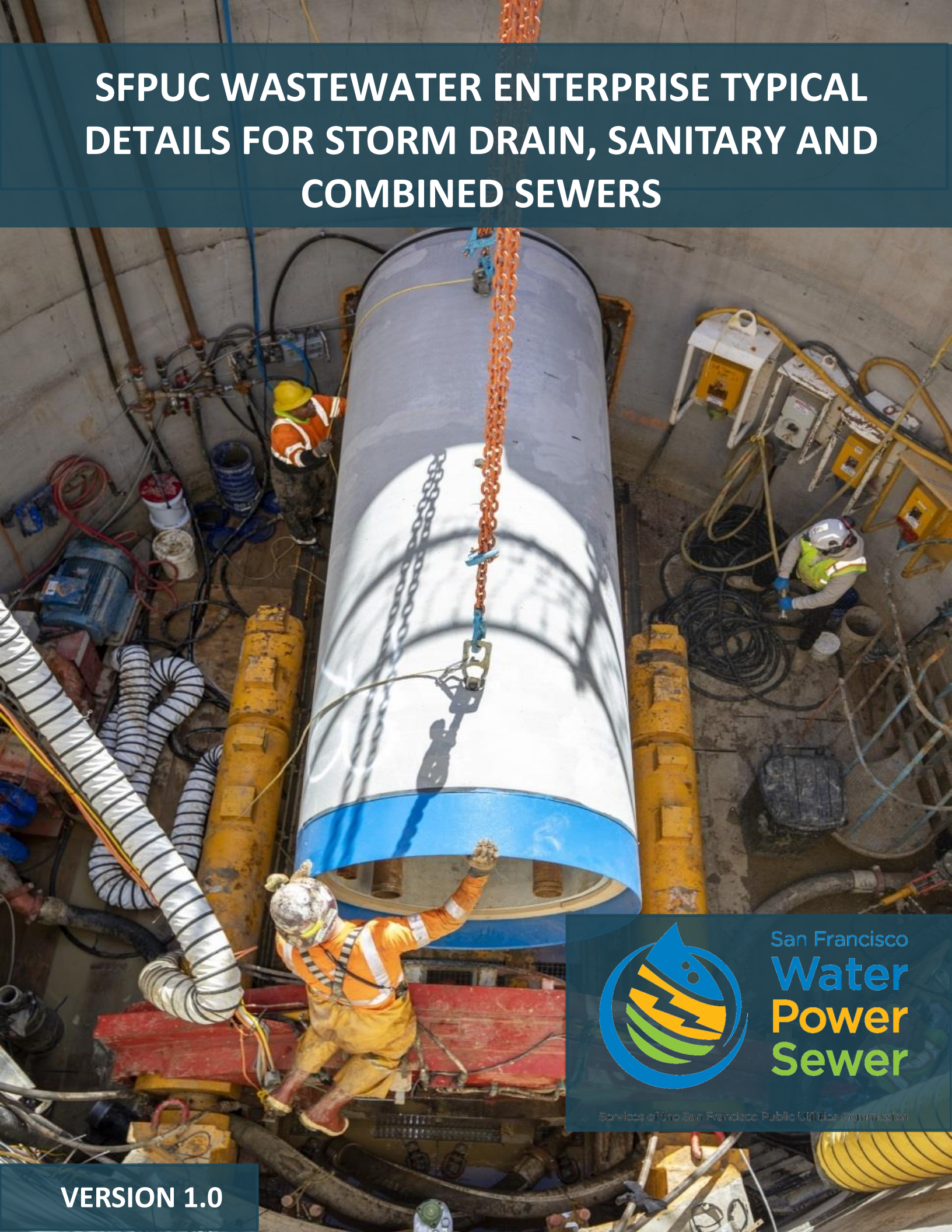
SFPUC WASTEWATER ENTERPRISE TYPICAL DETAILS FOR STORM DRAIN, SANITARY AND COMBINED SEWERS



San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

VERSION 1.0

San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

WASTEWATER ENTERPRISE

TYPICAL DETAILS FOR STORM DRAIN, SANITARY AND COMBINED SEWERS

APRIL 2024

San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

WASTEWATER ENTERPRISE

TYPICAL DETAILS FOR STORM DRAIN, SANITARY AND COMBINED SEWERS

APRIL 2024

RECOMMENDATIONS/APPROVALS

Prepared: 5/21/2024

Chris Portner Jr., P.E. Date
Hazen & Sawyer, Consultant
Senior Civil Engineer

Recommended: Sarah M Minick 5/21/2024

Sarah Minick Date
Urban Watershed Planning Division, Manager

Approved: 5/21/2024

Michael Tran, P.E. Date
Collection System Division, Technical Services
Section Manager
Senior Civil Engineer

Approved: 5/21/2024

Linda Candelaria Date
Collection System Division, Manager

Approved: 5/31/2024

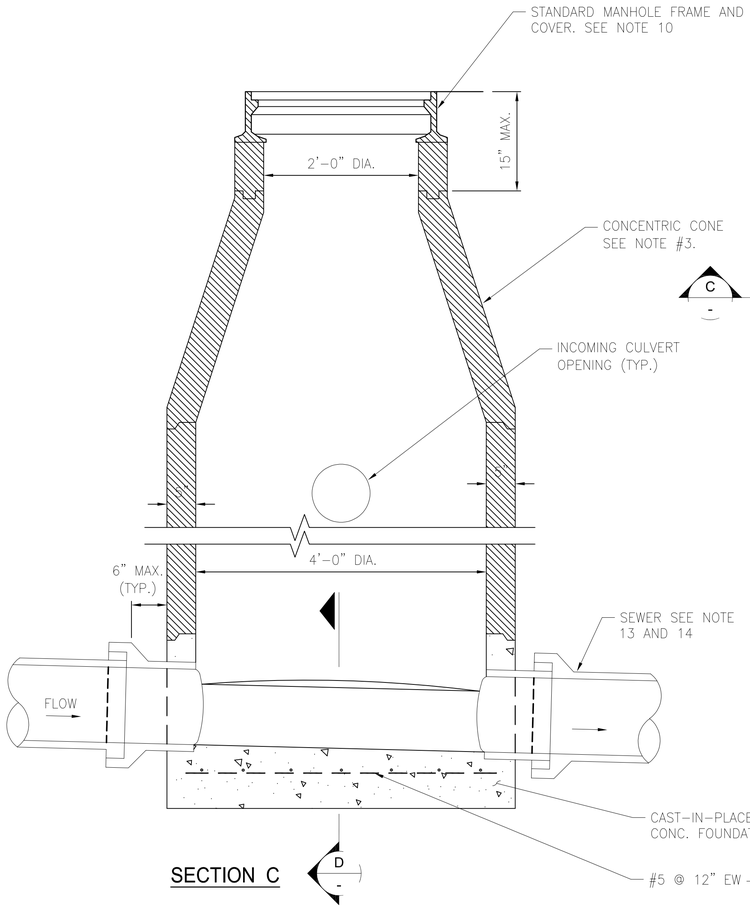
Joel Prather Date
Wastewater Enterprise, Assistant General Manager

WASTEWATER ENTERPRISE TYPICAL DETAILS
SIGNATURES FOR TYPICAL DETAILS ONLY

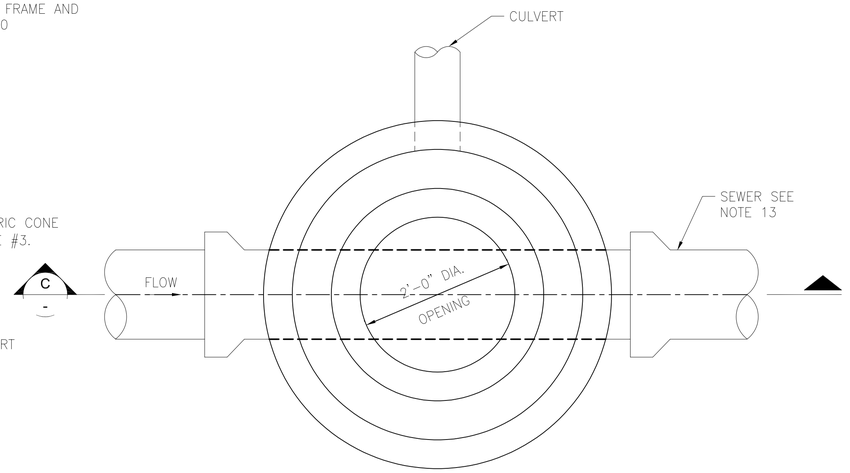
List of Typical Details

GENERAL NOTES

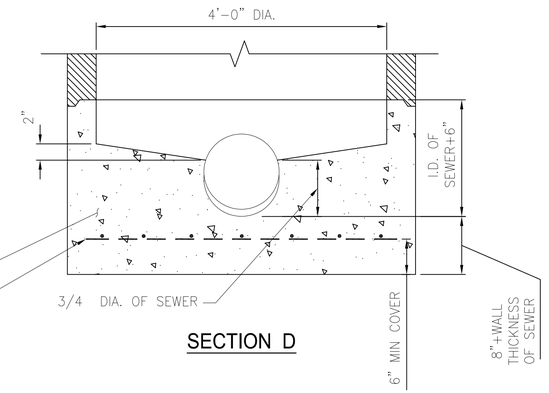
1. MANHOLE FRAME AND ALL JOINTS SHALL BE SET IN PREFORMED FLEXIBLE JOINT SEALANT COMPOUND USING RAM-NEK, OR APPROVED EQUAL.
2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478.
3. IF AN ECCENTRIC CONE IS REQUIRED, THE VERTICAL WALL SHALL BE UPSTREAM SIDE OF MANHOLE, UNLESS OTHERWISE DIRECTED BY THE SFPUC REPRESENTATIVE.
4. CAST-IN-PLACE CONCRETE FOUNDATION SHALL CONFORM TO ASTM C94/C94M, ALTERNATE 2 WITH A MINIMUM 4000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. BASE SHALL BE PLACED ON A MINIMUM OF 6-INCHES OF COMPACTED STONE BEDDING MATERIAL MEETING THE REQUIREMENTS OF CALTRANS CLASS 2 AGGREGATE BASE.
5. CULVERT OPENINGS SHALL BE A MINIMUM OF 8" FROM PRECAST SECTION JOINTS.
6. CONTRACTOR SHALL MINIMIZE NUMBER OF SECTION RINGS BY UTILIZING LARGEST SECTIONS AVAILABLE.
7. LOWER LATERAL CONNECTIONS TO THE MANHOLE SHALL NOT BE HIGHER THAN 12" ABOVE THE INVERT OF THE MANHOLE.
8. CULVERT CONNECTION SHALL BE FLUSH WITH INSIDE FACE OF MANHOLE WALL.
9. MANHOLE DEPTH WILL BE SPECIFIED.
10. MANHOLE COVER DIAMETER VARIES BY SERVICE. REFER TO CONTRACT DRAWINGS FOR INTENDED SERVICE. REFERENCE CONTRACT DRAWINGS AND SFPUC WWE TYP. DETAILS MH-1.10, MH-1.11, OR MH-1.12 AS APPROPRIATE FOR THE SERVICE.
11. THE MAXIMUM NUMBER OF CONNECTIONS TO ANY ONE MANHOLE SHALL NOT EXCEED 8. THE MINIMUM SPACING BETWEEN CONNECTIONS SHALL BE 8-INCHES FROM OUTSIDE EDGE TO OUTSIDE EDGE, AS MEASURED FROM THE INSIDE OF THE MANHOLE. COORDINATE WITH THE PRECAST CONCRETE MANHOLE MANUFACTURER TO CONFIRM IF ADDITIONAL SPACING ABOVE THE MINIMUM IS REQUIRED.
12. WATERPROOF EXTERIOR WALLS OF MANHOLES WITH A CRYSTALLINE WATERPROOFING ADMIXTURE FOR THE PORTION OF ALL MANHOLES LOCATED IN THE WATER TABLE, INCLUDING WHERE THE WATER TABLE IS ELEVATED DUE TO TIDAL INFLUENCE. THE ADMIXTURE SHALL CONFORM TO ASTM C 494, TYPE D OR S, AND BE XYPEX ADMIX C-500 NF, MASTERLIFE 300D, KRYSTOL INTERNAL MEMBRANE (KIM), OR APPROVED EQUAL.
13. INVERT OF PIPE SHALL BE FLUSH WITH INVERT OF CUNETTE.
14. FOR HDPE PIPES, PROVIDE A FULL DEPTH PENETRATION THROUGH THE WALL AND CONNECT THE SEWER PIPE USING A FLEXIBLE CONNECTOR SUCH AS A KOR N-SEAL I106-406, OR APPROVED EQUAL



SECTION C

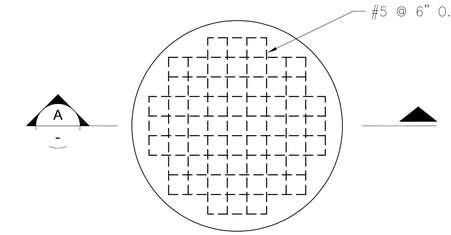


PLAN



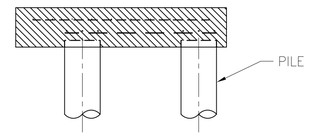
SECTION D

MANHOLE PLAN AND DETAILS



TOP REINFORCING STEEL

BOTTOM REINFORCING STEEL



SECTION A

REINFORCED CONCRETE FOUNDATION FOR MANHOLE ON PILES

DRAFT NOT FOR CONSTRUCTION

THIS SFPUC WWE TYPICAL DETAIL WAS DEVELOPED FOR USE ON SFPUC WWE PROJECTS IN THE CITY AND COUNTY OF SAN FRANCISCO, AND SHALL NOT BE USED WITHOUT CONSULTING A REGISTERED PROFESSIONAL ENGINEER. THE SFPUC RESERVES THE RIGHT TO MAKE REVISIONS TO THIS TYPICAL DETAIL AT ANY TIME.

