

Book

3

Guidelines and Standards
Standard and Guide Details



City of San Diego Water Department
Capital Improvements Program



Water CIP Guidelines and Standards

BOOK LISTING

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PREFACE

This Guidelines and Standards Book contains information to assist planners and engineers with the design and construction of water facilities. The City's intent is to ensure uniformity of design concepts, formats, methodologies, procedures, construction materials, types of equipment and quality of work products. These standards have been produced and adopted to encourage exceptional quality while using current technology for all Water Department facilities.

These Guidelines and Standards are not a substitute for good engineering. Sound judgement must be exercised in all applications to create quality and cost efficient facilities.

Water Department management encourages the creation of relationships between project stakeholders that promotes engineering excellence and timely completion of projects. City staff and consultants are encouraged to take the time at the beginning of all projects to identify common goals, common interests, lines of communication, and a commitment to cooperative problem solving.



LARRY GARDNER
Water Department Director

Water CIP Guidelines and Standards
BOOK 3
STANDARD AND GUIDE DETAILS

Revision Table

Civil

Drawing		Initial Issue	Revised Dates		
C	101	October 1999			
C	102	October 1999			
C	103	October 1999			
C	104	October 1999			
C	105	October 1999			

Architectural

Drawing		Initial Issue	Revised Dates		
A	201	October 1999			
A	202	October 1999			
A	203	October 1999			
A	204	October 1999			

Structural

Drawing		Initial Issue	Revised Dates		
S	301	October 1999			
S	302	October 1999			
S	303	October 1999			
S	304	October 1999			
S	305	October 1999			
S	306	October 1999			
S	307	October 1999			
S	308	October 1999			
S	309	October 1999			
S	310	October 1999			
S	311	October 1999			
S	312	October 1999			
S	313	October 1999			
S	314	October 1999			
S	315	October 1999			
S	316	October 1999			
S	317	October 1999			
S	318	October 1999			

Drawing		Initial Issue	Revised Dates		
S	319	October 1999			
S	320	October 1999			
S	321	October 1999			
S	322	October 1999			
S	323	October 1999			
S	324	October 1999			
S	325	October 1999			
S	326	October 1999			
S	327	October 1999			
S	328	October 1999			
S	329	October 1999			
S	330	October 1999			
S	331	October 1999			
S	332	October 1999			
S	333	October 1999			
S	334	October 1999			
S	335	October 1999			
S	336	October 1999			
S	337	October 1999			
S	338	October 1999			
S	339	October 1999			
S	340	October 1999			
S	341	October 1999			
S	342	October 1999			
S	343	October 1999			
S	344	October 1999			
S	345	October 1999			
S	346	October 1999			

Mechanical

Drawing		Initial Issue	Revised Dates		
M	401	October 1999			
M	402	October 1999			
M	403	October 1999			
M	404	October 1999			
M	405	October 1999			
M	406	October 1999			
M	407	October 1999			
M	408	October 1999			
M	409	October 1999			
M	410	October 1999			

Drawing		Initial Issue	Revised Dates		
M	411	October 1999			
M	412	October 1999			
M	413	October 1999			
M	414	October 1999			
M	415	October 1999			
M	416	October 1999			
M	417	October 1999			
M	418	October 1999			
M	419	October 1999			
M	420	October 1999			
M	421	October 1999			
M	422	October 1999			
M	423	October 1999			
M	424	October 1999			

Electrical

Drawing		Initial Issue	Revised Dates		
E	501	October 1999			
E	502	October 1999			
E	503	October 1999			
E	504	October 1999			
E	505	October 1999			
E	506	October 1999			
E	507	October 1999			
E	508	October 1999			
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E	512	October 1999			
E	513	October 1999			
E	514	October 1999			
E	515	October 1999			

Instrumentation

Drawing		Initial Issue	Revised Dates		
I	601	October 1999			
I	602	October 1999			
I	603	October 1999			
I	604	October 1999			

Drawing		Initial Issue	Revised Dates		
I	605	October 1999			
I	606	October 1999			
I	607	October 1999			
I	608	October 1999			
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I	610	October 1999			
I	611	October 1999			
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I	619	October 1999			
I	620	October 1999			
I	621	October 1999			
I	622	October 1999			
I	623	October 1999			
I	624	October 1999			
I	625	October 1999			
I	626	October 1999			
I	627	October 1999			
I	628	October 1999			
I	629	October 1999			
I	630	October 1999			
I	631	October 1999			

Corrosion Control

Drawing		Initial Issue	Revised Dates		
C	701	October 1999			
C	702	October 1999			
C	703	October 1999			
C	704	October 1999			
C	705	October 1999			
C	706	October 1999			
C	707	October 1999			
C	708	October 1999			
C	709	October 1999			

Drawing		Initial Issue	Revised Dates		
C	710	October 1999			
C	711	October 1999			
C	712	October 1999			
C	713	October 1999			
C	714	October 1999			
C	715	October 1999			
C	716	October 1999			
C	717	October 1999			
C	718	October 1999			
C	719	October 1999			
C	720	October 1999			
C	721	October 1999			
C	722	October 1999			
C	723	October 1999			
C	724	October 1999			
C	725	October 1999			

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C	102	Butt-Welded Steel Pipe Joint
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C	104	Steel Pipe Through or Terminating At Wall
C	105	Steel Casing for Carrier Pipe

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A	204	Roof Hatch Detail

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S	302	Foundation or Base Slab Vertical Construction Joint Type 2
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S	304	Slab-On-Grade Construction Joint Type 2
S	305	Wall and Elevated Slab Construction Joint Type 1
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S	307	Wall Horizontal Construction Joint Type 1
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M	402	Adjustable Pipe Support With 'U' Bolt
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M	404	Fabricated Steel Pipe Thimble Type 1
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C	709	Test Station for Foreign Pipeline Crossing
C	710	Galvanic Anode Test Station
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Book 3

STANDARD AND GUIDE DETAILS

The standard and guide details have been prepared to be incorporated into Water Department project drawings. The details are available in electronic format and have been developed in Microstation. These details are typically inserted in detail sheets by discipline.

Related References

In the development of Book 3, the City of San Diego Standard Drawings were referenced. The City of San Diego Standard Drawings include all of the San Diego Area Regional Standard Drawings, as developed by the San Diego Regional Standards Committee, plus those additional standard drawings which are unique to public works construction in the City of San Diego.

Book 2 – Facility Design Guidelines criteria on storage facilities, transmission and distribution pipelines and pumping stations were reviewed in conjunction with these drawings.

Book 4 – Standard and Guide Specifications should be reviewed in conjunction with Book 3, Standard and Guide Details to ensure that the material requirements and other requirements are the same.

Book 5 – CADD Standards describes the standard G-sheets including site plan, abbreviations, symbols, and the standard border. Information on the drawing requirements are included in Book 5.

Revisions

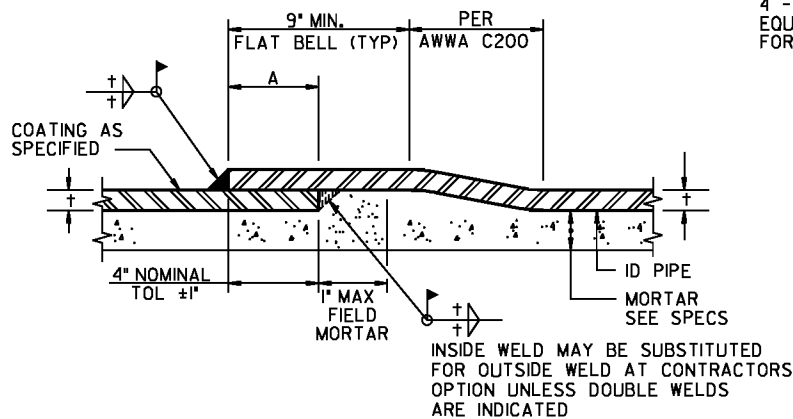
Revisions to these standards or new details will be accepted for review. These should be submitted to the CIP Program Manager at the Water Department following the deviation procedure described in Book 1, General Design Guidelines. Any revisions made to the drawings will be indicated in the revision list at the front of this book.

The DESIGN CONSULTANTS are responsible for the designs and must resolve all conflicts, inconsistencies, errors and omissions in any conflicting or inconsistent guidelines and standards to ensure that the completed designs meet the standards.

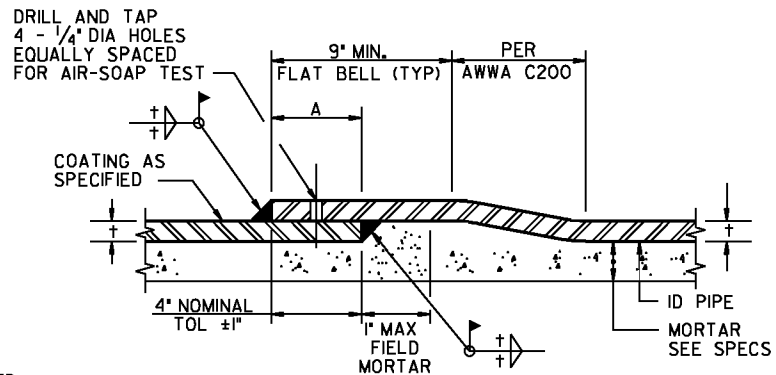
Numbering Procedures

The standard detail drawings for the CIP are identified by a single discipline letter and a three digit drawing number. To discern between drawing types, the drawing numbers are also grouped according to subject. The table below summarizes the numbering scheme. Note that the corrosion control details are regarded as civil drawings but have been assigned 700 series drawing numbers to denote the specialized nature of their contents.

Discipline	Letter Designator	Drawing Number Series
Civil	C	100's
Architectural	A	200's
Structural	S	300's
Mechanical	M	400's
Electrical	E	500's
Instrumentation	I	600's
Corrosion Control	C	700's



SINGLE LAP-WELDED SLIP JOINT



DOUBLE LAP-WELDED SLIP JOINT

NOTES:

1. SIZE WELD IN ACCORDANCE WITH THE STRUCTURAL WELDING CODE (AMERICAN WELDING SOCIETY)
2. A = 2" MIN FOR PIPE LESS THAN 36" DIA
A = 3" MIN FOR PIPE 36" AND GREATER - DOUBLE LAP

LAP-WELDED STEEL PIPE JOINT



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

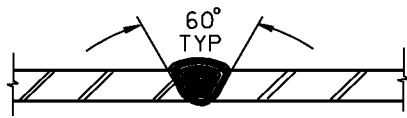


STANDARD
DETAIL

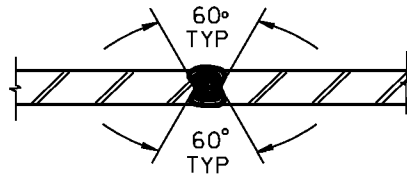
CIP

LAP-WELDED STEEL PIPE JOINT

C-101



SINGLE - BUTT WELD JOINT

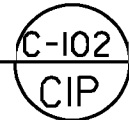


DOUBLE - BUTT WELD JOINT

NOTE:

SIZE WELD IN ACCORDANCE WITH THE STRUCTURAL WELDING CODE
(AMERICAN WELDING SOCIETY)

BUTT-WELDED STEEL PIPE JOINT



REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego

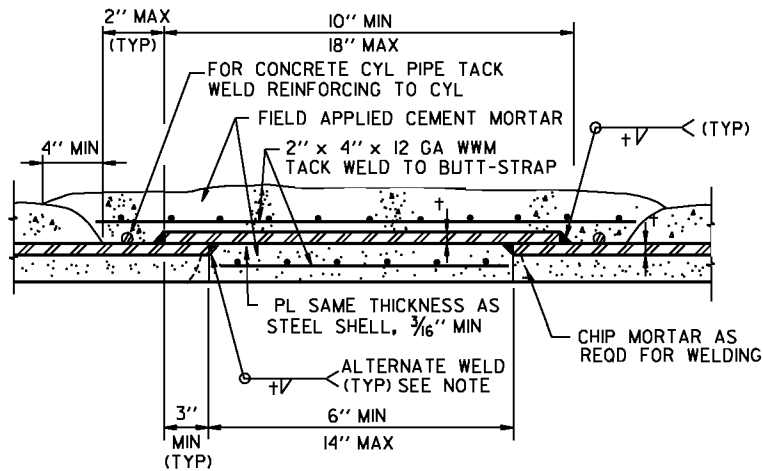


STANDARD
DETAIL

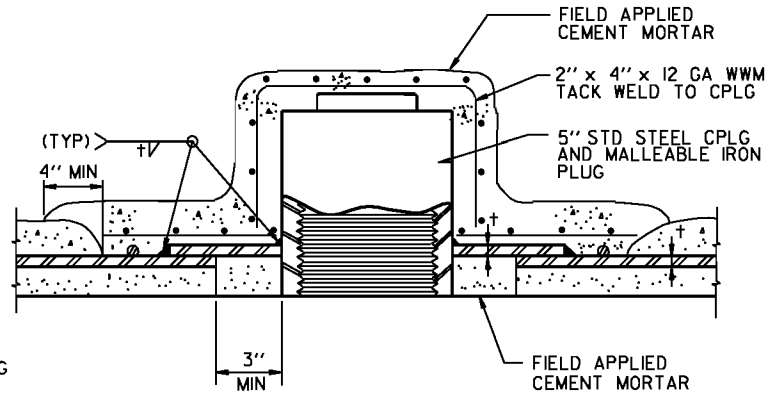
CIP

BUTT-WELDED STEEL PIPE JOINT

C-102



TYPICAL BUTT-STRAP JOINT



TYPICAL HANDHOLE

(REQD ON PIPE SMALLER THAN 24" DIA)

NOTES:

1. WELD BUTT-STRAP INSIDE AND OUTSIDE ON PIPES 36" AND GREATER
2. ALTERNATE WELD INSIDE OR OUTSIDE ON PIPES LESS THAN 36"

BUTT-STRAP JOINT FOR: RC CYLINDER PIPE

ROD WRAPPED STEEL CYLINDER PIPE

AND MORTAR LINED AND COATED STEEL PIPE



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REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego

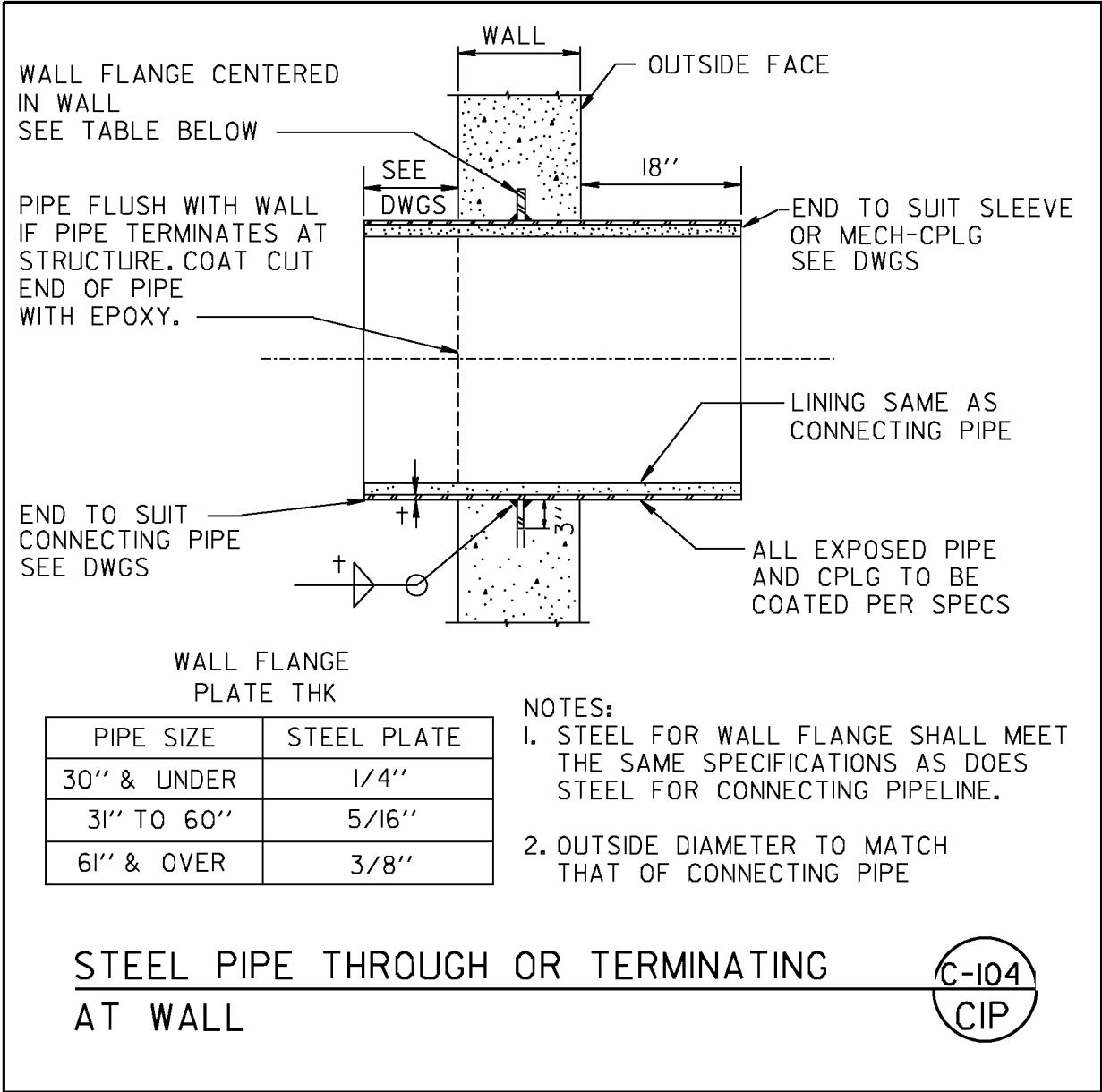


STANDARD
DETAIL

CIP


**BUTT-STRAP JOINT
FOR STEEL CYLINDER PIPE**

C-103



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WATER DEPARTMENT
City of San Diego



STEEL PIPE THROUGH OR TERMINATING AT WALL

STANDARD DETAIL
CIP
C-104

NOTES:

1. ALL JOINTS OF CARRIER PIPE WITHIN CASING SHALL BE WELDED
2. CARRIER PIPE SHALL BE TESTED BEFORE INSTALLATION OF END SEALS ON CASING
3. CASING SPACERS SHALL BE SO BOLTED AROUND THE PIPE THAT THE PLASTIC RUNNERS ARE LOCATED SYMMETRICALLY ABOUT THE VERTICAL AXIS OF PIPE
4. INNER DIAMETER OF THE STEEL CASING SHALL BE AT LEAST 12 INCHES LARGER THAN THE OUTER DIAMETER OF THE CARRIER PIPE

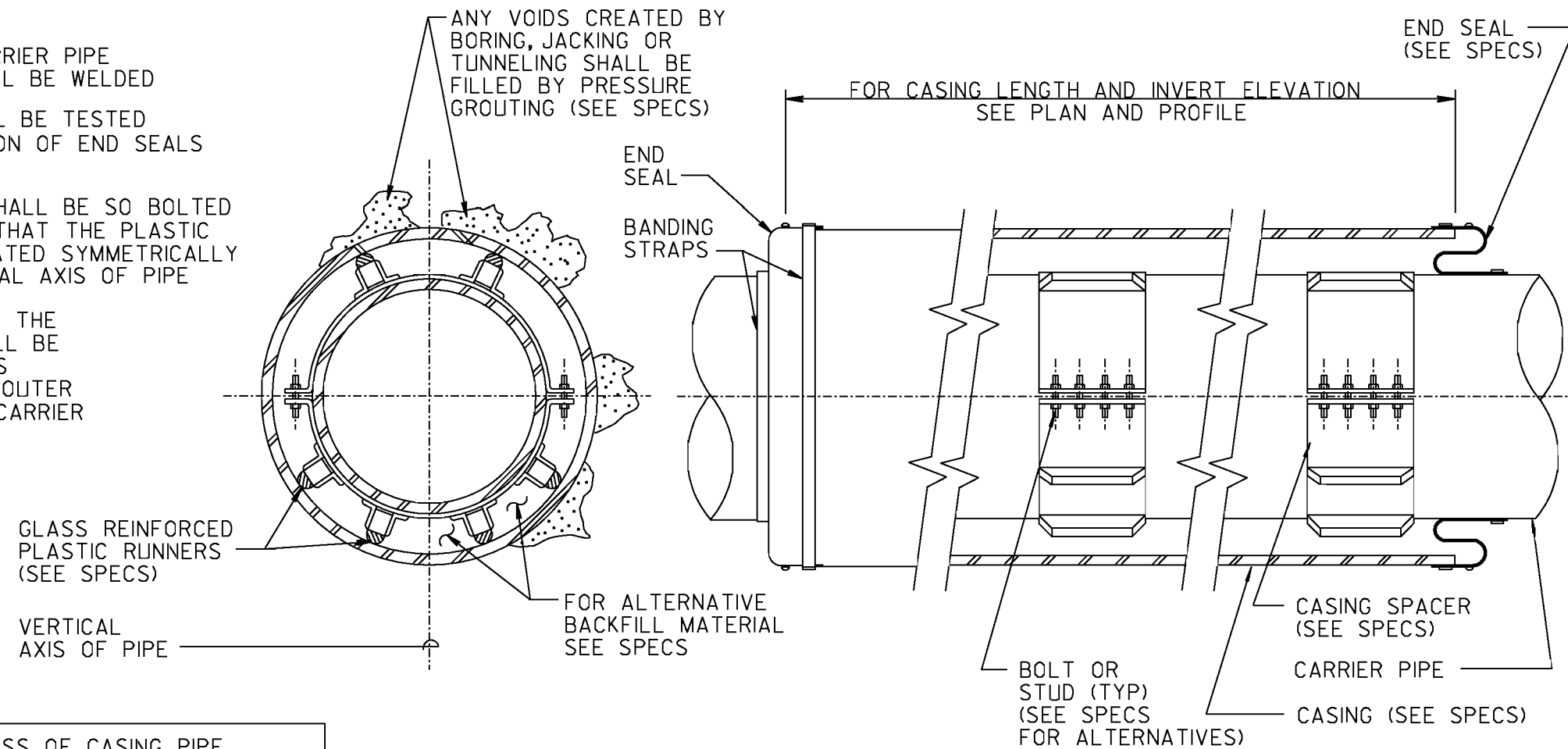


PLATE THICKNESS OF CASING PIPE			
DIAMETER	TO 27"	30" TO 54"	60" TO 72"
MINIMUM THICKNESS	3/8"	1/2"	5/8"

CASING SHALL BE SMOOTH STEEL PIPE

STEEL CASING FOR CARRIER PIPE
(SEE SPECS FOR ALTERNATIVES)

C-105
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

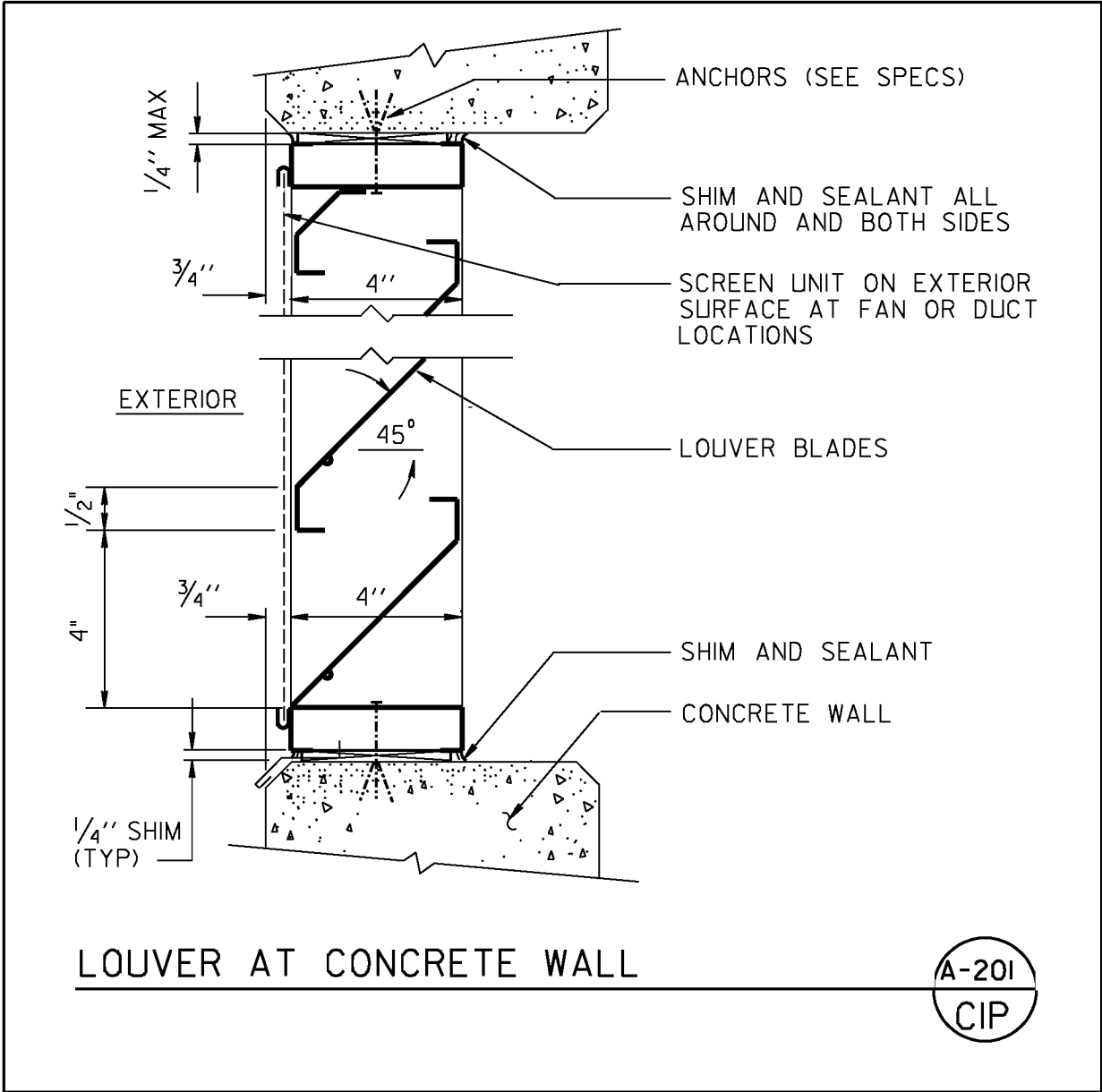


STANDARD
DETAIL

CIP

STEEL CASING FOR CARRIER PIPE

C-105



REVISION	BY	APPROVED	DATE
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City of San Diego

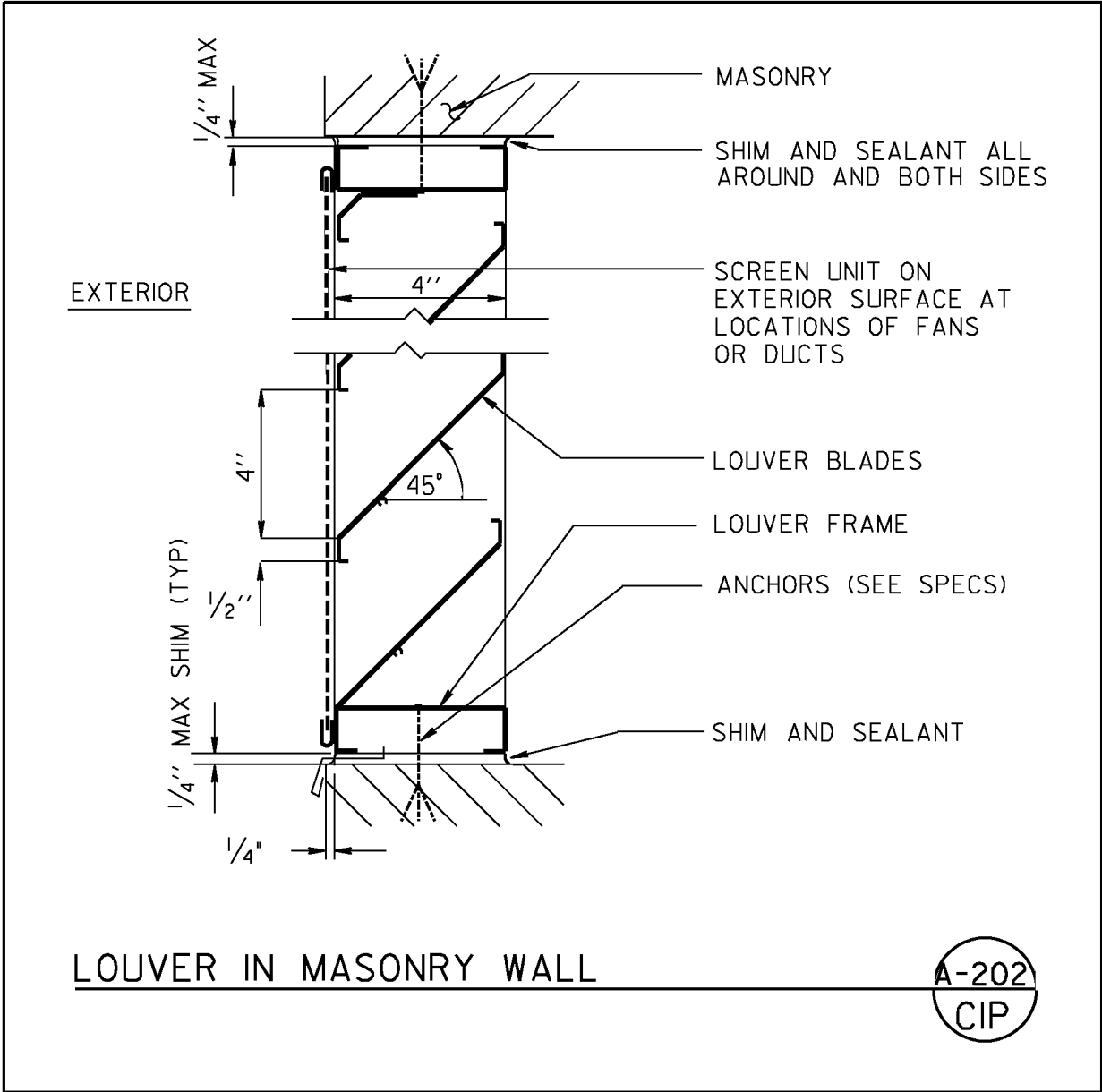


STANDARD
DETAIL

CIP

LOUVER AT CONCRETE WALL

A-201



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

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City of San Diego

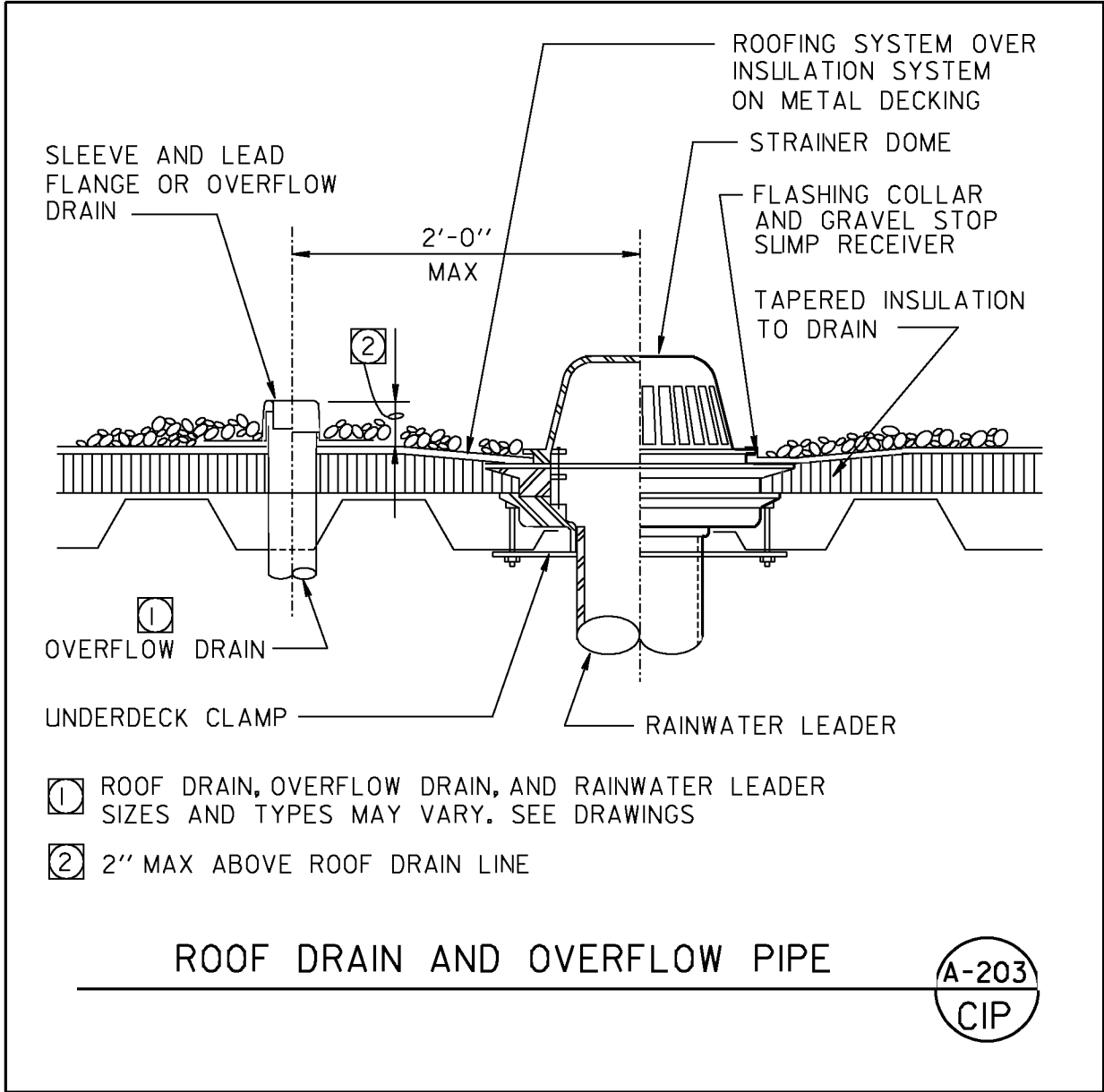


STANDARD
DETAIL

CIP

LOUVER IN MASONRY WALL

A-202



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

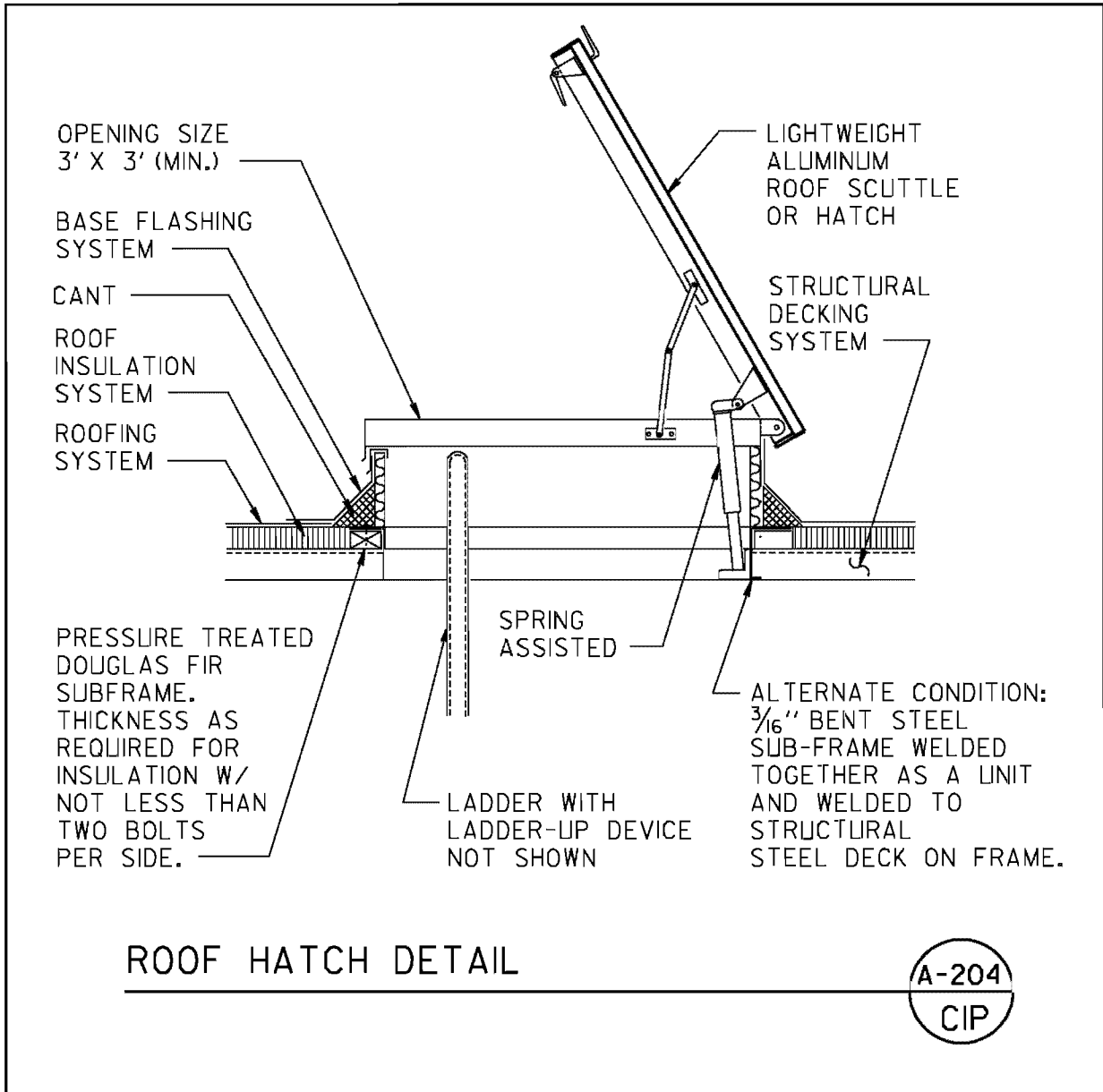


STANDARD
DETAIL

CIP

ROOF DRAIN AND OVERFLOW PIPE

A-203



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
 City of San Diego

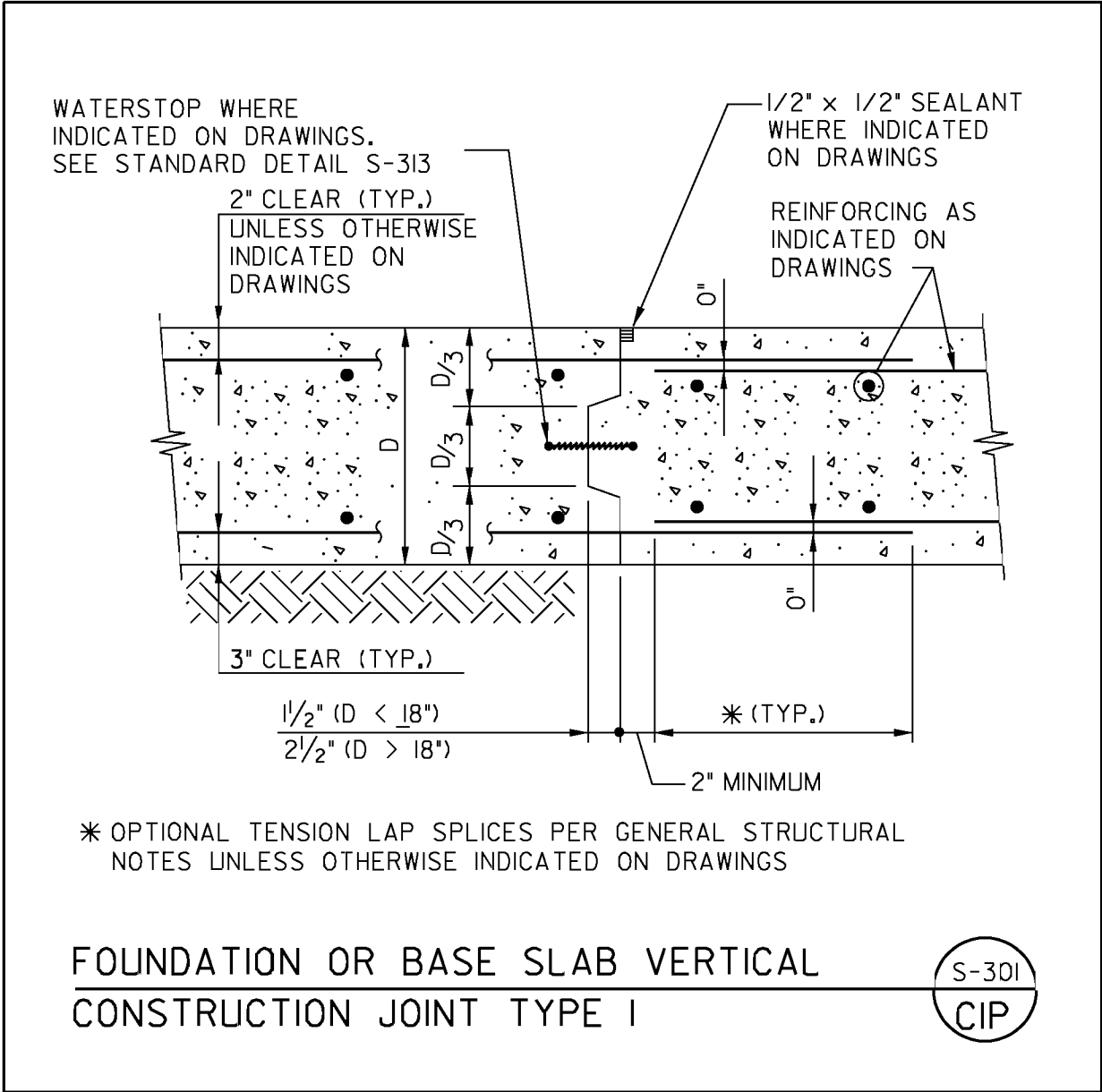


STANDARD
DETAIL

CIP

ROOF HATCH DETAIL

A-204



Notes to Design Consultant: _____

1. This detail is to be used for strip footings under walls and for mat-type foundation slabs. Locate joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego

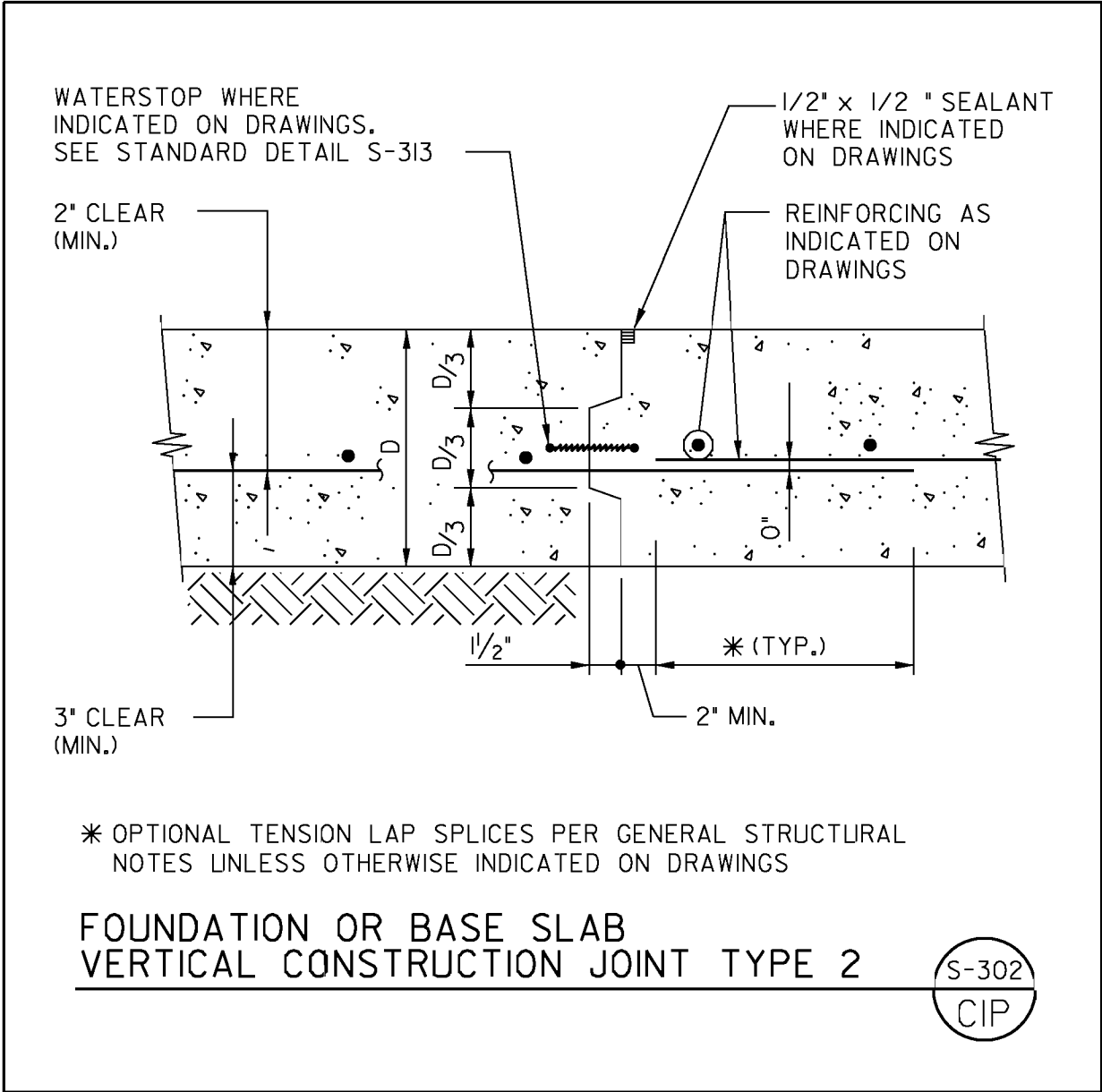


STANDARD
DETAIL

CIP

**FOUNDATION OR BASE SLAB VERTICAL
CONSTRUCTION JOINT TYPE I**

S-301



Notes to Design Consultant: _____

1. This detail is to be used for strip footings under walls and for mat-type foundation slabs. Locate joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego



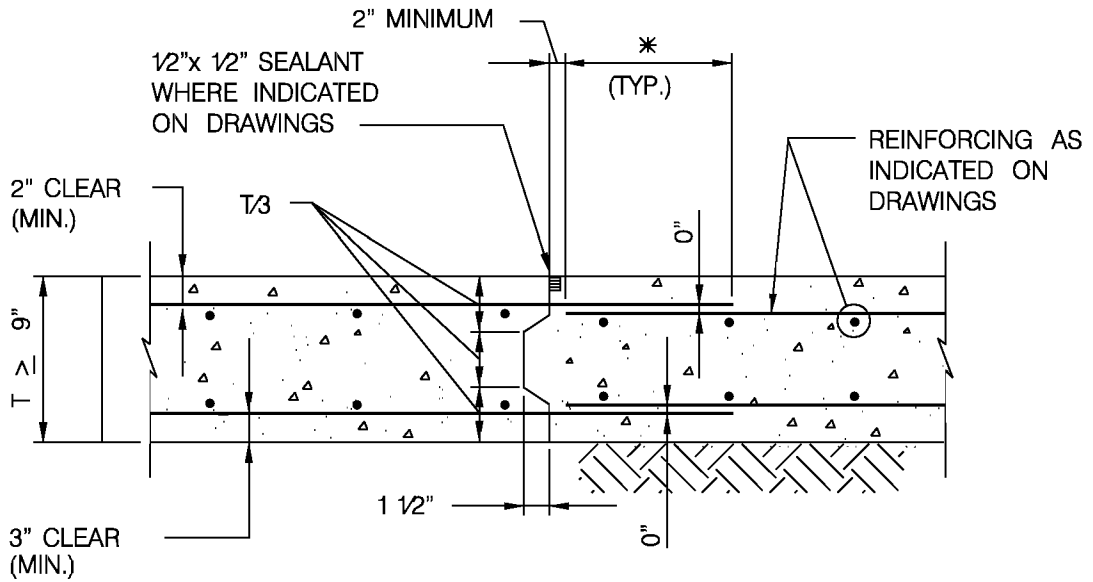
STANDARD
DETAIL

CIP

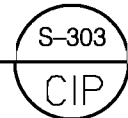
**FOUNDATION OR BASE SLAB VERTICAL
CONSTRUCTION JOINT TYPE 2**

S-302

* OPTIONAL TENSION LAP SPLICES AS PER GENERAL STRUCTURAL NOTES UNLESS OTHERWISE INDICATED ON DRAWINGS



SLAB-ON-GRADE CONSTRUCTION JOINT TYPE I



Notes to Design Consultant:

1. This detail should be used for slab-on-grade for buildings and non-water bearing structures subject to heavy uniform and vehicular traffic loadings. Locate joints on drawings.
2. Call 1/2" x 1/2" joint sealant drawings where required and specification for material.
3. Location (cover) of reinforcing shall be clearly defined on the drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

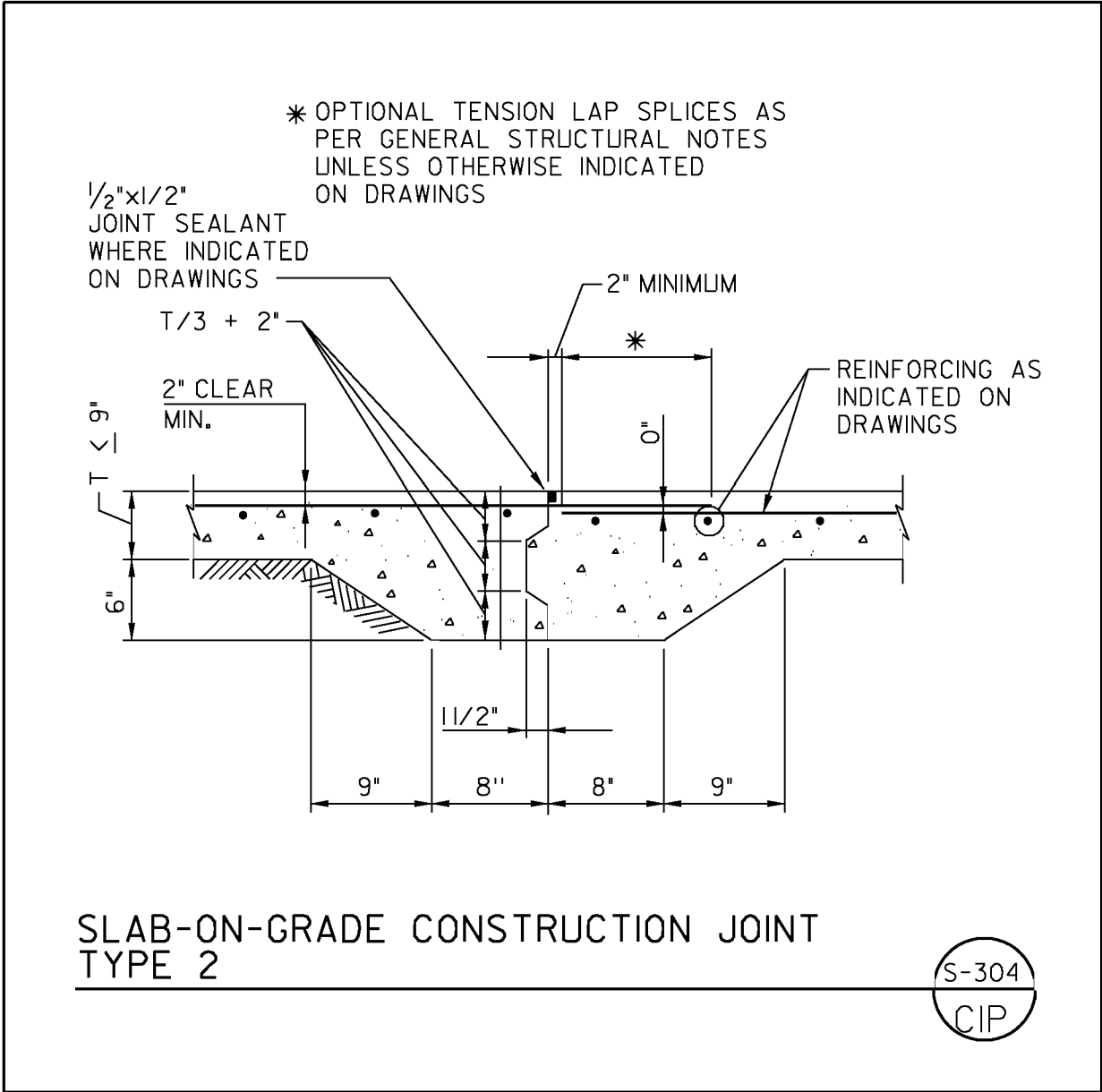


STANDARD
DETAIL

CIP

SLAB-ON-GRADE
CONSTRUCTION JOINT TYPE I

S-303



Notes to Design Consultant:

1. This detail should be used for slab-on-grade for buildings and non-water bearing structures is subject to light uniform loading.
2. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
3. Location (cover) of reinforcing shall be clearly defined on the drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego

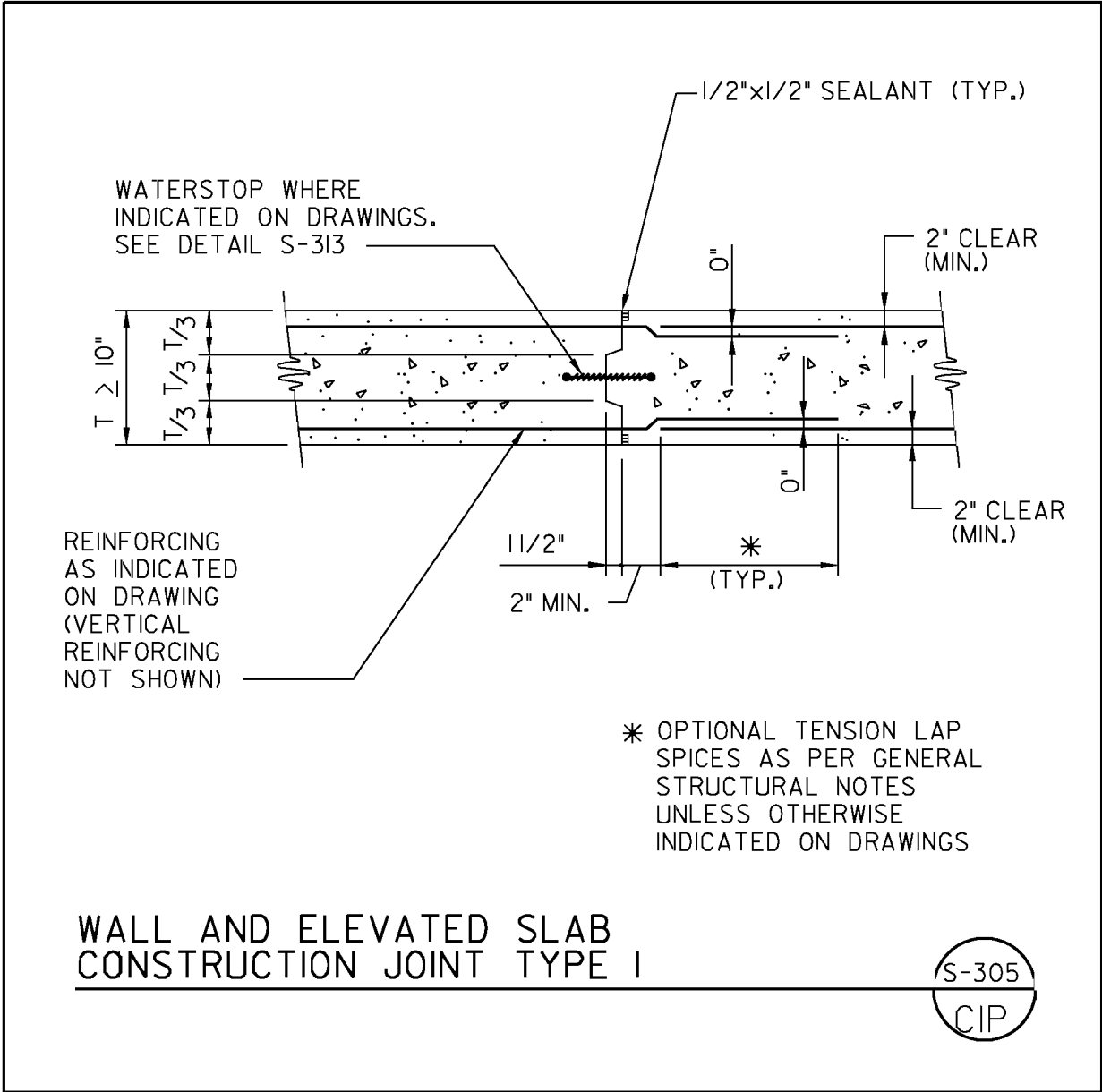


STANDARD
DETAIL

CIP

**SLAB-ON-GRADE
CONSTRUCTION JOINT TYPE 2**

S-304



Notes to Design Consultant: _____

1. Located joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego

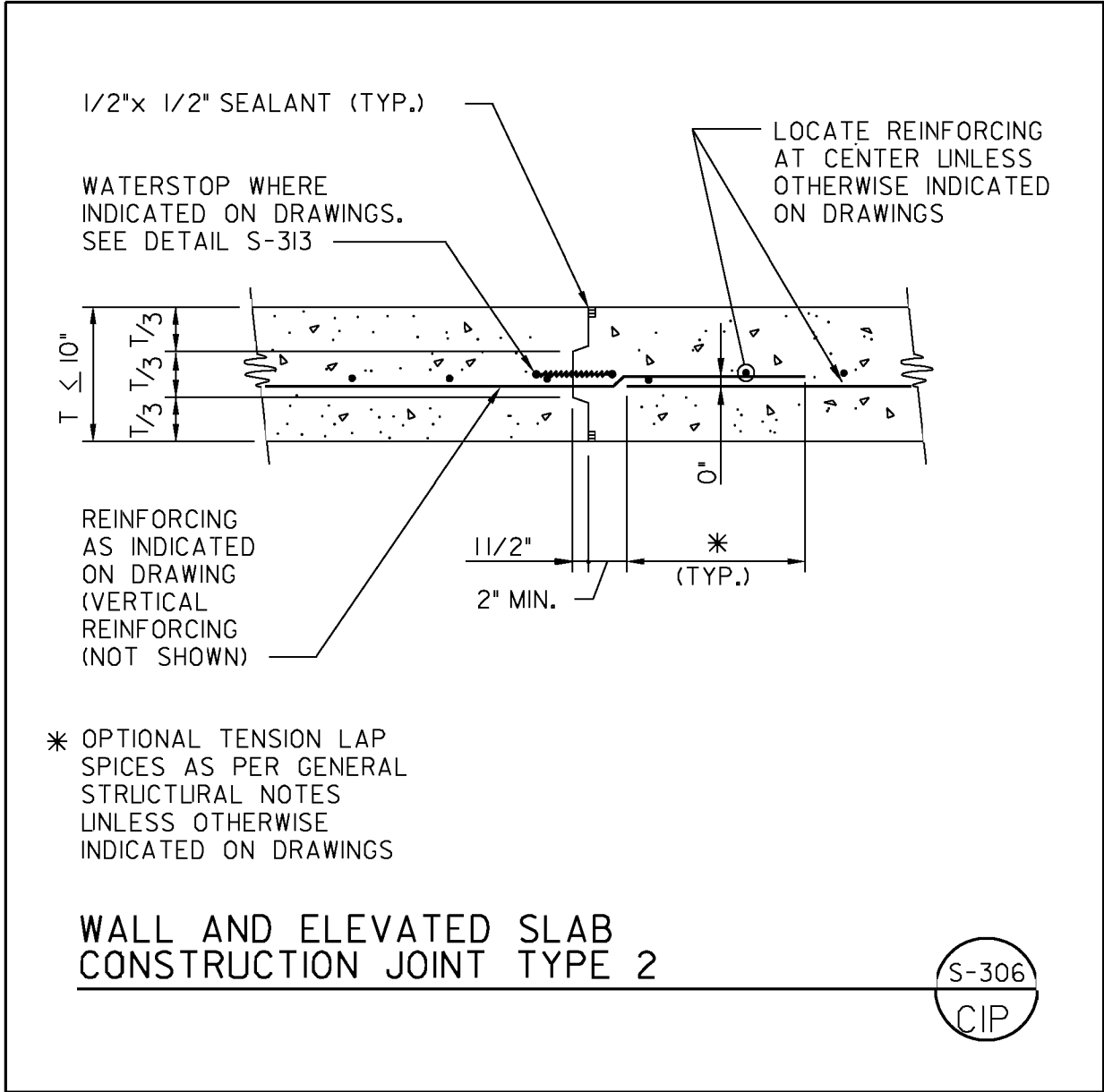


STANDARD
DETAIL

CIP

**WALL AND ELEVATED SLAB
CONSTRUCTION JOINT TYPE I**

S-305



Notes to Design Consultant: _____

1. Located joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego



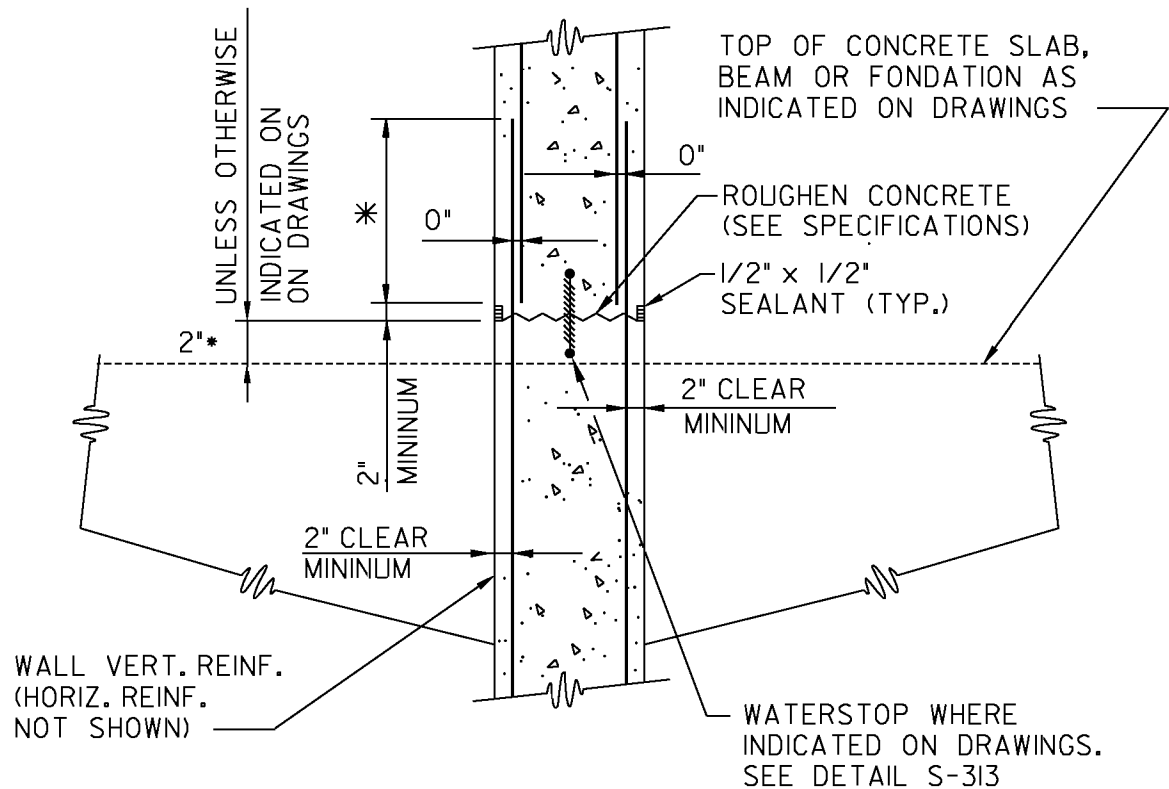
STANDARD
DETAIL

CIP

**WALL AND ELEVATED SLAB
CONSTRUCTION JOINT TYPE 2**

S-306

* TENSION LAP SPLICES
AS PER GENERAL
STRUCTURAL NOTES
UNLESS OTHERWISE
INDICATED ON DRAWINGS



**WALL HORIZONTAL CONSTRUCTION JOINT
TYPE I**

S-307
CIP

Notes to Design Consultant:

1. Located joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego



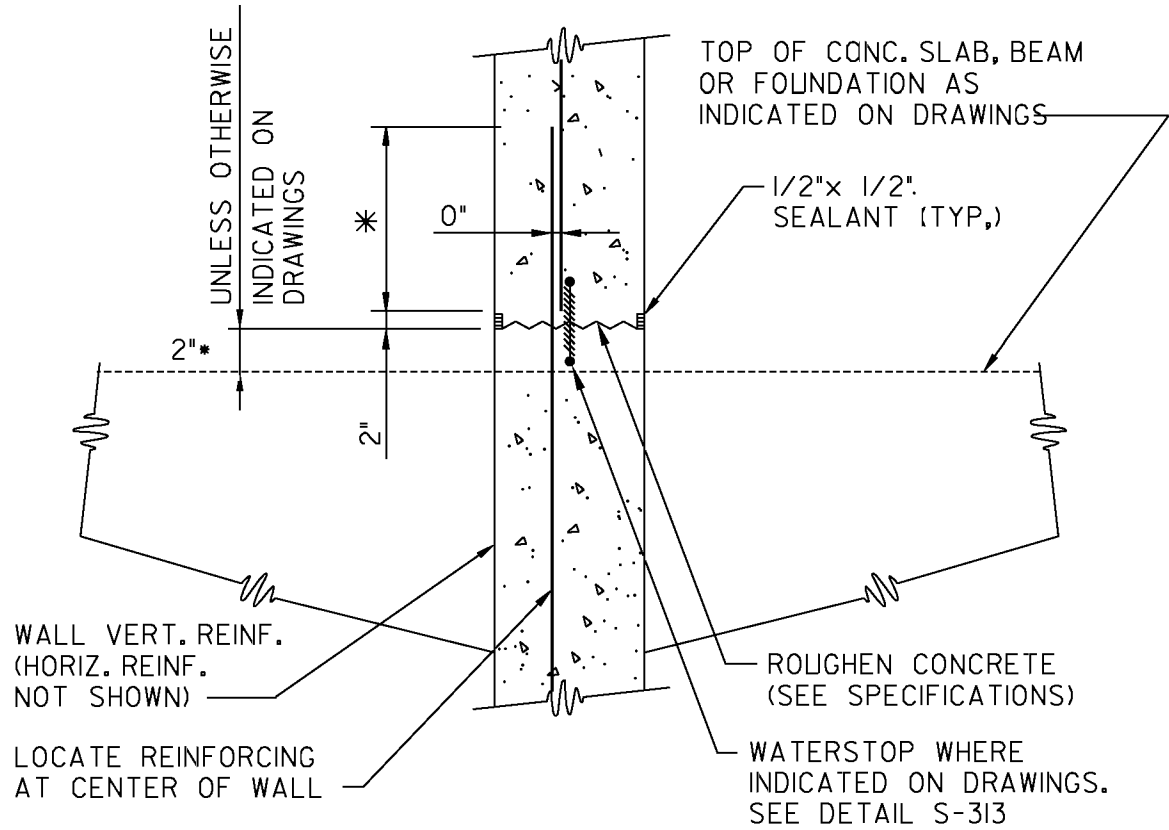
STANDARD
DETAIL

CIP

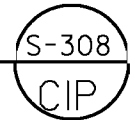
**WALL HORIZONTAL
CONSTRUCTION JOINT TYPE I**

