



SEWER DESIGN STANDARDS

PREPARED BY

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF INFRASTRUCTURE
BUREAU OF DESIGN

(SEPTEMBER 2007) REVISED SEPTEMBER 2025

SEWER DESIGN STANDARDS

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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR SEWER DESIGN CRITERIA - MANHOLE SPACING AND LOCATION ON PIPE SEWERS

A. MAXIMUM SPACING OF MANHOLE ON PIPE SEWERS

<u>PIPE SIZE:</u>	<u>RECOMMENDED MAXIMUM SPACING</u>	<u>ABSOLUTE MAXIMUM SPACING</u>
10" DIA. TO 36" DIA. CIRCULAR PIPE 14"H x 23"W TO 29"H x 45"W HORIZONTAL ELLIPTICAL PIPE 23"H x 14"W TO 45"H x 29"W VERTICAL ELLIPTICAL PIPE	250'	300'
42" DIA. TO 72" DIA. CIRCULAR PIPE 34"H x 53"W TO 58"H x 91"W HORIZONTAL ELLIPTICAL PIPE 53"H x 34"W TO 91"H x 58"W VERTICAL ELLIPTICAL PIPE	400'	500'
78" DIA. AND LARGER CIRCULAR PIPE 63"H x 98"W AND LARGER HORIZONTAL ELLIPTICAL PIPE 98"H x 63"W AND LARGER VERTICAL ELLIPTICAL PIPE	600'	800'

B. MANHOLE LOCATION ON PIPE SEWERS

1. AT ALL CHANGES IN GRADE OR ELEVATION FOR ALL SIZES OF SEWERS.
2. AT ALL CHANGES IN ALIGNMENT FOR ALL SIZES OF SEWERS.
3. AT ALL STREET INTERSECTIONS FOR SEWERS UP TO AND INCLUDING 24" DIAMETER.
4. AT ALL JUNCTIONS OF 2 OR MORE SEWERS.
5. AT ALL CATCH BASIN CONNECTIONS WHERE IT IS NOT PRACTICAL TO CONNECT DIRECTLY TO THE SEWER. A DIRECT CONNECTION SHALL NOT BE MADE TO A SEWER LESS THAN 60" IN DIAMETER.
6. THE TERM "DRY LOCATION" SHALL MEAN ANY LOCATION WHERE THE ENTIRE MANHOLE IS LOCATED ABOVE THE WATER TABLE AND IS IN NORMALLY DRY SOIL.
7. THE TERM "WET LOCATION" SHALL MEAN ANY LOCATION WHERE THE MANHOLE IS LOCATED IN WHOLE OR IN PART BELOW THE WATER TABLE OR IN NORMALLY WET SOIL.
8. SPECIAL CONSIDERATION WILL BE REQUIRED FOR SITUATIONS NOT COVERED HEREIN.


ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

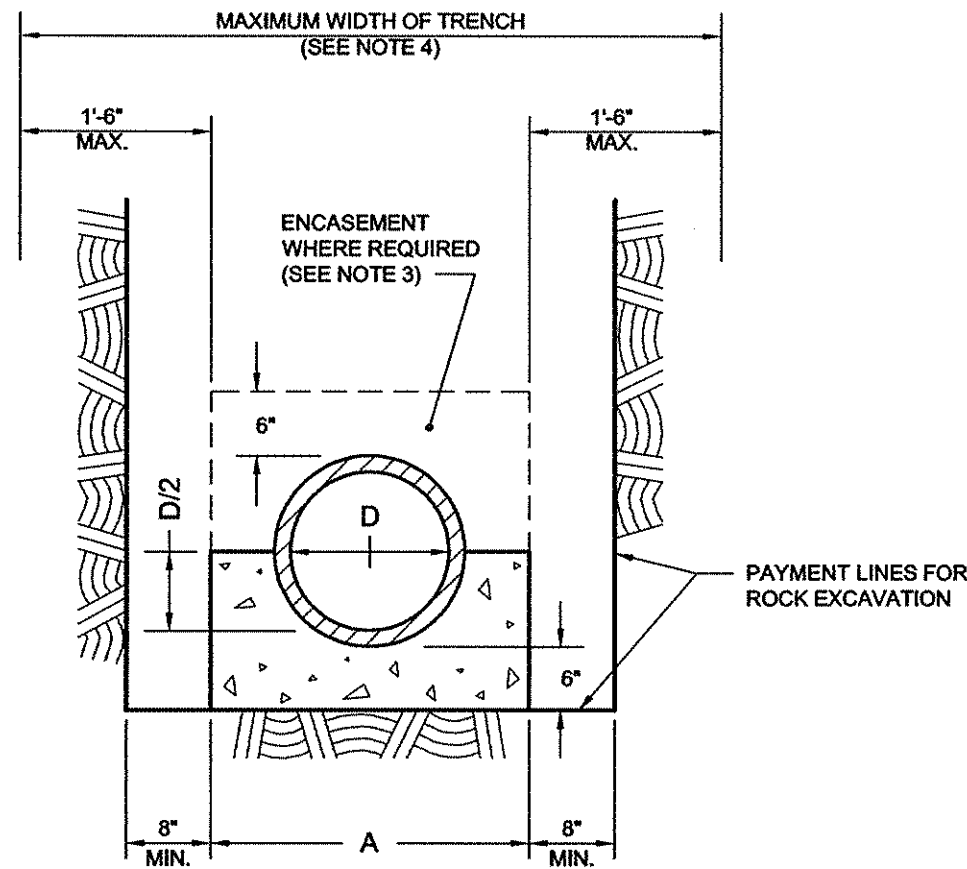
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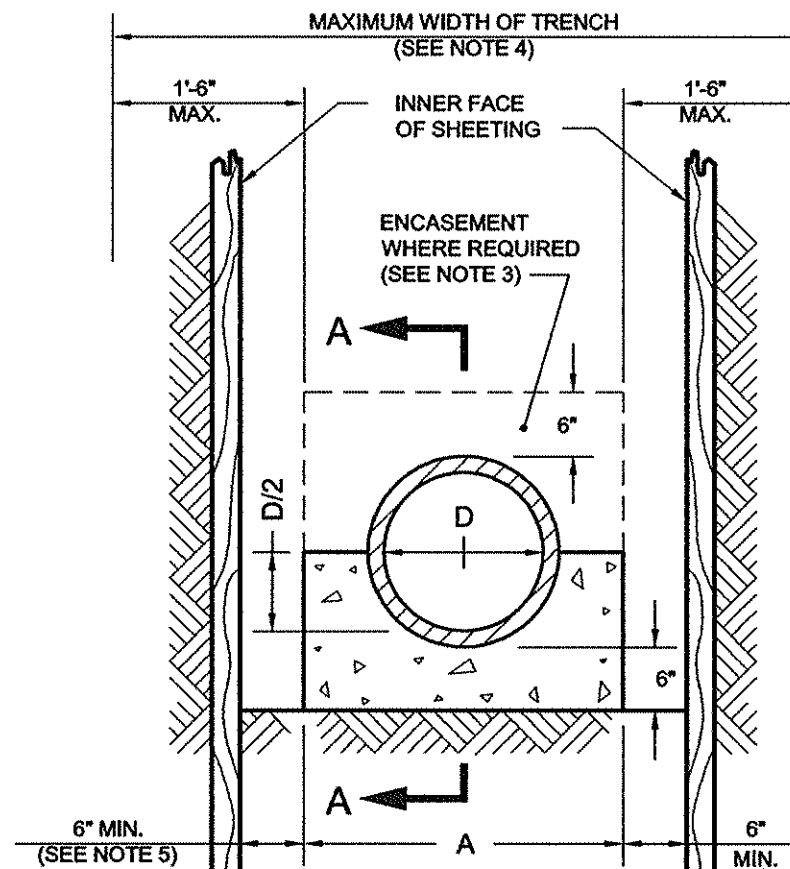

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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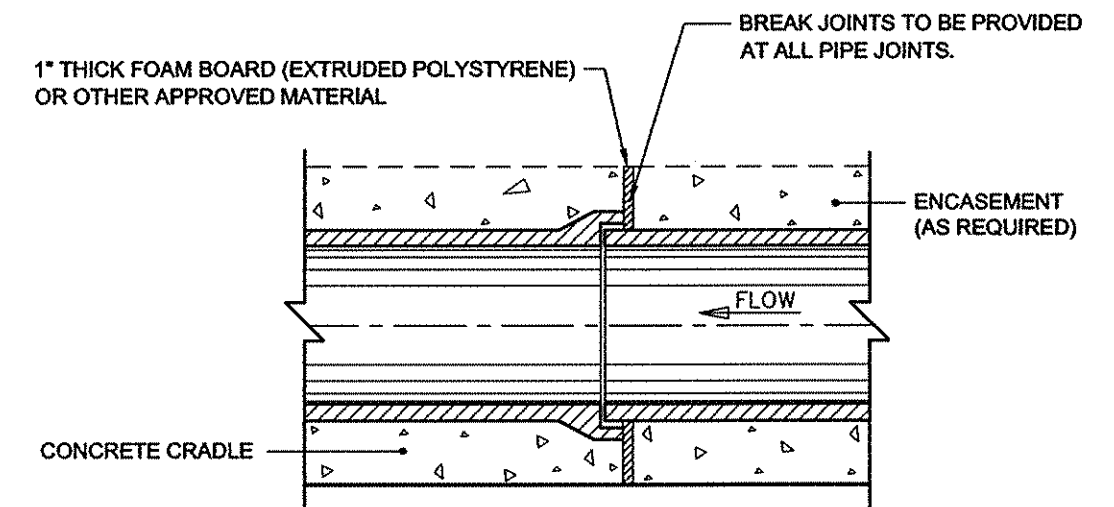
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTIONSTANDARD FOR VITRIFIED CLAY PIPE
ON CONCRETE CRADLE ON EARTH OR ON ROCK

SECTION ON ROCK



SECTION ON EARTH

D	A	MAX. COVER WITHOUT ENCSMT.	CONC. CRADLE CU. YD./L.F.	CONC. ENCSMT. CU. YD./L.F.
8"	1'-6"	22'	0.0408	0.0815
10"	2'-0"	20'	0.0596	0.1191
12"	2'-3"	18'	0.0708	0.1415
15"	2'-6"	16'	0.0831	0.1661
18"	2'-10"	15'	0.0998	0.1996

SECTION A-A
BREAK JOINTS TO CONCRETE BEDDING

NOTES:

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.

Gardip S. Saini

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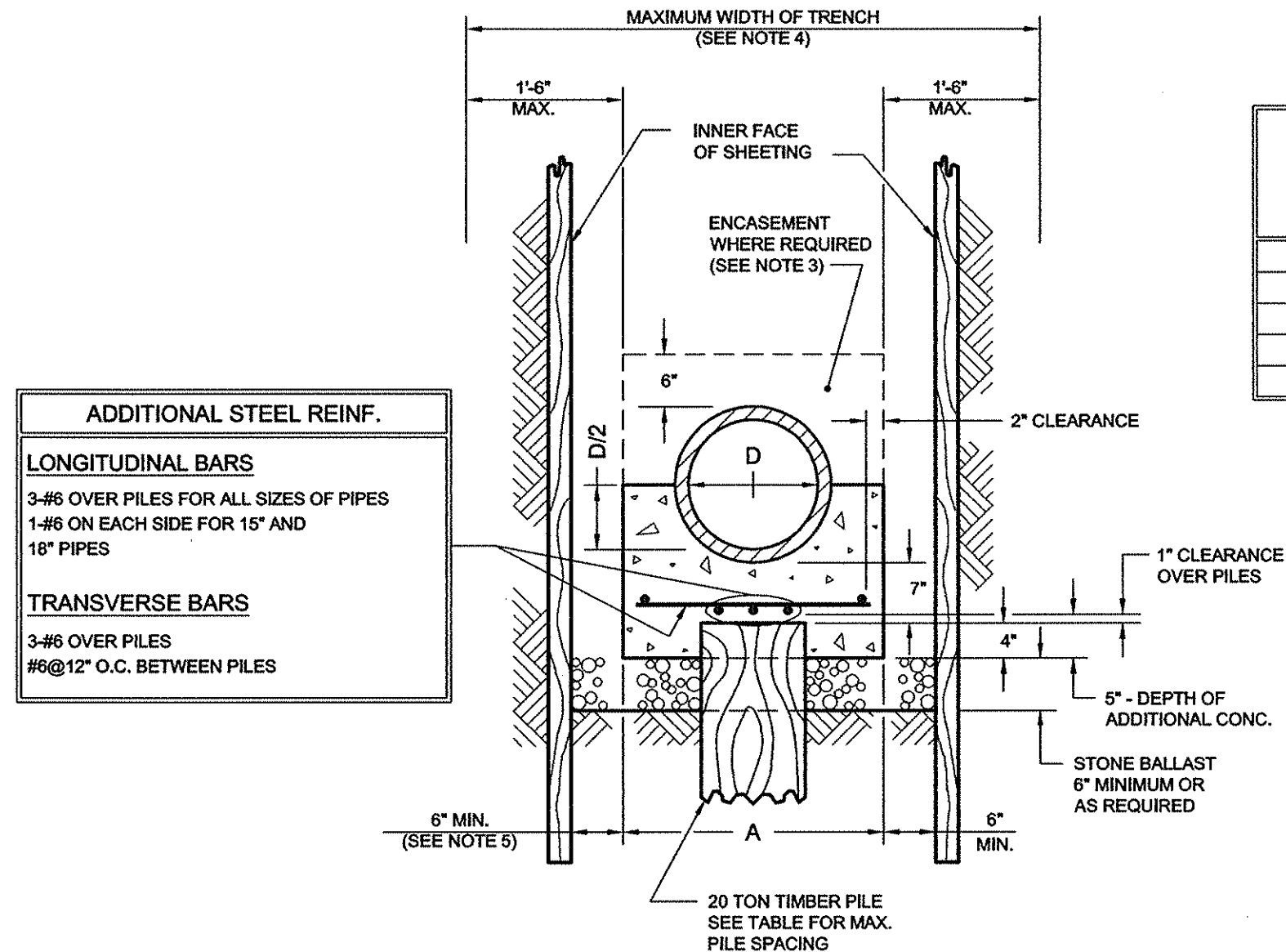
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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR VITRIFIED CLAY PIPE ON CONCRETE CRADLE ON PILES



D	A	MAXIMUM PILE SPACING				ADDITIONAL ITEMS/L.F.					STONE BALLAST CU. YD. PER L.F.
		10' COVER	15' COVER	20' COVER	25' COVER	ADD. CONC. CU. YD.	ADDITIONAL STL. REINF. (LBS.)				
							10' COVER	15' COVER	20' COVER	25' COVER	
8"	1'-6"	6'-0"	6'-0"	6'-0"	6'-0"	0.0232	6.85	6.85	6.85	6.85	0.0834
10"	2'-0"	6'-0"	6'-0"	6'-0"	6'-0"	0.0309	7.85	7.85	7.85	7.85	0.0926
12"	2'-3"	6'-0"	6'-0"	6'-0"	5'-0"	0.0348	8.35	8.35	8.35	8.54	0.0973
15"	2'-6"	6'-0"	6'-0"	5'-0"	4'-0"	0.0386	11.85	11.85	12.07	12.40	0.1019
18"	2'-10"	6'-0"	5'-0"	4'-0"	3'-6"	0.0438	12.52	12.77	13.15	13.95	0.1081

NOTES:

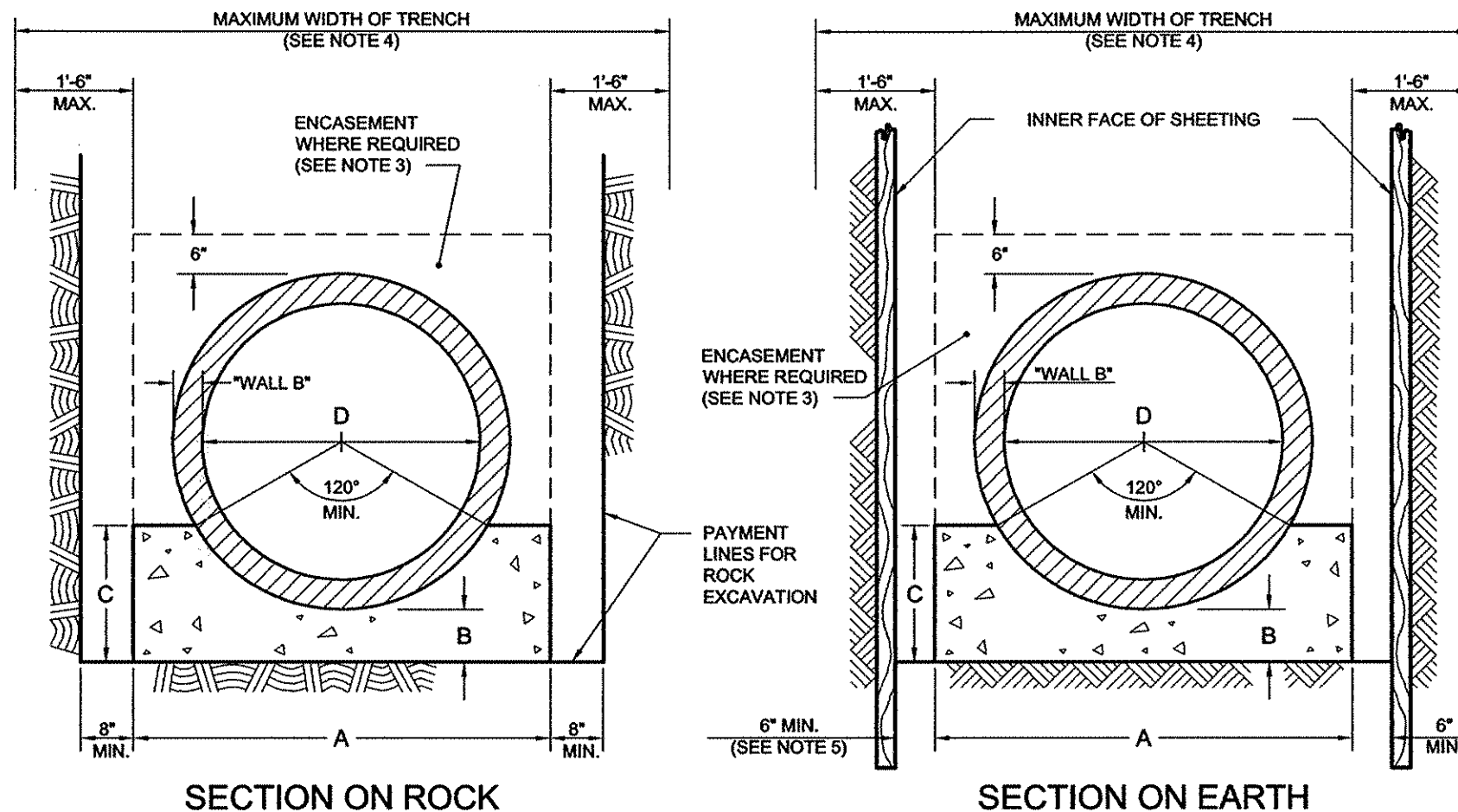
- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE. REBARS-GRADE 60.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.

Gurdeep S. Saini
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ASSOCIATE COMMISSIONER, DESIGN
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Thomas W. Lyons
P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTIONSTANDARD FOR CIRCULAR REINFORCED CONCRETE PIPE
ON CONCRETE CRADLE ON EARTH OR ON ROCK

D	A	B	C	CONC. CRADLE CU. YD./L.F.	CONC. ENCSMT. CU. YD./L.F.	MAX. COVER FOR PIPE CLASS		
						III	IV	V
24"	3'-6"	6"	1'-2"	0.1124	0.2719	12'-0"	18'-0"	27'-0"
30"	4'-1"	6"	1'-4"	0.1414	0.3410	12'-6"	18'-6"	27'-6"
36"	4'-8"	7"	1'-6"	0.1829	0.4300	12'-6"	18'-6"	28'-0"
42"	5'-3"	8"	1'-9"	0.2348	0.5279	12'-6"	18'-6"	28'-0"
48"	5'-10"	9"	2'-0"	0.2928	0.6348	12'-6"	18'-6"	28'-6"
54"	6'-5"	10"	2'-3"	0.3570	0.7507	13'-0"	19'-0"	28'-6"
60"	7'-0"	11"	2'-5"	0.4219	0.8757	13'-0"	19'-0"	29'-0"
66"	7'-7"	12"	2'-8"	0.4981	1.0097	13'-0"	19'-0"	29'-0"
72"	8'-2"	13"	2'-11"	0.5806	1.1526	13'-0"	19'-6"	29'-6"
78"	8'-9"	14"	3'-2"	0.6691	1.3046	13'-6"	19'-6"	29'-6"
84"	9'-4"	15"	3'-4"	0.7574	1.4656	13'-6"	20'-0"	29'-6"
90"	9'-11"	17"	3'-8"	0.8886	1.6662	14'-0"	20'-0"	30'-0"
96"	10'-6"	18"	3'-11"	0.9972	1.8470	14'-0"	20'-0"	30'-0"

NOTES:

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
- (6) CRADLE WIDTH "A" IS BASED ON MINIMUM WALL THICKNESS PER ASTM C76 FOR "WALL B" FOR CLASS III, IV & V - R.C.P.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

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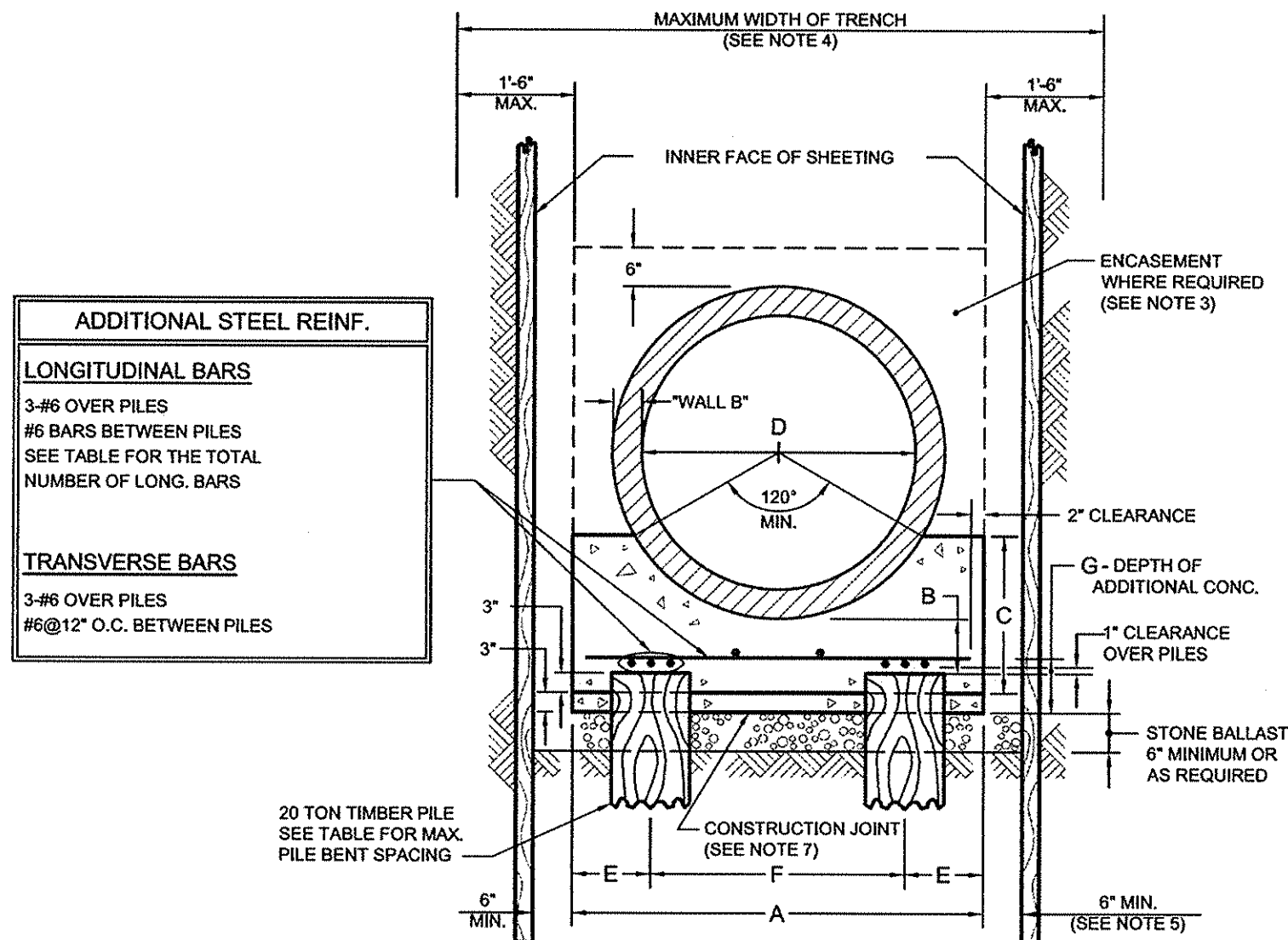
Thomas Wynne

P.E.

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTIONSTANDARD FOR 24" DIA. TO 48" DIA. CIRCULAR REINFORCED
CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 2 PILE BENTS
(20' AND 25' COVER)

D	A	B	C	E	F	G	MAXIMUM PILE BENT SPACING		#6 LONG. BARS	ADDITIONAL ITEMS/L.F.			STONE BALLAST CU. YD. PER L.F.
							20' COVER	25' COVER		ADD. STL. REINF. (LBS.)		ADD. CONC. CU. YD.	
										20' COVER	25' COVER		
24"	3'-6"	10"	1'-9"	9"	2'-0"	10"	6'-0"	6'-0"	7	16.86	16.86	0.1081	0.1204
30"	4'-1"	8"	1'-9"	9"	2'-7"	8"	5'-6"	5'-0"	7	17.69	18.40	0.1009	0.1312
36"	4'-8"	7"	1'-9"	12"	2'-8"	6"	5'-0"	4'-6"	7	19.63	19.20	0.0865	0.1420
42"	5'-3"	8"	2'-0"	12"	3'-3"	6"	4'-3"	4'-0"	8	22.45	23.10	0.0973	0.1528
48"	5'-10"	9"	2'-3"	12"	3'-10"	6"	3'-9"	3'-6"	9	26.74	25.32	0.1081	0.1636

NOTES:

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE. REBARS-GRADE 60.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
- (6) CRADLE WIDTH "A" IS BASED ON MINIMUM WALL THICKNESS PER ASTM C76 FOR "WALL B" FOR CLASS III, IV & V - R.C.P.
- (7) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wynne

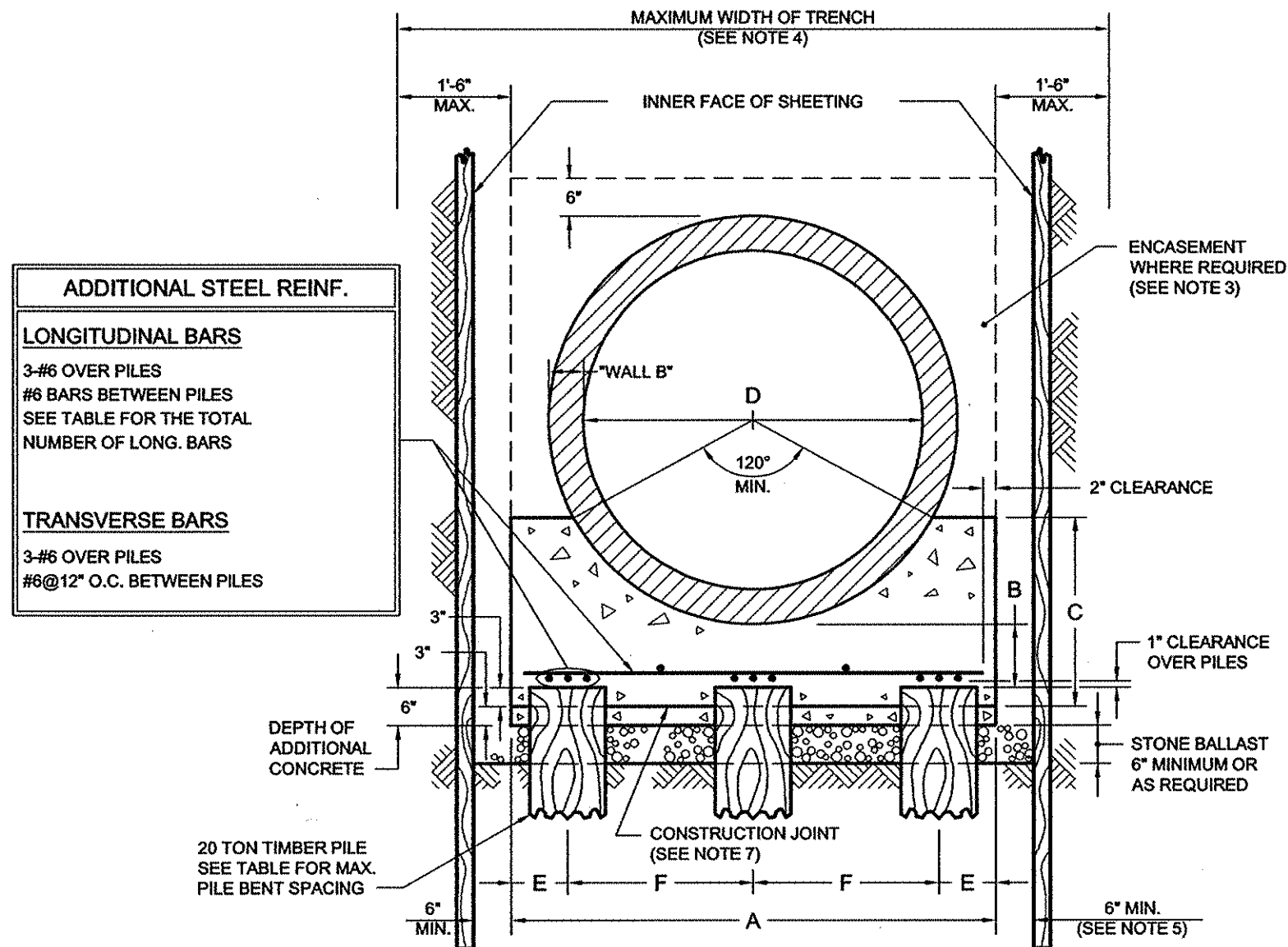
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EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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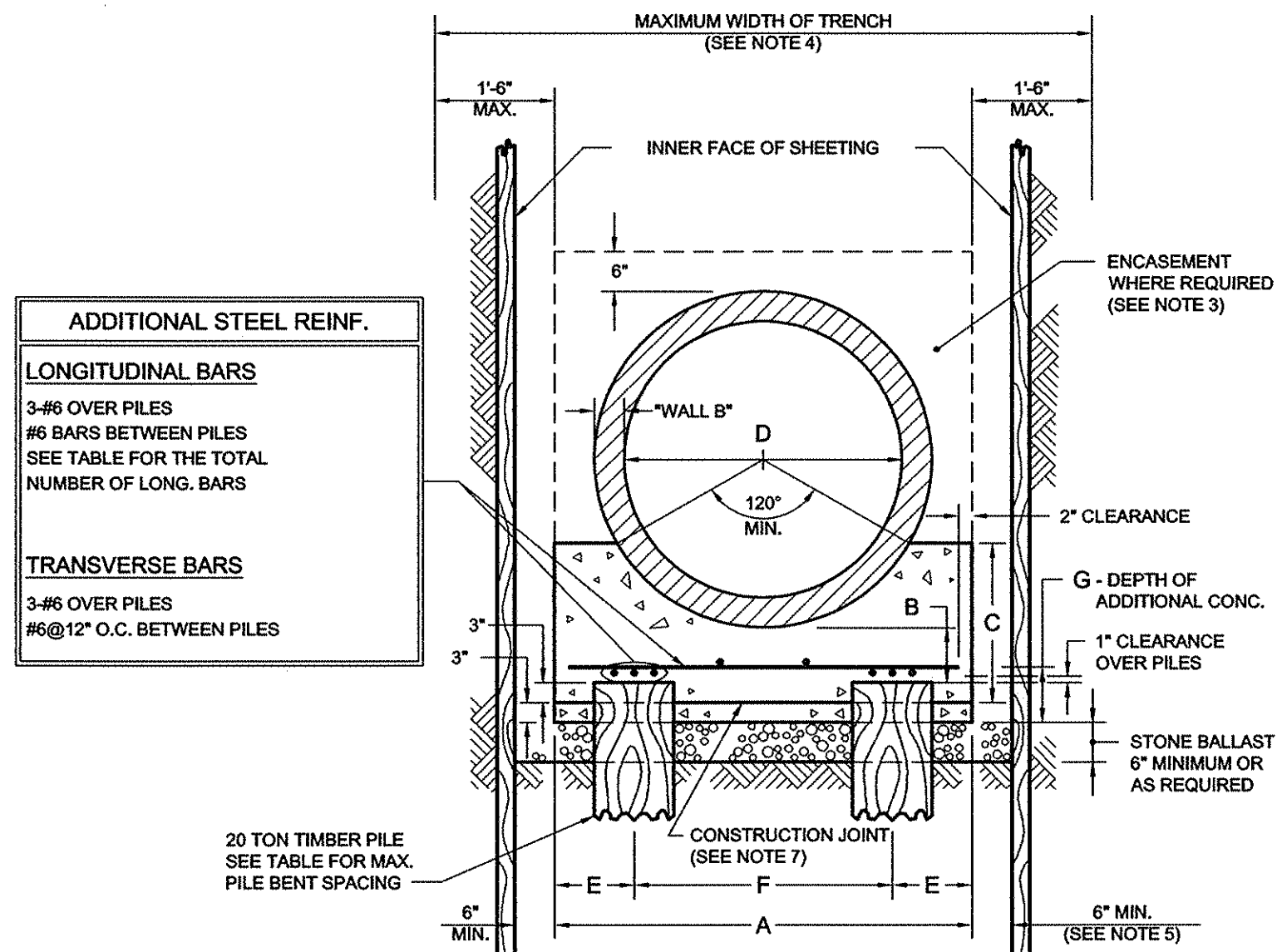
STANDARD FOR 54" DIA. TO 96" DIA. CIRCULAR REINFORCED CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 3 PILE BENTS (20' AND 25' COVER)



D	A	B	C	E	F	MAXIMUM PILE BENT SPACING		#6 LONG. BARS	ADDITIONAL ITEMS/L.F.			STONE BALLAST CU. YD. PER L.F.
						20' COVER	25' COVER		ADD. STL. REINF. (LBS.)		ADD. CONC. CU. YD.	
									20' COVER	25' COVER		
54"	6'-5"	10"	2'-6"	9"	2'-5 1/2"	5'-3"	4'-9"	11	28.71	29.99	0.1189	0.1744
60"	7'-0"	11"	2'-8"	12"	2'-6"	4'-9"	4'-3"	11	31.28	30.66	0.1297	0.1852
66"	7'-7"	12"	2'-11"	12"	2'-9 1/2"	4'-3"	4'-0"	11	31.90	32.86	0.1405	0.1960
72"	8'-2"	13"	3'-2"	12"	3'-1"	4'-0"	3'-6"	13	37.18	36.34	0.1513	0.2068
78"	8'-9"	14"	3'-5"	12"	3'-4 1/2"	3'-6"	3'-3"	13	37.59	38.98	0.1621	0.2176
84"	9'-4"	15"	3'-7"	12"	3'-8"	3'-3"	3'-0"	13	40.33	42.06	0.1729	0.2284
90"	9'-11"	17"	3'-11"	12"	3'-11 1/2"	3'-0"	2'-9"	15	46.53	48.71	0.1837	0.2392
96"	10'-6"	18"	4'-2"	12"	4'-3"	3'-0"	2'-6"	15	47.99	53.01	0.1945	0.2500

NOTES:

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE. REBARS-GRADE 60.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
- (6) CRADLE WIDTH "A" IS BASED ON MINIMUM WALL THICKNESS PER ASTM C76 FOR "WALL B" FOR CLASS III, IV & V - R.C.P.
- (7) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTIONSTANDARD FOR 24" DIA. TO 60" DIA. CIRCULAR REINFORCED
CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 2 PILE BENTS
(5', 10' AND 15' COVER)

D	A	B	C	E	F	G	MAXIMUM PILE BENT SPACING			#6 LONG. BARS	ADDITIONAL ITEMS/L.F.				STONE BALLAST CU. YD. PER L.F.
							5' COVER	10' COVER	15' COVER		ADD. STL. REINF. (LBS.)		ADD. CONC. CU. YD.		
											5' COVER	10' COVER		15' COVER	
24"	3'-6"	9"	1'-8"	9"	2'-0"	9"	6'-0"	6'-0"	6'-0"	7	16.86	16.86	16.86	0.0973	0.1204
30"	4'-1"	8"	1'-9"	9"	2'-7"	8"	6'-0"	6'-0"	6'-0"	7	18.03	18.03	18.03	0.1009	0.1312
36"	4'-8"	7"	1'-9"	12"	2'-8"	6"	6'-0"	6'-0"	5'-6"	7	19.20	19.20	18.80	0.0865	0.1420
42"	5'-3"	8"	2'-0"	12"	3'-3"	6"	6'-0"	6'-0"	4'-9"	8	21.87	21.87	22.90	0.0973	0.1528
48"	5'-10"	9"	2'-3"	12"	3'-10"	6"	6'-0"	5'-6"	4'-3"	9	24.54	24.04	25.19	0.1081	0.1636
54"	6'-5"	10"	2'-6"	12"	4'-5"	6"	6'-0"	4'-9"	4'-0"	9	25.70	26.99	27.23	0.1189	0.1744
60"	7'-0"	11"	2'-8"	12"	5'-0"	6"	6'-0"	4'-3"	3'-6"	10	28.38	29.16	29.33	0.1297	0.1852

NOTES:

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE. REBARS-GRADE 60.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
- (6) CRADLE WIDTH "A" IS BASED ON MINIMUM WALL THICKNESS PER ASTM C76 FOR "WALL B" FOR CLASS III, IV & V - R.C.P.
- (7) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.

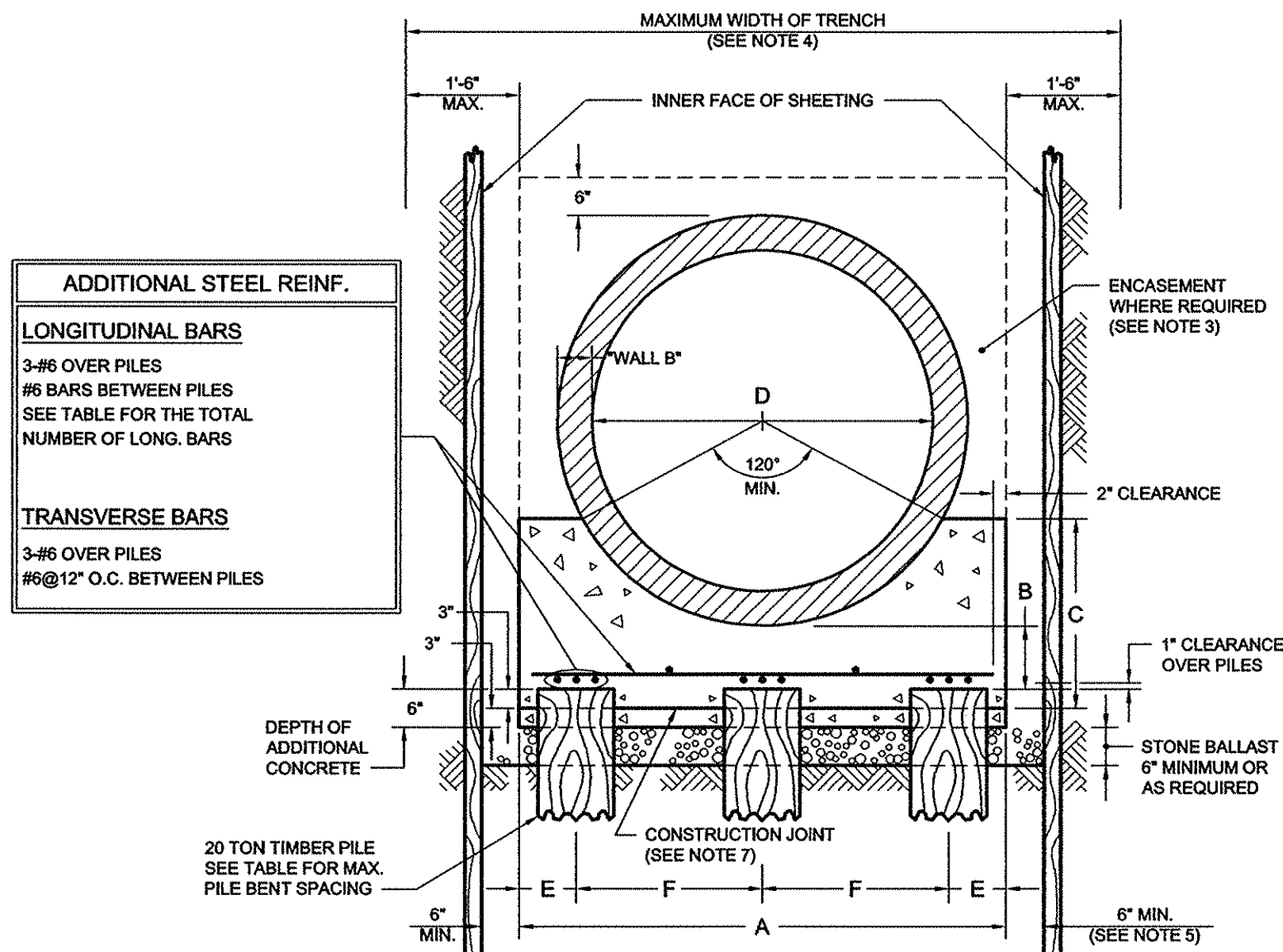
Gardner S. Saini P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

Thomas W. Wynn P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

STANDARD FOR 66" DIA. TO 96" DIA. CIRCULAR REINFORCED CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 3 PILE BENTS (5', 10' AND 15' COVER)



D	A	B	C	E	F	MAXIMUM PILE BENT SPACING			#6 LONG. BARS	ADDITIONAL ITEMS/L.F.				STONE BALLAST CU. YD. PER L.F.
						5' COVER	10' COVER	15' COVER		ADD. STL. REINF. (LBS.)			ADD. CONC. CU. YD.	
										5' COVER	10' COVER	15' COVER		
66"	7'-7"	12"	2'-11"	12"	2'-9 1/2"	6'-0"	6'-0"	4'-9"	11	31.05	31.05	32.57	0.1401	0.1960
72"	8'-2"	13"	3'-2"	12"	3'-1"	6'-0"	5'-6"	4'-6"	13	35.22	34.50	35.22	0.1513	0.2068
78"	8'-9"	14"	3'-5"	12"	3'-4 1/2"	6'-0"	5'-0"	4'-0"	13	36.39	37.23	38.49	0.1621	0.2176
84"	9'-4"	15"	3'-7"	12"	3'-8"	6'-0"	4'-6"	3'-9"	13	37.55	37.55	41.16	0.1729	0.2284
90"	9'-11"	17"	3'-11"	12"	3'-11 1/2"	5'-9"	4'-3"	3'-6"	15	42.56	42.86	43.10	0.1837	0.2392
96"	10'-6"	18"	4'-2"	12"	4'-3"	5'-3"	4'-0"	3'-3"	15	42.90	45.44	46.03	0.1945	0.2500

NOTES:

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE. REBARS-GRADE 60.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS V PIPE IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
- (6) CRADLE WIDTH "A" IS BASED ON MINIMUM WALL THICKNESS PER ASTM C76 FOR "WALL B" FOR CLASS III, IV & V - R.C.P.
- (7) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

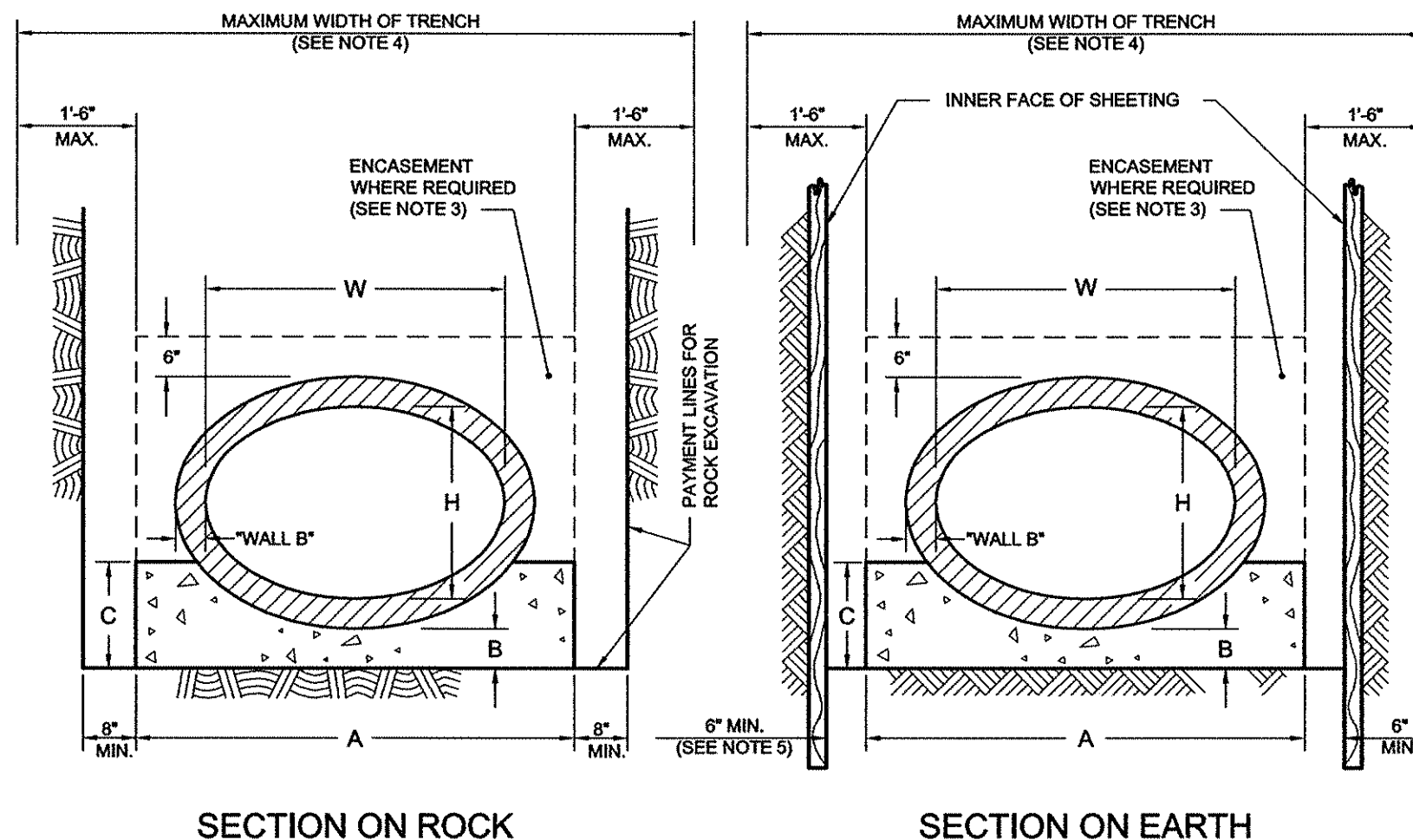
P.E.

8/14/18
DATE

Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

STANDARD FOR HORIZONTAL ELLIPTICAL REINFORCED
CONCRETE PIPE ON CONCRETE CRADLE ON EARTH OR ON ROCK

W	H	EQUIV. DIA.	A	B	C	CONC. CRADLE CU. YD./L.F.	CONC. ENCSMT. CU. YD./L.F.	MAXIMUM COVER FOR PIPE CLASS	
								HE-III	HE-IV
23"	14"	18"	3'-6"	6"	0'-11"	0.0961	0.2281	12'-6"	19'-0"
30"	19"	24"	4'-1"	6"	1'-1"	0.1219	0.2846	13'-0"	19'-6"
38"	24"	30"	4'-10"	6"	1'-2"	0.1510	0.3594	13'-0"	19'-6"
45"	29"	36"	5'-6"	6"	1'-4"	0.1845	0.4343	13'-0"	19'-6"
53"	34"	42"	6'-3"	7"	1'-6"	0.2377	0.5395	13'-0"	20'-0"
60"	38"	48"	6'-11"	7"	1'-7"	0.2721	0.6207	13'-0"	20'-0"
68"	43"	54"	7'-8"	8"	1'-10"	0.3422	0.7437	13'-6"	20'-6"
76"	48"	60"	8'-5"	9"	2'-0"	0.4139	0.8774	13'-6"	20'-6"
83"	53"	66"	9'-1"	10"	2'-3"	0.4947	1.0137	13'-6"	20'-6"
91"	58"	72"	9'-10"	10"	2'-4"	0.5499	1.1376	14'-0"	21'-0"
98"	63"	78"	10'-6"	11"	2'-7"	0.6385	1.2725	14'-0"	21'-0"
106"	68"	84"	11'-3"	12"	2'-10"	0.7467	1.4638	14'-0"	21'-0"
113"	72"	90"	11'-11"	13"	3'-0"	0.8434	1.6266	14'-6"	21'-0"
121"	77"	96"	12'-8"	14"	3'-2"	0.9544	1.8192	15'-0"	21'-6"

NOTES:

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS HE-IV PIPE IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
- (6) CRADLE WIDTH "A" IS BASED ON MINIMUM WALL THICKNESS PER ASTM C507 FOR "WALL B" FOR CLASS HE-III AND HE-IV - R.C.P.

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

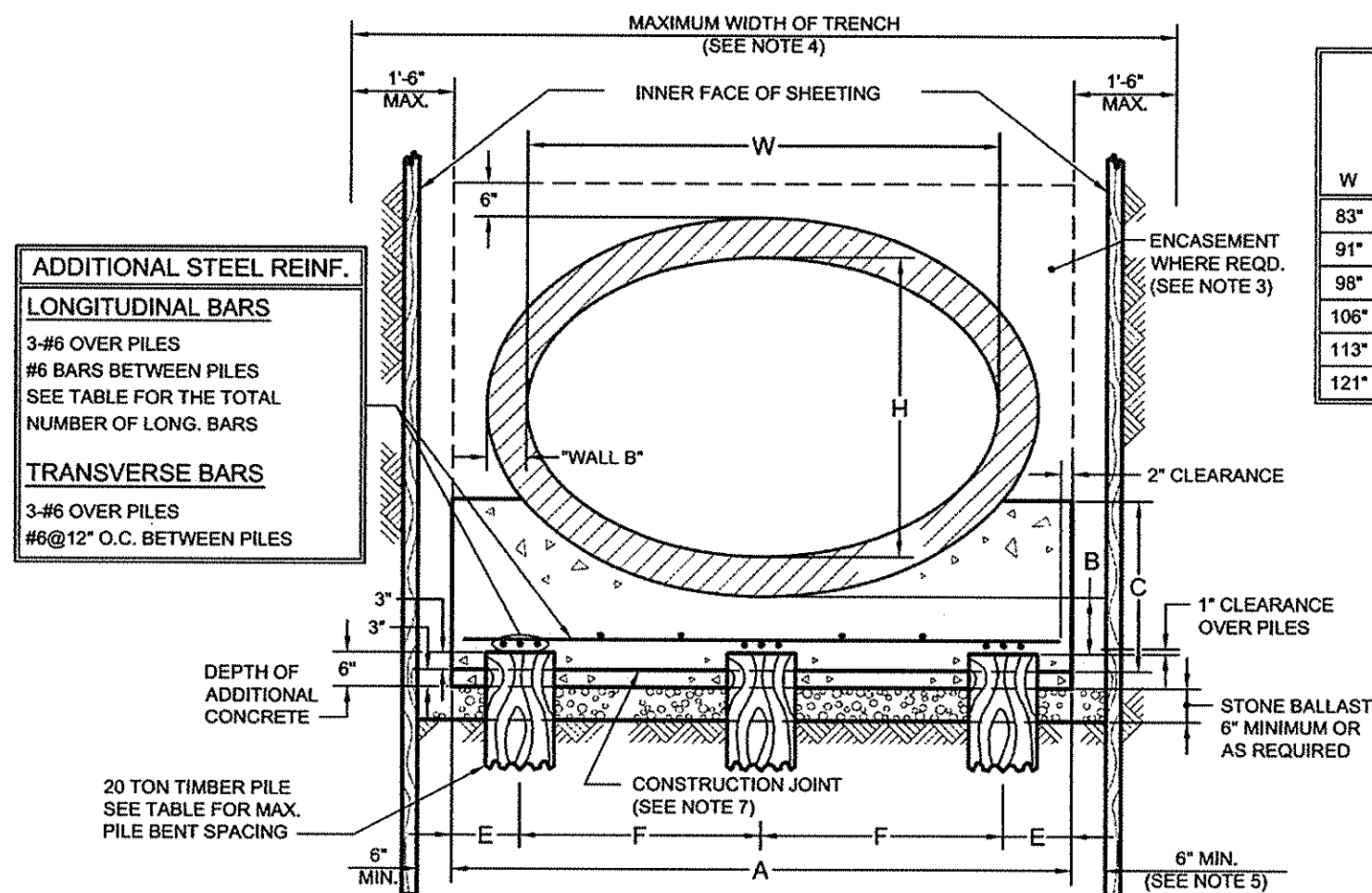
8/14/18
DATE

Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

STANDARD FOR 83"W x 53"H TO 121"W x 77"H HORIZONTAL ELLIPTICAL REINFORCED CONCRETE PIPE ON CONCRETE CRADLE ON PILES - 3 PILE BENTS (5', 10' AND 15' COVER)



W	H	EQUIV. DIA.	A	B	C	E	F	MAXIMUM PILE BENT SPACING			#6 LONG. BARS	ADDITIONAL ITEMS/L.F.				STONE BALLAS CU. YD PER L.F.
								5' COVER	10' COVER	15' COVER		ADD. STL. REINF. (LBS.)			ADD. CONC. CU. YD.	
												5' COVER	10' COVER	15' COVER		
83"	53"	66"	9'-1"	10"	2'-6"	12"	3'-6 1/2"	6'-0"	5'-3"	4'-6"	13	37.05	37.05	37.05	0.1682	0.2238
91"	58"	72"	9'-10"	10"	2'-7"	12"	3'-11"	6'-0"	5'-0"	4'-0"	15	41.56	42.51	43.94	0.1821	0.2377
98"	63"	78"	10'-6"	11"	2'-10"	12"	4'-3"	6'-0"	4'-6"	3'-6"	15	42.89	42.89	44.35	0.1945	0.2500
106"	68"	84"	11'-3"	12"	3'-1"	12"	4'-7 1/2"	5'-6"	4'-0"	3'-3"	15	43.40	47.13	47.76	0.2084	0.2639
113"	72"	90"	11'-11"	13"	3'-3"	12"	4'-11 1/2"	5'-3"	3'-9"	3'-0"	17	48.73	53.37	54.53	0.2207	0.2763
121"	77"	96"	12'-8"	14"	3'-5"	12"	5'-4"	4'-9"	3'-6"	2'-9"	17	52.84	52.00	59.22	0.2346	0.2902

NOTES:

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE. REBARS-GRADE 60.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY ABOVE THE CONSTRUCTION JOINT.
- (3) ENCASEMENT REQUIRED ON PIPE WHICH HAS A COVER, FROM FINAL GRADE TO OUTER TOP OF THE PIPE, OF LESS THAN FOUR (4) FEET OR WHEN THE UPPER LIMIT OF COVER FOR CLASS HE-IV PIPE IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAX. WIDTH OF TRENCH SHALL BE SUCH THAT THE MAX. WIDTH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MIN. HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT BE GREATER THAN THE STANDARD CRADLE WIDTH PLUS EIGHTEEN (18) INCHES MAXIMUM EACH SIDE.
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.
- (6) CRADLE WIDTH "A" IS BASED ON MINIMUM WALL THICKNESS PER ASTM C507 FOR "WALL B" FOR CLASS HE-III AND HE-IV - R.C.P.
- (7) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT PROPER SUPPORT OF PIPE.

