

NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
2. Weights: Frame 75.3kg (166) – 87.6kg (193)lbs.
Cover 67.7kg (147) – 77.6kg (171)lbs.
3. Machine all matching surfaces and seats of frame and cover to prevent rocking.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.

FOR	MARK
Sewer Projects	Sewer
Storm Drain Projects	Storm Drain
Water Projects	Water

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

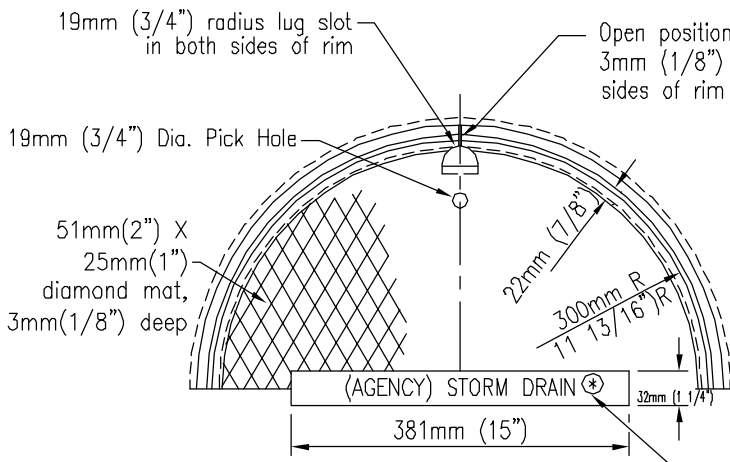
SAN DIEGO REGIONAL STANDARD DRAWING

**.61m (24") MANHOLE FRAME AND COVER
HEAVY DUTY**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

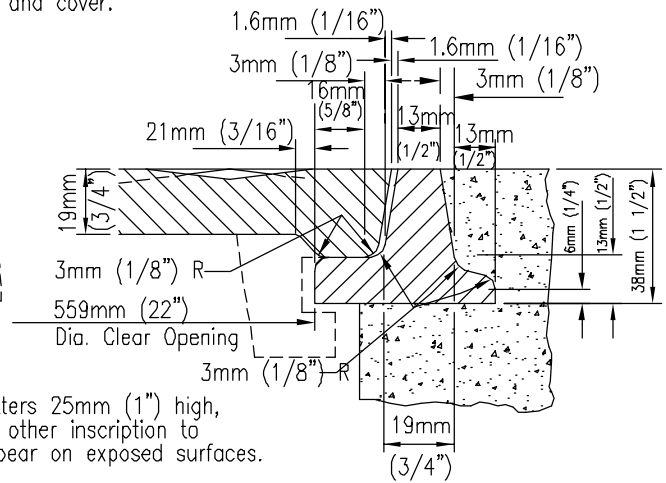
T. Stanton 3/01/003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-1**

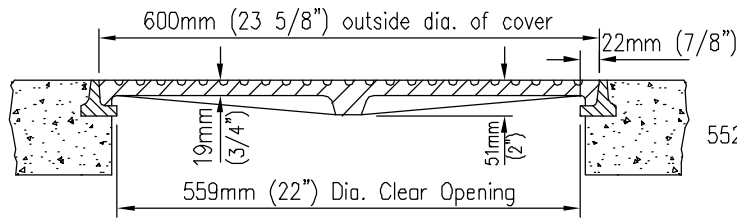


TOP OF FRAME & COVER

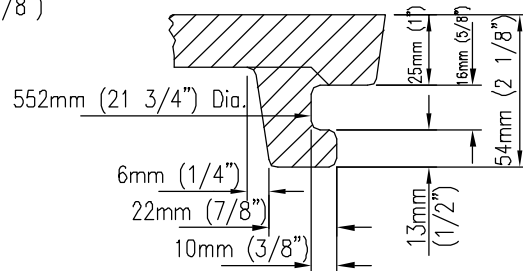
Letters 25mm (1") high, no other inscription to appear on exposed surfaces.



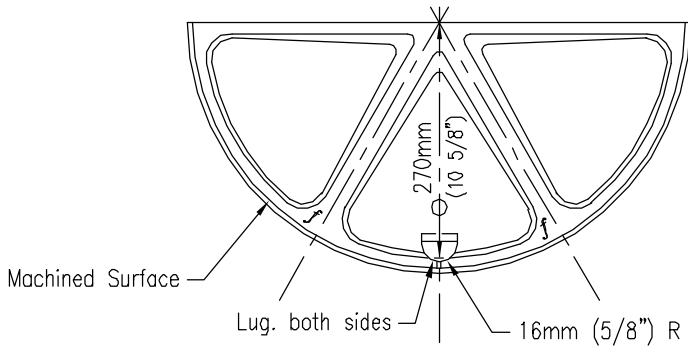
SECTION THROUGH RIM



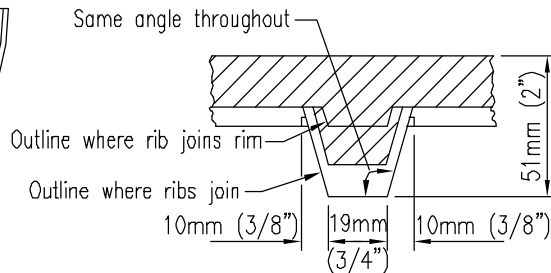
SECTION THROUGH FRAME & COVER



SECTION THROUGH LUG



BOTTOM OF COVER



SECTION THROUGH RIB AT MID RADIUS

NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 30.
2. Frame and cover for use in non-traffic area only.
3. Weights: Frame 13.2kg (29) - 15kg (33) lbs.
Cover 43kg (95) - 50kg (110) lbs.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.

FOR		MARK	
Sewer Projects		Sewer	
Storm Drain Projects		Storm Drain	
Water Projects		Water	

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

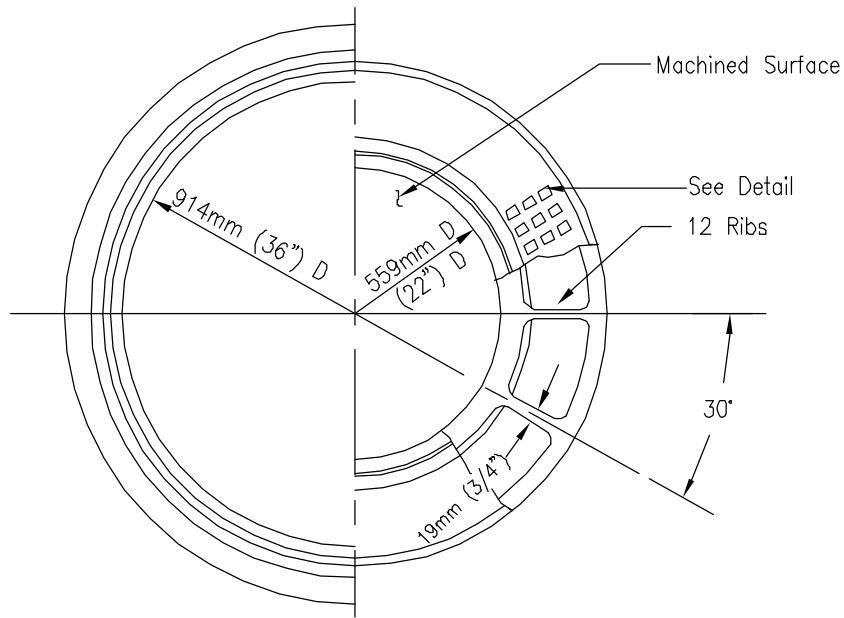
SAN DIEGO REGIONAL STANDARD DRAWING

.61m (24") MANHOLE FRAME AND COVER
LIGHT DUTY

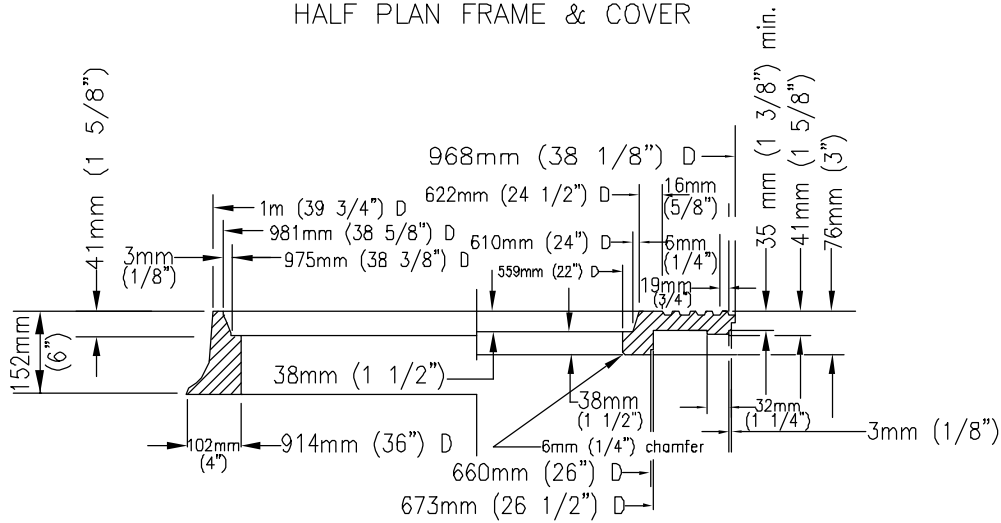
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 51018003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-2**



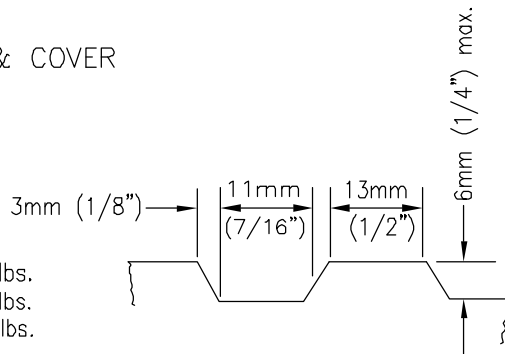
HALF PLAN FRAME & COVER



HALF SECTION FRAME & COVER

NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
2. Weights: Frame 142.4kg (314) - 164.6kg (363) lbs.
Outer Cover 129.3kg (285) - 149.7kg (330) lbs.
Inner Cover 66.7kg (147) - 77.5kg (171) lbs.
3. Machine all matching surfaces and seats of frame and cover to prevent rocking.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.



DETAIL

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

914mm (36") MANHOLE FRAME
AND TWO CONCENTRIC COVERS
HEAVY DUTY

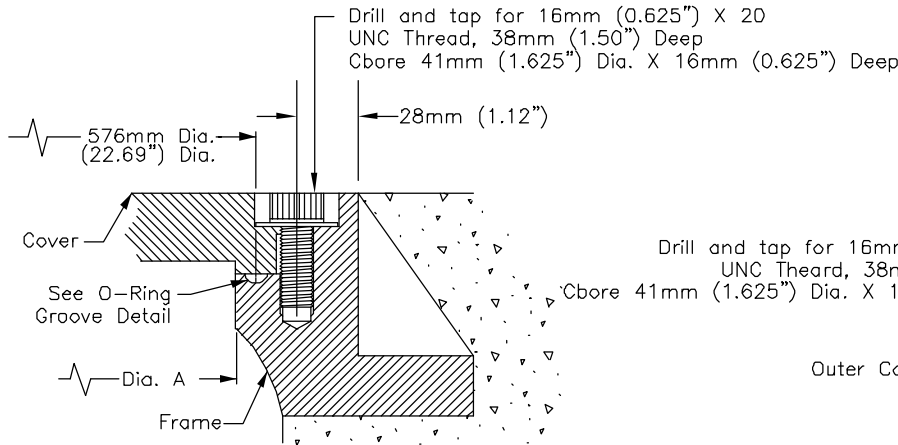
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 5/10/8005

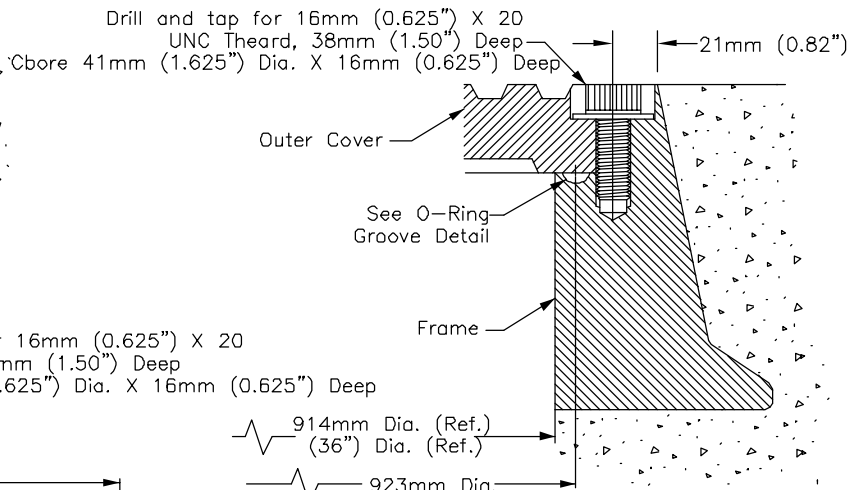
Chairperson R.C.E. 19246 Date

DRAWING NUMBER

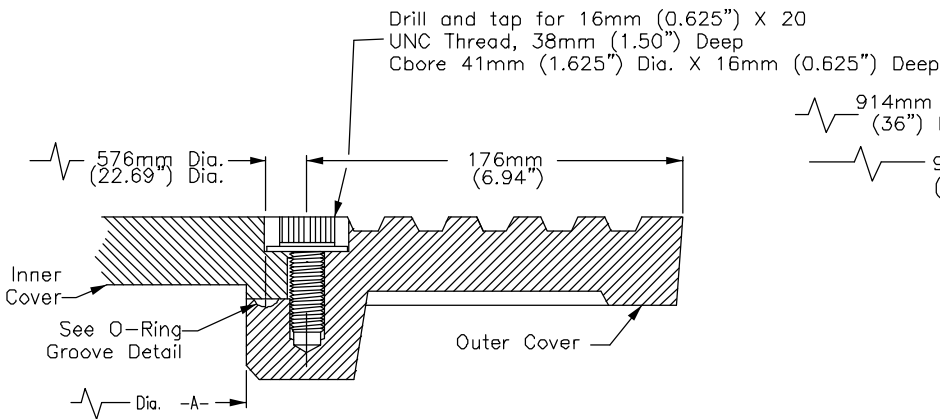
M-3



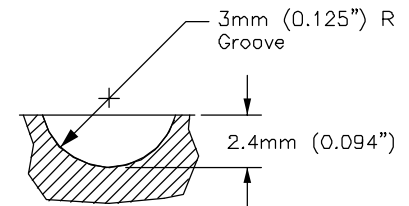
M-1 Detail:
COVER TO FRAME



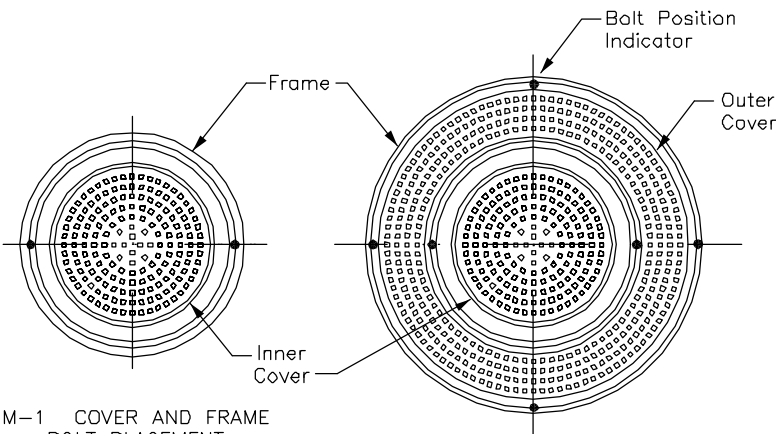
M-3B Detail:
OUTER COVER TO FRAME



M-3A Detail:
INNER COVER TO OUTER COVER



NEOPRENE O-RING
GROOVE DETAIL



M-1 COVER AND FRAME
BOLT PLACEMENT
(See Note 3)

M-3 CONCENTRIC COVERS AND FRAME
BOLT PLACEMENT
(See Note 3)

NOTES:

- 16mm (0.625) X 20 UNC THREAD, 316 STAINLESS STEEL SOCKET HEAD CAP SCREW AND 38mm (1.50) O.D. X 17mm (0.687) I.D. X 0.078 THICK 316 STAINLESS STEEL WASHER.
- 6mm (0.25) NEOPRENE O-RING GASKET SHALL BE GLUED INTO MACHINED GROOVE. GLUE SHALL MEET THE REQUIREMENTS OF MIL-M-81288 (AMEND. 1)
- BOLTDOWN PATTERNS:
 - M-1 DETAIL (610mm (24) COVER & FRAME): INSTALL TWO (2) BOLTS AT 180 DEGREES.
 - M-3A DETAIL (CONCENTRIC COVERS): BETWEEN INNER AND OUTER COVERS INSTALL TWO (2) BOLTS AT 180 DEGREES.
 - M-3B DETAIL (OUTER COVER & FRAME): BETWEEN OUTER COVER & FRAME INSTALL FOUR (4) BOLTS AT 90 DEGREES.

Revision	By	Approved	Date
ORIGINAL		Parkinson	2/95
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

MANHOLE COVER - LOCKING DEVICE

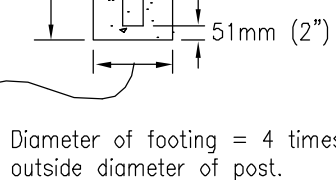
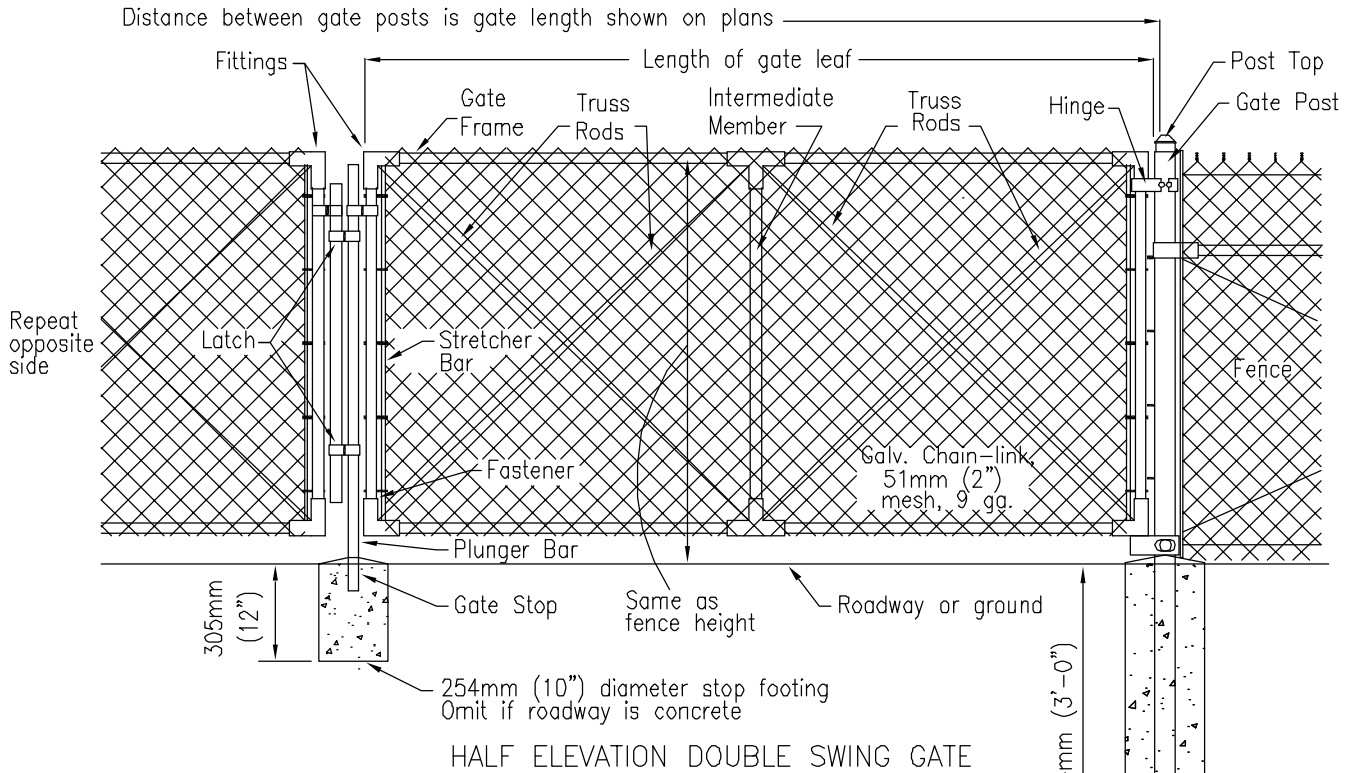
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/003

Chairperson R.C.E. 19246 Date

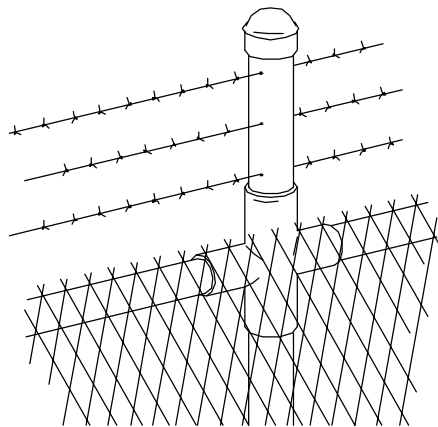
DRAWING
NUMBER

M-4

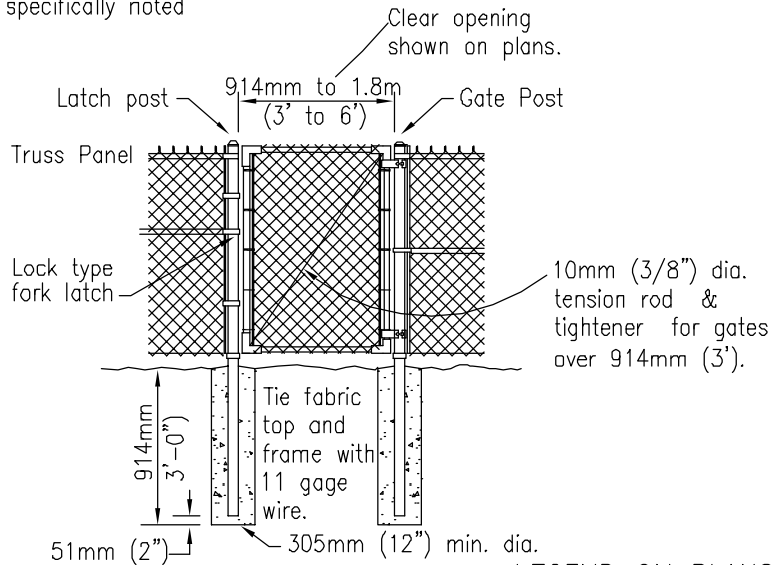


NOTES

- All footings shall be 309kg/M³-C-22-Mpa (520-C-2500) concrete.
- The following items shall be furnished and installed only when shown on the plans and/or called for in the special provisions:
 - Barbed wire
 - Extension post
- Chain link fence shall conform to Section 206-6 of the Standard Specification for Public Works Construction unless specifically noted on this drawing.

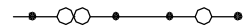


EXTENSION POST AND BARBED WIRE



WALK GATE

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

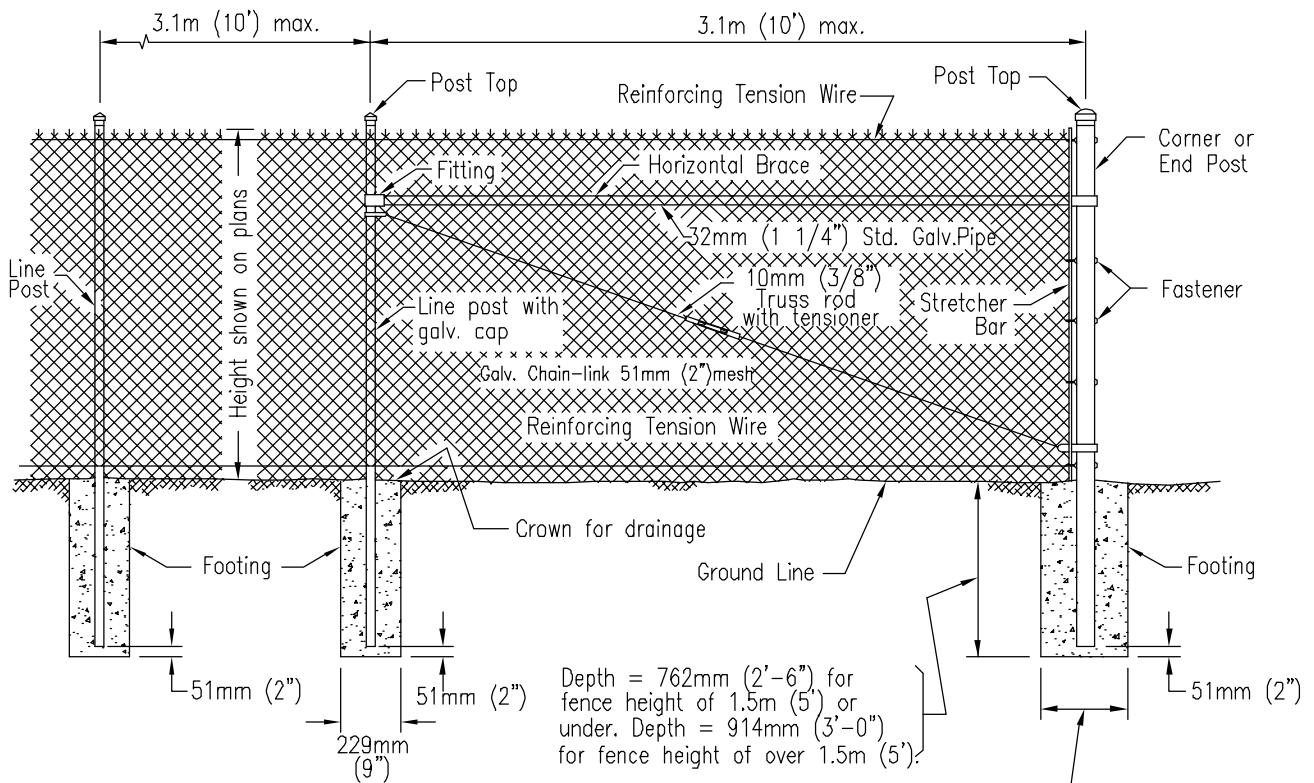
CHAIN LINK GATE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

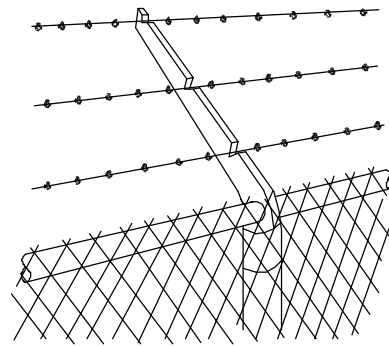
T. Stanton 51018005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-5**

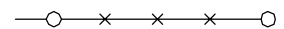


Diameter of footing = 4 times outside diameter of post.



EXTENSION ARM AND BARBED WIRE

LEGEND ON PLANS



NOTES

1. All footings shall be 309kg/M³-C-22-Mpa (520-C-2500) concrete.
2. The following items shall be furnished and installed only when shown on the plans and/or called for in the special provisions.
 - a. Barbed Wire
 - b. Extension Arm
 - c. Top Horizontal Rail
3. Chain link fence shall conform to Section 206-6 of the Standard Specifications for Public Works Construction unless specifically noted on this drawing.
4. See Standard Drawing M-20 for additional details.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03

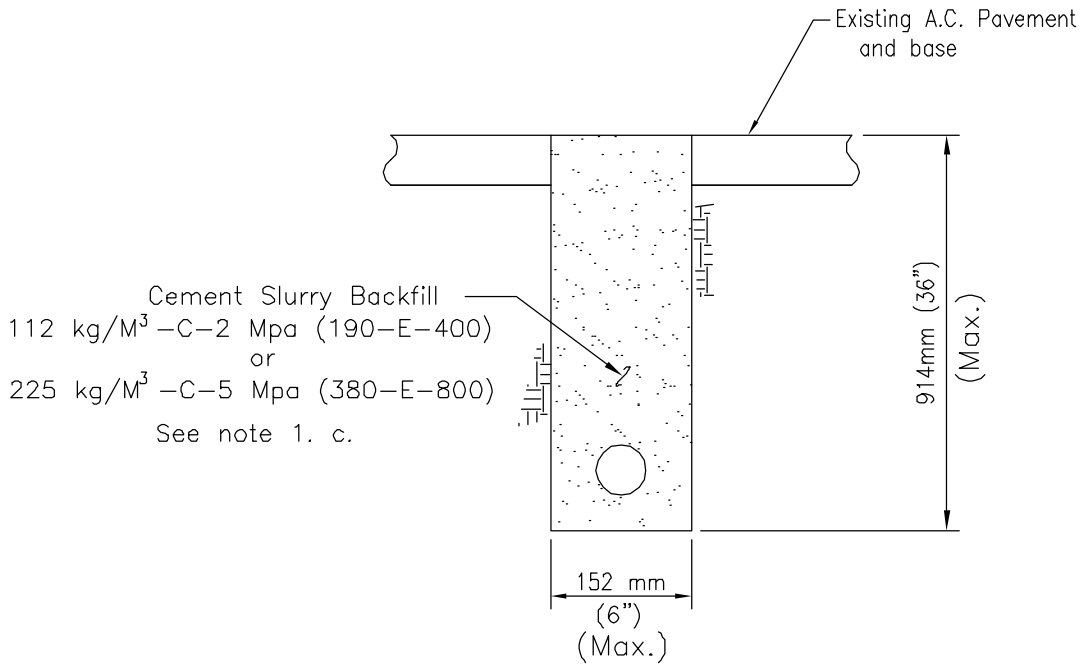
SAN DIEGO REGIONAL STANDARD DRAWING

CHAIN LINK FENCE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-6**



NOTES

1. Cement Slurry Backfill:
 - a. Cement slurry backfill shall have a maximum slump of 102 mm (4").
 - b. Cement slurry backfill shall be thoroughly consolidated to encase conduits. Tampers or vibrators shall be used.
 - c. Cement slurry backfill shall be as follows:
 - Alleys and local residential streets Class 112 kg/M³-C-2 Mpa (190-E-400)
 - All other streets Class 225 kg/M³-C-5 Mpa (380-E-800)
2. Existing A.C. pavement will not require sawcutting when using rockwheel for excavation.
3. All cuts shall be parallel or perpendicular to street centerline, when practical.
4. See drawing G-33 for narrow trench resurfacing.
5. See table on drawing M-15 for standard minimum conduit depths.

Revision	By	Approved	Date
ORIGINAL		Hashemian	9/02
Add Metric		T. Stanton	03/03

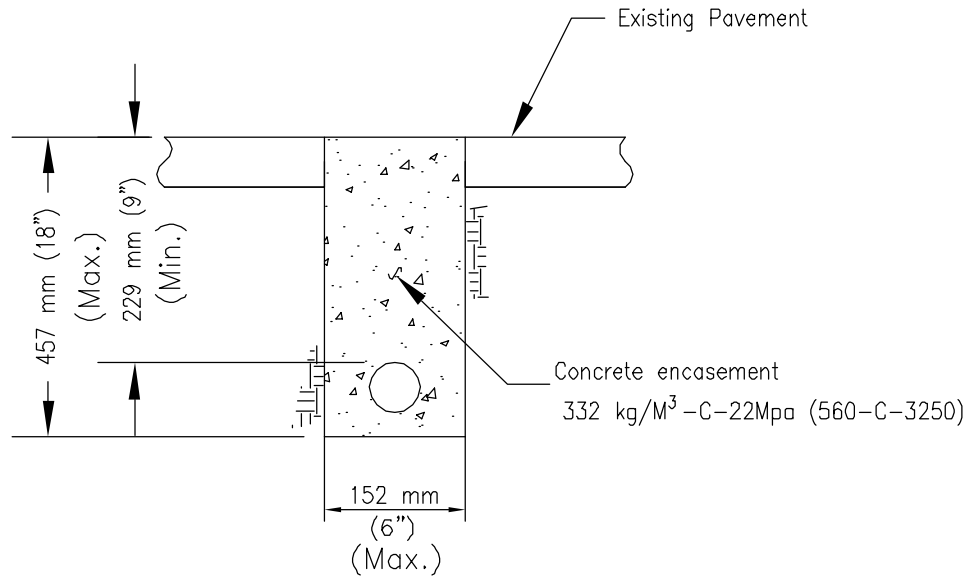
SAN DIEGO REGIONAL STANDARD DRAWING

**NARROW TRENCHES
TRENCHING & BACKFILLING**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/03/03
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-7A**



NOTES

1. Concrete encasement or backfill shall have a minimum slump of 102 mm (4").
2. Concrete encasement and/or sand cement slurry backfill shall be thoroughly consolidated to encase conduits. Tampers or vibrators shall be used.
3. Concrete shall be screeded off to match pavement grade and floated to assure proper edge match.
4. Existing pavement will not require saw cutting when using rockwheel for excavation except when the existing pavement is concrete and trench finish is concrete.
5. All cuts shall be parallel or perpendicular to street centerline, when practical.
6. Allow concrete backfill or concrete trench cover 7 calendar days minimum, but no longer than 30 calendar days to cure and dry before applying any road surface finishes.
7. In major or prime arterial streets, an approved set accelerating admixture, such as calcium chloride, may be used only with prior approval of the Agency's Engineer otherwise the contractor shall protect the trench with the approval of the Agency's Engineer.
8. This type of trech shall be permitted for supply cables of 750 volts or less. See California Public Utility Commission General Order No. 128, Rule 33.4 D.(1)(b) and where the conduit can not be placed at the proper recommended depth.
9. See drawing G-33 for narrow trench resurfacing.
10. This detail shall be used only when there is underground conflicts. See table on drawing M-15 for standard minimum conduit depths.