S-307

* TENSION LAP SPLICES
 PER GENERAL
 STRUCTURAL NOTES
 UNLESS OTHERWISE
 INDICATED ON DRAWINGS



**WALL HORIZONTAL CONSTRUCTION JOINT
 TYPE 2**



Notes to Design Consultant:

1. Located joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 12 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

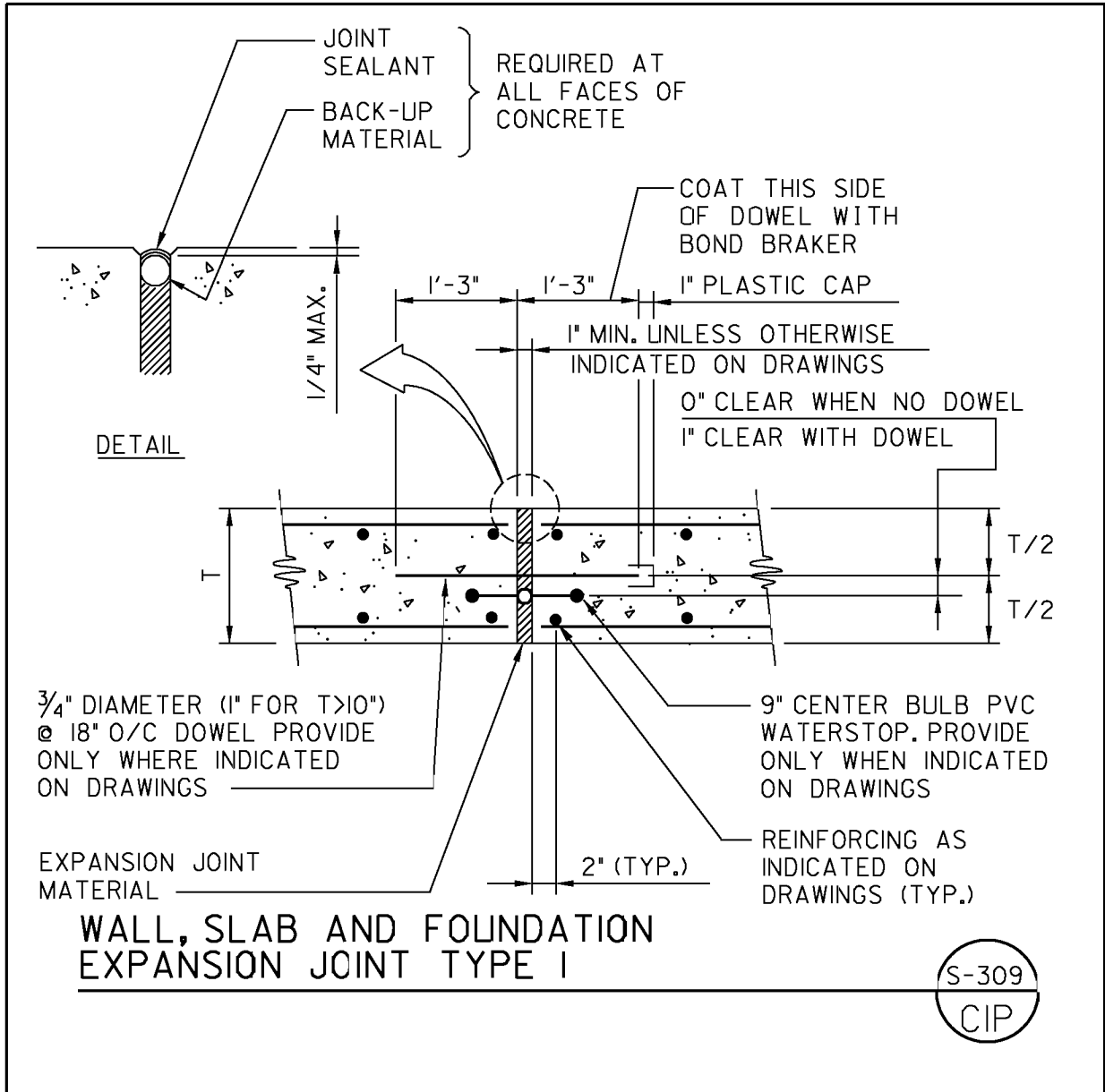
WATER DEPARTMENT
 City of San Diego

**WALL HORIZONTAL
 CONSTRUCTION JOINT TYPE 2**

STANDARD
 DETAIL

CIP

S-308



Notes to Design Consultant: _____

1. Provide dowels if concrete is subject to heavy load which must be transferred across joint. Locate joints on drawings.
2. Callout waterstop and dowels on drawing where required.
3. Specify joint sealant, expansion material and back-up material in project technical specifications.
4. Location (cover) of reinforcing shall be clearly defined on drawings.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
 City of San Diego

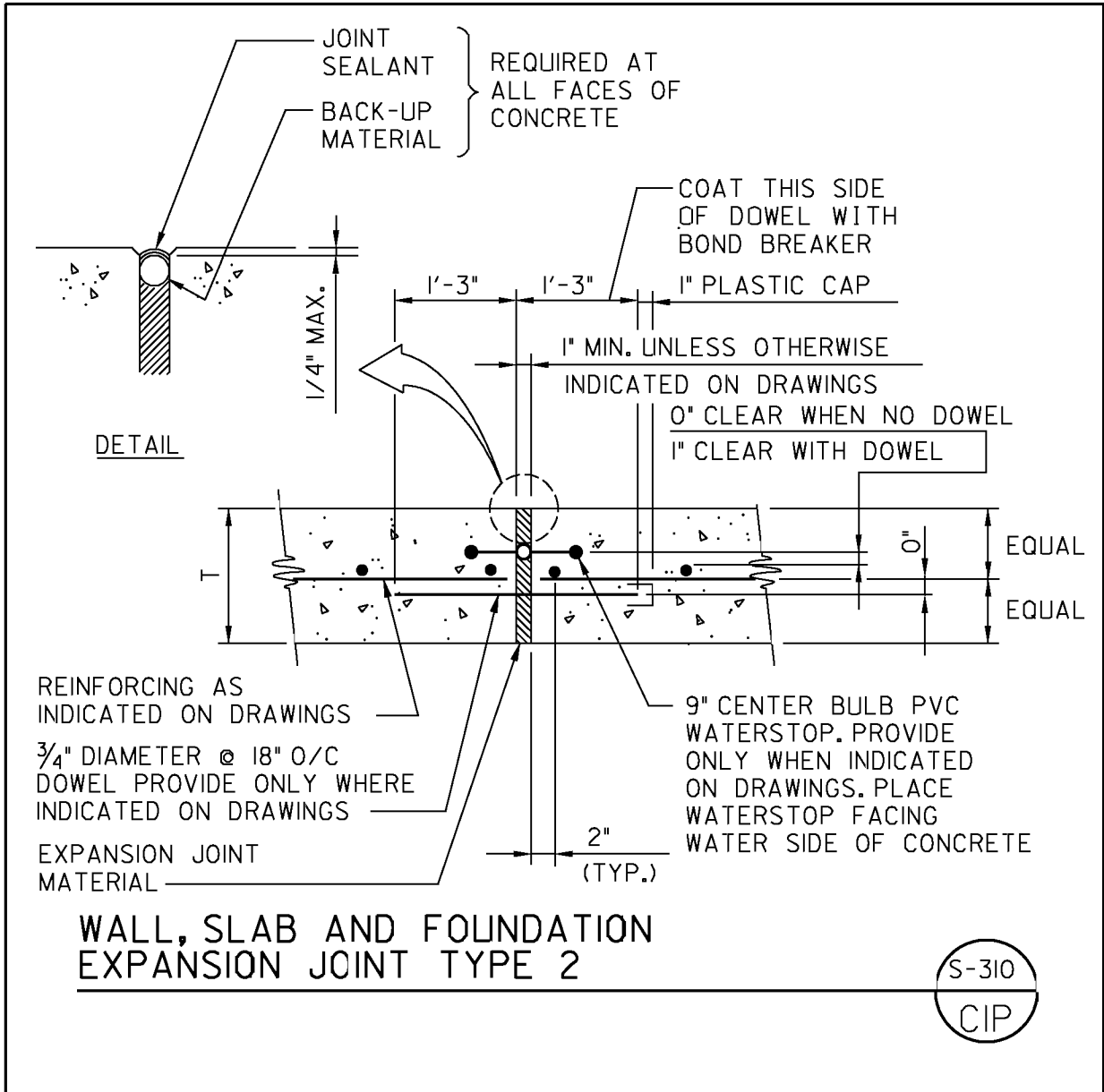


STANDARD
 DETAIL

CIP

S-309

WALL, SLAB AND FOUNDATION EXPANSION JOINT TYPE I



Notes to Design Consultant:

1. Provide dowels if concrete subject to heavy load which must be transferred across joint.
2. Call out waterstop and dowels on drawing where required.
3. The specification will more fully describe joint materials.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
 City of San Diego

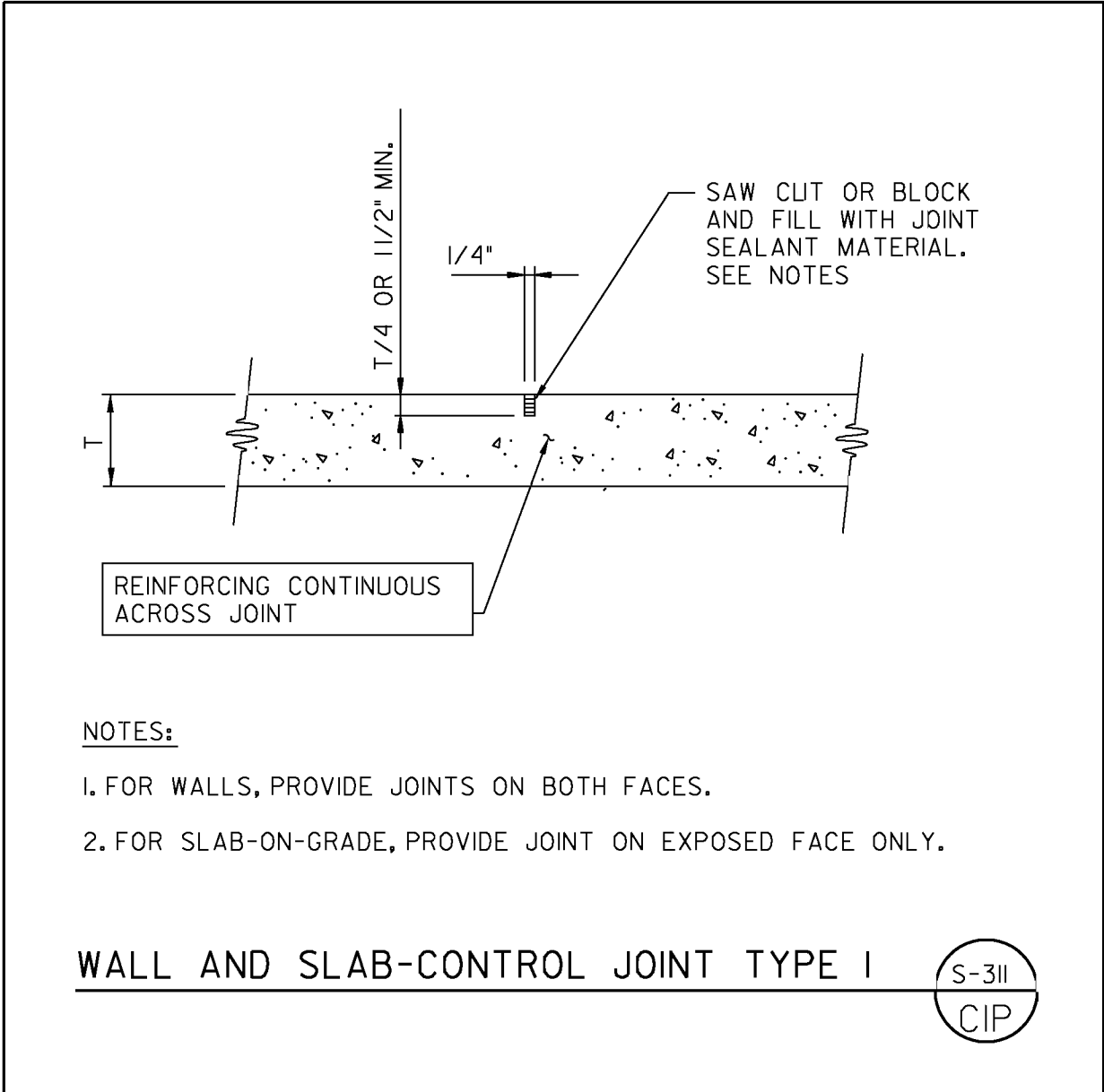


STANDARD
 DETAIL

CIP

**WALL, SLAB AND FOUNDATION
 EXPANSION JOINT TYPE 2**

S-310



Notes to Design Consultants: _____

1. Locate joints on drawings.
2. Specify joint sealant requirements in projec technical specifications.
3. Do not specify use of plastic strip in lieu of joint sealant.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego

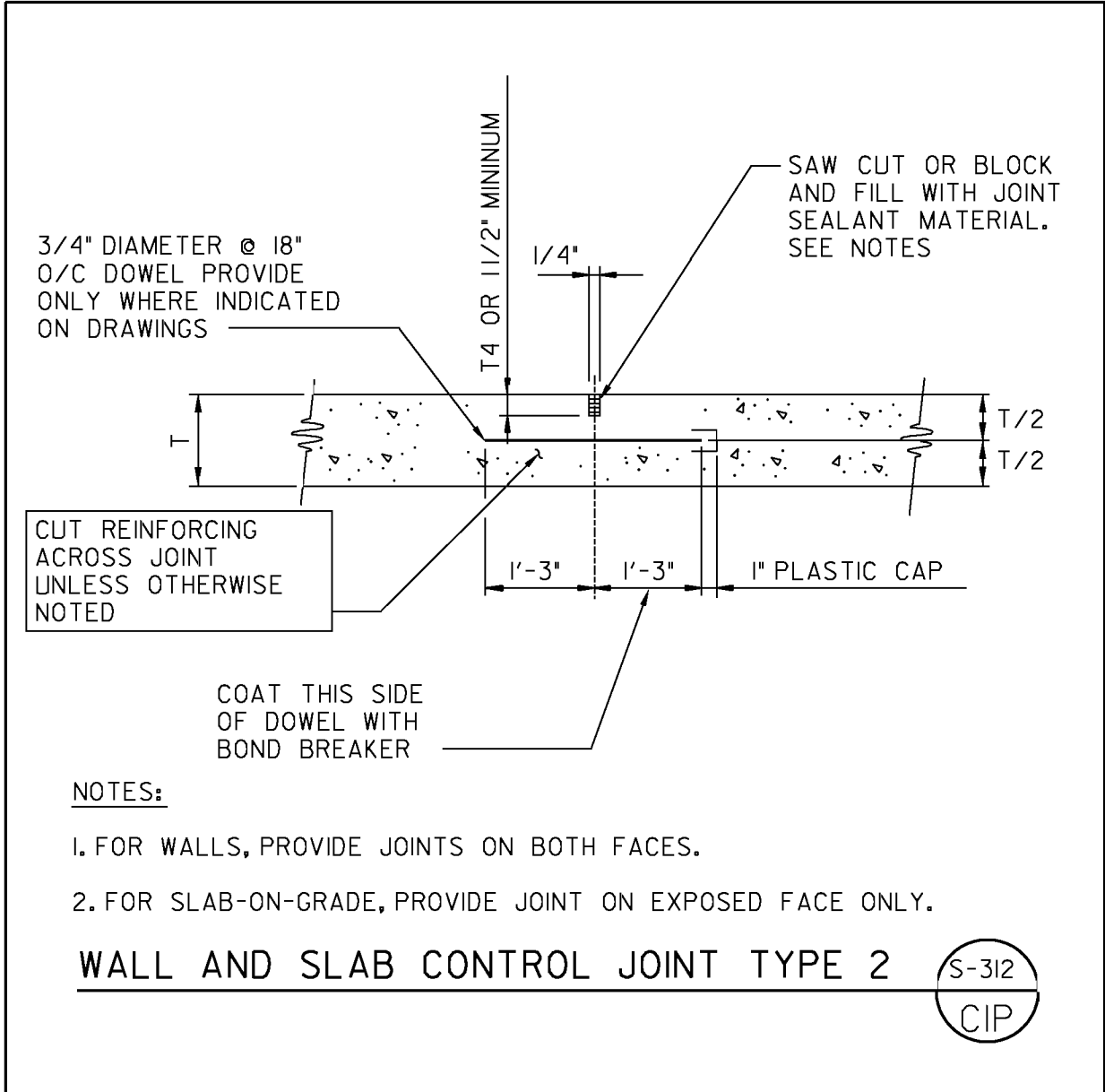


STANDARD
DETAIL

CIP

**WALL AND SLAB CONTROL JOINT
TYPE I**

S-311



Notes to Design Consultant:

1. This detail to be used for slab and wall where flexibility is required. Locate joints on drawings.
2. Specify joint sealant requirements in project technical.
3. Do not specify use of plastic strip in lieu of joint sealant.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

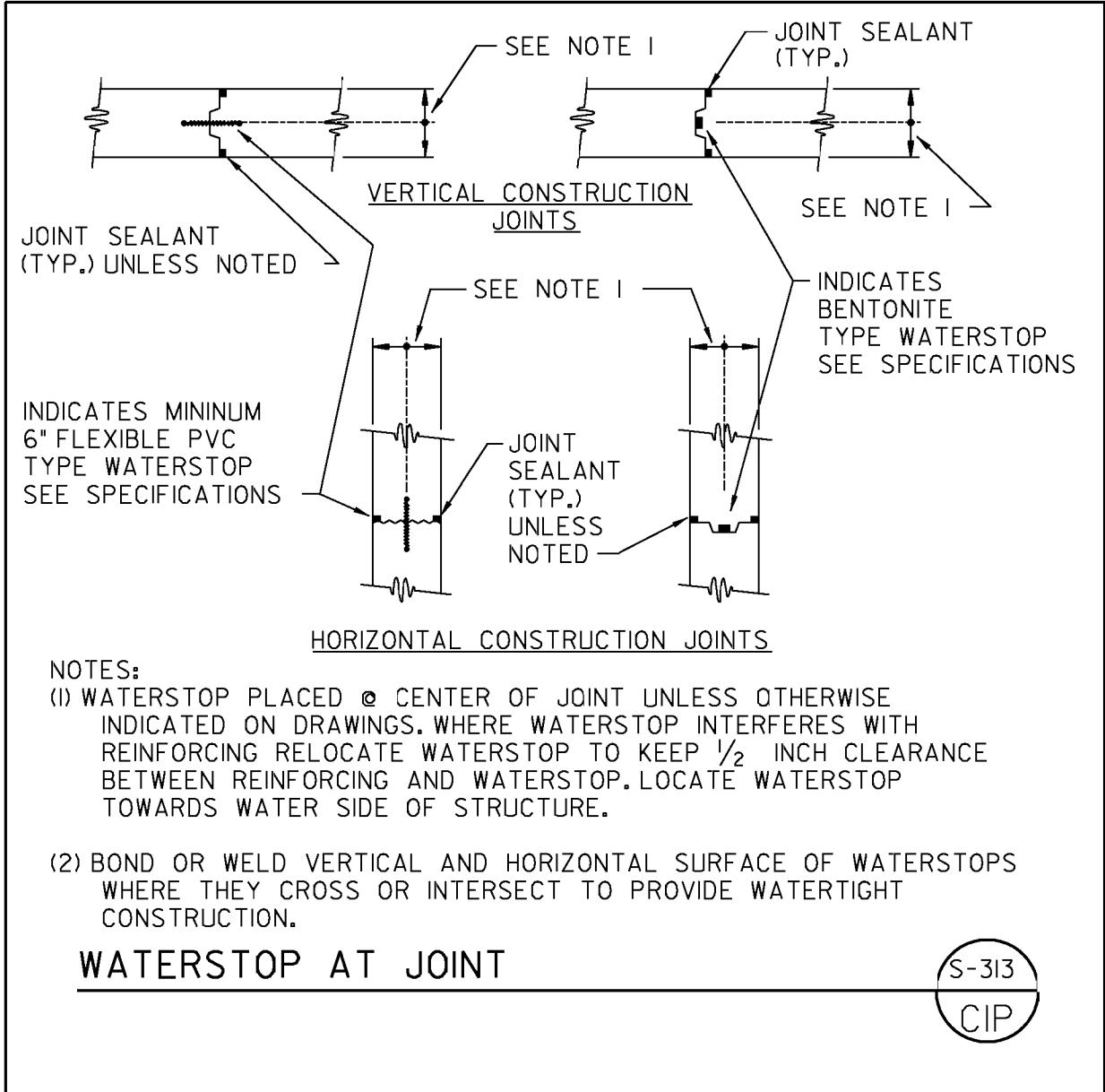


STANDARD
DETAIL

CIP

**WALL AND SLAB CONTROL JOINT
TYPE 2**

S-312



Notes to Design Consultant:

1. Type and location of waterstop shall be indicated on drawings.
2. Use of joint sealant with construction joint shall be indicated on drawings.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

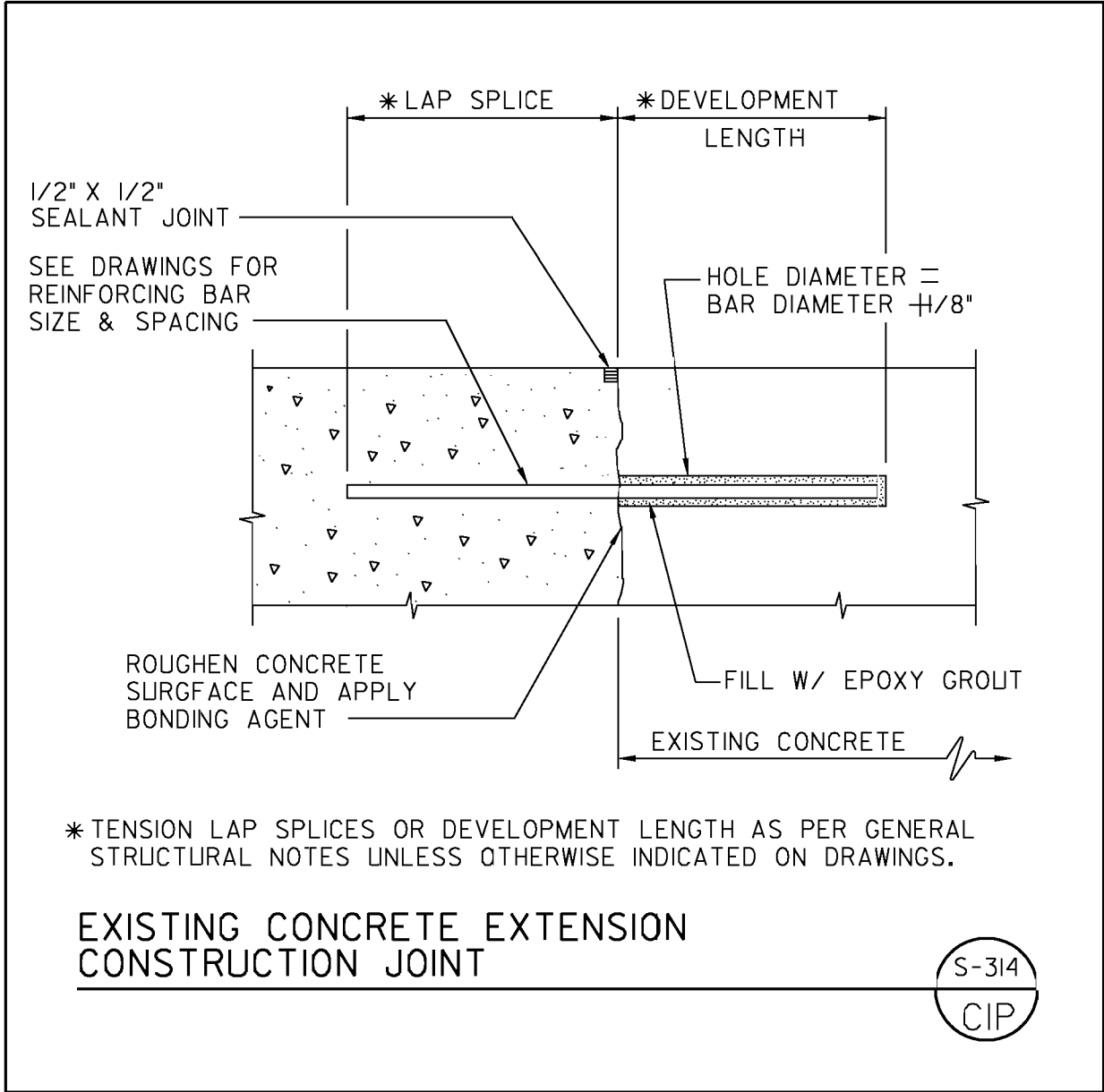


STANDARD
DETAIL

CIP

WATERSTOP AT JOINT

S-313




Notes to Design Consultant:

1. To be used where continuity required between existing concrete and new concrete. Located joint on drawings.
2. Specify surface joint preparation, bonding agent and joint sealant requirement in project technical specifications.
3. Reinforcing size and spacing should be indicated on drawings.

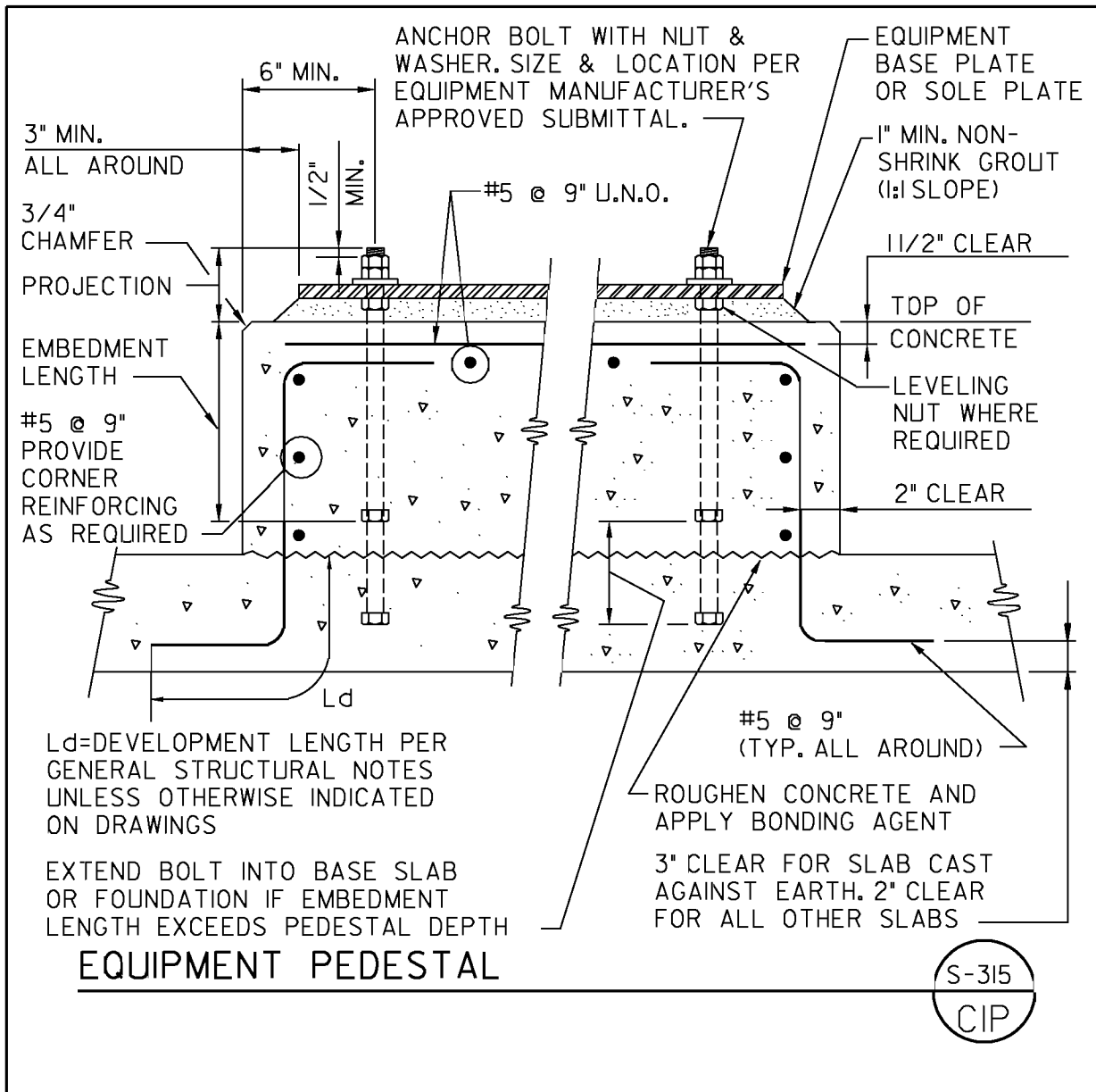
REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego



EXISTING CONCRETE EXTENSION CONSTRUCTION JOINT

STANDARD DETAIL
CIP
S-314



Notes to Design Consultant:

1. This detail to be used for light & medium weight equipment base. Adequacy shall be verified for heavy equipment base.
2. Pedestal reinforcing adequacy shall be verified.
3. Anchor bolt requirements shall be verified. Anchor bolt projection and embedment length shall be verified and adjusted to meet design requirements.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

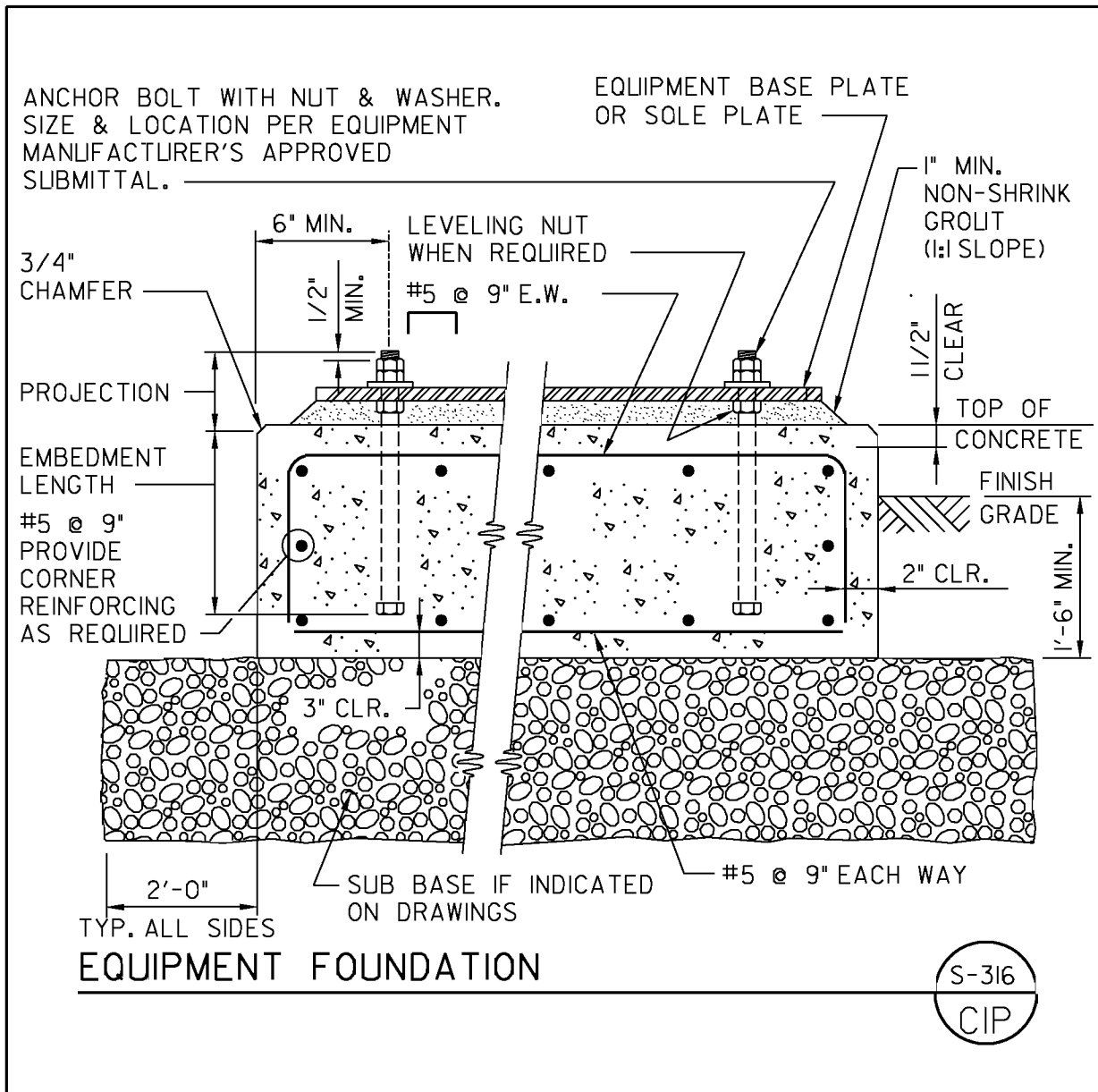


STANDARD
DETAIL

CIP

EQUIPMENT PEDESTAL

S-315



Notes to Design Consultant:

1. This detail to be used for light equipment foundation.
2. Modify this detail, as required, for large, heavy equipment foundations.
Reinforcing adequacy shall be verified.
3. Anchor bolt requirements shall be verified. Anchor bolt projection and embedment length shall be verified and adjusted to meet design requirements.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

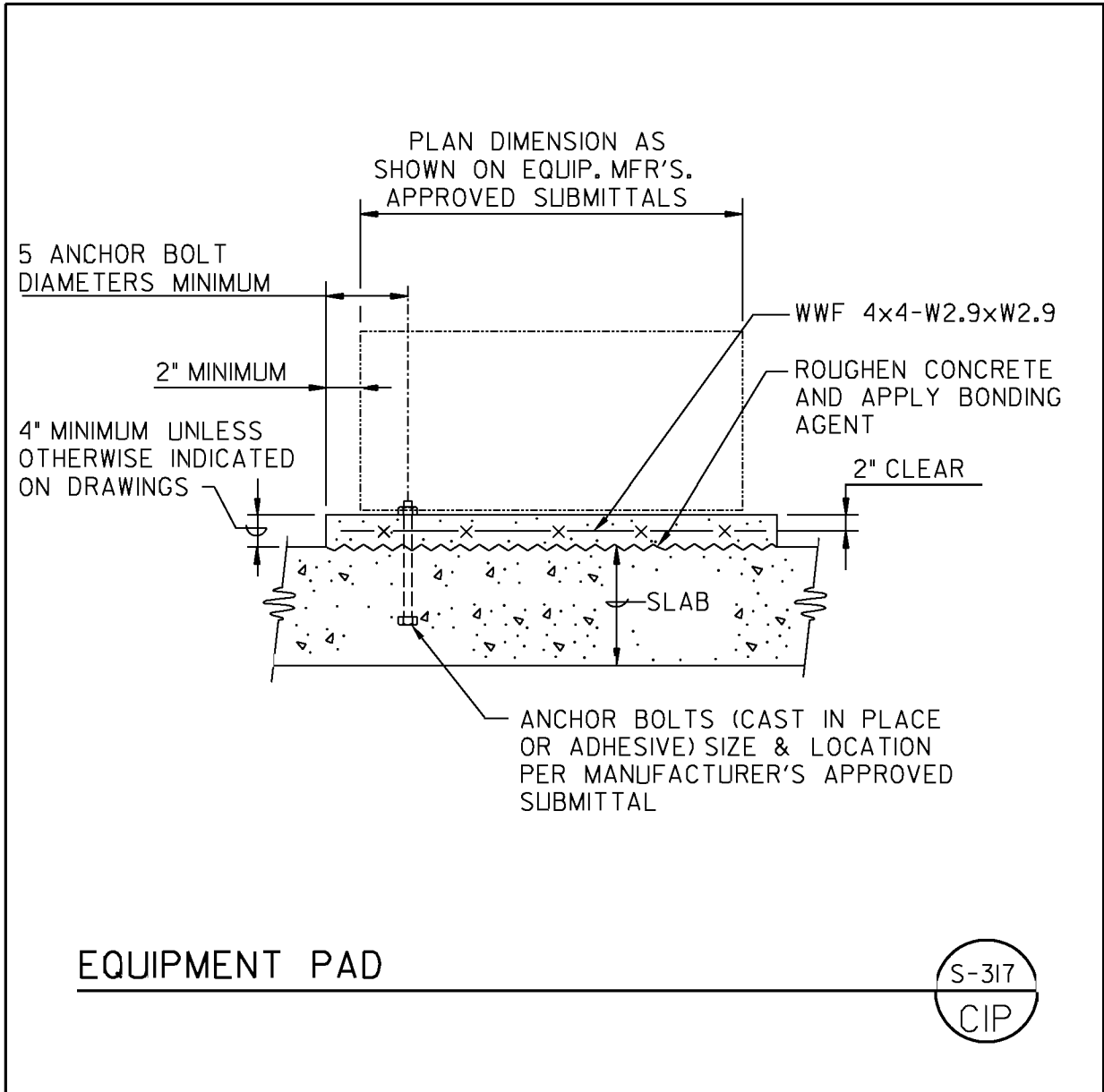


STANDARD
DETAIL

CIP

EQUIPMENT FOUNDATION

S-316



Notes to Design Consultant:

1. This detail to be used under electrical MCC units, and other house keeping light equipment pad.
2. Provide height of pad on drawings.
3. This detail to be used only for equipment pad height \leq 6".

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego



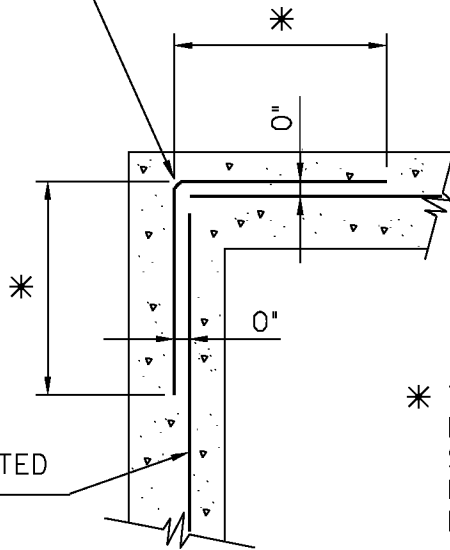
STANDARD
DETAIL

CIP

S-317

EQUIPMENT PAD

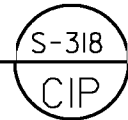
ADDITIONAL CORNER REINFORCING
 SAME SIZE AND SPACING AS WALL
 REINFORCING UNLESS OTHERWISE
 INDICATED ON DRAWINGS



REINFORCING AS INDICATED
 ON DRAWINGS (TYP.)

* TENSION LAP SPLICES
 PER GENERAL
 STRUCTURAL NOTES
 UNLESS OTHERWISE
 INDICATED ON DWGS.

SINGLY REINFORCED WALL L-CORNER
TYPE I



REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
 City of San Diego

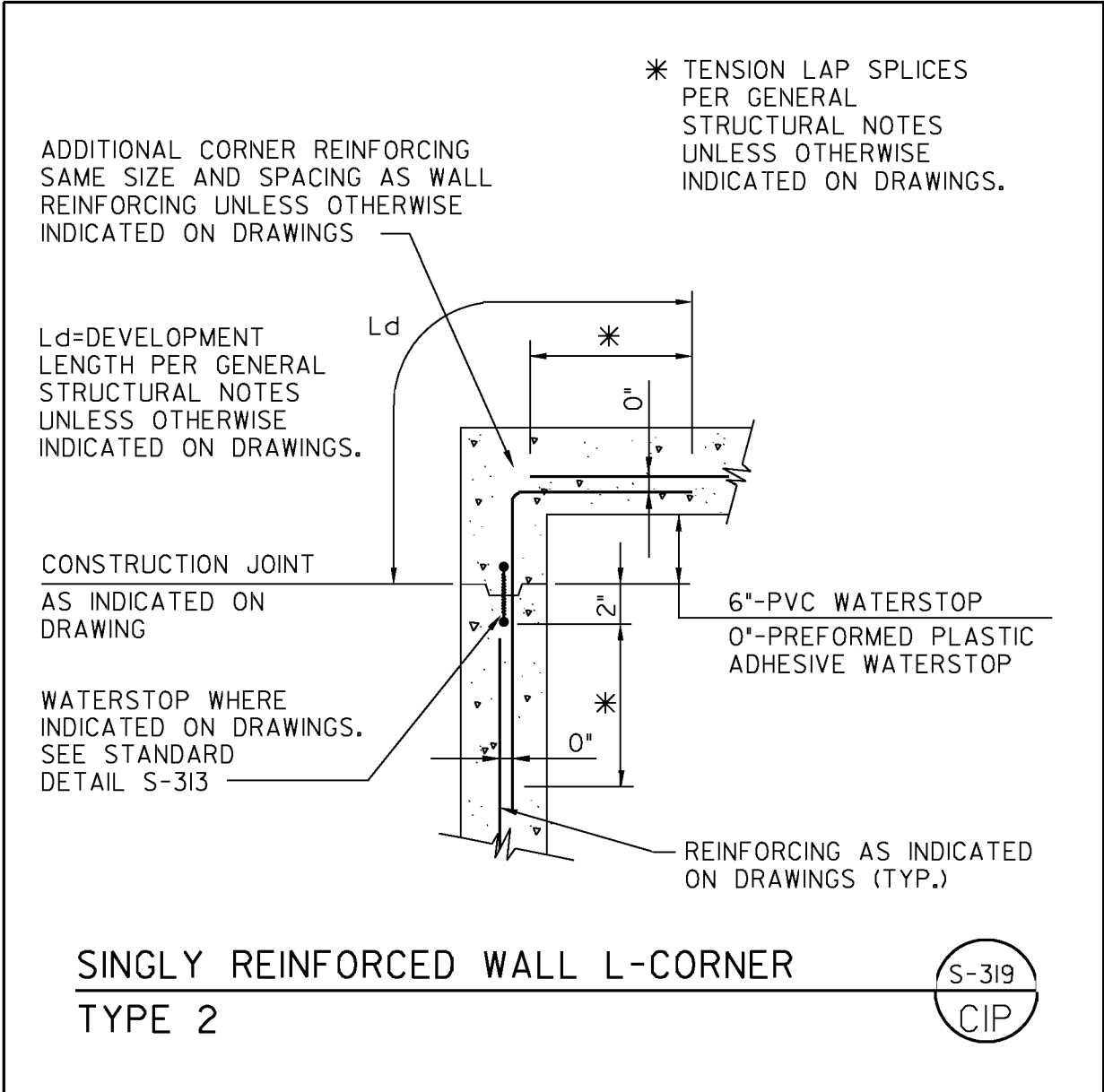


STANDARD
 DETAIL

CIP

**SINGLY REINFORCED WALL
 L-CORNER TYPE I**

S-318



Notes to Design Consultant:

1. Use this detail if there is a vertical joint at the junction of the walls, and waterstop required.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

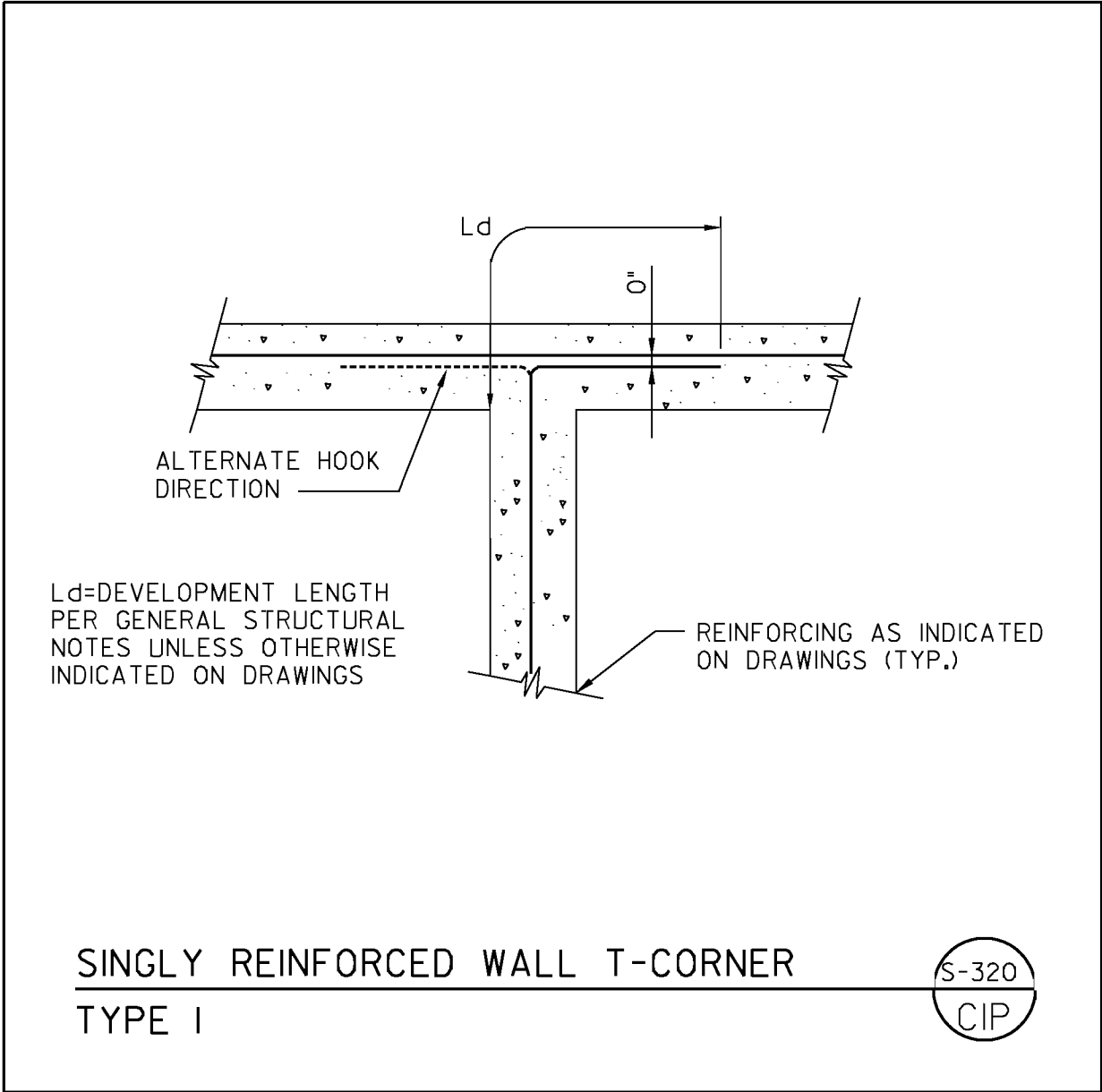


STANDARD
DETAIL

CIP

**SINGLY REINFORCED WALL
L-CORNER TYPE 2**

S-319



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

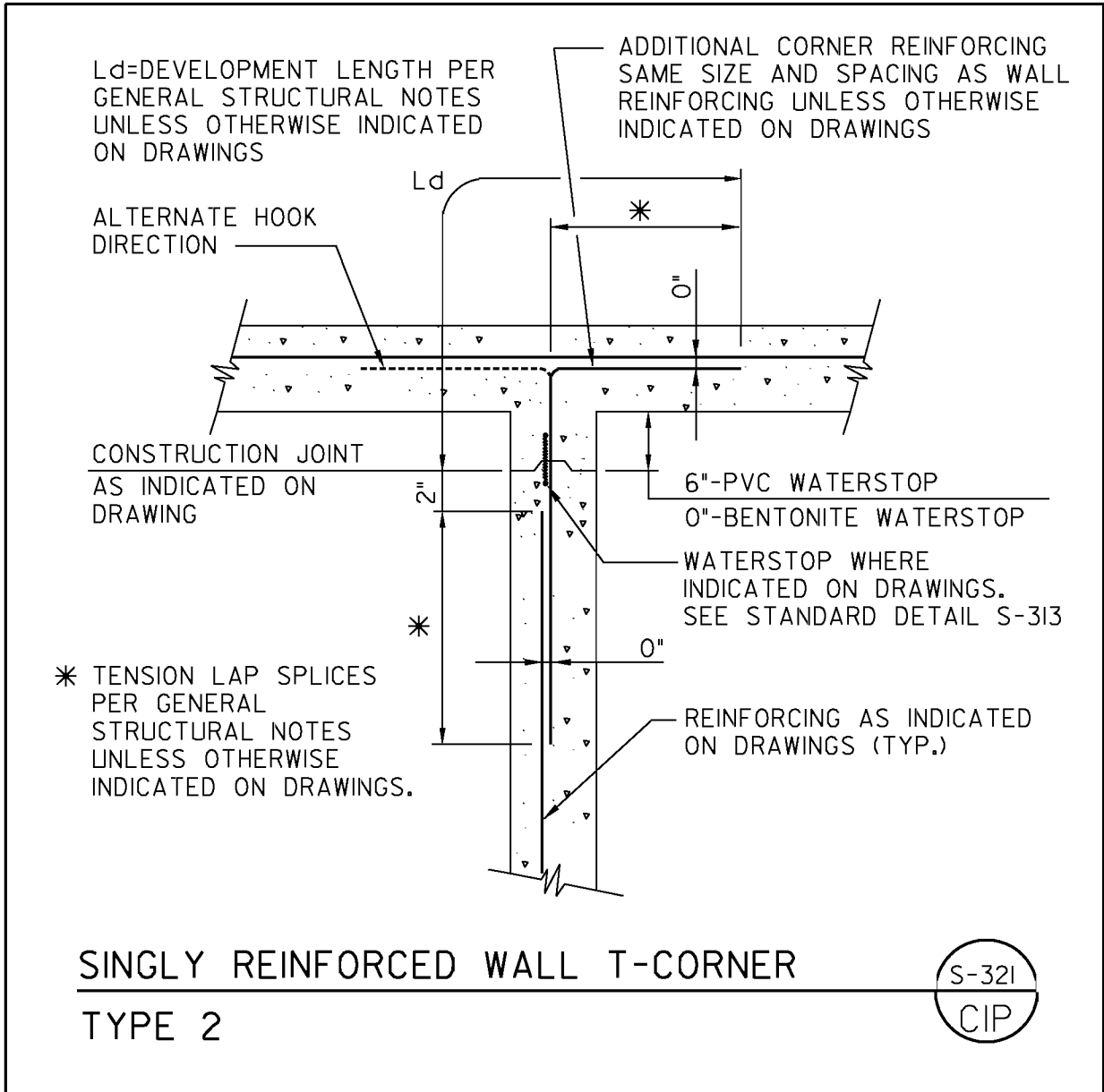


STANDARD
DETAIL

CIP

SINGLY REINFORCED WALL
T-CORNER TYPE I

S-320



Notes to Design Consultant:

1. Use this detail if there is a vertical joint at the junction of the walls, and waterstop required.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

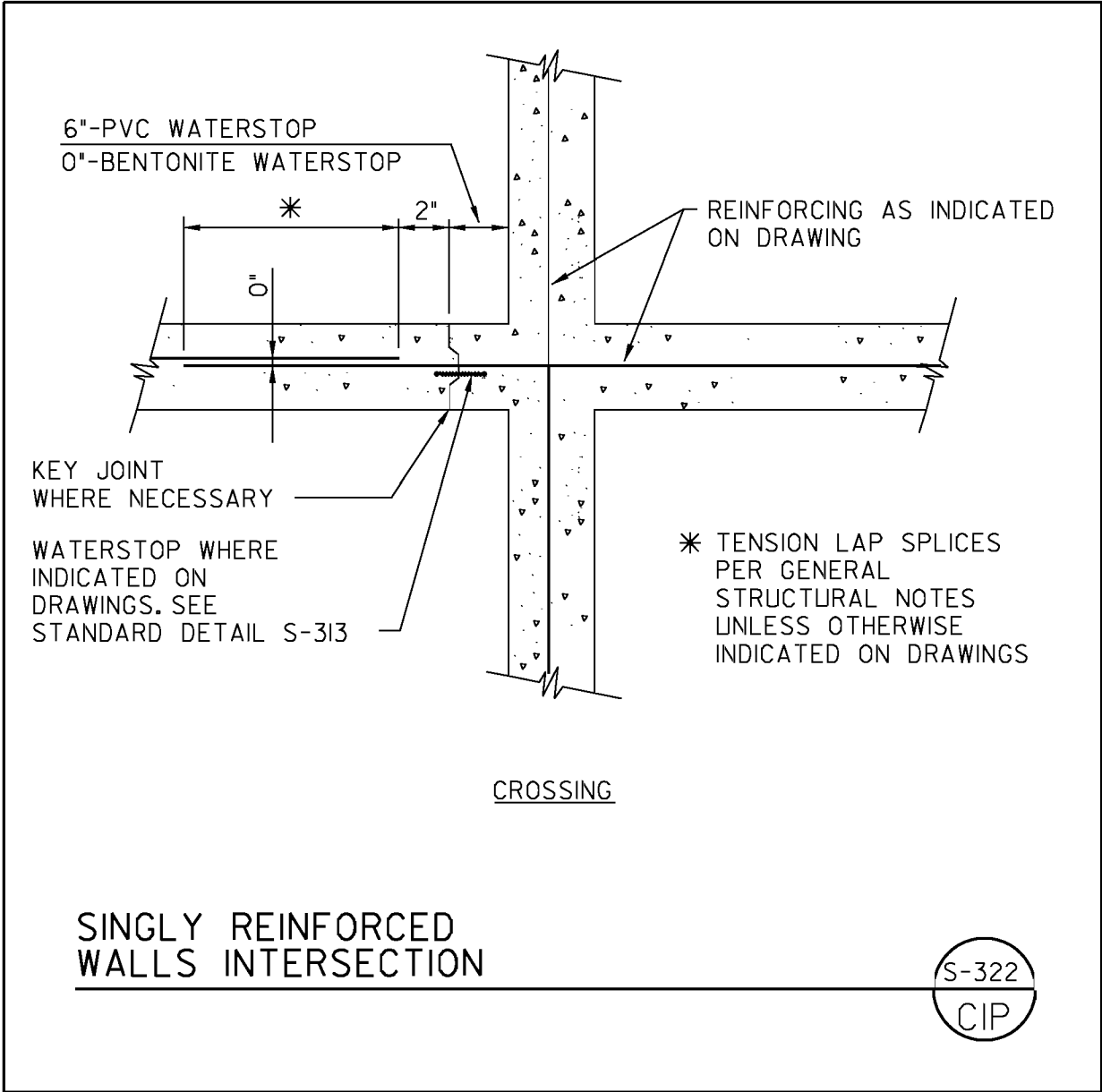


STANDARD
DETAIL

CIP

**SINGLY REINFORCED WALL
T-CORNER TYPE 2**

S-321



Notes to Design Consultant: _____

1. Use this detail if there is a vertical joint in any of the walls at the junction.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

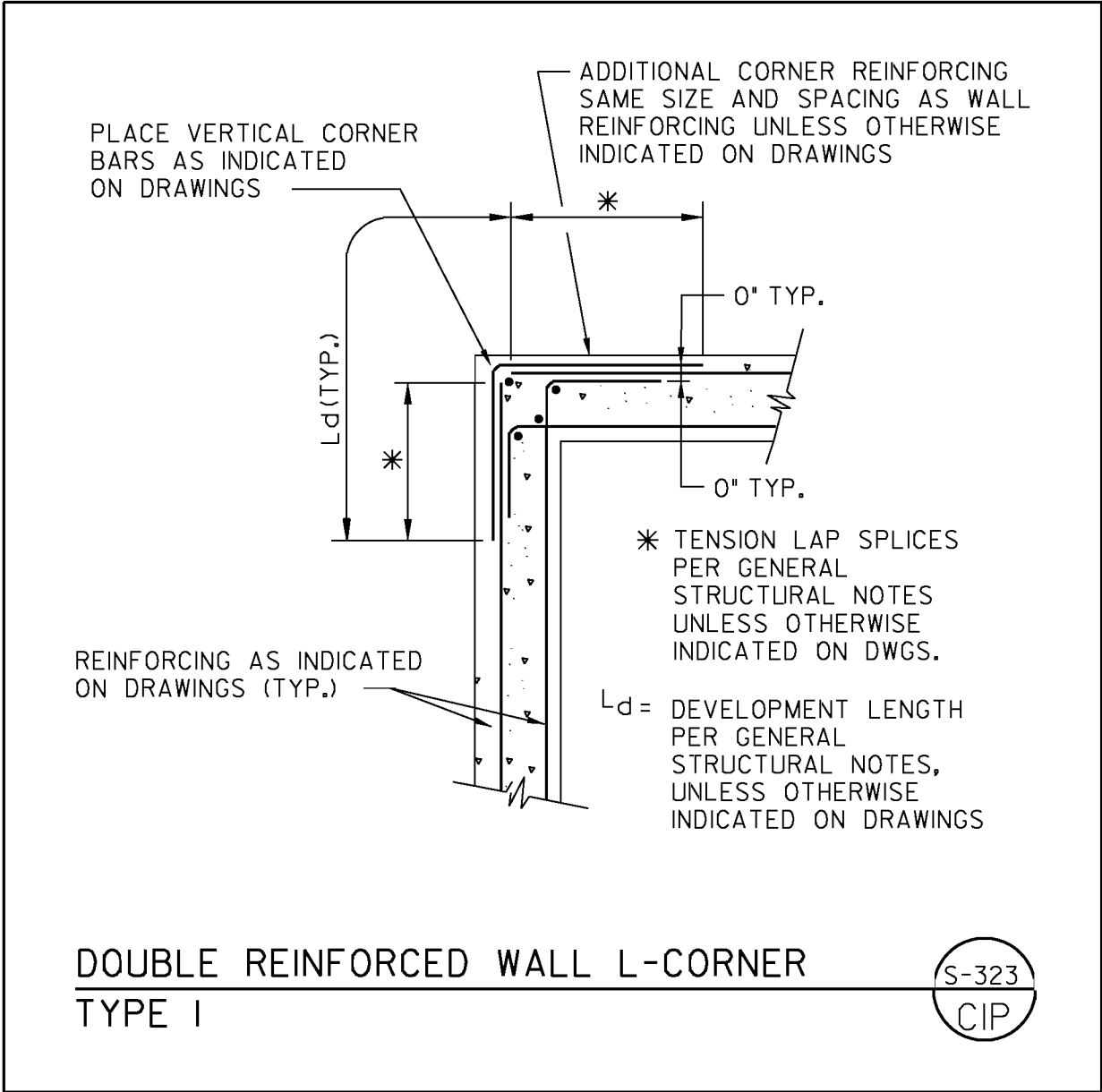


STANDARD
DETAIL

CIP

SINGLY REINFORCED
WALLS INTERSECTION

S-322



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

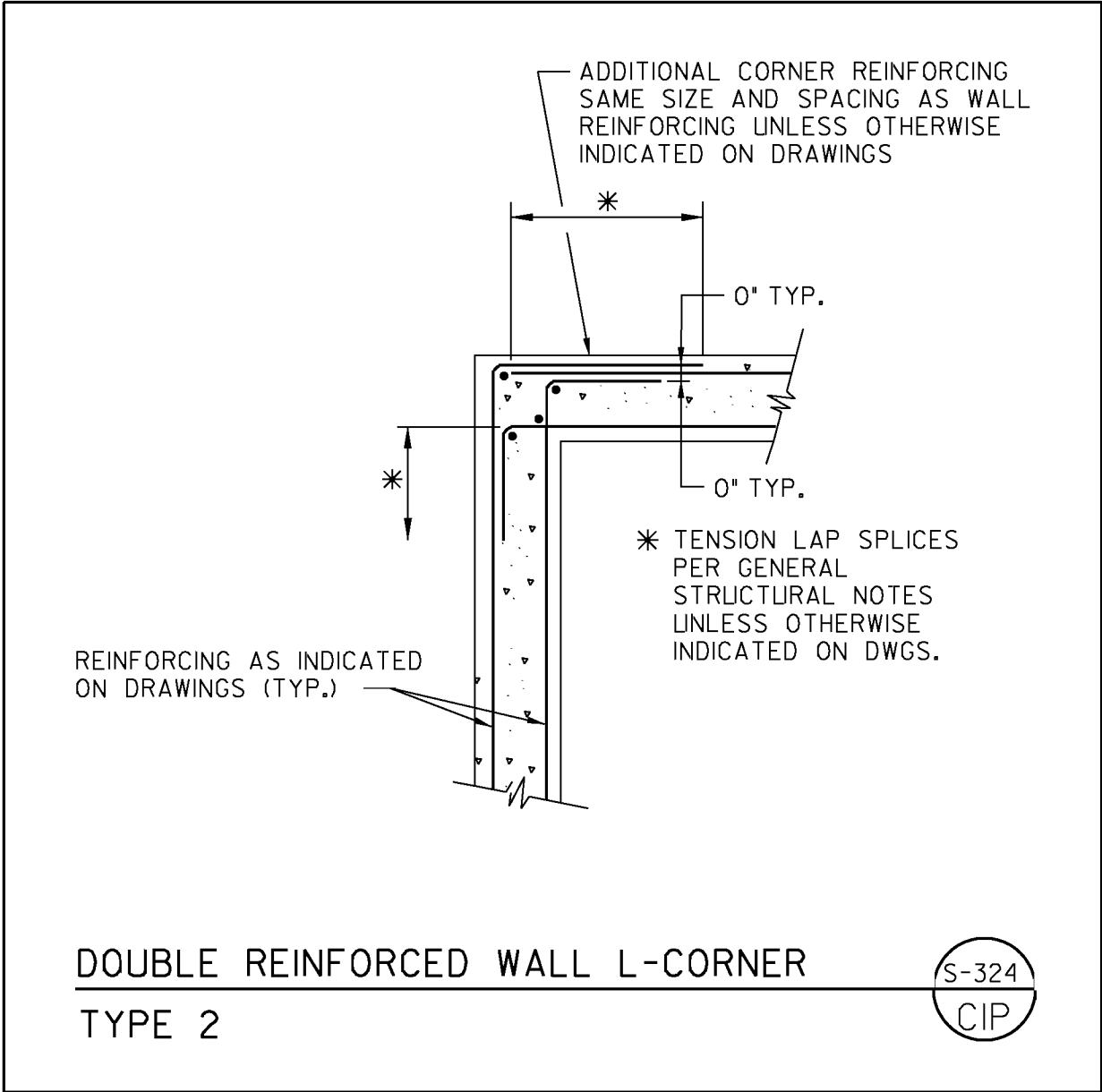


STANDARD
DETAIL

CIP

**DOUBLE REINFORCED WALL
L-CORNER TYPE I**

S-323



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

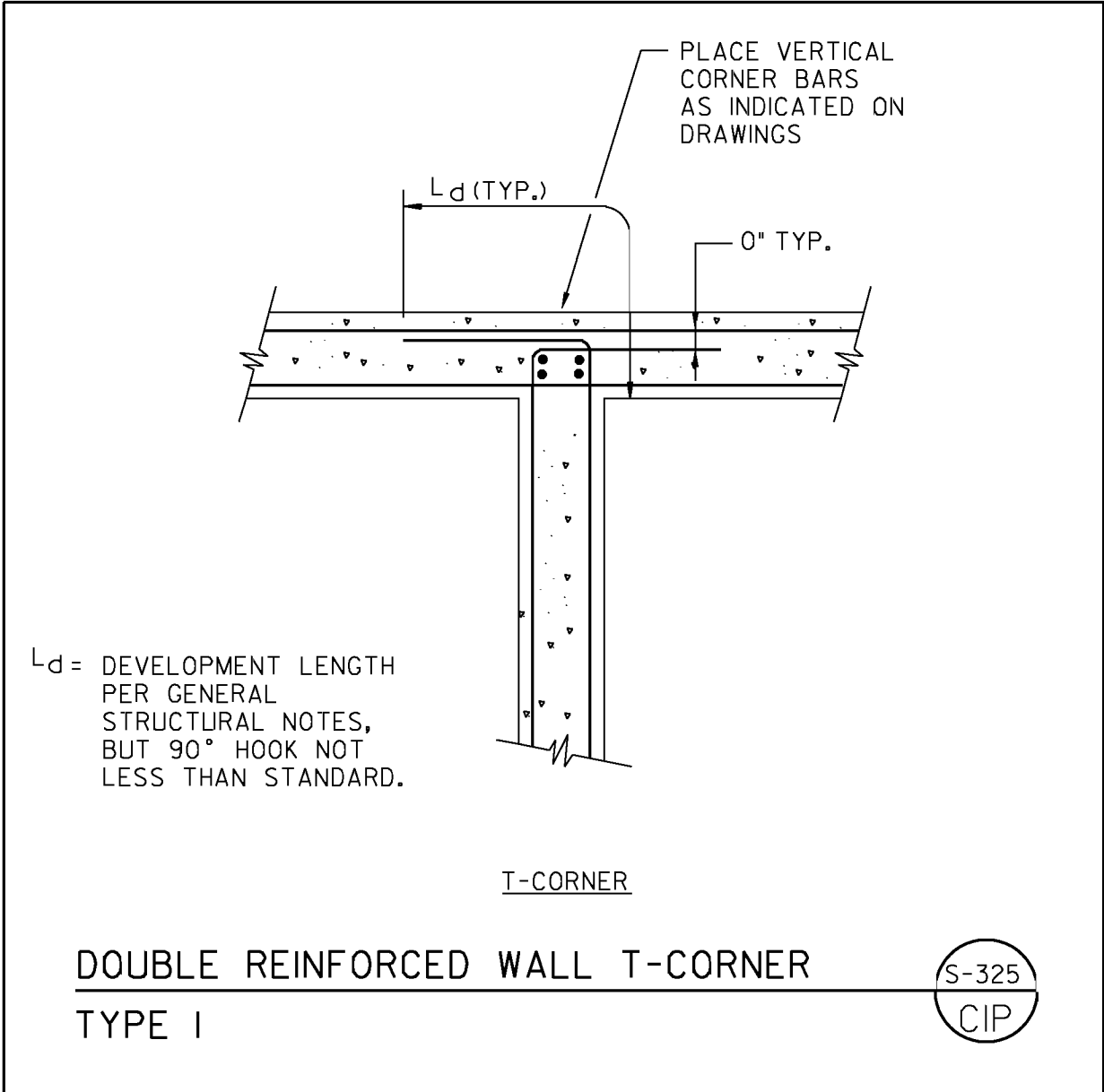


STANDARD
DETAIL

CIP

DOUBLE REINFORCED WALL
L-CORNER TYPE 2

S-324



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

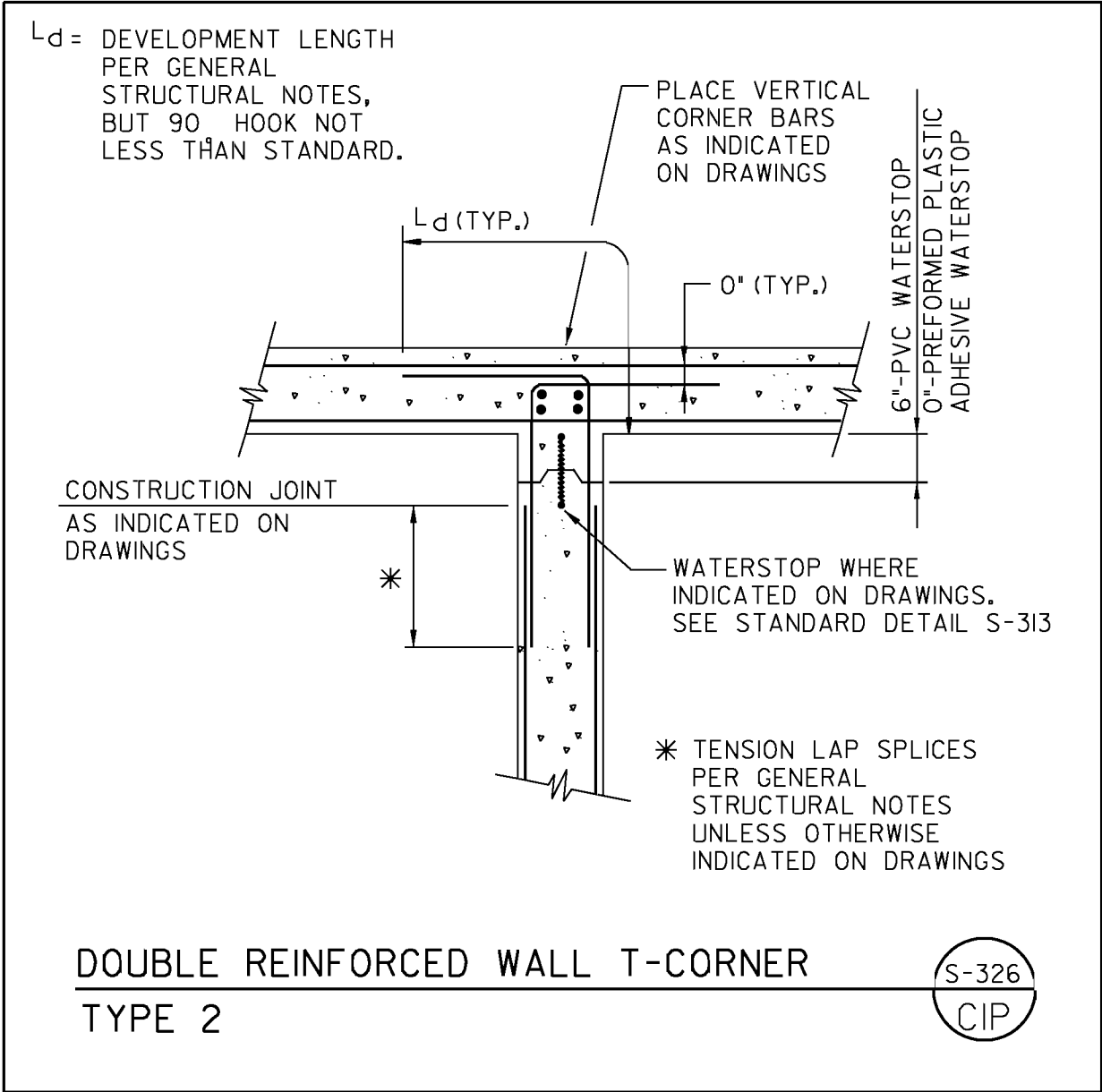


STANDARD
DETAIL

CIP

**DOUBLE REINFORCED WALL
T-CORNER TYPE I**

S-325



Notes to Design Consultant:

1. Use this detail if there is a vertical joint at the junction of the walls, and waterstop required.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

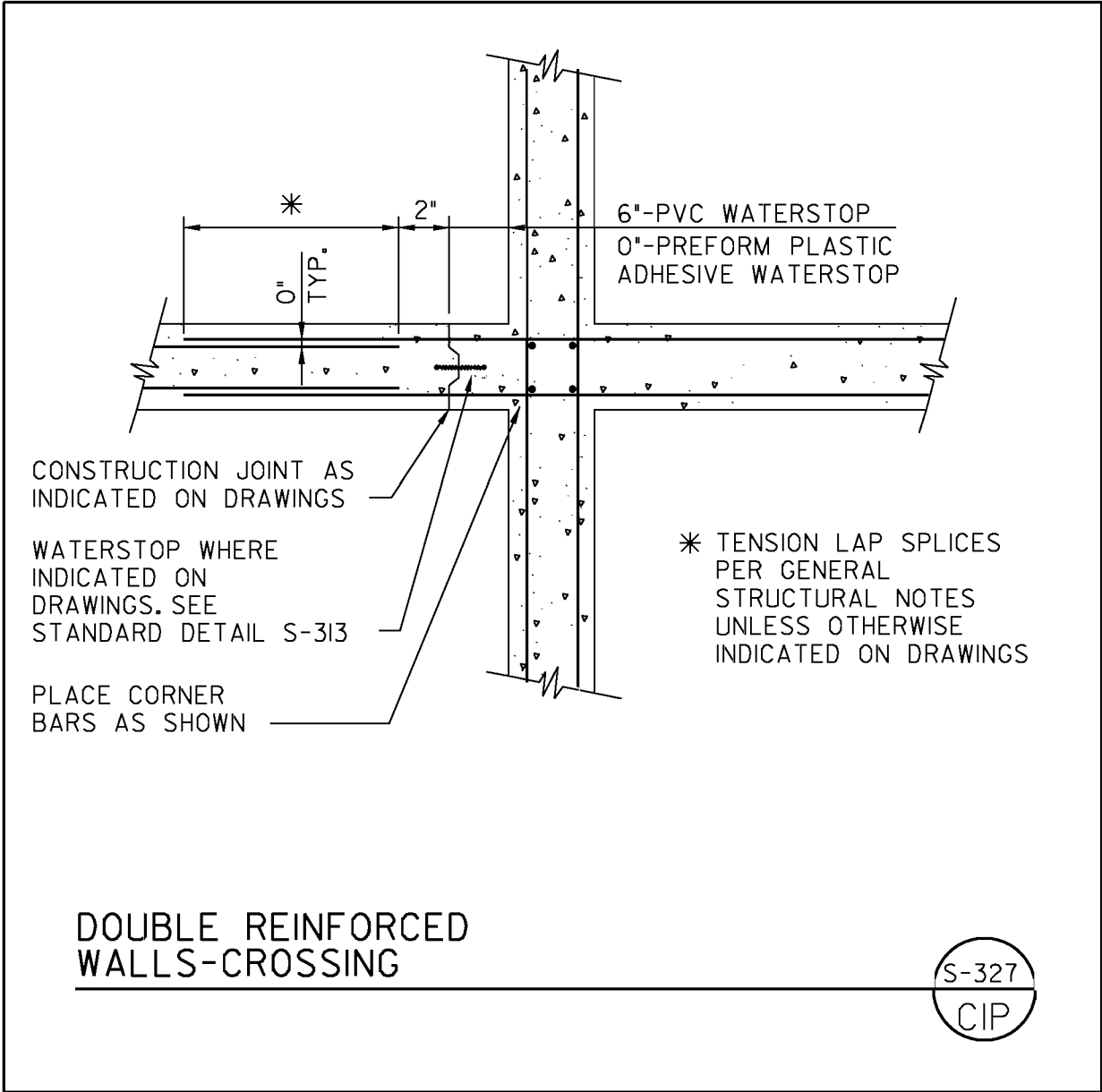


STANDARD
DETAIL

CIP

**DOUBLE REINFORCED WALL
T-CORNER TYPE 2**

S-326



Notes to Design Consultant: _____

1. Use this detail if there is a vertical joint in any of the walls at the junction.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

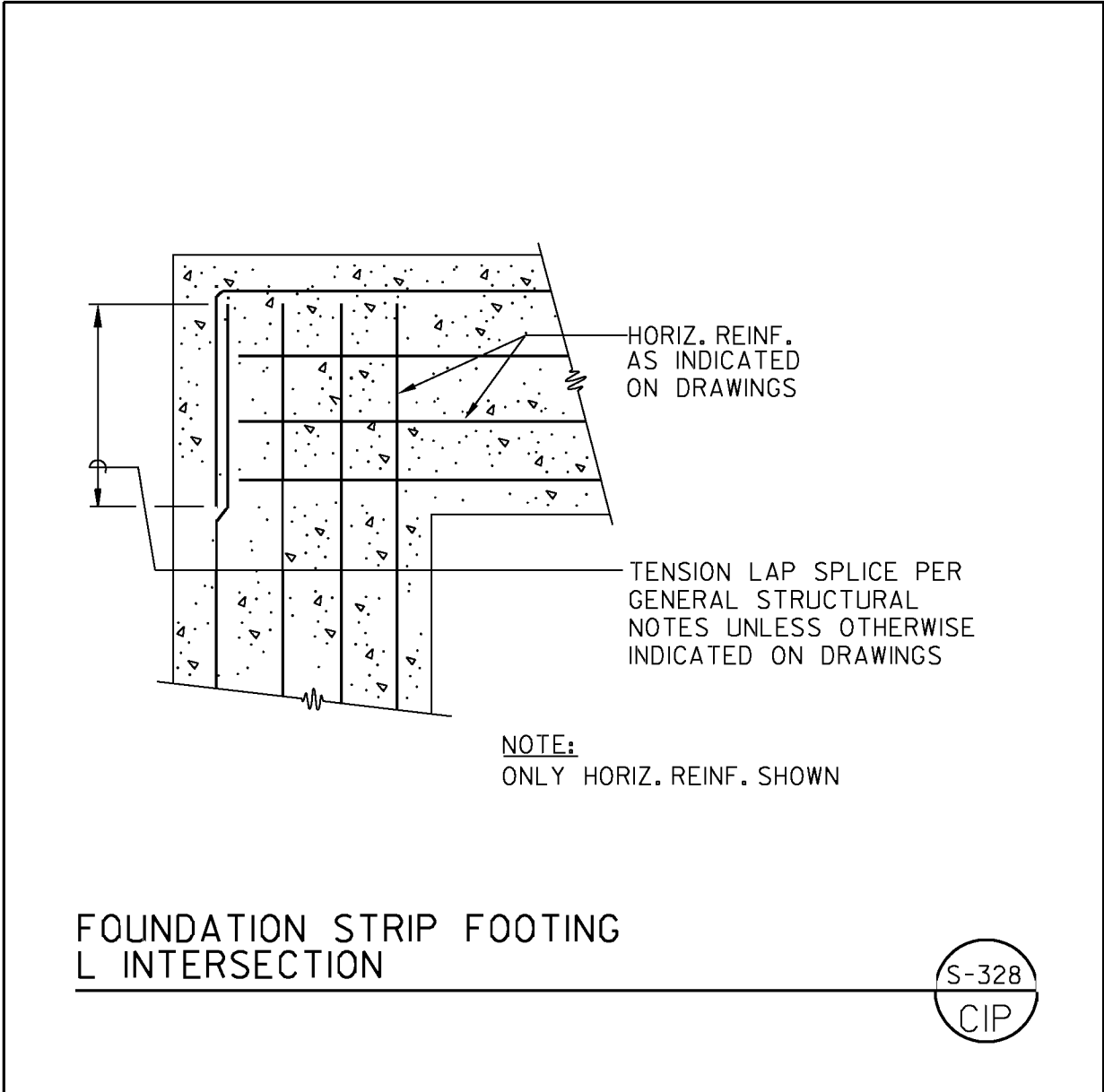


STANDARD
DETAIL

CIP

**DOUBLE REINFORCED
WALLS-CROSSING**

S-327



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego



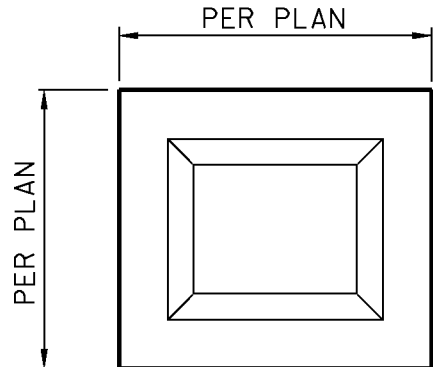
STANDARD
DETAIL

CIP

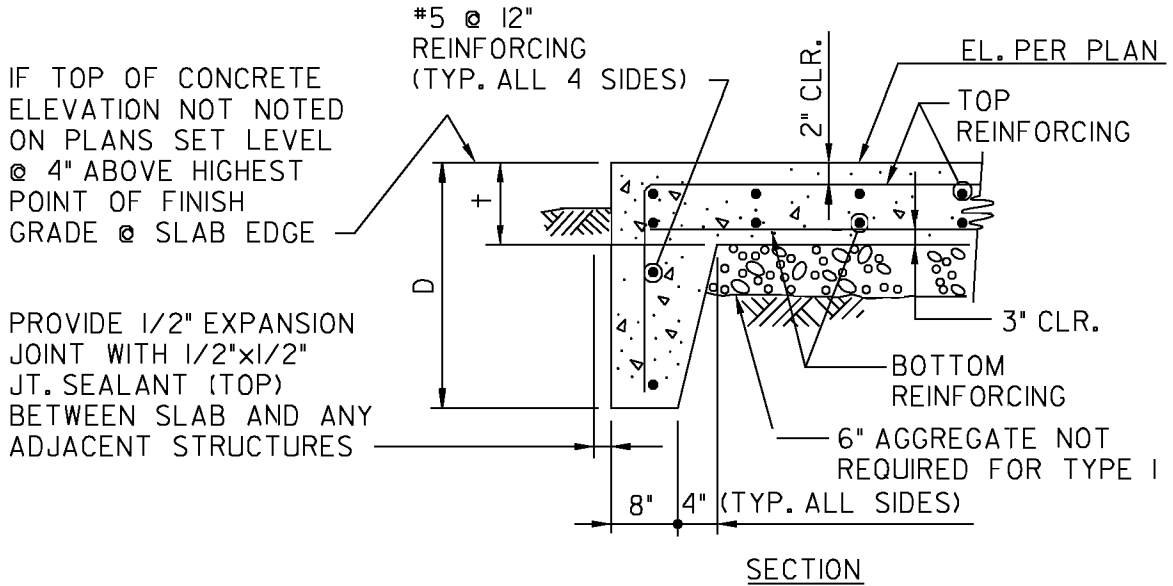
FOUNDATION STRIP FOOTING
L INTERSECTION

S-328

SLAB TYPE	D	+	TOP REINF. E.W.	BOTTOM REINF. E.W.
1	1'-0"	6"	#4 @ 12"	-
2	1'-6"	8"	#5 @ 12"	-
3	2'-0"	12"	#5 @ 12"	#5 @ 12"



PLAN



SECTION

SLAB-ON-GRADE



Note to Design Consultant

1. Use Type 1 for foot traffic, Type 2 for light vehicular and Type 3 for heavy vehicular traffic.

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REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego



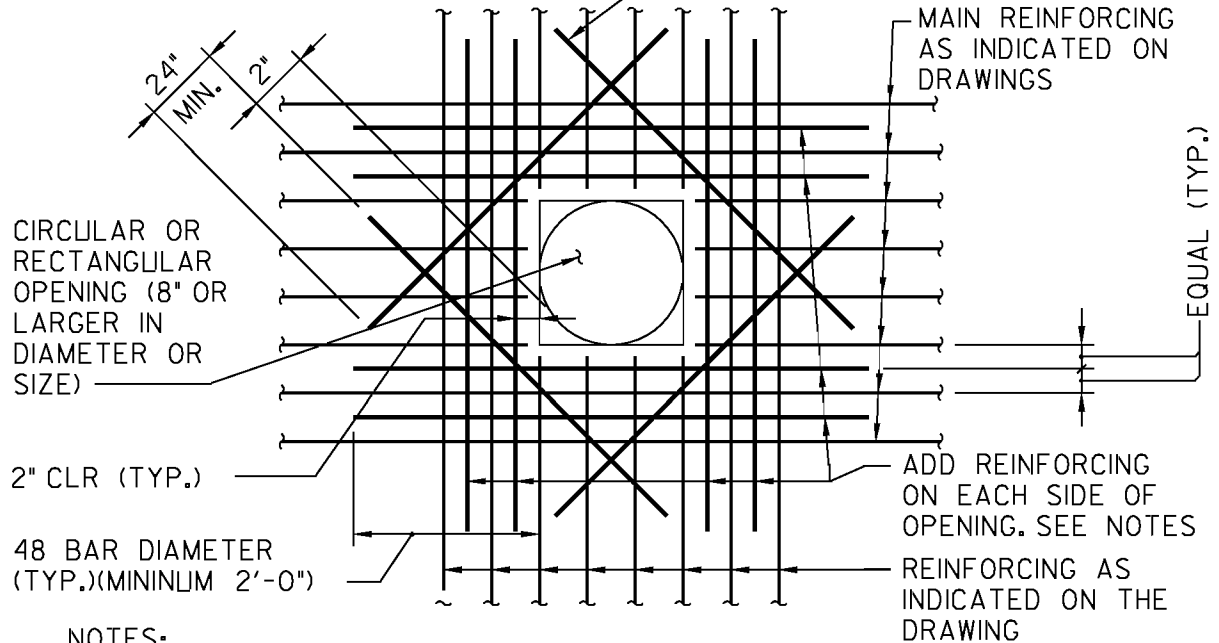
STANDARD
DETAIL

CIP

SLAB-ON-GRADE

S-329

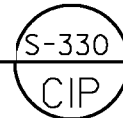
PROVIDE 1-#5 AT CENTER OF WALL OR SLAB FOR SINGLE REINFORCED MEMBER. (SEE NOTE 2)
 PROVIDE 1-#5 EACH FACE OF WALL OR SLAB FOR DOUBLY REINFORCED MEMBER. (SEE NOTE 2)



NOTES:

1. AREA OF ADDED REINFORCING AT EACH EDGE OF OPENING IN EACH DIRECTION SHALL BE AT LEAST $\frac{1}{2}$ THE CROSS SECTIONAL AREA OF THE INTERRUPTED REINFORCING.
2. PROVIDE STANDARD HOOKS ON REINFORCING IF STRAIGHT EXTENSION PAST THE OPENING CANNOT BE OBTAINED.
3. PLACE ADDED REINFORCING IN SAME PLANES AS MAIN REINFORCING.

OPENING REINFORCEMENT



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WATER DEPARTMENT
 City of San Diego

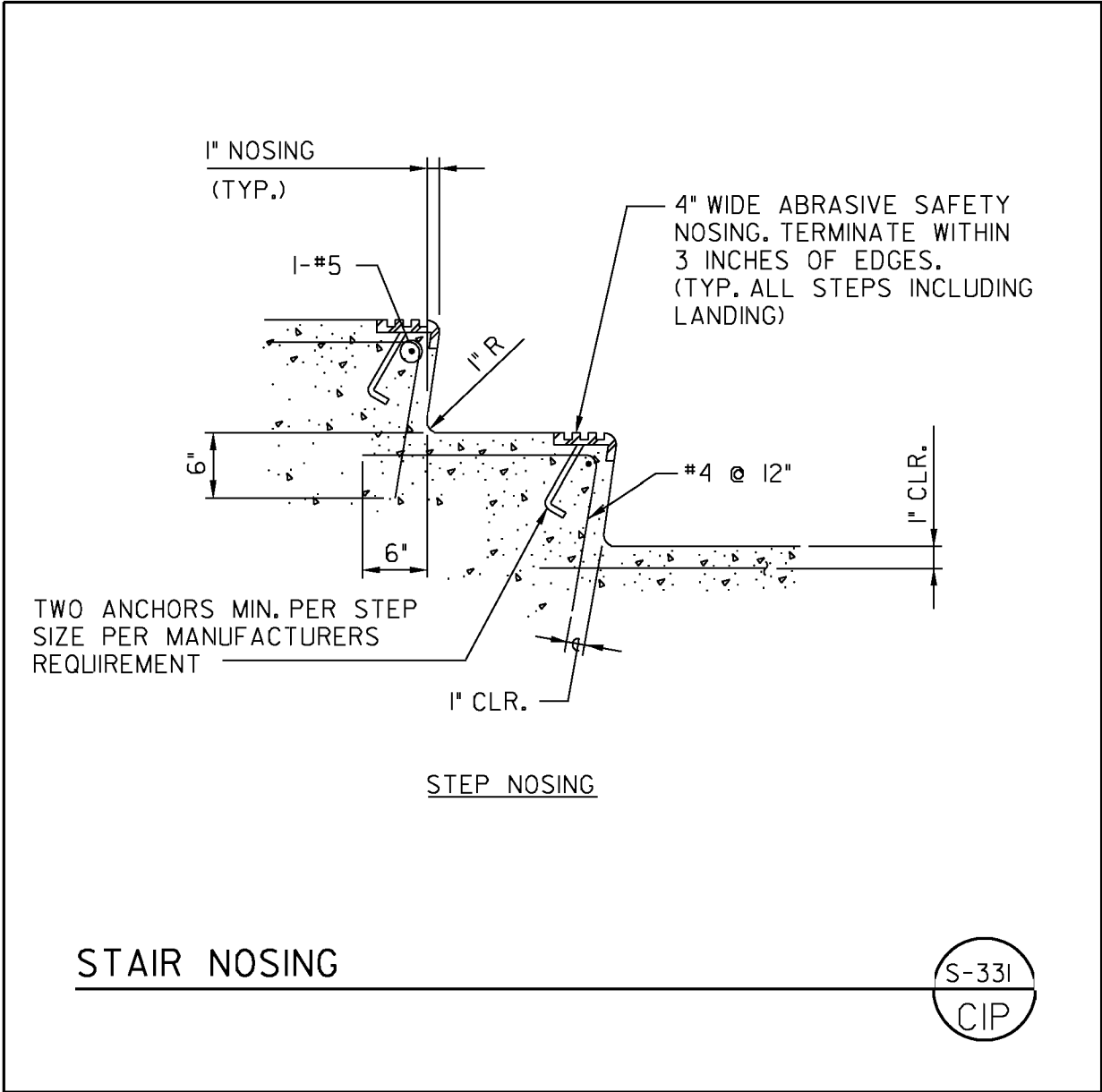


STANDARD
 DETAIL

CIP

OPENING REINFORCEMENT

S-330



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

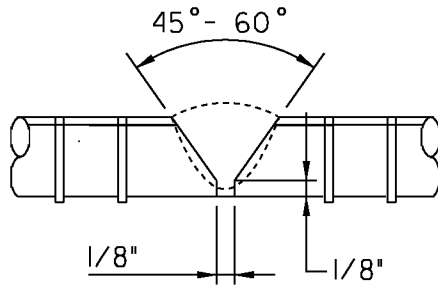


STANDARD
DETAIL

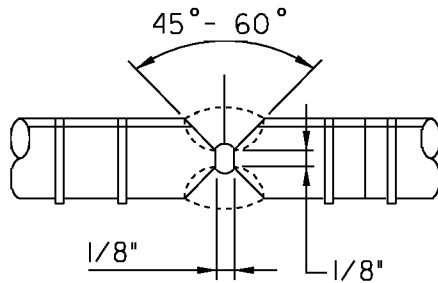
CIP

STAIR NOSING

S-331



SINGLE - V- GROOVE WELD



DOUBLE - V- GROOVE WELD

NOTES:

1. WELDING PROCEDURES SHALL BE PER AWS D1.4 REQUIREMENT.
2. USE E-80 ELECTRODE FOR GRADE 60 AND E-70 FOR GRADE 40 BARS.

DIRECT BUTT-WELDED SPLICES
HORIZONTAL REINFORCING BARS



Note to Design Consultant _____

Welding of rebar is not allowed except when approved by engineer.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

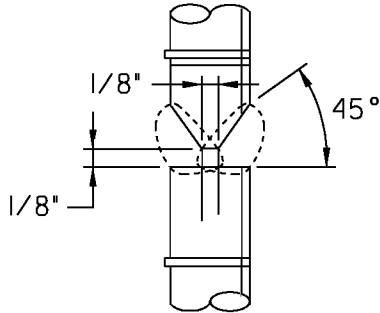


STANDARD
DETAIL

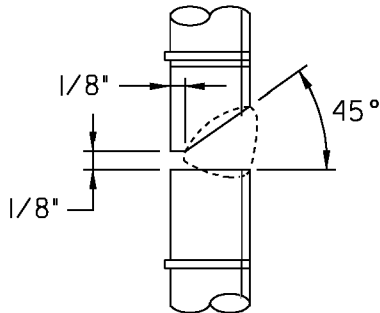
CIP

**DIRECT BUTT-WELD SPLICES
HORIZONTAL REINFORCING BARS**

S-332



DOUBLE - BEVEL - GROOVE WELD



SINGLE - BEVEL - GROOVE WELD

NOTES:

1. WELDING PROCEDURES SHALL BE PER AWS D1.4 REQUIREMENT.
2. USE E980 ELECTRIDE FOR GRADE 60 AND E70 FOR GRADE 40 BARS.

**DIRECT BUTT-WELDED SPLICES
VERTICAL REINFORCING BARS**



Note to Design Consultant

Welding rebar are not allowed except when approved by engineer.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

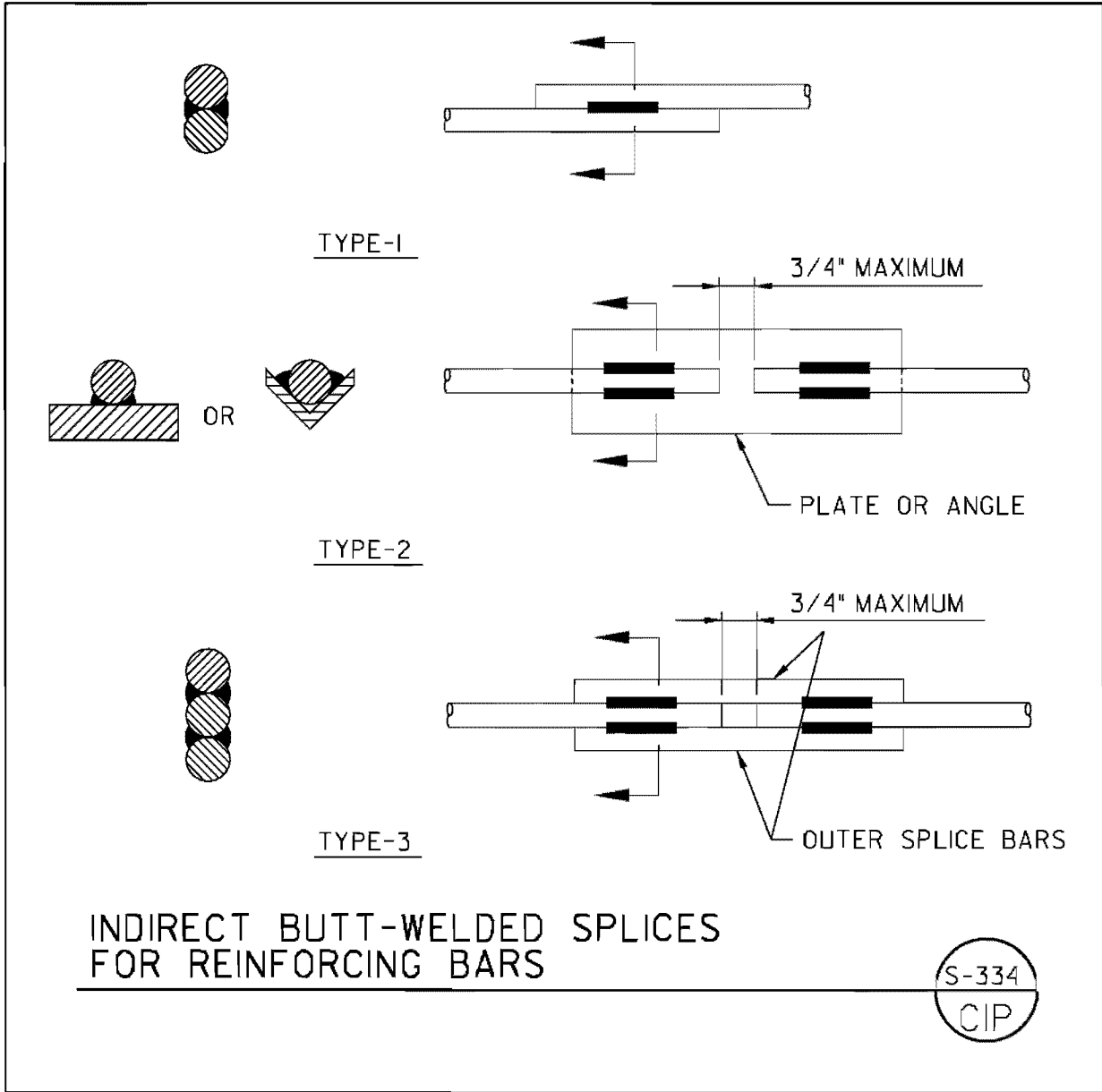


STANDARD
DETAIL

CIP

**DIRECT BUTT-WELD SPLICES
VERTICAL REINFORCING BARS**

S-333



Note to Design Consultant

Welding rebar are not allowed except when approved by engineer.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

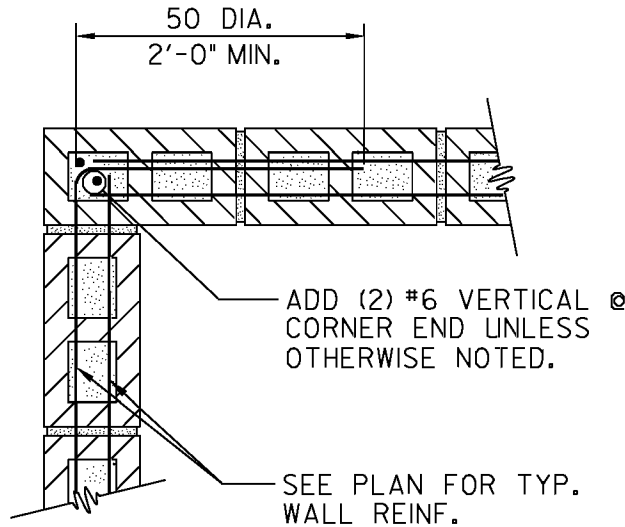


STANDARD
DETAIL

CIP

**INDIRECT BUTT-WELD SPLICES
FOR REINFORCING BARS**

S-334



VERTICAL REINFORCING NOT SHOWN FOR CLARITY

NOTE:
 ALL EXTERIOR JOINTS TO BE RAKED
 AND INTERIOR JOINTS TO BE TOOLED
 SEE PROJECT SPECIFICATIONS.

MASONRY WALL L-CORNER



REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
 City of San Diego

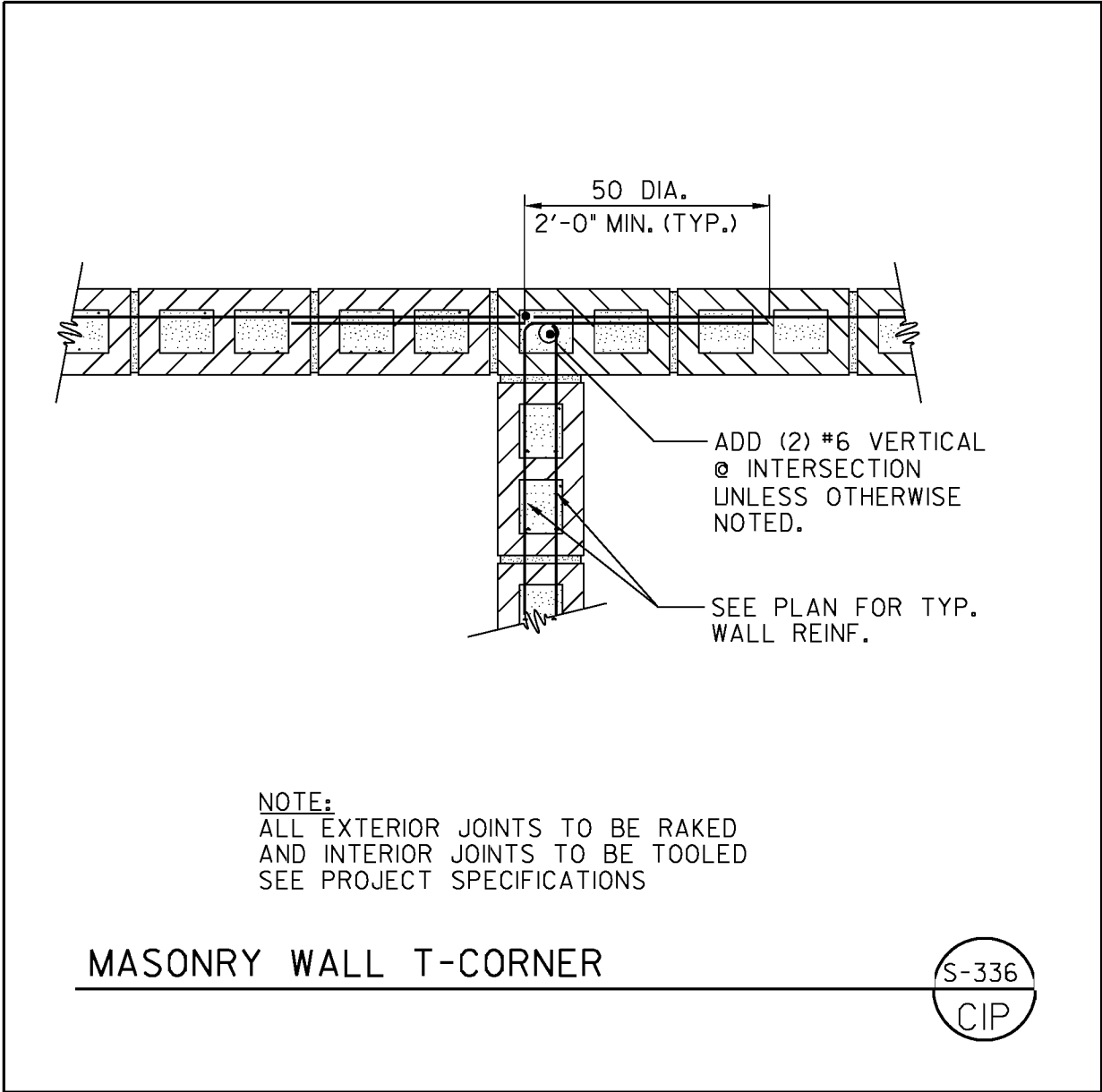


STANDARD
 DETAIL

CIP

MASONRY WALL L-CORNER

S-335



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

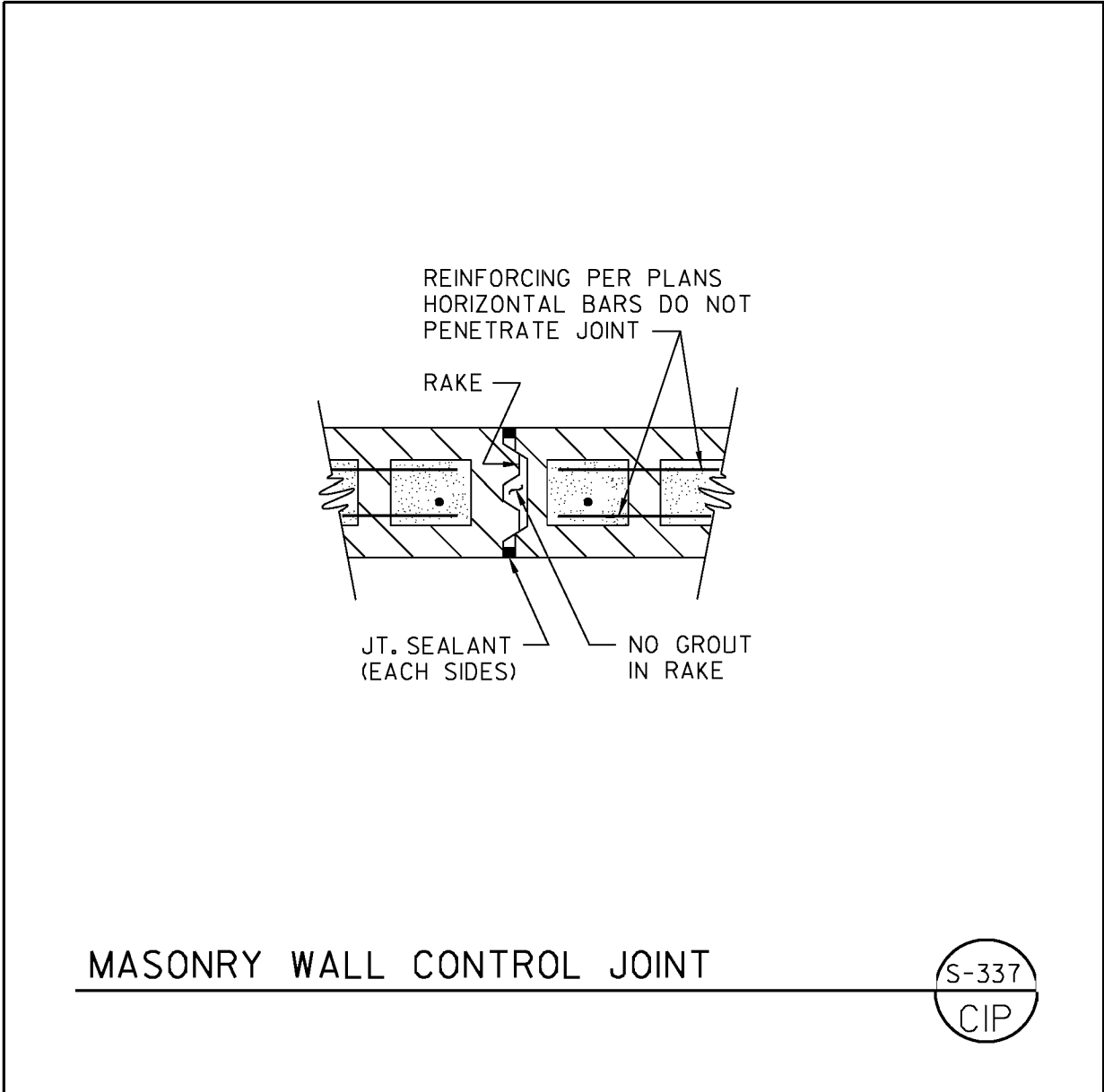


STANDARD
DETAIL

CIP

MASONRY WALL T-CORNER

S-336



Note to Consultant: _____

1. Locate control joint at 20' + o/c.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

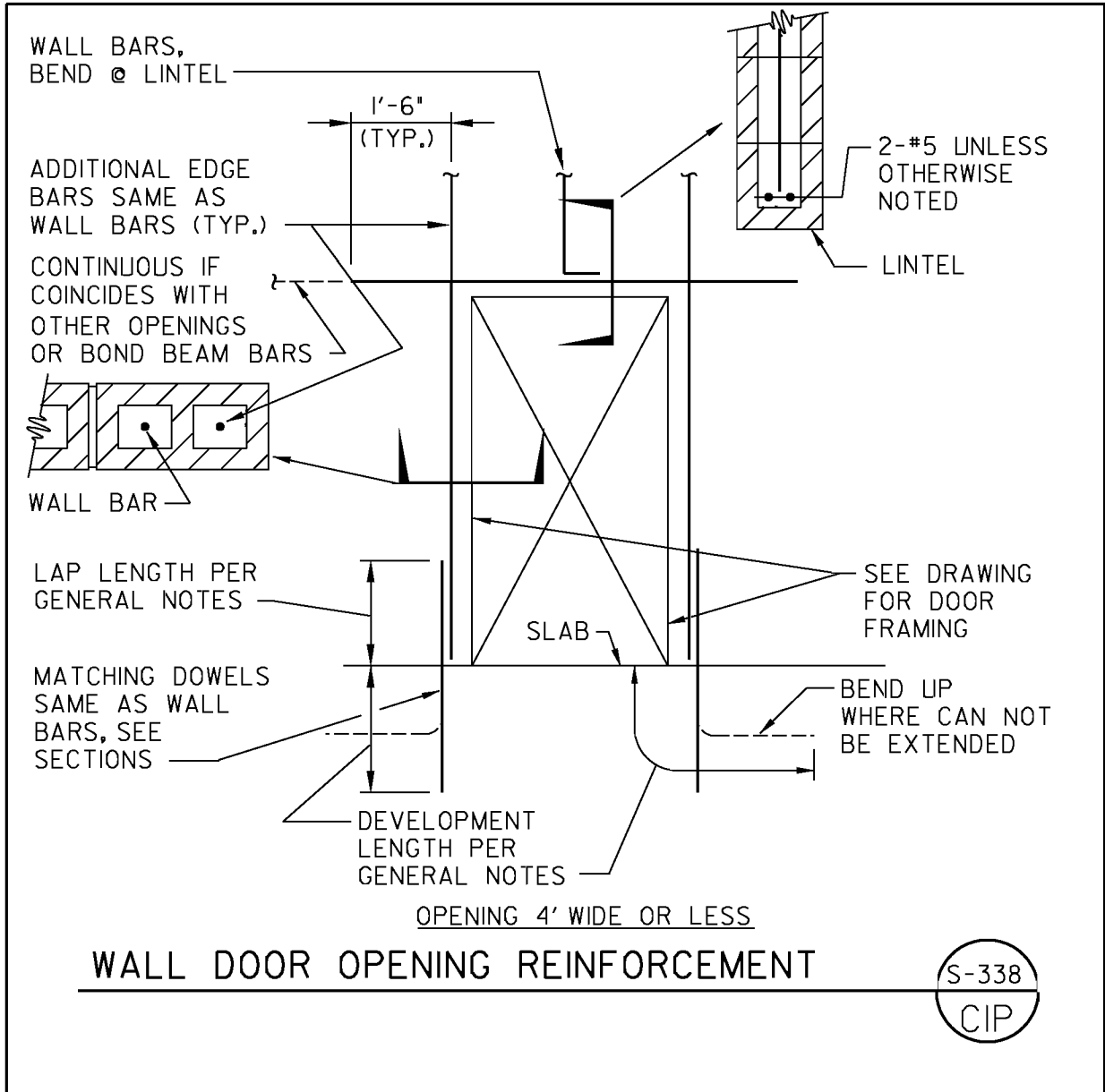


STANDARD
DETAIL

CIP

MASONRY WALL CONTROL JOINT

S-337



Note to Consultant

1. Verify reinforcement for design loading.
2. Provide reinforcing details for opening wider than 4'-0".

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

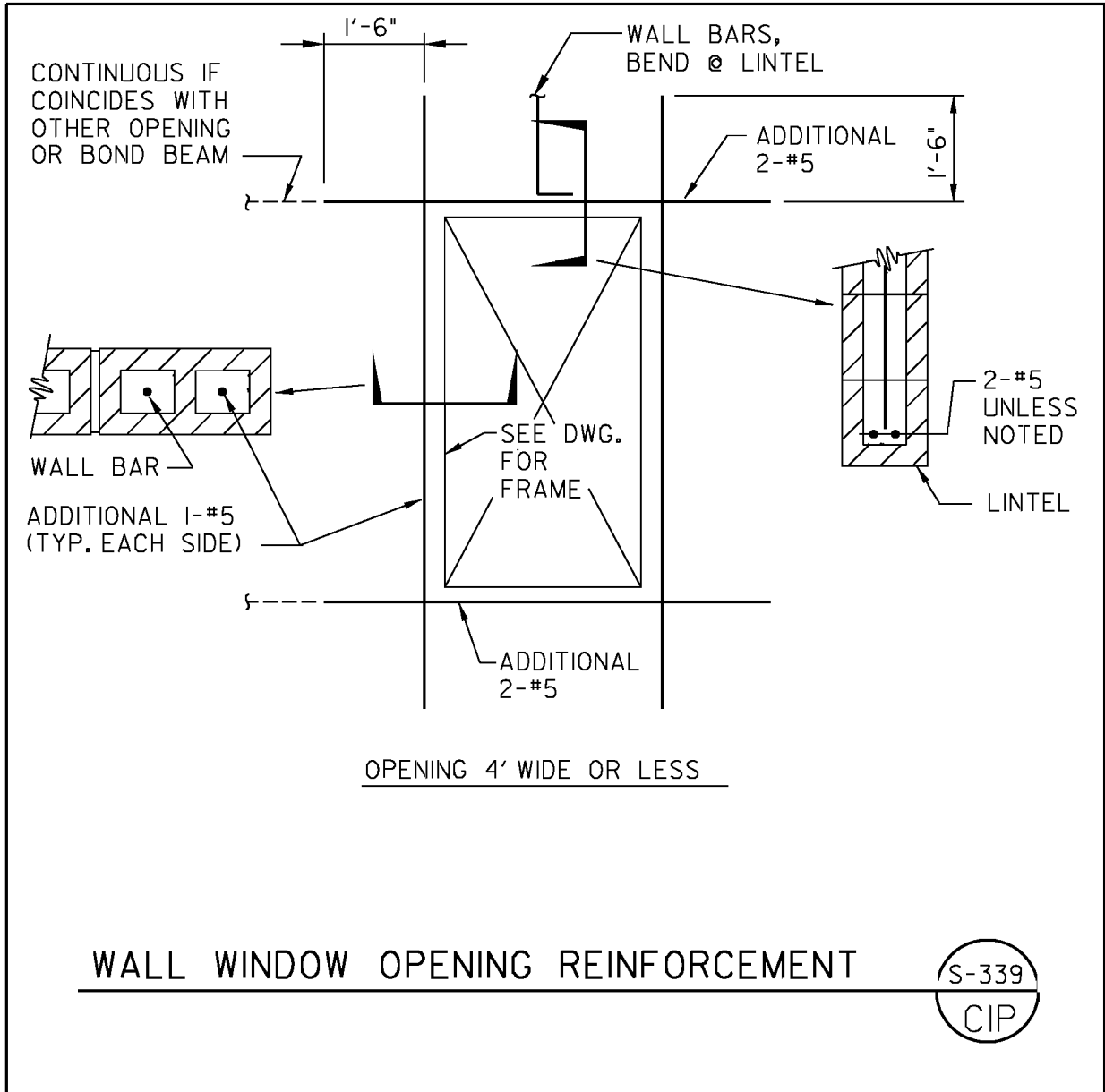


STANDARD
DETAIL

CIP

**WALL DOOR OPENING
REINFORCEMENT**

S-338



Notes to Consultant

1. Verify reinforcement for design loading.
2. Provide reinforcing details for opening wider than 4'-0".
3. Additional reinforcement not required for opening smaller than 16" x 16".

REVISION	BY	APPROVED	DATE

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WATER DEPARTMENT
City of San Diego

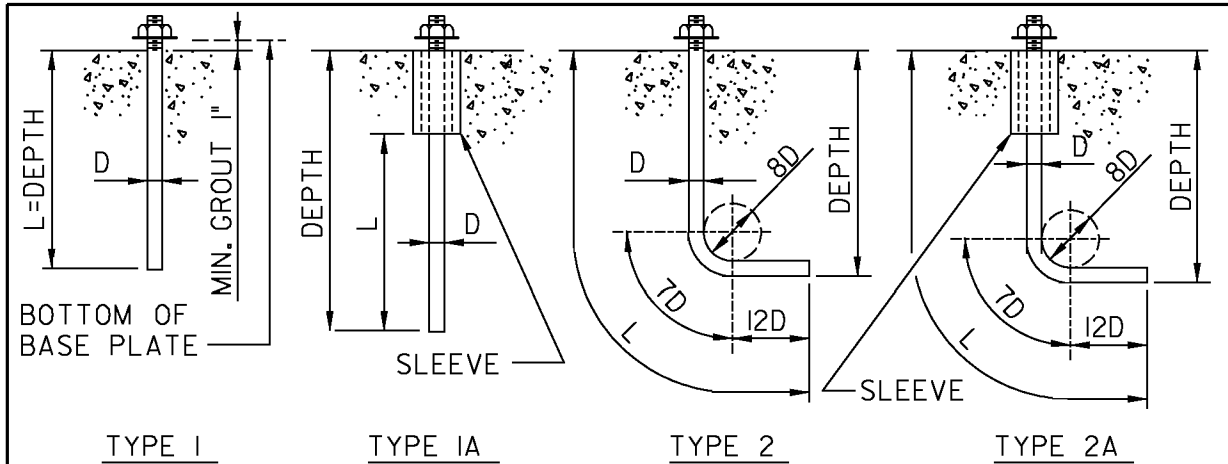


STANDARD
DETAIL

CIP

**WALL WINDOW OPENING
REINFORCEMENT**

S-339



BOLT DIAMETER, D, in.		1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
ALLOWABLE KIPS	TENSION	3.9	6.1	8.8	12.0	15.7	19.9	24.5	29.7	35.3
	SHEAR	2.0	3.1	4.4	6.0	7.9	9.9	12.3	14.8	17.7
REQ'D EMBEDMENT LENGTH, L		1'-4"	1'-8"	2'-0"	2'-4"	2'-10"	3'-6"	4'-4"	5'-3"	6'-4"
TYPE I	DEPTH	1'-4"	1'-8"	2'-0"	2'-4"	2'-10"	3'-6"	4'-4"	5'-3"	6'-4"
TYPE IA	SLEEVE	2" DIA. x6"	2" DIA. x6"	2" DIA. x8"	2" DIA. x8"	2 1/2" DIA. x12"	2 1/2" DIA. x12"	3" DIA. x15"	3" DIA. x15"	3 1/2" DIA. x15"
	DEPTH	1'-10"	2'-2"	2'-8"	3'-0"	3'-10"	4'-6"	5'-7"	6'-6"	7'-7"
TYPE 2	DEPTH	0'-9"	0'-11 1/4"	1'-1 1/2"	1'-3 3/4"	1'-8"	2'-2 1/4"	2'-10 1/2"	3'-7 3/4"	4'-8"
TYPE 2A	SLEEVE	2" DIA. x6"	2" DIA. x6"	2" DIA. x8"	2" DIA. x8"	2 1/2" DIA. x12"	2 1/2" DIA. x12"	3" DIA. x15"	3" DIA. x15"	3 1/2" DIA. x15"
	DEPTH	1'-3"	1'-5 1/4"	1'-9 1/2"	1'-11 3/4"	2'-8"	3'-2 1/4"	4'-1 1/2"	4'-10 3/4"	5'-11"

ANCHOR BOLTS AND SCHEDULE

S-340
CIP

MATERIAL

ANCHOR BOLTS - ASTM A307 GRADE A OR A36
CONCRETE STRENGTH - $f'_c = 4000$ PSI

Note to Consultant

1. Tension and shear capacity based on normal anchor bolt spacing, minimum concrete reinforcement and 4000 PSI concrete.
2. Allowables based on tensile stress of 20 KSI and shear stress of 10 KSI on gross area.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego

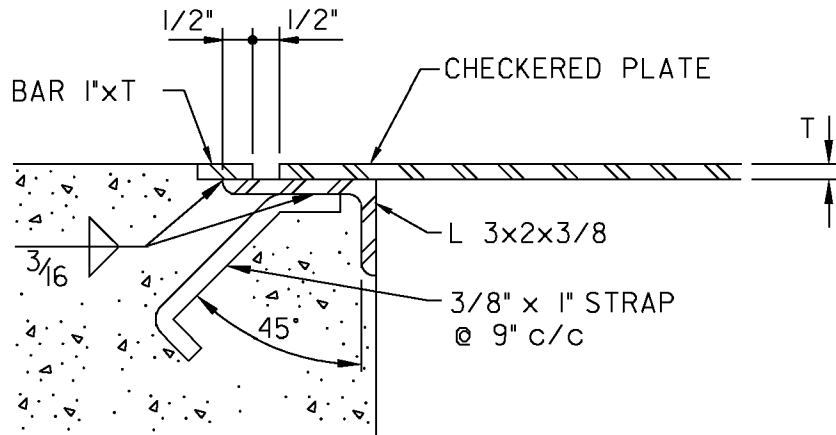


STANDARD
DETAIL

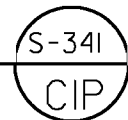
CIP

ANCHOR BOLTS AND SCHEDULE

S-340



CHECKERED PLATE SUPPORT AT FLOOR



Notes to Consultant: _____

1. Specify material on drawings.
2. Indicate required thickness on drawings.

REVISION	BY	APPROVED	DATE

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City of San Diego

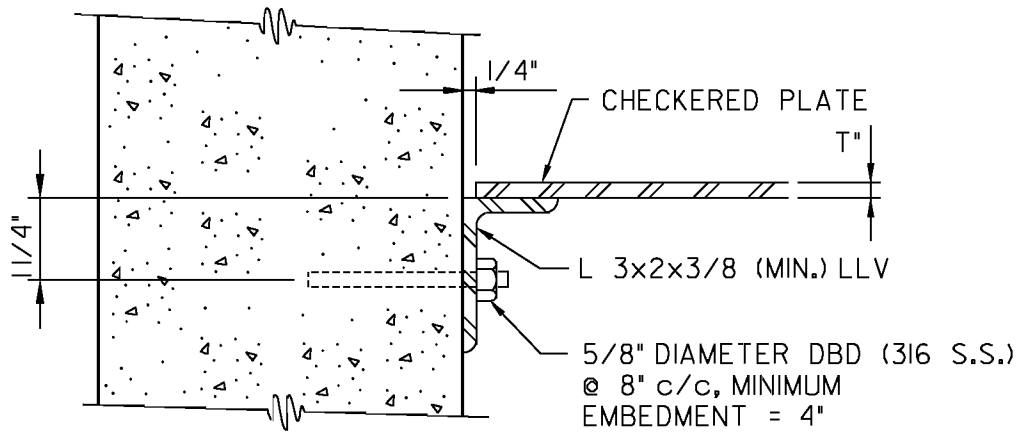


STANDARD
DETAIL

CIP

**CHECKERED PLATE SUPPORT
AT FLOOR**

S-341



CHECKERED PLATE SUPPORT AT WALL



Notes to Consultant: _____

1. Specify material on drawings.
2. Indicate required thickness on drawings.

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 City of San Diego

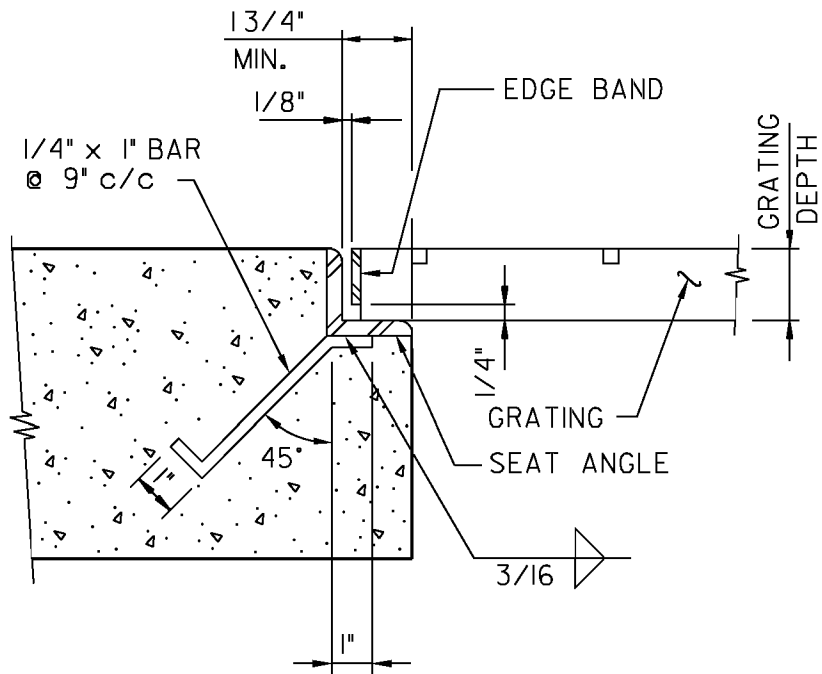


STANDARD
 DETAIL

CIP

**CHECKERED PLATE SUPPORT
 AT WALL**

S-342



GRATING SUPPORT AT FLOOR



Notes to Consultant: _____

1. Specify material on drawings.
2. Indicate required depth on drawings.
3. Indicate minimum seat angle size on drawings.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

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City of San Diego

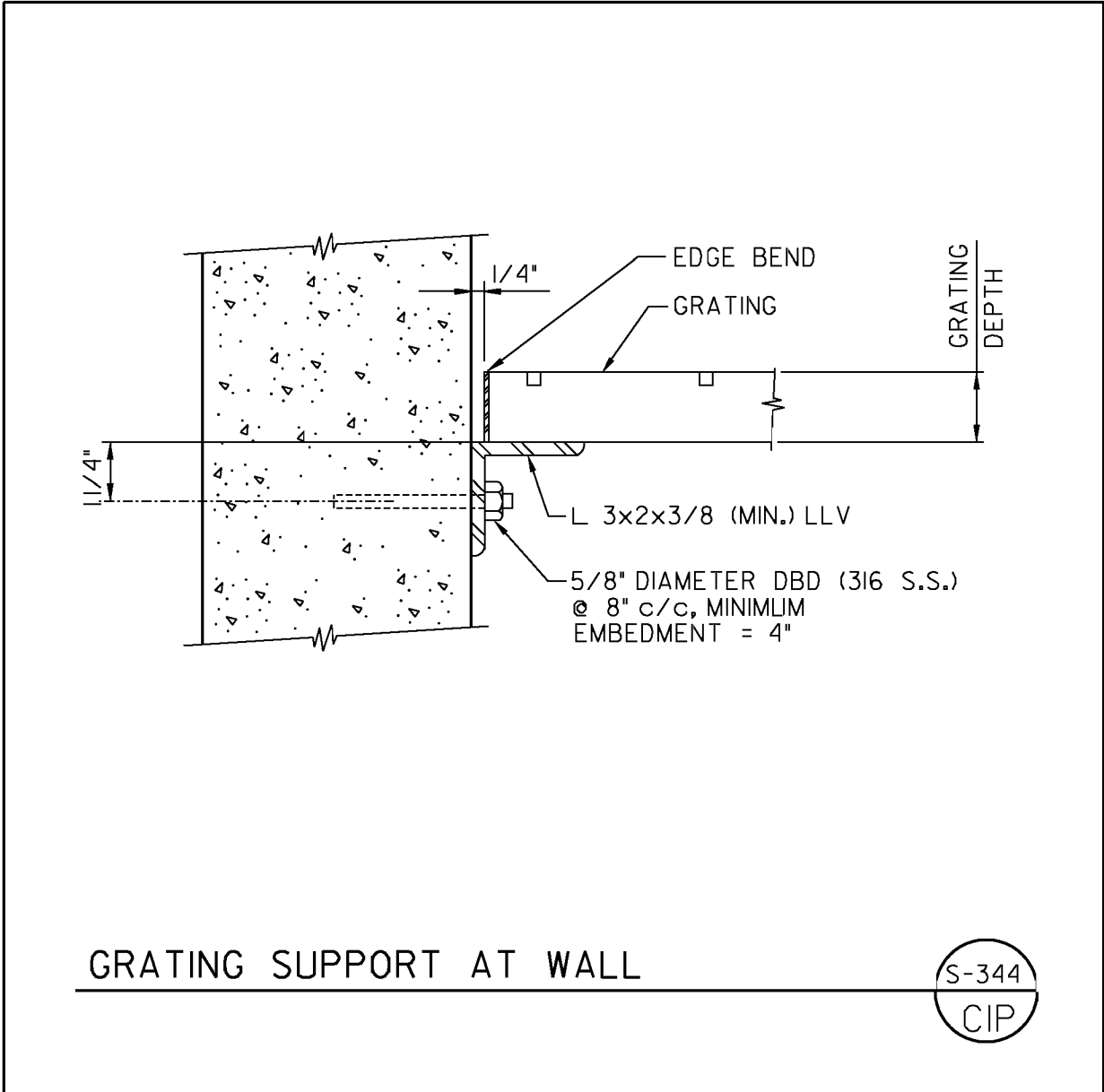


STANDARD
DETAIL

CIP

GRATING SUPPORT AT FLOOR

S-343



Notes to Consultant: _____

1. Specify material on drawings.
2. Indicate required depth on drawings.
3. Indicate minimum seat angle and bolt spacing size on drawings.

