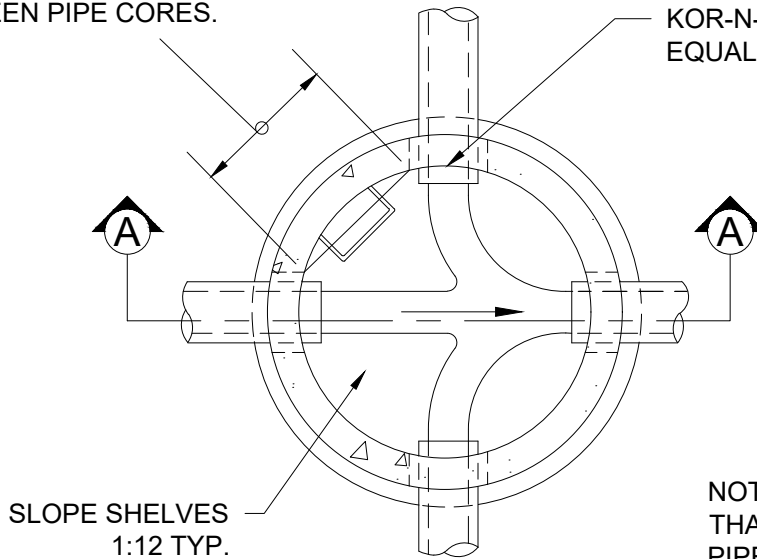


FILENAME: y:\inter-departmental\development engineering projects\public works standards\20 pws revision copy\details\200\_general\general.cad\201.dwg, Plotted 9/18/2023 12:51 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)

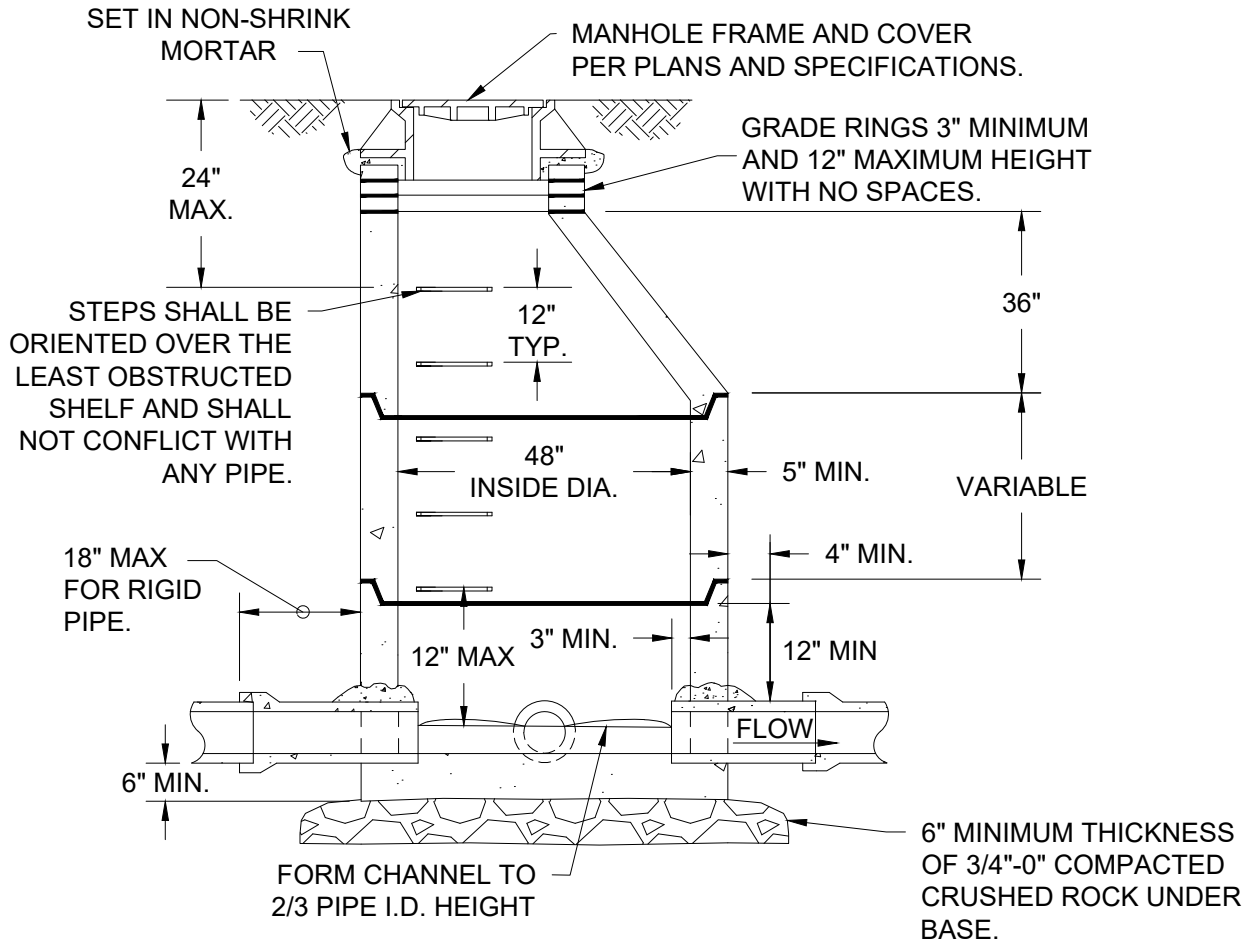
MINIMUM OF 12" PRECAST WALL BETWEEN PIPE CORES.

KOR-N-SEAL OR APPROVED EQUAL MANHOLE ADAPTOR



NOTE: FOR MANHOLES LESS THAN 60" FROM RIM TO TOP OF PIPE, SEE STANDARD DETAIL 203.

**PLAN**



**SECTION A-A**

**CITY OF GRESHAM**

**STANDARD MANHOLE FOR 27" AND LESSER DIAMETER PIPES**

PWS VERSION: JAN 2024

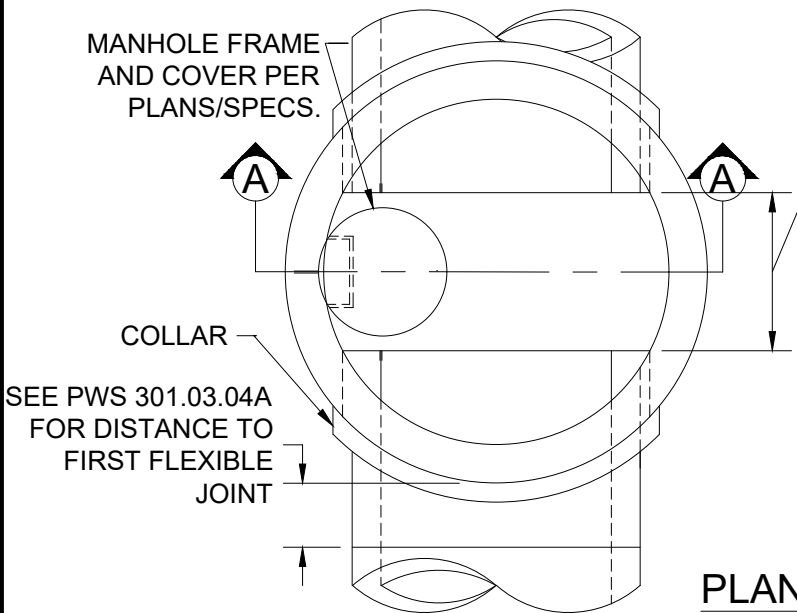
DRAWN KRB

REV. DATE JAN 2024

APPR. *[Signature]*

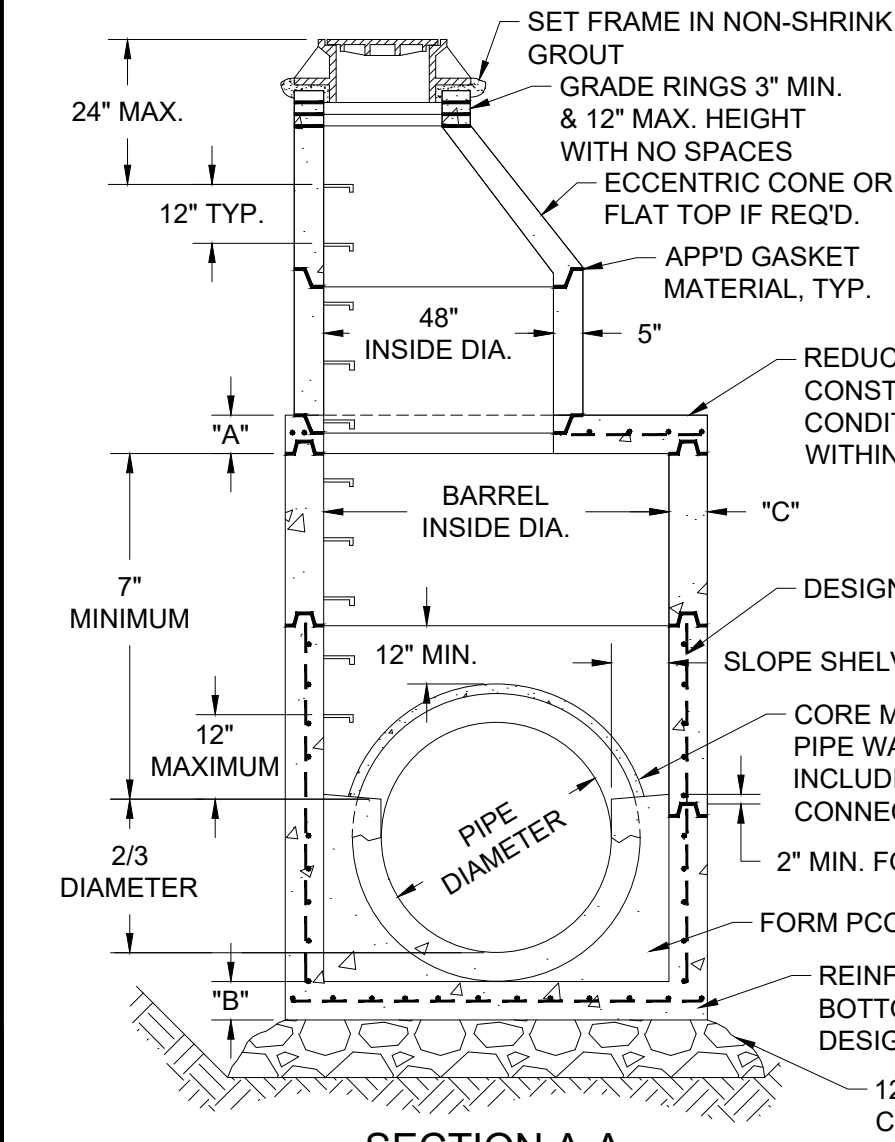
DETAIL NO. 201

FILENAME: y:\inter-departmental\development\_engineering\_projects\public\_works\_standards\200\_pws\_revision\_copy\details\200\_general\general\_cad\202.dwg, Plotted 9/18/2023 12:52 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



MINIMUM OF 12" PRECAST WALL BETWEEN PIPE CORING REQ'D.

PIPE DIA. IN.	BARREL DIA.* IN.	MINIMUMS		
		"A" DIM. IN.	"B" DIM. IN.	"C" DIM. IN.
30"	72"	7"	10"	7"
33"	72"	7"	10"	7"
36"	72"	7"	10"	7"
42"	84"	12"	12"	8"
48"	84"	12"	12"	8"
54"	96"	12"	12"	9"
60"	96"	12"	12"	9"
66"	108"	12"	12"	10"
72"	108"	12"	12"	10"
78"	120"	12"	12"	11"
84"	120"	12"	12"	11"
90"	132"	12"	12"	11"
96"	132"	12"	12"	11"



\* APPLIES TO (2) PIPE MANHOLES WITH 0° DEFLECTION. OTHER NUMBERS OF PIPES OR DEFLECTION WILL REQUIRE LARGER SIZE.