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

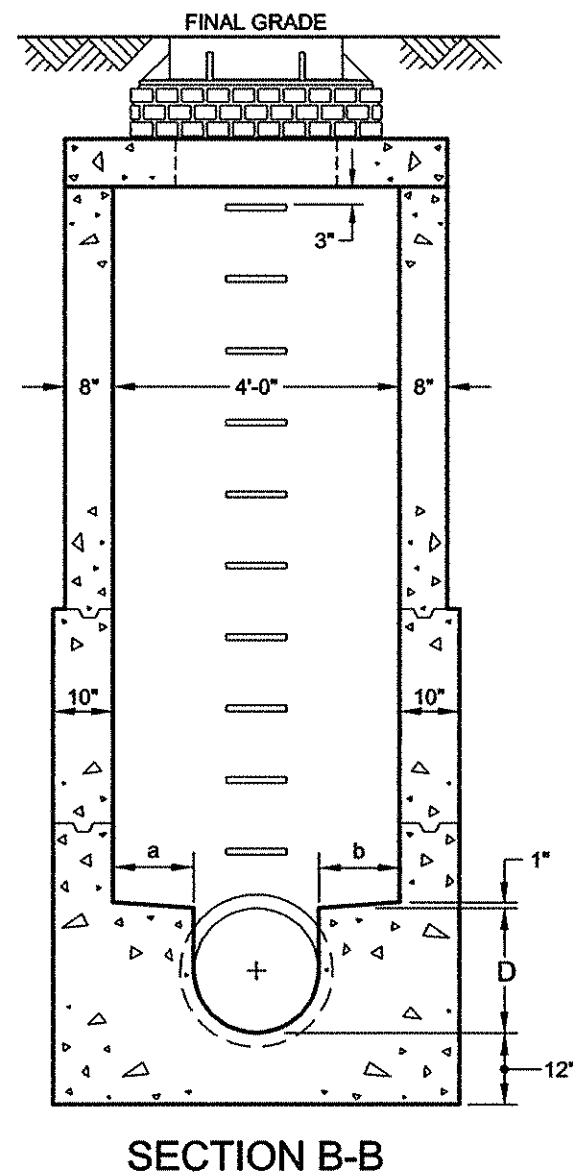
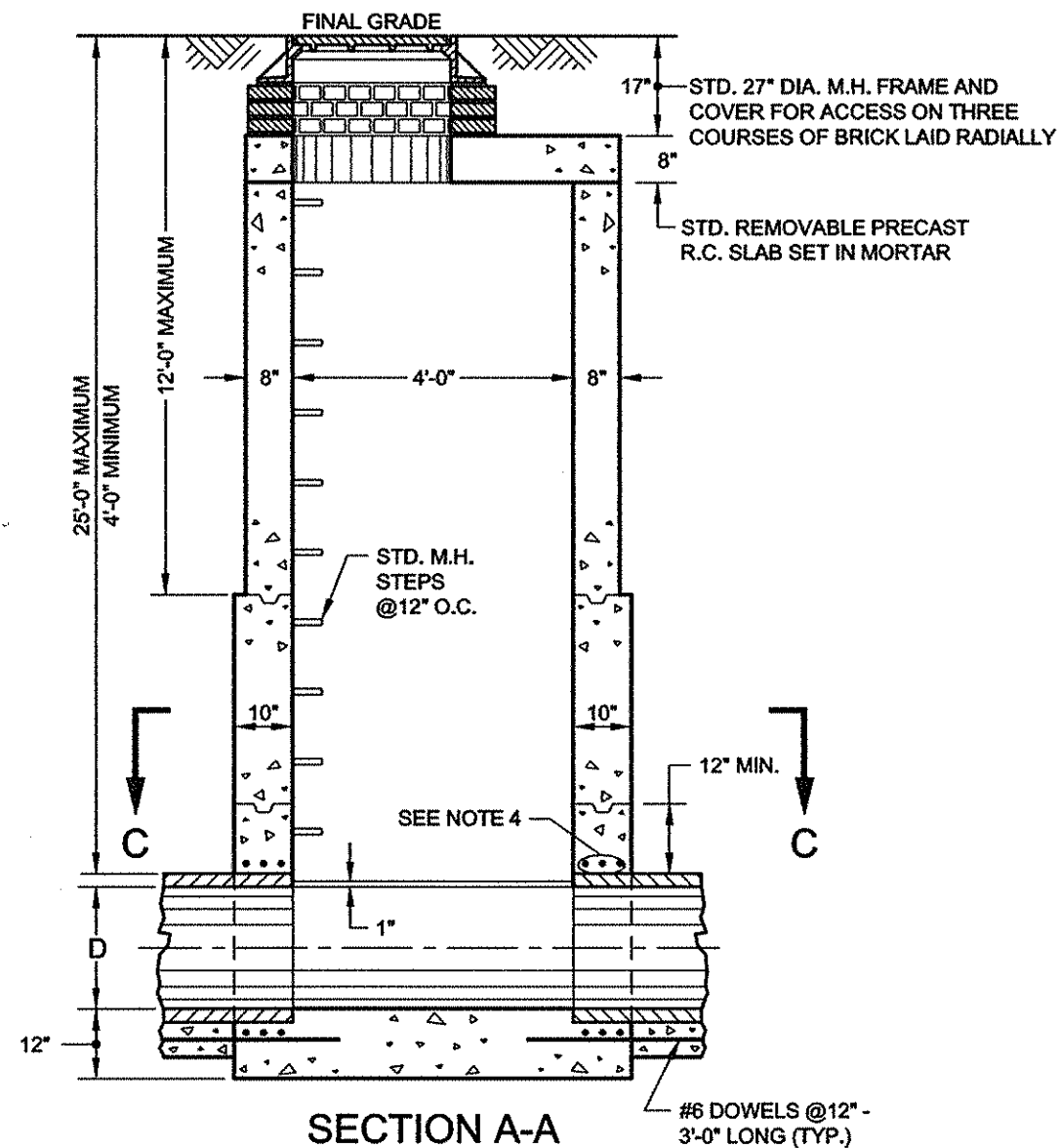
Thomas Leung
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

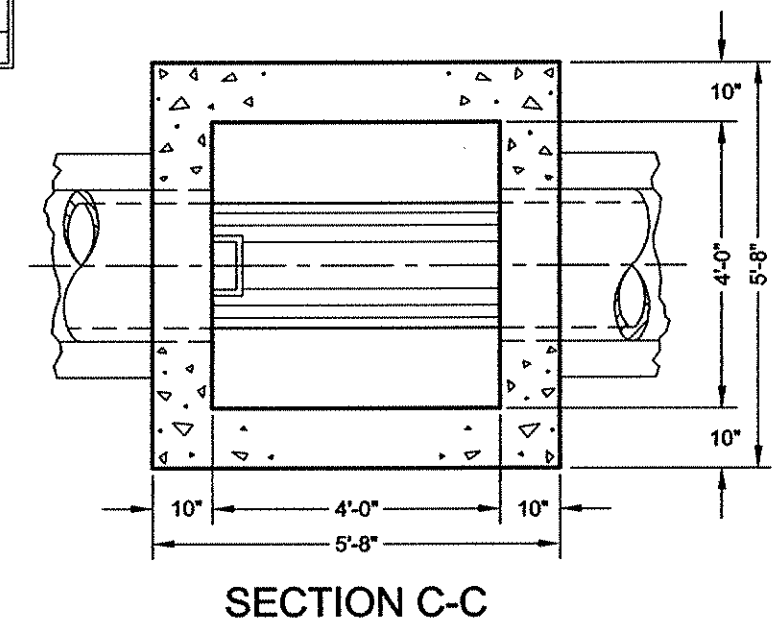
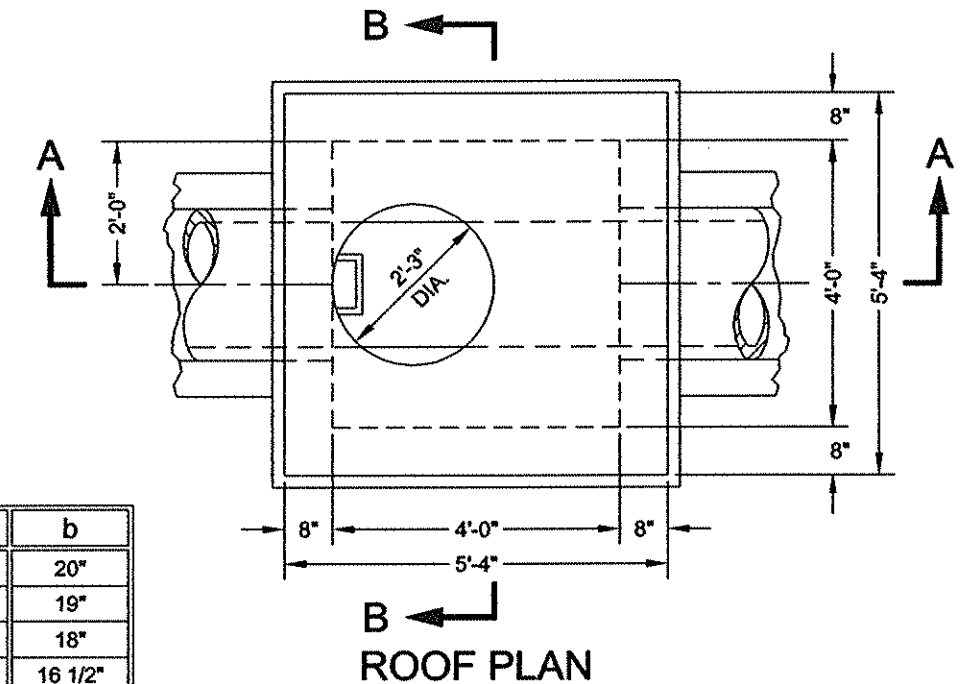
8/14/18
DATE

STANDARD FOR MANHOLE ON 8" DIA. TO 30" DIA. PIPE SEWERS IN DRY LOCATION

TYPE A-1 (12' MAX. COVER) AND TYPE A-2 (25' MAX. COVER)



D	a	b
8"	20"	20"
10"	19"	19"
12"	18"	18"
15"	16 1/2"	16 1/2"
18"	15"	15"
24"	12"	12"
30"	12"	6"



NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS- GRADE 60.
- (4) FOR ALL PIPE SEWERS EIGHTEEN (18) INCHES IN DIAMETER AND GREATER, ADD 3-#6@3" ABOVE AND BELOW THE PIPE.

Gandip S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

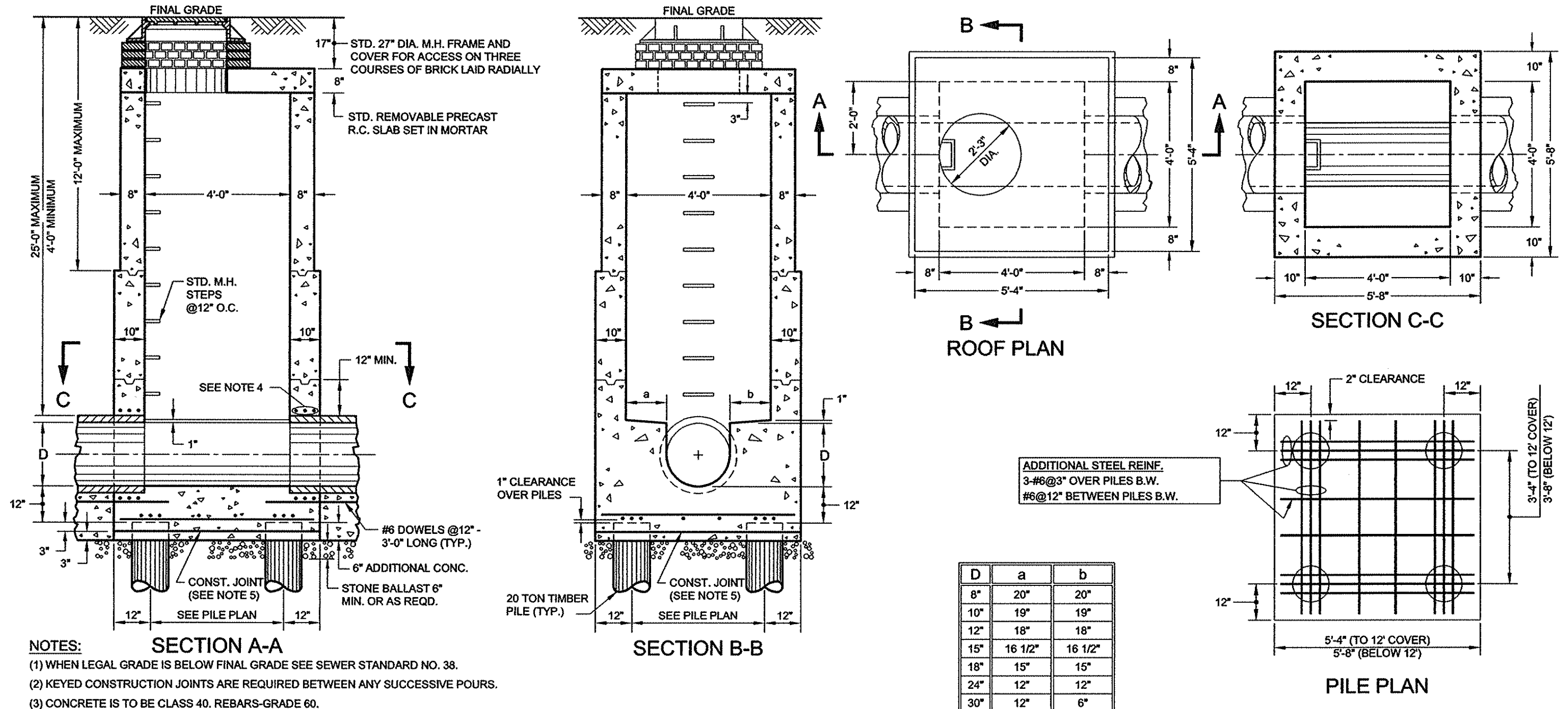
Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/19/18
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**STANDARD FOR MANHOLE ON 8" DIA. TO 30" DIA.
PIPE SEWERS ON PILE IN DRY LOCATION**
TYPE A-1 (12' MAX. COVER) AND TYPE A-2 (25' MAX. COVER)



NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) FOR ALL PIPE SEWERS EIGHTEEN (18) INCHES IN DIAMETER AND GREATER, ADD 3-#6@3" ABOVE AND BELOW THE PIPE.
- (5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

Sundip S. Saini P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

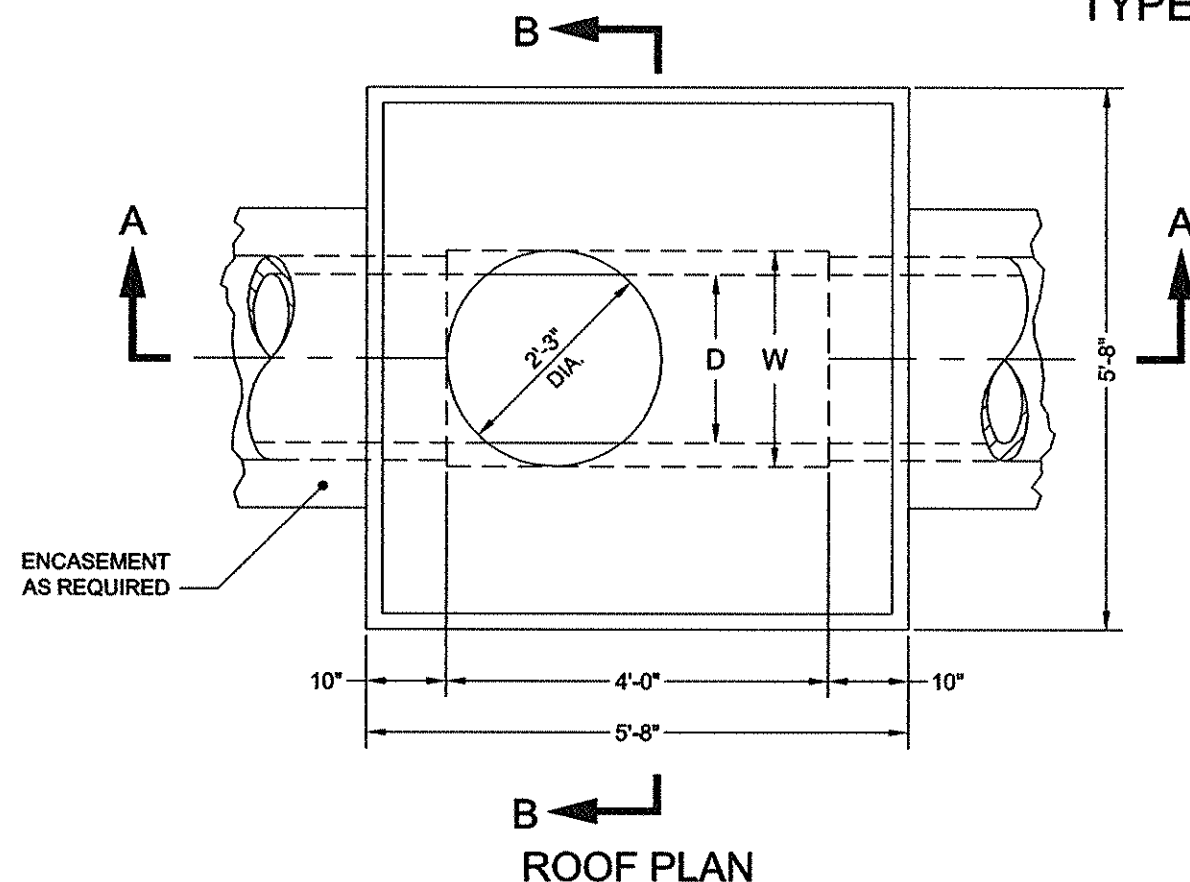
Thomas Wynne P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR SHALLOW MANHOLE ON 8" DIA. TO 30" DIA. PIPE SEWERS

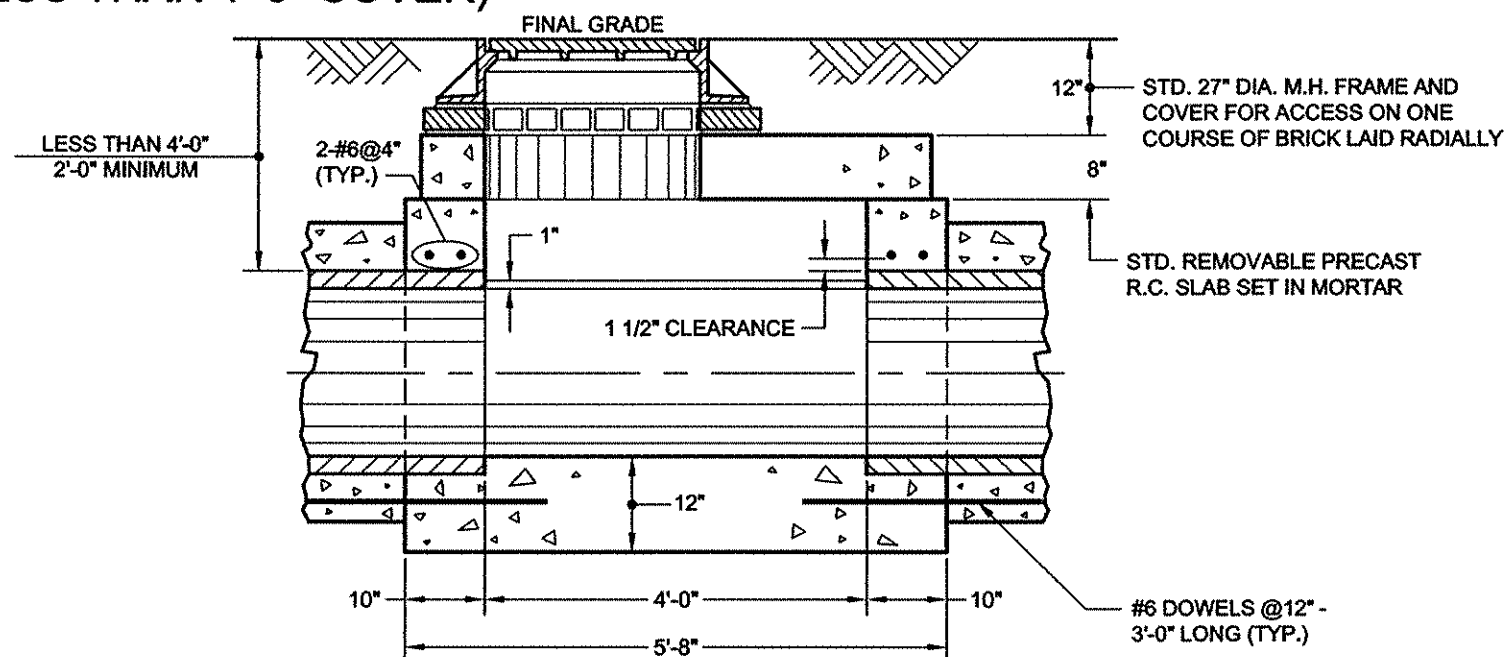
TYPE A-3 (LESS THAN 4'-0" COVER)



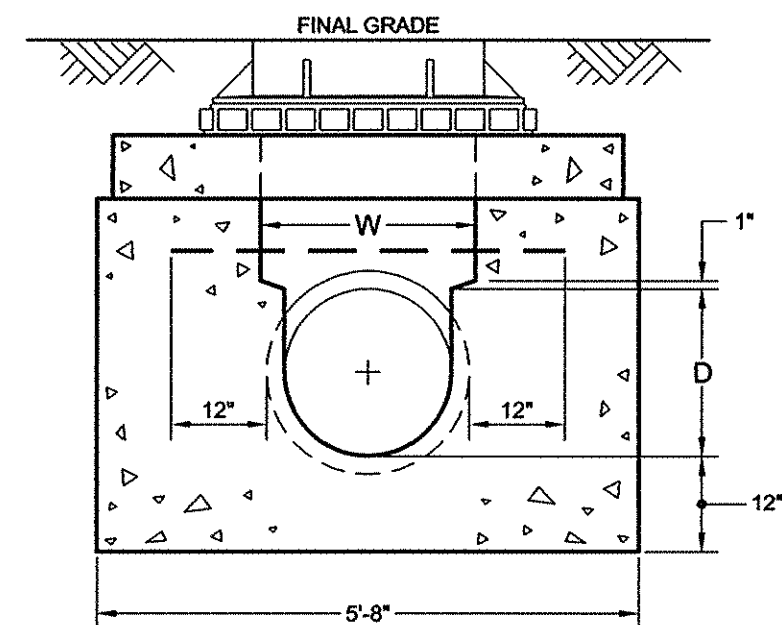
D	W
8"-24"	27"
30"	30"

NOTES:

- (1) WHEN PILES ARE REQUIRED, REFER TO STANDARD MANHOLE TYPE A-2 FOR PILE DETAILS.
- (2) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.



SECTION A-A



SECTION B-B

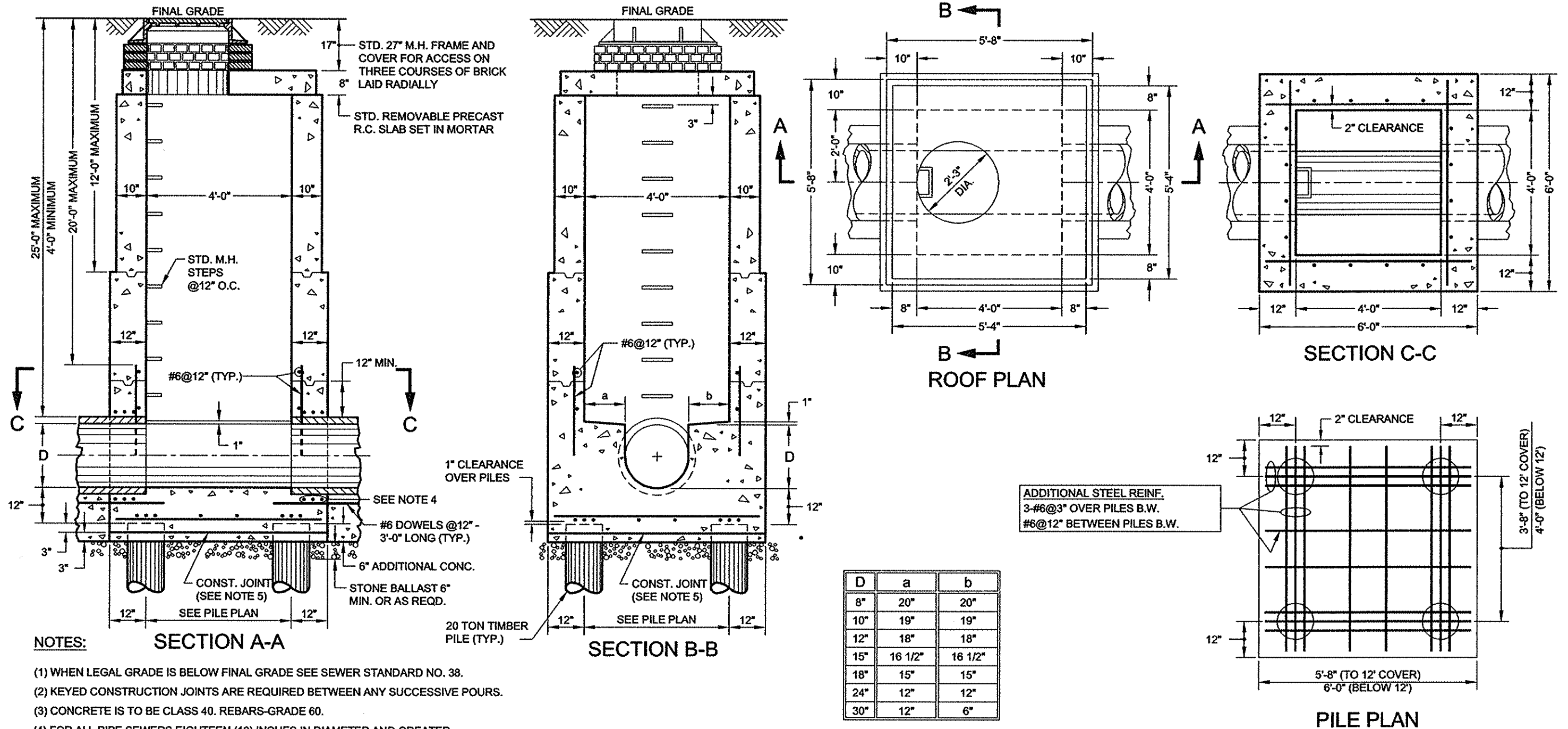
Gurdip S. Saini P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

Thomas Wynne P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

STANDARD FOR MANHOLE ON 8" DIA. TO 30" DIA. PIPE SEWERS ON PILES IN WET LOCATION TYPE B-1 (12' MAX. COVER) AND TYPE B-2 (25' MAX. COVER)



NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) FOR ALL PIPE SEWERS EIGHTEEN (18) INCHES IN DIAMETER AND GREATER, ADD 3-#6@3" ABOVE AND BELOW THE PIPE.
- (5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

Sundip S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

DATE

Thomas L. Lynam
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

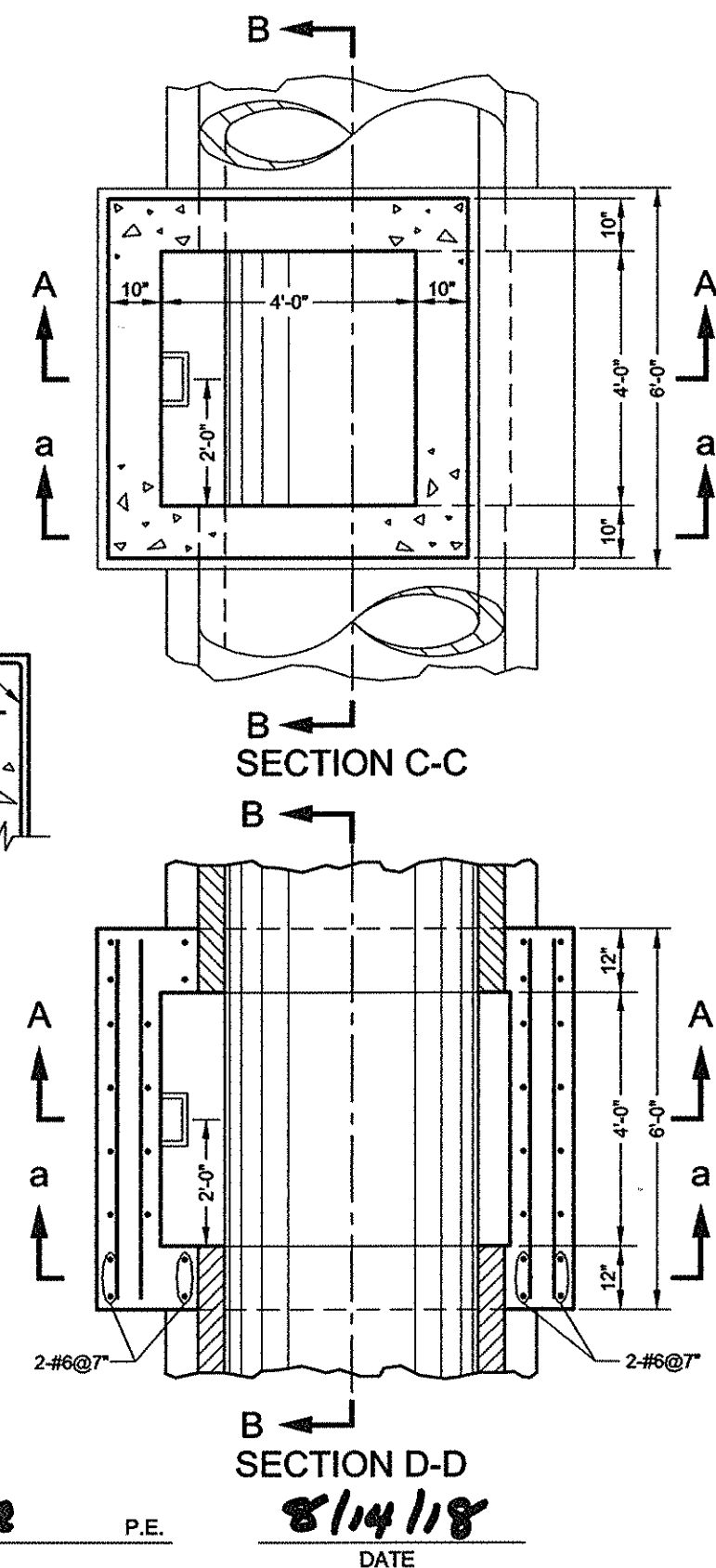
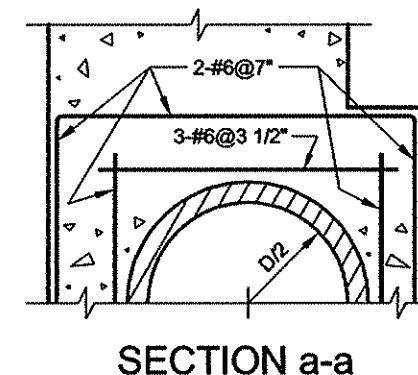
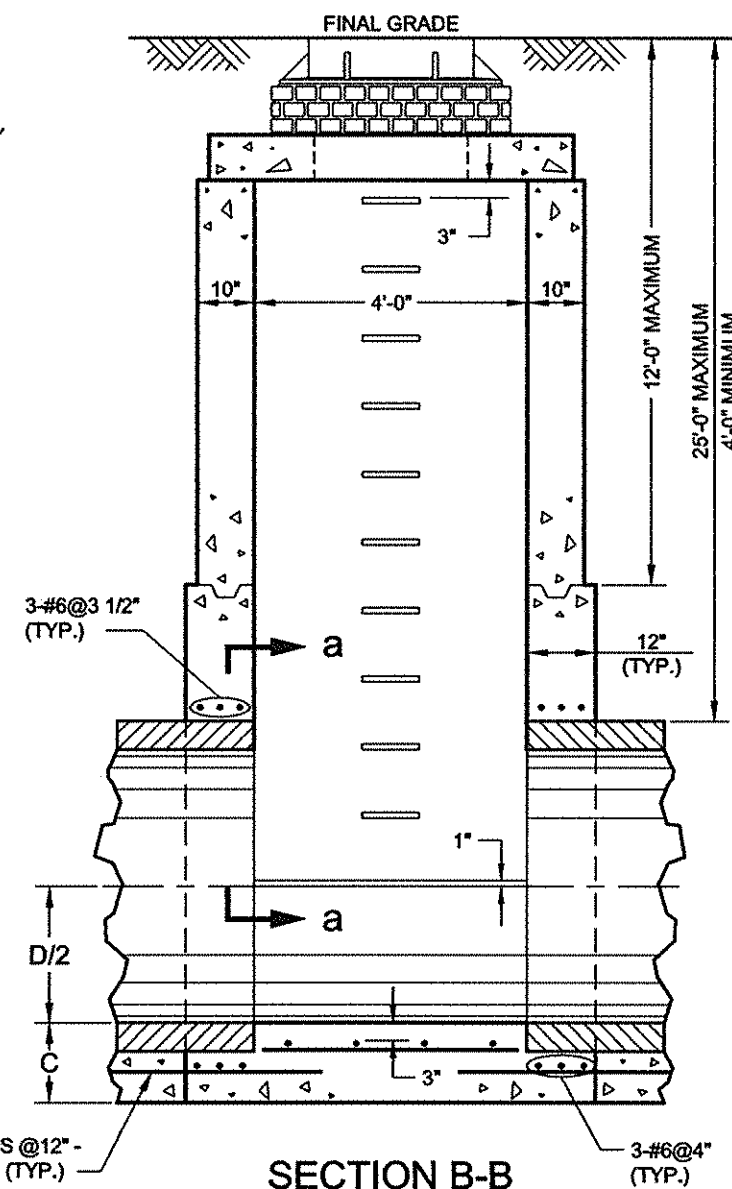
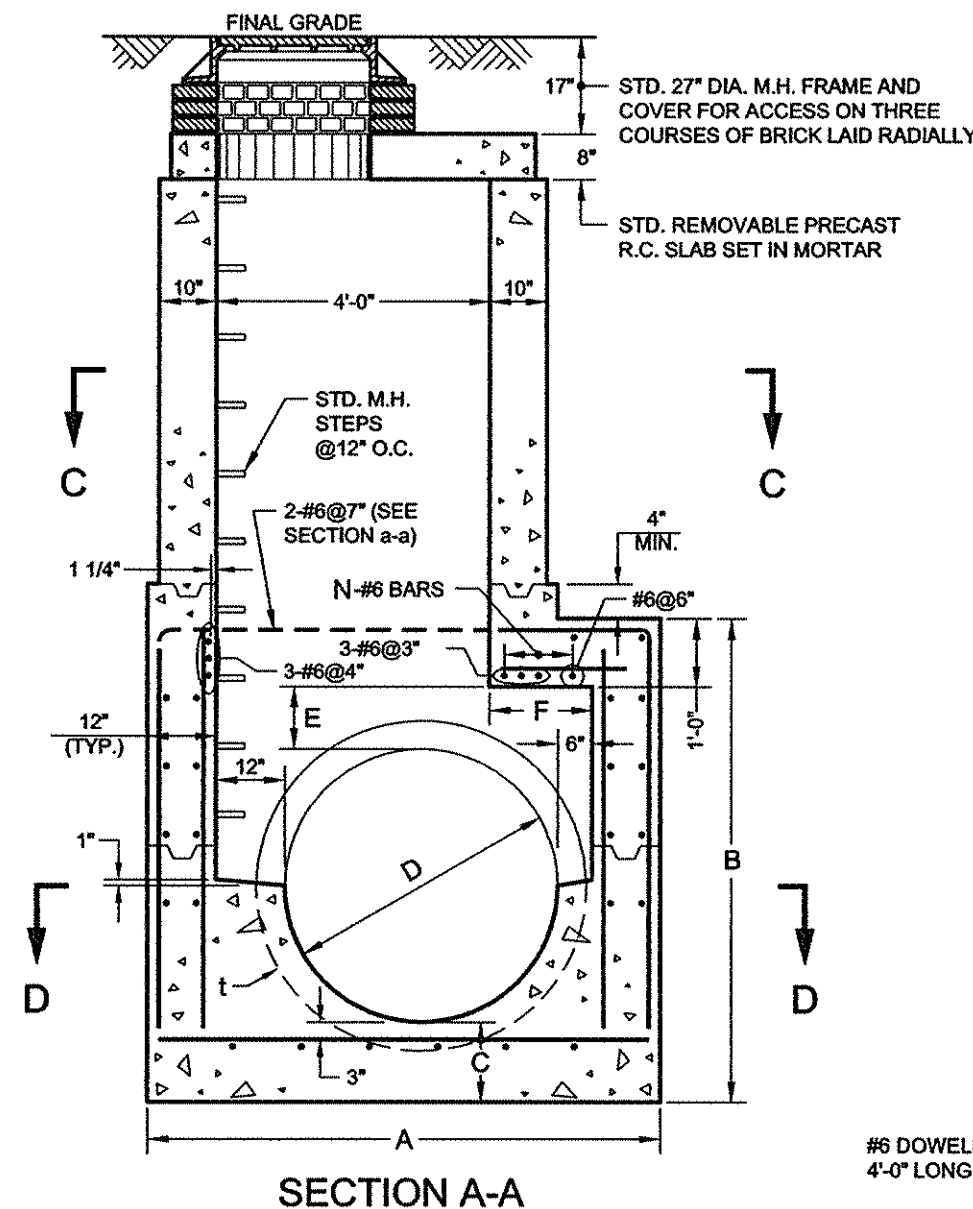
DATE

8/14/18

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 36" DIA. TO 60" DIA. R.C.P. SEWERS

TYPE C-1 (12' MAX. COVER) AND TYPE C-2 (25' MAX. COVER)



NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

D	t	A	B	C	E	F	N
36"	4"	6'-6"	5'-10"	12"	10"	0'-6"	1
42"	4 1/2"	7'-0"	6'-5"	12 1/2"	10 1/2"	1'-0"	3
48"	5"	7'-6"	7'-1"	14"	11"	1'-6"	4
54"	5 1/2"	8'-0"	7'-9"	15 1/2"	11 1/2"	2'-0"	5
60"	6"	8'-6"	8'-5"	17"	12"	2'-6"	6

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

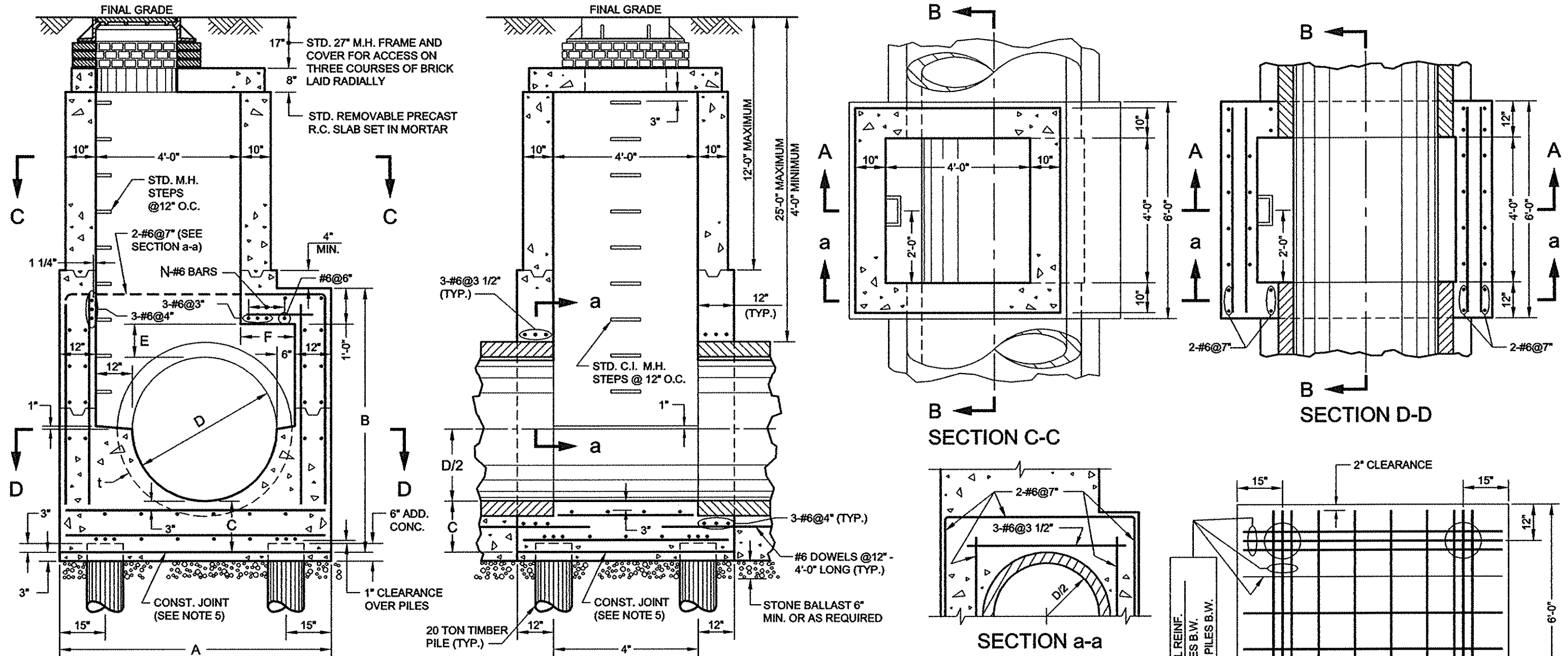
P.E.

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DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 36" DIA. TO 60" DIA. R.C.P. SEWERS ON PILES

TYPE C-1 (12' MAX. COVER) AND TYPE C-2 (25' MAX. COVER)



NOTES:

SECTION A-A

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
- (5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

D	t	A	B	C	E	F	N
36"	4"	6'-6"	6'-0"	14"	10"	0'-6"	1
42"	4 1/2"	7'-0"	6'-8"	15 1/2"	10 1/2"	1'-0"	3
48"	5"	7'-6"	7'-4"	17"	11"	1'-6"	4
54"	5 1/2"	8'-0"	8'-0"	18 1/2"	11 1/2"	2'-0"	5
60"	6"	8'-6"	8'-8"	20"	12"	2'-6"	6

Gurdeep S. Saini P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

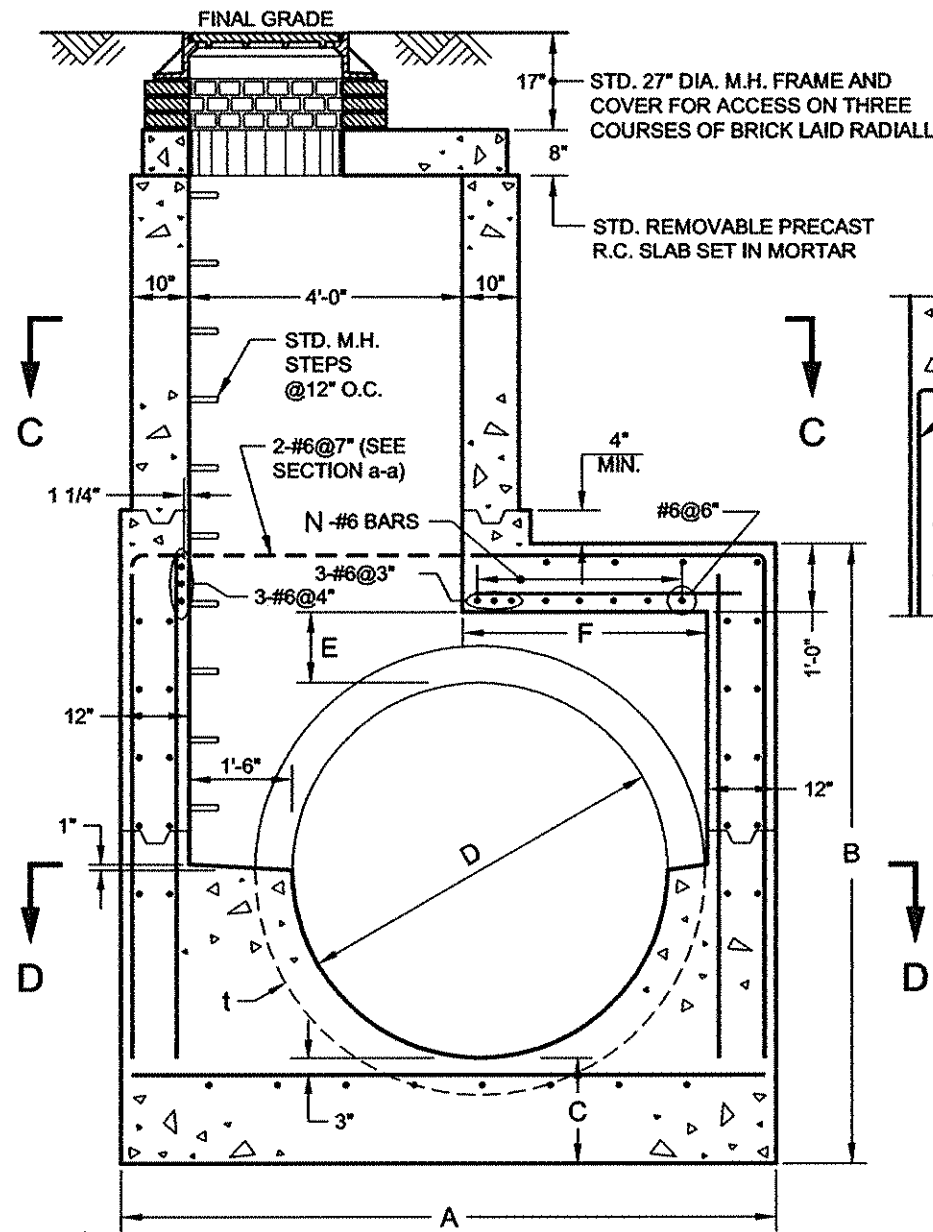
Thomas Wayne P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 66" DIA. TO 96" DIA. R.C.P. SEWERS

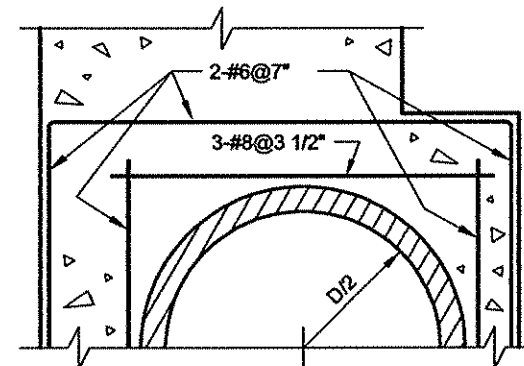
TYPE D-1 (12' MAX. COVER) AND TYPE D-2 (25' MAX. COVER)



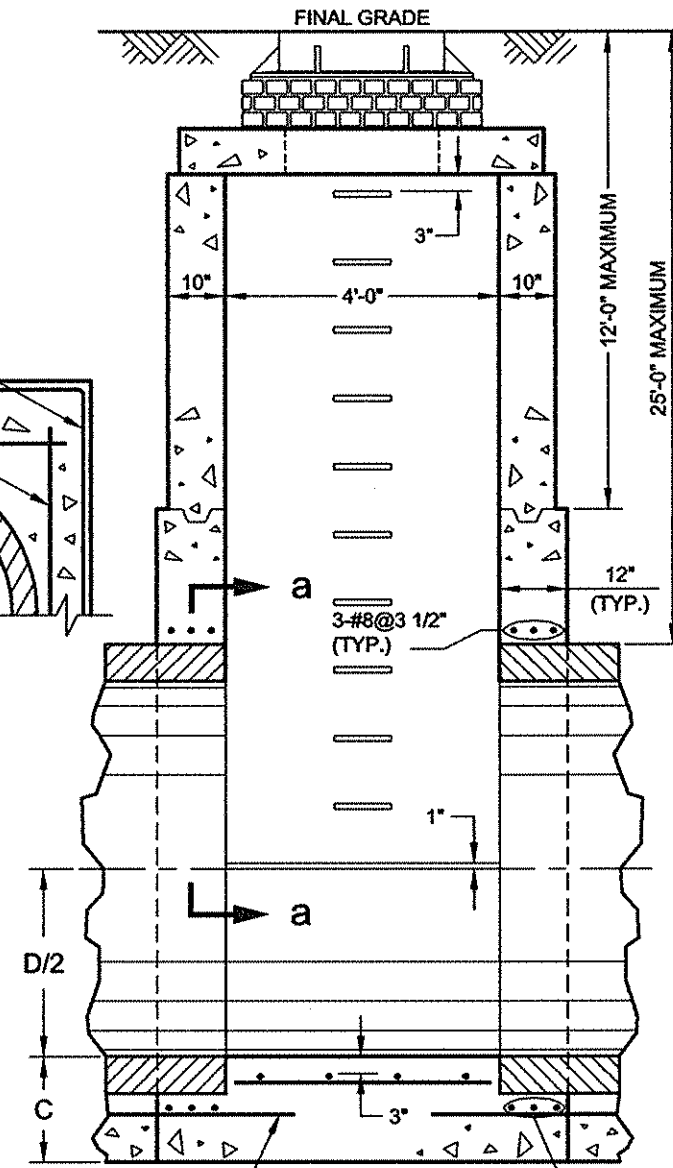
SECTION A-A

NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

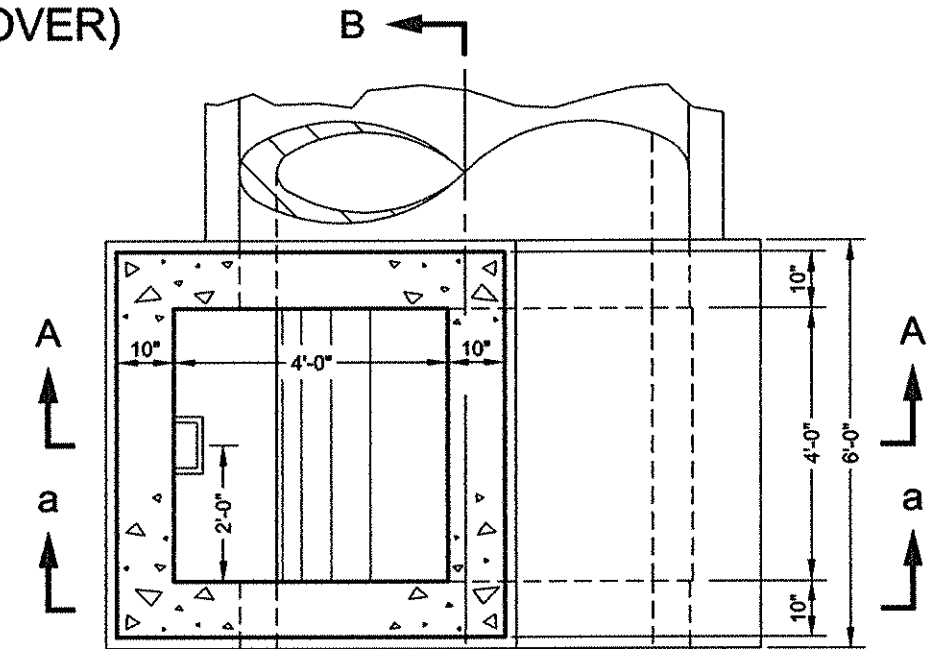


SECTION a-a

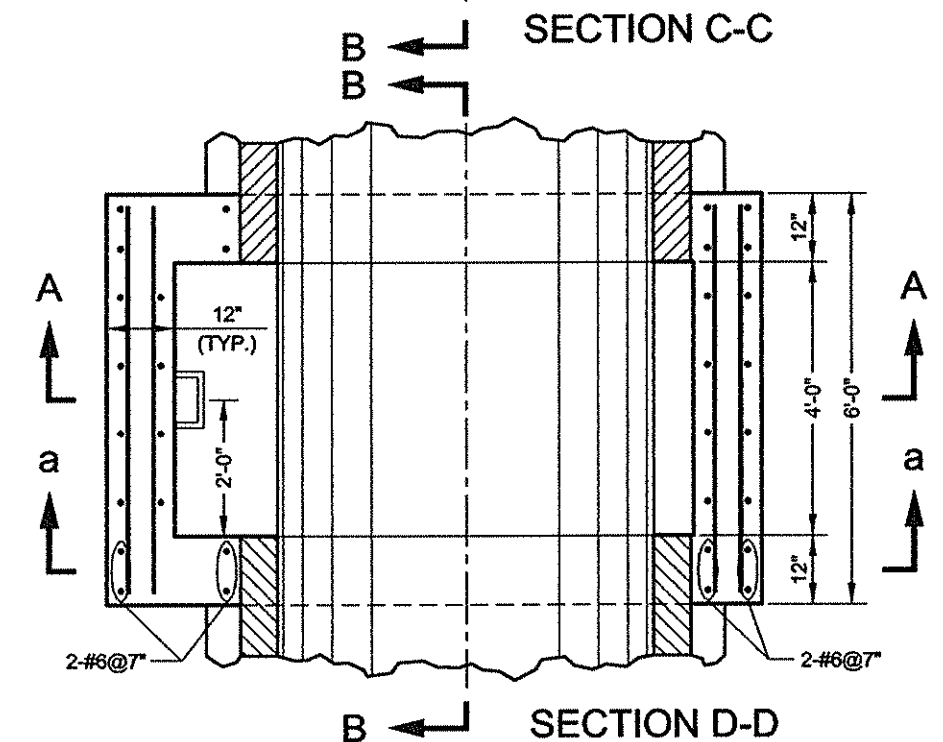


SECTION B-B

D	t	A	B	C	E	F	N
66"	6 1/2"	9'-7"	9'-1"	18 1/2"	12 1/2"	3'-7"	8
72"	7"	10'-1"	9'-9"	20"	13"	4'-1"	9
78"	7 1/2"	10'-8"	10'-5"	21 1/2"	13 1/2"	4'-8"	10
84"	8"	11'-2"	11'-1"	23"	14"	5'-2"	11
90"	8 1/2"	11'-9"	11'-10"	25 1/2"	14 1/2"	5'-9"	12
96"	9"	12'-3"	12'-5"	27"	15"	6'-3"	13



SECTION C-C



SECTION D-D

Surdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wayne

P.E.