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City of San Diego

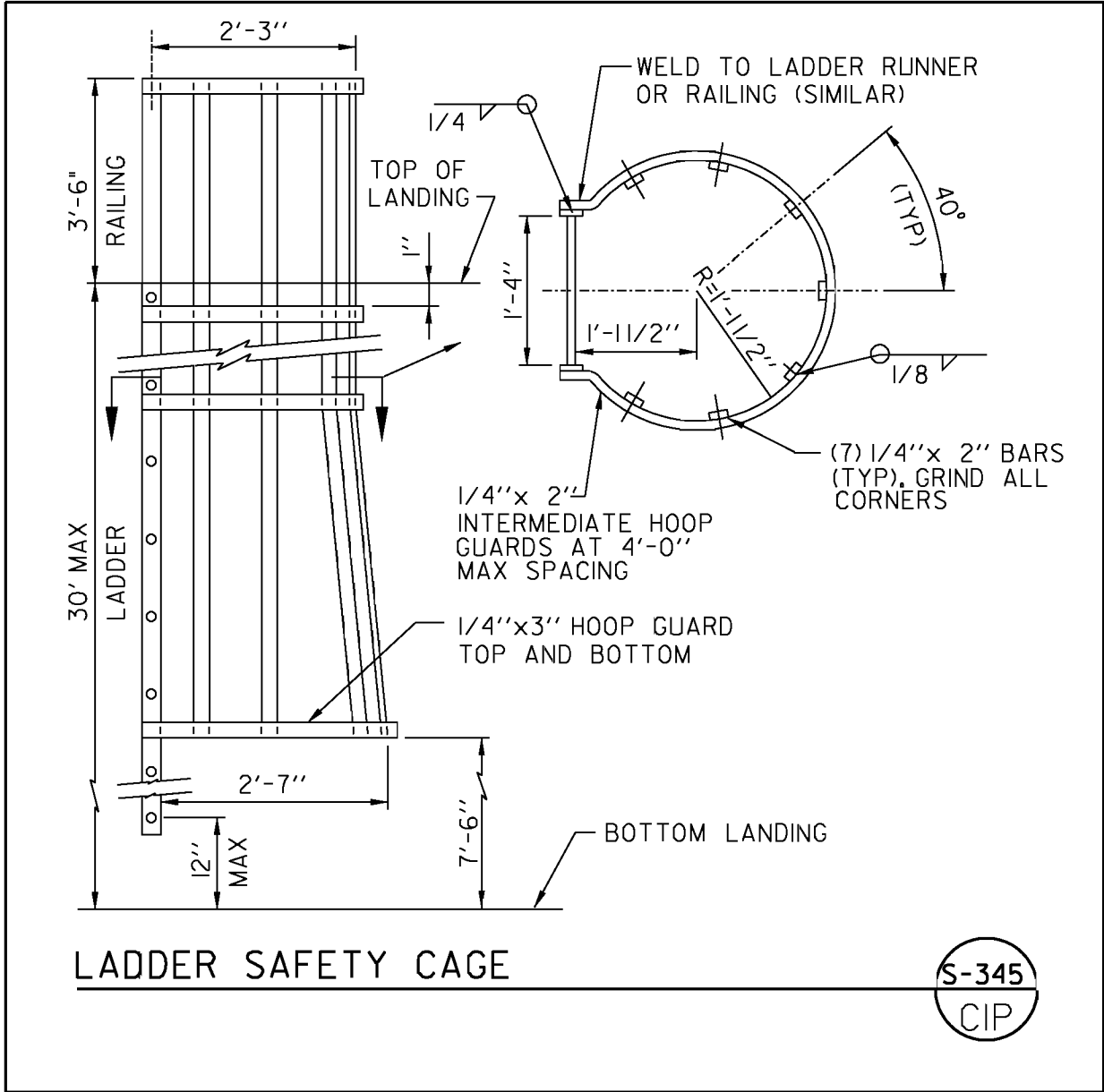


STANDARD
DETAIL

CIP

GRATING SUPPORT AT WALL

S-344



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
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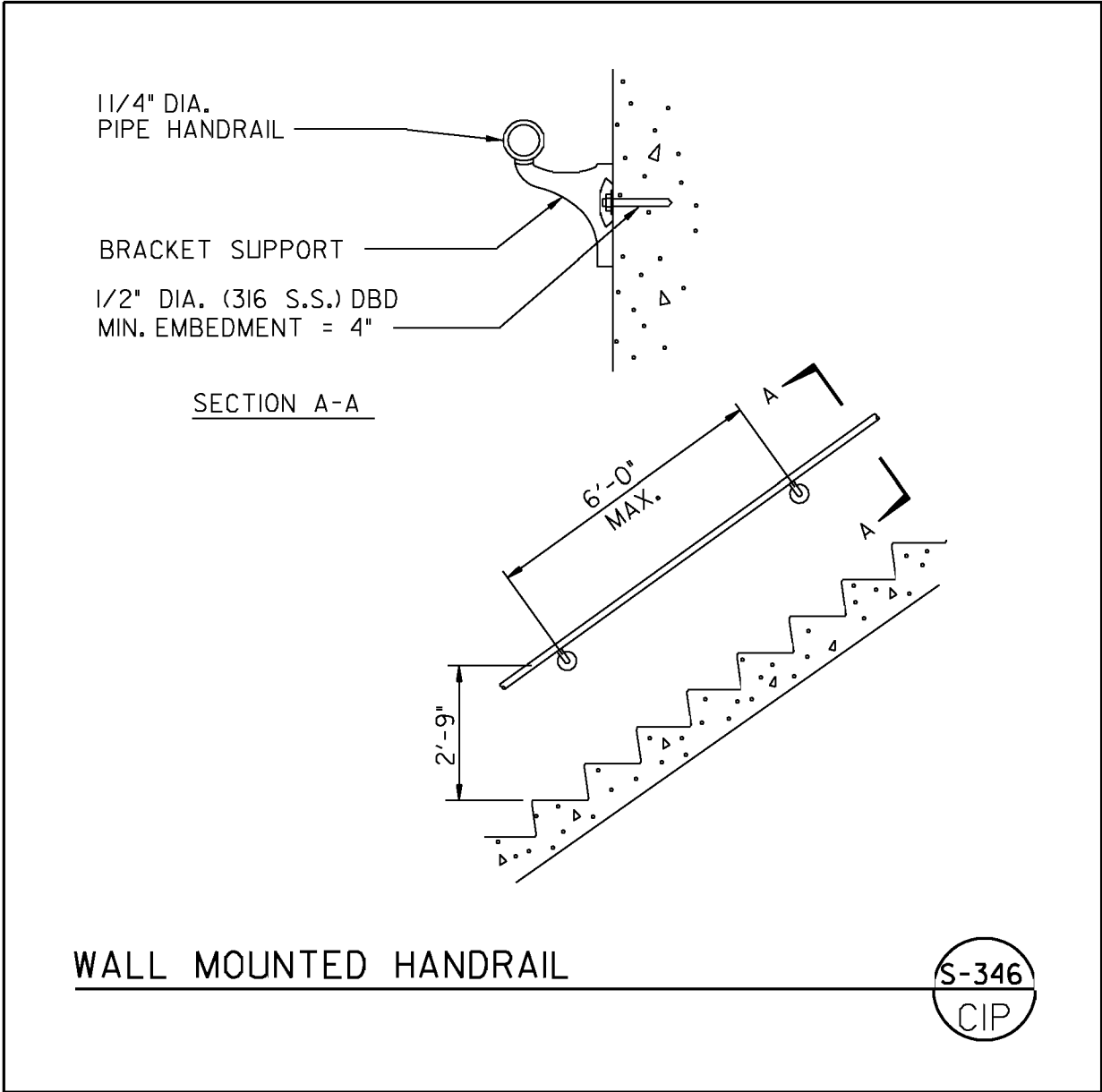


STANDARD
DETAIL

CIP

LADDER SAFETY CAGE

S-345



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego



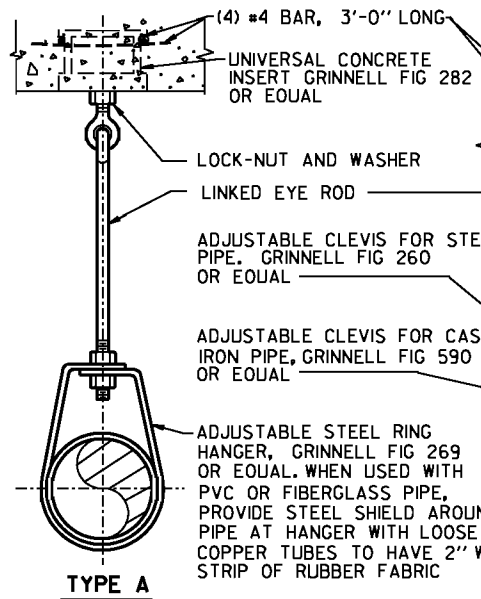
STANDARD
DETAIL

CIP

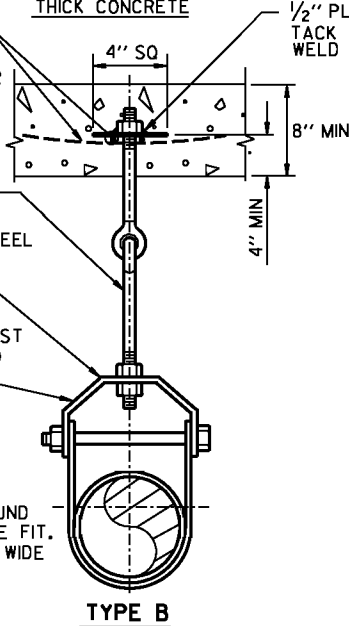
WALL MOUNTED HANDRAIL

S-346

FOR HANGER RODS
3/4" DIA AND SMALLER



FOR HANGER RODS 1/2" DIA AND LARGER, AND MIN 8" THICK CONCRETE



PIPE HANGER RODS AND SUPPORT SPACING					
PIPE DIA (INCHES)	ROD DIA (INCHES)	MAX SUPPORT SPACING (FEET)		WEIGHT LIMIT (LBS)	
		STL PIPE	CI PIPE	TYPE A	TYPE B
1 & SMALLER	3/8	6	5	610	1700
1 1/4 TO 2	3/8	9	5	610	1700
2 1/2 TO 3 1/2	1/2	12	5	1130	3200
4 TO 5	5/8	14	5	1430	3800
6, 8	3/4	16	5	1430	3800
10, 12	7/8	18	—	1430	3800
14, 16	1	20	—	1430	3800

NOTE: GALVANIZE ALL PARTS AFTER FABRICATION

PIPE HANGER



NOTES:

1. TYPE A - FOR CONCRETE INSERT, ALLOW 1430 LB LOAD MAX
TYPE B - FOR 4" SQ BEARING PLATE, ALLOW 3800 LB LOAD MAX
2. CONCRETE STRENGTH TO BE 3000 PSI OR MORE
3. DESIGN IS FOR STATIC LOAD ONLY
4. ANCHORS SHALL BE 316 SS IF HANGER WILL BE SUBMERGED

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WATER DEPARTMENT
City of San Diego



STANDARD
DETAIL

CIP

PIPE HANGER

M-401

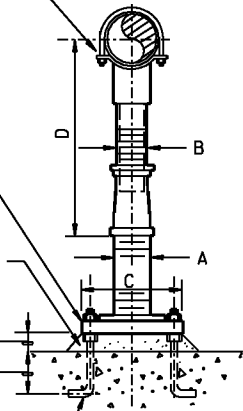
'U'BOLT PIPE SUPPORT
GRINNELL FIG 259
OR EQUAL

150 LB THREADED
REDUCING FLANGE,
GALVANIZED

NON-SHRINK GROUT

1" MINIMUM
3" MINIMUM

GALVANIZED STEEL
ANCHOR BOLT
WITH TWO NUTS AND
ONE LOCKWASHER.
(TYP OF 4 AT 90 °
316 SS IF BURIED
OR SUBMERGED



ADJUSTABLE PIPE SUPPORT DIMENSIONS IN INCHES					
PIPE SIZE	A	B	C	D MINIMUM	D MAXIMUM
2-1/2	2-1/2	1-1/2	9	8	11-1/2
3	2-1/2	1-1/2	9	8-1/4	11-3/4
3-1/2	2-1/2	1-1/2	9	8-1/2	12
4	3	2-1/2	9	10-1/4	14
6	3	2-1/2	9	11-5/8	15-1/4
8	3	2-1/2	9	13-5/8	16-1/2
10	3	2-1/2	9	14-5/8	18-1/4
12	3	2-1/2	9	15-5/8	19-3/4
14	4	3	11	18-7/8	20-3/4
16	4	3	11	19-7/8	22-1/4
18	6	3-1/2	13-1/2	21-1/4	24
20	6	3-1/2	13-1/2	23-1/4	25-1/2
24	6	4	13-1/2	26-1/2	28-1/4
30	6	4	13-1/2	29-5/8	31-1/2
32	6	4	13-1/2	30-5/8	32-3/4
36	6	4	13-1/2	32-5/8	34-3/4

ADJUSTABLE PIPE SUPPORT
WITH 'U' BOLT



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City of San Diego

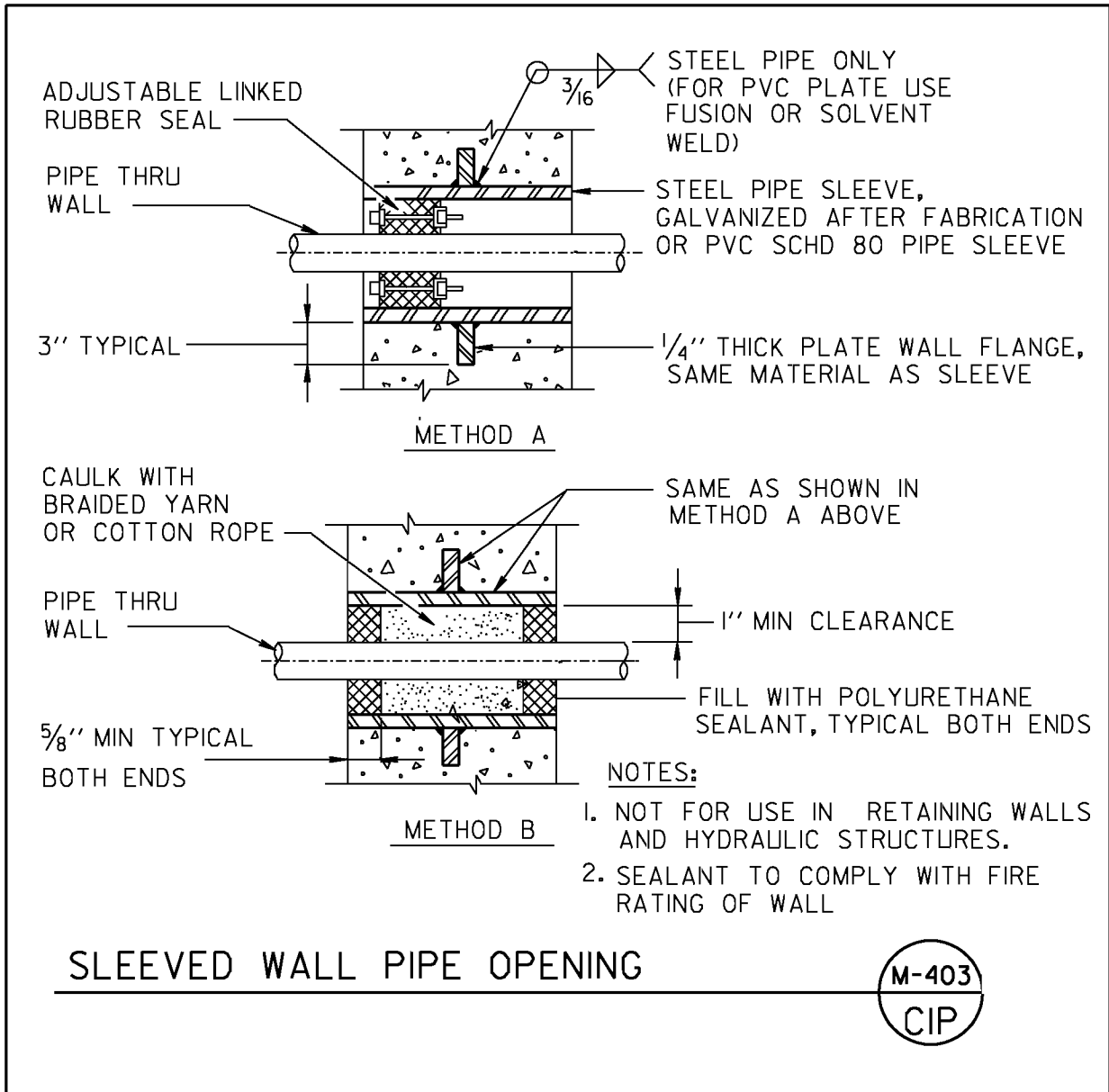


STANDARD
DETAIL

ADJUSTABLE PIPE SUPPORT
WITH 'U' BOLT

CIP

M-402



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City of San Diego

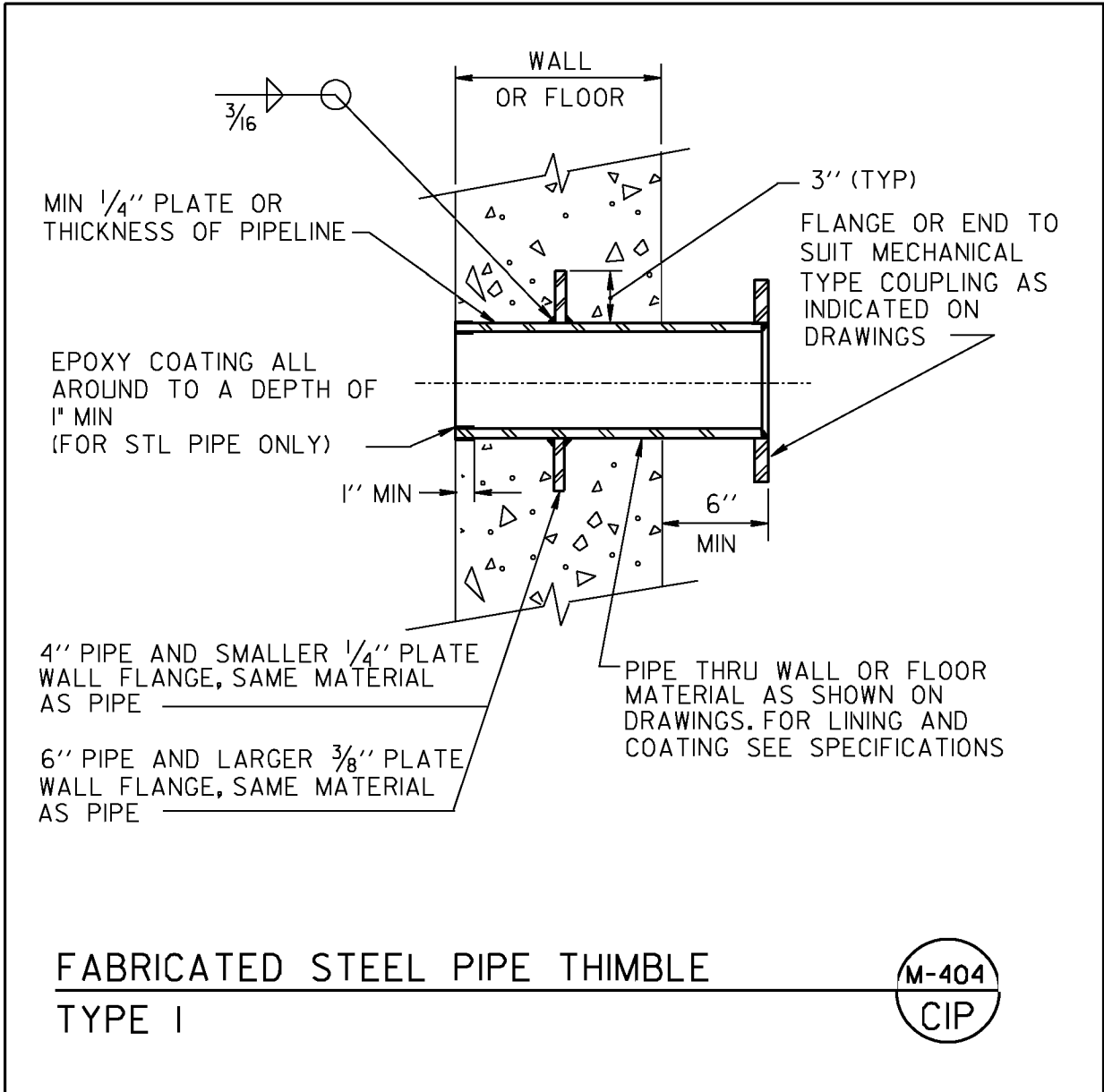


STANDARD
DETAIL

CIP

SLEEVED WALL PIPE OPENING

M-403



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City of San Diego

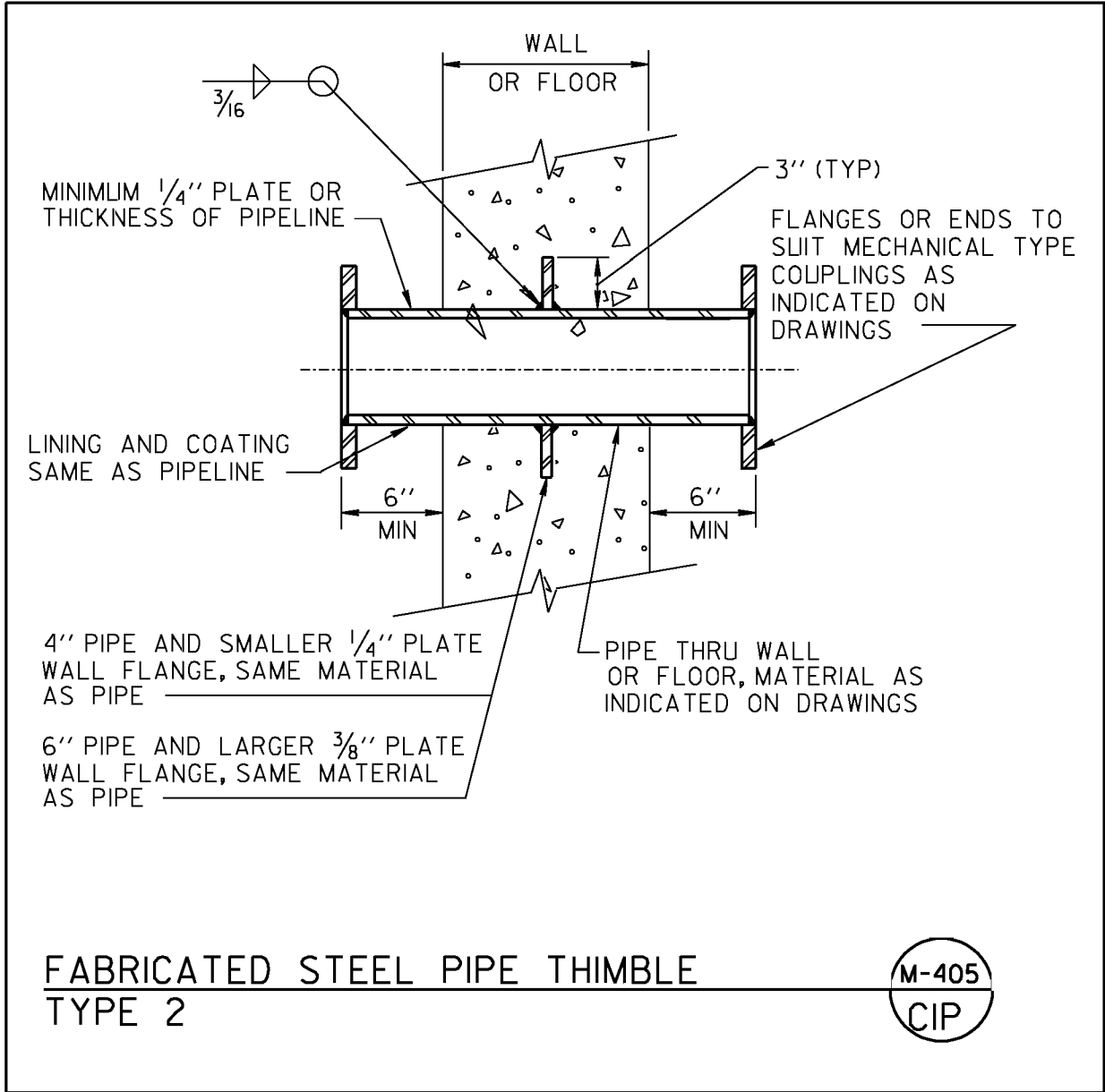


STANDARD
DETAIL

CIP

FABRICATED STEEL PIPE THIMBLE
TYPE I

M-404



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WATER DEPARTMENT
City of San Diego

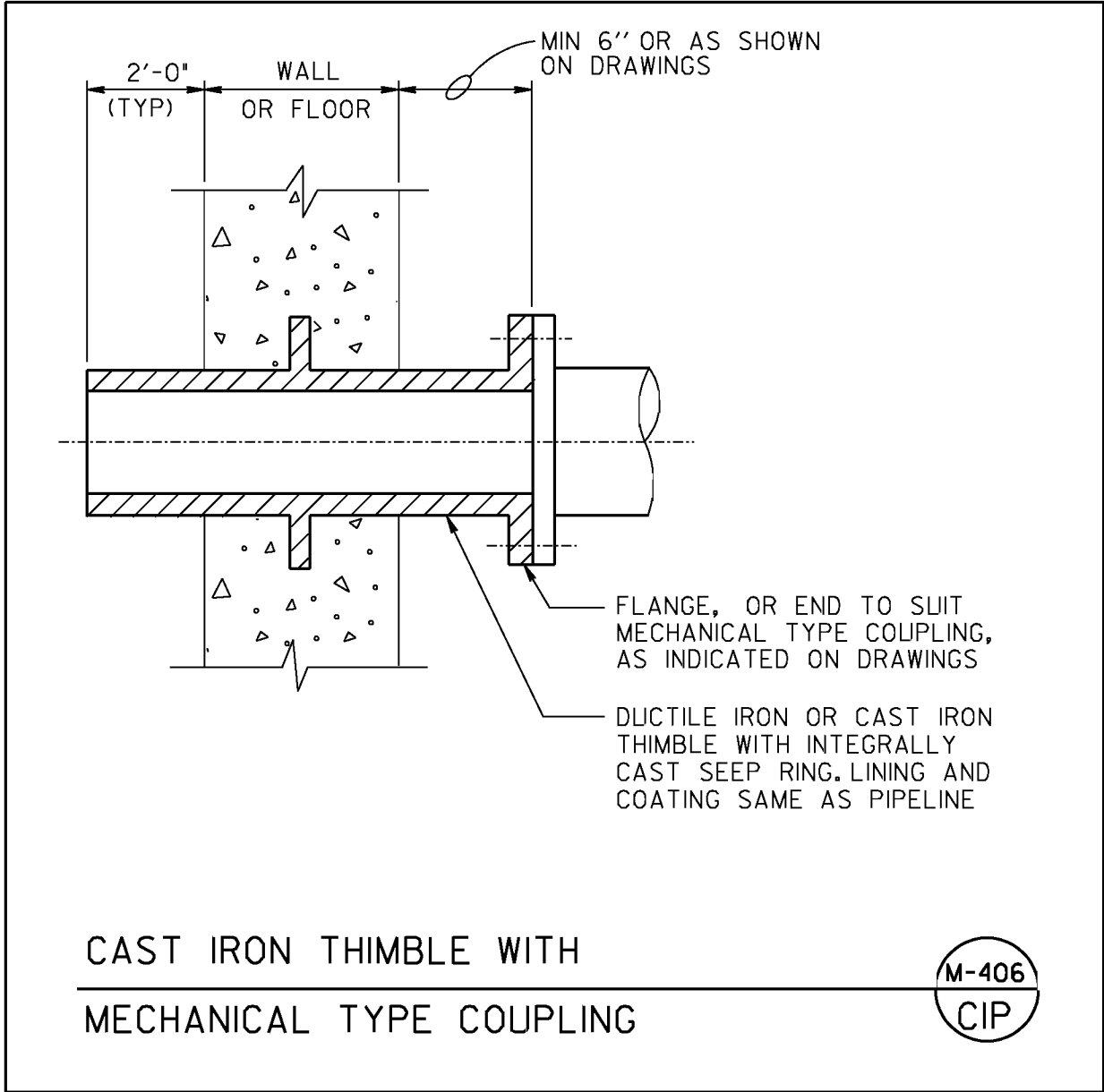


STANDARD
DETAIL

CIP

FABRICATED STEEL PIPE THIMBLE
TYPE 2


M-405



REVISION	BY	APPROVED	DATE

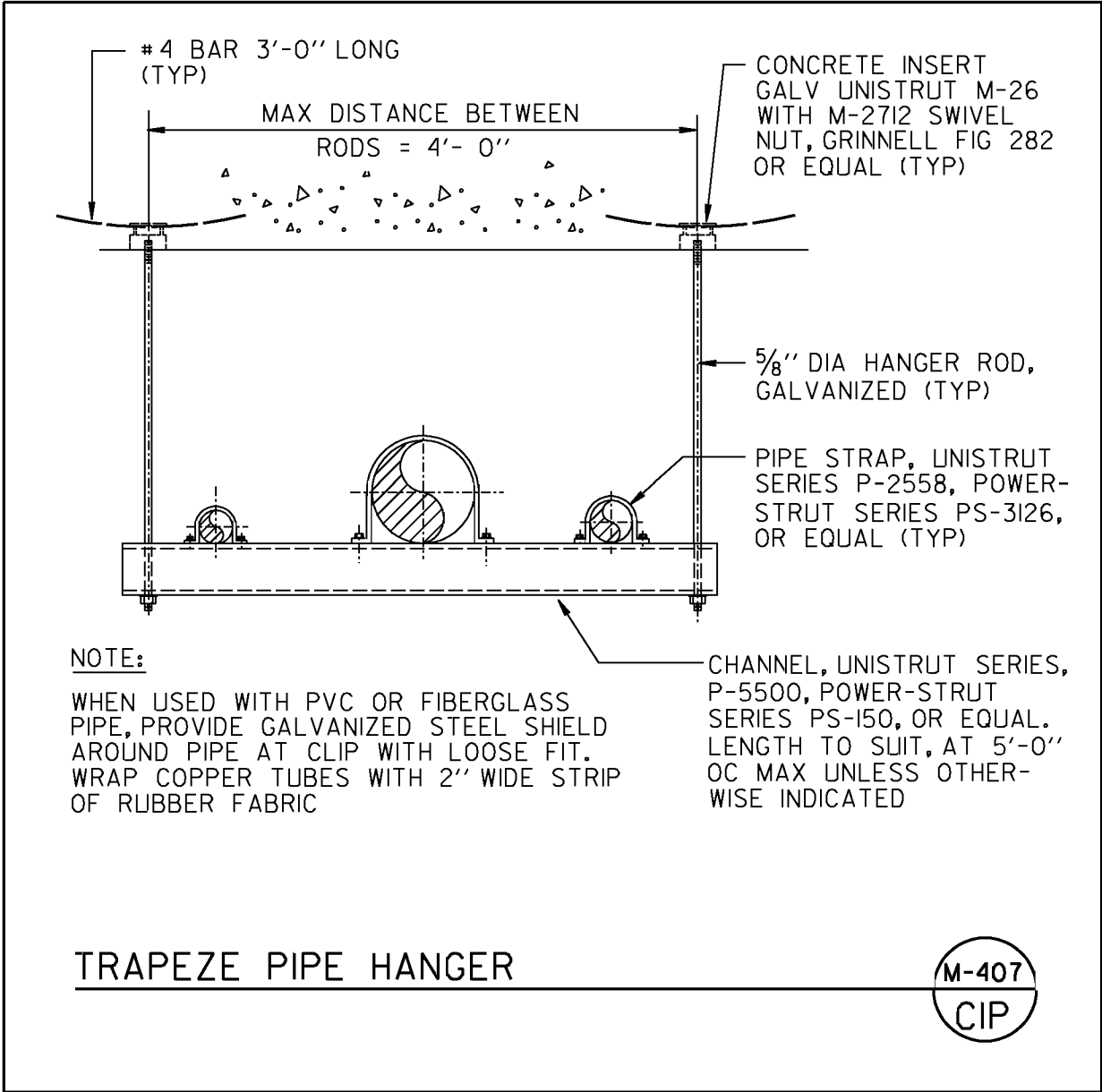
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WATER DEPARTMENT
City of San Diego



CAST IRON THIMBLE WITH MECHANICAL TYPE COUPLING

STANDARD DETAIL
CIP
M-406



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 City of San Diego

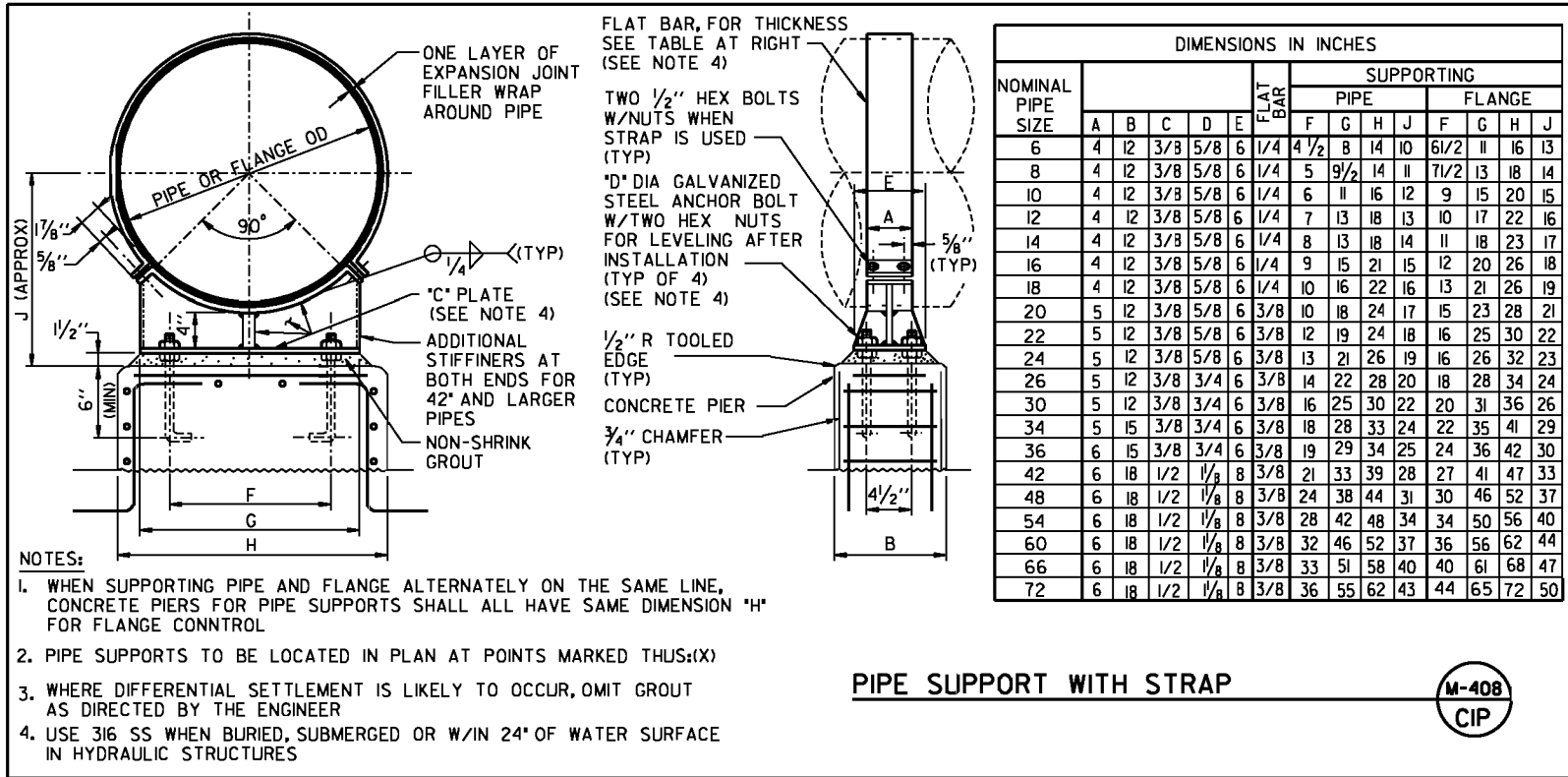


STANDARD
DETAIL

CIP

TRAPEZE PIPE HANGER

M-407



PIPE SUPPORT WITH STRAP



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WATER DEPARTMENT
City of San Diego



STANDARD
DETAIL

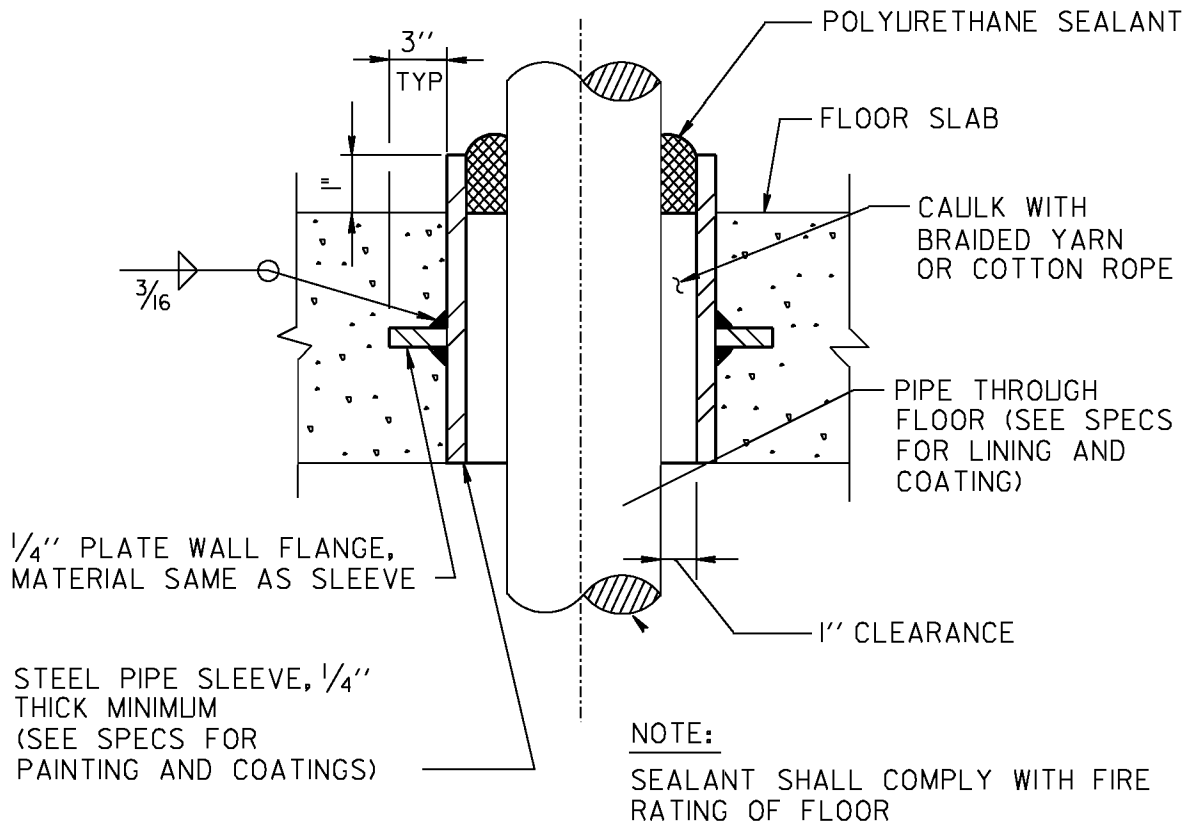
CIP

PIPE SUPPORT WITH STRAP

M-408

NOTE:

1. THIS SLEEVE IS TO BE USED BETWEEN DRY AREAS ONLY
2. NOT FOR SLABS ON GRADE



NOTE:
SEALANT SHALL COMPLY WITH FIRE RATING OF FLOOR

FLOOR PIPE SLEEVE



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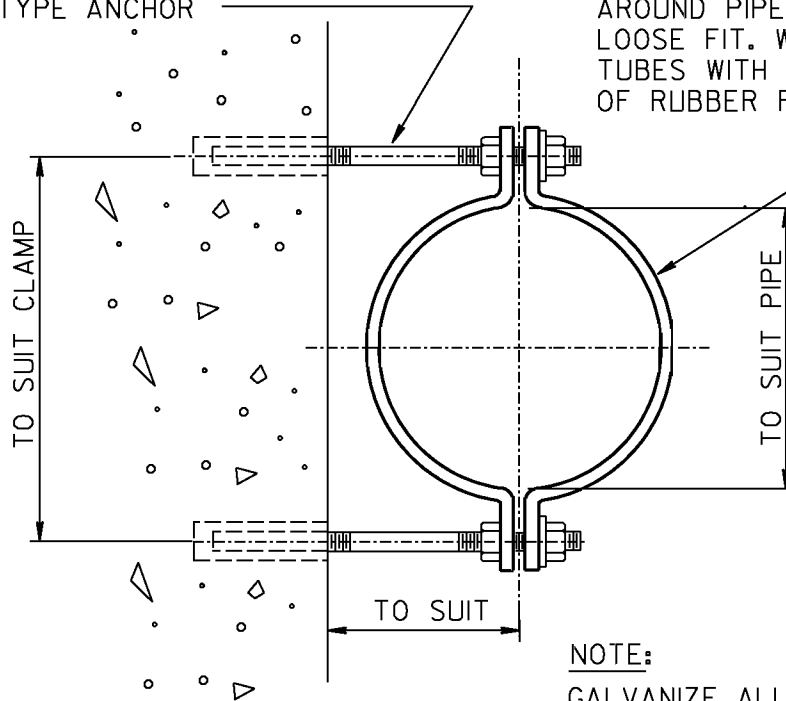
WATER DEPARTMENT
City of San Diego

FLOOR PIPE SLEEVE

STANDARD DETAIL
CIP
M-409

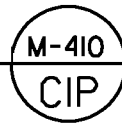
STUD BOLT, MIN 1/2" DIA
WITH TWO HEX NUTS
& LOCKWASHERS, SET
IN ADHESIVE EPOXY
TYPE ANCHOR

FLAT BAR 1/2" X 1/4" PIPE
CLAMP. WHEN USED WITH
PVC OR FIBERGLASS PIPE
PROVIDE STEEL SHEILD
AROUND PIPE AT CLAMP WITH
LOOSE FIT. WRAP COPPER
TUBES WITH 2" WIDE STRIP
OF RUBBER FABRIC



NOTE:
GALVANIZE ALL PARTS AFTER
FABRICATION. WHERE SUBMERGED,
PIPE CLAMP, ANCHORS, NUTS,
LOCKWASHERS AND SHIELDS TO BE
TYPE 316 SS

PIPE CLAMP



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WATER DEPARTMENT
City of San Diego

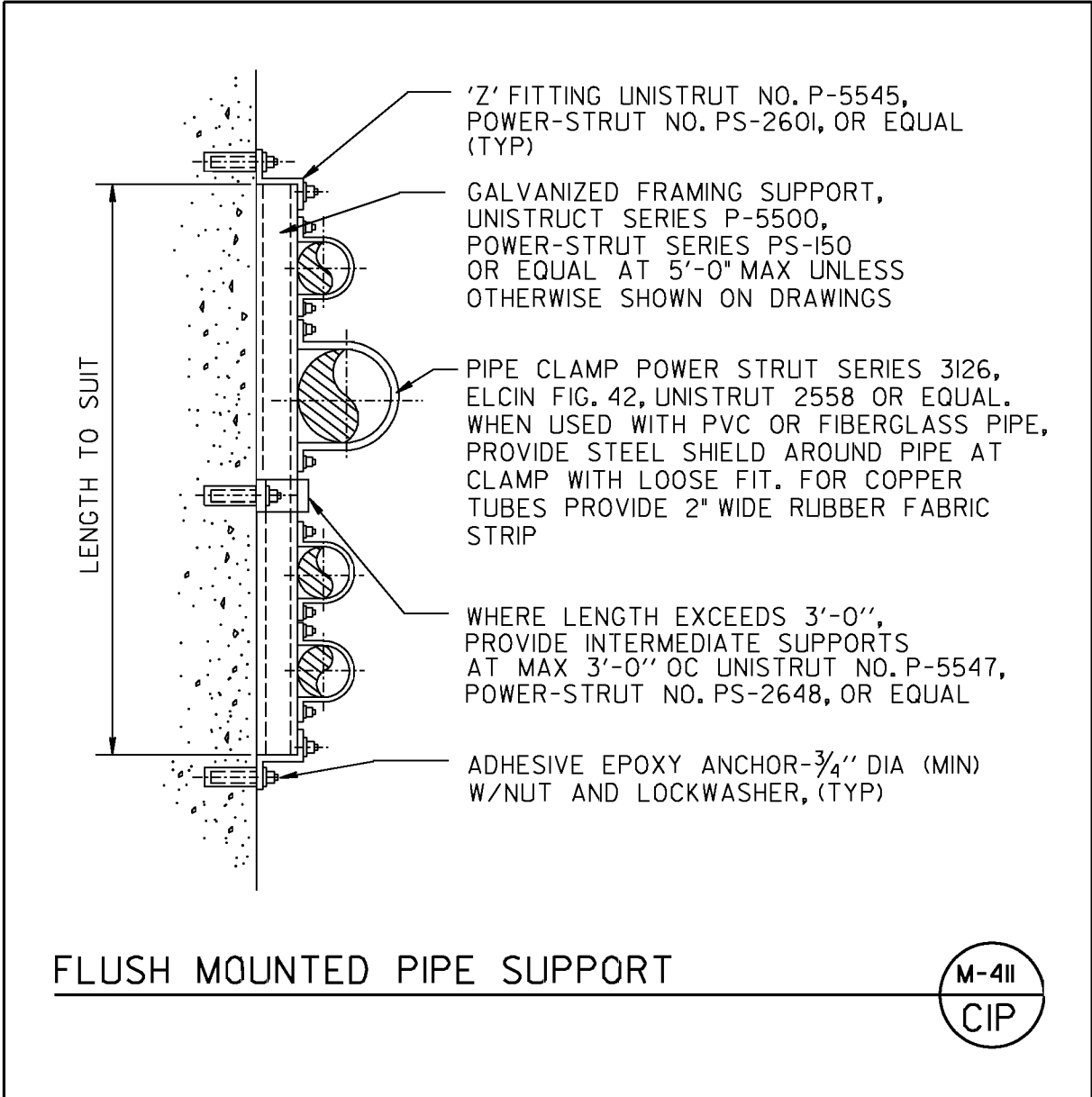


STANDARD
DETAIL

CIP

PIPE CLAMP

M-410



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City of San Diego

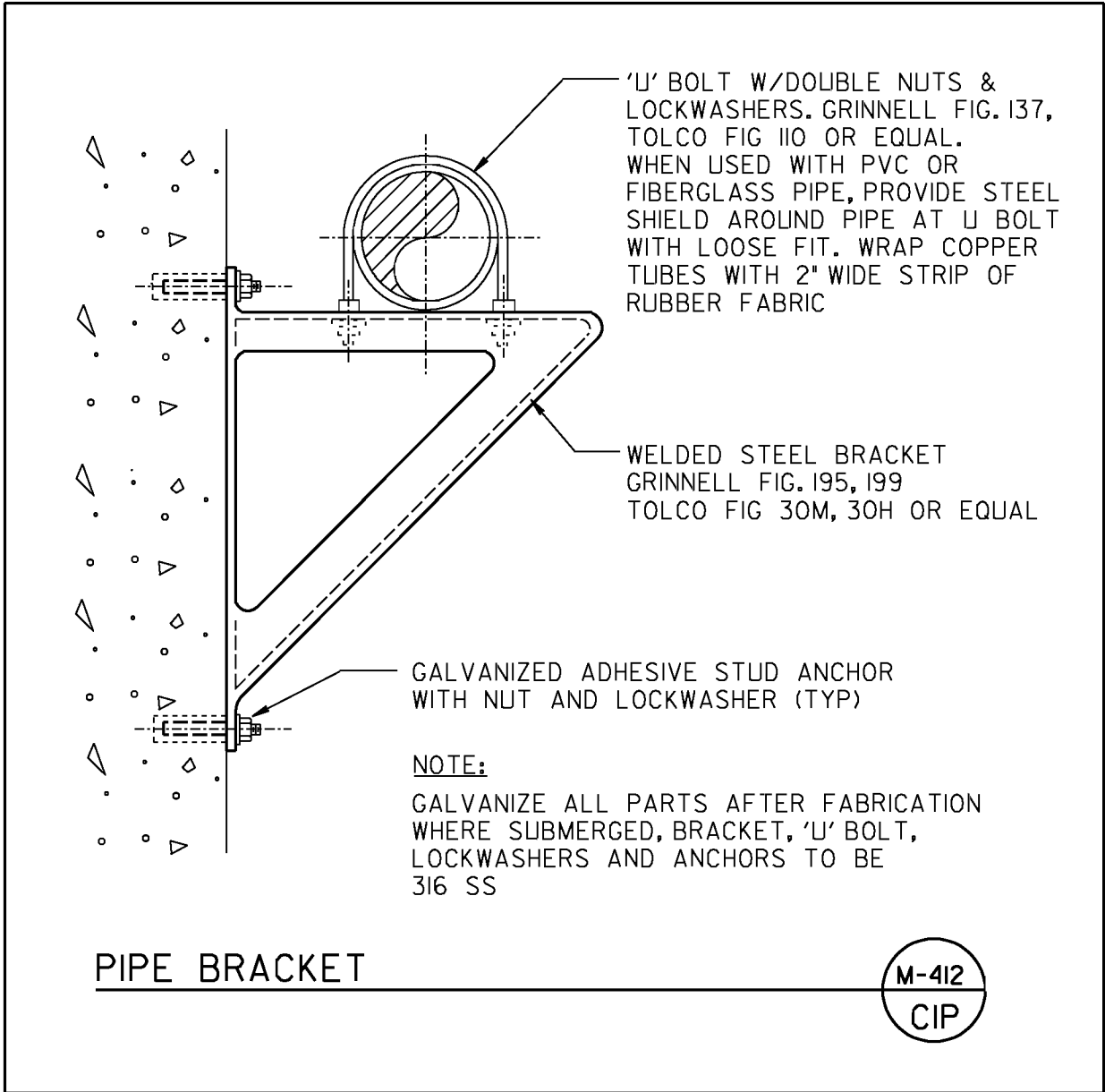


STANDARD
DETAIL

CIP

FLUSH MOUNTED PIPE SUPPORT

M-4II



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City of San Diego

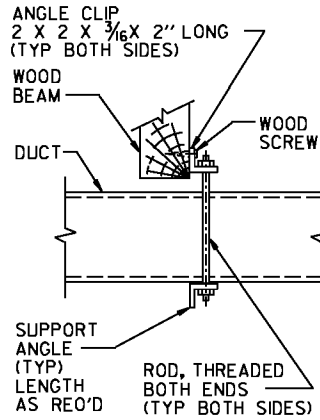


STANDARD
DETAIL

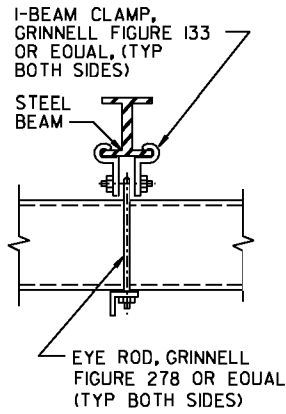
CIP

PIPE BRACKET

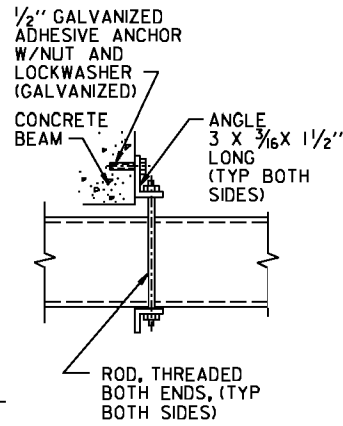
M-412



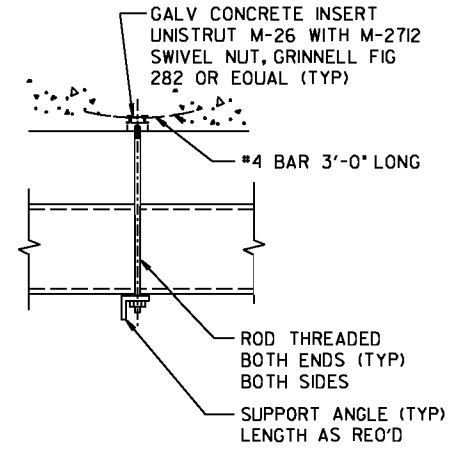
ON WOOD BEAM



ON STEEL BEAM



ON CONCRETE BEAM



CONCRETE BEAM OR SLAB HANGER

SIZING AND SPACING (INCHES)			
MAX DUCT SIZE	ROD DIA	SUPPORT ANGLE	MAXIMUM SPACING
36 X 12	3/8	1-1/2 X 1/2 X 1/8	8'-0" ON CENTER
48 X 18	1/2	2 X 2 X 1/8	8'-0" ON CENTER
60 X 24	1/2	2 X 2 X 3/16	6'-0" ON CENTER
80 X 24	1/2	2 X 2 X 1/4	6'-0" ON CENTER

HANGERS FOR DUCTS



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City of San Diego

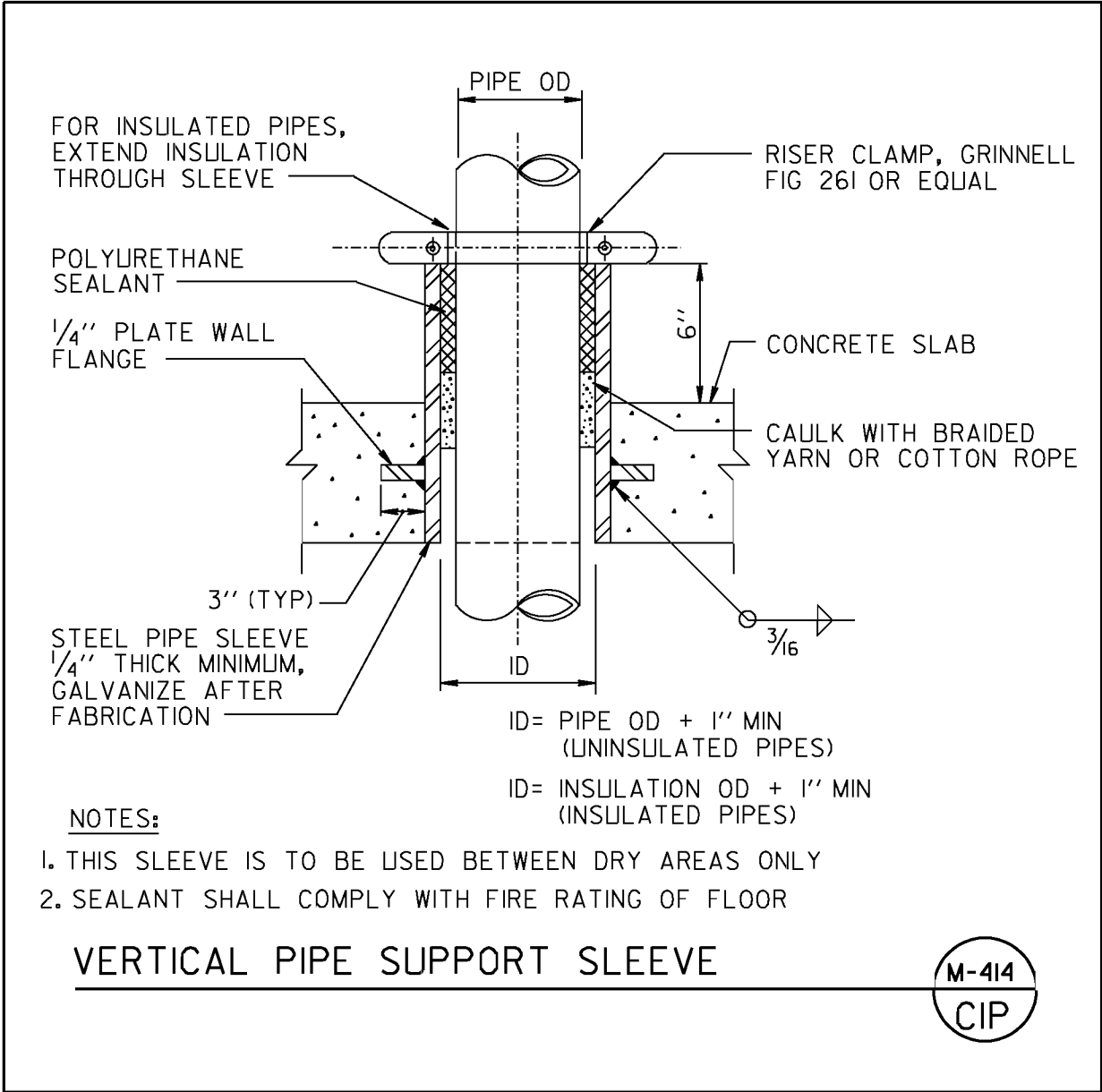


STANDARD
DETAIL

HANGERS FOR DUCTS

CIP

M-413



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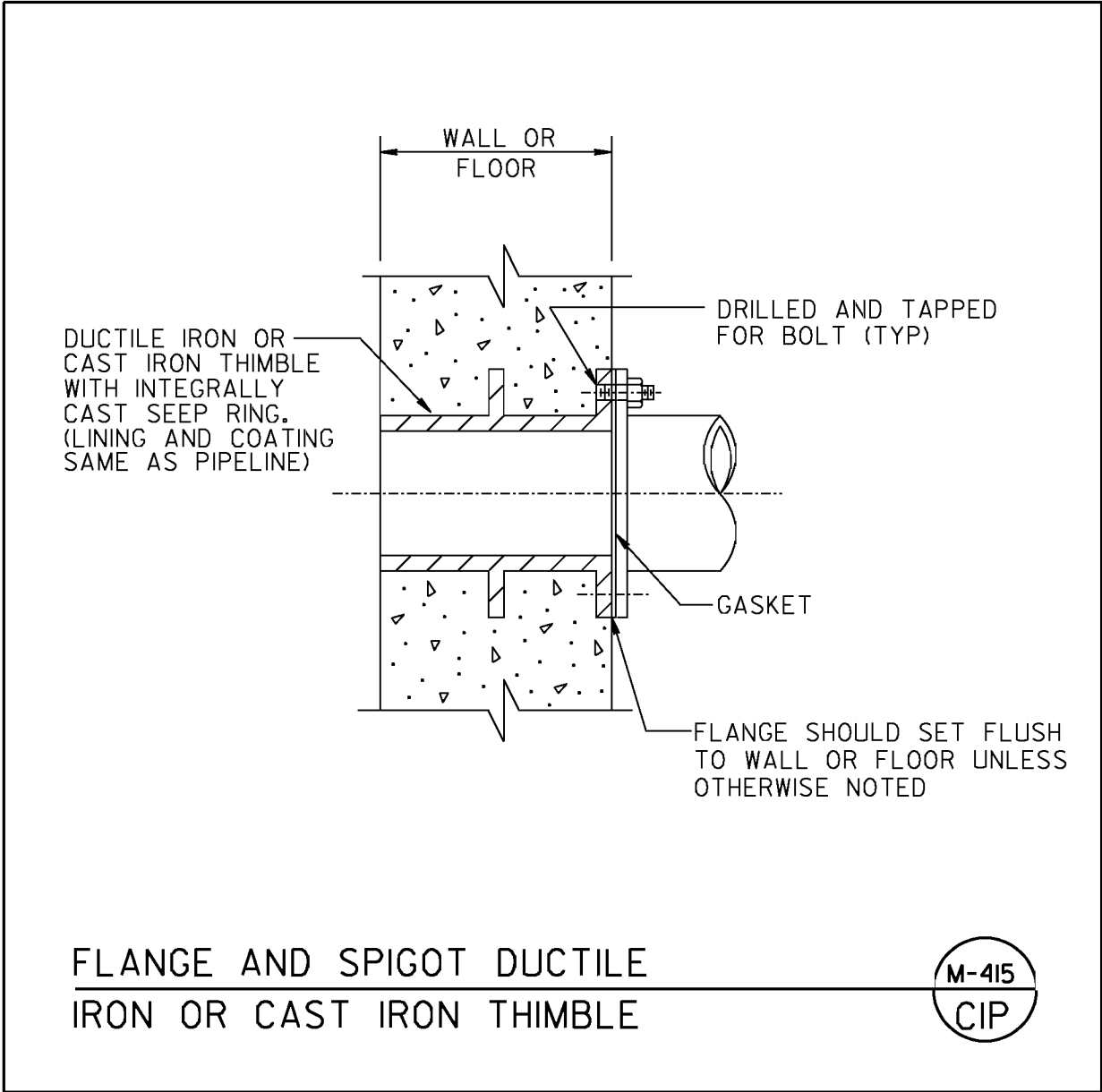


STANDARD
DETAIL

CIP

VERTICAL PIPE SUPPORT SLEEVE

M-414



FLANGE AND SPIGOT DUCTILE
IRON OR CAST IRON THIMBLE

M-415
CIP

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City of San Diego

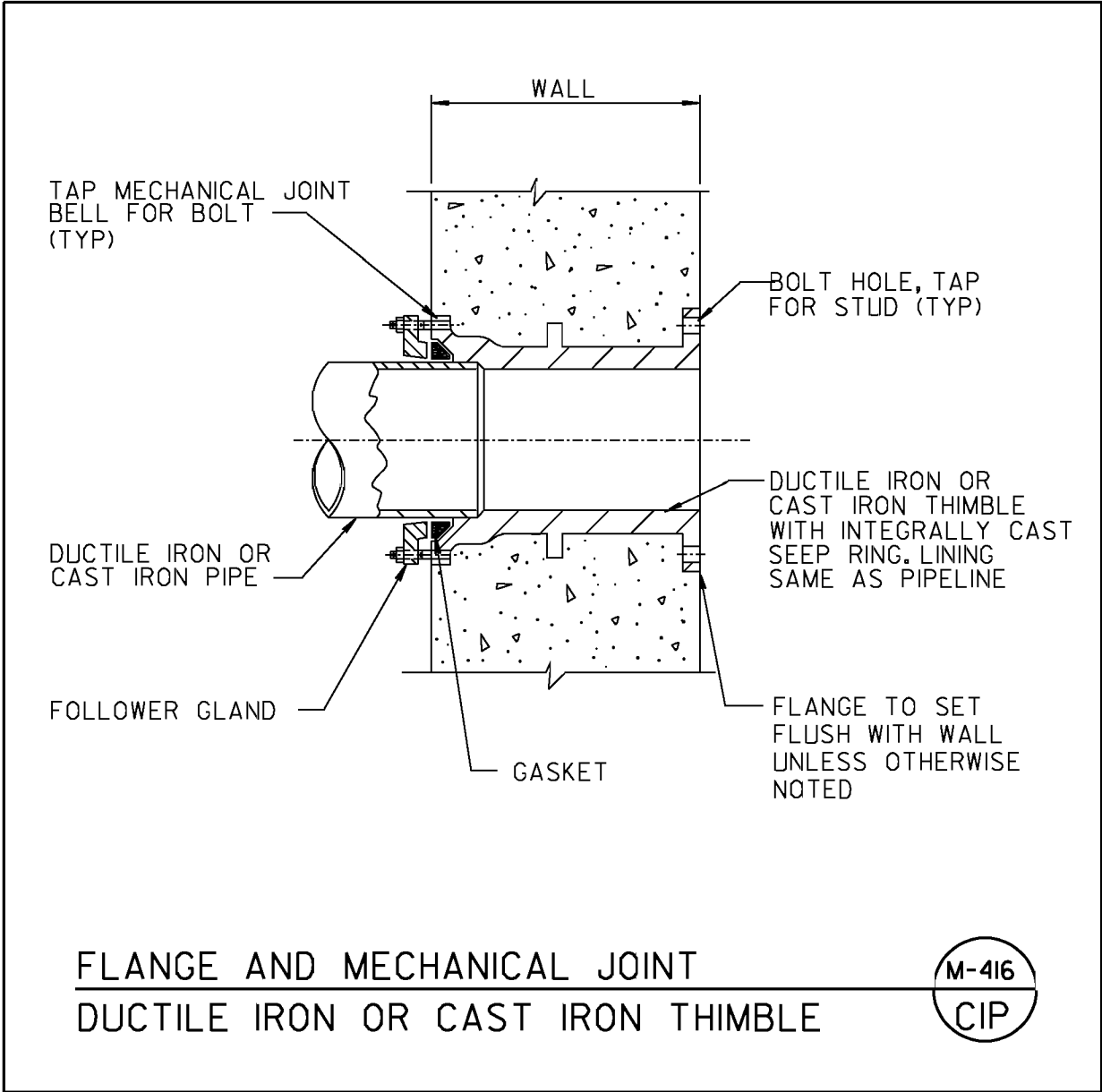


STANDARD
DETAIL

CIP

FLANGE AND SPIGOT DUCTILE
IRON OR CAST IRON THIMBLE

M-415



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City of San Diego



STANDARD
DETAIL

CIP

M-416

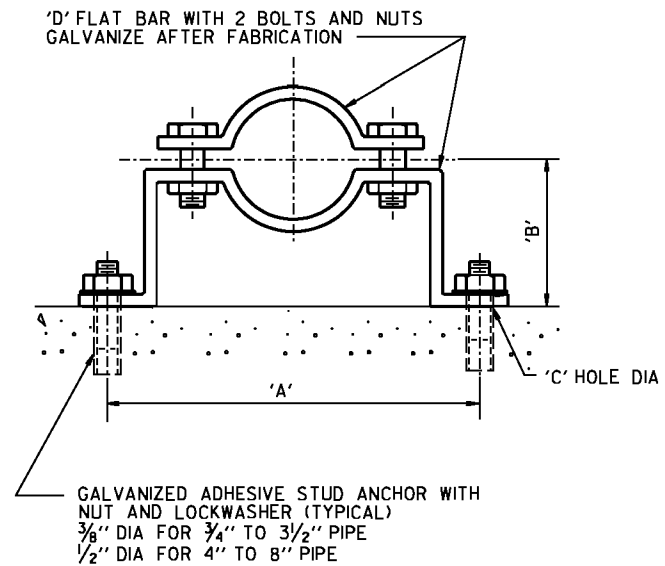
FLANGE AND MECHANICAL JOINT
DUCTILE IRON OR CAST IRON THIMBLE

DIMENSIONS IN INCHES					
PIPE DIA	A	B SEE NOTE 3 BELOW	C HOLE DIA	D FLAT BAR SIZE	LOAD RATING LBS *
3/4	5-15/16	2-1/2	7/16	3/16 x 1-1/4	300
1	6-1/4	2-5/8	7/16	3/16 x 1-1/4	300
1-1/4	6-11/16	2-3/4	7/16	3/16 x 1-1/4	300
1-1/2	6-15/16	3	7/16	3/16 x 1-1/4	300
2	8-5/16	3-3/16	7/16	1/4 x 1-1/4	500
2-1/2	8-7/8	3-7/16	7/16	1/4 x 1-1/4	500
3	9-1/8	3-3/4	7/16	1/4 x 1-1/4	500
3-1/2	10-1/16	4	7/16	1/4 x 1-1/4	500
4	10-9/16	4-1/4	9/16	1/4 x 1-1/2	600
5	11-3/4	4-3/4	9/16	1/4 x 1-1/2	600
6	14-3/8	5-5/16	9/16	3/8 x 1-1/2	850
8	16-5/8	6-5/16	9/16	3/8 x 1-1/2	850

*SAFETY FACTOR OF 5

NOTES:

1. WHERE SUBMERGED, BURIED, OR IN HYDRAULIC STRUCTURES PIPE CLAMP, ANCHOR, SHIELD, NUTS AND LOCKWASHER TO BE TYPE 316 STAINLESS STEEL
2. WHEN USED WITH PVC OR FIBERGLASS PIPE, PROVIDE STEEL SHIELD AROUND PIPE AT CLAMP, WITH LOOSE FIT WRAP COPPER TUBES WITH 2" STRIP OF RUBBER FABRIC
3. FOR FLANGED PIPING, INCREASE 'B' DIMENSION AS REQUIRED



PIPE CLAMP FOR INDIVIDUAL PIPES



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City of San Diego

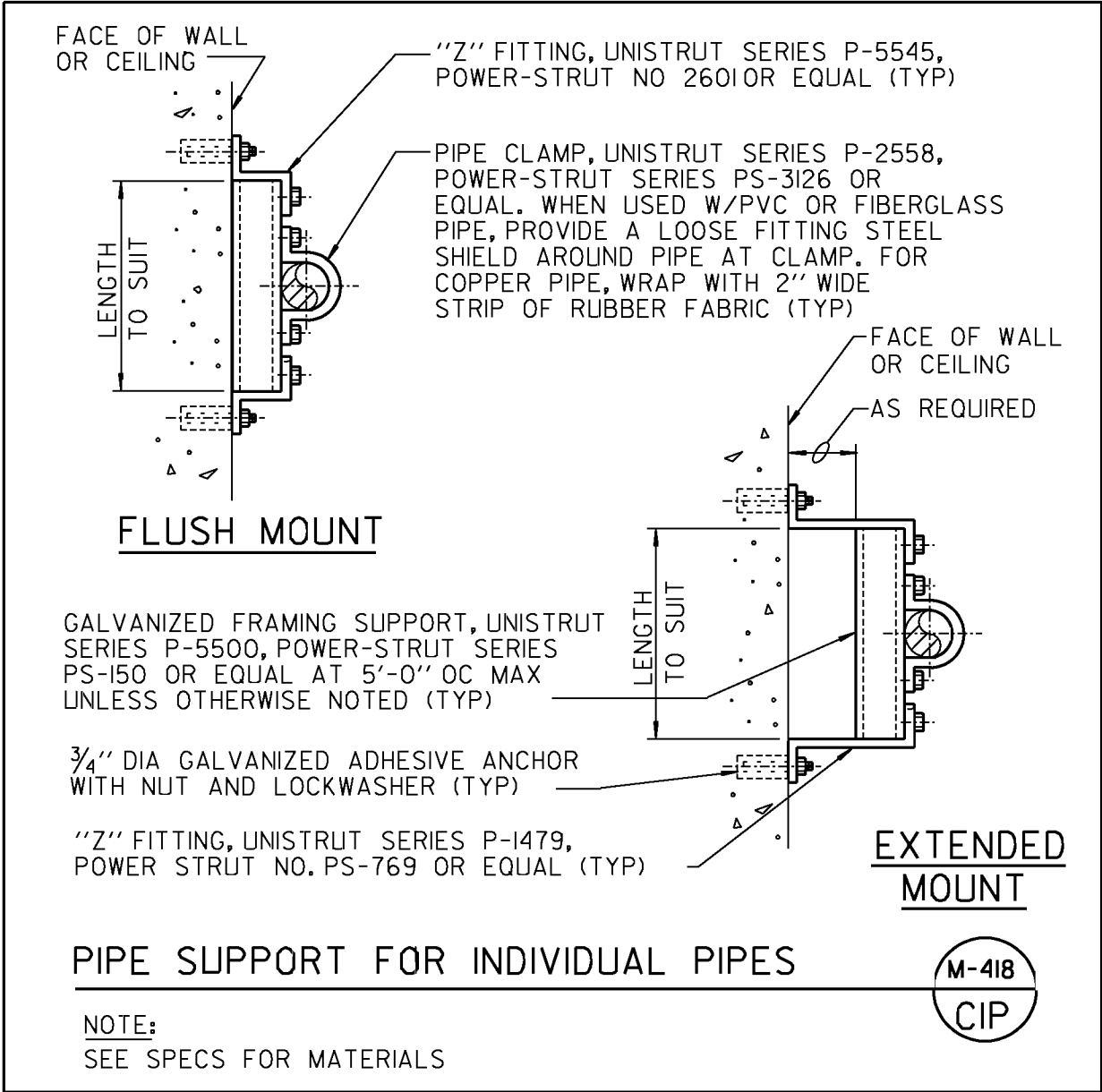


STANDARD
DETAIL

CIP

PIPE CLAMP FOR INDIVIDUAL PIPES

M-417



NOTE: USE THIS DETAIL FOR PIPES 6 INCHES AND SMALLER IN DIAMETER

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WATER DEPARTMENT
City of San Diego



