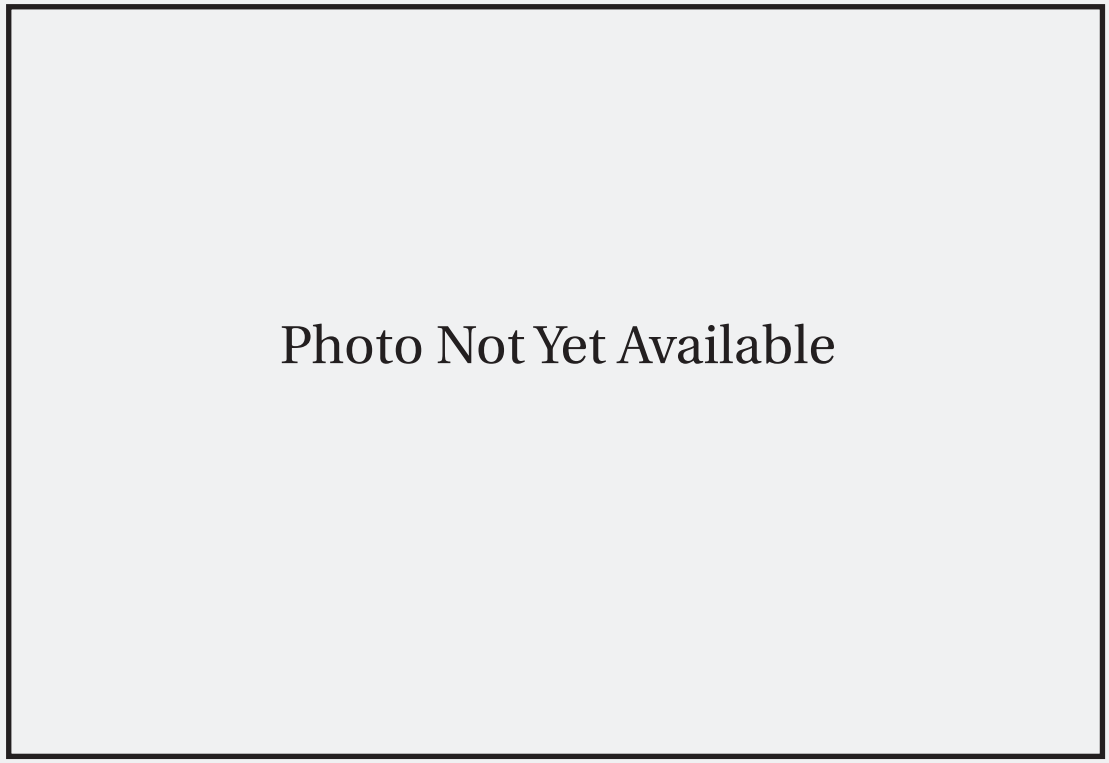
Height:
48"