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

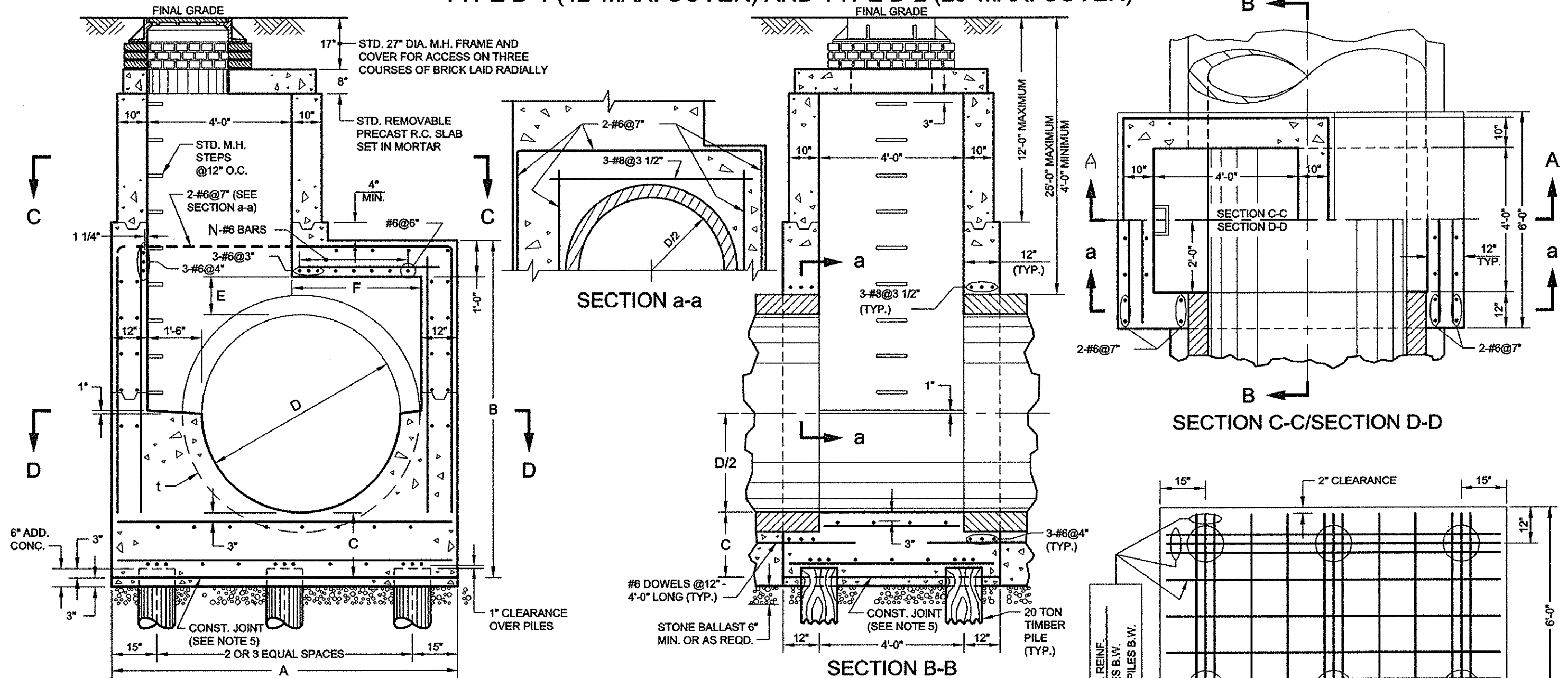
8/19/18

DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 66" DIA. TO 96" DIA. R.C.P. SEWERS ON PILES

TYPE D-1 (12' MAX. COVER) AND TYPE D-2 (25' MAX. COVER)



NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
- (5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

D	t	A	B	C	E	F	N	PILES/ BENT
66"	6 1/2"	9'-7"	9'-4"	21 1/2"	12 1/2"	3'-7"	8	3
72"	7"	10'-1"	10'-0"	23"	13"	4'-1"	9	3
78"	7 1/2"	10'-8"	10'-8"	24 1/2"	13 1/2"	4'-8"	10	3*
84"	8"	11'-2"	11'-4"	26"	14"	5'-2"	11	3*
90"	8 1/2"	11'-9"	12'-1"	28 1/2"	14 1/2"	5'-9"	12	3*
96"	9"	12'-3"	12'-8"	30"	15"	6'-3"	13	3*

* USE FOUR PILES PER BENT FOR COVER OVER 15'.

Gurdeep S. Saini P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

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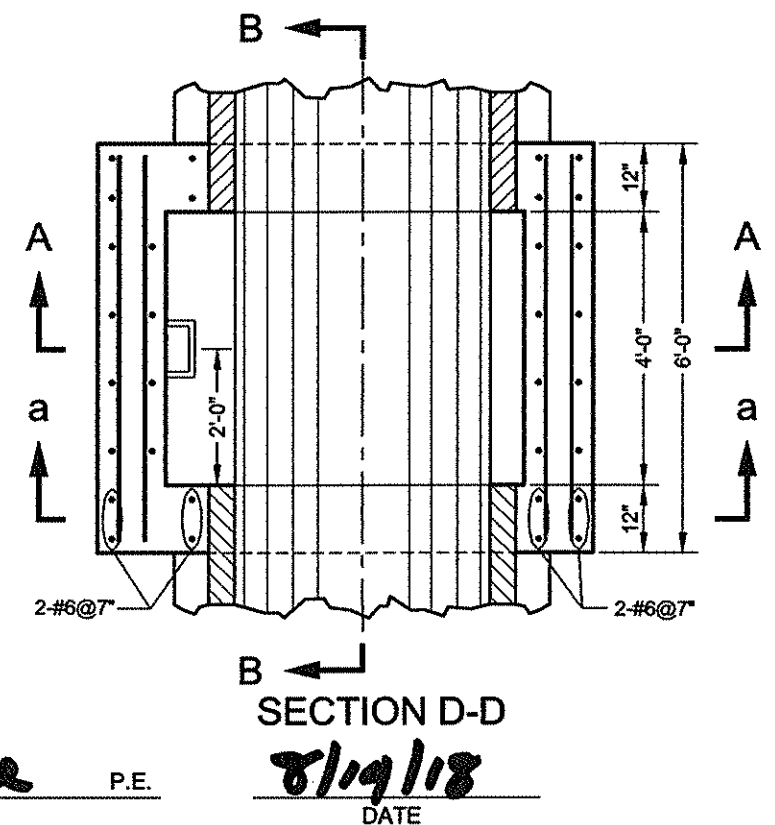
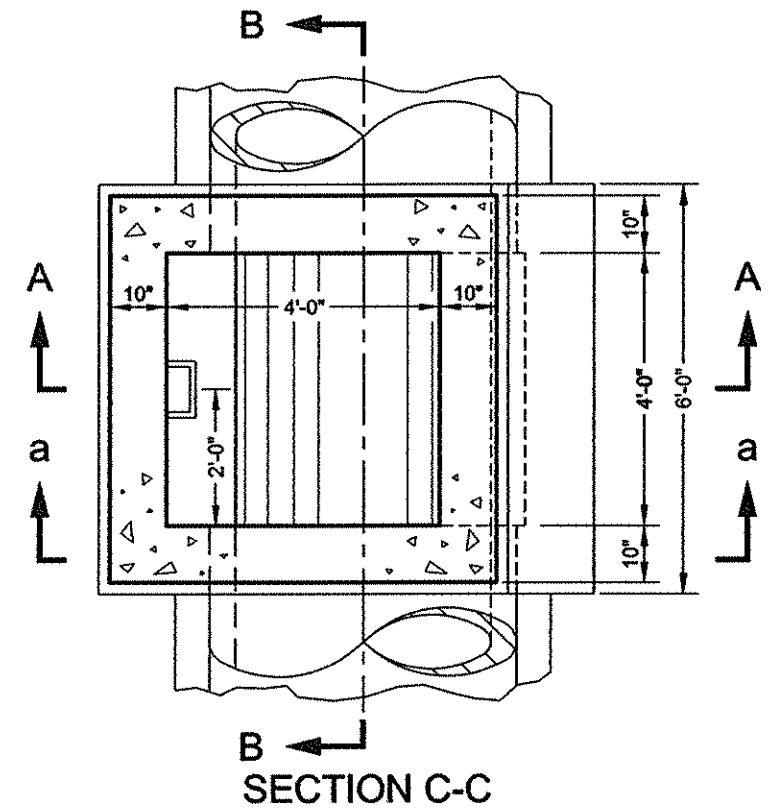
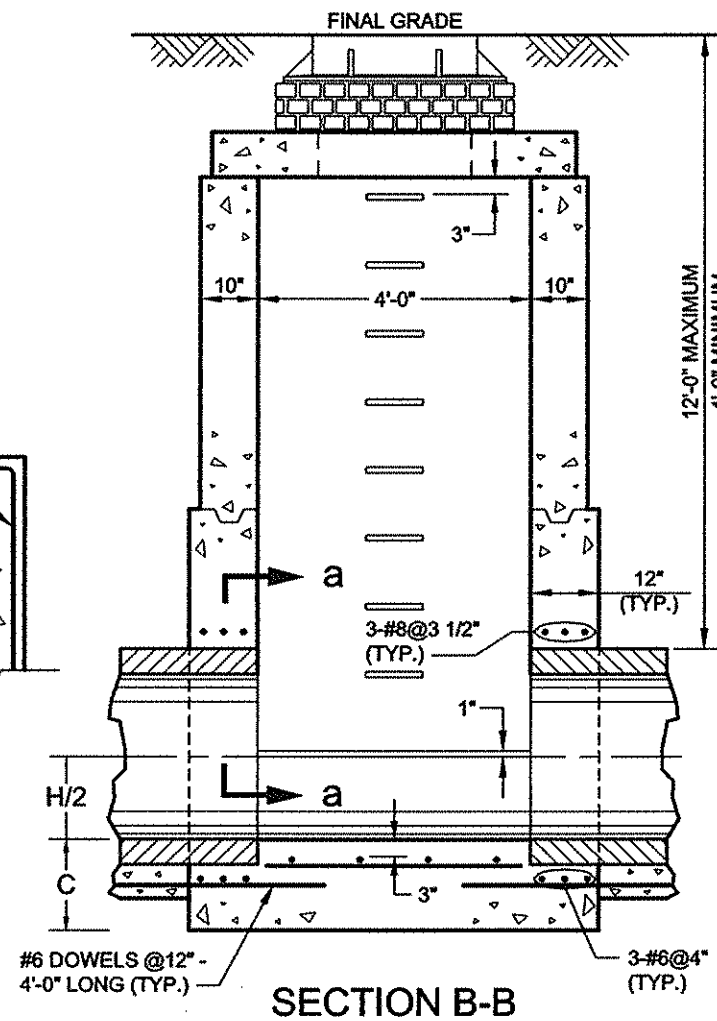
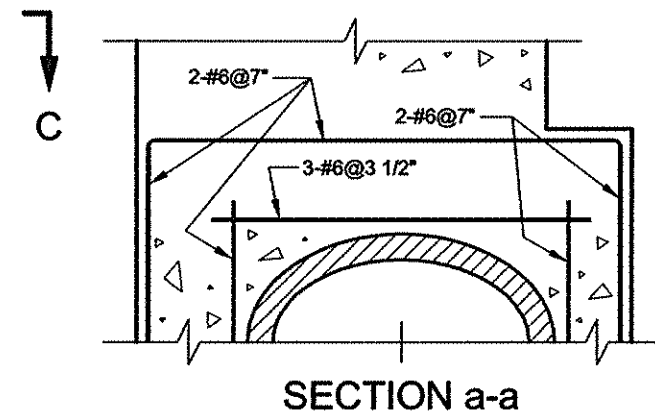
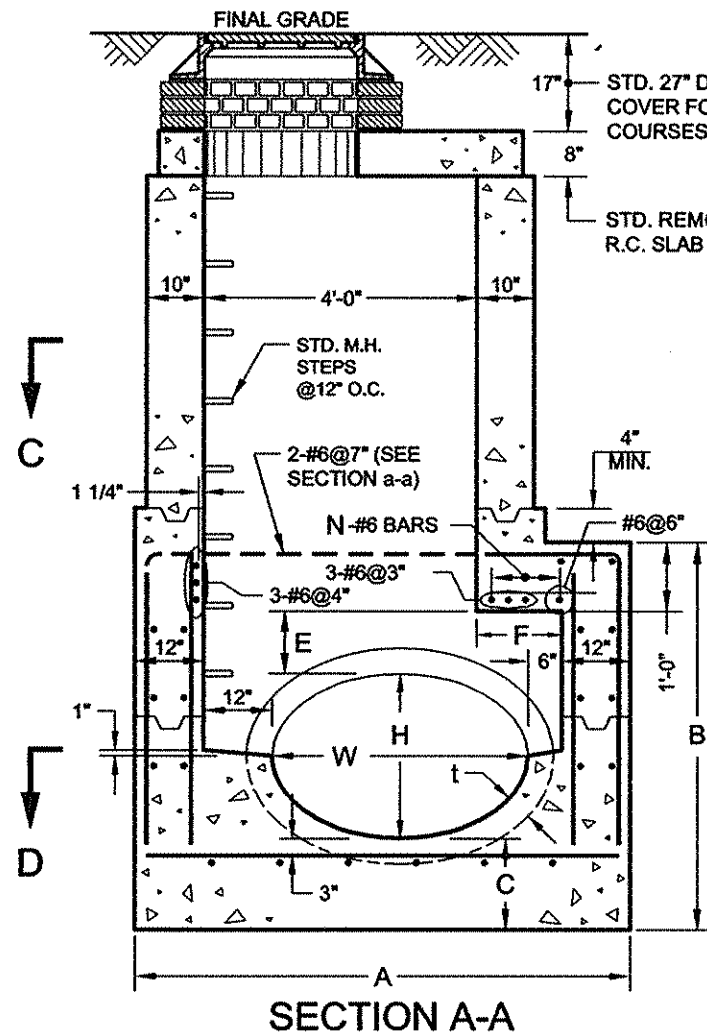
Thomas Wynne P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

STANDARD FOR MANHOLE ON 23"W x 14"H TO 60"W x 38"H

HORIZONTAL ELLIPTICAL R.C.P. SEWERS

TYPE E-1 (12' MAX. COVER)



NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS- GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

W	H	t	A	B	C	E	F	N
23"	14"	2 3/4"	6'-0"	4'-1"	14"	9"	-	-
30"	19"	3 1/4"	6'-0"	4'-7"	14"	10"	-	-
38"	24"	3 3/4"	6'-8"	5'-1"	15"	10"	0'-8"	2
45"	29"	4 1/2"	7'-3"	5'-8"	16"	11"	1'-3"	4
53"	34"	5"	7'-11"	6'-1"	16"	11"	1'-11"	5
60"	38"	5 1/2"	8'-6"	6'-7"	17"	12"	2'-6"	6

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

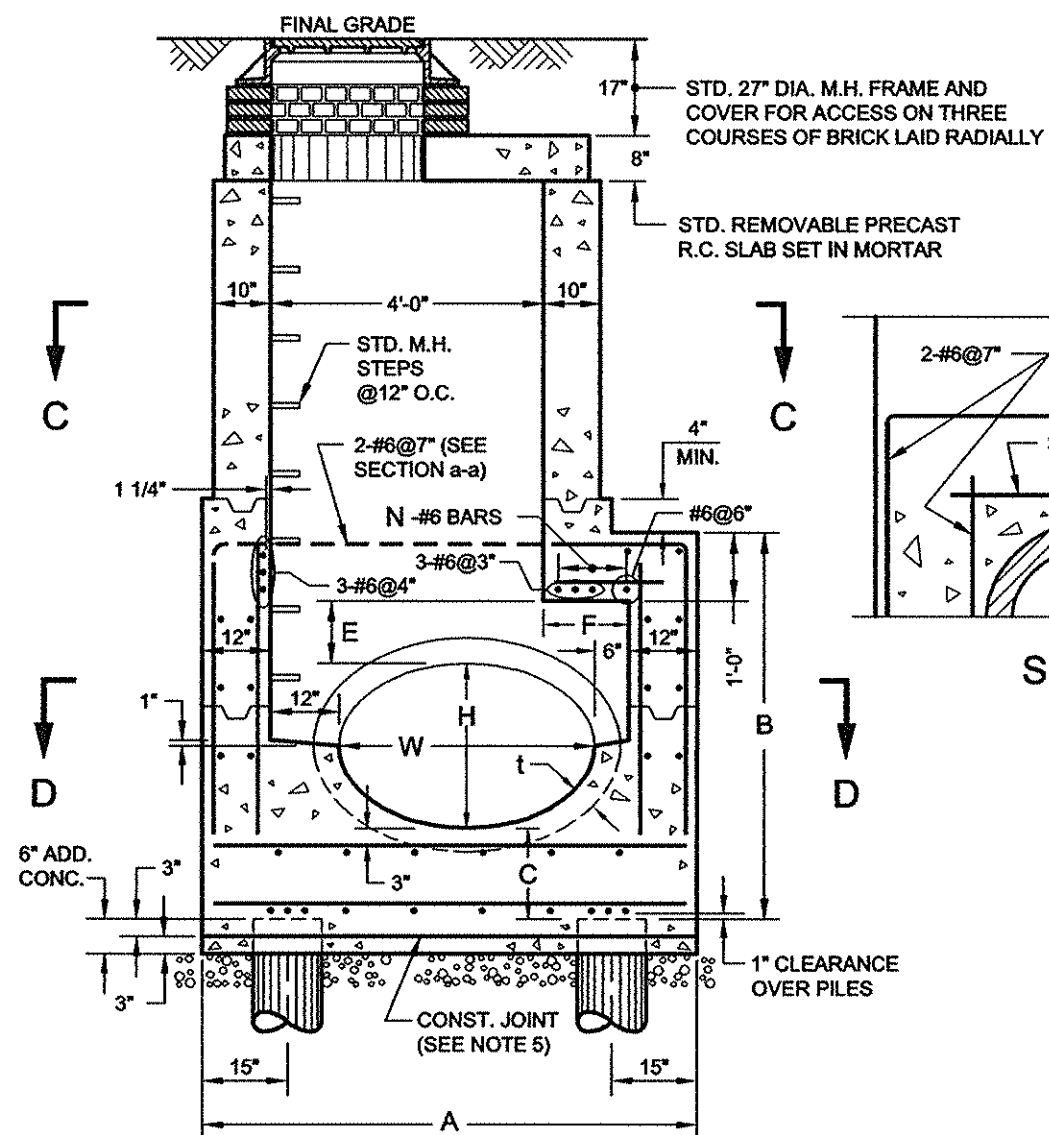
Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/19/18
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 23"W x 14"H TO 60"W x 38"H
HORIZONTAL ELLIPTICAL R.C.P. SEWERS ON PILES
TYPE E-1 (12' MAX. COVER)



SECTION A-A

NOTES:

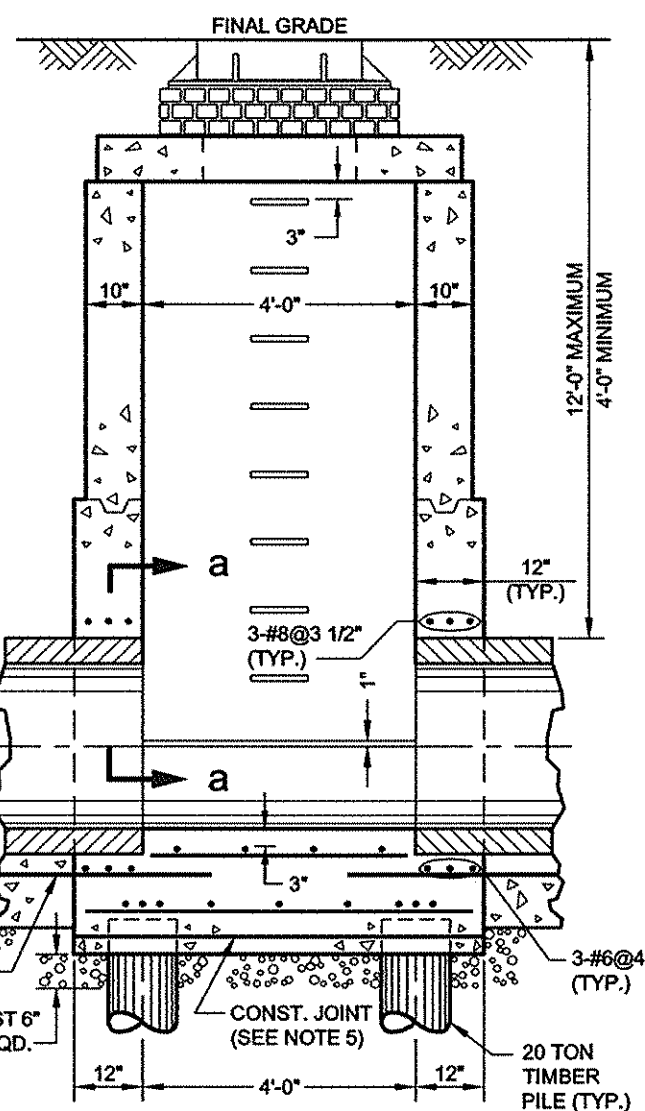
- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS- GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED.
COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
- (5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

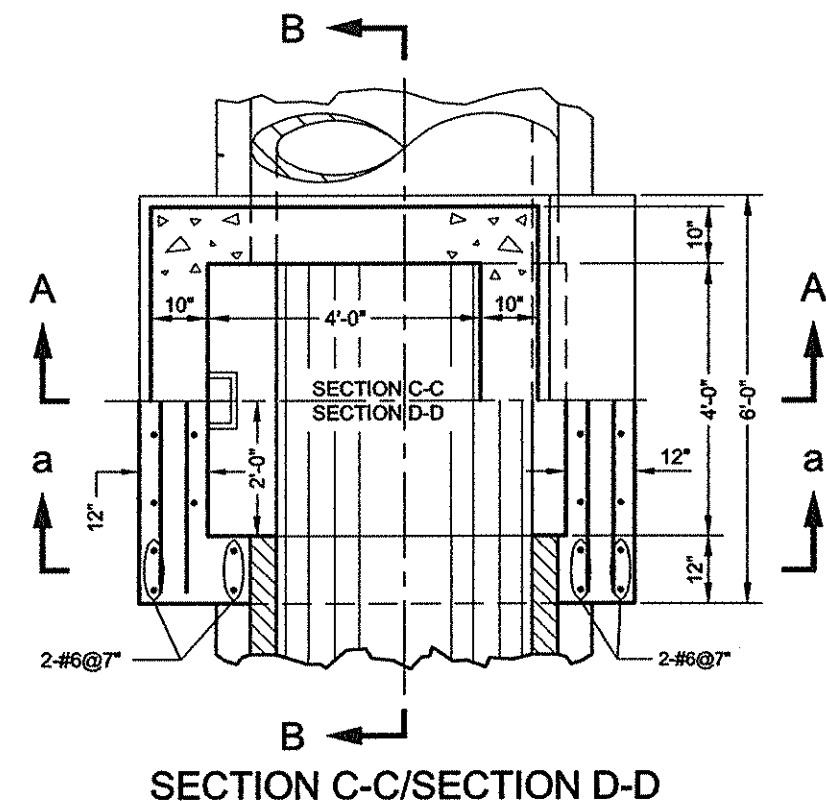
DATE

8/14/18

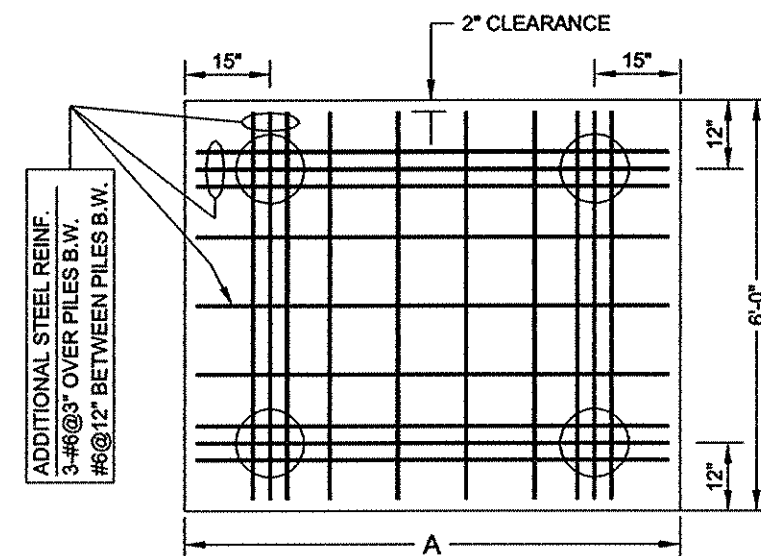


SECTION B-B

W	H	t	A	B	C	E	F	N
23"	14"	2 3/4"	6'-0"	4'-1"	14"	9"	-	-
30"	19"	3 1/4"	6'-0"	4'-7"	14"	10"	-	-
38"	24"	3 3/4"	6'-8"	5'-1"	15"	10"	0'-8"	2
45"	29"	4 1/2"	7'-3"	5'-8"	16"	11"	1'-3"	4
53"	34"	5"	7'-11"	6'-1"	16"	11"	1'-11"	5
60"	38"	5 1/2"	8'-6"	6'-7"	17"	12"	2'-6"	6



SECTION C-C/SECTION D-D



PILE PLAN

P.E.

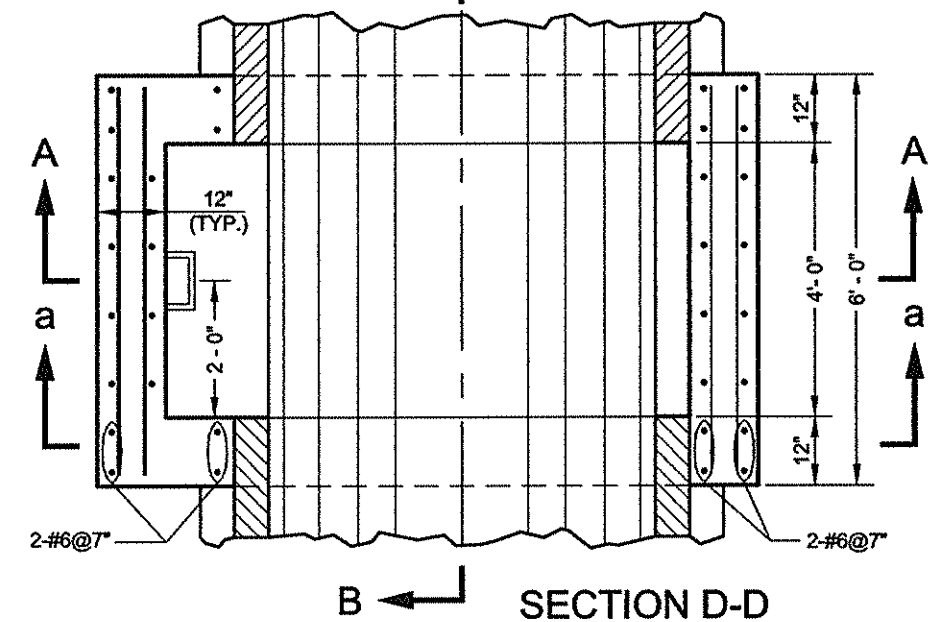
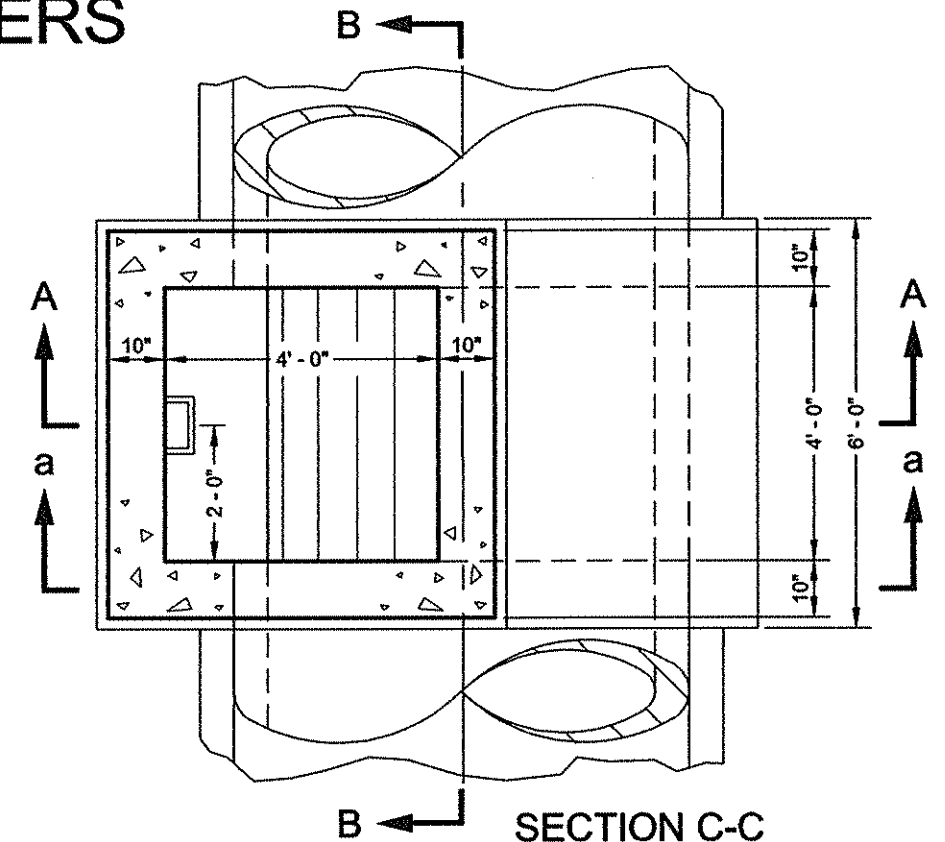
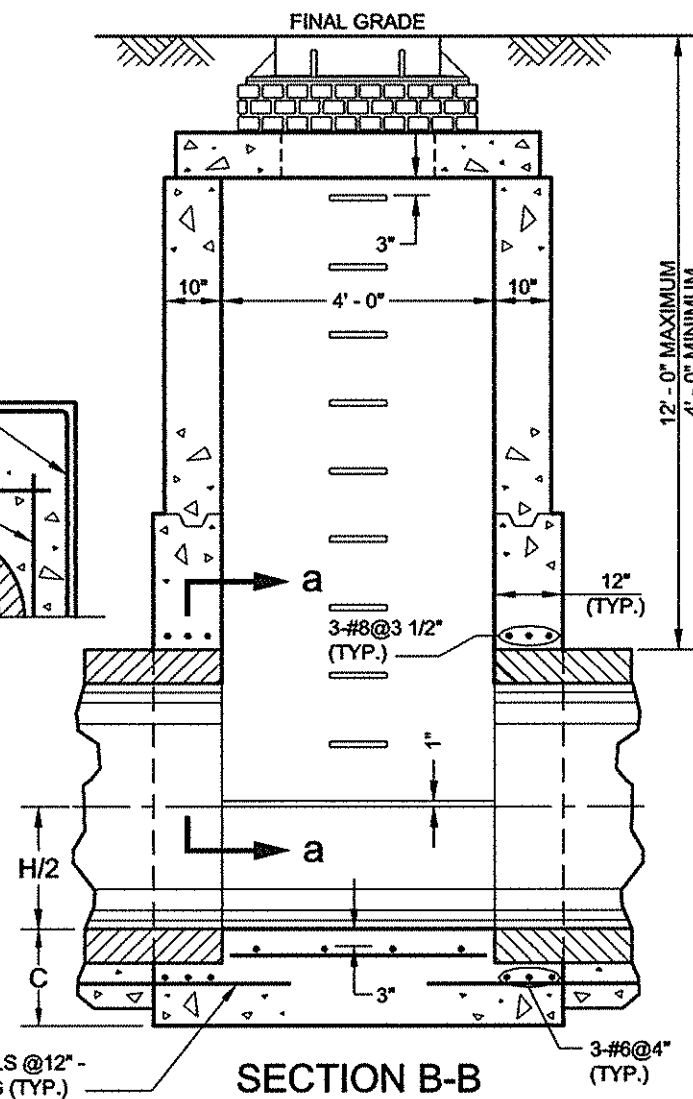
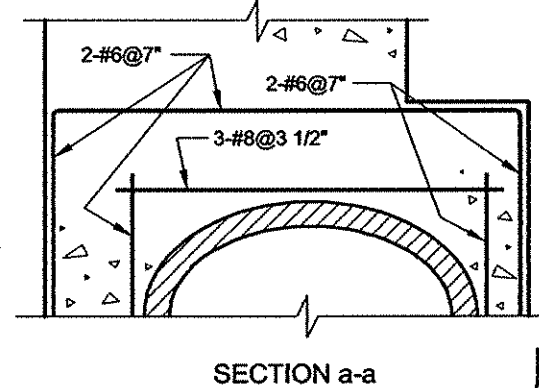
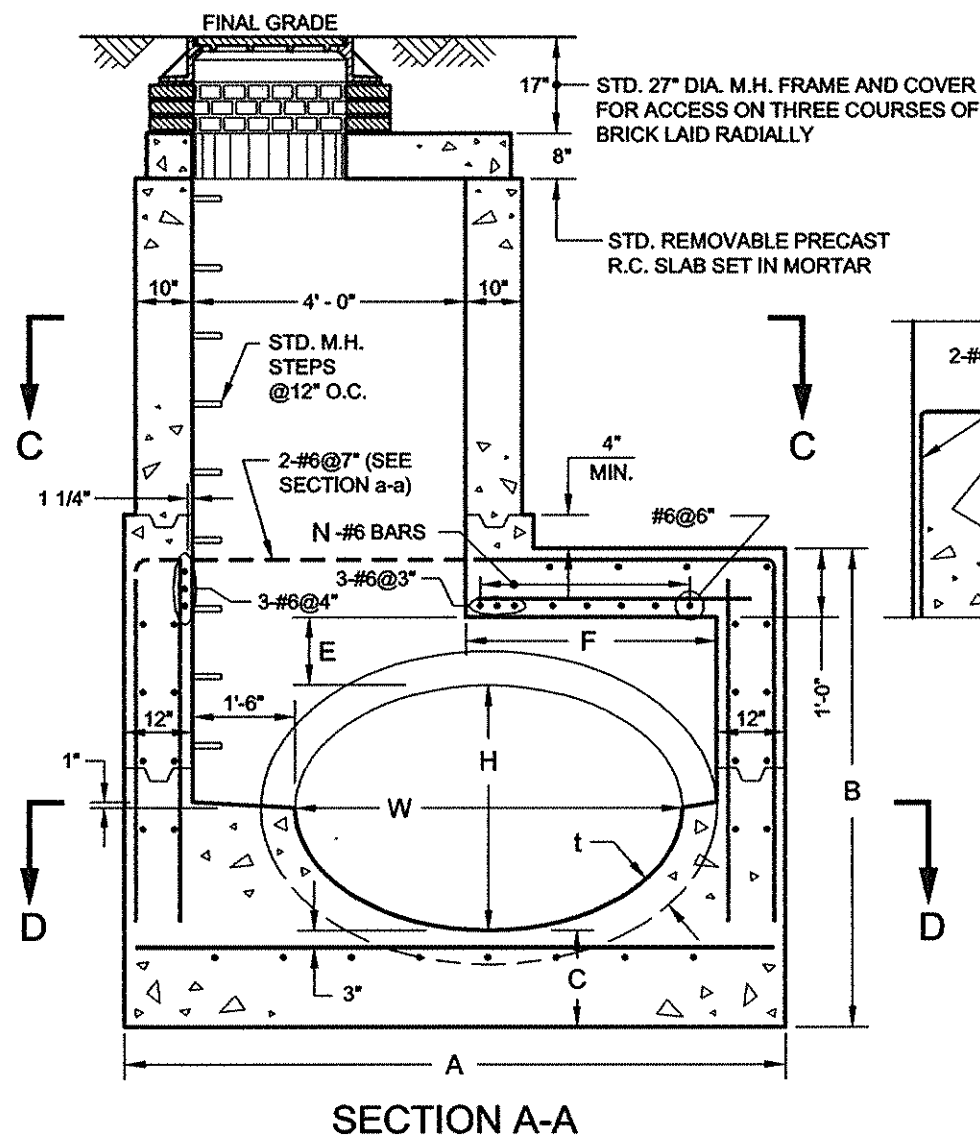
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE

8/14/18

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE ON 68"W x 43"H TO 121"W x 77"H
HORIZONTAL ELLIPTICAL R.C.P. SEWERS
TYPE E-2 (12" MAX. COVER)



NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED.
COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

W	H	t	A	B	C	E	F	N
68"	43"	6"	9'-8"	7'-0"	17"	12"	3'-8"	8
76"	48"	6 1/2"	10'-5"	7'-7"	18"	13"	4'-5"	9
83"	53"	7"	11'-0"	8'-0"	18"	13"	5'-0"	11
91"	58"	7 1/2"	11'-9"	8'-7"	19"	14"	5'-9"	12
98"	63"	8"	12'-4"	9'-0"	19"	14"	6'-4"	13
106"	68"	8 1/2"	13'-1"	9'-8"	21"	15"	7'-1"	15
113"	72"	9"	13'-8"	10'-1"	22"	15"	7'-8"	16
121"	77"	9 1/2"	14'-5"	10'-9"	24"	16"	8'-5"	17

Sandeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
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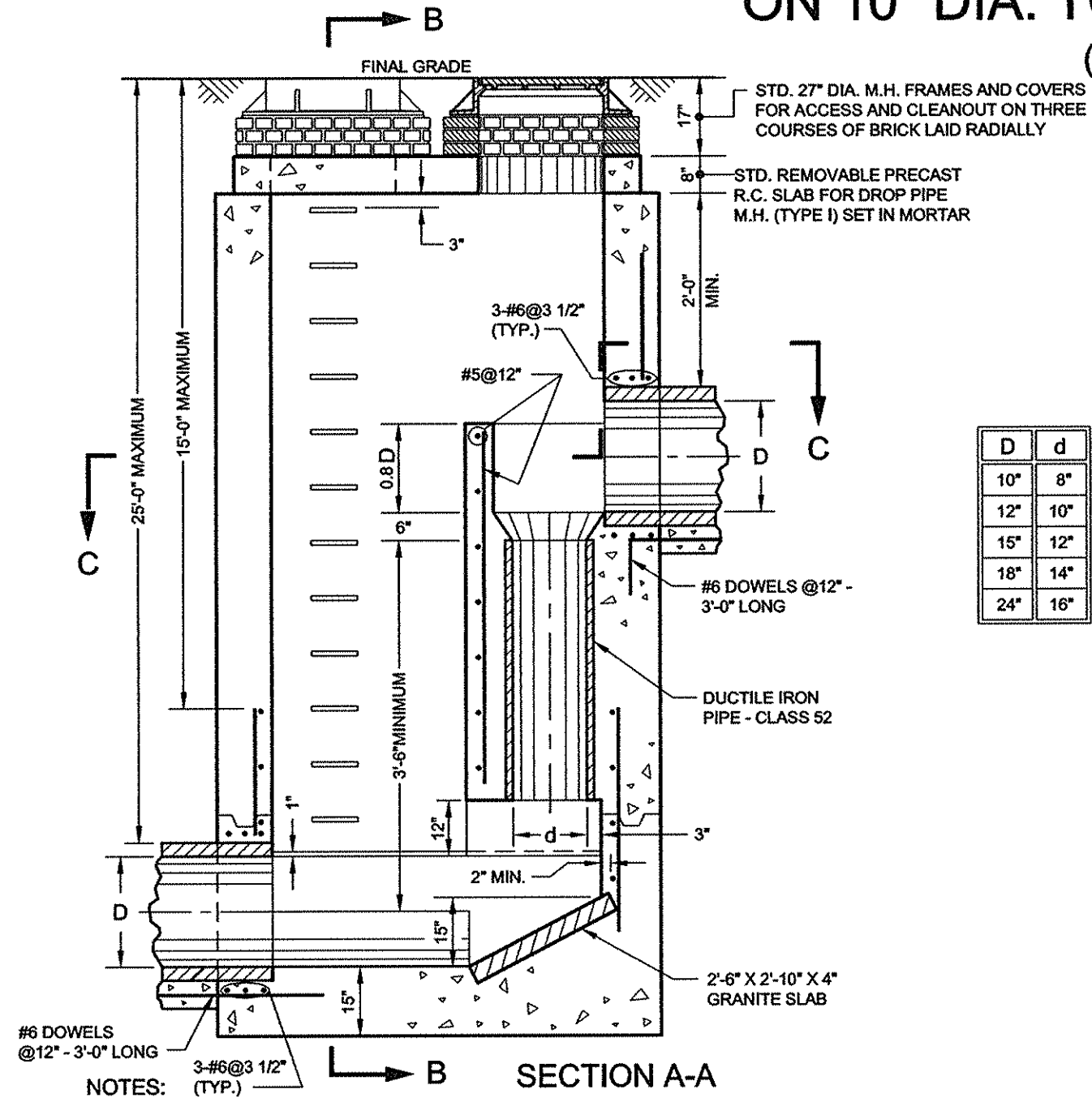
Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

8/14/18
DATE

STANDARD FOR DROP PIPE MANHOLE (TYPE I) ON 10" DIA. TO 24" DIA. PIPE SEWERS (25' MAX. COVER)



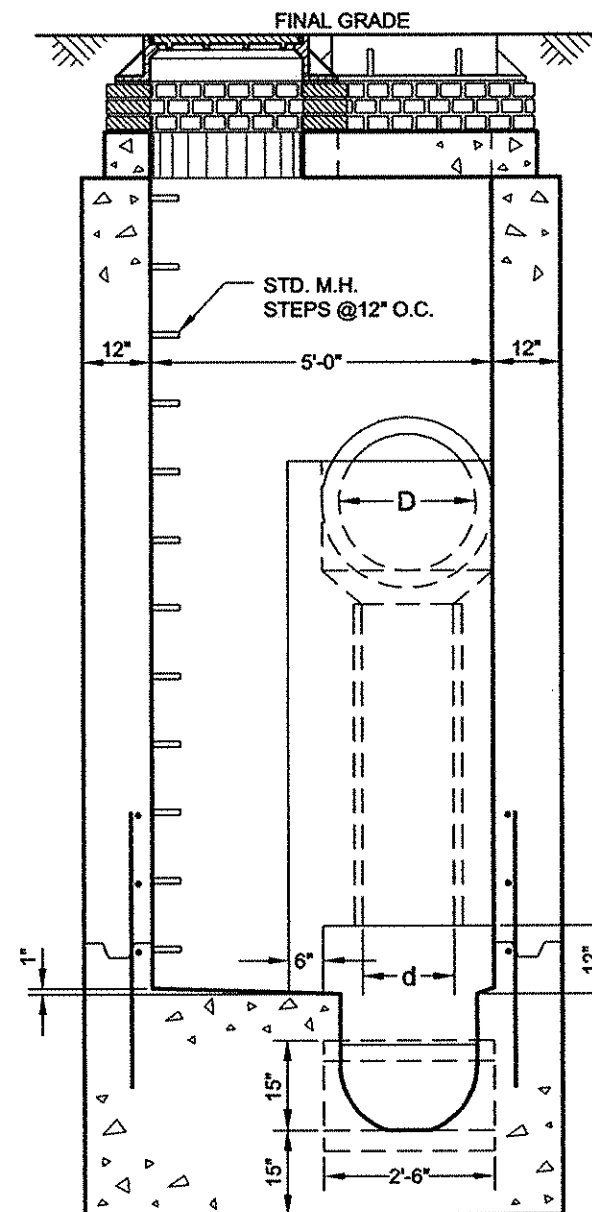
- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS- GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

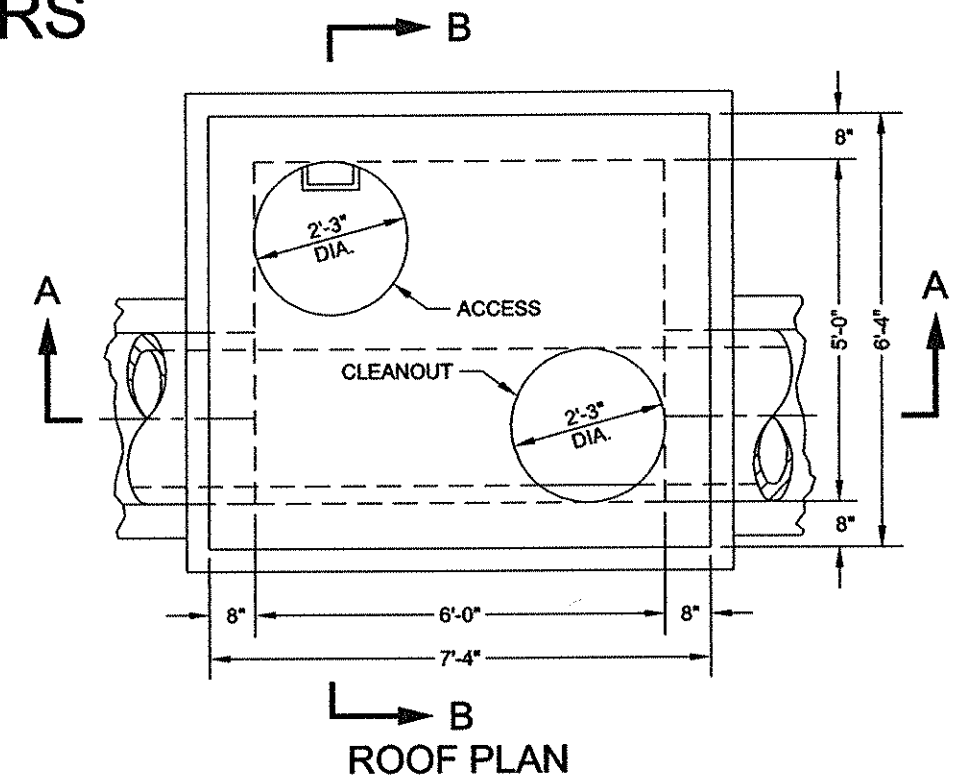
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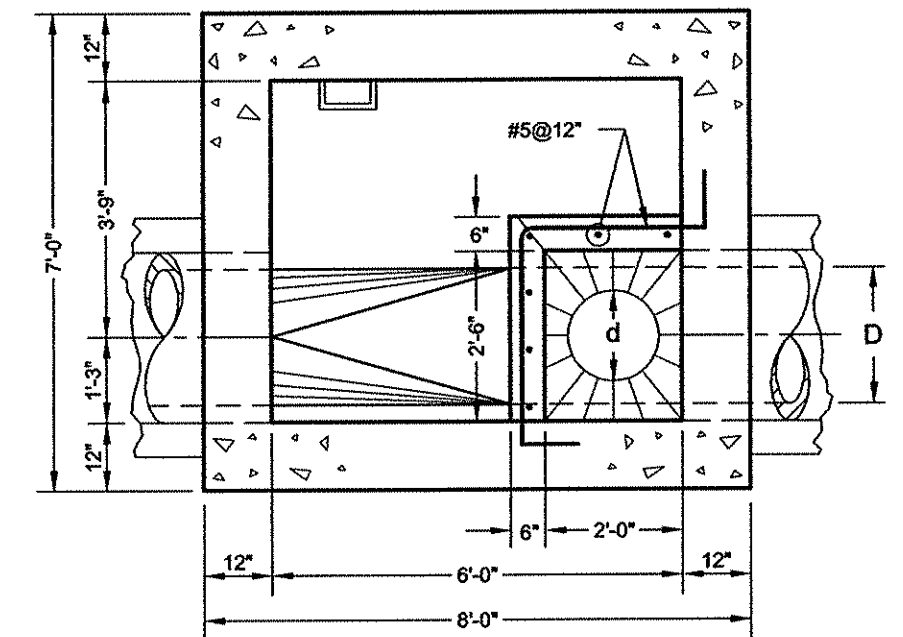
DATE _____



SECTION B-B



ROOF PLAN



SECTION C-C

Thomas W. Byrne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

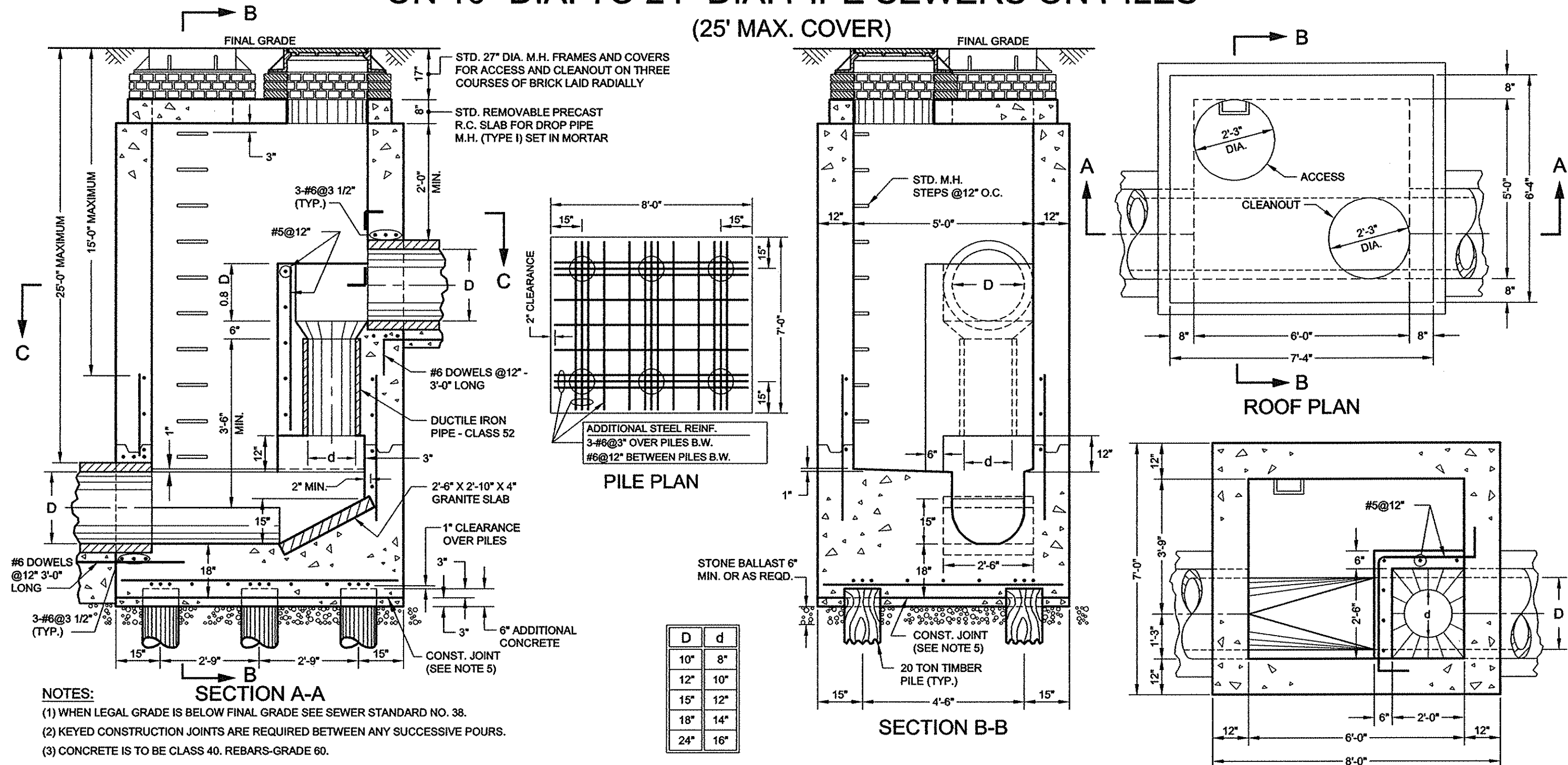
P.E

8/14/18
DATE

DATE _____

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR DROP PIPE MANHOLE (TYPE I) ON 10" DIA. TO 24" DIA. PIPE SEWERS ON PILES (25' MAX. COVER)



NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS- GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
- (5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

Gurdeep S. Saini
P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

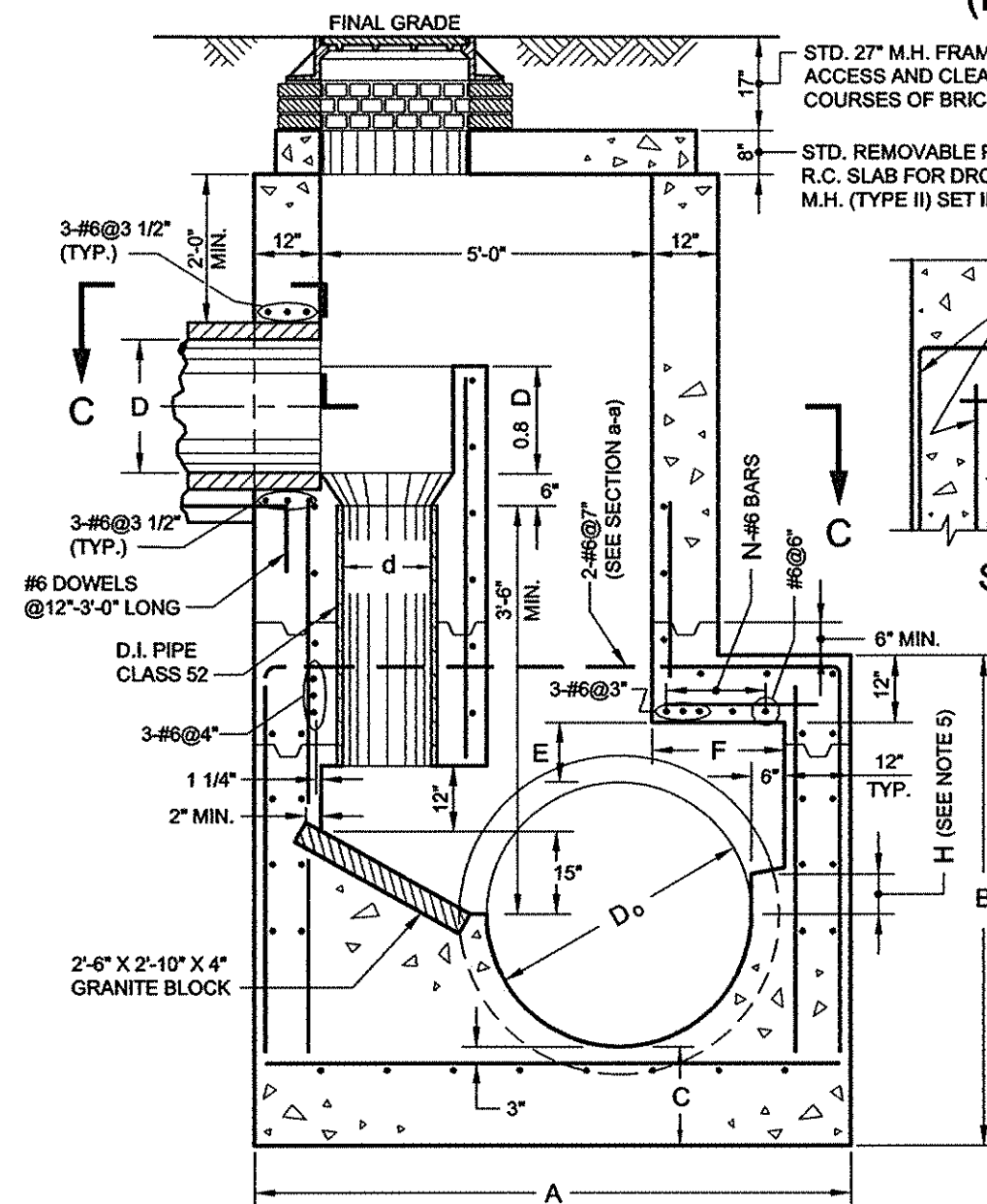
8/14/18
DATE

Thomas Wynne
P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

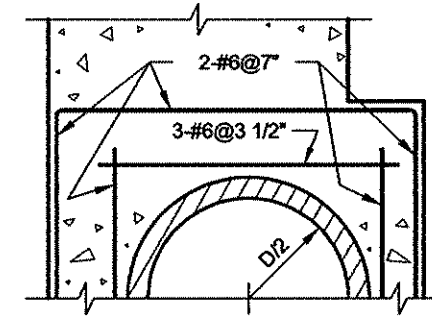
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR DROP PIPE MANHOLE (TYPE II) (FOR 10" TO 24" INCOMING DROP PIPE SEWERS)

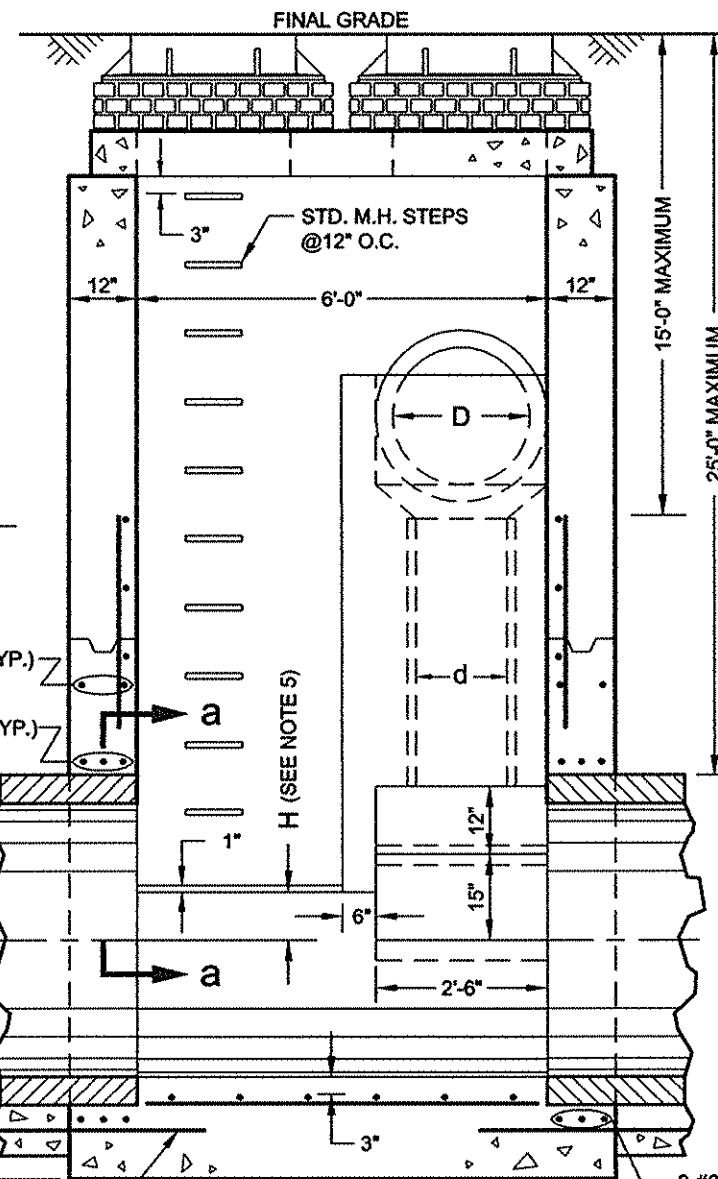


STD. 27" M.H. FRAMES AND COVERS FOR ACCESS AND CLEANOUT ON THREE COURSES OF BRICK Laid RADIALLY

STD. REMOVABLE PRECAST R.C. SLAB FOR DROP PIPE M.H. (TYPE II) SET IN MORTAR



SECTION a-a



SECTION B-B

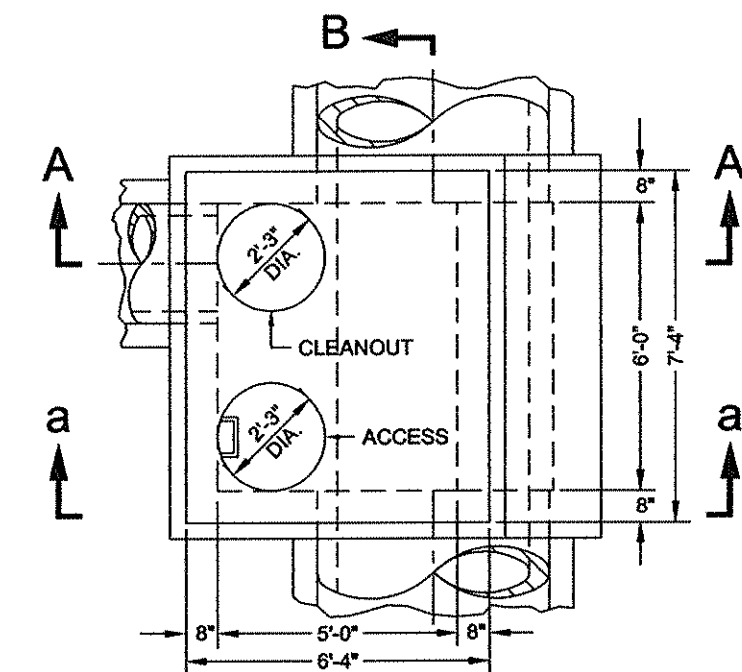
NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BET. ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED. COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
- (5) FOR PIPE SEWERS 10" TO 30" IN DIAMETER 'H' SHALL BE $D_o/2$ FOR PIPE SEWERS 36" TO 60" IN DIAMETER 'H' SHALL BE ZERO.