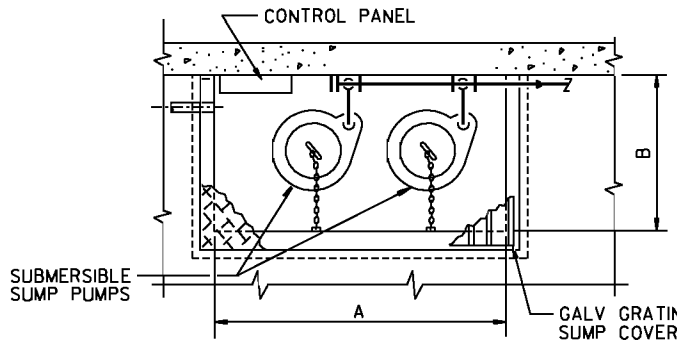
STANDARD
DETAIL

CIP

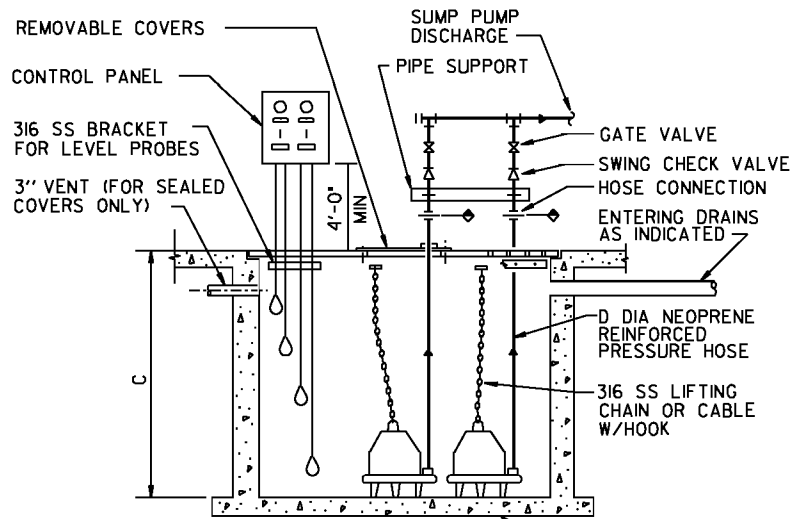
**PIPE SUPPORT
FOR INDIVIDUAL PIPES**

M-418

PUMP NO	LOCATION	DIMENSIONS IN INCHES				
		A	B	C	D	E



PLAN



SECTION


DRAINAGE SUMP WITH DUPLEX PUMPS

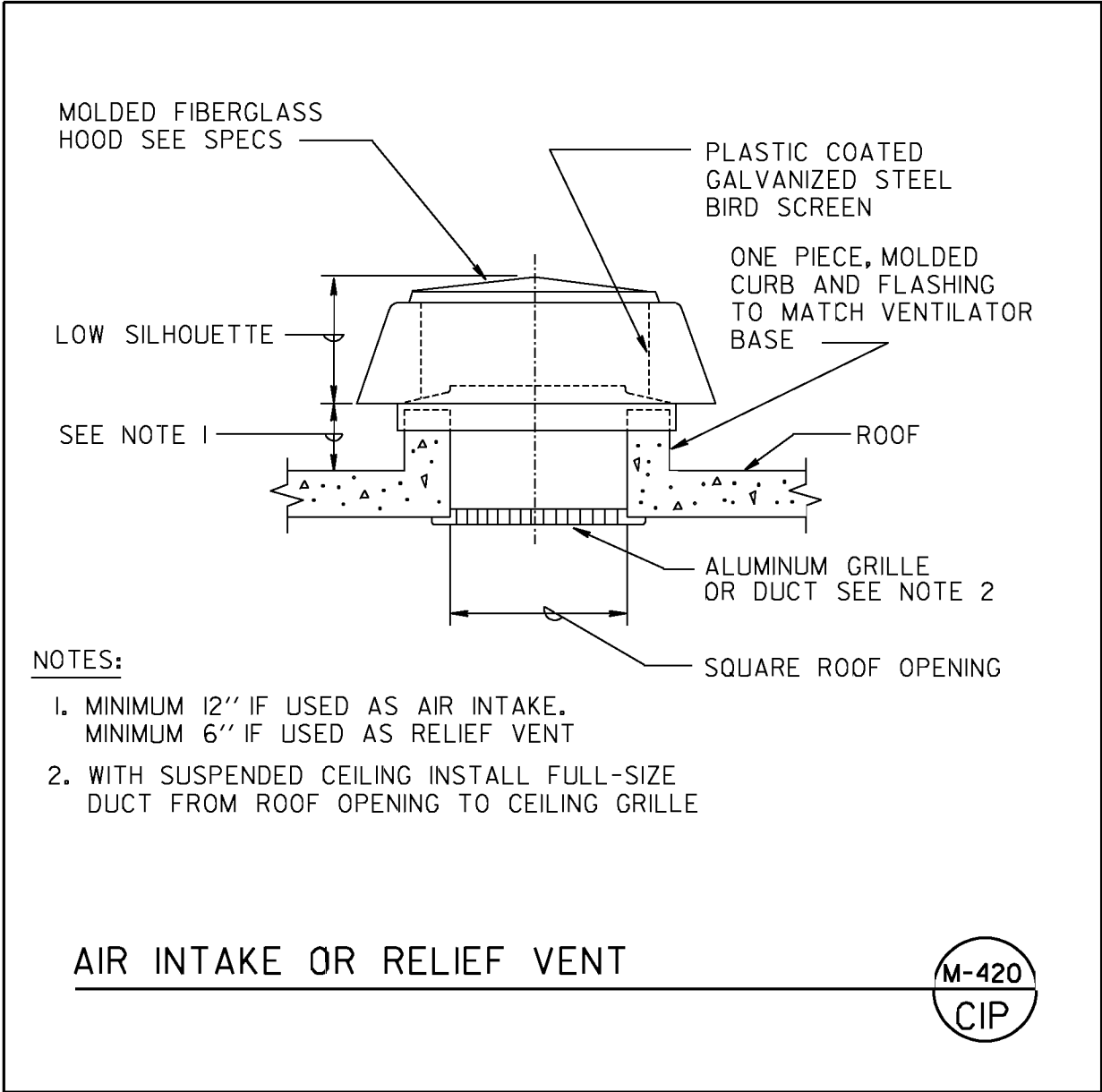


NOTE:
COMPLETE TABLE FOR ALL DUPLEX SUMPS ON THE PROJECT

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT City of San Diego		STANDARD DETAIL
		CIP
DRAINAGE SUMP WITH DUPLEX PUMPS		M-419



REVISION	BY	APPROVED	DATE
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WATER DEPARTMENT
City of San Diego

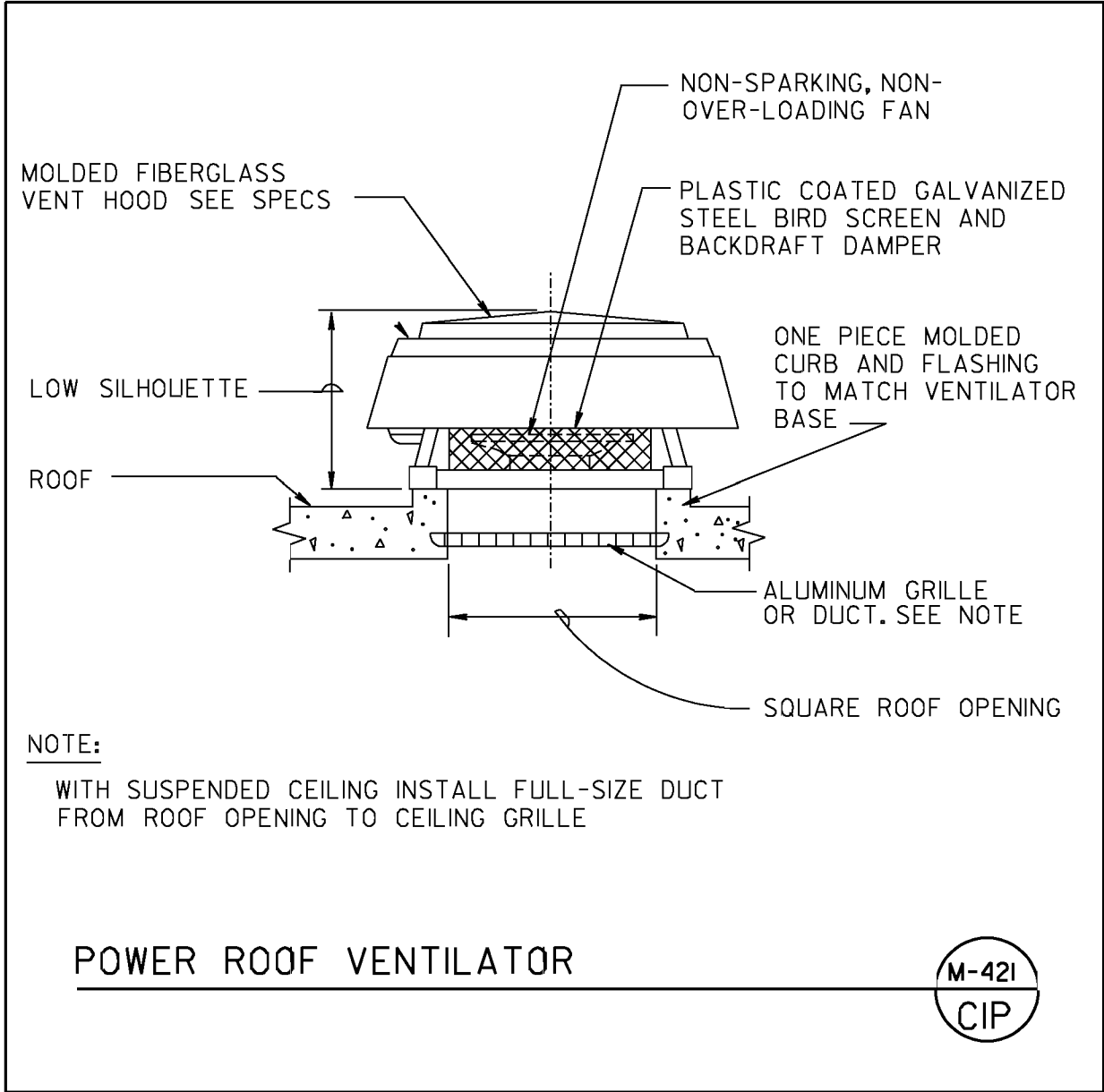


STANDARD
DETAIL

CIP

AIR INTAKE OR RELIEF VENT

M-420



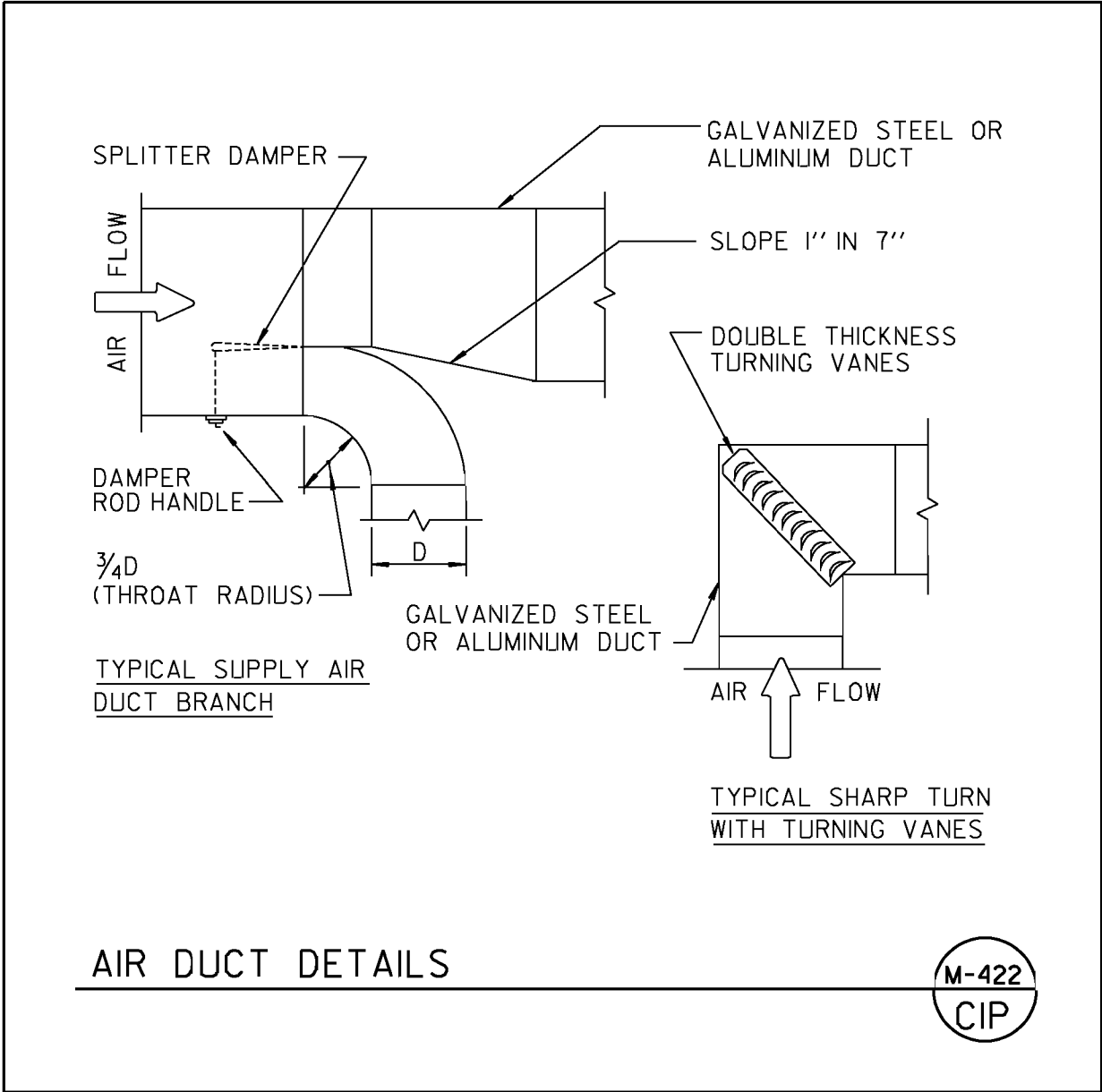
REVISION	BY	APPROVED	DATE
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WATER DEPARTMENT
 City of San Diego

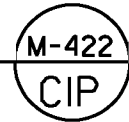


POWER ROOF VENTILATOR

STANDARD DETAIL
CIP
M-421



AIR DUCT DETAILS



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

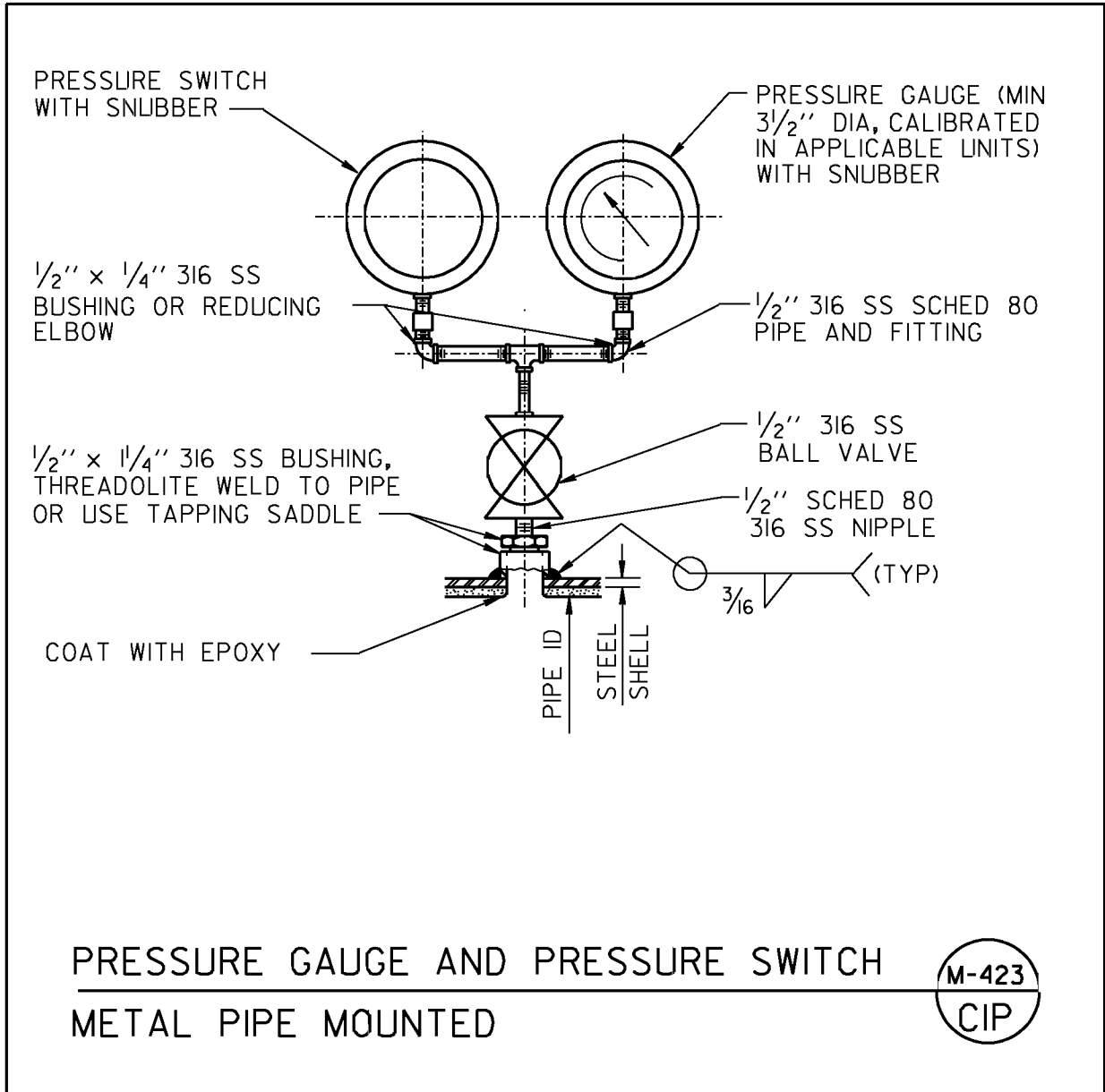


STANDARD
DETAIL

CIP

AIR DUCT DETAILS

M-422



NOTES:

FOR STANDARD APPLICATIONS ON WATER, AIR AND GAS LINES.
 WHERE PIPE VIBRATION OR PULSATION IS EXPECTED,
 MAKE SUITABLE PROVISION WITH FLEXIBLE
 CONNECTORS AND INDEPENDENT GAUGE SUPPORT

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WATER DEPARTMENT
 City of San Diego

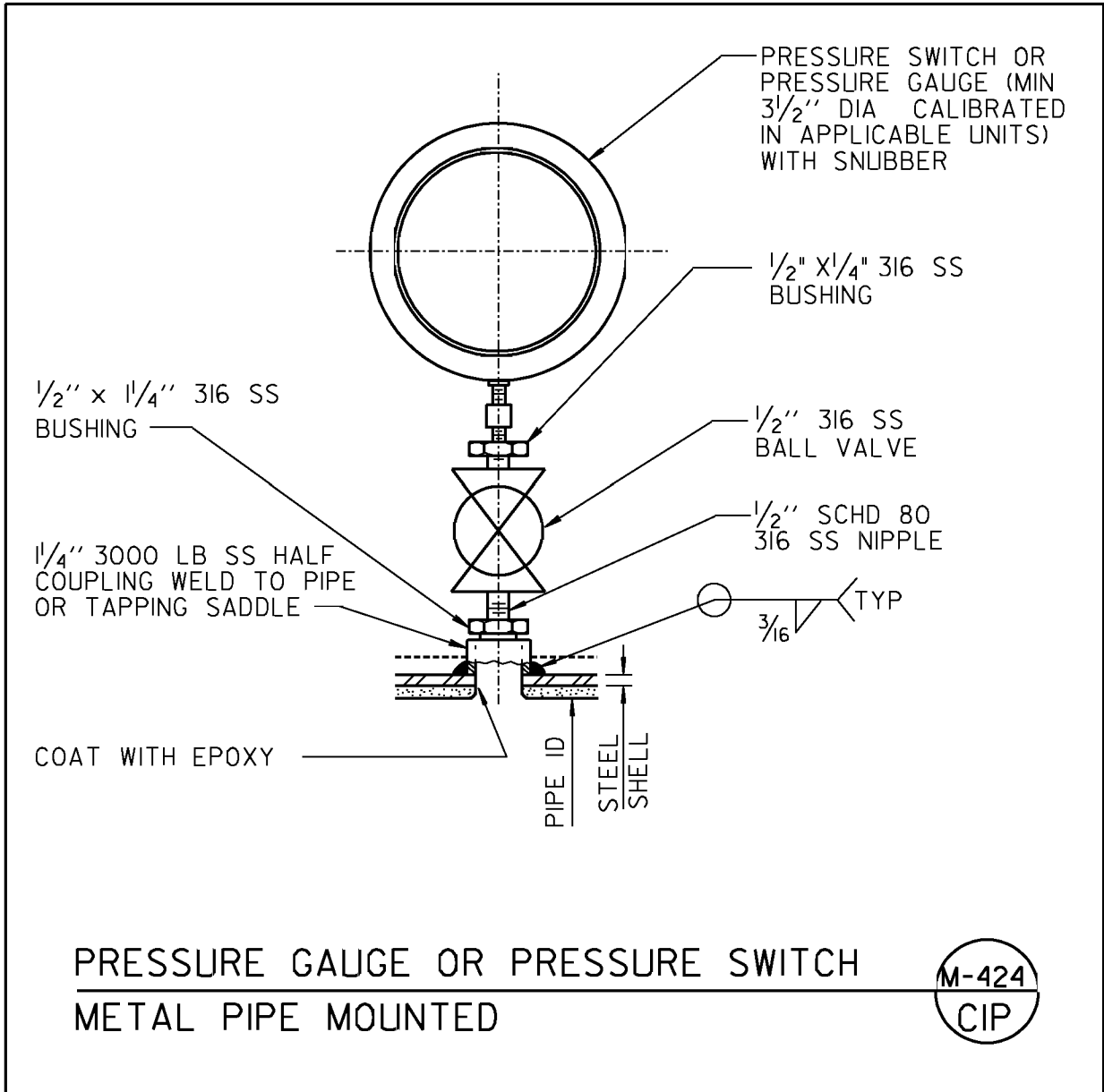


STANDARD
 DETAIL

CIP

**PRESSURE GAUGE AND PRESSURE
 SWITCH, METAL PIPE MOUNTED**

M-423



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WATER DEPARTMENT
City of San Diego

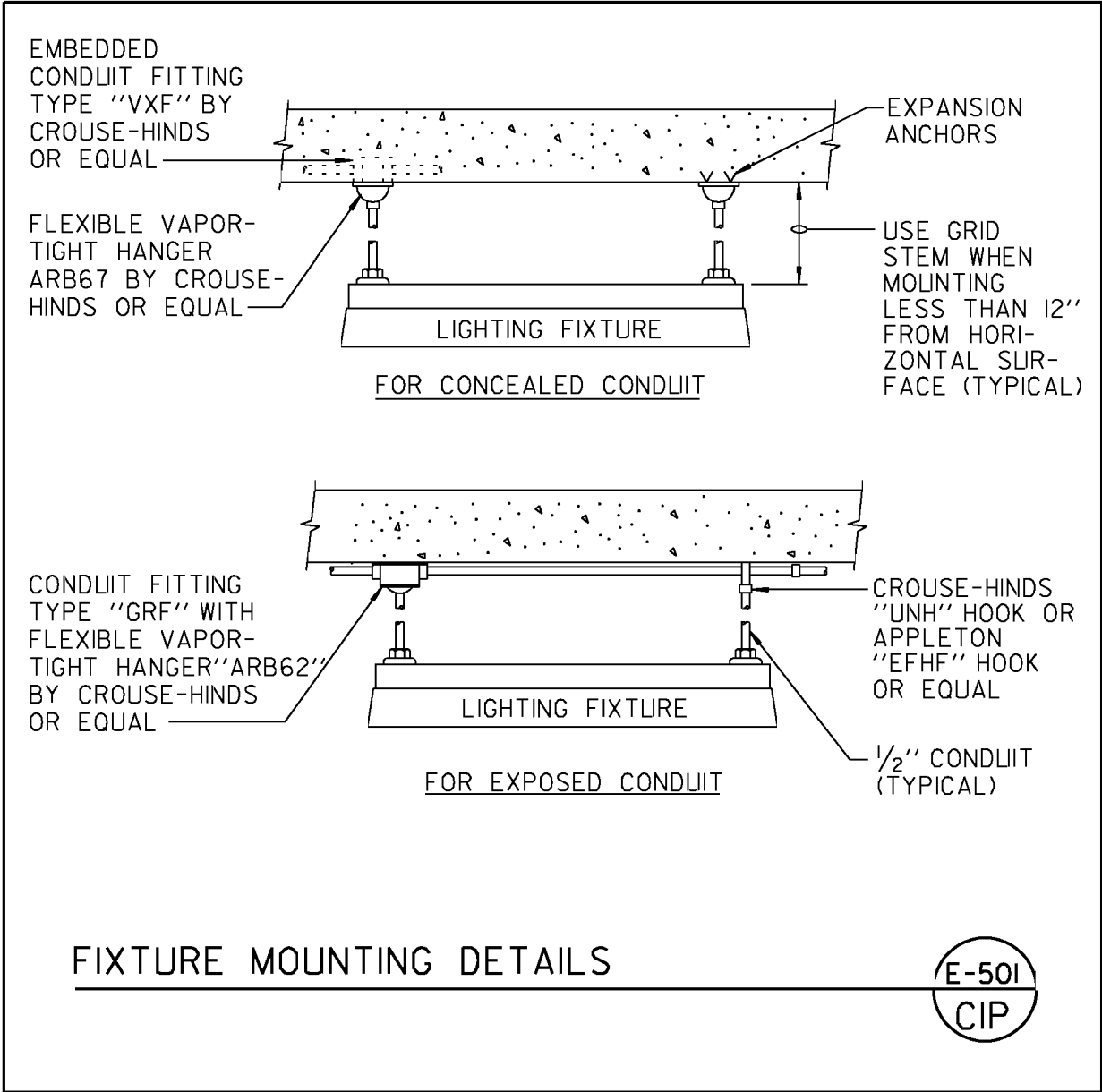


STANDARD
DETAIL

CIP

**PRESSURE GAUGE OR PRESSURE
SWITCH, METAL PIPE MOUNTED**

M-424

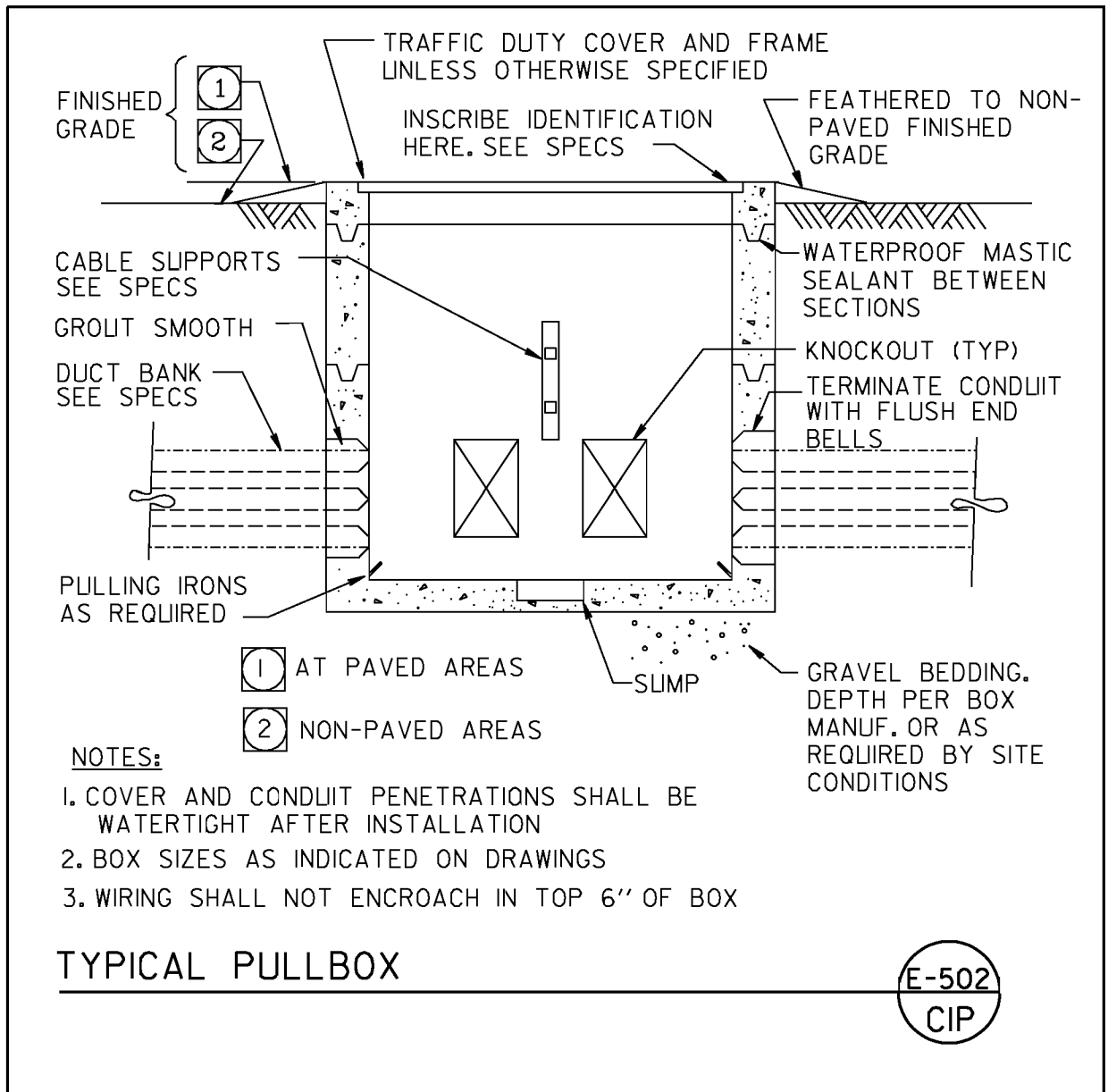


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REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

FIXTURE MOUNTING DETAILS

STANDARD DETAIL
CIP
E-501



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WATER DEPARTMENT
City of San Diego



STANDARD
DETAIL

CIP

E-502

TYPICAL PULLBOX

CONTINUOUS
DUCT BANK MARKER
(SEE SPECS)

FINISH GRADE

#4 BAR AT
12" EACH FACE

#4 HOOPS
AT 24" OC

24" MINIMUM

4" (MIN)

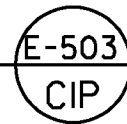
8" MIN LAP

2" (TYP)

NOTES:

1. CONCRETE SHALL CONTAIN AN INTEGRAL RED OXIDE COLORING PIGMENT
2. ENCASE A NO. 4/0 BARE STRANDED COPPER GROUND WIRE THROUGHOUT THE ENTIRE LENGTH OF DUCT BANK

TYPICAL DUCT BANK



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City of San Diego

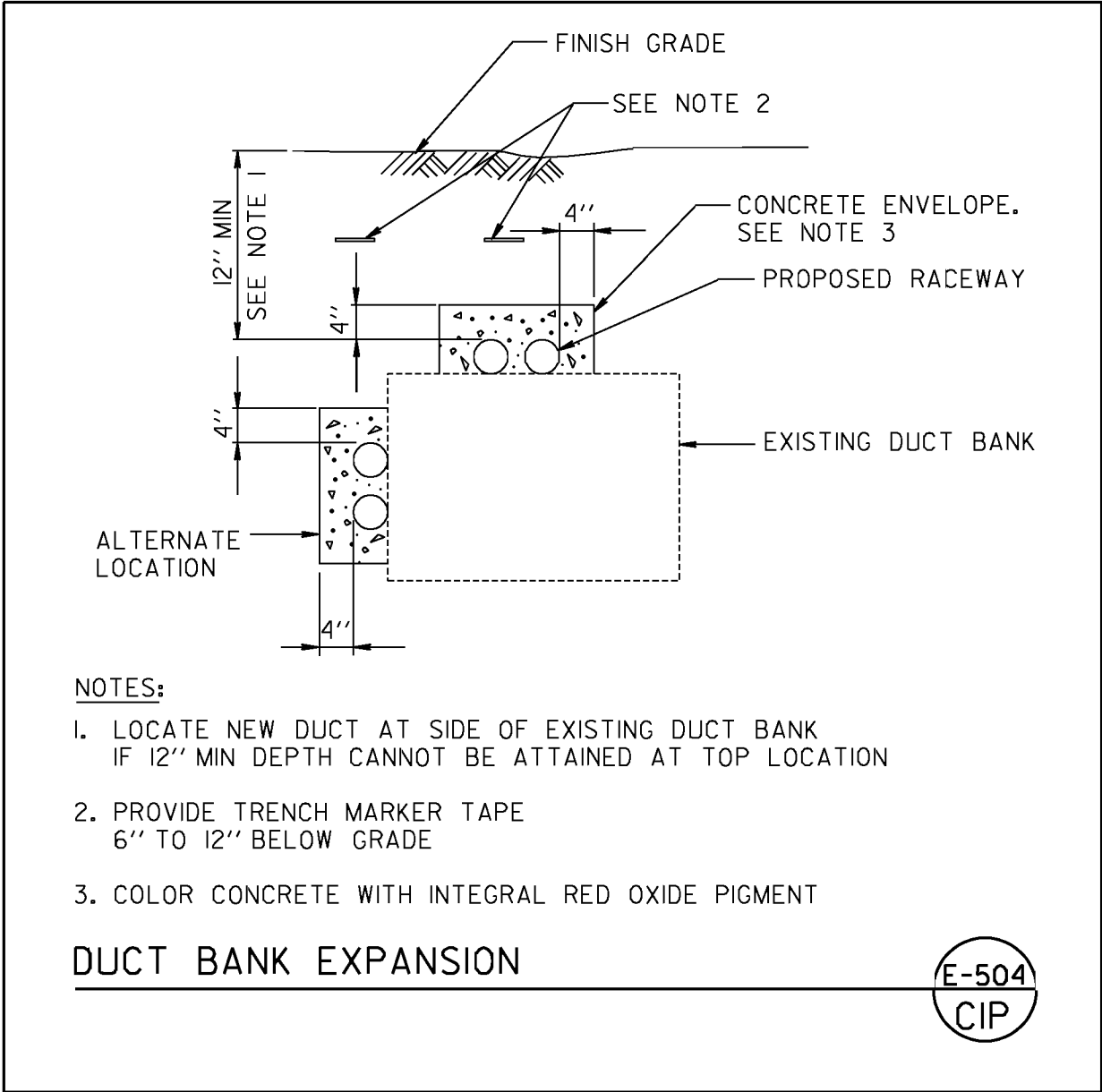


STANDARD
DETAIL

CIP

TYPICAL DUCT BANK

E-503



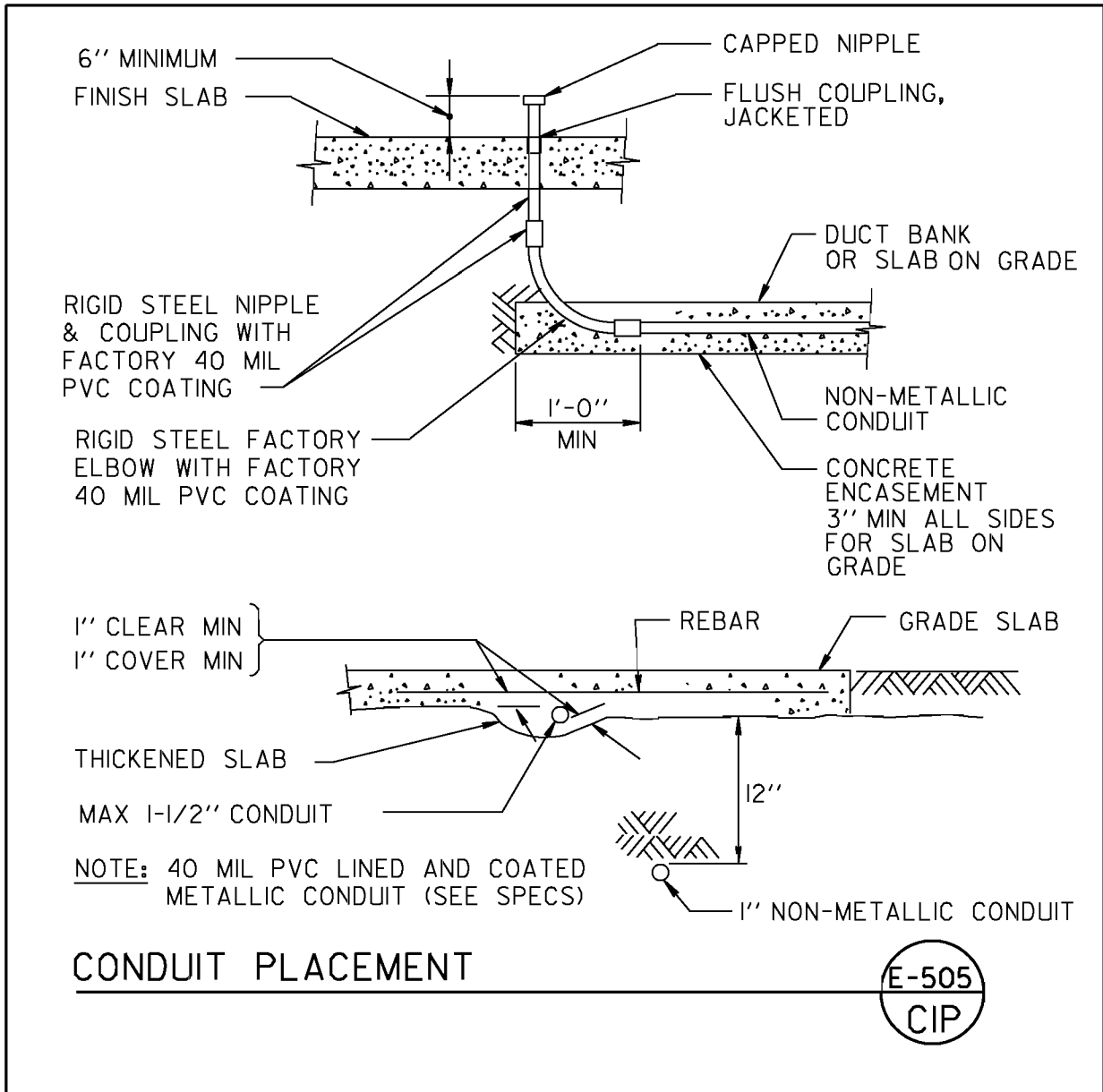
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City of San Diego



DUCT BANK EXPANSION

STANDARD DETAIL
CIP
E-504



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REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

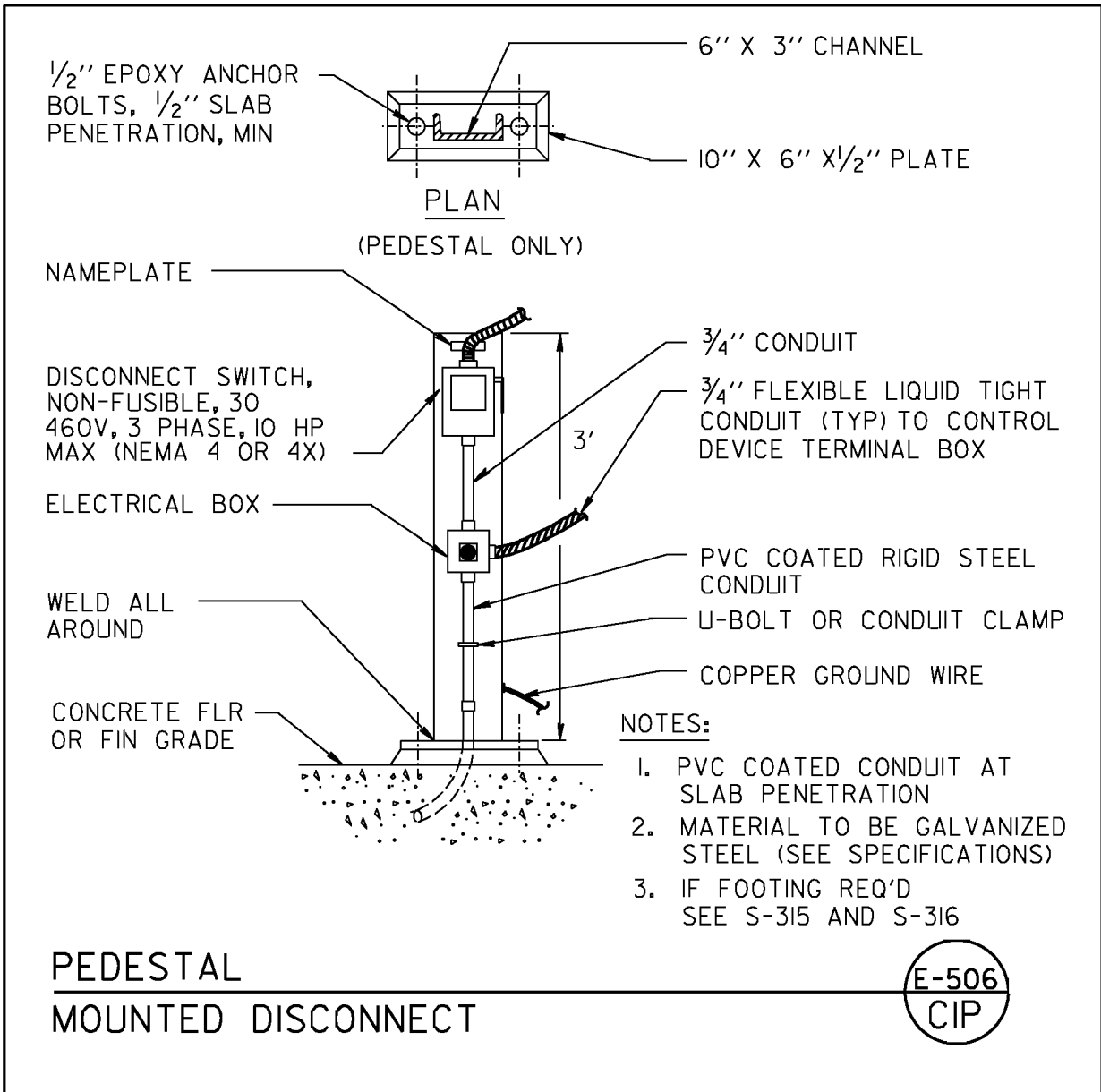


STANDARD
DETAIL

CIP


CONDUIT PLACEMENT

E-505



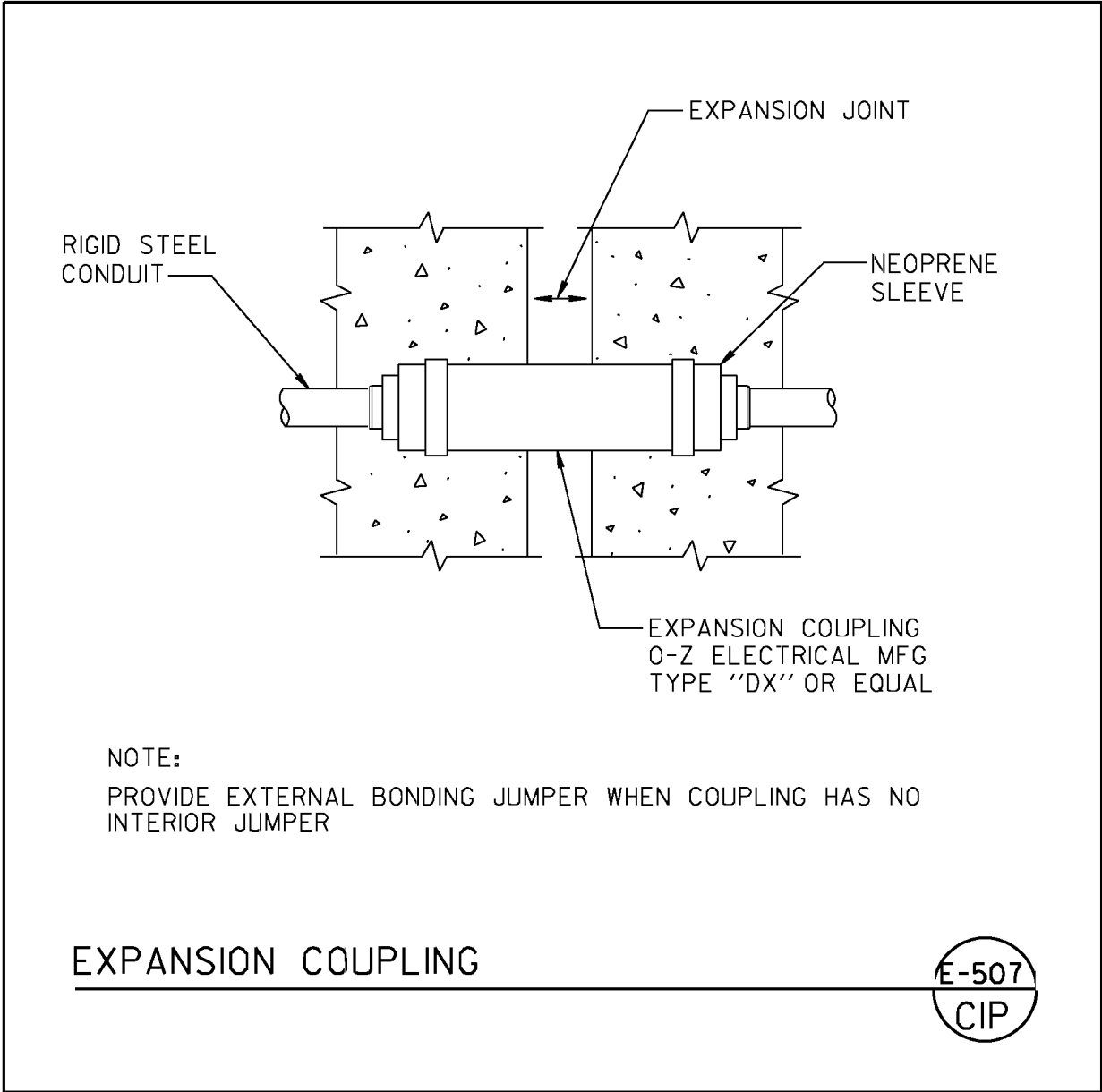
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City of San Diego



PEDESTAL MOUNTED DISCONNECT

STANDARD DETAIL
CIP
E-506



EXPANSION COUPLING

E-507
CIP

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WATER DEPARTMENT
City of San Diego

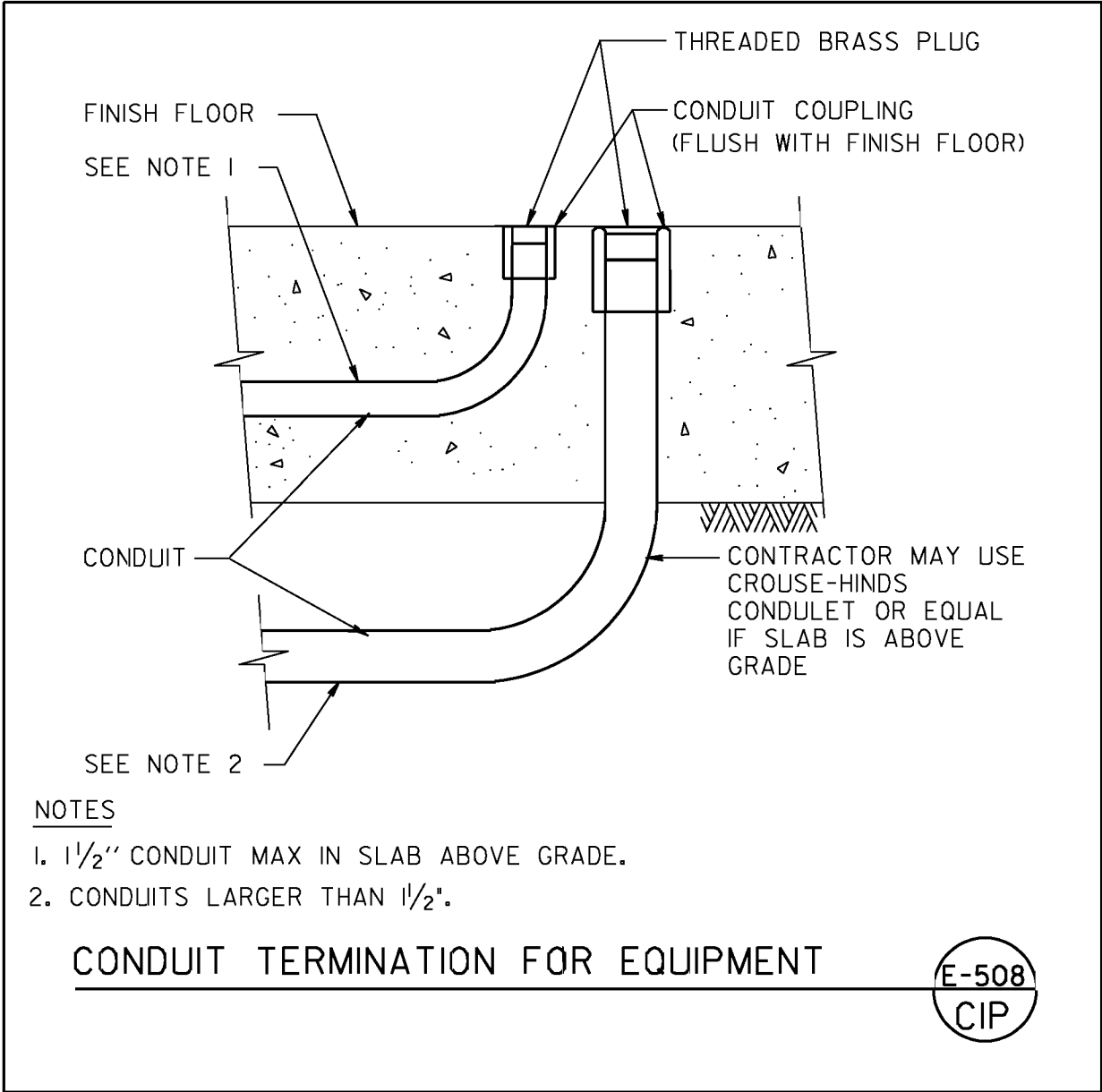


STANDARD
DETAIL

CIP

EXPANSION COUPLING

E-507



REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT
City of San Diego

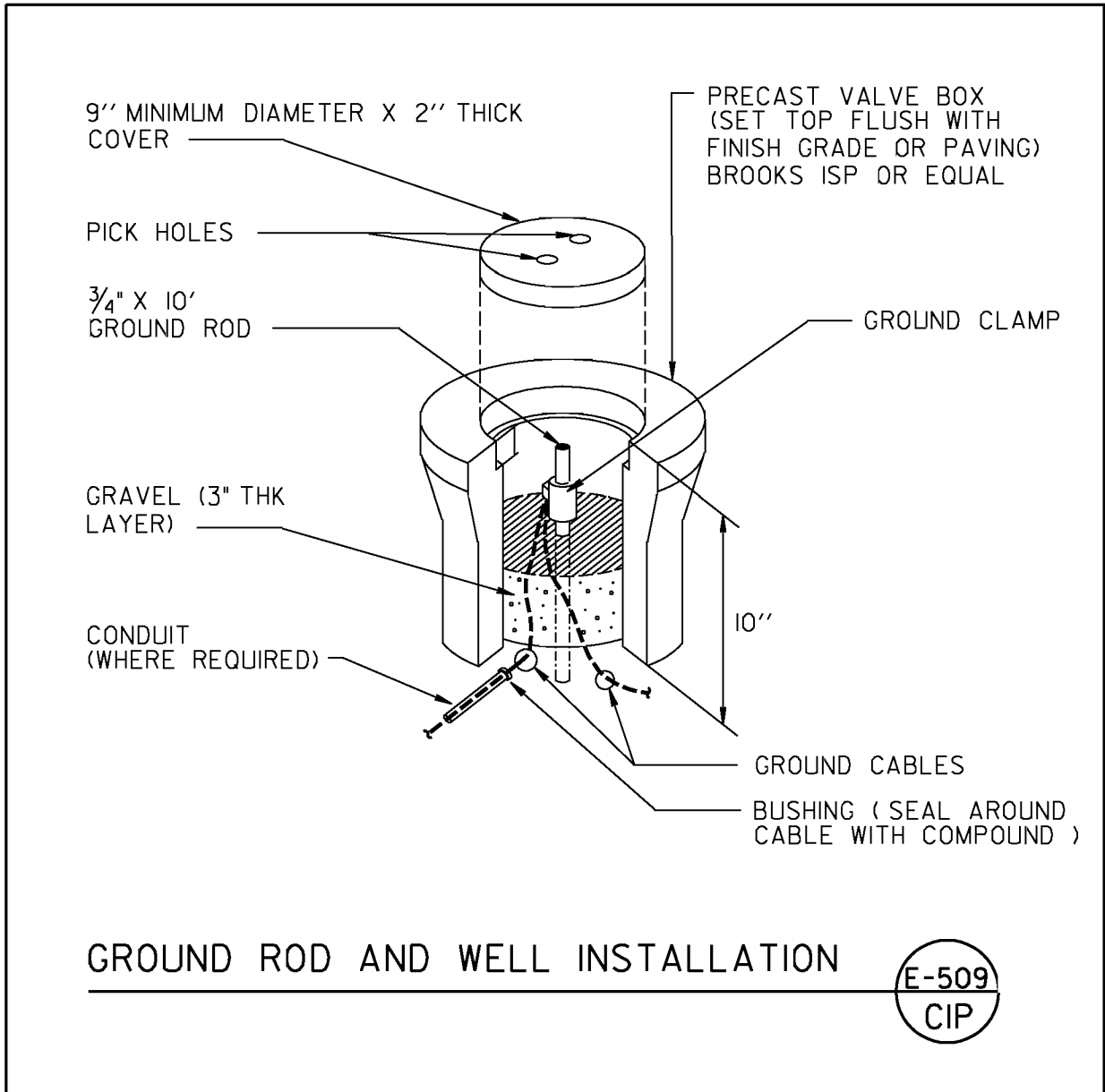


STANDARD
DETAIL

CIP

**CONDUIT TERMINATION
FOR EQUIPMENT**

E-508



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WATER DEPARTMENT
City of San Diego

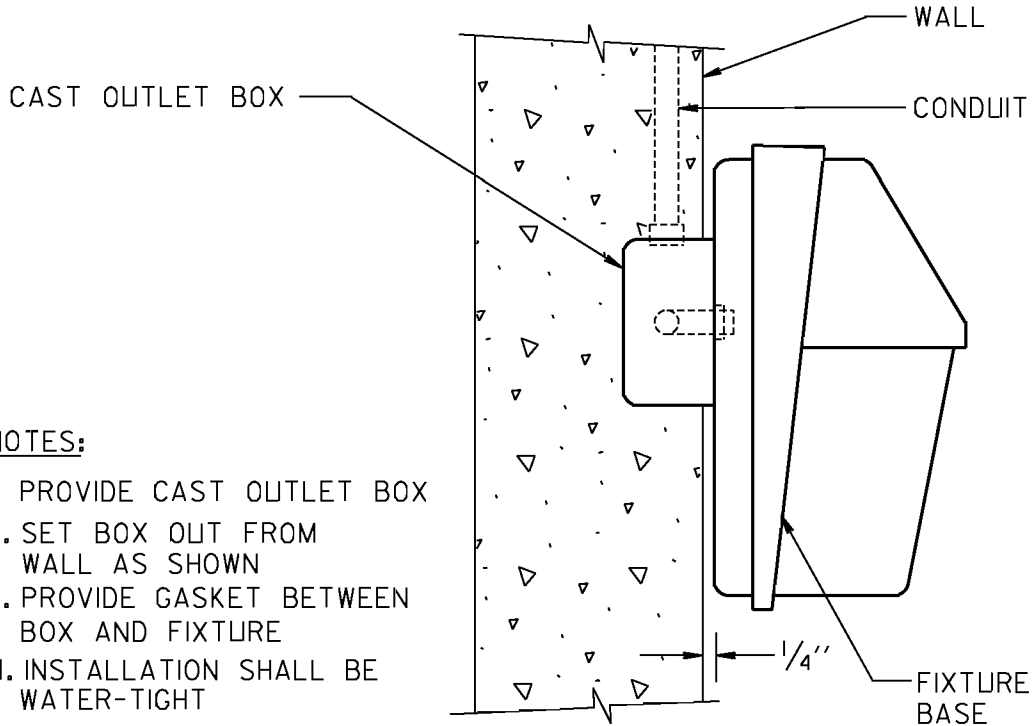


STANDARD
DETAIL

CIP

**GROUND ROD
AND WELL INSTALLATION**

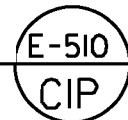
E-509



NOTES:

1. PROVIDE CAST OUTLET BOX
2. SET BOX OUT FROM WALL AS SHOWN
3. PROVIDE GASKET BETWEEN BOX AND FIXTURE
4. INSTALLATION SHALL BE WATER-TIGHT

WALL HUNG FIXTURE MOUNTING



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City of San Diego

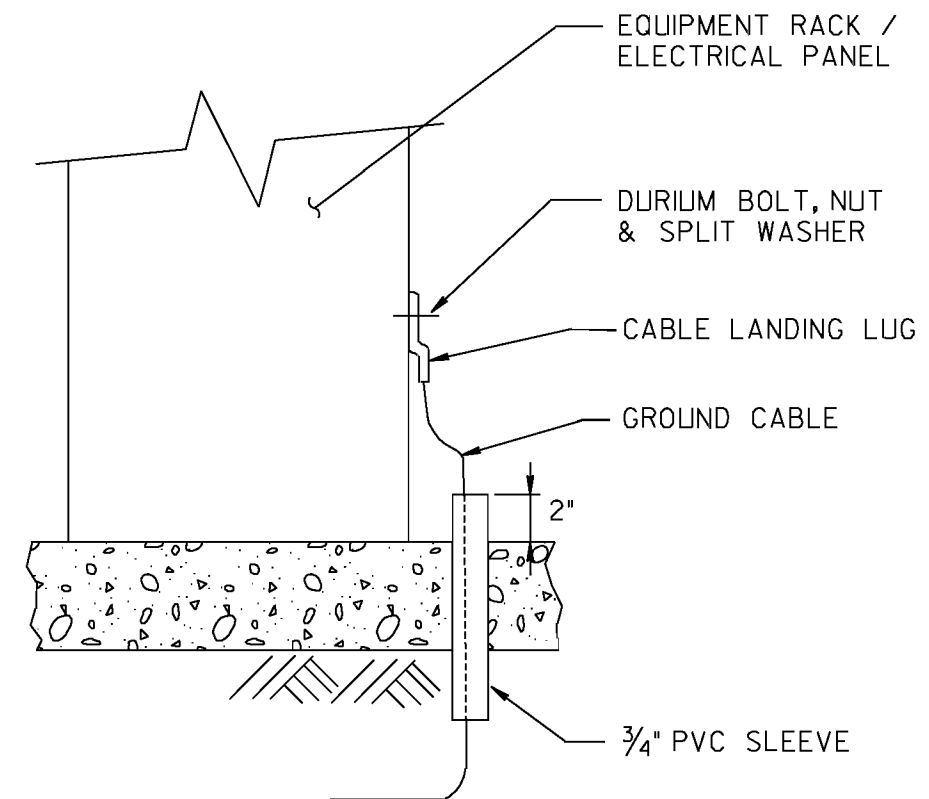
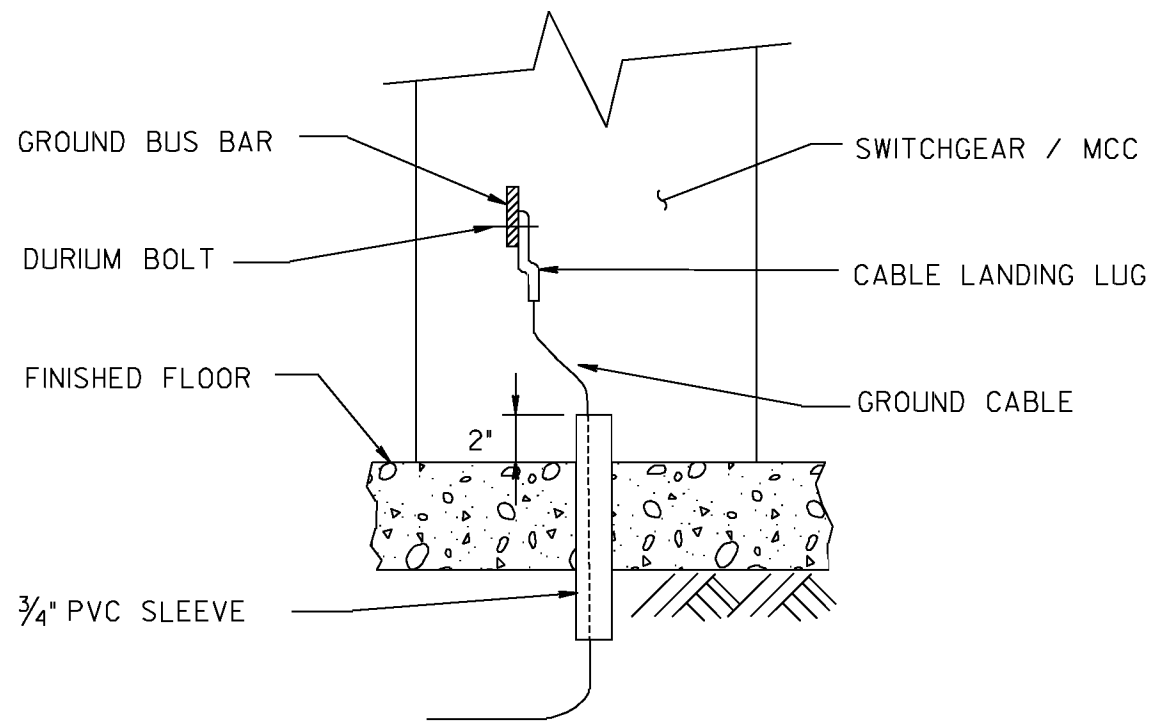


STANDARD
DETAIL

CIP

WALL HUNG FIXTURE MOUNTING

E-510



SWITCHGEAR/MCC/PANEL GROUNDING

E-511
CIP

NOT TO SCALE

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

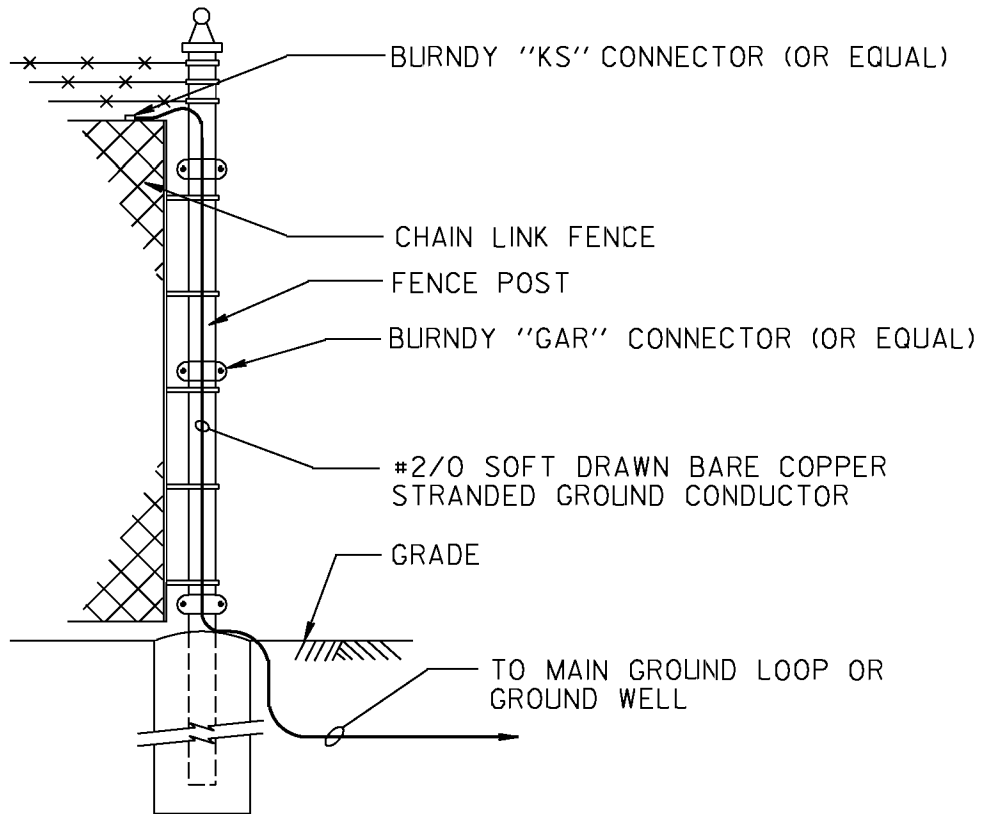


STANDARD
DETAIL

CIP

**SWITCHGEAR/MCC/PANEL
GROUNDING**

E-511



FENCE GROUNDING

E-512
CIP

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WATER DEPARTMENT
City of San Diego