NOTES:  
STEPS TO BE AS DETAILED IN STANDARD DETAIL 210

REDUCING TOP SLAB TO BE DESIGNED & CONSTRUCTED FOR DEPTH AND TRAFFIC CONDITIONS BY MANUFACTURER. FOR SLABS WITHIN 17" OF STREET, OPENING TO BE 25"

DESIGN BARREL REINFORCING FOR CONDITIONS

SLOPE SHELVES 1:12, 18" MINIMUM WIDTH

CORE MANHOLE WALL 2" MIN., 4" MAX. CLEAR OF PIPE WALL. GROUT WITH NON-SHRINK GROUT & INCLUDING 4"x4" COLLAR AROUND PIPE CONNECTION

2" MIN. FOR CAST-IN-PLACE BASE

FORM PCC CHANNEL TO 2/3 DIA. HEIGHT

REINFORCED PRE-CAST OR CAST-IN-PLACE BOTTOM SLAB. SUBMIT CALCULATIONS & DESIGN FOR PRIOR APPROVAL

12" MINIMUM THICKNESS OF 3/4"-0" COMPACTED CRUSHED ROCK

CITY OF GRESHAM

STANDARD MANHOLE FOR 30" AND LARGER DIAMETER PIPES

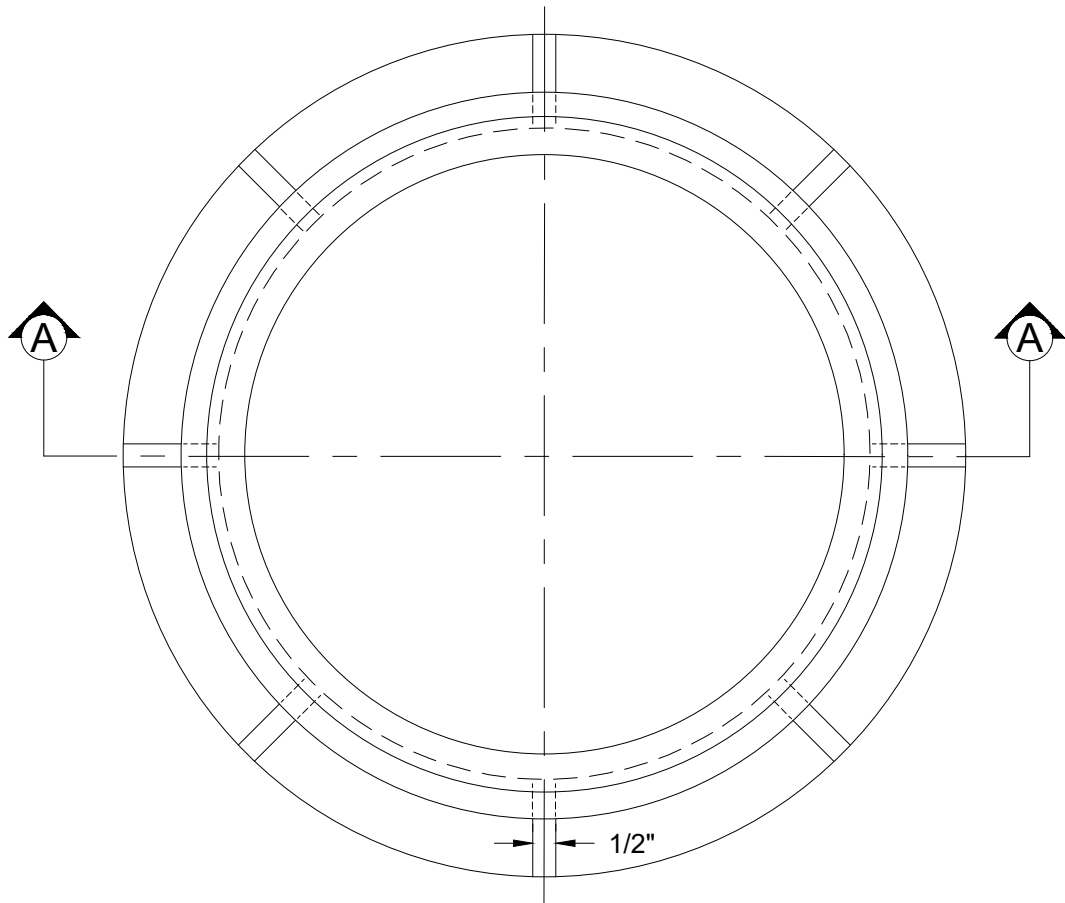
PWS VERSION: JAN 2024

DRAWN	KCK
REV. DATE	JAN 2019
APPR.	
DETAIL NO.	202

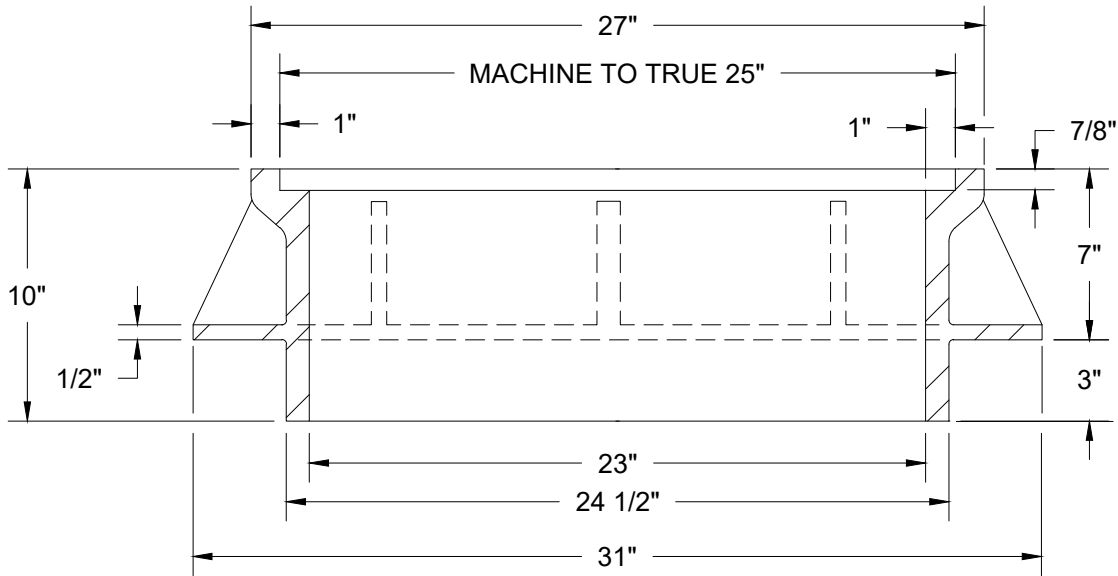




FILENAME: y:\inter-departmental\development engineering projects\public works standards\200 pws revision copy\details\200\_general\general cad\205a.dwg, Plotted 9/18/2023 12:58 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



**PLAN**



**SECTION A-A**

**NOTES:**

- 1. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30, APPROXIMATE WEIGHT = 237 LBS.
- 2. TO BE USED IN ASPHALT GREATER THAN 4" IN DEPTH.

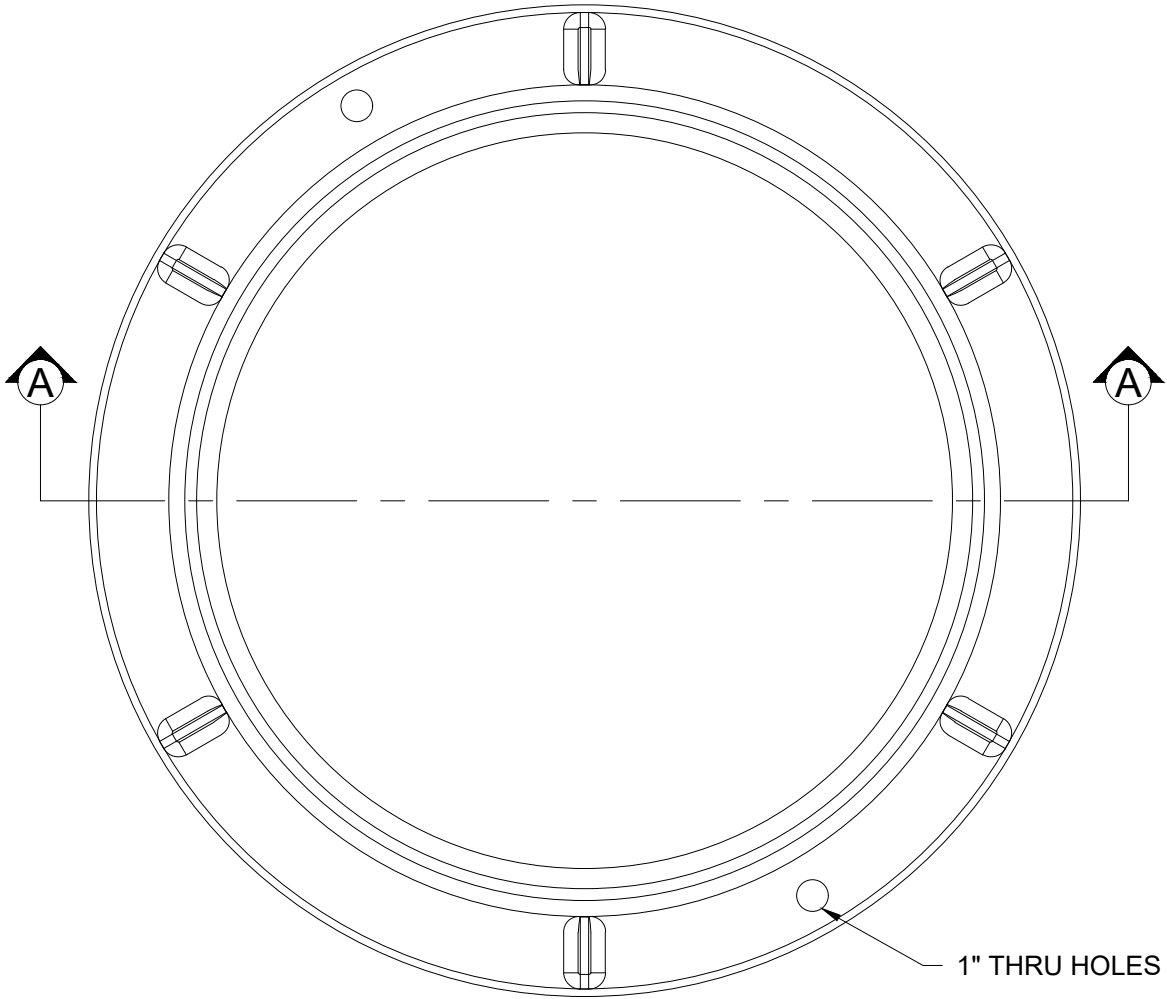
**CITY OF  
GRESHAM**

**STANDARD MANHOLE FRAME**

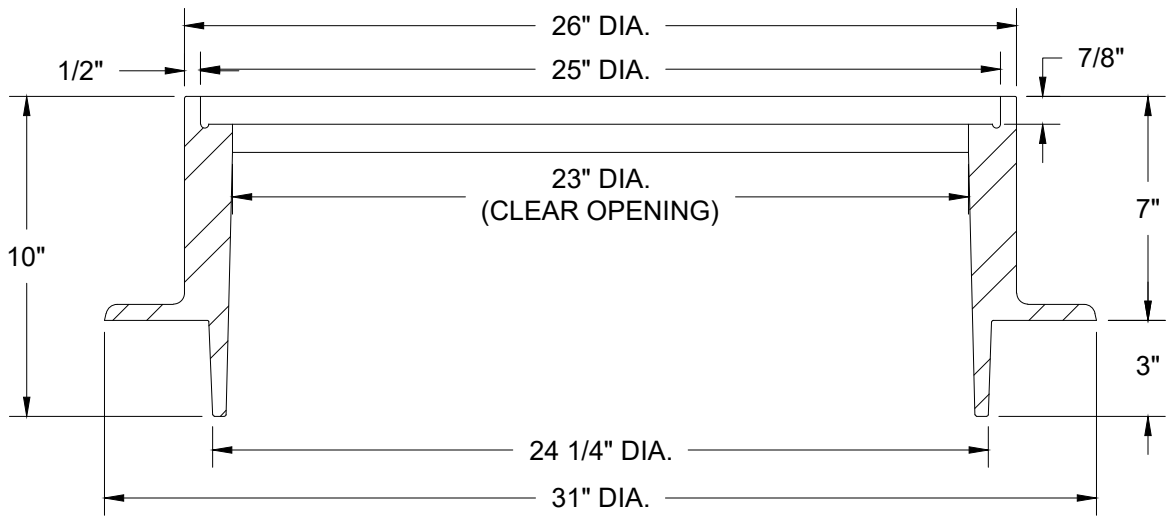
PWS VERSION: JAN 2024

DRAWN	KCK
REV. DATE	JAN 2019
APPR.	<i>[Signature]</i>
DETAIL NO.	205A

FILENAME: y:\inter-departmental\development engineering projects\public works standards\200 pws revision copy\details\200\_general\general cad\205b.dwg, Plotted 9/18/2023 1:00 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