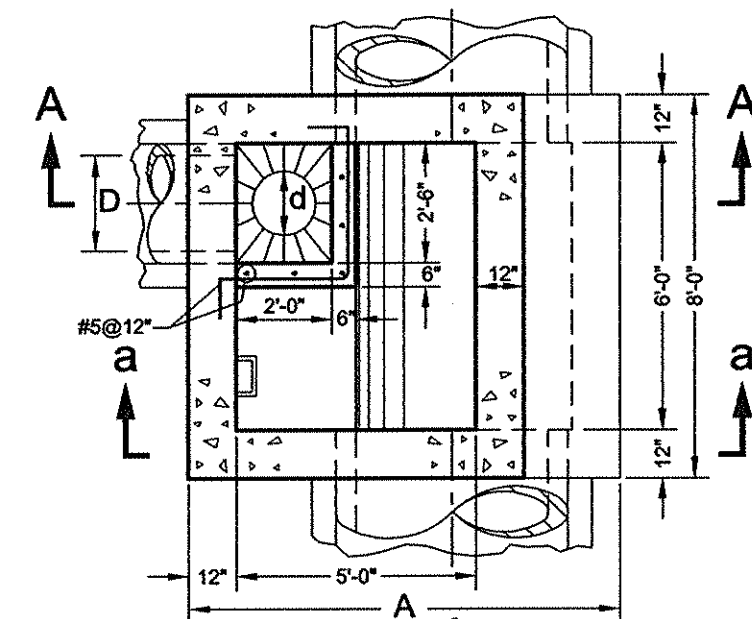
SECTION A-A

D_o	A	B	C	E	F	N
10" TO 24"	7'-0"	NA	12 1/2"	NA	NA	NA
30"	7'-6"	5'-6"	14"	10"	0'-6"	1
36"	8'-0"	6'-2"	16"	10"	1'-0"	3
42"	8'-6"	6'-10"	17 1/2"	10 1/2"	1'-6"	4
48"	9'-0"	7'-5"	18"	11"	2'-0"	5
54"	9'-6"	8'-0"	18 1/2"	11 1/2"	2'-6"	6
60"	10'-0"	8'-8"	20"	12"	3'-0"	7

D	d
10"	8"
12"	10"
15"	12"
18"	14"
24"	16"



ROOF PLAN



SECTION C-C

Gurdeep S. Sarin
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

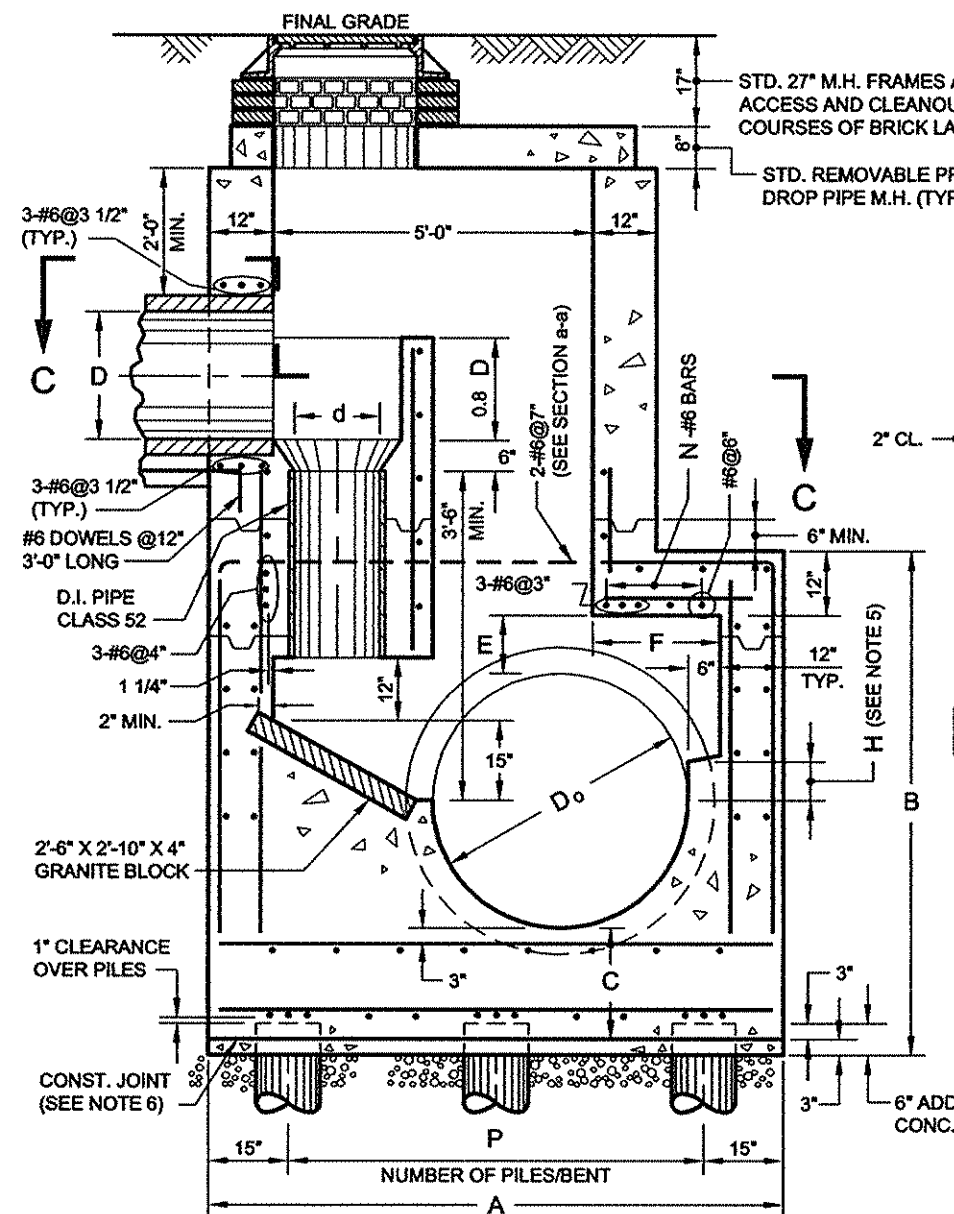
Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

STANDARD FOR DROP PIPE MANHOLE (TYPE II) ON PILES

(FOR 10" TO 24" INCOMING DROP PIPE SEWERS)



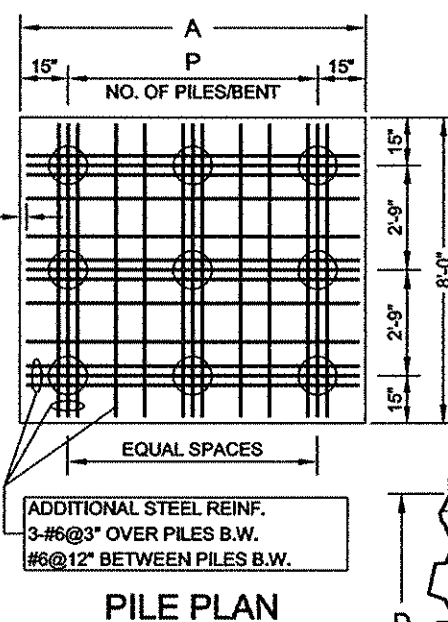
NOTES:

- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BET. ANY SUCCESSIVE POURS.
- (3) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (4) STEEL REINFORCEMENT IS #6@12" UNLESS OTHERWISE SPECIFIED.
COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.
- (5) FOR PIPE SEWERS 10" TO 30" IN DIAMETER 'H' SHALL BE $D_o/2$
FOR PIPE SEWERS 36" TO 60" IN DIAMETER 'H' SHALL BE ZERO.
- (6) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

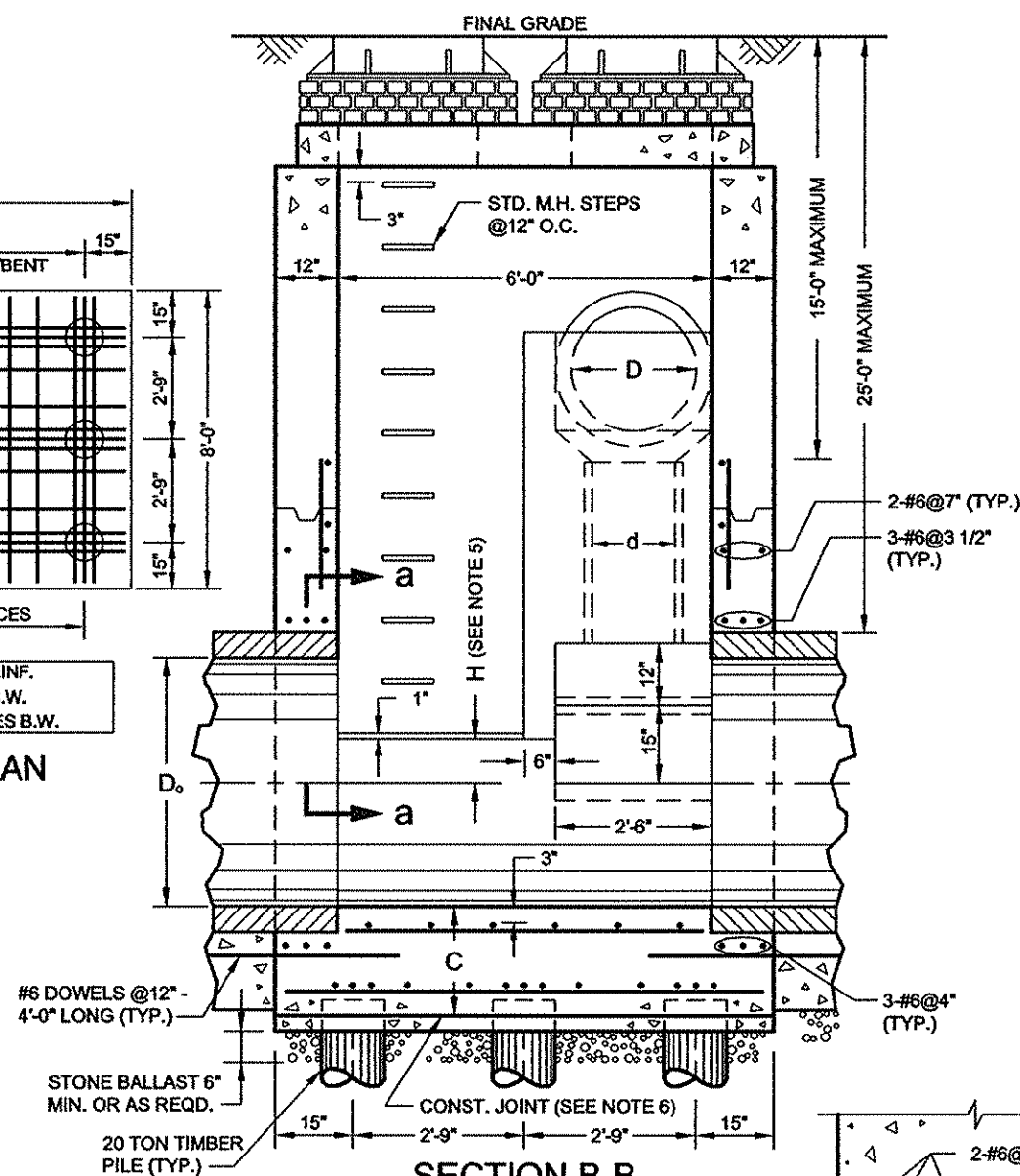
Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

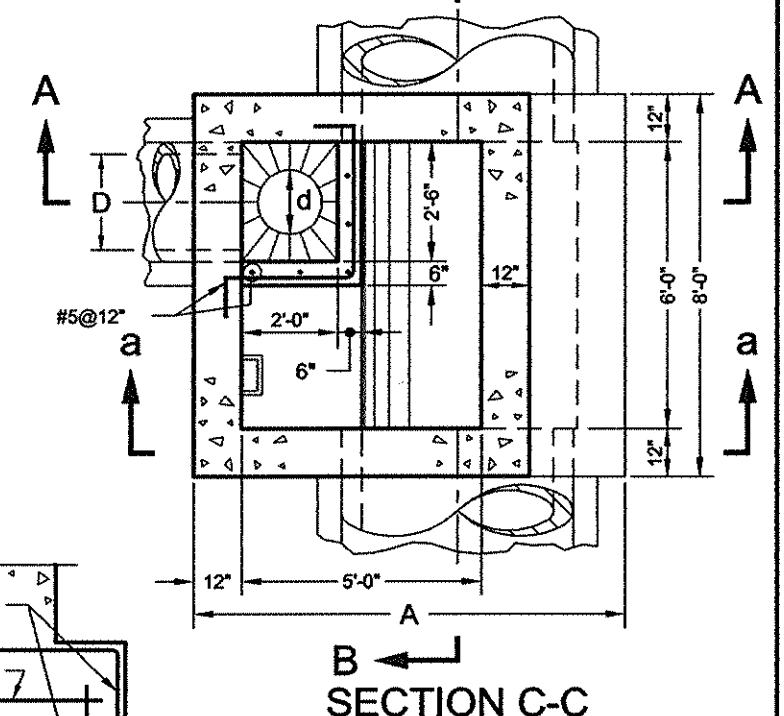
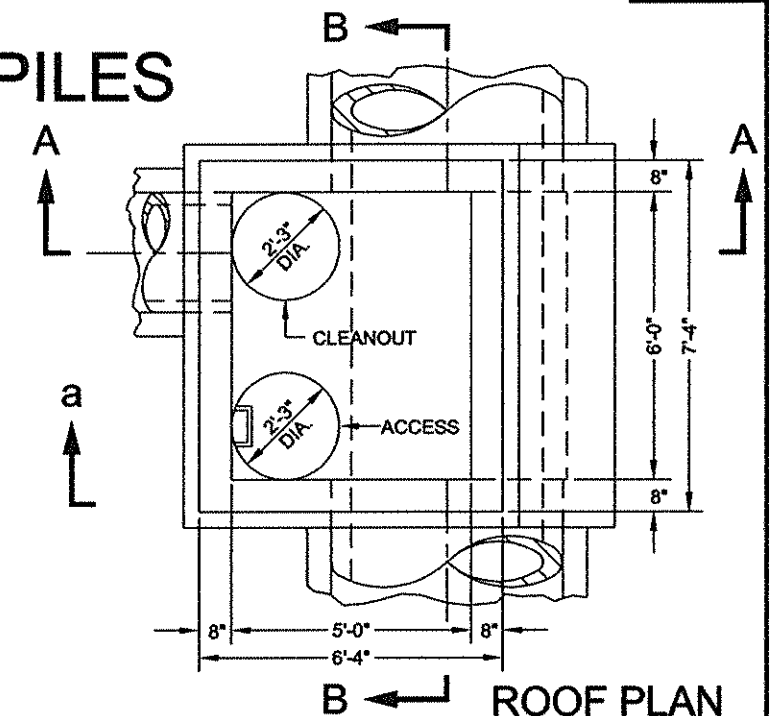
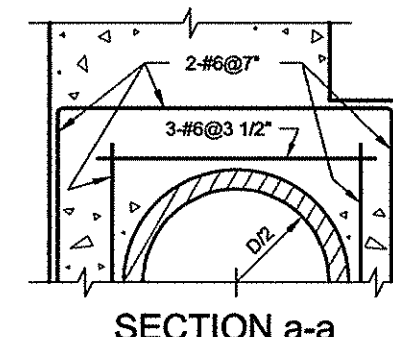
8/14/18
DATE



D_o	A	B	C	E	F	N	P
10" TO 24"	7'-0"	NA	15 1/2"	NA	NA	NA	2
30"	7'-6"	5'-9"	17"	10"	0'-6"	1	3
36"	8'-0"	6'-5"	19"	10"	1'-0"	3	3
42"	8'-6"	7'-1"	20 1/2"	10 1/2"	1'-6"	4	3
48"	9'-0"	7'-8"	21"	11"	2'-0"	5	3
54"	9'-6"	8'-3"	21 1/2"	11 1/2"	2'-6"	6	3
60"	10'-0"	8'-11"	23"	12"	3'-0"	7	3



D	d
10"	8"
12"	10"
15"	12"
18"	14"
24"	16"



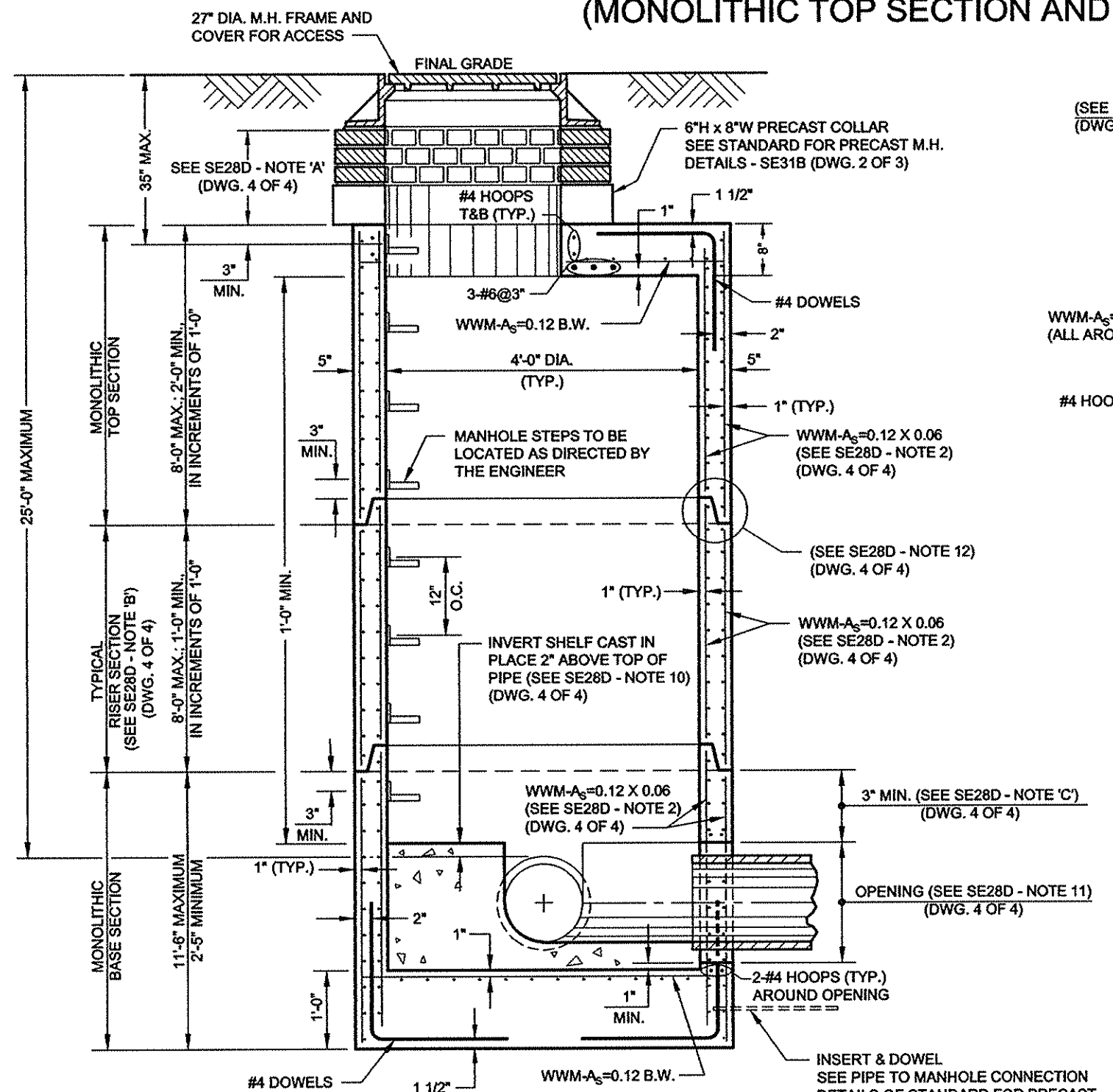
Thomas Wynne
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DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

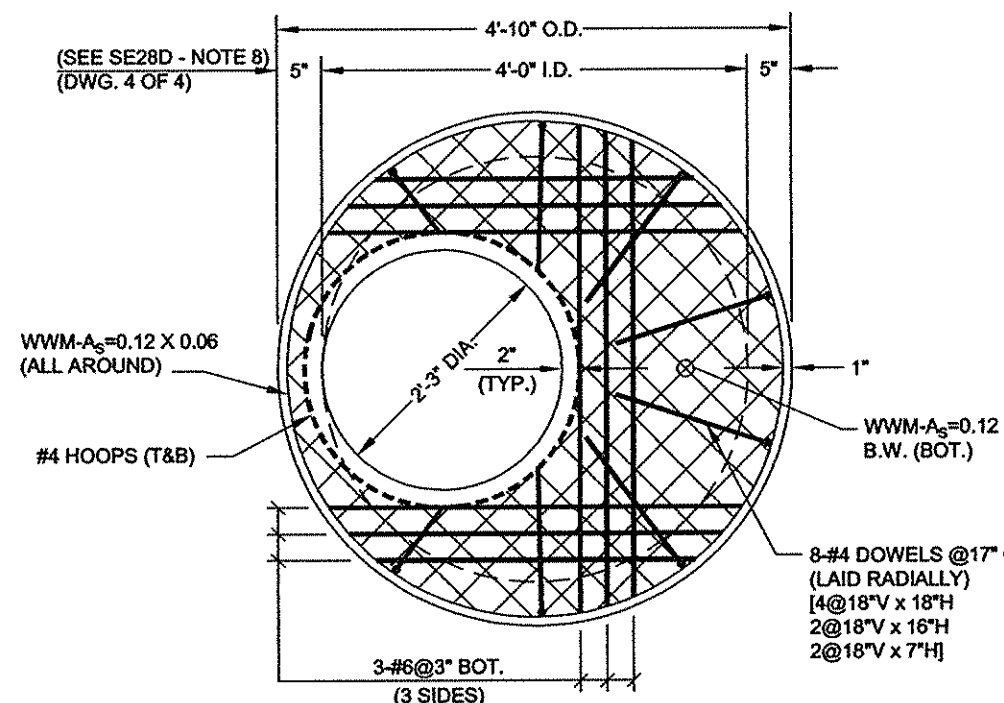
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STANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 2 OF 4)

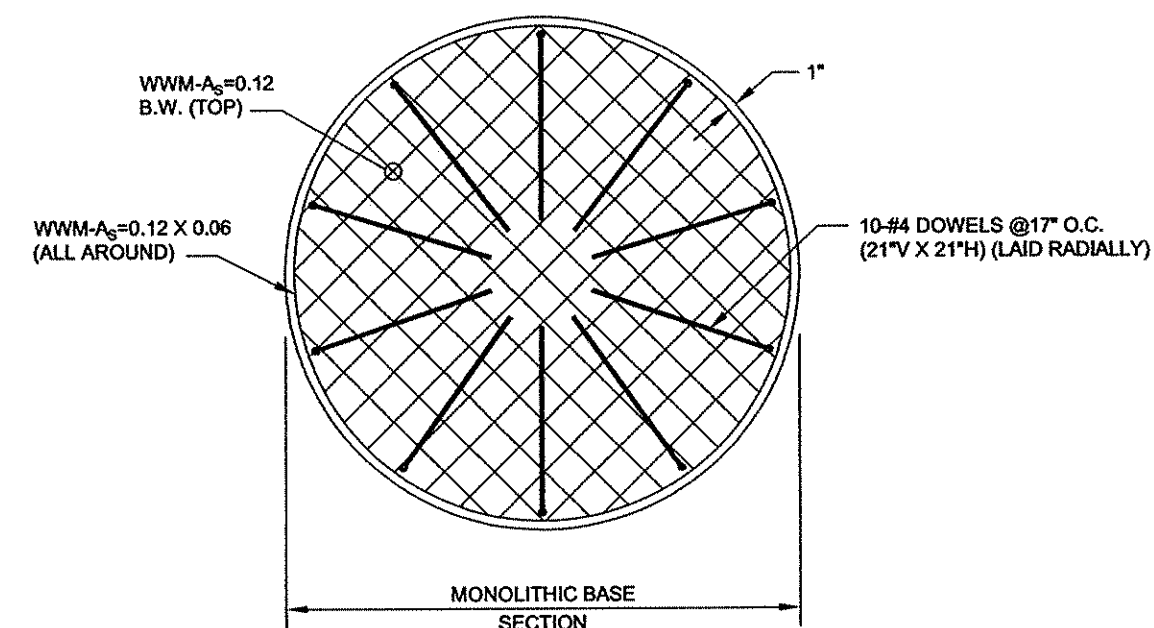
(MONOLITHIC TOP SECTION AND MONOLITHIC BASE SECTION)



SECTION A-A



PLAN OF MONOLITHIC TOP SECTION



PLAN OF BOTTOM REINFORCING

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

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8/14/18
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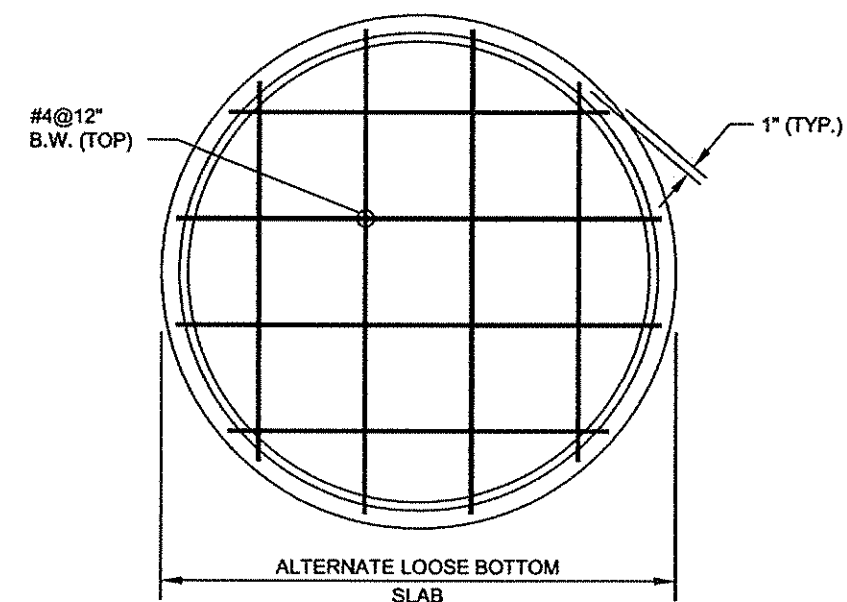
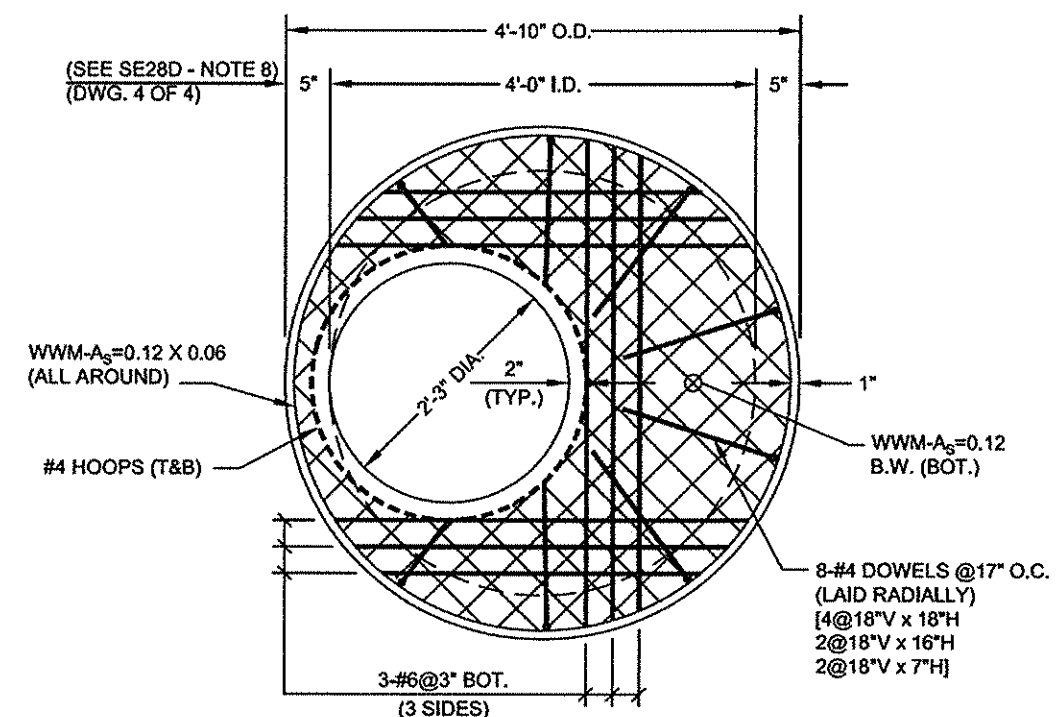
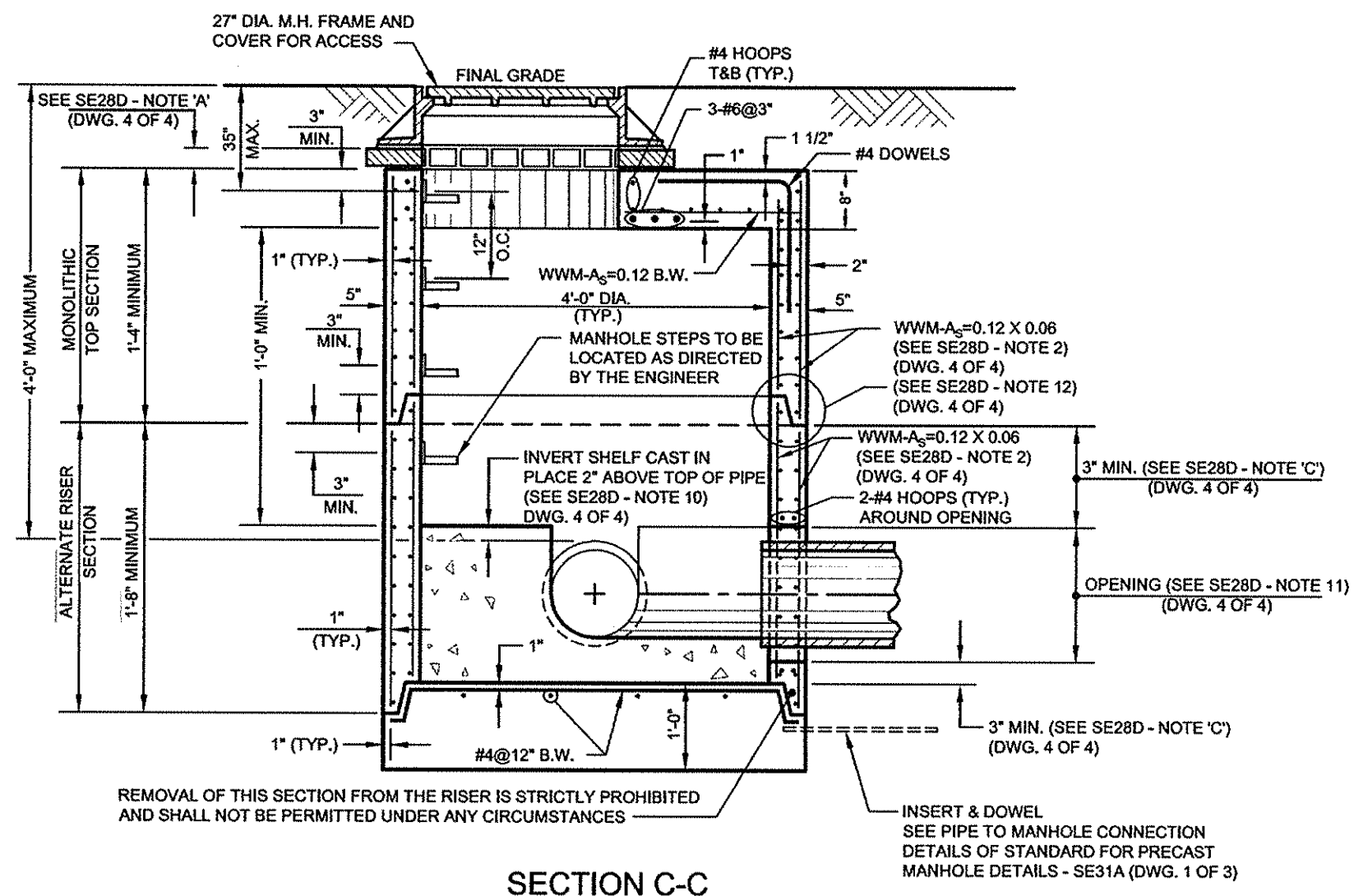
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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 3 OF 4)

(MONOLITHIC TOP SECTION AND ALTERNATE LOOSE BOTTOM SLAB)



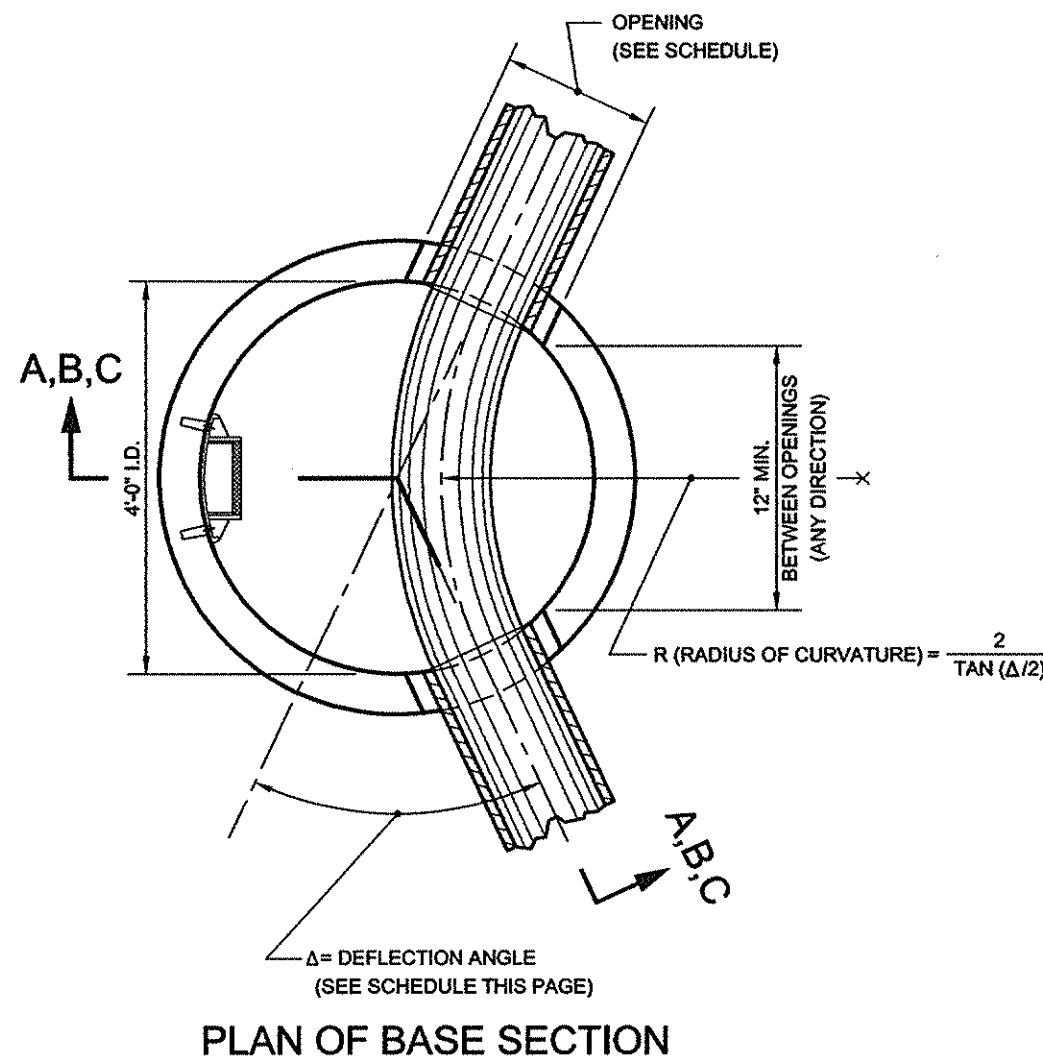
SEE SE28D - NOTE 'B' (DWG. 4 OF 4)

Gurdeep S. Sami
P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

Thomas L. Lyane
P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTIONSTANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 4 OF 4)
(MISCELLANEOUS DETAIL, NOTES AND SCHEDULE)**NOTE 'A':**

9" MIN. TO 20" MAX.; 9" BRICK MIN. LAID RADIALLY, USE 1 OR 2 PRECAST COLLARS OR BRICK AS REQUIRED. (4" BRICK MIN. ONLY FOR SHALLOW MANHOLE CONSTRUCTION.)

NOTE 'B':

ALTERNATE LOOSE BOTTOM SLAB TO BE USED ONLY IN SHALLOW MANHOLE CONSTRUCTION.

MANHOLE RISER MAY NOT BE REQUIRED IN SHALLOW MANHOLE CONSTRUCTION. A SHALLOW MANHOLE IS A MANHOLE ON A SEWER WHICH HAS A COVER FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE OF LESS THAN 4'-0". USE OF LOOSE BOTTOM SLAB IN CONJUNCTION WITH LOOSE TOP SLAB WILL NOT BE PERMITTED.

NOTE 'C':

PIPE OPENINGS WILL NOT BE PERMITTED THROUGH JOINTS. DISTANCE FROM TOP OR BOTTOM OF ANY SECTION SHALL BE A MINIMUM OF 3" PLUS THE JOINT DEPTH FOR CAST PIPE OPENINGS AND A MINIMUM OF 12" PLUS THE JOINT DEPTH FOR CORED OPENINGS FOR BASIN CONNECTIONS.

NOTE 'D':

THE MANUFACTURER SHALL ENSURE THAT ALL PRECAST MANHOLE SECTIONS ARE ADDITIONALLY REINFORCED WHERE REQUIRED TO RESIST DAMAGE FROM HANDLING, SHIPPING AND INSTALLATION STRESSES.

GENERAL NOTES:

- (1) THIS 4'-0" DIA. PRECAST MANHOLE MAY BE SUBSTITUTED FOR STANDARD MANHOLE TYPES A-1, A-2, B-1 AND B-2 ON SEWERS 24" IN DIAMETER AND LESS ONLY.
- (2) MANHOLE RISER REINFORCING COMPLIES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH WWM, $A_s=0.12$ CIR. X 0.06 LONG. - E.F. WITH 2-#4 HOOPS AROUND ALL CAST PIPE OPENINGS (1-E.F.). (THE 2-#4 HOOPS WILL NOT BE REQUIRED AT CORED OPENINGS FOR BASIN CONNECTIONS.) (ALL VALUES OF AREA OF STEEL (A_s) ARE IN SQUARE INCHES AND ARE A MINIMUM.)
- (3) CORED OPENINGS WILL BE PERMITTED FOR 12" DIA. BASIN CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 16" FOR THESE BASIN CONNECTIONS. CORED OPENING WILL NOT BE PERMITTED FOR SHALLOW MANHOLES.
- (4) FOR DETAILS OF STEPS, JOINTS, GASKETS, PRECAST COLLARS, PIPE TO MANHOLE CONNECTIONS, PILE CAP AND POURED IN PLACE ALTERNATE MONOLITHIC BASE SECTION SEE STANDARD FOR PRECAST MANHOLE DETAILS, STANDARD FOR MANHOLE STEPS AND STANDARD FOR ALTERNATE MONOLITHIC BASE SECTIONS FOR PRECAST MANHOLES (POURED IN PLACE).
- (5) THE MAXIMUM DEPTH OF COVER OF THE 4'-0" DIA. PRECAST MANHOLE, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, SHALL BE TWENTY-FIVE (25) FEET.
- (6) ALL COVER DISTANCES SHOWN FOR REINFORCEMENT ARE CLEAR DISTANCES.
- (7) LIFTING HOLES SHALL BE LOCATED IN THE SECTIONS AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING.
- (8) THE VALUES OF THE WALL AND SLAB THICKNESSES ARE A MINIMUM.
- (9) CONCRETE DESIGN MIX = 5,000 PSI (MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47). REBARS - $F_s = 60,000$ PSI. WWM - $F_s = 65,000$ PSI.
- (10) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
- (11) THE OPENING DIAMETERS SHOWN IN THE SCHEDULE ARE MAXIMUM VALUES. THE MINIMUM OPENING DIAMETERS SHALL BE AS FOLLOWS: 8" TO 24" DIA. PIPES = O.D.+3".
- (12) BELL-UP TYPE JOINTS SHALL BE ALLOWED FOR 4'-0" DIA. PRECAST MANHOLE, WITH THE FOLLOWING MODIFICATION TO THE LOOSE TOP SLAB:
(A) THE MINIMUM SLAB THICKNESS SHALL BE $X+6"$ (WHERE 'X' IS JOINT DEPTH), BUT IN NO CASE SHALL IT BE LESS THAN 8" THICK AND (B) THE EMBEDMENT LENGTH SHALL BE $t-1"$ (WHERE 't' IS THE THICKNESS OF RISER WALL); SEE DETAIL "A" ON DWG. 1 OF 4.

SCHEDULE		
PIPE DIA.	OPENING*	Δ MAX.
8"	14"	117°
10"	16"	112°
12"	19"	104°
15"	22"	93°
18"	26"	83°
24"	34"	60°

* SEE NOTE 11

REVISED JULY 2018: C. LAM
W. PATALANO/P. MOY

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wynne

P.E.