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

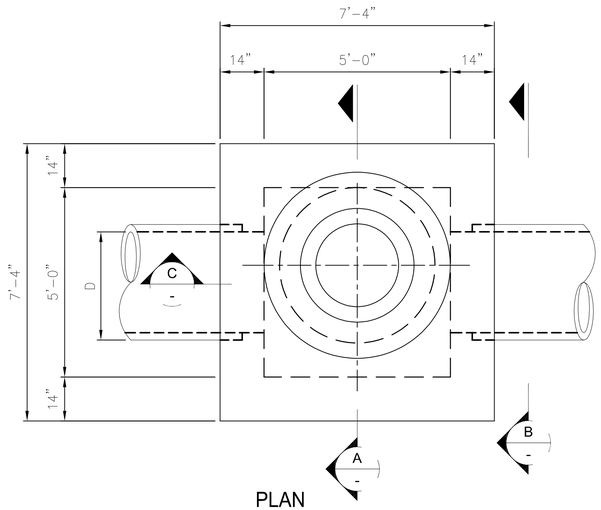
CONCRETE MANHOLE FOR 12" TO 24" DIAMETER SEWERS

MH 1.1

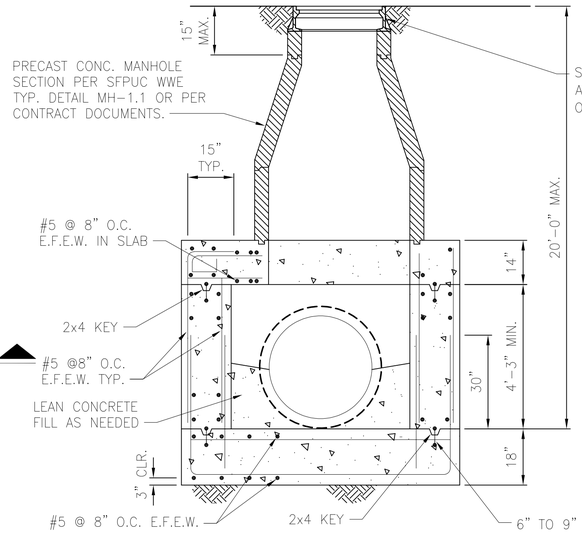
ISSUE DATE/VER:
VERSION 1.1
NOV 2025

GENERAL NOTES

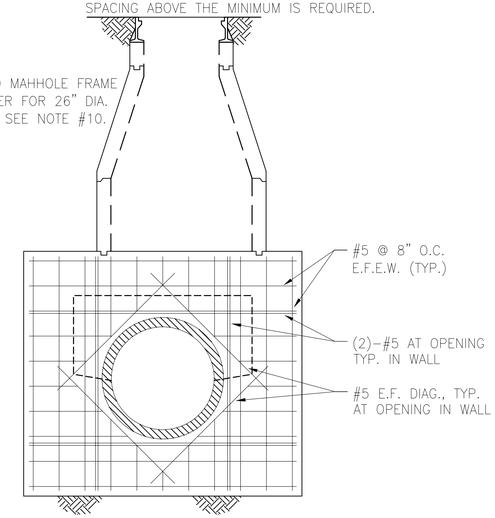
1. ALL REINFORCING STEEL SHALL BE PLACED AT LEAST 2" FROM FACE OF CONCRETE, EXCEPT WHERE OTHERWISE SHOWN.
2. PROVIDE CONTINUOUS BENDS AT ALL CORNERS AND LAP BARS AS SHOWN.
3. MANHOLE FRAME AND ALL JOINTS SHALL BE SET IN A PREFORMED FLEXIBLE JOINT SEALANT COMPOUND USING RAM-NEK, OR APPROVED EQUAL.
4. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478.
5. CAST-IN-PLACE CONCRETE FOUNDATION SHALL CONFORM TO ASTM C94/94M, ALTERNATE 2 WITH A MINIMUM 4000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. BASE SHALL BE PLACED ON A MINIMUM OF 6-INCHES OF COMPACED STONE BEDDING MATERIAL MEETING THE REQUIREMENTS OF CALTRANS CLASS 2 AGGERGATE BASE.
6. CULVERT OPENING SHALL BE A MINIMUM OF 8" FROM PRECAST SECTION JOINTS.
7. CONTRACTOR SHALL MINIMIZE THE NUMBER OF SECTION RINGS BY UTILIZING LARGEST SECTIONS AVAILABLE.
8. USE STEEL WALL ANCHOR RING CONNECTION PER CONTRACT DOCUMENTS FOR PIPE 42" AND GREATER.
9. HEIGHT OF CAST-IN-PLACE PORTION OF MANHOLE SHALL BE INCREASED, AS NECESSARY, TO ACCOMMODATE EGG-SHAPED AND OTHER MONOLITHIC SEWERS.
10. MANHOLE COVER DIAMETER VARIES BY SERVICE. REFER TO CONTRACT DRAWINGS FOR INTENDED SERVICE. REFERENCE CONTRACT DRAWINGS AND SFPUC WWE TYP. DETAIL MH-1.10, MH-1.11, OR MH-1.12 AS APPROPRIATE FOR THE SERVICE.
11. THE MAXIMUM NUMBER OF CONNECTIONS TO ANY ONE MANHOLE SHALL NOT EXCEED 8. THE MINIMUM SPACING BETWEEN CONNECTIONS SHALL BE 8-INCHES FROM OUTSIDE EDGE TO OUTSIDE EDGE, AS MEASURED FROM THE INSIDE OF THE MANHOLE. COORDINATE WITH THE PRECAST CONCRETE MANHOLE MANUFACTURER TO CONFIRM IF ADDITIONAL SPACING ABOVE THE MINIMUM IS REQUIRED.
12. WATERPROOF EXTERIOR WALLS OF MANHOLES WITH A CRYSTALLINE WATERPROOFING ADMIXTURE FOR THE PORTION OF ALL MANHOLES LOCATED IN THE WATER TABLE, INCLUDING WHERE THE WATER TABLE IS ELEVATED DUE TO TIDAL INFLUENCE. THE ADMIXTURE SHALL CONFORM TO ASTM C 494, TYPE D OR S, AND BE XYPEX ADMIX C-500 NF, MASTERLIFE 300D, KRYSTOL INTERNAL MEMBRANE (KIM), OR APPROVED EQUAL.
13. FOR HDPE PIPES, PROVIDE A FULL DEPTH PENETRATION THROUGH THE WALL AND CONNECT THE SEWER PIPE USING A FLEXIBLE CONNECTOR SUCH AS A KOR N-SEAL I106-4063, KOR N-SEAL II 206, OR APPROVED EQUAL.



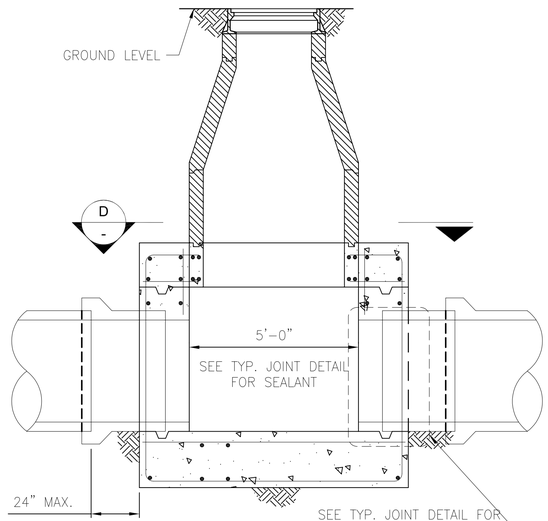
PLAN
NOT TO SCALE



SECTION A
NOT TO SCALE



SECTION B
TYP. REINF. AT OPENING
NOT TO SCALE



SECTION C
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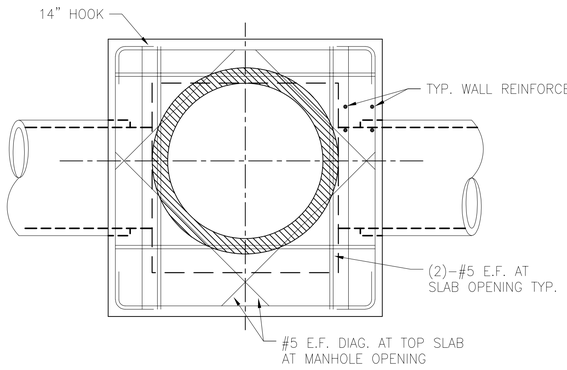

SECTION D
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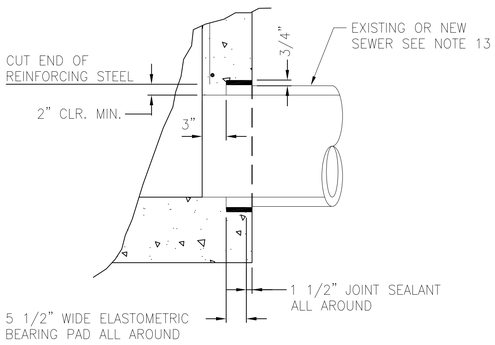

TYP. JOINT DETAIL
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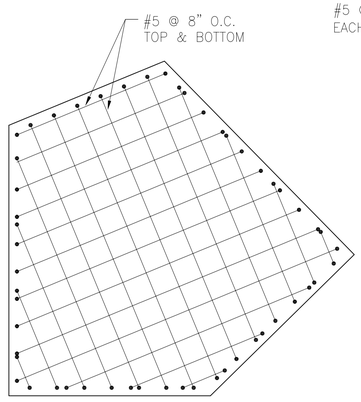
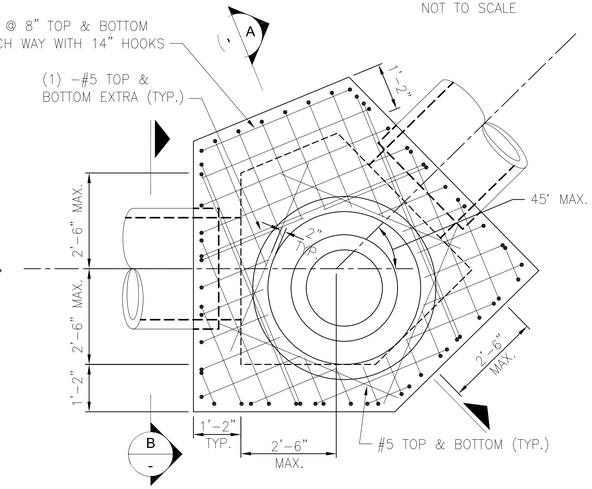


BOTTOM SLAB
NOT TO SCALE

ANGLE MANHOLE
NOT TO SCALE



TOP SLAB
NOT TO SCALE

DRAFT NOT FOR CONSTRUCTION

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San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

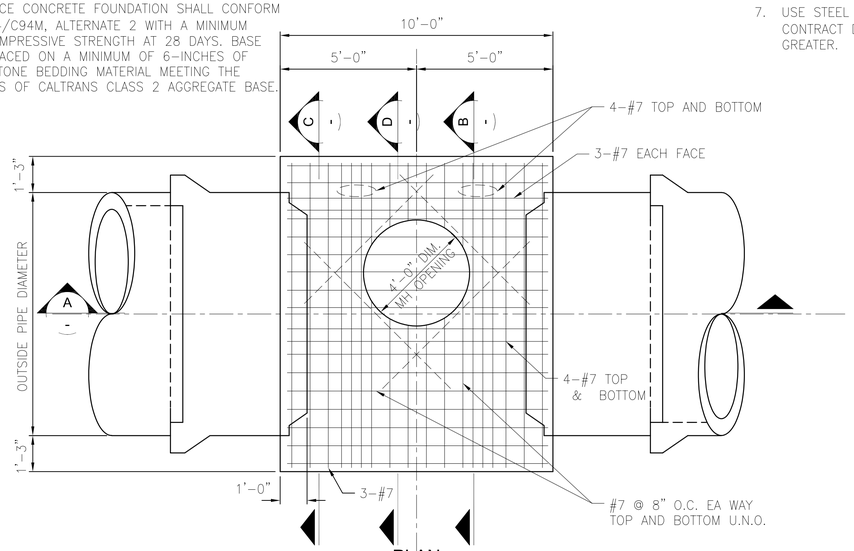
STANDARD CONCRETE MANHOLE FOR PIPE SEWERS 27" TO 48" DIAMETER

MH 1.2

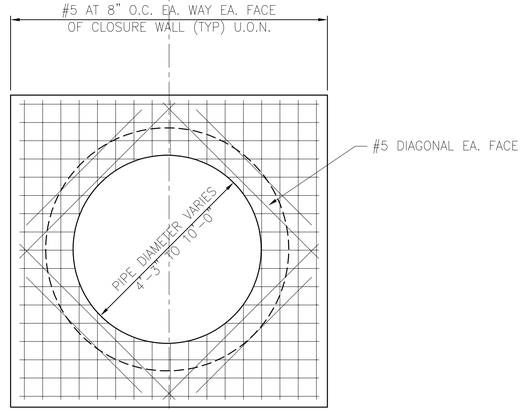
ISSUE DATE/VER:
VERSION 1.1
NOV 2025

GENERAL NOTES

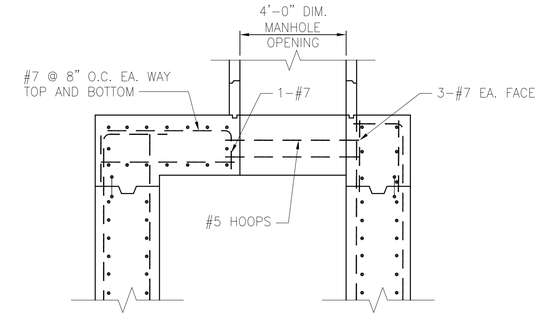
1. ALL REINFORCING STEEL SHALL BE ASTM A615, GRADE 60, WITH fy=60,000 psi.
2. CAST-IN-PLACE CONCRETE FOUNDATION SHALL CONFORM TO ASTM C94/C94M, ALTERNATE 2 WITH A MINIMUM 4000 PSI COMPRESSIVE STRENGTH AT 28 DAYS. BASE SHALL BE PLACED ON A MINIMUM OF 6-INCHES OF COMPACED STONE BEDDING MATERIAL MEETING THE REQUIREMENTS OF CALTRANS CLASS 2 AGGREGATE BASE.
3. PROVIDE CONTINUOUS BENDS AT ALL CORNER OR LAP BARS 30 DIA.
4. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478.
5. MANHOLE FRAME AND ALL JOINTS SHALL BE SET IN A PREFORMED FLEXIBILE JOINT SEALANT COMPOUND USING RAM-NEK, OR APPROVED EQUAL.
6. CONTRACTOR SHALL MINIMIZE THE NUMBER OF SECTION RINGS BY UTILIZING LARGEST SECTIONS AVAILABLE.
7. USE STEEL WALL ANCHOR RING CONNECTION PER CONTRACT DOCUMENTS FOR PIPE SIZE 42" AND GREATER.
8. MANHOLE COVER DIAMETER VARIES BY SERVICE. REFER TO CONTRACT DRAWINGS FOR INTENDED SERVICE. REFERENCE CONTRACT DRAWINGS AND SFPUC WWE TYP. DETAIL MH-1.10, MH-1.11, OR MH-1.12 AS APPROPRIATE FOR THE SERVICE.
9. THE MAXIMUM NUMBER OF CONNECTIONS TO ANY ONE MANHOLE SHALL NOT EXCEED 8. THE MINIMUM SPACING BETWEEN CONNECTIONS SHALL BE 8-INCHES FROM OUTSIDE EDGE TO OUTSIDE EDGE, AS MEASURED FROM THE INSIDE OF THE MANHOLE. COORDINATE WITH THE PRECAST CONCRETE MANHOLE MANUFACTURER TO CONFIRM IF ADDITIONAL SPACING ABOVE THE MINIMUM IS REQUIRED.
10. WATERPROOF EXTERIOR WALLS OF MANHOLES WITH A CRYSTALLINE WATERPROOFING ADMIXTURE FOR THE PORTION OF ALL MANHOLES LOCATED IN THE WATER TABLE, INCLUDING WHERE THE WATER TABLE IS ELEVATED DUE TO TIDAL INFLUENCE. THE ADMIXTURE SHALL CONFORM TO ASTM C 494, TYPE D OR S, AND BE XYPEX ADMIX C-500 NF, MASTERLIFE 300D, KRYSTOL INTERNAL MEMBRANE (KIM), OR APPROVED EQUAL.
11. FOR HDPE PIPES, PROVIDE A FULL DEPTH PENETRATION THROUGH THE WALL AND CONNECT THE SEWER PIPE USING A FLEXIBLE CONNECTOR SUCH AS A KOR N-SEAL I106-406, OR APPROVED EQUAL.



