DEPARTMENT OF TRANSPORTATION
ESC/OE
1727 30TH STREET, 2ND FLOOR
SACRAMENTO, CA 95816

TDD (916) 654-4014

Errata No. 97-2

TO: All holders of the **July 1997 edition of the Standard Plans Book**

FROM: Engineering Service Center-Office of Office Engineer

SUBJECT: Errata

DATE: August 20, 1998

The attached Revised Standard Plans (RSPs) and New Standard Plans (NSPs) dated August 6, 1998 contain revisions and additions to the July 1997 edition of the Standard Plans Book and are being issued as Errata No. 97-2.

Revised Standard Plans (RSPs) are to replace the comparable sheets in the July 1997 edition of the book. New Standard Plans (NSPs) are to supplement the July 1997 edition of the book.

The revisions or additions to the Revised Standard Plans (RSPs) and New Standard Plans (NSPs) issued as Errata No. 97-2 are:

A77 series RSPs and NSPs- Most of the A77 series of Standard Plan sheets have been revised or new sheets developed so that all new guard railing end treatments conform to the crash test requirements of the National Cooperative Highway Research Program 350 (NCHRP 350) as directed by the Federal Highway Administration.

RSP A77A - Revises the sheet to eliminate the steel post with steel block guard railing installations. The use of a flat plate washer under the button head bolt attaching the rail element to the line post has been eliminated. Flat plate washers are to be used only where shown on the plans. A plan for steel post with notched wood block guard railing will potentially be available at a later date provided such a configuration passes additional NCHRP 350 crash test requirements.

RSP A77B - Note 2 has been revised to reflect deletion of steel post with steel block guard railing installations.

RSP A77C - Revises the sheet to reflect deletion of steel post with steel block guard railing installations.

RSP A77D -Revises the description of guard railing installations to numbered layouts instead of flare types to reflect use of flared or in-line terminal systems depending on site conditions. Former Type 1M Flare has been renamed and split into two details -

Type 1A Layouts for structure approach installations and Type 1B Layouts for embankment installations. Former Type 9 Flare (from Standard Plan A77E) has been moved to this sheet, split into two details and renamed - Type 2A Layouts for structure approach installations and Type 2B Layouts for embankment installations. The 7.6 m parabolic flare and associated 10:1 or flatter flare approach details for Type 2 Layouts have been further defined. The parabolic offset formula and detail has been added.

RSP A77E - Revises the description of guard railing installations to numbered layouts instead of flare types to reflect use of flared or in-line terminal systems depending on site conditions. Former Type 4 Flare (from Standard Plan A77D) has been moved to this sheet and renamed Type 4A Layout. Former Type 8M Flare has been revised to reflect use if terminal system end treatment and renamed Type 8A Layout. The parabolic offset formula and detail has been added.

RSP A77F -Revises the embankment widening details to show flared end treatments and in-line end treatments. Post footing details have been moved to New Standard Plan NSP A77FA.

NSP A77FA - Provides new details for typical post embedment for embankment installations. Post footing details (from Standard Plan A77F) have been moved to this sheet.

RSP A77G -Deletes details for Type M end treatment and replaces Type M with terminal system end treatment.

Standard Plan A77GA has been canceled.

RSP A77J -Deletes former Note 2 of Standard Plan A77J. Remaining notes have been renumbered.

RSP A77K -Deletes former Note 6 of Standard Plan A77K. Remaining notes have been renumbered.

NSP A77L -Provides details for Terminal System (Type SRT), a flared end treatment which conforms to the crash test requirements of the National Cooperative Highway Research Program 350 (NCHRP 350).

NSP A77M - Provides details for Terminal System (Type ET)), an in-line end treatment which conforms to the crash test requirements of the National Cooperative Highway Research Program 350 (NCHRP 350).

NSP A77N - Provides details for Terminal System (Type CAT)), an in-line end treatment which conforms to the crash test requirements of the National Cooperative Highway Research Program 350 (NCHRP 350).

RSP A78B - Revises plan view of Double Thrie Beam Barrier to correctly show steel post and steel block connections.

RSP A78E - Deletes details for Type M end treatment and replaces Type M with terminal system end treatment.

Standard Plan A81 has been deleted and replaced with NSP A81A, NSP A81B and NSP A81C.

NSP A81A, NSP A81B and NSP A81C - Provides new details for sand filled crash cushions which conform to crash test requirements of the National Cooperative Highway Research Program 350 (NCHRP 350).

NSP A82 - Provides details for Crash Cushion (Type CAT) which conforms to the crash test requirements of the National Cooperative Highway Research Program 350 (NCHRP 350).

RSP D82 - Revises the earth load information specified in the Design Notes.

Standard Plan T1 has been deleted and replaced with NSP T1A, and NSP T1B.

NSP T1A and NSP T1B - Provide new details for sand filled crash cushions which conform to crash test requirements of the National Cooperative Highway Research Program 350 (NCHRP 350).

RSP T2 - Revises the details for sand filled crash cushions so that they conform to crash test requirements of the National Cooperative Highway Research Program 350 (NCHRP 350).

RSP T4 - Revises the spacing dimensions for the pipe supports used for the traffic screen to comform to a soft conversion of the dimensions of the original imperial version of the plan.

RSP T7 - Revises the information on the sign by deleting the route shield and replacing it with the CT logo, adding the "Give 'em a brake" message to the orange diamond-shaped figure, and deleting the phrase "Project Funded By" and replacing it with the type project involved and the year of completion of construction.

RSP T15 - Revises Note 6 to redefine the weigh of Shadow Vehicle V2.

RSP T16 - Revises Note 6 to redefine the weigh of Shadow Vehicle V2.

RSP T17 - Revises Note 5 to redefine the weigh of Shadow Vehicle V2.

RSP B3-7 - Revises the wall batter to 100:6 for the Design H of 3600 mm in the table titled "Table of Reinforcing Steel Dimensions and Data".

RSP B11-52 - Revises the dimensions of the slotted holes in the splice bar shown in the "Splice or Expansion Joint Detail".

RSP RS3 - Revises the dimensions shown in Table 1 and the notes to a soft conversion of the dimensions of the original imperial version of the plan.

RSP S8C - Revises the dimensions of the stop plate shown in Section A-A.

RSP S11 - Revises the number of cable clamps shown in the "Turnbuckle Details" to 3 and revises the description of the eyebolts used with the safety chains and cables.

RSP S13 - Revises Note 3 to show Class 2 PCC.

RSP S18B - Revises the thickness dimension for the light fixture mounting bracket.

RSP S40Q - Revises the "Slant Post Table" to properly align the span entries in the rows of the table to correspond to splits shown in the pipe post column.

In addition to the attached 8-1/2" x 11" copies of the above listed Revised Standard Plans (RSPs) and New Standard Plan (NSPs), also attached is a list of new and revised standard plans issued subsequent to the publication of the July, 1997 Metric Standard Plans Book and the latest revised Standard Plans List for use with the July, 1997 metric edition of the Standard Plans Book.

The July 1997 Standard Plans, 1997 Standard Plans Errata No. 1, and this 1997 Standard Plans Errata No. 2 (without signature and registration seal information) are available for electronic access by:

- Caltrans personnel via the Caltrans Internal Network from the following location:
  /net/trws004/drv4/stdplans/metric/97/details
- All others via the Caltrans OE-ESC Internet WEB site from the following location:
  http: //www.dot.ca.gov/hq/esc/projplan/ppintro.htm

Hard (non-electronic) copies of the July 1997 Standard Plans, 1997 Standard Plans Errata No. 97-1, and this 1997 Standard Plans Errata No. 97-2 are available through a vendor for a fee at the following address:

Winslow Repro/Graphics, 2337 Lexington Street, Sacramento, CA 95815
Telephone: (916) 921-9311 FAX: (916) 921-2470

John Gizinos
ESC/OE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Date: August 6, 1998

JULY 1997 STANDARD PLANS BOOK

NEW STANDARD PLANS (NSP) AND REVISED STANDARD PLANS (RSP) ISSUED SUBSEQUENT TO THE PUBLICATION OF THE JULY 1997 METRIC STANDARD PLANS BOOK

PLAN NO.	PLAN TITLE	DATED	ISSUED BY ERRATA No.
RSP A76A	Concrete Barrier Type 60	12-04-97	97-1
RSP A76G	Concrete Barrier Type 60S	12-04-97	97-1
RSP A77C	Metal Beam Guard Railing-Posts and Blocks	12-04-97	97-1
RSP C7E	Reinforced Concrete Crib Wall-Types A, B, C, D, E, and F - Header and Stretcher Details	12-04-97	97-1
RSP C7F	Design Data For Reinforced Concrete Crib Wall Foundation Pressure-Battered Wall	12-04-97	97-1
RSP C7G	Reinforced Concrete Crib Wall Foundation Pressure-Vertical Wall	12-04-97	97-1
RSP C8C	Steel Crib Wall-Design Data	12-04-97	97-1
RSP C9B	Timber Crib Wall-Types A, B, C, and D Design Data	12-04-97	97-1
NSP D75A	Pipe Inlets	12-04-97	97-1
NSP D75B	Pipe Inlets	12-04-97	97-1
NSP D75C	Pipe Inlets-Ladder, Step and Trash Rack Details	12-04-97	97-1
RSP D77A	Grate Details	12-04-97	97-1
RSP D85	Box Culvert Wingwalls-Types D and E	12-04-97	97-1
RSP H2	Planting and Irrigation Symbols	12-04-97	97-1
RSP B3-1	Retaining Wall Type 1- H=1200 mm through 9100 mm	12-04-97	97-1
RSP B3-3	Retaining Wall Type 1A	12-04-97	97-1
RSP B3-7	Retaining Wall Type 5	12-04-97	97-1

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NEW STANDARD PLANS (NSP) AND REVISED STANDARD PLANS (RSP) ISSUED SUBSEQUENT TO THE PUBLICATION OF THE JULY 1997 METRIC STANDARD PLANS BOOK

(CONT'D)

PLAN NO.	PLAN TITLE	DATED	ISSUED BY ERRATA No.
RSP B3-8	Retaining Wall Details No. 1	12-04-97	97-1
RSP S4	Overhead Signs-Truss Single Post Type Structural Frame Members	12-04-97	97-1
RSP ES-6J	Signal and Lighting Standards-Case 1 Arm Loading- Wind Velocity = 113 km/h-Arm Lengths 4.6 m to 9.1 m	12-04-97	97-1
RSP ES-6R	Signal and Lighting Standards-Case 4 Arm Loading- Wind Velocity = 129 km/h-Arm Lengths 7.6 m to 13.7 m	12-04-97	97-1
RSP ES-34A	Closed Circuit Television-Pole Details	12-04-97	97-1
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RSP A77A	Metal Beam Guard Railing- Wood Posts and Wood Blocks	8-6-98	97-2
RSP A77B	Metal Beam Guard Railing- Standard Hardware	8-6-98	97-2
RSP A77C	Metal Beam Guard Railing- Wood Posts and Wood Blocks	8-6-98	97-2
RSP A77D	Guard Railing-Typical Layouts	8-6-98	97-2
RSP A77E	Guard Railing-Typical Layouts	8-6-98	97-2

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STATE OF CALIFORNIA
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Date: August 6, 1998

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(CONT'D)

PLAN NO.	PLAN TITLE	DATED	ISSUED BY ERRATA No.
RSP A77F	Metal Beam Guard Railing-Typical Embankment Widening for End Treatments	8-6-98	97-2
NSP A77FA	Metal Beam Guard Railing-Typical Line Post Installation	8-6-98	97-2
RSP A77G	Guard Railing End Anchor (Breakaway, Type B)	8-6-98	97-2
A77GA *Canceled*	~~Anchor Assembly (Breakaway, Type M) Hardware and Post Details~~	7-1-97	*Canceled by Errata No. 97-2*
RSP A77J	Guard Railing Connections to Bridge Railings, Retaining Walls and Abutments	8-6-98	97-2
RSP A77K	Guard Railing Connection to Bridge Sidewalks and Curbs	8-6-98	97-2
NSP A77L	Guard Railing and Barrier Railing End Treatment	8-6-98	97-2
NSP A77M	Guard Railing and Barrier Railing End Treatment	8-6-98	97-2
NSP A77N	Guard Railing and Barrier Railing End Treatment	8-6-98	97-2
RSP A78B	Thrie Beam Barrier	8-6-98	97-2

John Gizinos/ESC-OE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Date: August 6, 1998

JULY 1997 STANDARD PLANS BOOK

NEW STANDARD PLANS (NSP) AND REVISED STANDARD PLANS (RSP) ISSUED SUBSEQUENT TO THE PUBLICATION OF THE JULY 1997 METRIC STANDARD PLANS BOOK

(CONT'D)

PLAN NO.	PLAN TITLE	DATED	ISSUED BY ERRATA No.
RSP A78E	Thrie Beam Barrier - End Anchors and End Treatments	8-6-98	97-2
A81	~~Crash Cushion, Sand Filled~~ *Canceled and replaced with NSP A81A, NSP A81B and NSP A81C*	8-6-98	*Canceled by Errata No. 97-2*
NSP A81A	Crash Cushion, Sand Filled (Unidirectional)	8-6-98	97-2
NSP A81B	Crash Cushion, Sand Filled (Unidirectional)	8-6-98	97-2
NSP A81C	Crash Cushion, Sand Filled (Bidirectional)	8-6-98	97-2
NSP A82	Crash Cushion (Type CAT)	8-6-98	97-2
RSP D82	Cast-in-Place Reinforced Concrete Box Culvert Miscellaneous Details	8-6-98	97-2
T1	~~Temporary Crash Cushion, Sand Filled~~ *Canceled and replaced with NSP T1A, and NSP T1B*	8-6-98	*Canceled by Errata No. 97-2*
NSP T1A	Temporary Crash Cushion, Sand Filled (Unidirectional)	8-6-98	97-2
NSP T1B	Temporary Crash Cushion, Sand Filled (Bidirectional)	8-6-98	97-2
RSP T2	Temporary Crash Cushion, Sand Filled (Shoulder Installations)	8-6-98	97-2

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JULY 1997 STANDARD PLANS BOOK

NEW STANDARD PLANS (NSP) AND REVISED STANDARD PLANS (RSP) ISSUED SUBSEQUENT TO THE PUBLICATION OF THE JULY 1997 METRIC STANDARD PLANS BOOK

(CONT'D)

PLAN NO.	PLAN TITLE	DATED	ISSUED BY ERRATA No.
RSP T4	Temporary Traffic Screen	8-6-98	97-2
RSP T7	Construction Project Information Sign	8-6-98	97-2
RSP T15	Traffic Control System for Moving Lane Closure on Multilane Highways	8-6-98	97-2
RSP T16	Traffic Control System for Moving Lane Closure on Multilane Highways	8-6-98	97-2
RSP T17	Traffic Control System for Moving Lane Closure on Two Lane Highways	8-6-98	97-2
RSP B3-7	Retaining Wall Type 5	8-6-98	97-2
RSP B11-52	Chain Link Railing Type 7	8-6-98	97-2
RSP RS3	Roadside Signs Laminated Wood Box Post Typical Installation Details No. 3		
RSP S8C	Overhead Signs, Truss - Sign Mounting Details, Laminated Panel - Type A	8-6-98	97-2
RSP S11	Overhead Signs - Walkway Safety Railing Details	8-6-98	97-2
RSP S13	Overhead Signs- Truss - Pile Foundation	8-6-98	97-2
RSP S18B	Overhead Signs- Lightweight - Light Fixture Mounting Details	8-6-98	97-2
RSP S40Q	Overhead Signs- Tubular - Two Post Type, Layout and Pipe Selection	8-6-98	97-2

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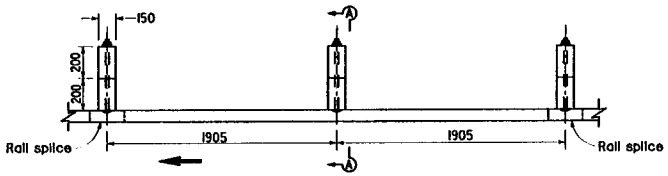
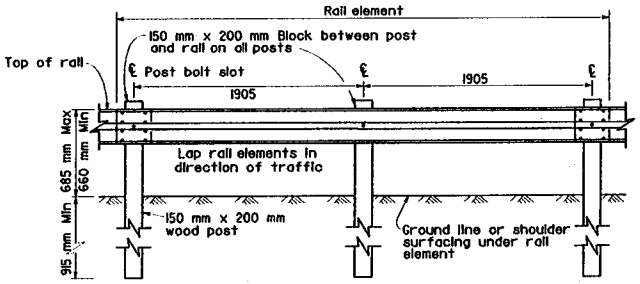
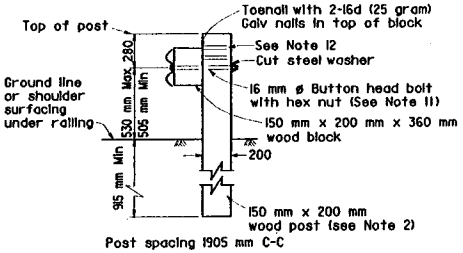


PLAN



ELEVATION

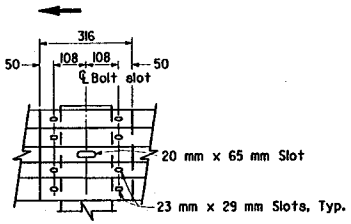
METAL BEAM GUARD RAILING WITH WOOD POST AND BLOCKS



SECTION A-A

TYPICAL WOOD LINE POST INSTALLATION

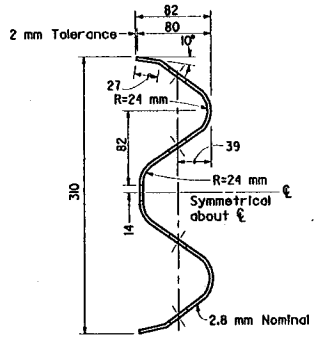
See Note 13



ELEVATION

RAIL ELEMENT SPLICE DETAIL

16 mm ø x 35 mm button head oval shoulder bolts inserted into the 23 mm x 29 mm slots and bolted together with 16 mm ø x 35 mm recessed hex nuts. A total of 8 bolts and nuts are to be used at each rail splice connection. The ends of the rail elements are to be overlapped in the direction of traffic (see details). Where a terminal section or end section is to be attached to the end of a rail element, a total of 4 of the above described splice bolts and nuts are to be used.



SECTION THRU RAIL ELEMENT

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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To accompany plans dated _____

NOTES

1. For details of standard hardware used to construct guard railing, see Revised Standard Plan RSP A77B.
2. For details of wood posts and blocks used to construct guard railing, see Revised Standard Plan RSP A77C.
3. Guard railing post spacing to be 1905 mm center to center, except as otherwise noted.
4. For guard railing typical layouts, see Revised Standard Plans RSP A77D and RSP A77E.
5. For embankment widening details to accommodate guard railing terminal system end treatments, see Revised Standard Plan RSP A77F.
6. For guard railing end anchor details, see Standard Plan A77I and Revised Standard Plan RSP A77G. For guard railing terminal systems, see Project Plans.
7. For guard railing connection details to bridge railing, retaining walls and abutments, see Revised Standard Plan RSP A77J.
8. For guard railing connection details to bridge sidewalks and curbs, see Revised Standard Plan RSP A77K.
9. For dike positioning with guard railing installations, see Revised Standard Plan RSP A77F.
10. Direction of traffic indicated by ⟶.
11. Where conditions require the bolt to be installed in the opposite direction from that shown in Section A-A or where a 16 mm threaded rod is required in place of the bolt, no more than 13 mm of thread to be exposed on the traffic side of the rail element.
12. Additional holes in wood post are required for potential adjustments of railing height.
13. For additional installation details, see New Standard Plan NSP A77FA.
14. For guard railing delineation details, see Revised Standard Plan RSP A77F.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

METAL BEAM GUARD RAILING WOOD POSTS AND WOOD BLOCKS

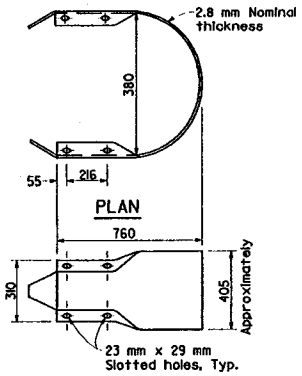
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A77A DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A77A DATED JULY 1, 1997-PAGE 36 OF THE STANDARD PLANS BOOK DATED JULY 1997.

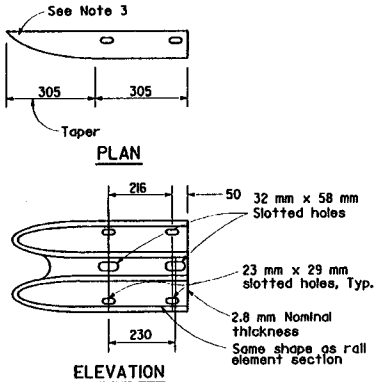
REVISED STANDARD PLAN RSP A77A

STD. PLAN RSP A77A



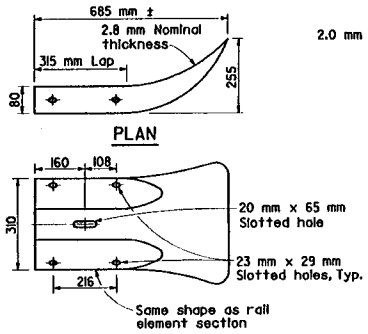
ELEVATION

RETURN SECTION



ELEVATION

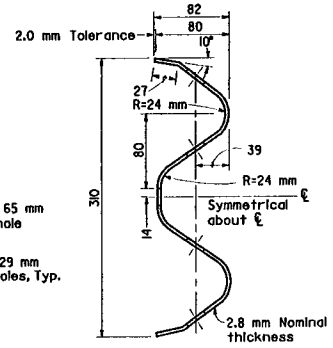
END SECTION DETAILS



ELEVATION

TERMINAL SECTION

(TYPE B)



SECTION THRU

RAIL ELEMENT

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA

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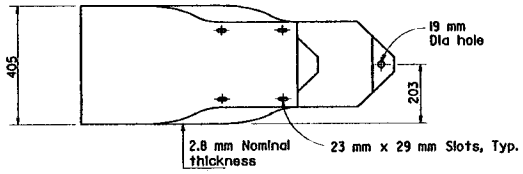
To accompany plans dated _____

NOTES

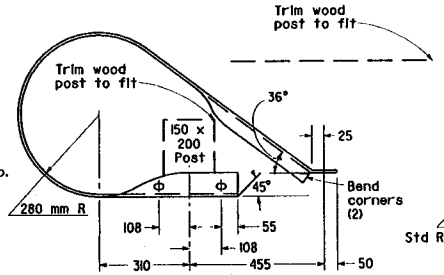
1. Terminal sections not to be installed on the trailing end of guard railing constructed adjacent to one-way roadways.
2. For use of back-up plates, see Revised Standard Plans RSP A77J and RSP A77K.
3. End Section may be cut from Terminal Section (Type B) or fabricated.
4. Use for nested railing applications.
5. Terminal Section 'Type A' has been deleted.
6. Use flat plate washer where indicated on plans.



ELEVATION

TERMINAL SECTION

(TYPE C)

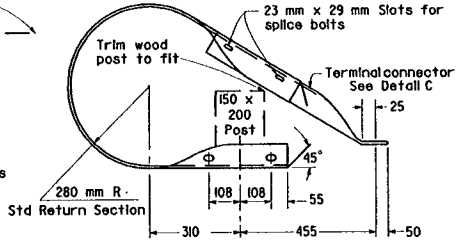


PLAN

TERMINAL SECTION

(TYPE C)

DETAIL A

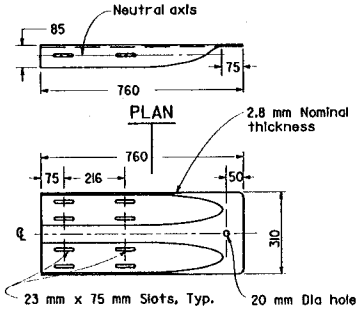


PLAN

OPTIONAL DESIGN TERMINAL SECTION

(TYPE C)

DETAIL B



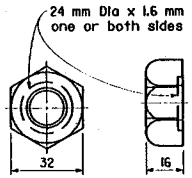
ELEVATION

TERMINAL CONNECTOR FOR

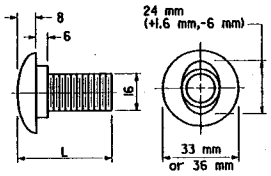
OPTIONAL DESIGN TERMINAL SECTION

(TYPE C)

DETAIL C



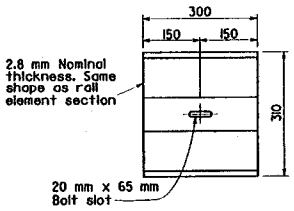
16 mm Ø RECESS NUT



16 mm Ø BUTTON HEAD BOLT

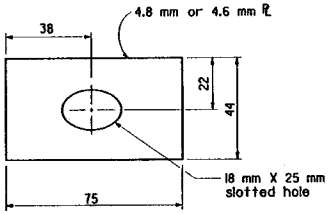
L	THREAD LENGTH
35 mm	full thread length
50 mm	45 mm Min thread length
255 mm	100 mm Min thread length
460 mm	100 mm Min thread length
••70 mm	50 mm Min thread length
••480 mm	100 mm Min thread length

•• SEE NOTE 4



BACK-UP PLATE

See Note 2



FLAT PLATE WASHER

See Note 6

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

METAL BEAM GUARD RAILING STANDARD HARDWARE

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A77B DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A77B DATED JULY 1, 1997-PAGE 37 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP A77B

STD. PLAN RSP A77B

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Ellis K. Hirst
No. C17926
Exp. 6-30-01
CIVIL
STATE OF CALIFORNIA

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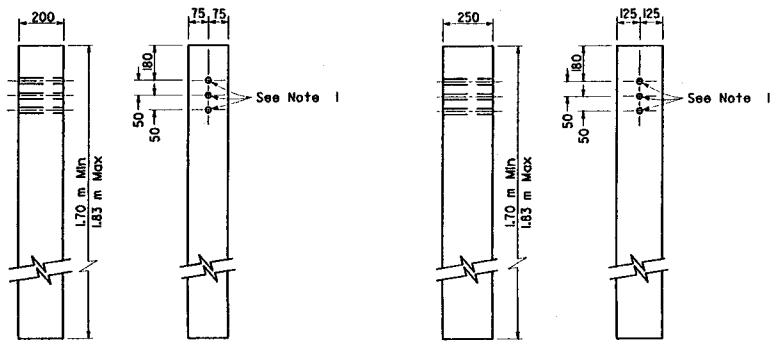
To accompany plans dated _____

Caltrans Metric

NOTES

1. All holes in wood posts and blocks shall be 20 mm dia ± 1.6 mm.
2. Dimensions shown for wood post are nominal.

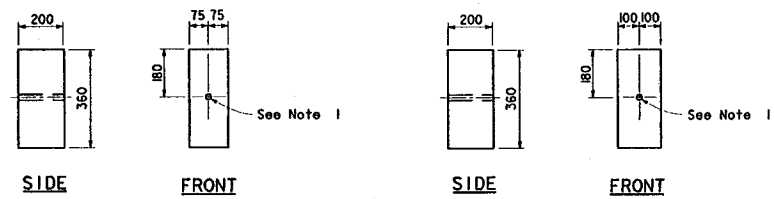


SIDE FRONT

150 mm x 200 mm
WOOD POST

SIDE FRONT

250 mm x 250 mm
WOOD POST



SIDE FRONT

150 mm x 200 mm
WOOD BLOCK

SIDE FRONT

200 mm x 200 mm
WOOD BLOCK

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

METAL BEAM GUARD RAILING WOOD POSTS AND WOOD BLOCKS

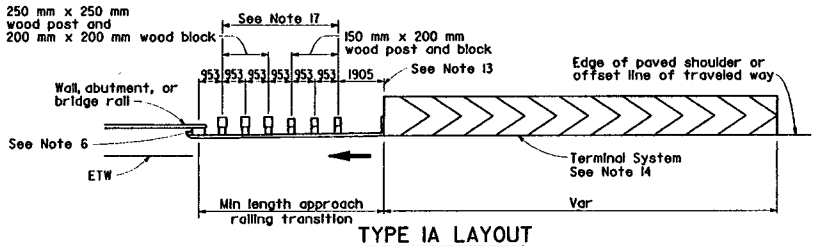
NO SCALE

ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A77C DATED AUGUST 6, 1998 SUPERSEDES
RSP A77C DATED DECEMBER 4, 1997 AND STANDARD PLAN A77C
DATED JULY 1, 1997-PAGE 38 OF THE STANDARD PLANS BOOK DATED JULY 1997.