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

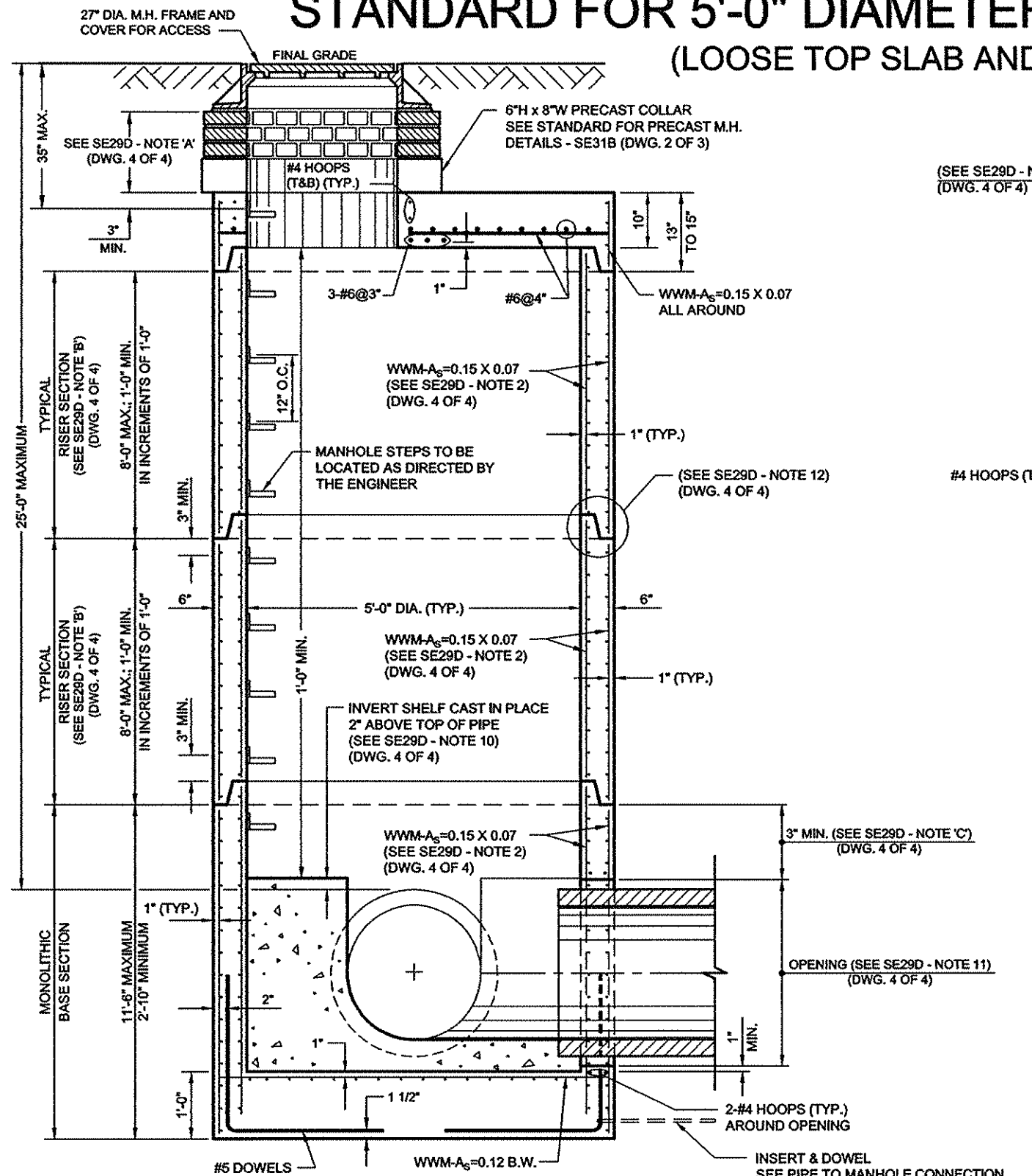
8/14/18

DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 1 OF 4)

(LOOSE TOP SLAB AND MONOLITHIC BASE SECTION)

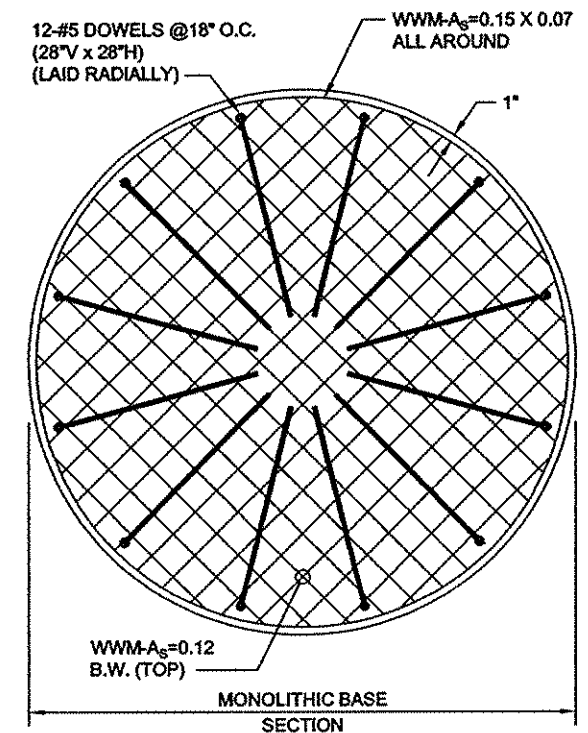
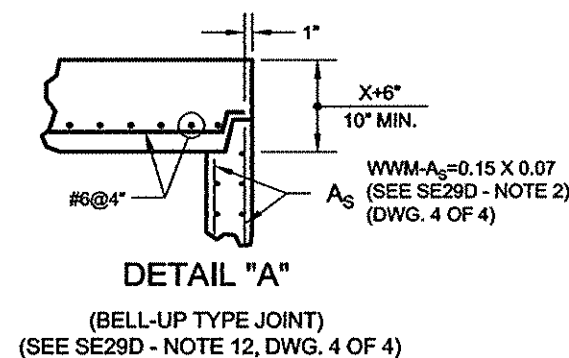
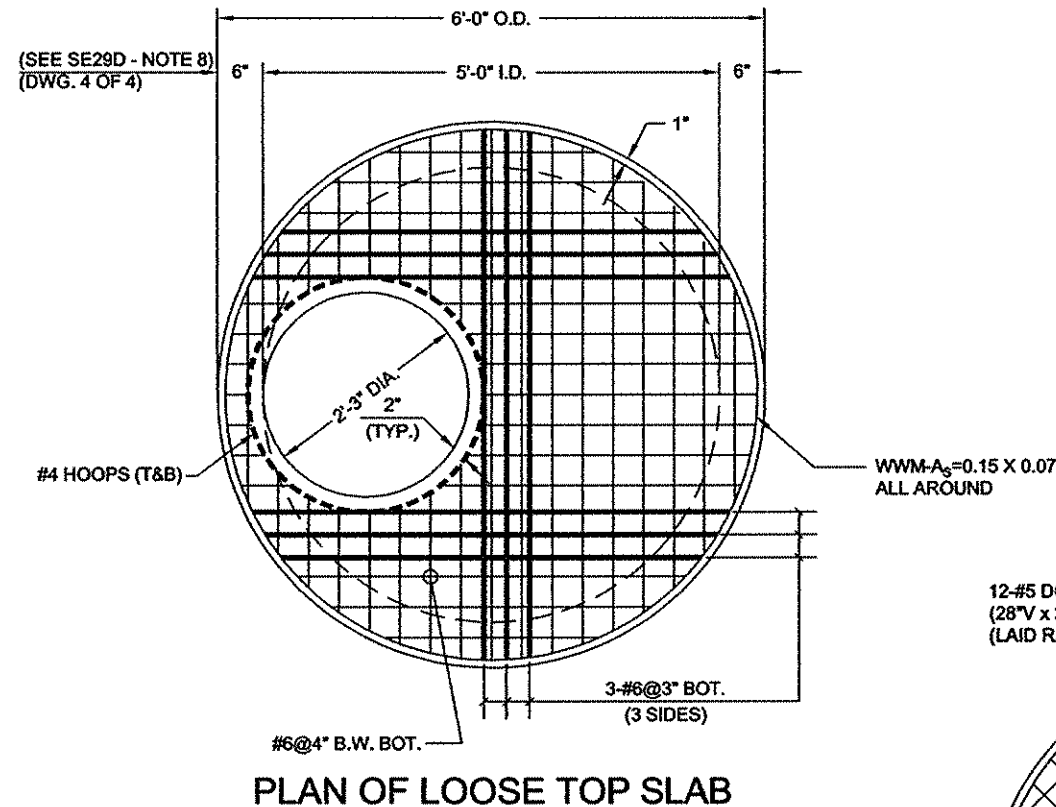


SECTION A-A

Sundip S. Sarini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE



Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

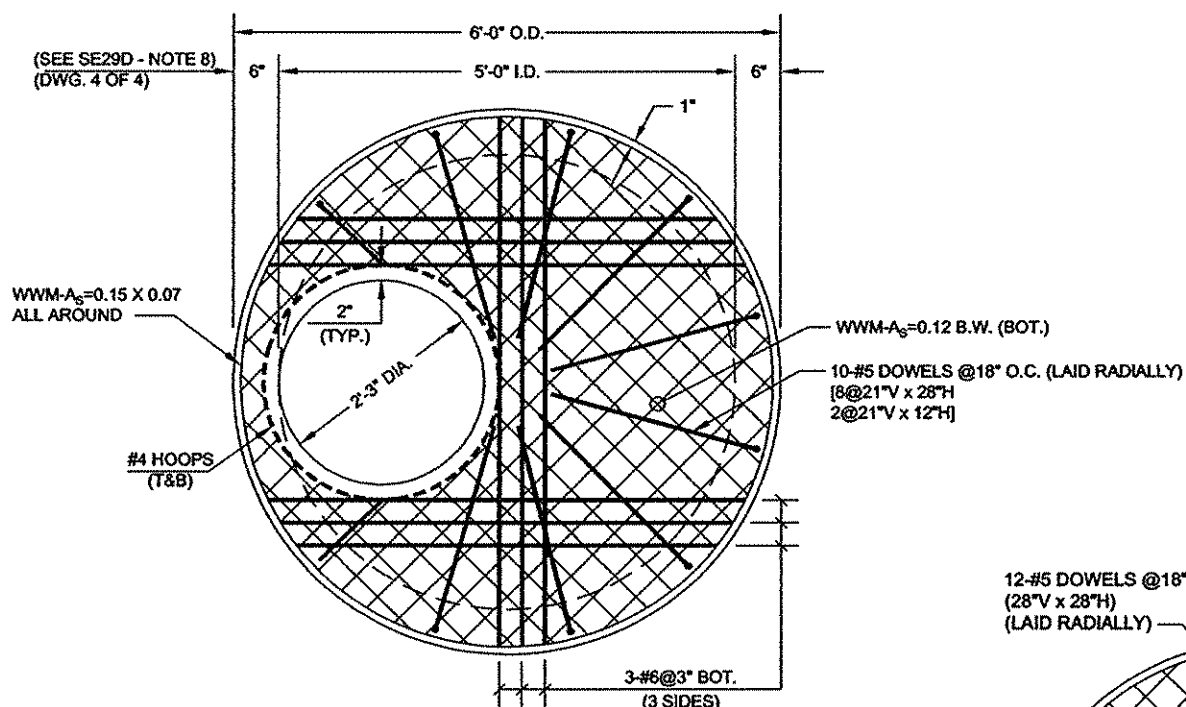
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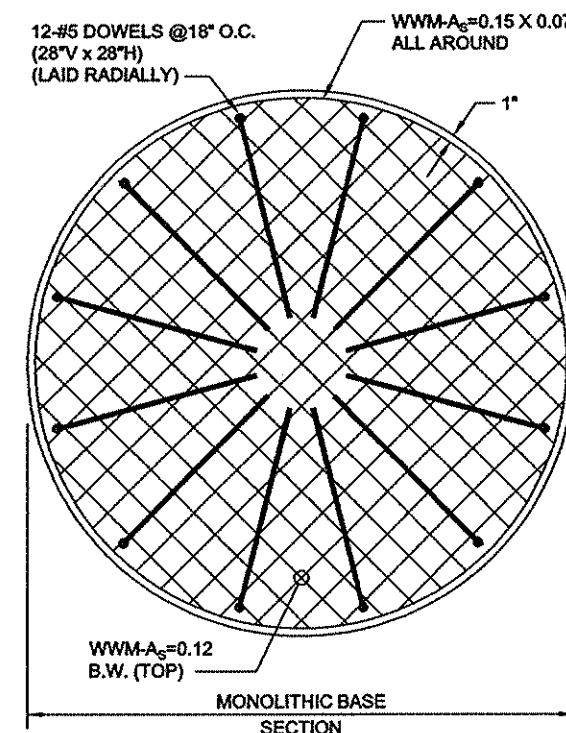
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STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 2 OF 4)

(MONOLITHIC TOP SECTION AND MONOLITHIC BASE SECTION)



PLAN OF MONOLITHIC TOP SECTION



PLAN OF BOTTOM REINFORCING

SECTION B-B

Gurdeep S. Saini

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

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DATE _____

Thomas Wynne

P.E.

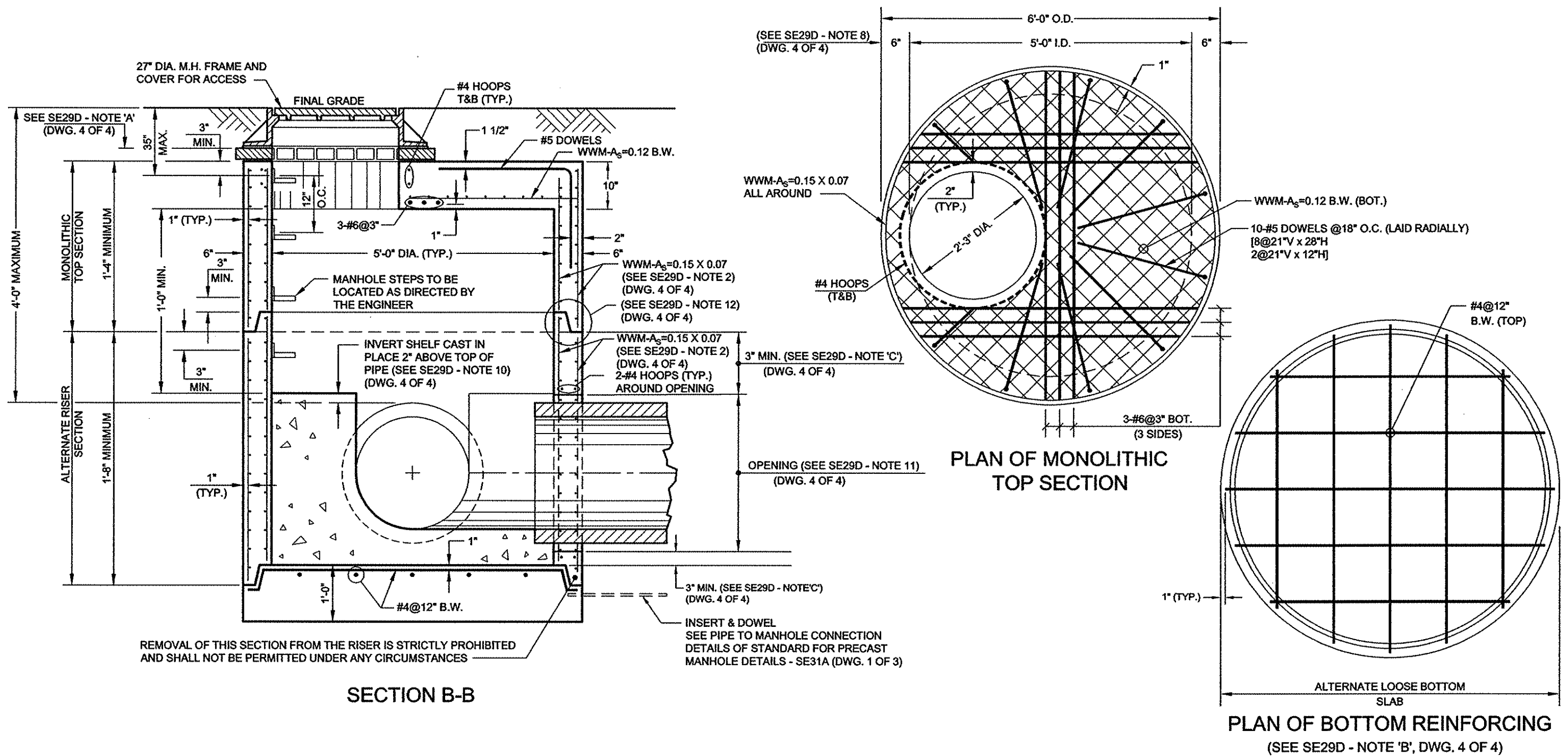
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

DATE _____

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 3 OF 4)
(MONOLITHIC TOP SECTION AND ALTERNATE LOOSE BOTTOM SLAB)



REVISED JULY 2018: C. LAM
W. PATALANO/P. MOY

Sandeep S. Samra

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wayne

P.E.

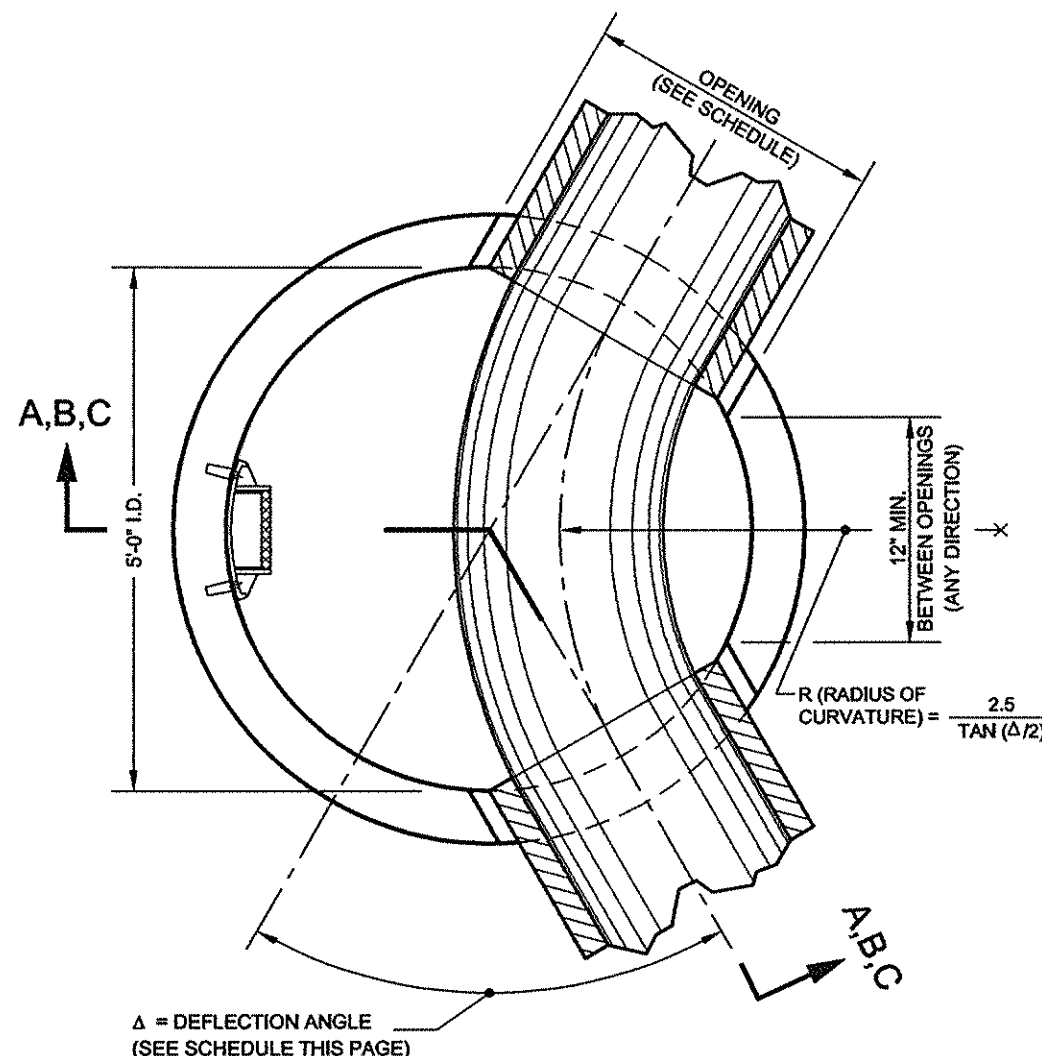
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

DATE

STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 4 OF 4)

(MISCELLANEOUS DETAIL, NOTES AND SCHEDULE)

**NOTE 'A':**

9" MIN. TO 20" MAX.; 9" BRICK MIN. LAID RADIALLY, USE 1 OR 2 PRECAST COLLARS OR BRICK AS REQUIRED. (4" BRICK MIN. ONLY FOR SHALLOW MANHOLE CONSTRUCTION.)

NOTE 'B':

ALTERNATE LOOSE BOTTOM SLAB TO BE USED ONLY IN SHALLOW MANHOLE CONSTRUCTION. MANHOLE RISER MAY NOT BE REQUIRED IN SHALLOW MANHOLE CONSTRUCTION. A SHALLOW MANHOLE IS A MANHOLE ON A SEWER WHICH HAS A COVER FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE OF LESS THAN 4'-0". USE OF LOOSE BOTTOM SLAB IN CONJUNCTION WITH LOOSE TOP SLAB WILL NOT BE PERMITTED.

NOTE 'C':

PIPE OPENINGS WILL NOT BE PERMITTED THROUGH JOINTS. DISTANCE FROM TOP OR BOTTOM OF ANY SECTION SHALL BE A MINIMUM OF 3" PLUS THE JOINT DEPTH FOR CAST PIPE OPENINGS AND A MINIMUM OF 12" PLUS THE JOINT DEPTH FOR CORED OPENINGS FOR BASIN CONNECTIONS.

NOTE 'D':

THE MANUFACTURER SHALL ENSURE THAT ALL PRECAST MANHOLE SECTIONS ARE ADDITIONALLY REINFORCED WHERE REQUIRED TO RESIST DAMAGE FROM HANDLING, SHIPPING AND INSTALLATION STRESSES.

SCHEDULE

PIPE DIA.	OPENING*	Δ MAX.
12"	19"	118°
15"	22"	106°
18"	26"	96°
24"	34"	79°
30"	42"	67°
36"	49"	47°

* SEE NOTE 11

GENERAL NOTES:

- (1) THIS 5'-0" DIA. PRECAST MANHOLE MAY BE SUBSTITUTED FOR STANDARD MANHOLE TYPES A-1, A-2, B-1, B-2, C-1 AND C-2 ON SEWERS 36" IN DIAMETER AND LESS ONLY.
- (2) MANHOLE RISER REINFORCING COMPLIES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH WWM, $A_s=0.15$ CIR. X 0.07 LONG. - E.F. WITH 2-#4 HOOPS AROUND ALL CAST PIPE OPENINGS (1-E.F.). (THE 2-#4 HOOPS WILL NOT BE REQUIRED AT CORED OPENINGS FOR BASIN CONNECTIONS.) (ALL VALUES OF AREA OF STEEL (A_s) ARE IN SQUARE INCHES AND ARE A MINIMUM.)
- (3) CORED OPENINGS WILL BE PERMITTED FOR 12" DIA. BASIN CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 16" FOR THESE BASIN CONNECTIONS. CORED OPENING WILL NOT BE PERMITTED FOR SHALLOW MANHOLES.
- (4) FOR DETAILS OF STEPS, JOINTS, GASKETS, PRECAST COLLARS, PIPE TO MANHOLE CONNECTIONS, PILE CAP AND POURED IN PLACE ALTERNATE MONOLITHIC BASE SECTION SEE STANDARD FOR PRECAST MANHOLE DETAILS, STANDARD FOR MANHOLE STEPS AND STANDARD FOR ALTERNATE MONOLITHIC BASE SECTIONS FOR PRECAST MANHOLES (POURED IN PLACE).
- (5) THE MAXIMUM DEPTH OF COVER OF THE 5'-0" DIA. PRECAST MANHOLE, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, SHALL BE TWENTY-FIVE (25) FEET.
- (6) ALL COVER DISTANCES SHOWN FOR REINFORCEMENT ARE CLEAR DISTANCES.
- (7) LIFTING HOLES SHALL BE LOCATED IN THE SECTIONS AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING.
- (8) THE VALUES OF THE WALL AND SLAB THICKNESSES ARE A MINIMUM.
- (9) CONCRETE DESIGN MIX = 5,000 PSI (MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47). REBARS - $F_s = 60,000$ PSI. WWM - $F_s = 65,000$ PSI.
- (10) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
- (11) THE OPENING DIAMETERS SHOWN IN THE SCHEDULE ARE MAXIMUM VALUES. THE MINIMUM OPENING DIAMETERS SHALL BE AS FOLLOWS: 8" TO 24" DIA. PIPES = O.D.+3"; 30" TO 36" DIA. PIPES = O.D.+4".
- (12) BELL-UP TYPE JOINTS SHALL BE ALLOWED FOR 5'-0" DIA. PRECAST MANHOLE, WITH THE FOLLOWING MODIFICATION TO THE LOOSE TOP SLAB: (A) THE MINIMUM SLAB THICKNESS SHALL BE X+6" (WHERE 'X' IS JOINT DEPTH), BUT IN NO CASE SHALL IT BE LESS THAN 10" THICK AND (B) THE EMBEDMENT LENGTH SHALL BE t-1" (WHERE 't' IS THE THICKNESS OF RISER WALL); SEE DETAIL "A" ON DWG. 1 OF 4.

Gurdeep S. Saini

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18

DATE

Thomas Wynne

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

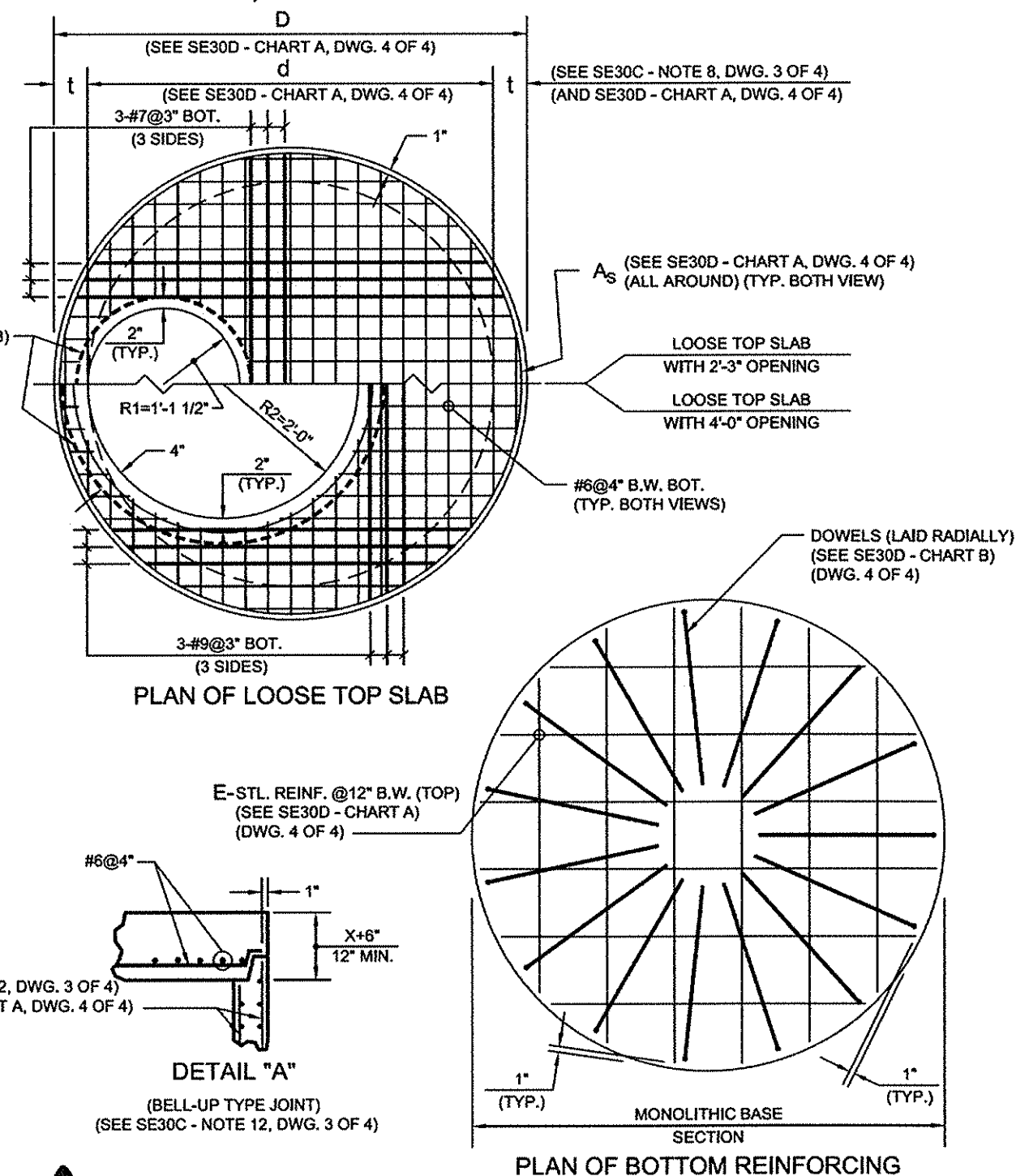
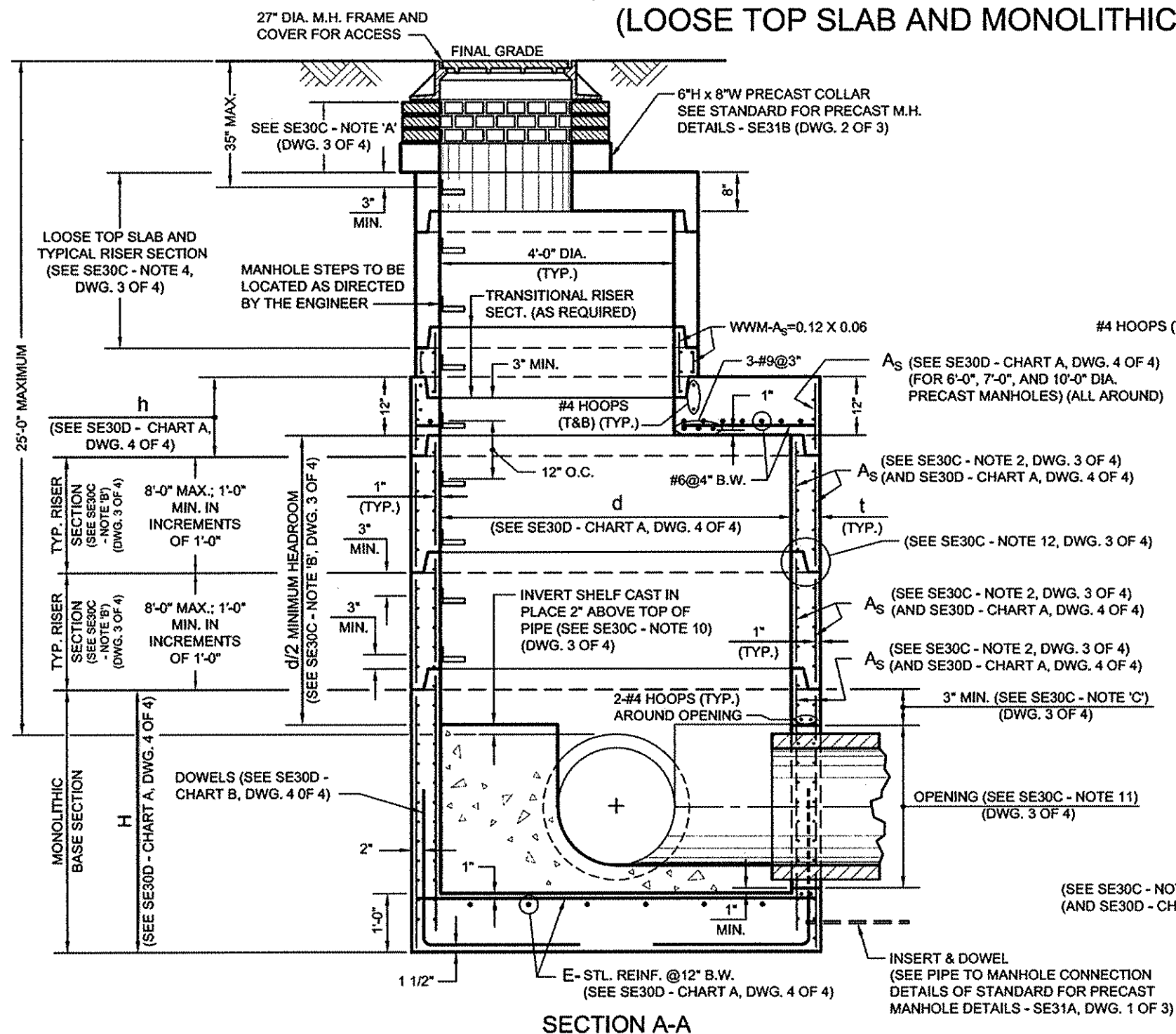
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STANDARD FOR PRECAST MANHOLE (DWG. 1 OF 4)

(FOR 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLE)
(LOOSE TOP SLAB AND MONOLITHIC BASE SECTION)



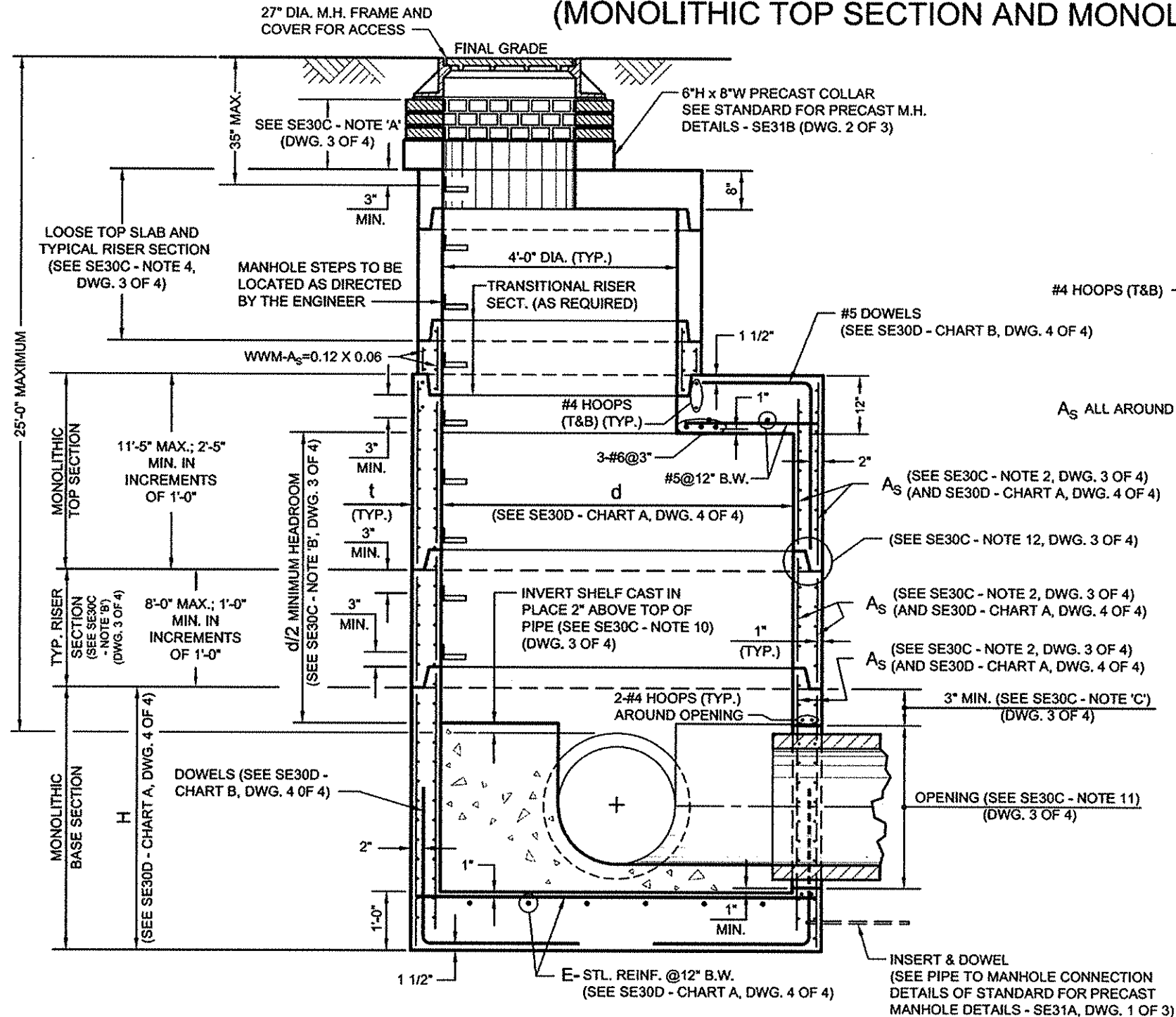
Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

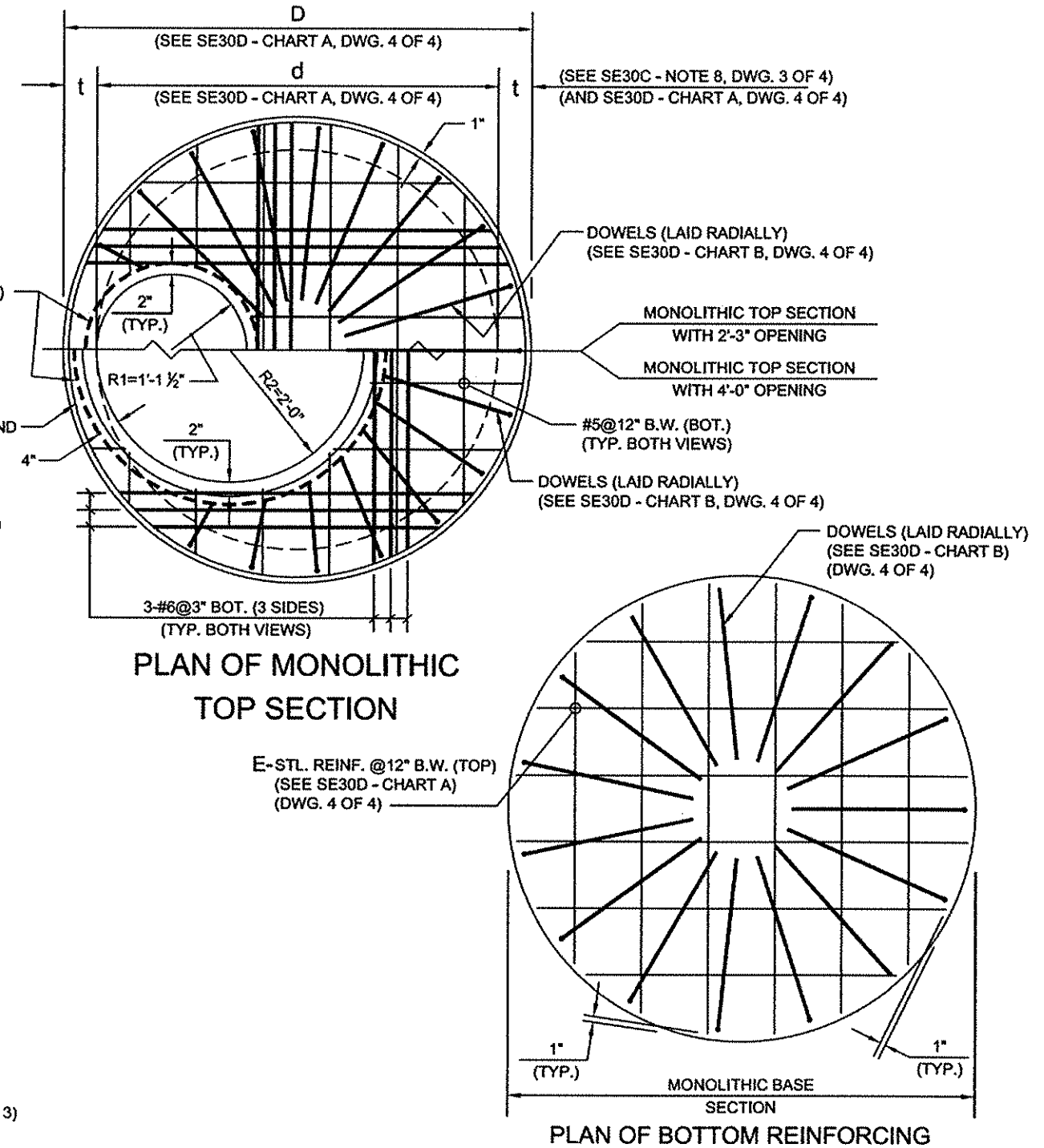
Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

STANDARD FOR PRECAST MANHOLE (DWG. 2 OF 4)

(FOR 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLE)
(MONOLITHIC TOP SECTION AND MONOLITHIC BASE SECTION)

SECTION B-B



Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18

DATE

Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

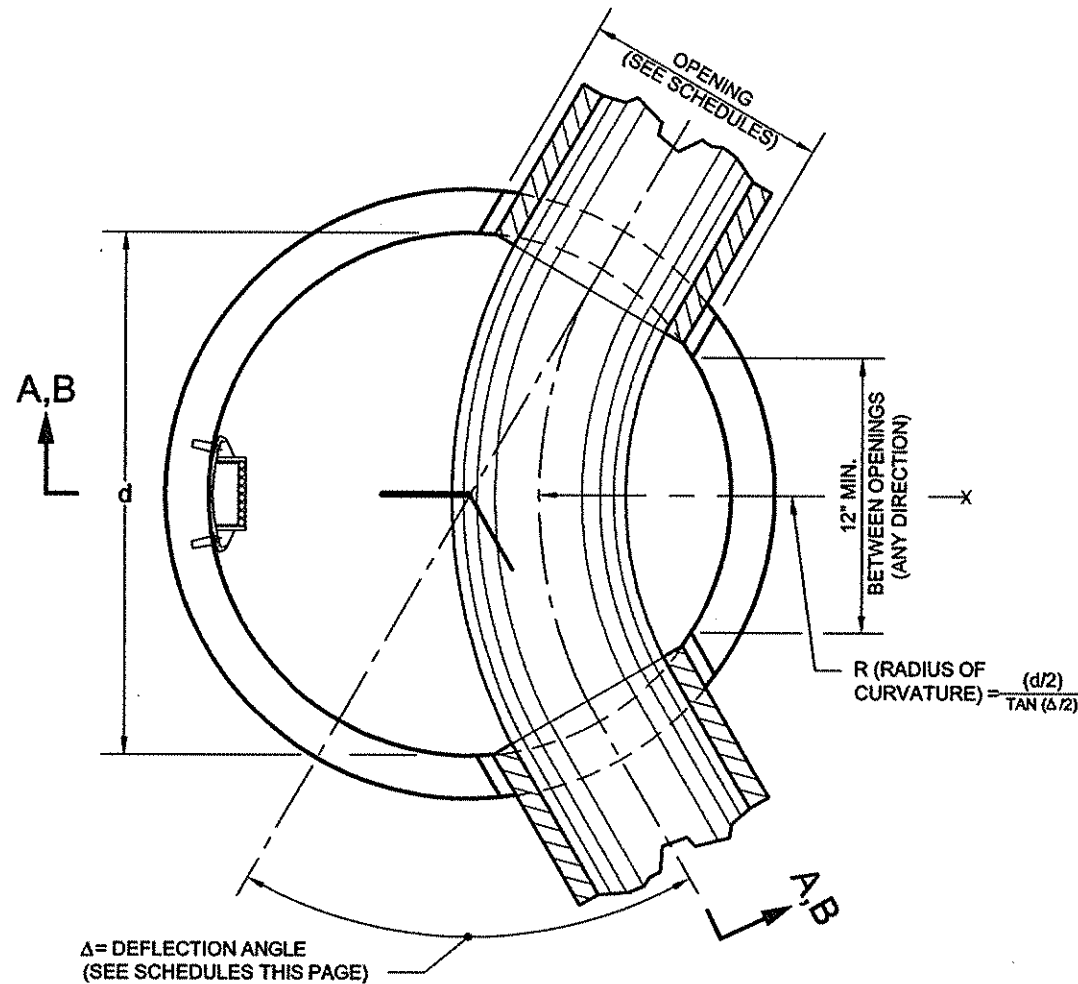
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DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR PRECAST MANHOLE (DWG. 3 OF 4)

(FOR 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLE)
(PRECAST MANHOLE MISCELLANEOUS DETAIL, NOTES AND SCHEDULES)

PLAN OF BASE SECTION

SCHEDULE (6'-0" DIA. PRECAST MANHOLE)		
PIPE DIA.	OPENING*	Δ MAX.
18"	26"	106°
24"	34"	90°
30"	42"	77°
36"	49"	67°
42"	56"	58°
48"	63"	38°

* SEE NOTE 11

SCHEDULE (7'-0" DIA. PRECAST MANHOLE)		
PIPE DIA.	OPENING*	Δ MAX.
18"	26"	114°
24"	34"	98°
30"	42"	86°
36"	49"	75°
42"	56"	67°
48"	63"	60°
54"	71"	48°

* SEE NOTE 11

SCHEDULE (8'-0" DIA. PRECAST MANHOLE)		
PIPE DIA.	OPENING*	Δ MAX.
24"	34"	106°
30"	42"	93°
36"	49"	83°
42"	56"	74°
48"	63"	67°
54"	71"	61°
60"	78"	56°
66"	85"	41°

* SEE NOTE 11

SCHEDULE (10'-0" DIA. PRECAST MANHOLE)		
PIPE DIA.	OPENING*	Δ MAX.
36"	49"	96°
42"	56"	87°
48"	63"	79°
54"	71"	73°
60"	78"	67°
66"	85"	62°
72"	92"	58°
78"	99"	54°
84"	106"	44°

* SEE NOTE 11

GENERAL NOTES:

- (1) THESE PRECAST MANHOLE MAY BE SUBSTITUTED FOR STANDARD MANHOLE TYPES A-1, A-2, B-1, B-2, C-1, C-2, D-1 AND D-2 ON SEWERS 84" IN DIAMETER AND LESS ONLY (AS SHOWN IN SCHEDULES).
- (2) MANHOLE RISER REINFORCING COMPLIES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH WWM, A_s =(SEE CHART A - DWG. 4 OF 4) E.F. WITH 2-#4 HOOPS AROUND ALL CAST PIPE OPENINGS (1-E.F.). (THE 2-#4 HOOPS WILL NOT BE REQUIRED AT CORED OPENINGS FOR BASIN CONNECTIONS.) (ALL VALUES OF AREA OF STEEL (A_s) ARE IN SQUARE INCHES AND ARE A MINIMUM.)
- (3) CORED OPENINGS WILL BE PERMITTED FOR 12" DIA. BASIN CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 16" FOR THESE BASIN CONNECTIONS. CORED OPENING WILL NOT BE PERMITTED FOR SHALLOW MANHOLES.
- (4) FOR DETAILS OF STEPS, JOINTS, GASKETS, PRECAST COLLARS, PIPE TO MANHOLE CONNECTIONS, PILE CAP, POURED IN PLACE ALTERNATE MONOLITHIC BASE SECTIONS AND 4'-0" DIA. PRECAST MANHOLE UNITS SEE STANDARD FOR PRECAST MANHOLE DETAILS, STD. FOR M.H. STEPS, STD. FOR ALTERNATE MONOLITHIC BASE SECTIONS FOR PRECAST MANHOLES (POURED IN PLACE) AND STD. FOR 4'-0" DIA. PRECAST MANHOLE. TYPICAL 4'-0" DIA. PRECAST RISER SECTION WILL NOT BE REQUIRED FOR SHALLOW MANHOLE CONSTRUCTION.
- (5) THE MAXIMUM DEPTH OF COVER OF THE 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLES, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, SHALL BE TWENTY-FIVE (25) FEET.
- (6) ALL COVER DISTANCES SHOWN FOR REINFORCEMENT ARE CLEAR DISTANCES.
- (7) LIFTING HOLES SHALL BE LOCATED IN THE SECTIONS AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING.
- (8) THE VALUES OF THE WALL AND SLAB THICKNESSES ARE A MINIMUM.
- (9) CONCRETE DESIGN MIX = 5,000 PSI (MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47). REBARS - F_s = 60,000 PSI. WWM - F_s = 65,000 PSI.
- (10) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
- (11) THE OPENING DIAMETERS SHOWN IN THE SCHEDULE ARE MAXIMUM VALUES. THE MINIMUM OPENING DIAMETERS SHALL BE AS FOLLOWS: 8" TO 24" DIA. PIPES = O.D.+3"; 30" TO 48" DIA. PIPES = O.D.+4" AND 54" TO 84" DIA. PIPES = O.D.+5".
- (12) BELL-UP TYPE JOINTS SHALL BE ALLOWED FOR 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLE, WITH THE FOLLOWING MODIFICATION TO THE LOOSE TOP SLAB: (A) THE MINIMUM SLAB THICKNESS SHALL BE X+6" (WHERE 'X' IS JOINT DEPTH), BUT IN NO CASE SHALL IT BE LESS THAN 12" THICK AND (B) THE EMBEDMENT LENGTH SHALL BE t-1" (WHERE 't' IS THE THICKNESS OF RISER WALL); SEE DETAIL "A" ON DWG. 1 OF 4.

Sandeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR PRECAST MANHOLE (DWG. 4 OF 4)
(FOR 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLES)

CHART A

d	D	t	H	As	E	h
			MONOLITHIC BASE SECTION			
6'-0"	7'-2"	7"	11'-6" MAX.; 3'-5" MIN.	0.18 X 0.09	#4	15" TO 18"
7'-0"	8'-4"	8"	11'-6" MAX.; 3'-5" MIN.	0.21 X 0.10	#4	15" TO 18"
8'-0"	9'-6"	9"	11'-6" MAX.; 4'-1" MIN.	0.24 X 0.12	#5	15" TO 20"
10'-0"	11'-10"	11"	11'-6" MAX.; 5'-4" MIN.	0.30 X 0.15	#6	15" TO 20"

CHART B

d	DOWELS IN MONOLITHIC TOP SECTION		DOWELS IN MONOLITHIC BASE SECTION
	2'-3" OPENING	4'-0" OPENING	
6'-0"	19-#5 DOWELS @12" O.C. (17@23"V x 32"H) (2@23"V x 10"H)	15-#5 DOWELS @12" O.C. (3@23"V x 25"H); (4@23"V x 23"H) (2@23"V x 20"H); (2@23"V x 17"H) (2@23"V x 13"H); (2@23"V x 9"H)	15-#5 DOWELS @17" O.C. (32"V x 32"H)
7'-0"	23-#5 DOWELS @12" O.C. (21@23"V x 38"H) (2@23"V x 10"H)	19-#5 DOWELS @12" O.C. (5@23"V x 38"H); (4@23"V x 35"H) (2@23"V x 31"H); (2@23"V x 28"H) (2@23"V x 23"H); (2@23"V x 17"H) (2@23"V x 12"H)	20-#6 DOWELS @15" O.C. (38"V x 38"H)
8'-0"	27-#6 DOWELS @12" O.C. (25@23"V x 40"H) (2@23"V x 10"H)	23-#6 DOWELS @12" O.C. (15@23"V x 40"H); (2@23"V x 35"H) (2@23"V x 28"H); (2@23"V x 20"H) (2@23"V x 14"H)	25-#6 DOWELS @13 3/4" O.C. (40"V x 40"H)
10'-0"	33-#7 DOWELS @12" O.C. (33@23"V x 46"H)	31-#7 DOWELS @12" O.C. (25@23"V x 46"H); (2@23"V x 40"H) (2@23"V x 25"H); (2@23"V x 16"H)	34-#7 DOWELS @12 3/4" O.C. (46"V x 46"H)

Gurdeep S. Saini

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DEPARTMENT OF DESIGN AND CONSTRUCTION

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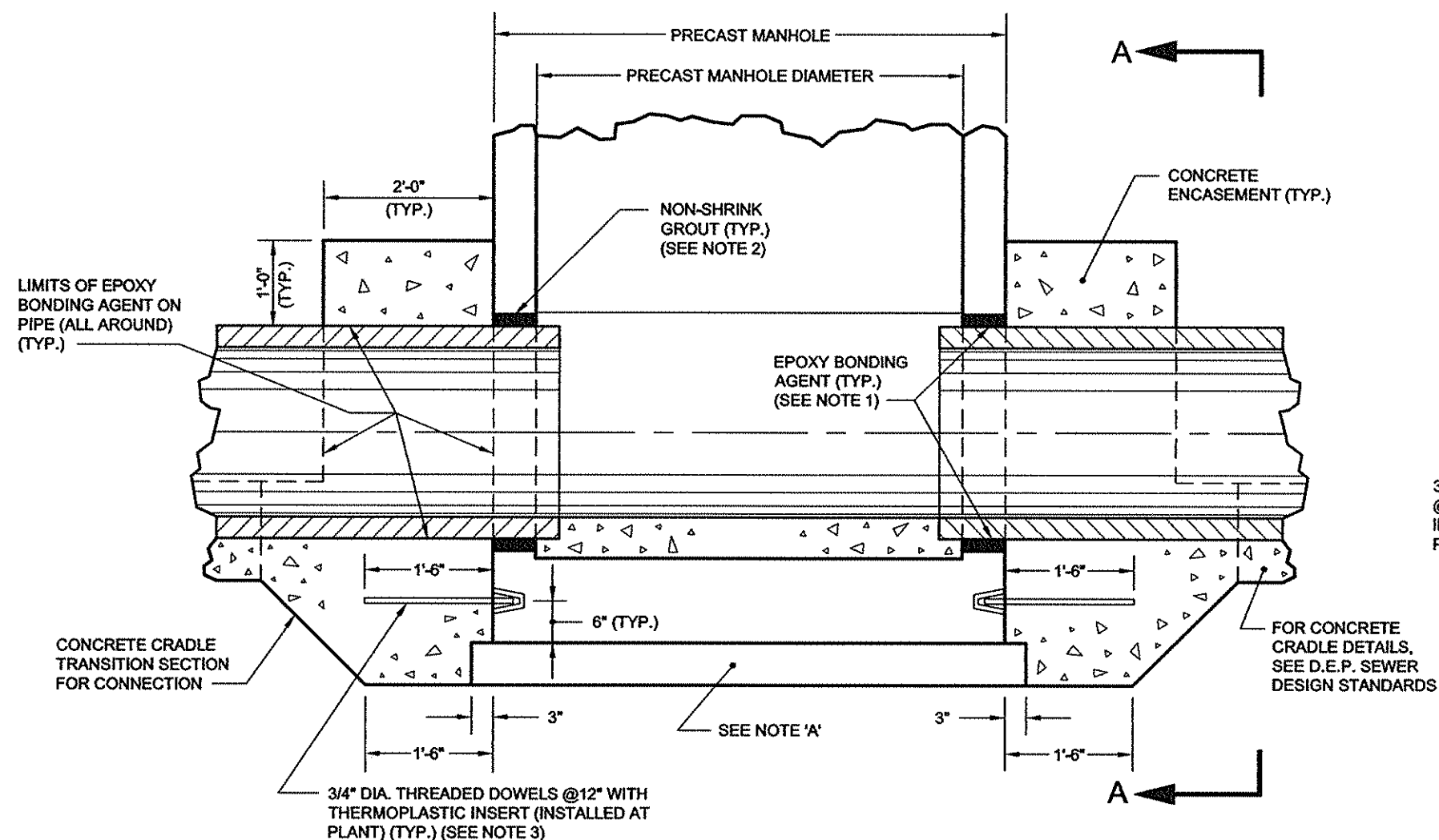
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REVISED DECEMBER 2017: P. LEUNG
W. PATALANO/P. MOY

STANDARD FOR PRECAST MANHOLE DETAILS (DWG. 1 OF 3)

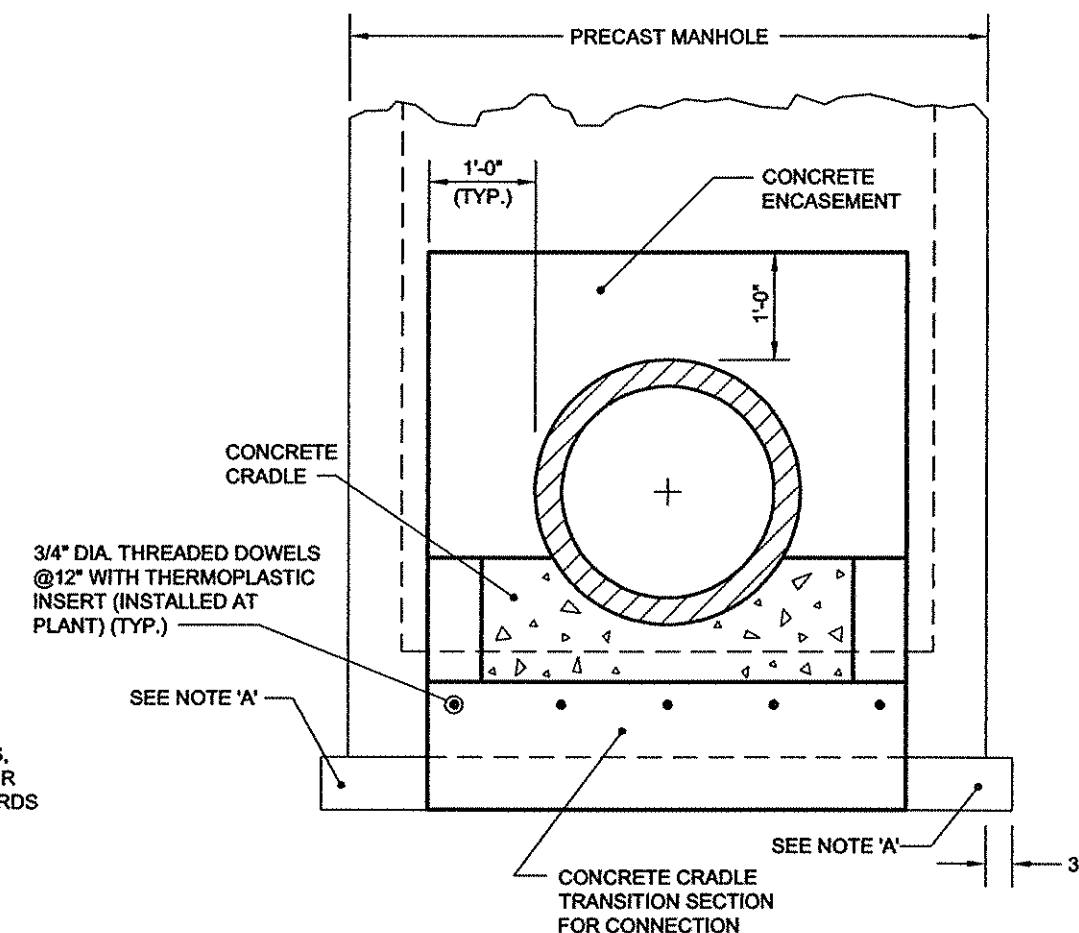
(PIPE TO MANHOLE CONNECTION DETAILS)



SECTIONAL PROFILE

NOTE 'A':

LEVELING PAD AND/OR PILE CAP - FOR MH'S ON GRADE, USE 6" WELL COMPACTED STONE BALLAST. FOR MH'S ON PILES, USE A CLASS 40 REINFORCED CONCRETE PILE CAP AS SHOWN ON THE STANDARD FOR PRECAST MANHOLE DETAILS DWG. 3 OF 3. IN EACH CASE, THE SHAPE SHALL BE SQUARE AND 3" LARGER THAN THE O.D. OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED.



SECTION A-A

GENERAL NOTES:

- (1) EPOXY BONDING AGENT TO BE ROCKWELL 'C' AS MANUFACTURED BY PRECO CHEMICAL CO. OR EQUAL.
- (2) NON-SHRINK GROUT TO BE SIKA-SET MORTAR AS MANUFACTURED BY SIKA CO. OR EQUAL.
- (3) THERMOPLASTIC INSERT AS MANUFACTURED BY PENNSYLVANIA INSERT CORP. OR EQUAL.