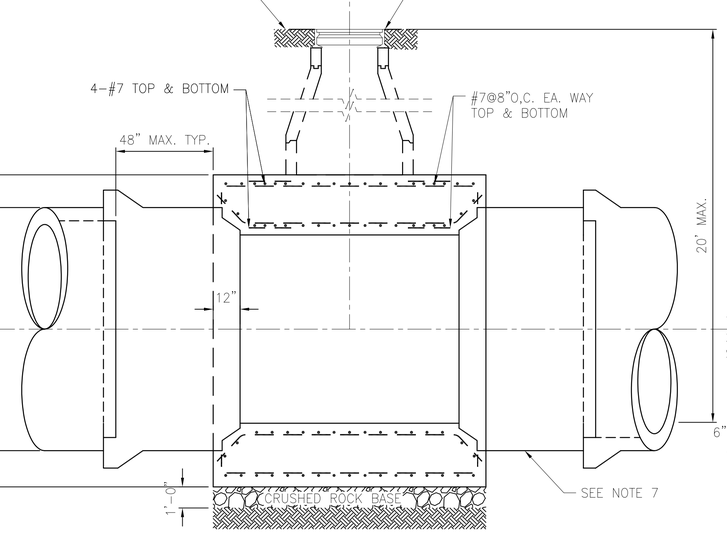
PLAN



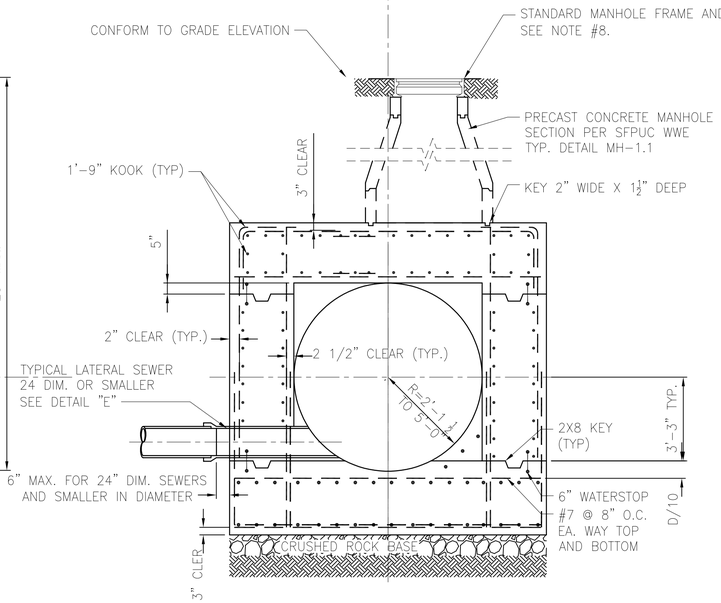
SECTION C



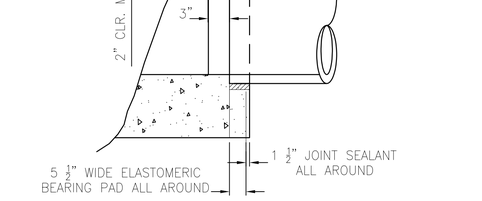
SECTION D



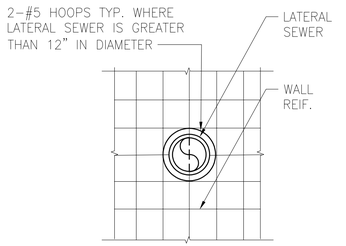
SECTION A



SECTION B



DETAIL "E" - LATERAL SEWER PENETRATION TRU WALL DETAIL



TYP. JOINT DETAIL

DRAFT NOT FOR CONSTRUCTION

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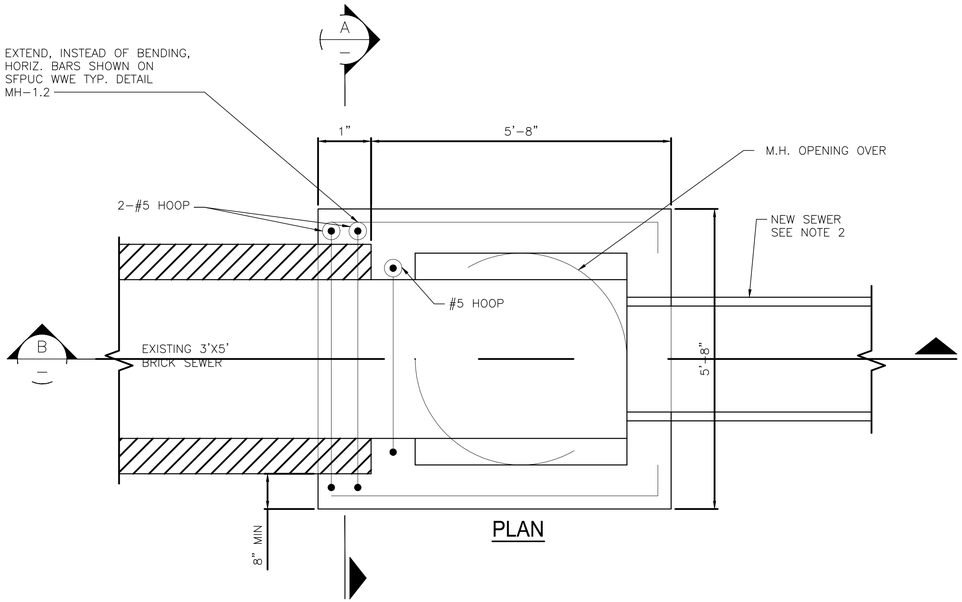
San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

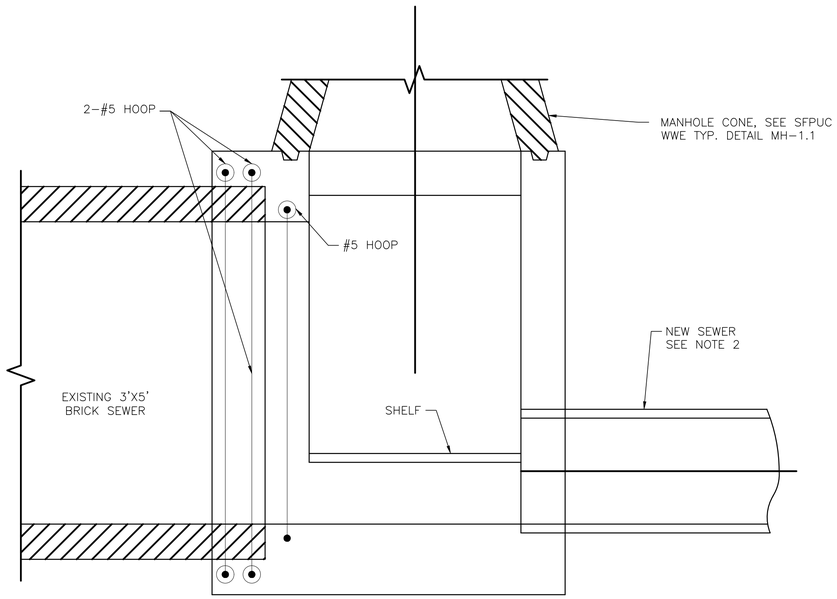
STANDARD CONCRETE MANHOLE FOR PIPE SEWERS GREATER THAN 48" DIAMETER

MH 1.3

ISSUE DATE/VER:
VERSION 1.1
NOV 2025



PLAN



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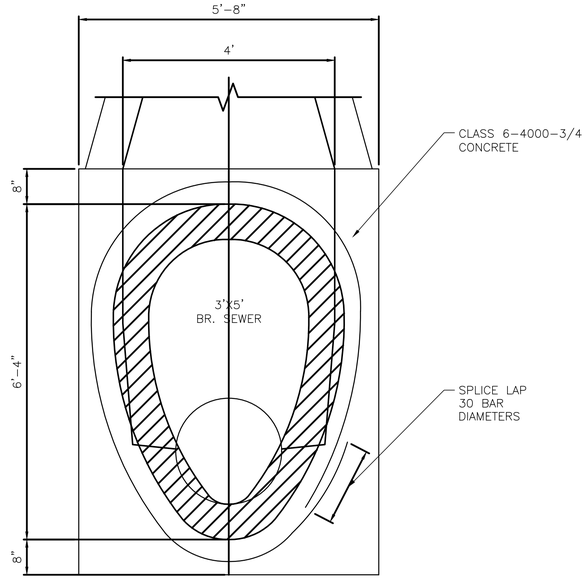

SECTION A

NOTE:

1. FOR OTHER DIMENSIONS AND REINFORCING STEEL SEE SFPUC WWE TYP. DETAIL MH-1.2.
2. FOR HDPE PIPES, PROVIDE A FULL DEPTH PENETRATION THROUGH THE WALL AND CONNECT THE SEWER PIPE USING A FLEXIBLE CONNECTOR SUCH AS A KOR N-SEAL I106-406, FOR N-SEAL II 206, OR APPROVED EQUAL.

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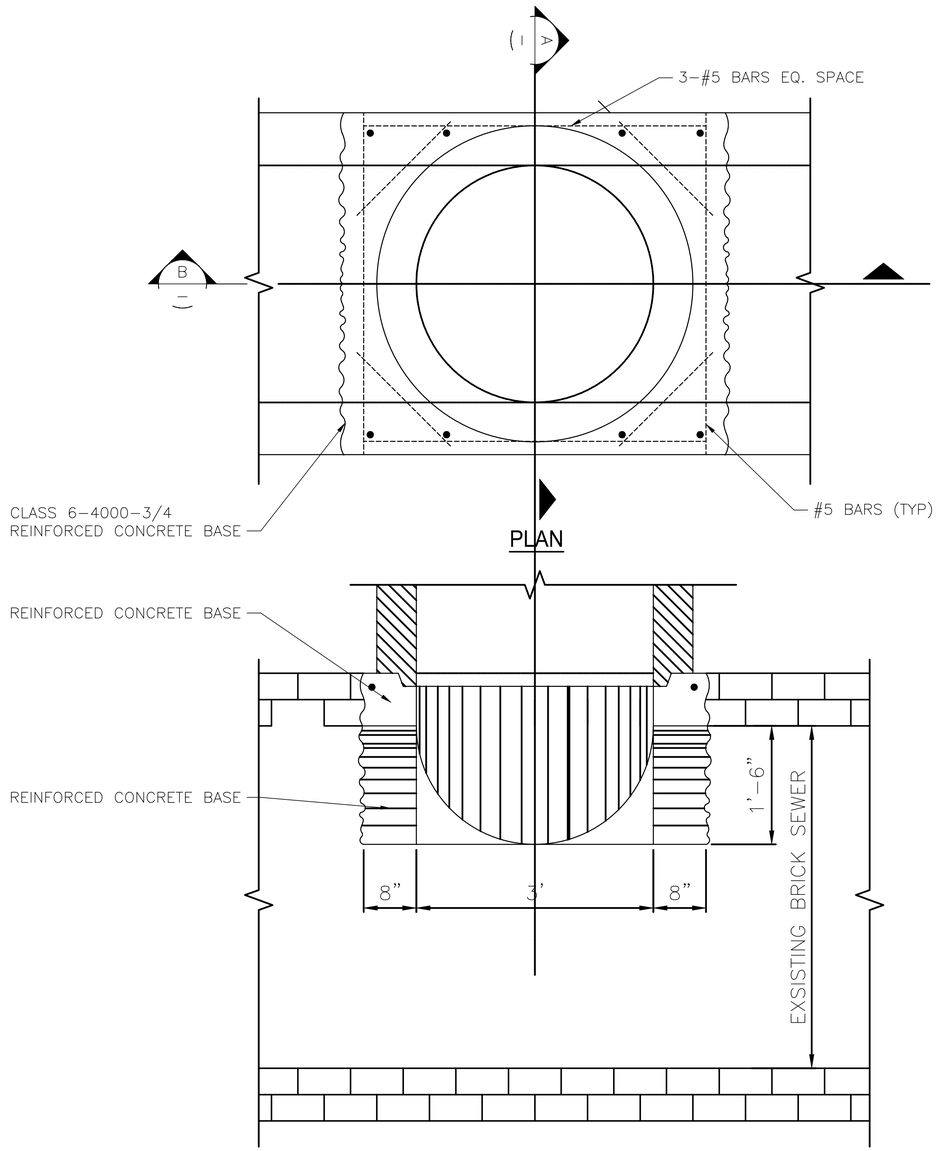
San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

STANDARD CONCRETE MANHOLE FOR PIPE SEWERS GREATER THAN 48" DIAMETER

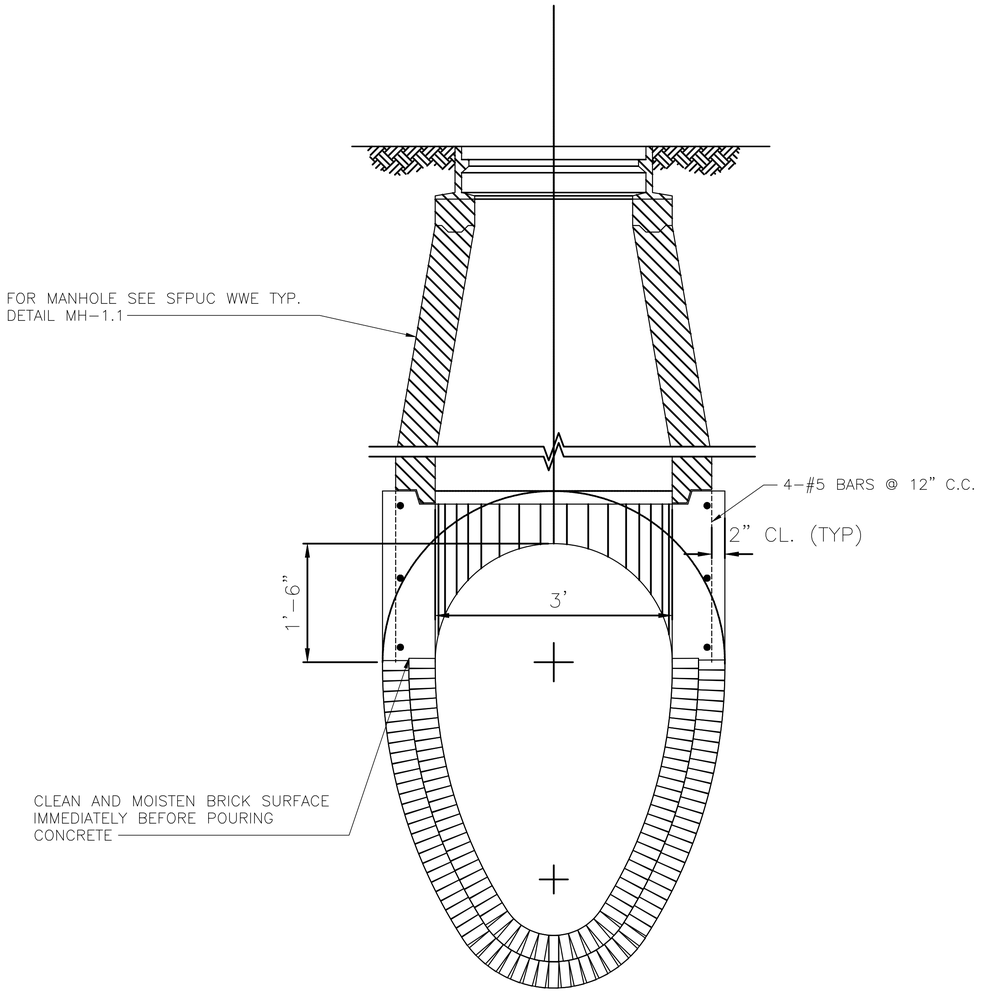
MH 1.4

ISSUE DATE/VER:
VERSION 1.0
MAR 2024



PLAN

SECTION B



SECTION A

DRAFT NOT FOR CONSTRUCTION

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San Francisco Water Power Sewer

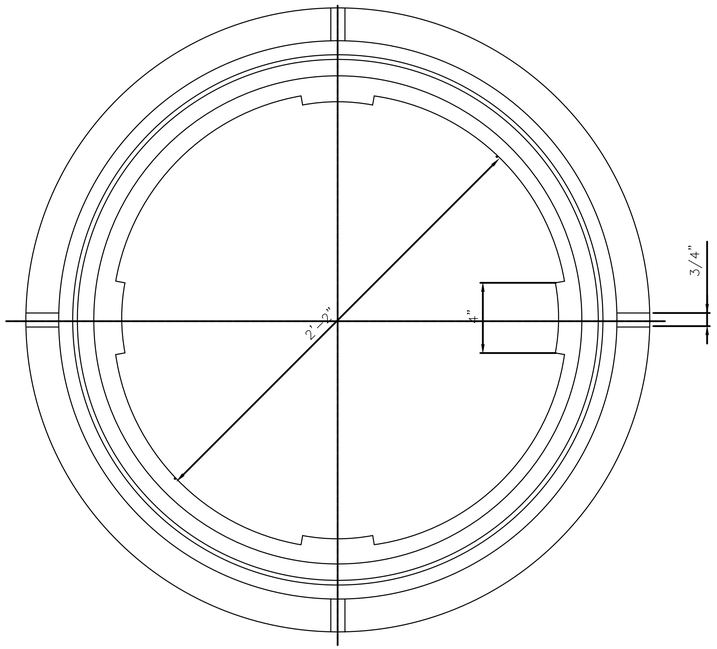
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