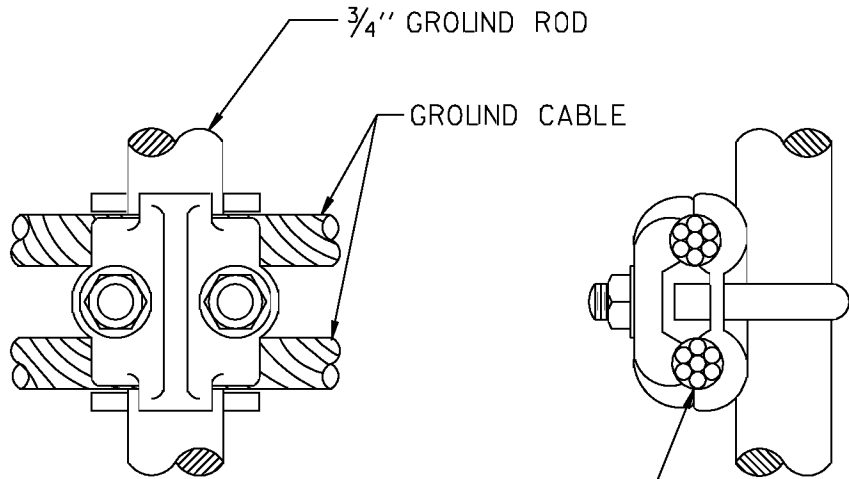


STANDARD
DETAIL

CIP

FENCE GROUNDING

E-512



ROD TYPE CONNECTOR
 90° CABLE CONNECTION
 TO ROD OR PIPE. BURNDY
 TYPE "GP" GROUND
 CONNECTOR (OR EQUAL)

CABLE TO ROD CONNECTION



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 City of San Diego

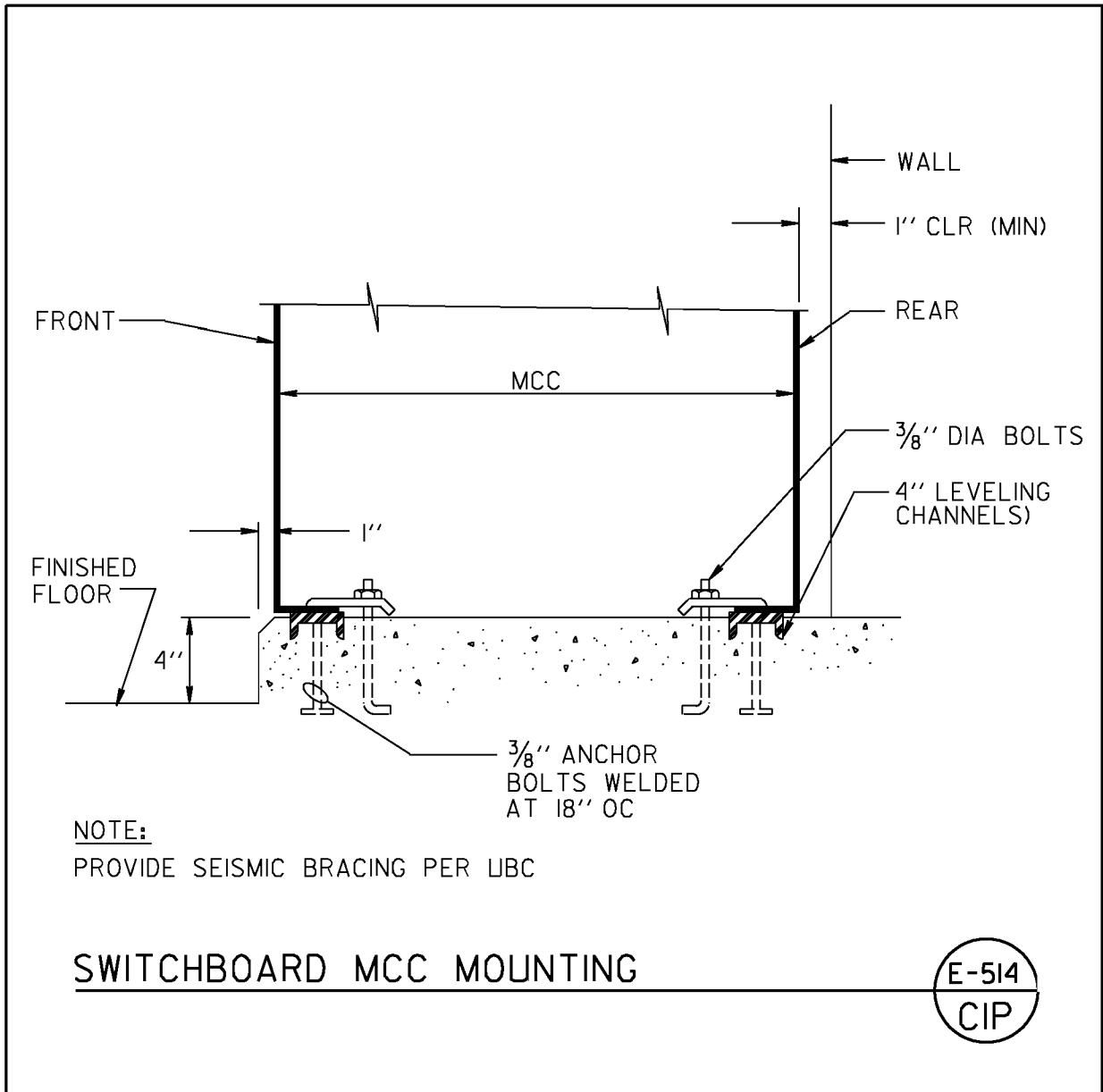


STANDARD
 DETAIL

CIP

CABLE TO ROD CONNECTION

E-513



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WATER DEPARTMENT
City of San Diego

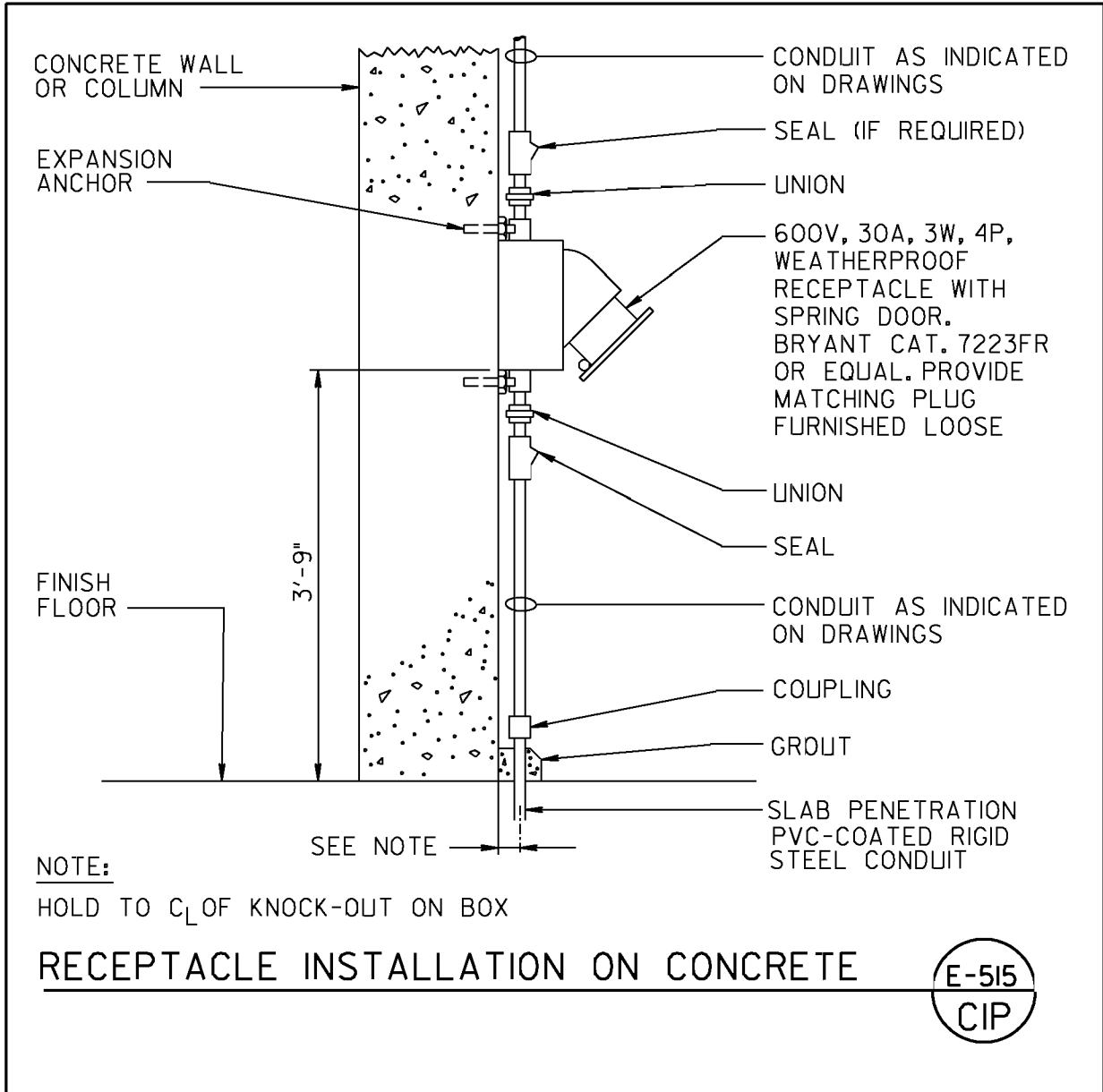


STANDARD
DETAIL

CIP

SWITCHBOARD MCC MOUNTING

E-514



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REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

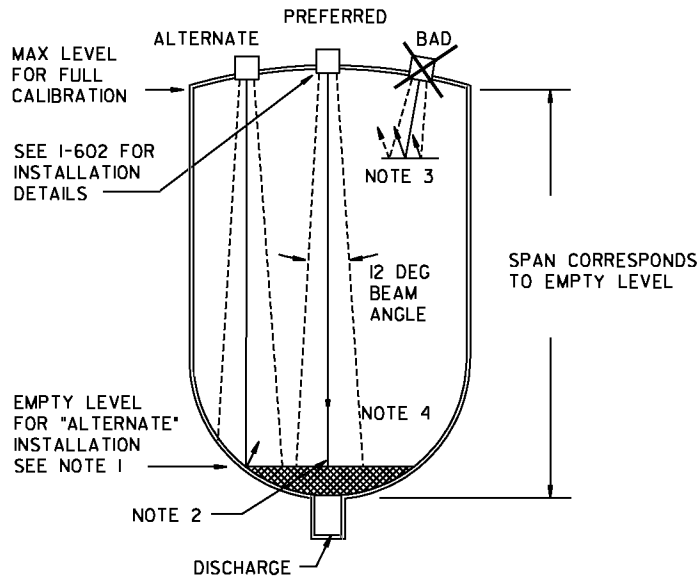


STANDARD
DETAIL

CIP

RECEPTACLE INSTALLATION ON CONCRETE

E-515



NOTES:

1. BEAM SHOULD NOT DETECT BIN BOTTOM. USE RANGE EXTENSION PARAMETERS TO OMIT FALSE ECHOS IF THIS OCCURS. THE TRANSDUCER SHOULD BE CENTERED AS MUCH AS POSSIBLE (WITHOUT INTERFERENCE FROM INLET) FOR OPTIMUM READING RANGE.
2. SOUND BEAM MUST BE PERPENDICULAR TO LIQUID SURFACE.
3. ECHO HAS MISSED IMPROPERLY LEVELED TRANSDUCER.
4. TANK MUST BE AT NORMAL TEMPERATURE AND CONTAIN ITS NORMAL VAPOR WHEN PERFORMING EMPTY OR FULL CALIBRATION

**ULTRASONIC LEVEL TRANSMITTER
TANK INSTALLATION**

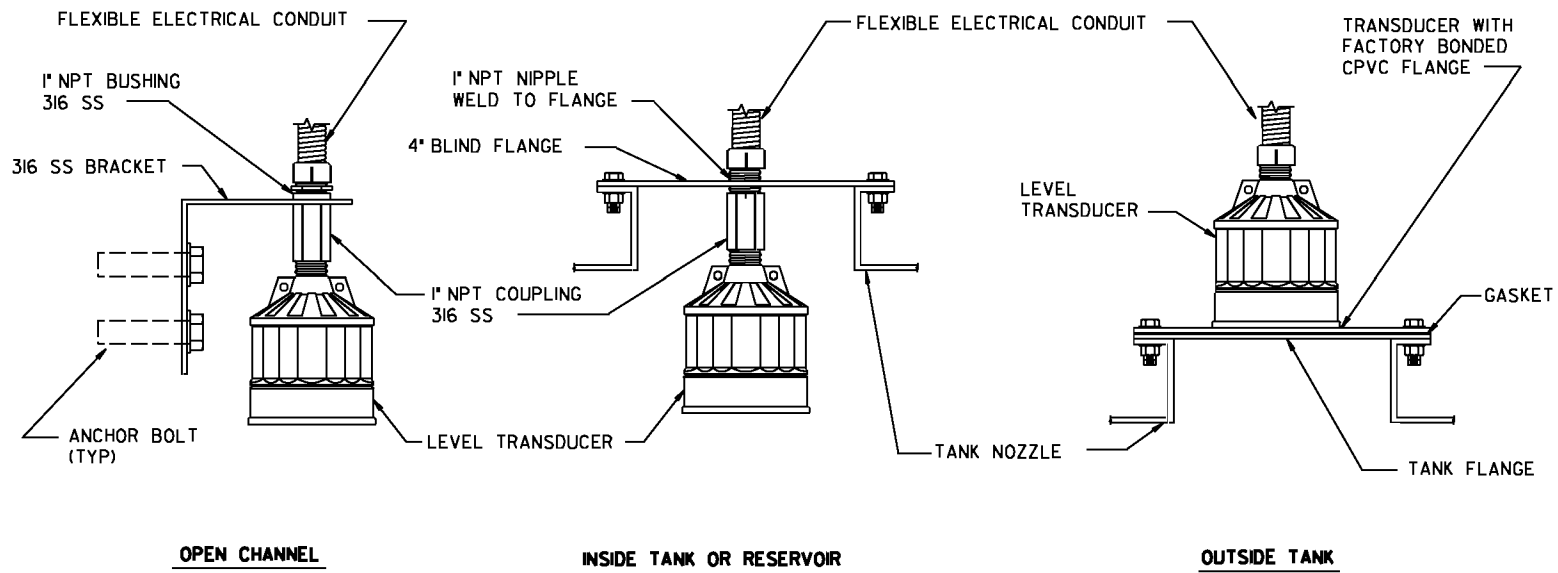


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City of San Diego

**ULTRASONIC LEVEL INDICATION
TANK INSTALLATION**

STANDARD DETAIL
CIP
I-601



SCALE: NO SCALE

ULTRASONIC TRANSMITTER
INSTALLATION DETAILS

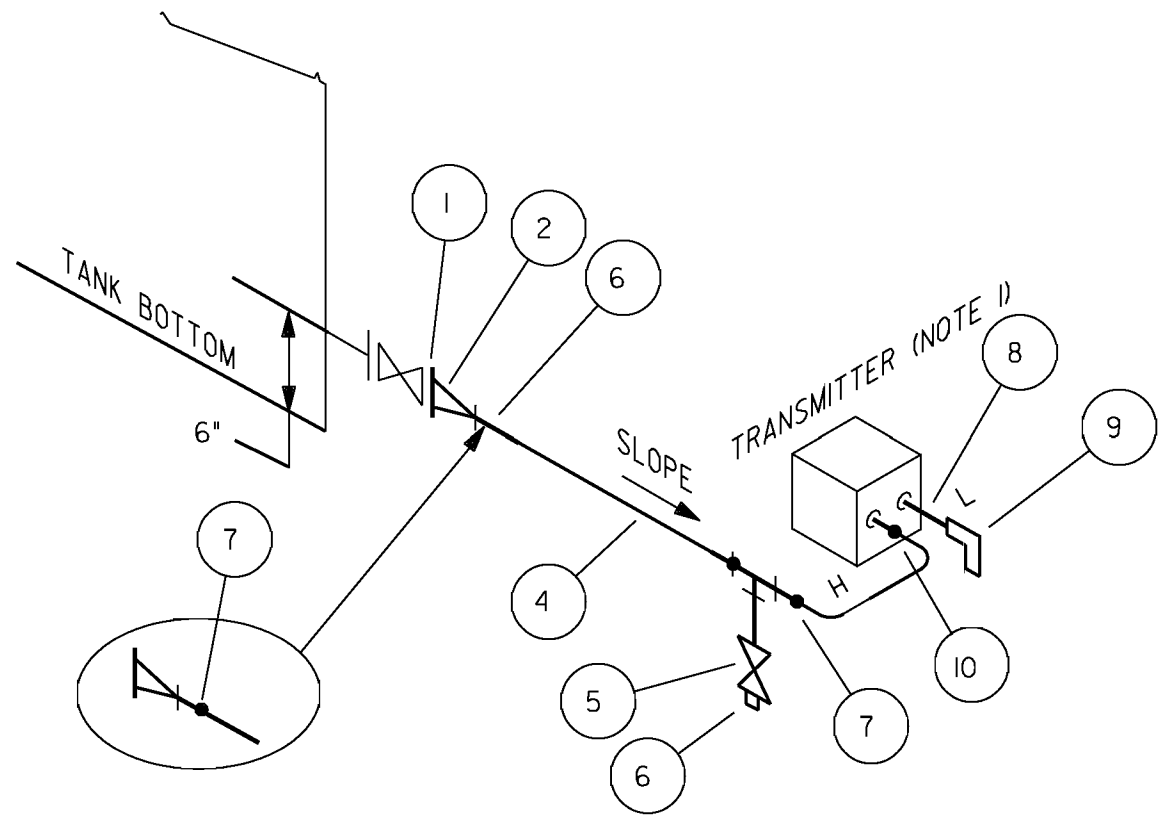


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City of San Diego

ULTRASONIC TRANSMITTER
INSTALLATION DETAILS

STANDARD DETAIL
CIP
I-602



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	X" x 3/8"	1	RED. FLANGE
2	3/8" x 1/4"	1	SWAGE
3	1/4"	2	TEE
4	3/8"	A/R	TUBING
5	1/4"	1	VALVE
6	1/4"	2	PLUG
7	3/8" Tx 1/4" MNPT	3	CONNECTOR
8	1/4" x 3"	1	NIPPLE
9	1/2"	1	BUG VENT
10	3/8" Tx 1/2" MNPT	1	CONNECTOR
11			
12			
13			
14			
15			

NOTES:
 I. AIR BLEED VALVE IS INTEGRAL WITH THE TRANSMITTER.

LEVEL TRANSMITTER-REMOTE MOUNTED
ATMOSPHERIC REFERENCE



REVISION	BY	APPROVED	DATE
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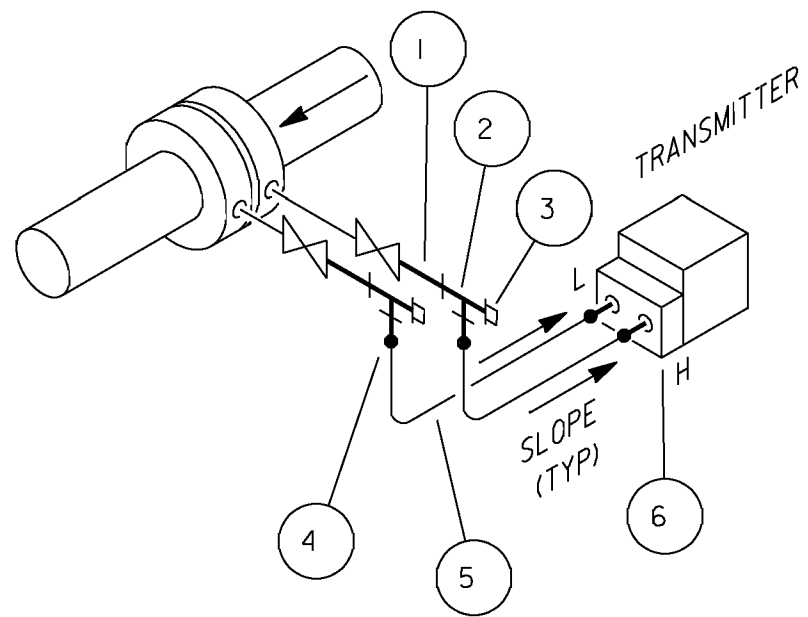
WATER DEPARTMENT
 City of San Diego

LEVEL TRANSMITTER-REMOTE MTD.
ATMOSPHERIC REFERENCE

STANDARD
 DETAIL

CIP

1-603



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	1/2"x3"	2	NIPPLE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8" T x 1/2" MNPT	4	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	3-VA MANIFOLD
7			
8			
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13			
14			
15			

FLOW TRANSMITTER-LINE MOUNTED
LIQUID SERVICE

I-604
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

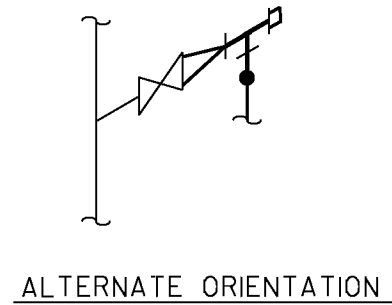
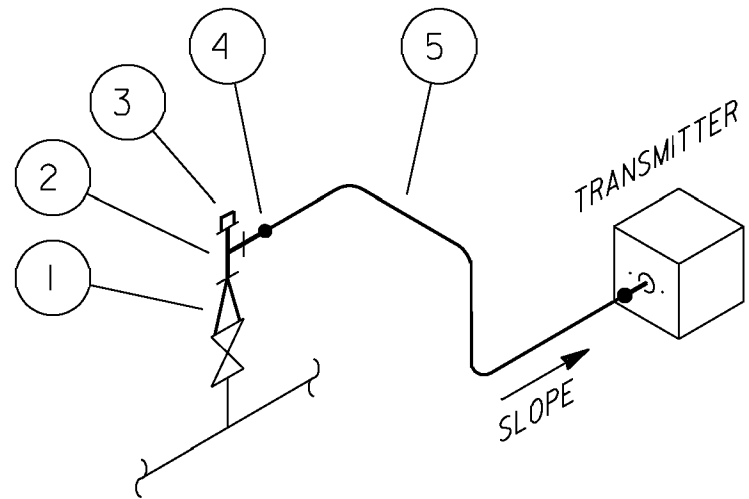


FLOW TRANSMITTER-LINE MOUNTED
LIQUID SERVICE

STANDARD
DETAIL

CIP

I-604




LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	1	SWAGE
2	1/2"	1	TEE
3	1/2"	1	PLUG
4	3/8" Tx 1/2" MNPT	2	CONNECTOR TXMP
5	3/8"	A/R	TUBING
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

PRESSURE TRANSMITTER-LINE MOUNTED
LIQUID SERVICE



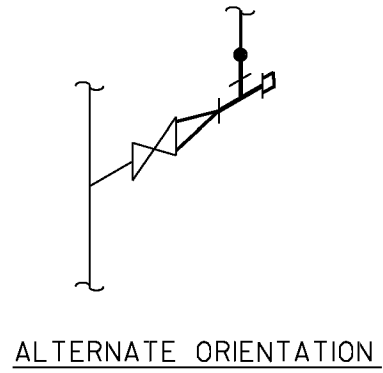
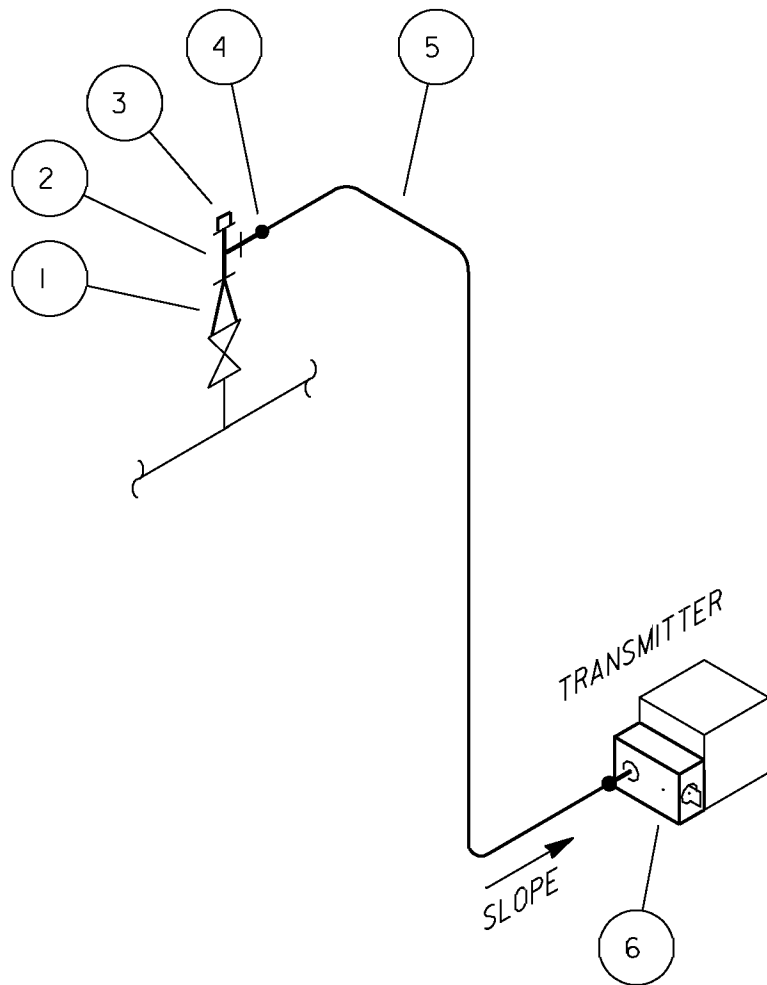
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WATER DEPARTMENT
City of San Diego



PRESSURE TRANSMITTER-LINE MOUNTED
LIQUID SERVICE

STANDARD DETAIL
CIP
I-605



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	1	SWAGE
2	1/2"	1	TEE
3	1/2"	2	PLUG
4	3/8" T x 1/2" MNPT	2	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	2-VA MANIFOLD
7			
8			
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15			

PRESSURE TRANSMITTER-REMOTE MOUNTED I-606
 LIQUID SERVICE CIP

REVISION	BY	APPROVED	DATE
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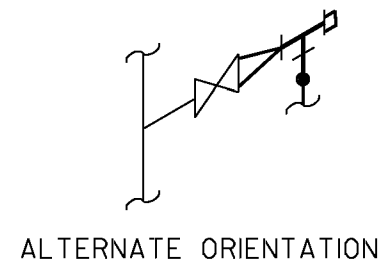
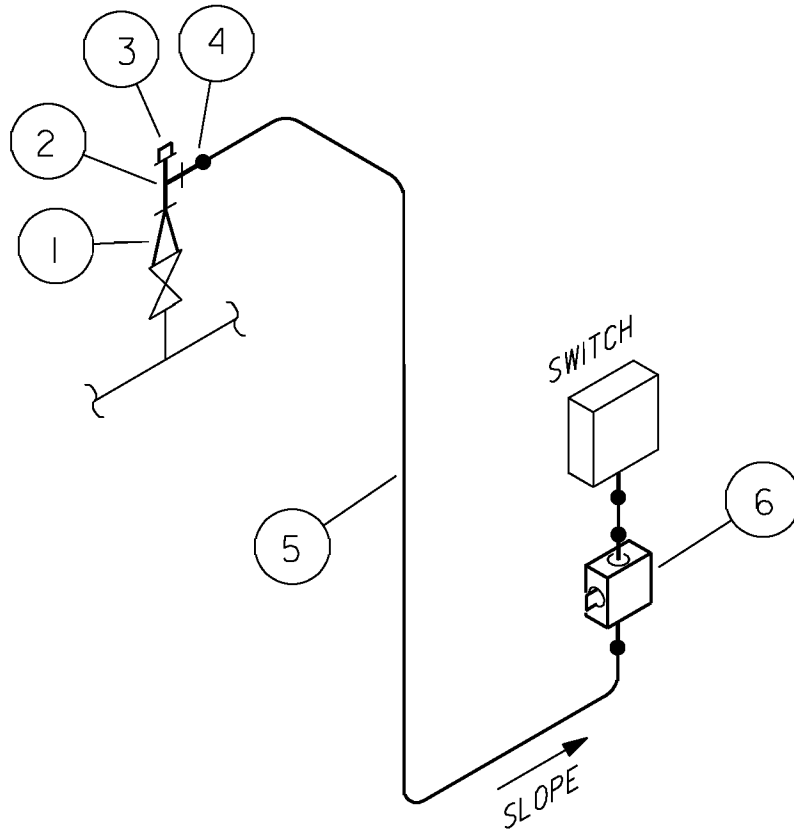
WATER DEPARTMENT
 City of San Diego

PRESSURE TRANSMITTER-REMOTE MOUNTED
 LIQUID SERVICE

STANDARD
 DETAIL

CIP

I-606



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" X 1/2"	1	SWAGE
2	1/2"	1	TEE
3	1/2"	2	PLUG
4	3/8" T x 1/2" MNPT	4	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	2-VA MANIFOLD
7			
8			
9			
10			
11			
12			
13			
14			
15			

PRESSURE SWITCH-REMOTE MOUNTED
LIQUID SERVICE



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

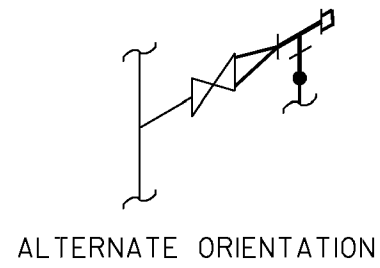
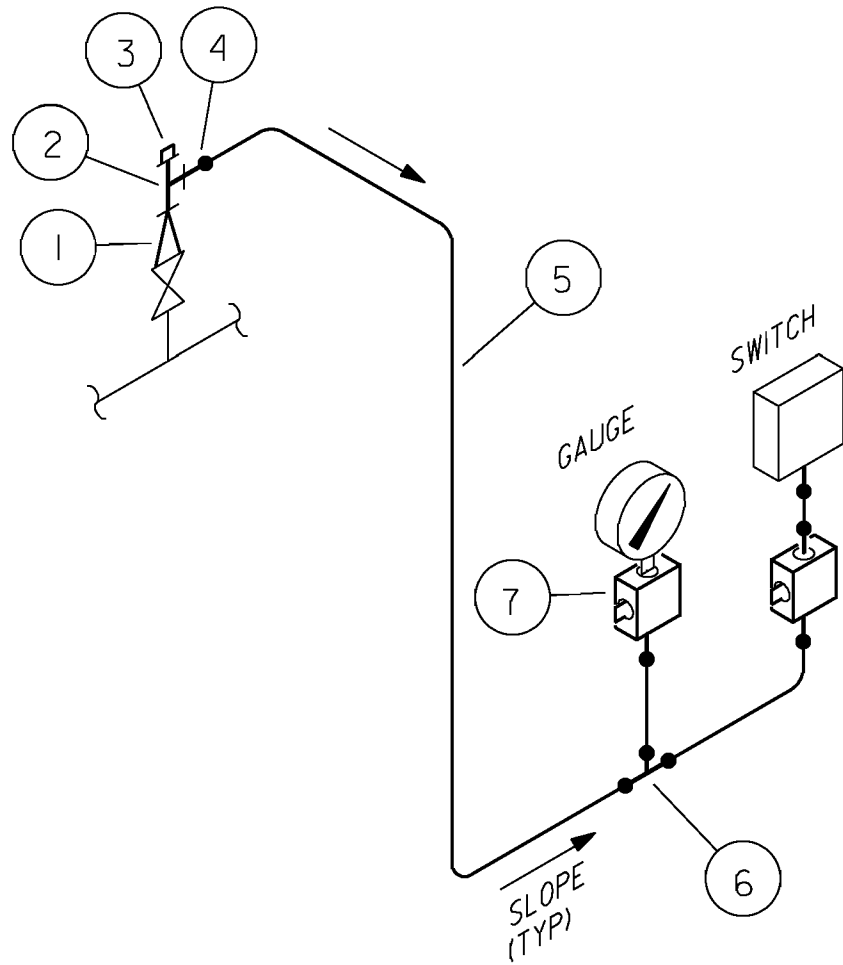


PRESSURE SWITCH-REMOTE MOUNTED
LIQUID SERVICE

STANDARD
DETAIL

CIP

1-607




LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	1	SWAGE
2	1/2"	1	TEE
3	1/2"	3	PLUG
4	3/8" T x 1/2" MNPT	5	CONNECTOR
5	3/8"	A/R	TUBING
6	3/8"	1	TUBING TEE
7	1/2"	2	2-VA MANIFOLD
8			
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13			
14			
15			

PRESSURE SWITCH W/ GAUGE
LIQUID SERVICE

1-608
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

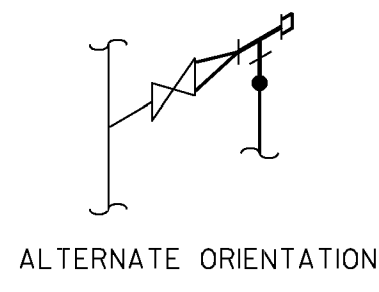
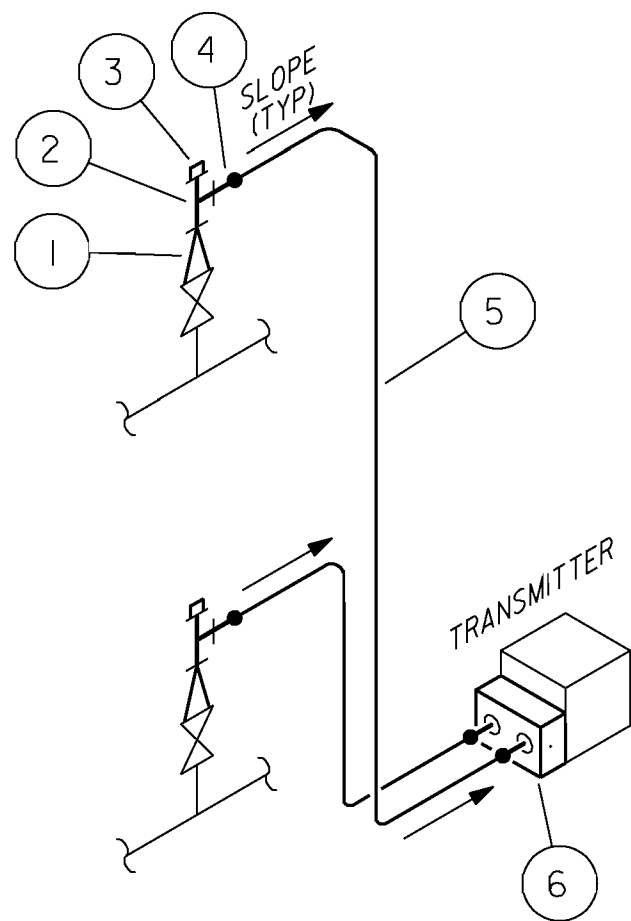


PRESSURE SWITCH W/ GAUGE
LIQUID SERVICE

STANDARD
DETAIL

CIP

1-608



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	2	SWAGE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8" T x 1/2" MNPT	4	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	3-VA MANIFOLD
7			
8			
9			
10			
11			
12			
13			
14			
15			

D/P TRANSMITTER-REMOTE MOUNTED
LIQUID SERVICE

1-609
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

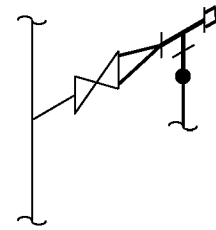
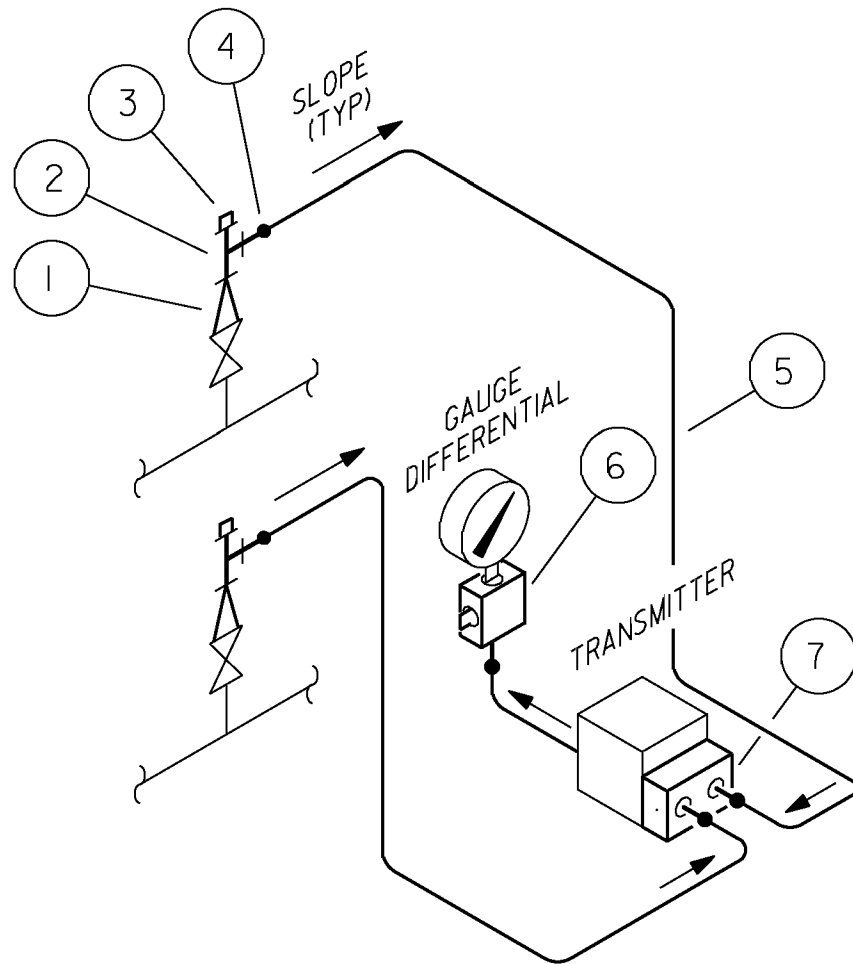


D/P TRANSMITTER-REMOTE MOUNTED
LIQUID SERVICE

STANDARD
DETAIL

CIP

1-609



ALTERNATE ORIENTATION

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	2	SWAGE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8"x1/2"MNPT	6	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	2-VA MANIFOLD
7	1/2"	1	3-VA MANIFOLD
8			
9			
10			
11			
12			
13			
14			
15			

D/P TRANSMITTER W/ GAUGE
LIQUID SERVICE

1-610
CIP

REVISION	BY	APPROVED	DATE
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WATER DEPARTMENT
City of San Diego

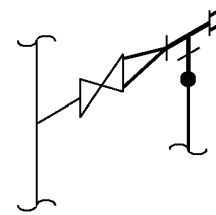
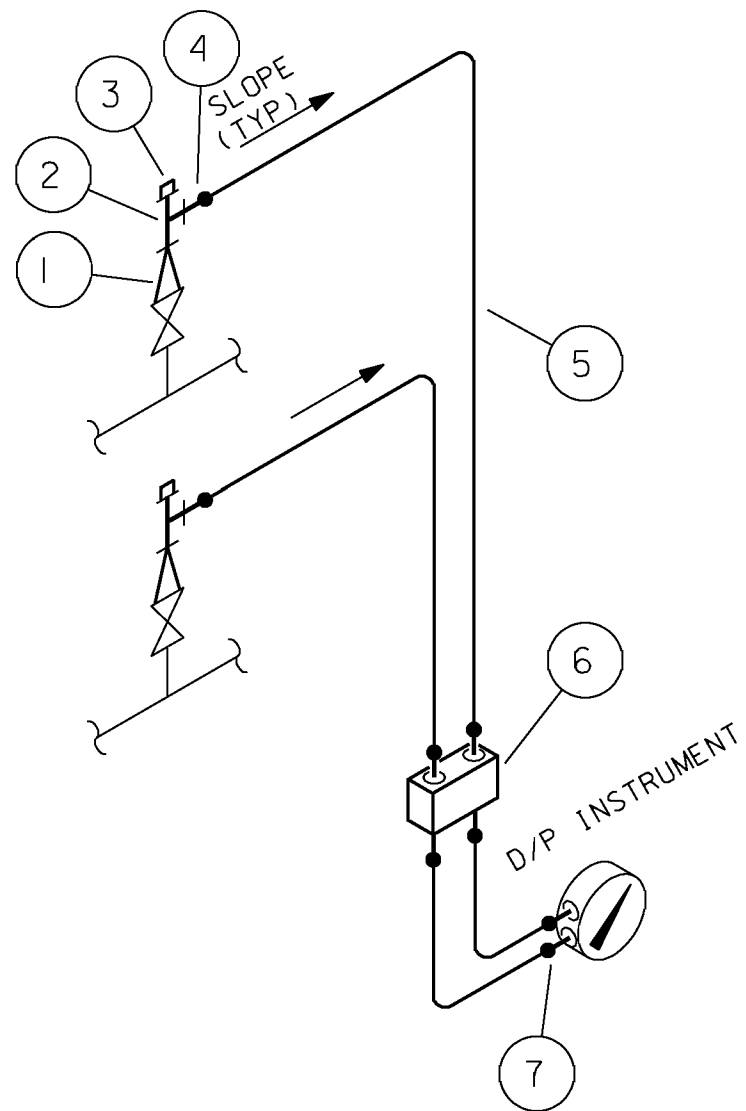


D/P TRANSMITTER W/ GAUGE
LIQUID SERVICE

STANDARD
DETAIL

CIP

I-610



ALTERNATE ORIENTATION


LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	2	SWAGE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8"Tx1/2"MNPT	6	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	3-VA MANIFOLD
7	3/8"Tx1/8"MNPT	2	RED.CONN.
8			
9			
10			
11			
12			
13			
14			
15			

INSTRUMENT INSTALLATION DETAIL
D/P INDICATOR-REMOTE MOUNTED

I-611
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

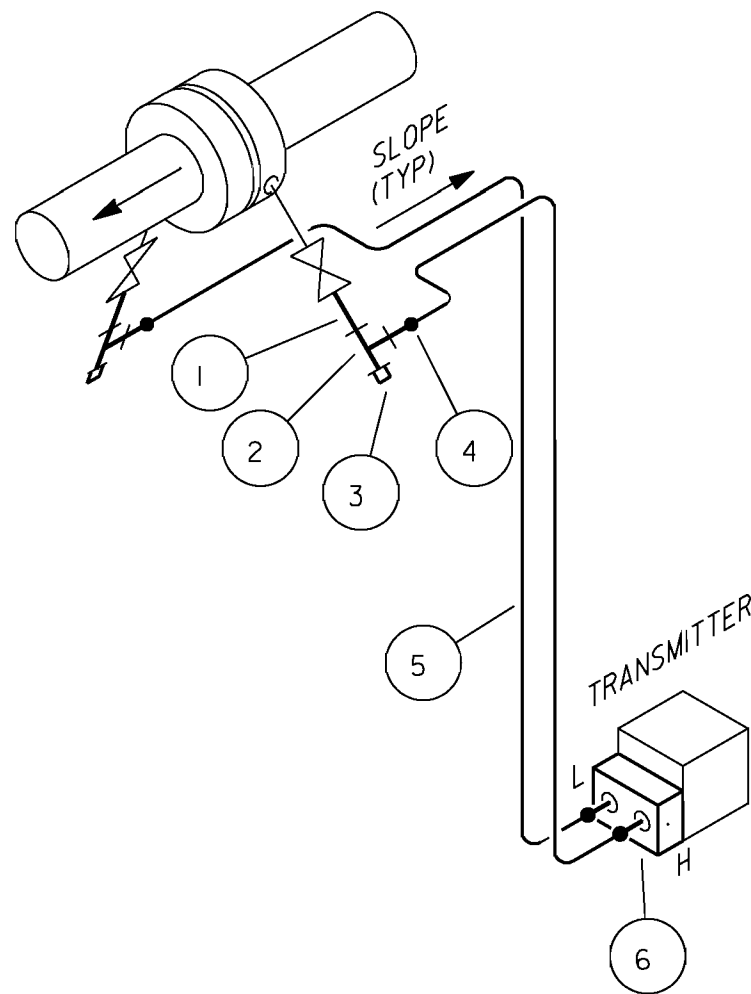


INSTRUMENT INSTALLATION DETAIL
D/P INDICATOR-REMOTE MOUNTED

STANDARD
DETAIL

CIP

I-611



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	1/2"x3"	2	NIPPLE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8"Tx1/2"MNPT	4	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	3-VA MANIFOLD
7			
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15			

FLOW TRANSMITTER-REMOTE MOUNTED
LIQUID SERVICE



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

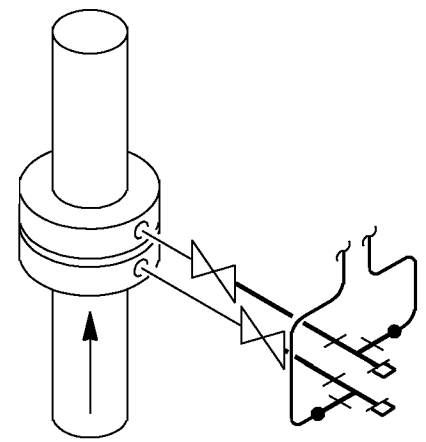
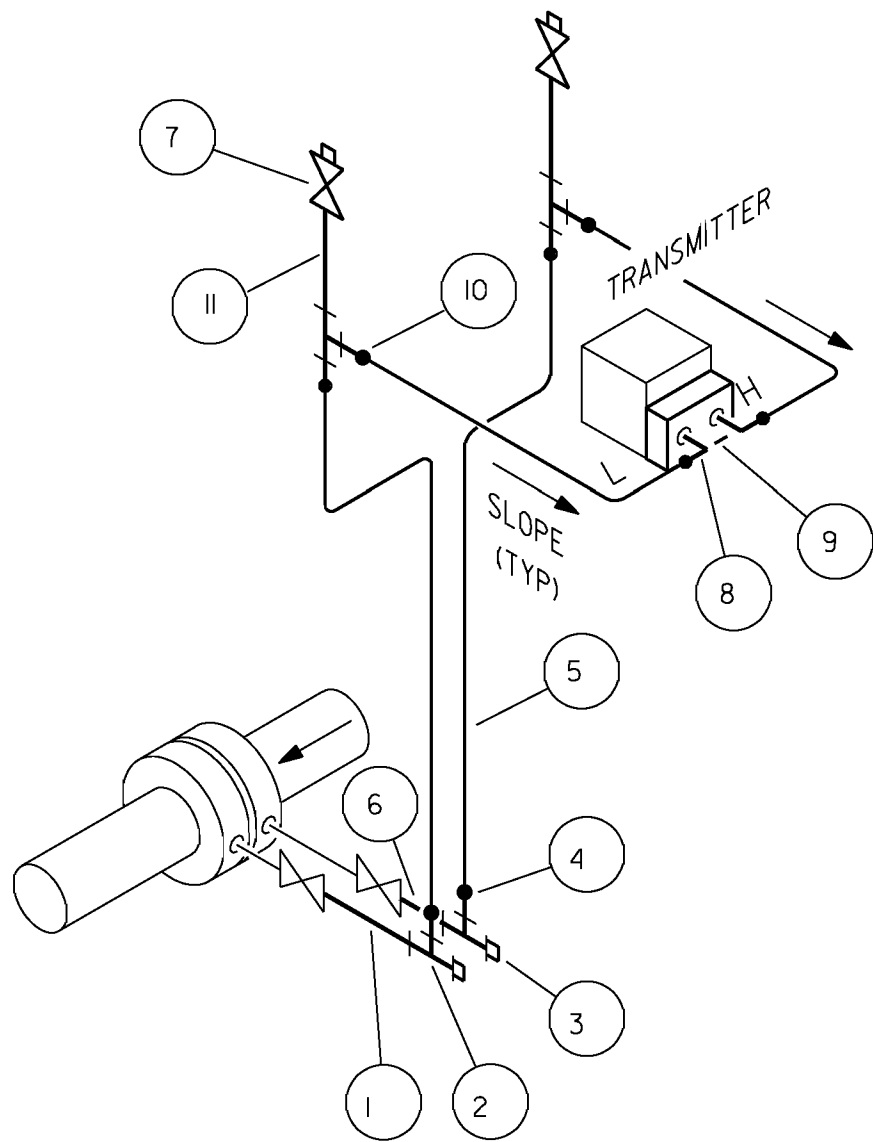
WATER DEPARTMENT
City of San Diego

**FLOW TRANSMITTER-REMOTE MOUNTED
LIQUID SERVICE**

STANDARD
DETAIL

CIP

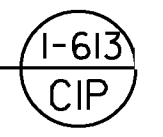
I-612



ALTERNATE ORIENTATION

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	1/2"x6"	2	NIPPLE
2	1/2"	4	TEE
3	1/2"	4	PLUG
4	3/8"Tx1/2" MNPT	2	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"x3"	1	NIPPLE
7	1/4"	2	VALVE
8	3/8"Tx1/2" MNPT	2	ELBOW
9	1/2"	1	3-VA MANIFOLD
10	3/8"Tx1/4" MNPT	2	CONNECTOR
11	1/4" x 6"	2	NIPPLE
12			
13			
14			
15			

FLOW TRANSMITTER-REMOTE MTD.
LIQUID SERVICE-ABOVE TAPS

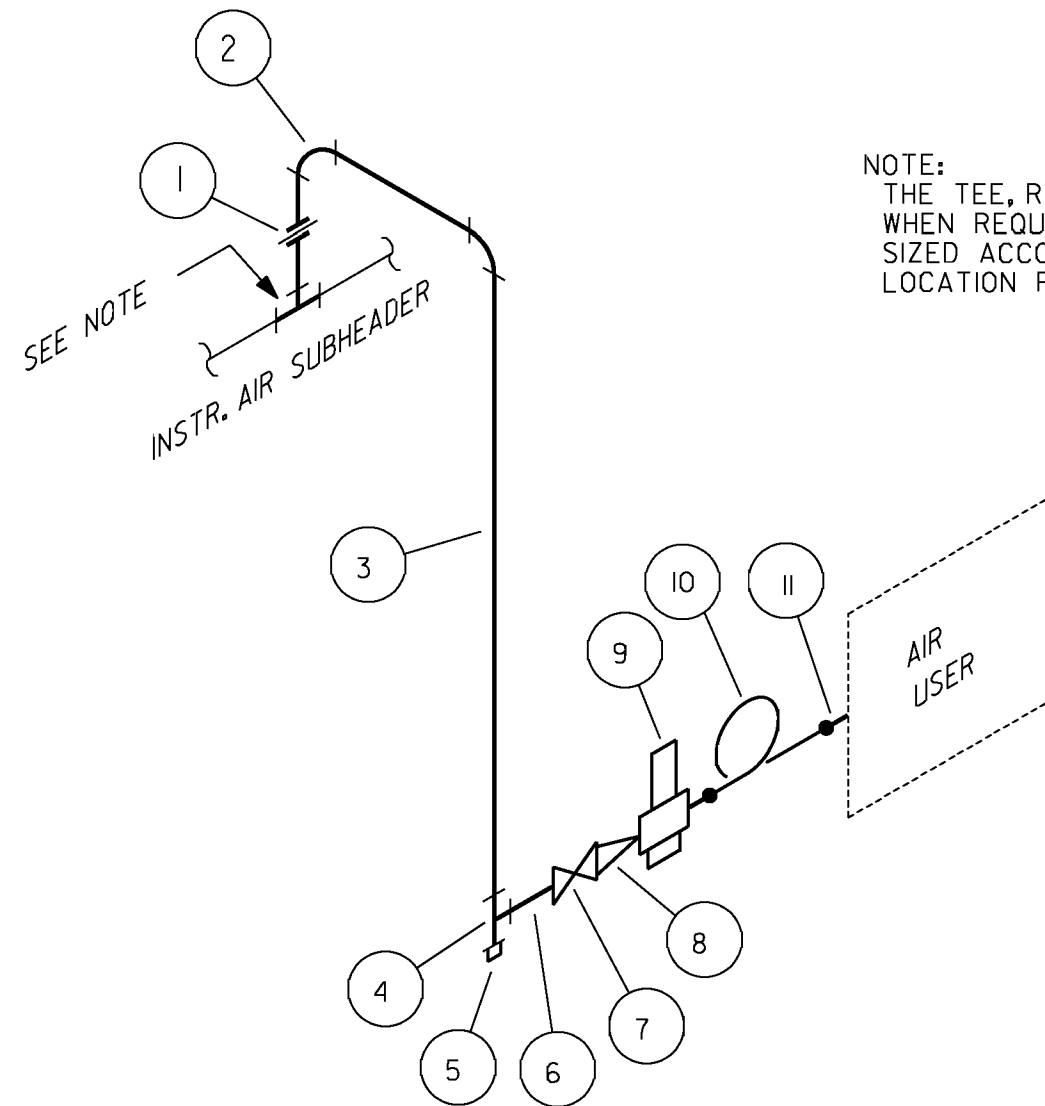


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WATER DEPARTMENT
City of San Diego

**FLOW TRANSMITTER-REMOTE MOUNTED
LIQUID SERVICE-ABOVE TAPS**

STANDARD DETAIL
CIP
I-613



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	1/2"	1	UNION
2	1/2"	2	ELBOW
3	1/2"	25'	PIPE
4	1/2"	1	TEE
5	1/2"	1	PLUG
6	1/2"x3"	2	NIPPLE
7	1/2"	1	VALVE
8	1/4"x1/2"	1	SWAGE
9	1/4"	1	FILTER REGULATOR
10	1/4"	5'	TUBING
11			
12			
13			
14			
15			

INSTRUMENT AIR SUPPLY TAKEOFF
W/ FILTER REGULATOR

1-614
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

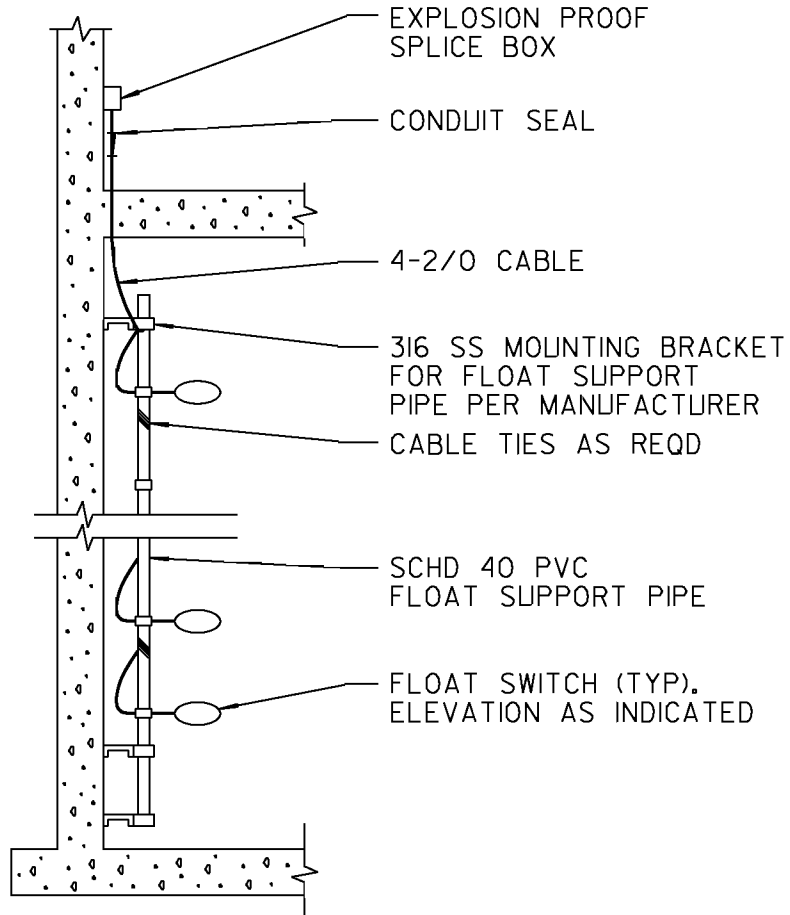


INSTRUMENT AIR SUPPLY TAKEOFF
W/ FILTER REGULATOR

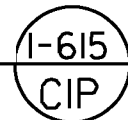
STANDARD
DETAIL

CIP

1-614



BALL FLOAT SWITCH



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REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

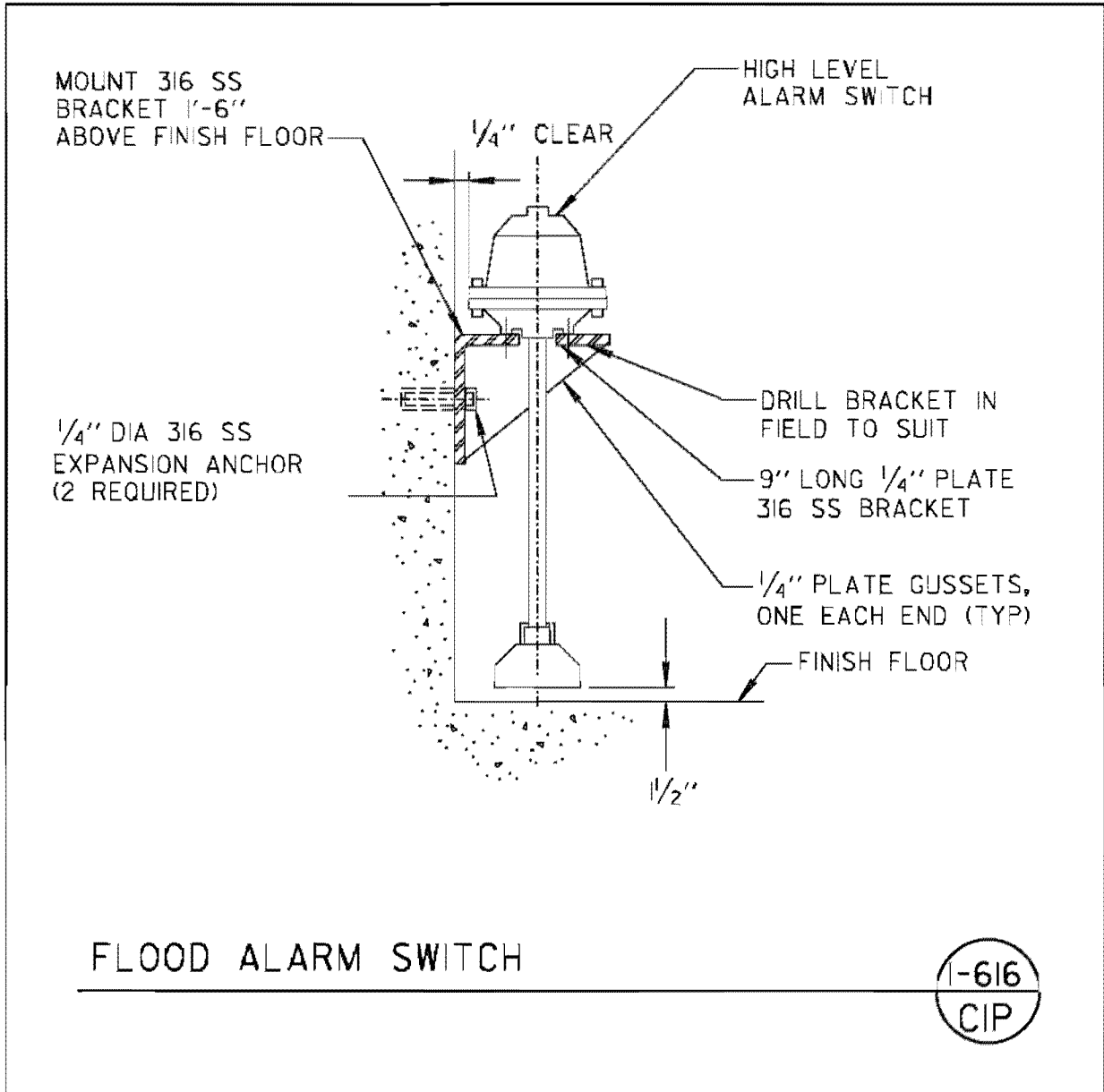


STANDARD
DETAIL

CIP

BALL FLOAT SWITCH

I-615



REVISION	BY	APPROVED	DATE

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WATER DEPARTMENT
City of San Diego

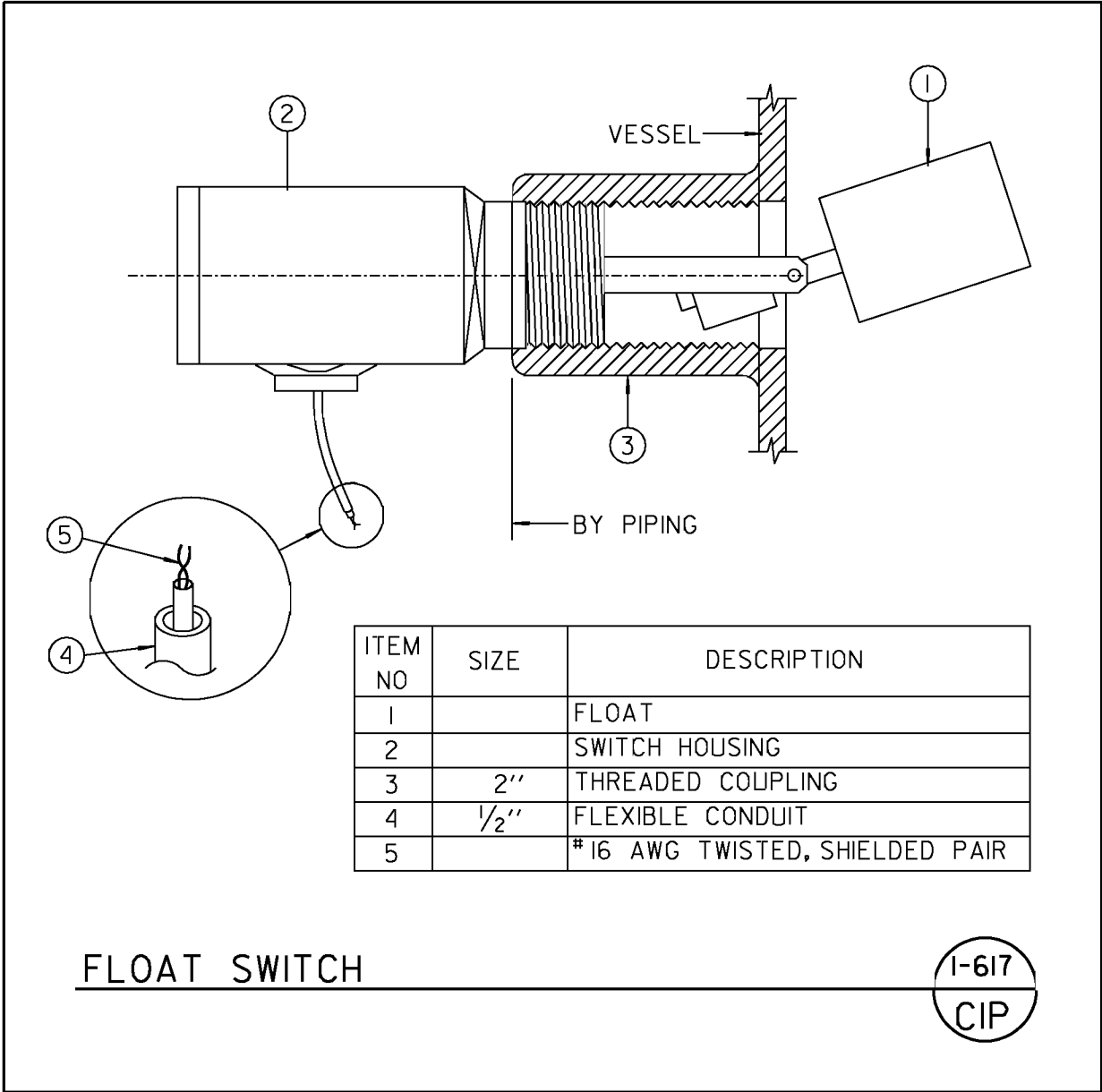


STANDARD
DETAIL

CIP

1-616

FLOOD ALARM SWITCH



REVISION	BY	APPROVED	DATE
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WATER DEPARTMENT
City of San Diego

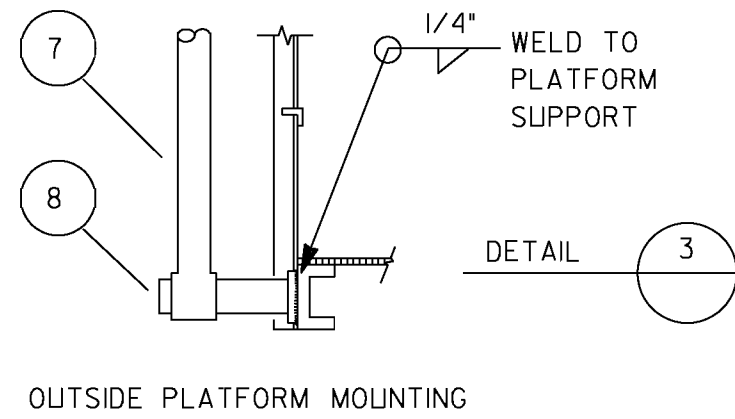
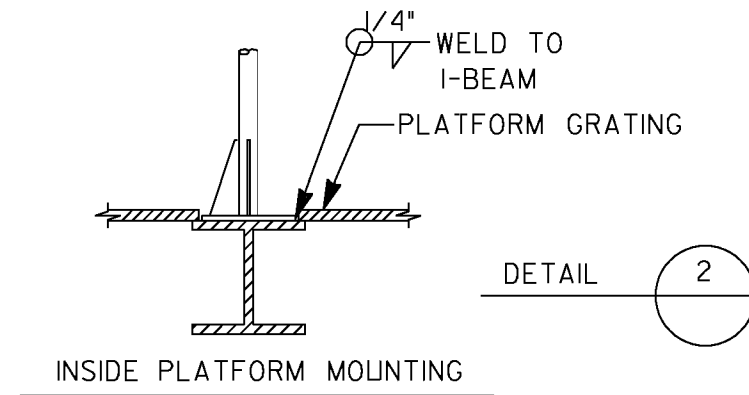
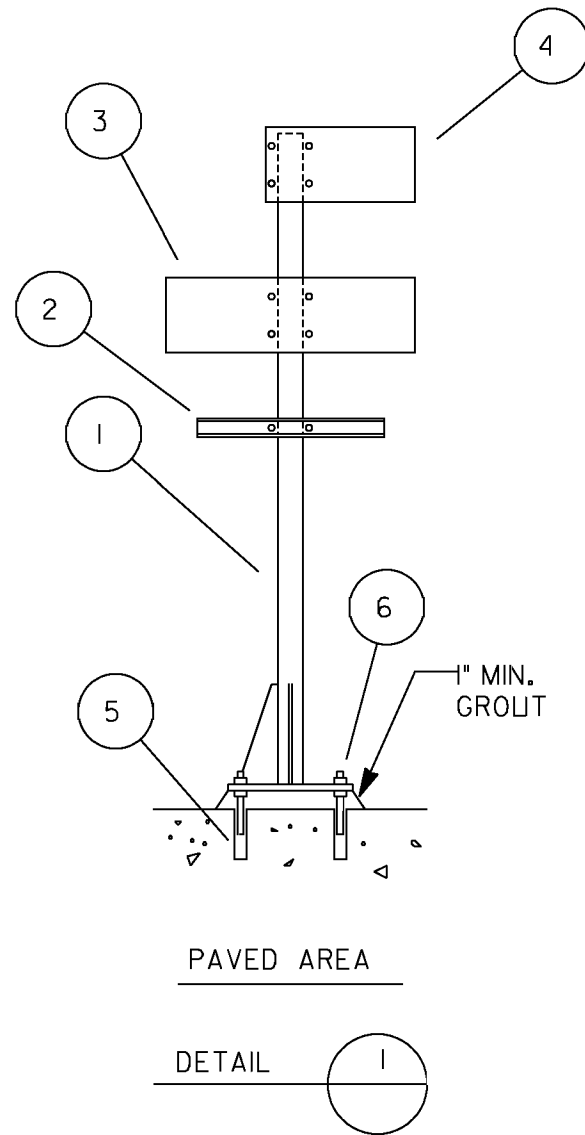