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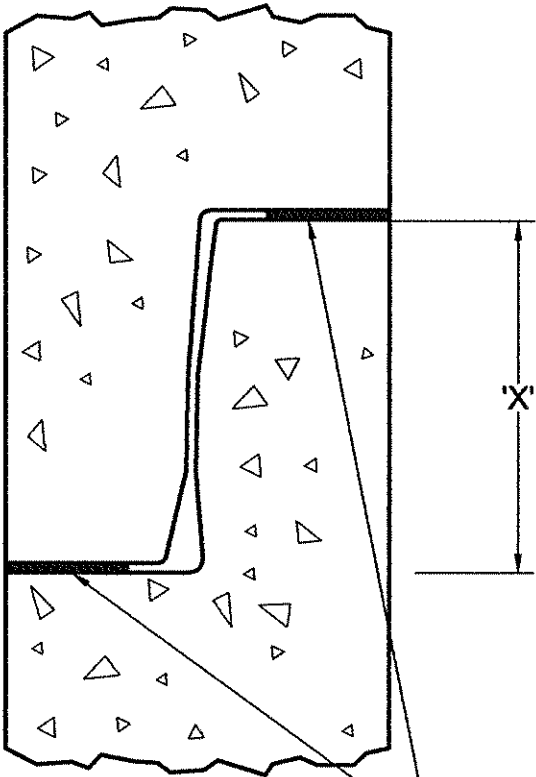
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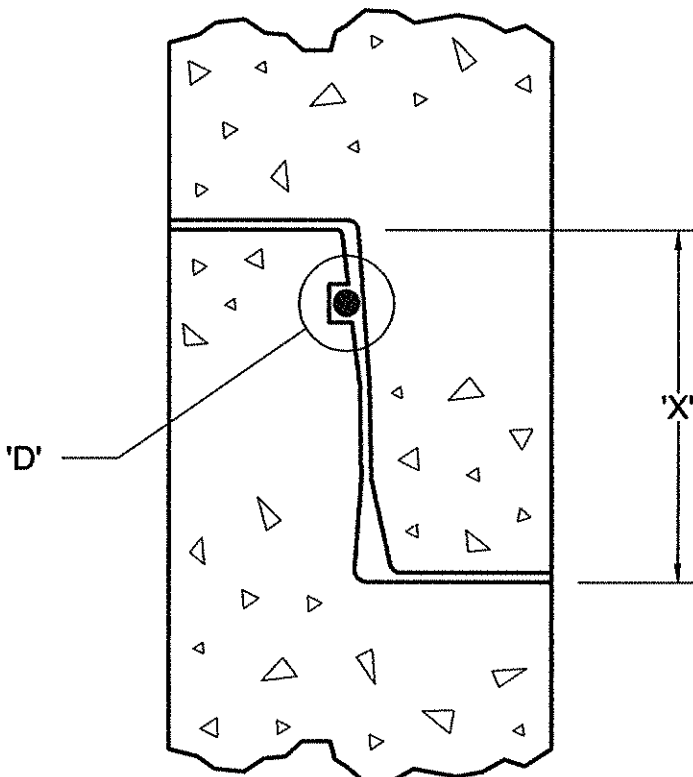
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STANDARD FOR PRECAST MANHOLE DETAILS (DWG. 2 OF 3)
(JOINTS, GASKETS AND PRECAST COLLAR DETAILS)

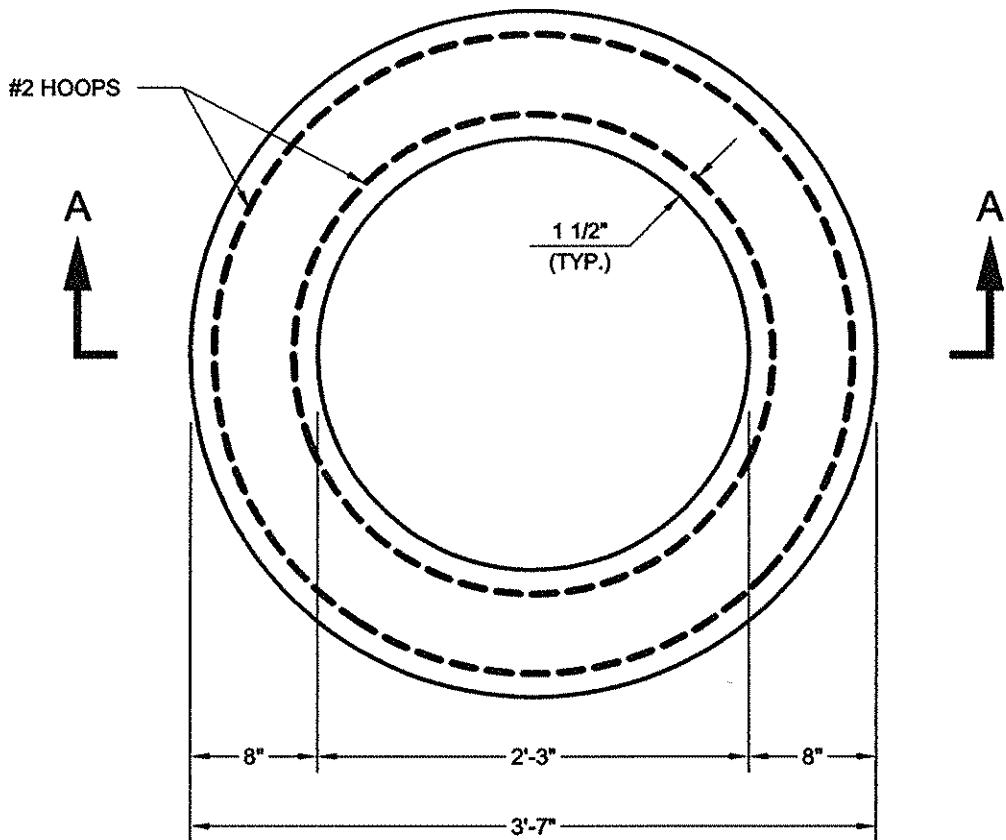


BUTYL JOINT

7/8" X 7/8" OR 1" DIA. SELF SEALING BUTYL GASKET.
QUALITY EQUAL TO FEDERAL SPEC. #SS-S-00210.

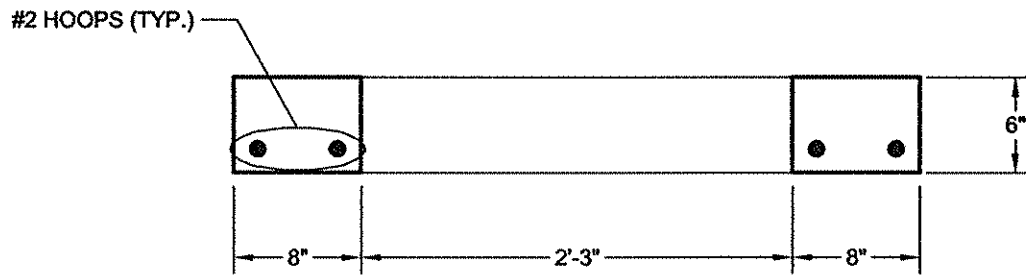


'O' RING JOINT



PLAN OF 6"H X 8"W PRECAST COLLAR

JOINT DETAILS		
M.H. I.D.	'X'	'D'
4'-0"	3" TO 5"	5/8" DIA.
5'-0"	3" TO 5"	3/4" DIA.
6'-0" AND 7'-0"	3" TO 6"	3/4" DIA.
8'-0" AND 10'-0"	3" TO 8"	3/4" DIA.



SECTION A-A

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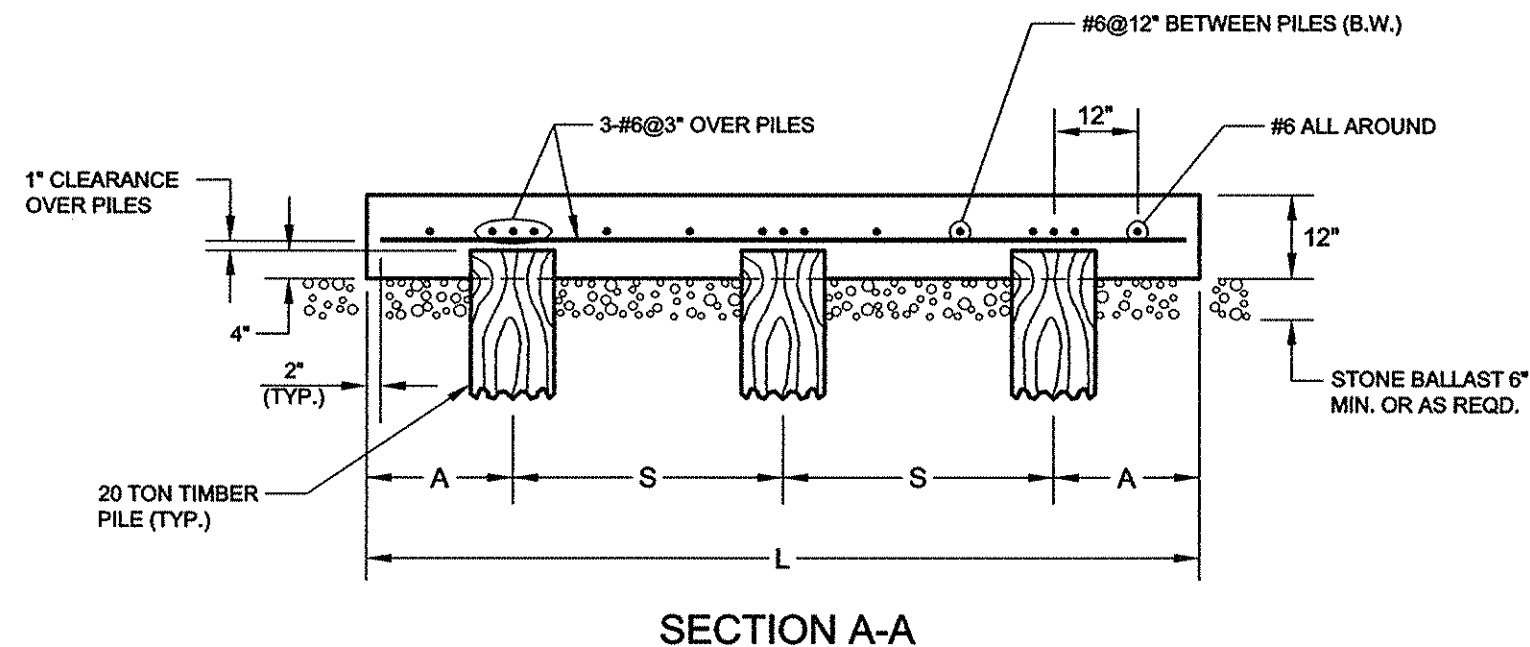
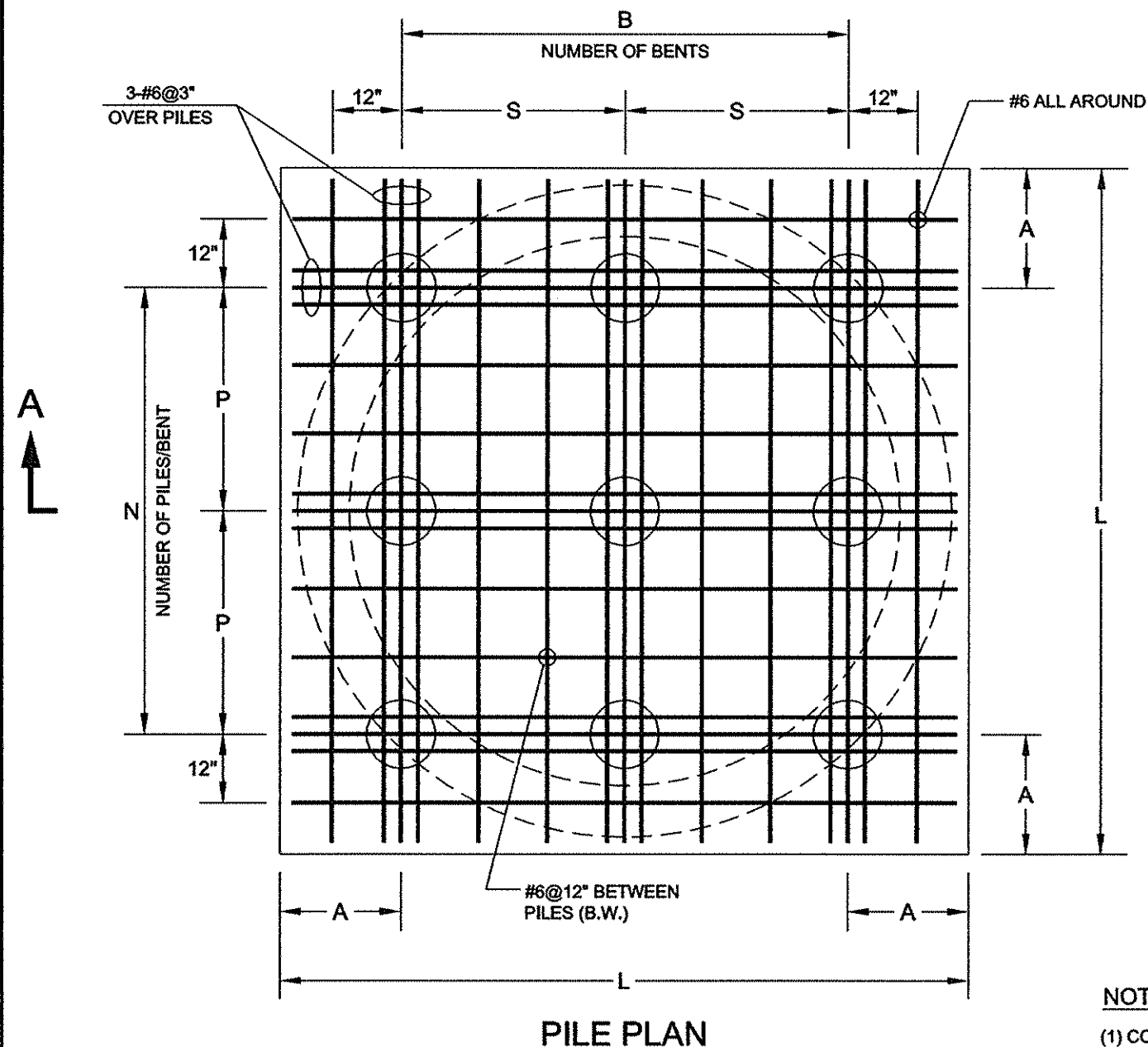
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STANDARD FOR PRECAST MANHOLE DETAILS (DWG. 3 OF 3)

(PRECAST MANHOLE PILE CAP DETAILS)



M.H. DIA.	L	A	N/B	P/S
4'-0"	5'-4"	15"	2	2'-10"
5'-0"	6'-6"	16"	2	3'-10"
6'-0"	7'-8"	17"	3	2'-5"
7'-0"	8'-10"	20"	3	2'-9"
8'-0"	10'-0"	21"	3	3'-3"
10'-0"	12'-4"	23"	4	2'-10"

NOTES:

- (1) CONCRETE SHALL BE CLASS 40. STEEL REINFORCEMENT BARS SHALL BE GRADE 60.
- (2) COST FOR ALL LABOR, MATERIAL, ETC. REQUIRED FOR THE PLACEMENT OF PILE CAP(S) SHALL BE MADE UNDER THE FOLLOWING CONTRACT ITEMS:
 - (A) ADDITIONAL EARTH EXCAVATION INCLUDING TEST PITS
 - (B) ADDITIONAL CONCRETE
 - (C) ADDITIONAL STEEL REINFORCING BARS
 - (D) STONE BALLAST

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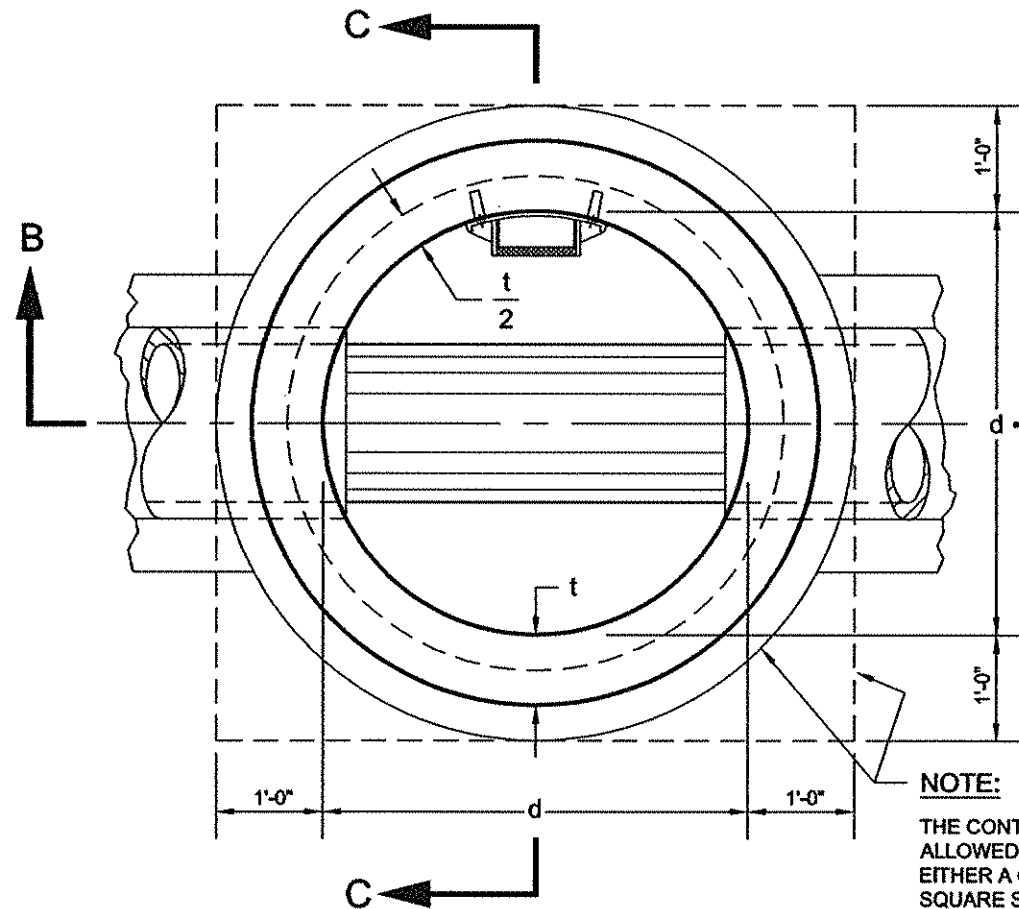
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STANDARD FOR ALTERNATE MONOLITHIC BASE SECTION FOR PRECAST MANHOLES (POURED IN PLACE)

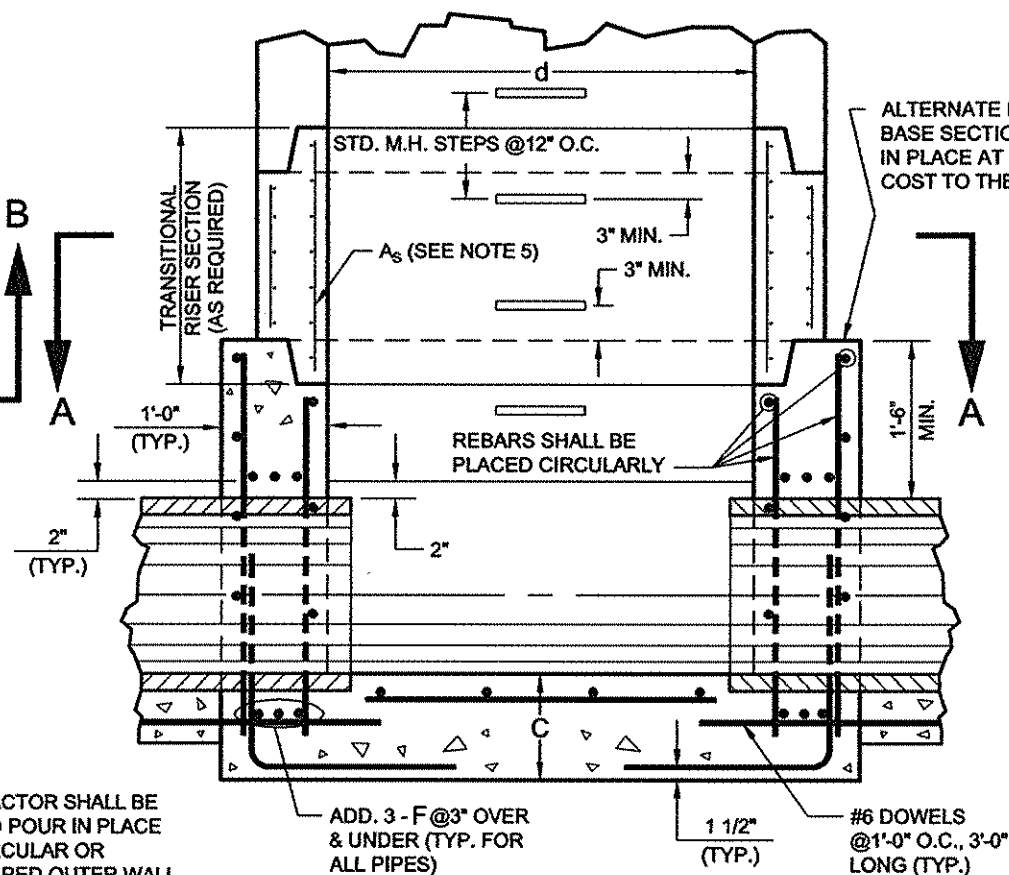
(FOR 4'-0", 5'-0", 6'-0", 7'-0", 8'-0" AND 10'-0" DIA. PRECAST MANHOLES)



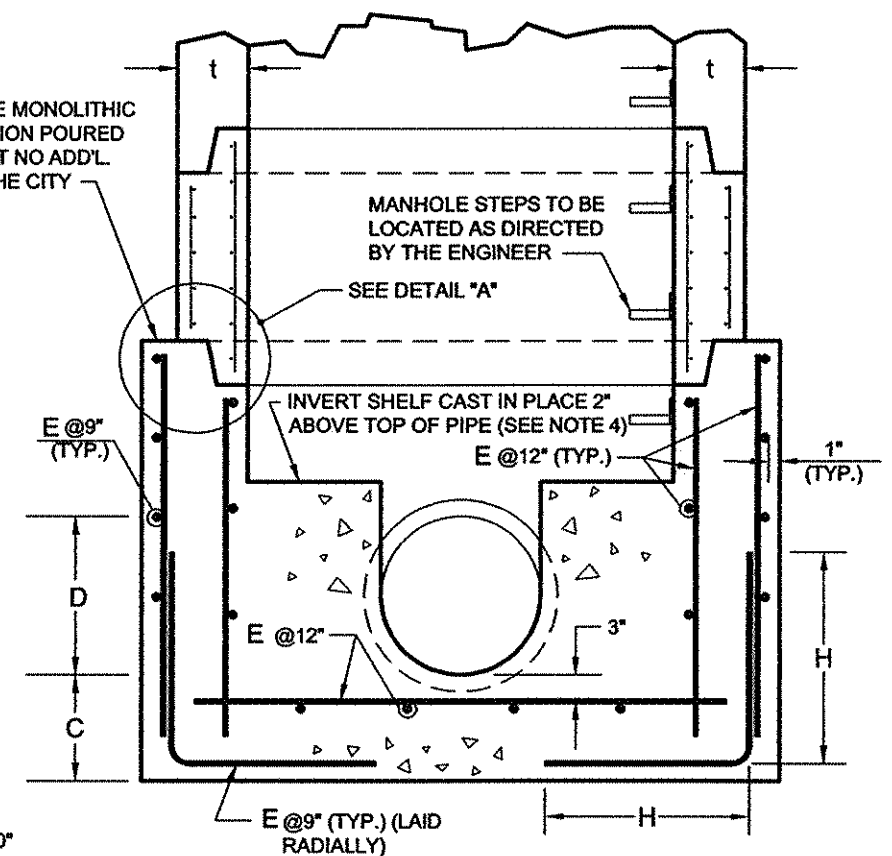
SECTION A-A

NOTE:

THE CONTRACTOR SHALL BE ALLOWED TO POUR IN PLACE EITHER A CIRCULAR OR SQUARE SHAPED OUTER WALL FOR THE ALTERNATE MONOLITHIC BASE SECTION.



SECTION B-B



SECTION C-C

NOTES:

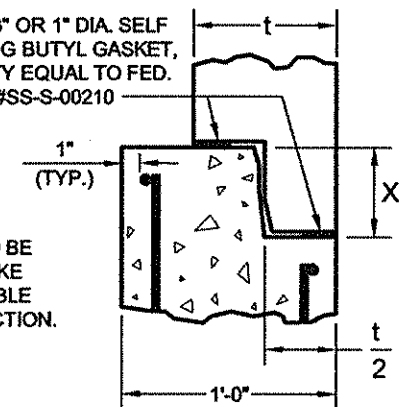
- (1) ALL STEEL REINFORCEMENT SHALL BE AS SHOWN. COVER DISTANCES SHOWN ARE CLEAR DISTANCES.
- (2) FOR ALTERNATE MONOLITHIC BASE SECTION ON PILES SEE PRECAST MANHOLE PILE CAP DETAILS OF STANDARD FOR PRECAST MANHOLE DETAILS DWG. 3 OF 3. ALL PILE CAP DIMENSIONS SHALL REMAIN THE SAME, WITH THE EXCEPTIONS OF DIMENSION "L" WHICH SHALL BE EQUAL TO THE DIMENSION OF THE ALTERNATE MONOLITHIC BASE SECTION AND DIMENSION "A" WHICH SHALL BE ADJUSTED ACCORDINGLY.
- (3) CONCRETE SHALL BE CLASS 40. STEEL REINFORCEMENT BARS SHALL BE GRADE 60.
- (4) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
- (5) TRANSITIONAL RISER SECTION SHALL CONFORM TO ALL REQUIREMENTS OF THE STANDARDS FOR PRECAST MANHOLES.

d	t	X	C	E	F	H	A _s
4'-0"	5"	3" TO 5"	12"	#4	#6	2'-0"	0.12 X 0.06
5'-0"	6"	3" TO 5"	12"	#4	#6	2'-3"	0.15 X 0.07
6'-0"	7"	3" TO 6"	14"	#4	#6	2'-6"	0.18 X 0.09
7'-0"	8"	3" TO 6"	15 1/2"	#5	#6	2'-9"	0.21 X 0.10
8'-0"	9"	3" TO 8"	18 1/2"	#5	#8	3'-0"	0.24 X 0.12
10'-0"	11"	3" TO 8"	23"	#5	#8	3'-6"	0.30 X 0.15

7/8"x7/8" OR 1" DIA. SELF SEALING BUTYL GASKET, QUALITY EQUAL TO FED. SPEC. #SS-S-00210

NOTE:

STEEL FORM TO BE UTILIZED TO MAKE JOINT COMPATIBLE WITH RISER SECTION.



DETAIL "A"

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P.E.

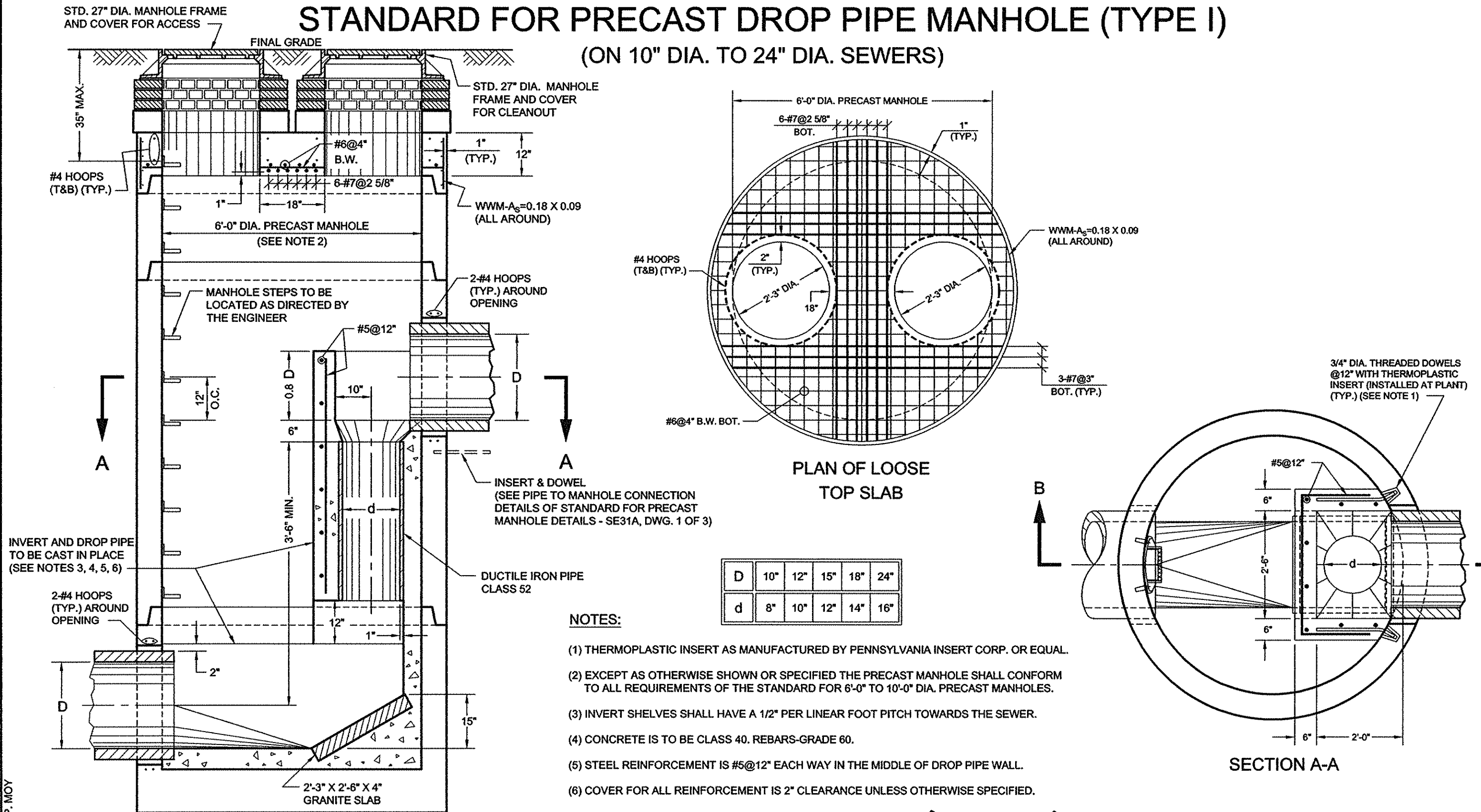
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EXECUTIVE DIRECTOR OF ENGINEERING
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STANDARD FOR PRECAST DROP PIPE MANHOLE (TYPE I) (ON 10" DIA. TO 24" DIA. SEWERS)



SECTION B-B

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

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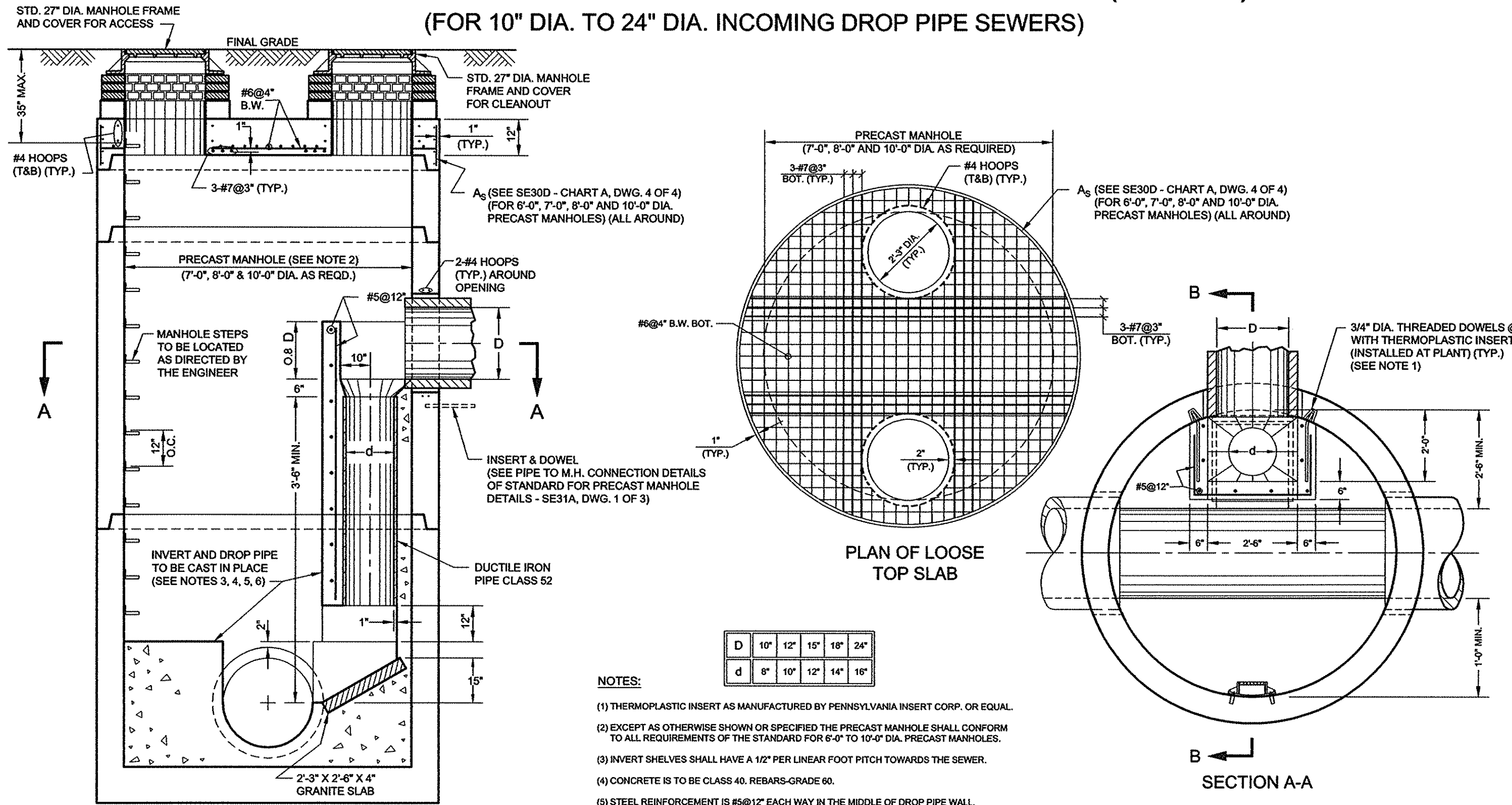
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STANDARD FOR PRECAST DROP PIPE MANHOLE (TYPE II)

(FOR 10" DIA. TO 24" DIA. INCOMING DROP PIPE SEWERS)



- NOTES:
- (1) THERMOPLASTIC INSERT AS MANUFACTURED BY PENNSYLVANIA INSERT CORP. OR EQUAL.
 - (2) EXCEPT AS OTHERWISE SHOWN OR SPECIFIED THE PRECAST MANHOLE SHALL CONFORM TO ALL REQUIREMENTS OF THE STANDARD FOR 6'-0" TO 10'-0" DIA. PRECAST MANHOLES.
 - (3) INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
 - (4) CONCRETE IS TO BE CLASS 40. REBARS- GRADE 60.
 - (5) STEEL REINFORCEMENT IS #5@12" EACH WAY IN THE MIDDLE OF DROP PIPE WALL.
 - (6) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

D	10"	12"	15"	18"	24"
d	8"	10"	12"	14"	16"

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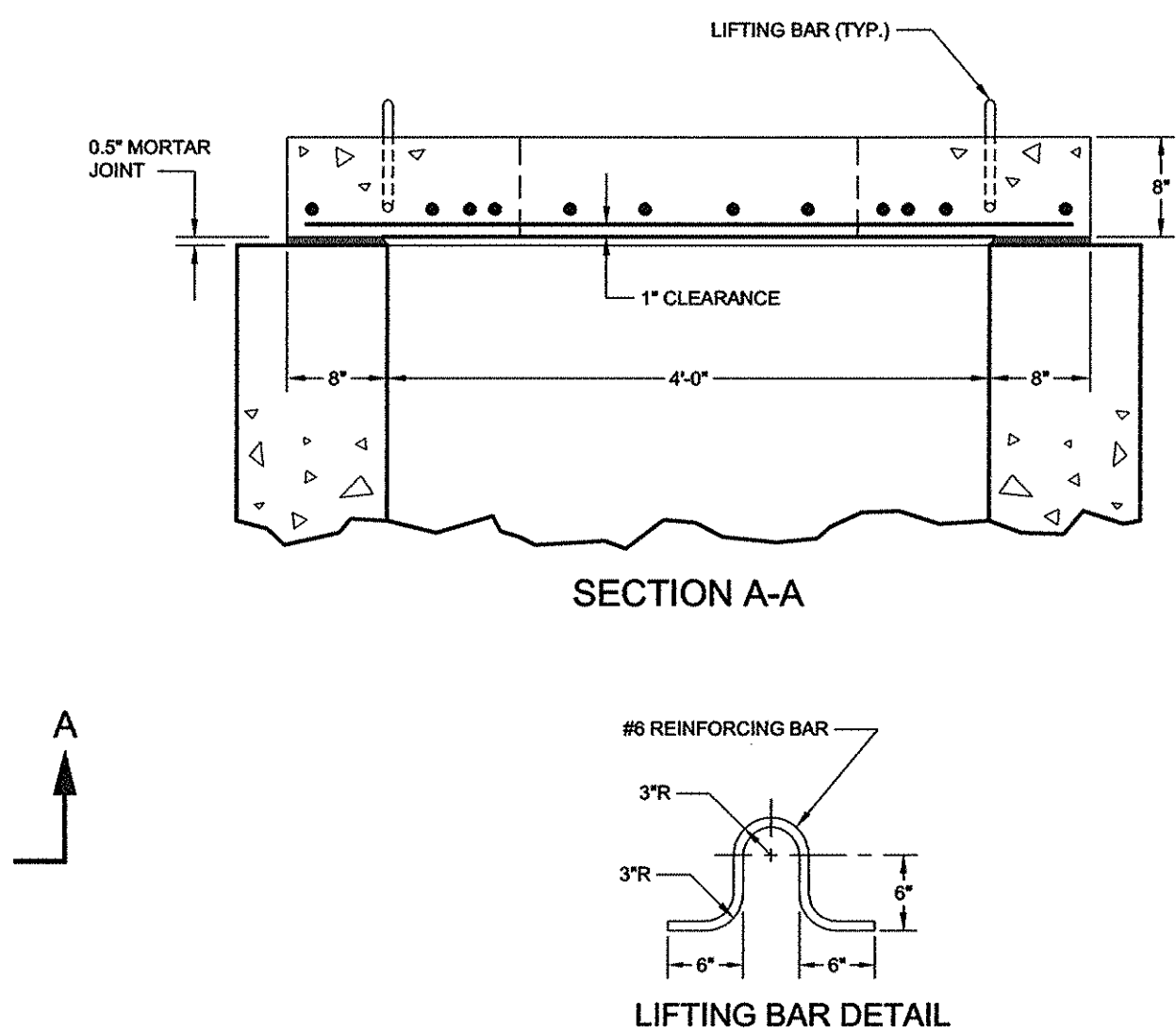
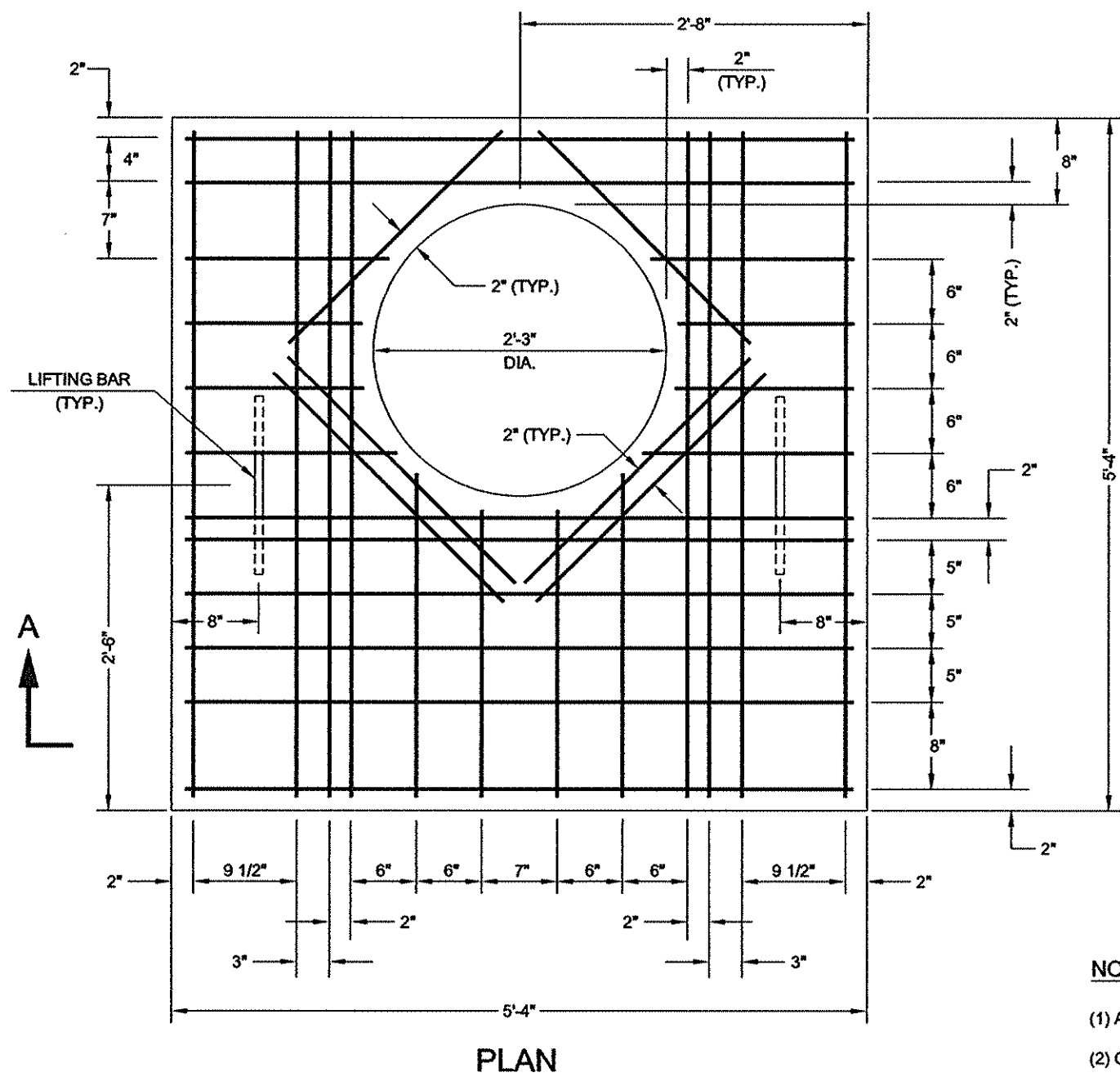
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EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

REVISED DECEMBER 2017: P. LEUNG
W. PATALANO/P. MOY

STANDARD FOR REMOVABLE PRECAST REINFORCED CONCRETE SLAB



- NOTES:
- (1) ALL STEEL REINFORCEMENT ARE #6 BARS.
 - (2) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.

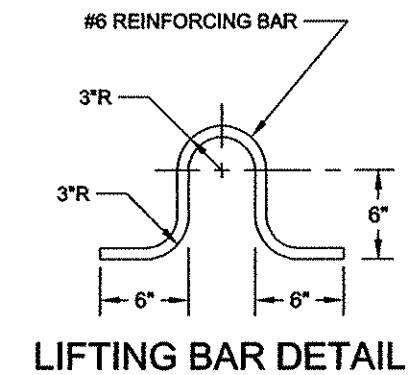
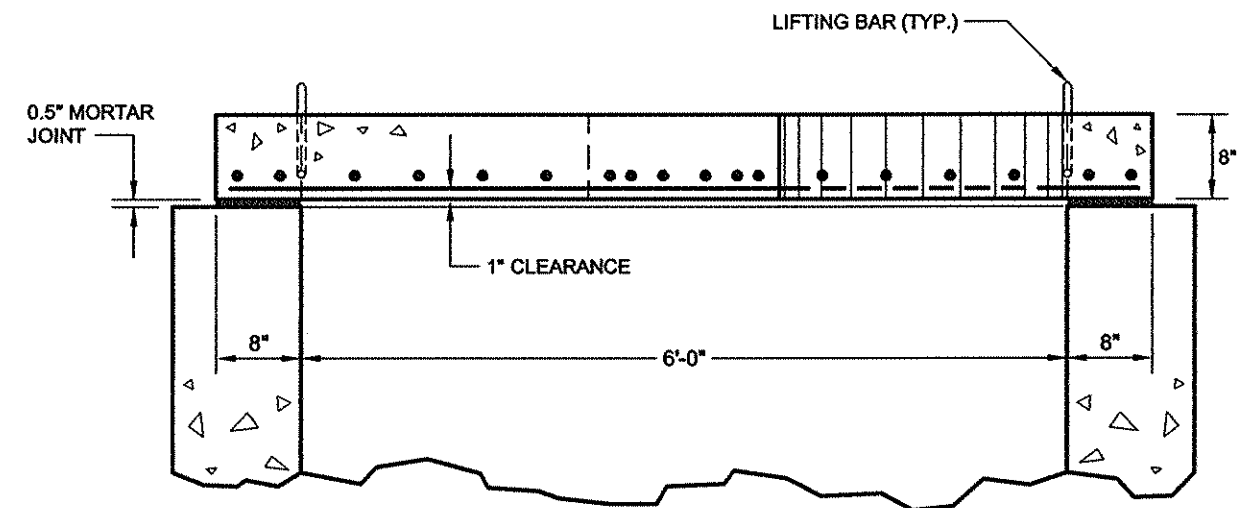
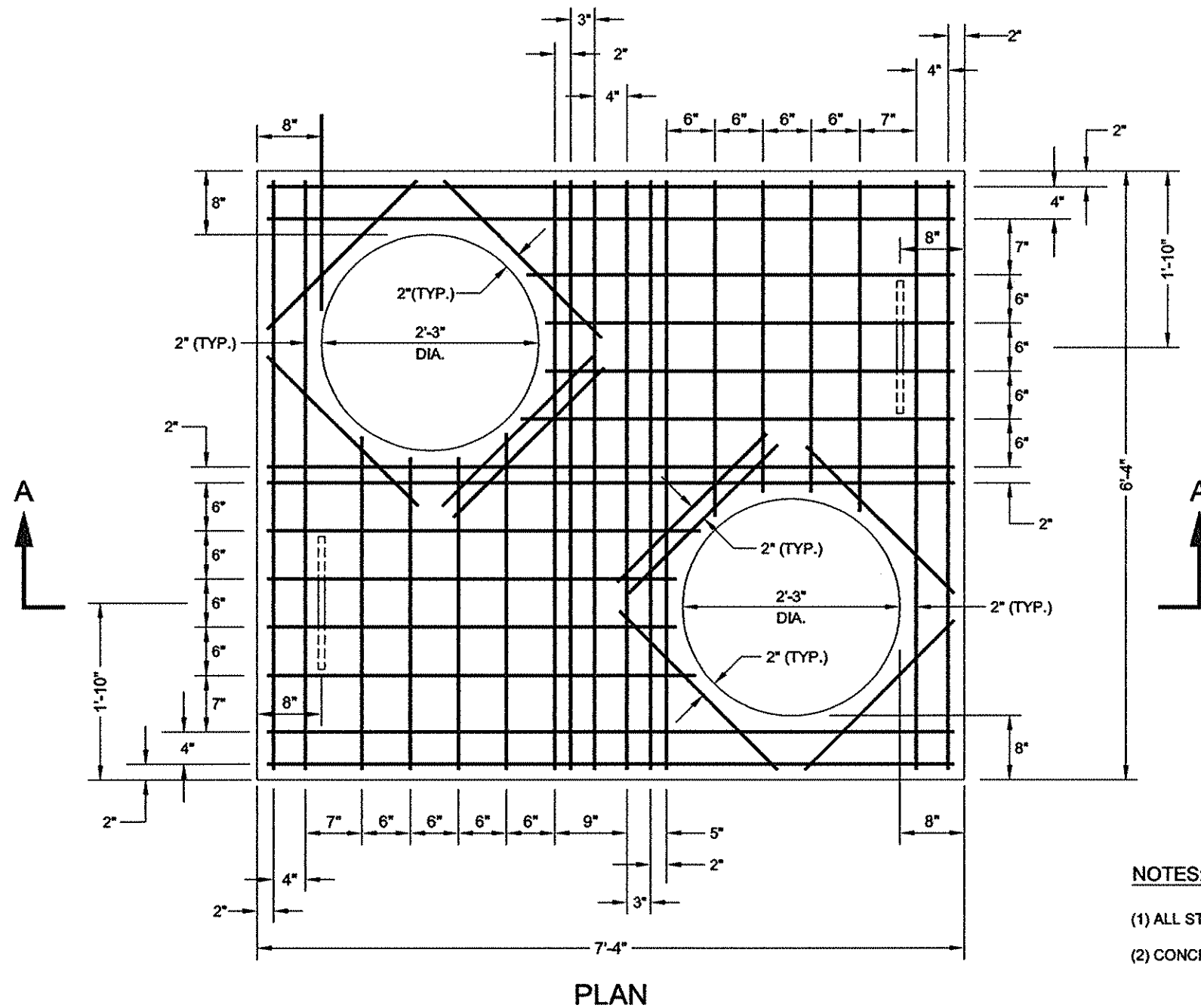
REVISED DECEMBER 2017: P. LEUNG
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Sandip S. Saini
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DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
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EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
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STANDARD FOR REMOVABLE PRECAST REINFORCED
CONCRETE SLAB FOR DROP PIPE MANHOLE (TYPE I)

NOTES:

- (1) ALL STEEL REINFORCEMENT ARE #6 BARS.
- (2) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.

Gurdeep S. Sarin

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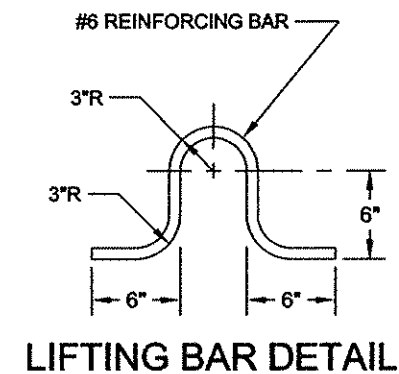
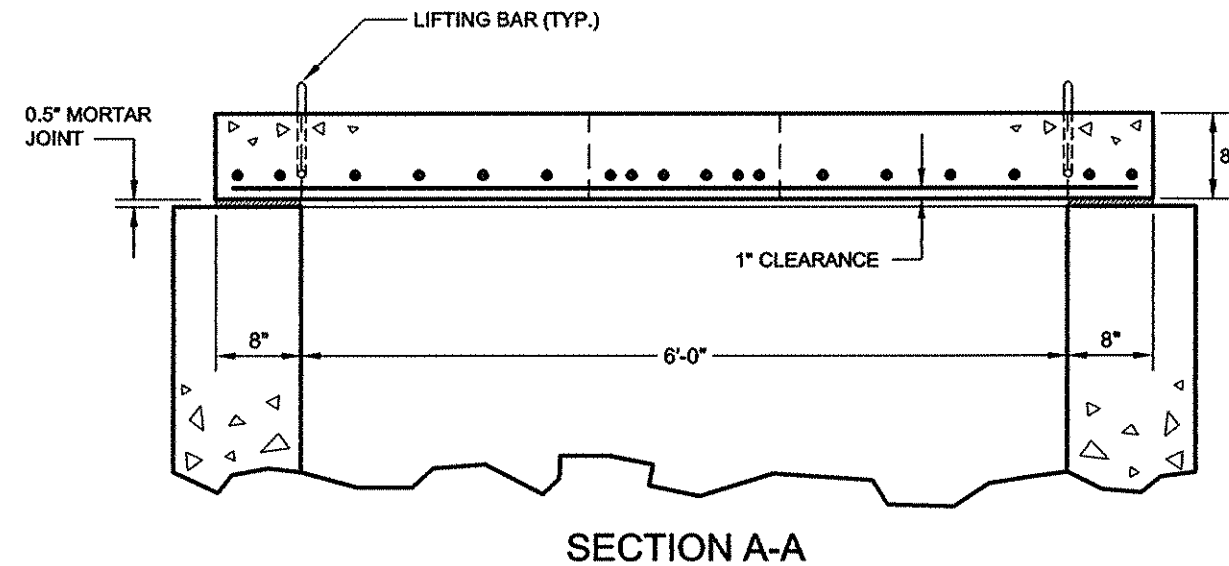
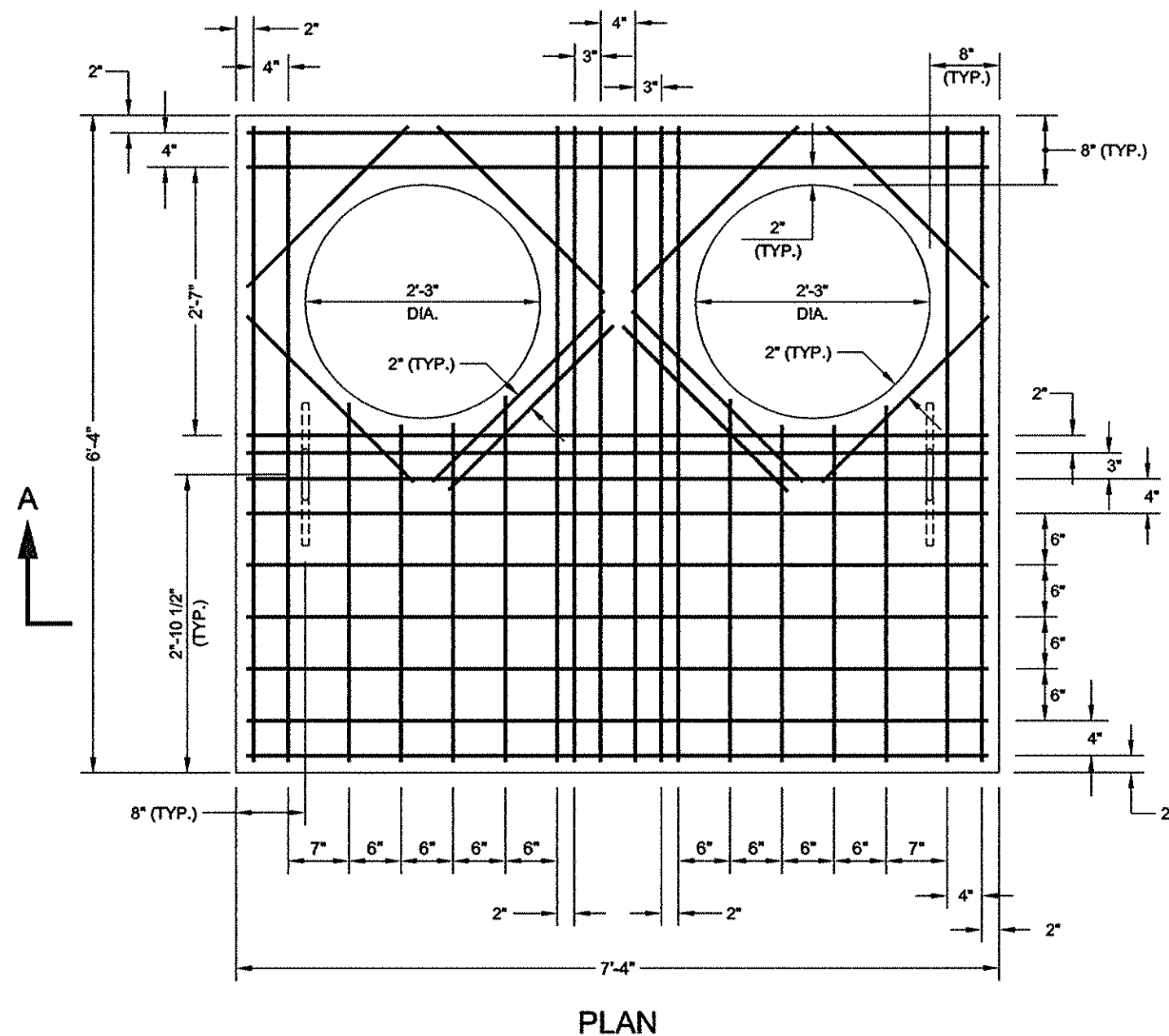
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DEPARTMENT OF ENVIRONMENTAL PROTECTION

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STANDARD FOR REMOVABLE PRECAST REINFORCED
CONCRETE SLAB FOR DROP PIPE MANHOLE (TYPE II)

NOTES:

- (1) ALL STEEL REINFORCEMENT ARE #6 BARS.
- (2) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.