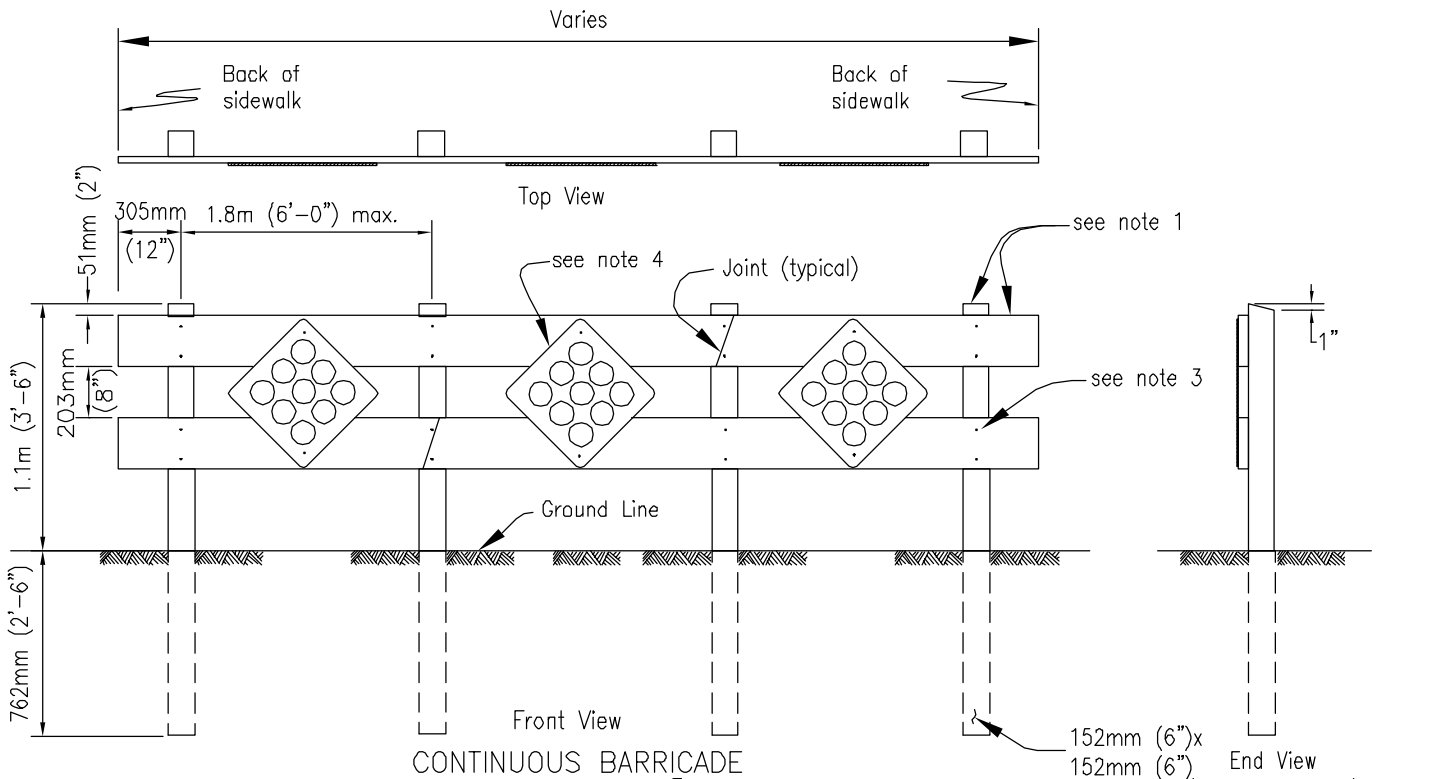
Revision	By	Approved	Date
ORIGINAL		Hashemian	9/02
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

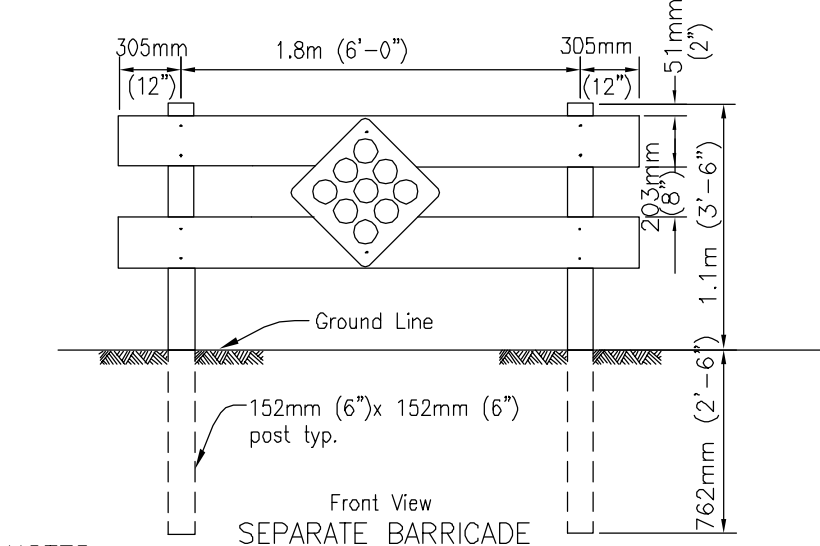
**NARROW TRENCHES
TRENCHING & BACKFILLING
SHALLOW CONDUIT DEPTH**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
 5/01/2003
 Chairperson R.C.E. 19246 Date

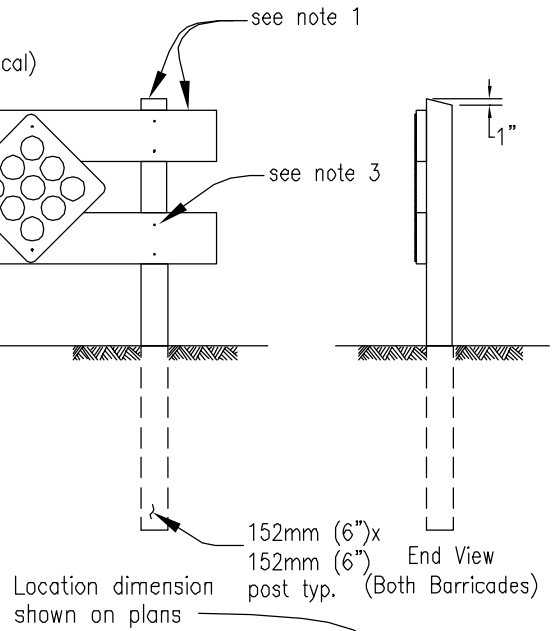
DRAWING NUMBER **M-8**



CONTINUOUS BARRICADE



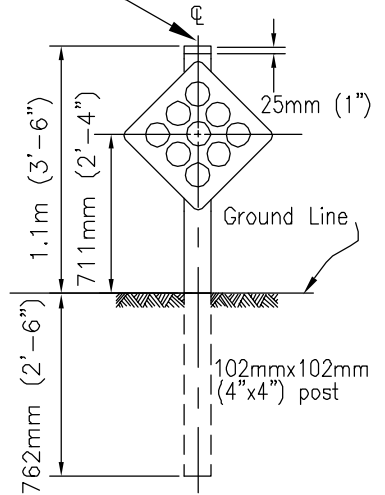
SEPARATE BARRICADE



End View

152mm (6") x 152mm (6") post typ. (Both Barricades)

Location dimension shown on plans

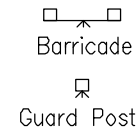


Front View
GUARD
POST

NOTES

1. Posts to be structural grade redwood or pressure treated (with wood preservative) Douglas Fir, surfaced four sides; cross pieces to be 51mm (2") x 203mm (8") select grade Douglas Fir, surfaced four sides.
2. All exposed portions of barricades shall be painted with two coats of white exterior enamel over prime coat.
3. Connections shall be made with 10mm (3/8") x 152mm (6") galvanized lag screws with one (1) washer each. Reflector sign fasteners to be 10mm (3/8") x 38mm (1 1/2") galvanized lag screws.
4. Reflector signs - California Type N. Size 457mm (18") x 457mm (18") - Yellow with nine (9) -83mm (3 1/4") reflectors (center mount).
 - a. Reflectors shall be red for use on dead end streets, in all other cases they shall be yellow. Reflector material shall be plastic or other approved reflectorized material.
 - b. Sign material shall be aluminum alloy 6061-T6 or 5052-H38, aluminum thickness 1.6mm (0.063").
5. 1.8m (6') long hat section metal post per Caltrans Std. Plan A74-A optional for guard post.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD POST AND BARRICADE

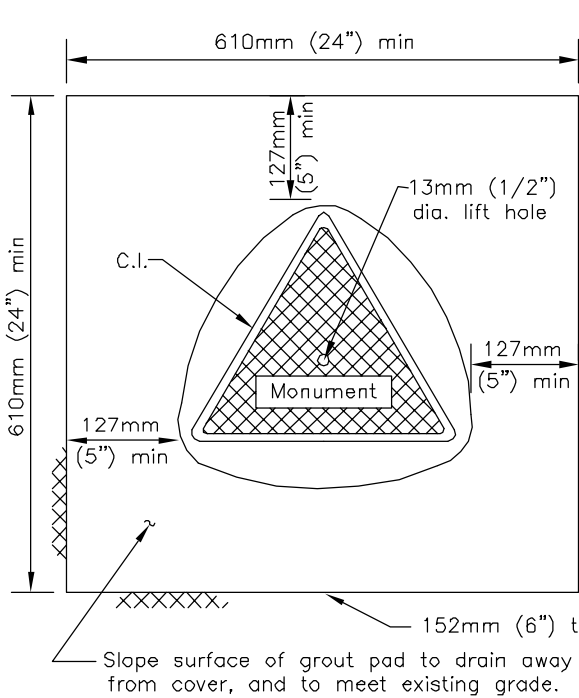
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 5/10/2003

Chairperson R.C.E. 19246 Date

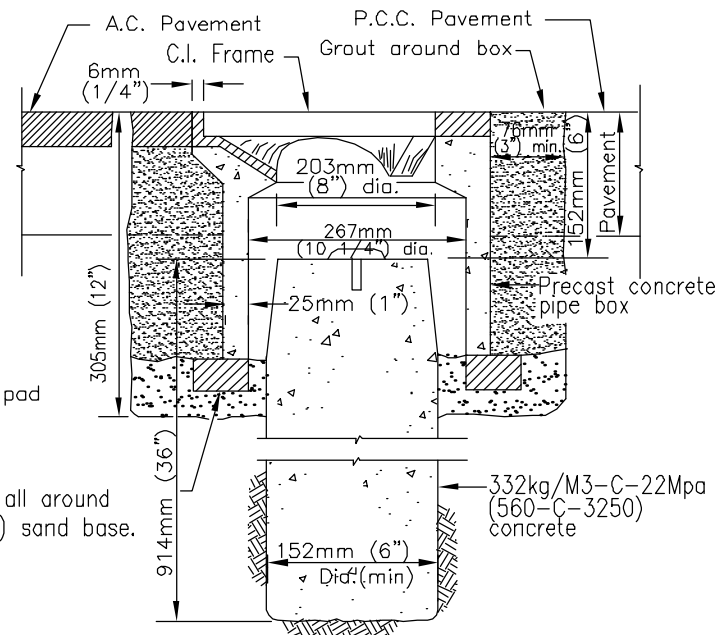
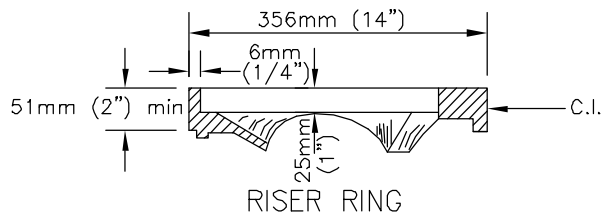
DRAWING
NUMBER

M-9



PLAN-IN UNPAVED AREA

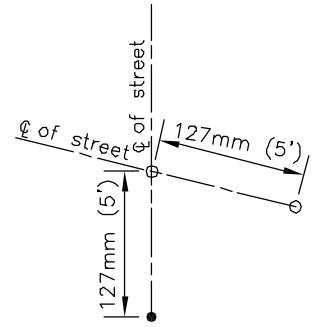
Brick support all around on 51mm (2") sand base.



TYPICAL MONUMENT SECTION IN PAVED AREA

NOTES

1. Cover and frame to be cast integrally with pipe box.
2. Monument base may be cast in place or precast.
3. Form and taper exposed upper 152mm (6") of cast-in-place base to a top diameter of 127mm (5"). (Precast base shall be sand backfilled).
4. Monument marker shall be a domed brass, 76mm (3") in diameter.
5. Monument Location:
 - a) Set on all centerline intersections unless actual location is modified by the Agency and shown in modified location on map. When centerline intersection is impractical, offset 1.5m (5') on centerline of major street, (see detail at right). If neither centerline can be occupied, two monuments will be set in line around the front on the perimeter of a 3m (10') diameter circle, whose center is the point.
 - b) Set on centerline at intervals not exceeding 305m (1000') on straight runs.
 - c) Set on centerline at points of curvature.
 - d) Set on center at center points of cul-de-sacs.
 - e) Set on centerline when center point of cul-de-sac is offset from centerline.
 - f) These standards may be modified at the discretion of the Agency in cases where strict compliance therewith results in more monuments than it considers necessary. The following technique for reducing the number of monuments will be routine.
 - g) Substitution of one monument on the "Point of Intersection" for monuments at the "Beginning of Curve" and the "Ending of Curve" when the "Point of Intersection" falls within the pavement area.
 - h) Deletion of any monument otherwise required by these standards when its position can be determined by turning one angle from a point on a straight line between two other monuments, providing such point is not more than 91.4m (300') from the point on which the deleted monument would have been placed.



Alteration location of monument. Tie distances shown on final sub-division map if alternate location is used.

LOCATION OF STREET SURVEY MONUMENT

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

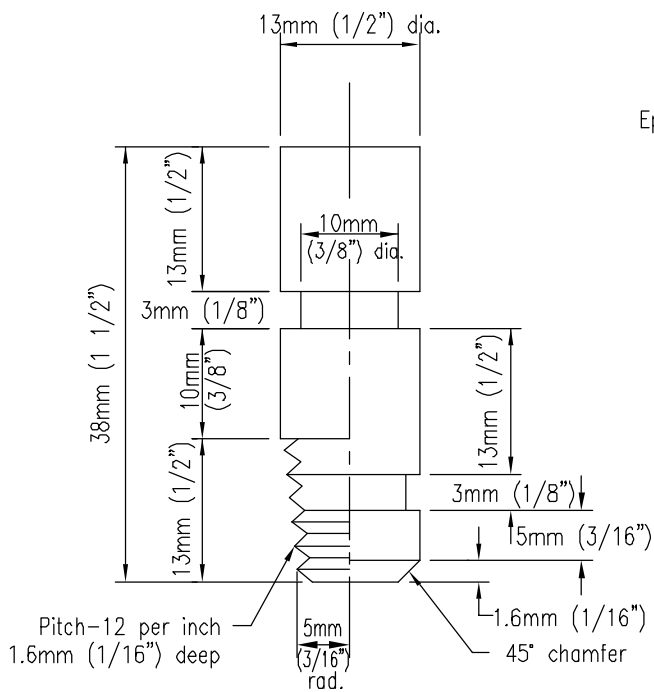
STREET SURVEY MONUMENT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

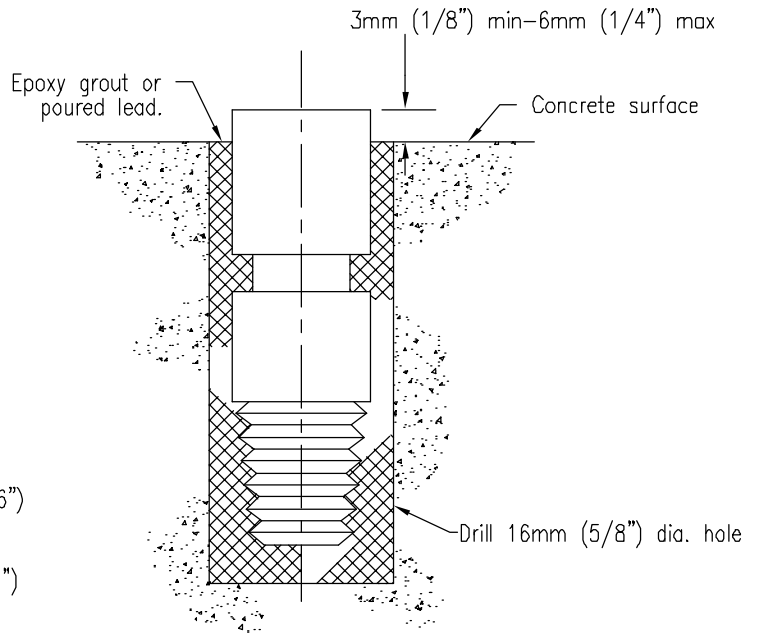
T. Stanton 3/01/003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-10**



TYPE-A TYPE-B
ELEVATION



INSTALLATION IN EXISTING CONCRETE
(Typical for Type A or B)

NOTES

1. Material- Brass A.S.T.M. B-16. All machine tolerances $\pm 0.4\text{mm}$ ($1/64$ ") machine finish.
2. May be installed in fresh concrete at time of installation of concrete structure.
3. Location-in most stable, permanent location in vicinity, such as in base for street light standard or traffic signal (behind sidewalk), in curb (not near joint, on curve or near trees), on top of drainage headwall, in foundation for building or retaining wall or in concrete pads for transformers, pump stations etc.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

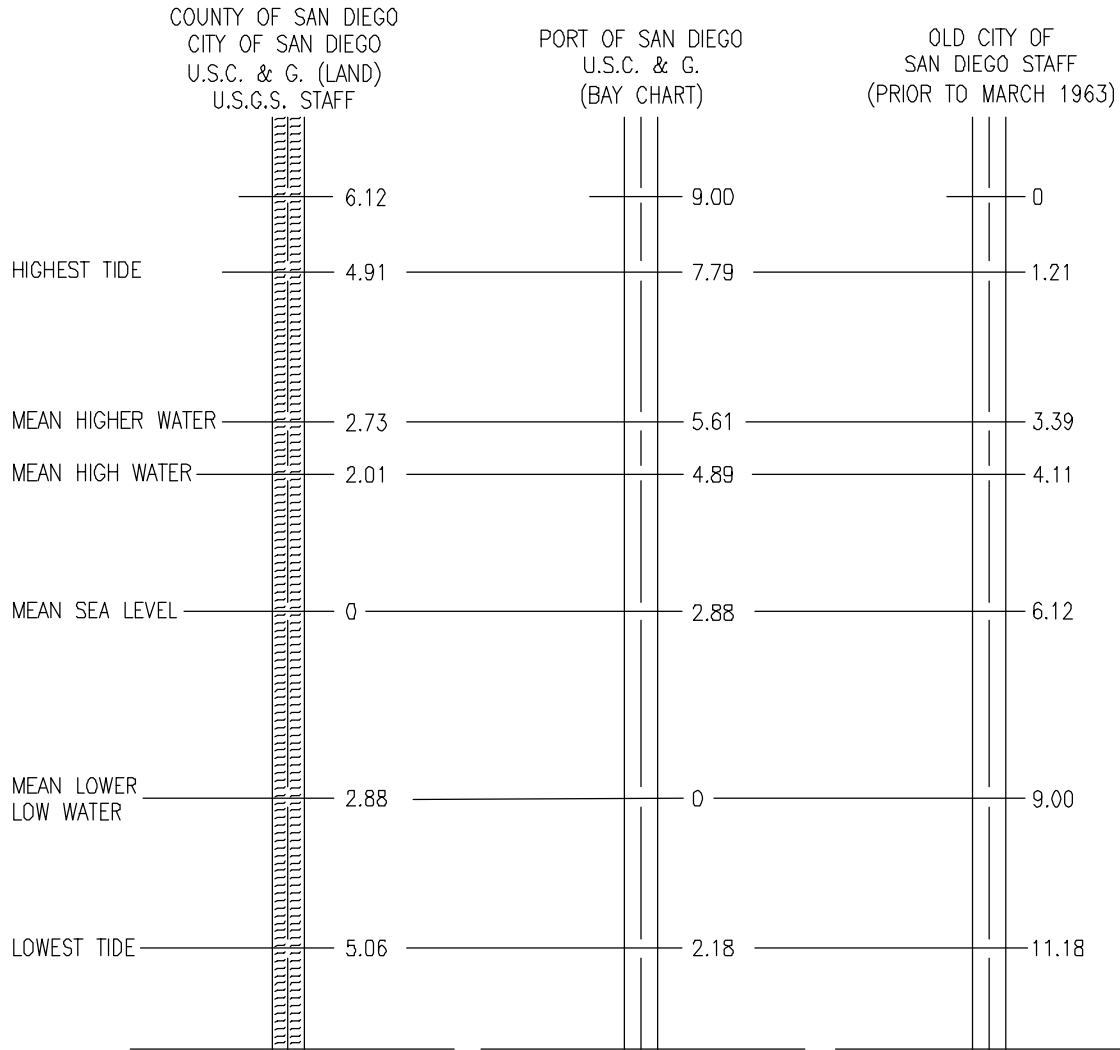
SAN DIEGO REGIONAL STANDARD DRAWING

BENCH MARK - BRASS PLUG

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/03/03
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-11**



LEGEND

- U.S.C. & G. = United States Coast and Geodetic Survey.
 - U.S.G.S. = United States Geological Survey.
 - MEAN HIGH WATER = Mean of all high water in San Diego Bay.
 - MEAN HIGHER WATER = Mean of all higher water in San Diego Bay.
- Bay charts and topography up to the mean high tide based on zero at the mean lower low water.

SOURCE

Data based on U.S.C. & G. "Sea level Datum of 1923".

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

DATUMS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/03/03
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-12**

FOUND MONUMENTS

Found monuments must denote the character of the monument, how it is identified and the record, or no record as applicable.

SET MONUMENTS – Criteria for Locating and Character

On subdivision boundaries, permanent monuments are required; and must be shown on the map at intervals as specified by the local agency. The location of such points that are unacceptable or will be destroyed by construction may be established by ties to permanent reference monuments shown on the final map.

A permanent monument shall be no less substantial than the following:

- a. An iron pipe of minimum two inch diameter not less than 610mm (2') in length placed upright in the ground so that the top of said pipe is flush with the surface. Said pipe shall be filled with a metal or cement plug at least three inches in depth and centered with a metal tack and disc; or
- b. A metal plug with tack and disc set flush with the surface in portland cement concrete sidewalk, curb or pavement; or other monument satisfactory to the City Engineer or County Surveyor. The metal plug shall be anchored 25mm (1") deep in sidewalk.

Lot corners and points of curves along street and alley right of way lines where portland cement concrete sidewalks, curbs or pavement exist, or will be constructed as part of the subdivision requirements, shall be identified with tack and disc set flush with the surface along an extension of the lot line at an approved offset, to be measured radially or at right angles to the right of way line in said sidewalk, curb pavement. In case the sideline of the lot is not radial or at right angles to the right of way line a disc shall be set along an extension of the sideline at an offset to be measured radially or at right angles to the right of way line. Where no such concrete work exists, and none will be required to be constructed, all lot corners, angle points and points of curve shall be marked with a monument no less substantial than a one-half inch steel rod or pipe, 457mm (18") long, set flush with the surface.

LEGEND

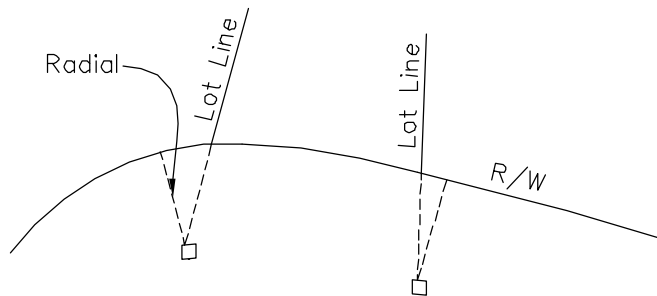
-  Fd 51mm (2") Iron Pipe Marked RCE XXXX or per Map XXX unless otherwise noted
-  Fd Street Survey Monument Stamped RCE XXXX or LS XXXX
-  Set 51mm (2") x 610mm (24") Iron Pipe Marked RCE XXXX or LS XXXX
-  Set Lead and Disc Stamped RCE XXXX or LS XXXX
-  Set 13mm (1/2") x 457mm (18") Iron Pipe Marked RCE XXXX or LS XXXX
-  Set Street Survey Monument Stamped RCE XXXX or LS XXXX per Standard Drawing M-10

The addition of other symbols is permissible where such will result in a clearer map.


The following notes should be used in the legend where applicable.

Unless otherwise shown on this map:

1. All lot corners except as described below will be monumented by a 13mm (1/2") by 457mm (18") iron pin stamped (RCE or LS number).
2. Lot corners along the sideline of dedicated street right of way will be monumented by a disc stamped (RCE or LS number), set along an extension of the lot line at an offset of ___ in the (curb, sidewalk). The offset shall be measured radially, or at right angles, to the right of way line. (See example below.)
3. All points of curve of the sidelines of dedicated streets will be monumented by a disc stamped (RCE or LS number), set at an offset of ___ in the (curb, sidewalk). The offset shall be measured radially.



EXAMPLE OF OFFSET DISCS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		SURVEY MONUMENTS	 31018005
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date		
				DRAWING NUMBER		M-13

1 Gram	= 15.4324 grains	WEIGHT	1 Grain	= 0.0648 g.
1 Gram	= 0.0353 oz.		1 Once	= 28.3495 g.
1 Kg.	= 2.2046 lb.		1 Pound	= 0.4536 kg.
1 Kg.	= 0.0011 ton		1 Ton	= 907.1848 kg.
1 Ton (met)	= 1.1023 ton		1 Ton	= 0.9072 ton (met)

1 Sq. cm.	= 0.1550 sq. in.	AREA	1 Sq. in.	= 6.4516 sq. cm.
1 Sq. m.	= 10.7639 sq. ft.		1 Sq. ft.	= 0.0929 sq. m.
1 Sq. m.	= 1.1960 sq. yd.		1 Sq. yd.	= 0.8361 sq. m.
1 Hectare	= 2.4710 acres		1 Acre	= 0.4047 hectare
1 Sq. km.	= 0.3861 sq. mile		1 Sq. mile	= 2.5900 sq. km.
1 Sq. km.	= 247.10 acres		1 Acre	= 0.0040 sq. km.

1 Cu. cm.	= 0.0610 cu. in.	VOLUME	1 Cu. in.	= 16.3872 cu. cm.
1 Cu. m.	= 35.3134 cu. ft.		1 Cu. ft.	= 0.0283 cu. m.
1 Cu. m.	= 1.3079 cu. yd.		1 Cu. yd.	= 0.7646 cu. m.

1 Liter	= 61.0250 cu. in.	CAPACITY	1 Cu. in.	= 0.0164 liter
1 Liter	= 0.0353 cu. ft.		1 Cu. ft.	= 28.3162 liters
1 Liter	= 0.2642 gal. (U.S.)		1 Gal.	= 3.7853 liters
1 Liter	= 0.0284 gal. (U.S.)		1 Bu.	= 35.2383 liters

1 MM.	= 0.0394 in.	LENGTH	1 In.	= 25.4000 mm.
1 CM.	= 0.3937 in.		1 In.	= 2.5400 cm.
1 Meter	= 3.2808 ft.		1 Ft.	= 0.3048 m.
1 Meter	= 1.0936 yd.		1 Yd.	= 0.9144 m.
1 Km.	= 0.6214 mile		1 Mile	= 1.6093 km.

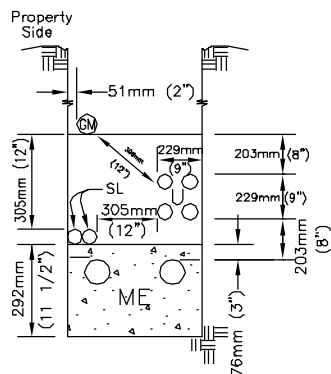
MULTIPLE	PREFIX	METRIC PREFIX	MULTIPLE	PREFIX
1000000	mega		1/10	deci
1000	kilo		1/100	centi
100	hecto		1/1000	milli
10	deka		1/1000000	micro

TEMPERATURE

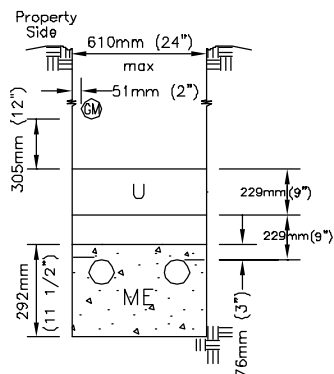
Degrees Fahrenheit = 9/5 (Degrees Celsius) + 32

Degrees Centigrade = 5/9 (Degrees Fahrenheit - 32)

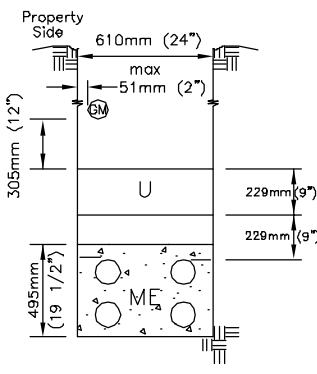
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		METRIC EQUIVALENTS	31018005
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date
						DRAWING NUMBER
						M-14



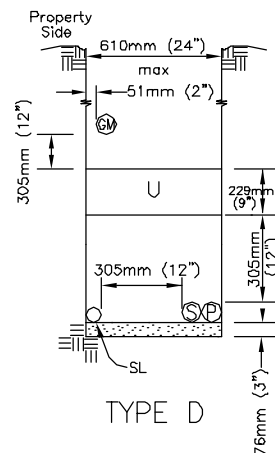
TYPE A



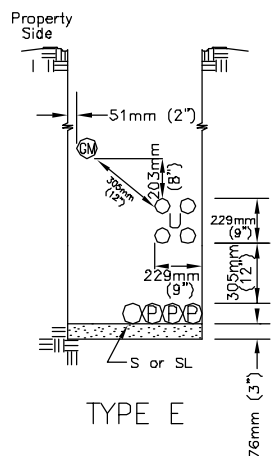
TYPE B



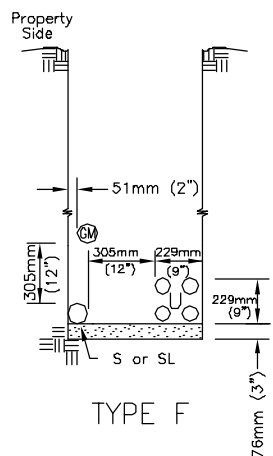
TYPE C



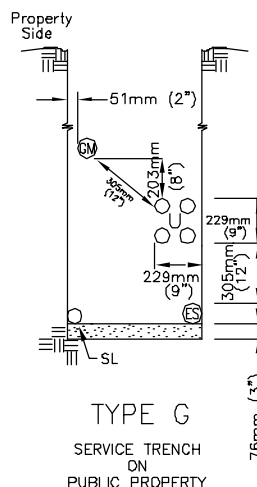
TYPE D



TYPE E



TYPE F



TYPE G

SERVICE TRENCH ON PUBLIC PROPERTY

Legend		Minimum Cover
GM	Gas Main	762mm (30")
GS	Gas Service	762mm (30")
P	Primary Electric	1.1m (42")
S	Secondary Electric	762mm (30")
ES	Electric Service	762mm (30")
ME	Multiple Electric (P, S or ES in Spacers) Concrete Encased	610mm (24")
SL	Street Light (not series)	762mm (30")
U	CATV	610mm (24")
	TELCO	610mm (24")

NOTES

1. All dimensions are typical unless otherwise noted.
2. Generally utilities are to be installed under the applicable specifications for the particular utility and the specifications of the owner Agency.
3. The location of utilities as shown by the Standard Drawing shall in no way violate existing codes or regulations applicable to individual utilities.
4. Installation of sewer and/or water utilities are not permitted in the joint trenches shown above.
5. Minimum depth of gas pipe may, subject to gas company inspectors approval, be reduced to 610mm (24") where necessary to clear structure crossings.
6. Depth and width of trench varies.
7. CATV main or trunk line conduit required along all streets, except cul-de-sac streets less than 305m (1,000') in length which may be served by feeder lines only.
8. CATV 38mm (1-1/2") feeder conduit shall run across streets with each power service line and capped at edge of sidewalk.
9. All CATV terminals and conduits shall be terminated at generally accepted locations and marked. A map shall be filed with the appropriate agency showing the locations of the CATV system.
10. In no case shall CATV conduits be placed within 305mm (12") of gas lines, also conduits are not to be placed directly over gas lines.
11. Catv conduit may be placed with the TELCO conduit provided the TELCO minimum depth is held.

Revision	By	Approved	Date
ORIGINAL		Parkinson	9/88
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

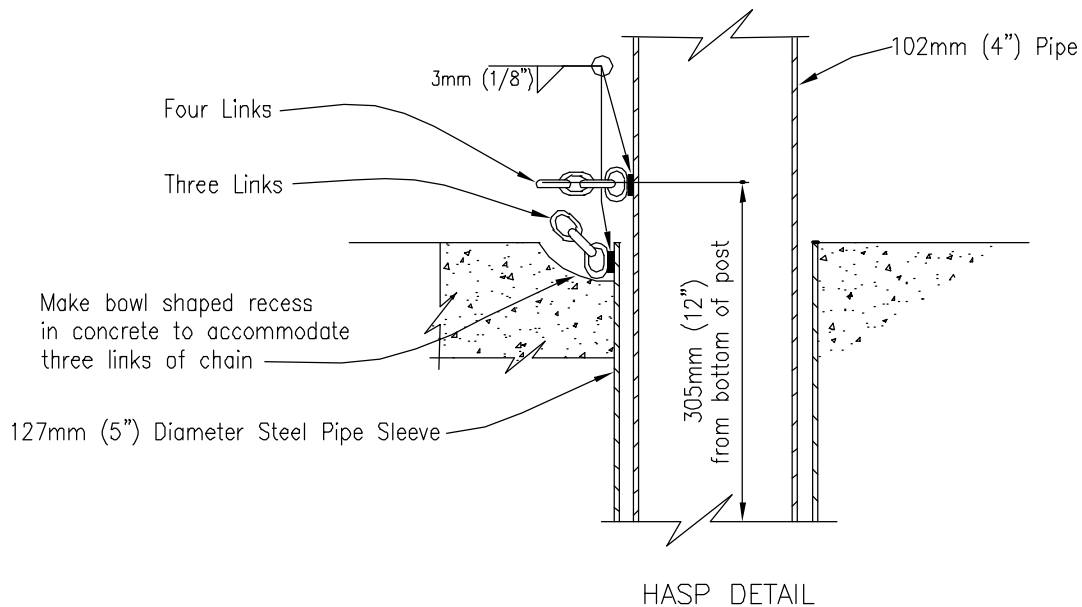
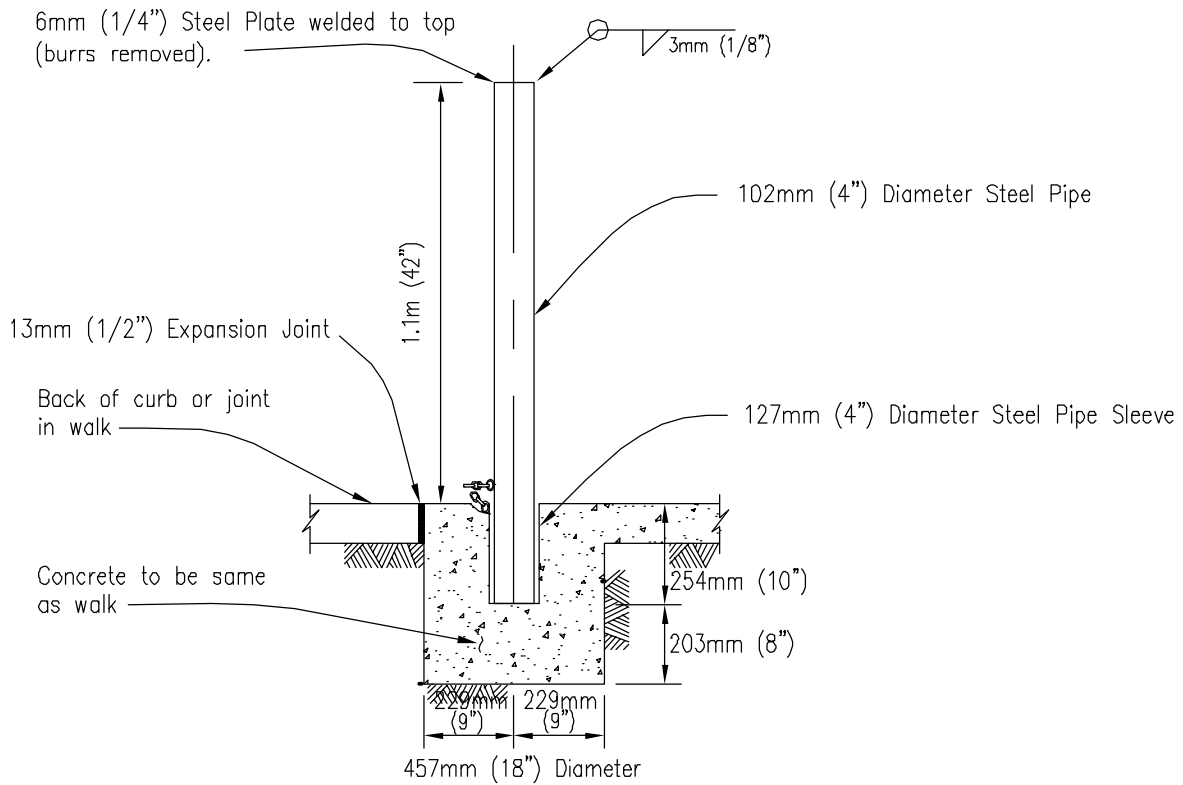
JOINT TRENCH LOCATIONS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/03/03

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-15**



NOTES

1. Chain to be 6mm (1/4") proof coil chain galvanized steel. Weld four links to post and three links to pipe sleeve.
2. All metal to be hot-dip galvanized after fabrication.

LEGEND ON PLANS



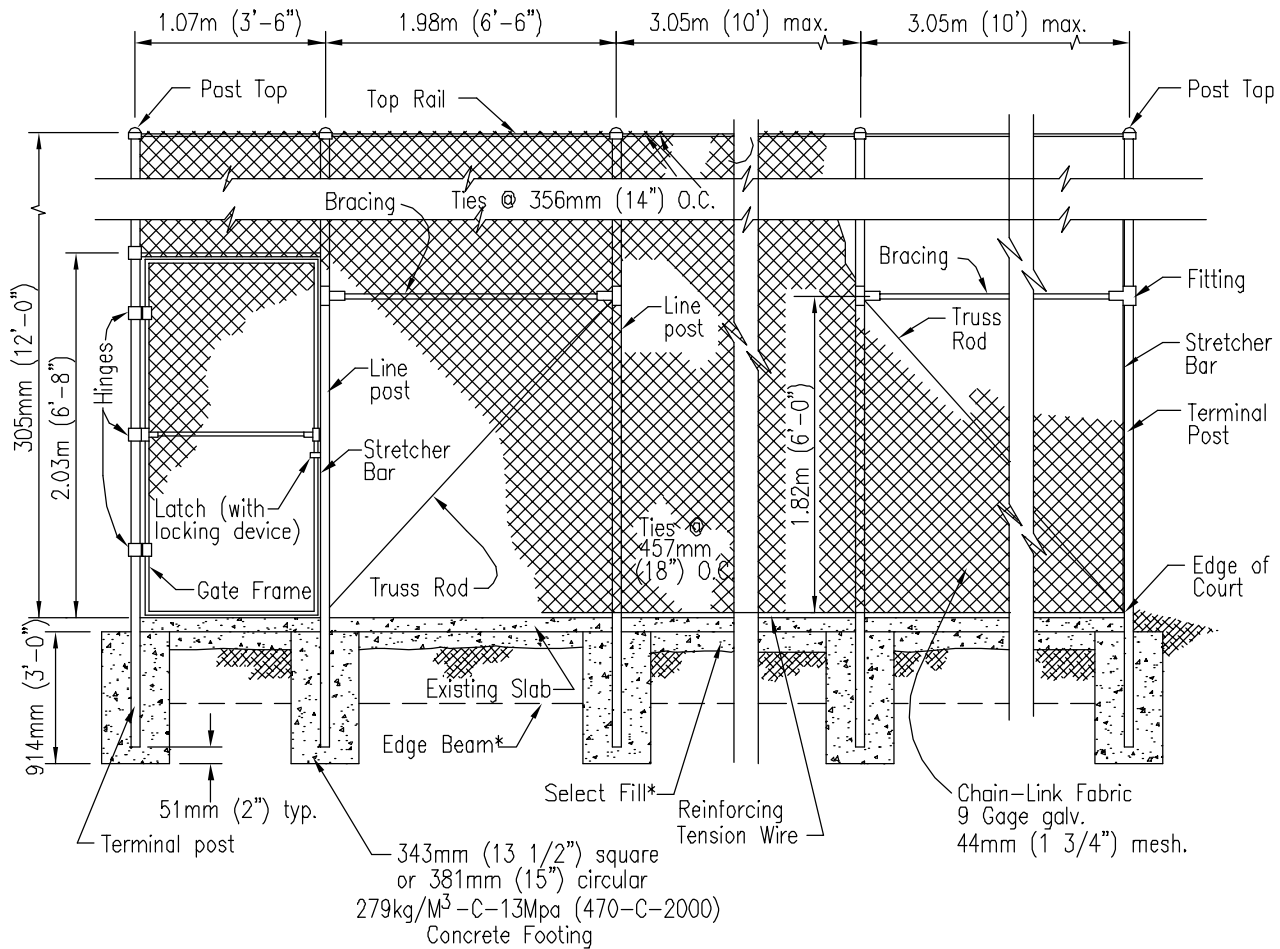
Revision	By	Approved	Date
ORIGINAL		Soloman	7/79
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

DEMOUNTABLE POST

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
T. Stanton 01018005
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-16**



ELEVATION

* For Edge Beam, Slab, and Select Fill details, see plans.

DESCRIPTION	MIN. SIZE IN KILOGRAMS / (INCHES)	MIN. WEIGHT PER LIN FT IN KILOGRAMS / (LBS).
Line Post	60mm (2.375) O.D.	1.65kg (3.65)
Terminal Post	73mm (2.875) O.D.	2.63kg (5.79)
Top Rail	42mm (1.660) O.D.	1.03kg (2.27)
Bracing	42mm (1.660) O.D.	1.03kg (2.27)
Gate Frame	42mm (1.660) O.D.	1.03kg (2.27)

NOTE:

Chain link fabric shall be erected on the interior side of the courts.

CAUTION:

This Standard Drawing is not to be used if any wind screen is to be applied to the fence.