STANDARD
DETAIL

CIP

FLOAT SWITCH

I-617



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x40"	1	GALV STL PIPE
2	15"	1	2"X2" UNISTRUT
3	6"x20"	1	3/16" THK STL PLATE
4	6"x12"	1	3/16" THK STL PLATE
5	1/2"	4	CINCH ANCHOR,GALV
6	1/2"x5"	4	STUD BOLT,GALV
7	2"x48"	1	PEDESTAL,GALV STL
8	2"x48"	1	BRACKET,GALV STL
9			
10			
11			
12			
13			
14			
15			

INSTRUMENT SUPPORT
SINGLE MOUNTING

1-618
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

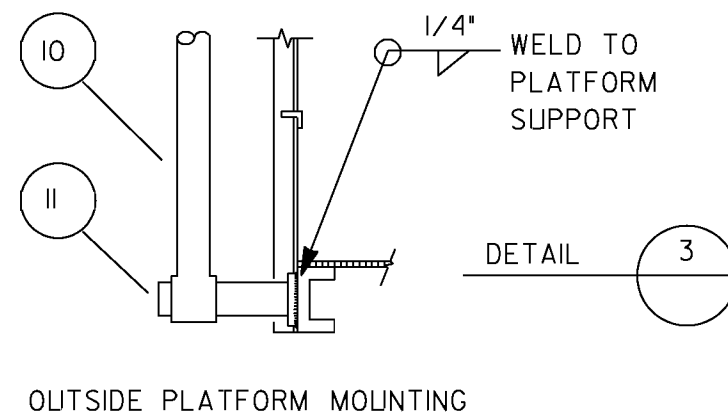
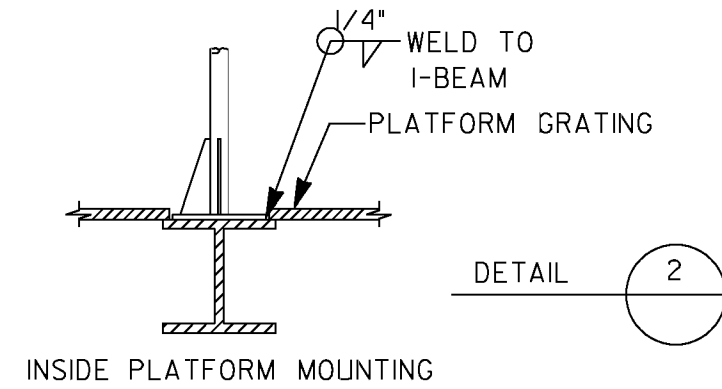
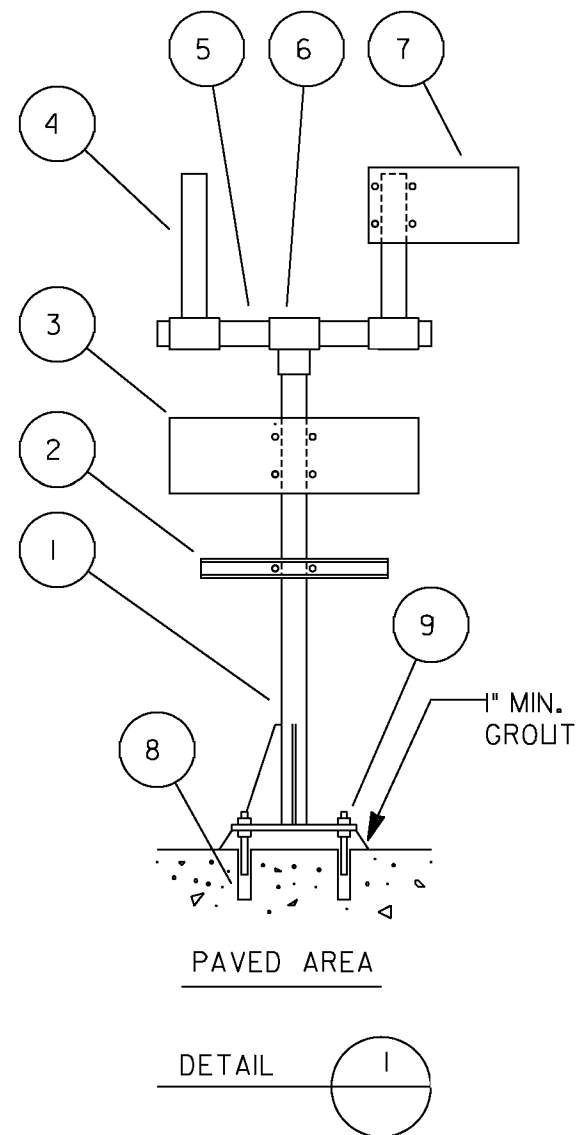


STANDARD
DETAIL

INSTRUMENT SUPPORT
SINGLE MOUNTING

CIP

1-618



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x40"	1	GALV STL PIPE
2	15"	1	2"X2" UNISTRUT
3	6"x20"	1	3/16" THK STL PLATE
4	2" DIA	2	GALV STL PIPE
5	2" DIA	1	PIPE NIPPLE
6	2" DIA	1	FEMALE ADAPTER
7	6"x12"	1	3/16" THK STL PLATE
8	1/2"	4	CINCH ANCHOR
9	1/2"x5"	4	STUD BOLT
10	2"x48"	1	GALV STL PIPE
11	2" DIA	1	BRACKET, GALV STL
12			
13			
14			
15			

**INSTRUMENT SUPPORT
DOUBLE MOUNTING**

1-619
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT
City of San Diego

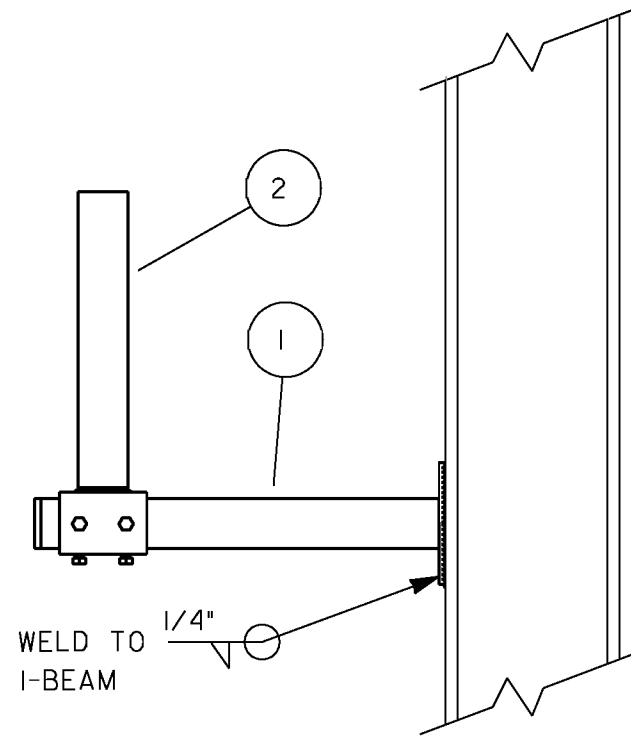
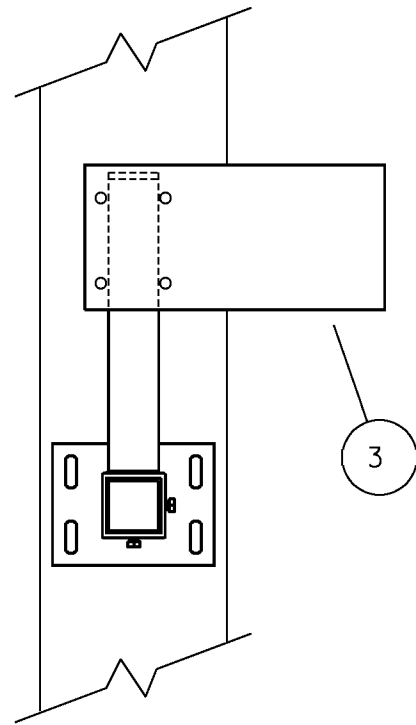


STANDARD
DETAIL

CIP

**INSTRUMENT SUPPORT
DOUBLE MOUNTING**

1-619



STEEL COLUMN


LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x16"	1	GALV STL PIPE
2	2"x12"	1	GALV STL PIPE
3	6"x12"	1	3/16" THK STL PLATE
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

INSTRUMENT SUPPORT
SINGLE COLUMN MOUNTING

I-620
CIP

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WATER DEPARTMENT
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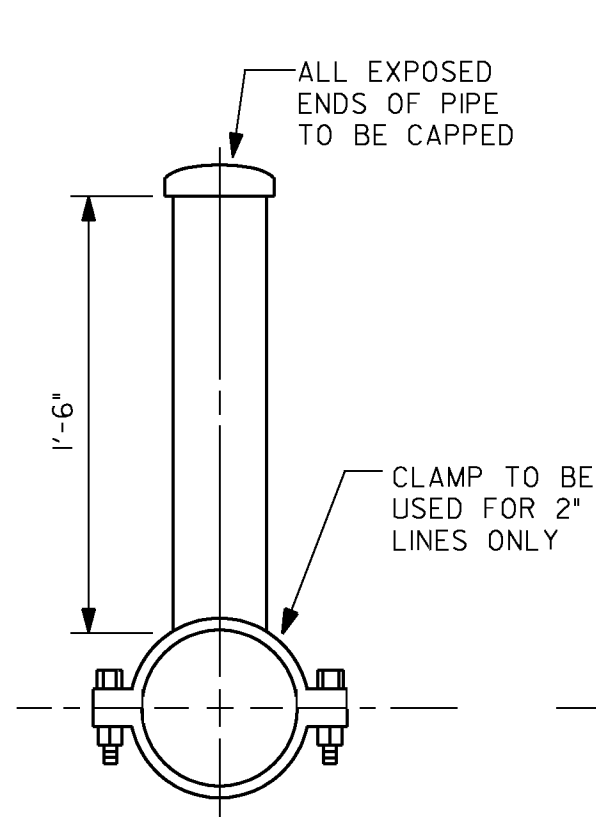


INSTRUMENT SUPPORT
SINGLE COLUMN MOUNTING

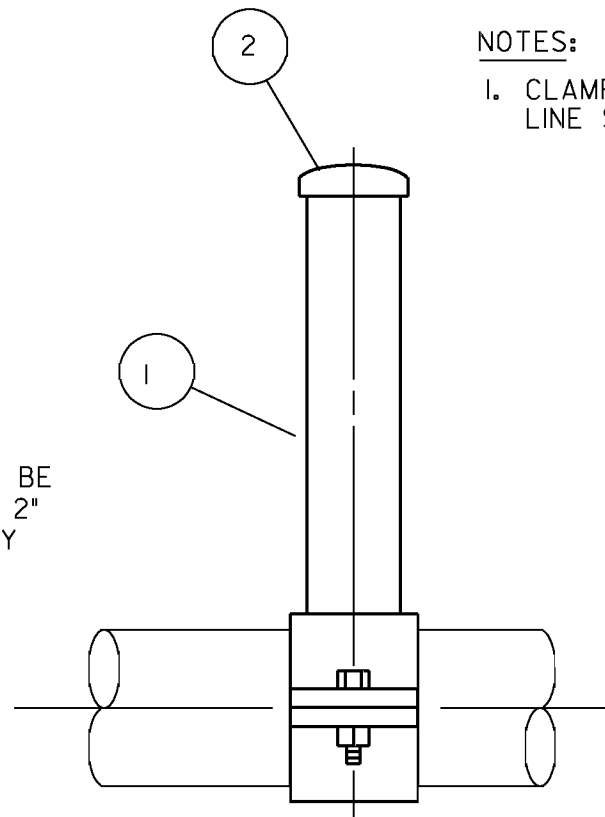
STANDARD
DETAIL

CIP

I-620



SIDE VIEW



FRONT VIEW

NOTES:

- 1. CLAMP TO BE USED FOR LINE SIZES OF 2".


LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x18"	1	GALV STL PIPE
2	2"	2	PIPE CAP
3	2"	1	CLAMP, 2" PIPE
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

INSTRUMENT SUPPORT
2" LINE MOUNT ABOVE-CLAMP

1-621
CIP

REVISION	BY	APPROVED	DATE
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WATER DEPARTMENT
City of San Diego

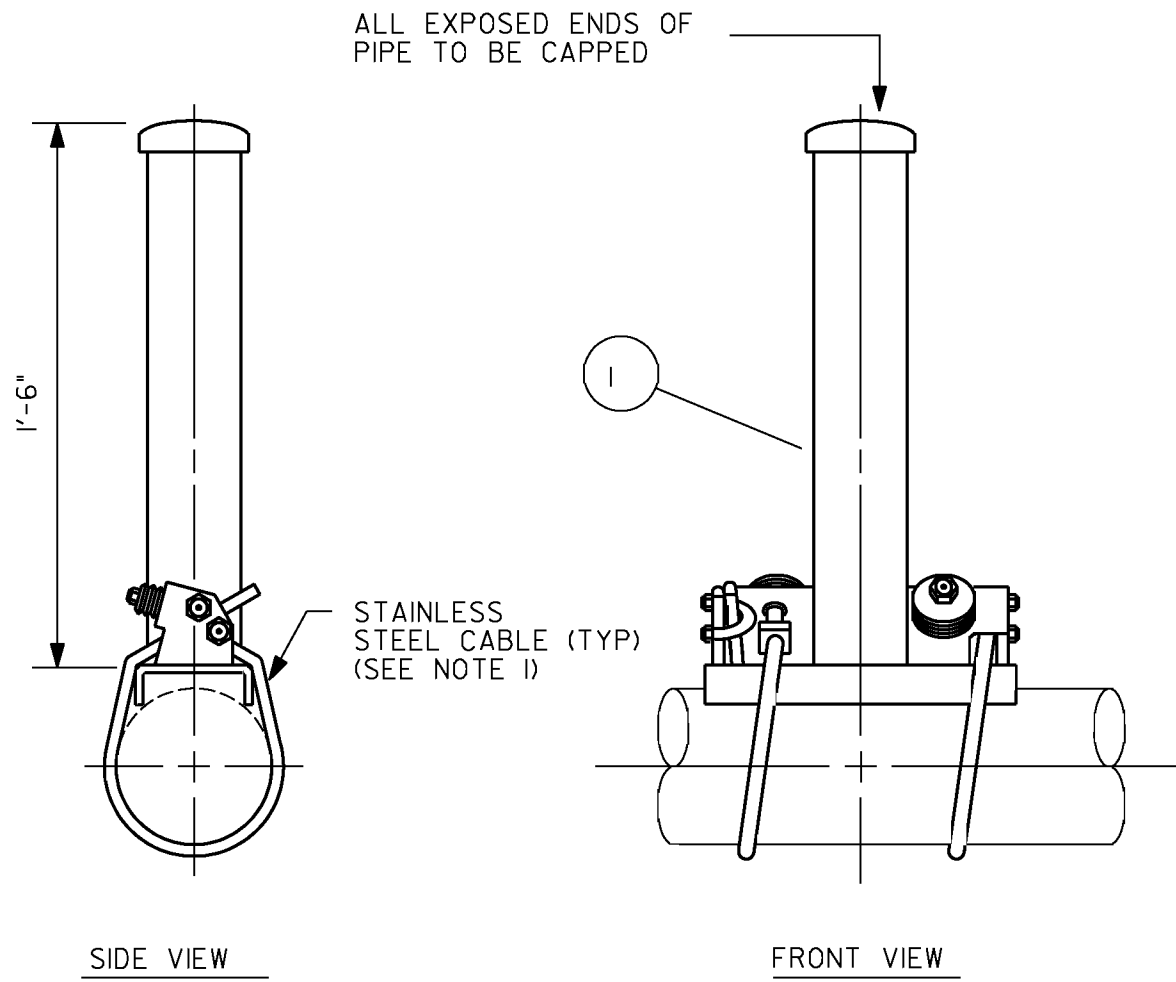


INSTRUMENT SUPPORT
2" LINE MOUNT ABOVE-CLAMP

STANDARD
DETAIL

CIP

1-621



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x18"	1	GALV STL PIPE
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			


NOTES:
 1. CABLE CLAMP TO BE USED FOR LINE SIZES 3" THROUGH 14"

INSTRUMENT SUPPORT
 3"-14" LINE MOUNT



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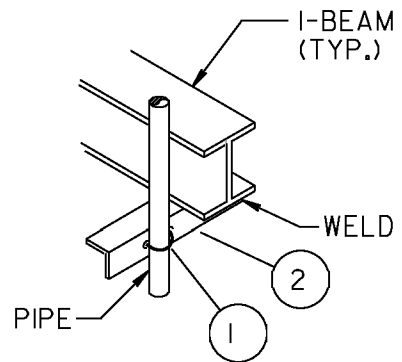
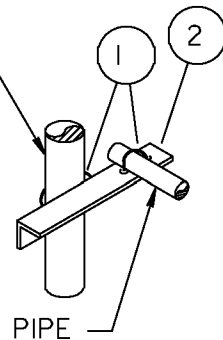
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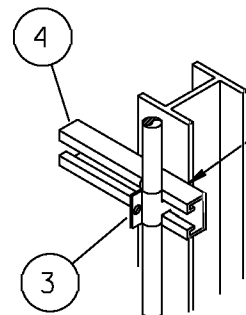
INSTRUMENT SUPPORT
 3"-14" LINE MOUNT

STANDARD DETAIL
CIP
1-622

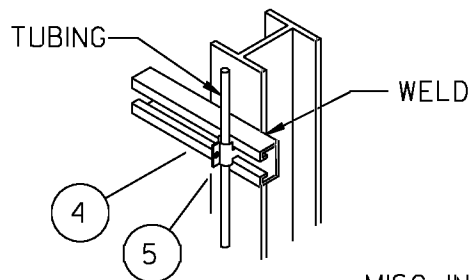
INSULATION PIPE
FREE OF VIBRATION



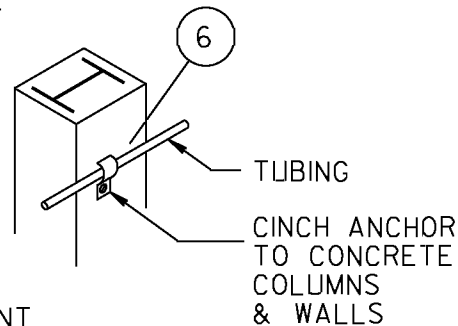
MISC. INSTRUMENT
PIPE SUPPORT



WELD
(WHEN WELDING IS NOT
ALLOWED, USE STRUT BEAM
CLAMPS & CLIPS TO ATTACH
TO STRUCTURAL MEMBER
IN FIELD) TYP



MISC. INSTRUMENT
TUBING SUPPORT



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	AS REQ'D	-	U-BOLT, STL
2	2"x2"	-	ANGLE, 1/4", STL
3	AS REQ'D	-	PIPE CLAMP, STRUT
4	AS REQ'D	-	STRUT
5	AS REQ'D	-	TUBE CLAMP, SPLIT
6	AS REQ'D	-	TUBE CLAMP, 1 HOLE
7			
8			
9			
10			
11			
12			
13			
14			
15			

NOTES:

- INSTRUMENT PIPING/TUBING SHALL BE SUPPORTED FROM PIPE, PIPE SUPPORTS, & OTHER TYPES OF PERMANENT STRUCTURES AS SHOWN ABOVE ROUTING OF INSTRUMENT PIPING/TUBING TO BE DETERMINED IN FIELD.
- MAXIMUM SPACING BETWEEN SUPPORTS IS TO BE 5'-0". PIPING/TUBING RUNS OF LESS THAN 5'-0" NEED NOT BE SUPPORTED.

TYPICAL PIPING/TUBING SUPPORT



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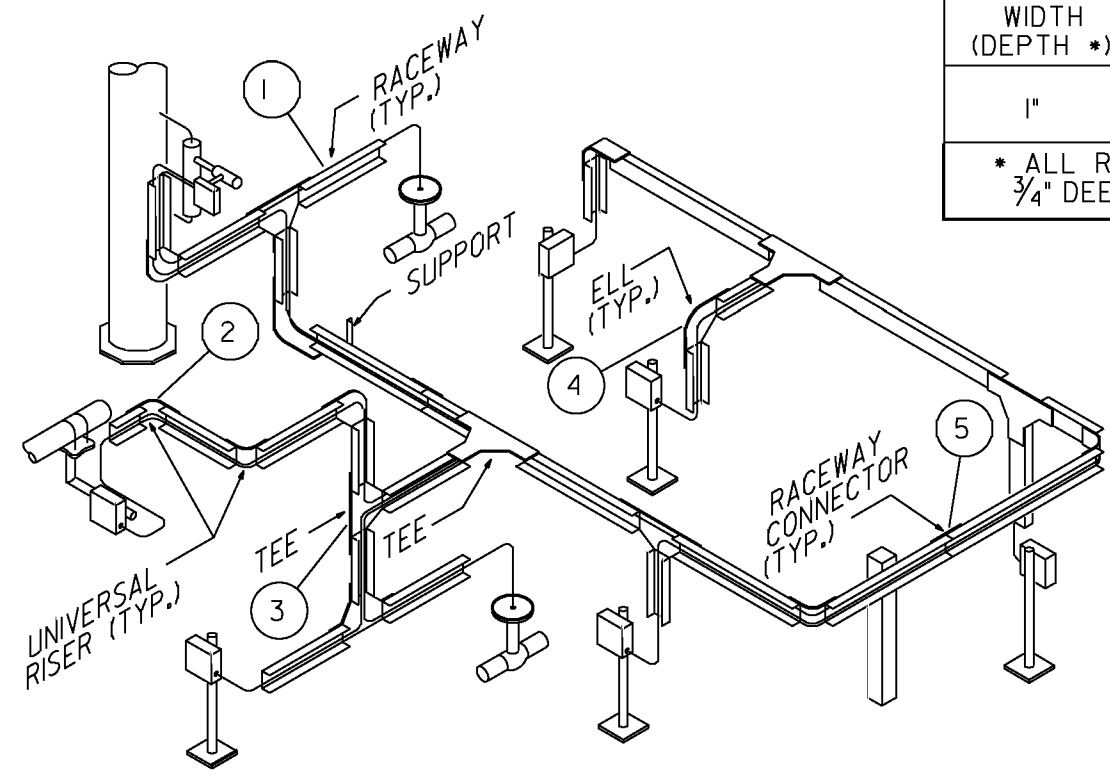


STANDARD
DETAIL

CIP

TYPICAL PIPING/TUBING SUPPORT

1-623



MAX. NO. OF TUBES IN RACEWAY			
RACEWAY WIDTH (DEPTH *)	TUBING O.D. WITH $\frac{1}{32}$ PLASTIC COATING		
	1"	1/4"	3/8"
	2	2	1

* ALL RACEWAY CHANNEL TO BE $\frac{3}{4}$ " DEEP

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	AS REQ'D	-	TUBING RACEWAY
2	AS REQ'D	-	UNIVERSAL RISER
3	AS REQ'D	-	RACEWAY TEE
4	AS REQ'D	-	RACEWAY ELBOW
5	AS REQ'D	-	RACEWAY CONN.
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

TYPICAL PNEUMATIC TUBING SUPPORT

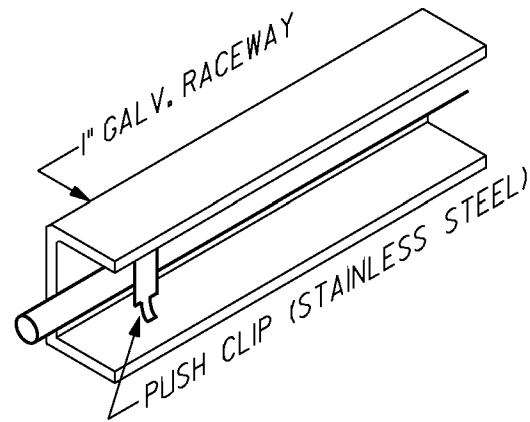


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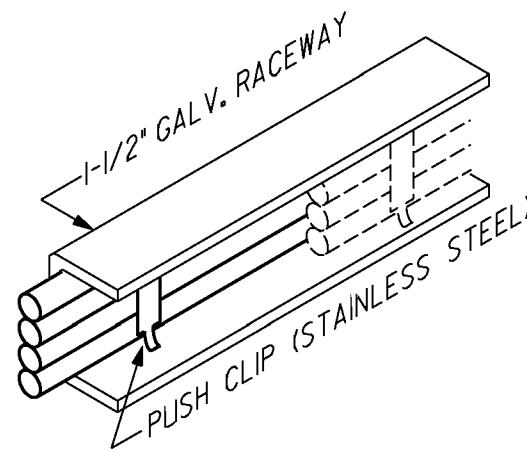
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City of San Diego

TYPICAL PNEUMATIC TUBING SUPPORT

STANDARD DETAIL
CIP
I-624



DETAIL "A"
 DETAIL FOR SUPPORT OF
 1 TO 3 TUBING LEADS.



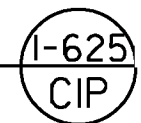
DETAIL "B"
 DETAIL FOR SUPPORT OF 4 OR
 MORE TUBING LEADS WITH 1-1/2"
 & LARGER RACEWAY DOUBLE
 LAYER IS PERMITTED.

NOTES:

1. SUPPORT RACEWAY EVERY 6'-0".
2. SECURE TUBING IN RACEWAY EVERY 2'-0".
3. RACEWAY FITTINGS COME WITH DRIVE RIVETS AND ARE PRE-DRILLED. USE THEM FOR TEMPLATES ON RACEWAY.
4. SHORT RUNS OF TUBING 2'-0" IN LENGTH OR LESS DO NOT REQUIRE SUPPORT.

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

TUBING SUPPORT
RACEWAY DETAIL



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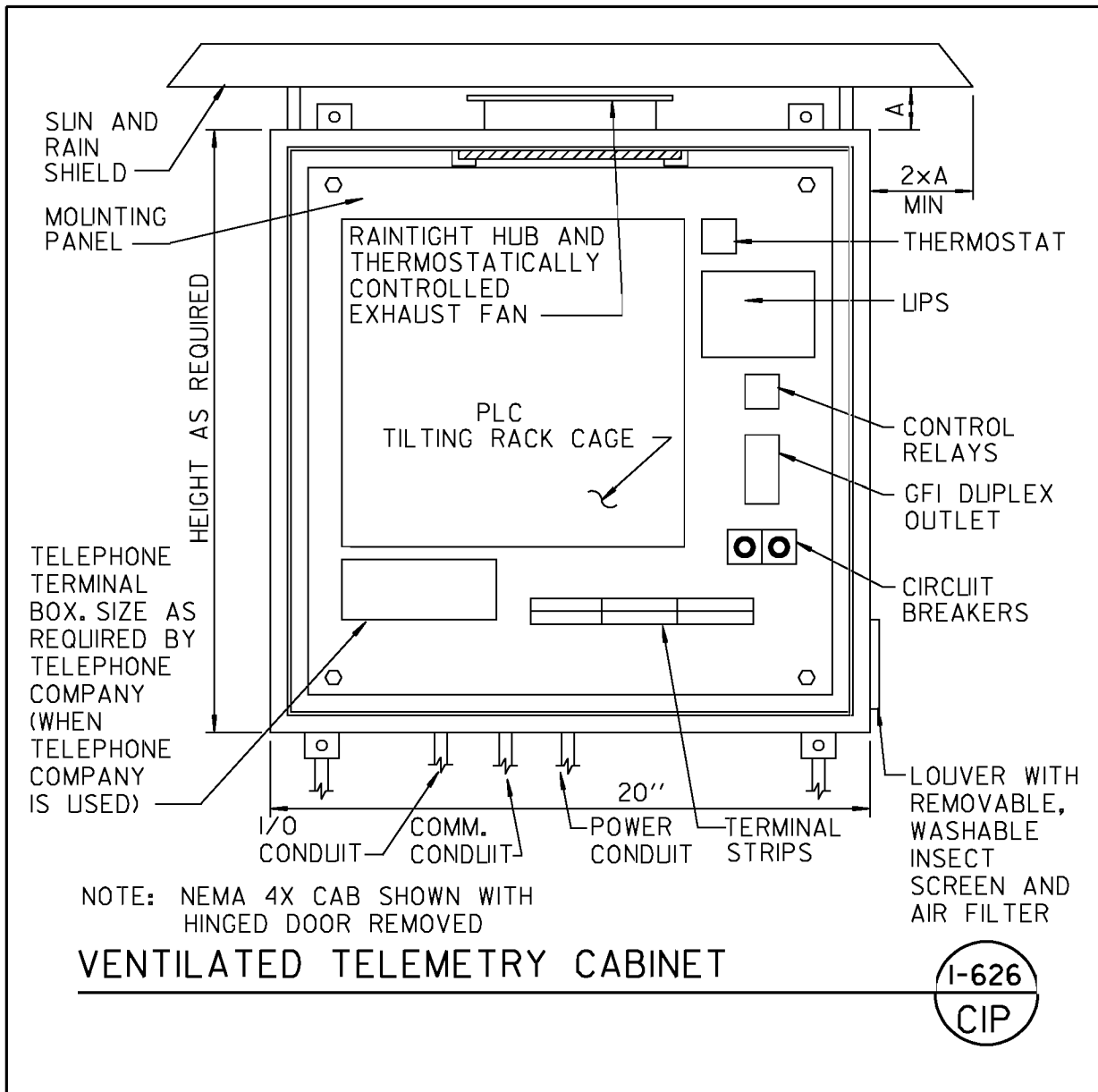


TUBING SUPPORT
RACEWAY DETAIL

STANDARD
 DETAIL

CIP

I-625



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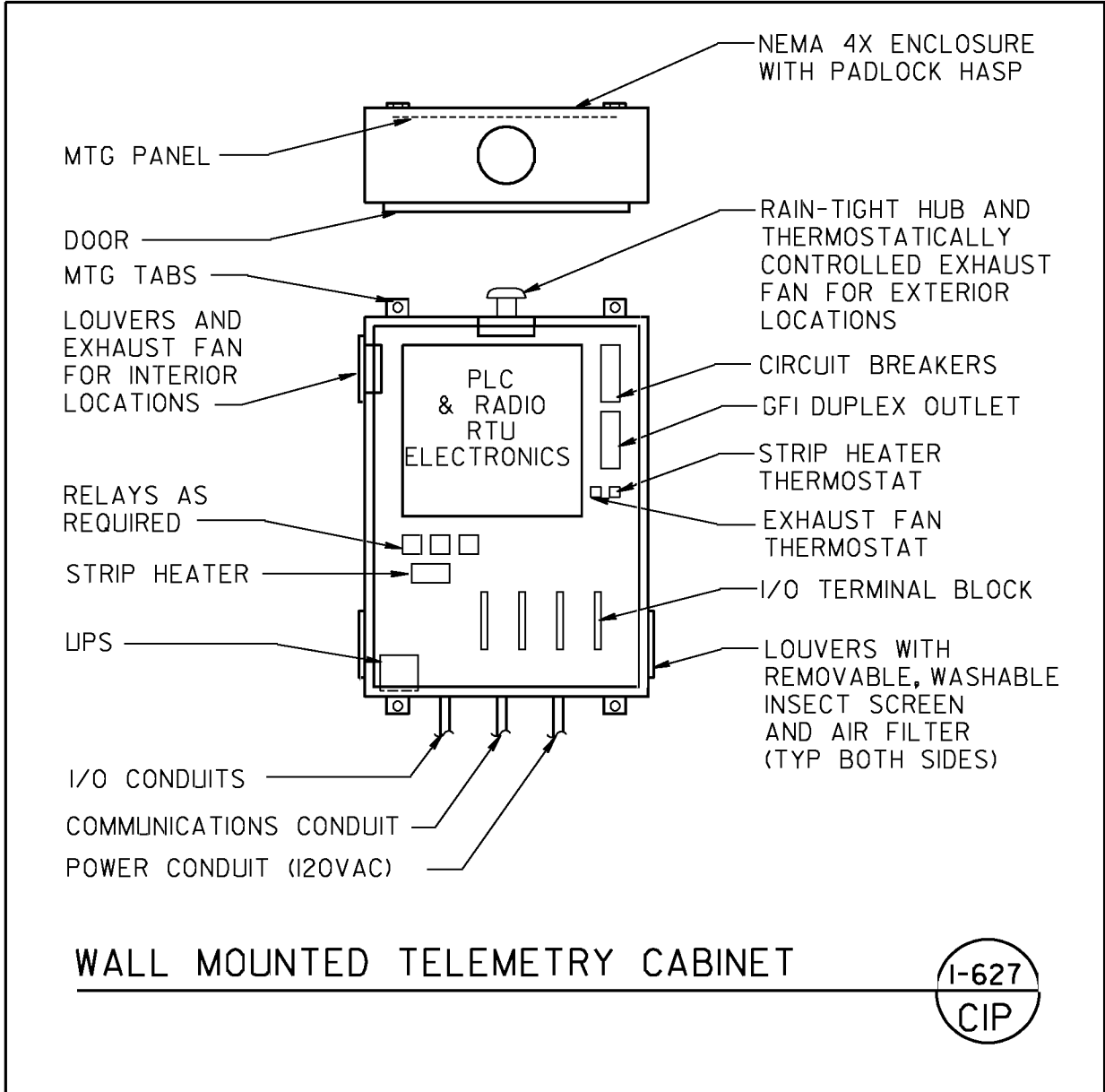


STANDARD
DETAIL

CIP

VENTILATED TELEMETRY CABINET

1-626



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WATER DEPARTMENT
 City of San Diego

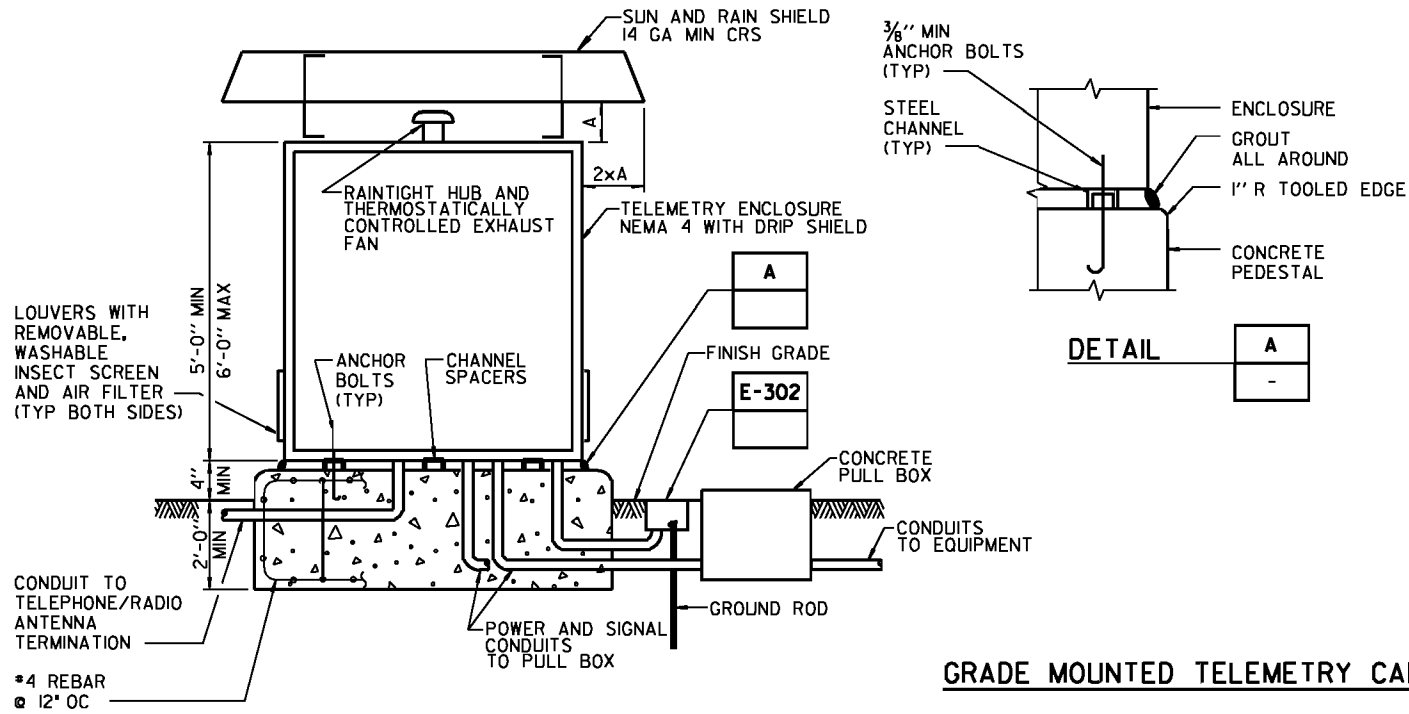


STANDARD
DETAIL

CIP

WALL MOUNTED TELEMETRY CABINET

1-627



GRADE MOUNTED TELEMETRY CABINET



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City of San Diego

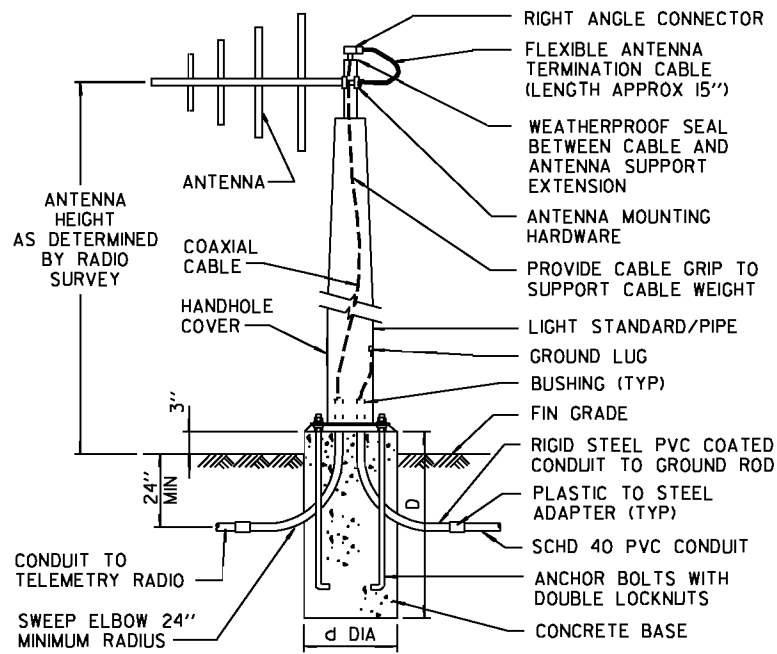


STANDARD
DETAIL

CIP

GRADE MOUNTED TELEMETRY CABINET

I-628



POLE HGT	d	D
50'	30''	8'-0''
40'	28''	7'-0''
30'	24''	6'-0''
20'	20''	5'-6''
12'	20''	4'-6''

NOTE:
 ALL ANTENNA CABLE CONNECTIONS TO BE WEATHERPROOFED

POLE MOUNTED DIRECTIONAL ANTENNA



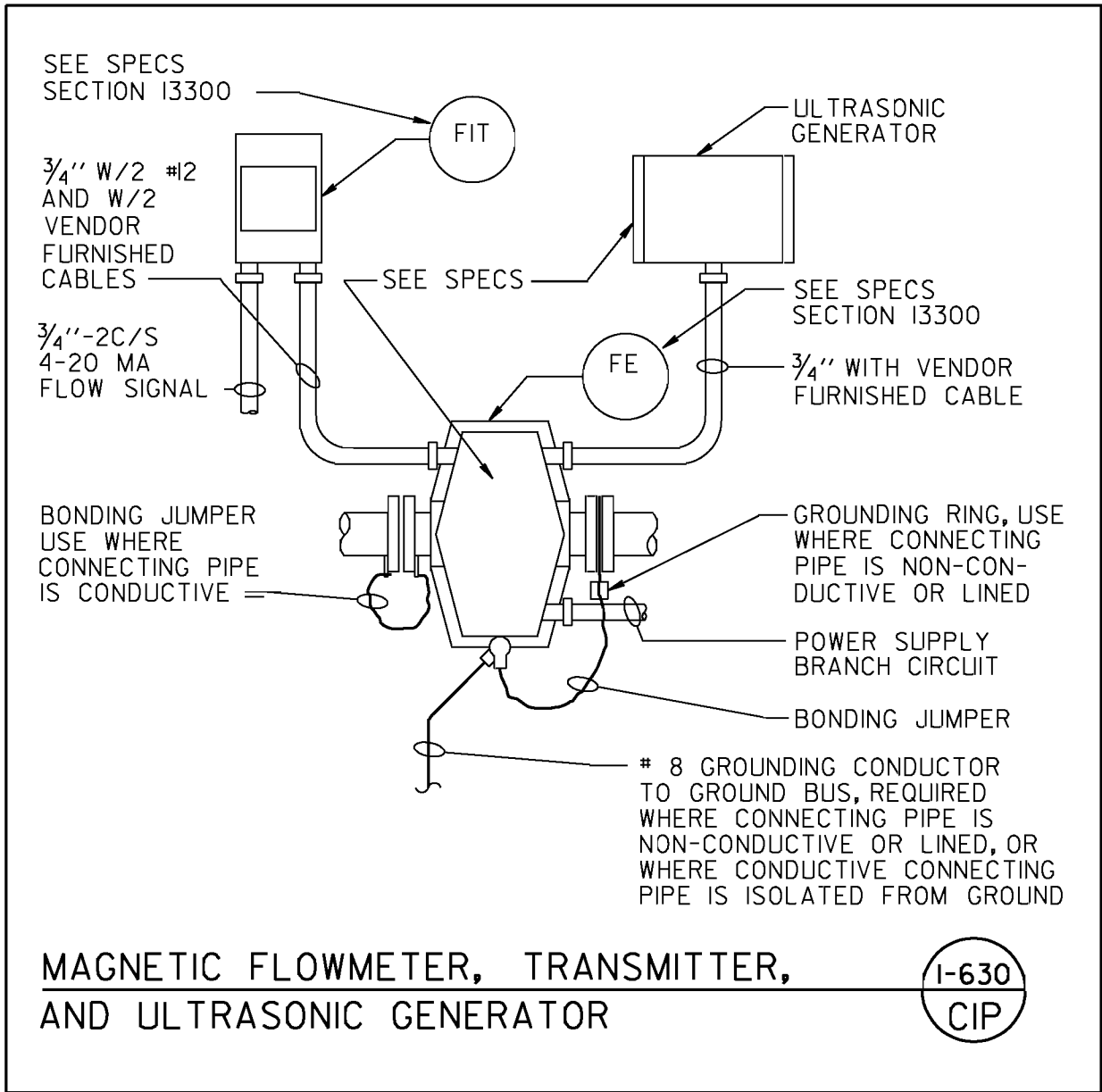
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 City of San Diego


POLE MOUNTED DIRECTIONAL ANTENNA

STANDARD
 DETAIL
CIP
 I-629



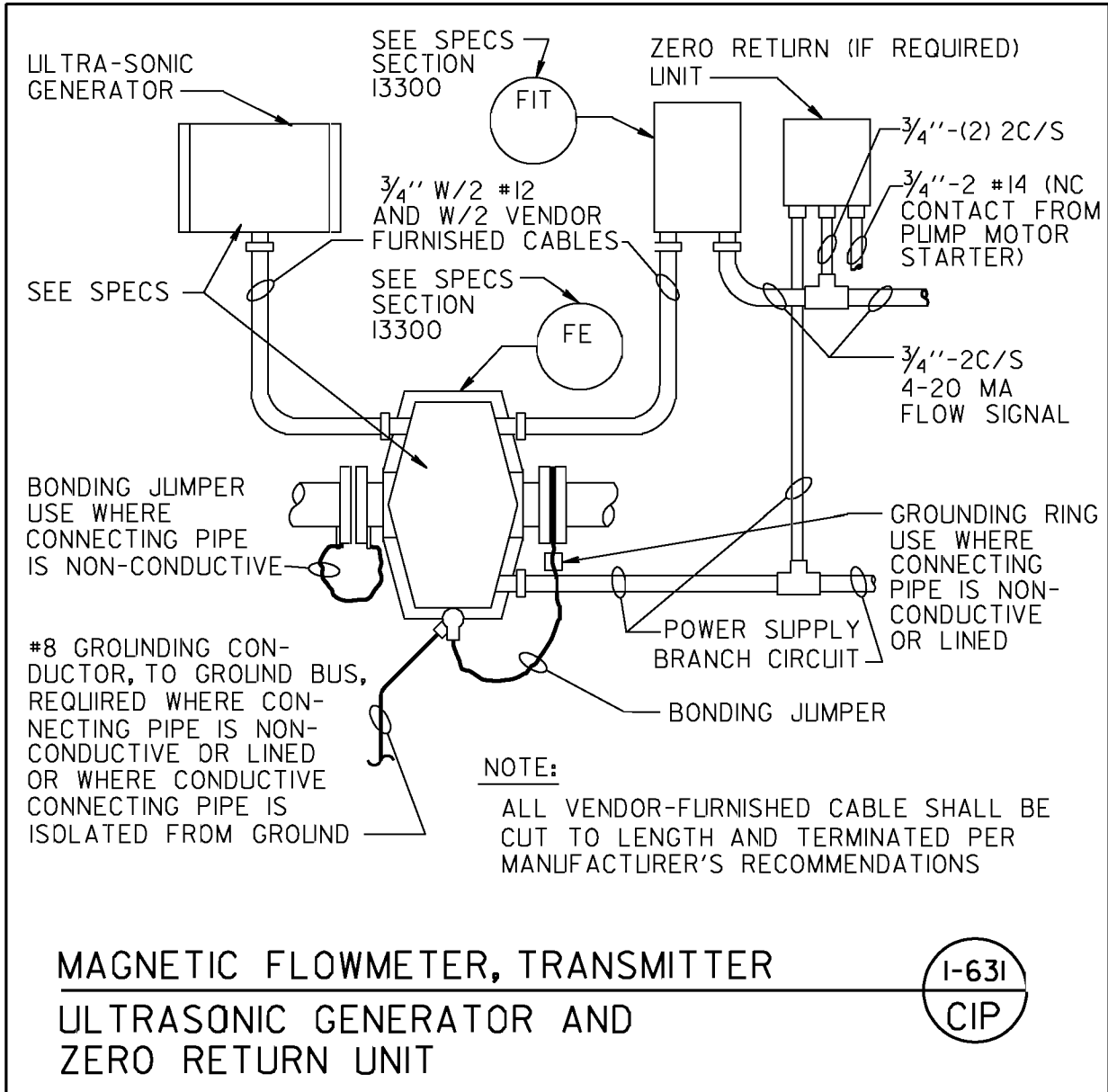
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MAGNETIC FLOWMETER, TRANSMITTER, AND ULTRASONIC GENERATOR

STANDARD DETAIL
CIP
I-630



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WATER DEPARTMENT
City of San Diego

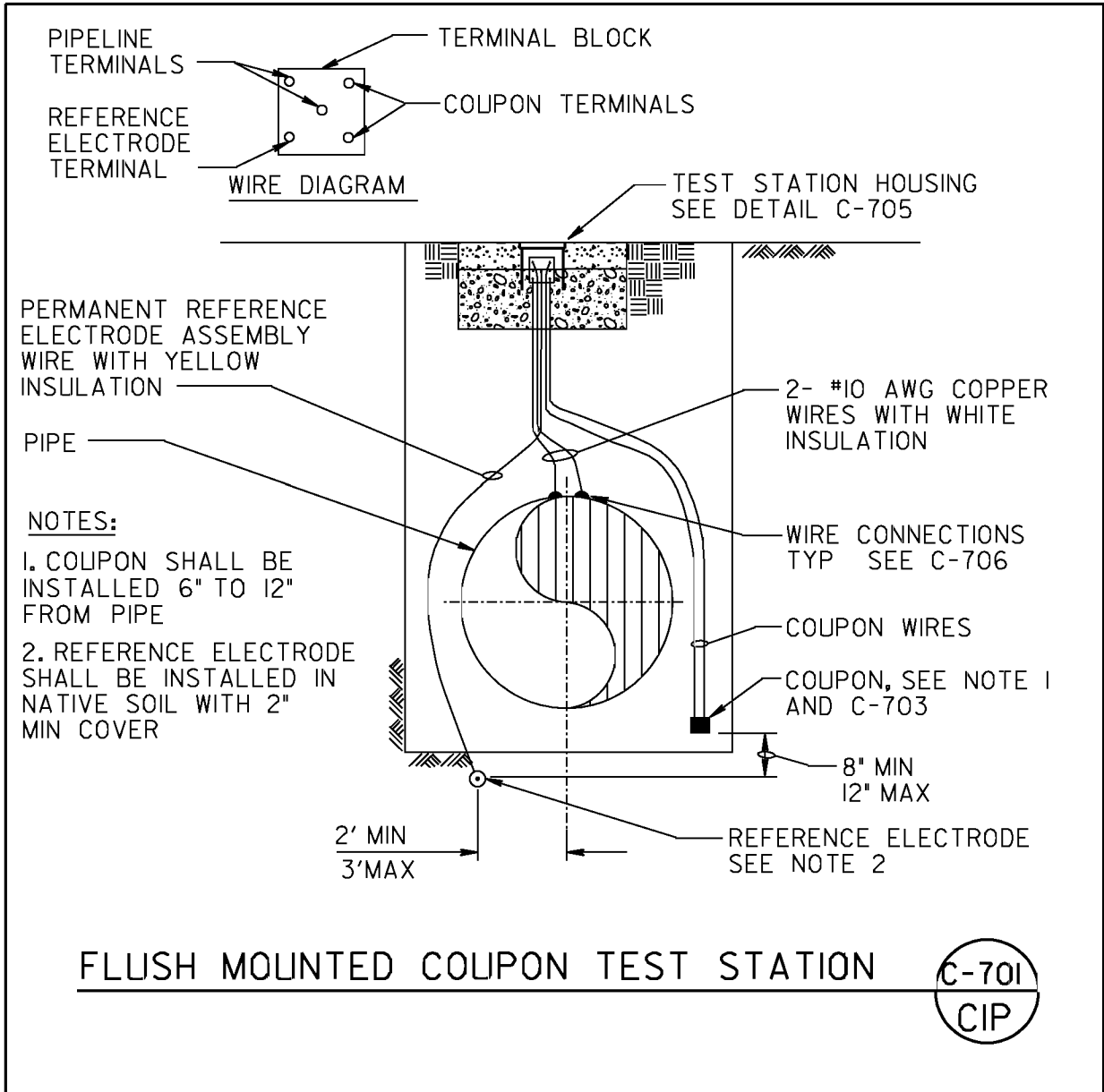


STANDARD
DETAIL

MAGNETIC FLOWMETER, TRANSMITTER
ULTRASONIC GENERATOR AND
ZERO RETURN UNIT

CIP


1-631



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WATER DEPARTMENT
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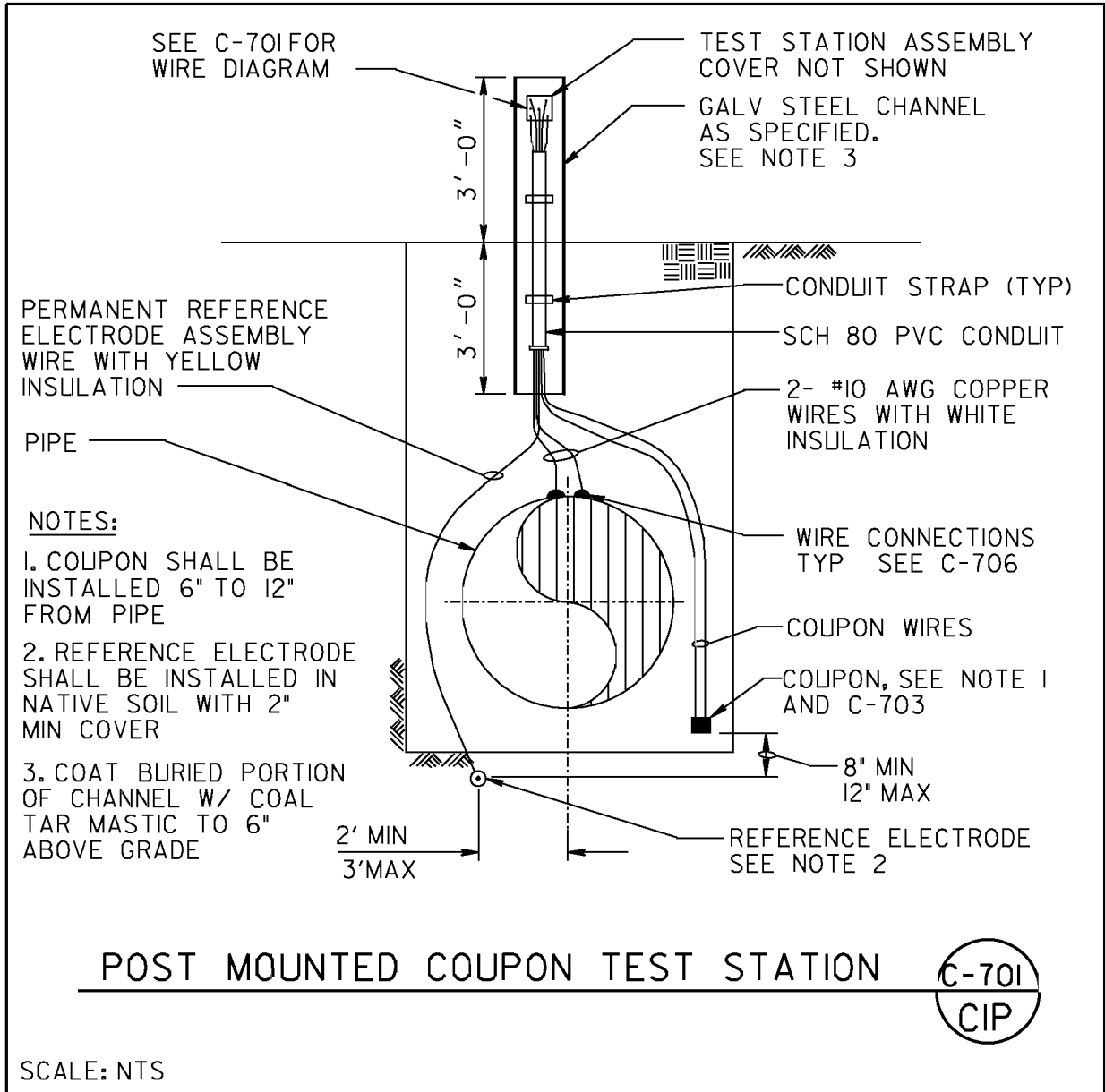


FLUSH MOUNTED COUPON TEST STATION

STANDARD
 DETAIL

CIP

C-701



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WATER DEPARTMENT
City of San Diego

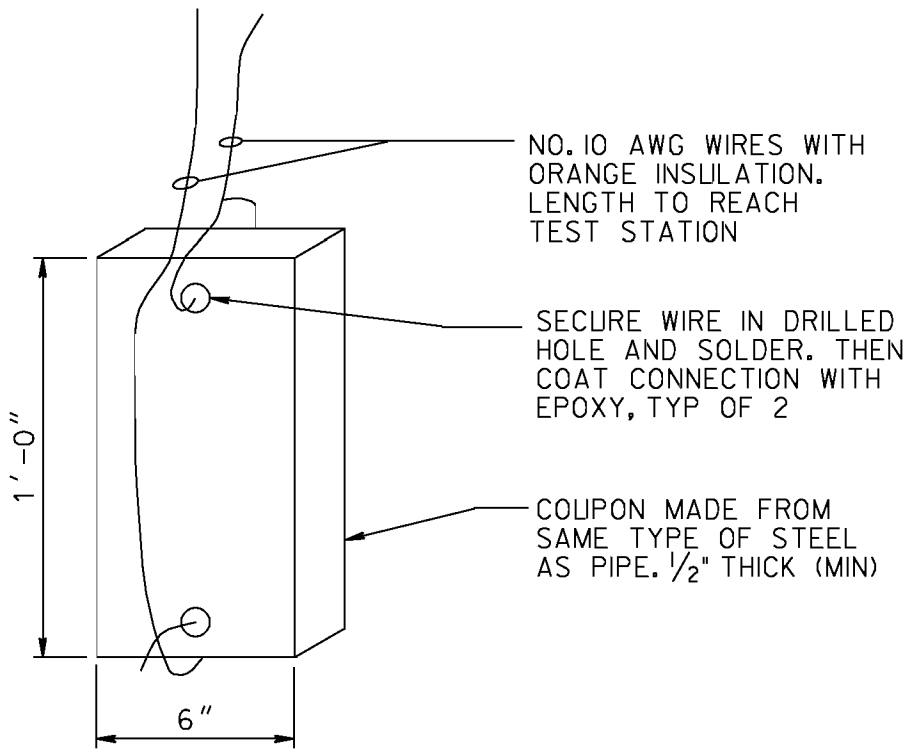


STANDARD
DETAIL

CIP

**POST MOUNTED
COUPON TEST STATION**

C-702



NOTES:

1. ABRASIVE BLAST COUPON AND COAT WITH RICH CEMENT MORTAR IN SHOP.
2. INSTALL COUPON IN ORIENTATION SHOWN.

COUPON DETAIL



SCALE: NO SCALE

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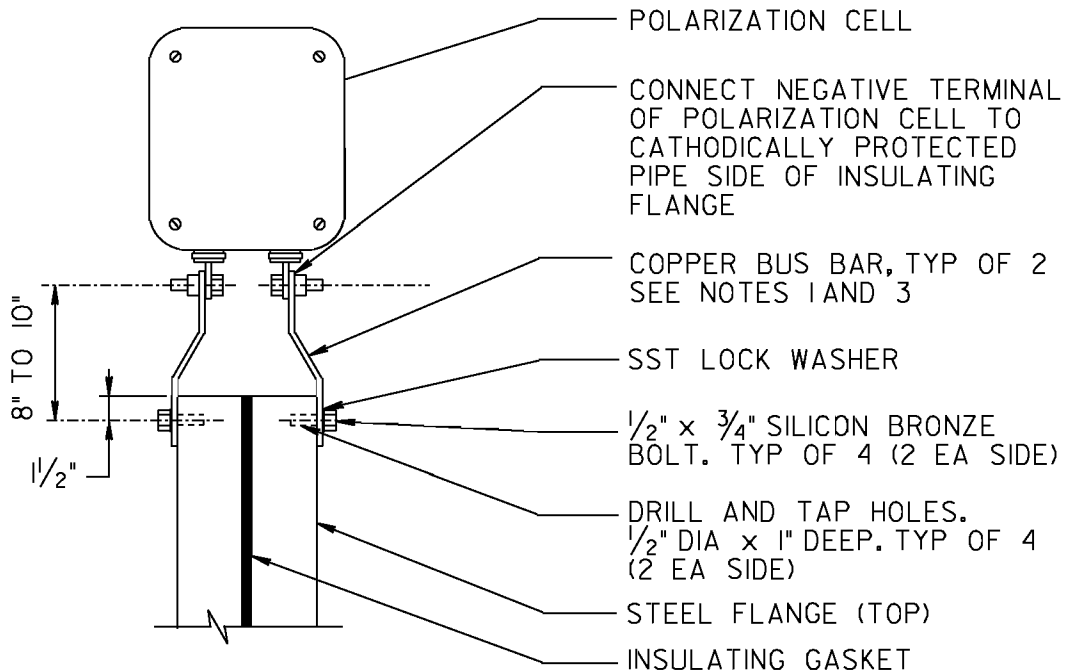
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WATER DEPARTMENT
City of San Diego



STANDARD
DETAIL
CIP
C-703

COUPON DETAIL



NOTES:

1. DRILL HOLES IN COPPER BUS BAR TO CONNECT DIRECTLY TO POLARIZATION CELL CONNECTORS. DRILL HOLES APPROX 1/2" OC AND 1" FROM BOTTOM OF BUS BAR FOR CONN TO FLANGE
2. COAT SURFACES OF COPPER BAR AS SPECIFIED
3. ATTACH BUS BARS PRIOR TO COATING FLANGE
4. NOT REQD FOR INSULATING FLEX COUPLINGS ON DI PIPE

POLARIZATION CELL



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City of San Diego

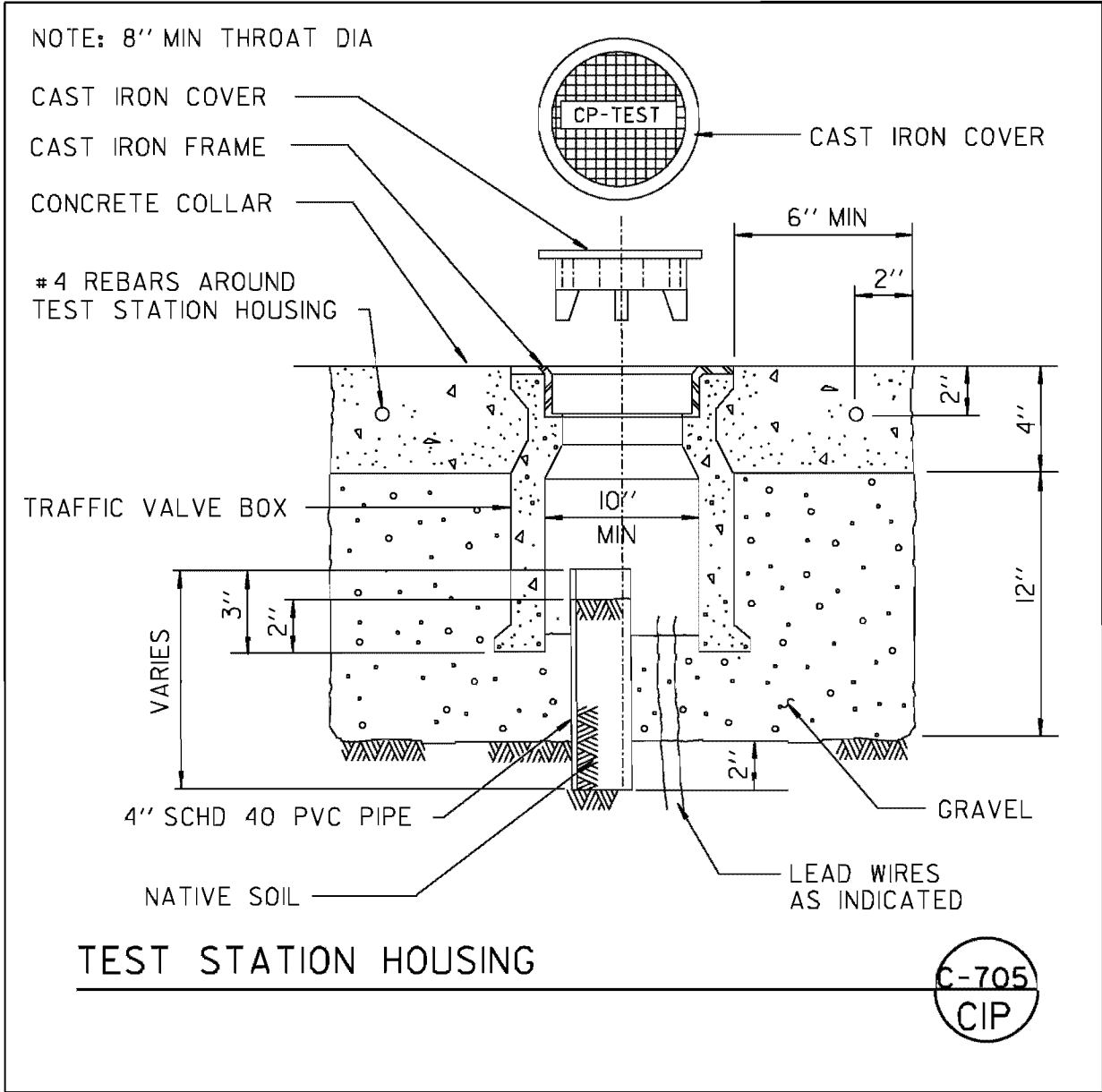


STANDARD
DETAIL

CIP

POLARIZATION CELL

C-704



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City of San Diego

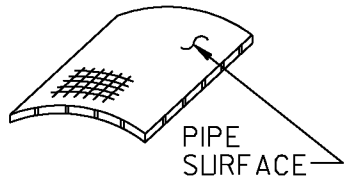


STANDARD
DETAIL

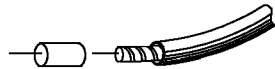
CIP

TEST STATION HOUSING

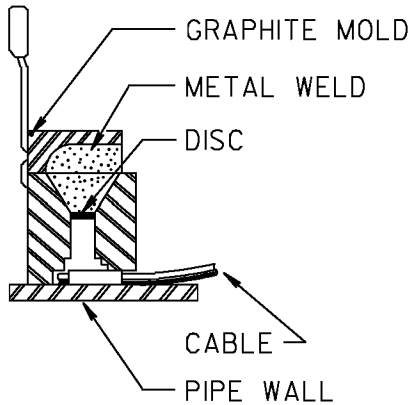
C-705



1) FILE TO BARE METAL AND CLEAN SURFACE

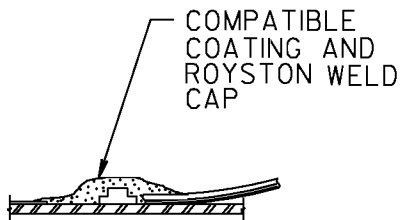


2) STRIP INSULATION FROM WIRE AND ATTACH SLEEVE



3) HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR. IGNITE WITH FLINT GUN

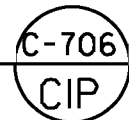
4) REMOVE SLAG FROM CONNECTION WITH CHIP HAMMER



5) COVER CONNECTION WITH COMPATIBLE COATING OVER ALL EXPOSED METAL

NOTE: CERAMIC MOLDS WILL NOT BE ALLOWED

EXOTHERMIC WELD



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City of San Diego



STANDARD
DETAIL

CIP

EXOTHERMIC WELD

C-706

TEST STATION ASSEMBLY, COVER NOT SHOWN

8" GALV STEEL CHANNEL INSTALLED NEXT TO VAULT WALL. SEE NOTE 2

CONDUIT STRAP (TYP)

SCH 80 PVC CONDUIT

1-#8 AND 1-#12AWG COPPER WIRES W/WHITE INSULATION

SEE NOTE 1

NEW OR PROTECTED PIPELINE

NEW OR PROTECTED PIPELINE TERMINALS

WIRE DIAGRAM

TERMINAL BLOCK

EXISTING OR UNPROTECTED PIPELINE TERMINALS

TEST STATION HOUSING SEE DETAIL C-705

1-#8 AND 1-#10 AWG COPPER WIRES W/ WHITE INSULATION

SEE NOTE 1

NEW OR PROTECTED PIPELINE

1-#8 AND 1-#10 AWG COPPER WIRES W/RED INSULATION

JOINT SEALANT AT WALL PENETRATION

WIRE CONNECTION (TYP) SEE C-706

EXISTING OR UNPROTECTED PIPELINE

INSULATING JOINT

INSIDE OF VAULT

POST MOUNTED

FLUSH MOUNTED

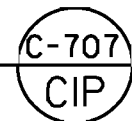
NOTES:

1. CONDUIT IN VAULTS NOT SHOWN FOR CLARITY. WIRES TO BE INSTALLED IN GALVANIZED STEEL CONDUIT FROM VAULT PENETRATION TO CONNECTION ON PIPELINE. ANCHOR CONDUIT ON VAULT WALLS AS SPECIFIED.