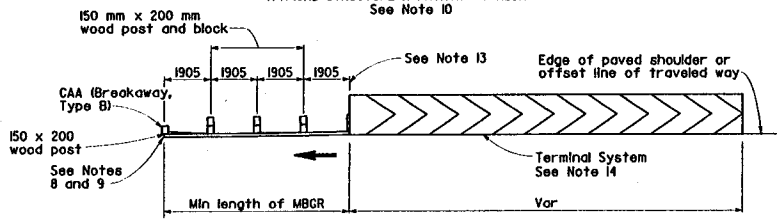
REVISED STANDARD PLAN RSP A77C

STD. PLAN RSP A77C



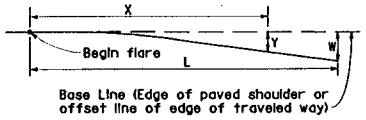
TYPE 1A LAYOUT

(TYPICAL STRUCTURE APPROACH INSTALLATION)
See Note 10



TYPE 1B LAYOUT

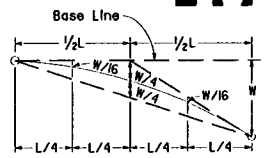
(TYPICAL EMBANKMENT INSTALLATION)
See Note 10



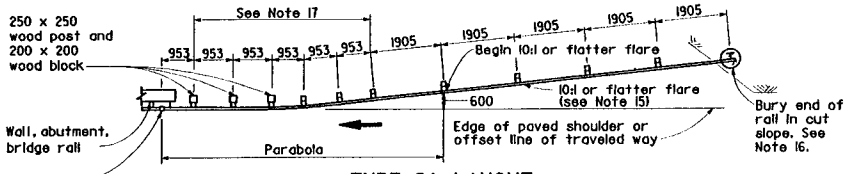
$$Y = \frac{WX^2}{L^2}$$

Y = Offset from base line
W = Maximum offset
X = Distance along base line
L = Length of flare

PARABOLIC FLARE OFFSETS

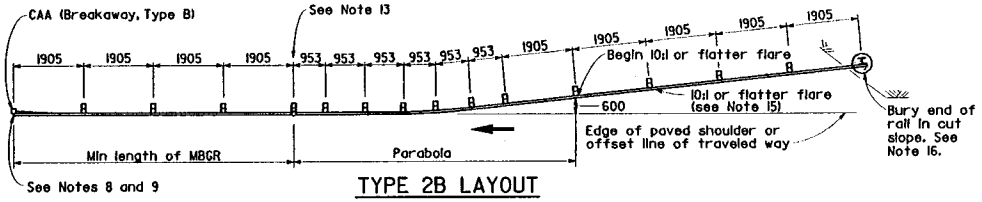


TYPICAL PARABOLIC LAYOUT



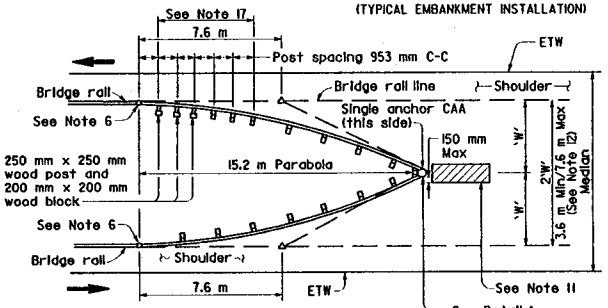
TYPE 2A LAYOUT

(TYPICAL STRUCTURE APPROACH INSTALLATION)

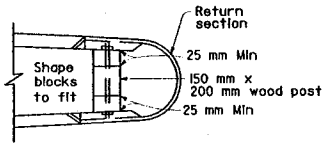


TYPE 2B LAYOUT

(TYPICAL EMBANKMENT INSTALLATION)



TYPE 3A LAYOUT



DETAIL A

NOTES

1. Post, blocks and hardware to be used are shown on Revised Standard Plans RSP A77B and RSP A77C.
2. Guard rail post spacing to be 1905 mm center to center, except as otherwise noted.
3. Except as noted, posts shown are 150 mm x 200 mm wood.
4. Rail elements to be installed as shown on Revised Standard Plan RSP A77A.
5. Direction of traffic indicated by ⟶
6. For connection details see Revised Standard Plan RSP A77J or RSP A77K.
7. For cable anchor assembly (CAA) details, see Standard Plan A77I. Where a crash cushion is required as specified in Note 11 and the crash cushion attaches to the ends of the guard railing, the CAA and return section may not be required (see Project Plans).
8. For breakaway anchor details, see Standard Plan RSP A77C. Terminal Sections not to be installed on trailing end of guard railing constructed adjacent to one-way roadways.
9. On two-way roadways less than 18 m in width, a terminal system is to be used in place of the cable anchor assembly (breakaway, Type B) at the trailing end of guard railing for embankment installations.
10. For details of a terminal system typically used as a flared end treatment on Type 1A and Type 1B Layouts, see New Standard Plan NSP A77L. For details of terminal system typically used on Type 1A and Type 1B Layouts where site conditions will not accommodate a flared end treatment, see New Standard Plans NSP A77M and NSP A77N. For embankment widening details to accommodate terminal system end treatments, see Revised Standard RSP A77F.
11. A crash cushion is required for Type 3A layout, when the end of the guard railing is within 9.0 m of the edge of traveled way (ETW) of approaching traffic. For the type of crash cushion to be used, see Project Plans and the Special Provisions.
12. When width 'W' exceeds 3.8 m; to calculate the length of parabolic flare use "L=3W" and round to nearest 3.8 m.
13. As site conditions dictate, additional 3.8 m lengths of guard railing with post spacing at 1905 mm may be required at the point shown.
14. For the type of terminal system to be used, see Project Plans and the Special Provisions.
15. The 10:1 or flatter flare is based on the edge of the paved shoulder or offset line of edge of traveled way. The length of guard railing within the 10:1 or flatter flare may be increased by 3.8 m lengths, as site conditions dictate.
16. For buried end anchor details, see Standard Plan A77I.
17. Use a flat plate washer on the rail face when attaching rail element to these posts.

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER
August 6, 1998
PLANS APPROVAL DATE
REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst CL7926 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.
To accompany plans dated

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

GUARD RAILING TYPICAL LAYOUTS

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

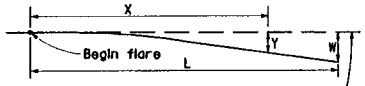
RSP A77D DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A77D DATED JULY 1, 1997-PAGE 39 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP A77D

STD. PLAN RSP A77D

NOTES

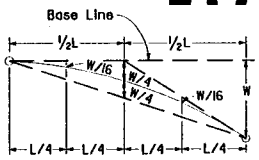
1. Post, blocks and hardware to be used are shown on Revised Standard Plan RSP A77B and RSP A77C.
2. Guard railing post spacing to be 1905 mm center to center, except as otherwise noted.
3. Except as noted, posts and blocks shown are 150 mm x 200 mm wood.
4. Rail elements to be installed as shown on Revised Standard Plan RSP A77A.
5. A 1.2 m minimum clearance is required between the face of the railing and the face of a fixed object located directly behind a guard railing post. Where a fixed object is behind the railing, but not directly behind a guard railing post, a 910 mm minimum clearance, is required between the face of the railing and the face of the fixed object. Where minumum clearances cannot be obtained, construct guard railing as shown in "Approach Railing Transition Details for Fixed Objects" on this plan.
6. Direction of traffic indicated by ⟶.
7. For connection details, see Revised Standard Plans RSP A77J and RSP A77K.
8. For cable anchor assembly (CAA) details, see Standard Plan A77I. Where a crash cushion is required as specified in Note 11 and the crash cushion attaches to the ends of the guard railing, the CAA and return section may not be required (see Project Plans).
9. For breakaway anchor details, see Revised Standard Plan RSP A77G.
10. Terminal sections not to be installed on trailing end of guard railing constructed adjacent to one-way roadways.
11. A crash cushion is required for Type 4A, 5A and 6A layouts, when the end of the guard railing is within 9.0 m of the edge of traveled way (ETW) of approaching traffic. For the type of crash cushion to be used, see the Project Plans and Special Provisions.
12. When width 'W' exceeds 3.8 m; to calculate the length of parabolic flare use "L=3W" and round to nearest 3.8 m.
13. For the type terminal system to be used, see Project Plans and the Special Provisions.
14. For details of a terminal system typically used as a flared end treatment on Type 8A Layouts, see New Standard Plan NSP A77L. For details of a terminal system typically used on Type 8A Layouts where site conditions will not accommodate a flared end, see New Standard Plans NSP A77M and NSP A77N.
15. Use a flat plate washer on the rail face when attaching rail element to these posts.



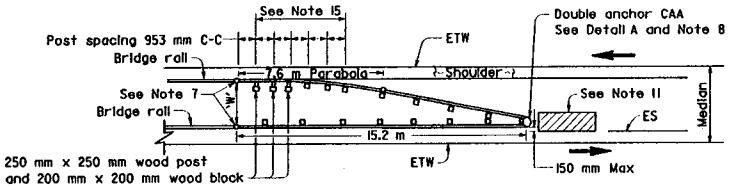
$$Y = \frac{WX^2}{L^2}$$

Y = Offset from base line
W = Maximum offset
X = Distance along base line
L = Length of flare

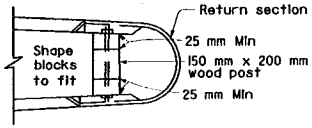
PARABOLIC FLARE OFFSETS



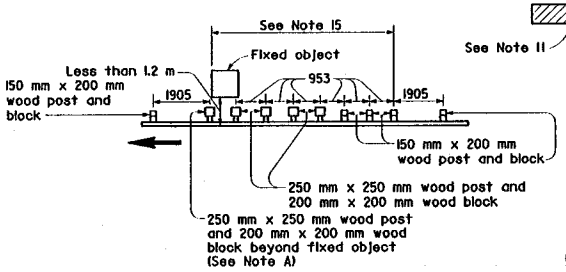
TYPICAL PARABOLIC LAYOUT



TYPE 4A LAYOUT



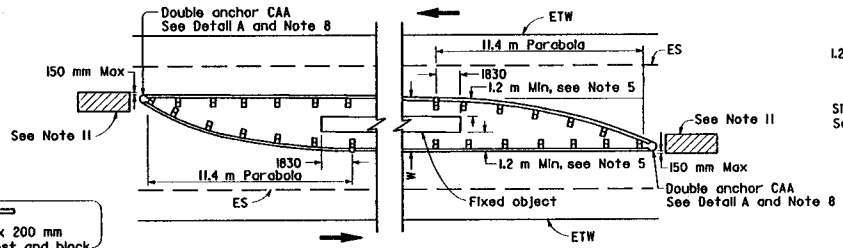
DETAIL A



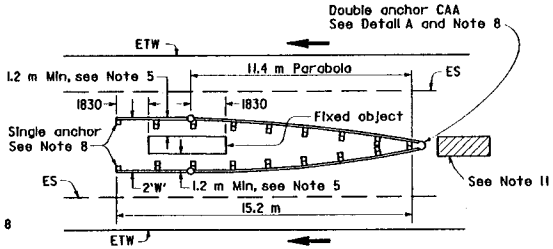
Note A. For a series of fixed objects (bridge columns, overhead sign supports, etc.) additional 250 mm x 250 mm wood post with 200 mm x 200 mm wood blocks at 953 mm center to center spacing are to be used between fixed objects.

APPROACH RAILING TRANSITION DETAIL FOR FIXED OBJECT

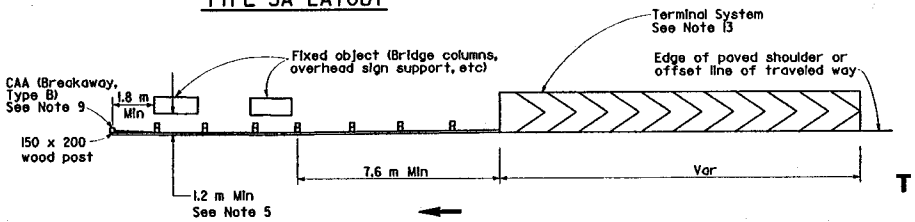
Use with Type 5A, 6A, and 8A layouts where minimum clearances specified in Note 5 cannot be obtained between the face of the guard railing and fixed object(s).



TYPE 5A LAYOUT



TYPE 6A LAYOUT



TYPE 8A LAYOUT
See Note 14

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA

To accompany plans dated _____

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

GUARD RAILING TYPICAL LAYOUTS

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A77E DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A77E DATED JULY 1, 1997-PAGE 40 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP A77E

STD. PLAN RSP A77E

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA

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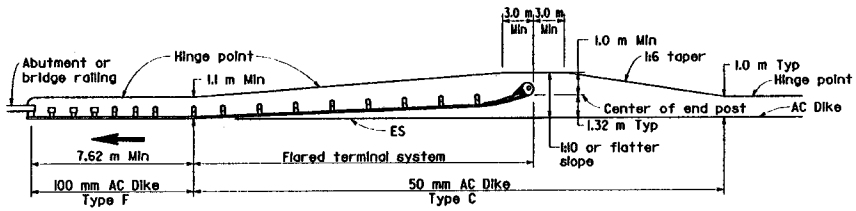
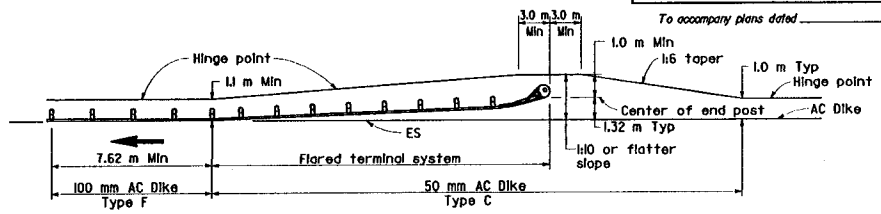


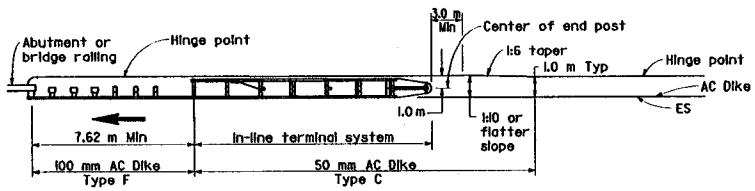
TYPICAL STRUCTURE APPROACH EMBANKMENT WIDENING AND DIKE PLACEMENT FOR FLARED END TREATMENT

See Notes 1 and 2



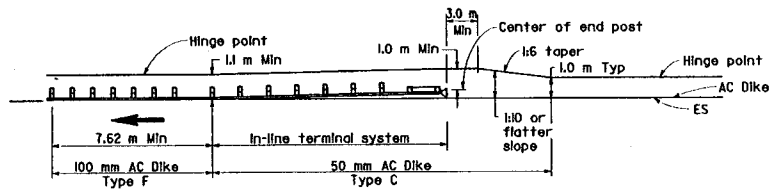
TYPICAL ROADWAY EMBANKMENT WIDENING AND DIKE PLACEMENT FOR FLARED END TREATMENT

See Notes 1 and 2



TYPICAL STRUCTURE APPROACH EMBANKMENT WIDENING AND DIKE PLACEMENT FOR IN-LINE END TREATMENT

See Notes 1 and 2

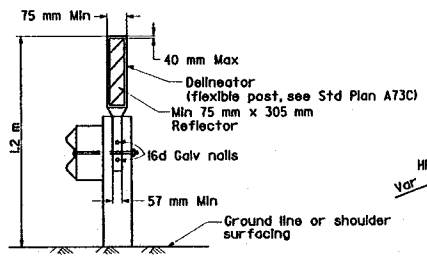


TYPICAL ROADWAY EMBANKMENT WIDENING AND DIKE PLACEMENT FOR IN-LINE END TREATMENT

See Notes 1 and 2

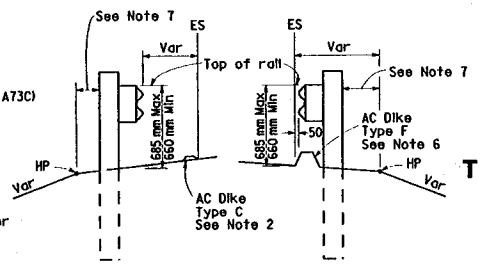
NOTES

1. For guard railing layout details, see Revised Standard Plans RSP A77D and RSP A77E.
2. When necessary to place dike in front of face of guard railing, only Type C dike may be used. For dike details, see Standard Plan A87.
3. For standard railing post embedment, see New Standard Plan NSP A77FA.
4. Guard railing delineation to be used where shown on the project plans.
5. Direction of traffic indicated by ⟶.
6. When dike or curb is placed under guard railing, the maximum height of the dike or curb shall be 100 mm. For dike and curb details, see Standard Plan A87.
7. For details of distance between the back of post and hinge point, see New Standard Plan NSP A77FA.



GUARD RAILING DELINEATION

See Note 4



DIKE POSITIONING

(See Note 2)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

METAL BEAM GUARD RAILING TYPICAL EMBANKMENT WIDENING FOR END TREATMENTS

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A77F DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A77F DATED JULY 1, 1997-PAGE 41 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP A77F

STD. PLAN RSP A77F

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

Ellis K. Hirst
No. C17926
Exp. 6-30-01
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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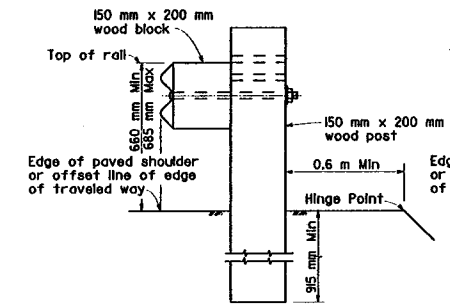
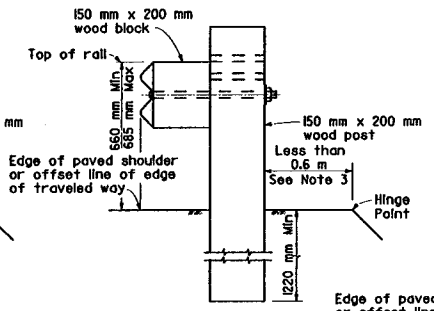
To accompany plans dated _____

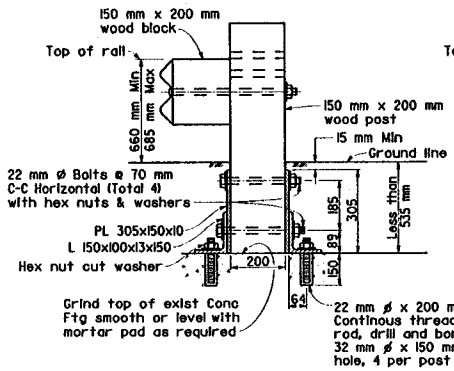


DETAIL A
TYPICAL ROADWAY EMBANKMENT INSTALLATION
See Note 1

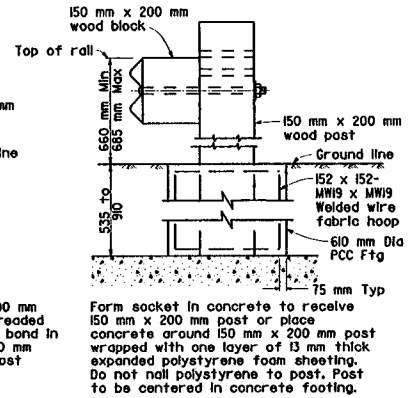


DETAIL B
NARROW ROADWAY EMBANKMENT INSTALLATION
See Note 1

POST EMBEDMENT

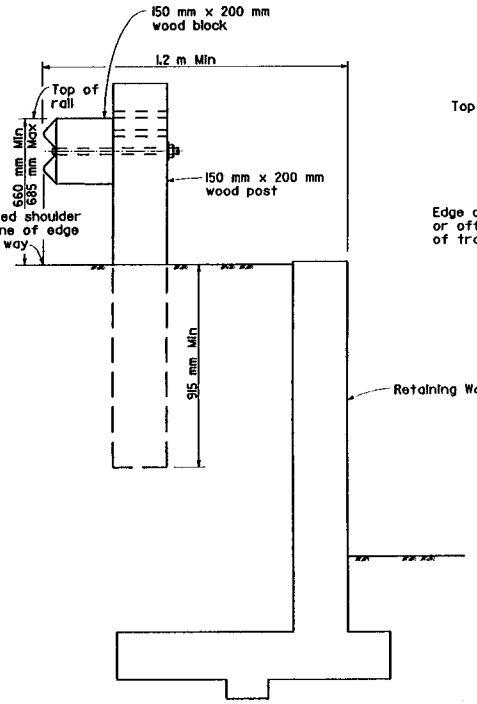


DETAIL C

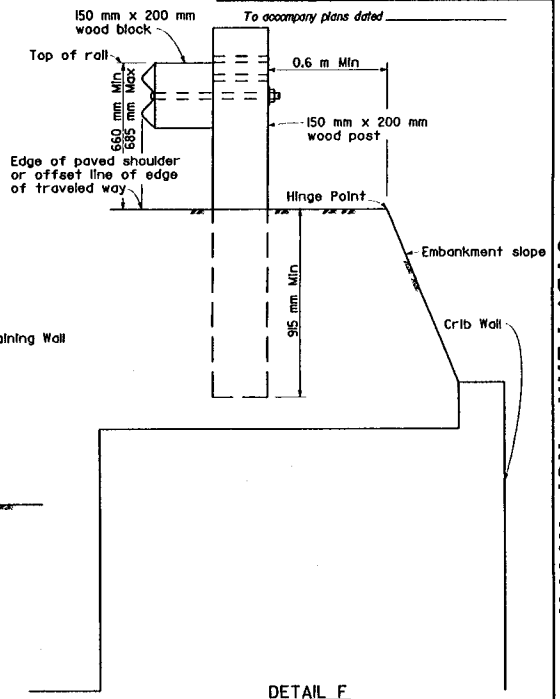


DETAIL D

POST FOOTINGS
See Note 4



DETAIL E



DETAIL F

INSTALLATION AT EARTH RETAINING WALLS

NOTES

1. For additional installation details, see Revised Standard Plan RSP A77A.
2. For additional details of wood post and blocks, see Revised Standard Plan RSP A77C.
3. Where the distance between the back of the post and the hinge point is less than 0.3 m, see the Project Plans for additional details.
4. Use these post footings where standard embedment of railing post is restricted by underground concrete facilities such as footing of walls, columns, etc. Use Detail C where embedment of post is less than 535 mm. Use Detail D where embedment of post is between 535 mm and 910 mm.
5. For dike positioning with guard railing installations, see Revised Standard Plan RSP A77F.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

METAL BEAM GUARD RAILING TYPICAL LINE POST INSTALLATION

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP A77FA DATED AUGUST 6, 1998 SUPPLEMENTS THE STANDARD PLANS BOOK DATED JULY 1997

NEW STANDARD PLAN NSP A77FA

STD. PLAN NSP A77FA

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA

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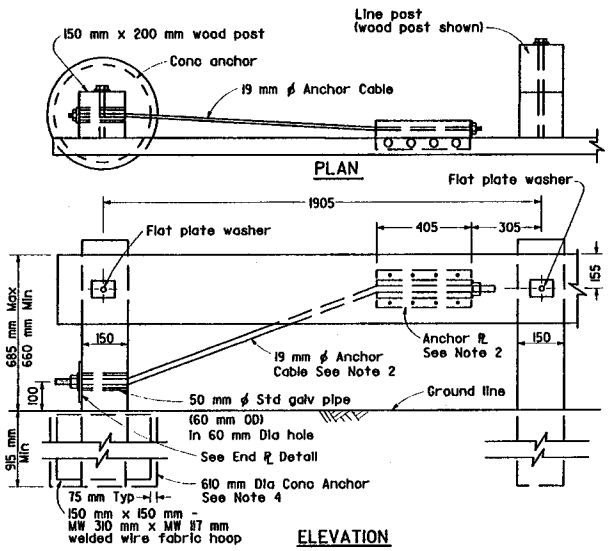
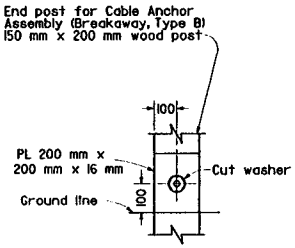


ELEVATION

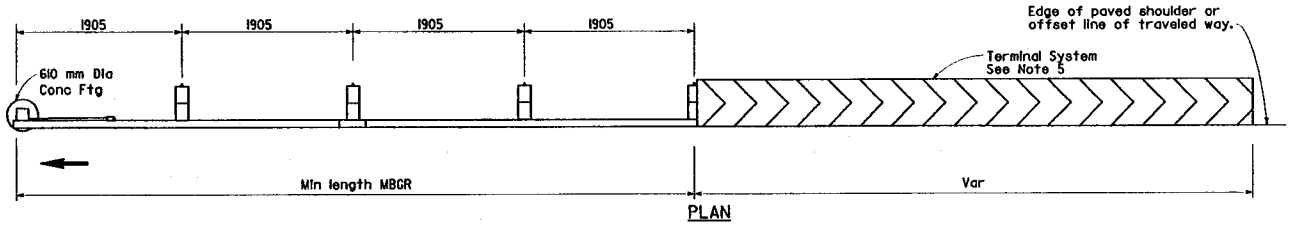
CABLE ANCHOR ASSEMBLY
(BREAKAWAY, TYPE B)



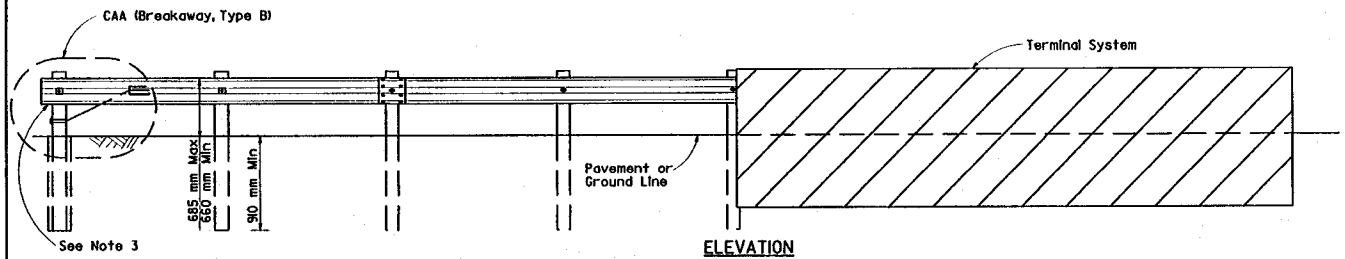
END PLATE DETAIL

NOTES

1. Cable anchor assembly (Breakaway, Type B) is typically used on the trailing end of guard railing for embankment installations except two-way road beds less than 18 m in width. See Revised Standard Plans RSP A77D and A77E.
2. For details of the anchor plate and 19 mm cable, see Standard Plan A77H.
3. Terminal sections not to be installed on trailing end of guard railing constructed adjacent to one-way roadway.
4. For concrete anchor, form socket in concrete to receive 150 mm x 200 mm post or place concrete around 150 mm x 200 mm post wrapped with one layer of 13 mm thick expanded polystyrene foam sheeting. Do not nail polystyrene to post. Post to be centered in concrete footing.
5. For type of terminal system and guard railing layout to be used, see Project Plans and Special Provisions.
6. Direction of traffic indicated by ⟶.



PLAN



ELEVATION

GUARD RAILING LAYOUT WITH BREAKAWAY END ANCHOR
See Note 1

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

GUARD RAILING END ANCHOR (BREAKAWAY, TYPE B)

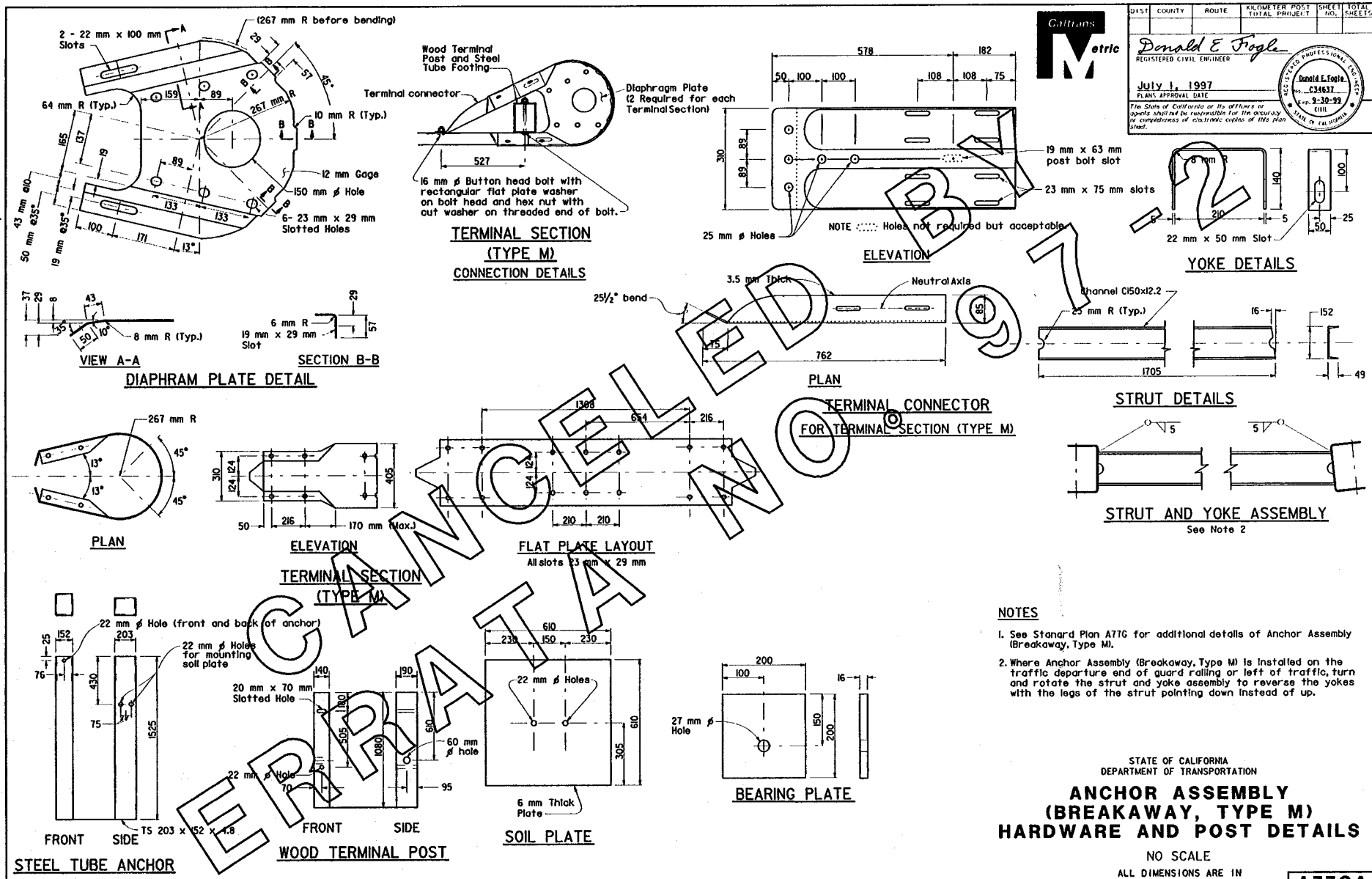
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A77G DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A77G DATED JULY 1, 1997-PAGE 42 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP A77G

STD. PLAN RSP A77G



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

Donald E Fogle
REGISTERED CIVIL ENGINEER

July 1, 1997
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER Donald E. Fogle No. C34637 Exp. 9-30-99 CIVIL STATE OF CALIFORNIA

NOTES

1. See Stanard Plan A77G for additional details of Anchor Assembly (Breakaway, Type M).
2. Where Anchor Assembly (Breakaway, Type M) is installed on the traffic departure end of guard railing or left of traffic, turn and rotate the strut and yoke assembly to reverse the yokes with the legs of the strut pointing down instead of up.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ANCHOR ASSEMBLY (BREAKAWAY, TYPE M) HARDWARE AND POST DETAILS

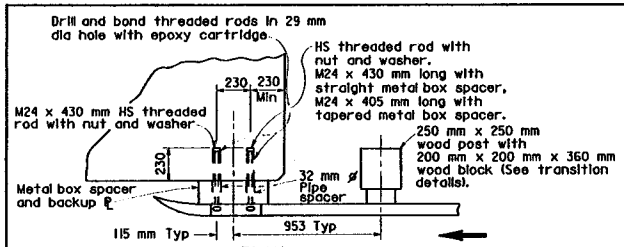
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

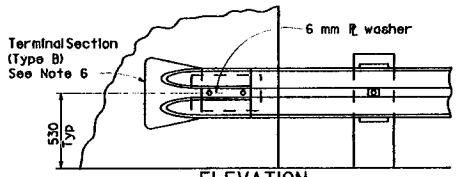
A77GA

STD. PLAN A77GA

CANCELED BY ERRATA NO 97-2

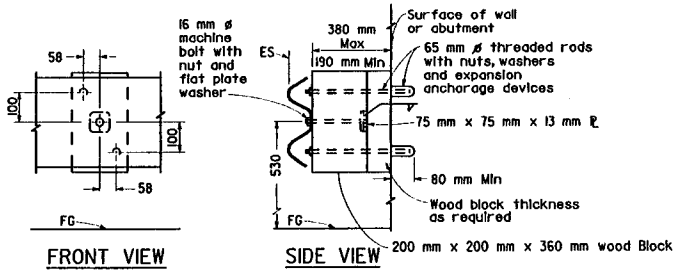


PLAN



ELEVATION

GUARD RAILING END CONNECTION TO WALL OR ABUTMENT FACE

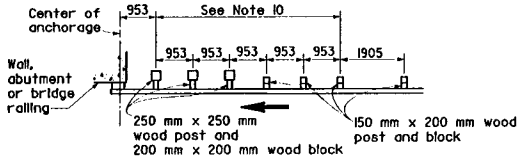


FRONT VIEW SIDE VIEW

ELEVATION

GUARD RAILING ANCHORAGE TO WALL OR ABUTMENT FACE

(Use this type of anchorage where guard railing is required across face of wall or abutment)
See Notes 8 and 9



APPROACH RAILING TRANSITION

Wood post and blocks

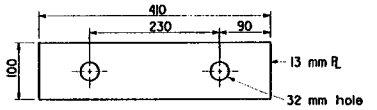
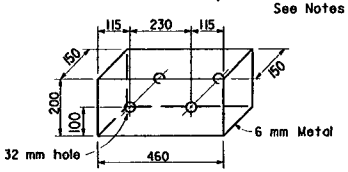


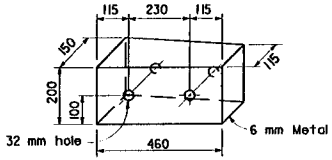
PLATE WASHER

(For backside of bridge railing)



STRAIGHT METAL BOX SPACER

Use where approach guard railing is parallel to bridge railing, wall or abutment face at the point of connection.
See Note 5



TAPERED METAL BOX SPACER

Use where approach guard railing is not parallel to bridge railing, wall or abutment face at the point of connection.
See Note 5

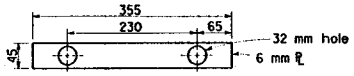
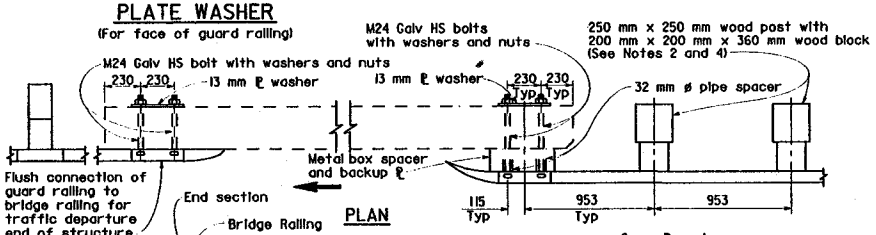


PLATE WASHER

(For face of guard railing)



PLAN

CONNECTION DETAIL B

See Note 7

CONNECTION DETAIL A

See Note 7

ELEVATION

GUARD RAILING CONNECTION TO BRIDGE RAILING

NOTES

1. These connection details apply to bridge railings, abutments and retaining walls. For additional connection details for bridge railing, see Standard Plan B11-53 and B11-54 and the project plans. See Revised Standard Plan RSP A77K for connection details to bridges with sidwalks or curbs.
2. Additional details of post, blocks and hardware are shown on Revised Standard Plans RSP A77B and RSP A77C.
3. Direction of traffic indicated by ⟶
4. For traffic approach railing details, see Type IA layout on Revised Standard Plan RSP A77D and the "Approach Railing Transition Details" on this plan.
5. When metal box spacer is installed, place M24 bolts through 32 mm ø x 125 mm and 32 mm ø x 100 mm pipe spacers within tapered box spacer and place M24 bolts through 32 mm ø x 130 mm pipe spacers within straight box spacer.
6. Terminal sections not to be installed on trailing end of approach guard railing constructed adjacent to one-way roadways. When terminal section is not installed, use backup plate between rail element and metal box spacer. See Revised Standard Plan RSP A77B for backup plate details.
7. In addition to the use of "Connection Detail B" for traffic departure ends of structure, "Connection Detail B" shall be used on the traffic approach ends of structure on two-way roadways which are 18 m or less in width. Where "Connection Detail B" is used at the traffic approach ends of structures, the size and spacing of posts and blocks shall be as shown in the "Approach Railing Transition" detail on this plan.
8. Use timber shims without posts where clearance between rail element and wall or abutment is less than 380 mm.
9. Do Not attach railing to bridge columns. Use separate posts as shown on Revised Standard Plan RSP A77E.
10. Use a flat plate washer on the rail face when attaching rail element to these posts.