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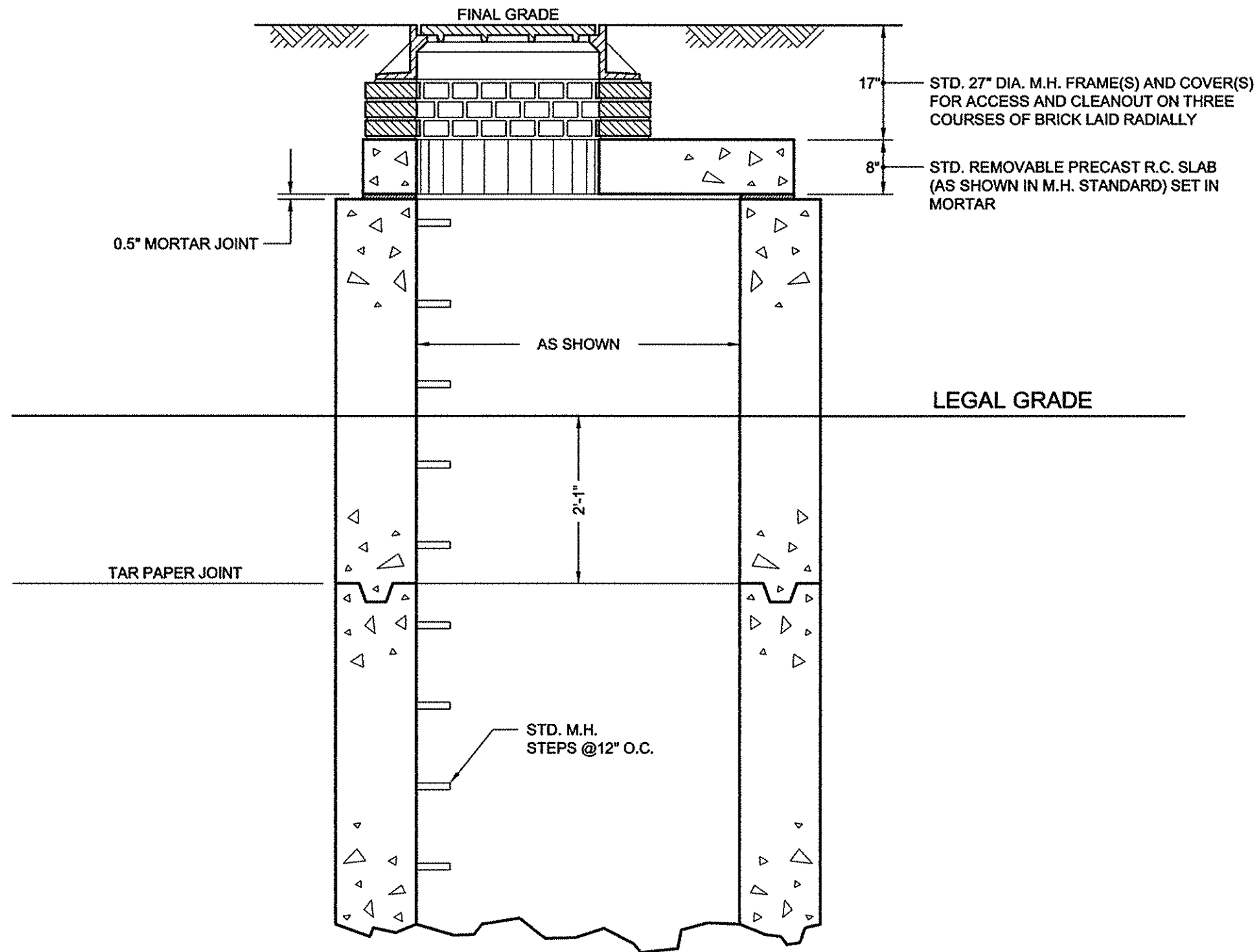
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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MANHOLE CHIMNEY DETAIL
(WHEN LEGAL GRADE IS BELOW FINAL GRADE)



STANDARD SQUARE MANHOLE CHIMNEY

Sundip S. Saini

P.E.

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DEPARTMENT OF DESIGN AND CONSTRUCTION

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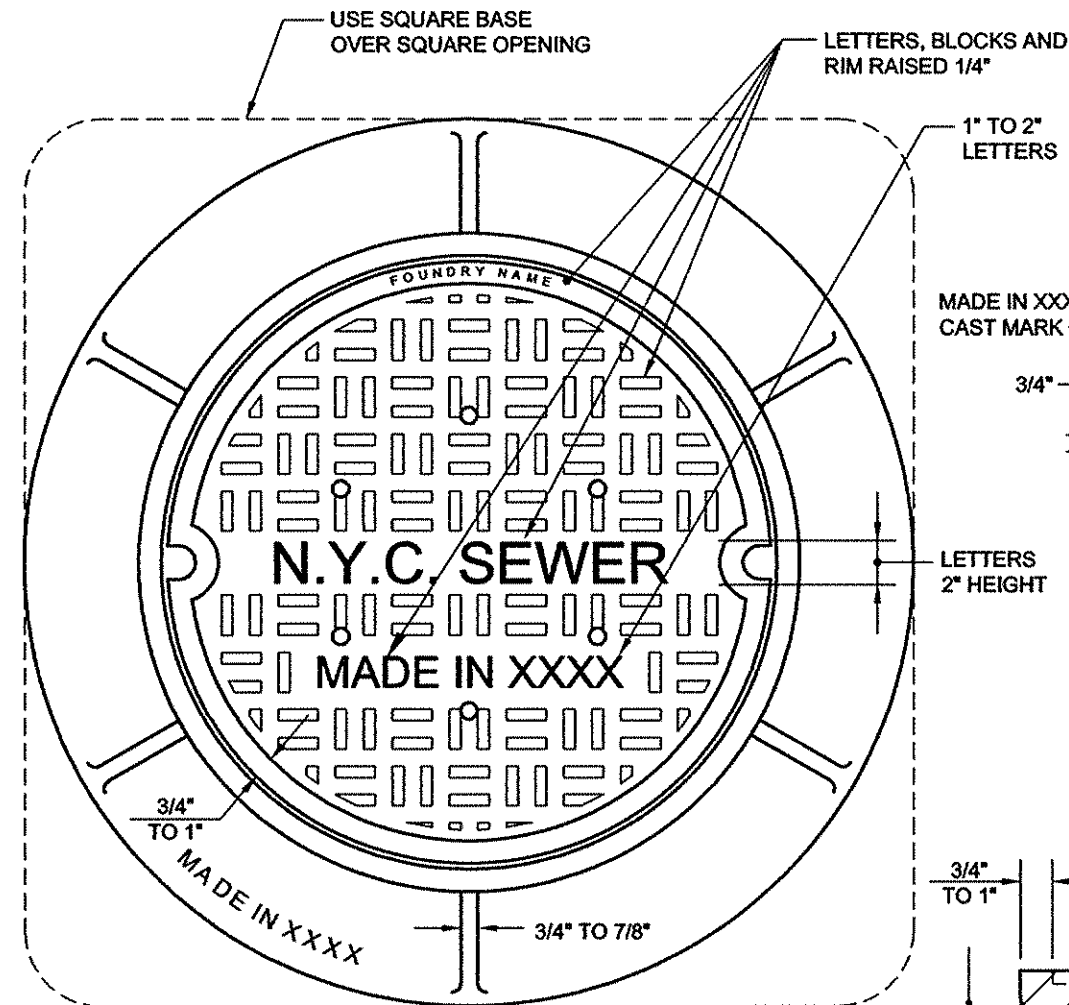
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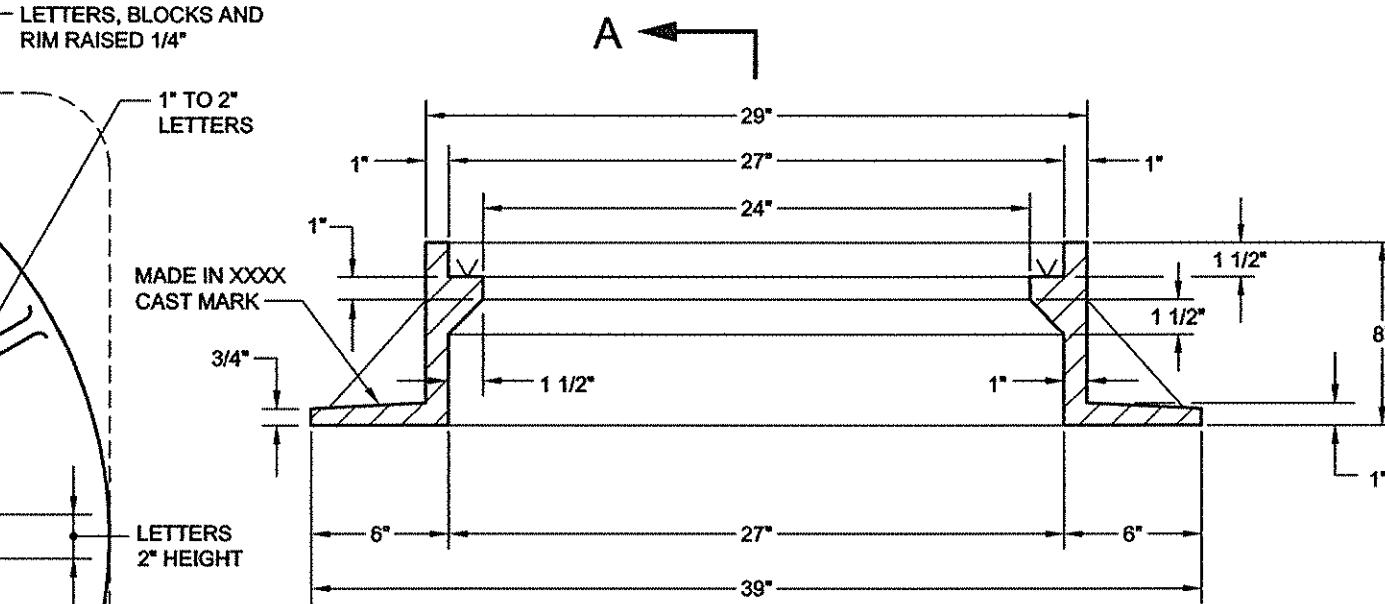
STANDARD FOR 27" DIAMETER CAST IRON MANHOLE FRAME AND COVER (FOR ACCESS OR CLEANOUT)



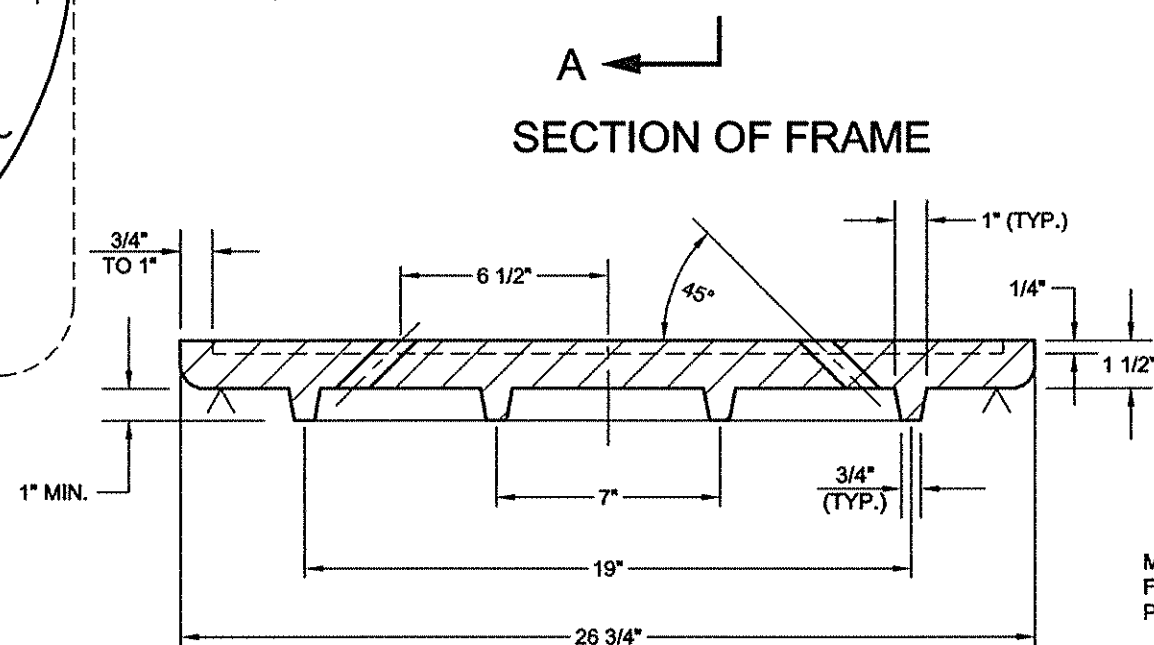
PLAN VIEW OF FRAME AND COVER

NOTES:

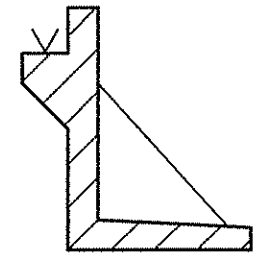
- (1) FRAME MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT OF FRAME IS 345 LBS.
- (2) COVER MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT OF COVER IS 195 LBS.
- (3) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
- (4) ALL MANHOLE FRAMES & COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.



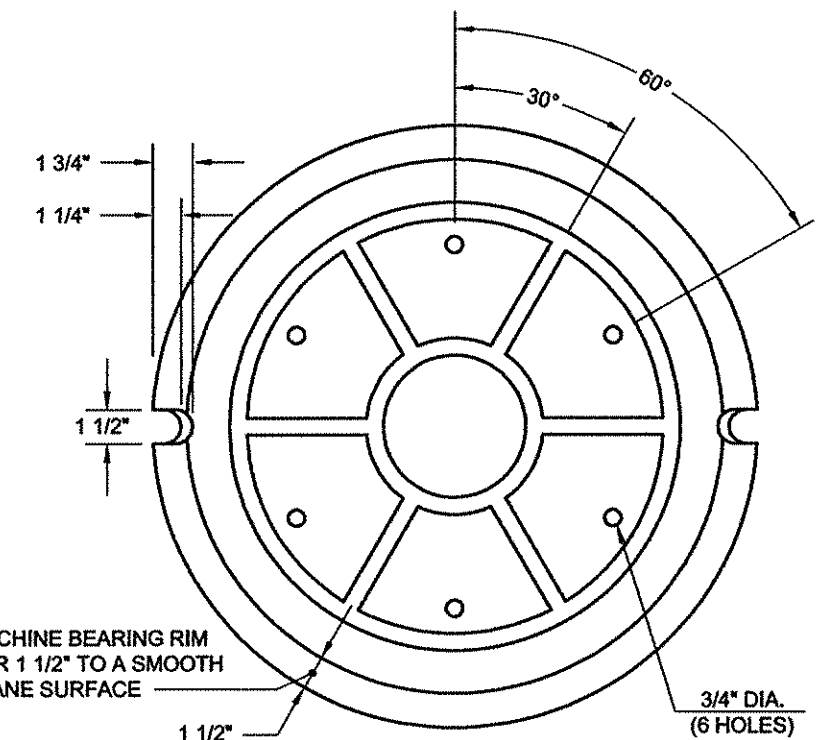
SECTION OF FRAME



SECTION OF COVER



SECTION A-A



BOTTOM VIEW OF COVER

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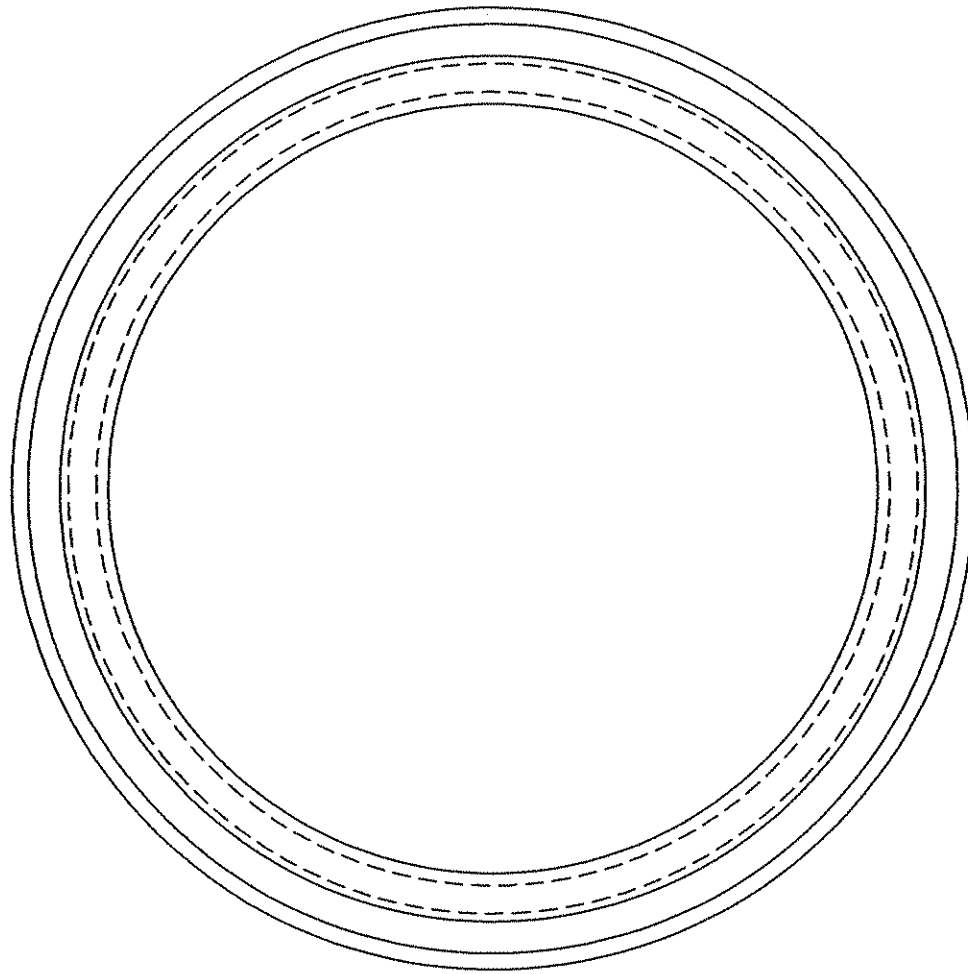
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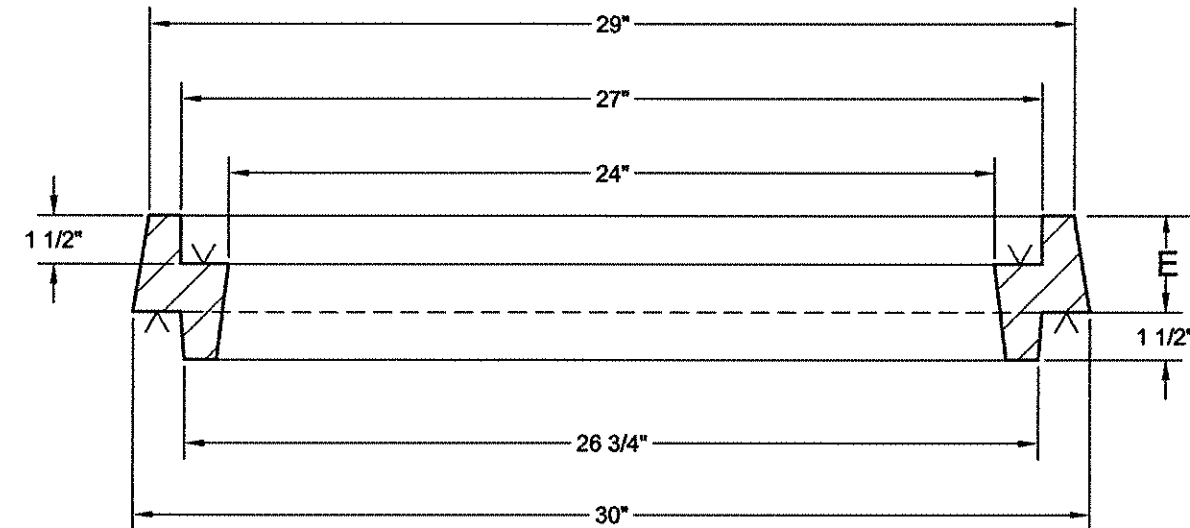
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STANDARD FOR 27" DIAMETER CAST IRON EXTENSION RING FOR 27" DIAMETER MANHOLE FRAME AND COVER



PLAN



SECTION

E = 2" for 2" raise
E = 3" for 3" raise
E = 4" for 4" raise
Minimum Raise: 2"
Maximum Raise: 4"

NOTES:

- (1) MATERIAL: GRAY CAST IRON ASTM A-48, CLASS 35B. MINIMUM WEIGHT OF EXTENSION RINGS:
2" = 120 LBS.; 3" = 150 LBS.; 4" = 170 LBS.
- (2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
- (3) ALL MANHOLE FRAMES & COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

Gurdeep S. Saini

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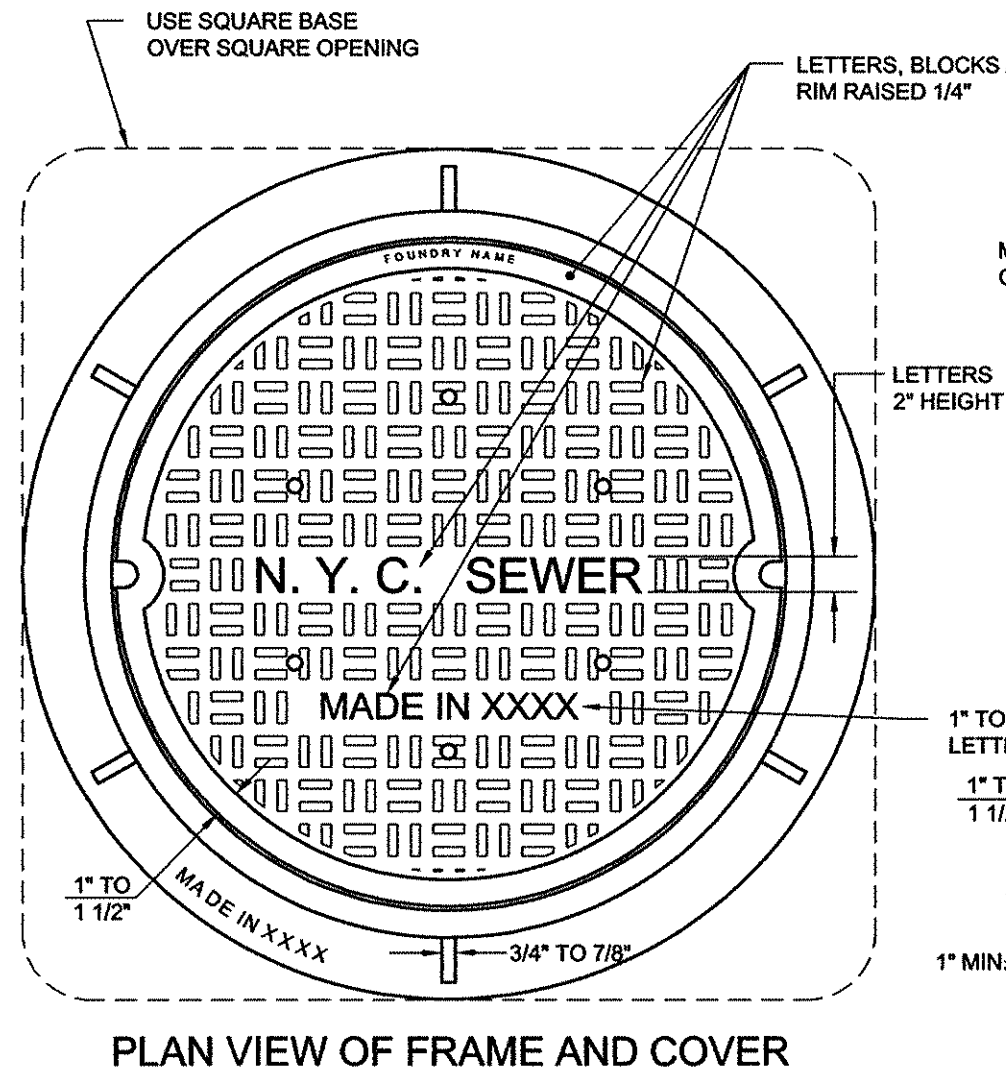
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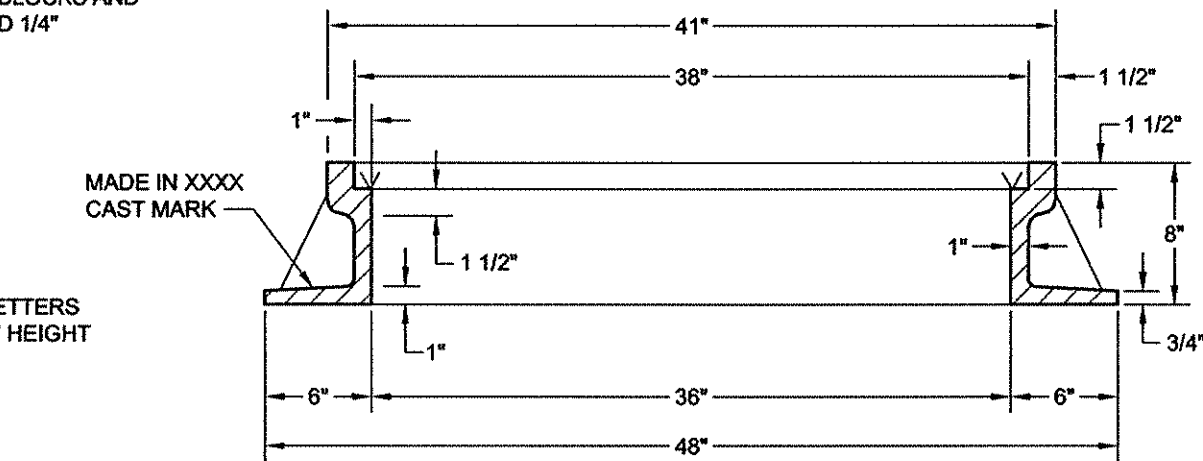
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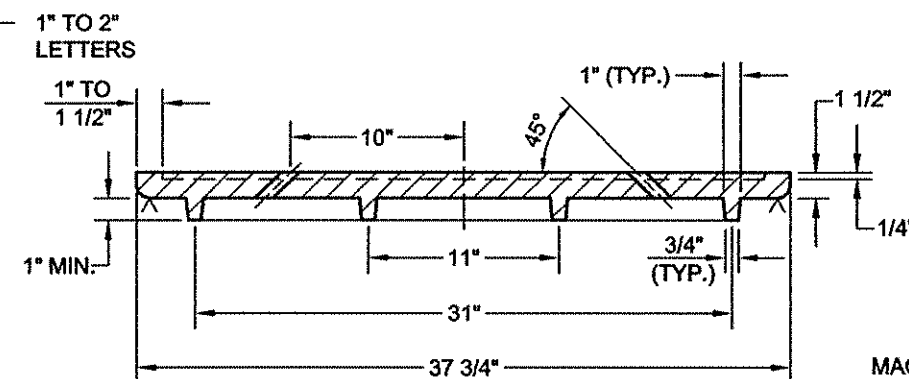
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
**STANDARD FOR 36" DIAMETER CAST IRON
MANHOLE FRAME AND COVER FOR CLEANOUT**



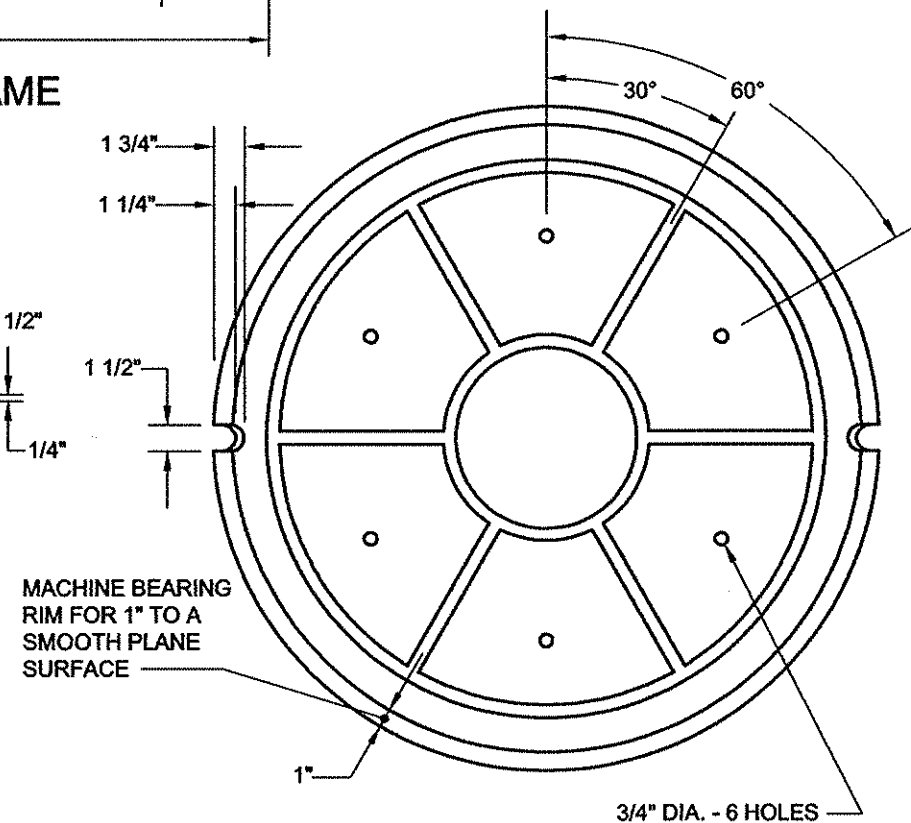
SECTION OF FRAME



SECTION OF COVER



BOTTOM VIEW OF COVER



NOTES:

- (1) FRAME MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT OF FRAME IS 480 LBS.
- (2) COVER MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT OF COVER IS 400 LBS.
- (3) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
- (4) ALL MANHOLE FRAMES & COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

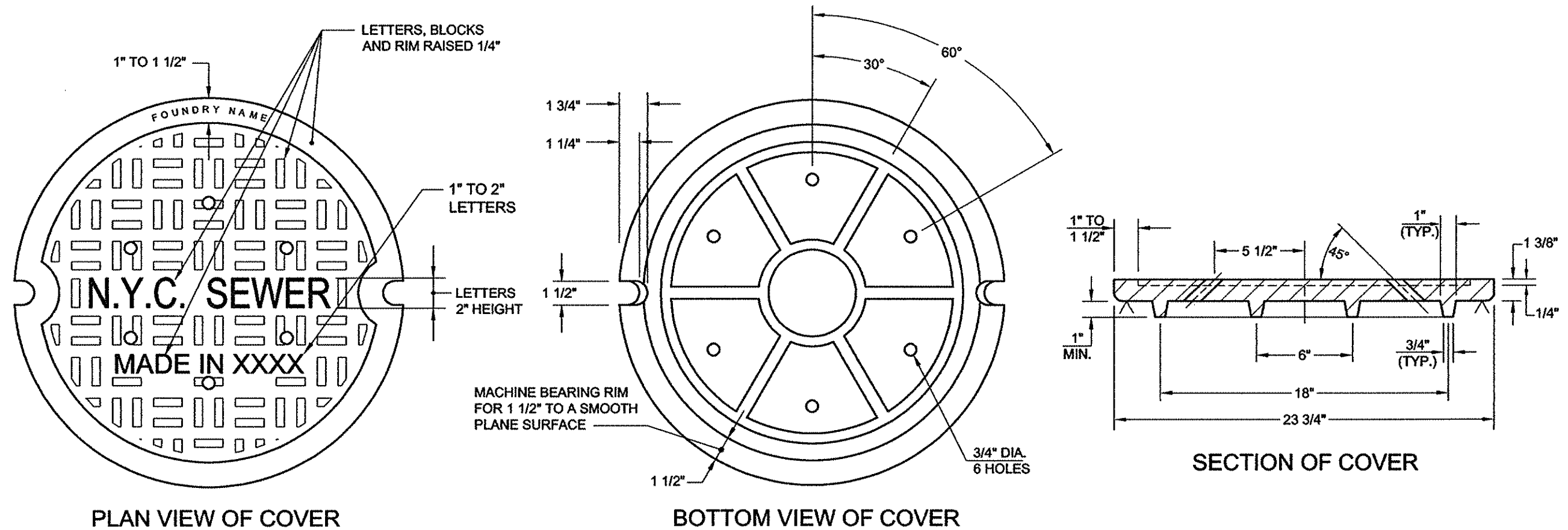
Thomas Wyne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E

8/14/18
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR 24" DIAMETER CAST IRON MANHOLE COVER



NOTES:

- (1) COVER MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT OF COVER IS 130 LBS.
- (2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
- (3) ALL MANHOLE COVERS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
- (4) TO BE USED ONLY TO REPLACE BROKEN OR DAMAGED EXISTING 24" DIAMETER SEWER MANHOLE COVER.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wynne

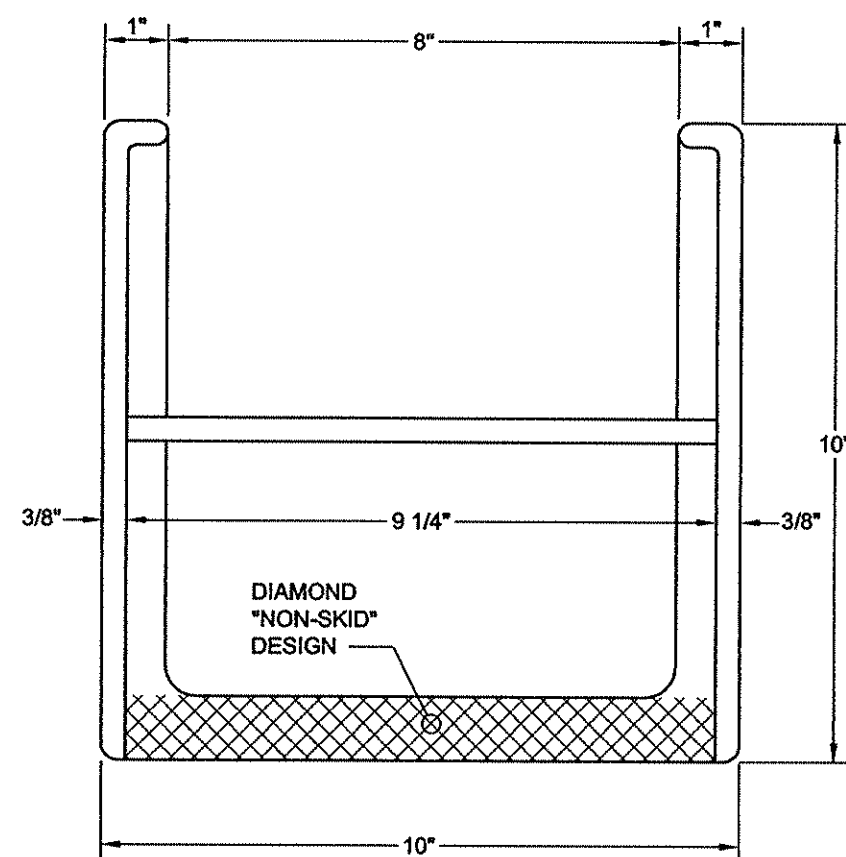
P.E.

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

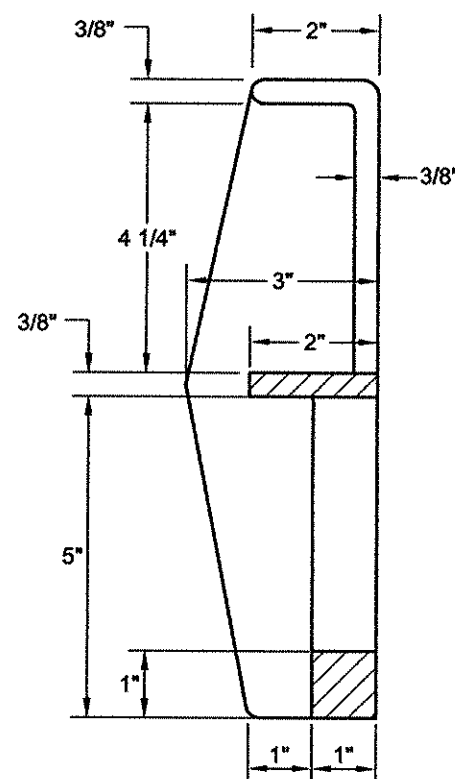
8/14/18

DATE

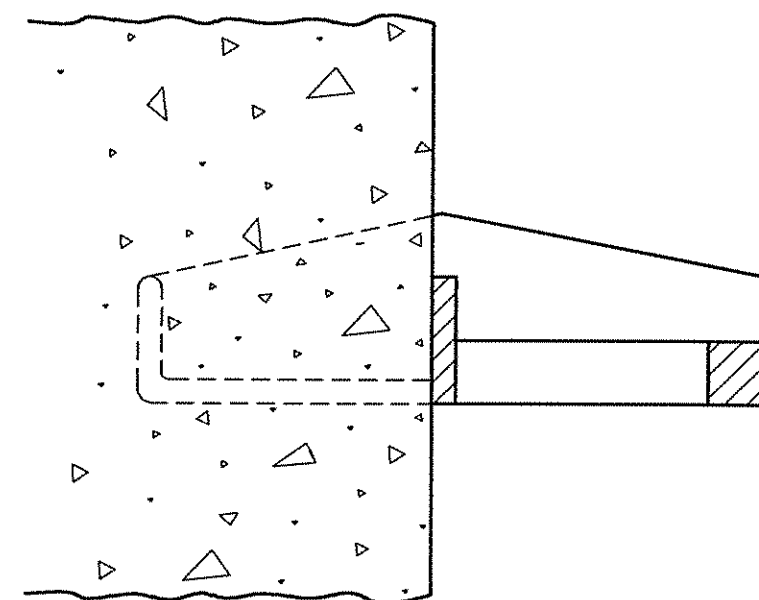
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR CAST IRON MANHOLE STEP



PLAN



SECTION



SECTION OF STEP IN PLACE

NOTES:

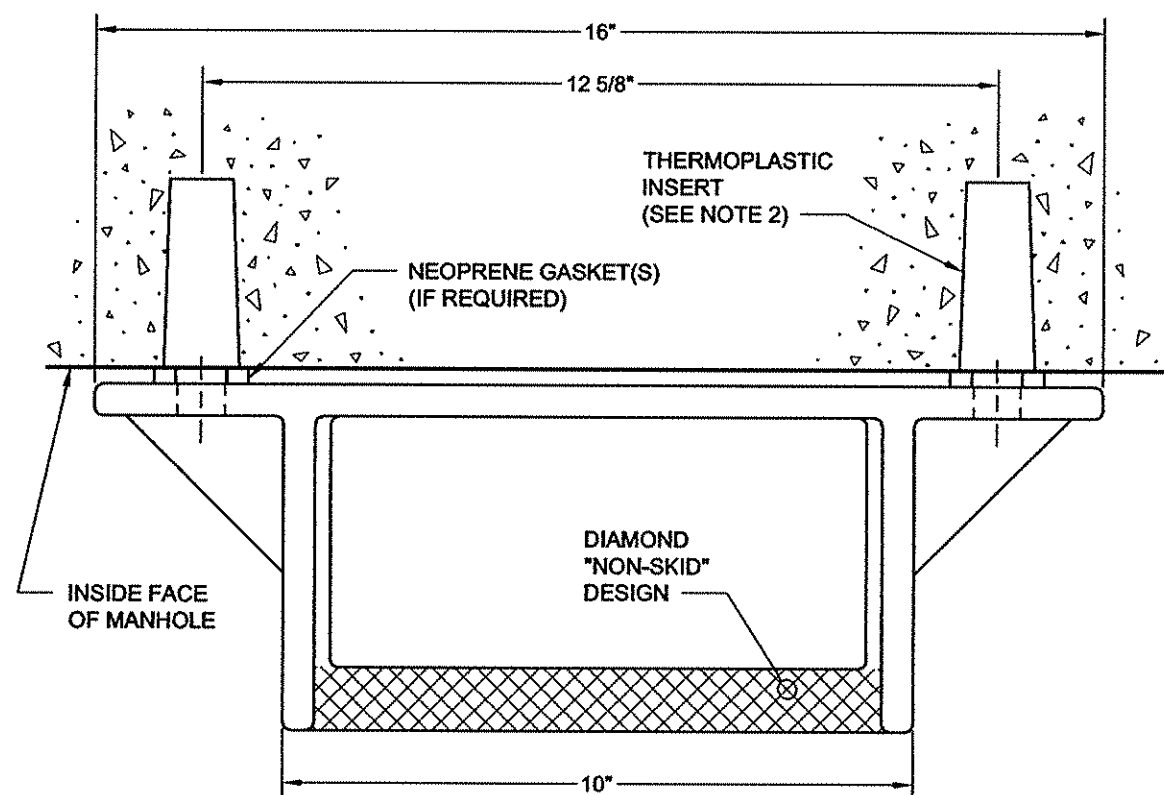
- (1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF STEP IS 11 LBS.
- (2) ALL MANHOLE STEPS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

Sandeep S. Saini
P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

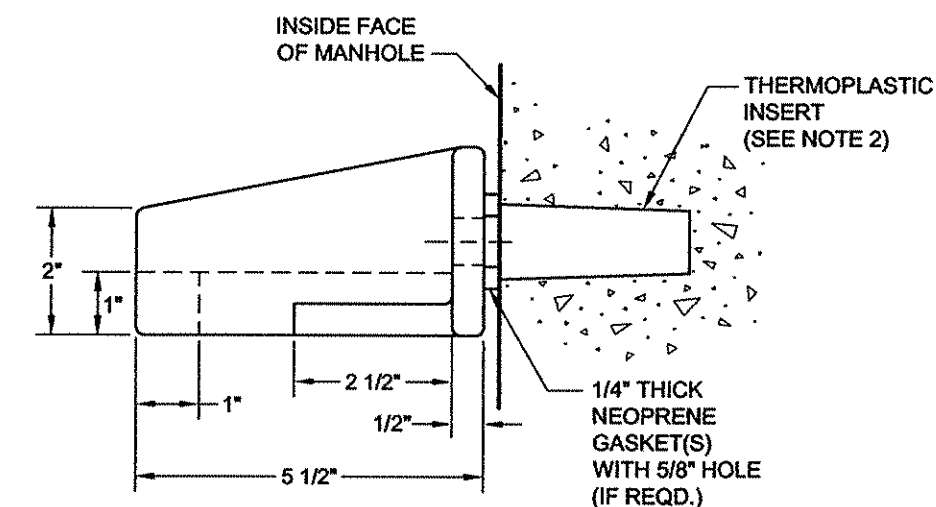
8/14/18
DATE

Thomas Wynne
P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

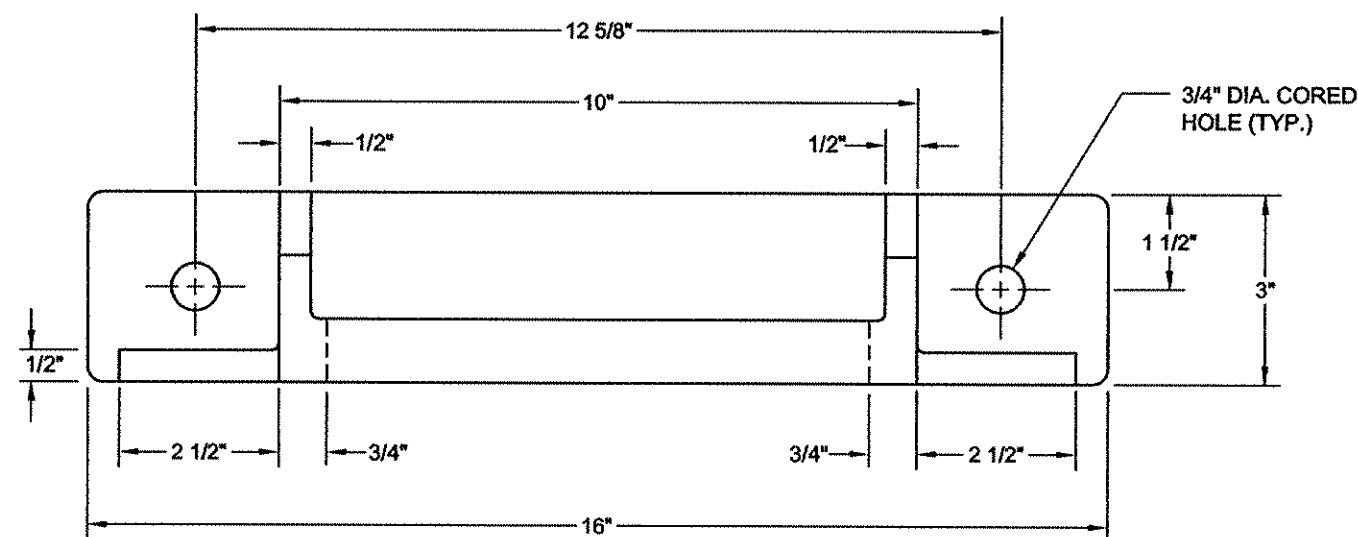
8/14/18
DATE

STANDARD FOR CAST IRON MANHOLE STEP
(BOLT-ON TYPE)

PLAN



SIDE ELEVATION



FRONT ELEVATION

NOTES:

- (1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF BOLT-ON STEP IS 13 LBS.
- (2) THERMOELASTIC INSERT AS MANUFACTURED BY PENNSYLVANIA INSERT CORP., OR EQUAL, WITH 5/8"-11 X 2 1/2" STAINLESS STEEL BOLT AND WASHER.
OR
1 1/8" X 2" CORED HOLE FOR 5/8"-11 X 2 1/2" STAINLESS STEEL BOLT AND WASHER, WITH ACKERMAN - JOHNSON EXPANSIVE SCREW ANCHOR WITH NONCORROSIVE BRASS CONES, CATALOG NO. 701-62.
- (3) ALL MANHOLE STEPS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

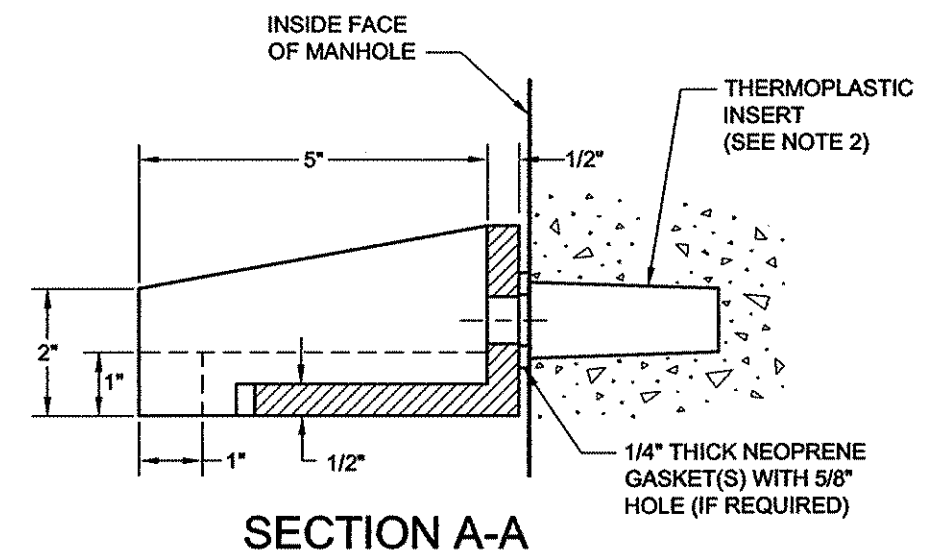
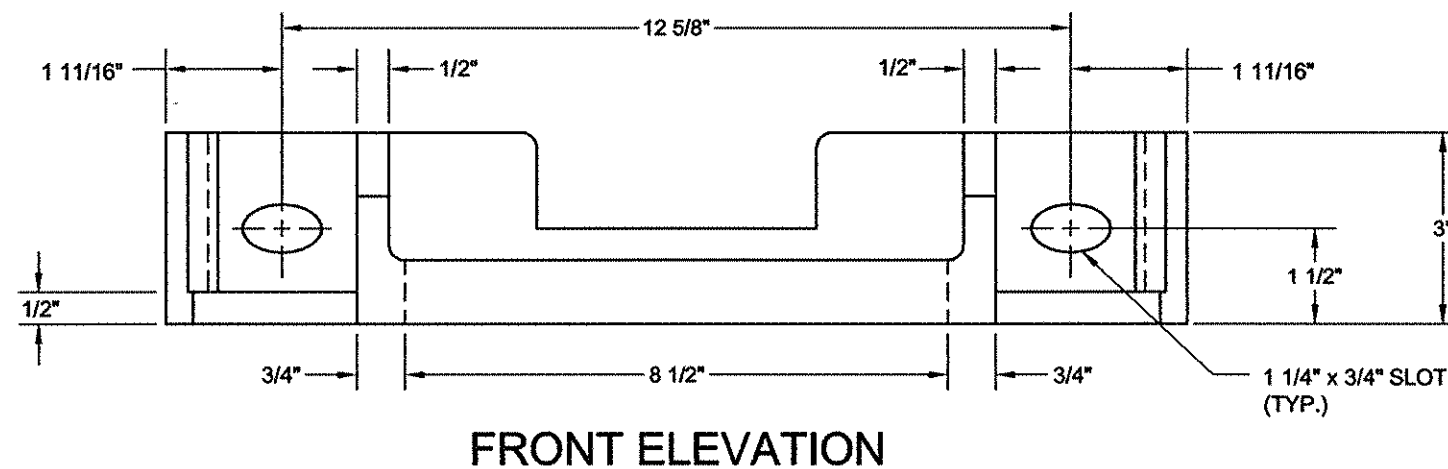
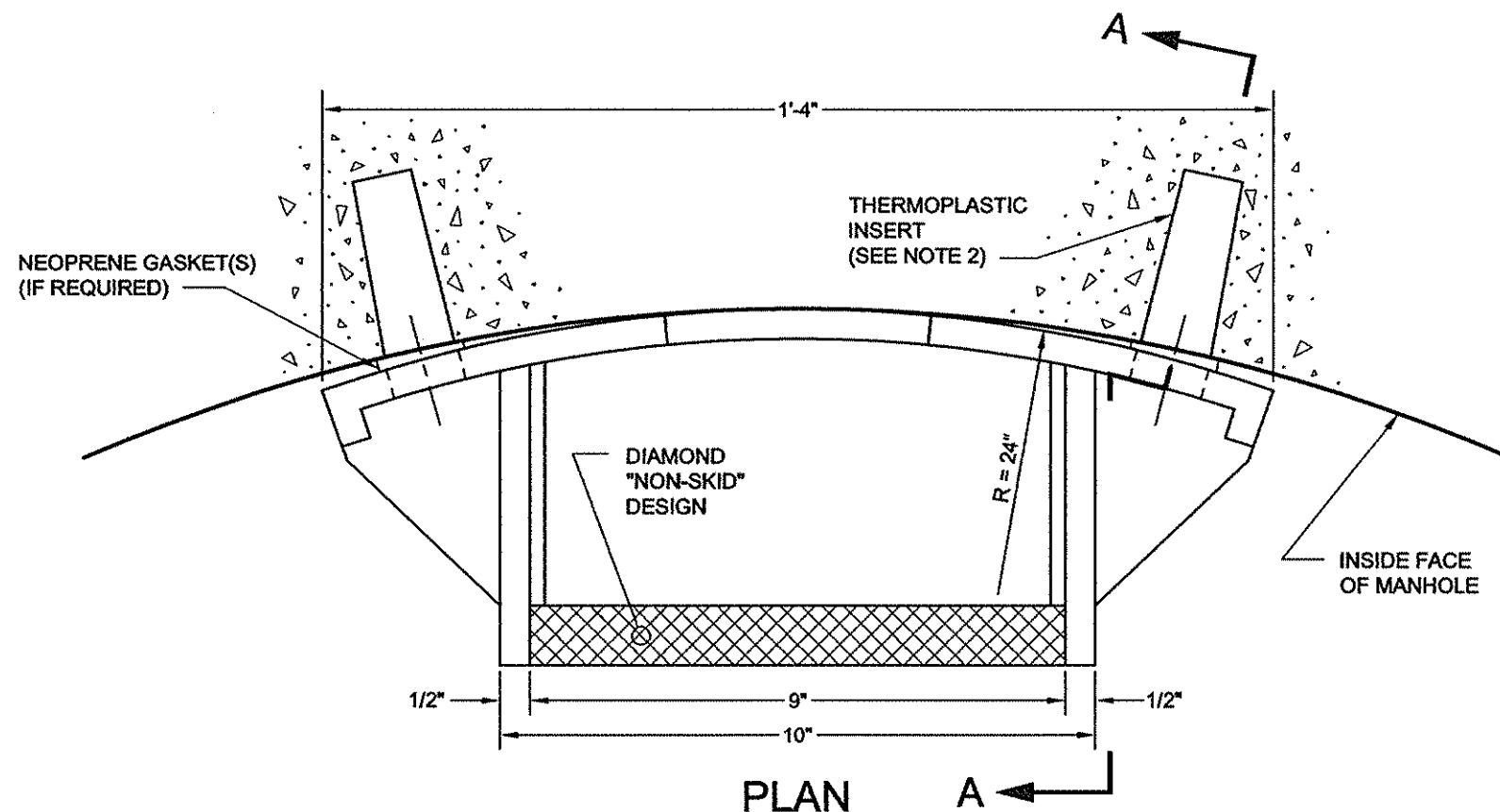
Thomas Wayne

P.E.