Cost per linear foot:
$__

Test level:
___

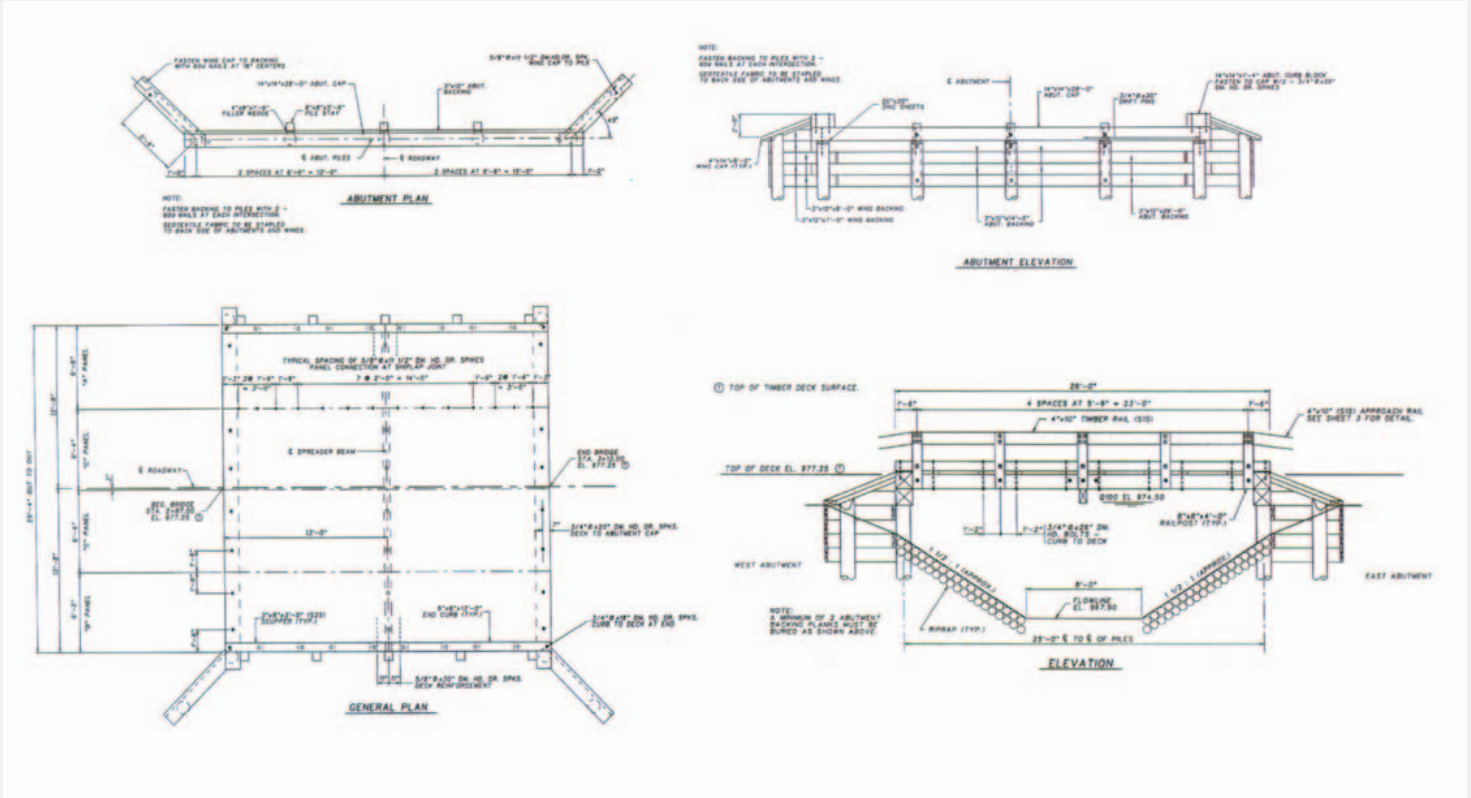
Utilized in:
_____

Contact:
Nahed Abdin
California Dept
of Transportation
1801 30th Street, FM1-2/9I
Sacramento, CA 95816
(916) 227-8805



Timber Bridge Rail

Panel-Lam Timber Vehicle Bridge Rail



Timber Bridge Rail

Curb-Type Glu-Lam Rail for Longitudinal Timber Decks

Height:
21"

Cost per linear foot:
$__

Test level:
TL-1

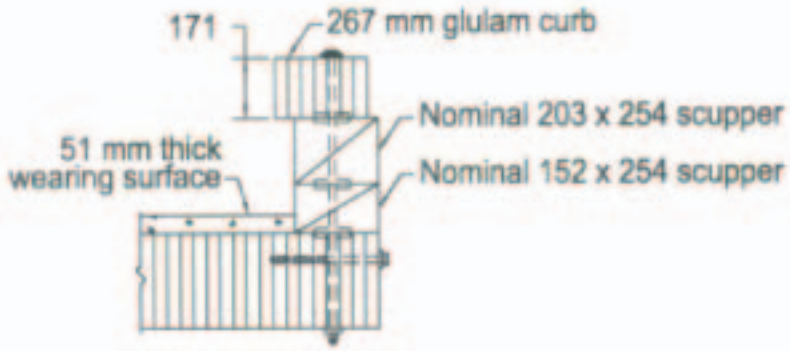
Utilized in:

Contact:
Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside
Safety Facility
University of Nebraska-Lincoln
527 Nebraska Hall
Lincoln, NE 68588-0529
(402) 472-6864

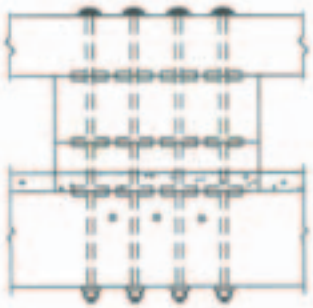
Timber Bridge Rail

Curb-Type Glu-Lam Rail for Longitudinal Timber Decks

Curb-type Rail



End View



Front View

*Dimensions in mm.

The low-height, curb-type timber rail was constructed with a glulam timber rail and supported with scupper blocks. The curb and scupper blocks, spaced 3048 mm on center, were connected to the bridge deck with bolts and timber connectors.