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REGISTERED CIVIL ENGINEER

August 6, 1998
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REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

GUARD RAILING CONNECTIONS TO BRIDGE RAILINGS, RETAINING WALLS AND ABUTMENTS

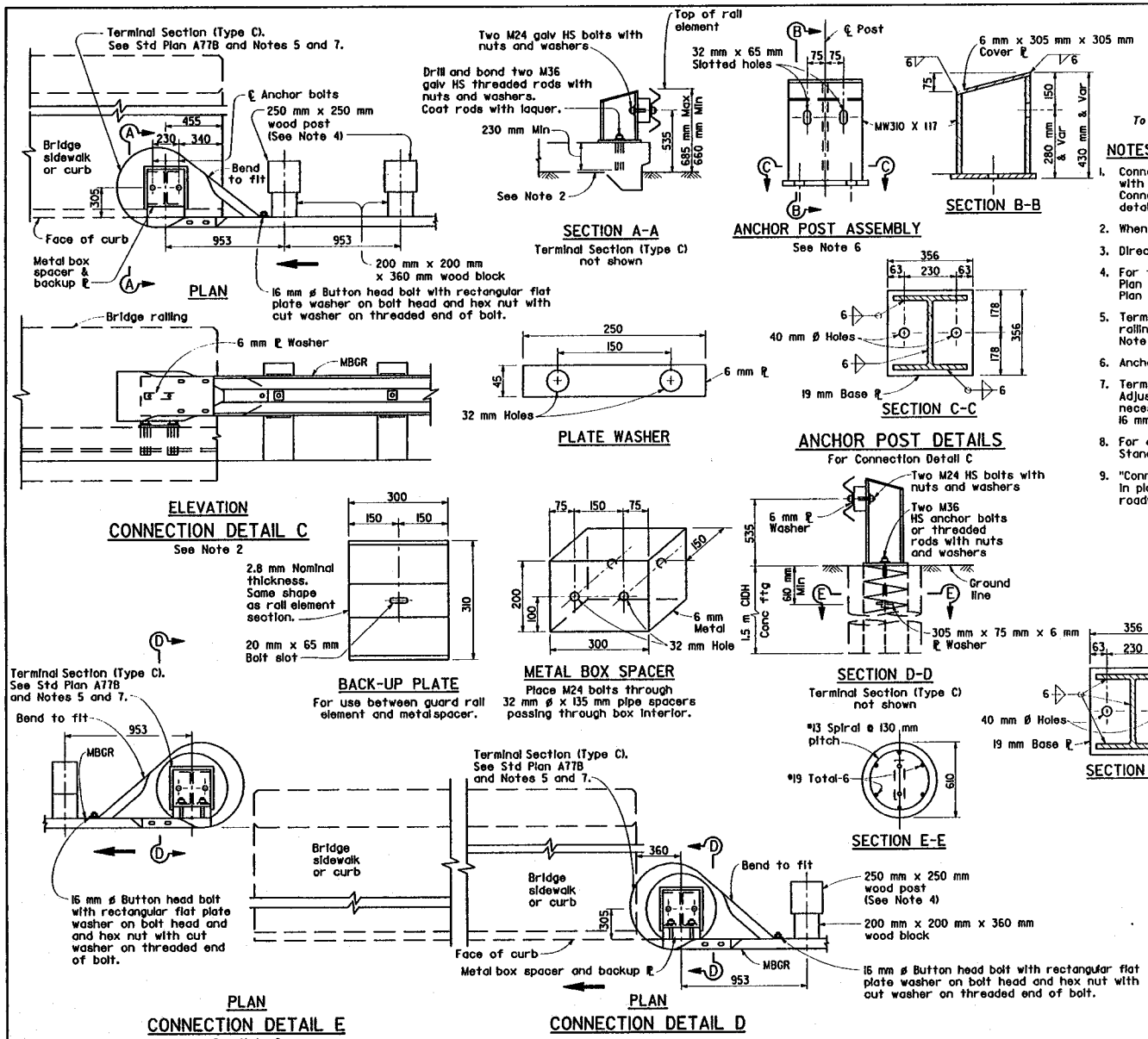
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A77J DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A77J DATED JULY 1, 1997-PAGE 46 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP A77J

STD. PLAN RSP A77J



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NOTES

1. Connection Details C and D applies to the traffic approach end of bridges with sidewalks or curbs. For traffic departure end of bridges, see Connection Detail E. See Revised Standard Plan RSP A77J for connection details to bridges without sidewalks or curbs.
2. When curb or sidewalk depth is less than 230 mm, use Connection Detail D.
3. Direction of traffic indicated by ⟶
4. For traffic approach railing details, see Type IA layout on Revised Standard Plan RSP A77D and "Approach Railing Transition Details" on Revised Standard Plan RSP A77J.
5. Terminal sections not to be installed on the trailing end of approach guard railing constructed adjacent to one-way roadways, except as provided in Note 7.
6. Anchor post assembly to be galvanized after fabrication.
7. Terminal Section (Type C) to be used where pedestrian traffic is present. Adjust positioning of Terminal Section (Type C) to encircle anchor post. Drill necessary holes in rail element to attached Terminal Section (Type C) with 16 mm ø button head bolts with hex nuts and cut washers (5 per connection).
8. For additional connection details for bridge barrier railing, see Standard Plans B11-53 and B11-54 and the project plans.
9. "Connection Detail B" shown on Revised Standard Plan RSP A77J may be used in place of "Connection Detail E" for structures with walkways on two-way roadway 18 m or less in width.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

GUARD RAILING CONNECTIONS TO BRIDGE SIDEWALKS AND CURBS

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A77K DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A77K DATED JULY 1, 1997-PAGE 47 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP A77K

STD. PLAN RSP A77K

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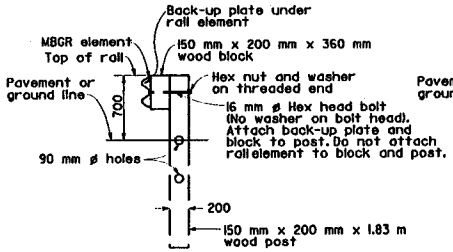
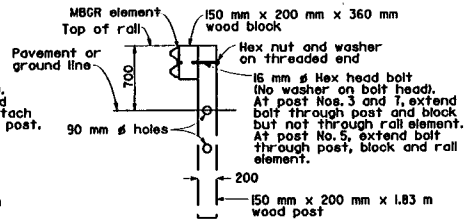
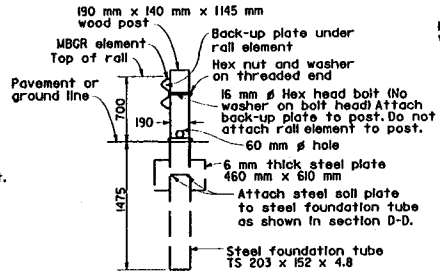


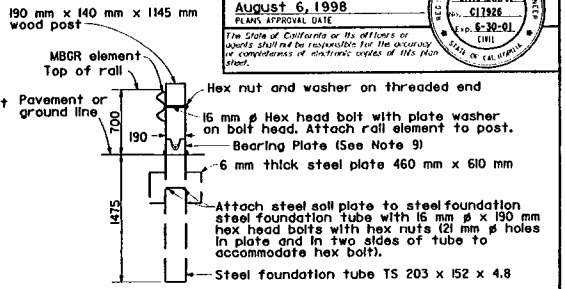
SECTION A-A



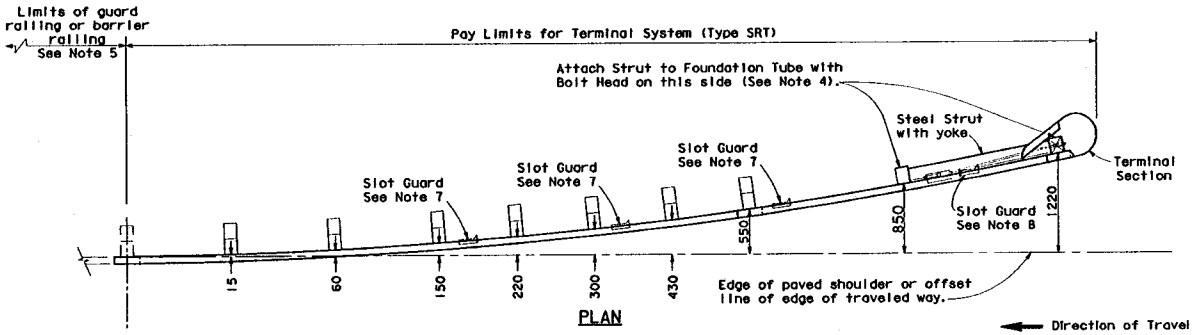
SECTION B-B



SECTION C-C

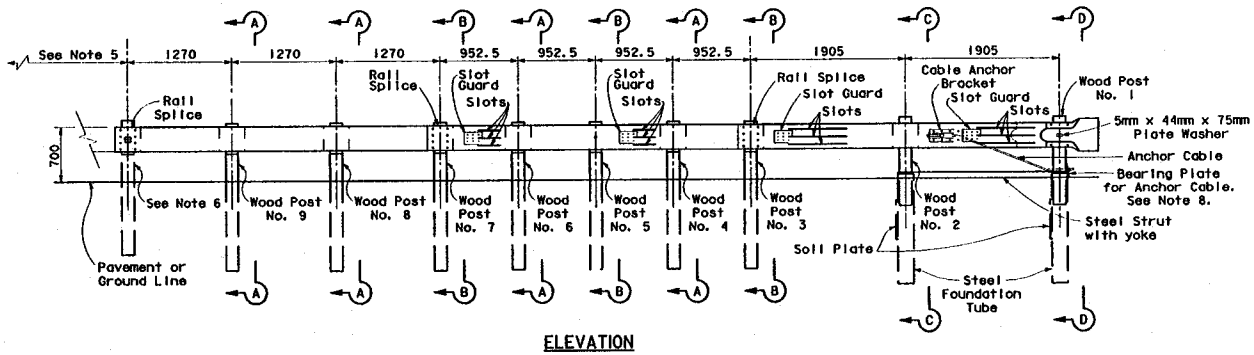


SECTION D-D
(Terminal Section not shown)



PLAN

Direction of Travel



ELEVATION
TERMINAL SYSTEM (TYPE SRT)
See Note 9

NOTES:

1. For additional details of Terminal System (Type SRT), refer to the manufacturer's installation instructions.
2. The post offset dimensions are given to the center of the traffic face of the block, except at the first two posts, where the dimension is to the center of the traffic face of the post. Offset points are to be located by chord measurements at the back of the rail equal to the nominal post spacings shown. Posts are to be set approximately radial to the railing at each post location.
3. Do not attach rail elements to posts 2, 3, 4, 6, 7, 8 and 9.
4. Attach strut to Post Nos. 1 and 2 foundation tubes with 16 mm ø hex head bolts, washers and hex nuts. Bolts extend through the strut, steel foundation tube, and wood posts.
5. For the length and type of guard railing or barrier the terminal system is attached to, see the Project Plans. For minimum length of guard railing used with terminal system end treatments, see Revised Standard Plans RSP A77D and RSP A77E.
6. Attach rail element to this post and block. Payment for this post, block and hardware is included in payment for the type of railing or barrier the terminal system is attached to, not part of payment for Terminal System (Type SRT).
7. The deflector angle of the slot guard is to be positioned immediatley downstream of the slots.
8. For bearing plate orientation, refer to the manufacturer's installation instructions.
9. Terminal system (Type SRT) is a flared end treatment for guard railing or barrier railing. See Type 1A and 1B Layouts on Revised Standard Plan RSP A77D and Type 8A Layout on Revised Standard Plan RSP A77E for typical use of this terminal system with guard railing. See Revised Standard Plan RSP A78E for typical use of this terminal system with single thrie beam barrier.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

GUARD RAILING AND BARRIER RAILING END TREATMENT

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP A77L DATED AUGUST 6, 1998 SUPPLEMENTS THE STANDARD PLANS BOOK DATED JULY 1997

NEW STANDARD PLAN NSP A77L

STD. PLAN NSP A77L

NOTES:

1. For additional details of Terminal System (Type ET), refer to the manufacturer's installation instructions.
2. Terminal System (Type ET) must be constructed so that the full length of the terminal system guard railing is in straight alignment. The Guard Rail Extruder head of the terminal system should not encroach upon the adjacent paved shoulder or lane. A traffic approach flare of 50:1 for the full length of Terminal System (Type ET) installation shall be used to keep the Guard Rail Extruder head from encroaching upon the adjacent paved shoulder or lane.
3. Slide Guard Rail Extruder over the end of the rail element and attach to Post No. 1 with lag screws. Guard Rail Extruder attachment brackets have 3 holes in each bracket to provide tolerance adjustments. Use the holes in the bracket closest to center of Post No. 1. Drill 6 mm pilot holes to accommodate lag screws.
4. Attach strut to Post Nos. 1 and 2 foundation tubes with hex head bolts, washers and hex nuts. Bolts extend through the strut, steel foundation tube, and wood posts. Channel side of strut to face downward.
5. For length and type of guard railing or barrier the terminal system is attached to, see Project Plans. For minimum length of guard railing used with terminal system end treatments, see Revised Standard Plans RSP A77D and RSP A77E.
6. Attach rail element to this post and block. Payment for this post, block and hardware included in payment for the type of railing or barrier the terminal system is attached to, not part of the payment for Terminal System (Type ET).
7. Yellow retroreflective sheeting, as provided by Terminal System (Type ET) manufacturer, shall be adhered to the face of extruder head. The sheeting shall be consistent with the design pattern and colors of a TYpe P object marker panel.
8. Attach rail to Post No. 2 (no wood block) in same manner shown in section A-A. Do not bolt rail to Post No. 1, see Note 3.
9. Terminal System (Type ET) is an in-line end treatment for guard railing or barrier railing where site conditions will not accomodate use of a flared end treatment. Do not use Terminal System (Type ET) where extrusion of the rail on the back side of the installation would be in the path of pedestrian or vehicular traffic.

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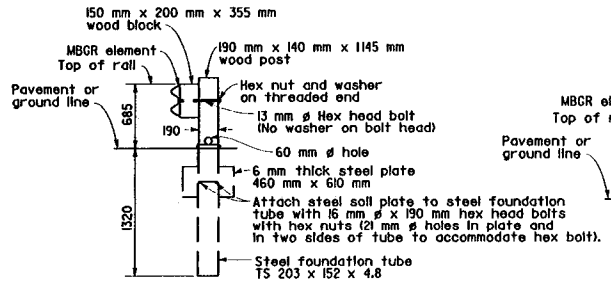
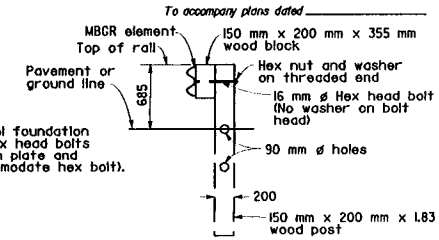
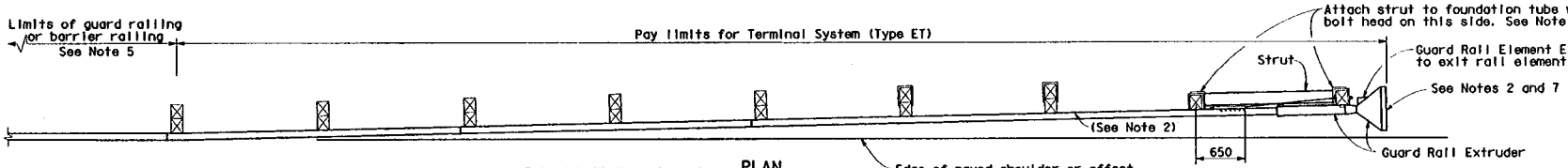


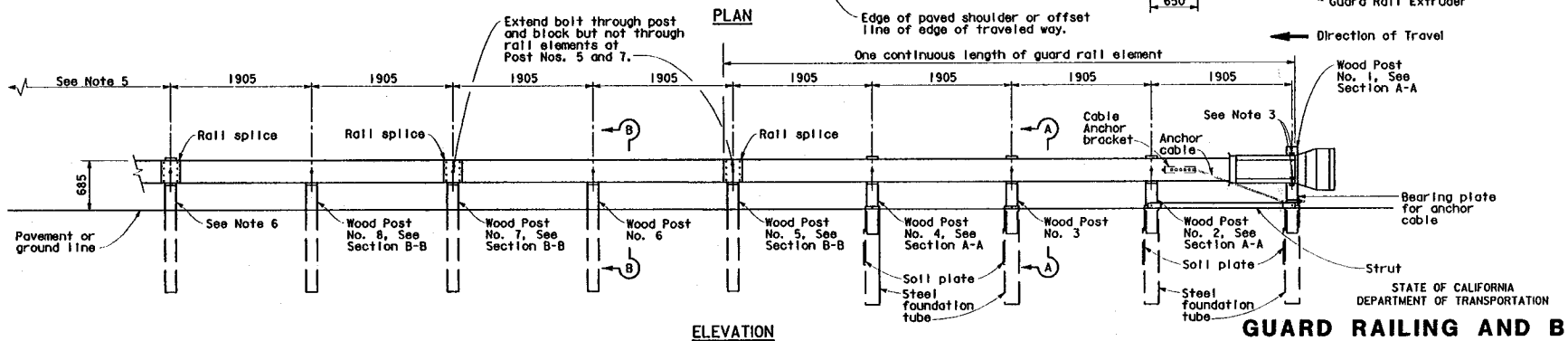
SECTION A-A
Soil plate and wood post attachment to steel foundation tube similar for Post Nos. 1, 2 and 4. Wood blocks not used with Post Nos. 1 and 2. See Note 8.



SECTION B-B
Post Nos. 5, 7 and 8 similar except rail elements are not attached to Post Nos. 5 and 7.



PLAN



ELEVATION
TERMINAL SYSTEM (TYPE ET)
See Note 9

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

GUARD RAILING AND BARRIER RAILING END TREATMENT

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP A77M DATED AUGUST 6, 1998 SUPPLEMENTS THE STANDARD PLANS BOOK DATED JULY 1997

NEW STANDARD PLAN NSP A77M

STD. PLAN NSP A77M

NOTES:

1. For additional details of Terminal System (Type CAT), refer to the manufacturer's installation instructions.
2. Terminal System (Type CAT) is to be used as an in-line end treatment for guard railing or barrier where site conditions will not accommodate use of a flared end treatment. Terminal System (Type CAT) to be used only in locations where there will be traffic on one side of the terminal system. For those locations where traffic would be on both sides of the CAT system, use New Standard Plan NSP A82.
3. The Terminal System Backup is required for all Terminal System (Type CAT) installations. This allows the slotted rail elements to slide over the face of the unslotted rail elements.
4. For length and type of railing or barrier the terminal system is attached to, see Project Plans. For minimum length of guard railing used with terminal system end treatments, see Revised Standard Plans RSP A77D and RSP A77E.
5. Both of the 3.43 mm thick slotted rail elements have an attachment plate welded to the back side of one end of each rail element. Attach the welded plate end of the rail elements to Post No. 4 prior to splicing the 2.67 mm thick slotted rail element over the 3.43 mm thick slotted rail element.
6. The 2.67 mm thick slotted rail elements have four 19 mm diameter holes near one end of the rail elements for the attachment of the spacer channel. Attach this end of the rail elements to Post No. 2.
7. For details of the anchor plate and 19 mm cable attached to Post No. 6, see Standard Plan A77H.
8. Attach steel soil plate to steel foundation tube with 16 mm ø x 190 mm hex head bolts with hex nuts (21 mm ø holes in plate and in two sides of tube to accommodate hex bolts).
9. The 150 mm x 200 mm knockout tube is to be located 100 mm down from top of wood post. Attach the knockout tube to the post with two 10 mm ø lag screws and flat washers.
10. Attach strut to Post Nos. 1 and 2 foundation tubes with 16 mm ø hex head bolts, washers, and hex nuts. Bolts extend through the strut, steel foundation tube, and wood posts.
11. Do not attach the rail elements to Post Nos. 3, 5 and 6.
12. Yellow retroreflective sheeting, as provided by the Terminal System (Type CAT) manufacturer, shall be adhered to the rounded end of nose plate. The sheeting shall be consistent with the design pattern and colors of a Type P object marker panel. The sheeting shall be positioned on the end of nose plate so that it is visible to approaching traffic.

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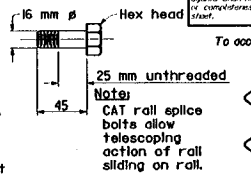
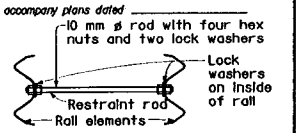
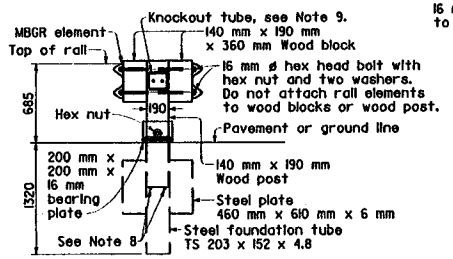


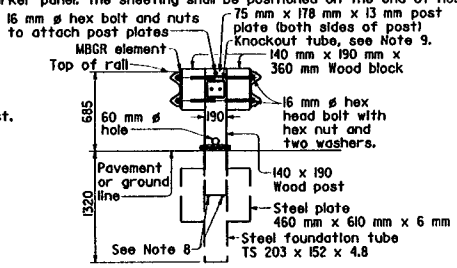
CAT RAIL SPLICE BOLT
Use at Post Nos. 4 and 6



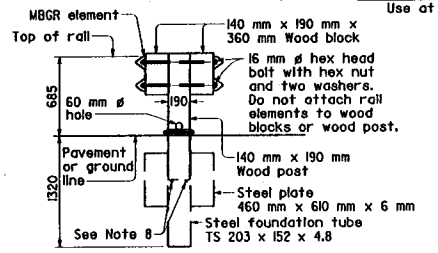
SECTION D-D



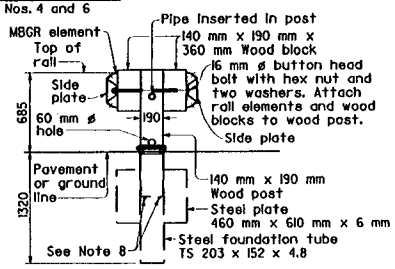
SECTION A-A



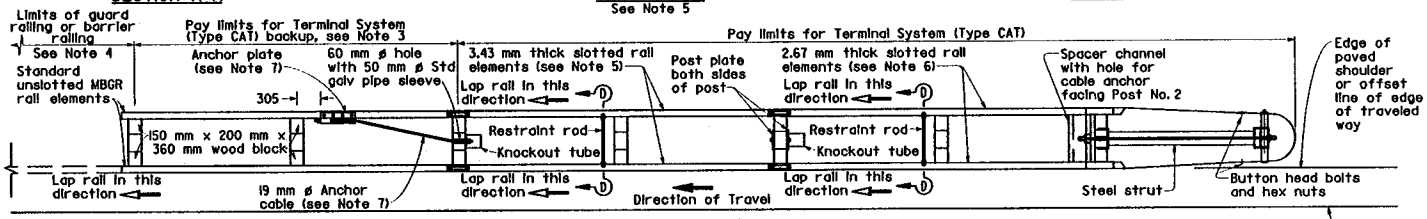
SECTION B-B
See Note 5



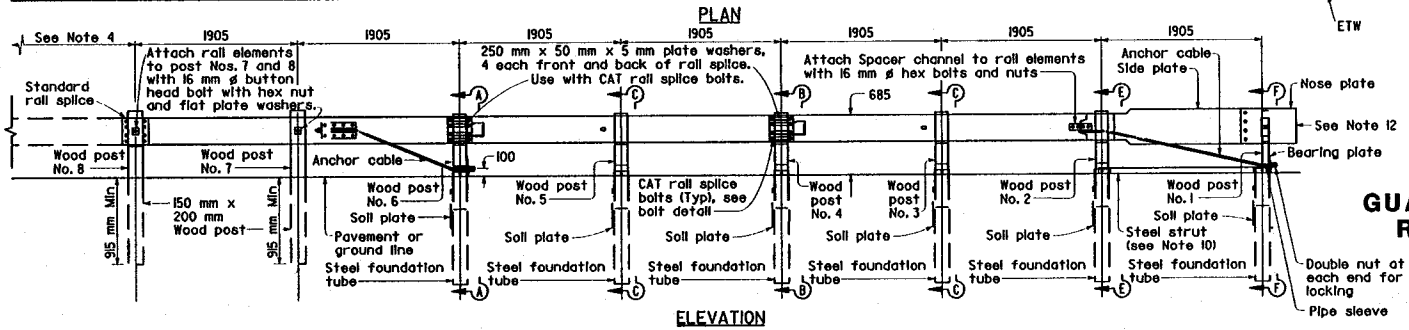
SECTION C-C



SECTION E-E

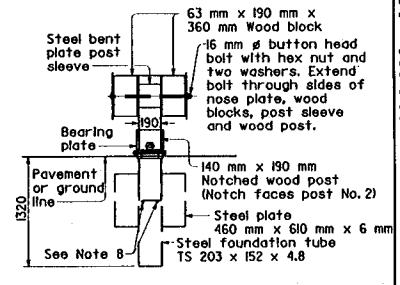


PLAN



ELEVATION

TERMINAL SYSTEM (TYPE CAT)
See Note 2



SECTION F-F

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

GUARD RAILING AND BARRIER RAILING END TREATMENT

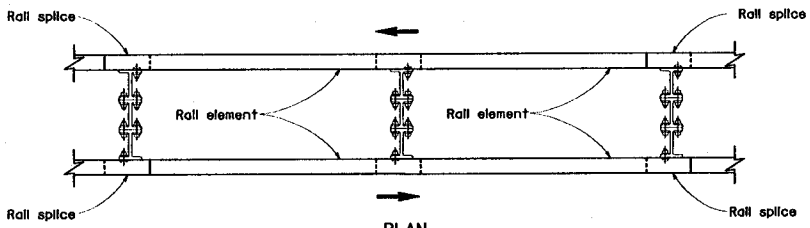
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

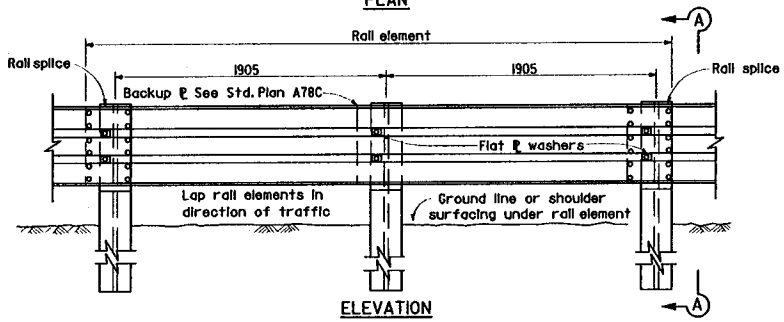
NSP A77N DATED AUGUST 6, 1998 SUPPLEMENTS THE STANDARD PLANS BOOK DATED JULY 1997