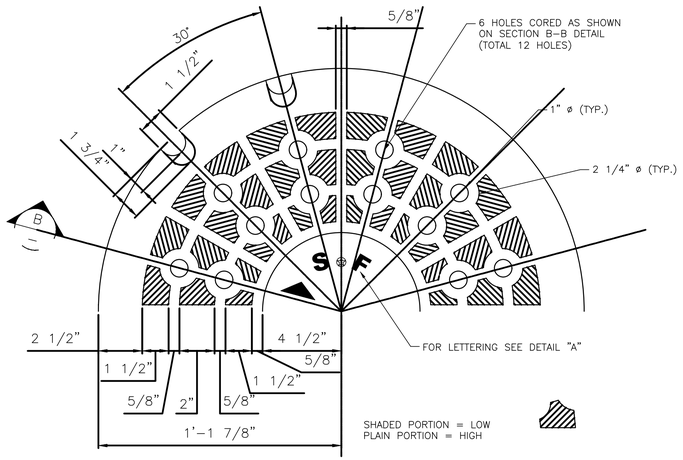
PRECAST MANHOLE ON EXISTING BRICK SEWER

MH 1.5

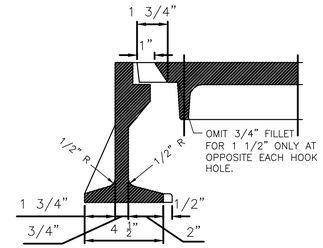
ISSUE DATE/VER:
VERSION 1.0
MAR 2024



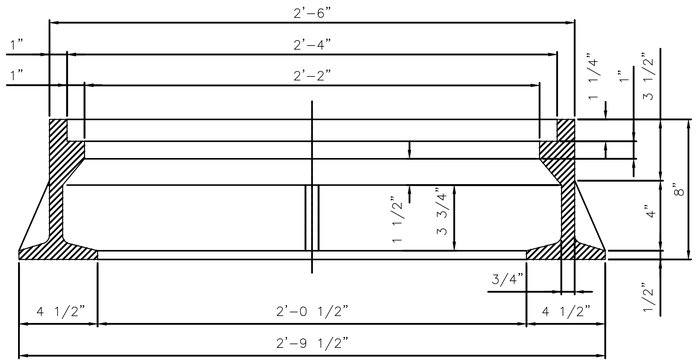
PLAN VIEW OF MANHOLE FRAME



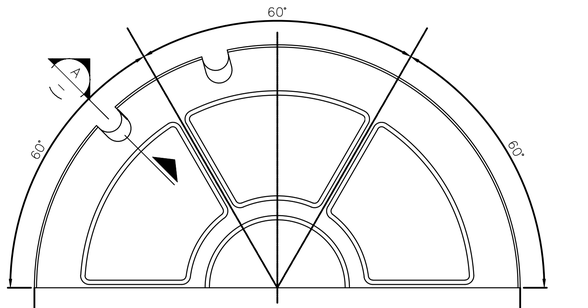
HALF PLAN OF COVER



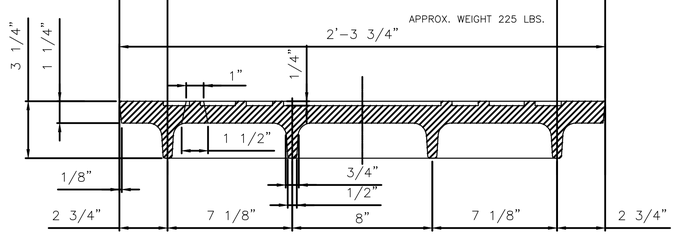
SECTION A



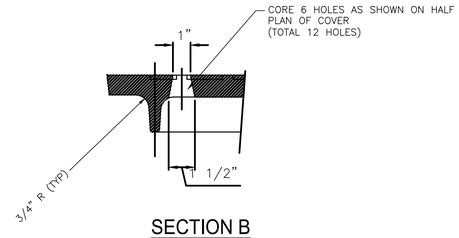
SECTION OF MANHOLE FRAME



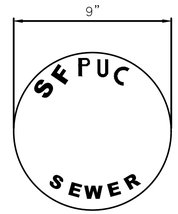
HALF PLAN - UNDERSIDE OF COVER



SECTION OF COVER



SECTION B



LETTER SIZE SHALL BE 1 1/4". PATTERN TO BE MADE SO THAT OTHER LETTERING CAN BE INSERTED IN THIS SPACE IF ORDERED.

DETAIL A

MATERIAL FOR MANHOLE FRAME AND COVER TO BE "GRAY IRON" IN ACCORDANCE WITH CURRENT A.S.T.M. – SPEC. A-48

DRAFT NOT FOR CONSTRUCTION

THIS SFPUC WWE TYPICAL DETAIL WAS DEVELOPED FOR USE ON SFPUC WWE PROJECTS IN THE CITY AND COUNTY OF SAN FRANCISCO, AND SHALL NOT BE USED WITHOUT CONSULTING A REGISTERED PROFESSIONAL ENGINEER. THE SFPUC RESERVES THE RIGHT TO MAKE REVISIONS TO THIS TYPICAL DETAIL AT ANY TIME.

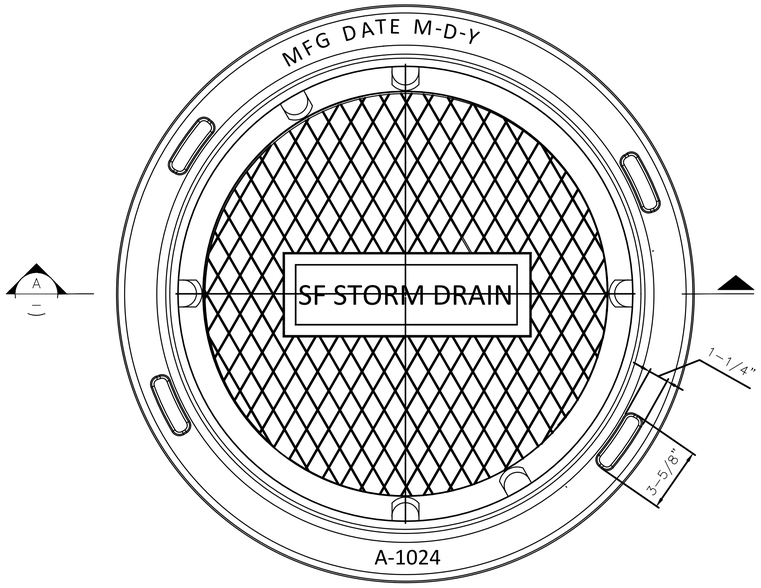
San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

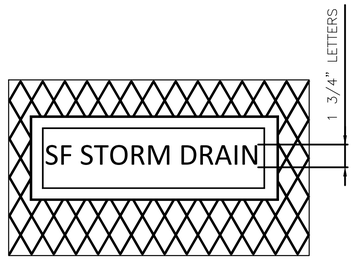
PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

STANDARD 26" COMBINED SEWER MANHOLE FRAME & COVER

MH 1.10

ISSUE DATE/VER:
VERSION 1.0
MAR 2024

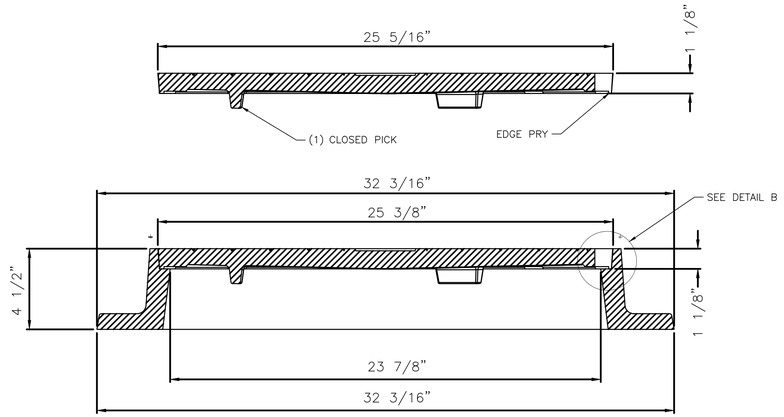




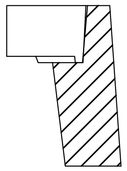
COVER, PLAQUE
LETTERING DETAIL

NOTES:

1. MATERIAL FOR RING AND COVER SHALL BE GRAY IRON AS DESCRIBED IN THE CURRENT ASTM A–48 CL 35B.
2. RING SHALL BE A–1024–R2 AS MANUFACTURED BY D&L SUPPLY COMPANY OR APPROVED EQUAL.
3. COVER SHALL BE A–1024–02 AS MANUFACTURED BY D&L SUPPLY COMPANY OR APPROVED EQUAL.
4. COVER SHALL MEET REQUIREMENTS FOR ASHTO H–20 LOADING.



SECTION A



DETAIL B

DRAFT NOT FOR CONSTRUCTION

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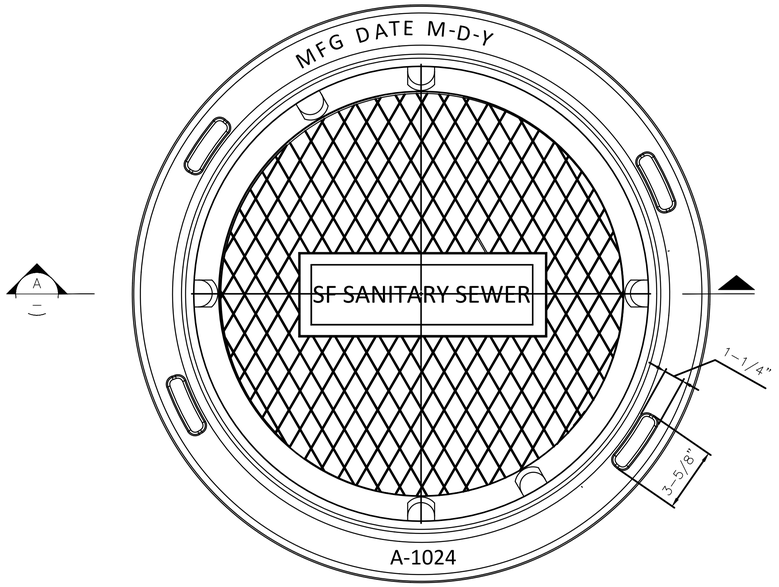
San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

STANDARD STORM DRAIN
MANHOLE FRAME AND COVER IN MS4 AREA

MH
1.11

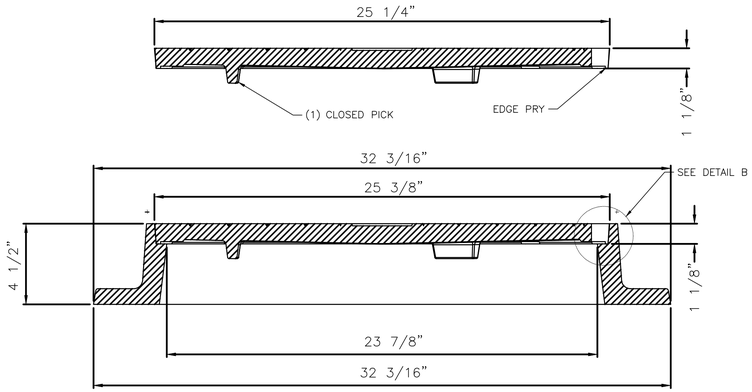
ISSUE DATE/VER:
VERSION 1.0
MAR 2024



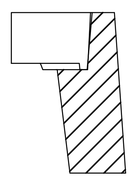
COVER, PLAQUE
LETTERING DETAIL

NOTES:

1. MATERIAL FOR RING AND COVER SHALL BE GRAY IRON AS DESCRIBED IN THE CURRENT ASTM A-48 CL 35B.
2. RING SHALL BE A-1024-R2 AS MANUFACTURED BY D&L SUPPLY COMPANY OR APPROVED EQUAL.
3. COVER SHALL BE A-1024 AS MANUFACTURED BY D&L SUPPLY COMPANY OR APPROVED EQUAL.
4. COVER SHALL MEET REQUIREMENTS FOR ASHTO H-20 LOADING.



SECTION A



DETAIL B

DRAFT NOT FOR CONSTRUCTION

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San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

STANDARD SANITARY SEWER
MANHOLE FRAME AND COVER IN MS4 AREA

MH
1.12

ISSUE DATE/VER:
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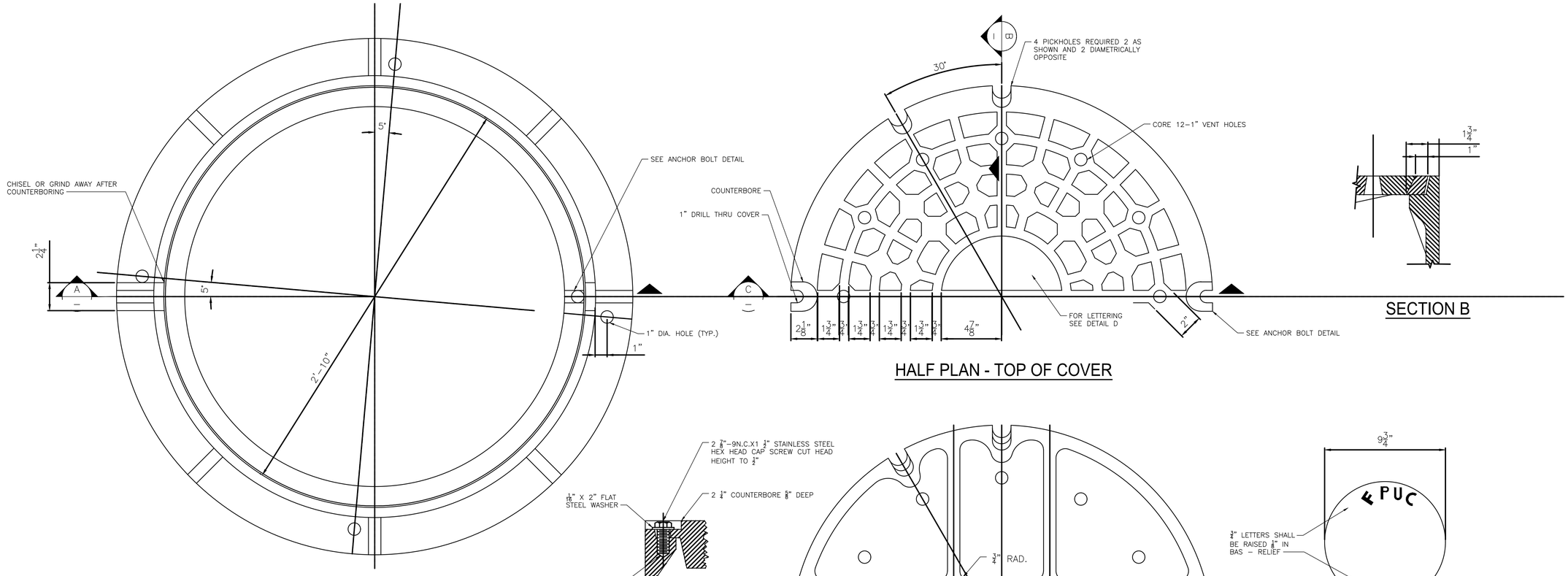
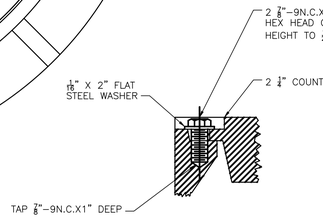
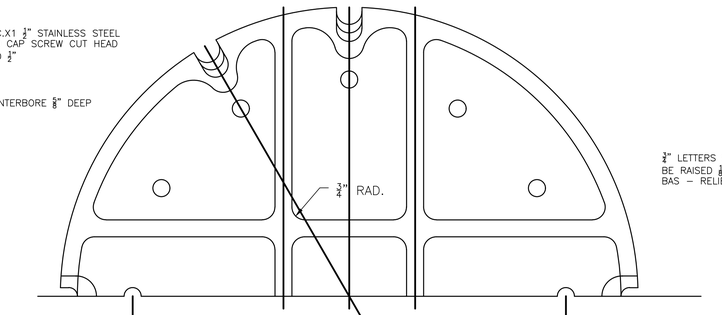