2. COAT BURIED PORTIONS OF STEEL BEAM W/COAL TAR MASTIC TO 6" ABOVE GRADE

SCALE: NTS

TEST STATIONS FOR INSULATING JOINT INSIDE VAULT



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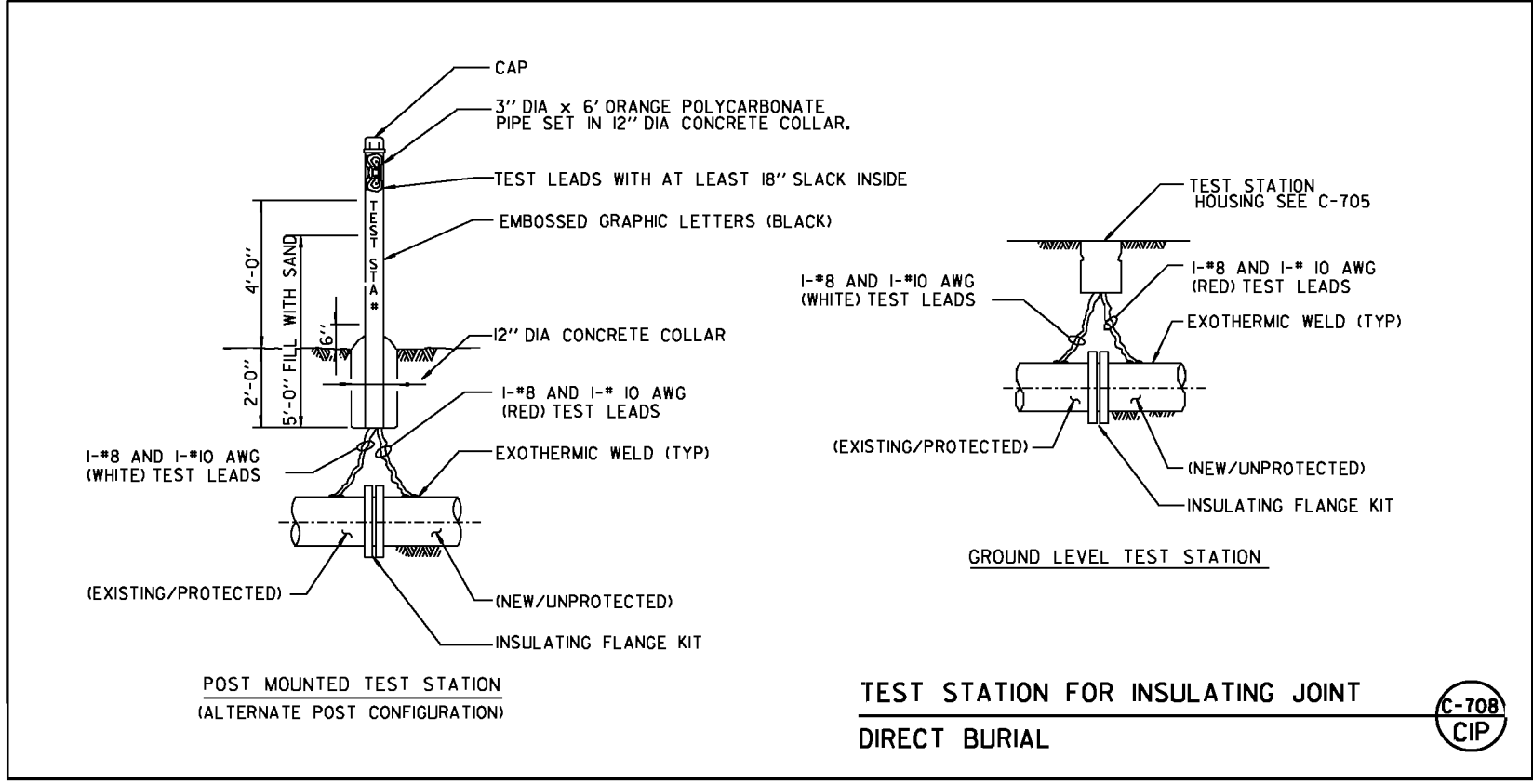


STANDARD
DETAIL

CIP

TEST STATIONS FOR
INSULATING JOINT INSIDE VAULT

C-707




**TEST STATION FOR INSULATING JOINT
DIRECT BURIAL**



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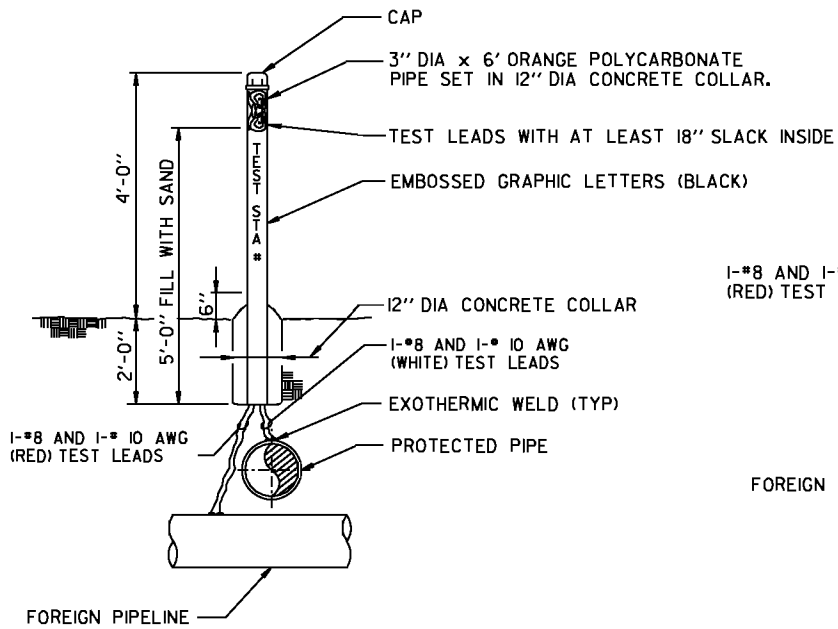


TEST STATION FOR INSULATING JOINT, DIRECT BURIAL

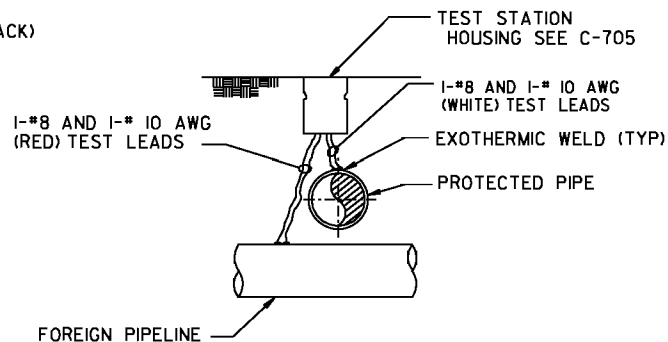
STANDARD
DETAIL

CIP

C-708



POST MOUNTED TEST STATION
(ALTERNATE POST CONFIGURATION)



GROUND LEVEL TEST STATION

TEST STATION FOR FOREIGN
PIPELINE CROSSING



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City of San Diego

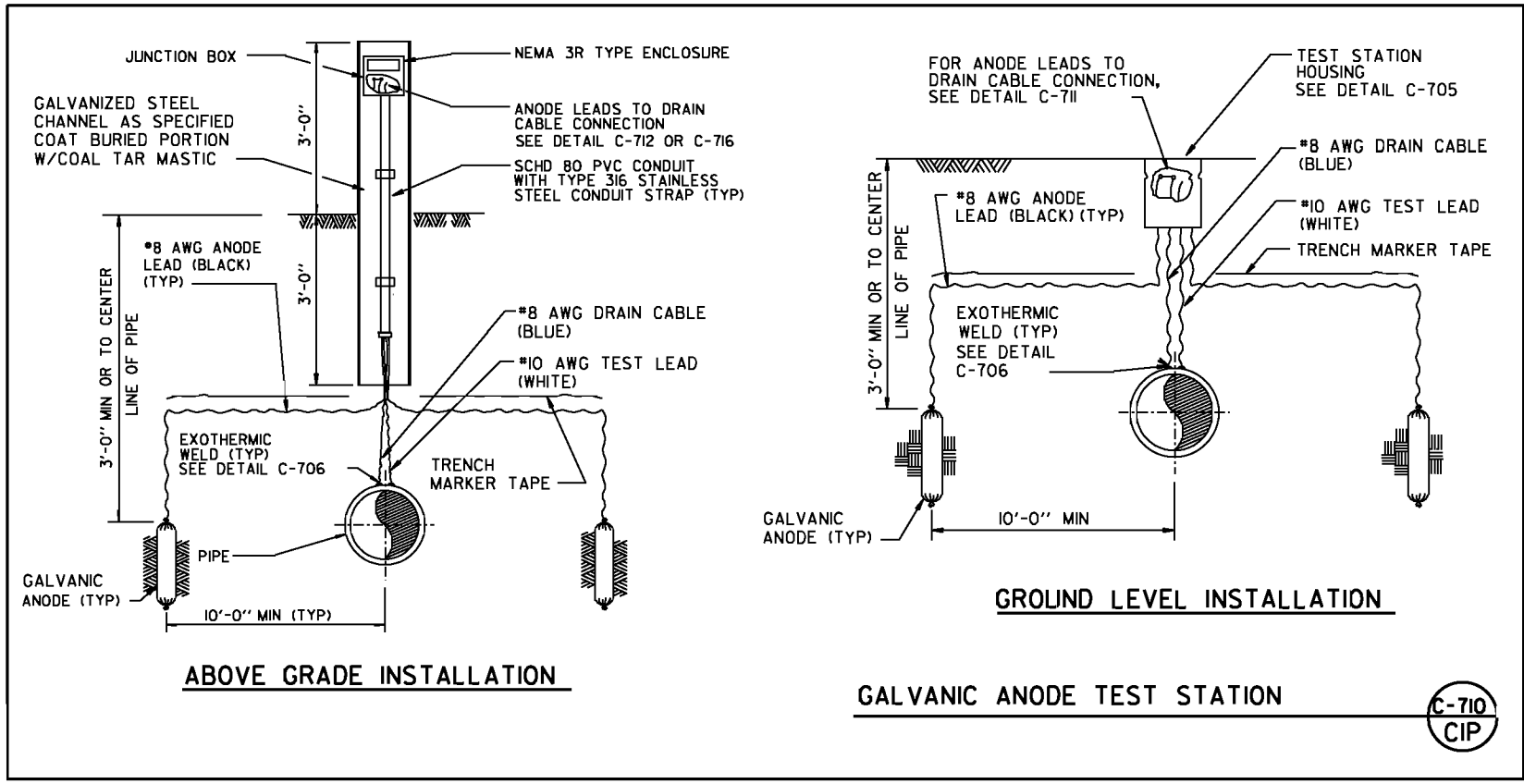


STANDARD
DETAIL

**TEST STATION FOR FOREIGN
PIPELINE CROSSING**

CIP

C-709



GALVANIC ANODE TEST STATION C-710
CIP

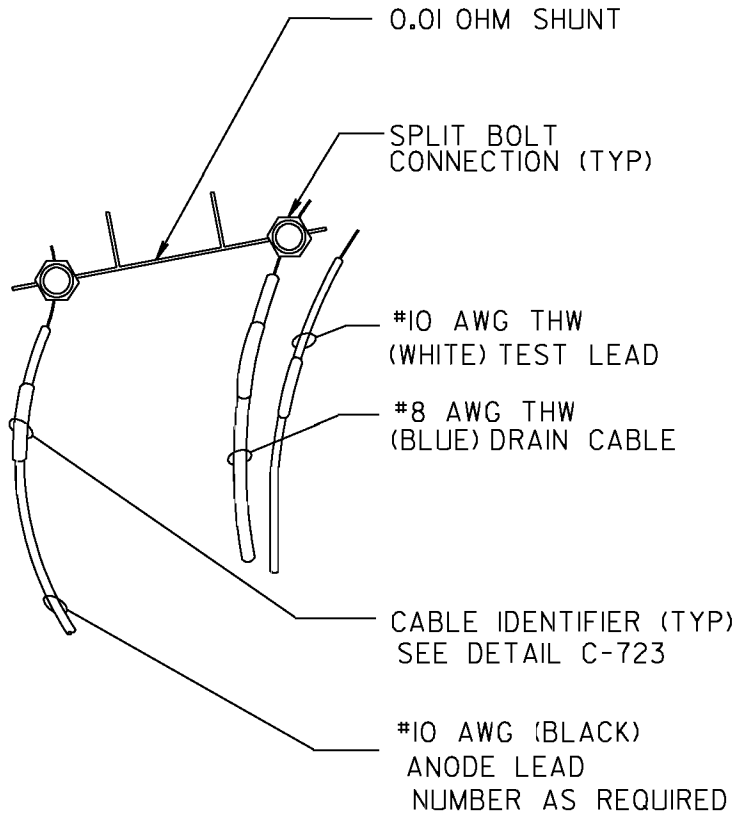
REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

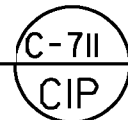
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GALVANIC ANODE TEST STATION

STANDARD DETAIL
CIP
C-710



GALVANIC ANODE LEAD TO DRAIN CABLE CONNECTION



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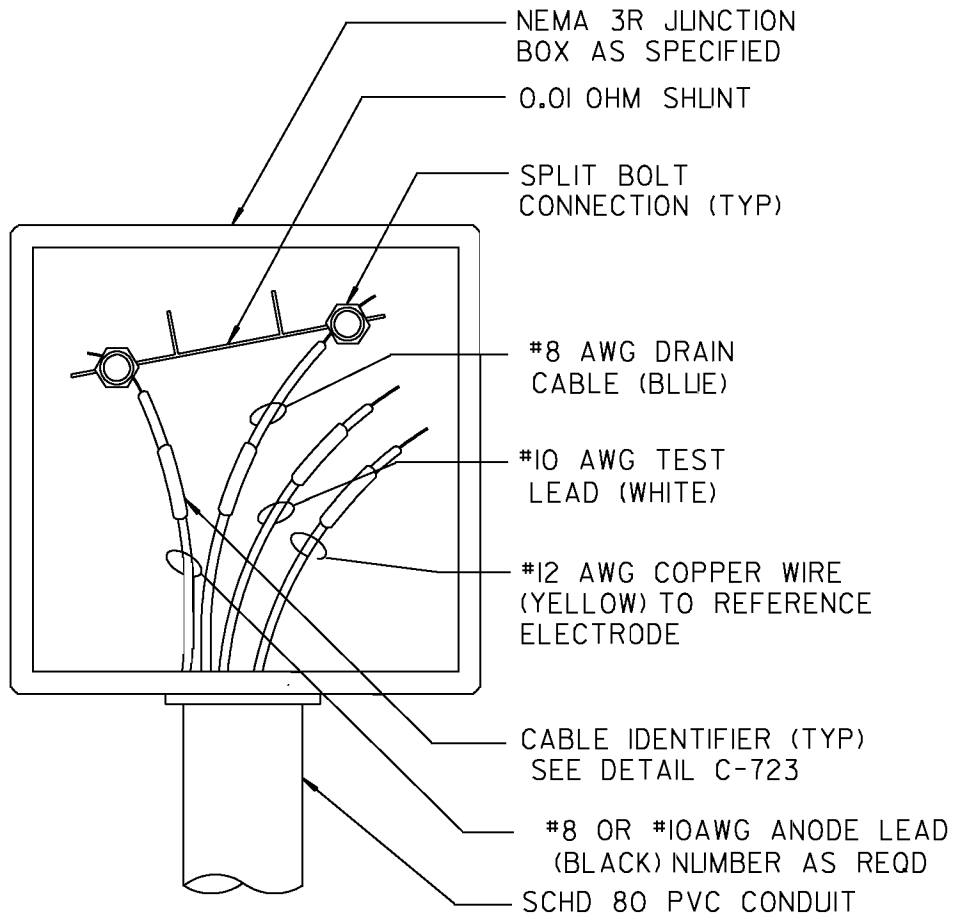


STANDARD
DETAIL

CIP

**GALVANIC ANODE LEAD TO DRAIN
CABLE CONNECTION**

C-711



**ABOVE GRADE GALVANIC ANODE
JUNCTION BOX**

C-712
CIP

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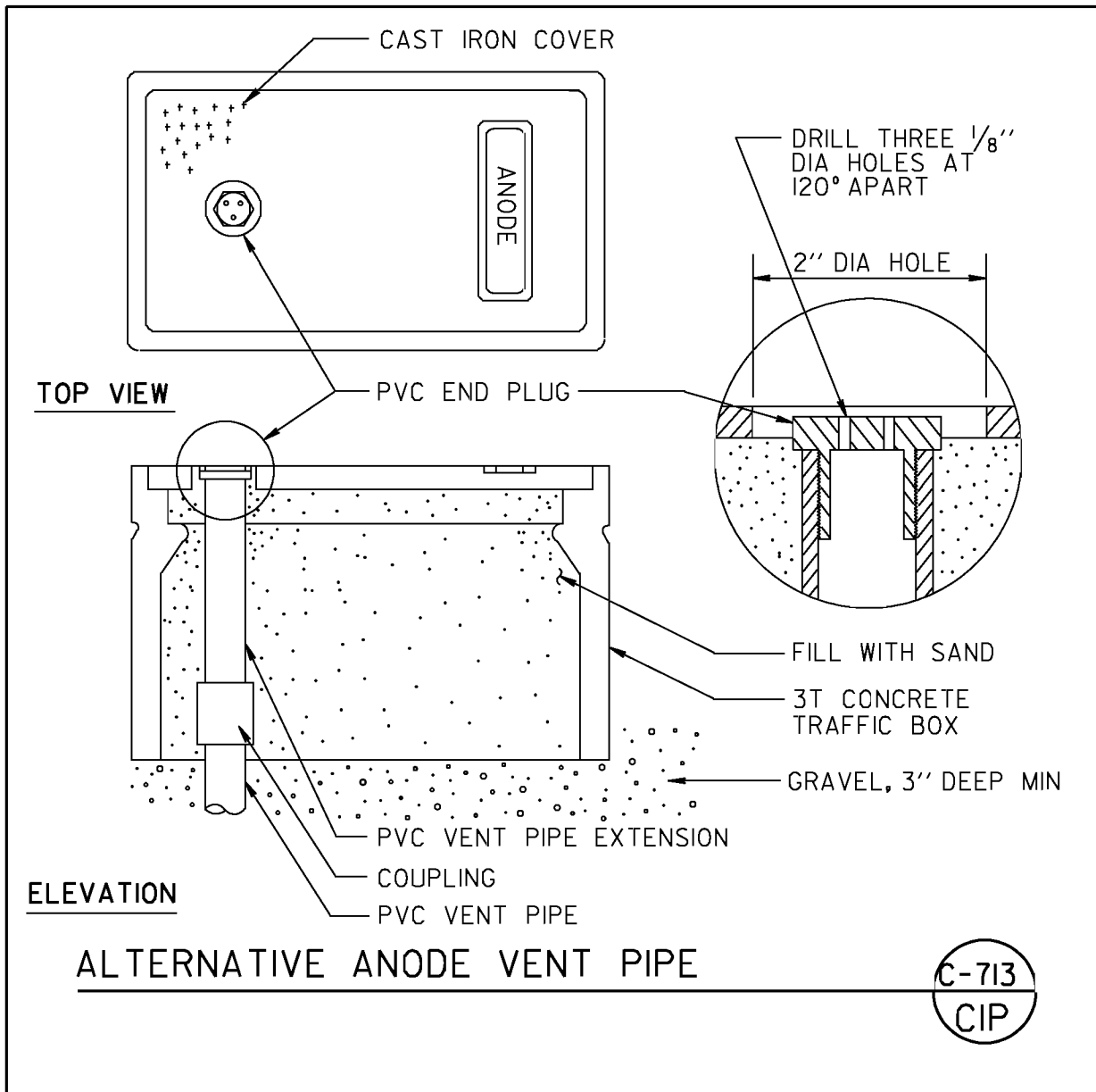


STANDARD
DETAIL

CIP

**ABOVE GRADE GALVANIC ANODE
JUNCTION BOX**

C-712



NOTE:
FOR USE IN PEDESTRIAN TRAFFIC AREAS

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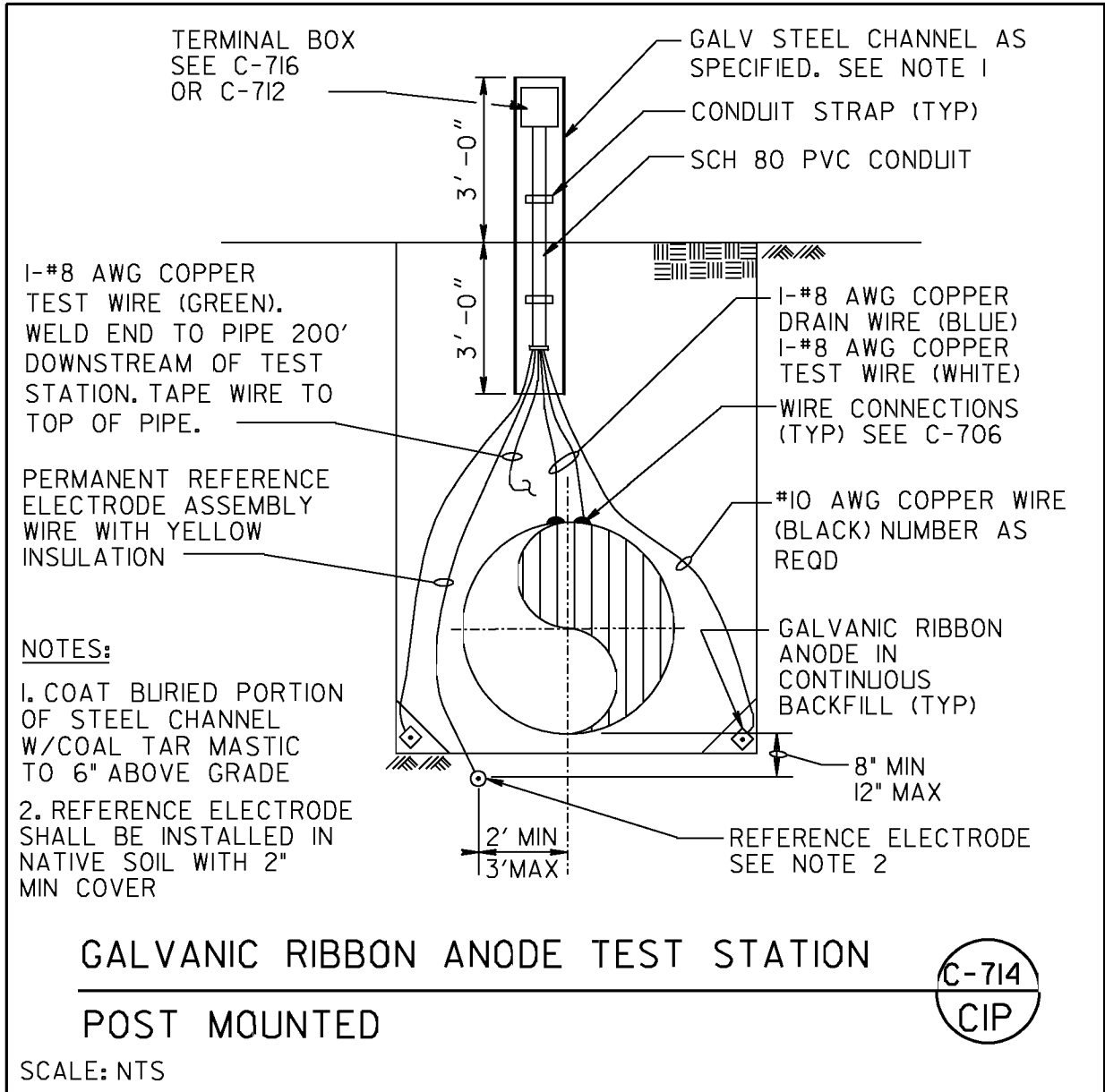


STANDARD
DETAIL

CIP

ALTERNATIVE ANODE VENT PIPE

C-713



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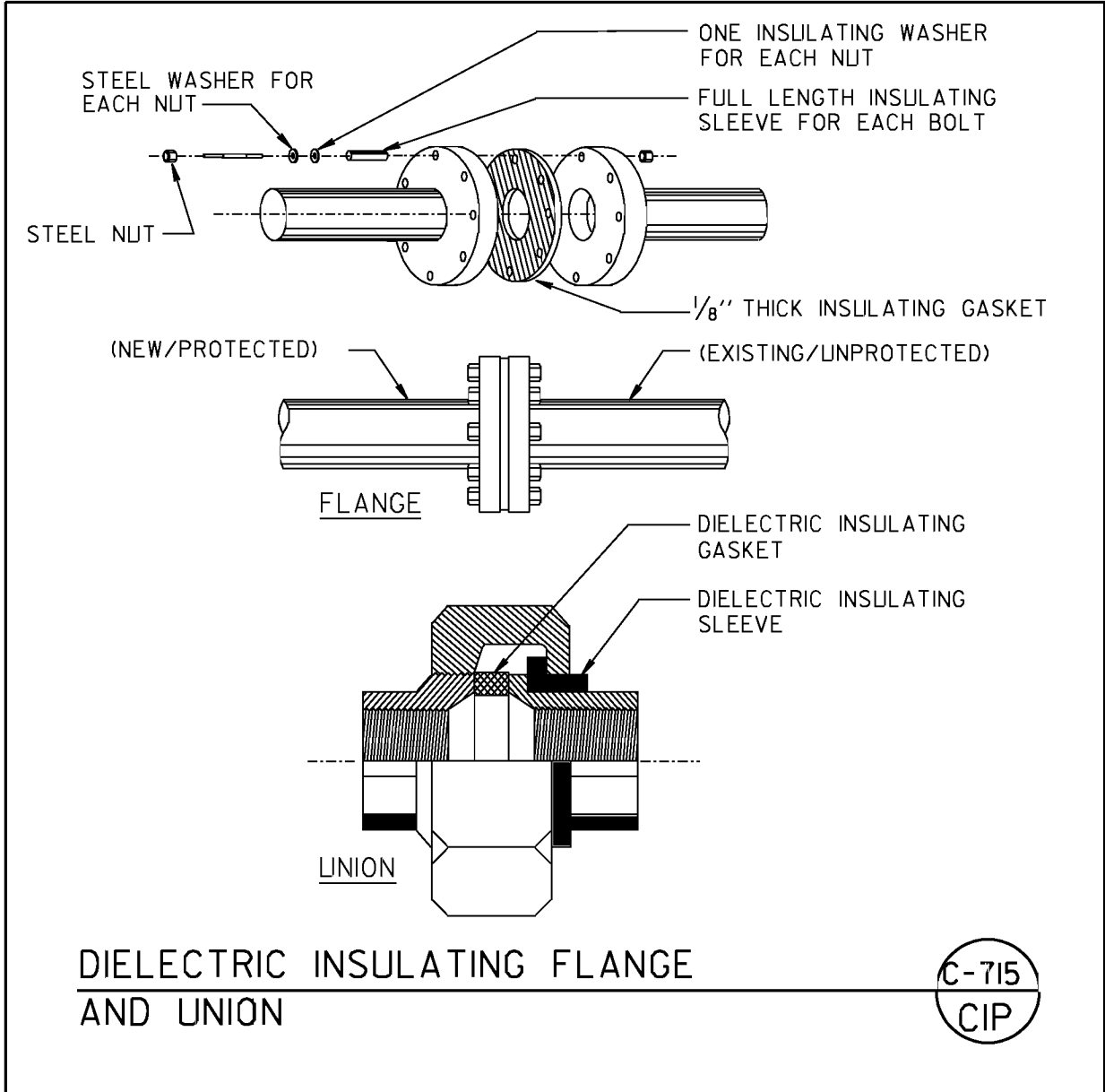


STANDARD
DETAIL

CIP

**GALVANIC RIBBON ANODE
TEST STATION POST MOUNTED**

C-714



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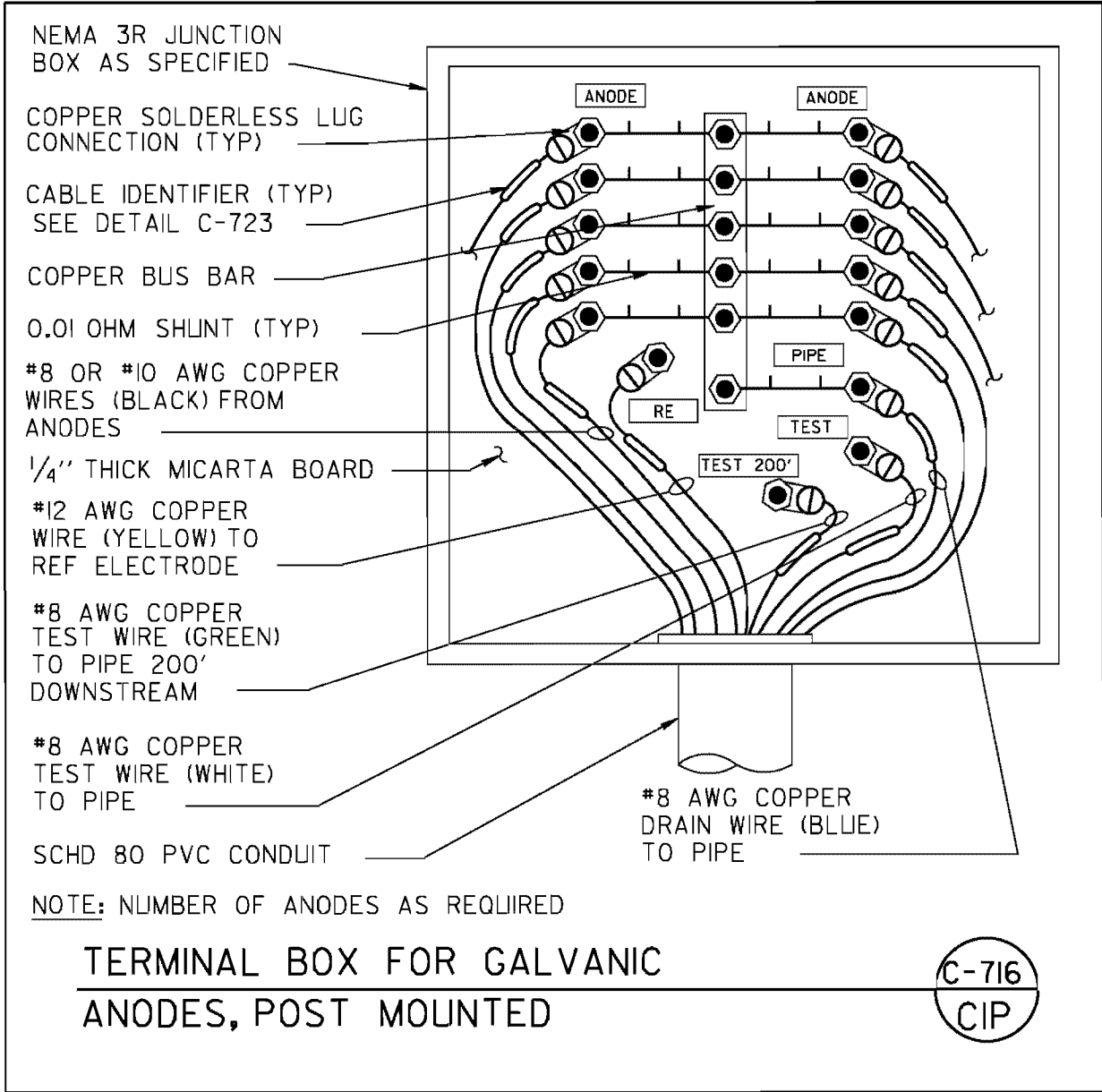


STANDARD
DETAIL

CIP

**DIELECTRIC INSULATING FLANGE
AND UNION**

C-715



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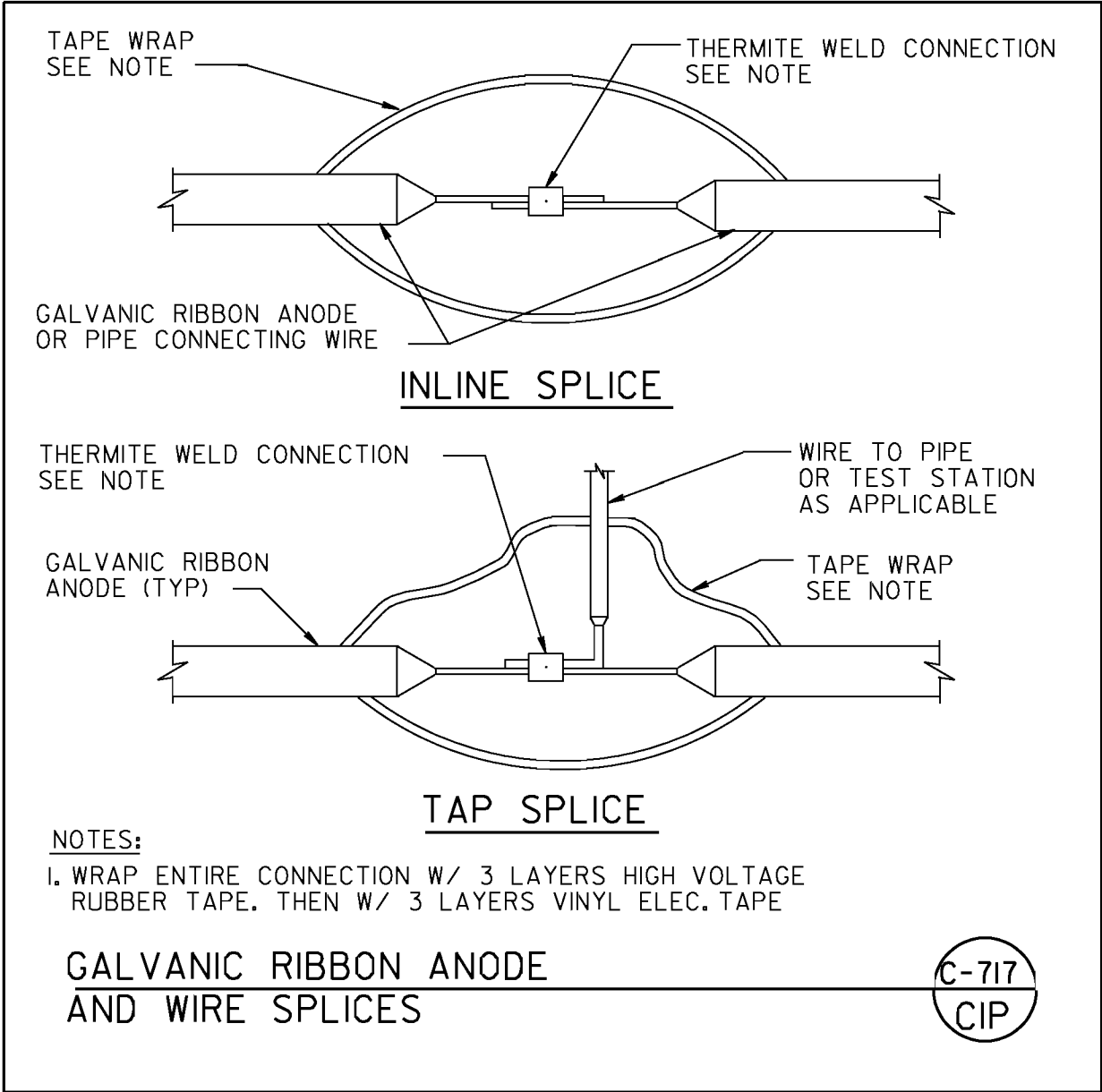
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STANDARD
 DETAIL
CIP
 C-716

TERMINAL BOX FOR GALVANIC ANODES, POST MOUNTED



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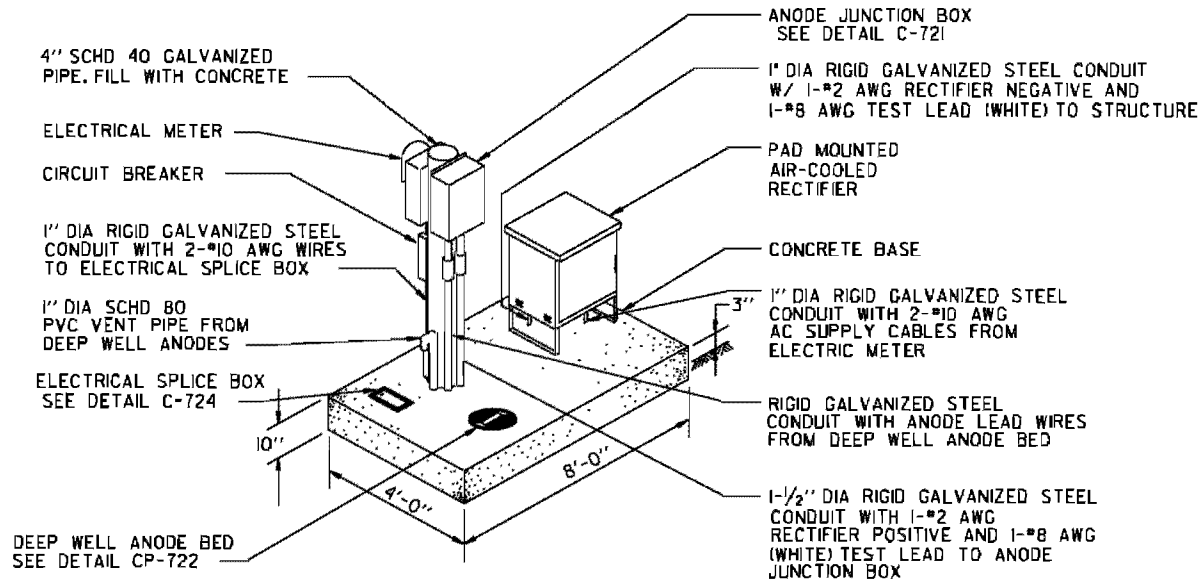


STANDARD
DETAIL

CIP

C-717

**GALVANIC RIBBON ANODE
AND WIRE SPLICES**



**RECTIFIER AND ANODE JUNCTION BOX
INSTALLATION DETAIL**



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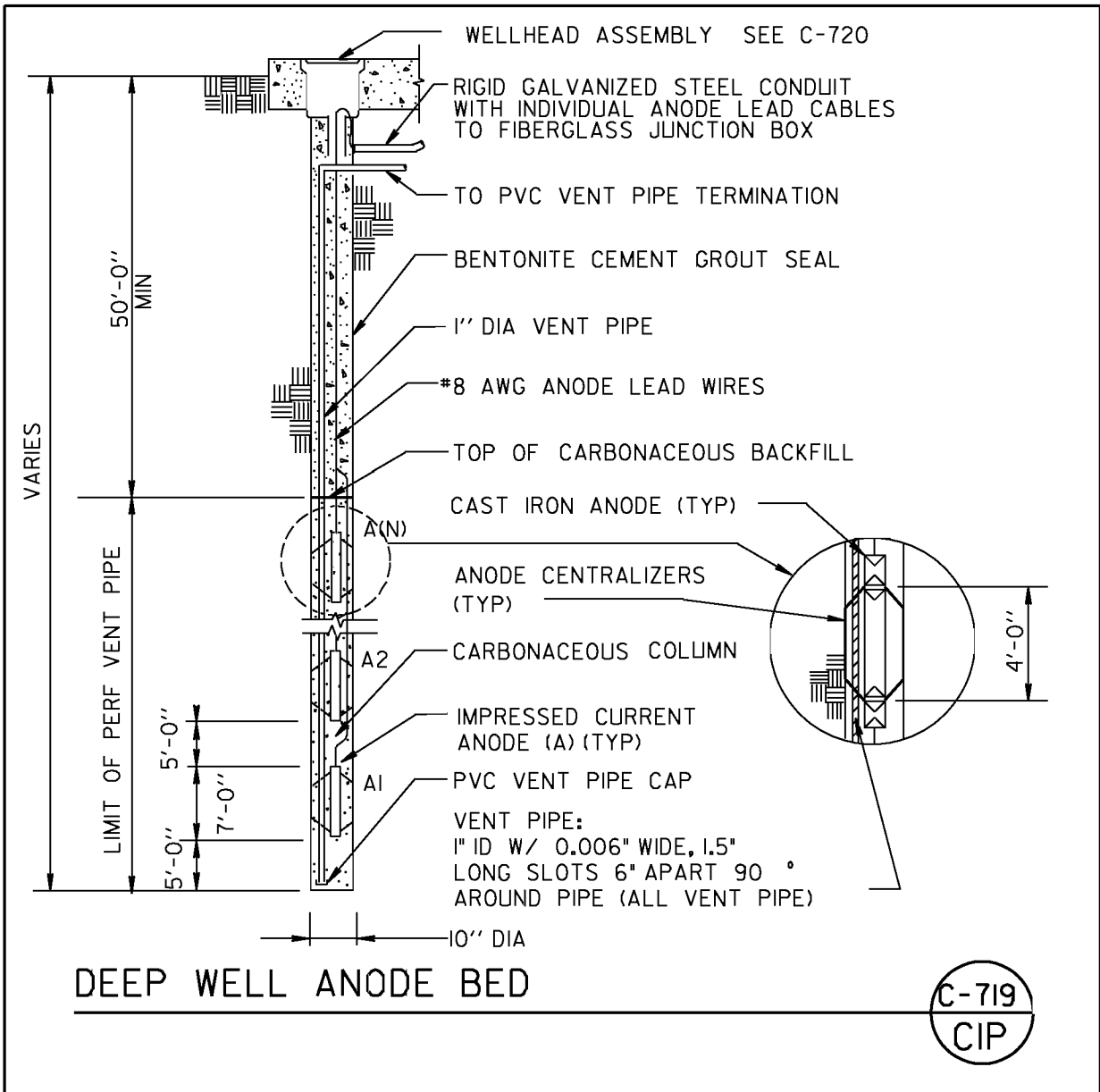
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**RECTIFIER AND ANODE JUNCTION
BOX INSTALLATION DETAIL**

STANDARD
DETAIL

CIP

C-718



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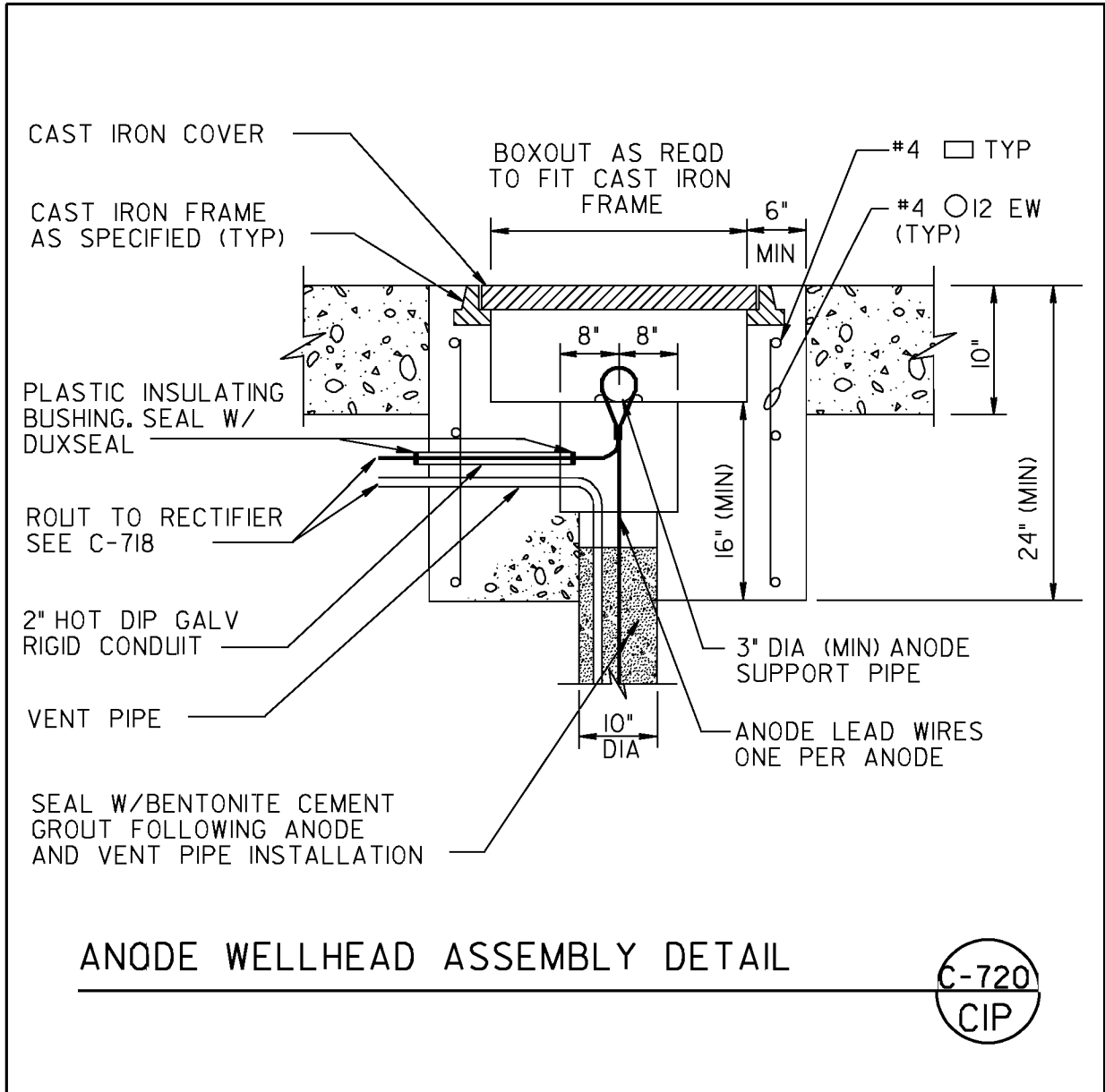


STANDARD
DETAIL

CIP

DEEP WELL ANODE BED

C-719



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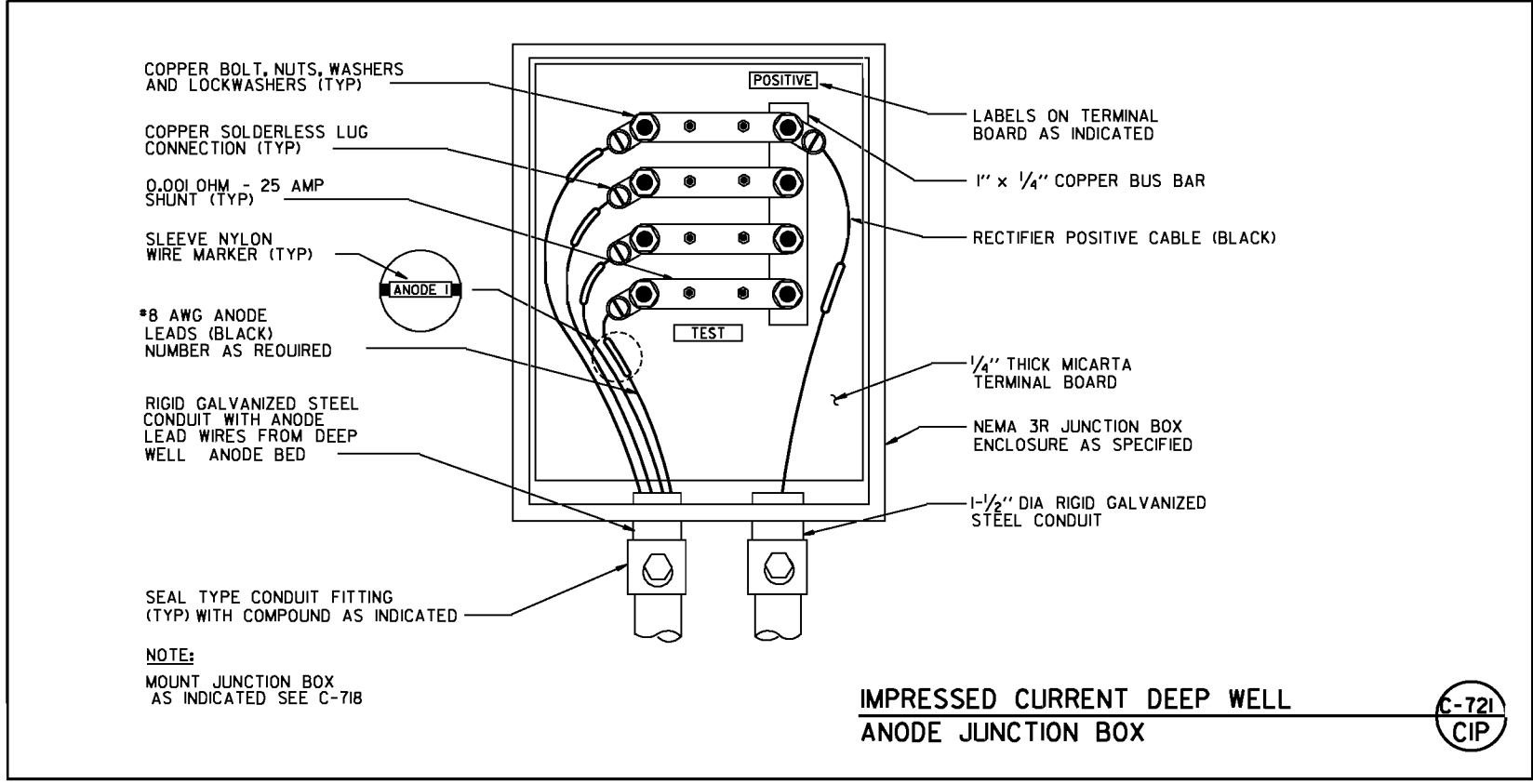


STANDARD
DETAIL

CIP

ANODE WELLHEAD ASSEMBLY DETAIL

C-720




IMPRESSED CURRENT DEEP WELL ANODE JUNCTION BOX



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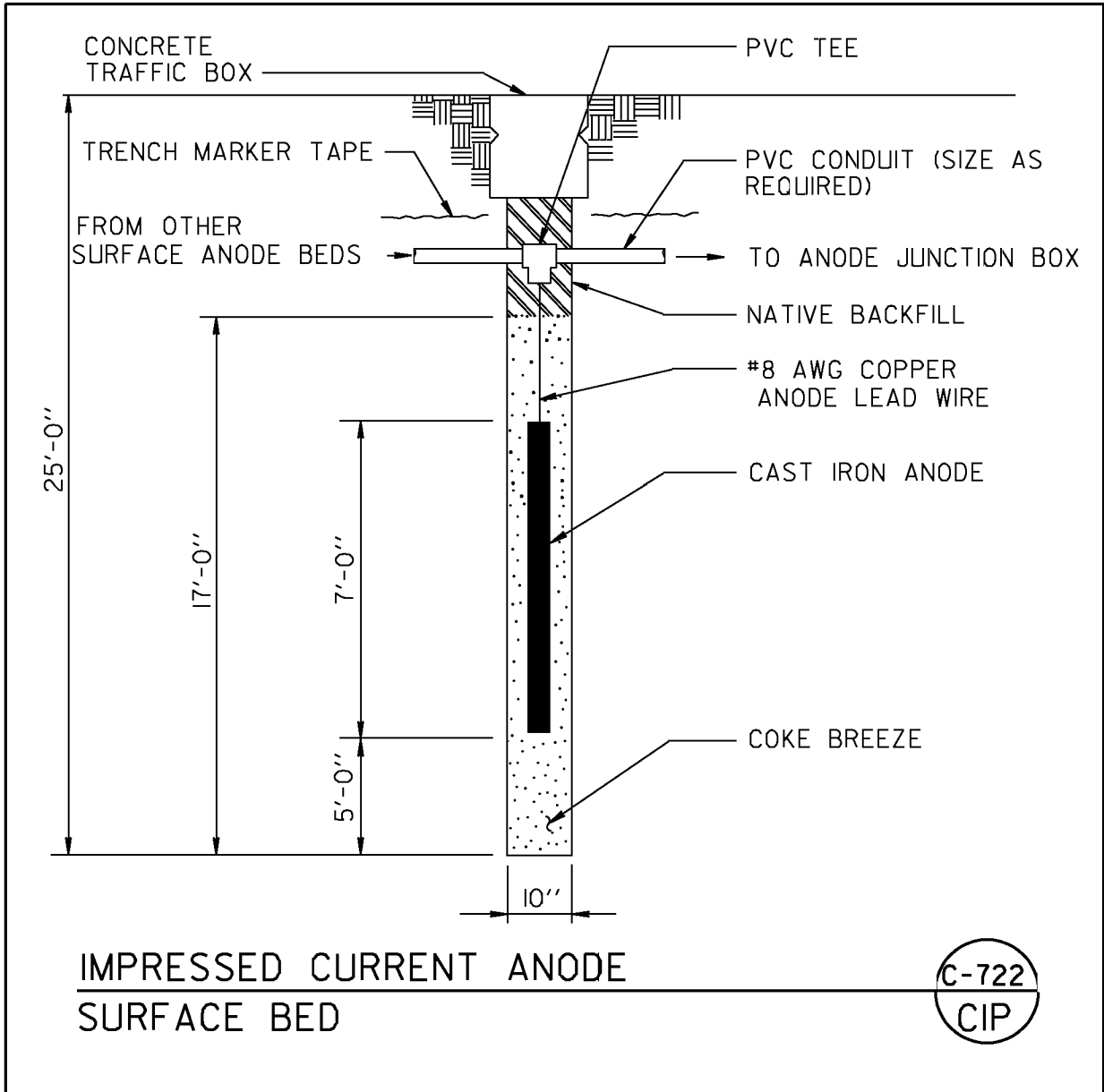


IMPRESSED CURRENT DEEP WELL ANODE JUNCTION BOX

STANDARD
DETAIL

CIP

C-721



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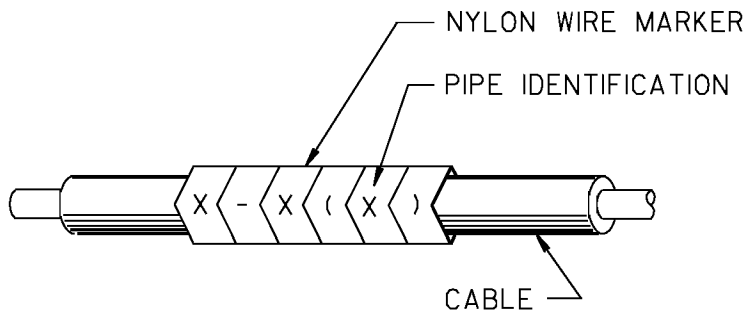


STANDARD
DETAIL

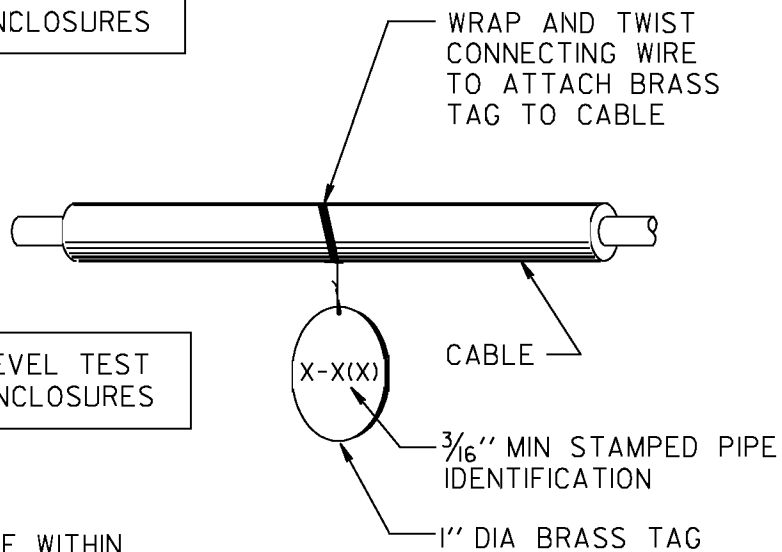
CIP

IMPRESSED CURRENT ANODE
SURFACE BED

C-722



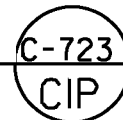
FOR USE IN JUNCTION BOXES
AND ABOVE GRADE ENCLOSURES



FOR USE IN GRADE LEVEL TEST
AND BOND STATION ENCLOSURES

NOTE:
IDENTIFIER SHOULD BE WITHIN
4" OF END OF WIRE

CABLE IDENTIFIER



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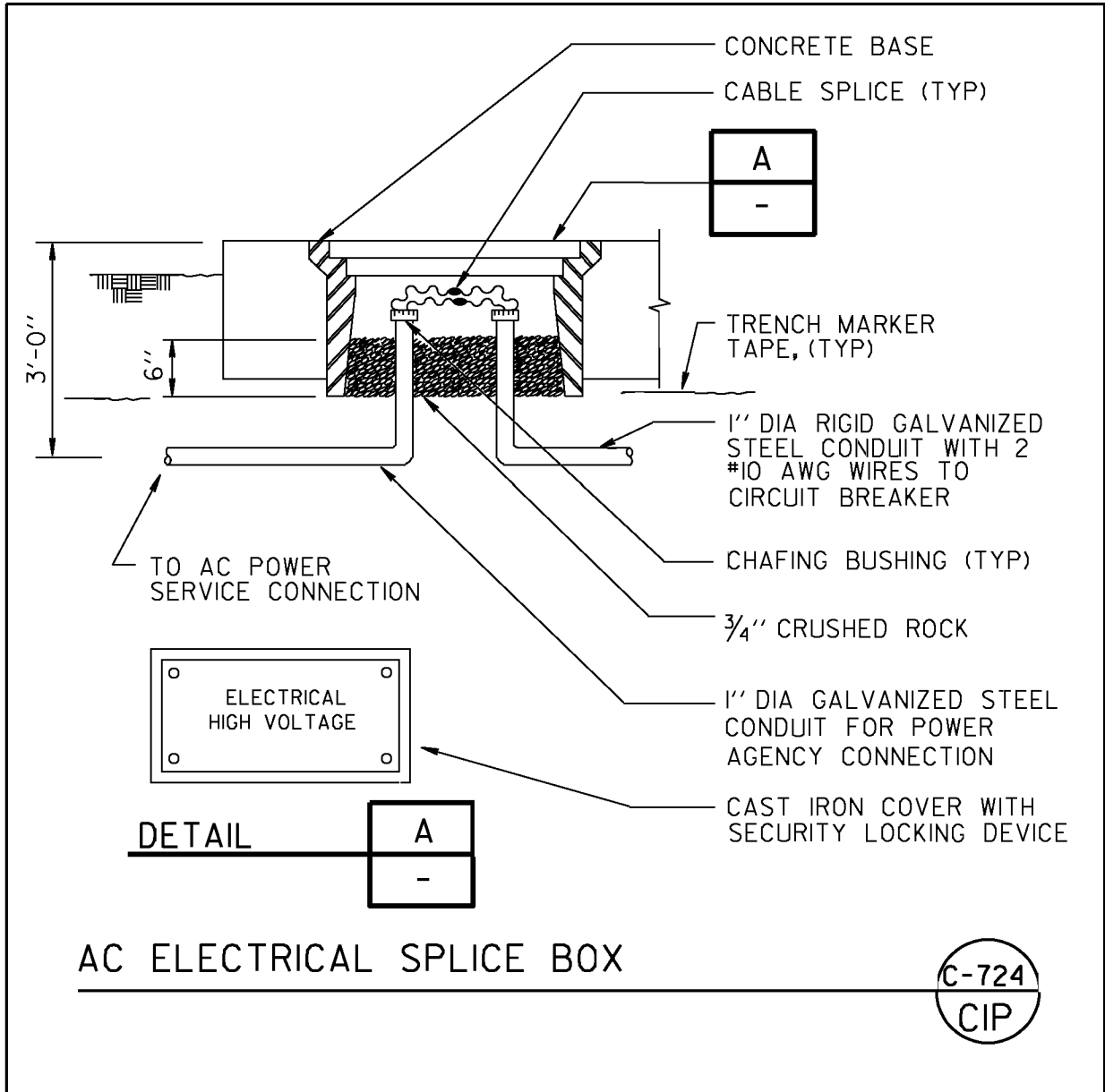


STANDARD
DETAIL

CIP

CABLE IDENTIFIER

C-723



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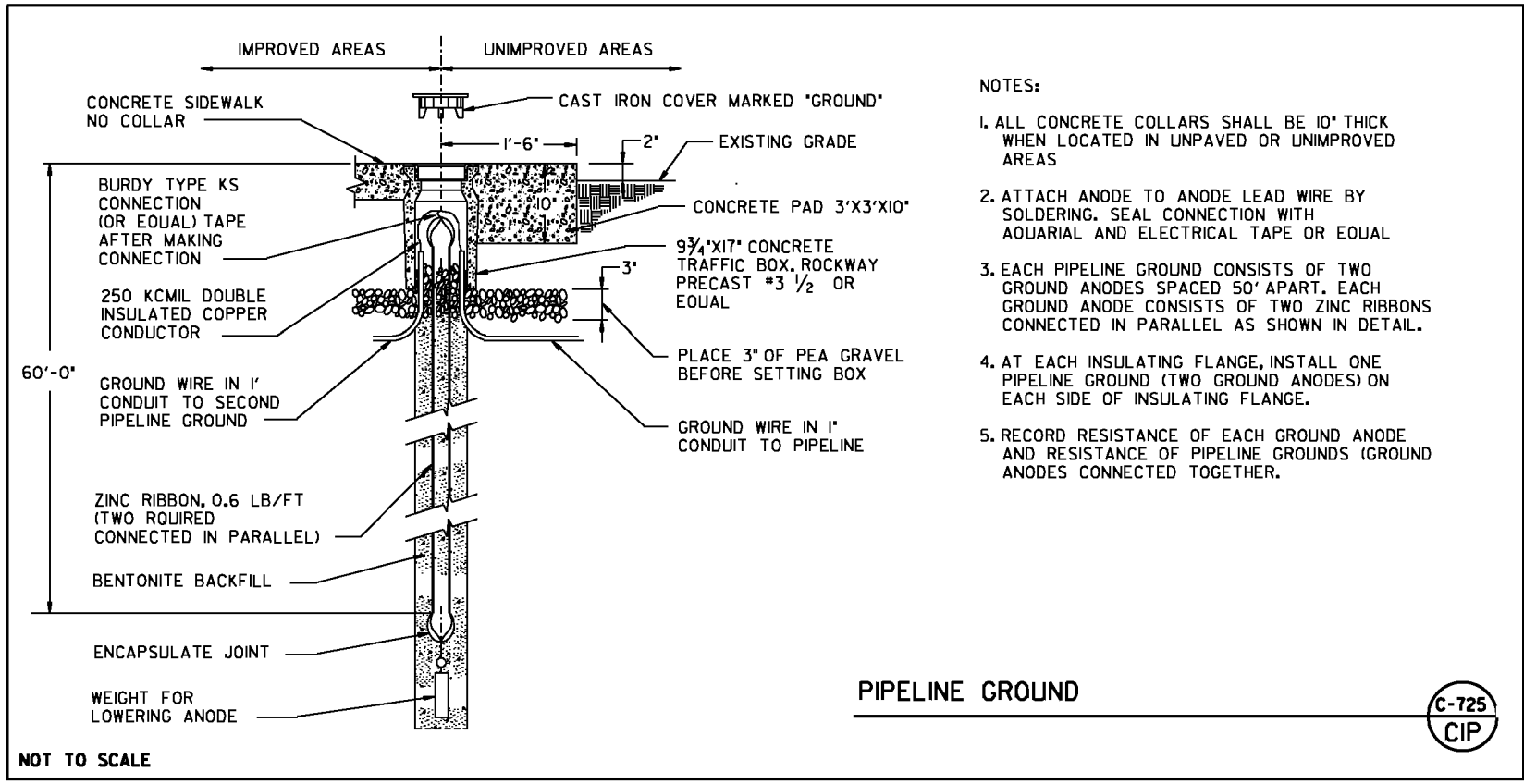


STANDARD
DETAIL

CIP

AC ELECTRICAL SPLICE BOX

C-724



- NOTES:
1. ALL CONCRETE COLLARS SHALL BE 10" THICK WHEN LOCATED IN UNPAVED OR UNIMPROVED AREAS
 2. ATTACH ANODE TO ANODE LEAD WIRE BY SOLDERING. SEAL CONNECTION WITH AQUARIUM AND ELECTRICAL TAPE OR EQUAL
 3. EACH PIPELINE GROUND CONSISTS OF TWO GROUND ANODES SPACED 50' APART. EACH GROUND ANODE CONSISTS OF TWO ZINC RIBBONS CONNECTED IN PARALLEL AS SHOWN IN DETAIL.
 4. AT EACH INSULATING FLANGE, INSTALL ONE PIPELINE GROUND (TWO GROUND ANODES) ON EACH SIDE OF INSULATING FLANGE.
 5. RECORD RESISTANCE OF EACH GROUND ANODE AND RESISTANCE OF PIPELINE GROUNDS (GROUND ANODES CONNECTED TOGETHER).

PIPELINE GROUND



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PIPELINE GROUND

STANDARD DETAIL
CIP
C-725