NEW STANDARD PLAN NSP A77N

STD. PLAN NSP A77N



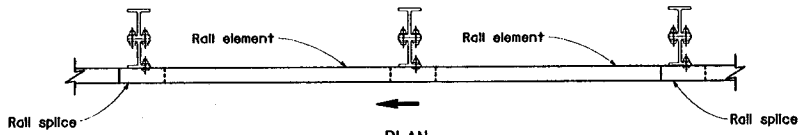
PLAN



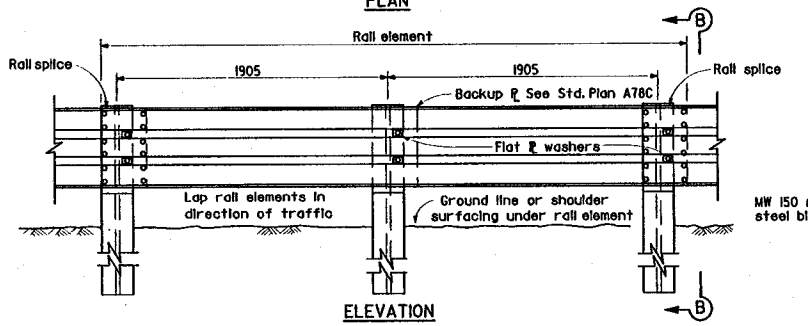
ELEVATION

DOUBLE THRIE BEAM BARRIER

(Steel post and block)
See Note 1



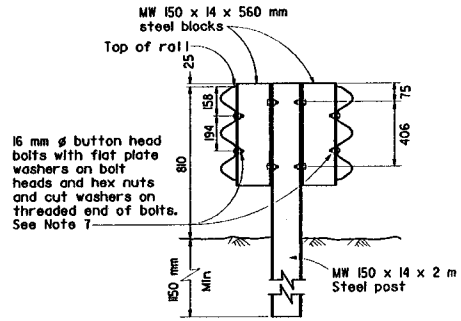
PLAN



ELEVATION

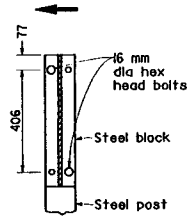
SINGLE THRIE BEAM BARRIER

(Steel post and block)
See Note 1



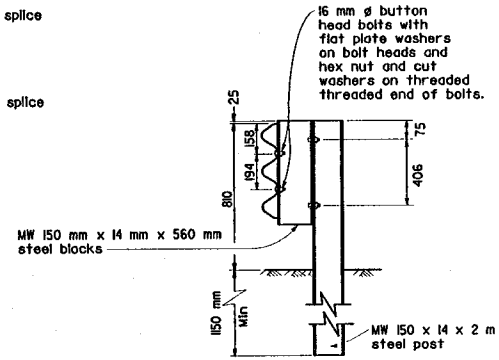
SECTION A-A

Each block attached to post with two 16 mm ø hex head bolts and hex nuts with cut washers. See Detail A and Note 8



DETAIL A

Steel block attachment to steel post



SECTION B-B

Block attached to post with two 16 mm ø hex head bolts and hex nuts with cut washers. See Detail A and Note 8

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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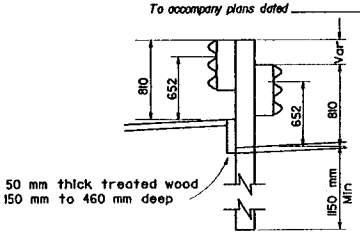
To accompany plans dated _____



DOUBLE THRIE BEAM BARRIER
SAW TOOTH INSTALLATION

(Steel post and blocks only)
See Note 11

NOTES

1. For details of the cross section of the thrie beam rail element, rail element splicing, and details for wood post and block installations, see Standard Plan A78A.
2. For details of standard hardware, posts and blocks used to construct thrie beam barrier, see Standard Plan A78C.
3. Thrie beam barrier post spacing to be 1905 mm center to center, except as otherwise noted.
4. Top of barrier rail to be 810 mm above ground line or shoulder surfacing under the rail element.
5. For barrier end anchors and barrier connections, see Standard Plans A78E, A78F and A78G.
6. For connection to Concrete Barrier (Type 50), see Standard Plan A78H.
7. Rail mounts to block with 2 bolts on approaching traffic side of block and post web.
8. Block mounts to post with 2 bolts staggered. Lower bolt on approaching traffic side of block and post web.
9. Where standard embedment of barrier post is restricted by underground concrete facilities such as footing of walls, columns, etc., use post footing details on Standard Plan A77F.
10. For details of thrie beam barrier on bridge and thrie beam barrier at fixed object, see Standard Plan A78D.
11. Saw tooth installation to be used where offset roadway grades are encountered and height of rail element for each roadway cannot be obtained as shown in Section A-A.
12. Direction of traffic indicated by →

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

THRIE BEAM BARRIER

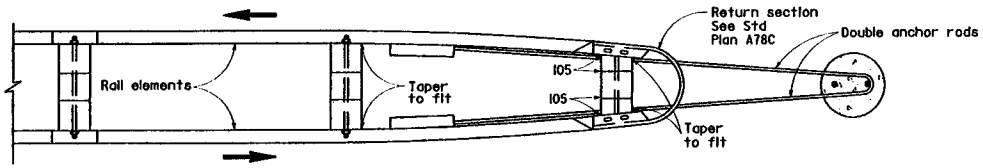
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

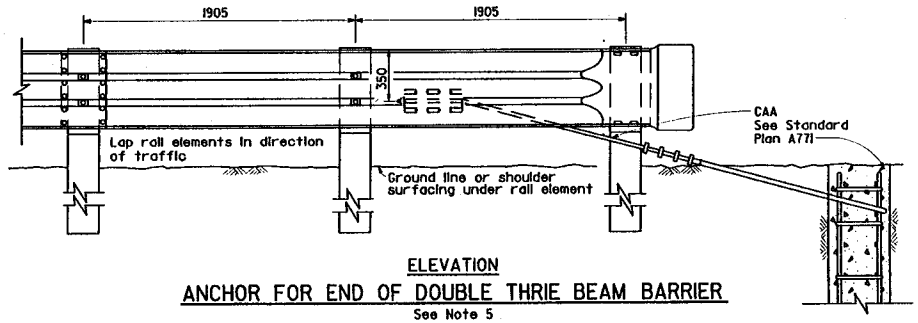
RSP A78B DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A78B DATED JULY 1, 1997-PAGE 49 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP A78B

STD. PLAN RSP A78B



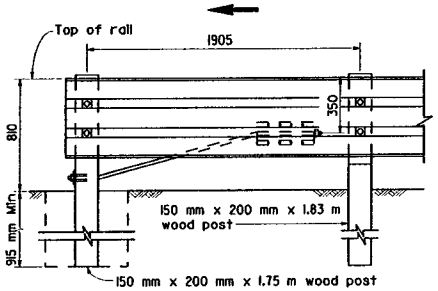
PLAN



ELEVATION

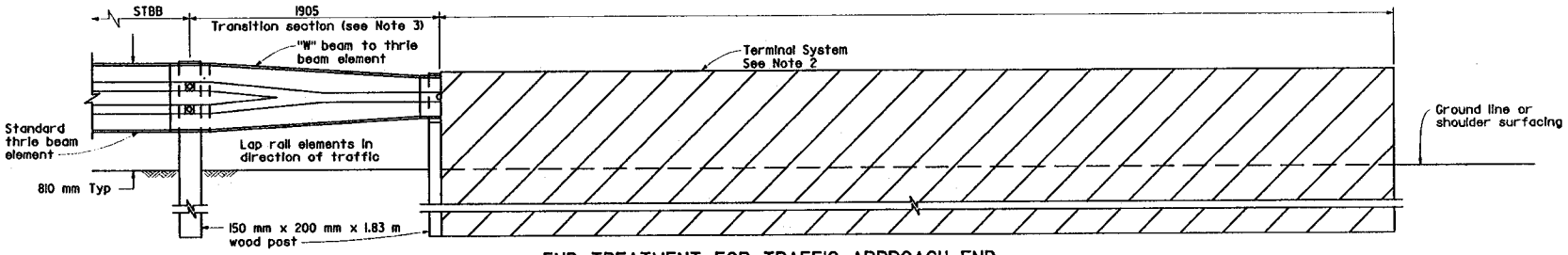
ANCHOR FOR END OF DOUBLE THRIE BEAM BARRIER

See Note 5



ANCHOR FOR TRAFFIC DEPARTURE END OF SINGLE THRIE BEAM BARRIER

(For one-way roadways)
See Note 1



END TREATMENT FOR TRAFFIC APPROACH END OF SINGLE THRIE BEAM BARRIER

See Note 6

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Ellis K. Hirst
REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Ellis K. Hirst
No. C17926
Exp. 6-30-01
CIVIL
STATE OF CALIFORNIA

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To accompany plans dated _____

NOTES

1. For anchor details, see Anchor Assembly (Breakaway, Type B) on Revised Standard Plan A77G.
2. For type of terminal system to be used, see Project Plans and Special Provisions.
3. The "W" beam to thrie beam section is required when the terminal system connection to the thrie beam barrier is a "W" beam rail.
4. For details of connection of thrie beam barrier to bridge, retaining walls and abutments, see Standard Plans A78F and A78G.
5. A crash cushion is required for the end of double thrie beam barrier, when the end of the barrier is within 9.0 m of the edge of the traveled way of approaching traffic. Where a crash cushion is required and the crash cushion attaches to end of the barrier, the CAA and return section may not be required (see Project Plans).
6. For details of a terminal system typically used as a flared end treatment, see New Standard Plan NSP A77L. For details of a terminal system typically used where site conditions will not accommodate a flared end treatment, see New Standard Plans NSP A77M and NSP A77N.
7. Direction of traffic indicated by ⟶.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

THRIE BEAM BARRIER END ANCHORS AND END TREATMENTS

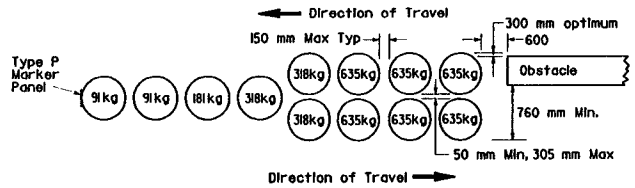
NO SCALE

ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

RSP A78E DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A78E
DATED JULY 1, 1997-PAGE 52 OF THE STANDARD PLANS BOOK DATED JULY 1997.

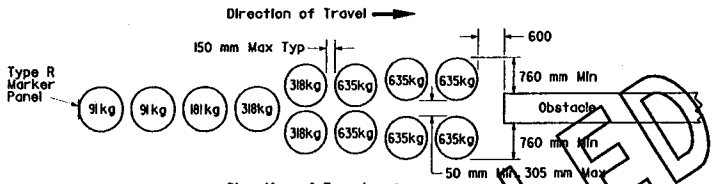
REVISED STANDARD PLAN RSP A78E

STD. PLAN RSP A78E



ARRAY 'A'

(APPROACH SPEED 70 km/h OR GREATER)



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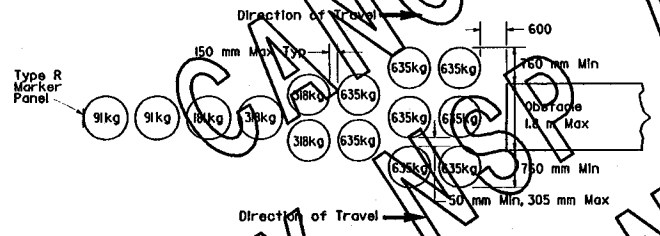

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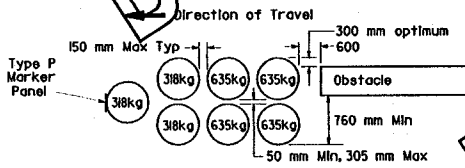

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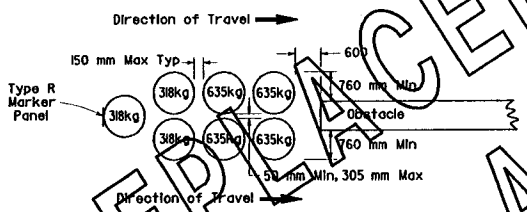
(APPROACH SPEED 65 km/h OR LESS)



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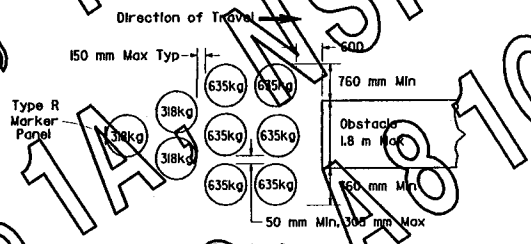

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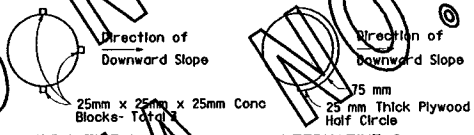
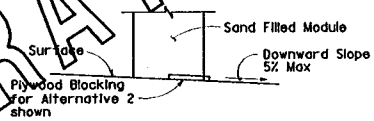
(APPROACH SPEED 65 km/h OR LESS)



ALTERNATIVE 1 ALTERNATIVE 2

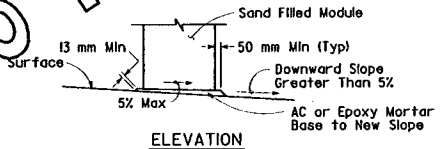
PLAN



ELEVATION

BRIDGE DECK MODULE BLOCKING DETAILS

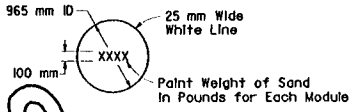
(SEE NOTE 8)



ELEVATION

SLOPED SEAT DETAIL

(SEE NOTE 6)



PAINTING DETAIL

(SEE NOTE 7)

NOTES

1. (XXX) indicates module location and weight of sand for each module.
2. All sand weights are nominal.
3. Each module is to contain amount of sand indicated, supported according to the manufacturer's instructions.
4. Arrays 'A', 'B' and 'C' are designed for 105 km/h.
5. Crash cushion array may be angled toward approaching traffic when traffic approaches on one side only (array 'A' and 'D'). Amount of angle not to exceed 10 degrees.
6. Modules shall be placed on asphalt concrete, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
7. Mass of sand and outline of each module shall be painted on the surface at each module location.
8. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
9. Place the top of the R marker panel 25 mm below the crash cushion lid. Place the type P marker panel so that the bottom of the panel is at the bottom of the module.

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Donald E Fogle
REGISTERED CIVIL ENGINEER

July 1, 1997
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER Donald E. Fogle No. C34637 Exp. 9-30-99 CIVIL STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CRASH CUSHION, SAND FILLED

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

A81

STD. PLAN A81

CANCELED, REPLACED BY NSP A81A NSP A81B AND NSP A81C ERRATA NO. 97-2

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst C17926 Exp. 6-30-01 Civil STATE OF CALIFORNIA

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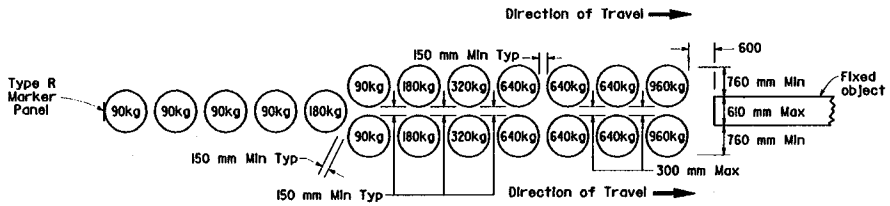
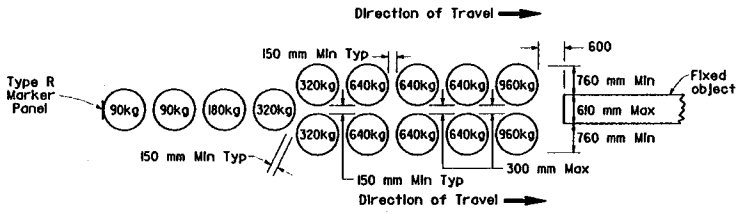
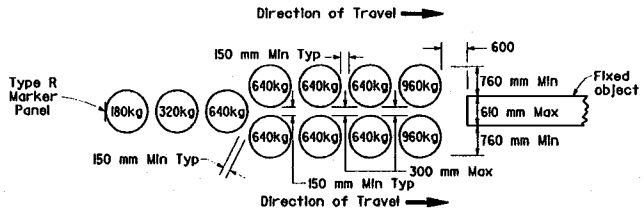
To accompany plans dated _____



ARRAY 'UA'
(APPROACH SPEED 110 km/h OR LESS)



ARRAY 'UB'
(APPROACH SPEED 80 km/h TO 90 km/h)



ARRAY 'UC'
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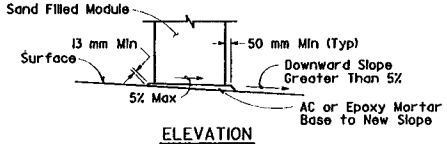
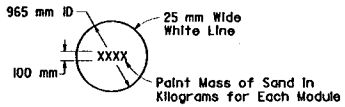
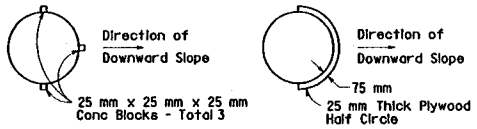


ELEVATION

SLOPED SEAT DETAIL
(See Note 4)

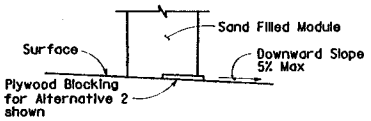


PAINTING DETAIL
(See Note 5)



ALTERNATIVE 1 ALTERNATIVE 2

PLAN



ELEVATION

BRIDGE DECK MODULE BLOCKING DETAILS
(See Note 6)

NOTES

1. (XXX) indicates module location and mass of sand in kilograms for each module. Module spacing is based on the greater diameter of the modules.
2. All sand masses are nominal.
3. Each module is to contain amount of sand indicated, supported according to the manufacturer's instructions.
4. Modules shall be placed on asphalt concrete, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
5. Mass of sand and outline of each module shall be painted on the surface at each module location.
6. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
7. Place the top of the Type R marker panel 25 mm below the module lid.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CRASH CUSHION, SAND FILLED (UNIDIRECTIONAL)

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP A81A, NSP A81B, AND NSP A81C DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A81 DATED JULY 1, 1997-PAGE 57 OF THE STANDARD PLANS BOOK DATED JULY 1997.

NEW STANDARD PLAN NSP A81A

STD. PLAN NSP A81A

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA

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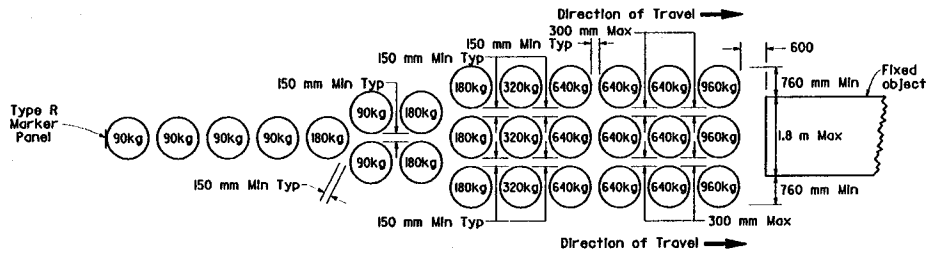
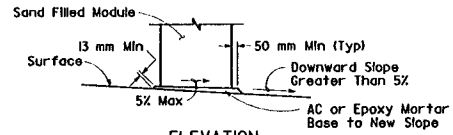
To accompany plans dated _____



ARRAY 'UD'

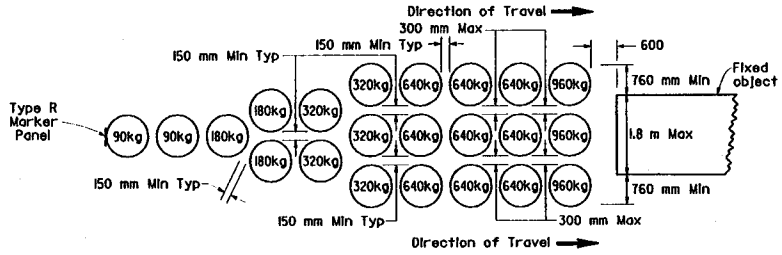
(APPROACH SPEED 110 km/h OR LESS)



ELEVATION

SLOPED SEAT DETAIL

(See Note 4)



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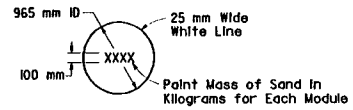
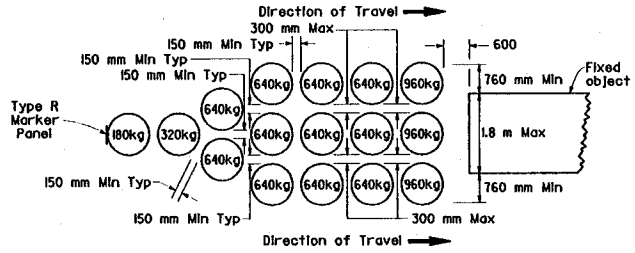
(APPROACH SPEED 80 km/h TO 90 km/h)



PAINTING DETAIL

(See Note 5)



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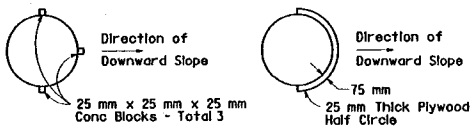
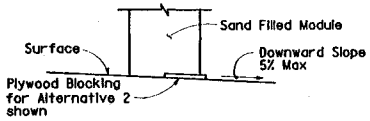
(APPROACH SPEED 70 km/h OR LESS)



ALTERNATIVE 1

ALTERNATIVE 2

PLAN



ELEVATION

BRIDGE DECK MODULE BLOCKING DETAILS

(See Note 6)

NOTES

1. (XXX) indicates module location and mass of sand in kilograms for each module. Module spacing is based on the greater diameter of the modules.
2. All sand masses are nominal.
3. Each module is to contain amount of sand indicated, supported according to the manufacturer's instructions.
4. Modules shall be placed on asphalt concrete, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
5. Mass of sand and outline of each module shall be painted on the surface at each module location.
6. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
7. Place the top of the Type R marker panel 25 mm below the module lid.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CRASH CUSHION, SAND FILLED (UNIDIRECTIONAL)

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP A81A, NSP A81B, AND NSP A81C DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A81 DATED JULY 1, 1997-PAGE 57 OF THE STANDARD PLANS BOOK DATED JULY 1997.

NEW STANDARD PLAN NSP A81B

STD. PLAN NSP A81B

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

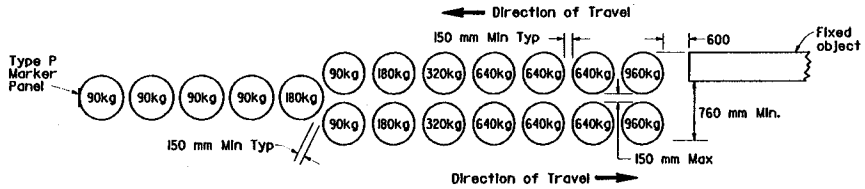
REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Ellis K. Hirst — No. C17926 — Exp. 6-30-01 — CIVIL — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

To accompany plans dated _____



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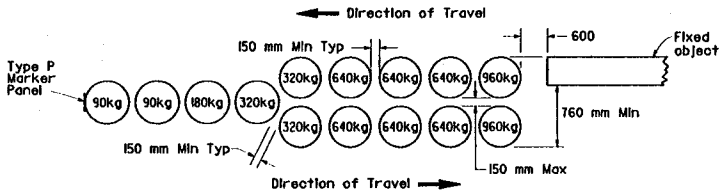
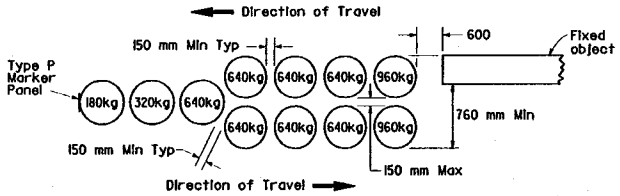
(APPROACH SPEED 110 km/h OR LESS)



ARRAY 'BB'

(APPROACH SPEED 80 km/h TO 90 km/h)



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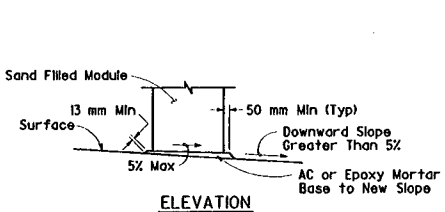
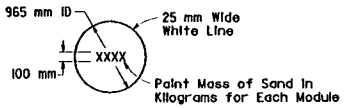


ELEVATION

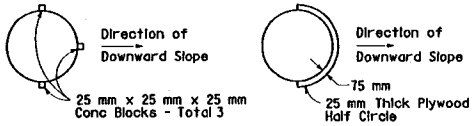
SLOPED SEAT DETAIL

(See Note 5)



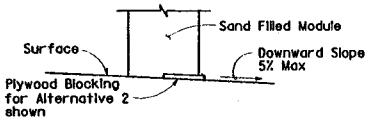
PAINTING DETAIL

(See Note 6)



ALTERNATIVE 1 ALTERNATIVE 2

PLAN



ELEVATION

BRIDGE DECK MODULE BLOCKING DETAILS

(See Note 7)

NOTES

1. (XXX) Indicates module location and mass of sand in kilograms for each module. Module spacing is based on the greater diameter of the module.
2. All sand masses are nominal.
3. Each module is to contain amount of sand indicated, supported according to the manufacturer's instructions.
4. Bidirectional crash cushion arrays may be angled toward approaching traffic. Amount of angle not to exceed 10 degrees.
5. Modules shall be placed on asphalt concrete, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
6. Mass of sand and outline of each module shall be painted on the surface at each module location.
7. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
8. Place the Type P marker panel so that the bottom of the panel is at the bottom of the module.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CRASH CUSHION, SAND FILLED (BIDIRECTIONAL)

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP A81A, NSP A81B, AND NSP A81C DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN A81 DATED JULY 1, 1997-PAGE 57 OF THE STANDARD PLANS BOOK DATED JULY 1997.

NEW STANDARD PLAN NSP A81C

STD. PLAN NSP A81C

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

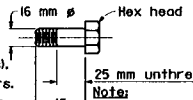
Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

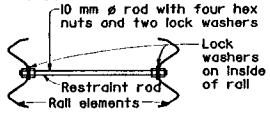
To accompany plans dated _____

NOTES:

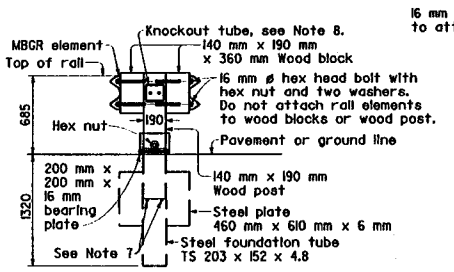
1. For additional details of Crash Cushion (Type CAT), refer to the manufacturer's installation instructions.
2. Crash Cushion (Type CAT) may be used at sites where the sides of the crash cushion would be exposed to opposing directions of travel (bidirectional traffic) or the same direction of travel (unidirectional traffic). For locations where traffic would only be on one side of the CAT system, use the New Standard Plan NSP A77N.
3. The Crash Cushion Backup is required for all Crash Cushion (Type CAT) installations. This allows the slotted rail elements to slide over the face of the unslotted rail elements.
4. For length and type of railing or barrier the crash cushion is attached to, see Project Plans.
5. Both of the 3.43 mm thick slotted rail elements have an attachment plate welded to the back side of one end of each rail element. Attach the welded plate end of the rail elements to Post No. 4 prior to splicing the 2.67 mm thick slotted rail element over the 3.43 mm thick slotted rail element.
6. The 2.67 mm thick slotted rail elements have four 19 mm diameter holes near one end of the rail elements for the attachment of the spacer channel. Attach this end of the rail elements to Post No. 2.
7. Attach steel soil plate to steel foundation tube with 16 mm ø x 190 mm hex head bolts with hex nuts (21 mm ø holes in plate and in two sides of tube to accommodate hex bolts).
8. The 150 mm x 200 mm knockout tube is to be located 100 mm down from top of wood post. Attach the knockout tube to the post with two 10 mm ø lag screws and flat washers.
9. Attach strut to Post Nos. 1 and 2 foundation tubes with 16 mm ø hex head bolts, washers, and hex nuts. Bolts extend through the strut, steel foundation tube, and wood posts.
10. Do not attach the rail elements to Post Nos. 3, 5 and 6.
11. Yellow retroreflective sheeting, as provided by the Crash Cushion (Type CAT) manufacturer, shall be adhered to the rounded end of nose plate. The sheeting shall be consistent with the design pattern and colors of a Type P object marker panel for unidirectional traffic and that of a TYPE R object marker panel for bidirectional traffic. The sheeting shall be positioned on the end of nose plate so that it is visible to approaching traffic.



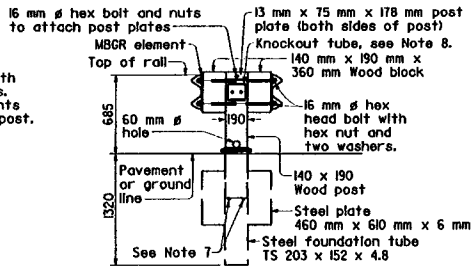
CAT RAIL SPLICE BOLT
Use at Post Nos. 4 and 6



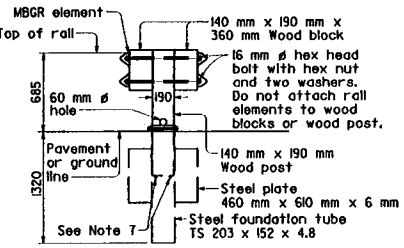
SECTION D-D



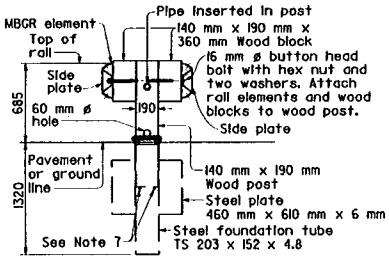
SECTION A-A



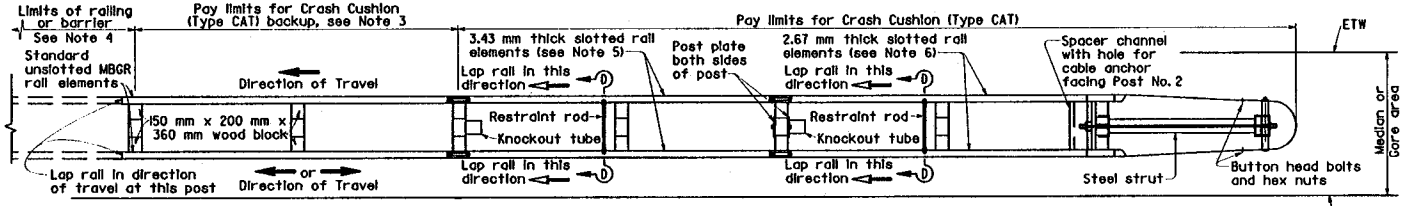
SECTION B-B
See Note 5



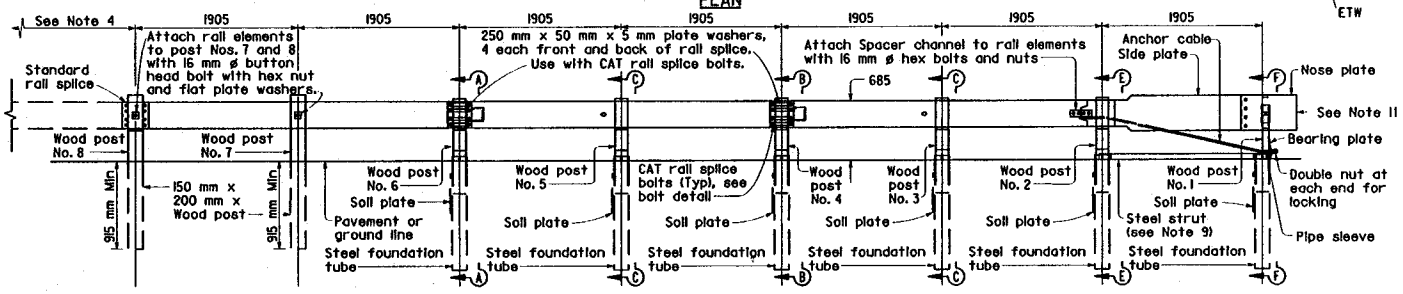
SECTION C-C



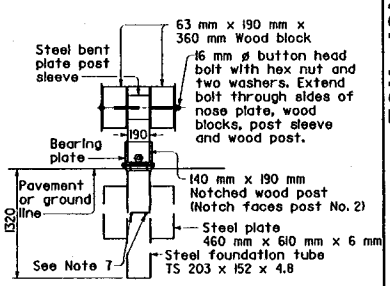
SECTION E-E



PLAN



ELEVATION
CRASH CUSHION (TYPE CAT)
See Note 2



SECTION F-F

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CRASH CUSHION (TYPE CAT)

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP A82 DATED AUGUST 6, 1998 SUPPLEMENTS THE STANDARD PLANS BOOK DATED JULY 1997

NEW STANDARD PLAN NSP A82

STD. PLAN NSP A82

DESIGN NOTES

Specifications:
Design:
Bridge Design Specification (1983 AASHTO Specifications with revisions by Caltrans)
Load Factors: 1.5 D + 1.5 E + 2.5 (L + I)
Where D=Dead Load
E=Earth Load
L=Live Load
I=Impact
Capacity reduction factor is included.