Timber Bridge Rail

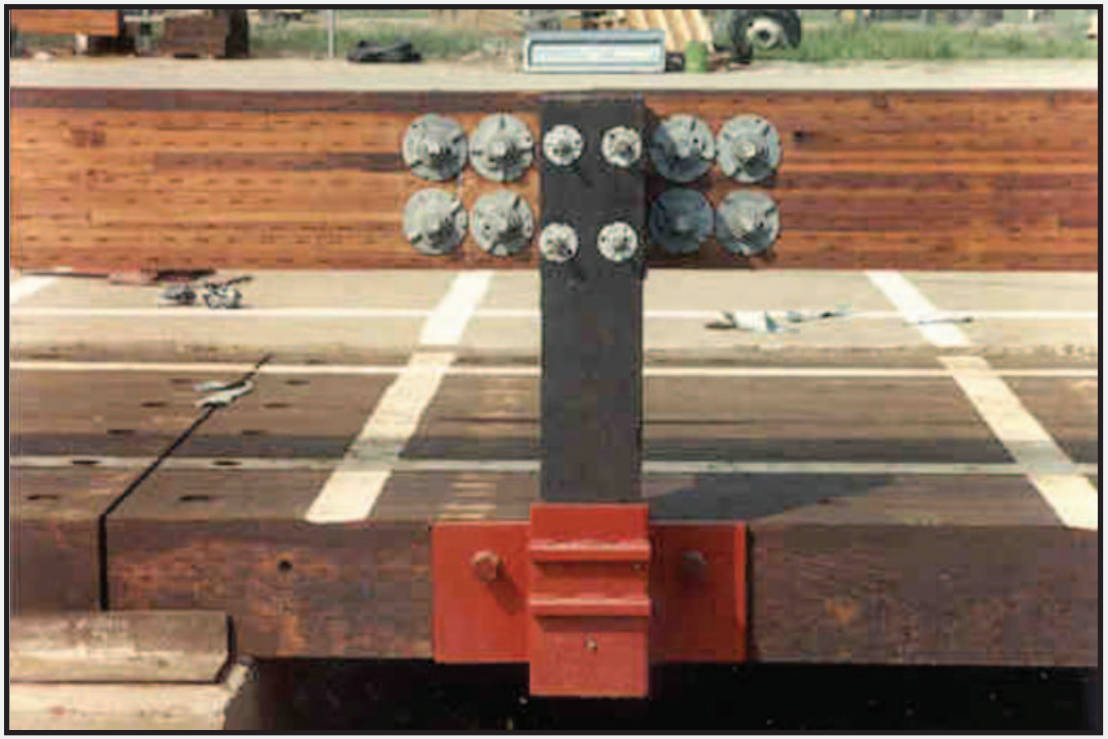
Glu-Lam Rail with Steel Box Attachment, side mount

Height:
32"