PLAN



SECTION A-A

- NOTES:
1. MANHOLE FRAME MANUFACTURED BY EJ, PRODUCT NUMBER 2603Z2, OR APPROVED EQUAL.
  2. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30.
  3. TO BE USED IN ASPHALT GREATER THAN 4" IN DEPTH.

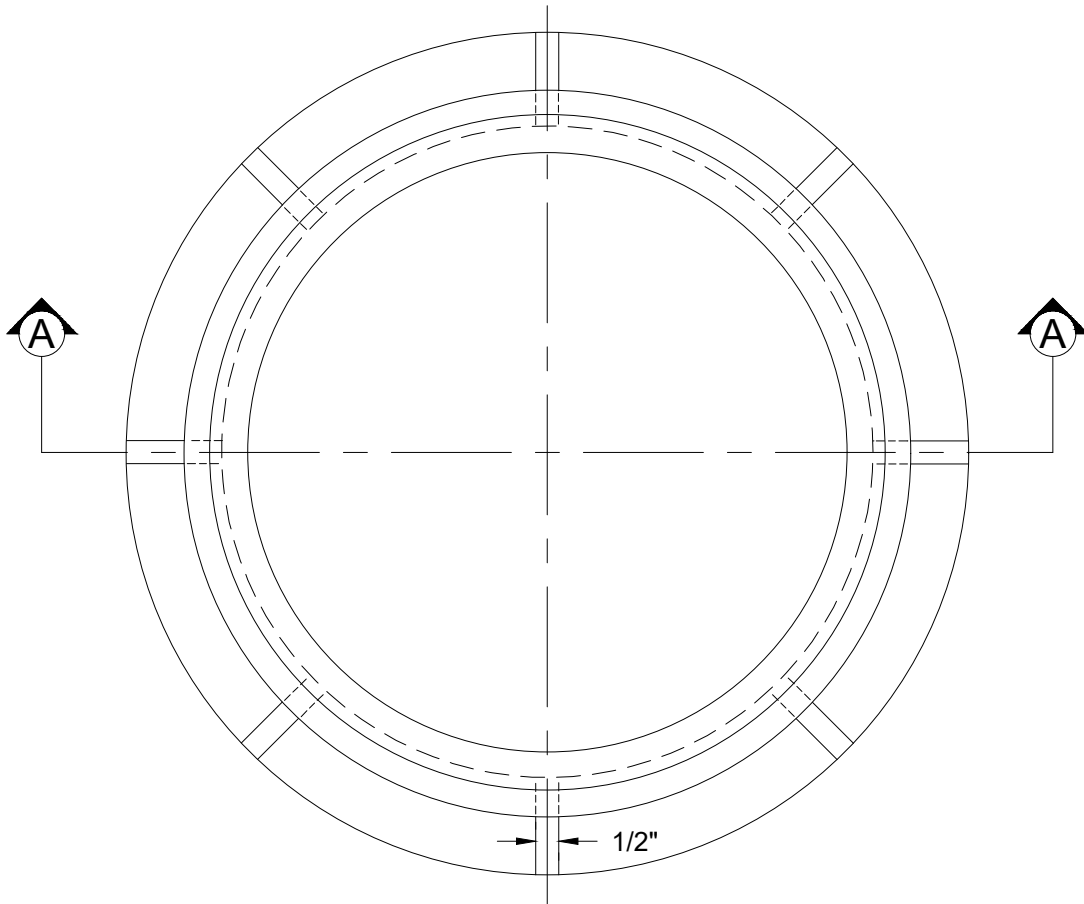
CITY OF GRESHAM

STANDARD MANHOLE STRAIGHT WALL FRAME

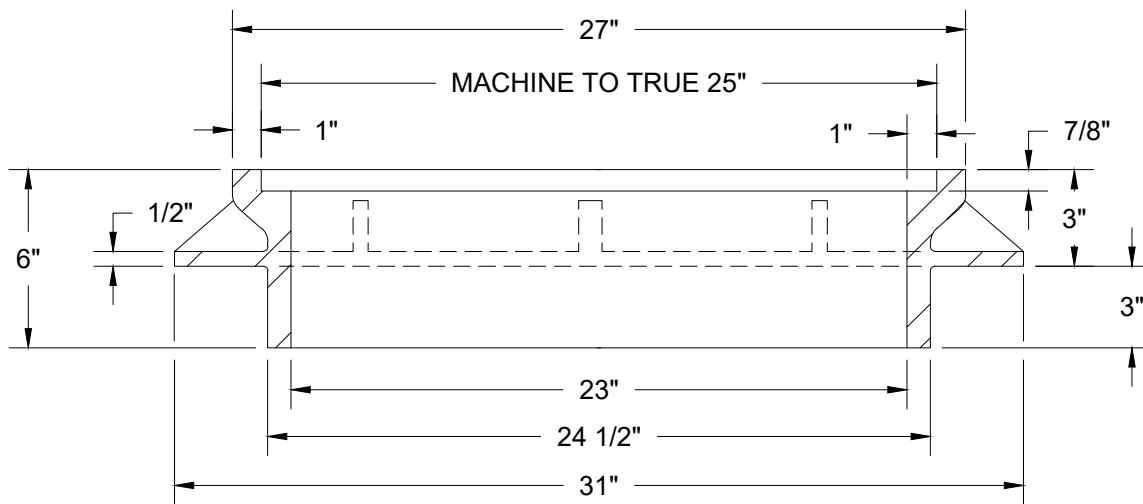
PWS VERSION: JAN 2024

DRAWN	KRB
REV. DATE	JAN 2024
APPR.	<i>[Signature]</i>
DETAIL NO.	205B

FILENAME: y:\inter-departmental\development engineering projects\public works standards\200 pws revision copy\details\200\_general\general cad\206a.dwg, Plotted 9/18/2023 1:00 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



**PLAN SECTION**



**SECTION A-A**

**NOTES:**

- 1. THIS MANHOLE FRAME MAY BE USED ONLY FOR LOCAL ROAD LOCATIONS.
- 2. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30. APPROX. WEIGHT = 172 LBS.