Loading:
Live load:
HS20-44 truck
Apply impact only to the roof slab.

Earth Cover (mm)	Impact (%)
Up to 300	30
301 to 600	20
601 to 900	10
Over 900	0

No surcharge on walls due to live load.
Earth load:
Earth pressures for two conditions:
22.0 kPa/m vertical, 6.6 kPa/m horizontal.
22.0 kPa/m vertical, 22.0 kPa/m horizontal.

Unit stresses:
f'_c = 25 MPa
f_y = 400 MPa

Distribution "d" bars:
Up to and including 3.0 m cover
Expressed as a percent of main positive reinforcement required: $\frac{100}{\sqrt{S}}$, max 50% (unless traffic longitudinal).
Over 3.0 m cover
#13 @ 450 mm maximum.

Shear:
Maximum allowable shear, $v_c = 0.29\sqrt{f'_c}$, MPa

Exclusions:
Compressive reinforcement and negative-moment reduction (for continuity) do not apply.
Axial loading on members has not been considered.

CONSTRUCTION NOTES

Construction loads:
Strutting required as shown on Standard Plan D88. Strutting may be required on culvert extensions when existing parapet is removed.

Expansion joints:
Invert:
No expansion joints shall be permitted.
Roof and Walls:
When cover is less than span length-
Place 13 mm expansion joint filler at 9 m± centers outside the paved roadway lanes and place Bridge Detail 3-2, Standard Plan B0-3, at 9 m centers under paved roadway lanes.
When cover is more than span length-
Place 13 mm expansion joint filler at 9 m± centers and additional 13 mm expansion joints at locations of change in foundation character, as directed by the Engineer.

Construction joints:
Temporary joints may be permitted if normal (or radial) to ℄ of RCB. Otherwise, the contractor is to submit a proposal for consideration.

Cutoff walls:
1.2 m cutoff walls are to be provided at inlet and/or outlet unless adjacent channel is lined and unless otherwise shown. These walls are to be extended if scour conditions warrant.

Earthwork:
See Standard Plan A62E.

Backfill:
See Standard Specifications, except that the difference in level of backfill (against outside walls) shall not exceed 600 mm.

Height \ Cover	3 m	6 m
1.8 m	95	150
2.4 m	105	160
3.0 m	115	170
3.7 m	125	180
4.3 m	135	190

DESIGN BEARING PRESSURE (kPa)

GENERAL NOTES

Designation:
Standard single or multiple box culverts are shown on plans as span times height with maximum cover over roof thus: 2.4 m x 1.5 m RCB with 3 m or DBL 3m x 1.5 m RCB with 6 m, followed by alternatives.

Alternatives:
Single cell: Invert will be sloped unless "trapezoidal invert", "flat invert" or "V invert" is included in designation
Multiple cell: Invert will be vee unless "flat invert" is specified. Ends of culvert will be rounded unless "square ends" are designated. Parapets will be as shown unless designated in plans. Such designations may be different for inlet and outlet ends.

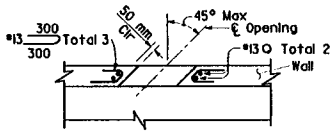
Quantities:
Quantities are for the sloped or vee invert and do not include "d" bars, nor splices in longitudinal bars, nor temperature reinforcement for exposed roof, nor concrete or reinforcement for parapets, cutoff walls or paving notches.

Reinforcement placement:
Main reinforcement is to be placed transverse or, for curved culverts, radial. When radial, reinforcing spacing of the "a", "f" and "g" bars is measured along the centerline. Stagger splices not shown. Hooks Hooks may be rotated or tilted, as necessary, for clearance.

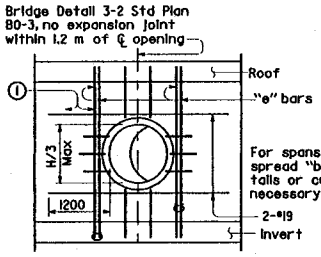
Special reinforcement coverage:
Box standard plans are not to be used for culverts in a corrosive environment or where there is a severe abrasive flow condition or in freeze-thaw locations.

Special design:
Required for culverts with conditions, loads, design bearing pressures or sizes greater than those given on this plan or Standard Plans D80 & D81. Also required for multiple cell culverts with unequal spans. For culverts with railroad loading, see the current AREA design specification.

3 or more cells:
For culverts with more than two cells, use dimensions and reinforcement for the standard "double box culvert" and adjust quantities accordingly.



PART PLAN-SECTION



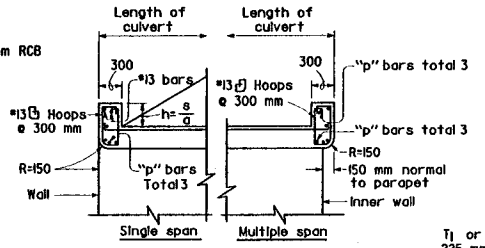
LONGITUDINAL SECTION

UTILITY OPENING-WALL

H= Height of box

① Adjacent to each side of the opening, place additional bars equivalent to half the interrupted main reinforcement.

To accompany plans dated

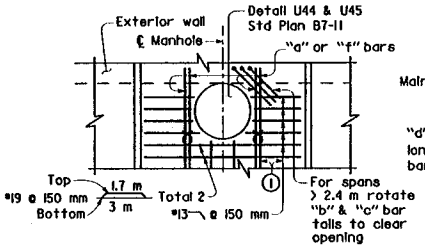


PARAPET DETAIL

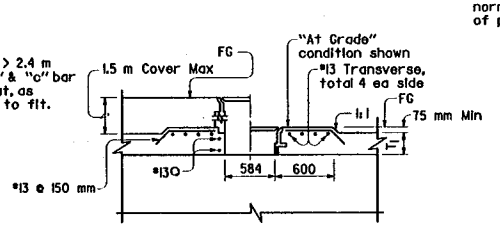
s = Clear span (mm)
a = 12 cosine skew angle

Parapet "p" bars			
Span \ Skew Angle	0° TO 15°	16° TO 30°	31° TO 45°
1.2 m	#13	#13	#13
1.8 m	#13	#13	#16
2.4 m	#13	#16	#19
3.0 m	#16	#19	#22
3.7 m	#19	#22	#25
4.3 m	#22	#25	#29

PARAPET REINFORCEMENT

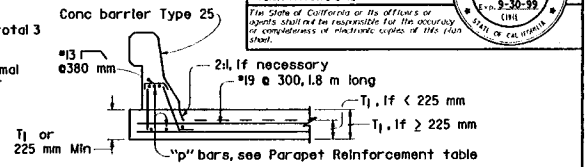


PART PLAN

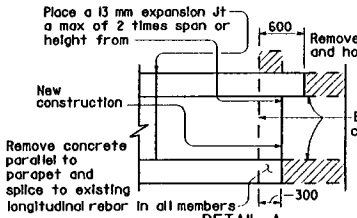


PART LONGITUDINAL SECTION

MANHOLE

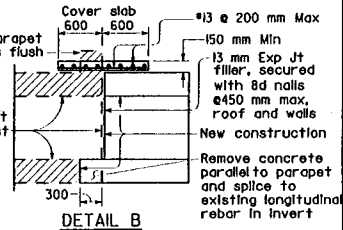


BARRIER SECTION (9.0 m MINIMUM)



DETAIL A

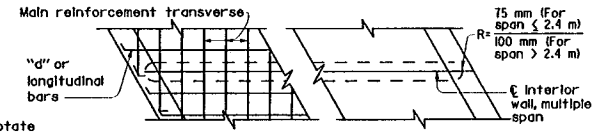
(20° maximum skew as shown. If existing longitudinal and transverse reinforcing bars in top slab are lap spliced with new longitudinal and transverse reinforcing bars, the 20° skew may be exceeded. Lap splicing may require removal of top slab in excess of 600 mm shown.



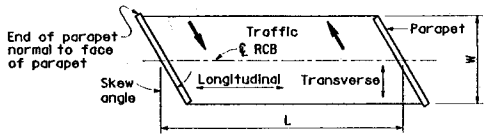
DETAIL B

(Single cell only, no skew allowed, 300 mm minimum cover.)

CULVERT EXTENSION



PART PLAN-SKEWED



RCB TERMINOLOGY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT MISCELLANEOUS DETAILS

NO SCALE

RSP D82 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN D82
DATED JULY 1, 1997-PAGE 89 OF THE STANDARD PLANS BOOK DATED JULY 1997.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

REVISED STANDARD PLAN RSP D82

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Paul Cotter
REGISTERED CIVIL ENGINEER
August 6, 1998
PLANS APPROVAL DATE

Paul Cotter No. 34509 Exp. 9-30-99 CIVIL STATE OF CALIFORNIA

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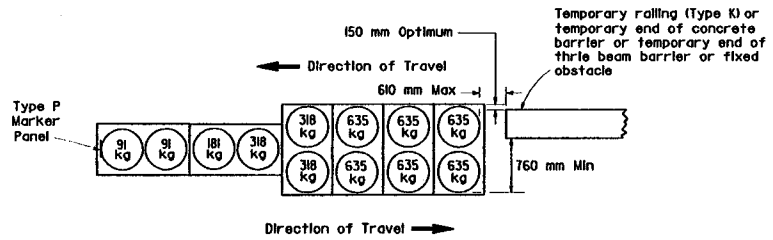
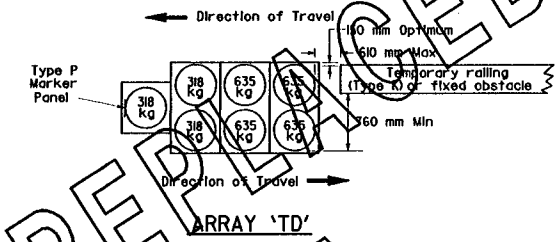
STD. PLAN RSP D82



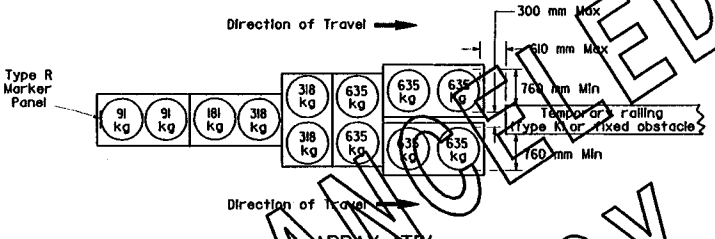
ARRAY 'TA'

(APPROACH SPEED 70 km/h OR GREATER)



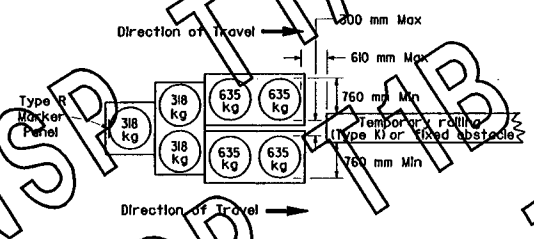
ARRAY 'TD'

(APPROACH SPEED 65 km/h OR LESS)
(FOR SPEEDS GREATER THAN 65 km/h USE ARRAY 'TA')



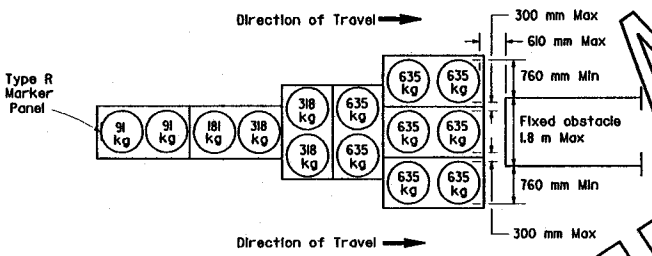
ARRAY 'TB'

(APPROACH SPEED 70 km/h OR GREATER)



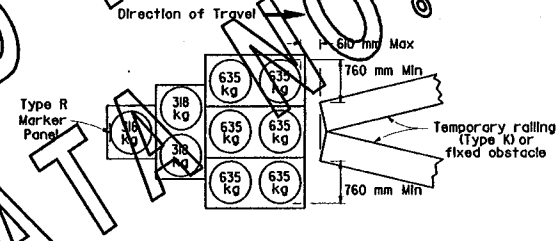
ARRAY 'TE'

(APPROACH SPEED 65 km/h OR LESS)
(FOR SPEEDS GREATER THAN 65 km/h USE ARRAY 'TB')



ARRAY 'TC'

(APPROACH SPEED 70 km/h OR GREATER)



ARRAY 'TF'

(APPROACH SPEED 65 km/h OR LESS)
(FOR SPEEDS GREATER THAN 65 km/h USE ARRAY 'TC')

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Donald E Fogle
REGISTERED CIVIL ENGINEER

July 1, 1997
PLANS APPROVAL DATE

Donald E. Fogle No. C34637 Exp. 9-30-99 CIVIL

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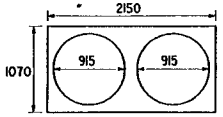
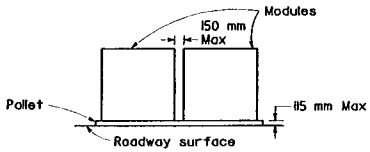


PLAN



ELEVATION

CRASH CUSHION PALLET DETAIL

NOTES

1. (XXX) indicates module location and weight of sand for each module.
2. All sand weights are nominal.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY CRASH CUSHION SAND FILLED

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

T1

STD. PLAN T1

CANCELLED, REPLACED BY NSP T1A AND NSP T1B ERRATA NO. 97-2

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Ellis K. Hirst No. C17926 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA

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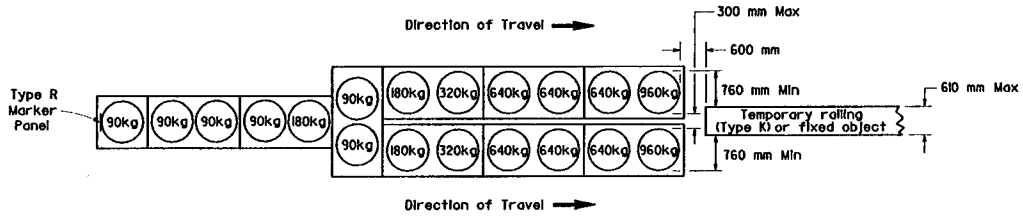
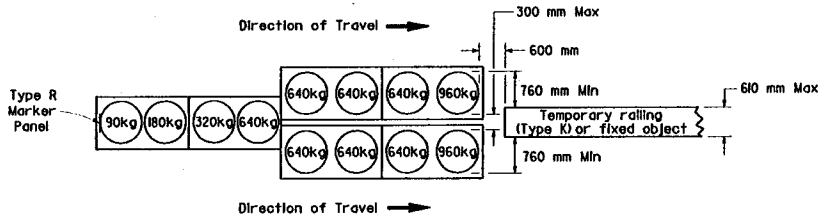
To accompany plans dated _____



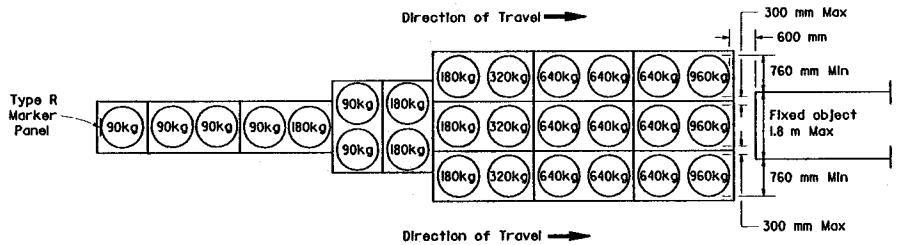
ARRAY 'TUA'

(APPROACH SPEED 110 km/h OR LESS)



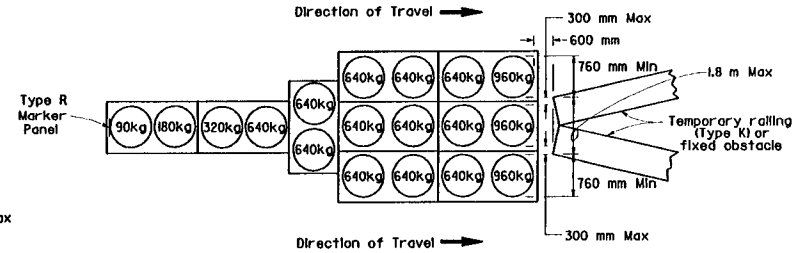
ARRAY 'TUB'

(APPROACH SPEED 80 km/h OR LESS)
(FOR SPEED GREATER THAN 80 km/h USE ARRAY 'TUA')



ARRAY 'TUC'

(APPROACH SPEED 110 km/h OR LESS)

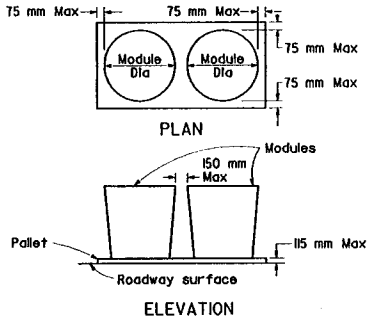


ARRAY 'TUD'

(APPROACH SPEED 80 km/h OR LESS)
(FOR SPEED GREATER THAN 80 km/h USE ARRAY 'TUC')

NOTES

1. (XXX) indicates sand filled module location and mass of sand in kilograms for each module. Module spacing is based on the greater diameter of the module.
2. All sand masses are nominal.
3. Temporary crash cushion arrays shall not encroach on the traveled way.
4. Place the top of Type R marker panel 25 mm below the module lid.
5. Refer to Standard Plan A73B for marker details.



CRASH CUSHION PALLET DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY CRASH CUSHION, SAND FILLED (UNIDIRECTIONAL)

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP T1A AND NSP T1B DATED AUGUST 6, 1998
SUPERSEDES STANDARD PLAN T1 DATED JULY 1, 1997-PAGE 130
OF THE STANDARD PLANS BOOK DATED JULY 1997.

NEW STANDARD PLAN NSP T1A

STD. PLAN NSP T1A

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

Ellis K. Hirst
No. C17926
Exp. 6-30-01
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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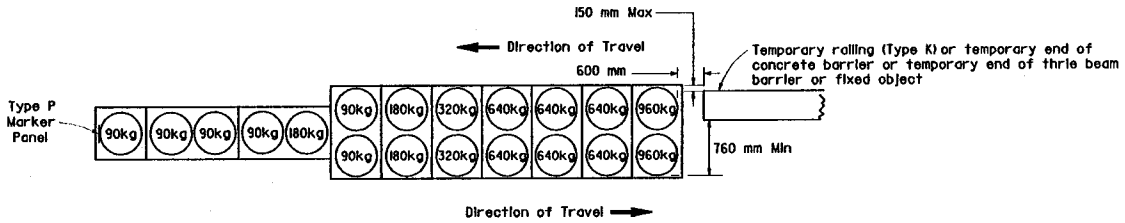
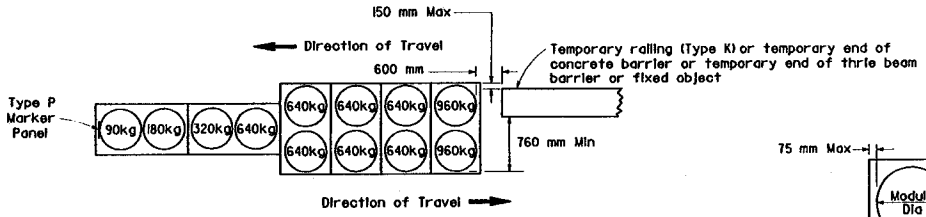
To accompany plans dated _____



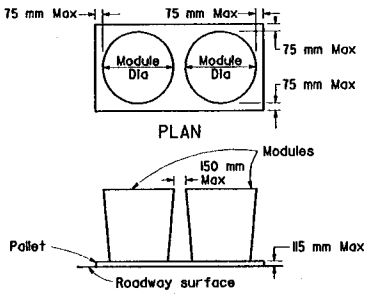
ARRAY 'TBA'

(APPROACH SPEED 110 km/h OR LESS)



ARRAY 'TBB'

(APPROACH SPEED 80 km/h OR LESS)
(FOR SPEEDS GREATER THAN 80 km/h USE ARRAY 'TBA')



CRASH CUSHION PALLET DETAIL

NOTES

1. (XXX) indicates sand filled module location and mass of sand in kilograms for each module. Module spacing is based on the greater diameter of the module.
2. All sand masses are nominal.
3. Temporary crash cushion arrays shall not encroach on the traveled way.
4. Place the Type P marker panel so that the bottom of the panel rests upon the pallet.
5. Refer to Standard Plan A73B for marker details.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY CRASH CUSHION, SAND FILLED (BIDIRECTIONAL)

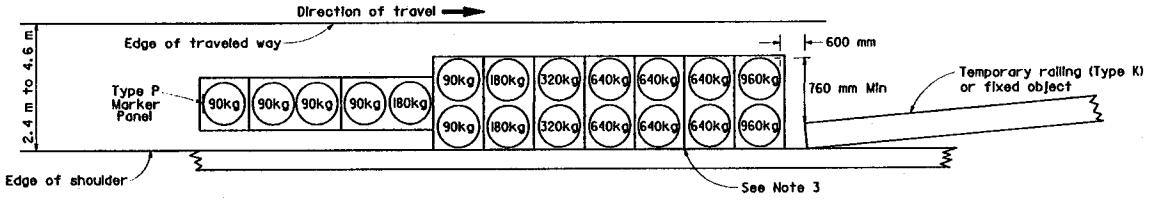
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NSP T1A AND NSP T1B DATED AUGUST 6, 1998
SUPERSEDES STANDARD PLAN T1 DATED JULY 1, 1997-PAGE 130
OF THE STANDARD PLANS BOOK DATED JULY 1997.

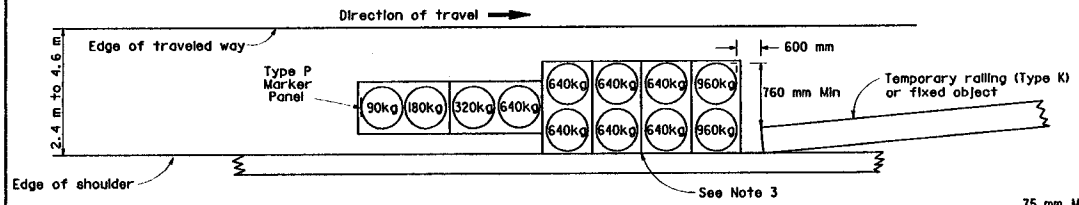
NEW STANDARD PLAN NSP T1B

STD. PLAN NSP T1B



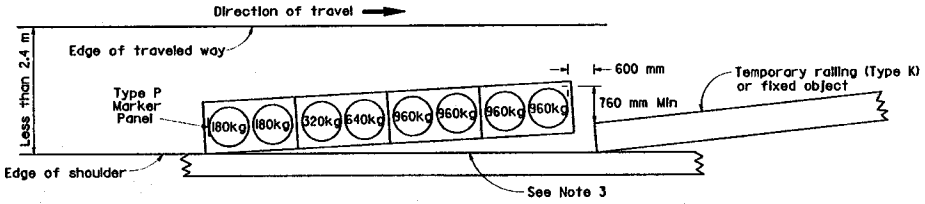
ARRAY 'TSA'

(APPROACH SPEED 110 km/h OR LESS)



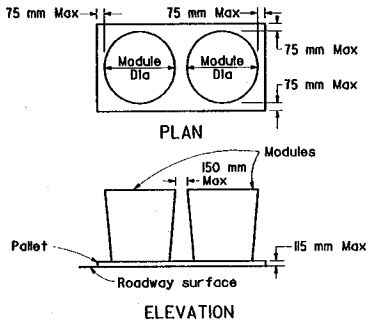
ARRAY 'TSB'

(APPROACH SPEED 80 km/h OR LESS)
(FOR SPEEDS GREATER THAN 80 km/h USE ARRAY 'TSA')



ARRAY 'TSC'

(APPROACH SPEED 90 km/h OR LESS AND SHOULDER WIDTHS LESS THAN 2.4 m)
(SEE NOTE 9)



CRASH CUSHION PALLET DETAIL

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

Ellis K. Hirst
No. C17926
Exp. 6-30-01
CIVIL
STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

To accompany plans dated _____

NOTES

1. (XXX) indicates sand filled module location and mass of sand in kilograms for each module. Module spacing is based on the greater diameter of the module.
2. All sand masses are nominal.
3. The temporary crash cushion arrays shown on this plan shall be used only in locations where there will be traffic on one side of the temporary crash cushion array. For Array 'TSC', a solid backup (wall, barrier or a toe of cut or fill slope) is required along the backside of the crash cushion array to reduce penetration of the modules.
4. If the fixed object or approach end of the temporary railing is less than 4.60 meters from the edge of traveled way, a temporary crash cushion is required.
5. Temporary crash cushion arrays shall not encroach on the traveled way.
6. Arrays for median shoulders shall conform to details shown on this plan for outside shoulders.
7. Place the Type P marker panel so that the bottom of the panel rest upon the pallet and faces traffic.
8. Refer to Standard Plan A73B for marker details.
9. For approach speed of greater than 90 km/h and shoulder widths less than 2.4 m, appropriate crash cushion protection shall be provided at fixed objects and at approach ends of temporary railing. The specific type of crash cushion protection shall be as shown on the project plans or as specified in the Special Provisions, or if not shown on the project plans or specified in the Special Provisions, shall be as approved by the Engineer.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY CRASH CUSHION SAND FILLED (SHOULDER INSTALLATIONS)

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP T2 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN T2 DATED JULY 1, 1997-PAGE 131 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP T2

STD. PLAN RSP T2

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER G.W. Edwards No. C36386 Exp. 6-30-00 CIVIL STATE OF CALIFORNIA

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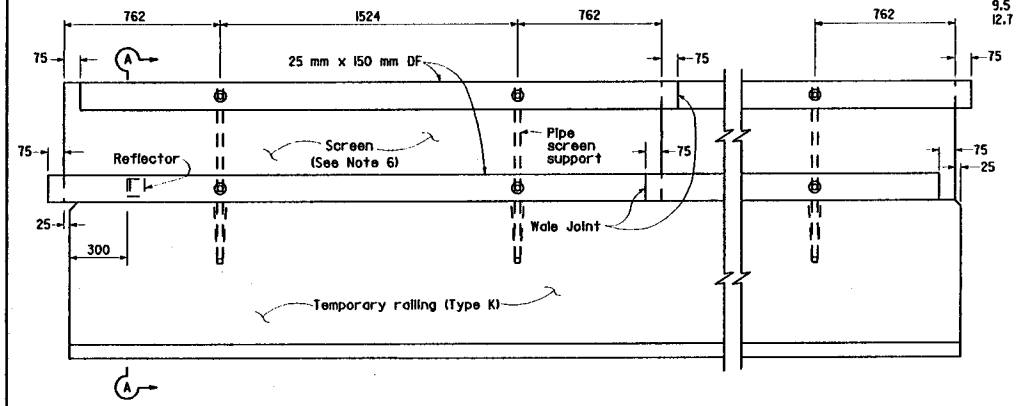
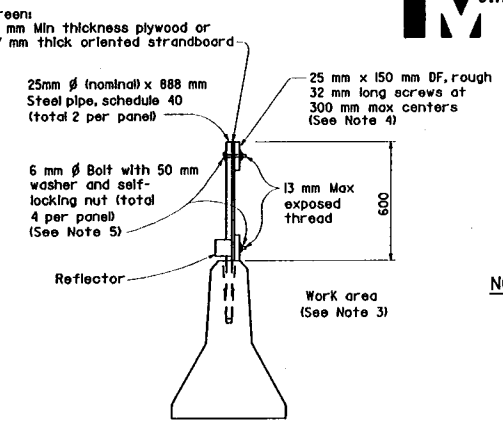
To accompany plans dated _____

Caltrans Metric



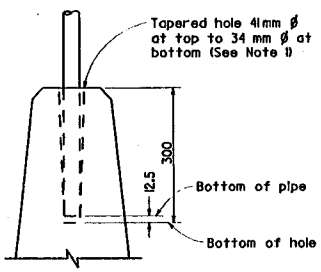
ELEVATION



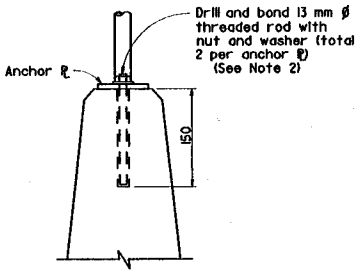
SECTION A-A

NOTE

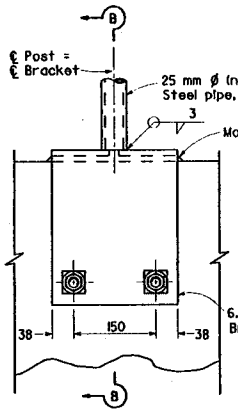
1. Straight holes 38 mm Ø of the depth shown may be used in lieu of the tapered holes.
2. Resin capsule-type anchorage devices may be substituted for threaded rods.
3. Place screen on work area side of the temporary railing where traffic will only be on one side of the temporary railing.
4. Clinched 8d box nails may be substituted for screws. The nails shall be clinched on the work area side of the screen where traffic will only be on one side of the temporary railing.
5. U-bolts may be substituted for 6 mm Ø bolts.
6. Openings in the screen of 1.0 m length shall be provided at 60 m intervals.