Cost per linear foot:
$__

Test level:
TL-2

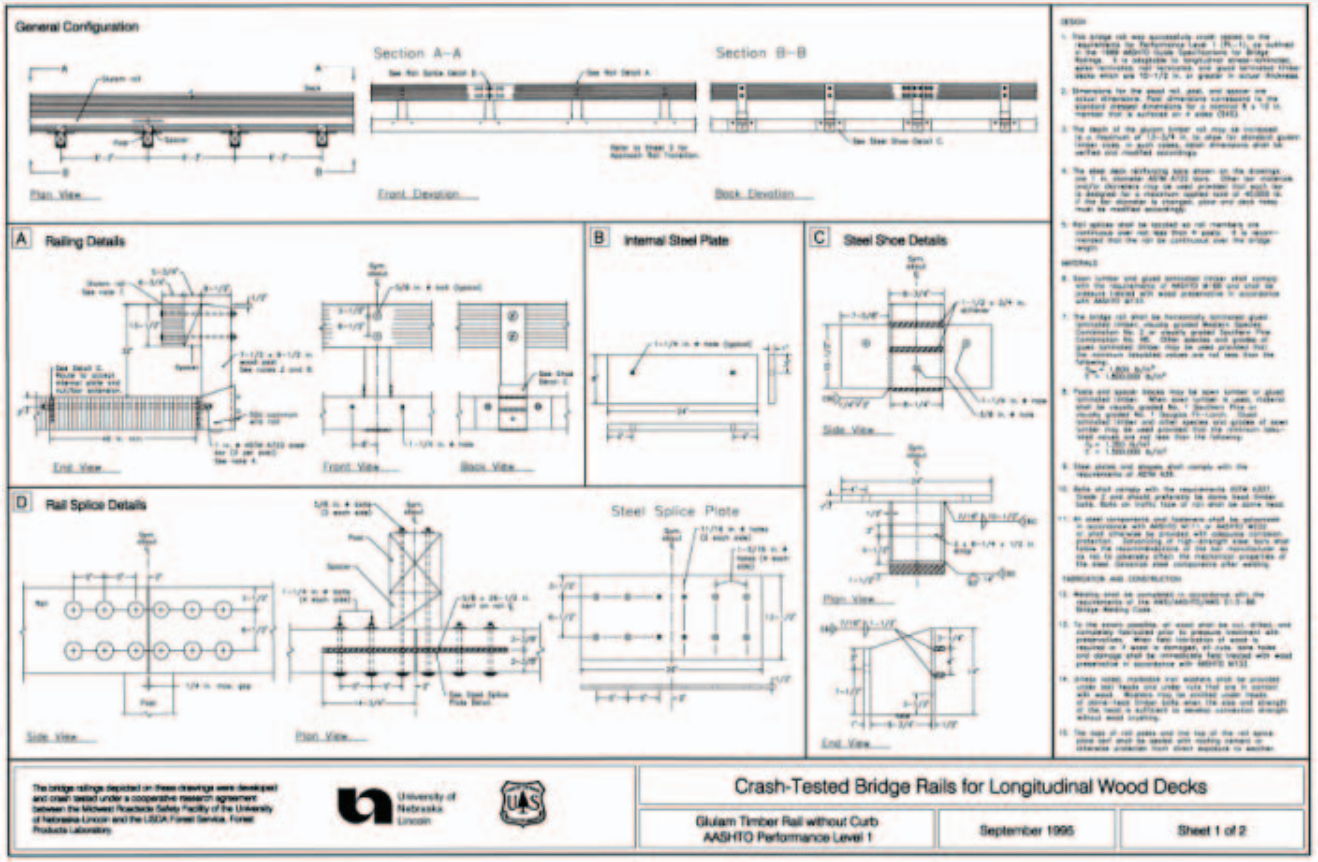
Utilized in:



Contact:
Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside
Safety Facility
University of Nebraska-Lincoln
527 Nebraska Hall
Lincoln, NE 68588-0529
(402) 472-6864

Timber Bridge Rail

Glu-Lam Rail with Steel Box Attachment, side mount



Timber Bridge Rail

Glu-Lam Timber Rail with Curb, GC8000 design

Height:
33"

Cost per linear foot:
$__

Test level:
TL-4

Utilized in:

Contact:
Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside
Safety Facility
University of Nebraska-Lincoln
527 Nebraska Hall
Lincoln, NE 68588-0529
(402) 472-6864

Timber Bridge Rail

Glu-Lam Timber Rail with Curb, GC8000 design

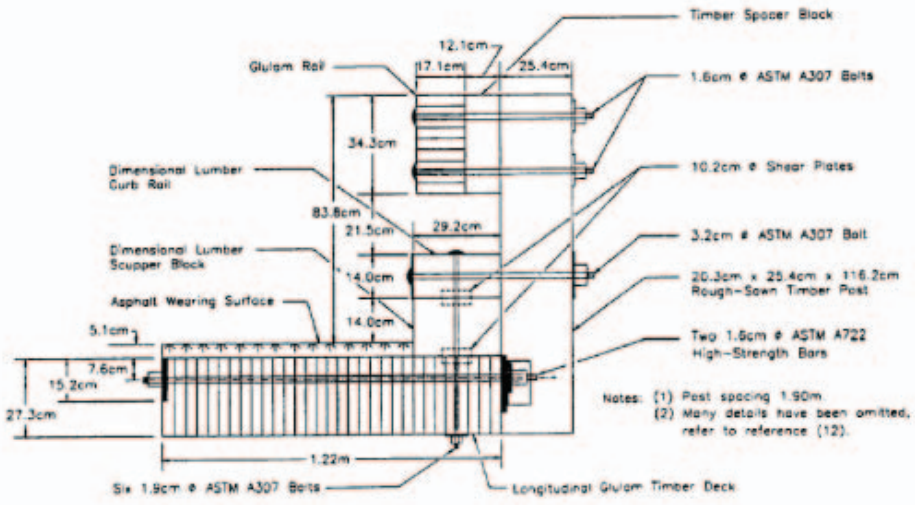
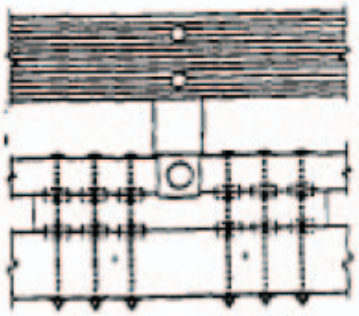


FIGURE 4 Glulam timber with curb bridge railing (GC-8000).