PLAN VIEW OF FRAME

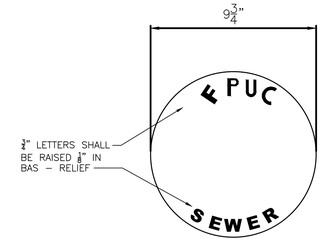
HALF PLAN - TOP OF COVER



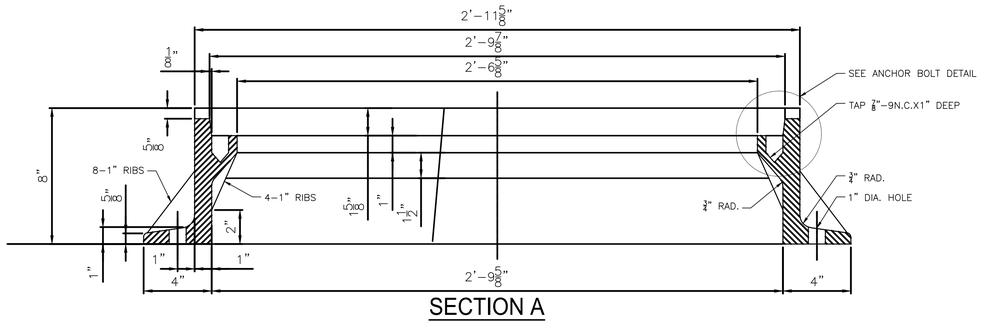
ANCHOR DETAIL



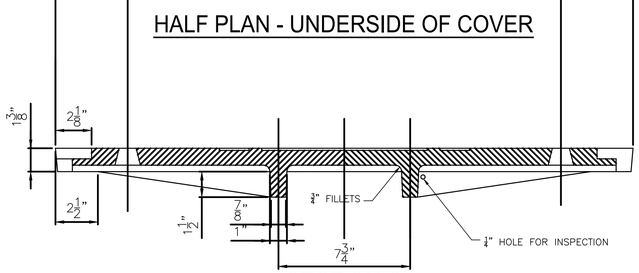
HALF PLAN - UNDERSIDE OF COVER



DETAIL D



SECTION A



SECTION C

NOTES

1. MATERIAL FOR FRAME SHALL BE "GRAY CAST IRON" IN ACCORDANCE WITH A.A.S.H.O. M-105 CLASS 30B.
2. MATERIAL FOR COVER SHALL BE CAST STEEL IN ACCORDANCE WITH A.S.T.M. STANDARD SPECIFICATIONS FOR CARBON-STEEL CASTING, DESIGNATION A27, CLASS 60-30

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San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

30" MANHOLE FRAME AND COVER

MH 1.13

ISSUE DATE/VER:
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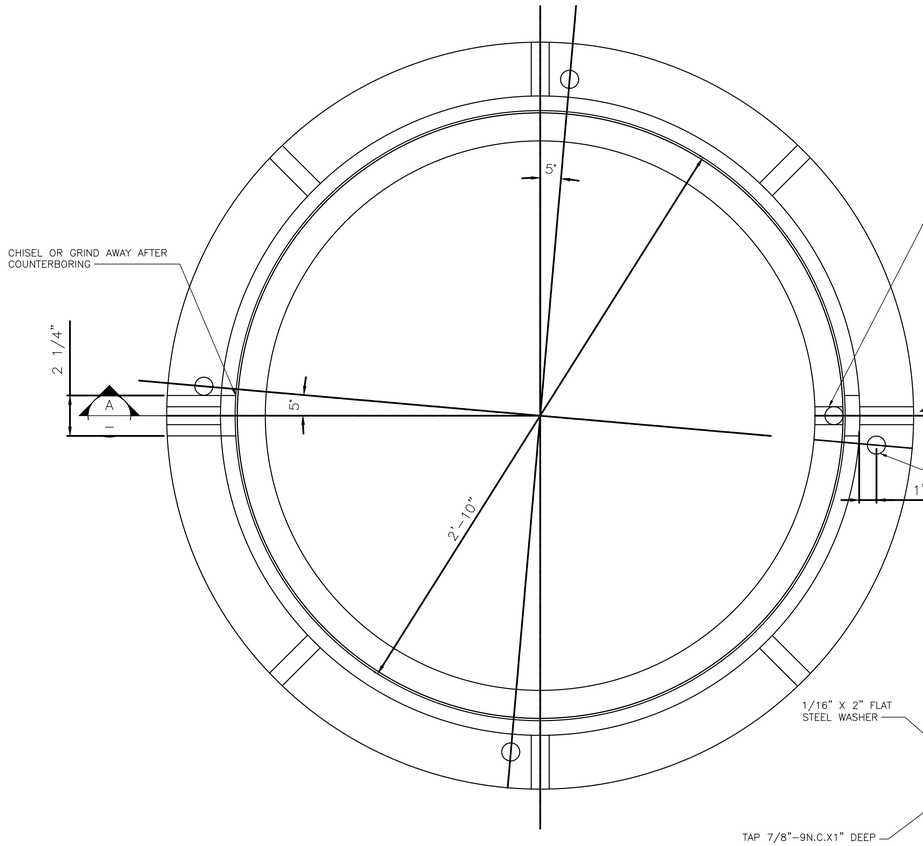
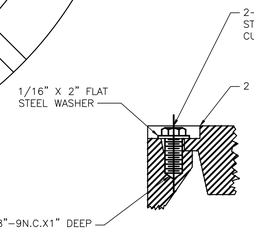
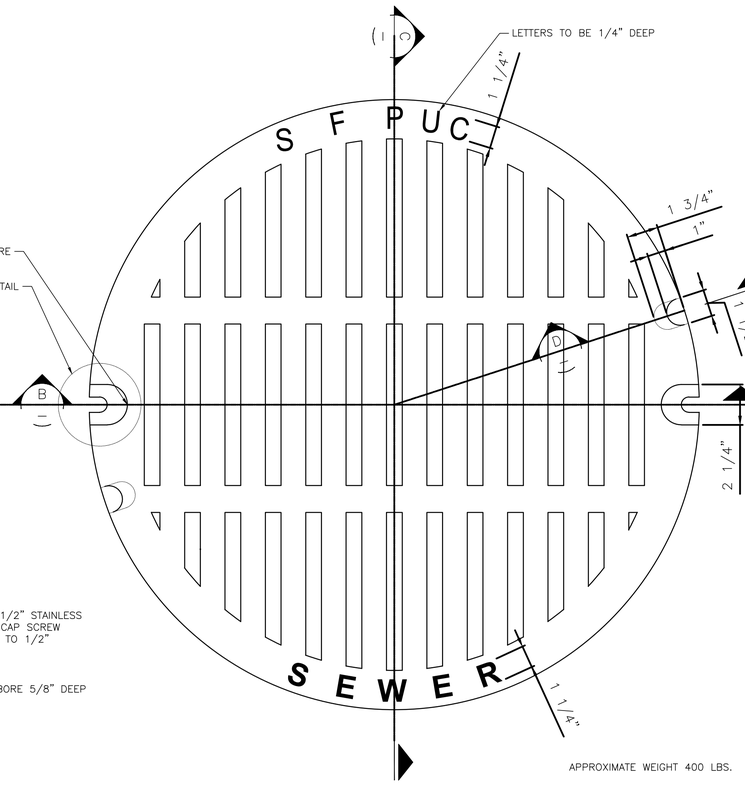
MAR 2024



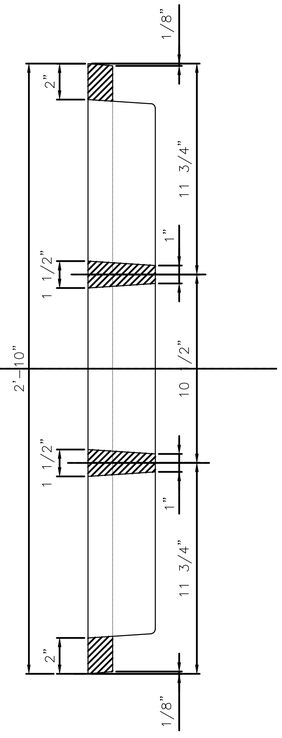
PLAN VIEW OF FRAME



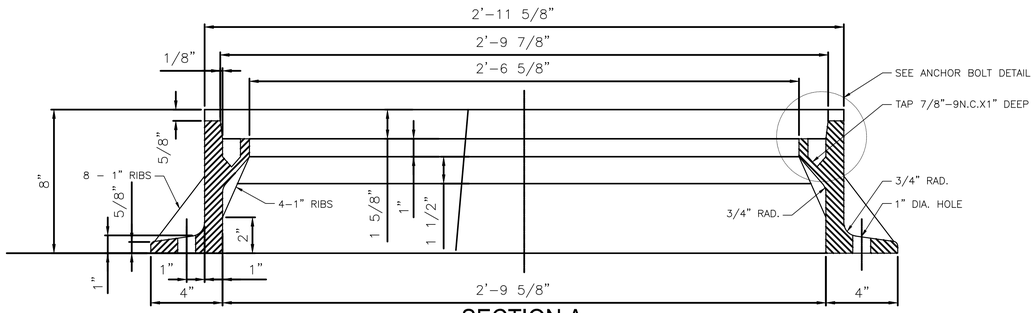
ANCHOR DETAIL



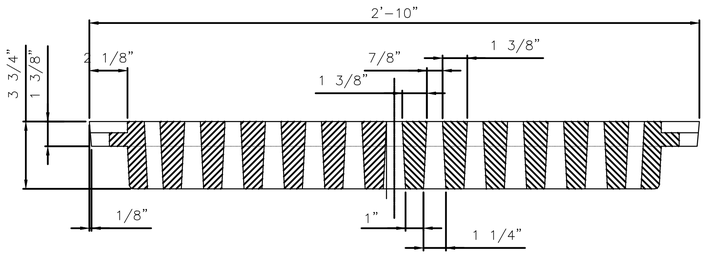
GRATING PLAN



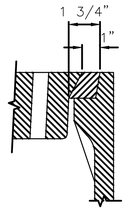
SECTION C



SECTION A



SECTION B



DETAIL D

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San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

30" MANHOLE FRAME AND GRATING TYPE COVER

MH 1.14

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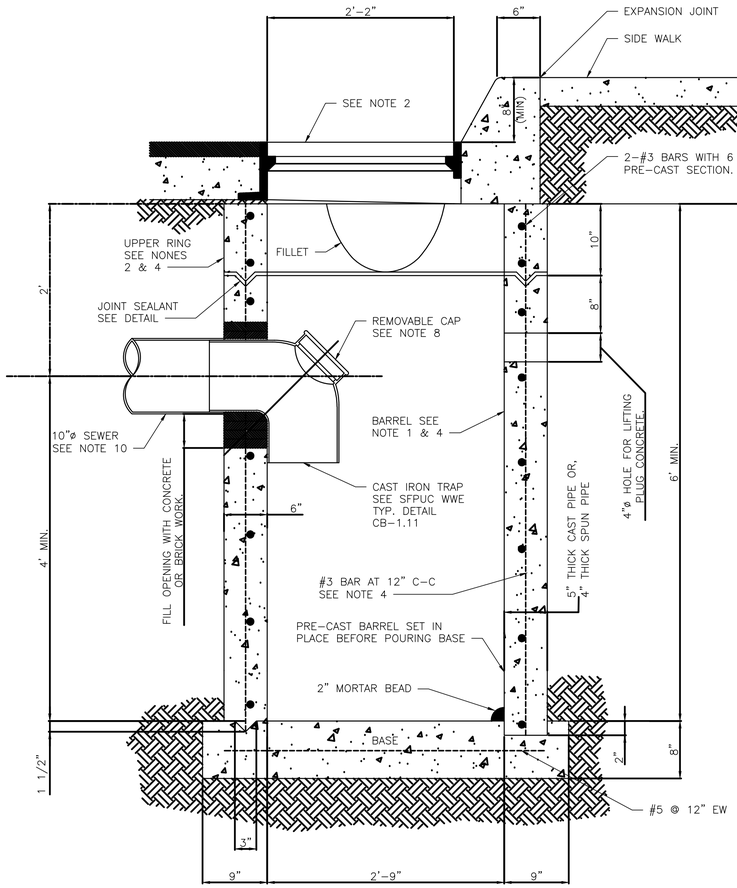
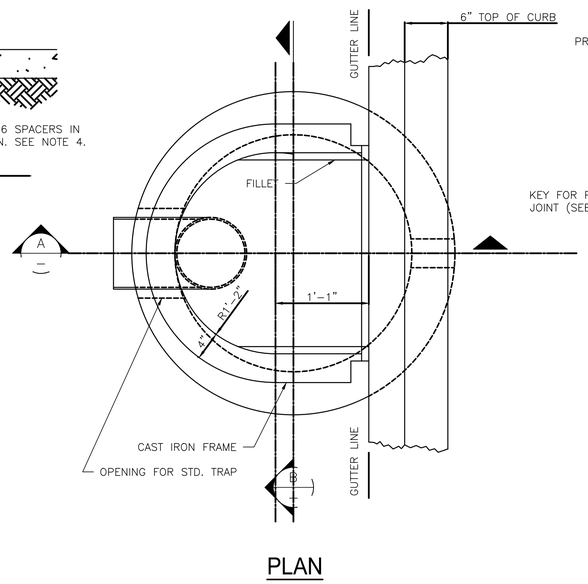
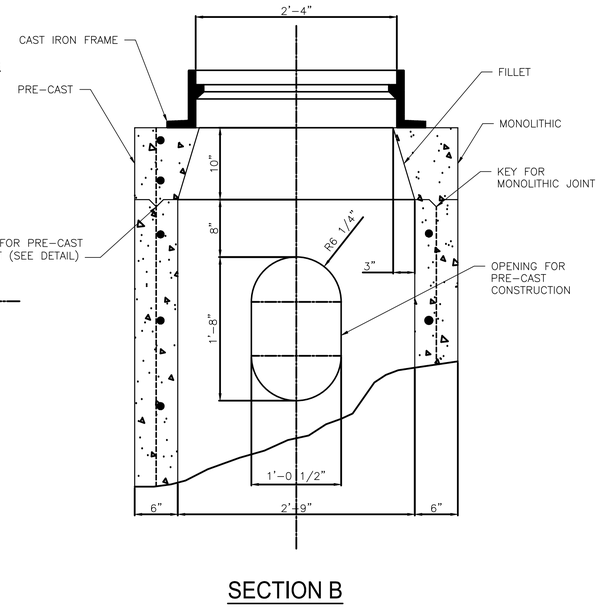


SECTION A



PLAN



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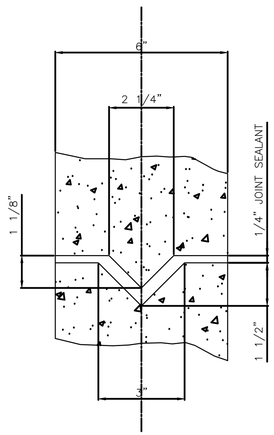

DETAIL OF KEY

NOTES:

1. BARREL OF C.B. MAY BE PRE-CAST CONCRETE WITH REINFORCING STEEL AS SHOWN, OR POURED IN PLACE CONCRETE.
2. UPPER RING OF C.B. MAY BE PRE-CAST CONCRETE WITH MATCHING KEY AS SHOWN OR POURED IN PLACE CONCRETE, OR CONSTRUCTED OF BRICK.
3. FOR DETAILS OF CATCH BASIN FRAME AND GRATING SEE SFPUC WWE TYP. DETAIL CB-1.10.
4. 4"X4" MESH No.4 WIRE MAY BE SUBSTITUTED FOR REINFORCING BARS.
5. BASE SHALL BE CONCRETE POURED IN PLACE.
6. ALL CONCRETE SHALL BE CLASS 6-4000-3/4.
7. FRAME AND GRATES OF CATCH BASINS TO BE INSTALLED IN TRAVELED LANES SHALL CONFORM TO GUTTER ELEVATION.
8. CLEANOUT CAP SHALL BE "T" CONE EXPANDABLE CLEANOUT PLUG S-802 OF ETCO SPECIAL PRODUCTS, INC. OR EQUAL.
9. BASE SHALL BE PLACED ON A MINIMUM OF 6-INCHES OF COMPACED STONE BEDDING MATERIAL MEETING THE REQUIREMENTS OF CALTRANS CLASS 2 AGGREGATE BASE.
10. FOR HDPE PIPES, PROVIDE A FULL DEPTH PENETRATION THROUGH THE WALL AND CONNECT THE SEWER PIPE USING A FLEXIBLE CONNECTOR SUCH AS A KOR N-SEAL I106-406, OR APPROVED EQUAL.