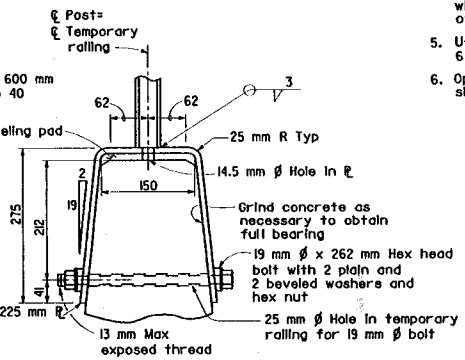
SCREEN ANCHORAGE DETAIL



SCREEN ANCHORAGE DETAIL
ALTERNATIVE 'A'

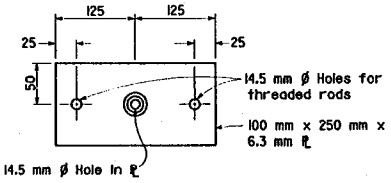


ELEVATION

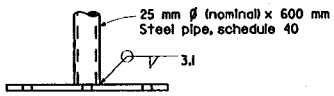


SECTION B-B

SCREEN ANCHORAGE DETAIL
ALTERNATIVE 'B'



PLAN



ELEVATION

ANCHOR PLATE DETAIL
ALTERNATIVE 'A'

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY TRAFFIC SCREEN

NO SCALE

ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

RSP T4 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN T4
DATED JULY 1, 1997-PAGE 133 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP T4

STD. PLAN RSP T4

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

G.W. Edwards
No. C36386
Exp. 6-30-00
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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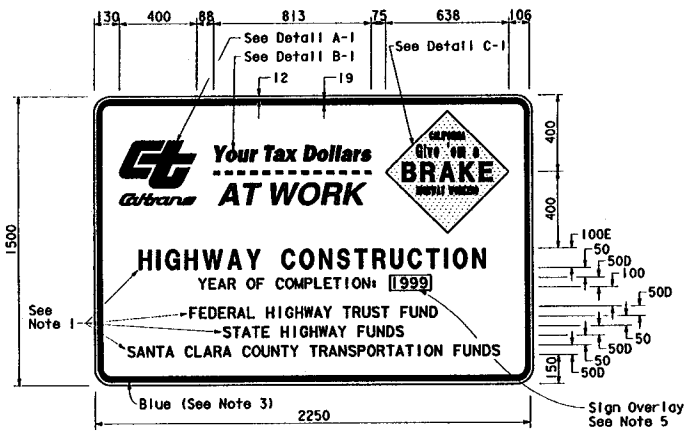
To accompany plans dated _____

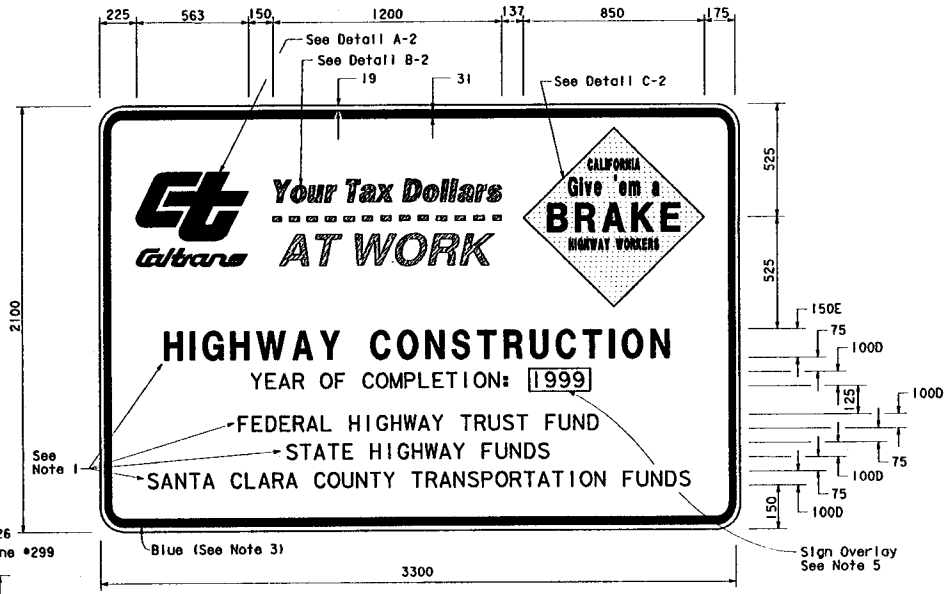
Caltrans Metric

NOTES

1. The sign messages shown for type of project and fund types are examples only. See the Special Provisions for the applicable type of project and fund type messages to be used.
2. Except as otherwise shown, the legend of sign shall be black on a white background (non-reflective).
3. The border of the signs and details "B-1" and "B-2" shall be blue (non-reflective).
4. The diamond in details "C-1" and "C-2" shall be orange (non-reflective).
5. Year of completion of project construction shown on the overlay is an example only. See the Special Provisions.

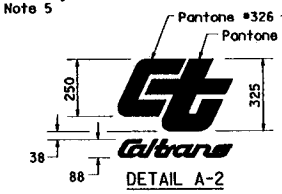


TYPE 1

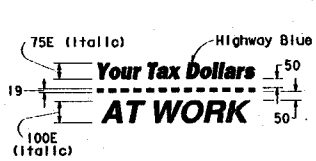


TYPE 2

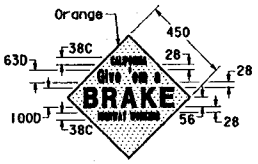
DETAIL A-1



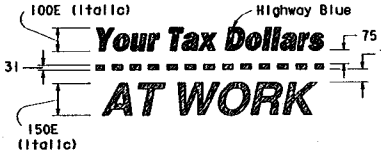
DETAIL A-2



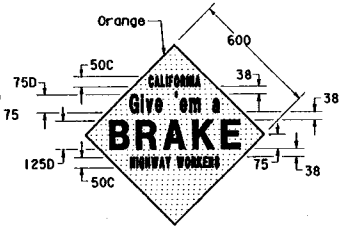
DETAIL B-1
(See Note 3)



DETAIL C-1
(See Note 4)



DETAIL B-2
(See Note 3)



DETAIL C-2
(See Note 4)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PROJECT INFORMATION SIGNS

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP T7 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN T7 DATED JULY 1, 1997-PAGE 135 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP T7

STD. PLAN RSP T7

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

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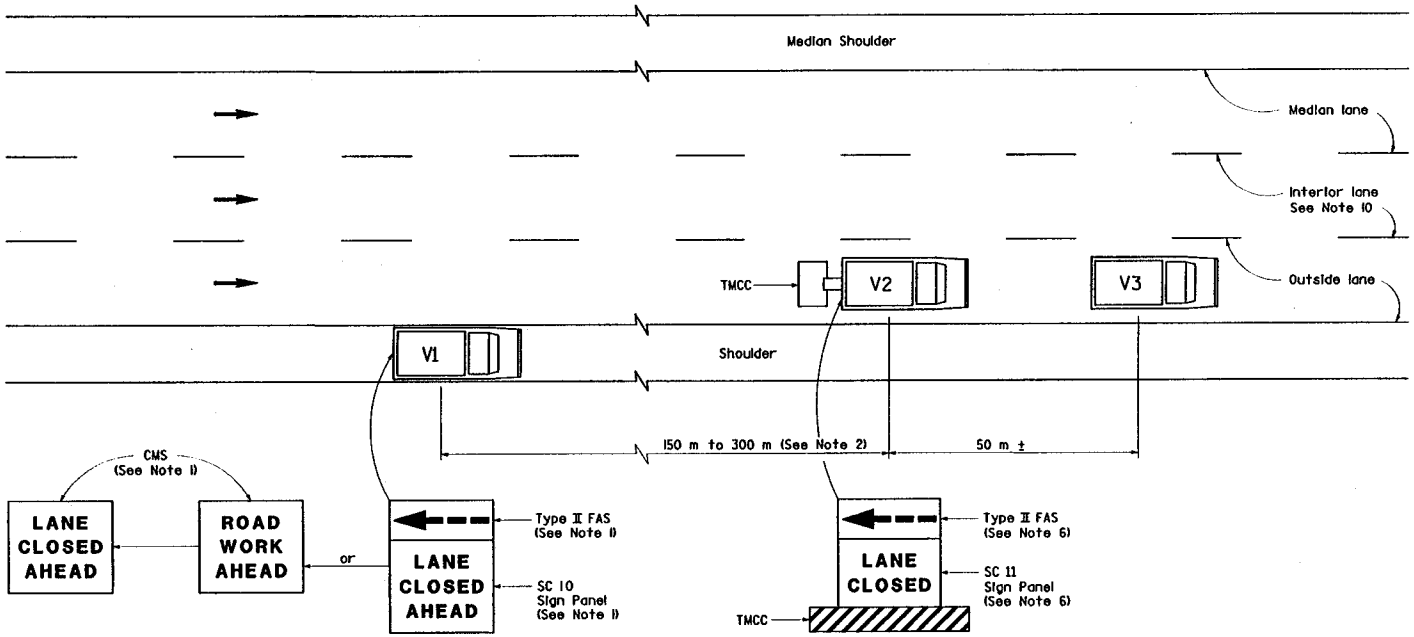
REGISTERED PROFESSIONAL ENGINEER G.W. Edwards No. C36386 Exp. 6-30-00 CIVIL STATE OF CALIFORNIA

To accompany plans dated _____

Caltrans Metric



MOVING LANE CLOSURE ON MEDIAN OR OUTSIDE LANE OF MULTILANE HIGHWAYS

LEGEND

V1	Sign Vehicle
V2	Shadow Vehicle
V3	Work/Application Vehicle
FAS	Flashing Arrow Sign
CMS	Changeable Message Sign
TMCC	Truck-Mounted Crash Cushion
→	Direction of Travel

NOTES

1. Either the SC 10 sign panel shown or a changeable message sign shall be mounted on the rear of sign vehicle V1. A Type II flashing arrow sign shall be mounted on the rear of sign vehicle V1 and used with the SC 10 sign panel. A Type II flashing arrow sign will not be required with the changeable message sign provided the flashing arrow sign symbol may be displayed on the changeable message sign board. The changeable message sign shall be sequenced to show the "ROAD WORK AHEAD" message first, followed by the "LANE CLOSED AHEAD" message and then the flashing arrow sign symbol. For median lane closure, the flashing arrow sign symbol shall be reversed with the arrowhead on the right.
2. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue. Sign vehicle V1 shall be positioned where highly visible when shoulders are not available.
3. A minimum sight distance of 450 m should be provided in advance of sign vehicle V1.
4. Sign vehicle V1 should remain at the beginning of horizontal or vertical curves until the other vehicles (V2 and V3) are far enough beyond the curve to resume the minimum sight distance of 450 m.
5. Vehicle-mounted sign panels shall be Type III or IV reflective sheeting, black on white or black on orange with 150 mm minimum series D letters per Caltrans sign specifications.
6. Shadow vehicle V2 shall weigh a minimum of 9,000 kilograms and shall be equipped with a truck-mounted crash cushion. The sign panel shown and a Type II flashing arrow sign shall be mounted on the rear of shadow vehicle V2. For median lane closure, the flashing arrow sign symbol shall be reversed with with the arrowhead on the right.
7. All vehicles used for lane closures shall be equipped with two-way radios and the vehicle operators shall maintain communication during the work or application operation.
8. All vehicles shall be equipped with flashing or rotating amber lights.
9. Where sufficient shoulder width is not available and sign vehicle V1 would encroach upon the traveled way of the adjacent traffic lane during lane closures or where workers would be on foot in the work area, a stationary type lane-closure (Standard Plan T10, T11, and so on, as applicable) shall be used instead of this plan.
10. For moving lane closure on interior lane of multilane highways, see Standard Plan T16.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP T15 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN T15 DATED JULY 1, 1997-PAGE 142 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP T15

STD. PLAN RSP T15

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

G. W. Edwards No. C36386 Exp. 6-30-00 CIVIL

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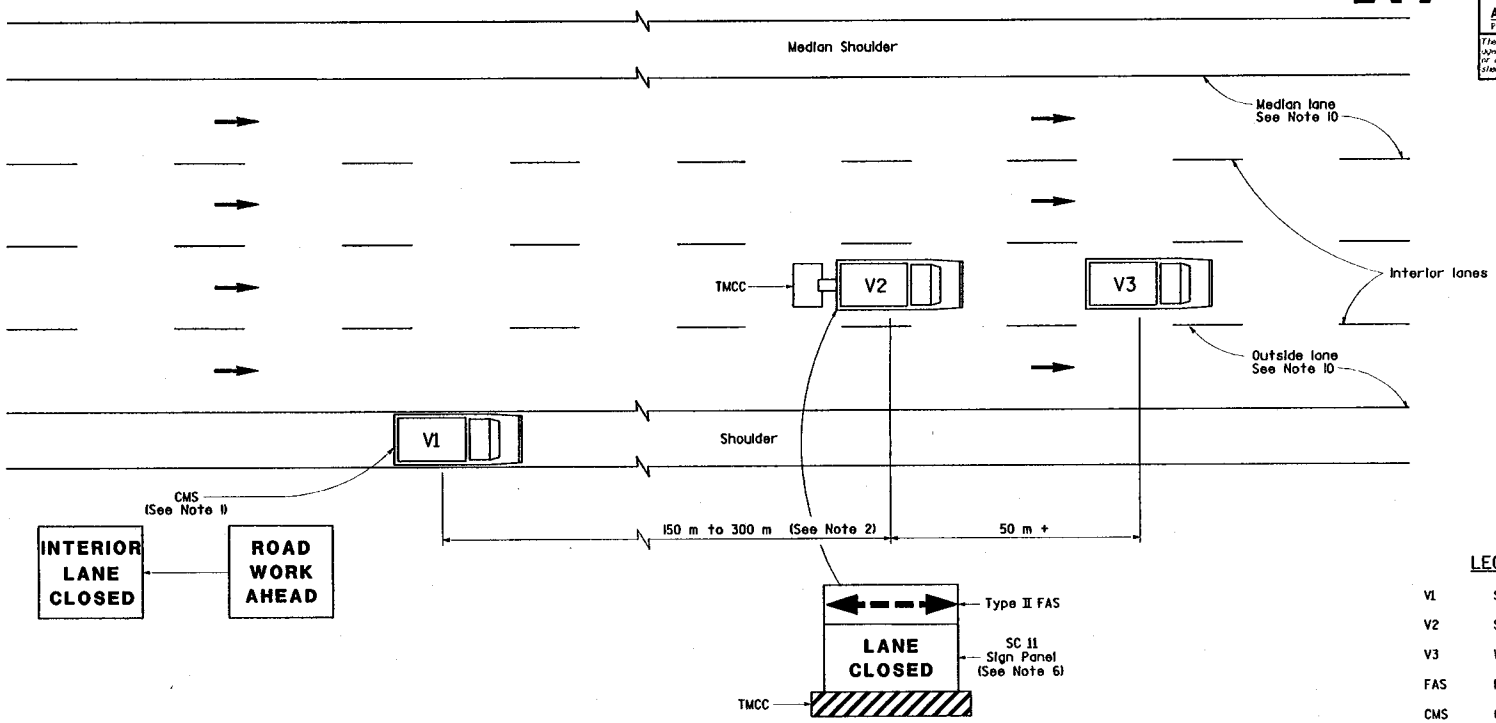
To accompany plans dated _____



MOVING LANE CLOSURE ON INTERIOR LANE OF MULTILANE HIGHWAYS

LEGEND

V1	Sign Vehicle
V2	Shadow Vehicle
V3	Work/Application Vehicle
FAS	Flashing Arrow Sign
CMS	Changeable Message Sign
TMCC	Truck-Mounted Crash Cushion
→	Direction of Travel

NOTES

1. A changeable message sign shall be mounted on the rear of sign vehicle V1. The changeable message sign shall be sequenced to show the "ROAD WORK AHEAD" message first, followed by the "INTERIOR LANE CLOSED" message. The message "CENTER LANE CLOSED" may be used in place of the "INTERIOR LANE CLOSED" message.
2. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue. Sign vehicle V1 shall be positioned where highly visible when shoulders are not available.
3. A minimum sight distance of 450 m should be provided in advance of sign vehicle V1.
4. Sign vehicle V1 should remain at the beginning of horizontal or vertical curves until the other vehicles (V2 and V3) are far enough beyond the curve to resume the minimum sight distance of 450 m.
5. Vehicle-mounted sign panels shall be Type III or IV reflective sheeting, black on white or black on orange with 150 mm minimum series D letters per Caltrans sign specifications.
6. Shadow vehicle V2 shall weigh a minumum of 9,000 kilograms and shall be equipped with a truck-mounted crash cushion. The sign panel shown and a Type II flashing arrow sign shall be mounted on the rear of shadow vehicle V2.
7. All vehicles used for lane closures shall be equipped with two-way radios and the vehicle operators shall maintain communication during the work or application operation.
8. All vehicles shall be equipped with flashing or rotating amber lights.
9. Where sufficient shoulder width is not available and sign vehicle V1 would encroach upon the traveled way of the adjacent traffic lane during lane closures or where workers would be on foot in the work area, a stationary type lane closure (Standard Plan T10, T11, and so on, as applicable) shall be used instead of this plan.
10. For moving lane closure on median or outside lanes of multilane highways, see Standard Plan T15.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP T16 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN T16 DATED JULY 1, 1997-PAGE 143 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP T16

STD. PLAN RSP T16

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

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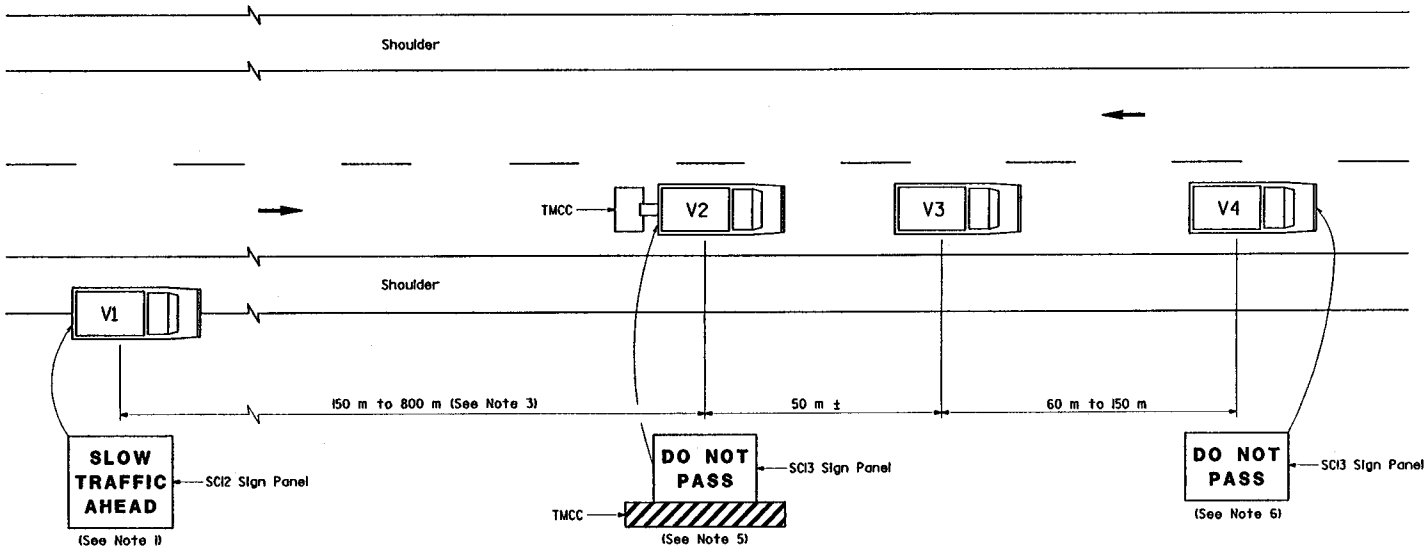
REGISTERED PROFESSIONAL ENGINEER G. W. Edwards C36386 Exp. 6-30-00 CIVIL STATE OF CALIFORNIA

To accompany plans dated _____



LEGEND

V1	Sign Vehicle
V2	Shadow Vehicle
V3	Work/Application Vehicle
V4	Sign Vehicle
TMCC	Truck-Mounted Crash Cushion
→	Direction of Travel

NOTES

1. Either the sign panel shown or a changeable message sign which can display the "SLOW TRAFFIC AHEA" message shall be mounted on the rear of sign vehicle V1.
2. Sign vehicle V1 should be positioned where highly visible when shoulders are not available.
3. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue.
4. Vehicle-mounted sign panels shall be Type III or IV reflective sheeting, black on white or black on orange with 150 mm minimum series D letters per Caltrans sign specifications.
5. Shadow vehicle V2 shall weigh a minimum of 9,000 kilograms and shall be equipped with a truck-mounted crash cushion. The sign panel shown shall be mounted on the rear of shadow vehicle V2. The message "LANE CLOSED" may be used in place of the "DO NOT PASS" message.
6. The sign panel shown shall be mounted on the front of sign vehicle V4, facing opposing traffic. The message "CAUTION" may be used in place of the "DO NOT PASS" message.
7. All vehicles shall be equipped with flashing or rotating amber lights.
8. Sign vehicle V4 will not be required when the work and vehicles V2 and V3 are 0.6 m or more from the centerline of the highway during the work or application operations.
9. All vehicles used for lane closures shall be equipped with two-way radios and the vehicle operators shall maintain communication during the work or application operation.
10. This plan shall not be used where workers would be on foot in the work area. Use a stationary type lane closure (Standard Plan T13) for this condition.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON TWO LANE HIGHWAYS

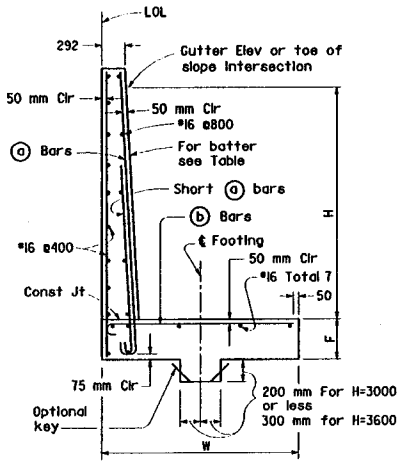
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

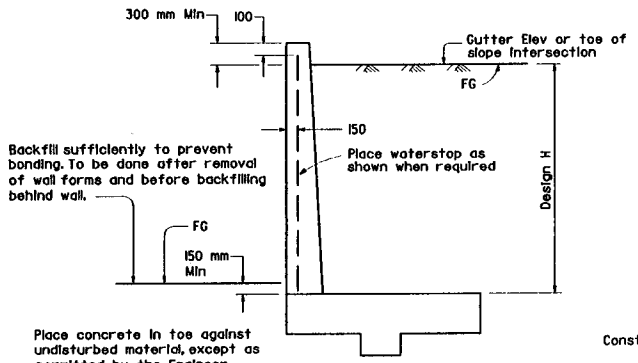
RSP T17 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN T17 DATED JULY 1, 1997-PAGE 144 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP T17

STD. PLAN RSP T17



SPREAD FOOTING SECTION



DESIGN

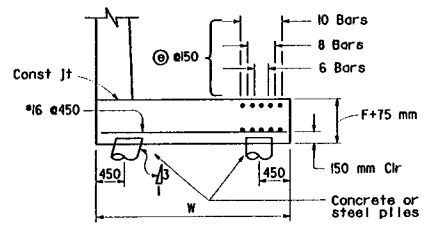
For drainage notes and other details, see (B3-8)

MAX PILE SPACING FOR 400 kN PILES

Design H	Front Row 1:3 Batter	Back Row Vertical
1200	5400	5400
1800	3600	5400
2400	2700	5400
3000	1800	3600
3600	1200	2400

For actual spacing, see Wall Layout.

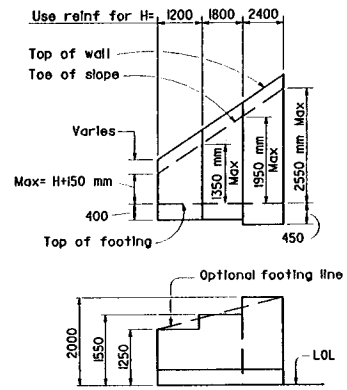
Pile layout does not apply to Case IV conditions.



Reinforcement detailed is to be placed in addition to that shown for spread footings.

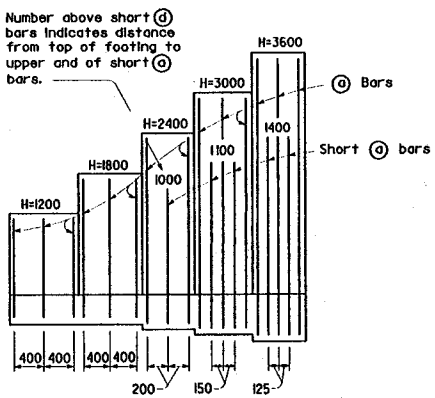
◉ For Design H=1200 use W=1550
All others from table

400 kN PILE FOOTING SECTION

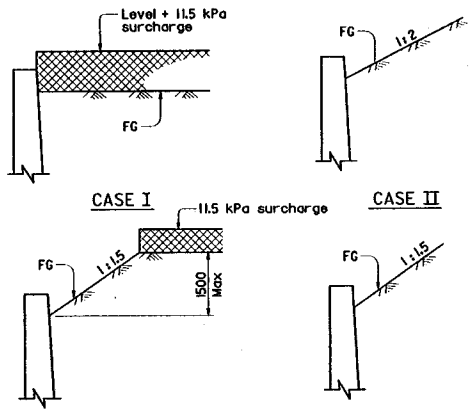


TYPICAL LAYOUT EXAMPLE

For joints required, see (B0-3 3-3) & (B0-3 3-4)



ELEVATION



DETAIL OF DESIGN LOADING CASES

Case I Level +11.5 kPa surcharge
Case II 1:2 Unlimited slope
Case III 1:1.5 Limited slope (1500 max height) +11.5 kPa surcharge
Case IV 1:1.5 Unlimited slope

NOTES

Design Conditions:

Design H may be exceeded by 150 mm before going to the next size.
Special footing design is required where foundation material is incapable of supporting toe pressure loads listed in table.

Design Data:

f_c = 10 MPa f'_c = 25 MPa f_s = 168 MPa n = 10 earth = 19 kN/m³
Case I- Wall design for equivalent fluid pressure = 4.2 and 5.6 kPa/m.
Case II, III, IV - Wall design is based on Rankine's formula with ø = 33°42'.

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

Design H		◉ 1200	1800	2400	3000	3600
W		1250	1550	2000	2450	2900
F Spread Ftg		400	400	450	450	550
Batter		None	None	None	100:3	100:6
	ⓐ Bars	#16@400	#16@400	#16@400	#16@300	#16@250
Short	ⓐ Bars	None	None	#16@400	#16@300	#16@250
	ⓑ Bars	#16@400	#16@400	#16@200	#16@150	#16@125
Total	ⓔ Bars	8-#19	8-#19	10-#19	8-#19	6-#19
Toe Pressure	Case I kPa	80	105	120	145	170
	Case II kPa	75	100	130	165	195
	Case III kPa	80	110	140	185	210
	Case IV kPa	95	155	200	255	310

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

RETAINING WALL TYPE 5

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP B3-7 DATED AUGUST 6, 1998 SUPERSEDES
RSP B3-7 DATED DECEMBER 4, 1997 AND STANDARD PLAN B3-7
DATED JULY 1, 1997-PAGE 162 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP B3-7

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER
August 6, 1998
PLANS APPROVAL DATE
REGISTERED PROFESSIONAL ENGINEER James C. Moore No. C16576 Exp. 6-30-01 CIVIL STATE OF CALIFORNIA
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To accompany plans dated

STD. PLAN RSP B3-7

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

R. C. Anderson No. 17180 Exp. 6-30-01 Civil — Registered Professional Engineer — State of California

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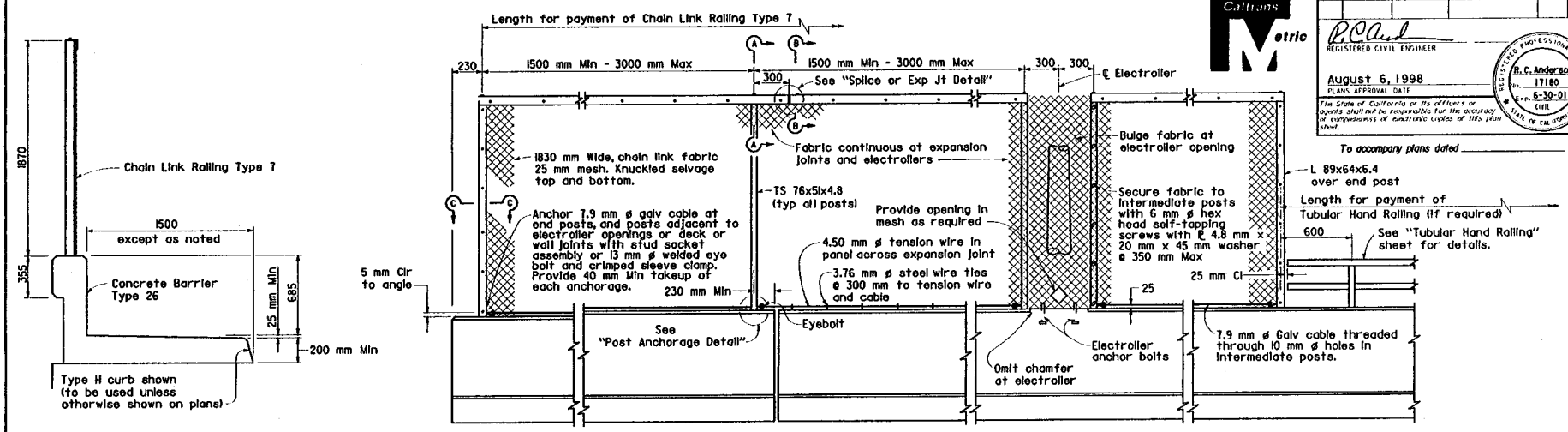
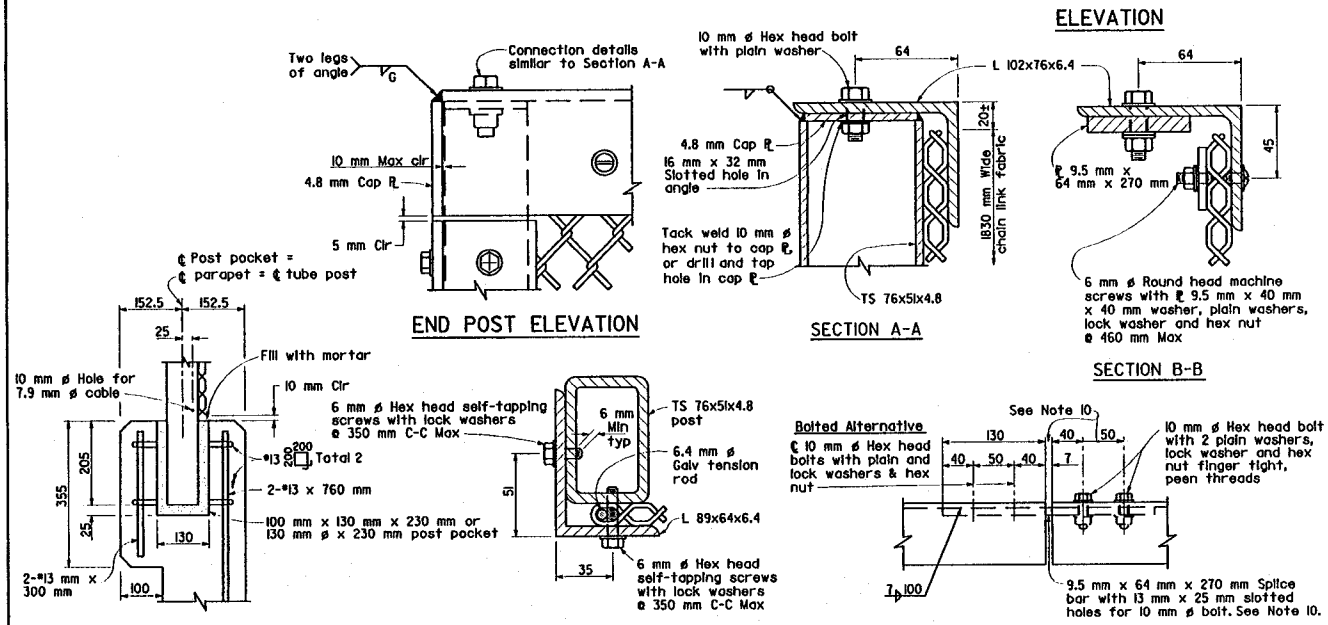
To accompany plans dated _____

Caltrans Metric





NOTES

1. Railing assembly except chain link fabric to be galvanized after fabrication.
2. Posts shall be vertical.
3. Railing shall conform to horizontal and vertical alignment. When railing is placed on a curved horizontal alignment with radius of 45 m or less, thread the 7.9 mm ø cable through 10 mm ø welded eye rods embedded 100 mm into the top of the concrete parapet and equally spaced to limit the midordinate distance between the 7.9 mm ø cable and the curve to 25 mm maximum. Horizontal angle shall be bent to conform to horizontal alignment if radius is 45 m or less and may be on 3 m chords if radius is over 45 m.
4. Horizontal angle shall be continuous over not less than two intermediate posts, except that a shorter length is permitted at expansion joints, electroliers and other rail discontinuities.
5. When rail is on slope, place fabric parallel to slope.
6. Alternative details may be submitted by Contractor for Engineer's approval.
7. For details and reinforcement not shown see Standard Plan B11-54.
8. See Project Plans for limits of Chain Link Railing Type 7.
9. Provide thimbles at all cable loops.
10. Expansion joint same dimension as expansion joint in deck or wall. Increase slotted hole length and splice bar length correspondingly.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CHAIN LINK RAILING TYPE 7

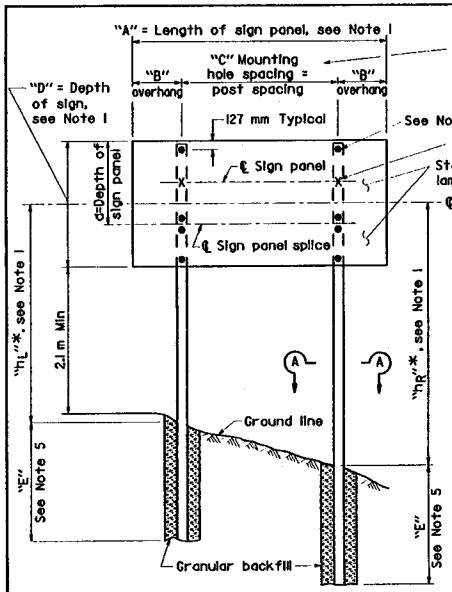
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP B11-52 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN B11-52 DATED JULY 1, 1997-PAGE 178 OF THE STANDARD PLANS BOOK DATED JULY 1997.