Revision	By	Approved	Date
ORIGINAL		Salomon	7/79
Add Metric		T. Stanton	03/03

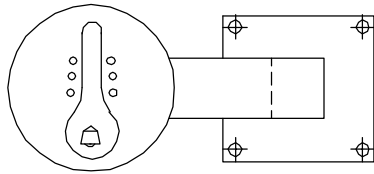
SAN DIEGO REGIONAL STANDARD DRAWING

TENNIS COURT FENCE
CHAIN LINK

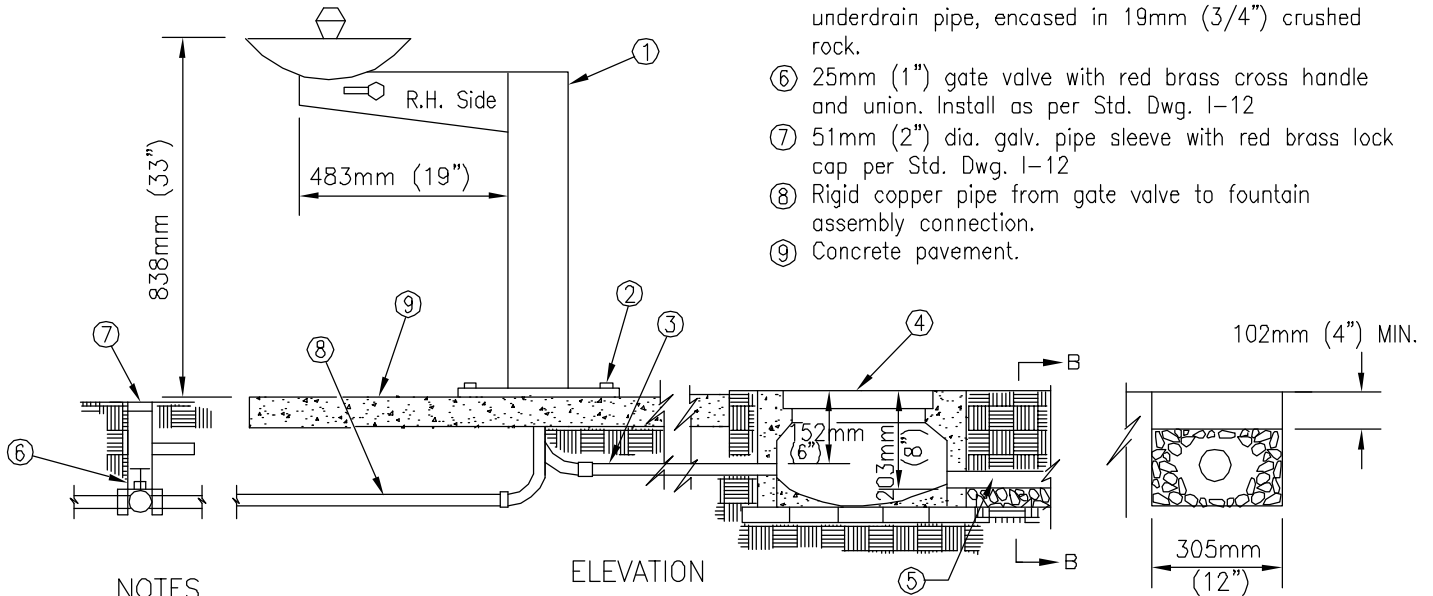
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/03/03
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-17



- ① Drinking Fountain – Haws model 3376 or approved equal.
- ② 10mm (3/8") dia. Expansion anchors with flat (recessed heads) screws 4 places.
- ③ 32mm (1 1/4") P.V.C. pipe with sweep 90° ell connection to fountain drain.
- ④ 241mm (9 1/2") x 406mm (16") concrete yard box with hinged locking top (Brooks No. 3HL or equal) set on red brick foundation.
- ⑤ 102mm (4") x 12.2m (40') perforated plastic underdrain pipe, encased in 19mm (3/4") crushed rock.
- ⑥ 25mm (1") gate valve with red brass cross handle and union. Install as per Std. Dwg. I-12
- ⑦ 51mm (2") dia. galv. pipe sleeve with red brass lock cap per Std. Dwg. I-12
- ⑧ Rigid copper pipe from gate valve to fountain assembly connection.
- ⑨ Concrete pavement.

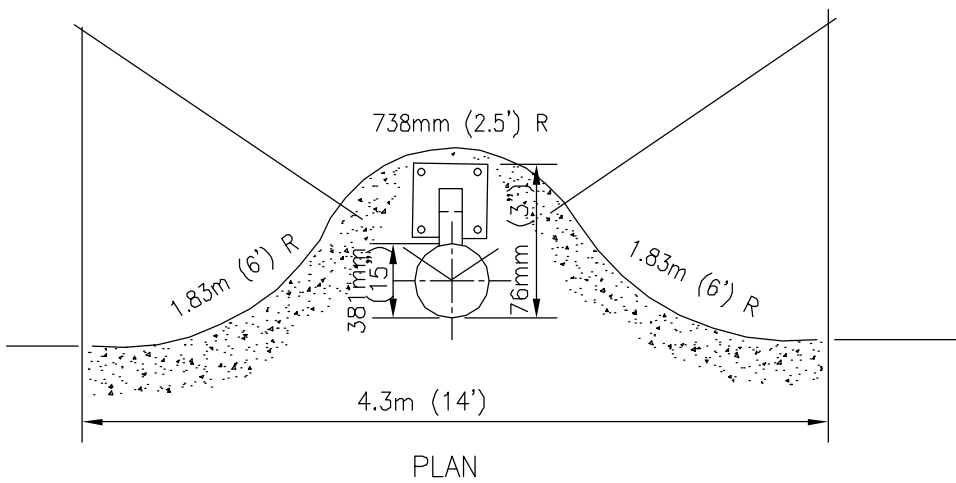


NOTES

1. Install fountain so that right hand side faces prevailing wind.
2. Hand form a concrete bowl at bottom of yard box to facilitate sand clean out.
3. Perforated drain pipe and trench are to drain away from fountain at 1% min. slope. Keep drain in lawn areas.
4. Item no. 6 is a 25mm (1") gate valve. Use red brass bushing reducers to adapt to feed pipe.

ELEVATION

SECTION B-B



LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		H. Hecht	10/82
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

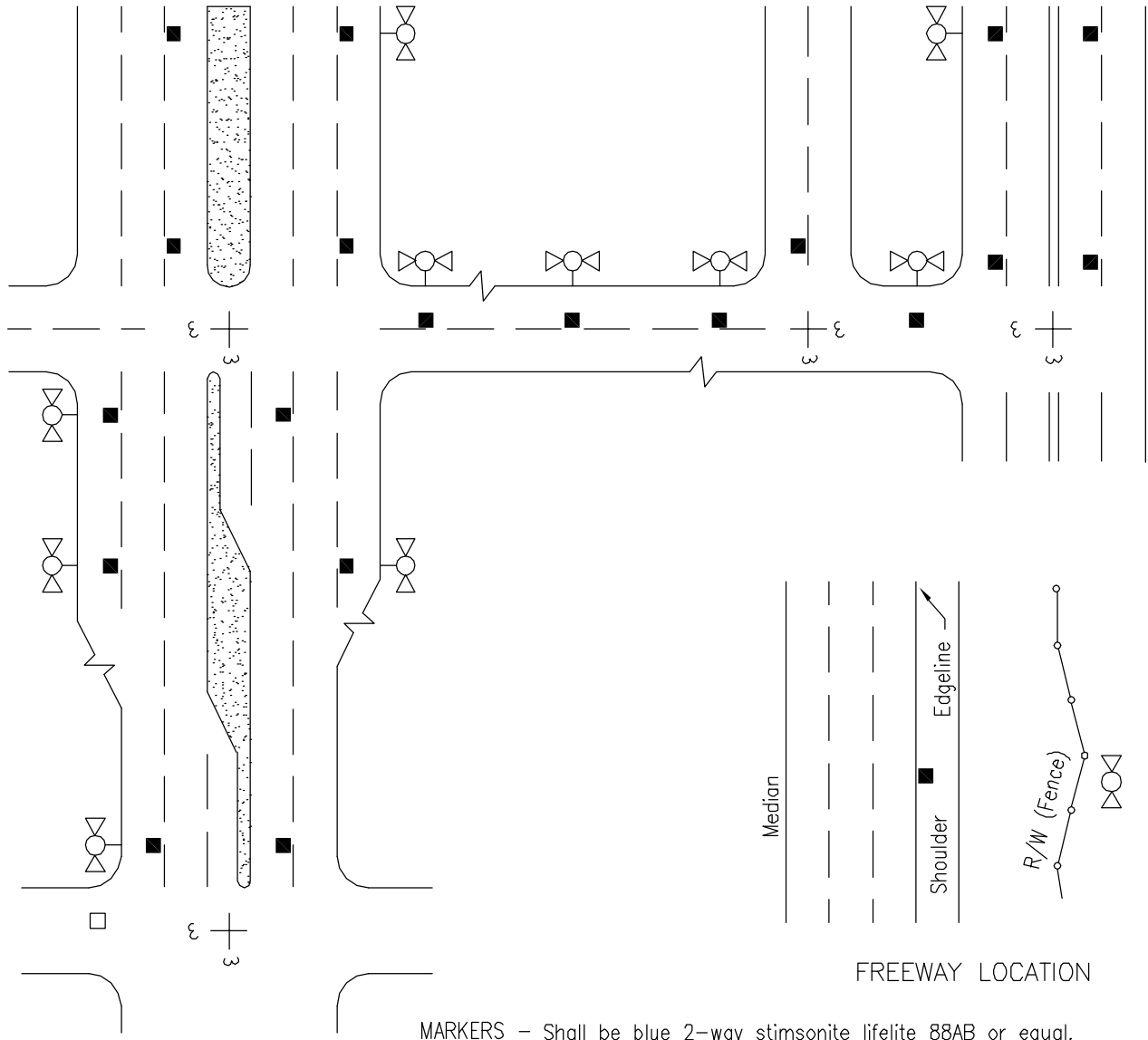
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER

STREET LOCATIONS

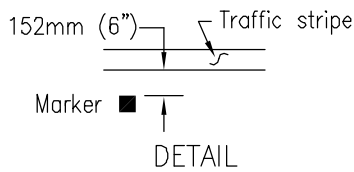


FREEWAY LOCATION

MARKERS - Shall be blue 2-way stimsonite lifelite 88AB or equal.

ADHESIVE - An ample amount of two (A&B) epoxy or equal.

SURFACES - Clean and dry prior to installation per manufacturer's recommendations. Install markers with reflective surfaces facing oncoming vehicles and offset 51mm (2") from lane lines toward fire hydrant.



NOTES

1. Fire Department will provide location(s) for all markers in PRD's, Commercial Lots and other areas outside of Public Right of Way.
2. Markers must be installed at the new and relocated hydrants and within all resurfacing projects.
3. For streets without lane lines or streets with raised pavement markers and no painted lane lines, install markers 152mm (6") from centerline or existing markers.

LEGEND ON PLANS

- Marker ■
- Fire Hydrant

Revision	By	Approved	Date
ORIGINAL		H. Hecht	10/82
Add Metric		T. Stanton	03/03

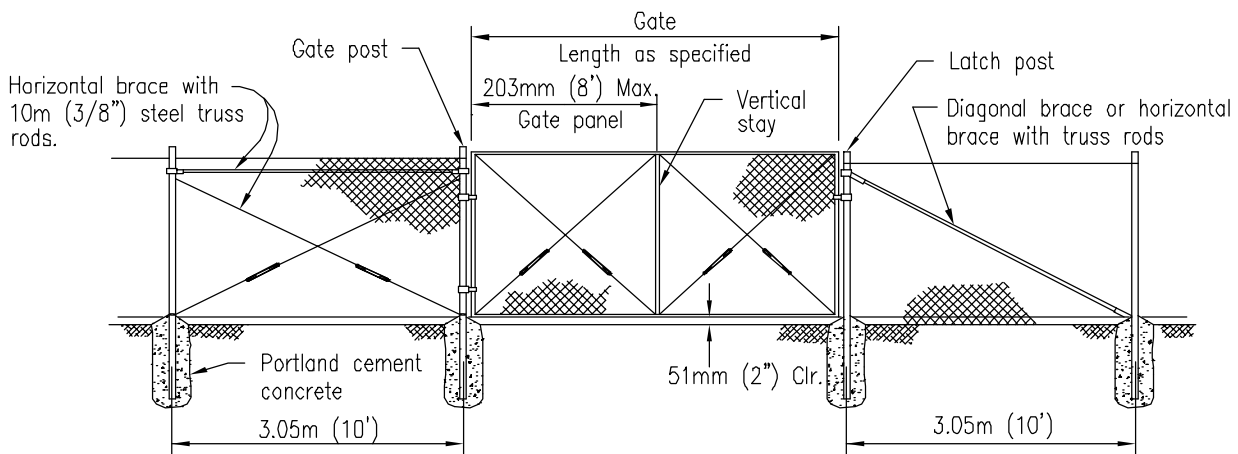
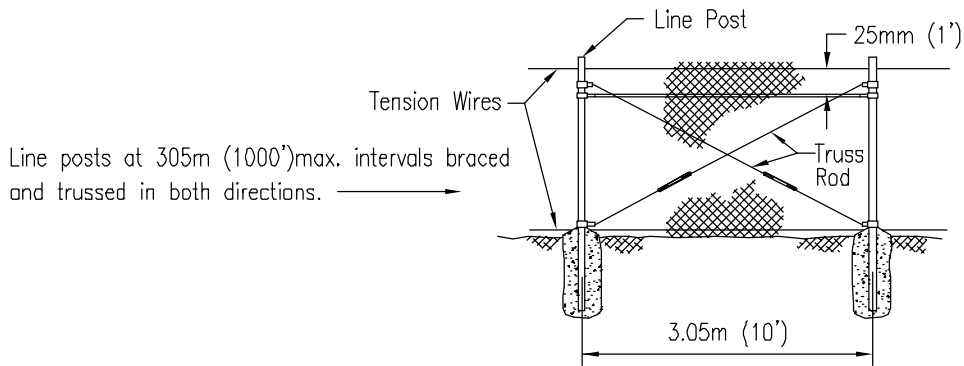
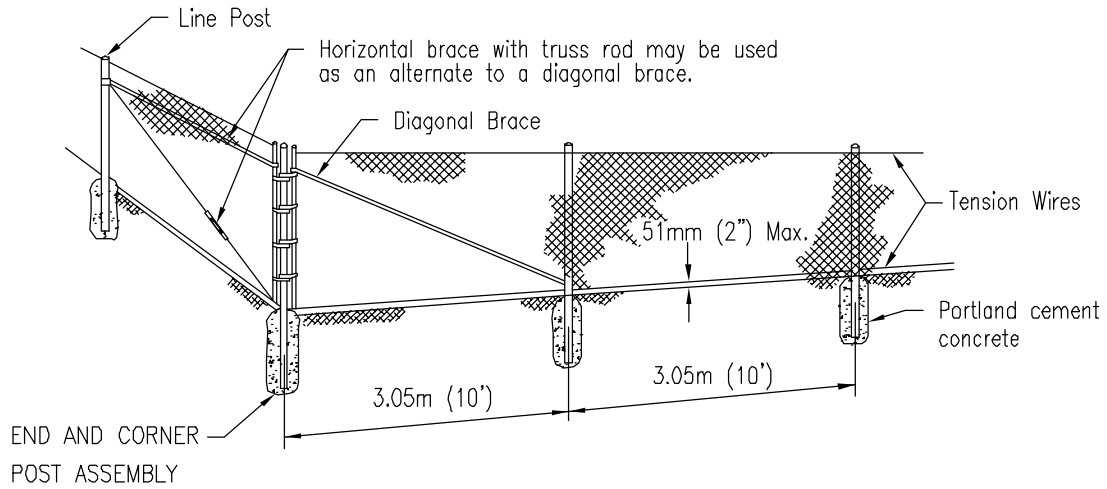
SAN DIEGO REGIONAL STANDARD DRAWING

FIRE HYDRANT MARKERS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/03/03
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-19**



Revision	By	Approved	Date
ORIGINAL		Bahmanian	4/86
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

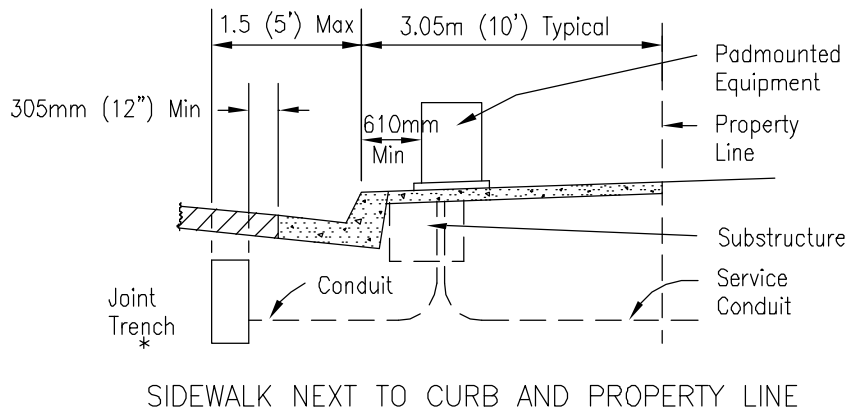
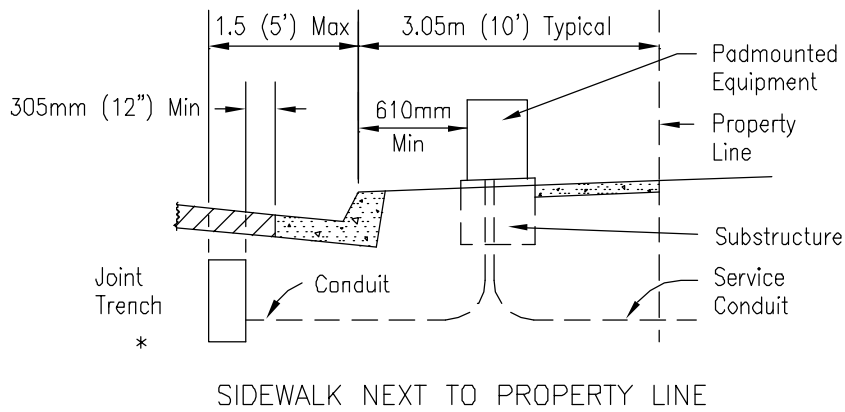
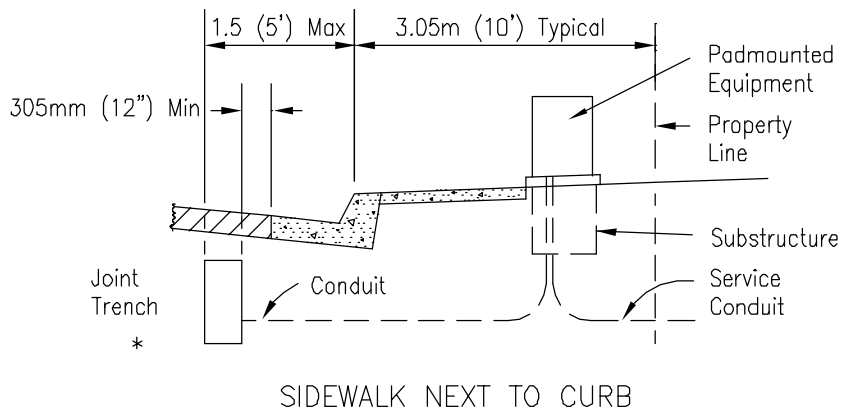
**CHAIN LINK FENCE
DETAILS**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 51018003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-20**



NOTES

1. Sidewalk shall have a minimum of 1.2m (4') clear area (path, not including curb) passing pedestals, pullboxes and other structures.
2. See Standard Drawing M-15 for joint trench.

Revision	By	Approved	Date
ORIGINAL		Parkinson	9/88
Add Metric		T. Stanton	03/03

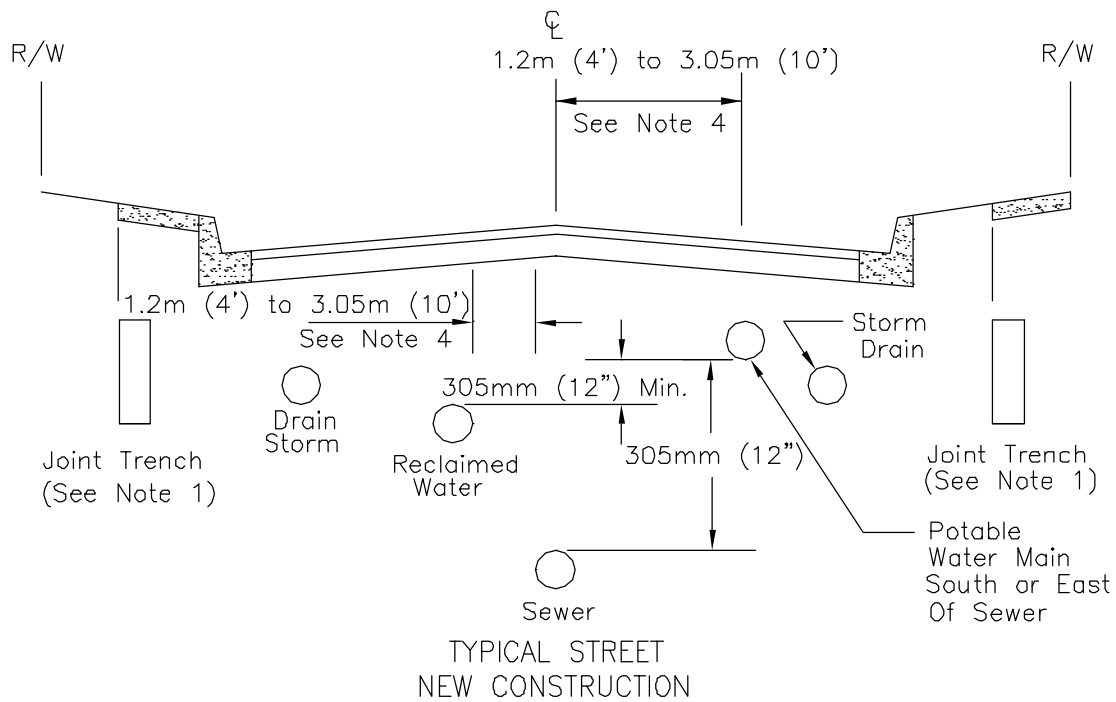
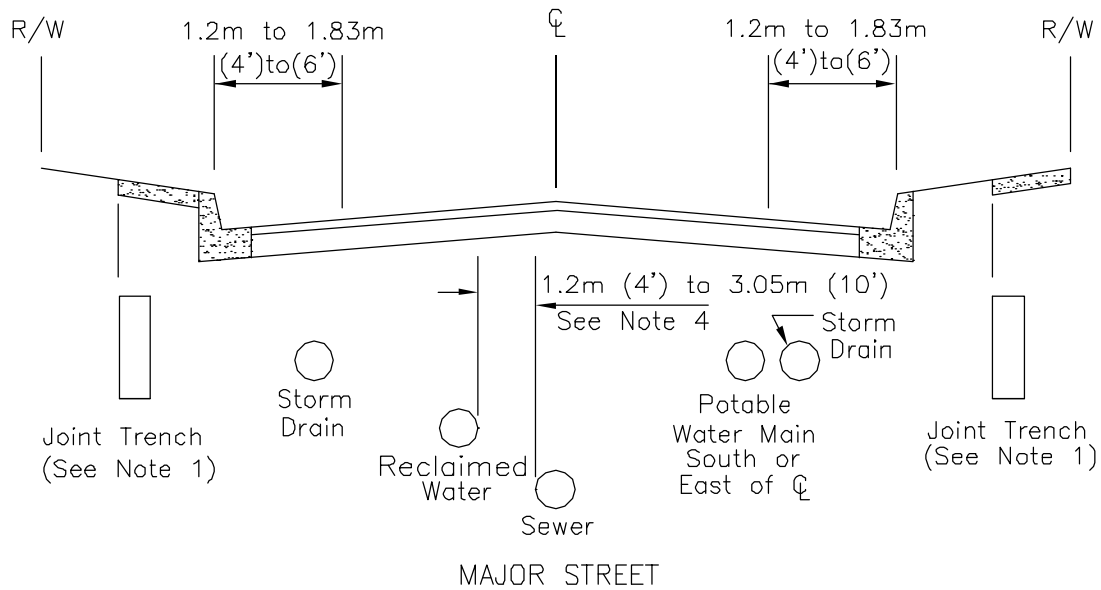
SAN DIEGO REGIONAL STANDARD DRAWING

**UNDERGROUND TYPICAL LOCATION
CONVERSION/REPLACEMENT/UPGRADE**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 31018005
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-21**



NOTES

1. At catch basin locations, joint trench shall be 1.2m (4') minimum from back of curb to inside wall of trench. See Standard Drawing M-15 for configuration of utilities in joint trench.
2. Sewer and reclaimed water mains shall be designed to cross under potable water mains. The vertical separation between potable water and reclaimed water shall be a minimum of 305mm (12").
3. Sewer and reclaimed water laterals shall cross under potable water main, with a minimum vertical separation of 305mm (12").
4. Sewer and reclaimed water mains shall maintain a 3.05m (10') minimum horizontal separation, O.D. to O.D., with any potable water or sewer/reclaimed main. This separation may be reduced utilizing special construction, with special approval from the Agency and the County Health Dept. For sewer or reclaimed water mains less than 610mm (24") in diameter, only Agency approval is required.

Revision	By	Approved	Date
ORIGINAL		Parkinson	2/95
Add Metric		T. Stanton	03/03

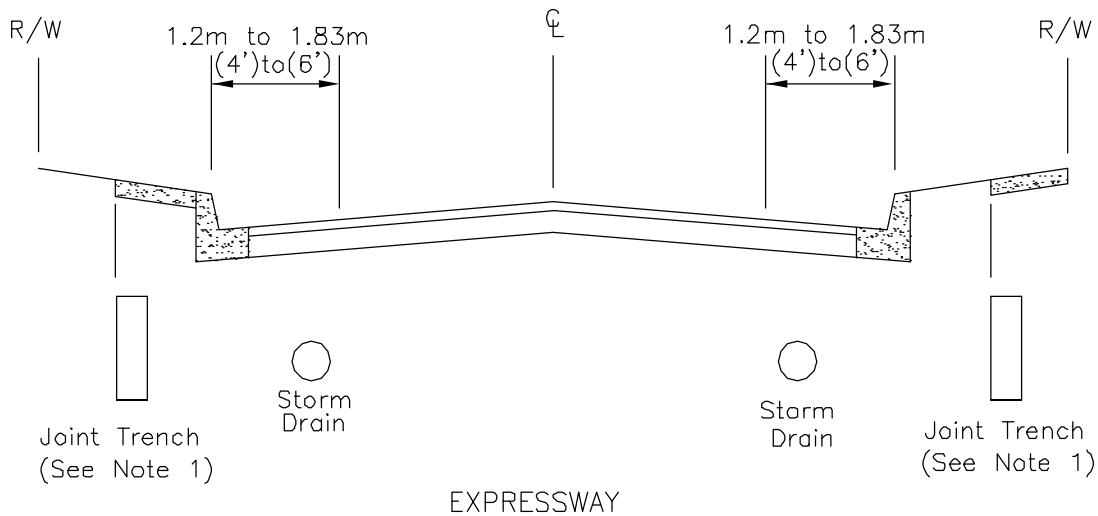
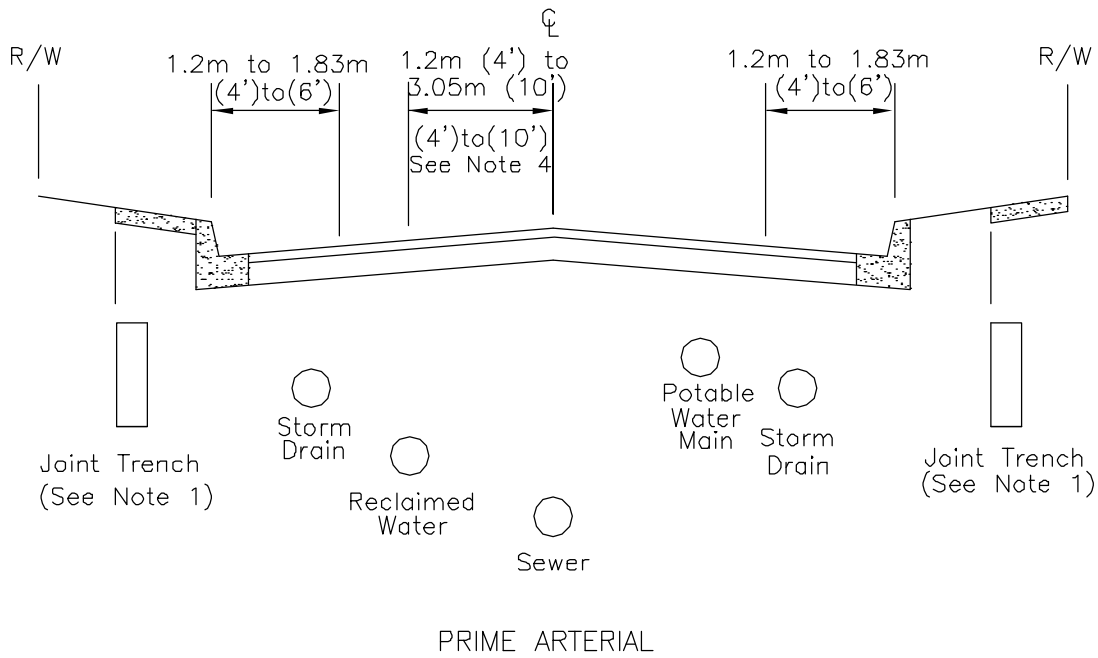
SAN DIEGO REGIONAL STANDARD DRAWING

**UTILITY LOCATIONS
LOCAL AND MAJOR STREETS**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-22**



NOTES

1. At catch basin locations, joint trench shall be 1.2m (4'). minimum from back of curb to inside wall of trench. See Standard Drawing M-15 for configuration of utilities in joint trench.
2. Sewer and reclaimed water mains shall be designed to cross under potable water mains. The vertical separation between potable water and reclaimed water shall be a minimum of 305mm(12").
3. Sewer and reclaimed water laterals shall cross under potable water main, with a minimum vertical separation of 305mm (12").
4. Sewer and reclaimed water mains shall maintain a 3.05m (10'). minimum horizontal separation, O.D to O.D., with any potable water or sewer/reclaimed main. This separation may be reduced utilizing special construction, with special approval from the Agency and the County Health Dept. For sewer or reclaimed water mains less than 610mm (24") in diameter, only Agency approval is required.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	2/95
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

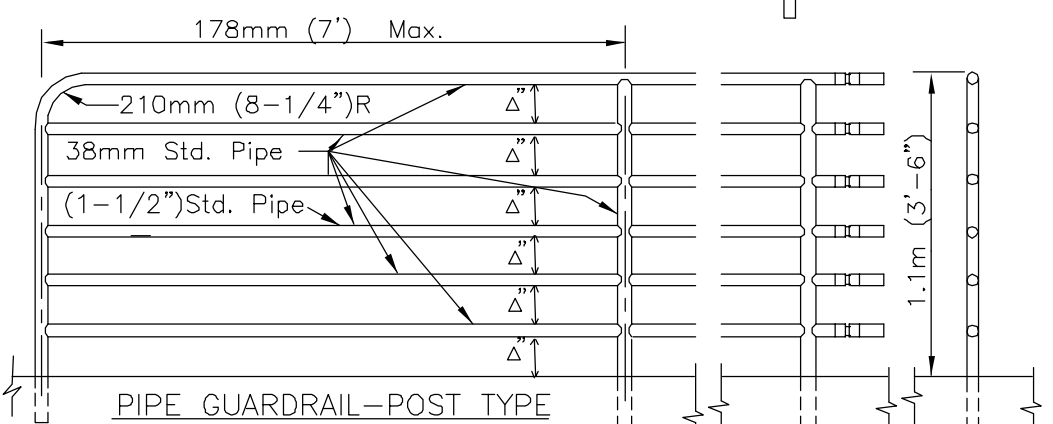
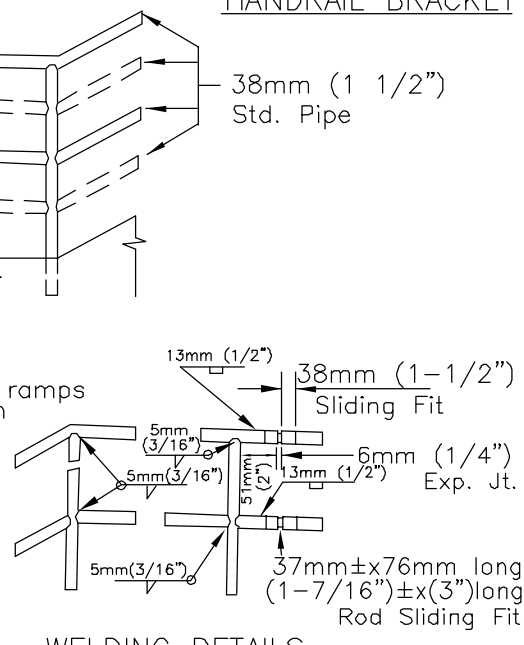
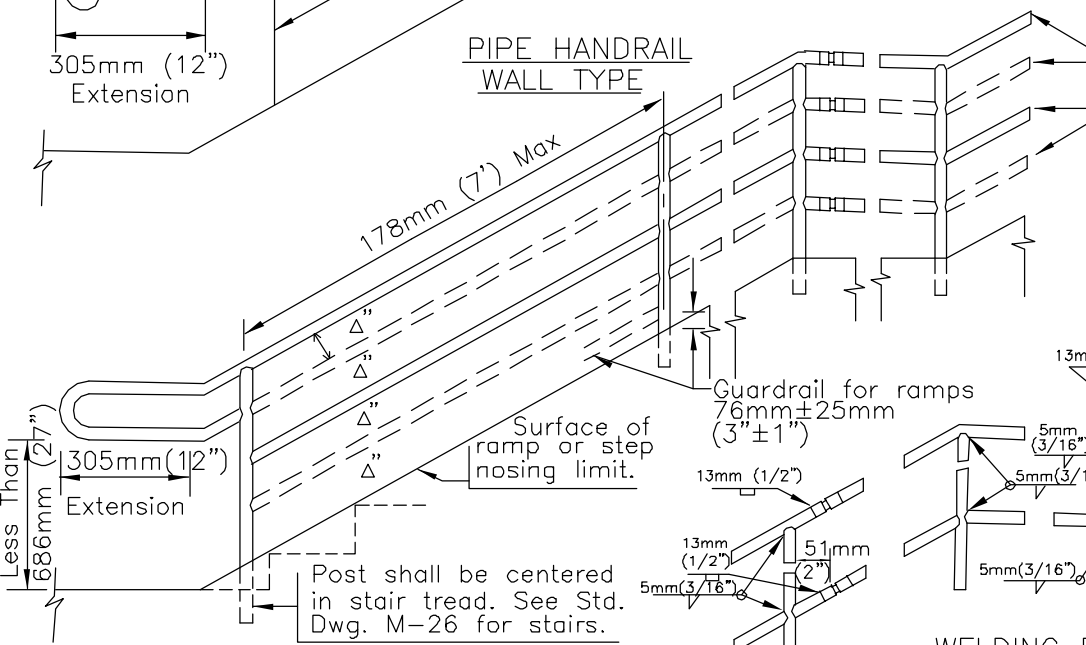
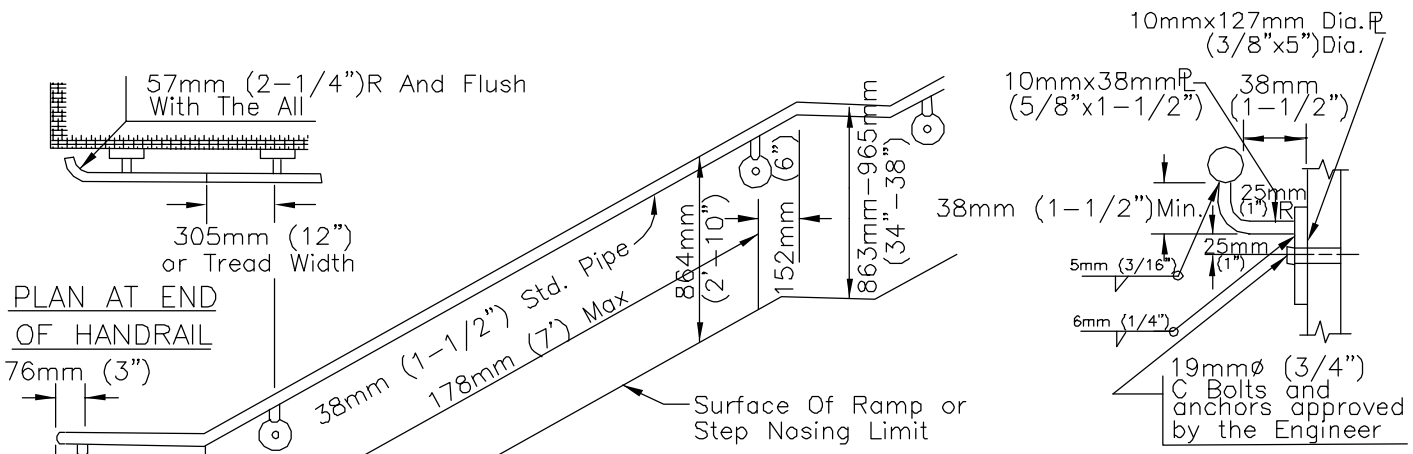
UTILITY LOCATIONS

PRIME ARTERIALS AND EXPRESSWAYS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/03/03
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-23**



RAILING NOTES

1. 6mm (1/4") Expansion joints @ 4.9m (16') ± centers.
2. Weld and grind smooth all connections.
3. All railing to be hot dip galvanized after fabrication.
4. Pipe shall seamless steel ASTM A53 Grade B.
5. Maximum = Δ102mm (4"). Guardrails and handrails for stairs and ramps more than 762mm (30") above have intermediate rails equally spaced such that a sphere 102mm (4") in diameter cannot pass through.
6. Handrail extension for stairs, at all bottom risers, shall be 305mm (12") plus one tread width.