Timber Bridge Rail

Timber Curbs for Longitudinal Timber Decks

Height:
12"

Cost per linear foot:
$__

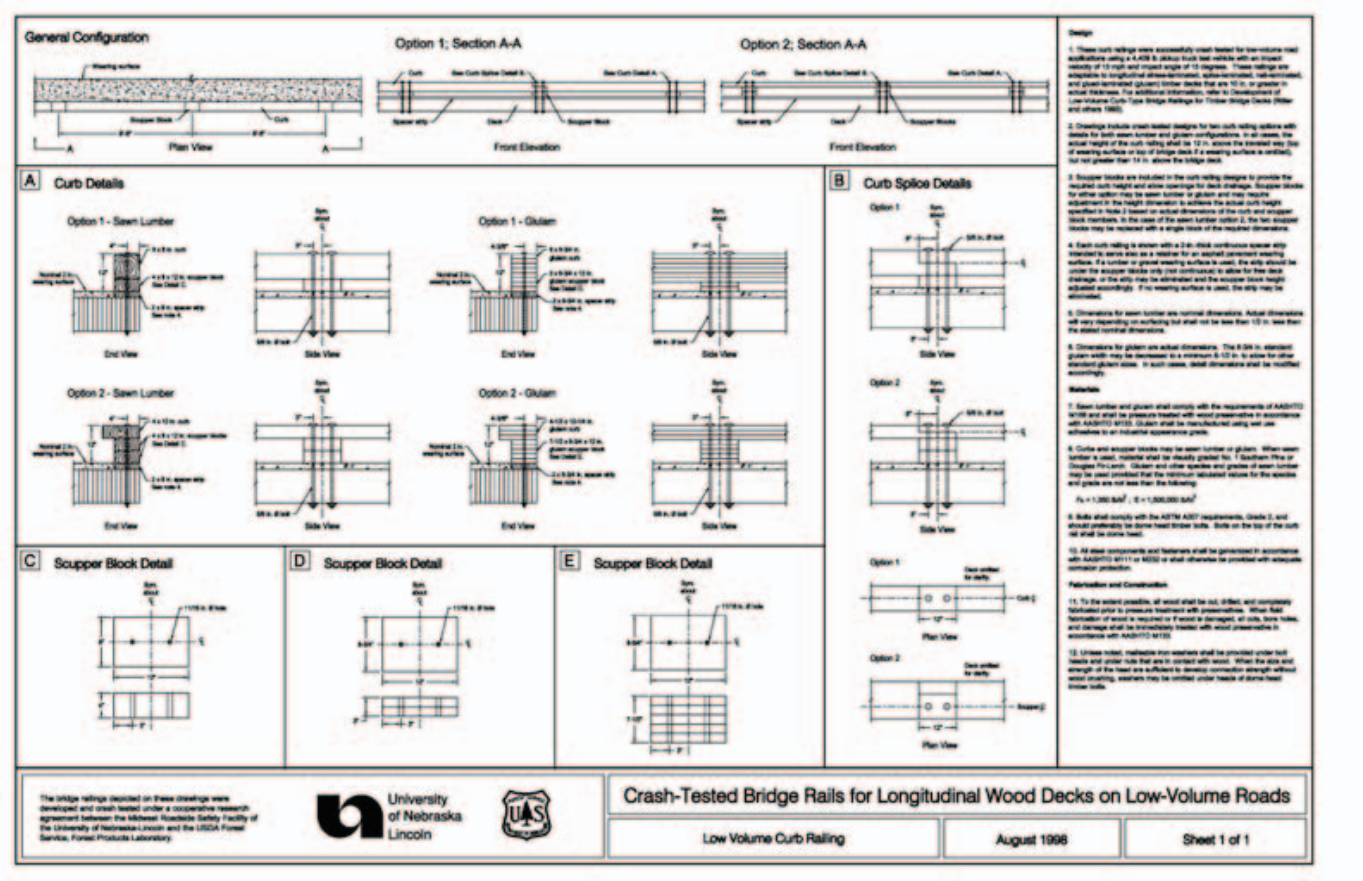
Test level:
Below TL-1

Utilized in:

Contact:
Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside
Safety Facility
University of Nebraska-Lincoln
527 Nebraska Hall
Lincoln, NE 68588-0529
(402) 472-6864

Timber Bridge Rail

Timber Curbs for Longitudinal Timber Decks



Timber Bridge Rail

W-Beam Breakaway Timber Post Railing

Height:
29"

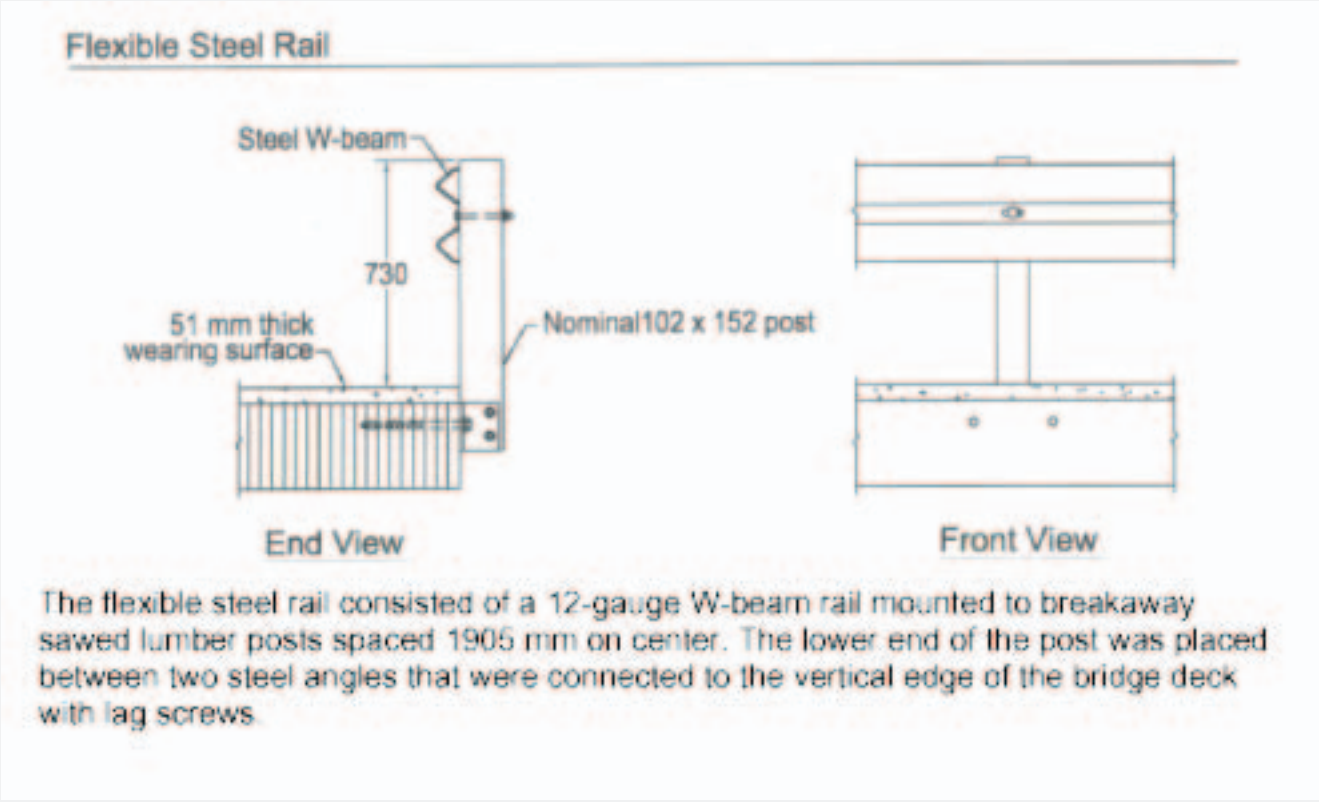
Cost per linear foot:
$__

Test level:
TL-1

Utilized in:

Contact:
Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside
Safety Facility
University of Nebraska-Lincoln
527 Nebraska Hall
Lincoln, NE 68588-0529
(402) 472-6864

W-Beam Breakaway Timber Post Railing



The flexible steel rail consisted of a 12-gauge W-beam rail mounted to breakaway sawed lumber posts spaced 1905 mm on center. The lower end of the post was placed between two steel angles that were connected to the vertical edge of the bridge deck with lag screws.