**CITY OF GRESHAM**

**SUBURBAN MANHOLE FRAME**

PWS VERSION: JAN 2024

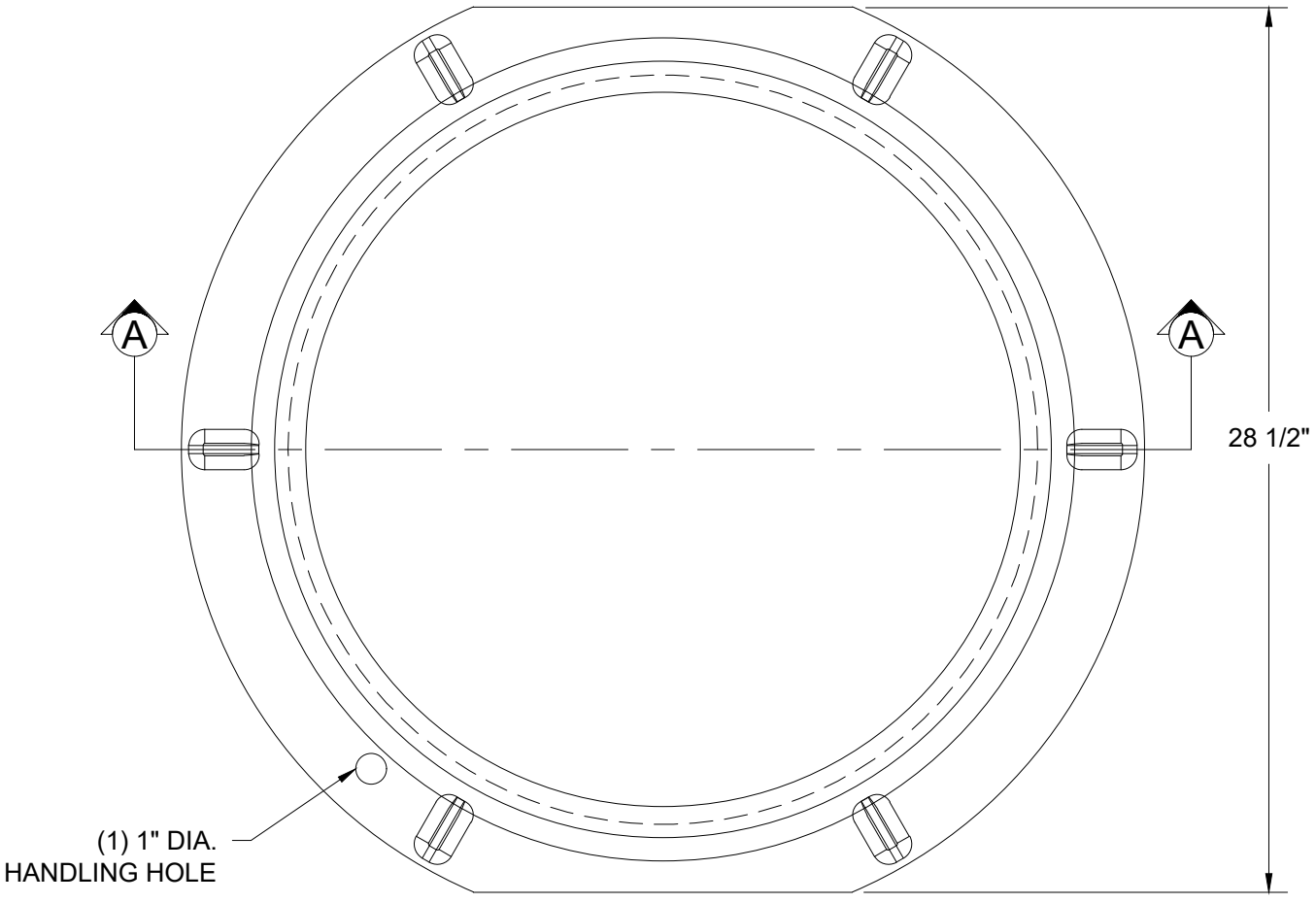
DRAWN KCK

REV. DATE JAN 2019

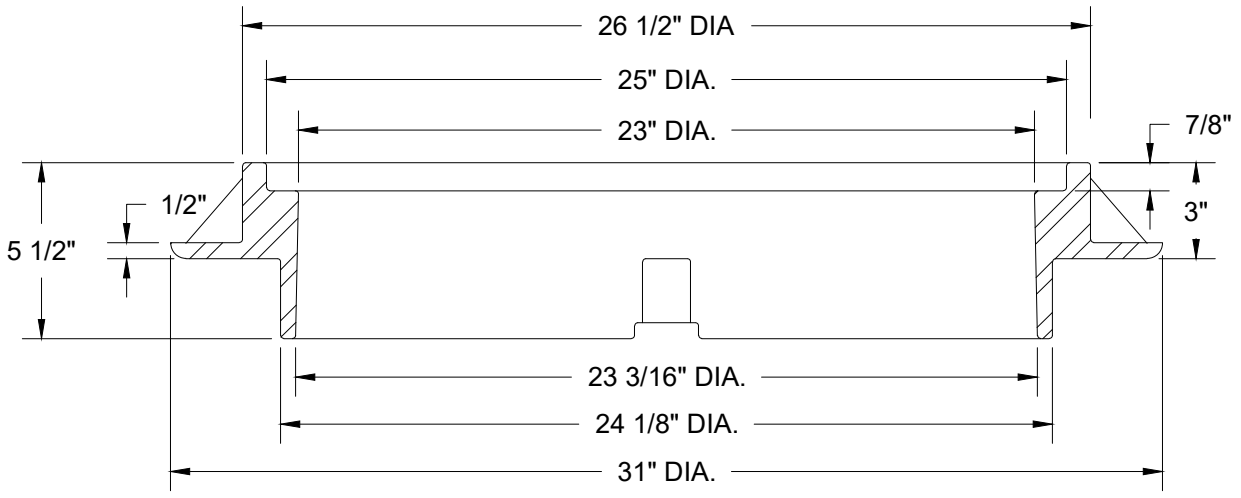
APPR. *[Signature]*

DETAIL NO. 206A

FILENAME: y:\inter-departmental\development engineering projects\public works standards\200 pws revision copy\details\200\_general\general cad\206b.dwg, Plotted 9/18/2023 1:01 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



**PLAN SECTION**



**SECTION A-A**

**NOTES:**

- 1. THIS MANHOLE FRAME MAY BE USED ONLY FOR LOCAL ROAD LOCATIONS.
- 2. MANHOLE FRAME MANUFACTURED BY EJ, PRODUCT NUMBER 2601Z, OR APPROVED EQUAL.
- 3. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30.

**CITY OF GRESHAM**

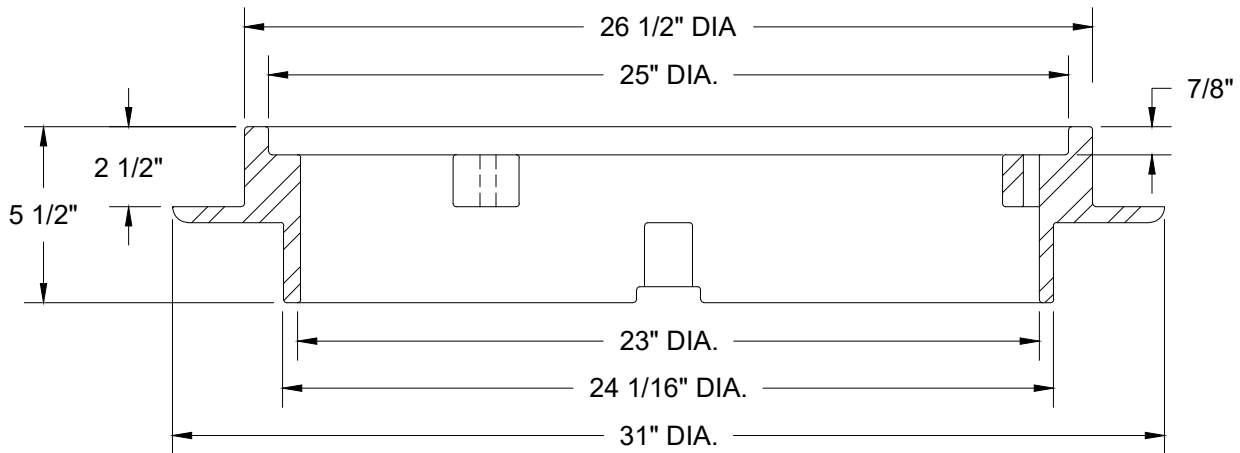
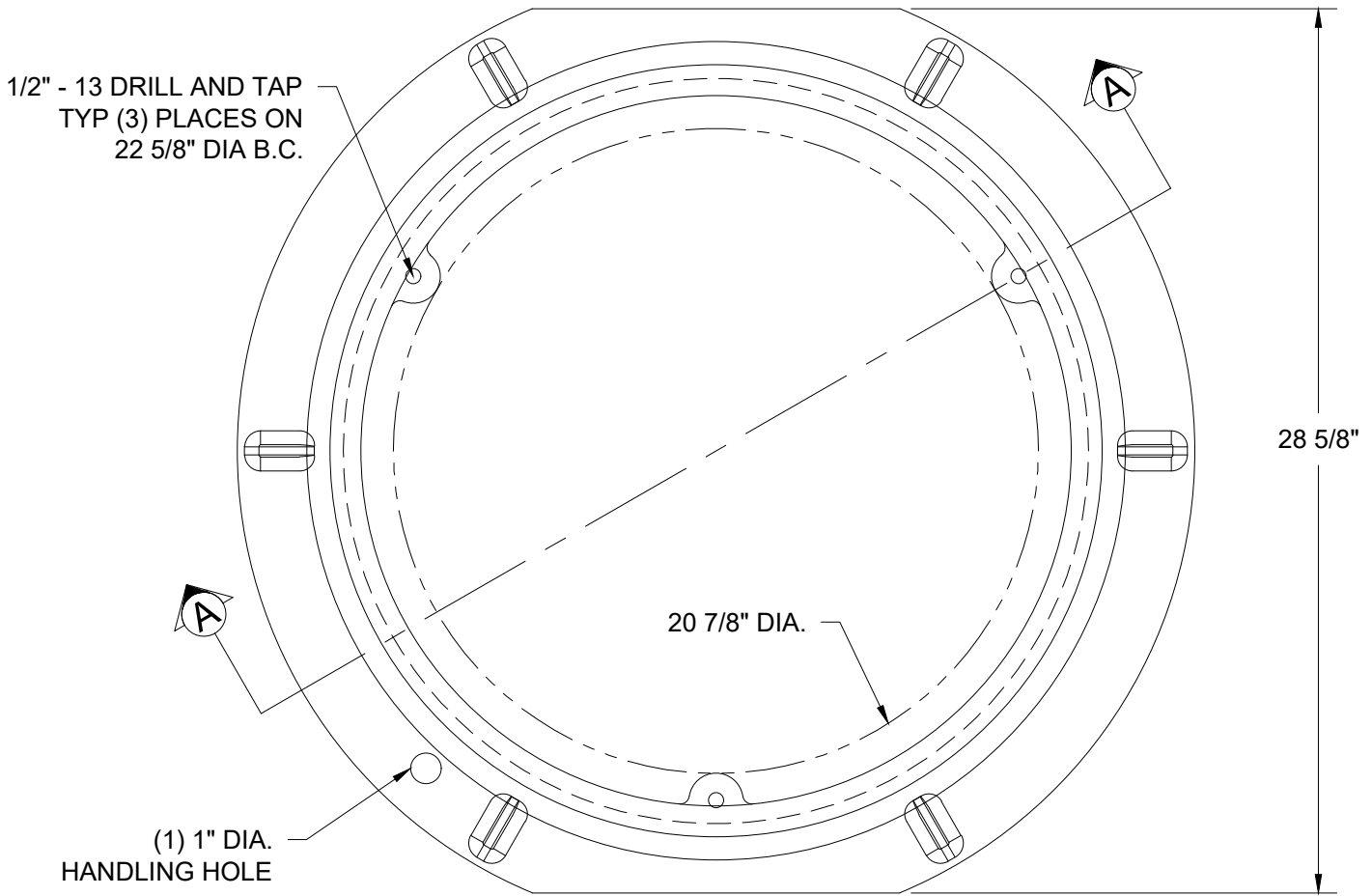
**SUBURBAN MANHOLE STRAIGHT WALL FRAME**

PWS VERSION: JAN 2024

DRAWN	KRB
REV. DATE	JAN 2024
APPR.	<i>[Signature]</i>
DETAIL NO.	206B



FILENAME: y:\inter-departmental\development engineering projects\public works standards\200 pws revision copy\details\200\_general\general cad\206c.dwg, Plotted 9/18/2023 1:02 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



NOTES:

1. THIS MANHOLE FRAME MAY BE USED ONLY FOR LOCAL ROAD LOCATIONS.
2. MANHOLE FRAME MANUFACTURED BY EJ, PRODUCT NUMBER 2601ZPT, OR APPROVED EQUAL.
3. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30.