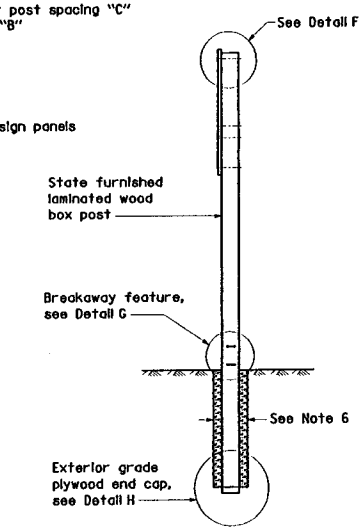
REVISED STANDARD PLAN RSP B11-52

STD. PLAN RSP B11-52



ELEVATION

* Dimensions shown on project plans are for fabrication. At time of installation adjust these dimensions to provide a level sign approximately 2.1 m above roadway shoulder.



SIDE VIEW

SIGN PANEL LENGTH (m) (See Note 1)	SIGN PANEL OVERHANG (mm)	MOUNTING HOLE SPACING (m)
"A"	"B"	"C"
2.44	457	1.52
2.74	559	1.63
3.05	610	1.83
3.35	610	2.13
3.66	762	2.13
3.96	762	2.44
4.27	762	2.74
4.57	914	2.74
4.88	991	2.90
5.18	991	3.20
5.49	1067	3.35
5.79	1143	3.51
6.10	1219	3.66
6.40	1295	3.81
6.71	1295	4.11
7.01	1372	4.27
7.32	1448	4.42

TABLE 1

"hL" or "hR" (m)	TOTAL SIGN AREA (m^2) 3.7 to 8.4	8.4+ to 13.0	13.0+ to 17.6	17.6+ to 22.3	22.3+ to 26.9
2.7 to 4.0	1.8	2.0	2.3	2.6	2.7
4.0+ to 5.2	1.8	2.1	2.4	2.7	3.0
5.2+ to 6.4	1.8	2.3	2.7	2.7	
6.4+ to 7.9	2.1	2.4	2.7		

TABLE 2

Minimum post embedment "E" for Type L post

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER G.W. Edwards C36386 Exp. 6-30-00 CIVIL STATE OF CALIFORNIA

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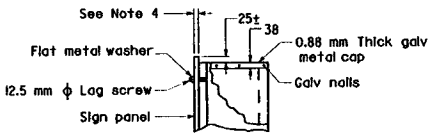
To accompany plans dated _____

NOTES

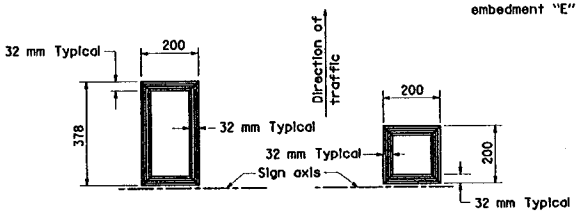
1. See Project Plans for:
   Location of each sign.
   Length of sign panel "A".
   Depth of sign "D".
   Height "h_L" and "h_R" of centerline of sign above ground line at each post.
   Type of post, L and M.
   See Standard Plans RSI for other details.
2. "e" indicates location of 12.5 mm lag screws and existing holes in panels. Lag screws are to be embedded at least 25 mm into post using 8 mm diameter pilot holes.
3. "x" indicates location of additional 12.5 mm lag screws required when the depth of sign panel (d) and the length of sign panel (A) are as follows:

d	A
1524 mm	5.18 to 7.32 m
1372 mm	5.78 to 7.32 m
1219 mm	6.40 to 7.32 m
1067 mm	7.32 m

4. State furnished Type B laminated sign panels are 29 mm thick for sign lengths of 4.6 m and less. Panel over 4.6 m in length are 67 mm thick.
5. Embedment "E" for Type L post shall conform to the requirements in Table 2. Embedment for Type M posts shall be 1.8 m minimum.
6. Diameter of post holes for Type L posts shall be at least 750 mm. Diameter of post holes for Type M posts shall be at least 600 mm.



DETAIL F



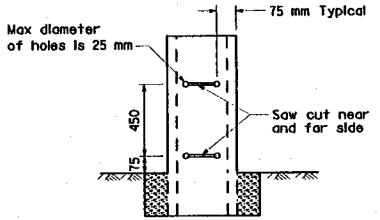
TYPE L POST

TYPE M POST

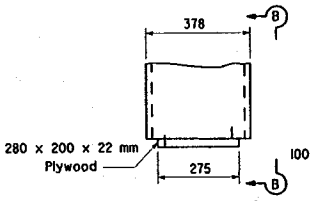
SECTION A-A

GALV METAL CAP

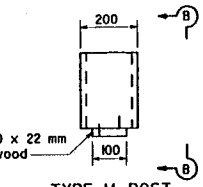
State furnished



DETAIL G

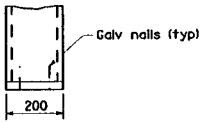


TYPE L POST



TYPE M POST

DETAIL H



SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS LAMINATED WOOD BOX POST TYPICAL INSTALLATION DETAILS NO. 3

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP RS3 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN RS3 DATED JULY 1, 1997-PAGE 188 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP RS3

STD. PLAN RSP RS3

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

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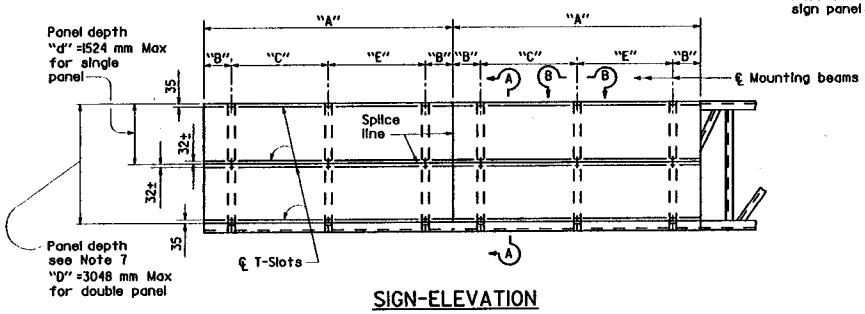
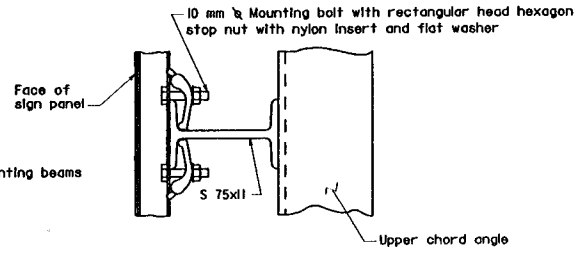
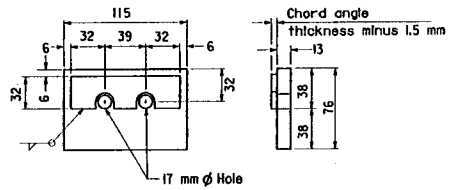
REGISTERED PROFESSIONAL ENGINEER Jeffrey B. Woody C41260 Exp. 3-31-99 CIVIL STATE OF CALIFORNIA



SIGN-ELEVATION



VIEW B-B

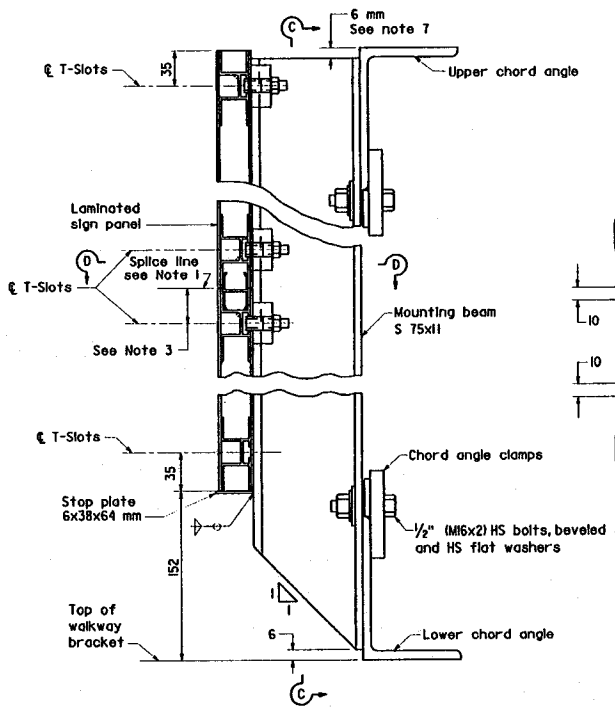


CHORD ANGLE CLAMP

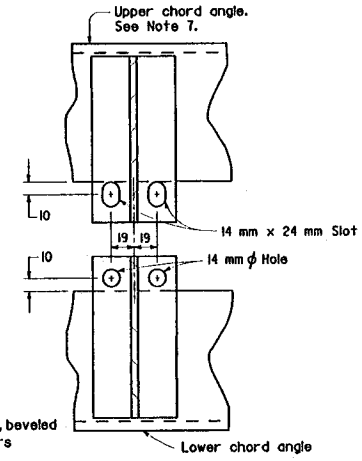
SIGN PANEL LENGTH * (m) "A"	NUMBER MOUNTING BEAMS	SIGN PANEL OVERHANG (mm) "B"	MOUNTING BEAM SPACING (m) "C"	(m) "E"
1.52	2	229	1.02	
1.83	2	305	1.22	
2.13	2	381	1.37	
2.44	2	458	1.52	
2.74	2	559	1.63	
3.05	2	610	1.83	
3.35	2	610	2.13	
3.66	2	762	2.13	
3.96	2	762	2.44	
4.27	2	762	2.74	
4.57	2	915	2.74	
4.88	3	153	2.29	2.29
5.18	3	305	2.29	2.29
5.49	3	305	2.44	2.44
5.79	3	305	2.59	2.59
6.10	3	458	2.59	2.59
6.40	3	458	2.74	2.74
6.71	3	610	2.74	2.74
7.01	3	762	2.74	2.74
7.32	3	915	2.74	2.74

* Signs longer than 7.32 meters are fabricated and mounted as adjoining single panels.

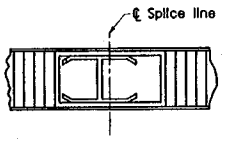
MOUNTING BEAM SPACING TABLE



SECTION A-A



SECTION C-C



SECTION D-D

NOTES

1. The size and number of individual sign panel plus the location of splice line is dependent on the sign panel manufacturer.
2. Mounting bolts are required on each side of the horizontal splice lines.
3. Dimension varies from panel to panel. Average value approximate 32 mm.
4. Torque aluminum sign panel mounting bolts to 12.3 N-M.
5. Chord angle clamp to be galvanized after fabrication.
6. The Contractor shall verify all dependent dimensions in the field before ordering or fabricating any material.
7. 2750 mm and 3000 mm sign panel along with the mounting beams will project above the top chord truss member 250 mm and 500 mm respectively. Attachment details shall be the same.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS-TRUSS SIGN MOUNTING DETAILS LAMINATED PANEL-TYPE A

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP S8C DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN S8C DATED JULY 1, 1997-PAGE 199 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP S8C

STD. PLAN RSP S8C

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

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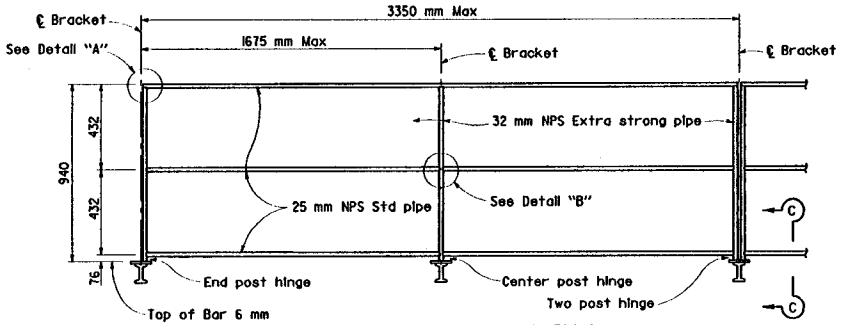
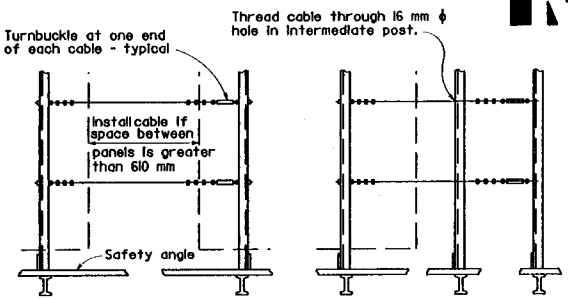
REGISTERED PROFESSIONAL ENGINEER Jeffrey B. Woody No. C41260 Exp. 3-31-99 CIVIL STATE OF CALIFORNIA

To accompany plans dated _____



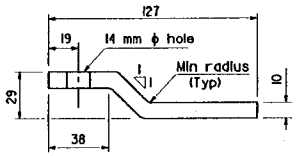
SAFETY RAILING ELEVATION



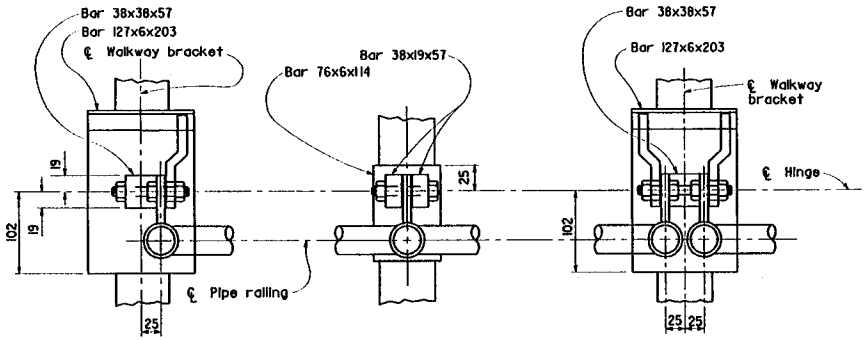
BETWEEN PANELS

BEYOND PANELS

SAFETY CABLE ELEVATION
FOR BRIDGE MOUNTED SIGNS



PLAN - KICKER BAR

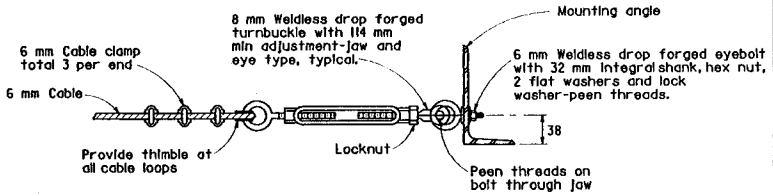


END POST

CENTER POST

TWO POST

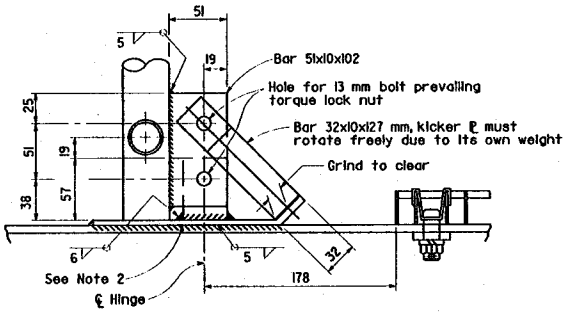
HINGE - PLAN



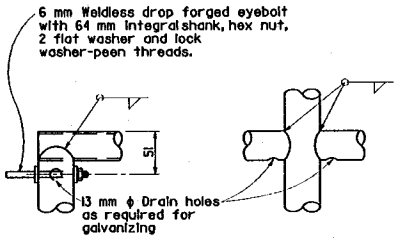
TURNBUCKLE DETAILS

NOTES

1. Special care shall be taken to insure that the complete hinge and latch assembly will hold the safety railing in a steady manner, free of wobble while in the raised position. Maximum allowable displacement from vertical at top of railing when latched shall be 25 mm.
2. Details for bolting hinge base plate to walkway bracket may be submitted for approval.
3. Safety chain shall be 5 mm galvanized steel coil chain, approximately 39.4 links per meter. Length shall be minimum which allows lock-up of safety railing. Minimum of two safety chains per safety railing.



SECTION C-C

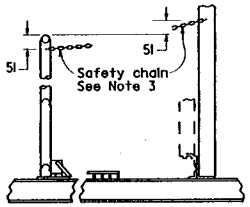


DETAIL A

DETAIL B

NOTES

Alternative venting methods may be used if approved by the Engineer.



CHAIN ASSEMBLY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS WALKWAY SAFETY RAILING DETAILS

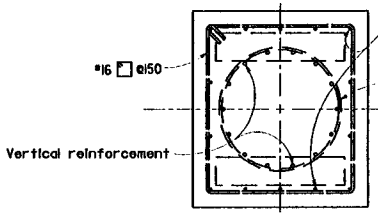
NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

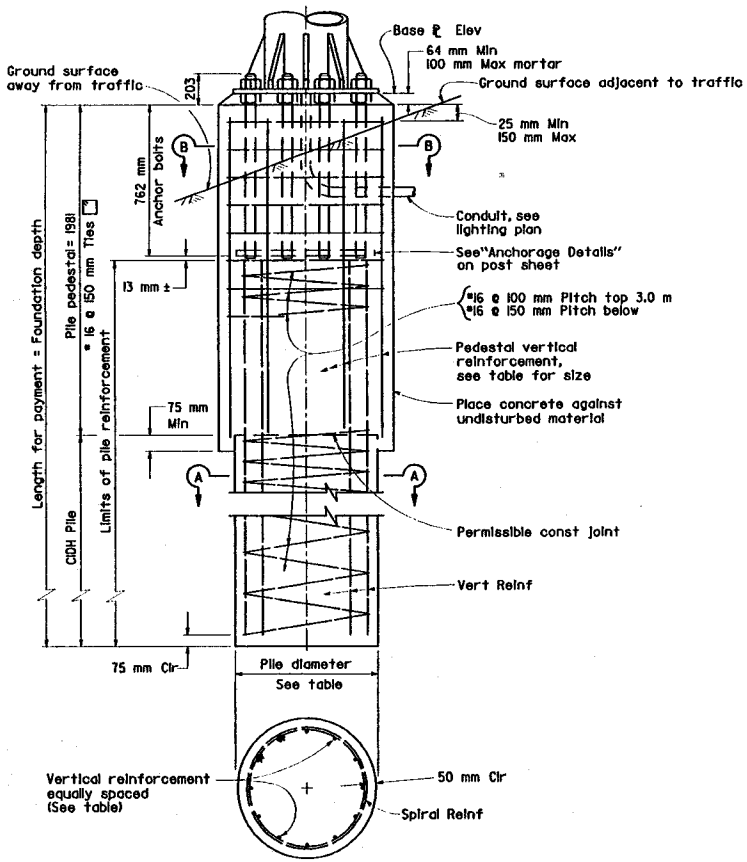
RSP S11 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN S11 DATED JULY 1, 1997-PAGE 203 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP S11

STD. PLAN RSP S11



SECTION B-B



SECTION A-A

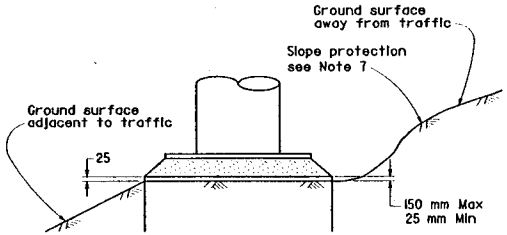
Post Type	Anchor Bolts	Pedestal Size (mm)	Reinforcing Steel Vertical	Pile Diameter (mm)	Foundation Depth ** (m)
II	6-51 mm ø	890x865	14-#22	760	4.0
III	6-51 mm ø	965x865	14-#25	760	4.0
IV	6-51 mm ø	1120x1020	16-#25	920	4.0
V	10-51 mm ø	1170x1095	16-#29	920	5.0
VI	10-51 mm ø	1170x1095	16-#32	920	5.5
VII	12-51 mm ø	1295x1195	16-#36	920	6.5
I-S	6-51 mm ø	865x865	14-#22	760	4.0
II-S	6-51 mm ø	940x865	14-#25	760	5.0
III-S	6-51 mm ø	1020x865	14-#32	760	5.5
IV-S	8-51 mm ø	1070x1020	16-#32	920	6.0
V-S	8-51 mm ø	1145x1020	16-#36	920	7.0
VI-S	8-51 mm ø	1245x1020	16-#36	920	7.0
VII-S	8-57 mm ø	1350x1195	*24-#36	920	8.0

** Use Foundation Depth shown in table unless otherwise shown on the Project Plans.

* Bundled bars

NOTES

1. For anchor bolt layout see post sheet.
2. For "Base ℄ elevation" see Project Plans.
3. Pedestal and pile shall be Class "2" PCC.
4. Pedestals and base plates, longer sides shall be normal to axis of sign.
5. Prior to erection of the post, backfill which is equivalent to the surrounding material shall be in place.
6. Pedestal shall be formed 150 mm minimum below ground surface. Remainder to be placed against undisturbed material.
7. Slope protection required when indicated on the Project Plans.
8. Foundation design is based on a lateral soil pressure of 86 MPa.



DETAIL C

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER Jeffrey B. Woody No. C41260 Exp. 3-31-99 CIVIL STATE OF CALIFORNIA

To accompany plans dated _____

STD. PLAN RSP S13

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS-TRUSS PILE FOUNDATION

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP S13 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN S13 DATED JULY 1, 1997-PAGE 204 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP S13

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

Jeffrey B. Woody
No. C41260
Exp. 3-31-99
CIVIL
STATE OF CALIFORNIA

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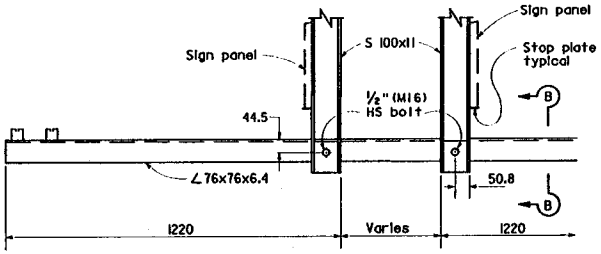
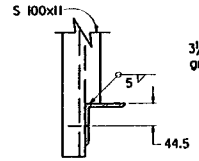


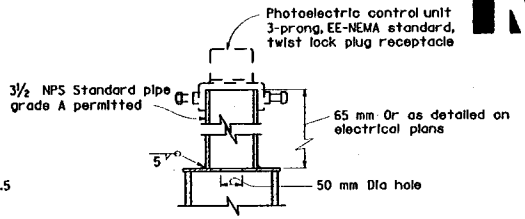
SIDE VIEW - DOUBLE FACED SIGN - END MOUNT

NOTE

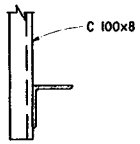
For details not shown see "Side View - Single Faced Sign Type A, B & C" details.



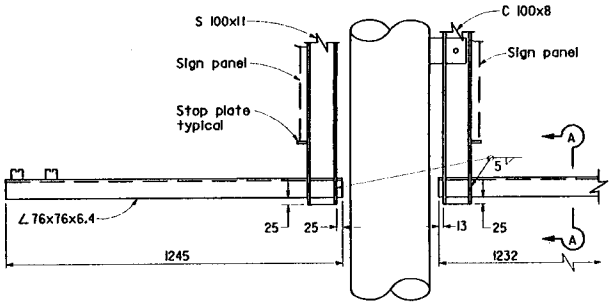
PART SECTION B-B



PHOTOELECTRIC CONTROL UNIT

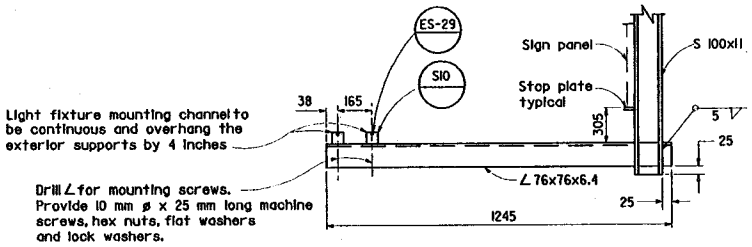


PART SECTION A-A



SIDE VIEW - DOUBLE FACED SIGN - CENTER MOUNT

(Required only on balanced single post signs 4.875 m thru 7.315 m)

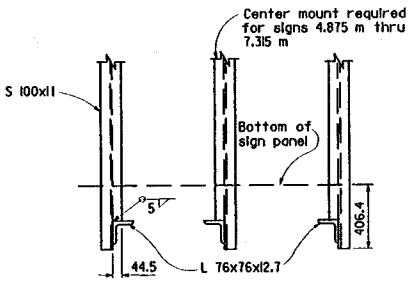


SIDE VIEW - SINGLE FACED SIGN TYPES A, B & C

LIGHT FIXTURE MOUNTING DETAIL

SIGNS GREATER THAN 1676 mm IN LENGTH

For signs 1676 mm or less in length see sheet for "Fluorescent Sign Lighting Equipment (915 mm)"



FRONT VIEW

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS-LIGHTWEIGHT LIGHT FIXTURE MOUNTING DETAILS

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP S18B DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN S18B DATED JULY 1, 1997-PAGE 211 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP S18B

STD. PLAN RSP S18B

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

August 6, 1998
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Jeffrey B. Woody — No. C41260 — Exp. 3-31-99 — CIVIL — STATE OF CALIFORNIA

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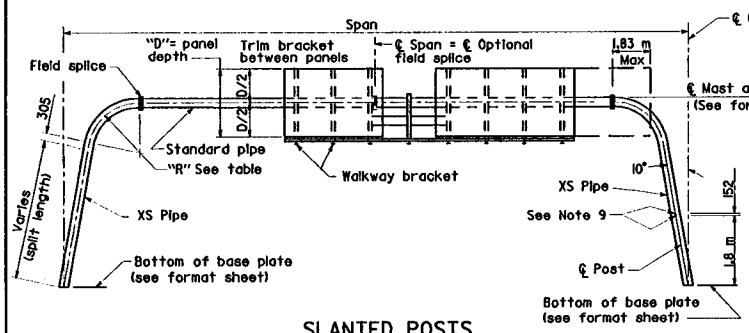
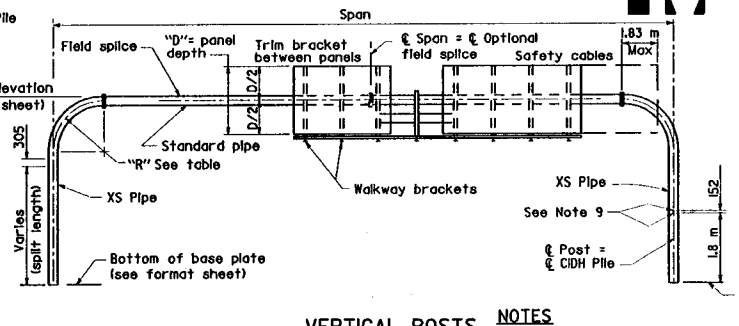
To accompany plans dated _____

Caltrans Metric



SLANTED POSTS



VERTICAL POSTS

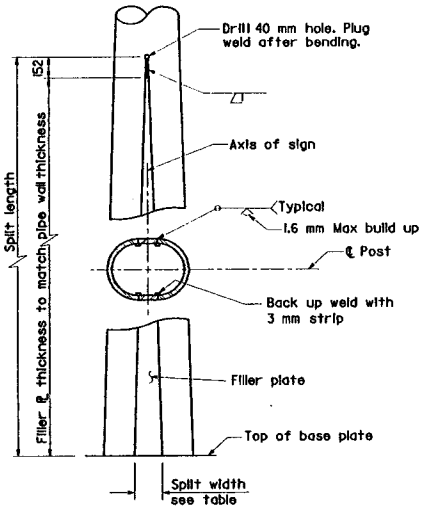
* Mast arm diameter same as post.

○ Indicates camber type, see table.