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San Francisco Water Power Sewer
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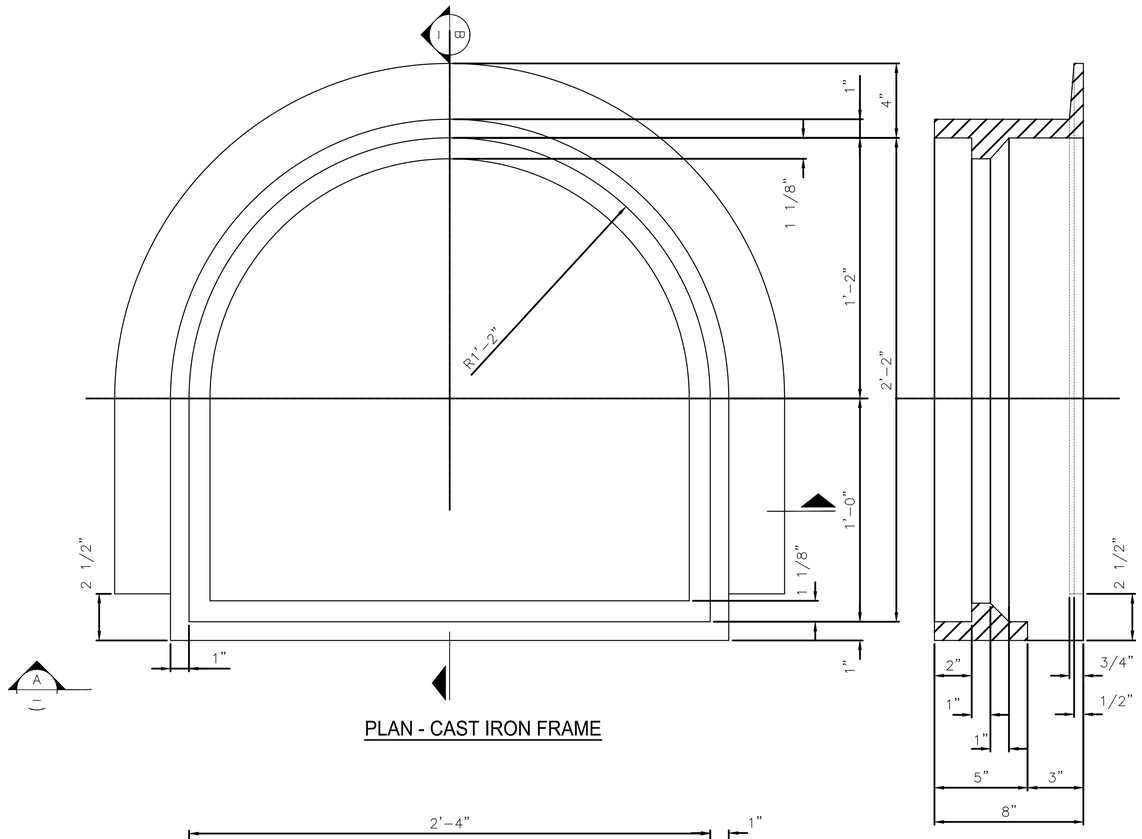
PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

STANDARD CONCRETE CATCH BASIN WITH CAST IRON TRAP

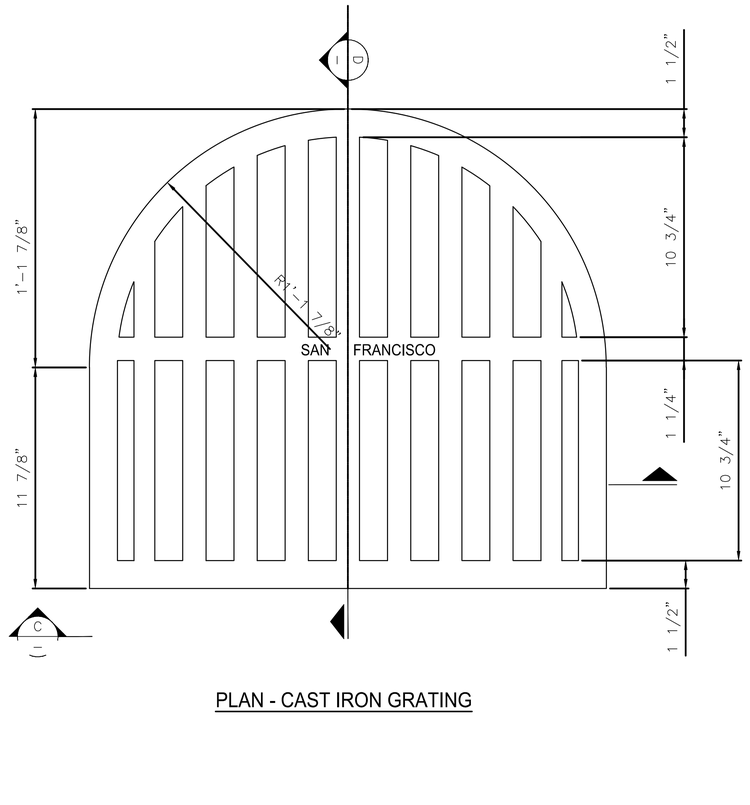
CB 1.1

ISSUE DATE/VER:
VERSION 1.0
MAR 2024

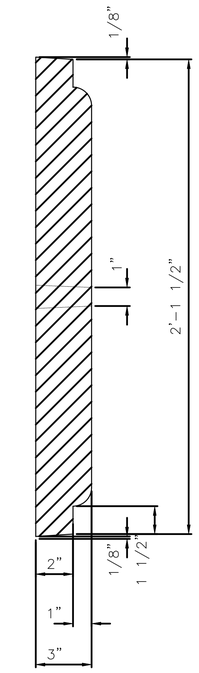


PLAN - CAST IRON FRAME

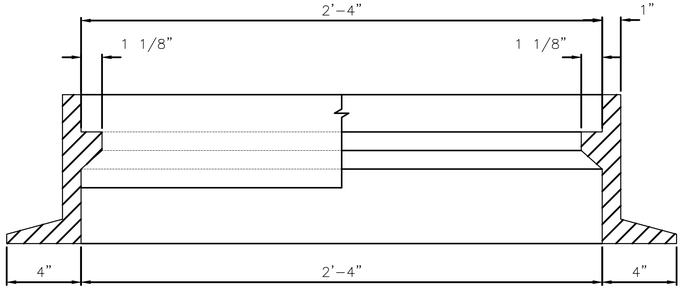
SECTION B



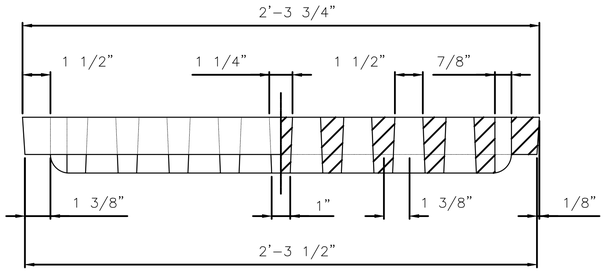
PLAN - CAST IRON GRATING



SECTION D



SECTION A



SECTION C

FINISH: GRIND HIGH SPOTS FROM CONTACT SURFACES TO OBTAIN UNIFORM BEARING OF GRATING ON FRAME.

NOTES

1. COMPUTED WEIGHT OF FRAME – 262 POUNDS. COMPUTED WEIGHT OF GRATING –242 POUNDS.
2. THE NAME OF THE FOUNDRY, THE YEAR OF MANUFACTURE & THE PATTERN NUMBER, SHALL BE CAST ON THE UNDERSIDE OF EACH CASTING IN 3/4" LETTERS, RAISED 1/8 ".
3. CAST IRON SHALL BE IN ACCORDANCE WITH CURRENT A.S.T.M. STANDARD SPEC. FOR GRAY CASTING (CL. 30B), DESIGNATION A–48.
4. THE WORD "SAN FRANCISCO" SHALL BE CAST, AS INDICATED, ON THE TOP OF THE GRATING IN 3/4" LETTERS RAISED 1/8".
5. GRATING SHALL MEET REQUIREMENTS FOR ASHTO H–20 LOADING.

DRAFT NOT FOR CONSTRUCTION

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PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

CAST IRON FRAME AND GRATING FOR CATCH BASIN

CB 1.10

ISSUE DATE/VER:
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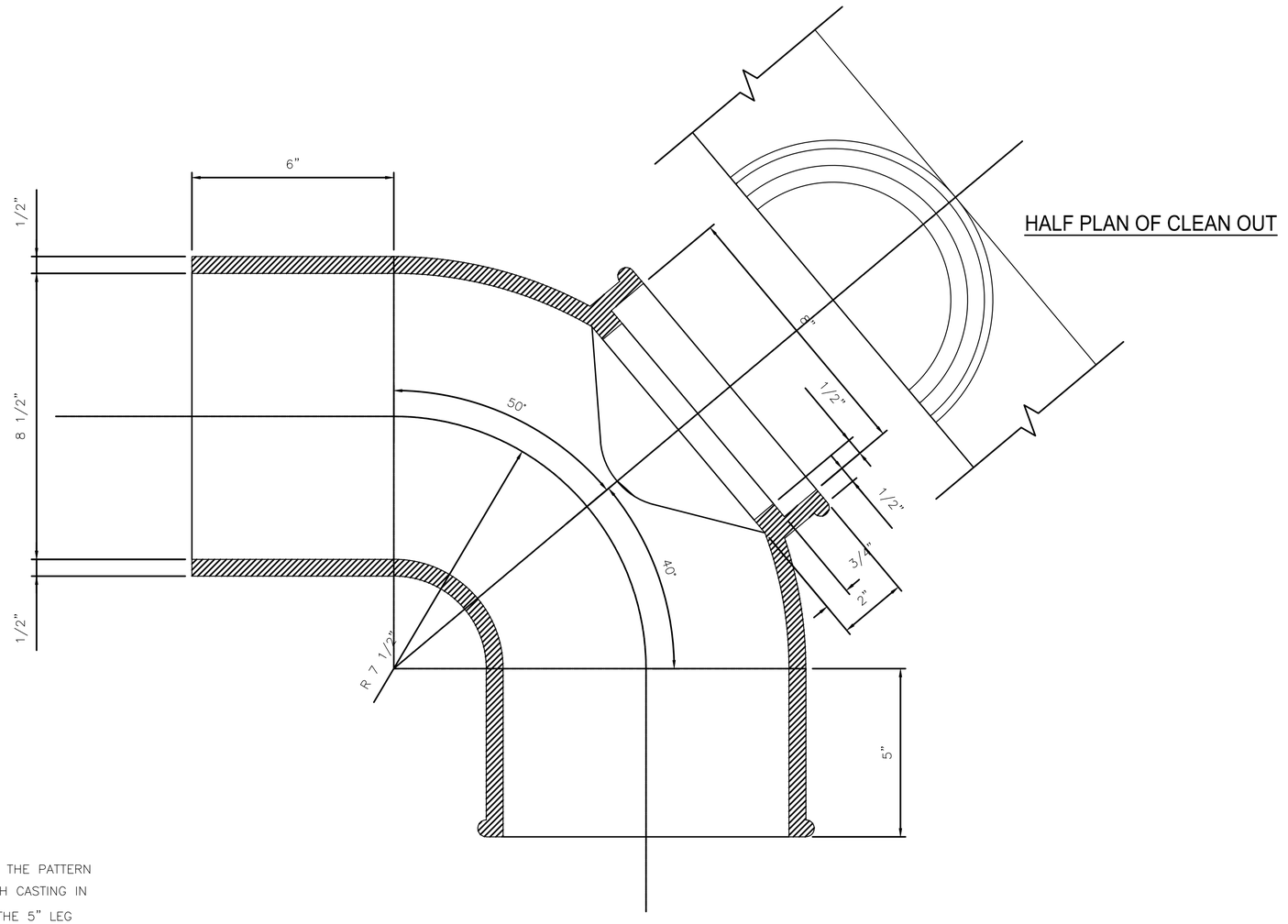
MAR 2024



HALF PLAN OF CLEAN OUT

SECTION OF CAST IRON TRAP

NOTES

1. RADIUS OF BEADS 1/4"
2. COMPUTED WEIGHT OF TRAP 89 LBS.
3. THE NAME OF THE FOUNDRY, THE YEAR OF MANUFACTURE, THE PATTERN NUMBER AND "CATCH BASIN END" SHALL BE CAST ON EACH CASTING IN 3/4" LETTERS, RAISED $\frac{1}{8}$". THIS DATA SHALL BE CAST ON THE 5" LEG OF TRAP DIRECTLY UNDER 8" DIAMETER CLEAN–OUT.
4. CAST IRON SHALL BE IN ACCORDANCE WITH THE CURRENT A.S.T.M. STANDARD SPEC. FOR GRAY–IRON CASTING (CL. 20), DESIGNATION A–48.
5. CAST IRON WATER TRAP SHALL INCLUDE CLEAN–OUT CAP.

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

CAST IRON WATER TRAP FOR CATCH BASIN

CB 1.11

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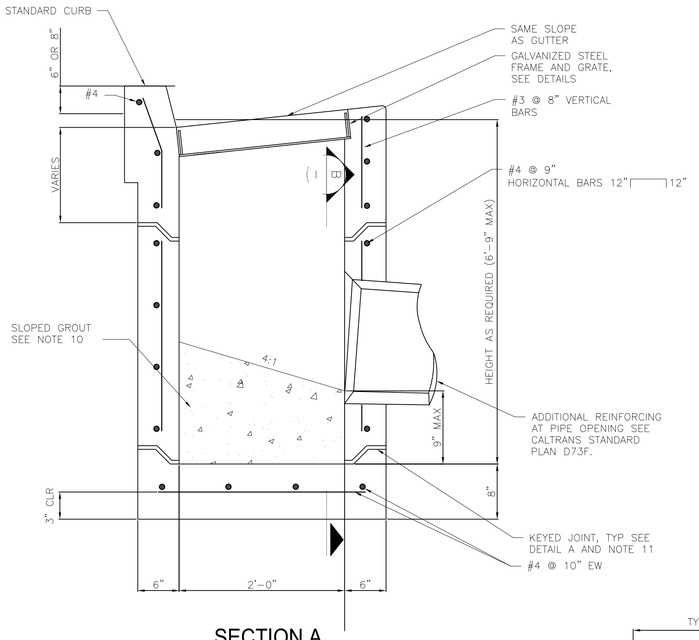
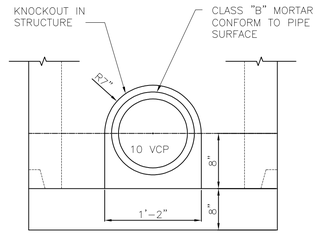
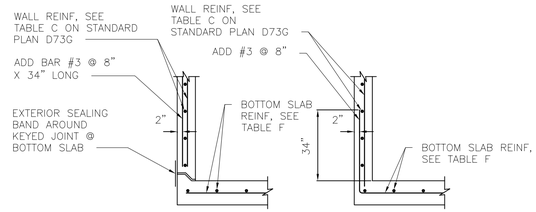


SECTION A



SECTION B

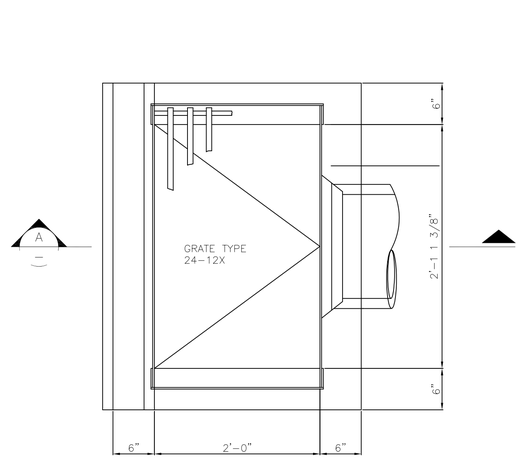


DETAIL A

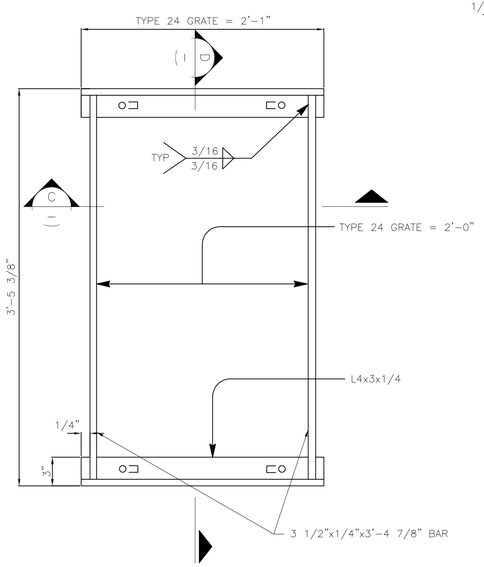
FOR INTEGRAL BASE, CLEARANCE BETWEEN PIPE PENETRATION AND BASE SLAB MAY BE AS SHOWN IN CIP ALTERNATIVE STANDARD PLAN SHEET.