CITY OF  
GRESHAM

SUBURBAN TAMPERPROOF AND WATERTIGHT  
MANHOLE STRAIGHT WALL FRAME

PWS VERSION: JAN 2024

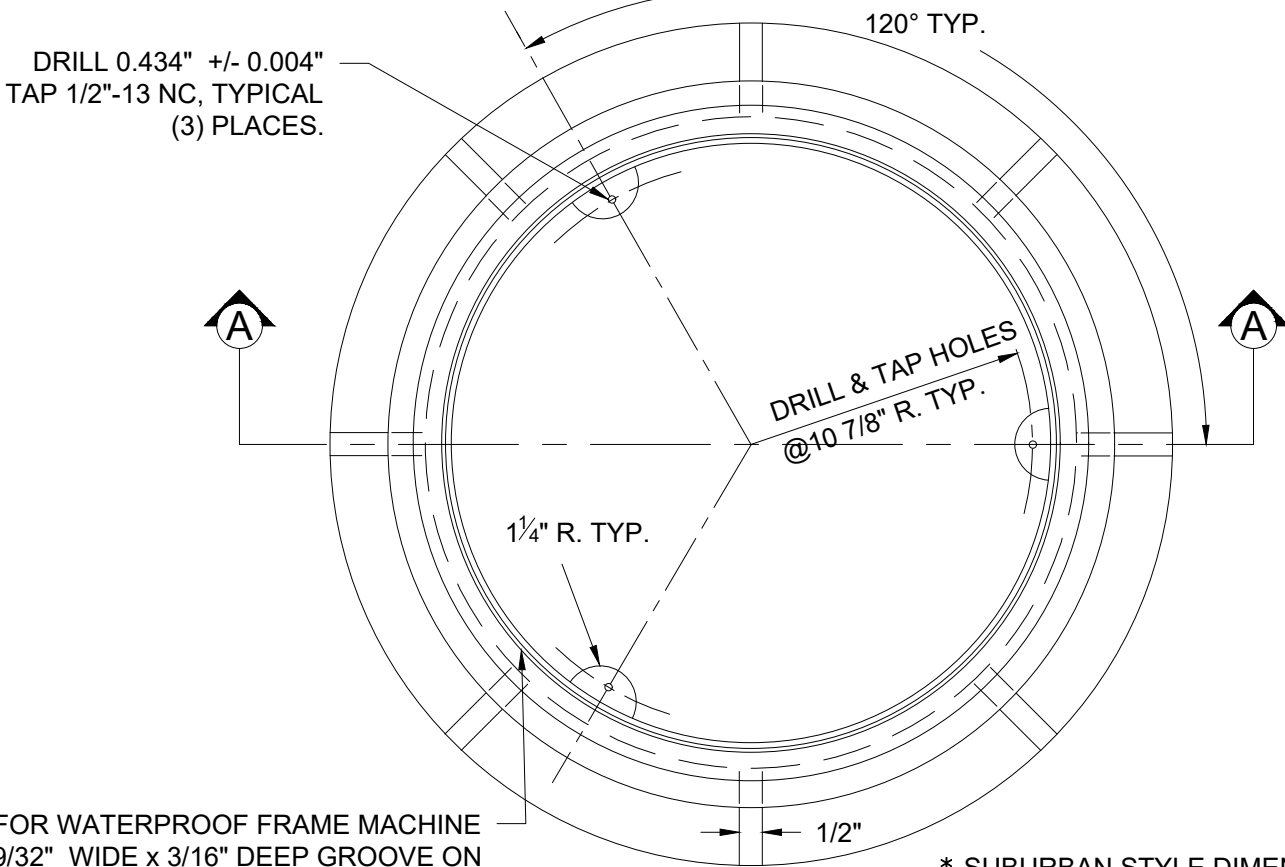
DRAWN KRB

REV. DATE JAN 2024

APPR. *[Signature]*

DETAIL NO. 206C

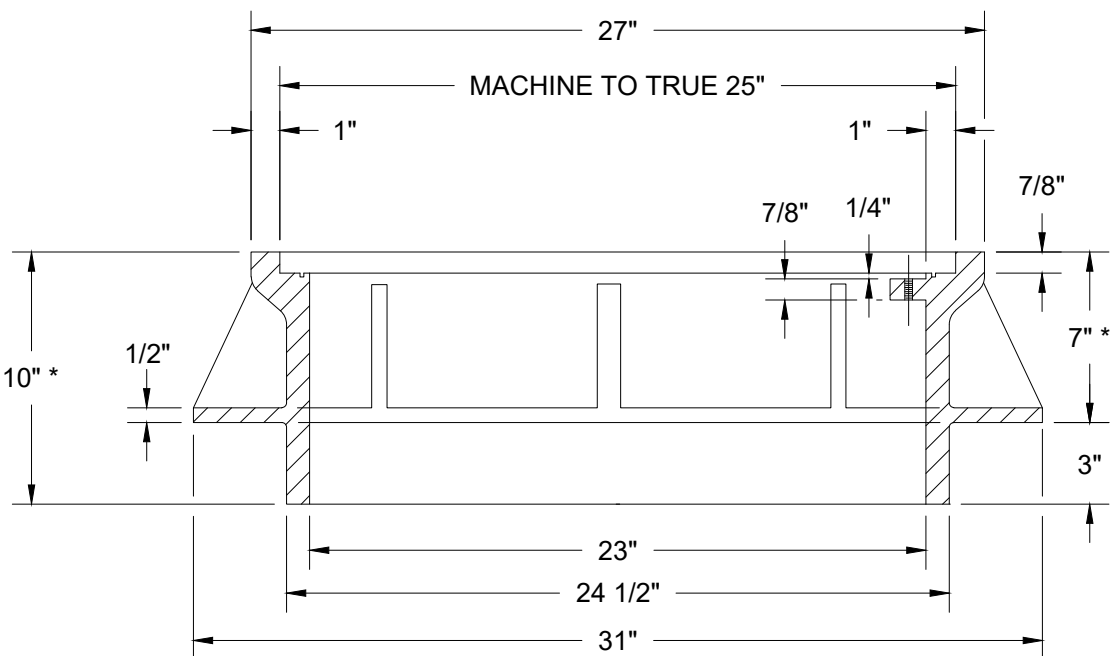
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FOR WATERPROOF FRAME MACHINE  
 9/32" WIDE x 3/16" DEEP GROOVE ON  
 23 3/4" I.D. CIRCLE. AND INSTALL 23 3/4"  
 I.D., 1/4" WIDE X 1/4" DEEP NEOPRENE  
 GASKET.

\* SUBURBAN STYLE DIMENSIONS  
 MAY BE USED FOR LOCAL ROAD  
 INSTALLATION

**PLAN**



**SECTION A-A**

NOTE:  
 1. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30.  
 APPROXIMATE WEIGHT = 237 (INDUSTRIAL) AND  
 APPROXIMATE WEIGHT = 172 LBS +/- (SUBURBAN).

**CITY OF  
 GRESHAM**

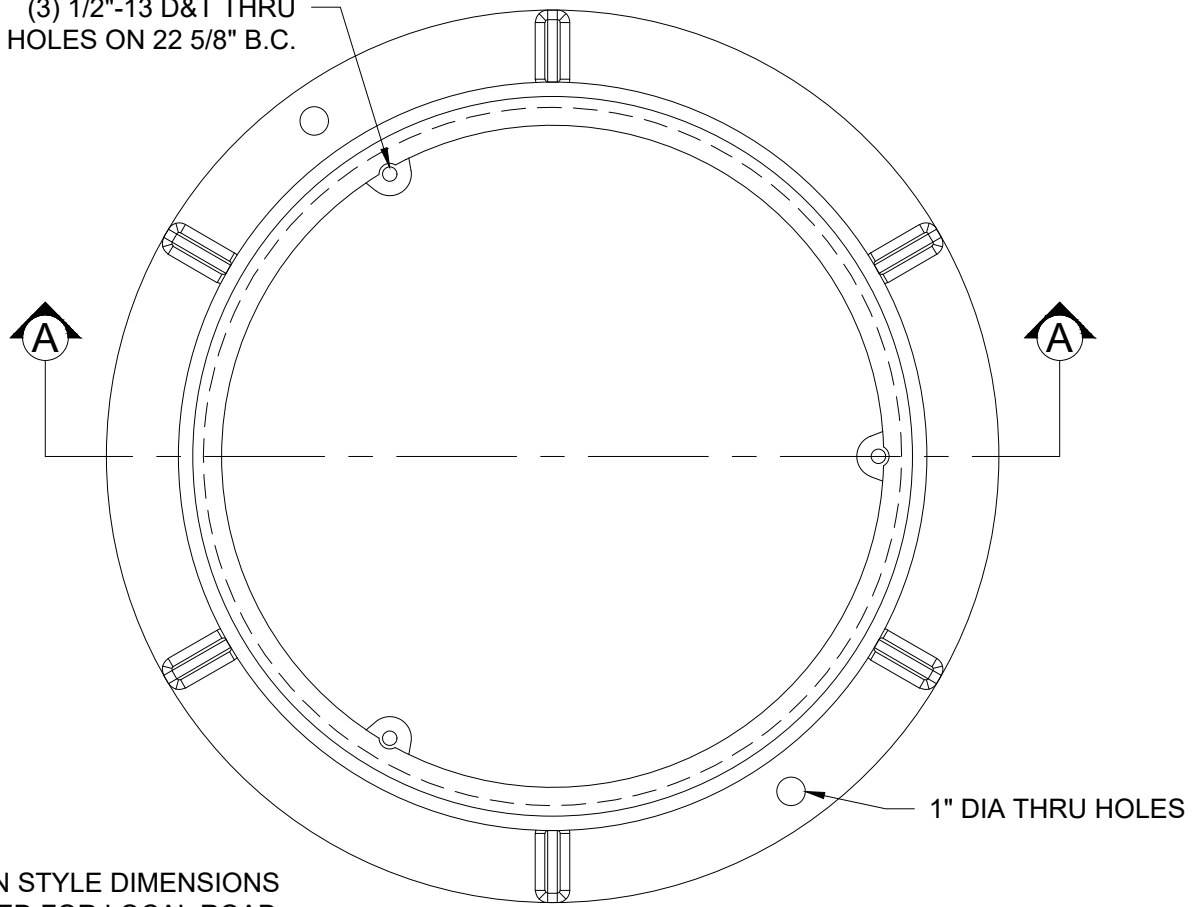
**TAMPERPROOF AND WATERTIGHT  
 MANHOLE FRAME**

PWS VERSION: JAN 2024

DRAWN	DLS
REV. DATE	JAN 2024
APPR.	<i>[Signature]</i>
DETAIL NO.	207A

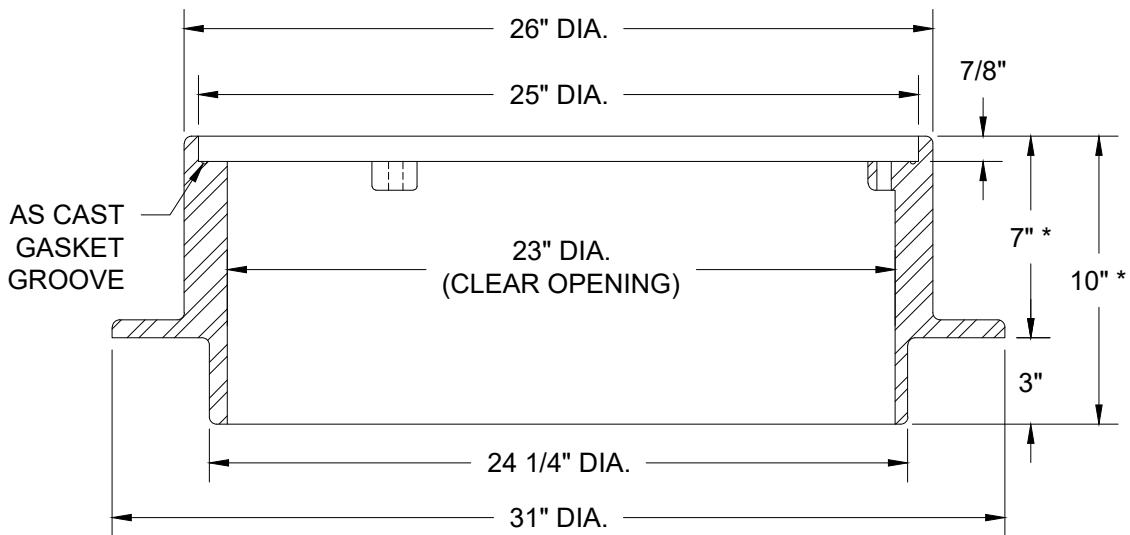
FILENAME: y:\inter-departmental\development engineering projects\public works standards\200 pws revision copy\details\200\_general\general cad\207b.dwg, Plotted 9/18/2023 1:06 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)

(3) 1/2"-13 D&T THRU HOLES ON 22 5/8" B.C.



\* SUBURBAN STYLE DIMENSIONS MAY BE USED FOR LOCAL ROAD INSTALLATION. SEE DETAIL 206C.