SLANTED POSTS TABLE
(See Note 2)

PIPE POST DATA "R" (m)	* Dia (NPS)	Split (mm)	"D" → (m)	1.778	2.032	2.286	2.540	2.794	3.048
2.44	8	127	Span (m)	Ⓐ 15.2-17.4	Ⓐ 15.2-17.4				
2.44	10	102 152		Ⓐ 17.5-20.4	Ⓐ 17.5-20.4	Ⓐ 15.2-20.4	Ⓐ 15.2-20.4	Ⓐ 15.2-18.3	Ⓐ 15.2-17.4
2.44	12	102 204		Ⓑ 20.5-23.5	Ⓑ 20.5-23.5	Ⓑ 20.5-23.5	Ⓑ 20.5-23.5	Ⓑ 18.4-21.9	Ⓐ 17.5-21.3
2.44	14	102 204		Ⓑ 23.6-27.1	Ⓑ 23.6-27.1	Ⓒ 23.6-27.1	Ⓒ 23.6-26.5	Ⓑ 22.0-25.9	Ⓑ 21.4-25.3
2.44	16	102 204		Ⓑ 27.2-30.5	Ⓑ 27.2-30.5	Ⓒ 27.2-30.5	Ⓒ 26.6-30.5	Ⓒ 26.0-28.3	Ⓒ 25.4-28.3
3.05	18	127 204		Ⓑ 30.6-33.5	Ⓑ 30.6-33.5	Ⓒ 30.6-33.5	Ⓒ 30.6-33.5	Ⓒ 28.4-32.6	Ⓒ 28.4-32.0
3.05	20	0 127		Ⓑ 33.6-36.6	Ⓒ 33.6-36.6	Ⓒ 33.6-36.6	Ⓓ 33.6-36.6	Ⓓ 32.7-35.1	Ⓒ 32.1-33.5
3.66	24	0 127		Ⓒ 36.7-42.7	Ⓒ 36.7-42.7	Ⓓ 36.7-42.7	Ⓓ 36.7-42.7	Ⓓ 35.2-42.7	Ⓓ 33.6-35.1 Ⓓ 35.2-41.1 ①

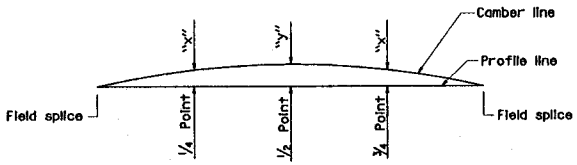
① May increase to 44.2 m with total panel coverage limited to 22.9 m camber type Ⓔ



POST SPLIT DETAILS

CAMBER

Type	"x"	"y"
Ⓐ	38	51
Ⓑ	57	76
Ⓒ	70	102
Ⓓ	89	127
Ⓔ	114	152



CAMBER DIAGRAM

NOTES

1. The maximum sign panel overlap onto elbow shall not exceed 1.83 m from the field splice.
2. For vertical post type, add 2.44 m to the vertical post span and enter the table for slanted post type. This adjusted span (vertical span +2.44 m) shall not exceed the maximum span shown in the table.
3. When several sign panels are to be installed with spaces between the panels the total sign panel length is the sum of the individual sign panel lengths only.
4. Maximum total sign panel coverage = 70% of slanted post span, 80% of vertical post span for spans up to 33.5 m above 33.5 m, varies on a straight line to 60% of vertical post span at 42.7 m.
5. All posts between base plate and field splice are extra strong pipe. All mast arms are standard pipe.
6. Before any portion of the sign frames are assembled in their final positions the Contractor shall demonstrate to the Engineer by preassembly or other approved methods that the span lengths of the frames in the no load condition match within 13 m ± the field measured span lengths between foundations.
7. If the sign frames are erected as one unit, they shall be adequately suspended to avoid distortions or changes in span length between base plates.
8. At final position of post, all top and bottom anchor bolt nuts shall be wrench tightened against base plate.
9. Drill and tap for 1/2 NPS chase nipples and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic.
10. Maximum difference between post heights on an individual frame = 1.5 m.
11. For standard pipe members (Mast Arms) with lengths greater than 24 m an optional field splice will be permitted at ℄ of span to facilitate hauling operations.
12. NPS = Nominal Pipe Size.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS-TUBULAR TWO POST TYPE LAYOUT AND PIPE SELECTION

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

RSP S400 DATED AUGUST 6, 1998 SUPERSEDES STANDARD PLAN S400 DATED JULY 1, 1997-PAGE 230 OF THE STANDARD PLANS BOOK DATED JULY 1997.

REVISED STANDARD PLAN RSP S400

STD. PLAN S400

GENERAL ROAD WORK

MISCELLANEOUS

- ☐ A10A Abbreviations
- ☐ A10B Symbols
- ☐ A20A Pavement Markers and Traffic Lines - Typical Details
- ☐ A20B Pavement Markers and Traffic Lines - Typical Details
- ☐ A20C Pavement Markers and Traffic Lines - Typical Details
- ☐ A20D Pavement Markers and Traffic Lines - Typical Details
- ☐ A24A Pavement Markings - Arrows
- ☐ A24B Pavement Markings - Arrows
- ☐ A24C Pavement Markings - Symbols and Numerals
- ☐ A24D Pavement Markings - Words
- ☐ A24E Pavement Markings - Words and Crosswalks
- ☐ A35A Portland Cement Concrete Paving Details
- ☐ A40 Rumble Strip Details
- ☐ A62A Excavation and Backfill - Miscellaneous Details
- ☐ A62B Limits of Payment for Excavation and Backfill - Bridge Surcharge and Wall
- ☐ A62C Limits of Payment for Excavation and Backfill - Bridge
- ☐ A62D Excavation and Backfill - Concrete Pipe Culverts
- ☐ A62E Excavation and Backfill - Cast-in-Place Reinforced Concrete Box and Arch Culverts
- ☐ A62F Excavation and Backfill - Metal and Plastic Culverts
- ☐ A73A Object Markers
- ☐ A73B Markers
- ☐ A73C Delineators, Channelizers and Barricades
- ☐ A74 Survey Monuments
- ☐ A75A Concrete Barrier Type 50
- ☐ A75B Concrete Barrier Type 50E
- ☐ A75D Concrete Headlight Glare Screen
- ☐ *RSP A76A CONCRETE BARRIER TYPE 60*
- ☐ A76B Concrete Barrier Type 60
- ☐ A76C Concrete Barrier Type 60E
- ☐ A76D Concrete Barrier Type 60G
- ☐ A76E Concrete Barrier Type 60G
- ☐ A76F Concrete Barrier Type 60GE
- ☐ *RSP A76G CONCRETE BARRIER TYPE 60S*
- ☐ A76H Concrete Barrier Type 60S
- ☐ A76I Concrete Barrier Type 60SE
- ☐ *RSP A77A METAL BEAM GUARD RAILING - WOOD POSTS AND WOOD BLOCKS*
- ☐ *RSP A77B METAL BEAM GUARD RAILING - STANDARD HARDWARE*
- ☐ *RSP A77C METAL BEAM GUARD RAILING - WOOD POSTS AND WOOD BLOCKS*
- ☐ *RSP A77D GUARD RAILING TYPICAL LAYOUTS*
- ☐ *RSP A77E GUARD RAILING TYPICAL LAYOUTS*
- ☐ *RSP A77F METAL BEAM GUARD RAILING - TYPICAL EMBANKMENT WIDENING FOR END TREATMENTS*
- ☐ *RSP A77G GUARD RAILING END ANCHOR (BREAKAWAY, TYPE B)*
- *A77GA CANCELED - NO LONGER BEING USED*
- ☐ A77H Guard Railing End Anchors - Breakaway Hardware
- ☐ A77I Barrier and Guard Railing End Anchors
- ☐ *RSP A77J GUARD RAILING CONNECTIONS TO BRIDGE RAILINGS, RETAINING WALLS AND ABUTMENTS*
- ☐ *RSP A77K GUARD RAILING CONNECTIONS TO BRIDGE SIDEWALKS AND CURBS*
- ☐ A78A Thrie Beam Barrier
- ☐ *RSP A78B THRIE BEAM BARRIER*
- ☐ A78C Thrie Beam Barrier - Standard Hardware
- ☐ A78D Thrie Beam Barrier - Miscellaneous Details
- ☐ *RSP A78E THRIE BEAM BARRIER - END ANCHORS AND END TREATMENTS*
- ☐ A78F Thrie Beam Barrier - Connections to Bridge Railing
- ☐ A78G Thrie Beam Barrier - Connections to Bridge Curbs, Retaining Walls and Abutments
- ☐ A78H Thrie Beam Barrier - Connection to Concrete Barrier Type 50
- ☐ A78I Thrie Beam Barrier - Connection to Concrete Barrier Type 60
- *A81 CANCELED, REPLACED WITH NSP A81A, NSP A81B AND NSP A81C.*
- ☐ A83 Portable Scale Pad and Approach Slab Details
- ☐ A85 Chain Link Fence
- ☐ A86 Barbed Wire and Wire Mesh Fences
- ☐ A87 Curbs, Dikes and Driveways
- ☐ A88 Curb Ramp Details
- ☐ A90 Accessible Parking

CRIB WALLS

- ☐ C7A Reinforced Concrete Crib Wall - Battered Wall, Types A, B and C
- ☐ C7B Reinforced Concrete Crib Wall - Battered Wall, Types D, E and F
- ☐ C7C Reinforced Concrete Crib Wall - Vertical Wall, Types A, B and C
- ☐ C7D Reinforced Concrete Crib Wall - Vertical Wall, Types D, E and F
- ☐ *RSP C7E REINFORCED CONCRETE CRIB WALL - TYPES A,B,C,D,E AND F - HEADER AND STRECHER DETAILS*
- ☐ *RSP C7F DESIGN DATA FOR REINFORCED CONCRETE CRIB WALL - FOUNDATION PRESSURE, BATTERED WALL*
- ☐ *RSP C7G REINFORCED CONCRETE CRIB WALL - FOUNDATION PRESSURE, VERTICAL WALL*
- ☐ C8A Steel Crib Wall - Construction Details
- ☐ C8B Steel Crib Wall - Design Data
- ☐ *RSP C8C STEEL CRIB WALL - DESIGN DATA*
- ☐ C9A Timber Crib Wall - Types A, B, C and D
- ☐ *RSP C9B TIMBER CRIB WALL - TYPES A,B,C AND D -DESIGN DATA*

DRAINAGE

- ☐ D72 Drainage Inlets
- ☐ D73 Drainage Inlets
- ☐ D74A Drainage Inlets
- ☐ D74B Drainage Inlets
- ☐ D74C Drainage Inlet Details
- *D75 CANCELED, REPLACED WITH NSP D75A, NSP D75B AND NSP D75C.*
- ☐ *RSP D77A Grate Details*
- ☐ D77B Bicycle Proof Grate Details
- ☐ D77C Alternative Hinged Cover for Type OL and OS Inlets and Trash Rack for Type OCP Inlet
- ☐ D78 Gutter Depressions
- ☐ D79 Precast Reinforced Concrete Pipe - Direct Design Method
- ☐ D80 Cast-in-Place Reinforced Concrete Single Box Culvert
- ☐ D81 Cast-in-Place Reinforced Concrete Double Box Culvert
- ☐ *RSP D82 CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT - MISCELLANEOUS DETAILS*
- ☐ D84 Box Culvert Wingwalls - Types A, B and C
- ☐ *RSP D85 BOX CULVERT WINGWALLS - TYPES D AND E*
- ☐ D86A Box Culvert Warped Wingwalls
- ☐ D86B Pipe Culvert Headwalls, Endwalls and Warped Wingwalls
- ☐ D86C Arch Culvert Headwalls, Endwalls and Warped Wingwalls
- ☐ D87A Overside Drains
- ☐ D87B Overside Drains
- ☐ D87C Underdrains
- ☐ D88 Construction Loads on Culverts
- ☐ D88A Strut Details for Structural Steel Plate Pipes, Arches, and Vehicular Undercrossings
- ☐ D89 Pipe Headwalls
- ☐ D90 Pipe Culvert Headwalls, Endwalls and Wingwalls - Types A, B and C
- ☐ D93A Pipe Riser Connections
- ☐ D93B Drainage Inlet Riser Connections
- ☐ D93C Pipe Riser with Debris Rack Cage
- ☐ D94A Metal and Plastic Flared End Sections
- ☐ D94B Concrete Flared End Sections
- ☐ D95 Concrete Arch Culverts
- ☐ D97A Corrugated Metal Pipe - Coupling Details No. 1, Annular Coupling Band Bar and Strap and Angle Connectors
- ☐ D97B Corrugated Metal Pipe - Coupling Details No. 2, Hat Band Coupler and Flange Details
- ☐ D97C Corrugated Metal Pipe - Coupling Details No. 3, Helical and Universal Couplers
- ☐ D97D Corrugated Metal Pipe - Coupling Details No. 4, Hugger Coupling Bands
- ☐ D97E Corrugated Metal Pipe - Coupling Details No. 5, Standard Joint
- ☐ D97F Corrugated Metal Pipe - Coupling Details No. 6, Positive Joint
- ☐ D97G Corrugated Metal Pipe - Coupling Details No. 7, Positive Joints and Downdrains
- ☐ D97H Reinforced Concrete Pipe or Non-Reinforced Concrete Pipe - Standard and Positive Joints
- ☐ D98A Slotted Corrugated Steel Pipe Drain Details
- ☐ D98B Slotted Corrugated Steel Pipe Drain Details
- ☐ D99A Structural Section Drainage System Details
- ☐ D99B Edge Drain Outlet and Vent Details
- ☐ D99C Edge Drain Cleanout and Vent Details
- ☐ D99D Cross Drain Interceptor Details

HIGHWAY PLANTING

- ☐ H1 Planting and Irrigation - Abbreviations
- ☐ *RSP H2 PLANTING AND IRRIGATION - SYMBOLS*
- ☐ H3 Planting and Irrigation - Details
- ☐ H4 Planting and Irrigation - Details
- ☐ H5 Planting and Irrigation - Details
- ☐ H6 Planting and Irrigation - Details

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DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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To accompany plans dated _____

- ☐ H7 Planting and Irrigation - Details
- ☐ H8 Planting and Irrigation - Details

TEMPORARY FACILITIES

- *T1 CANCELED, REPLACED WITH NSP T1A AND NSP T1B.*
- ☐ *RSP T2 TEMPORARY CRASH CUSHION, SAND FILLED (SHOULDER INSTALLATIONS)*
- ☐ T3 Temporary Railing (Type K)
- ☐ *RSP T4 TEMPORARY TRAFFIC SCREEN*
- ☐ T5 Temporary Terminal Section (Type K)
- ☐ *RSP T7 CONSTRUCTION PROJECT INFORMATION SIGNS*
- ☐ T10 Traffic Control System for Lane Closure on Freeways and Expressways
- ☐ T10A Traffic Control System for Lane and Complete Closures on Freeways and Expressways
- ☐ T11 Traffic Control System for Lane Closure on Multilane Conventional Highways
- ☐ T12 Traffic Control System for Lane Closure on Multilane Conventional Highways
- ☐ T13 Traffic Control System for Lane Closure on Two Lane Conventional Highways
- ☐ T14 Traffic Control System for Ramp Closures
- ☐ *RSP T15 TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS*
- ☐ *RSP T16 TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS*
- ☐ *RSP T17 TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON TWO LANE HIGHWAYS*

BRIDGE

- ☐ B0-1 Bridge Details
- ☐ B0-3 Bridge Details
- ☐ B0-5 Bridge Details
- ☐ B0-13 Bridge Details
- ☐ B2-3 400 mm Cast-in-Drilled-Hole Concrete Pile
- ☐ B2-5 Pile Details - Class 400 and Class 625
- ☐ B2-6 Pile Details - Class 400C and Class 625C
- ☐ B2-8 Pile Details - Class 900 and Class 900C
- ☐ B2-9 Load Test Pile Details (1)
- ☐ B2-10 Load Test Pile Details (2)
- ☐ B2-11 Load Test Pile Details (3)
- ☐ *RSP B3-1 RETAINING WALL TYPE 1 - H=1200 THROUGH 9100 mm*
- ☐ B3-2 Retaining Wall Type 1 - H=9700 Through 10 900 mm
- ☐ *RSP B3-3 RETAINING WALL TYPE 1A*
- ☐ B3-4 Retaining Wall Type 2
- ☐ B3-5 Counterfort Retaining Wall Type 3
- ☐ B3-6 Counterfort Retaining Wall Type 4
- ☐ *RSP B3-7 RETAINING WALL TYPE 5*
- ☐ *RSP B3-8 RETAINING WALL DETAILS No. 1*
- ☐ B3-9 Retaining Wall Details No. 2
- ☐ B3-11 Retaining Wall Type 6 - 1829 mm Maximum
- ☐ B6-1 T-Beam Details
- ☐ B6-10 Utility Openings - T-Beam
- ☐ B6-21 Joint Seals (Maximum Movement Rating = 50 mm)
- ☐ B7-1 Box Girder Details
- ☐ B7-5 Deck Drains
- ☐ B7-6 Deck Drains - Type D-1 and D-2
- ☐ B7-10 Utility Opening - Box Girder
- ☐ B7-11 Utility Details
- ☐ B8-5 Cast-in-Place Prestressed Girder Details
- ☐ B11-7 Chain Link Railing
- ☐ B11-47 Cable Railing
- ☐ B11-51 Tubular Hand Railing
- ☐ *RSP B11-52 CHAIN LINK RAILING TYPE 7*
- ☐ B11-53 Concrete Barrier Type 25
- ☐ B11-54 Concrete Barrier Type 26
- ☐ B13-1 Slope Protection Details

STANDARD PLANS LIST, SHEET 1 OF 2

July, 1997 Edition (REVISED AUGUST 6, 1998)

WEB SITE ADDRESS: http://www.dot.ca.gov/hq/esc/projplan/ppintro.htm

The Standard Plan sheets applicable to this contract include, but are not limited to those indicated by a marked box.
The Revised Standard Plans (RSP) and New Standard Plans (NSP) which apply to this contract are included as individual sheets of the project plans.

USERNAME => trrichf
DGN FILE => mspl_06130633

CONTRACT NO.

DATE PLOTTED => 6-AUG-1998
TIME PLOTTED => 13:06

- ☐ B14-1 Structural Steel Plate Vehicular Undercrossing
- ☐ B14-3 Communication and Sprinkler Control Conduit (Conduit less than size 103)
- ☐ B14-4 Water Supply Line (Bridge) (Pipe less than NPS 4)
- ☐ B14-5 Water Supply Line (Details) (Pipe less than NPS 4)

ROADSIDE SIGNS

- ☐ RS1 Roadside Signs - Typical Installation Details No. 1
- ☐ RS2 Roadside Signs - Wood Post, Typical Installation Details No. 2
- ☐ *RSP RS3 ROADSIDE SIGNS - LAMINATED WOOD BOX POST - TYPICAL INSTALLATION DETAILS NO.3*
- ☐ RS4 Roadside Signs - Typical Installation Details No. 4

OVERHEAD SIGNS

OVERHEAD SIGNS-TRUSS

- ☐ S1 Overhead Signs-Truss - Instructions and Examples
- ☐ S2 Overhead Signs-Truss - Single Post Type - Post Types II through VII
- ☐ S3 Overhead Signs-Truss - Two Post Type - Post Types 1-S through VII-S
- ☐ *RSP S4 OVERHEAD SIGNS-TRUSS - SINGLE POST TYPE, STRUCTURAL FRAME MEMBERS*
- ☐ S5 Overhead Signs-Truss - Two Post Type, Structural Frame Members
- ☐ S6 Overhead Signs-Truss - Structural Frame Details
- ☐ S7 Overhead Signs-Truss - Frame Juncture Details
- ☐ S8A Overhead Signs - Steel Frame, Removable Sign Panel Frames
- ☐ S8B Overhead Signs - Removable Sign Panel Frames, Overhead Formed Panel Mounting Details
- ☐ *RSP S8C OVERHEAD SIGNS-TRUSS - SIGN PANEL MOUNTING DETAILS, LAMINATED PANEL-TYPE A*
- ☐ S8D Overhead Signs-Truss - Removable Sign Panel Frames 2.794 m and 3.048 m Sign Panels
- ☐ S9 Overhead Signs - Walkway Details No. 1
- ☐ S10 Overhead Signs - Walkway Details No. 2
- ☐ *RSP S11 OVERHEAD SIGNS - WALKWAY SAFETY RAILING DETAILS*
- ☐ *RSP S13 OVERHEAD SIGNS-TRUSS - PILE FOUNDATION*

OVERHEAD SIGNS-LIGHTWEIGHT

- ☐ S14A Overhead Signs-Lightweight - Balanced, Single Steel Post Connection and Mounting Details
- ☐ S14B Overhead Signs-Lightweight - Balanced, Single Steel Post Details
- ☐ S15 Overhead Signs-Lightweight - Type A Connection Details
- ☐ S16 Overhead Signs-Lightweight - Type B Connection Details
- ☐ S17 Overhead Signs-Lightweight - Type C Connection Details
- ☐ S18A Overhead Signs-Lightweight - Sign Panel Mounting Details, Laminated Panel-Type A
- ☐ *RSP S18B OVERHEAD SIGNS-LIGHTWEIGHT - LIGHT FIXTURE MOUNTING DETAILS*
- ☐ S20A Overhead Signs-Lightweight - Post Details
- ☐ S20B Overhead Signs-Lightweight - Foundation Details

OVERHEAD SIGNS-BOX BEAM CLOSED TRUSS ALTERNATIVE

- ☐ S39 Overhead Signs-Box Beam Closed Truss - Foundation Details
- ☐ S40A Overhead Signs-Box Beam Closed Truss - Two Post Type, Frame Members
- ☐ S40B Overhead Signs-Box Beam Closed Truss - Single and Two Post Type, General Frame Details
- ☐ S40C Overhead Signs-Box Beam Closed Truss - Ribbed Sheet Metal Details
- ☐ S40D Overhead Signs-Box Beam Closed Truss - Two Post Type, Frame Details
- ☐ S40E Overhead Signs-Box Beam Closed Truss - Two Post Type, Frame Juncture Details
- ☐ S40F Overhead Signs-Box Beam Closed Truss - Two Post Type, Post Details
- ☐ S40G Overhead Signs-Box Beam Closed Truss - Single Post Type, Frame Members
- ☐ S40H Overhead Signs-Box Beam Closed Truss - Single Post Cantilever, Frame Details
- ☐ S40I Overhead Signs-Box Beam Closed Truss - Single Post Cantilever, Frame Juncture Details
- ☐ S40J Overhead Signs-Box Beam Closed Truss - Single Post Cantilever, Post Details
- ☐ S40K Overhead Signs-Box Beam Closed Truss - Single Post Butterfly, Frame Details
- ☐ S40L Overhead Signs-Box Beam Closed Truss - Single Post Butterfly, Frame Juncture Details
- ☐ S40M Overhead Signs-Box Beam Closed Truss - Single Post Butterfly, Post Details

OVERHEAD SIGNS-TUBULAR

- ☐ S40N Overhead Signs-Tubular - Instructions and Examples
- ☐ S40P Overhead Signs-Tubular - Single Post Type, Layout and Pipe Selection
- ☐ *RSP S40Q OVERHEAD SIGNS-TUBULAR - TWO POST TYPE, LAYOUT AND PIPE SELECTION*
- ☐ S40R Overhead Signs-Tubular - Structural Frame Details No. 1
- ☐ S40S Overhead Signs-Tubular - Structural Frame Details No. 2
- ☐ S40T Overhead Signs-Tubular - Foundation Details

SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

- ☐ ES-1A Signal, Lighting and Electrical Systems - Symbols and Abbreviations
- ☐ ES-1B Signal, Lighting and Electrical Systems - Symbols and Abbreviations
- ☐ ES-2A Signal, Lighting and Electrical Systems - Service Equipment
- ☐ ES-2B Signal, Lighting and Electrical Systems - Service Equipment
- ☐ ES-2C Signal, Lighting and Electrical Systems - Service Equipment Notes
- ☐ ES-2D Signal, Lighting and Electrical Systems - Service Equipment and Typical Wiring Diagram, Type A
- ☐ ES-2E Signal, Lighting and Electrical Systems - Service Equipment and Typical Wiring Diagram, Type B
- ☐ ES-2F Signal, Lighting and Electrical Systems - Service Equipment and Typical Wiring Diagram, Type C
- ☐ ES-3A Signal, Lighting and Electrical Systems - Signal Heads and Mountings
- ☐ ES-3B Signal, Lighting and Electrical Systems - Signal Heads and Mountings
- ☐ ES-3C Signal, Lighting and Electrical Systems - Signal Heads and Mountings
- ☐ ES-3D Signal, Lighting and Electrical Systems - Signal Heads and Mountings
- ☐ ES-3E Signal, Lighting and Electrical Systems - Signal Heads and Mountings
- ☐ ES-4A Signal, Lighting and Electrical Systems - Controller Cabinet Details
- ☐ ES-4B Signal, Lighting and Electrical Systems - Controller Cabinet Details
- ☐ ES-4C Signal, Lighting and Electrical Systems - Controller Cabinet Details
- ☐ ES-4D Irrigation Controller Enclosure Cabinet
- ☐ ES-5A Signal, Lighting and Electrical Systems - Detectors
- ☐ ES-5B Signal, Lighting and Electrical Systems - Detectors
- ☐ ES-5C Signal, Lighting and Electrical Systems - Detectors
- ☐ ES-5D Signal, Lighting and Electrical Systems - Detectors
- ☐ ES-5E Signal, Lighting and Electrical Systems - Detectors
- ☐ ES-5F Signal, Lighting and Electrical Systems - Pedestrian Barricades
- ☐ ES-6A Signal and Lighting Standards - Type I Standards and Equipment Numbering
- ☐ ES-6AA Signal Standards - Push Button Posts
- ☐ ES-6B Lighting Standards - Types 15, 21 and 22
- ☐ ES-6C Lighting Standards - 24.4 m to 48.8 m High Mast Light Pole Foundation Details
- ☐ ES-6D Lighting Standards - Types 30 and 31
- ☐ ES-6DA Lighting Standards - Type 32
- ☐ ES-6E Lighting Standards - Types 30 and 31, Base Plate Details
- ☐ ES-6F Lighting Standards - 10 Degree Type
- ☐ ES-6H Lighting Standards - 10 Degree Type, Details
- ☐ *RSP ES-6I SIGNAL AND LIGHTING STANDARDS - CASE 1 ARM LOADING, WIND VELOCITY = 113 km/h, ARM LENGTHS 4.6 m TO 9.1 m*
- ☐ ES-6K Signal and Lighting Standards - Case 2 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 6.1 m to 9.1 m
- ☐ ES-6L Signal and Lighting Standards - Case 3 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 4.6 m to 13.7 m
- ☐ ES-6M Signal and Lighting Standards - Case 4 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 7.6 m to 13.7 m
- ☐ ES-6MA Signal and Lighting Standards - Case 5 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 15.2 m to 16.8 m
- ☐ ES-6N Signal and Lighting Standards - Type 40-0-129
- ☐ ES-6O Signal and Lighting Standards - Case 1 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 7.6 m to 9.1 m
- ☐ ES-6P Signal and Lighting Standards - Case 2 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 6.1 m to 9.1 m
- ☐ ES-6Q Signal and Lighting Standards - Case 3 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 6.1 m to 13.7 m
- ☐ *RSP ES-6R SIGNAL AND LIGHTING STANDARDS - CASE 4 ARM LOADING, WIND VELOCITY = 129 km/h, ARM LENGTHS 7.6 m TO 13.7 m*

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DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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- ☐ ES-6RA Signal and Lighting Standards - Case 5 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 15.2 m to 16.8 m
- ☐ ES-6RB Signal and Lighting Standards - Case 5 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 18.2 m to 19.8 m
- ☐ ES-6S Signal and Lighting Standards - Details No. 1
- ☐ ES-6T Signal and Lighting Standards - Details No. 2
- ☐ ES-6TA Signal and Lighting Standards - Pole and Mast Arm Alternatives
- ☐ ES-6U Lighting Standards - Type 15 Slip Base Insert
- ☐ ES-6V Signal and Sign Standards - Type 33 Left Turn
- ☐ ES-7A Signal, Lighting and Electrical Systems - Electrical Details, Structure Installations
- ☐ ES-7B Signal, Lighting and Electrical Systems - Electrical Details, Structure Installations
- ☐ ES-7C Signal, Lighting and Electrical Systems - Electrical Details, Structure Installations
- ☐ ES-7D Signal, Lighting and Electrical Systems - Electrical Details, Structure Installations
- ☐ ES-7E Signal, Lighting and Electrical Systems - Electrical Details, Structure Installations
- ☐ ES-7F Signal, Lighting and Electrical Systems - Flush Soffit Luminaire Modification Details, Structure Installations
- ☐ ES-8 Signal, Lighting and Electrical Systems - Pull Box Details
- ☐ ES-9A Signal, Lighting and Electrical Systems - Cantilever Flashing Beacon, Types 9, 9A and 9B
- ☐ ES-9B Signal, Lighting and Electrical Systems - Cantilever Flashing Beacon, Types 9, 9A and 9B
- ☐ ES-10 Signal, Lighting and Electrical Systems - Isolux Diagrams
- ☐ ES-11 Signal, Lighting and Electrical Systems - Foundation Installations
- ☐ ES-12 Signal, Lighting and Electrical Systems - Pedestrian Undercrossing Fluorescent Lighting Fixture
- ☐ ES-13 Signal, Lighting and Electrical Systems - Splicing Details
- ☐ ES-14 Signal, Lighting and Electrical Systems - Wiring Details and Fuse Ratings
- ☐ ES-15 Signal, Lighting and Electrical Systems - Pedestrian Overcrossing Fluorescent Lighting Fixture
- ☐ ES-27A Signal, Lighting and Electrical Systems - Extinguishable Message Sign, 250 mm Letters
- ☐ ES-27B Signal, Lighting and Electrical Systems - Extinguishable Message Sign, 250 mm Letters
- ☐ ES-28 Signal, Lighting and Electrical Systems - Extinguishable Message Sign and Flashing Beacons

SIGN ILLUMINATION

- ☐ ES-29 Sign Illumination - Mercury Sign Illumination Equipment
- ☐ ES-30 Sign Illumination - 915 mm Fluorescent Sign Illumination Equipment
- ☐ ES-32A Sign Illumination - Sign Illumination Equipment
- ☐ ES-32B Sign Illumination - Sign Illumination Control
- ☐ ES-33 Sign Illumination - Internally Illuminated Street Name Sign

CLOSED CIRCUIT TELEVISION

- ☐ *RSP ES-34A CLOSED CIRCUIT TELEVISION - POLE DETAILS*
- ☐ ES-34B Closed Circuit Television - Pole Details, Overhead Sign Mounted

NEW STANDARD PLANS

- ☐ *NSP RT7A METAL BEAM GUARD RAILING - TYPICAL LINE POST INSTALLATION*
- ☐ *NSP RT7L GUARD RAILING AND BARRIER RAILING END TREATMENT*
- ☐ *NSP RT7M GUARD RAILING AND BARRIER RAILING END TREATMENT*
- ☐ *NSP RT7N GUARD RAILING AND BARRIER RAILING END TREATMENT*
- ☐ *NSP A81A CRASH CUSHION, SAN FILLED (UNIDIRECTIONAL)*
- ☐ *NSP A81B CRASH CUSHION, SAN FILLED (UNIDIRECTIONAL)*
- ☐ *NSP A81C CRASH CUSHION, SAN FILLED (BIDIRECTIONAL)*
- ☐ *NSP A82 CRASH CUSHION (TYPE CAT)*
- ☐ *NSP D75A PIPE INLETS*
- ☐ *NSP D75B PIPE INLETS*
- ☐ *NSP D75C PIPE INLETS - LADDER, STEP AND TRASH RACK DETAILS*
- ☐ *NSP T1A TEMPORARY CRASH CUSHION, SAND FILLED (UNIDIRECTIONAL)*
- ☐ *NSP T1B TEMPORARY CRASH CUSHION, SAND FILLED (BIDIRECTIONAL)*

STANDARD PLANS LIST, SHEET 2 OF 2

July,1997 Edition (REVISED AUGUST 6,1998)

WEB SITE ADDRESS: http://www.dot.ca.gov/hq/esc/projplan/ppintro.htm

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DGN FILE => msp2_06130634

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