Revision	By	Approved	Date
ORIGINAL	G. Parkinson		2/95
Add Metric	T. Stanton		03/03

SAN DIEGO REGIONAL STANDARD DRAWING

PEDESTRIAN PROTECTIVE RAILING

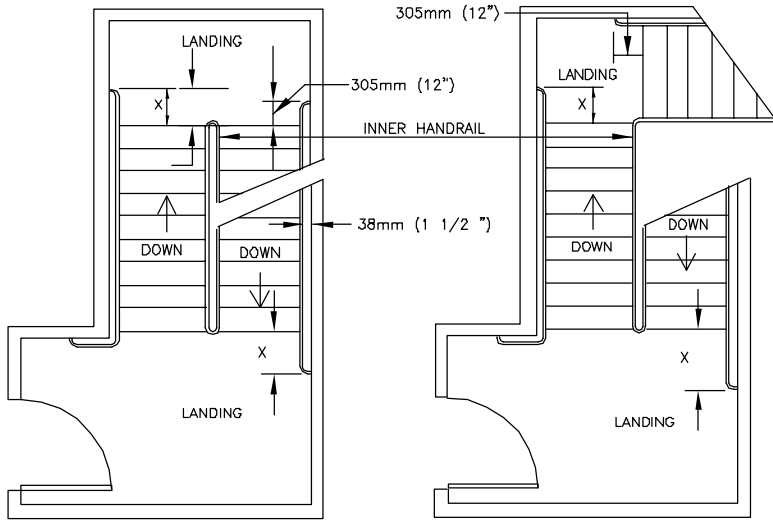
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton **STANTON**

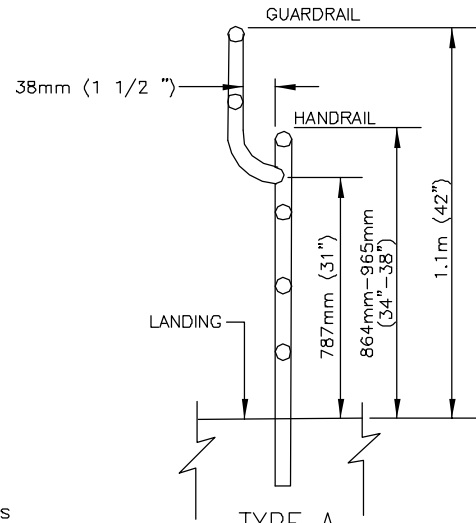
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-24**

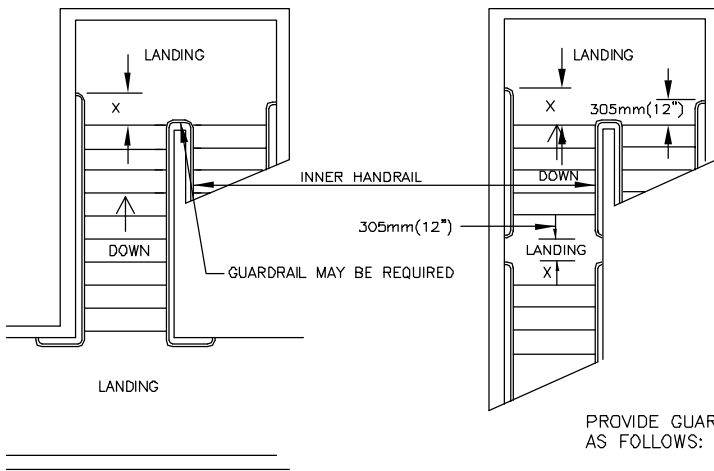


X IS THE MINIMUM HANDRAIL EXTENSION OF 12 INCHES PLUS THE WIDTH OF ONE TREAD AT EACH BOTTOM RISER.

NOTE: INNER HANDRAIL AT LANDINGS OF STAIRS THAT DOUBLE BACK OR IMMEDIATELY TURN SHALL BE CONTINUOUS, AND SHALL NOT EXTEND ONTO LANDING OR PATH OF TRAVEL.



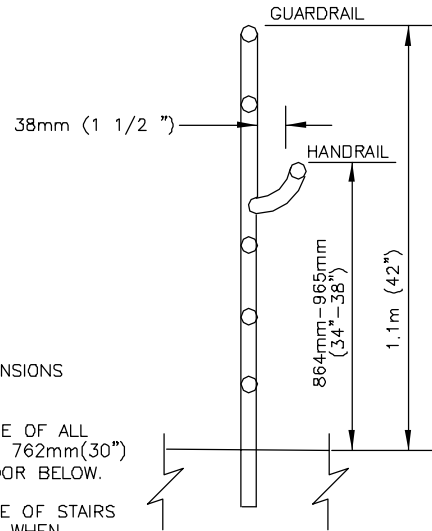
TYPE A
GUARDRAIL EXTENSION



STAIR HANDRAILS

PROVIDE GUARDRAIL EXTENSIONS AS FOLLOWS:

1. TYPE A ON OPEN SIDE OF ALL LANDINGS MORE THAN 762mm(30") ABOVE GRADE OR FLOOR BELOW.
2. TYPE B ON OPEN SIDE OF STAIRS (INCLUDING LANDINGS) WHEN SPECIFIED.



TYPE B
GUARDRAIL EXTENSION

NOTES

1. Post type guardrails, and handrails for stairs or landings 762mm(30") or less above grade or floor below shall have only one intermediate rail centered between the step nosing limit (or if specified the top of curb) and top of railing.
2. Post type guardrails, and handrails for stairs or landings more than 762mm(30") above grade or floor below shall have intermediate rails equally spaced such that a sphere 102mm(4") in diameter cannot pass through.
3. Where handrail extensions interfere with transverse walkways the horizontal portions shall not encroach but be turned away from stairs and parallel to walkway.
4. The top of guardrails for stairways, exclusive of their landings, may have a height as specified for handrails.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	2/95
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

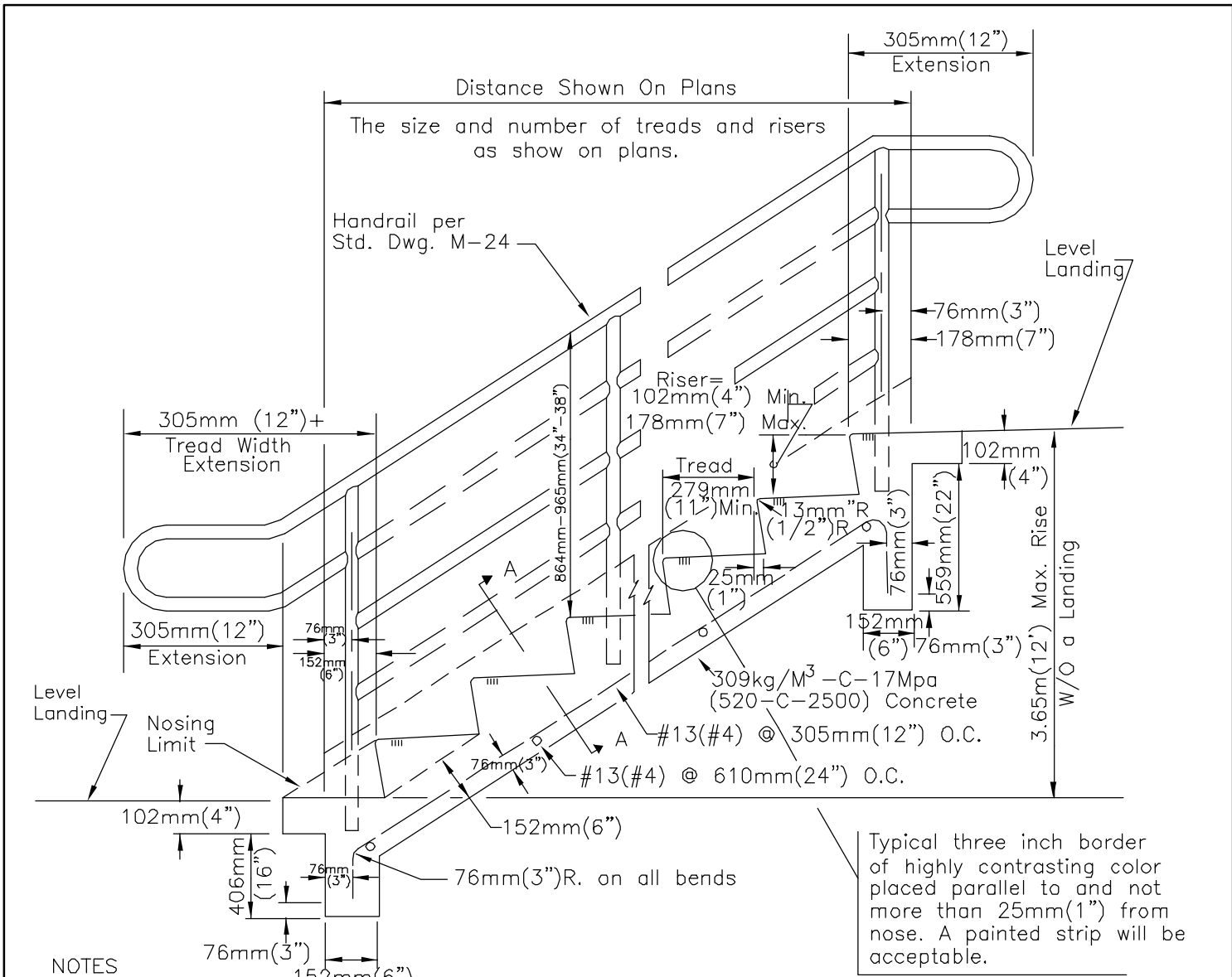
PEDESTRIAN PROTECTIVE RAILING
DETAILS No. 2

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/003

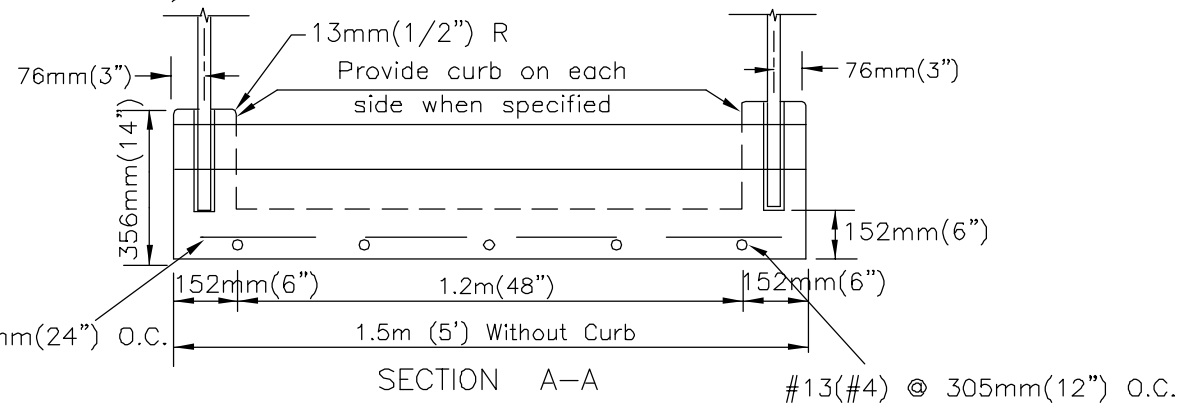
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-25



NOTES

1. Broom finish on treads, trowel finish on all other exposed surfaces.
2. 6mm(1/4") per 305mm(1') slope on treads for drainage.
3. Locate handrails on both sides.
4. Handrail may project into the required width a distance of 89mm(3-1/2") from each side of stairway.



Revision	By	Approved	Date
ORIGINAL	G.Parkinson		2/95
Add Metric	T. Stanton		03/03

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE STEPS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 31018005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-26**

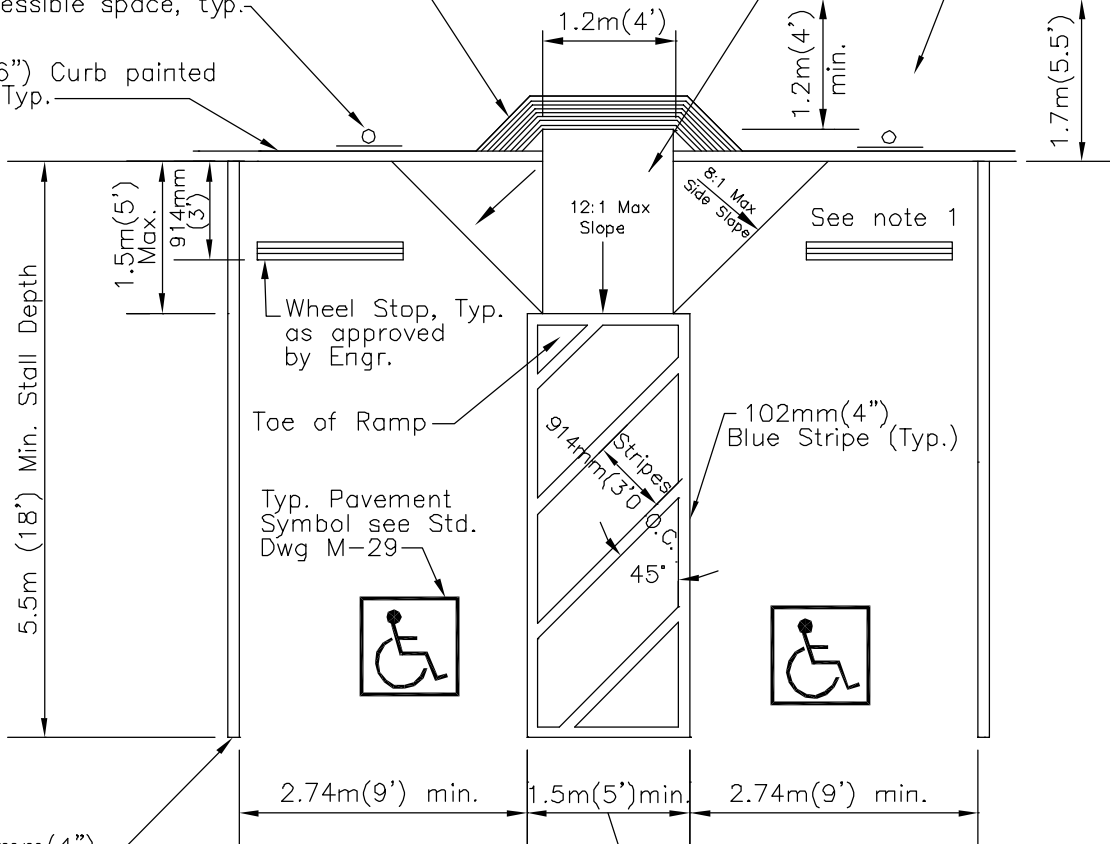
305mm(12") Wide Border with 6mm(1/4")
Grove approx. 19mm(3/4) O.C.

International symbol
of accessibility sign
see Std. Dwg. M-28A
and M-28B for van
accessible space, typ.

See Note 2

Contiguous Sidewalk

152mm (6") Curb painted
blue, Typ.



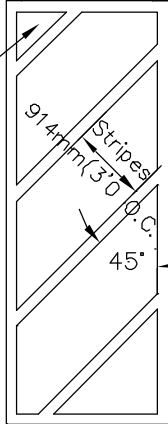
5.5m (18') Min. Stall Depth

1.5m (5')
Max.
914mm
(3')

Wheel Stop, Typ.
as approved
by Engr.

Toe of Ramp

Typ. Pavement
Symbol see Std.
Dwg M-29



102mm(4")
Blue Stripe (Typ.)



2.74m(9') min. 1.5m(5') min. 2.74m(9') min.

102mm(4")
Blue Stripe (Typ.)

1.5m(5') Min. at Typ. Accessible
Parking Stall.
2.43m(8') Min. at Van Accessible
Parking Stall.

NOTES:

1. Provide for adequate drainage.
2. For appropriate ramp alternate to conform to topographical conditions, see Std. Dwg. G-27 through G-31.
3. Slope shall not exceed 2% in any direction unless there is equivalent facilitation.
4. Blue color should match color No. 15090 in the Federal Standard 595a as specified in Section 522(b)2.

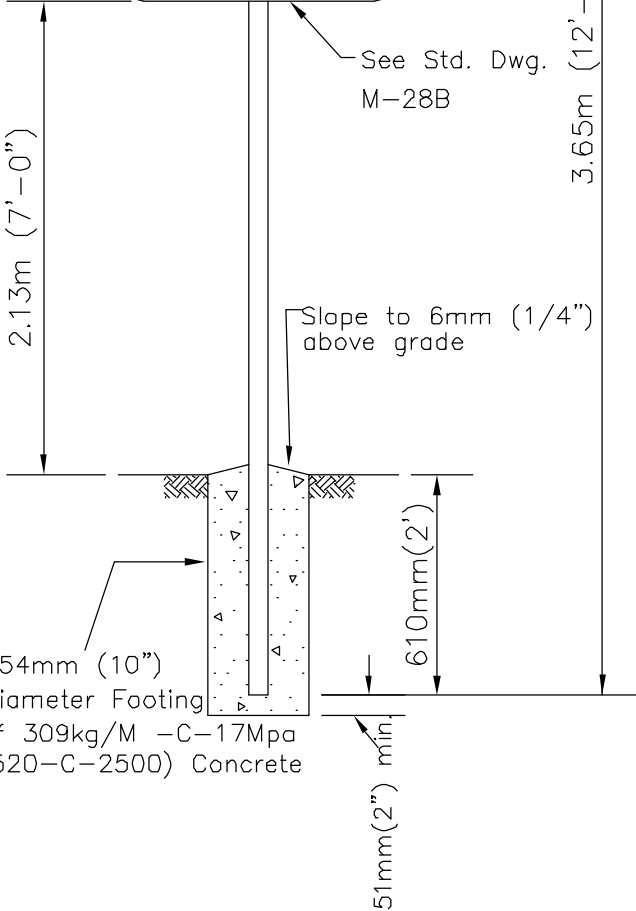
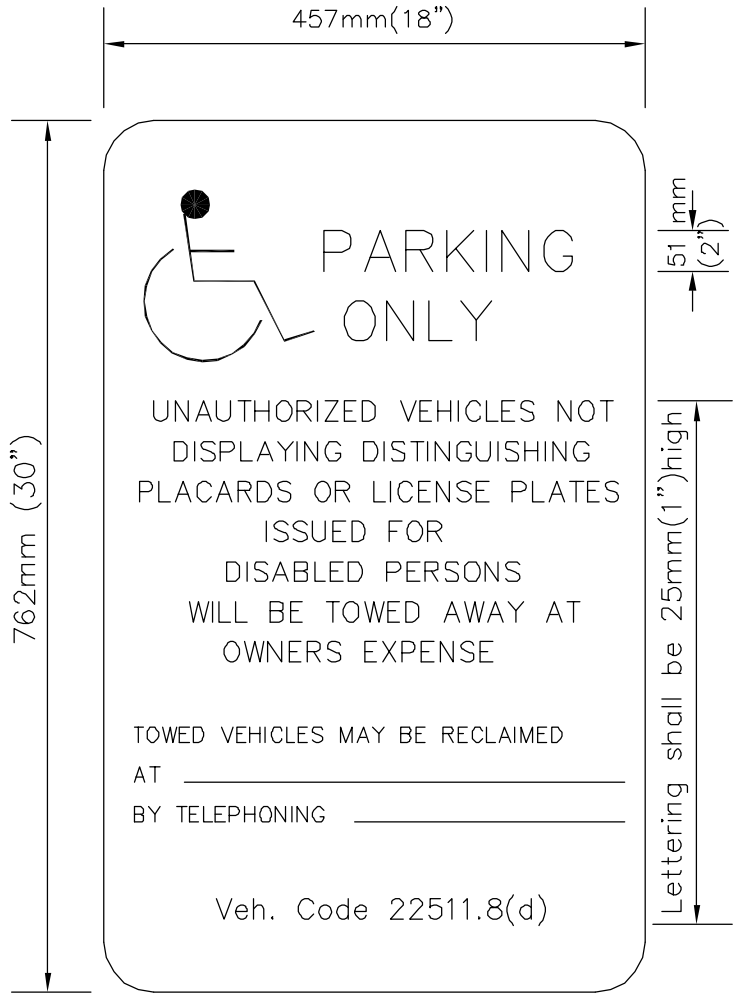
Revision	By	Approved	Date
ORIGINAL		G.Parkinson	2/95
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

DISABLED PARKING STALL(S)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
T. Stanton 3/01/003
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER **M-27A**



SIGN DETAIL

NOTES:

1. Sign shall be constructed of a minimum 1.57mm (0.062") thick aluminum.
2. Lettering, symbol and border shall be reflectorized white, on a blue background.
3. Lettering shall be 25mm (1") and 51mm (2") high.
4. Where space is designed for van accessibility, a sign "VAN ACCESSIBLE" shall be installed.
5. Minimum van accessible vertical clearance is 2.5m (8'-2").

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	2/95
Add Metric		T. Stanton	03/03

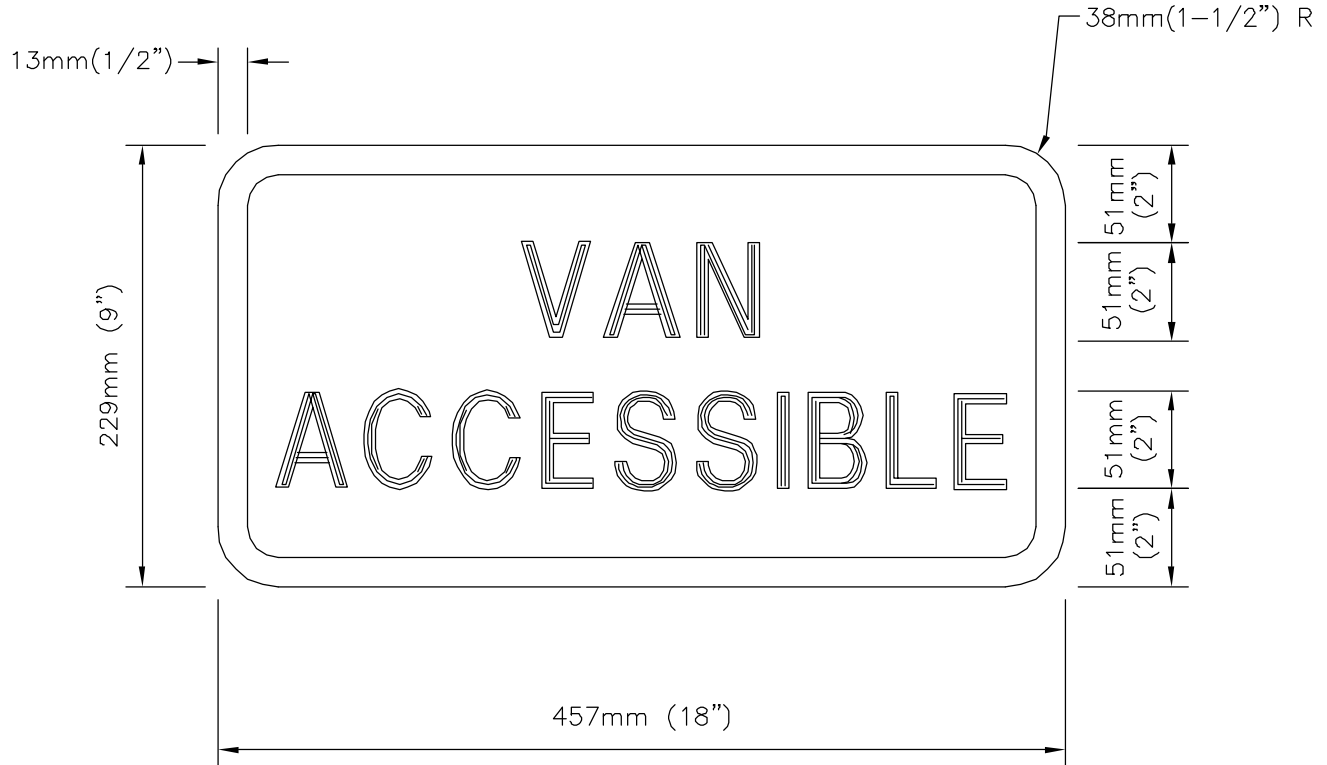
SAN DIEGO REGIONAL STANDARD DRAWING

DISABLED PARKING SIGN

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-28A**



NOTES

1. Sign shall be constructed of aluminum, 1.57mm (0.062") minimum thickness.
2. Colors: Background—Reflectorized Blue
 Border and letters— Reflectorized White
 Blue color shall match color No. 15090 in the
 Federal Standard 595a as specified in Section 522(b)2.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	2/95
Add Metric		T. Stanton	03/03

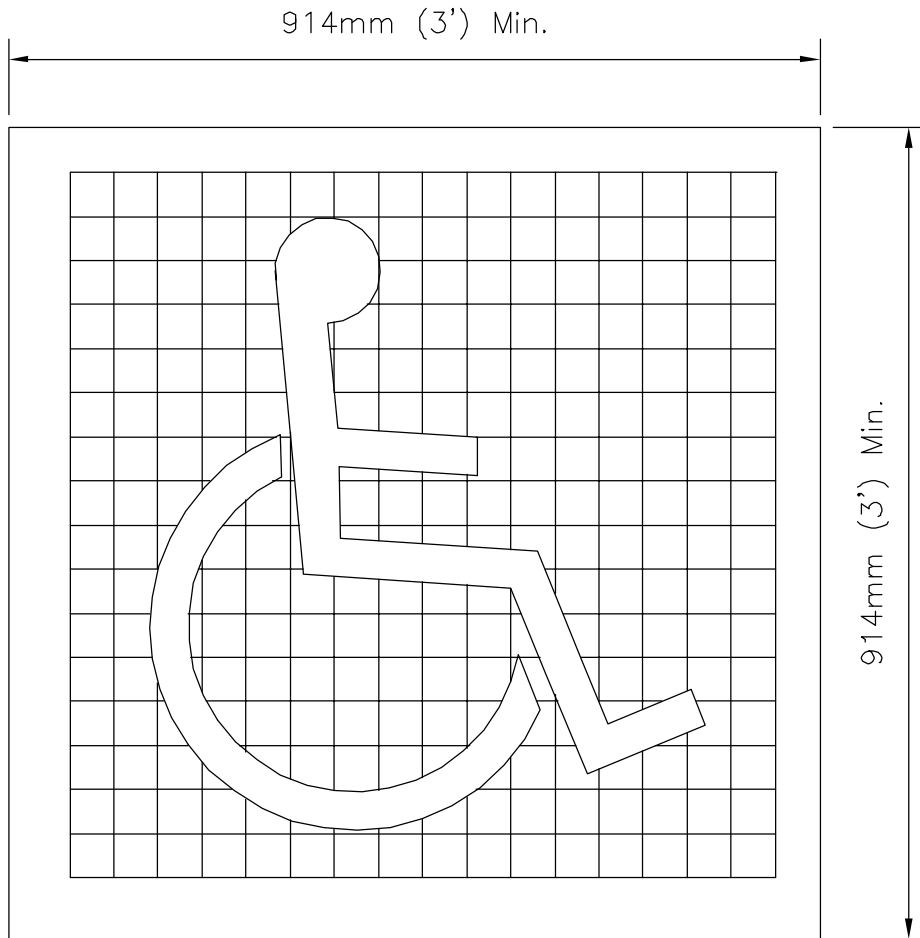
SAN DIEGO REGIONAL STANDARD DRAWING

**VAN ACCESSIBLE SIGN
FOR DISABLED PARKING SPACE**

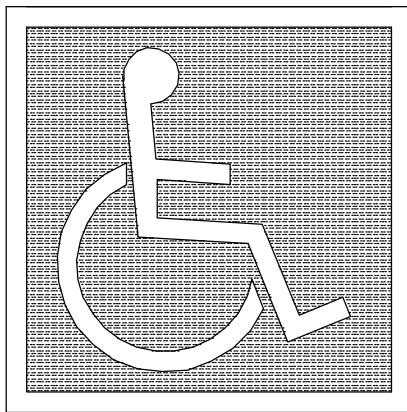
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-28B**



(a) SYMBOL PROPORTIONS



← INTERNATIONAL SYMBOL OF ACCESSIBILITY

(b) DISPLAY CONDITIONS

NOTES

1. Pavement symbol shall be painted white on a blue background.
2. Blue color shall match color No. 15090 in the Federal Standard 595a as specified in Section 522(b)2.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	2/95
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

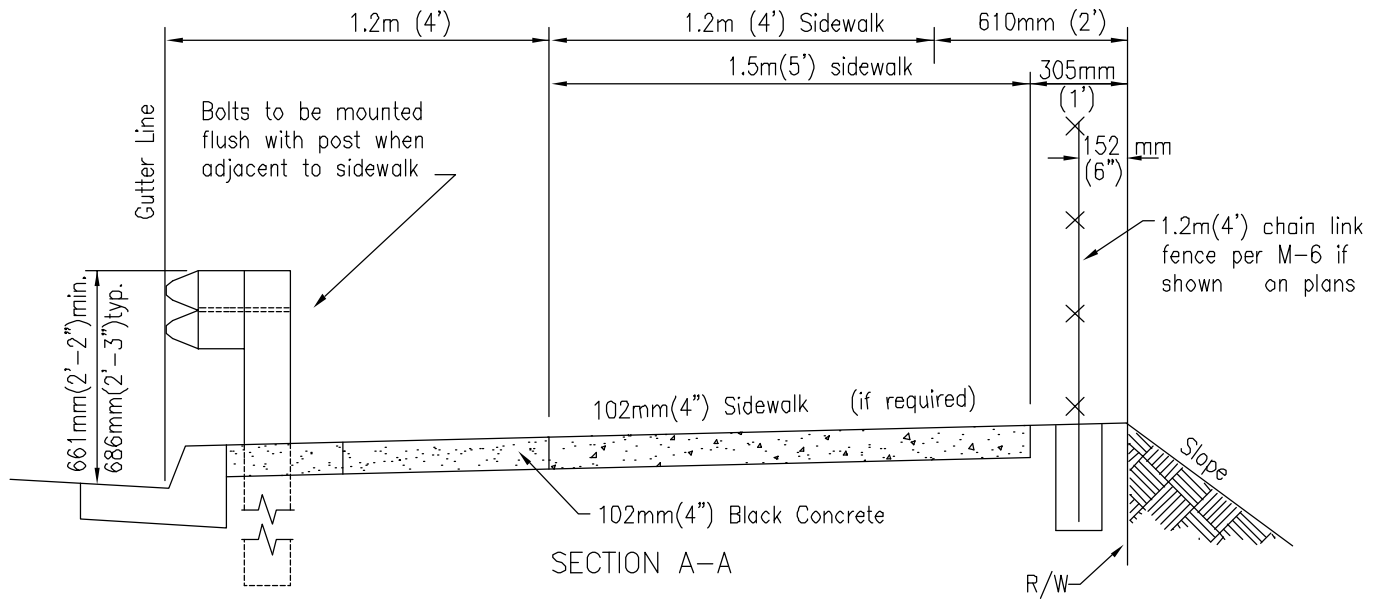
PAVEMENT SYMBOL - DISABLED PARKING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

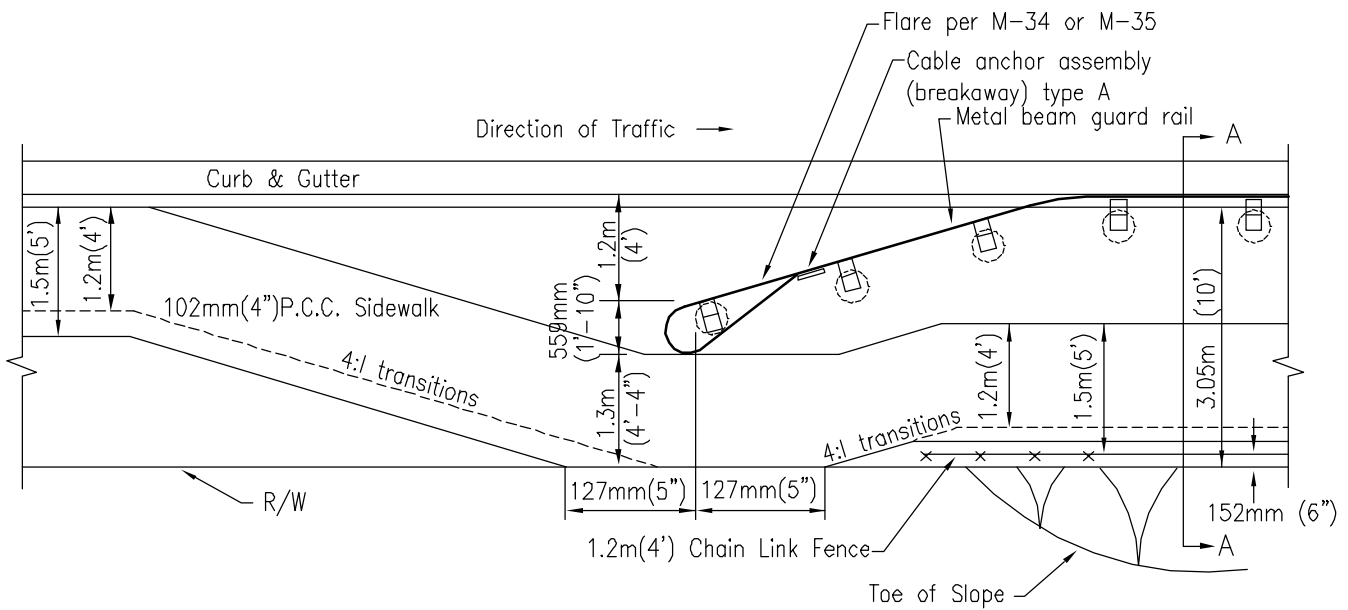
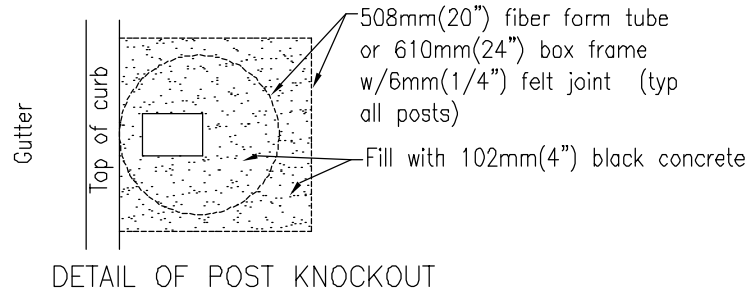
T. Stanton 3/03/03
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-29**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



Typical for above ground obstructions—4:1 sidewalk transitions typical for use with G-7



Revision	By	Approved	Date
ORIGINAL	G.Parkinson		5/92
Add Metric	T. Stanton		03/03

SAN DIEGO REGIONAL STANDARD DRAWING

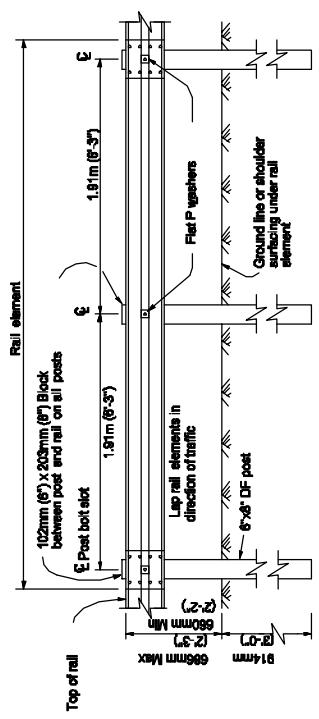
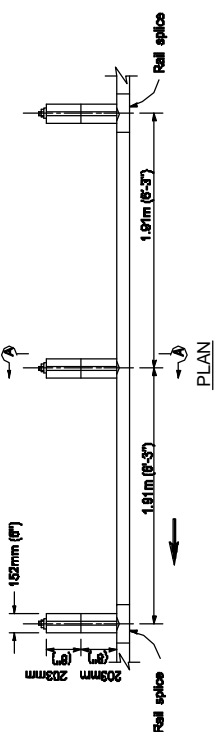
GUARD RAIL STANDARDS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

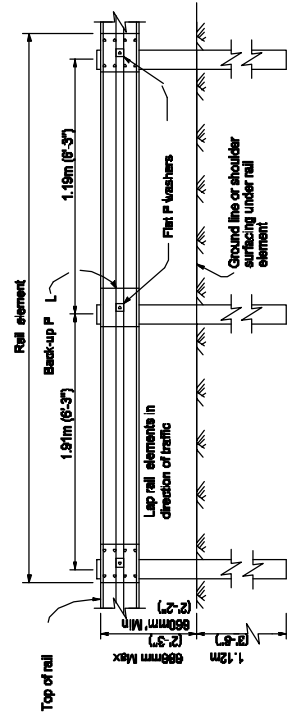
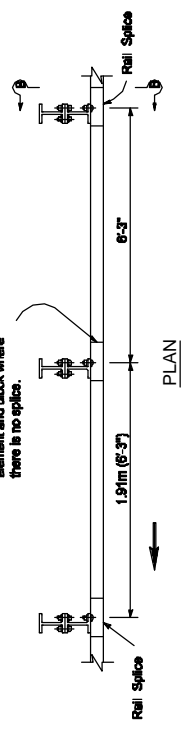
T. Stanton 3/03/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-30**

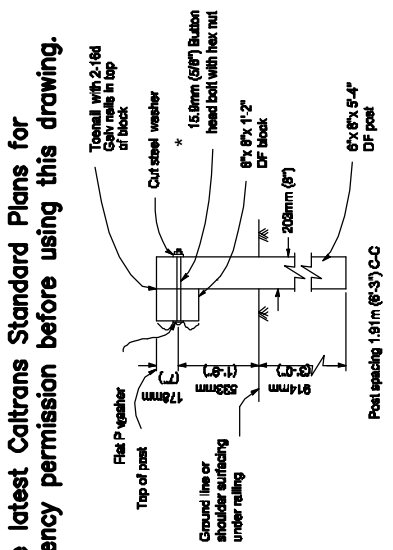
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



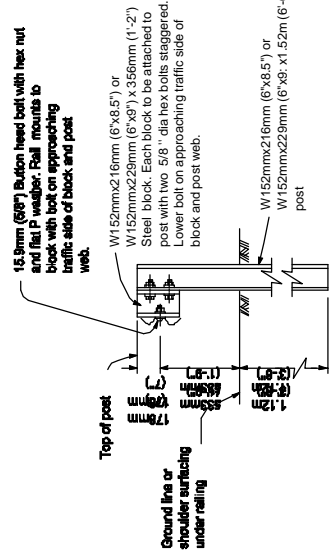
METAL BEAM GUARD RAIL WITH WOOD POST AND BLOCKS



METAL BEAM GUARD RAIL WITH W6x8.5
OR W6x9 STEEL POSTS AND BLOCKS

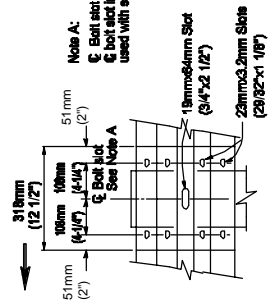


* Where bolt is reversed or 15.9mm (5/8") threaded rod is used to mount rail, no more than 13mm (1/2") of thread may be exposed on traffic side of rail.

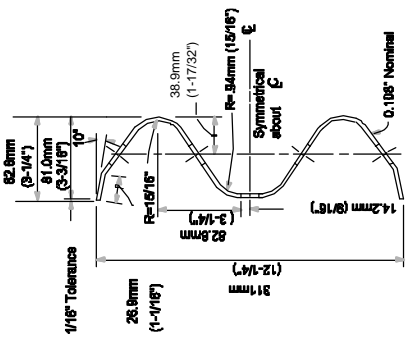


RAIL SPLICE DETAIL

ELEVATION VIEW



Splice the overlapped ends of the rail elements with 15.9mm (5/8") x 31.8mm (1 1/4") button head oval shoulder bolts and 15.9mm (5/8") x 38mm (1 1/4") recessed hex nut in the 23mm (29/32") x 28.6mm (1 1/8") slots. Total 8 per rail splice; 4 per terminal section and end section. Lap rail elements in direction of traffic.