### PLAN



### SECTION A-A

**NOTE:**

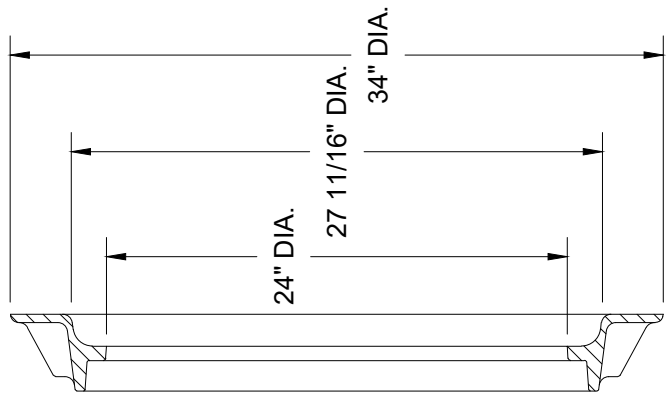
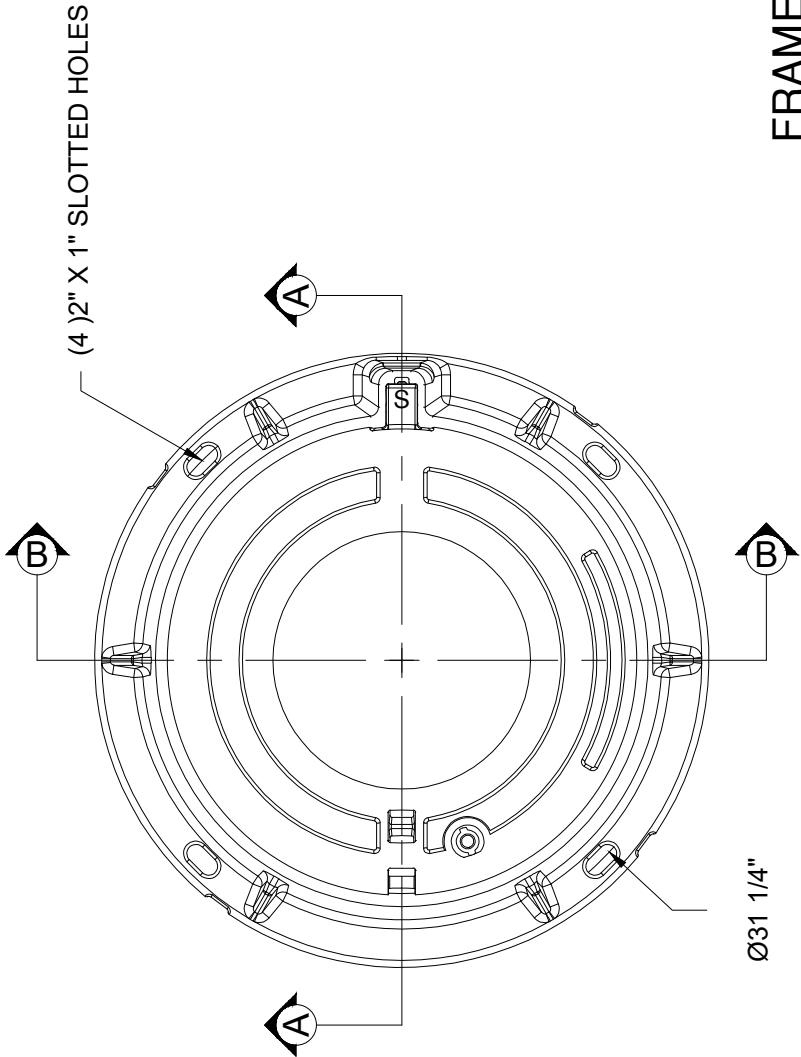
1. MATERIAL TO BE GRAY CAST IRON ASTM A48, CLASS 30.
2. MANHOLE FRAME MANUFACTURE BY EJ, PRODUCT NUMBER 2603Z2PT, OR APPROVED EQUAL.

**CITY OF GRESHAM**

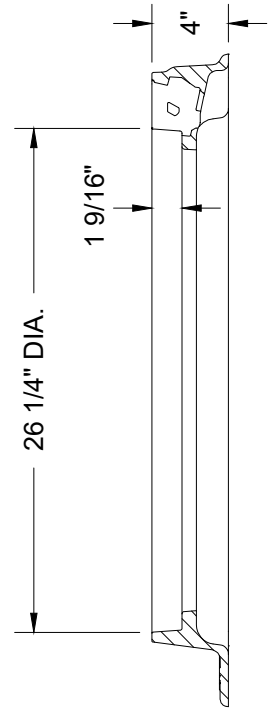
## STANDARD TAMPERPROOF AND WATERTIGHT MANHOLE STRAIGHT WALL FRAME

PWS VERSION: JAN 2024

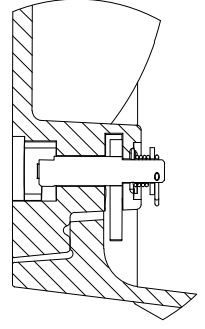
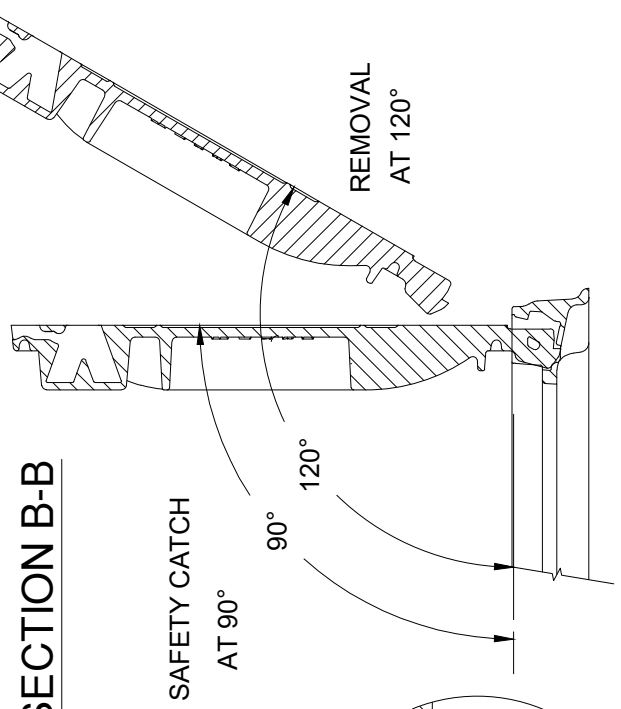
DRAWN	KRB
REV. DATE	JAN 2024
APPR.	<i>[Signature]</i>
DETAIL NO.	207B



**FRAME SECTION B-B**



**FRAME SECTION A-A**



**CAM LOCK LOCKING VIEW**

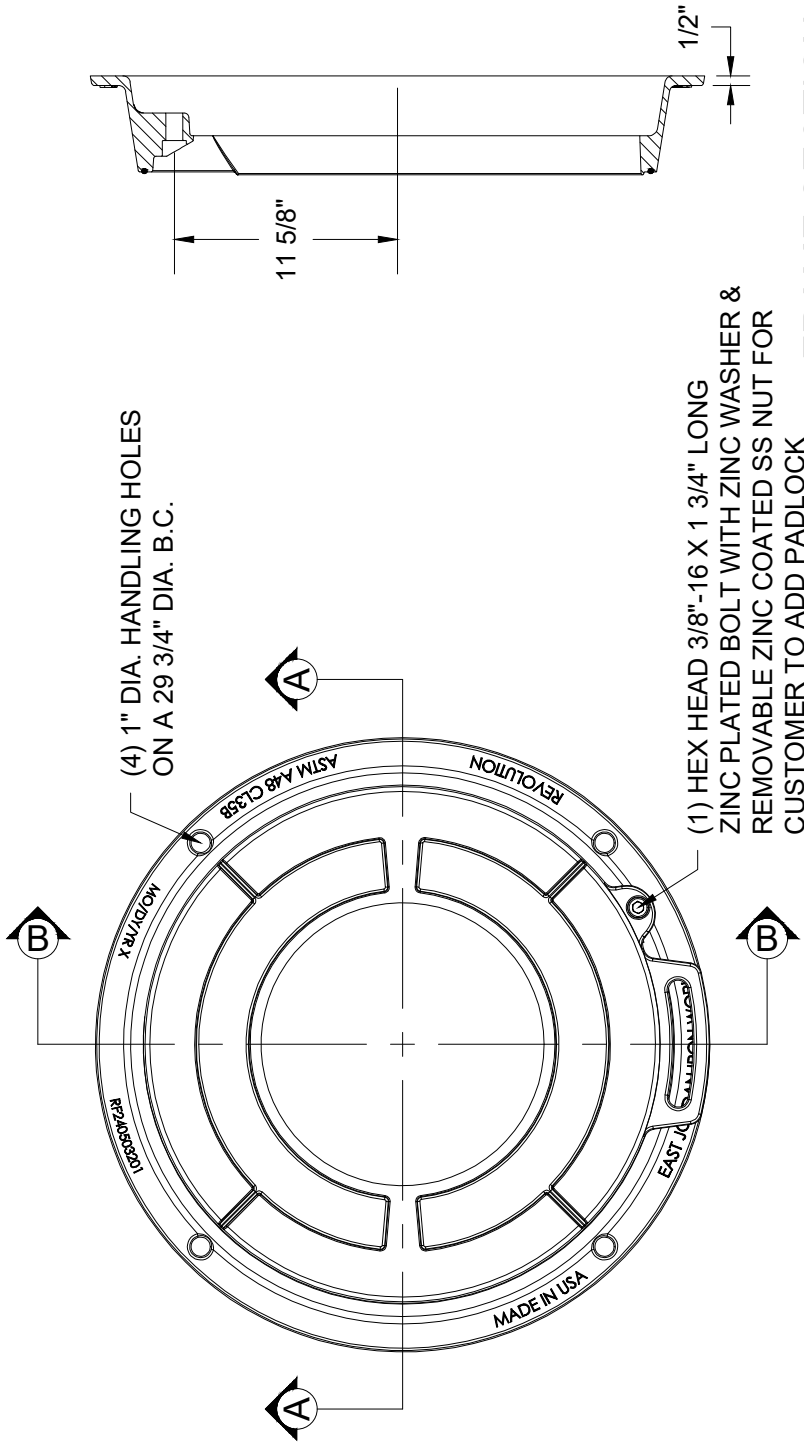
**HINGE POSITIONS**

**CITY OF GRESHAM**

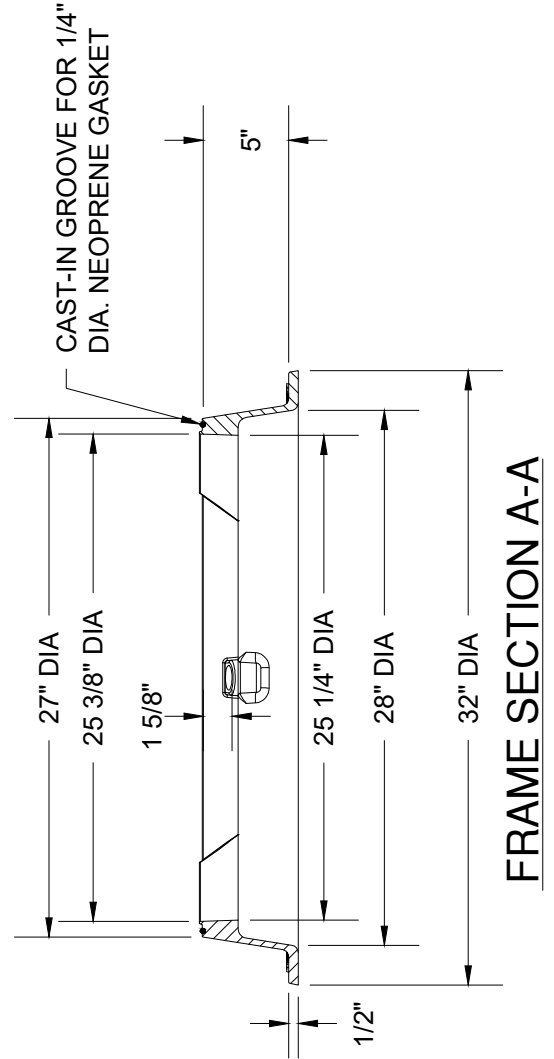
**OFF-ROAD ELEVATED FRAME ASSEMBLY (HINGE)**