Timber Bridge Rail

Steel Thrie-Beam Rail, side mount

Height:
32"

Cost per linear foot:
$__

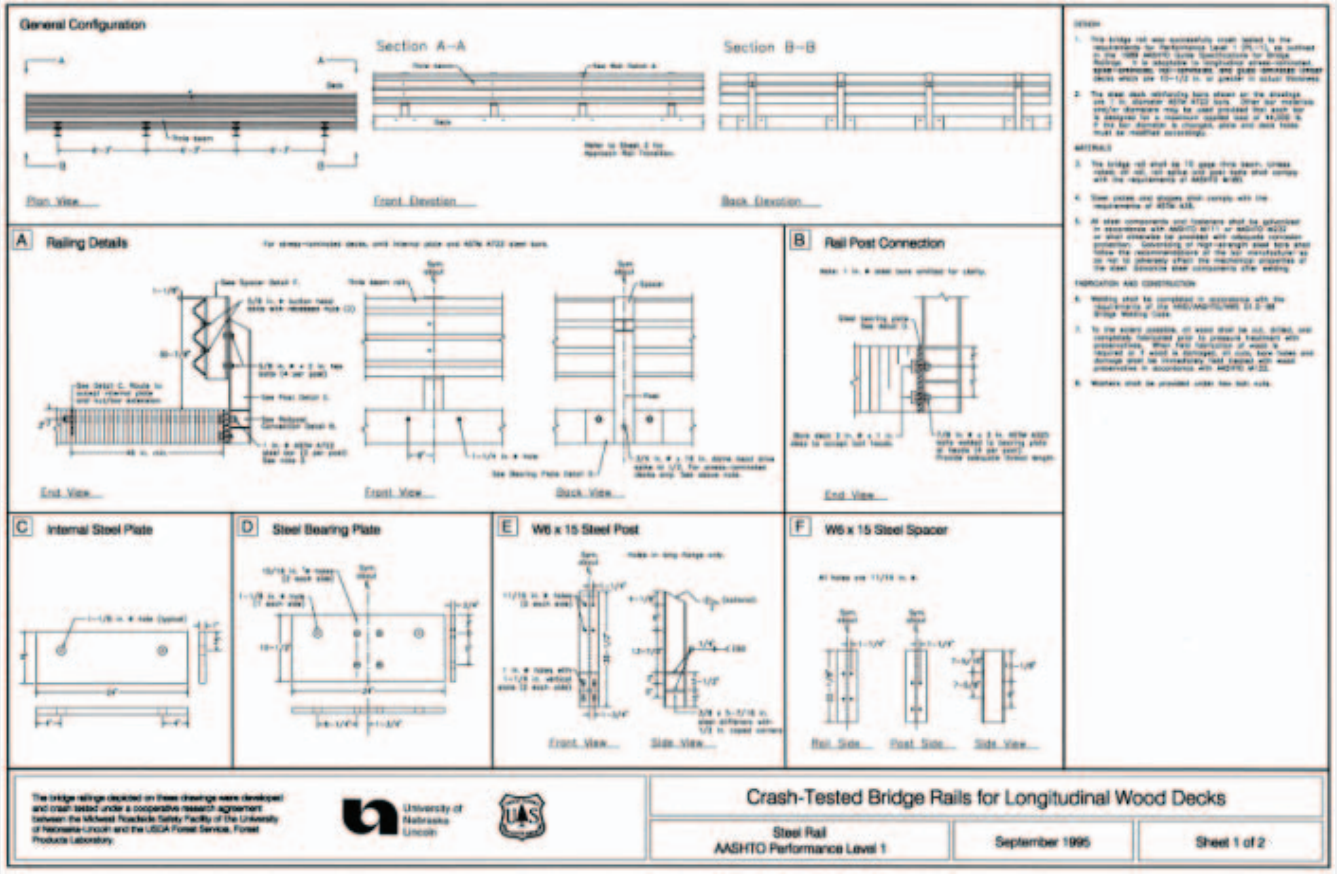
Test level:
TL-2

Utilized in:

Contact:
Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside
Safety Facility
University of Nebraska-Lincoln
527 Nebraska Hall
Lincoln, NE 68588-0529
(402) 472-6864

Timber Bridge Rail

Steel Thrie-Beam Rail, side mount



Timber Bridge Rail

Steel Thrie-Beam Rail with Upper Channel, TCB8000 design

Height:
33"