SECTION THRU
RAIL ELEMENT

NOTES

- For details of standard hardware used to construct guard railing, see Std. Dwg. M-32.
- For details of posts and blocks used to construct guard railing, see Std. Dwg. M-33.
- Guard railing post spacing to be 1.91m (6'-3") center to center, except as otherwise noted.
- Top of rail to be 686mm (27") above the ground line or shoulder surfacing under the rail element.
- For guard railing approach flares, see Std. Dwg. M-34 and M-35.
- For embankment widening details to accommodate guard railing approach flares, see Standard Dwg. M-36.
- For guard railing and anchor details, see Std. Dwg. M-37 and M-39.
- For guard railing connection details to bridge railing, retaining walls and abutments, see Std. Dwg. M-40.
- For guard railing connection details to bridge sidewalks and curbs, see Std. Dwg. M-41.
- For dike positioning with guard railing installations, see Std. Dwg. M-36.
- Direction of traffic indicated by

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

METAL BEAM GUARD RAILING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/10/2005

Chairperson R.C.E. 19246 Date

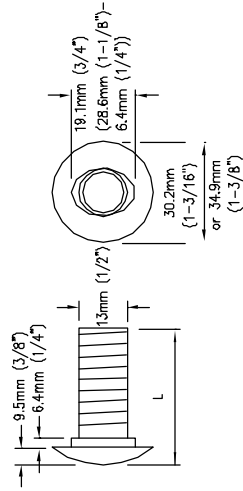
DRAWING NUMBER **M-31**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

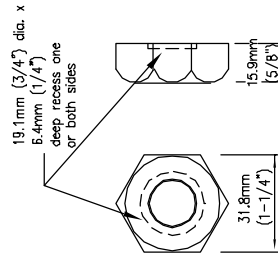
NOTES

1. Terminal sections will not be installed on the trailing end of guard railing placed adjacent to one-way roadways.
2. Back-up plate to be used between guard rail element and steel block on steel post where there is no rail element splice. See Standard Dwg. M-31.
3. For end sections details, see Standard Dwg. M-40.
4. For terminal section Type C, see Standard Dwg. M-38.

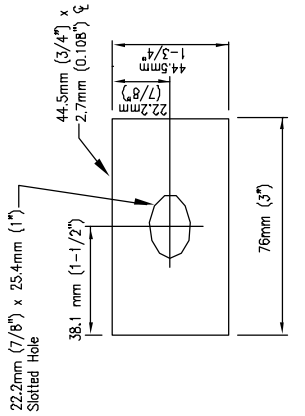
L	THREADED LENGTH
	31.8mm (1-1/4") Full Thread Length
51mm (2")	38.1mm (1-1/2") min. Thread Length
241mm (9-1/2")	44.5mm (1-3/4") min. Thread Length
305mm 12"	63.5mm (2-1/2") min. Thread Length



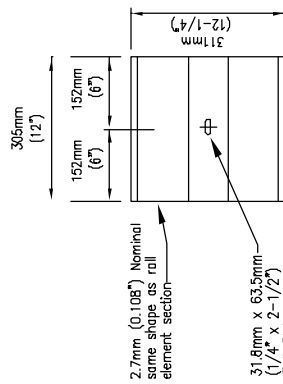
5/8" Ø BUTTON HEAD BOLT



15.9mm (5/8") O RECESS NUT

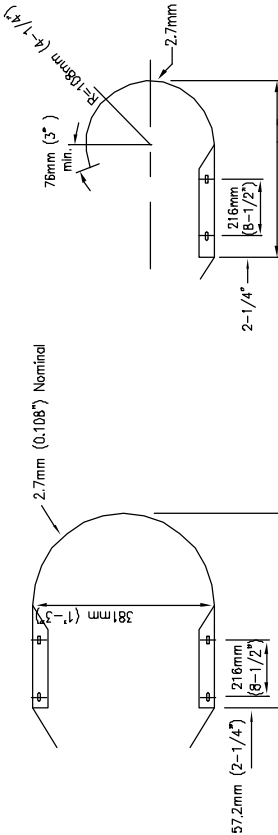


FLAT PLATE WASHER

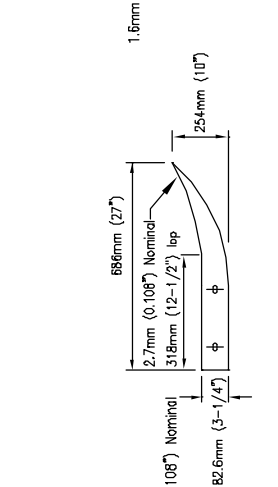


BACK-UP PLATE

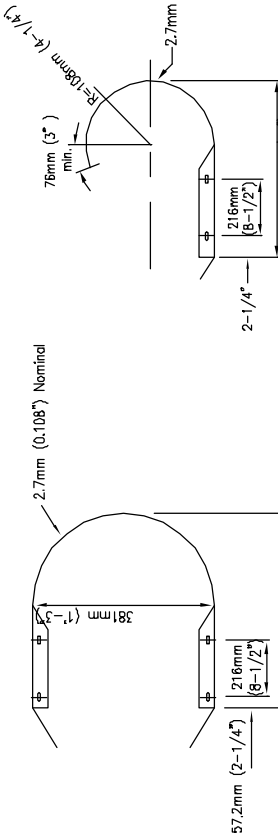
See Note 2



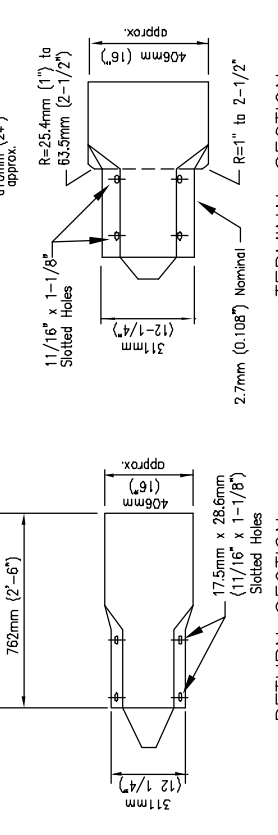
RETURN SECTION



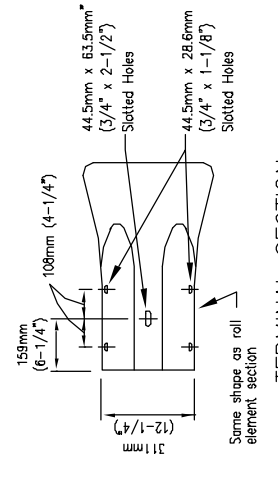
TERMINAL SECTION TYPE B



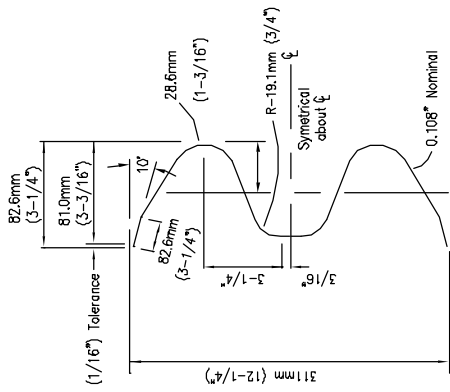
TERMINAL SECTION TYPE A



RETURN SECTION



TERMINAL SECTION



SECTION THRU RAIL ELEMENT

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

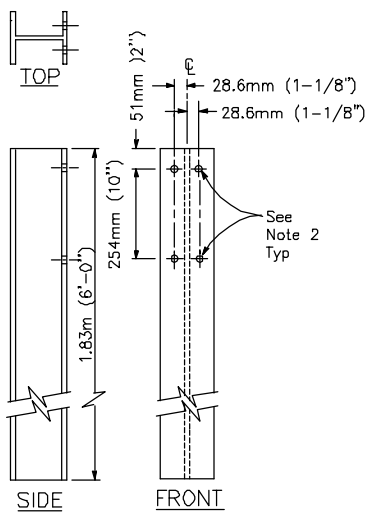
SAN DIEGO REGIONAL STANDARD DRAWING
METAL BEAM GUARD RAILING
STANDARD HARDWARE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

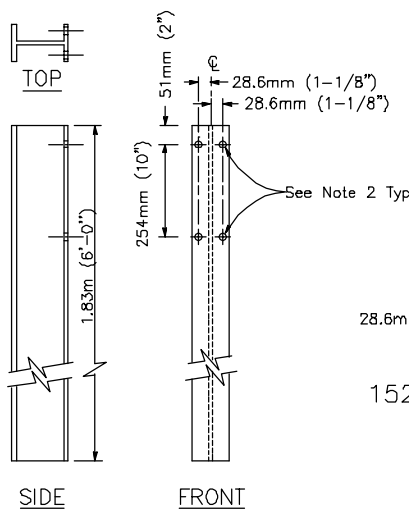
T. Stanton 3/10/2003
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-32**

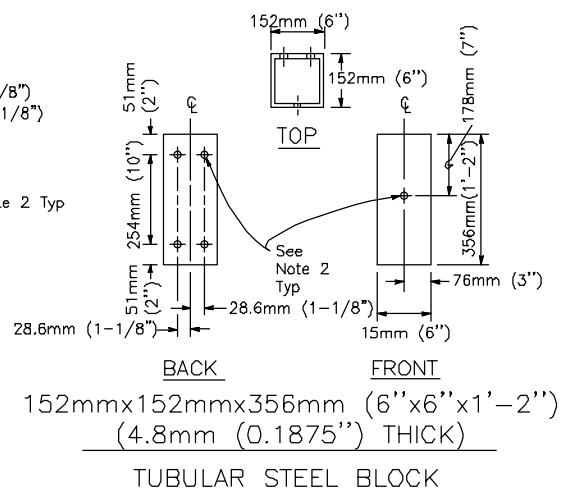
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



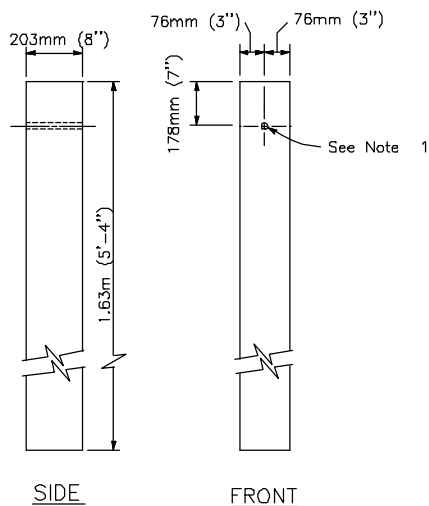
W6x15 STEEL POST



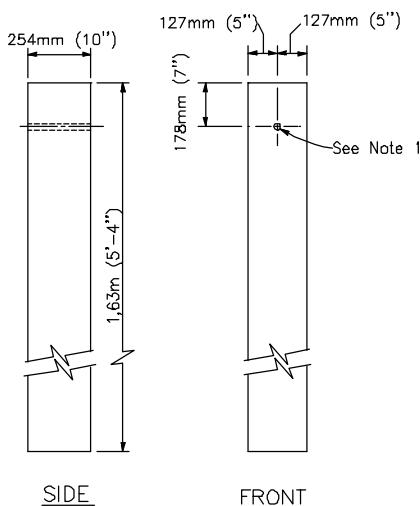
W6x8.5 OR W6x9 STEEL POST



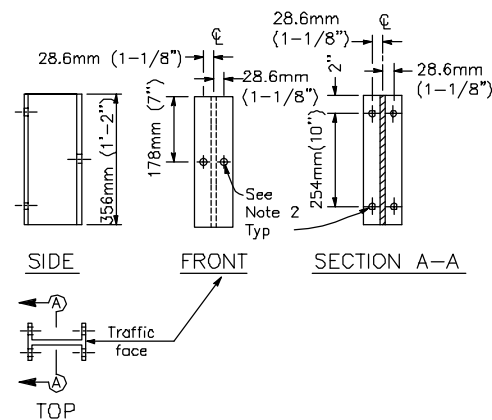
TUBULAR STEEL BLOCK



6"x 8" DOUGLAS FIR POST



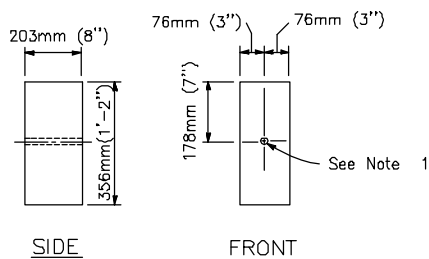
10"x 10" DOUGLAS FIR POST



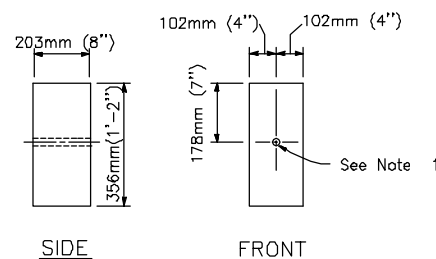
W6x8.5 OR W6x9 STEEL BLOCK

NOTES

1. All holes in wood posts and blocks shall be 44.5mm (3/4")
2. dia. ±1.6mm (1/16"). All holes in steel posts and blocks shall be 20.6mm (13/16) dia. maximum.
3. Contractor may submit alternative steel post details for Engineer's approval.
4. Dimensions shown for wood post are nominal.



6"x 8" DOUGLAS FIR BLOCK



8"x 8" DOUGLAS FIR BLOCK

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

METAL BEAM GUARD RAILING
POSTS AND BLOCKS

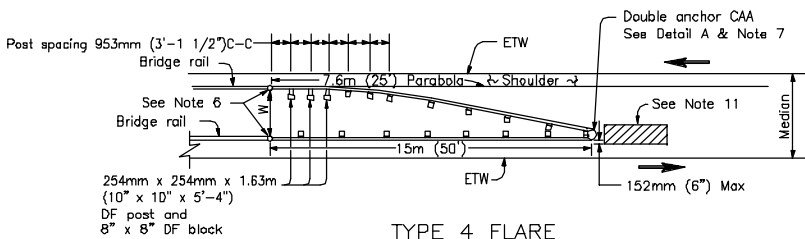
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

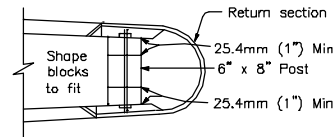
DRAWING NUMBER **M-33**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

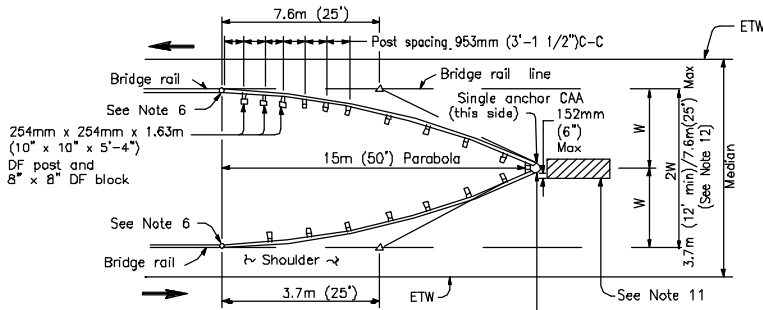


TYPE 4 FLARE

See Note 3

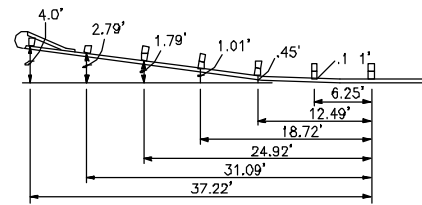


DETAIL A



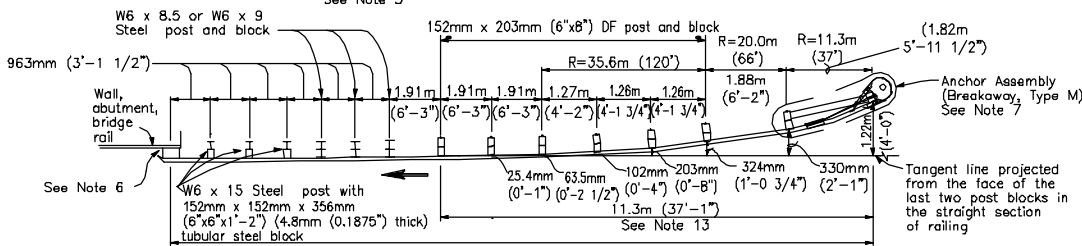
TYPE 3 FLARE

See Note 3



37'-6" PARABOLIC OFFSETS

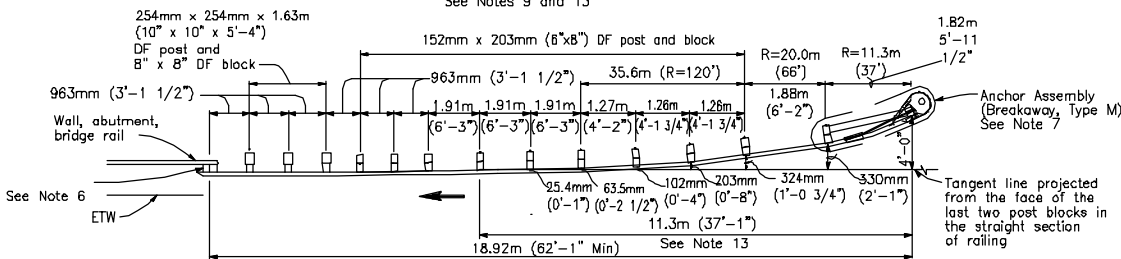
(Parabolic offsets not to be used with type 1M flares)



TYPE 1M FLARE

(STEEL POST INSTALLATION)

See Notes 9 and 13



TYPE 1M FLARE

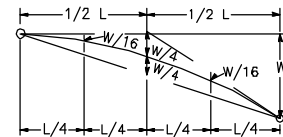
(WOOD POST INSTALLATION)

See Notes 9 and 13


NOTES

- Post, blocks and hardware to be used are shown on Standard Drawing M-31 and M-32.
- Guard rail post spacing to be 1.91m (6'-3") center to center, except as otherwise noted.
- Except as noted, posts shown are 152mm x 203mm (6" x 8") DF. W6 x 8.5 or W6 x 9 steel posts and blocks may be specified for 152mm x 203mm (6" x 8") DF posts and blocks where applicable. Where 254mm x 254mm (10" x 10") DF posts and 8" x 8" DF blocks are shown, W6 x 15 steel posts and tubular steel 152mm x 152mm x 356mm (6" x 6" x 1'-2") (4.8mm (0.1875 inch) thick) blocks may be specified where applicable.
- Top of rail to be 686mm (27") above ground line or shoulder surfacing under the rail element.
- Direction of traffic indicated by arrow.
- For connection details see Standard Drawing M-40 and M-41.
- For end anchor details see Standard Drawing M-37 and M-39.
- Terminal Sections not to be installed on trailing end of guard rail placed adjacent to one-way roadways.
- The 11.3m (37'-1") flared portion of Type 1M Flare is used at approach end of guard railing for embankment installations.
- For embankment widening details to accommodate approach flares, see Revised Standard Drawing M-36.
- Sand filled crash cushion, as shown on Standard Plan A81, or other crash cushion approved by the Engineer is required for Type 3 and 4 flares, when the end of the guard rail is within 9m (30 feet) of the edge of traveled way (ETW) of approaching traffic.
- When width W, exceeds 3.7m (12 feet); to calculate the length of parabolic flare use "L=3W" and round to nearest 3.81m (12'-6").
- For additional requirements for the Type 1M flare installations see Standard Drawing M-37.

CAA = Cable Anchor Assembly

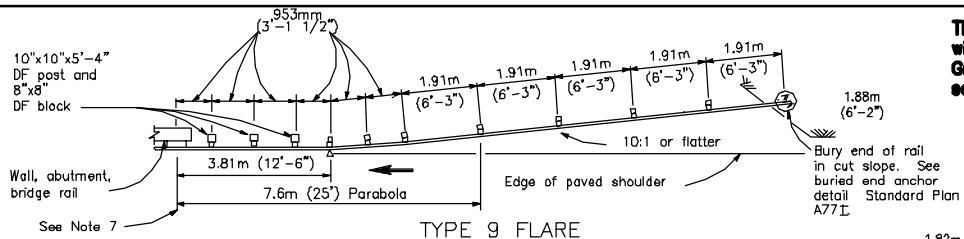


TYPICAL PARABOLIC LAYOUT

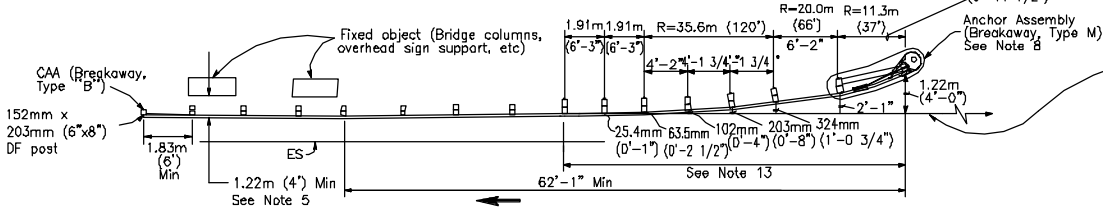
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		G.Parkinson	4/92		<p style="text-align: center;">GUARD RAIL FLARES</p>	 3/01/2003 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03	DRAWING NUMBER		M-34

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

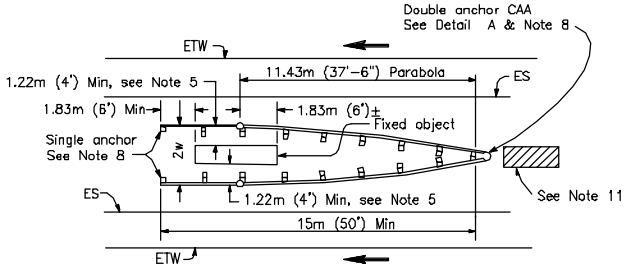
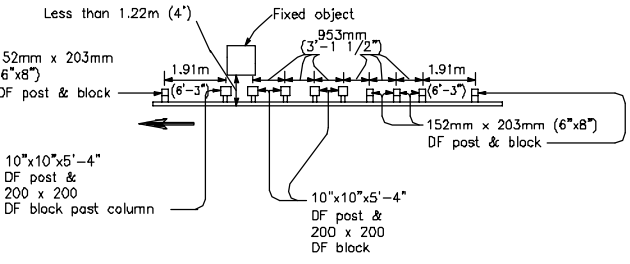
ABBREVIATION
CAA = Cable Anchor Assembly



TYPE 9 FLARE



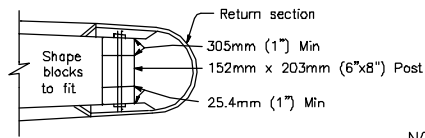
TYPE 8M FLARE
See Note 13



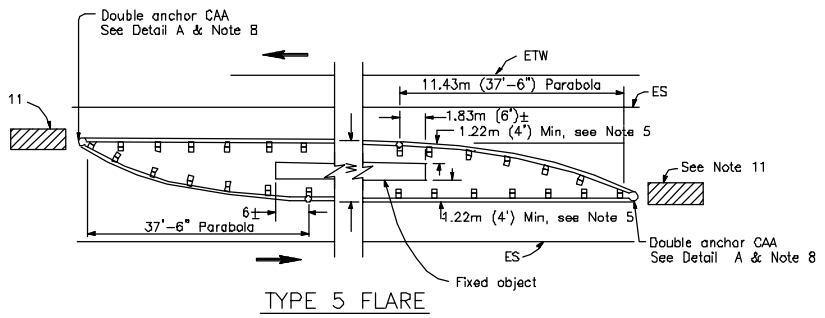
TYPE 6 FLARE

Use with Type 5, 6, and 8M flares when guard rail is less than 4' from fixed object. See Note 5. For a series of columns, additional 254mm x 254mm x 1.63m (10" x 10" x 5" x 4") DF post at 89mm (3'-1 1/2") center to center spacing to be used between columns. Where 254mm x 254mm (10" x 10") DF posts and 203mm x 203mm (8" x 8") DF blocks are shown, W6x15 steel posts and tubular steel 152mm x 152mm x 356mm (6" x 6" x 1'-2") (0.1875" thick) blocks may be specified where applicable. Where 152mm x 203mm (6" x 8") DF posts and blocks are shown, W6x8.5 or W6x9 steel posts and blocks may be specified where applicable.

APPROACH RAILING TRANSITION DETAIL FOR FIXED OBJECT



DETAIL A

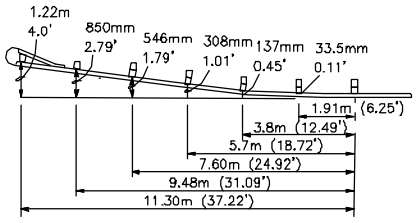
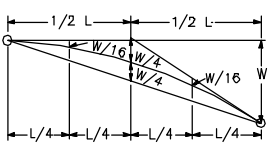


TYPE 5 FLARE

NOTES

1. Post, blocks and hardware to be used are shown on Standard Drawing M-31 and M-32.
2. Guard rail post spacing to be 1.91m (6'-3") center to center, except as noted.
3. Except as noted, posts and blocks shown are 152mm x 203mm (6" x 8") DF. W6x8.5 or W6x9 steel posts and blocks may be specified where applicable. Where 254mm x 254mm (10" x 10") DF posts and 203mm x 203mm (8" x 8") DF blocks are shown, W6x15 steel post and tubular steel 152mm x 152mm x 356mm (6" x 6" x 1'-2") (0.1875" thick) blocks may be specified where applicable.
4. Top of rail to be 686mm (27") above ground line or shoulder surfacing under the rail element.
5. A 1.22m (4') minimum clearance is required between face of rail and a fixed object located directly behind a guard rail post. A fixed object located behind the rail but not behind a guard rail post requires a 914mm (3') minimum clearance. Where minimum clearance cannot be obtained use approach railing transition details for fixed objects.
6. Direction of traffic indicated by arrow.
7. For connection details see Standard Drawing M-40.
8. For end anchor details see Standard Drawing M-37 and M-39.
9. Terminal sections not to be installed on trailing end of guard rail placed adjacent to one-way roadways.
10. Type 7 flare has been deleted.
11. Sand filled crash cushion, or other crash cushion approved by the Engineer, is required for Type 5 and 6 flares, when the end of the guard rail is within 9.14m (30 feet) of the edge of traveled way (ETW) of approaching traffic.
12. When width, exceeds 3.66m (12 feet); to calculate the length of parabolic flare use "L=3W" and round to nearest 3.81m (12'-6").
13. For additional requirements for the Type 8M flare installations see Standard Drawing M-37.

TYPICAL PARABOLIC LAYOUT



37'-6" PARABOLIC OFFSETS
(Parabolic offsets not to be used with Type 8M flares.)

Revision	By	Approved	Date
ORIGINAL			
Add Metric			

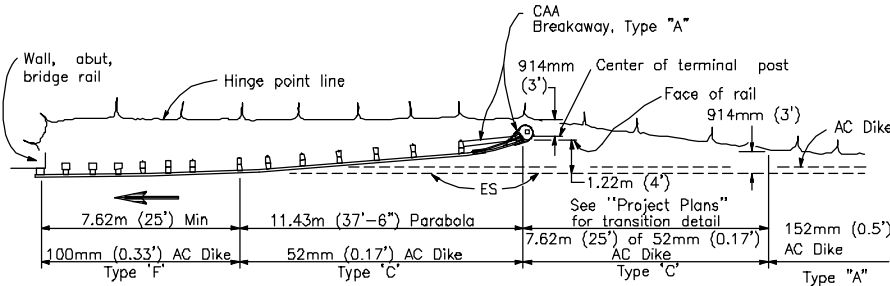
SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
R.C.E. Stanton 3/10/03
Chairperson R.C.E. 19246 Date

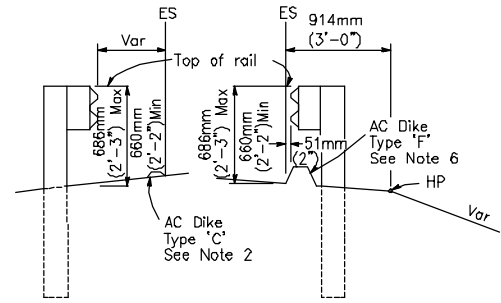
GUARD RAIL FLARES

DRAWING NUMBER **M-35**

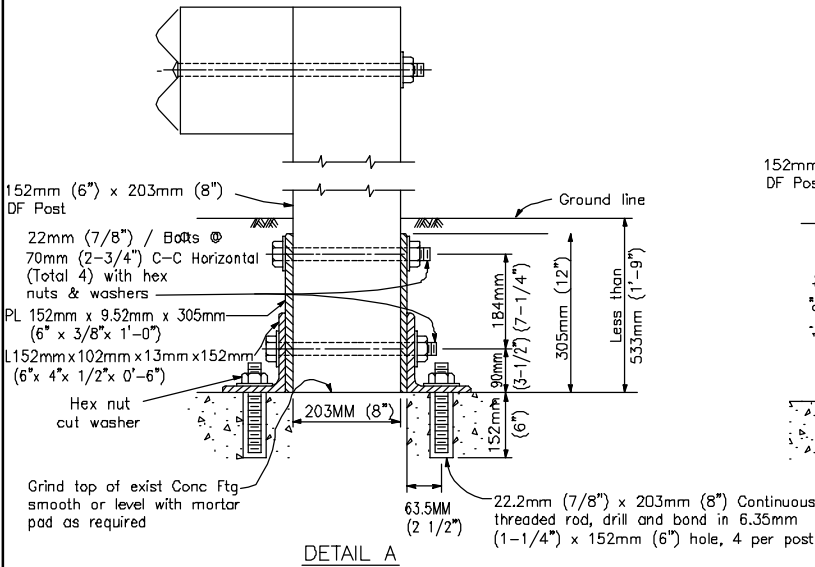
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



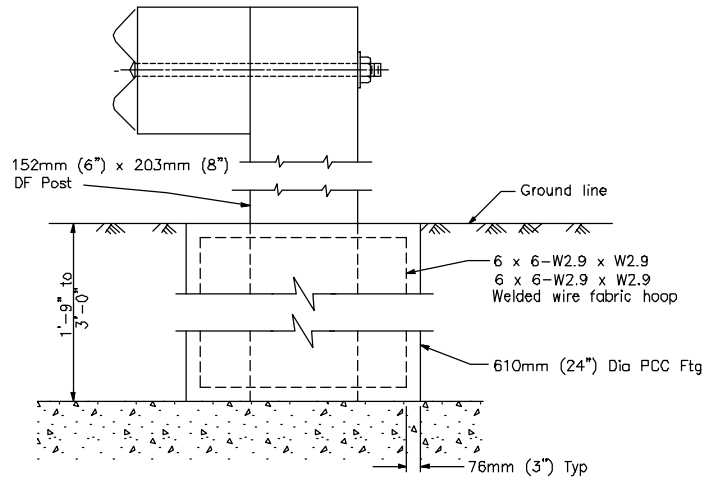
EMBANKMENT WIDENING AND DIKE PLACEMENT DIAGRAM
See Notes 1 and 2



DIKE POSITIONING
(See Note 2)



DETAIL A

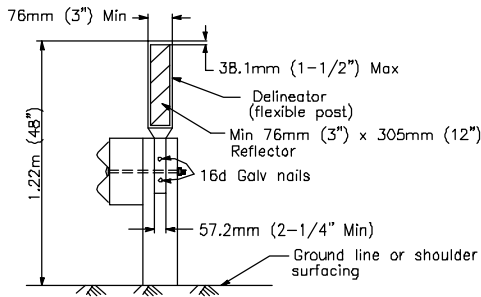


DETAIL B

Form socket in concrete to receive 152mm (6 inch) x 203mm (8 inch) post or place concrete around 152mm (6 inch) x 203mm (8 inch) post wrapped with one layer of 13mm (1/2") thick expanded polystyrene foam sheeting. Do not nail polystyrene to post. Post to be centered in concrete footing.

POST FOOTINGS
(See Note 3)

Use where standard embedment of railing post is restricted by underground concrete facilities such as footing of walls, columns, etc. Use Detail A where embedment of post is less than 533mm (1'-9"). Use Detail B where embedment of post is between 533mm (1'-9") and 914mm (3'-0").



GUARD RAILING DELINEATION
See Note 4

NOTES

1. For guard rail flare details, see Standard Drawings M-34 and M-35.
2. When necessary to place dike in front of guard rail face, only Type 'C' dike may be used. For dike details, see Standard Drawing G-5.
3. For standard railing post embedment, see Standard Drawing M-31.
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 101mm (0.33').

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

**METAL BEAM GUARD RAILING
MISCELLANEOUS DETAILS**

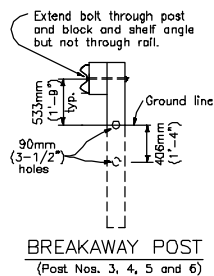
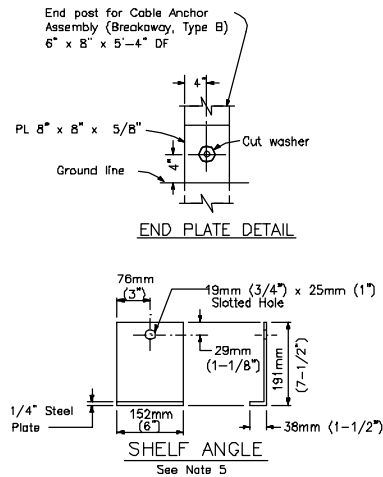
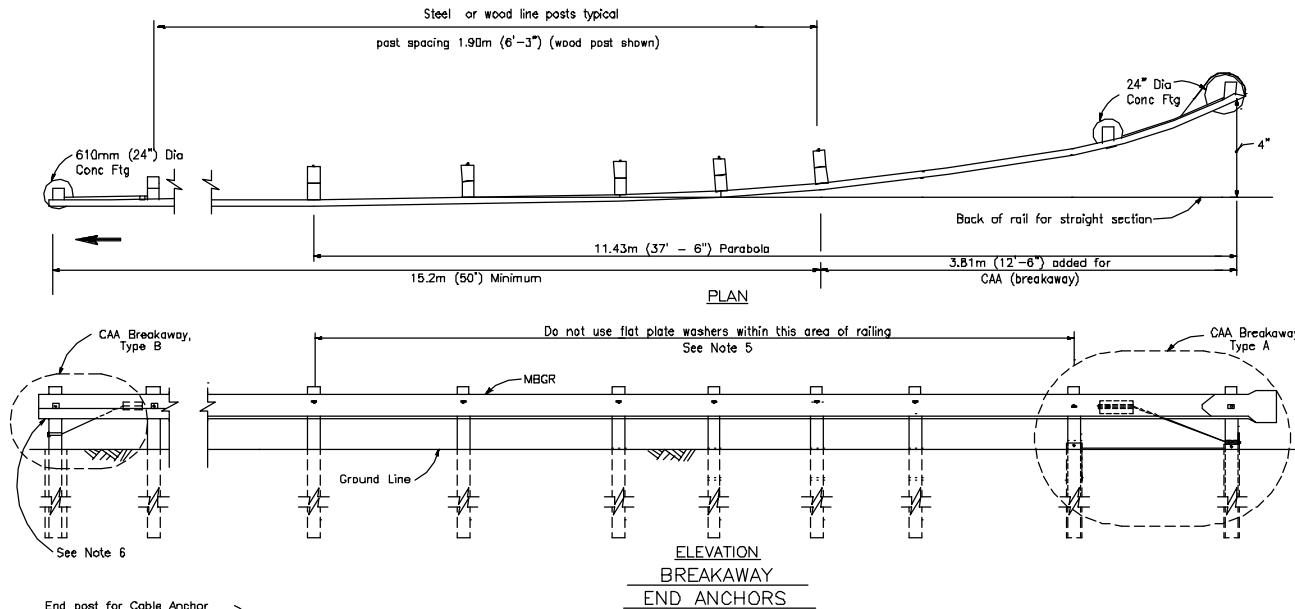
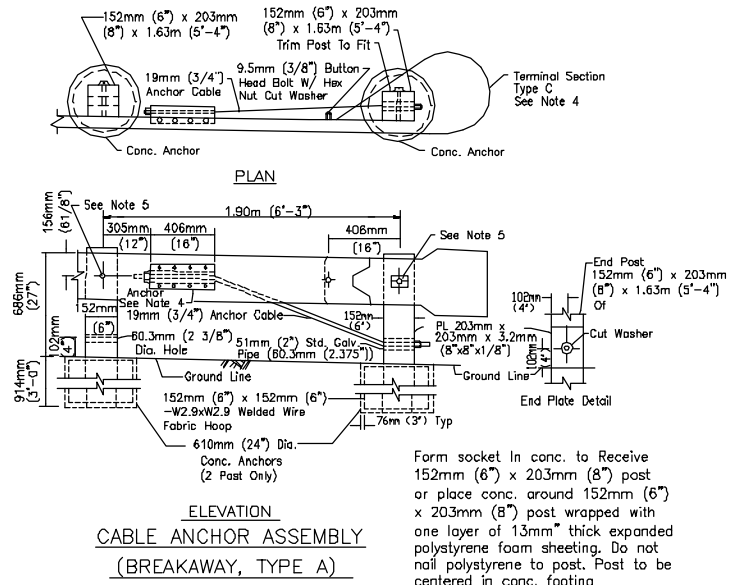
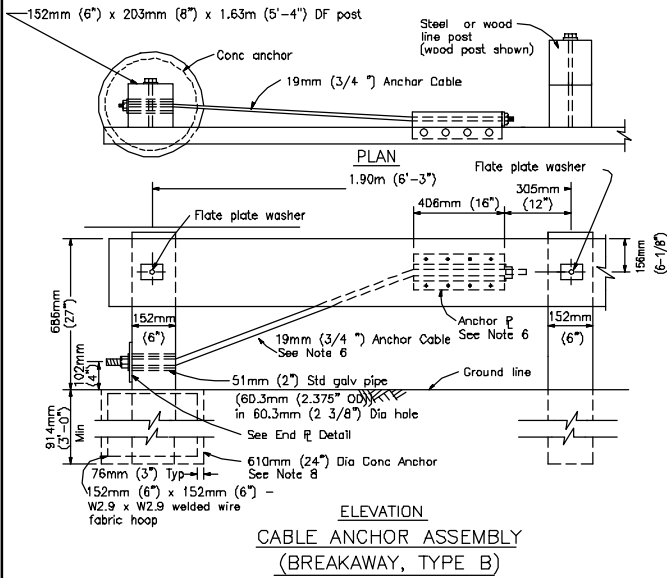
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-36**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



NOTES

1. For typical use of cable anchor assembly (Breakaway, Type A), see Revised Standard Drawings M-34 and M-35.
2. 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 18.3m (60 feet) in width.
3. Direction of traffic indicated by →
4. For details of Terminal Section Type C, anchor plate and 19mm (3/4") cable, see Standard Dwg. M-38.
5. Do not use flat plate washers under head of rail mounting bolt at the second anchor post of Type A anchors and next five line posts. Use flat plate washers on other line posts and at the first anchor post of Type A anchor and at the Type B anchor post.
6. For trailing end of guard rail adjacent to one-way roadway omit terminal section.