PWS VERSION: JAN 2024

DRAWN	KRB
REV. DATE	JAN 2019
APPR.	<i>[Signature]</i>
DETAIL NO.	208



**FRAME SECTION B-B**



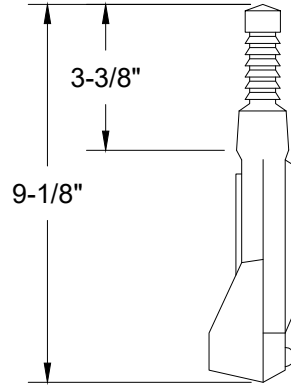
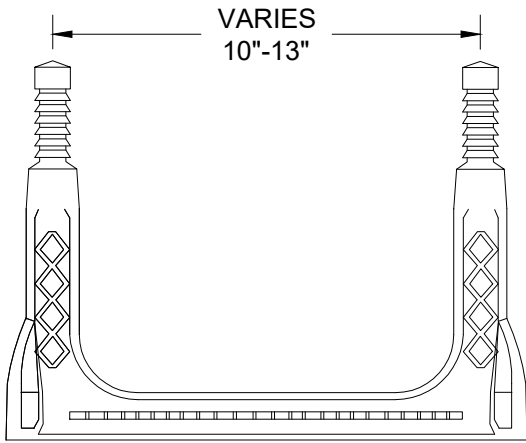
**CITY OF GRESHAM**

**OFF-ROAD ELEVATED FRAME ASSEMBLY (PIN)**

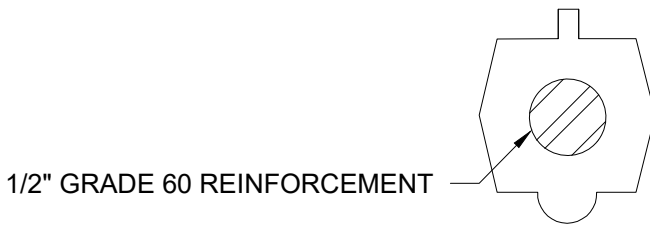
PWS VERSION: JAN 2024

DRAWN	KCK
REV. DATE	JAN 2019
APPR.	<i>[Signature]</i>
DETAIL NO.	209

FILENAME: y:\inter-departmental\development engineering projects\public works standards\200\_pws\_revision copy\details\200\_general\general cad\210.dwg, Plotted 9/18/2023 1:08 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



COPOLYMER POLYPROPYLENE PLASTIC



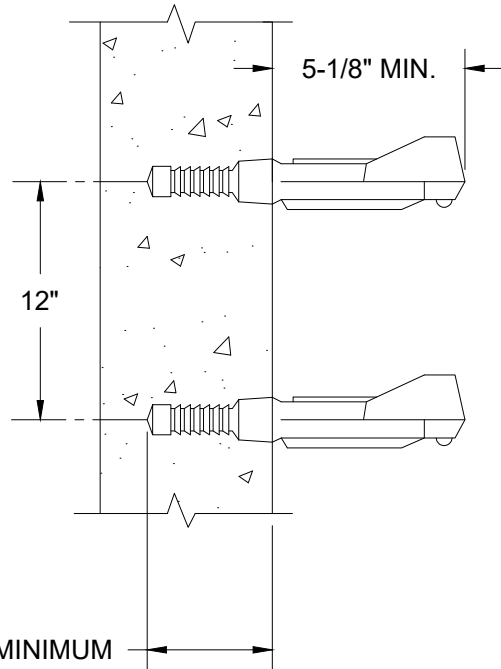
1/2" GRADE 60 REINFORCEMENT

**NOTE:**

MANHOLE STEPS MUST BE TIGHT AND FIRMLY EMBEDDED. THEY MUST ALSO MEET THE ASTM TEST FOR WITHSTANDING PULLING OUT.

**MATERIALS:**

PLASTIC: MUST CONFORM WITH ASTM C478.  
STEEL REINFORCING BAR MINIMUM 1/2" GRADE 60 MEETING REQUIREMENTS OF ASTM A615  
ENCAPSULATED WITH INJECTION MOLDED COPOLYMER POLYPROPYLENE WITH SERRATED SURFACES.



CITY OF  
GRESHAM

MANHOLE STEP

PWS VERSION: JAN 2024

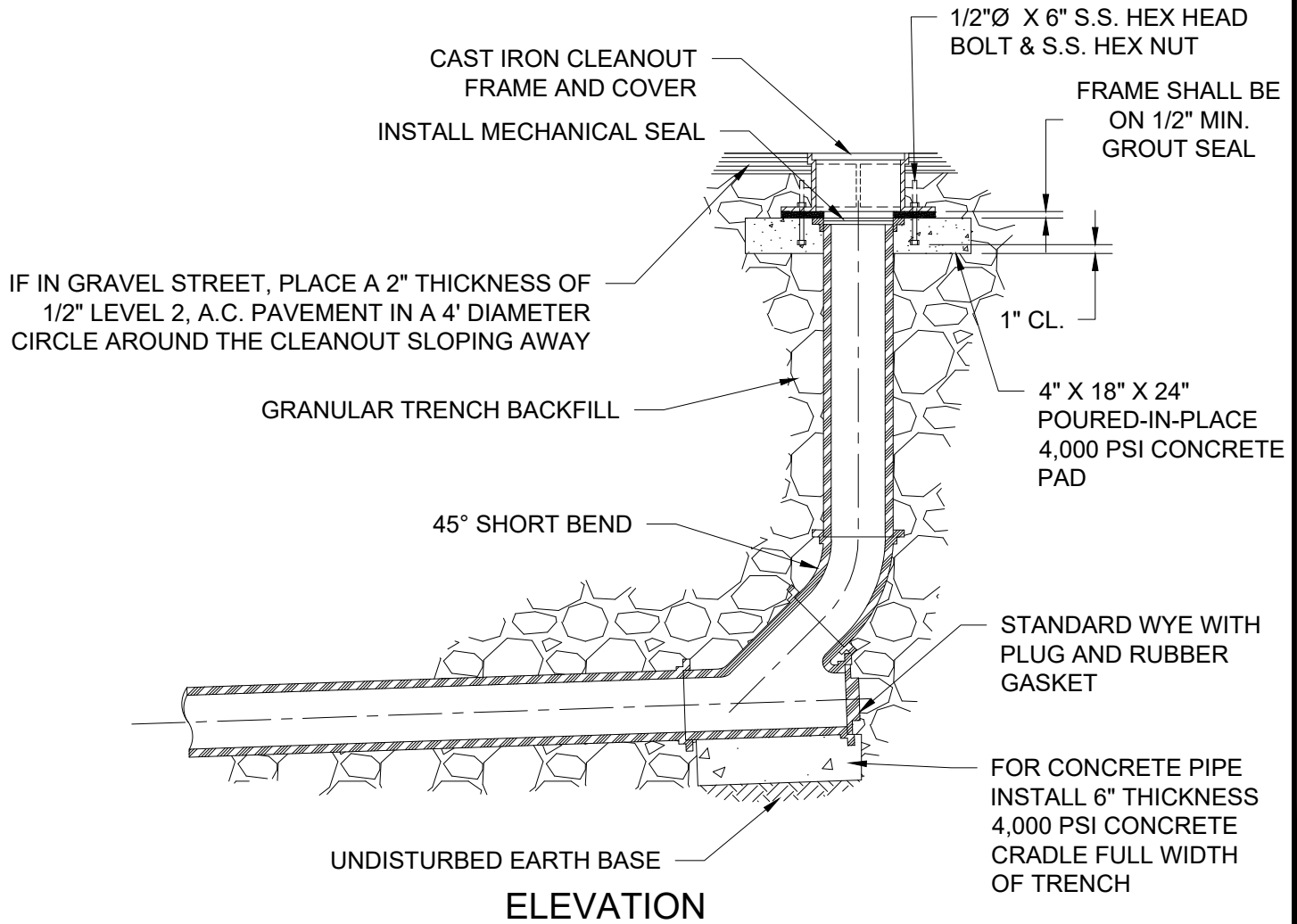
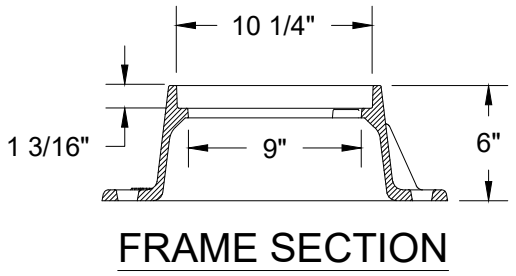
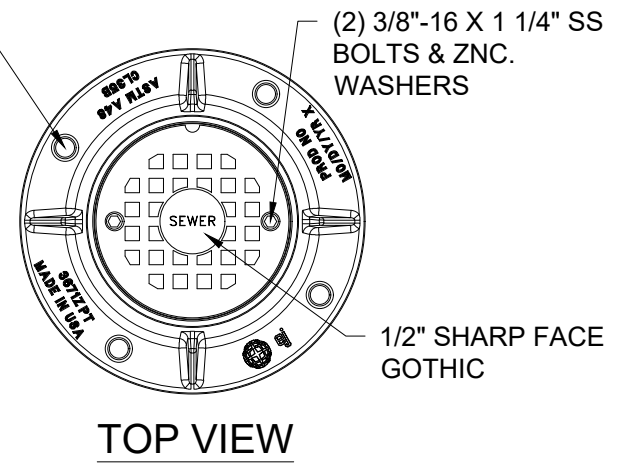
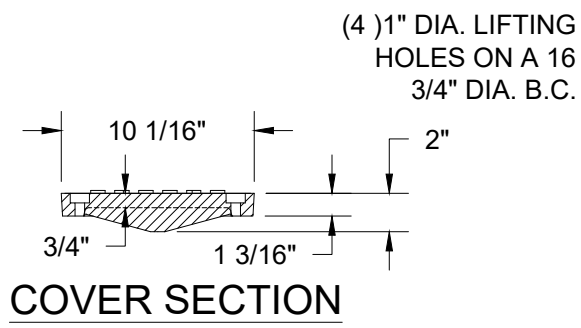
DRAWN KCK

REV. DATE JAN 2020

APPR. *[Signature]*

DETAIL NO. 210

FILENAME: y:\inter-departmental\development engineering projects\public works standards\200 pws revision copy\details\200\_general\general cad\211.dwg, Plotted 9/18/2023 1:10 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



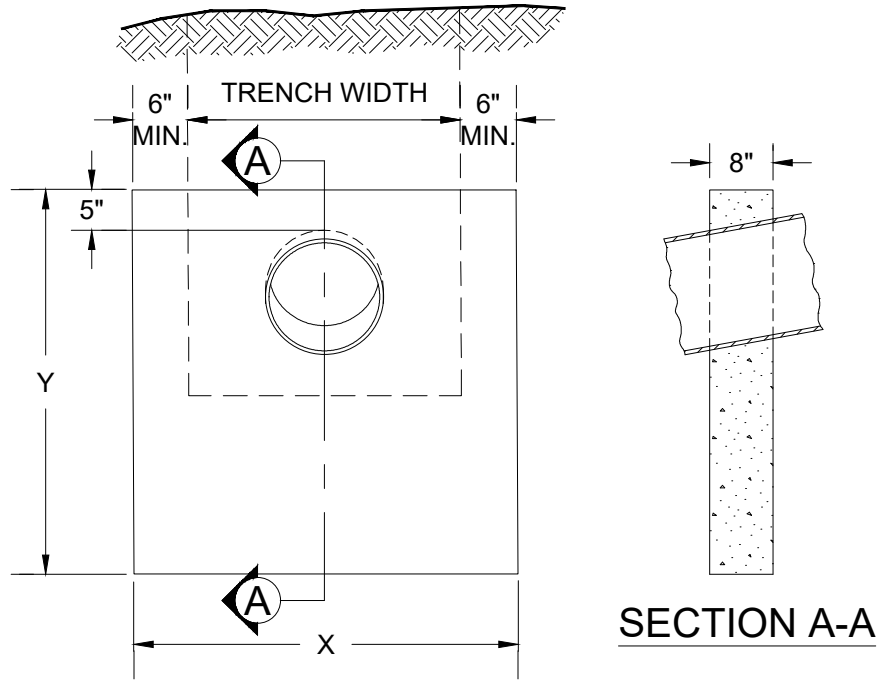
**CITY OF GRESHAM**

**STANDARD CLEANOUT**

PWS VERSION: JAN 2024

DRAWN	KCK
REV. DATE	JAN 2024
APPR.	<i>[Signature]</i>
DETAIL NO.	211

FILENAME: y:\inter-departmental\development engineering projects\public works standards\200 pws revision copy\details\200\_general\general cad\212.dwg, Plotted 9/18/2023 1:19 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



DIMENSION TABLE			
PIPE DIA.	X, MIN. (ft)	Y (ft)	MIN VOL (CY)
6" TO 10"	4	3	0.29
12" TO 15"	4	4	0.37
18" TO 24"	5	4	0.42
> 24"	TO BE DETERMINED BY ENGINEER OF RECORD		

**NOTES:**

1. ALL CONCRETE SHALL BE 4,000 PSI 28 DAY COMPRESSIVE STRENGTH, WITH 2" TO 4" SLUMP.
2. ANCHOR WALLS MUST BE USED WITH PIPES WITH SLOPES OVER 20%. ANCHOR WALLS TO BE EQUALLY SPACED. PROPORTION SPACING WITH SLOPE.