NOTES

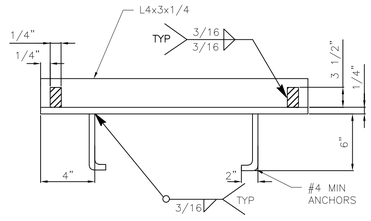
1. PRECAST STORM WATER INLET SHALL BE CALTRANS TYPE G3 24-INCH x 36-INCH ID. F'C = 5.0 KSI, FY = 60.0 KSI. SEE CALTRANS STANDARD PLAN D73B, D73F, AND D73G FOR ADDITIONAL DETAILS AND NOTES NOT SHOWN.
2. GRATING AND FRAME SHALL BE CALTRANS TYPE 24-12X. MATERIAL SHALL BE MEET THE REQUIREMENTS OF ASTM A36 AND GALVANIZED PER ASTM A123.
3. COMPUTED WEIGHT OF FRAME – 45 POUNDS.
4. COMPUTED WEIGHT OF GRATING –192 POUNDS.
5. FINISH: GRIND HIGH SPOTS FROM CONTACT SURFACES TO OBTAIN UNIFORM BEARING OF GRATING ON FRAME.
6. GRATING SHALL MEET REQUIREMENTS FOR ASHTO H-20 LOADING.
7. BASE SHALL BE PLACED ON A MINIMUM OF 6-INCHES OF COMPACTED STONE BEDDING MATERIAL MEETING THE REQUIREMENTS OF CALTRANS CLASS 2 AGGREGATE BASE.
8. BEARING BARS TO BE 3 1/2" x 3/8" BARS ON 1 7/8".
9. 3/8" +- A CROSS BARS MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTROFORGED TO BEARING BARS.
10. INLET FLOORS MUST HAVE WOOD TROWEL FINISH AND A MINIMUM SLOPE OF 4:1, UNLESS OTHERWISE NOTED, FROM ALL DIRECTIONS TOWARD OUTLET PIPE BY CASTING GROUT ON TOP OF THE BOTTOM SLAB. GROUT MUST BE PLACED PRIOR TO BACKFILL.
11. PROVIDE PRECAST INLETS WITH SEPARATE TOP SECTIONS FOR FINAL GRADE ADJUSTMENT. PROVIDE KEYED JOINTS WITH BUTYL RUBBER SEALANT BETWEEN THE TOP SECTION AND WALL, MULTIPLE WALL SECTIONS, AND WALL AND BOTTOM SLAB. JOINT DESIGN MAY VARY BUT MUST BE 1" TO 3" IN DEPTH. FOR TONGUE TYPE JOINTS, TONGUE DOWN ORIENTATION IS NOT ALLOWED. FOR KEYED JOINTS, KEYWAY UP, KEYWAY DOWN, OR TONGUE UP CONFIGURATIONS ARE ALLOWED. ONLY ONE KEY TYPE IS ALLOWED FOR EACH INLET.



PLAN

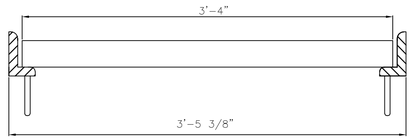


PLAN - GALVANIZED STEEL FRAME



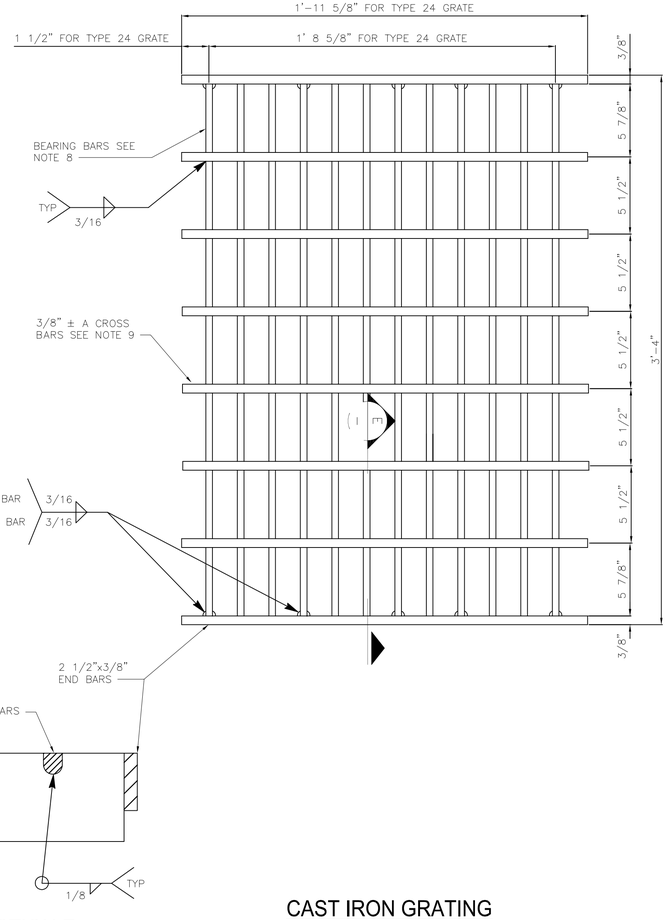
SECTION C

(THRU FRAME)



SECTION D

(THRU FRAME AND GRATE)



SECTION E

CAST IRON GRATING

DRAFT NOT FOR CONSTRUCTION

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San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

STORM WATER INLET

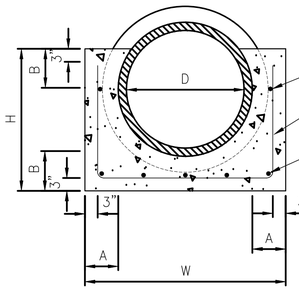
DI 1.1

ISSUE DATE/VER:
VERSION 1.1
NOV 2025

GENERAL NOTES

1. DIMENSIONS FOR HDPE PIPE ARE NOT SHOWN AND WILL DEPEND UPON THE SDR REQUIRED.
2. LAP BARS 30 DIAMETERS OR AS SHOWN.
3. CLASS 6-4000-3/4 CONCRETE.

					REINFORCEMENT				QUANTITIES PER FT. OF SEWER	
					LONGITUDINAL SIZE #4			TRANSVERSE SIZE #4		
					E	F	TOTAL	LENGTH	CONC.	STEEL
D	A	B	W	H	NUMBER OF BARS			J	CU. FT.	LBS
6"	5 5/8"	5 1/8"	1'-6 1/2"	10"	4		4	1'-1 1/2"	1.08	2.98
8"	5 3/4"	5 1/4"	1'-9"	12"	4		4	2'-5"	1.38	3.07
10"	5 7/8"	5 3/8"	1'-11 1/2"	14"	4		4	2'-11 1/2"	1.69	3.17
12"	6"	5 1/2"	2'-2"	16"	4		4	3'-6"	2.03	3.27
15"	6 1/4"	5 3/4"	2'-6"	19"	4	2	6	4'-4"	2.58	4.73
18"	6 1/2"	6"	2'-10"	22"	4	2	6	5'-2"	3.23	4.86
21"	6 3/4"	6 1/4"	3'-2"	2'-1"	4	2	6	6'-10"	3.91	5.01
24"	7"	6 1/2"	3'-6"	2'-4"	6	2	8	6'-10"	4.64	6.48
27"	7 1/4"	6 3/4"	3'-10"	2'-7"	6	2	8	7'-8"	5.42	6.61
30"	7 1/2"	7"	4'-2"	2'-10"	6	2	8	8'-6"	6.26	6.75
33"	7 7/8"	7 3/8"	4'-0"	3'-1"	6	2	8	9'-4"	7.18	6.90
36"	8 1/4"	7 3/4"	4'-10"	3'-4"	6	2	8	10'-2"	8.21	7.03

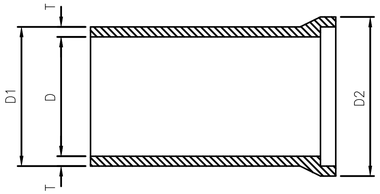


ALLOWABLE LOAD
H-20 TRUCK AND 10 FT. COVER WITH MAX. TRENCH WIDTH OF W+2'-0"
H-20 TRUCK AND 25 FT. COVER WITH MAX TRENCH WIDTH OF W+0'-6"

PIPE ON REINFORCED CONCRETE FOUNDATION TYPE I

NOT TO SCALE

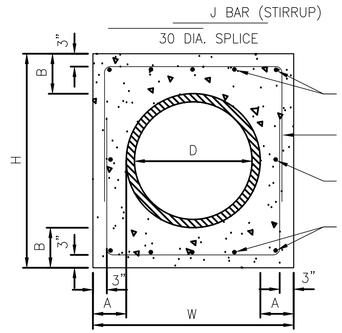
D	T	D1	D2
6"	5/8"	7 1/4"	9 3/8"
8"	3/4"	9 1/2"	11 7/8"
10"	7/8"	11 3/4"	14 3/8"
12"	1"	14"	16 3/4"
15"	1 1/4"	17 1/2"	20 5/8"
18"	1 1/2"	21"	2'-0 5/8"
21"	1 3/4"	2'-0 1/2"	2'-4 5/8"
24"	2"	2'-4"	2'-8 5/8"
27"	2 1/4"	2'-7 1/2"	3'-0 5/8"
30"	2 1/2"	2'-11"	3'-4 1/2"
33"	2 5/8"	3'-2 1/4"	3'-8 1/4"
36"	2 3/4"	3'-5 1/2"	3'-11 5/8"



DIMENSIONS FOR VITRIFIED CLAY PIPE

NOT TO SCALE

					REINFORCEMENT					QUANTITIES PER FT. OF SEWER	
					LONGITUDINAL SIZE #4				TRANSVERSE SIZE #4		
					E	F	G	TOTAL	LENGTH	CONC.	STEEL
D	A	B	W	H	NUMBER OF BARS				J	CU. FT.	LBS
8"	5 3/4"	5 1/4"	21"	20"	4		3	7	7'-5"	2.43	5.92
10"	5 7/8"	5 3/8"	23 1/2"	22 1/2"	4		3	7	8'-3"	2.92	6.05
12"	6"	5 1/2"	2'-2"	2'-1"	4		3	7	9'-1"	3.45	6.19
15"	6 1/4"	5 3/4"	2'-6"	2'-5"	4	2	3	9	10'-5"	4.37	7.75
18"	6 1/2"	6"	2'-10"	2'-9"	4	2	4	10	11'-9"	5.39	8.66
21"	6 3/4"	6 1/4"	3'-2"	3'-1"	4	2	4	10	13'-1"	6.49	8.87
24"	7"	6 1/2"	3'-6"	3'-5"	6	2	5	13	14'-5"	7.68	11.08
27"	7 1/4"	6 3/4"	3'-10"	3'-9"	6	2	5	13	15'-9"	8.97	11.32
30"	7 1/2"	7"	4'-2"	4'-1"	6	2	5	13	17'-1"	10.33	11.52
33"	7 7/8"	7 3/8"	4'-6"	4'-5"	6	2	5	13	18'-5"	11.90	11.73
36"	8 1/4"	7 3/4"	4'-10"	4'-9"	6	2	5	13	19'-9"	13.56	11.98



ALLOWABLE LOAD
E-50 TRAIN LOAD AND 8 FT. COVER WITH MAX. TRENCH WIDTH OF W+2'-0"
E-50 TRAIN LOAD AND 20 FT. COVER WITH MAX TRENCH WIDTH OF W+0'-6"

PIPE ENCASED IN REINFORCED CONCRETE TYPE II

NOT TO SCALE

DRAFT NOT FOR CONSTRUCTION

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San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

REINFORCED CONCRETE ENCASEMENT

PE 1.1

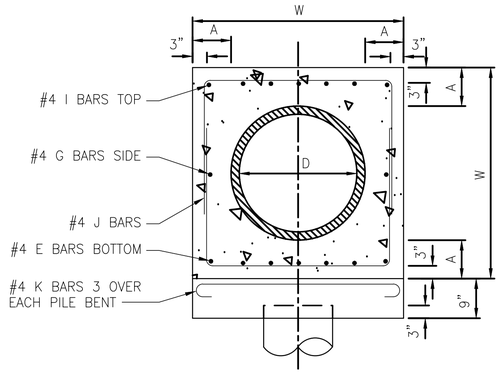
ISSUE DATE/VER:
VERSION 1.0
MAR 2024

GENERAL NOTES

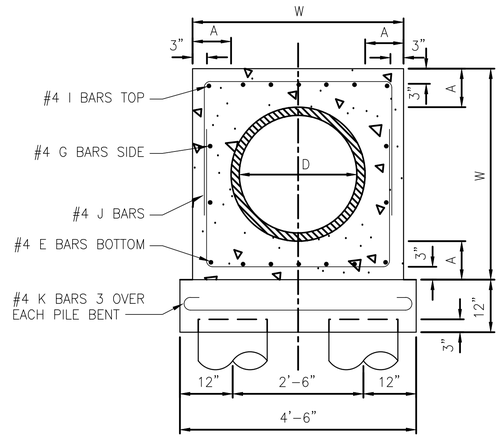
1. LAP BARS 30 DIAMETERS OR AS SHOWN.
2. CLASS 6–4000–3/4 CONCRETE.

D IN.	A IN.	W	PILE SUPPORTS	4'–0" COVER + H–20 TRUCK									6'–0" COVER + H–20 TRUCK								
				PILE SPACING–FT	REINFORCEMENT						QUANTITIES PER FT. OF SEWER		PILE SPACING–FT	REINFORCEMENT						QUANTITIES PER FT. OF SEWER	
					LONGITUDINAL SIZE #4			TRANSVERSE SIZE #4						LONGITUDINAL SIZE #4			TRANSVERSE SIZE #4				
					E	G	I	J		K	CONC.	STEEL		E	G	I	J		K	CONC.	STEEL
					NUMBER OF BARS			CTRS.	LENGTH		CU. FT.	LBS		NUMBER OF BARS			CTRS.	LENGTH		CU. FT.	LBS
12	6"	2'–2"	SINGLE	10	4	2	4	12"	9'–5"	2'–6"	13.47	3.83	10	6	2	5	12"	9'–5"	2'–6"	15.48	3.83
15	6 1/4"	2'–6"		10	4	2	4	12"	10'–9"	2'–10"	14.41	4.84	10	6	2	5	12"	10'–9"	2'–10"	16.41	4.84
18	6 1/2"	2'–10"		10	4	2	4	12"	12'–1"	3'–2"	15.41	5.93	10	6	2	5	12"	12'–1"	3'–2"	17.40	5.93
21	6 3/4"	3'–2"		10	4	2	4	12"	13'–5"	3'–6"	16.35	7.07	10	6	2	5	12"	13'–5"	3'–6"	18.35	7.07
24	7"	3'–6"		10	4	2	4	12"	14'–9"	3'–10"	17.30	8.34	9	4	2	4	12"	14'–9"	3'–10"	17.36	8.38
27	7 1/4"	3'–10"	DOUBLE	10	4	4	4	12"	16'–1"	5'–0"	19.74	9.93	10	6	4	5	12"	16'–1"	5'–0"	21.73	9.93
30	7 1/2"	4'–2"		10	4	4	4	12"	17'–5"	5'–0"	20.63	11.32	10	6	4	5	12"	17'–5"	5'–0"	22.62	11.32
33	7 7/8"	4'–6"		10	4	4	4	12"	18'–9"	5'–0"	21.52	12.87	10	6	4	5	12"	18'–9"	5'–0"	23.51	12.87
36	8 1/4"	4'–10"		10	4	4	4	12"	20'–1"	5'–0"	22.41	14.62	10	6	4	5	12"	20'–1"	5'–0"	24.40	14.62