Revision	By	Approved	Date
ORIGINAL	G.Parkinson		4/92
Add Metric	T. Stanton		03/03

SAN DIEGO REGIONAL STANDARD DRAWING

**GUARD RAIL END ANCHORS
(BREAKAWAY)**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

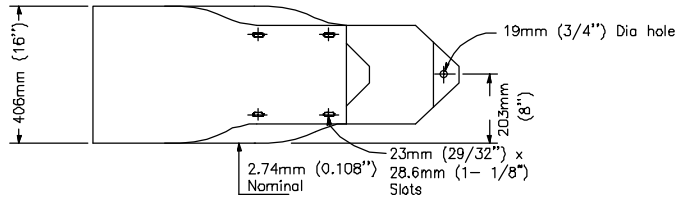
R.C.E. 3/10/03

Chairperson R.C.E. 19246 Date

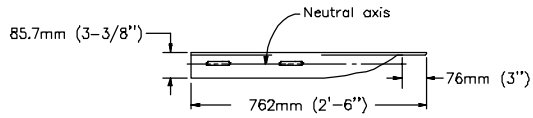
DRAWING NUMBER **M-37**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

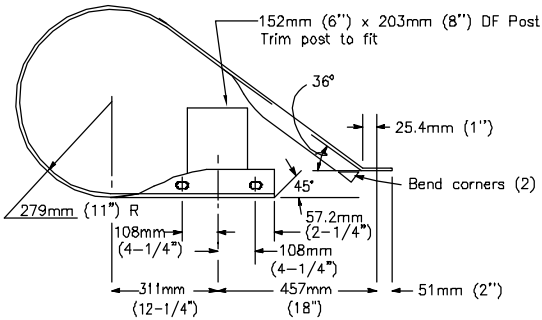
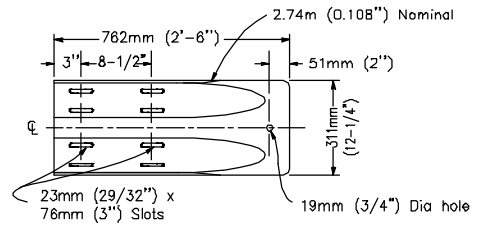
NOTE
See Standard Drawing M-37 for
Breakaway End Anchor details.



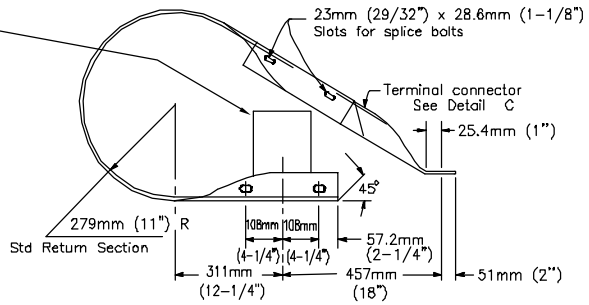
TERMINAL SECTION TYPE C - ELEVATION VIEW



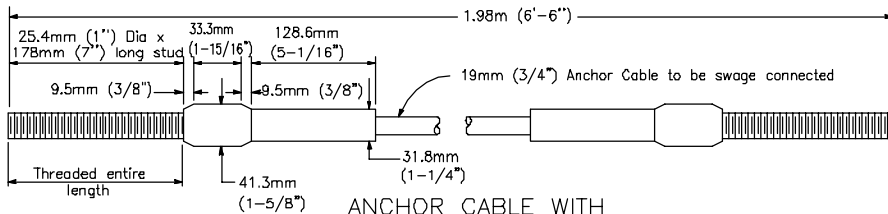
OPTIONAL DESIGN TERMINAL SECTION TYPE C
DETAIL C



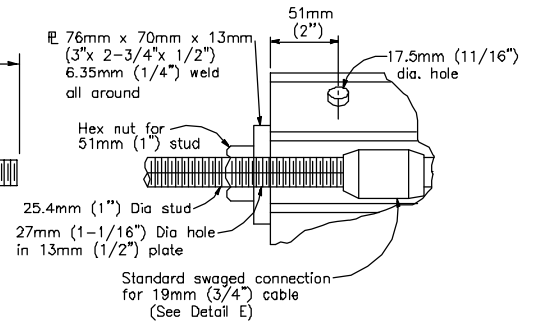
TERMINAL SECTION TYPE C
DETAIL A



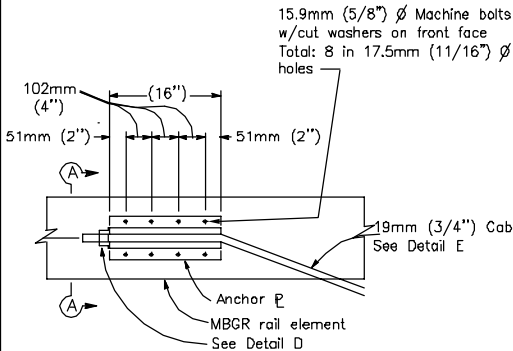
OPTIONAL DESIGN TERMINAL SECTION TYPE C
DETAIL B



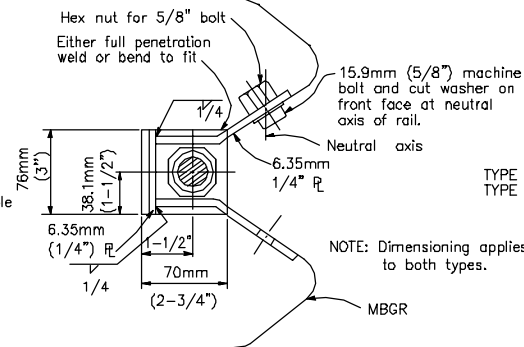
ANCHOR CABLE WITH
SWAGED FITTING AND STUD
DETAIL E



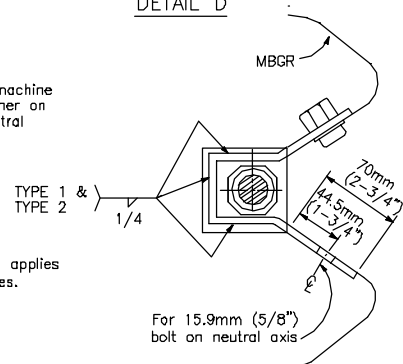
DETAIL D



ANCHOR PLATE DETAIL



SECTION A-A
(ALTERNATIVE TYPE 1)



SECTION A-A
(ALTERNATIVE TYPE 2)

Revision	By	Approved	Date
ORIGINAL	G.Parkinson		4/92
Add Metric	T. Stanton		03/03

SAN DIEGO REGIONAL STANDARD DRAWING

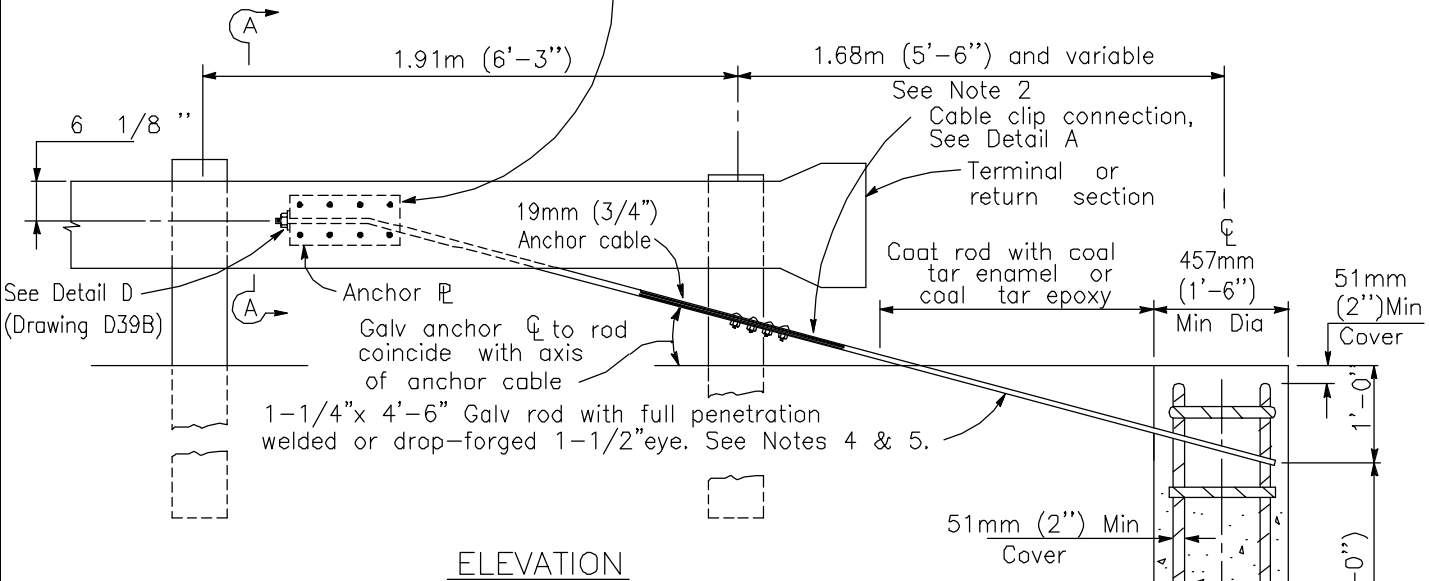
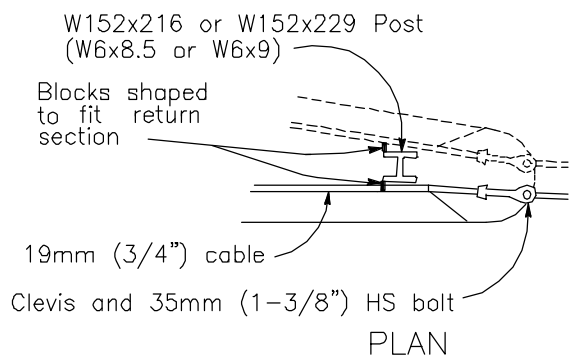
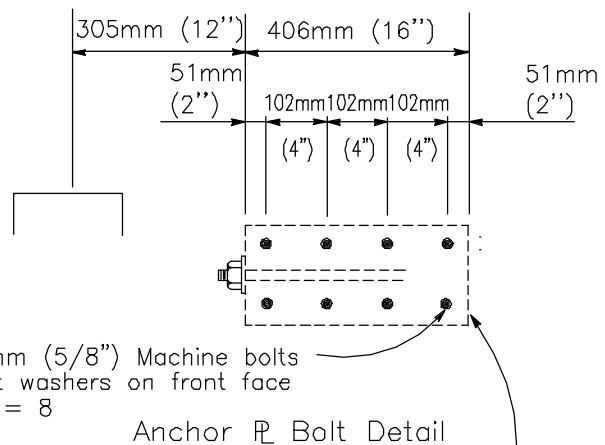
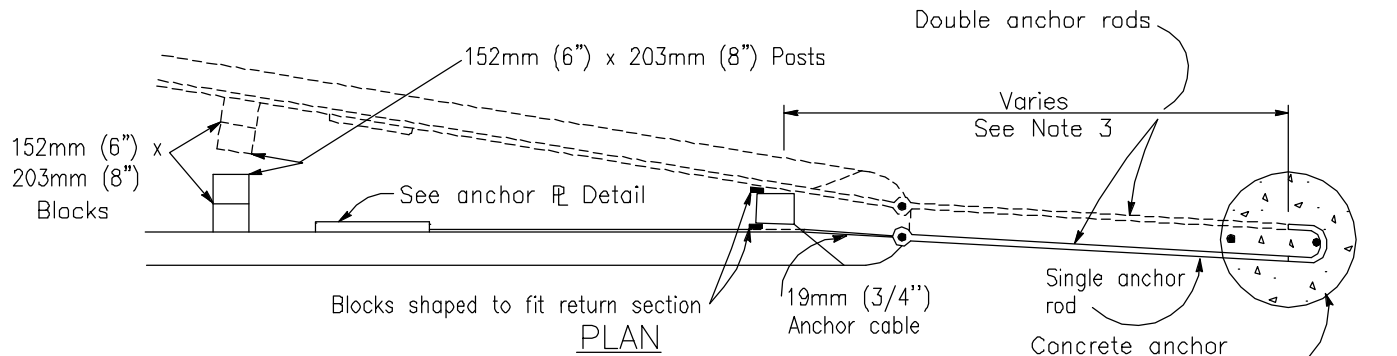
**GUARD RAIL END ANCHORS
(BREAKAWAY HARDWARE)**

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/003

Chairperson R.C.E. 19246 Date

DRAWING
NUMBER **M-38**



CABLE ANCHOR ASSEMBLY
(WOOD POST GUARD RAIL SHOWN)

#25 (#8)-1.63m (5'-4'') long. Total = 2

#13 (#4)-Total = 4 See Detail C

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

BARRIER AND GUARD RAIL

END ANCHORS

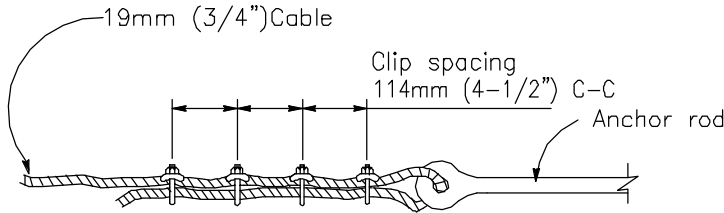
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 5/10/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-39A**

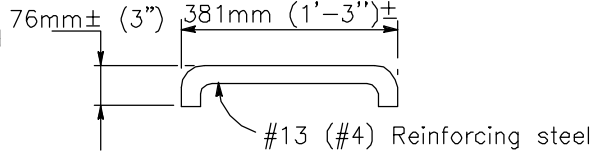
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



"U" bolts of clip on short end of cable only
 "U" bolts tightened to 67.8 N-m (50 ft. lb.) torque

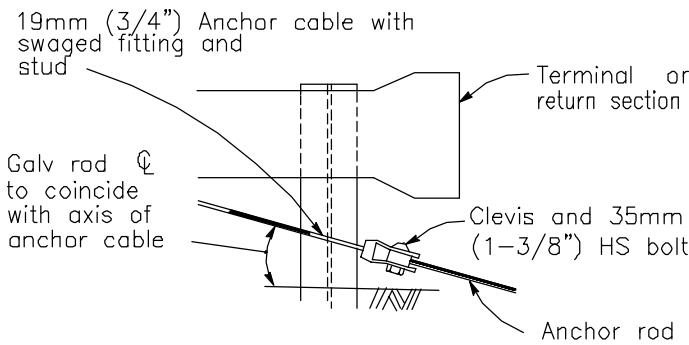
CABLE CLIP CONNECTION

DETAIL A
 See Note 5



DETAIL C

17.5mm ϕ (11/16") hole

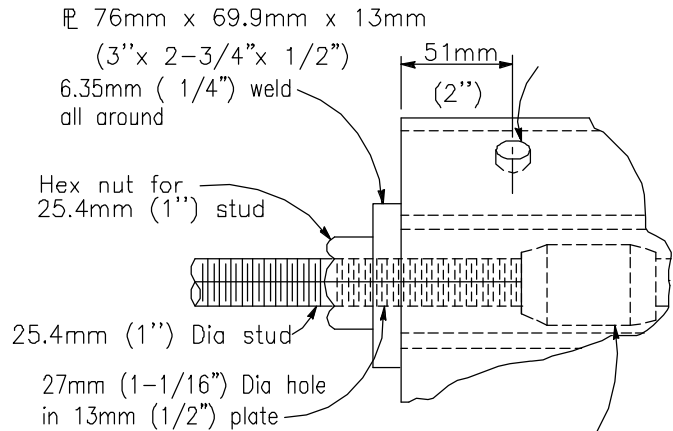


ELEVATION

CLEVIS AND BOLT CONNECTION

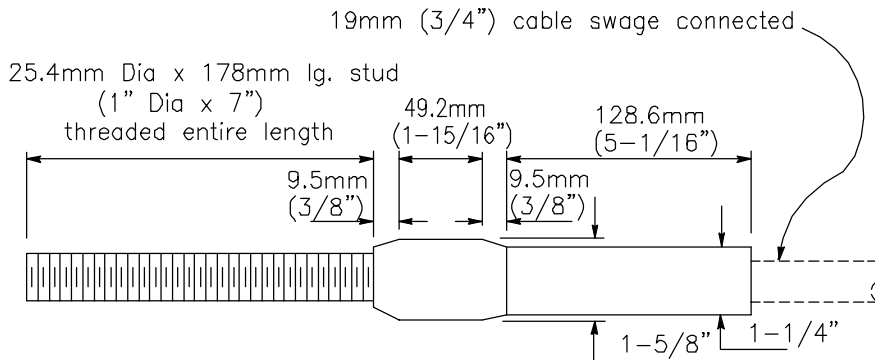
DETAIL B

(STEEL POST GUARD RAIL SHOWN)
 See Note 5



Standard swaged connection for 19mm (3/4") cable (See Detail E)

DETAIL D



ANCHOR CABLE WITH SWAGED FITTING AND STUD

DETAIL E

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

**BARRIER AND GUARD RAIL
 END ANCHORS**

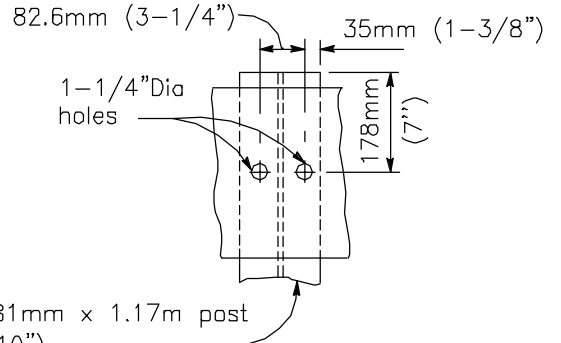
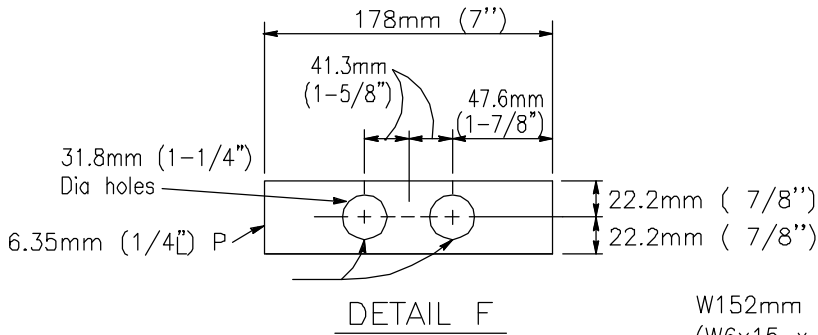
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 5/10/2003

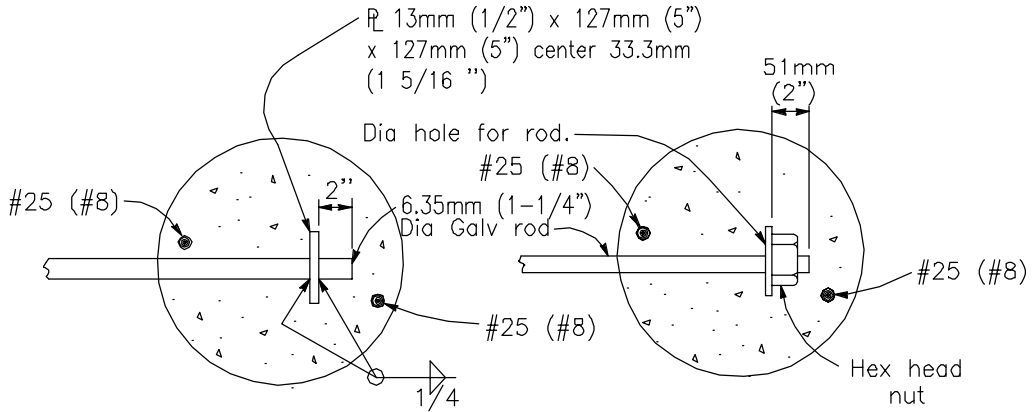
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-39B**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

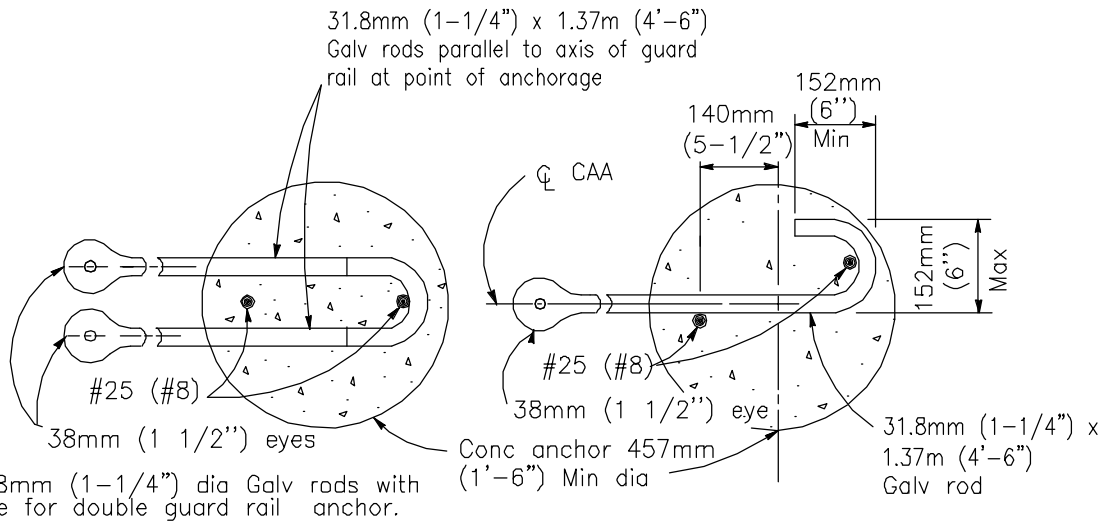


W152mm x 381mm x 1.17m post
(W6x15 x 3'-10")



OPTIONAL SINGLE ANCHOR ROD END DETAILS

Not to be used for double anchors



NOTE:

Use two 31.8mm (1-1/4") dia Galv rods with hook and eye for double guard rail anchor.

DOUBLE ANCHOR

SINGLE ANCHOR

ANCHOR RODS

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

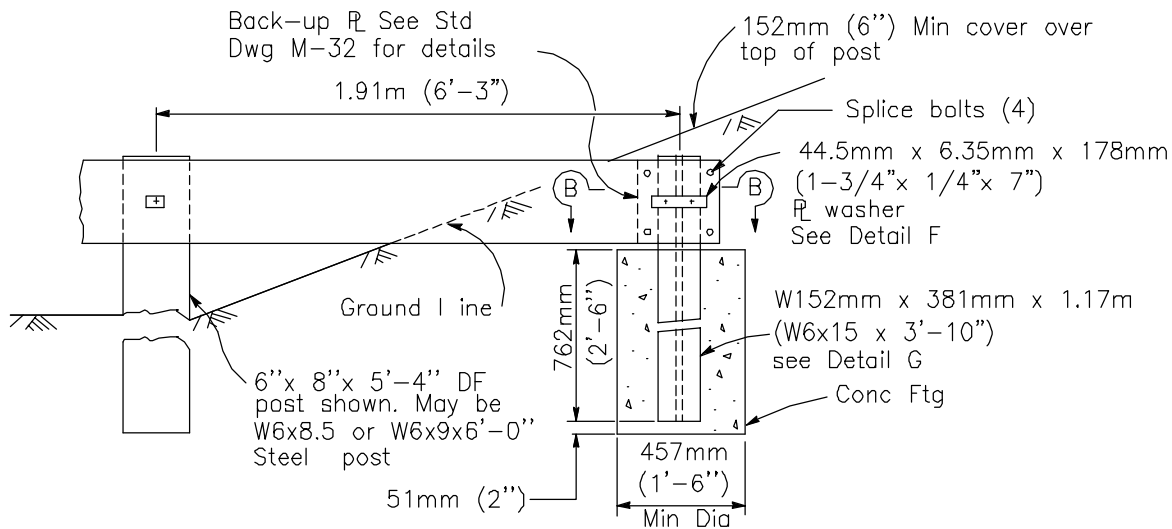
**BARRIER AND GUARD RAIL
END ANCHORS**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

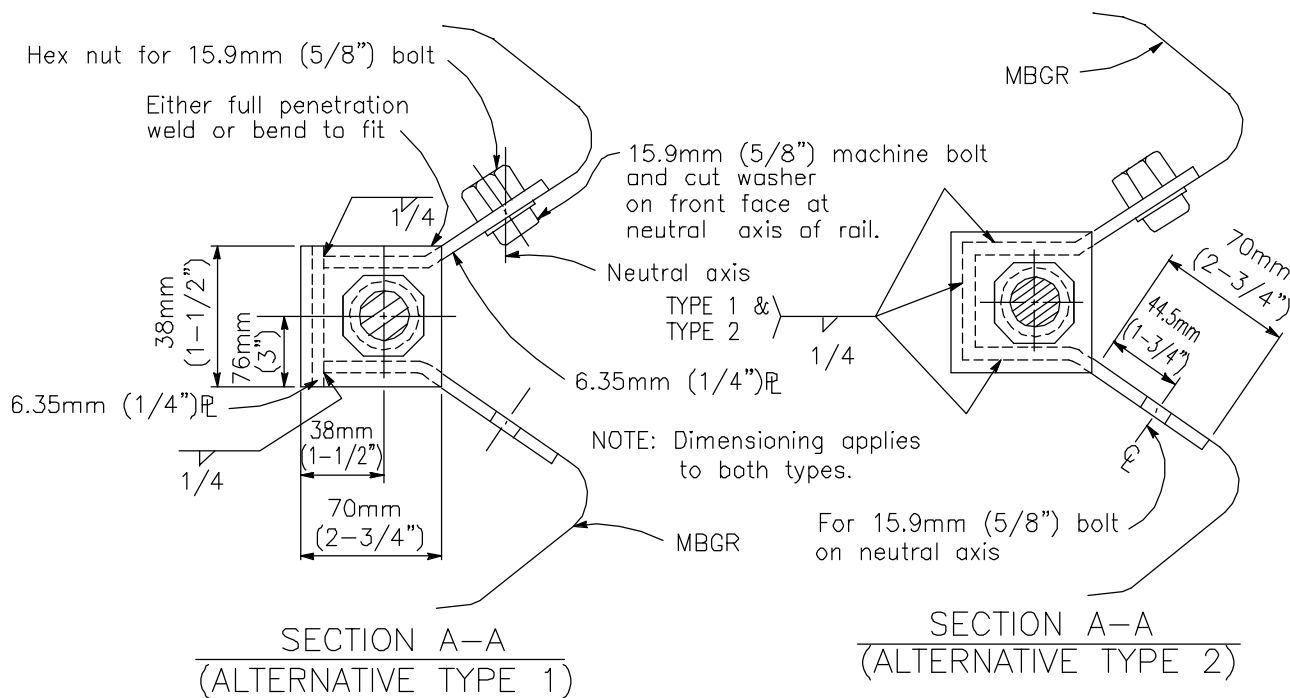
T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-39C**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



BURIED POST ANCHOR



ANCHOR PLATE DETAILS

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

**BARRIER AND GUARD RAIL
END ANCHORS**

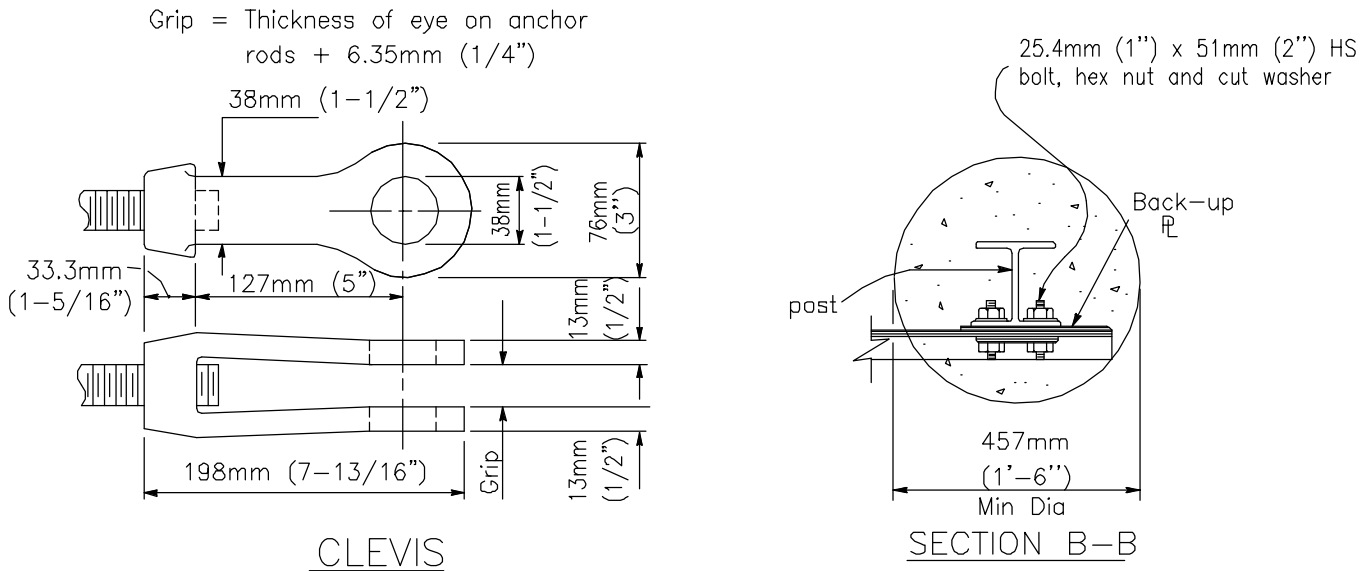
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-39D**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



NOTES

1. For typical use of end anchors shown on this plan, see Standard Drawings M-34 and M-35.
2. Anchor cable to be parallel to guard rail for straight runs of rail. Anchor cable may have angle point at anchor plate if guard rail is curved.
3. 1.68m (5'-6") with terminal section. May be less than with return sections if separate rods connect to concrete anchor.
4. Anchor rod hooks to be in contact with anchor reinforcement when concrete is placed. Wire ties may be used to position anchor rods.
5. Cable clip connection (Detail A) or clevis and bolt connection (Detail B) to be used with wood post guard railing installation. For steel post guard railing installations, clevis and bolt connection (Detail B) is to be used. Other alternative for attaching cable to anchor rod must be approved by the engineer.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

**BARRIER AND GUARD RAIL
END ANCHORS**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 5/10/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-39E**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

254mm x 254mm x 1.63m
(10" x 10" x 5'-4") DF Post with
203mm x 203 x 356mm
(8" x 8" x 1'-2") DF block
(See Notes 2 and 5)

25.4mm \varnothing (1") Galv HS bolts
with washers and nuts

38.1mm (1 1/4")
Pipe spacer

229mm (9")
Typ

Typ

953mm (3' 1-1/2")
Typ

953mm (3' 1-1/2")
Typ

114mm (4-1/2")
Typ

PLAN

6.35mm (1/4") \varnothing washer

Terminal section Type B
See Note 7

ELEVATION

GUARD RAIL CONNECTION TO BRIDGE RAILING

1" \varnothing Galv HS bolt with washers and nuts

229mm (9")
Typ

Typ

13mm (1/2") \varnothing washer

DEPARTING END SECTION
Flush end section
connection

End section
See Note 8

Bridge Railing

533mm
Typ

6.35mm (1/4") \varnothing washer

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

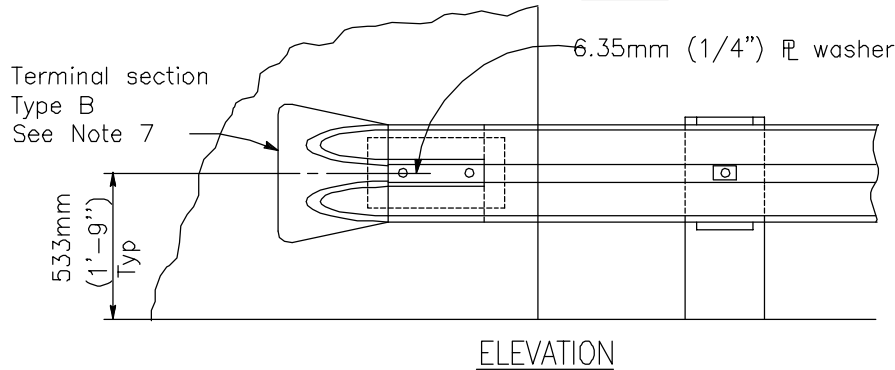
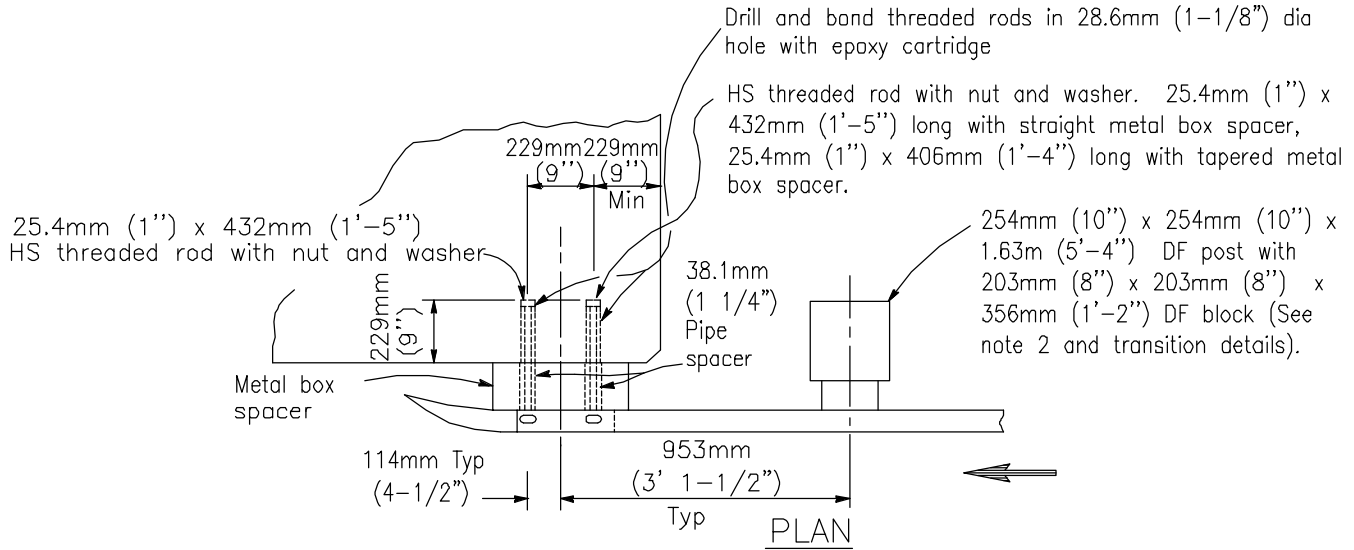
**GUARD RAIL CONNECTIONS
TO BRIDGE RAILS, RETAINING WALLS
AND ABUTMENTS**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

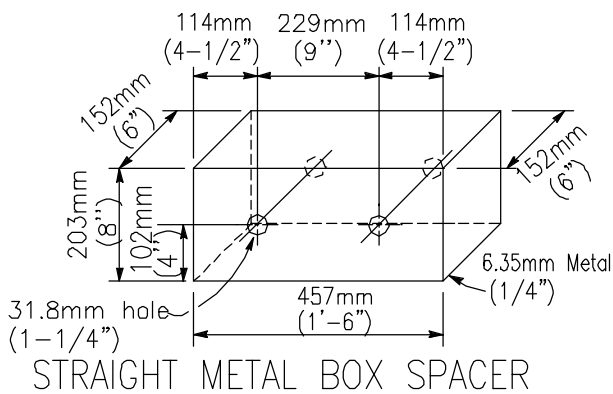
T. Stanton 3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-40A**

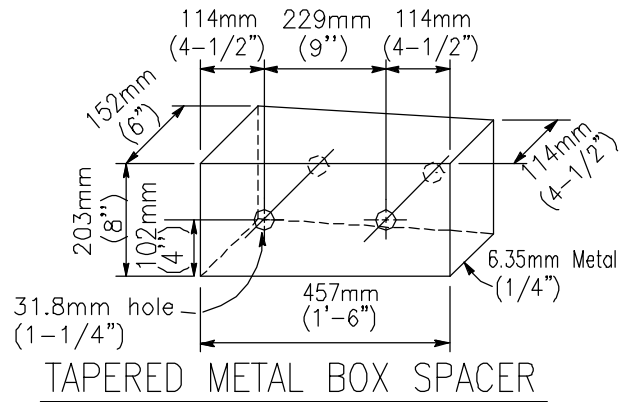
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



GUARD RAIL CONNECTION TO WALL OR ABUTMENT FACE



Use when approach guard rail is not tapered



Use when approach guard rail is tapered

Revision	By	Approved	Date
ORIGINAL	G.Parkinson		4/92
Add Metric	T. Stanton		03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL CONNECTIONS TO BRIDGE RAILS, RETAINING WALLS AND ABUTMENTS

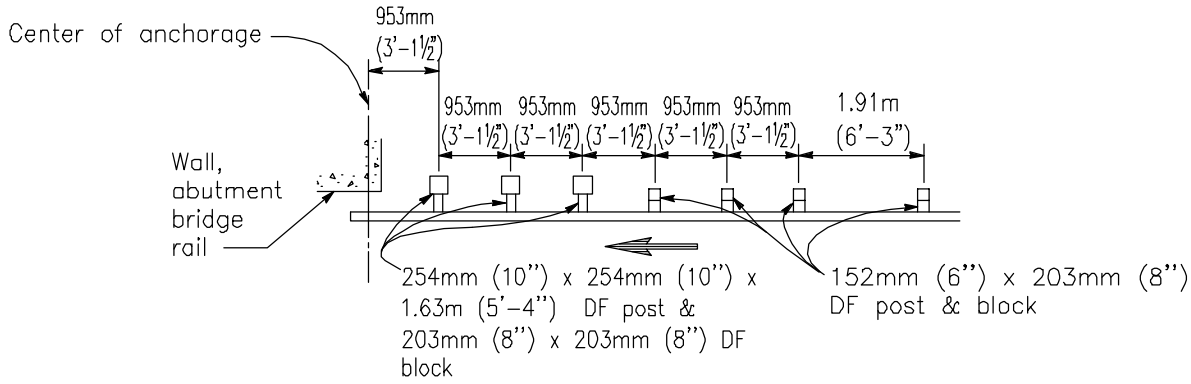
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

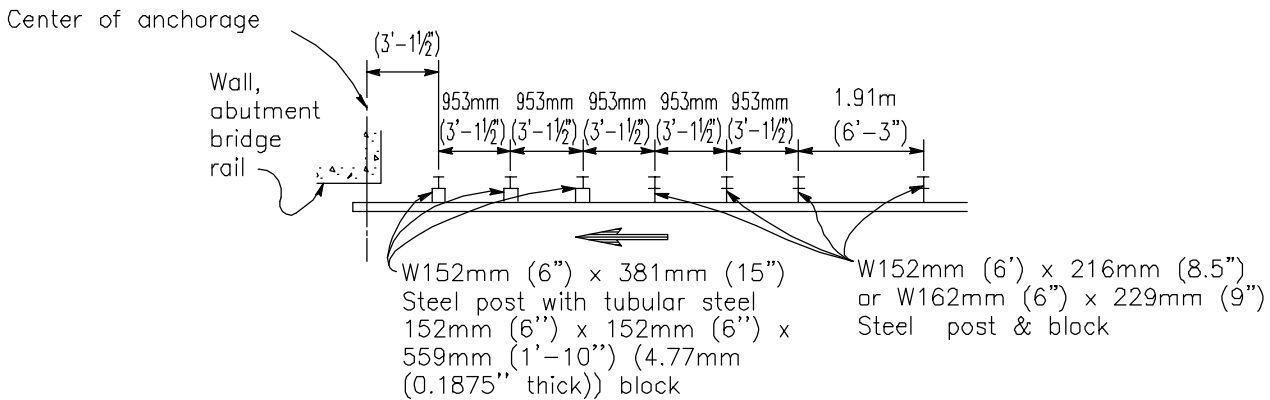
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-40B**