Cost per linear foot:
$__

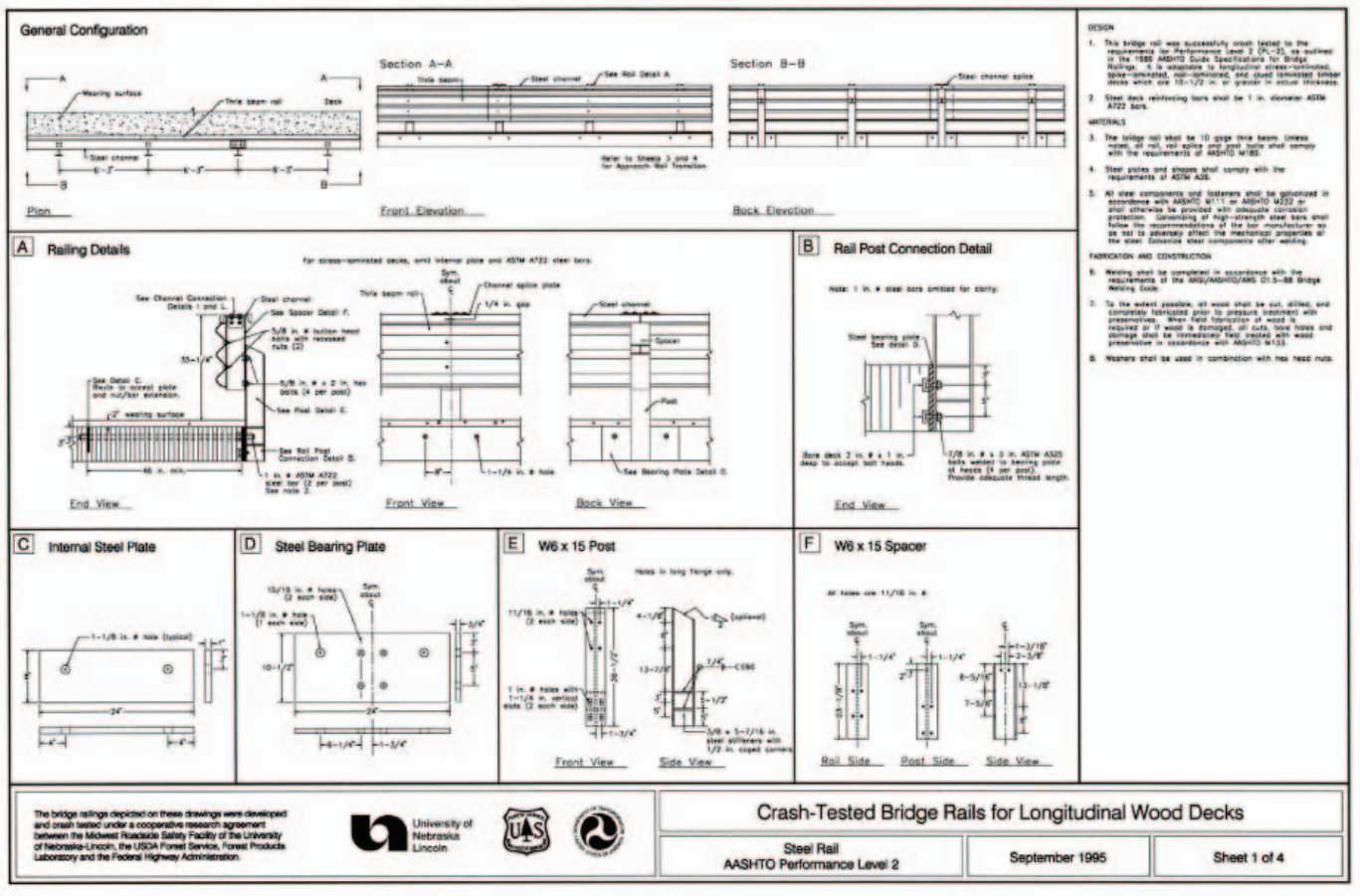
Test level:
TL-4

Utilized in:

Contact:
Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside
Safety Facility
University of Nebraska-Lincoln
527 Nebraska Hall
Lincoln, NE 68588-0529
(402) 472-6864

Timber Bridge Rail

Steel Thrie-Beam Rail with Upper Channel, TCB8000 design



Timber Bridge Rail

W-Beam Breakaway Steel Post Railing

Height:
41"

Cost per linear foot:
$__

Test level:
TL-1

Utilized in:

Contact:
Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside
Safety Facility
University of Nebraska-Lincoln
527 Nebraska Hall
Lincoln, NE 68588-0529
(402) 472-6864

Timber Bridge Rail

W-Beam Breakaway Steel Post Railing