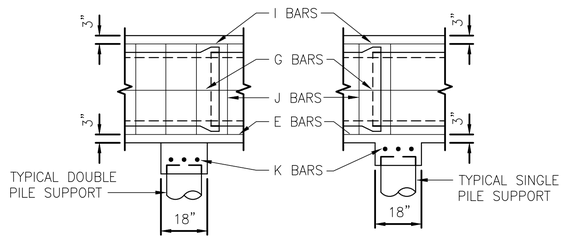
D IN.	A IN.	W	PILE SUPPORTS	8'–0" COVER + H–20 TRUCK									10'–0" COVER + H–20 TRUCK								
				PILE SPACING–FT	REINFORCEMENT						QUANTITIES PER FT. OF SEWER		PILE SPACING–FT	REINFORCEMENT						QUANTITIES PER FT. OF SEWER	
					LONGITUDINAL SIZE #4			TRANSVERSE SIZE #4						LONGITUDINAL SIZE #4			TRANSVERSE SIZE #4				
					E	G	I	J		K	CONC.	STEEL		E	G	I	J		K	CONC.	STEEL
					NUMBER OF BARS			CTRS.	LENGTH		CU. FT.	LBS		NUMBER OF BARS			CTRS.	LENGTH		CU. FT.	LBS
12	6"	2'–2"	SINGLE	10	8	2	7	12"	9'–5"	2'–6"	18.15	3.83	8	6	2	6	12"	9'–5"	2'–6"	16.25	3.87
15	6 1/4"	2'–6"		10	8	2	7	12"	10'–9"	2'–10"	19.10	4.84	7	4	2	4	12"	10'–9"	2'–10"	14.64	4.95
18	6 1/2"	2'–10"		9	6	2	5	12"	12'–1"	3'–2"	17.44	5.96	7	4	2	4	12"	12'–1"	3'–2"	15.63	6.05
21	6 3/4"	3'–2"		8	4	2	4	12"	13'–5"	3'–6"	16.51	7.15	6	4	2	4	12"	13'–5"	3'–6"	16.78	7.27
24	7"	3'–6"		7	4	2	4	12"	14'–9"	3'–10"	17.69	8.46	6	4	2	4	12"	14'–9"	3'–10"	17.81	8.57
27	7 1/4"	3'–10"	DOUBLE	10	6	4	6	12"	16'–1"	5'–0"	22.41	9.93	10	8	4	7	12"	16'–1"	5'–0"	24.40	9.93
30	7 1/2"	4'–2"		10	6	4	6	12"	17'–5"	5'–0"	23.30	11.32	10	8	4	7	12"	17'–5"	5'–0"	25.29	11.32
33	7 7/8"	4'–6"		10	6	4	6	12"	18'–9"	5'–0"	24.19	12.87	10	8	4	7	12"	18'–9"	5'–0"	26.18	12.87
36	8 1/4"	4'–10"		10	6	4	6	12"	20'–1"	5'–0"	25.08	14.62	9	6	4	6	12"	20'–1"	5'–0"	25.21	14.70



TYPICAL SINGLE PILE SUPPORT
NOT TO SCALE



TYPICAL DOUBLE PILE SUPPORT
NOT TO SCALE



ELEVATION

PIPE ENCASED IN REINFORCED CONCRETE & SUPPORTED ON PILES
TYPE III
NOT TO SCALE

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PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

REINFORCED CONCRETE ENCASEMENT

PE 1.2

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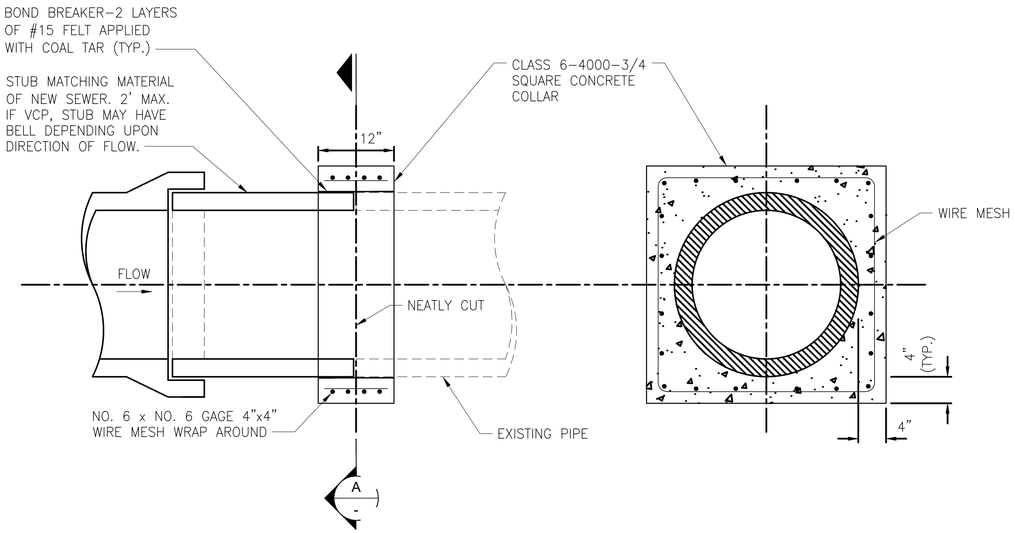
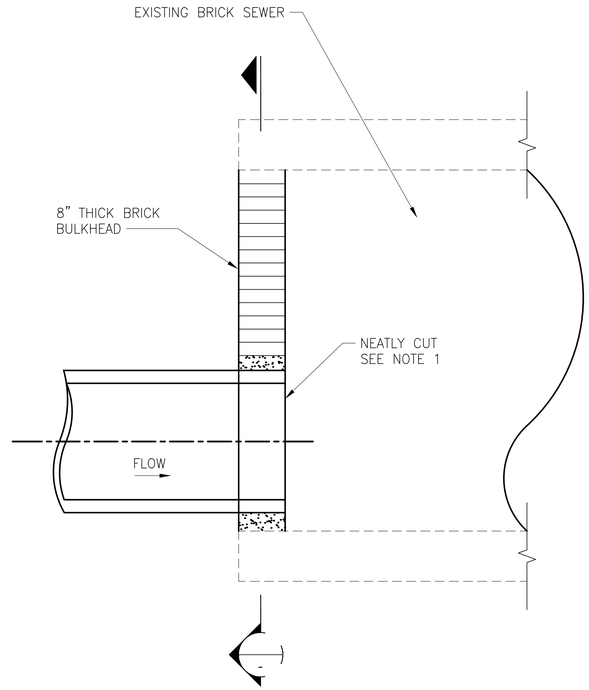
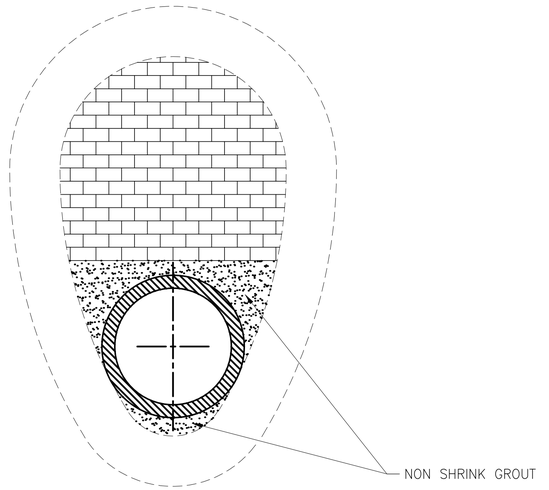


SECTION A

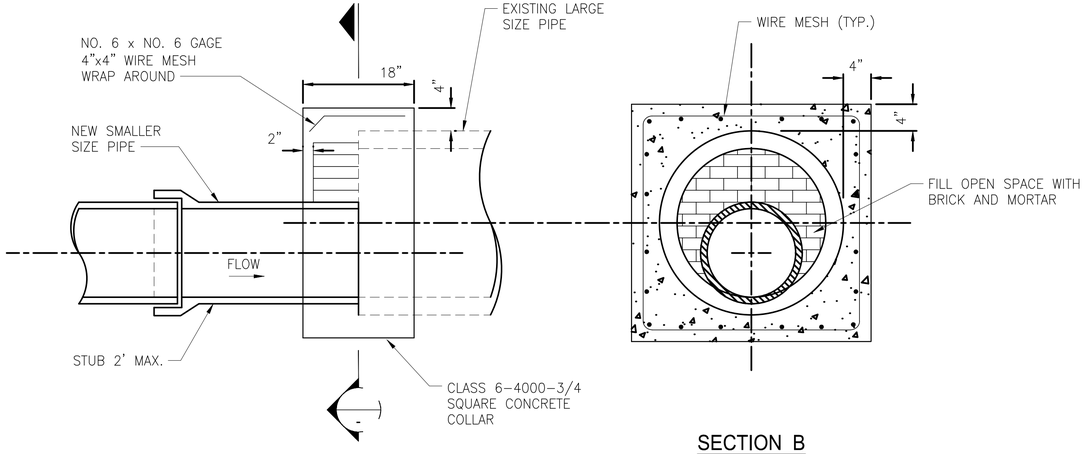
CONNECTION TO SIMILAR SIZE SEWERS

NOT TO SCALE





SECTION C



SECTION B

CONNECTION TO DIFFERENT SIZE SEWERS

NOT TO SCALE

CONNECTION TO BRICK SEWER

NOT TO SCALE

NOTES:

1. FOR HDPE PIPES, PROVIDE A FULL DEPTH PENETRATION THROUGH THE WALL AND CONNECT THE SEWER PIPE USING A FLEXIBLE CONNECTOR SUCH AS A KOR N–SEAL I106–206, KOR N SEAL II 206, OR APPROVED EQUAL.

DRAFT NOT FOR CONSTRUCTION

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San Francisco Water Power Sewer
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PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

SEWER PIPE CONNECTION DETAILS

SC 1.1

ISSUE DATE/VER:
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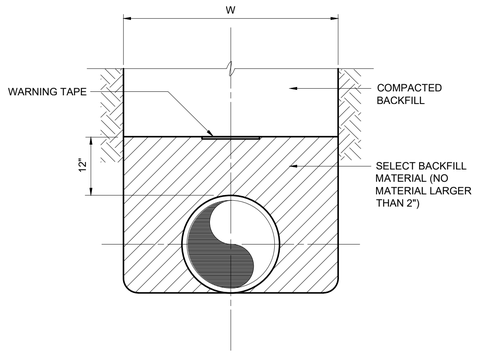
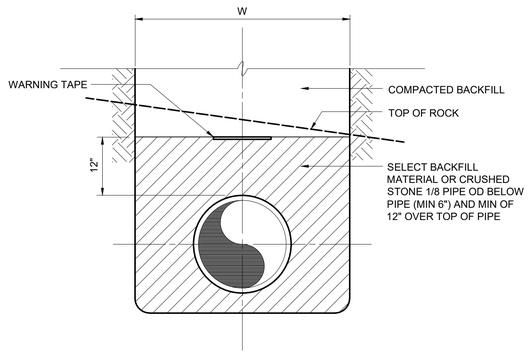
MAR 2024



TYPE A

IN EARTH

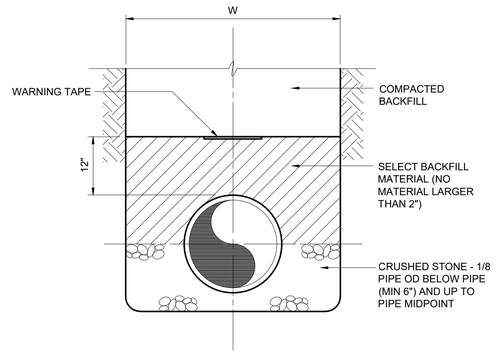
C-01-0100



TYPE A

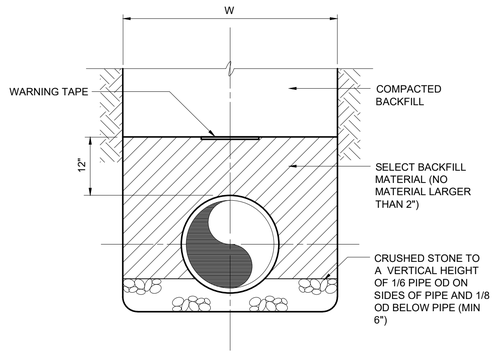
IN ROCK

C-01-0101



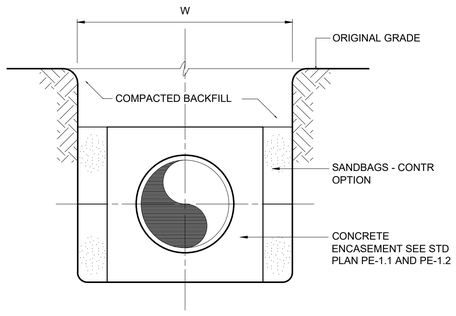
TYPE B

C-01-0102



TYPE C

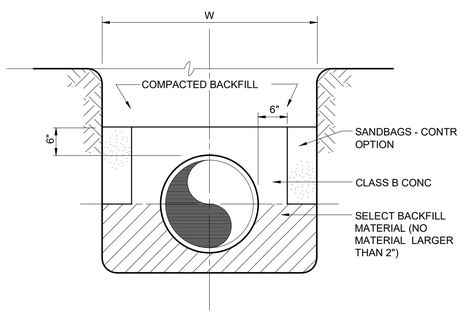
C-01-0103



CONCRETE ENCASEMENT

(SEE NOTE 1)

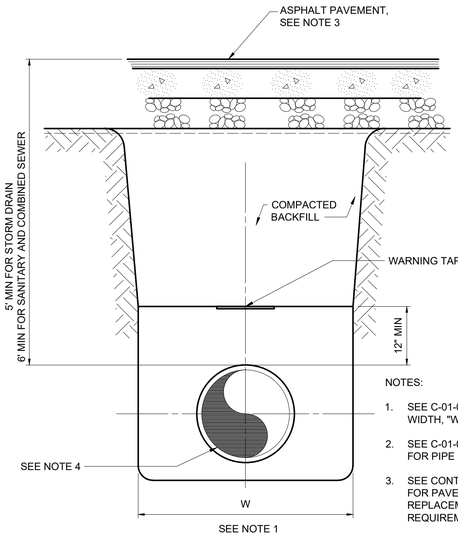
C-01-0104



CONCRETE ARCH

(SEE NOTE 1)

C-01-0105



TYPICAL TRENCH

C-01-0106

NOTES:

1. SEE C-01-0107 FOR TRENCH WIDTH, "W" VALUES.
2. SEE C-01-0100 THRU C-01-0105 FOR PIPE BEDDING DETAILS.
3. SEE CONTRACT DOCUMENTS FOR PAVEMENT REPLACEMENT REQUIREMENTS AND DETAILS.
4. HAND DIG OUT FOR BELL ENDS OF PIPE. BARREL SHALL BE LAID ON A FIRM BED OF APPROVED MATERIAL.

TRENCH EXCAVATION LIMITS		
INTERNAL DIAMETER OF PIPE	W WIDTH OF TRENCH	
	MAX	W=MIN
8"-10"	3'-9"	2'-2"
12"	3'-9"	O.D.+2'
14"-16"	4'-2"	O.D.+2'
18"	4'-4"	O.D.+2'
20",21"	4'-8"	O.D.+2'
24"	4'-11"	O.D.+2'
27"	5'-9"	O.D.+2'
30"	6'-7"	O.D.+2'
36"	7'-4"	O.D.+2'
42"	8'-2"	O.D.+2'
48"	8'-9"	O.D.+2'
54"	9'-4"	O.D.+2'
60"	9'-10"	O.D.+2'
72"	11'-0"	O.D.+2'
78"	11'-8"	O.D.+2'
84"	12'-0"	O.D.+2'
90"	12'-6"	O.D.+2'
96"	13'-0"	O.D.+2'
108"	14'-0"	O.D.+2'

W = TRENCH WIDTH AT BOTTOM OF PIPE. TRENCH SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.

C-01-0107

DRAFT NOT FOR CONSTRUCTION

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San Francisco Water Power Sewer

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PUBLIC UTILITIES COMMISSION

CITY AND COUNTY OF SAN FRANCISCO

SEWER TRENCH SECTION, BACKFILL AND BEDDING

EX 1.1

ISSUE DATE/VER:
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