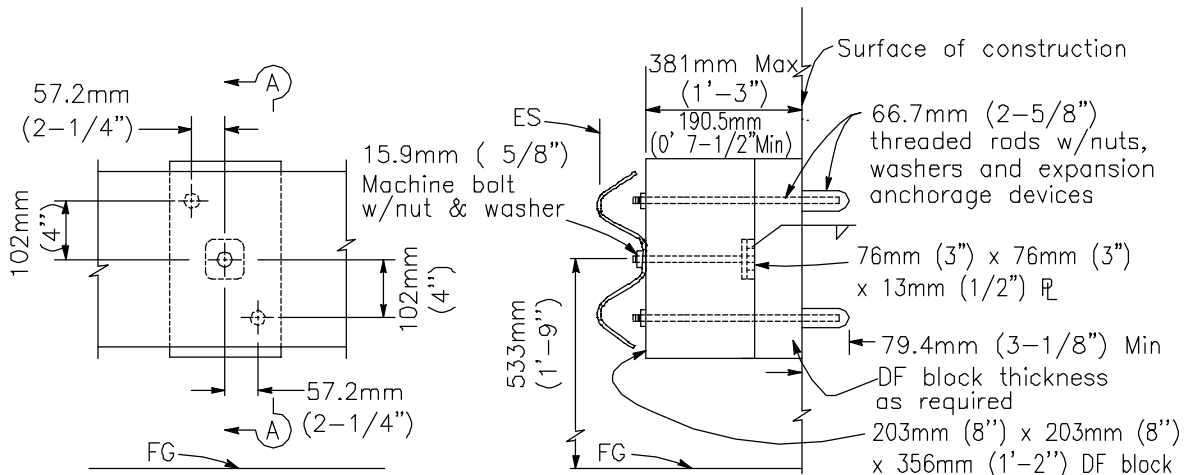
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



**APPROACH RAILING TRANSITION
WOOD POSTS**



**APPROACH RAILING TRANSITION
STEEL POSTS**



BLOCKOUT DETAIL-ELEVATION

SECTION A-A

See Notes 9 and 10

GUARD RAIL ANCHORAGE TO WALL OR ABUTMENT

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

**GUARD RAIL CONNECTIONS
TO BRIDGE RAILS, RETAINING WALLS
AND ABUTMENTS**

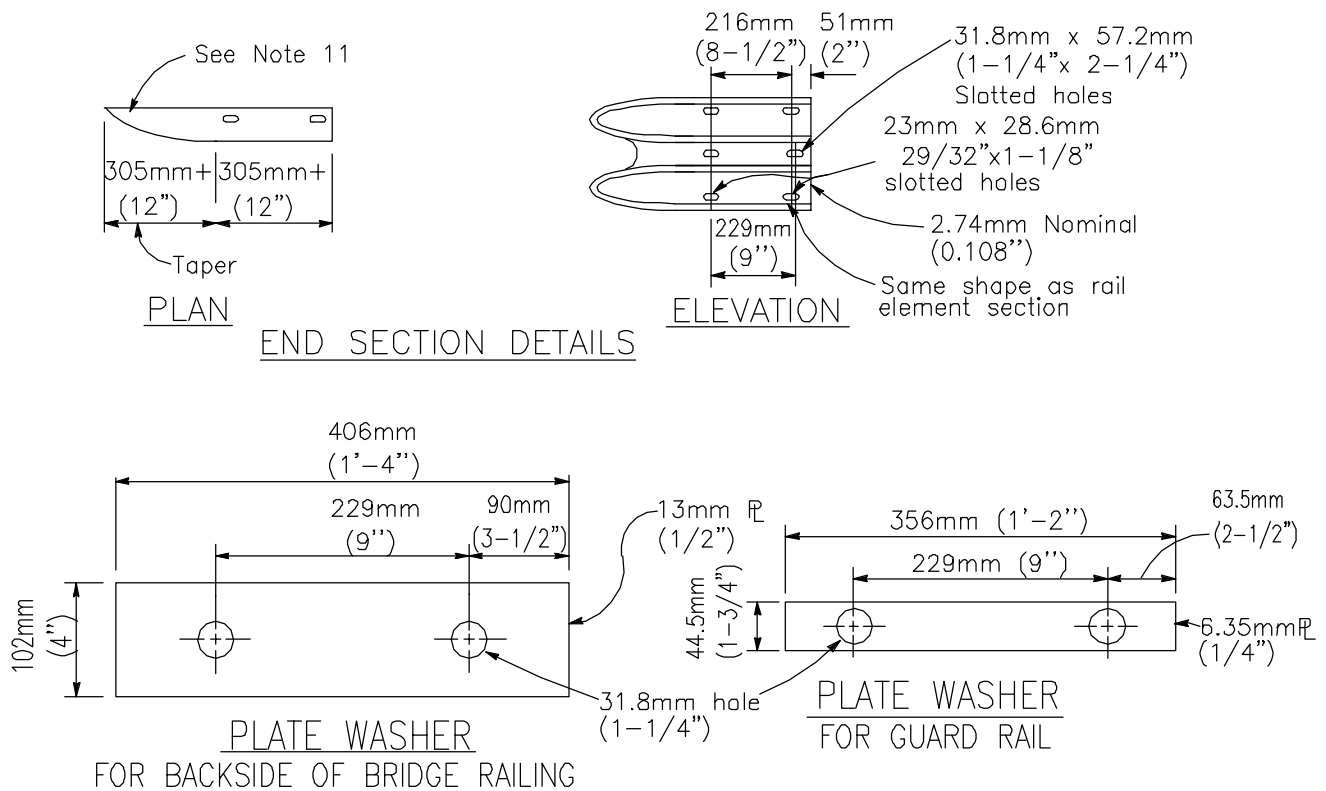
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-40C**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

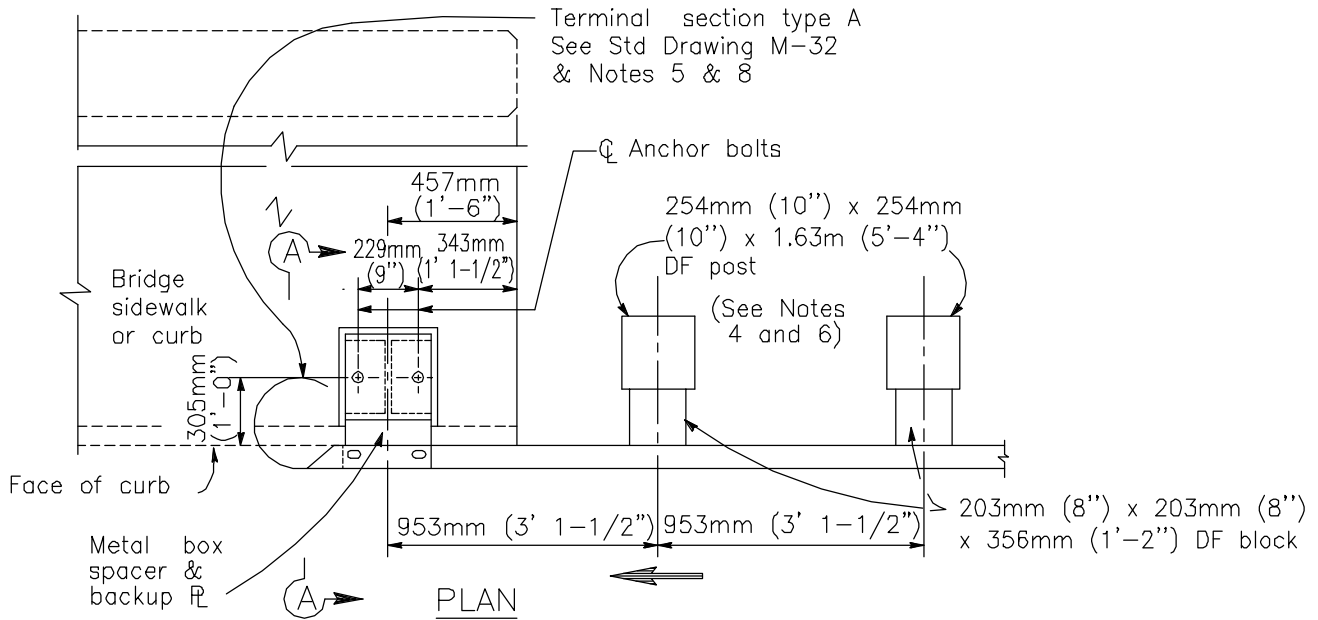


NOTES

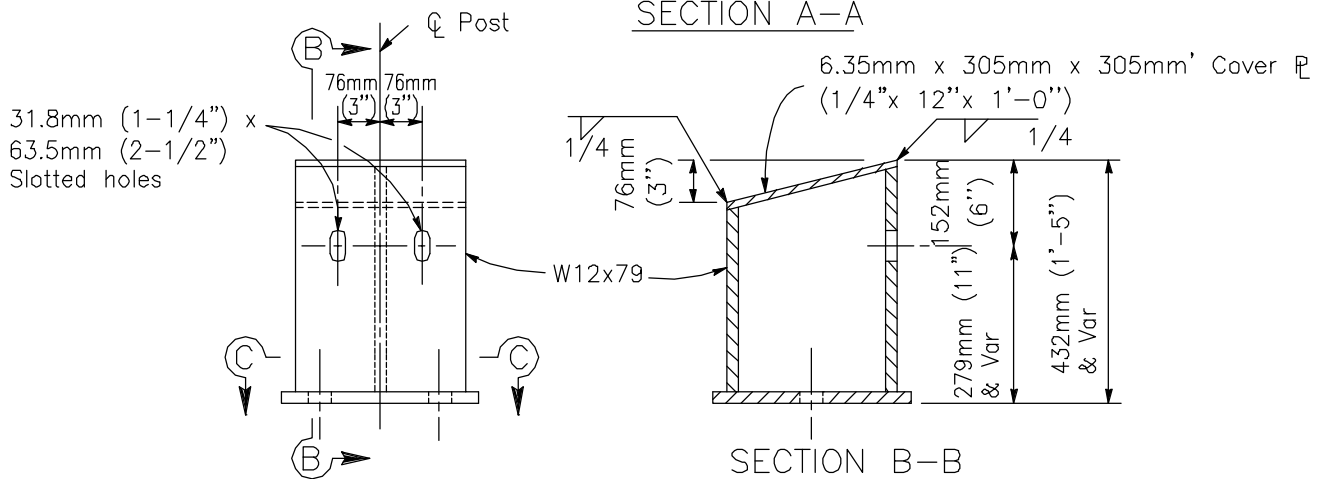
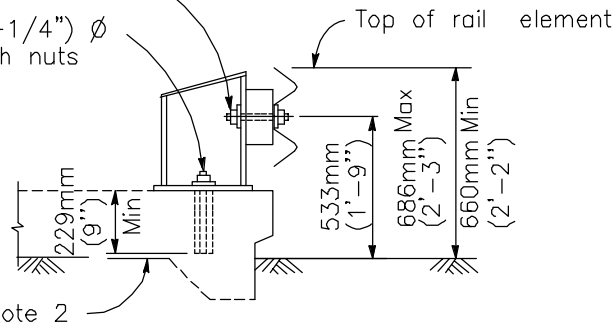
1. These connection details apply to bridge rails, abutments and retaining walls. For additional connection details for bridge railing, see the project plans.
2. Where 254mm (10") x 203mm (10") DF post and 203mm (8") x 203mm (8") DF blocks are shown, W152mm (6") x 381mm (15") steel posts and tubular steel 152mm (6") x 152mm (6") x 356mm (1'-2") (2.74mm (0.1875") thick) blocks may be specified where applicable.
3. Additional details of post, blocks and hardware are shown on Standard Drawings M-32 and M-33.
4. Direction of traffic indicated by \Rightarrow
5. For approach railing details, see Type 1 flare on Standard Drawing M-34 and transition details on this plan.
6. When metal box spacer is installed, place 31.8mm (1-1/4") x 127mm (5") and 31.8mm (1-1/4") x 102mm (4") pipe spacers on 25.4mm (1") bolts passing through interior of tapered box spacer and 31.8mm (1-1/4") x 133.4mm (5-1/4") pipe spacers on 25.4mm (1") bolts passing through interior of straight box spacer.
7. Terminal sections will not be installed on trailing end of approach guard rail placed adjacent to one-way roadways. When terminal section is not installed, use backup plate between rail element and metal box spacer. See Standard Drawing M-32 for backup plate details.
8. This type of connection may be used for both the approach and departing ends of structures on roadways 8.53m (28 feet) or less in width. Use timber shims without posts where rail to wall or abutment clearance is less than 381mm (15) inches.
9. Do Not attach rail to bridge columns.
10. Use separate posts as shown on Standard Drawing M-35.
11. End sections may be cut from Type B terminal section or fabricated.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G.Parkinson	4/92		GUARD RAIL CONNECTIONS TO BRIDGE RAILS, RETAINING WALLS AND ABUTMENTS
Add Metric		T. Stanton	03/03		

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Two 25.4mm (1") ϕ Galv HS bolts with nuts and washers.
Drill and bond two 31.8mm (1-1/4") ϕ bolts with HS threaded rods with nuts and washers.
Coat rods with laquer.



See Note 7

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

**GUARD RAIL CONNECTION
TO BRIDGE, SIDEWALK AND CURBS**

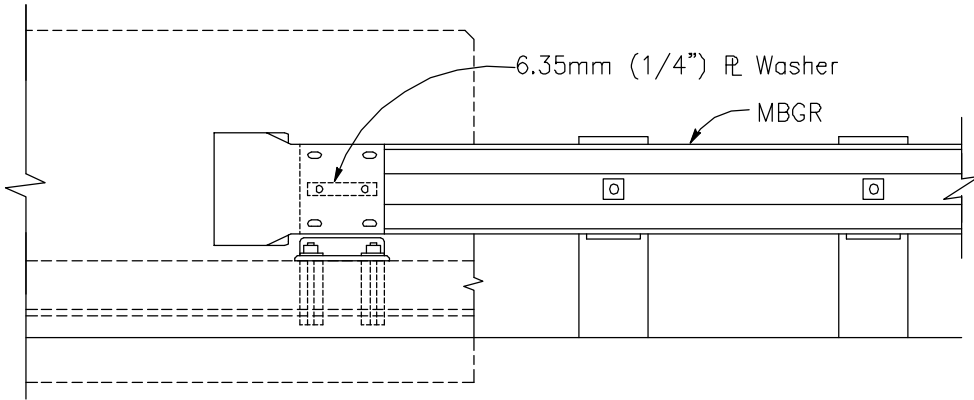
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-41A**

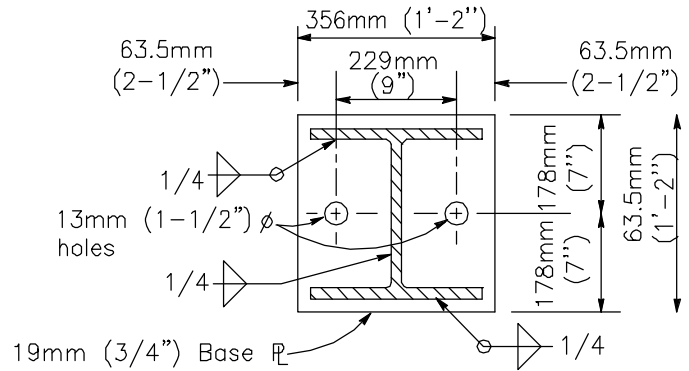
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



ELEVATION

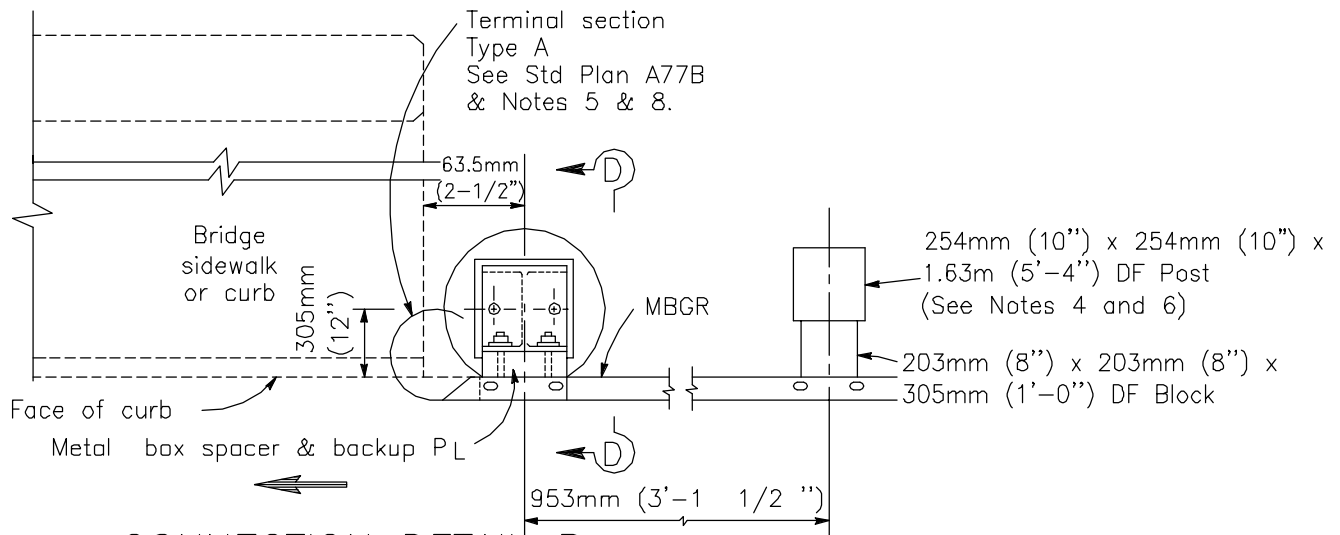
CONNECTION DETAIL A

See Note 2



SECTION C-C

ANCHOR POST DETAILS
(FOR CONNECTION DETAIL A)



CONNECTION DETAIL B

PLAN

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL CONNECTION
TO BRIDGE, SIDEWALK AND CURBS

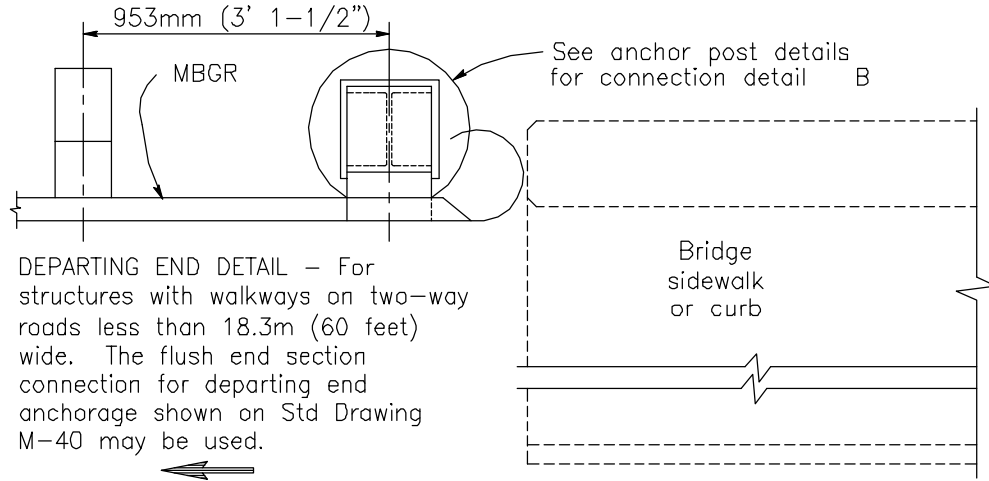
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/0005

Chairperson R.C.E. 19246 Date

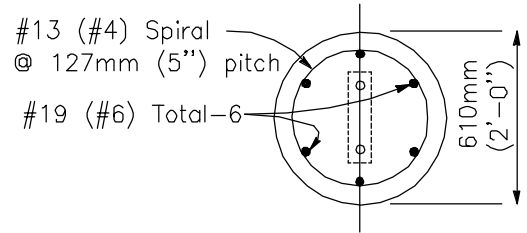
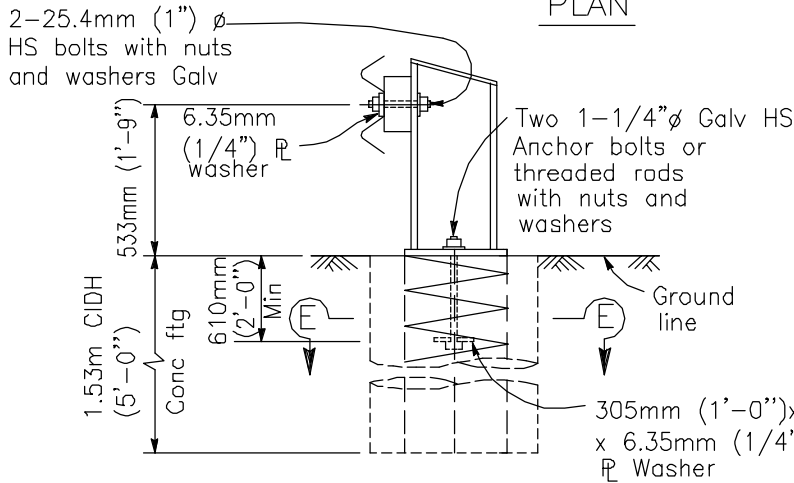
DRAWING NUMBER **M-41B**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



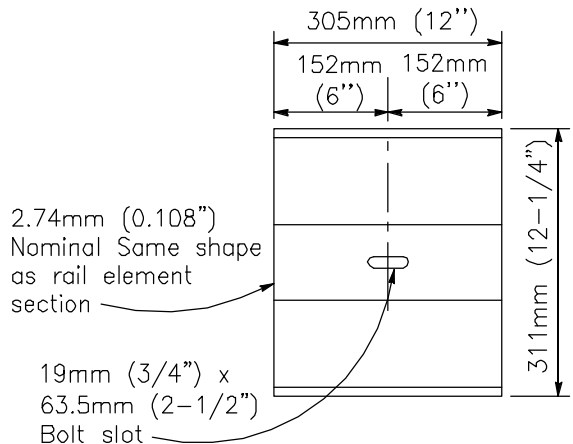
CONNECTION DETAIL C

PLAN



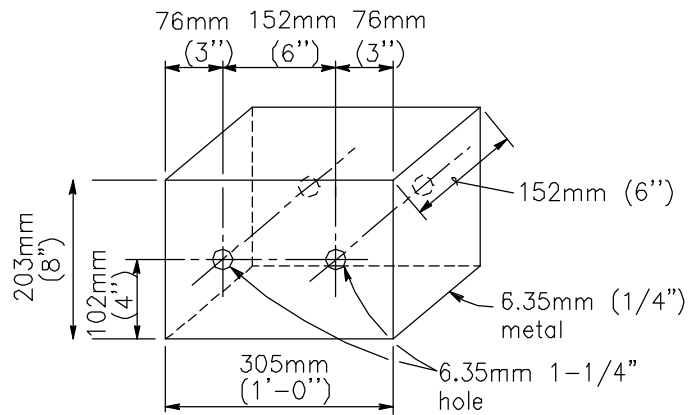
SECTION E-E

SECTION D-D



BACK-UP PLATE

For use between guard rail element and metal box spacer



METAL BOX SPACER

Place 31.8mm (1-1/4") x 133.4mm (5-1/4") pipe spacers on 25.4mm (1") bolts passing through box interior

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL CONNECTION TO BRIDGE, SIDEWALK AND CURBS

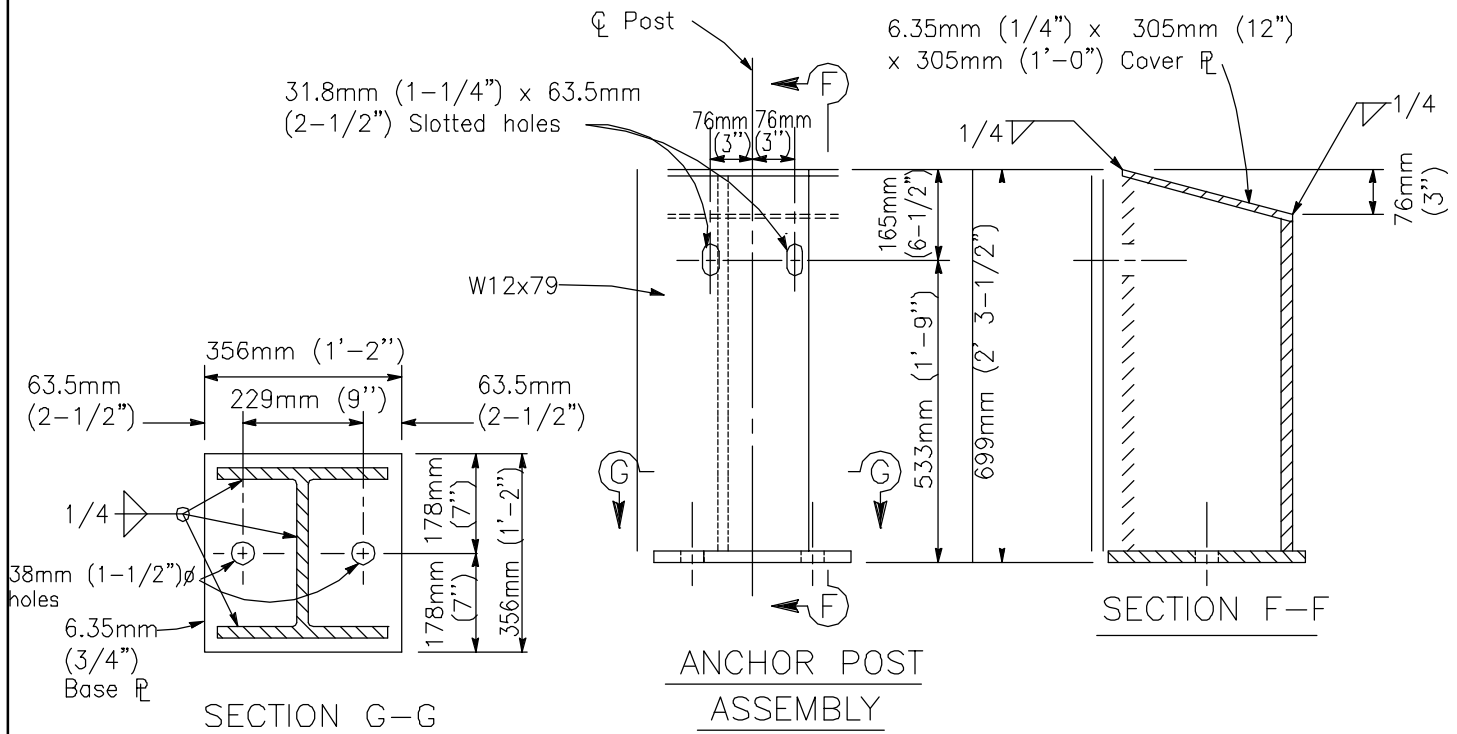
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

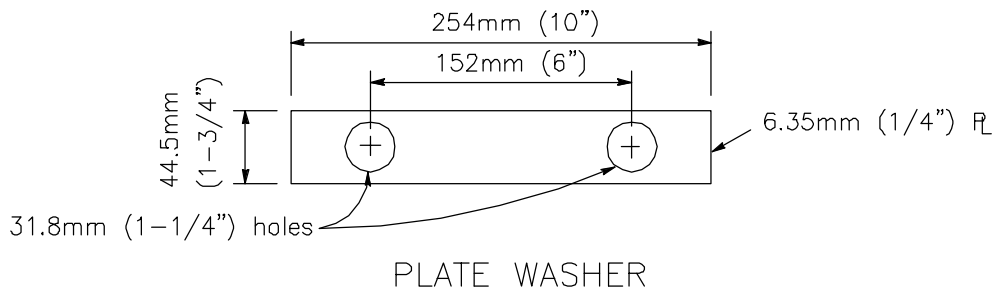
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-41C**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



ANCHOR POST DETAILS
(FOR CONNECTION DETAIL B)



NOTES

1. Connection Details A and B applies to the traffic approach end of bridges. For departure end of bridges, see Connection Detail C.
2. When curb or sidewalk depth is less than 229mm (9"), use Connection Detail B.
Direction of traffic indicated by \rightarrow
3. For approach railing details, see Type 1 Flare on Standard Drawing M-34.
4. Terminal sections will not be installed on the trailing end of approach guard rail placed adjacent to one-way roadways.
5. Where 254mm (10") x 254mm (10") DF posts and 203mm (8") x 203mm (8") DF blocks are shown, W152mm (6") x 381mm (15") steel post and Tubular Steel 152mm (6") x 152mm (6") x 356mm (1'-2") (4.76mm (0.1875") thick) blocks may be specified where applicable.
6. Rail post assembly to be galvanized after fabrication.
7. Terminal section Type A to be used where pedestrian traffic is present.
8. For additional connection details for bridge barrier railing, see the project plans.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

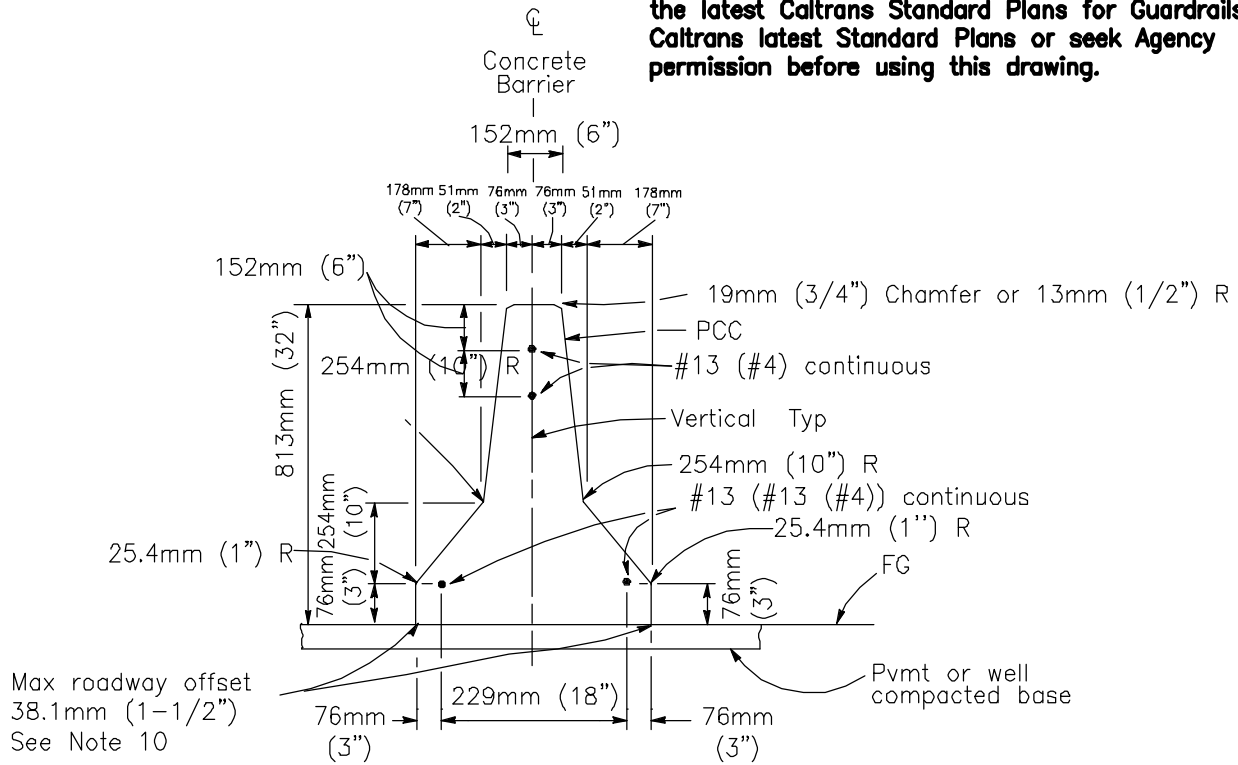
GUARD RAIL CONNECTION
TO BRIDGE, SIDEWALK AND CURBS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

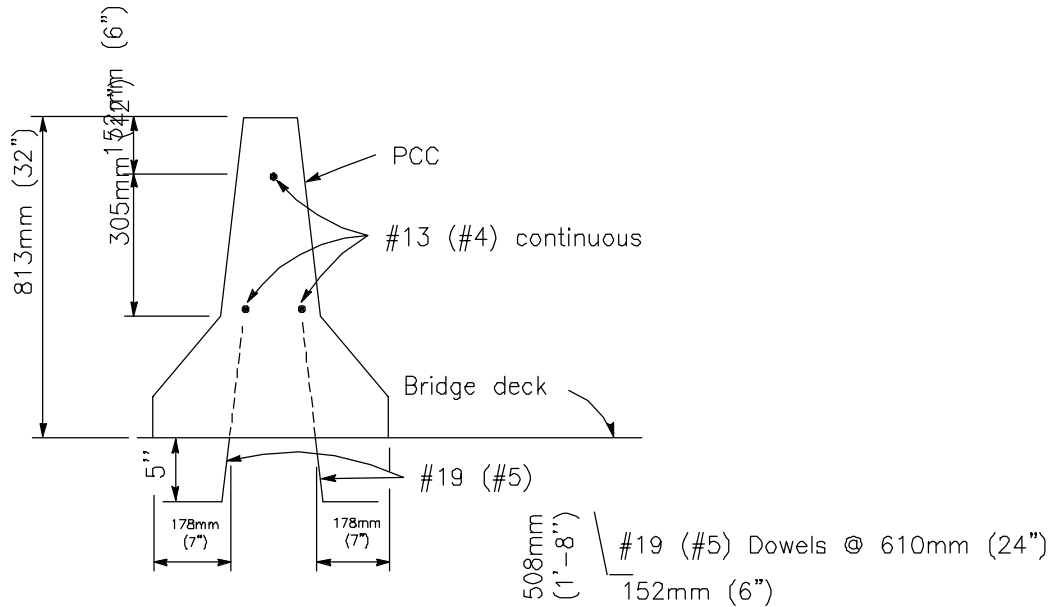
T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-41D**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



CONCRETE BARRIER
TYPE 50



CONCRETE BARRIER
TYPE 50A

Details similar to Type 50 except as noted
See Note 7

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

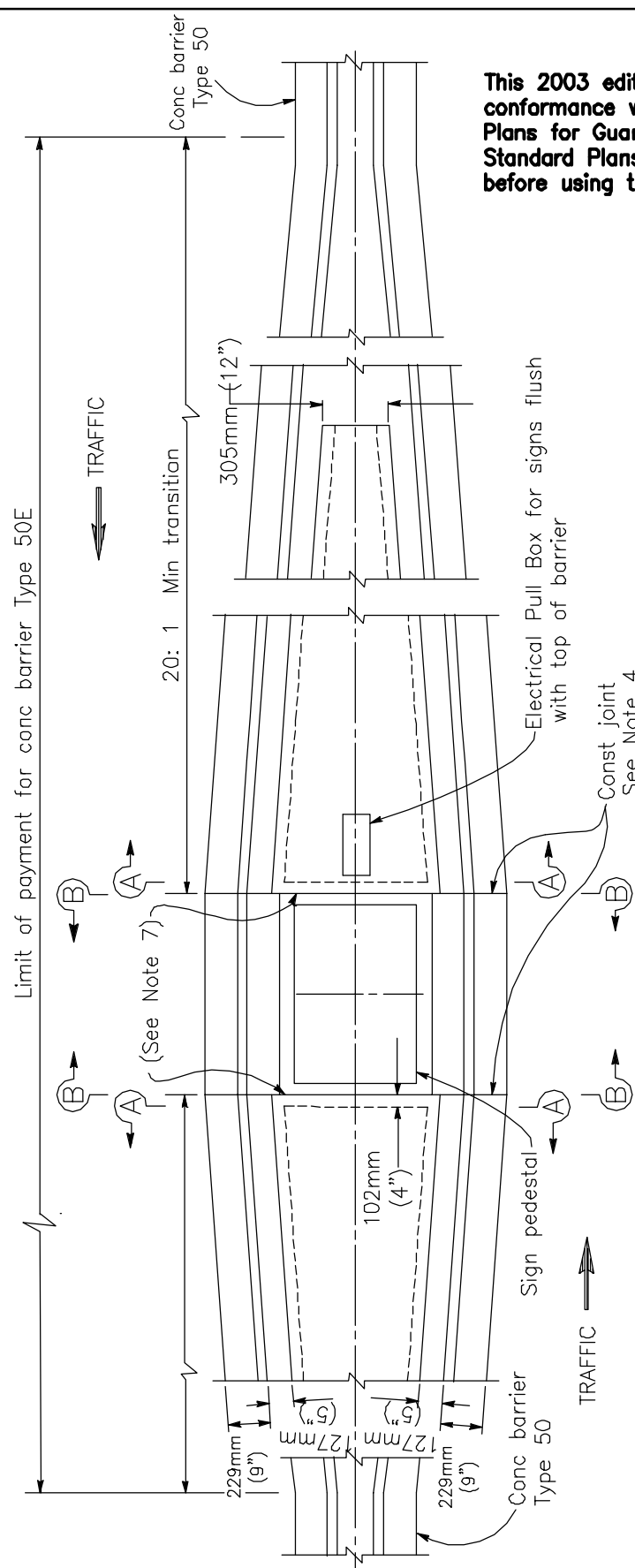
CONCRETE BARRIER - TYPE 50

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-42A**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



TRANSITION AT SIGN PEDESTAL

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

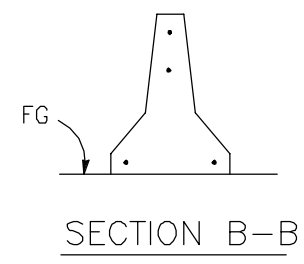
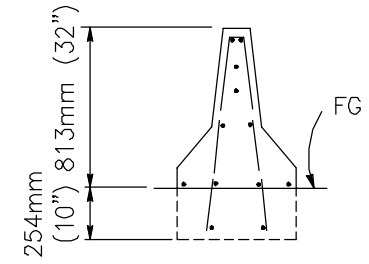
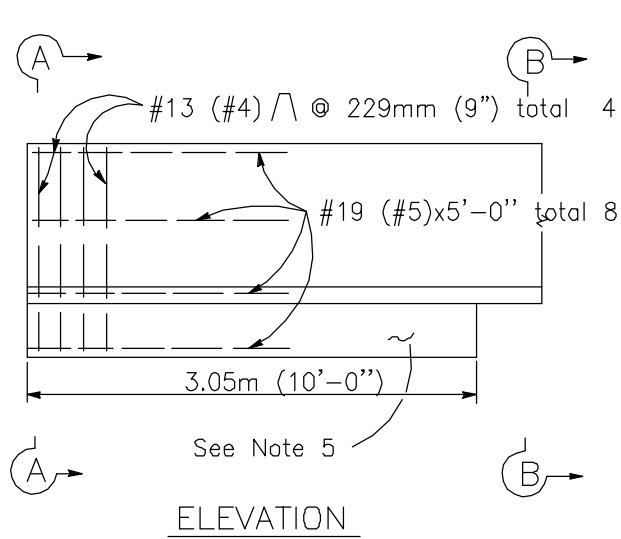
CONCRETE BARRIER - TYPE 50E