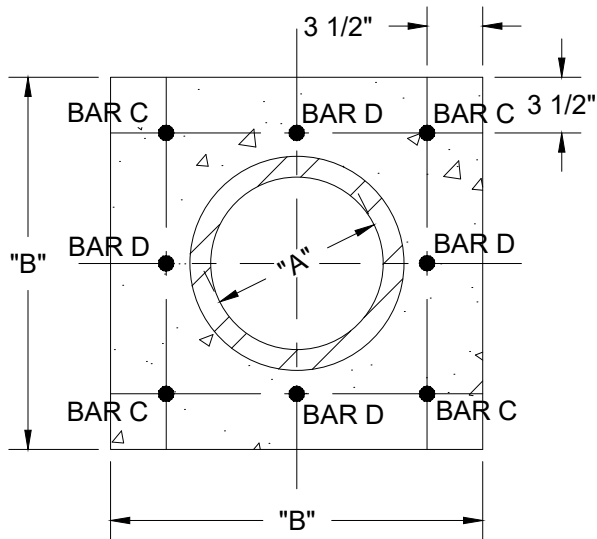
PIPE SLOPE	WALL SPACING
20%	21'
100%	12'
> 100%	NOT ALLOWED

3. PLACE WALL IMMEDIATELY BELOW BELL OF PIPE WHERE POSSIBLE.

	<p><b>PIPE ANCHOR WALL</b></p>	DRAWN <b>KCK</b>
		REV. DATE <b>JAN 2024</b>
		APPR.
		DETAIL NO. <b>212</b>
PWS VERSION: JAN 2024		



FILENAME: y:\inter-departmental\development engineering projects\public works standards\200\_pws\_revision copy\details\200\_general\general cad\213.dwg, Plotted 9/18/2023 1:19 PM, By: Kimberly Bogert, ANSI FULL BLEED A (8.50 X 11.00 INCHES)



DIMENSIONS (IN.)		BARS REQ'D
"A"	"B"	
6	16	C
8	19	C
10	21	C
12	23	C
15	26 1/2	C
18	30 1/2	C
21	39	C & D
24	43	C & D
27	50	C & D

### VERTICAL SECTION

**NOTES:**

1. ALL CONCRETE SHALL BE 4,000 PSI, 3" TO 5" SLUMP.
2. STEEL REINFORCING SHALL BE NO. 5 IN CONFORMANCE WITH ASTM A615, GRADE 60, WITH DEFORMATIONS PER ASTM A305.

**CITY OF  
GRESHAM**

## PIPE CONCRETE ENCASEMENT

PWS VERSION: JAN 2024

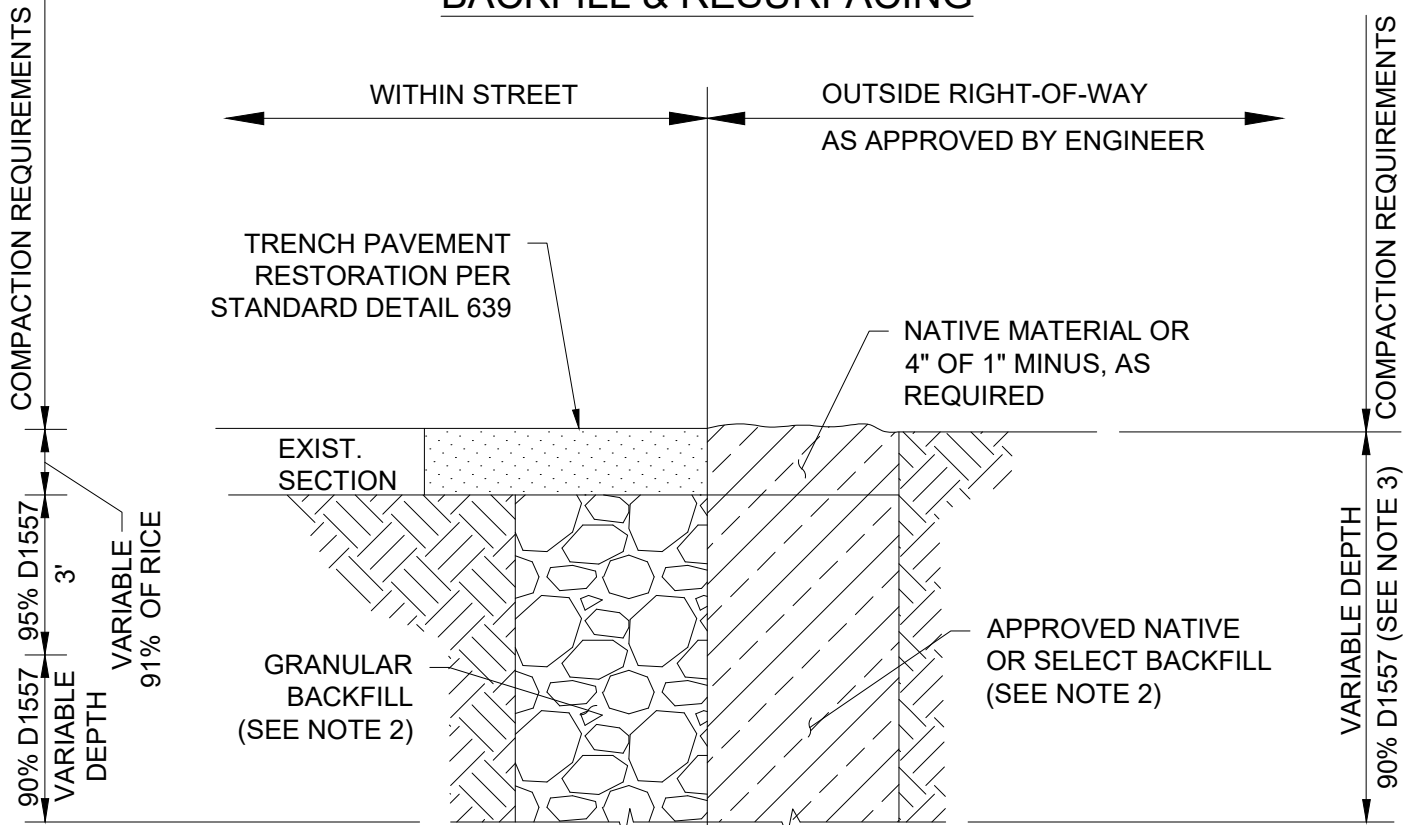
DRAWN **KRB**

REV. DATE **JAN 2024**

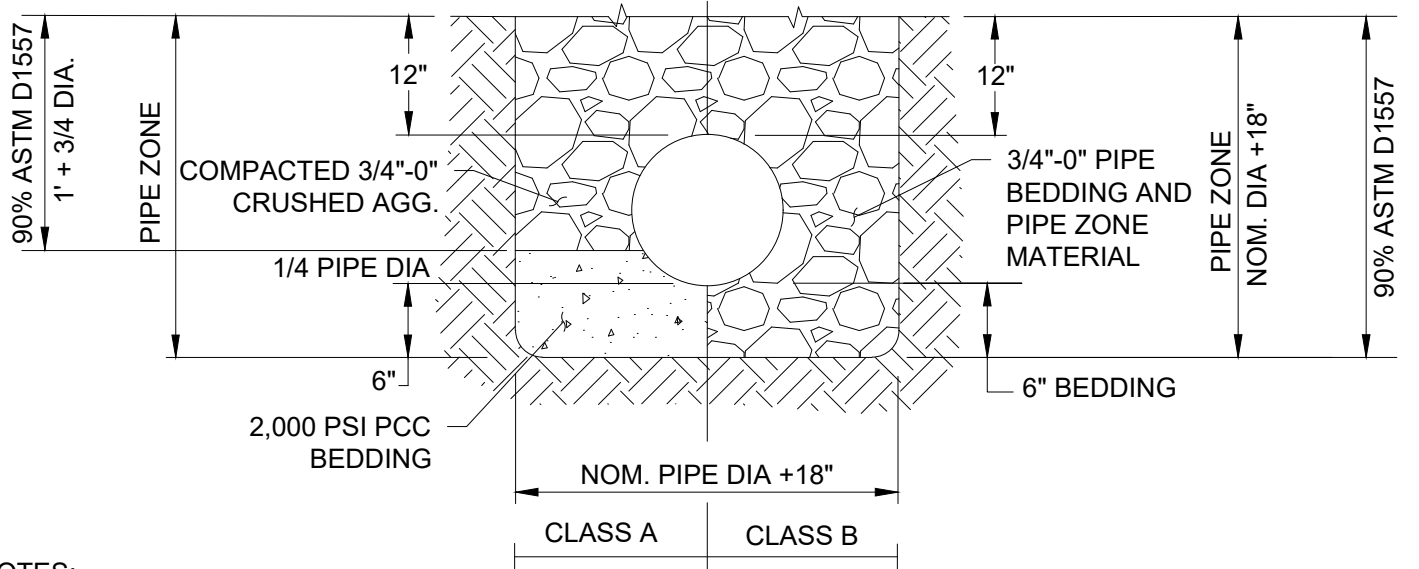
APPR. 

DETAIL NO. **213**

# BACKFILL & RESURFACING



# BEDDING & PIPE ZONE



**NOTES:**

1. WHERE REQUIRED BY THE ENGINEER OF RECORD OR THE CITY, GRANULAR TRENCH STABILIZATION SHALL BE PLACED PRIOR TO THE PIPE ZONE MATERIAL. SIZE AND DEPTH TO BE BASED ON SOIL CONDITIONS.
2. USE CLSM WHERE SPECIFIED AND WHERE REQUIRED BY THE ENGINEER.
3. IN AREAS WHERE NATIVE BACKFILL IS BROUGHT TO THE SURFACE AND IS TO BE SEED, DO NOT COMPACT THE TOP 2".
4. WHERE WATERLINES ARE WRAPPED WITH POLYETHYLENE ENCASMENT OR COAL-TAR COATED STEEL PIPE, SAND SHALL BE USED WITHIN THE ENTIRE PIPE ZONE AREA.

**CITY OF GRESHAM**

## TRENCH AND BACKFILL

PWS VERSION: JAN 2024

DRAWN **KRB**

REV. DATE **JAN 2024**

APPR. *[Signature]*

DETAIL NO. **214**