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

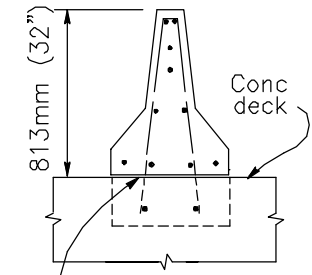
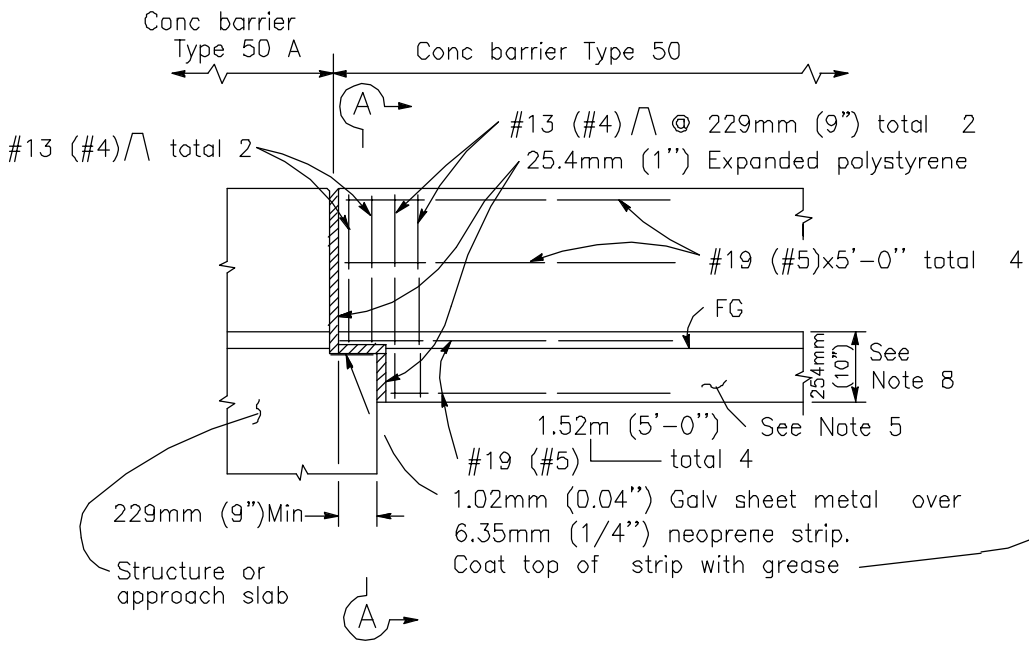
T. Stanton 3/10/2003
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-43B**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



BARRIER END ANCHOR
See Note 9



CONNECTION TO STRUCTURE

Revision	By	Approved	Date
ORIGINAL	G.Parkinson		4/92
Add Metric	T. Stanton		03/03

SAN DIEGO REGIONAL STANDARD DRAWING

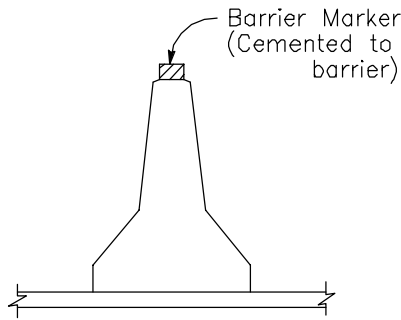
CONCRETE BARRIER - TYPE 50

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/0005
Chairperson R.C.E. 19246 Date

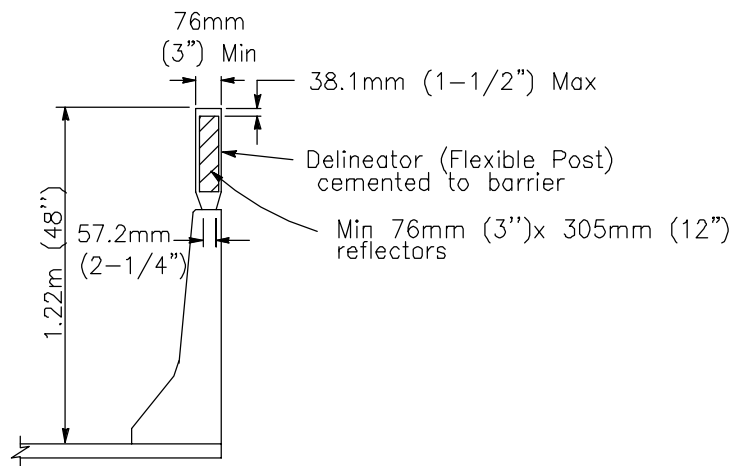
DRAWING NUMBER **M-42C**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



MEDIAN BARRIER DELINEATION

See Notes 11 and 12



CONCRETE BARRIER DELINEATION

(For barriers not located in median)
See Note 11

NOTES

1. See Standard Drawing M-32 for concrete barrier transitions at bridge column and sign pedestals.
2. Opening into existing drainage inlets shall not extend above the 76mm (3-inch) vertical face at bottom of the barrier.
3. Where the barrier is added to the face of an existing concrete structure, match existing weep holes.
4. Contractor may submit alternative details for Engineer's approval.
5. Footing monolithic or doweled with 2-#25 (#8)x 203mm (0'-8") @ 610mm (24"). Required at barrier ends and at interruptions in barrier.
6. See Standard Drawing M-33 for glare screen details.
7. Expansion joints in concrete barrier shall be located at all deck, pavement and principal wall joints. Expansion joint filler material shall be the same size as joint or 13mm (1/2") minimum. 254mm
8. (10") Barrier footing extends 3.05m (10') back from structure.
9. For transition to TBB see Standard Drawing M-34.
10. Where roadway offset is greater than 38.1mm (1-1/2"), see Concrete Barrier Type 50C.
11. Barrier delineation to be used when required by the special provisions.
12. Spacing of barrier markers to match spacing of raised pavement markers on the adjacent median edgeline pavement delineation.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

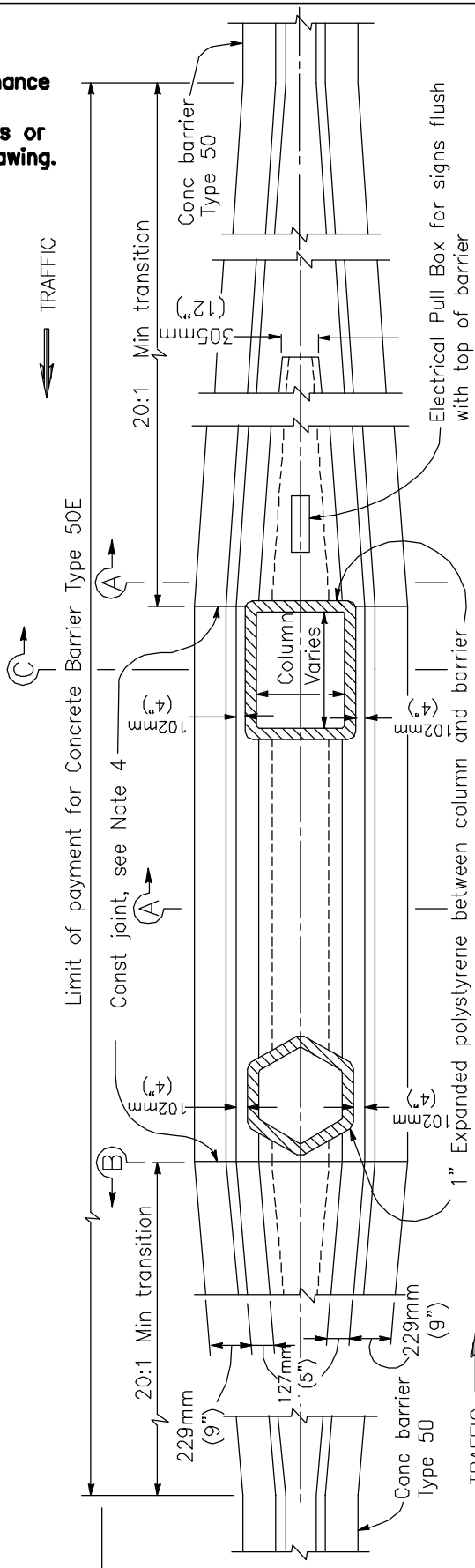
CONCRETE BARRIER - TYPE 50

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-42D**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



TRAFFIC

Limit of payment for Concrete Barrier Type 50E

Const joint, see Note 4

20:1 Min transition

229mm (9")

127mm (5")

Conc barrier Type 50

1" Expanded polystyrene between column and barrier

See Note 8

102mm (4")

Column Varies

102mm (4")

20:1 Min transition

305mm (12")

Conc barrier Type 50

Electrical Pull Box for signs flush with top of barrier

TRAFFIC

NON-RECTANGULAR COLUMN

RECTANGULAR COLUMN

TRANSITION AT BRIDGE COLUMN

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

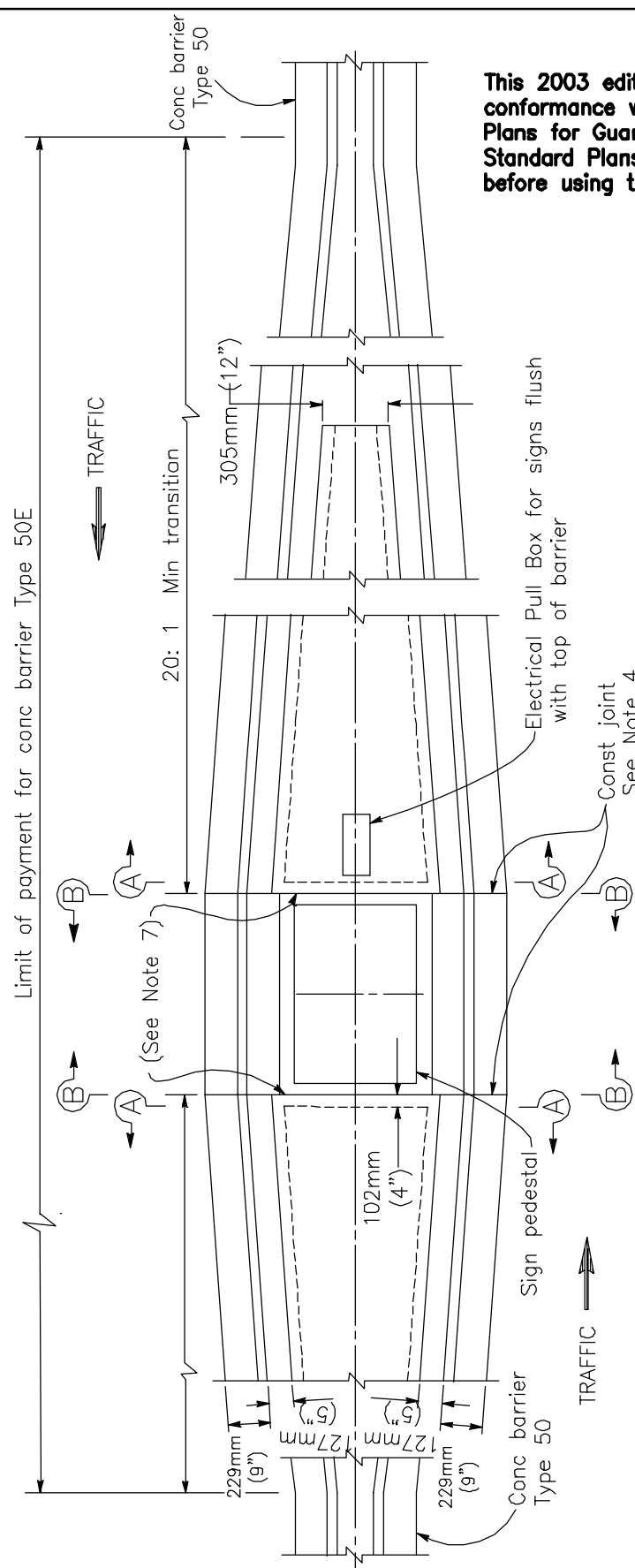
CONCRETE BARRIER - TYPE 50E

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-43A**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



TRANSITION AT SIGN PEDESTAL

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

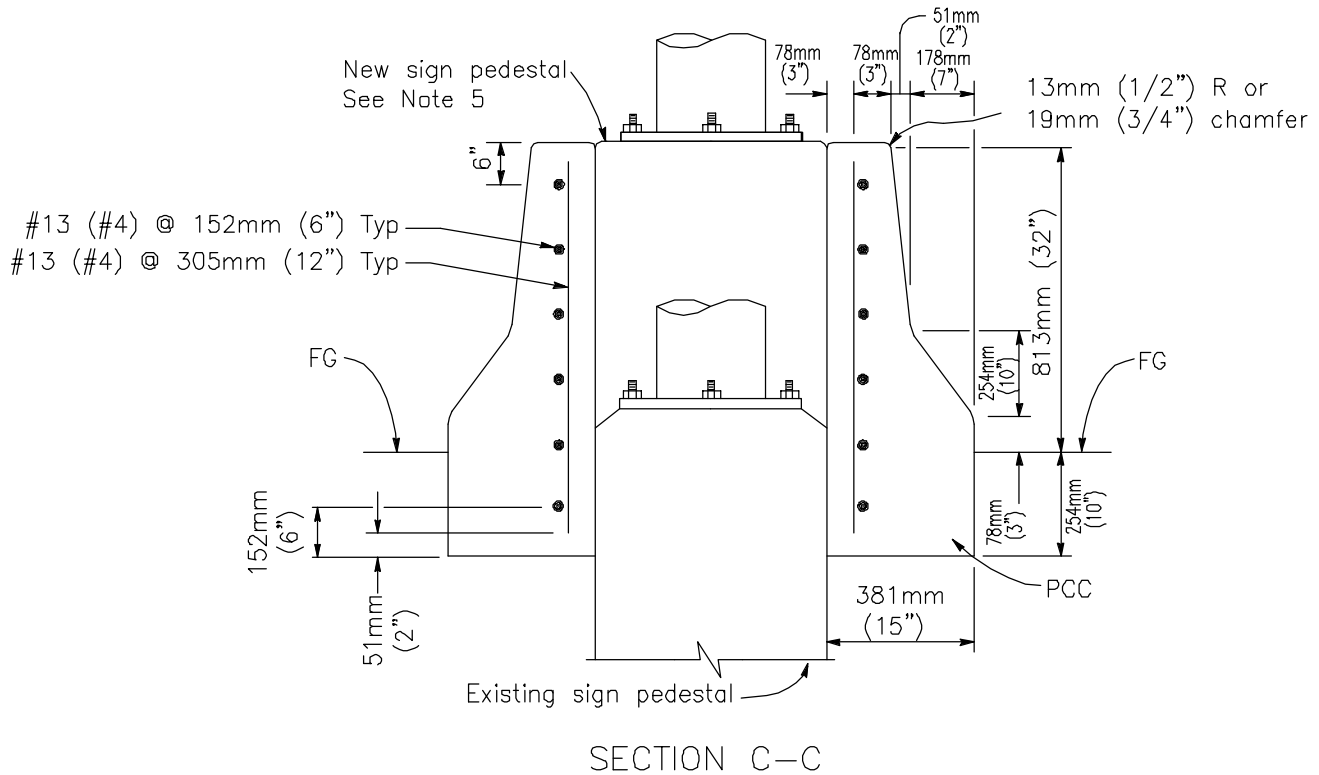
CONCRETE BARRIER - TYPE 50E

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/10/2003
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-43B**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



NOTES

1. See Standard Drawing M-31 for concrete barrier Type 50.
2. See Standard Drawing M-33 for concrete headlight glare screen details.
3. Contractor options for fill between barrier walls:
 - A. Place 102mm (4") PCC at base between barrier walls.
 - B. Place 305mm (12") of granular material at base between walls.
 - C. Place granular material from base to bottom of 102mm (4") cap.
 Forming material for 102mm (4") cap may remain in place.
4. Reinforcing steel shall extend continuous through construction joints.
5. See "Overhead Sign" plans for sign pedestal elevations on new construction.
6. Adjust height of barrier on low side of offset or superelevated roadways to provide level grade across top of Type 50E barrier.
7. 102mm (4") PCC vertical walls at existing sign pedestals.
8. Enclose column with 4" expanded polystyrene at locations where concrete or cement treated base encases the column.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

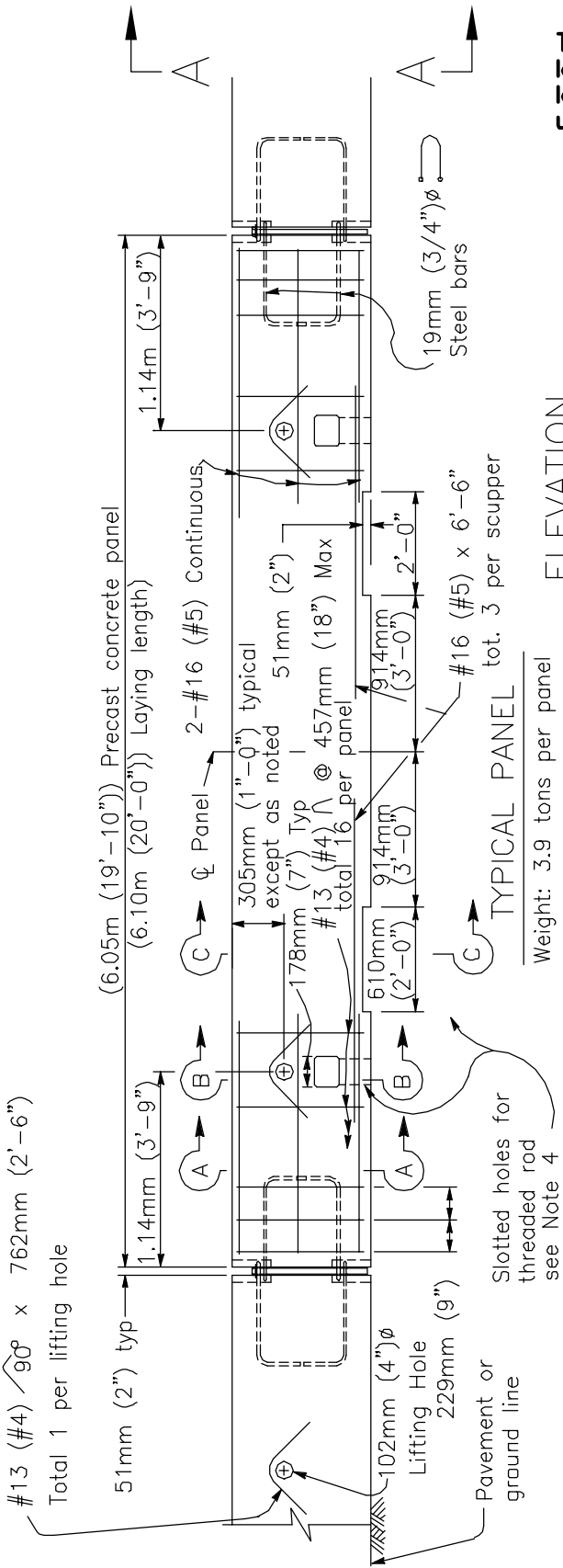
CONCRETE BARRIER - TYPE 50E

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

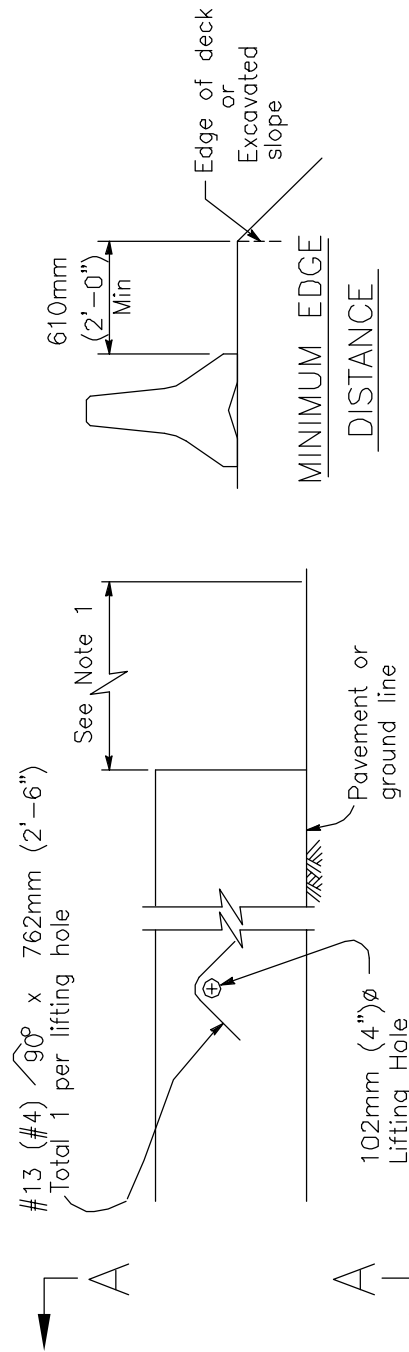
T. Stanton 3/01/0005
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-43D**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



ELEVATION



Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

TEMPORARY RAILING - TYPE K

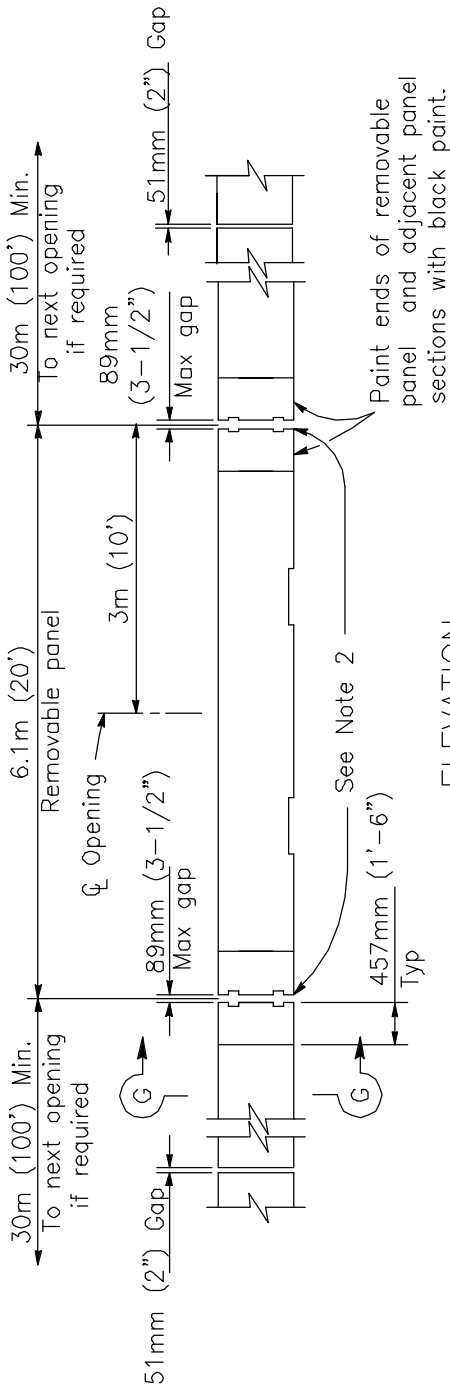
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

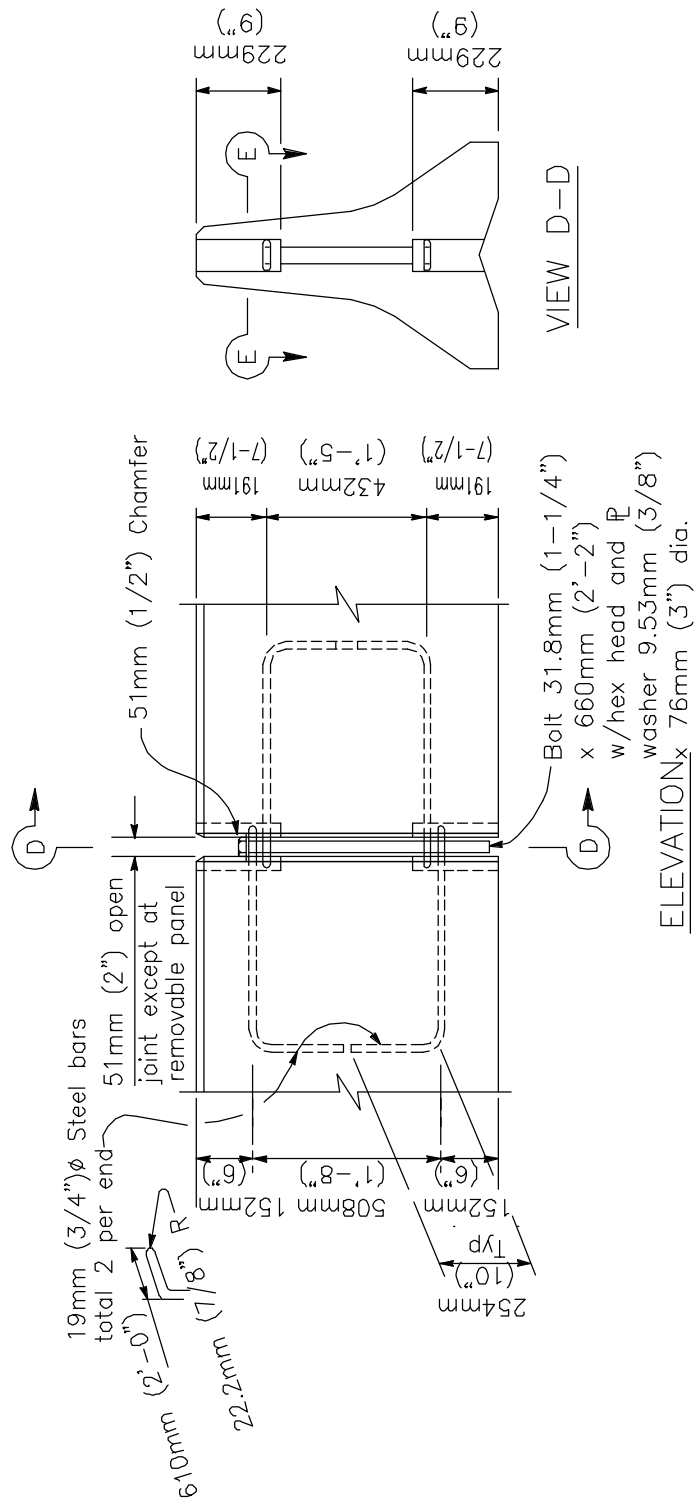
DRAWING NUMBER **M-44A**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



ELEVATION

TYPICAL OPENING DETAIL



Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

TEMPORARY RAILING - TYPE K

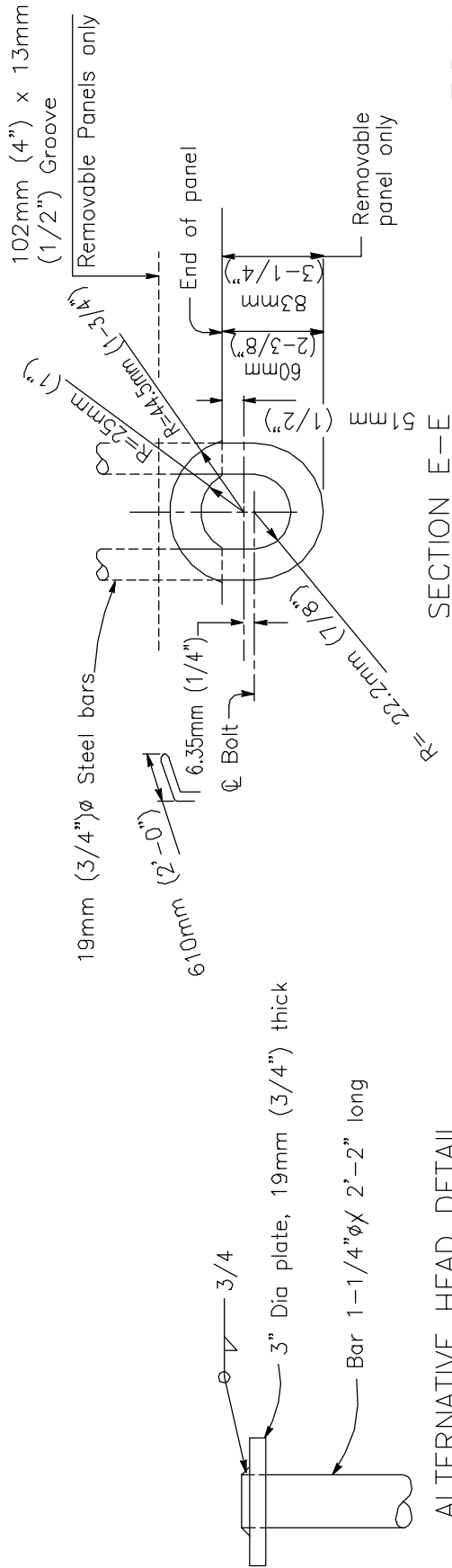
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 31018005

Chairperson R.C.E. 19246 Date

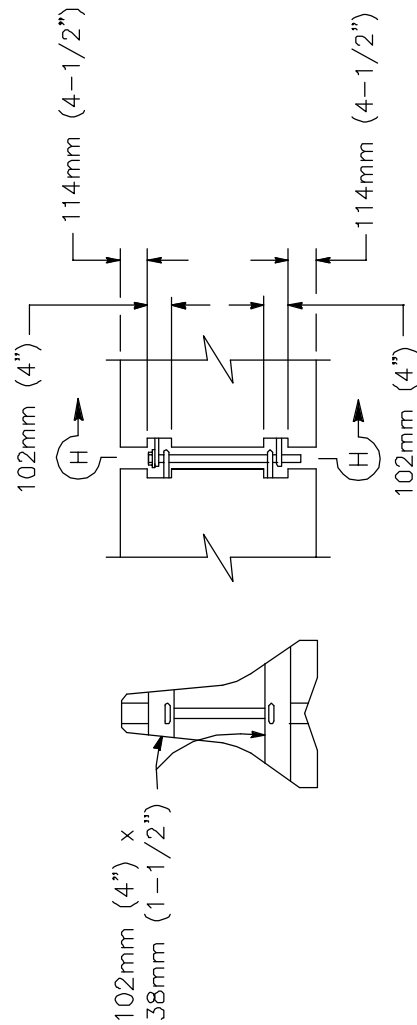
DRAWING NUMBER M-44C

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



SECTION E-E

BOLT CONNECTION DETAIL



SECTION H-H

ELEVATION

REMOVABLE PANEL GROOVE DETAILS

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

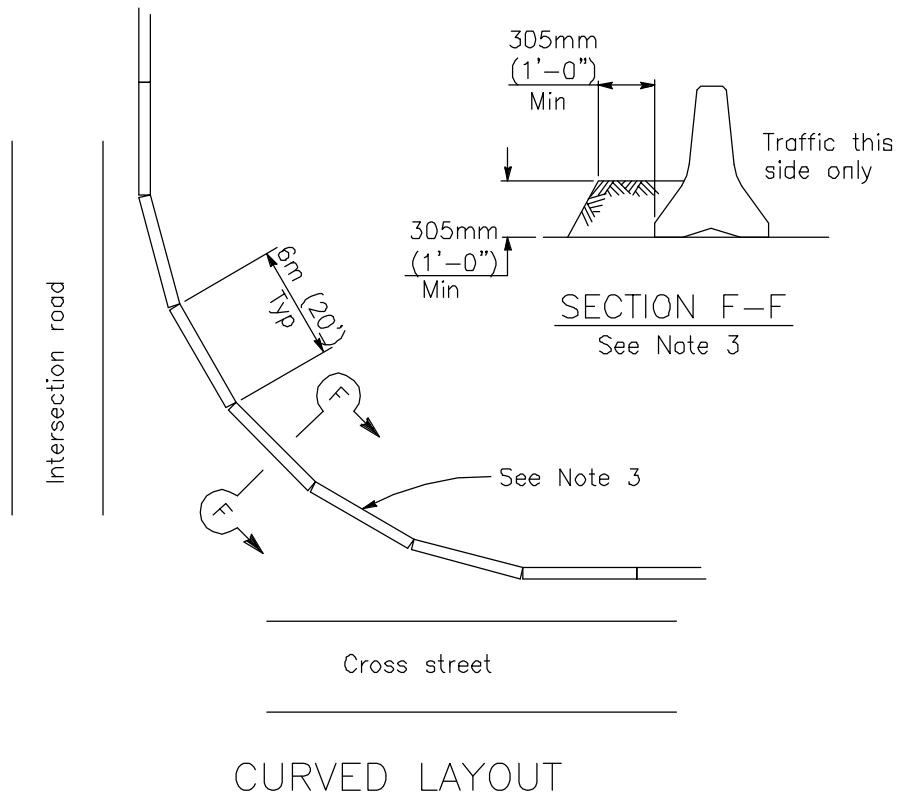
TEMPORARY RAILING - TYPE K

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/0005
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-44D**

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



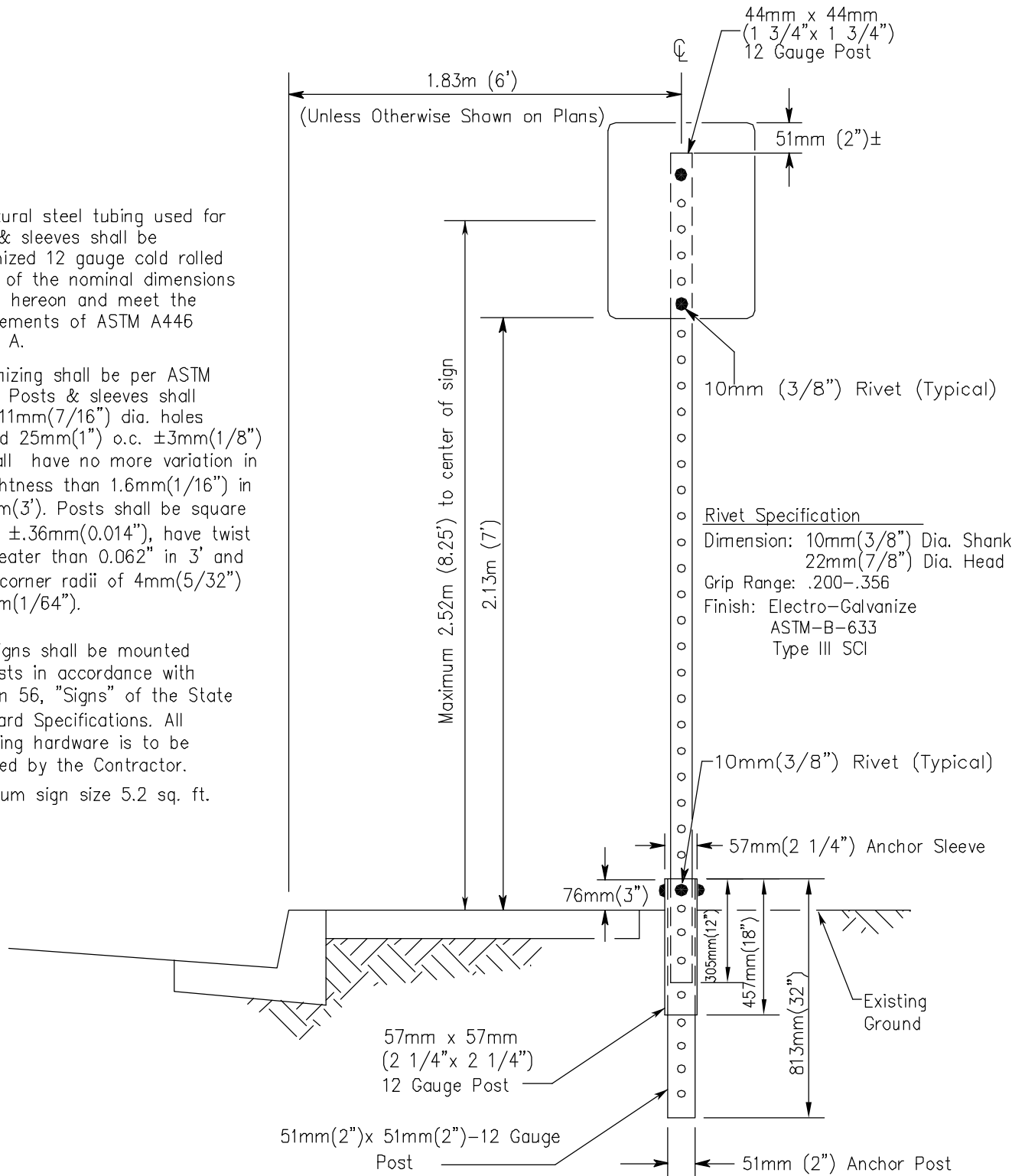
NOTES

- For end treatment, layout and crash cushions, where needed, see Project Plans or Special Provisions.
- All 89mm (3-1/2") gaps at removable panels are to be backed at the base with #32 (#10) x 203mm (8") dowel or 51mm (1/2") ϕ pin each side of joint. See Section G-G.
- Where Temporary Railing (Type K) is placed on curves and radii that are too severe to connect panels with bolted joints, the railing is to be backed continuously with earth fill. See Section F-F.
- Attach units to deck slabs when required by Bridge Plans.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G.Parkinson	4/92		TEMPORARY RAILING - TYPE K
Add Metric		T. Stanton	03/03		
					DRAWING NUMBER M-44E

NOTES

1. Structural steel tubing used for post & sleeves shall be galvanized 12 gauge cold rolled steel, of the nominal dimensions shown hereon and meet the requirements of ASTM A446 Grade A.
2. Galvanizing shall be per ASTM A525. Posts & sleeves shall have 11mm(7/16") dia. holes spaced 25mm(1") o.c. ±3mm(1/8") & shall have no more variation in straightness than 1.6mm(1/16") in 914mm(3'). Posts shall be square within ±.36mm(0.014"), have twist no greater than 0.062" in 3' and have corner radii of 4mm(5/32") ±.4mm(1/64").
3. The signs shall be mounted on posts in accordance with Section 56, "Signs" of the State Standard Specifications. All fastening hardware is to be provided by the Contractor.
4. Maximum sign size 5.2 sq. ft.



Revision	By	Approved	Date
ORIGINAL		G.Parkinson	2/95
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

BREAK-AWAY SIGN POST

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/0005
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **M-45**