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

DATE

STANDARD FOR CIRCULAR CAST IRON MANHOLE STEP
(BOLT-ON TYPE)

NOTES:

(1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT OF CIRCULAR BOLT-ON STEP IS 13 LBS.

(2) THERMOPLASTIC INSERT AS MANUFACTURED BY
PENNSYLVANIA INSERT CORP., OR EQUAL, WITH
5/8"-11 X 2 1/2" STAINLESS STEEL BOLT AND WASHER.

OR

1 1/8" X 2" CORED HOLE FOR 5/8"-11 X 2 1/2"
STAINLESS STEEL BOLT AND WASHER, WITH ACKERMAN -
JOHNSON EXPANSIVE SCREW ANCHOR WITH NONCORROSIVE
BRASS CONES, CATALOG NO. 701-62.

(3) ALL MANHOLE STEPS SHALL HAVE THE MANUFACTURER'S
IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF
ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF
MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas L. Byrne

P.E.

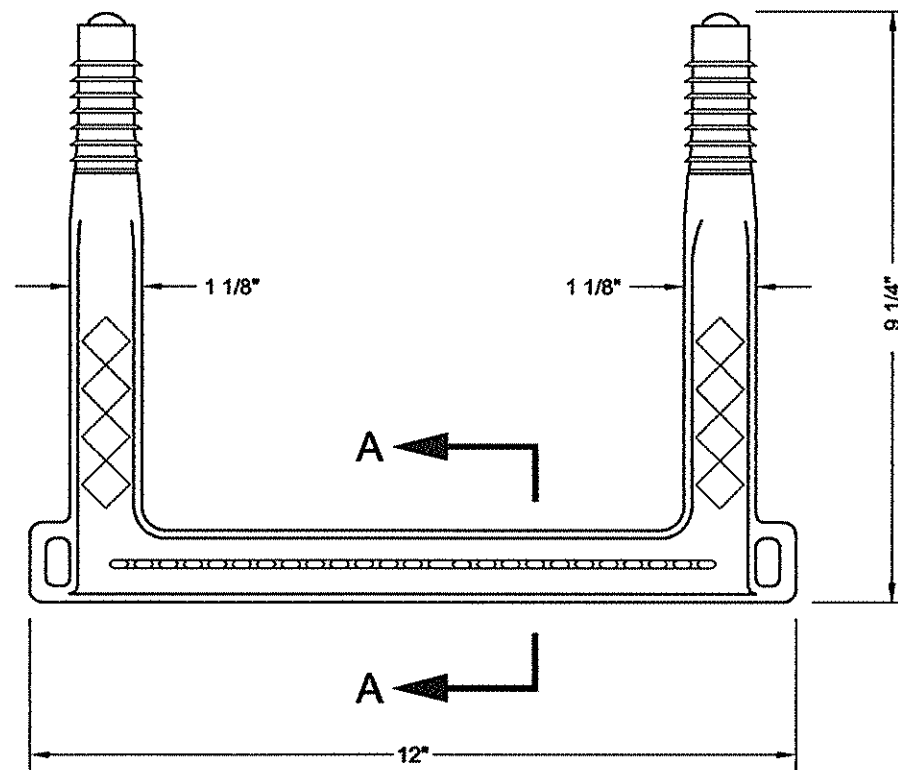
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

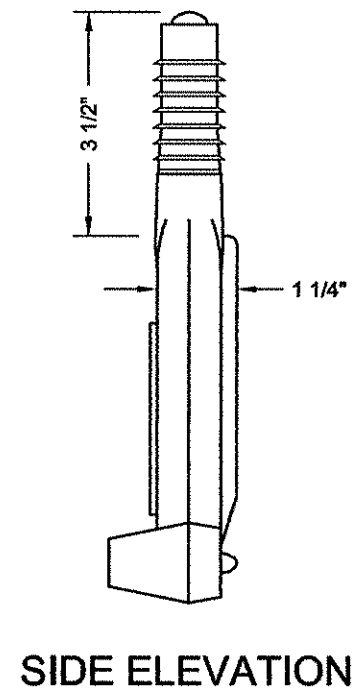
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

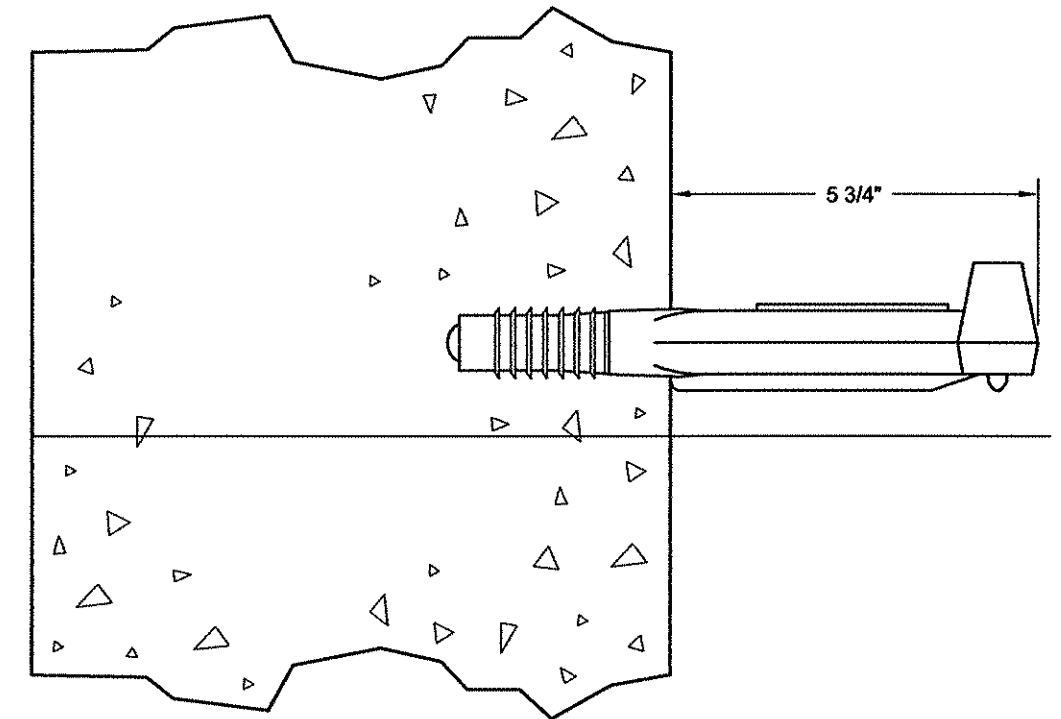
STANDARD FOR PLASTIC MANHOLE STEP
(COPOLYMER POLYPROPYLENE PLASTIC MANHOLE STEP)



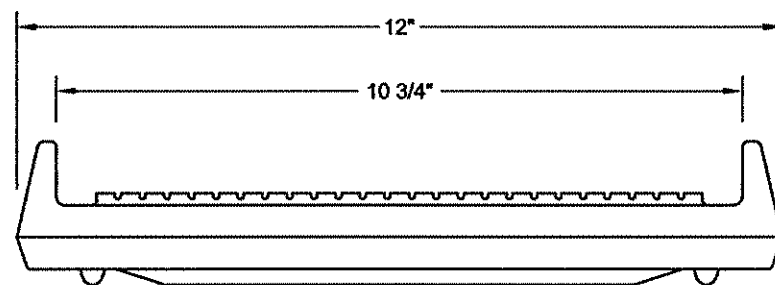
PLAN



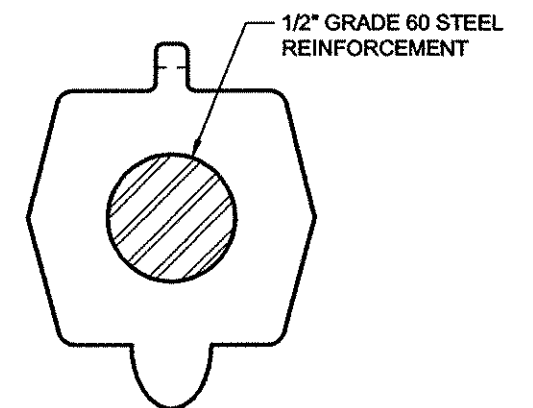
SIDE ELEVATION



ANCHORAGE DETAIL



FRONT ELEVATION



SECTION A-A

NOTE:

PLASTIC MANHOLE STEP MAY BE SUBSTITUTED FOR CAST IRON MANHOLE STEP,
UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wyane

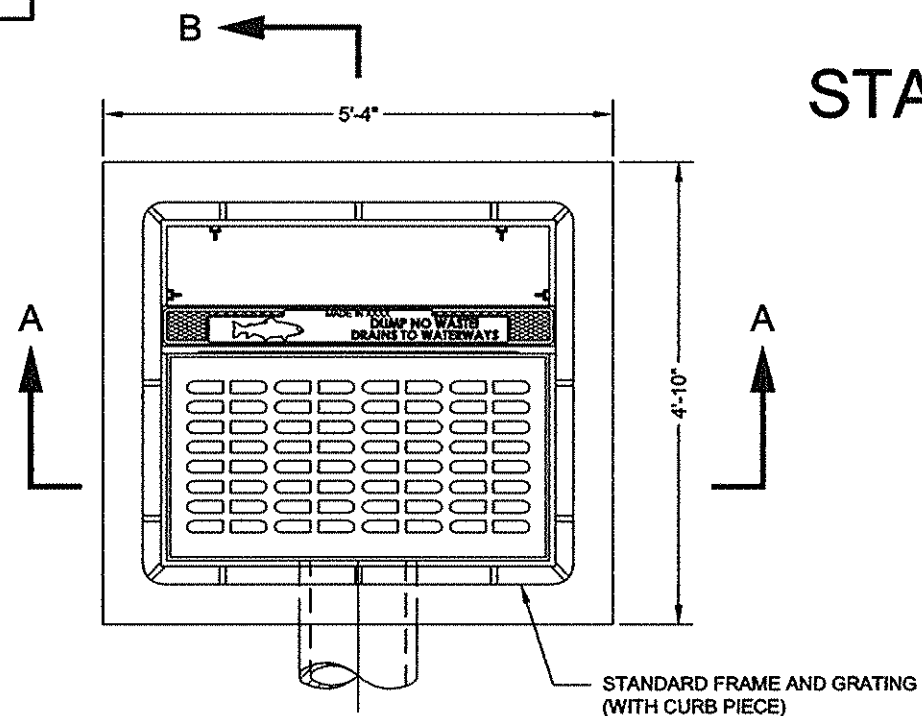
P.E.

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

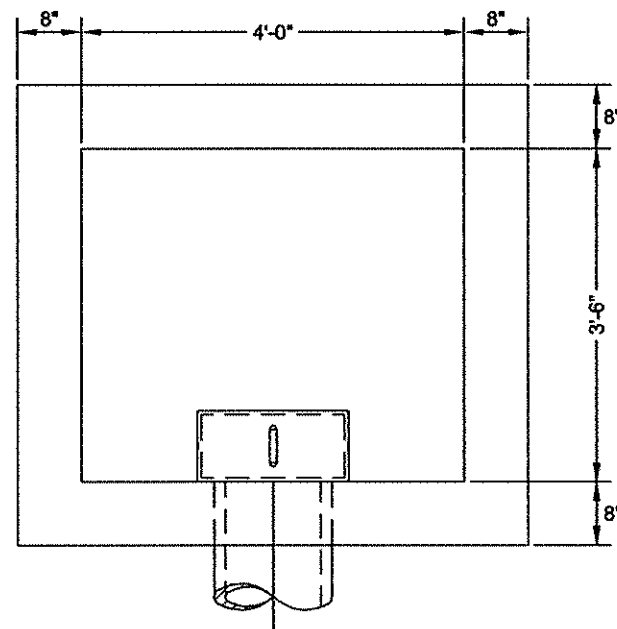
8/14/18

DATE

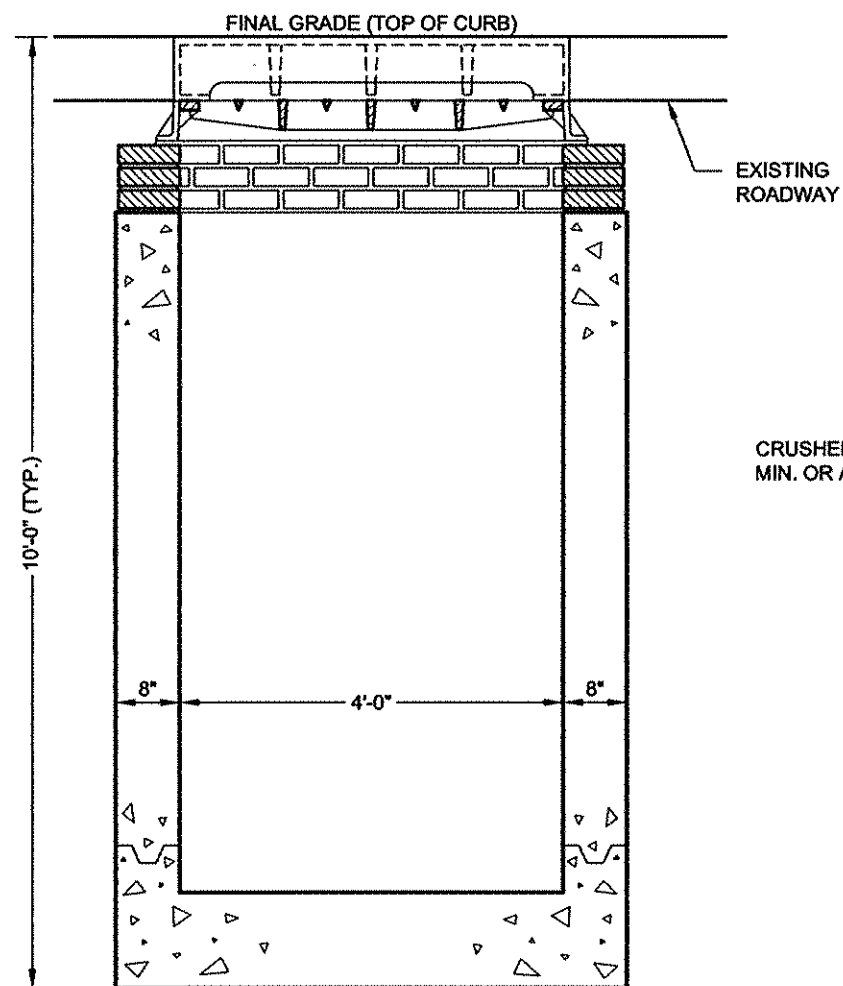
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR TYPE 1 CATCH BASIN
(WITH CURB PIECE)



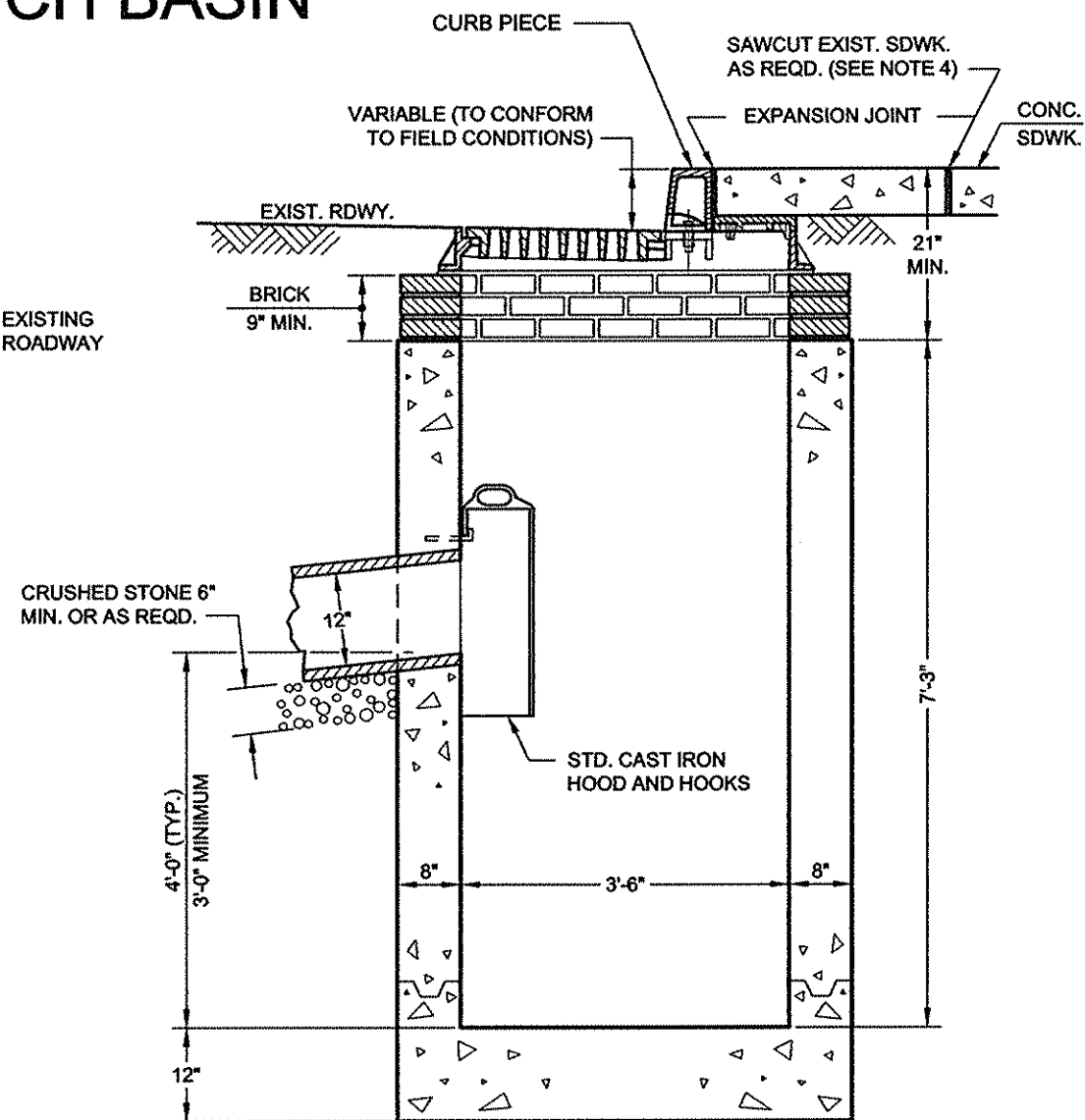
PLAN
(WITH CASTING)



PLAN
(WITHOUT CASTING)



SECTION A-A



SECTION B-B

NOTES:

- (1) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
- (2) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (3) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
- (4) EXPANSION JOINTS ARE REQUIRED IN THE CONCRETE SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
- (5) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wayne

P.E.

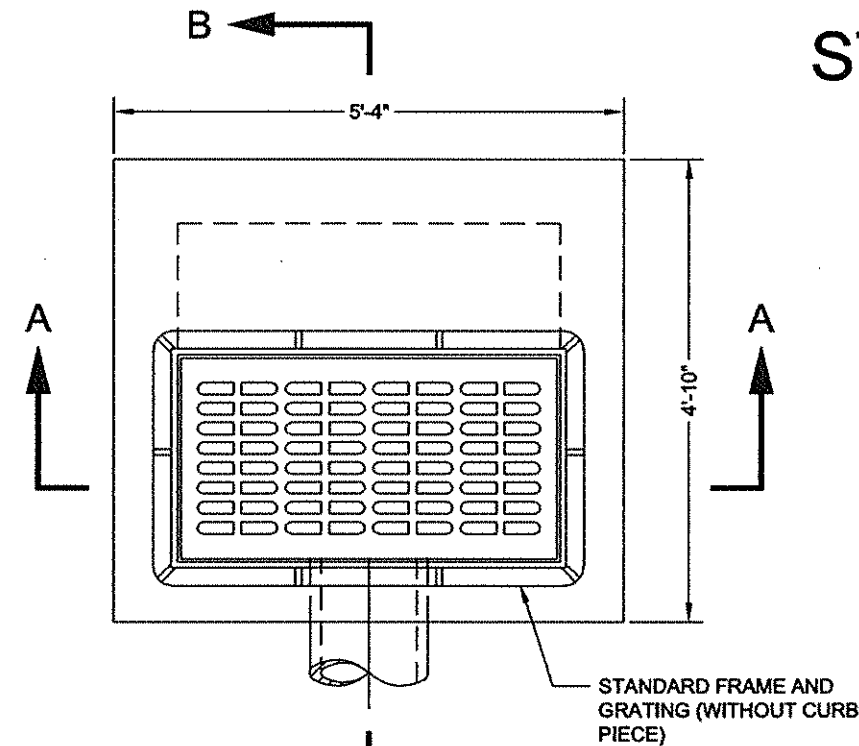
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

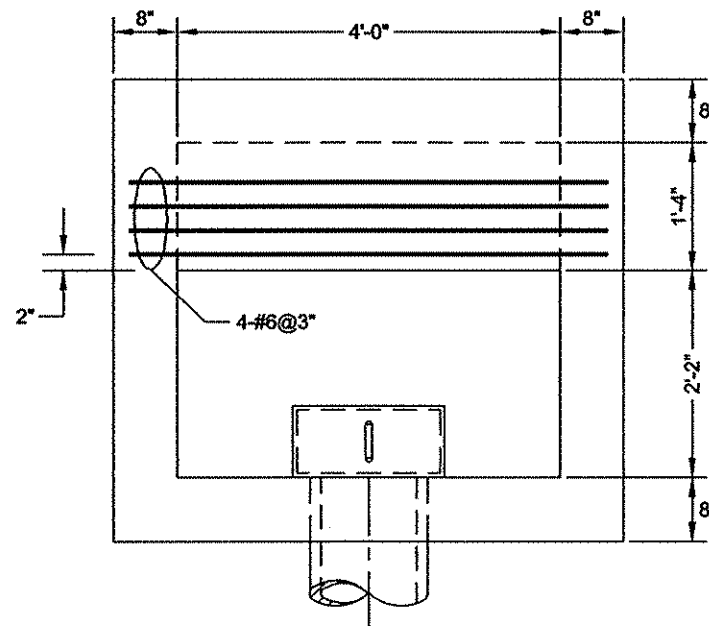
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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

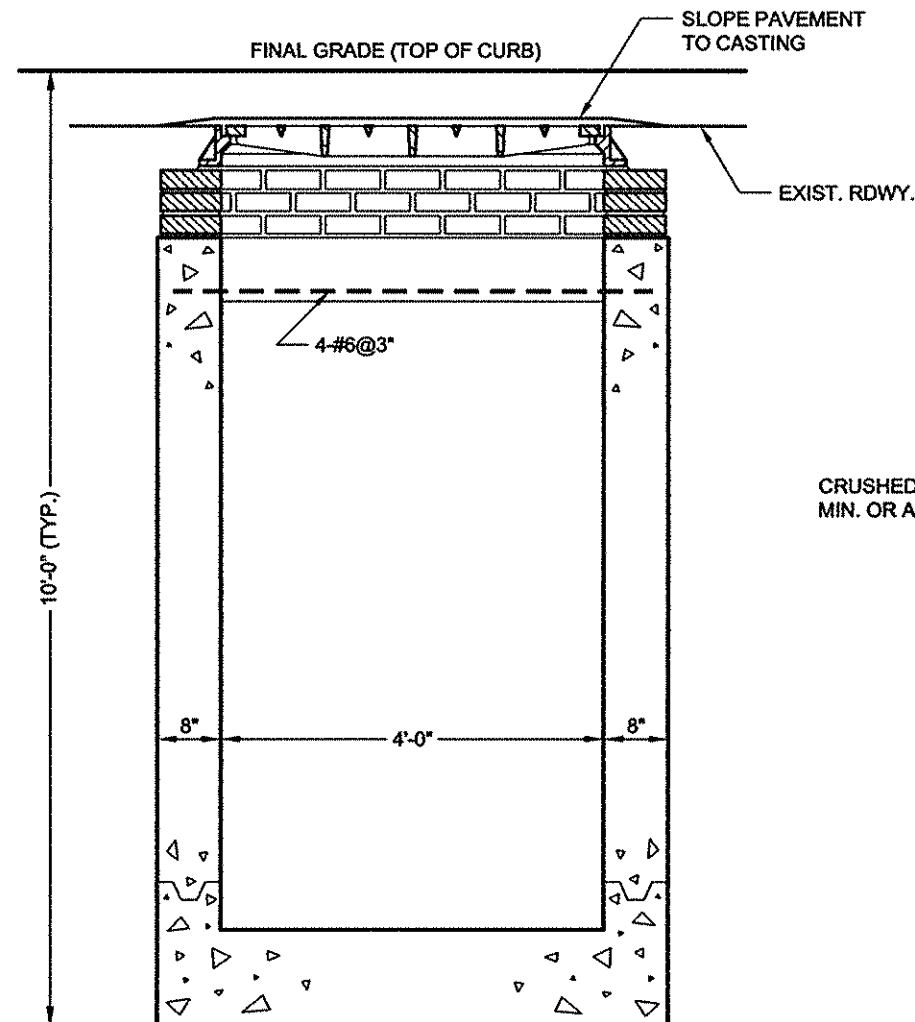
STANDARD FOR TYPE 2 CATCH BASIN (WITHOUT CURB PIECE)



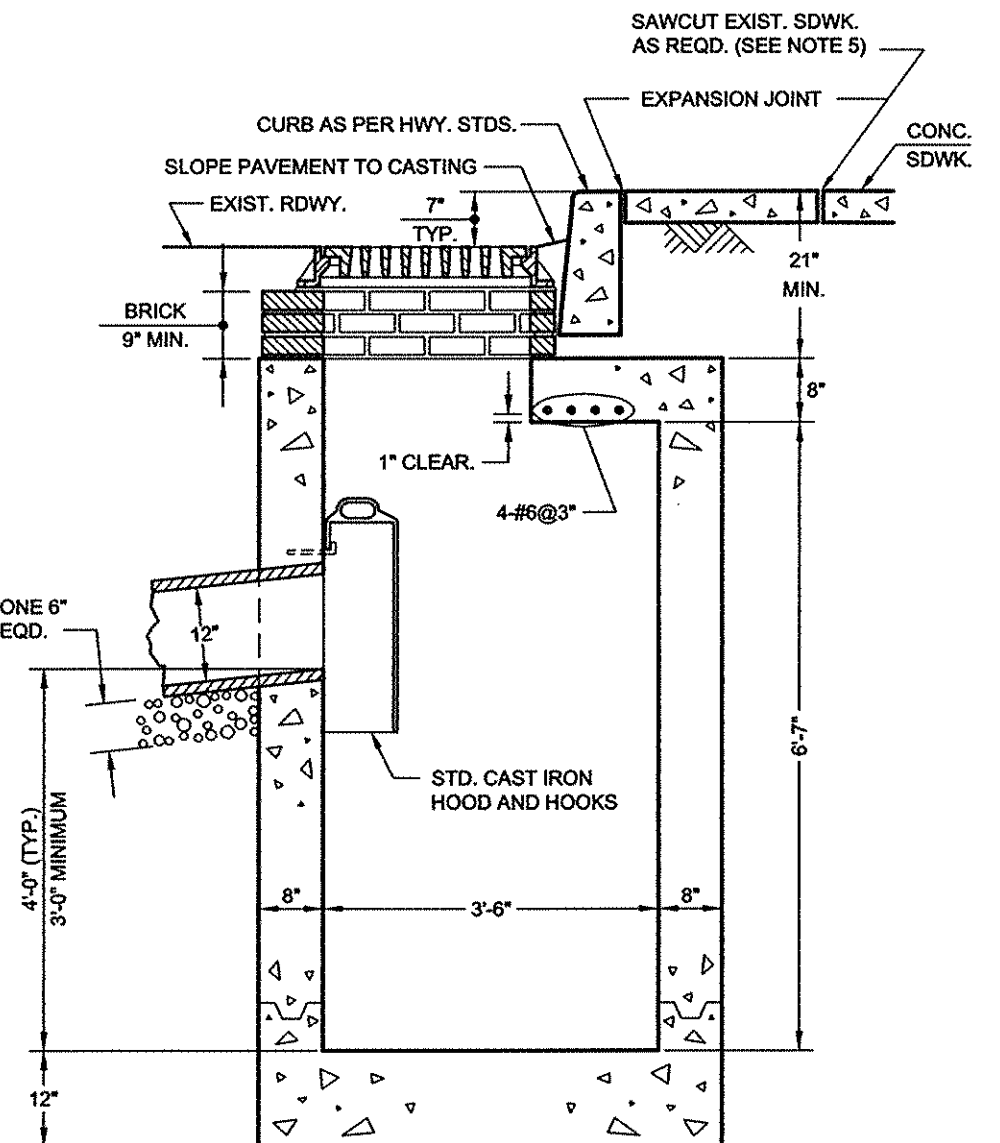
PLAN
(WITH CASTING)



PLAN
(WITHOUT CASTING)



SECTION A-A



SECTION B-B

NOTES:

- (1) LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- (2) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
- (3) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (4) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
- (5) EXPANSION JOINTS ARE REQUIRED IN THE CONCRETE SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
- (6) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (7) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

Gandip S. Sarini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

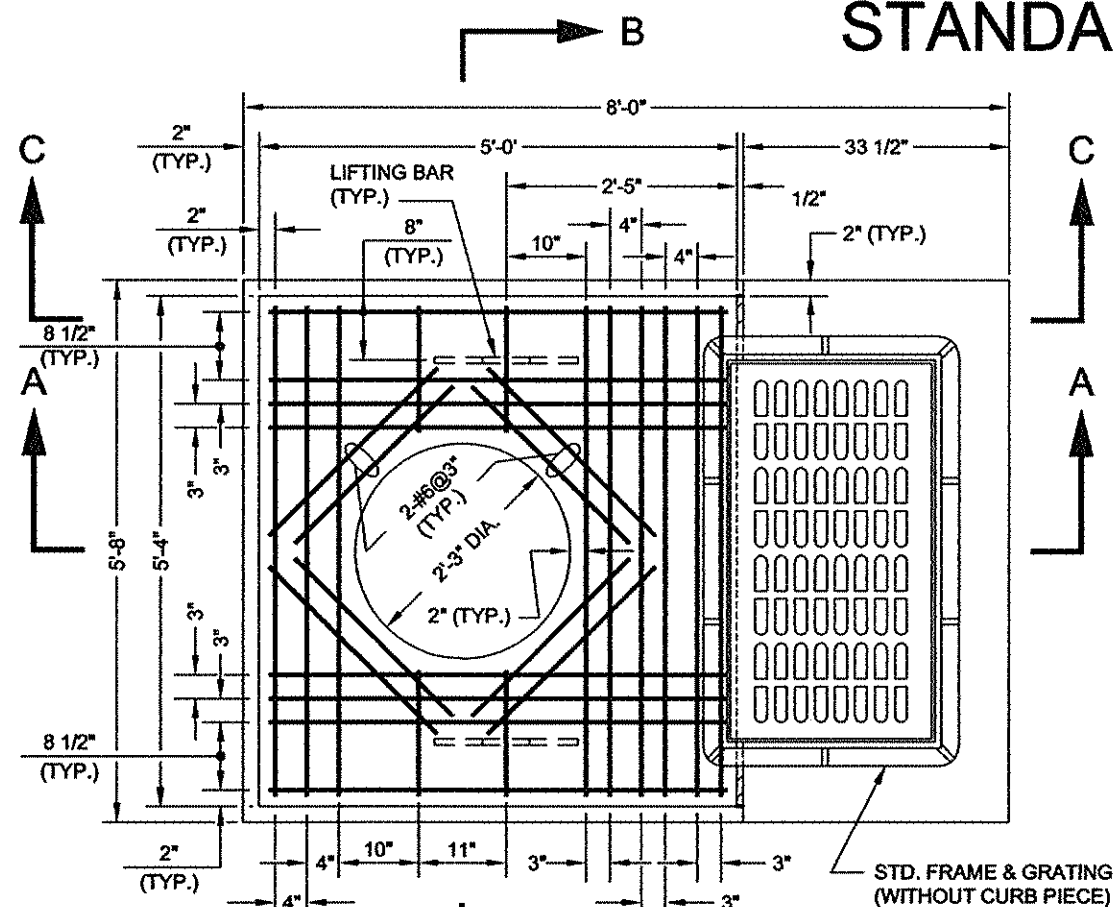
Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

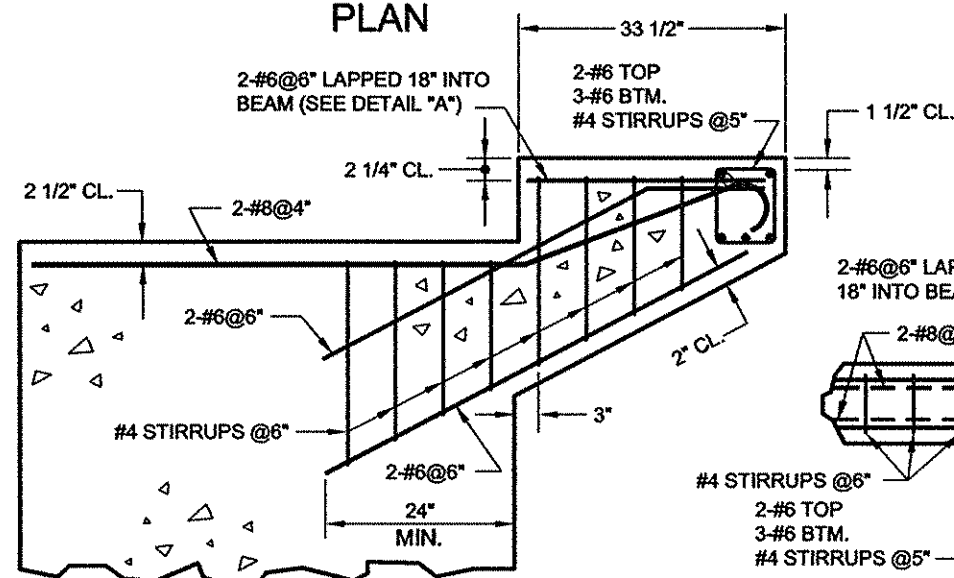
8/14/18
DATE

STANDARD FOR TYPE 3 CATCH BASIN

(WITHOUT CURB PIECE)



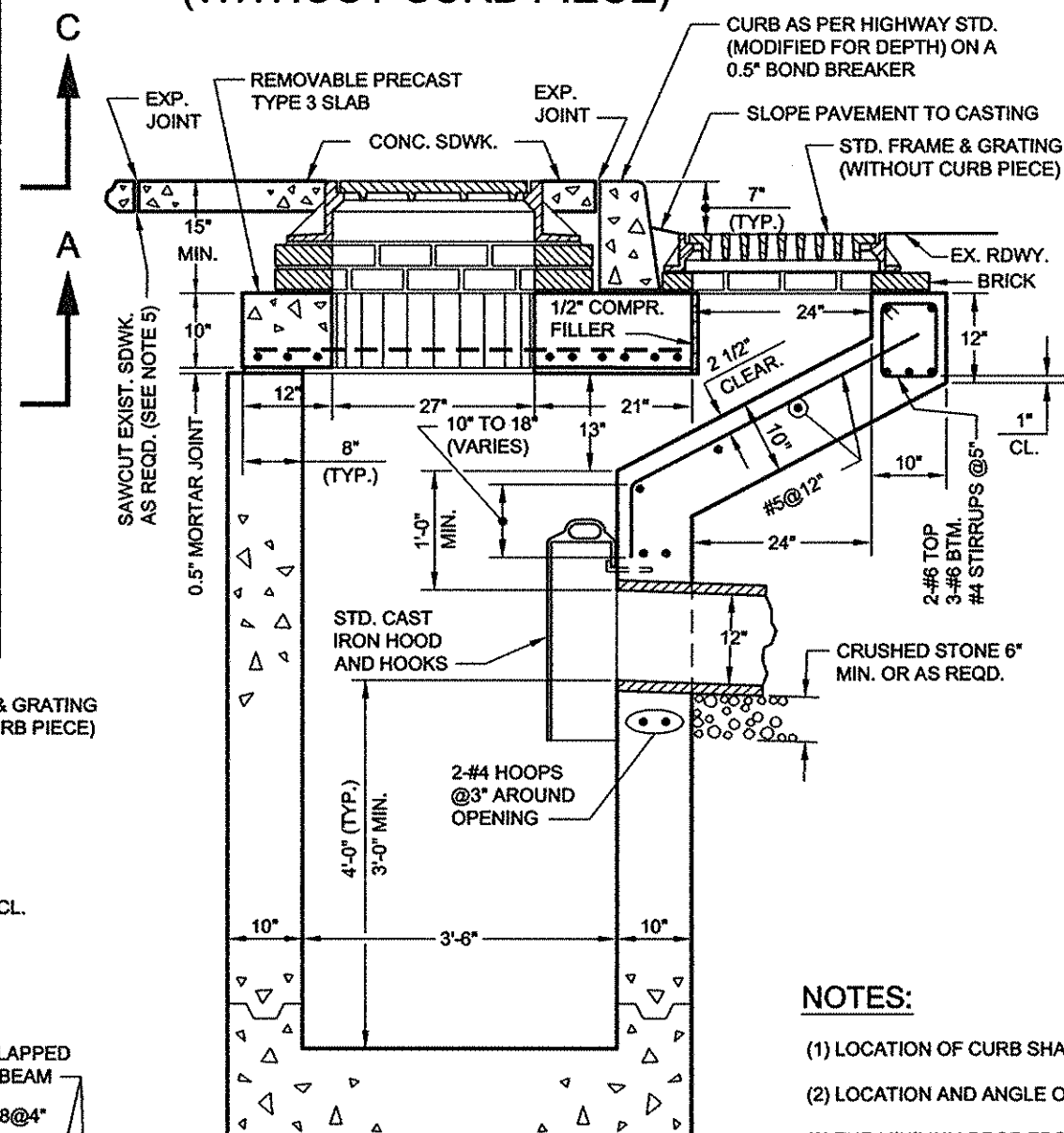
PLAN



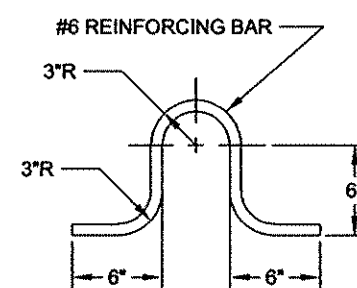
SECTION C-C

Sundip S. Saini

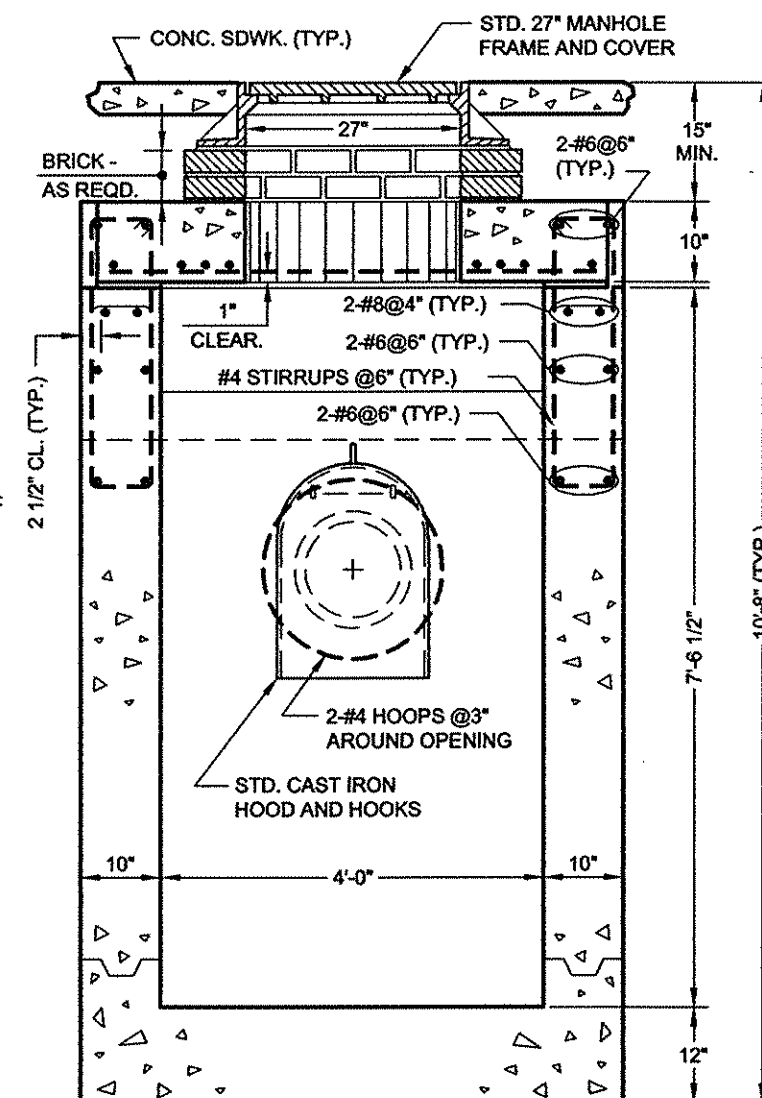
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION



SECTION A-A



LIFTING BAR DETAIL



SECTION B-B

NOTES:

- (1) LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- (2) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
- (3) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
- (4) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (5) EXPANSION JOINTS ARE REQUIRED IN THE CONC. SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
- (6) ALL REINFORCEMENT FOR ROOF SLAB IS #6 REINFORCING BARS UNLESS OTHERWISE SHOWN.
- (7) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (8) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

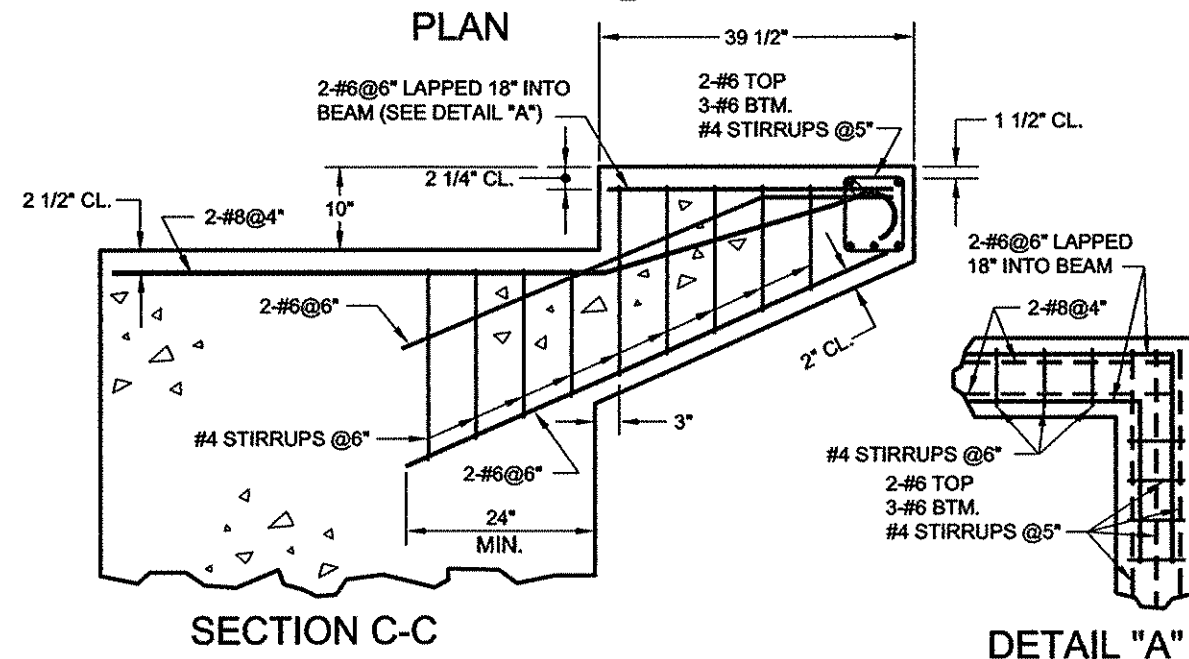
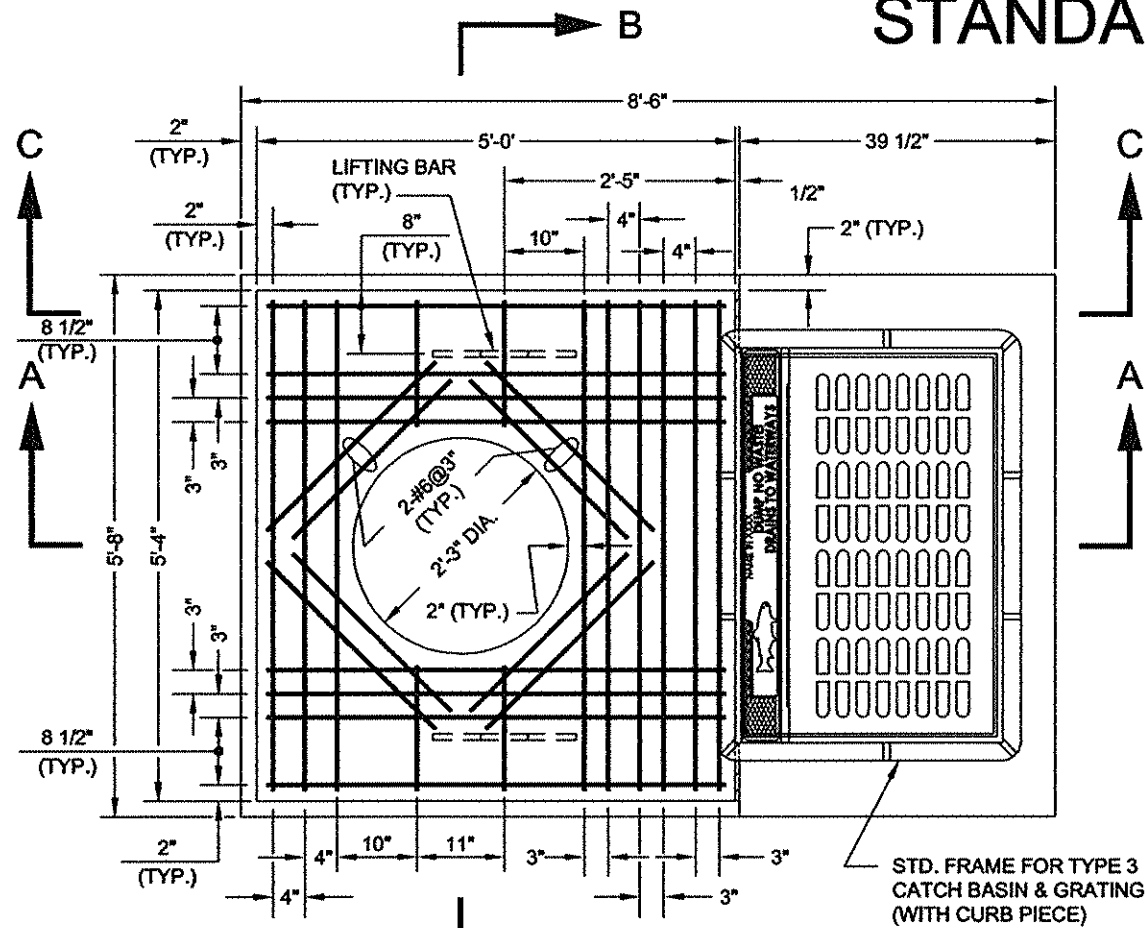
P.E

8/14/18
DATE

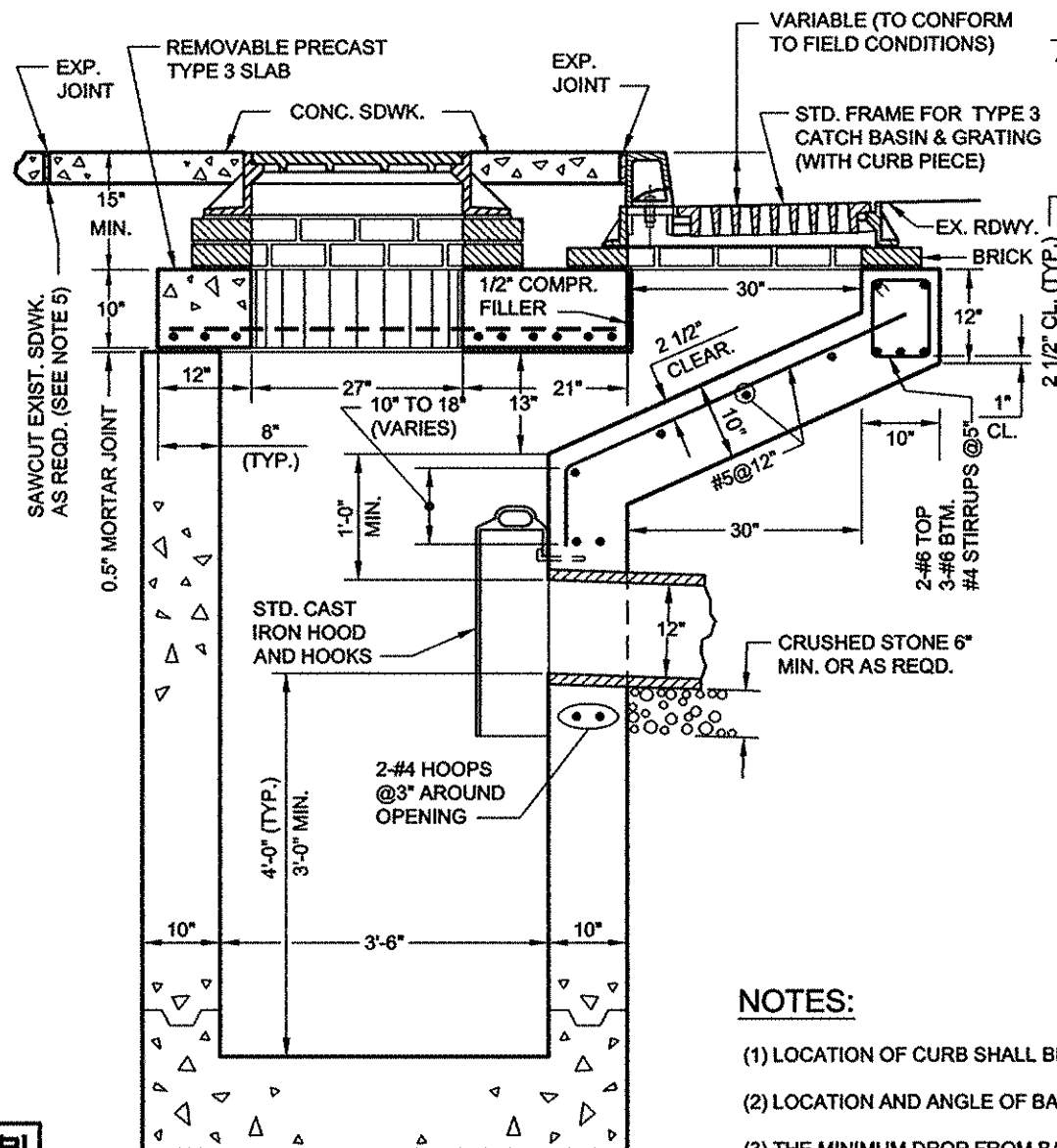
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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

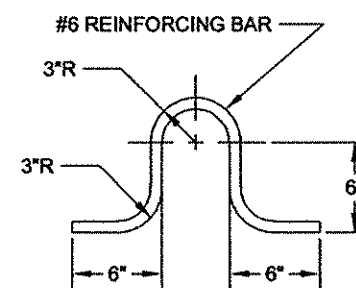
STANDARD FOR TYPE 3 CATCH BASIN (WITH CURB PIECE)



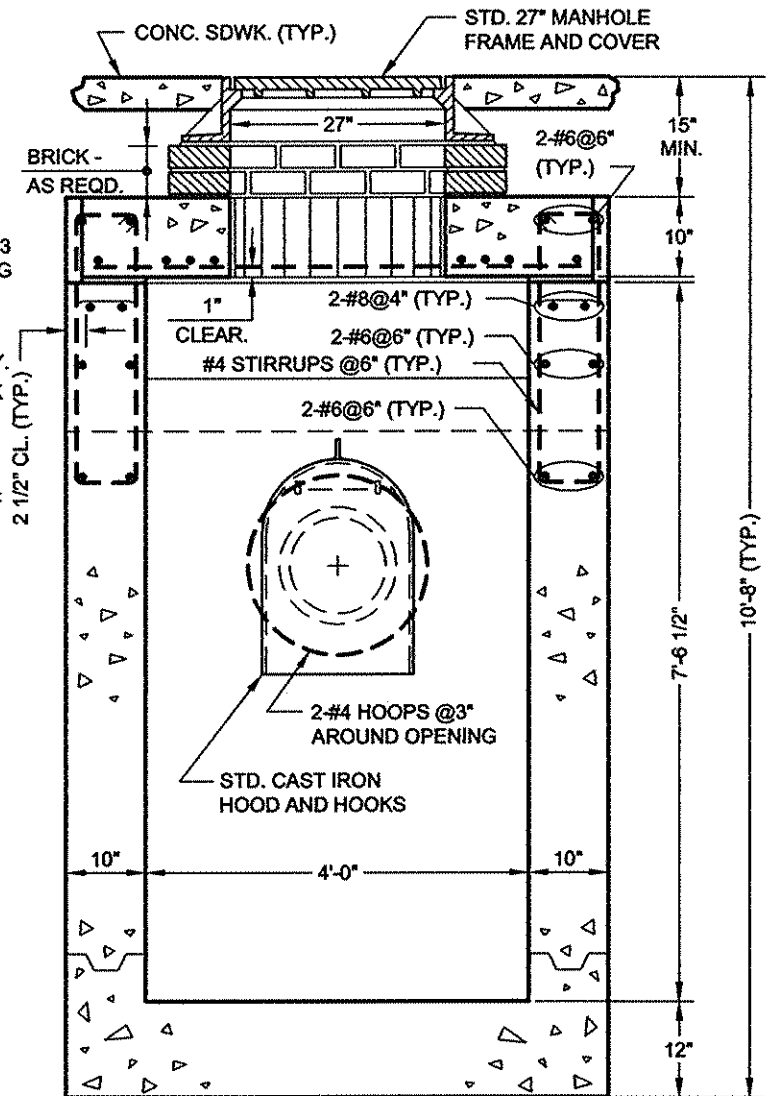
DETAIL "A"



SECTION A-A



LIFTING BAR DETAIL



SECTION B-B

NOTES:

- (1) LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- (2) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
- (3) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
- (4) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (5) EXPANSION JOINTS ARE REQUIRED IN THE CONC. SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
- (6) ALL REINFORCEMENT FOR ROOF SLAB IS #6 REINFORCING BARS UNLESS OTHERWISE SHOWN.
- (7) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (8) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

Cor dip S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

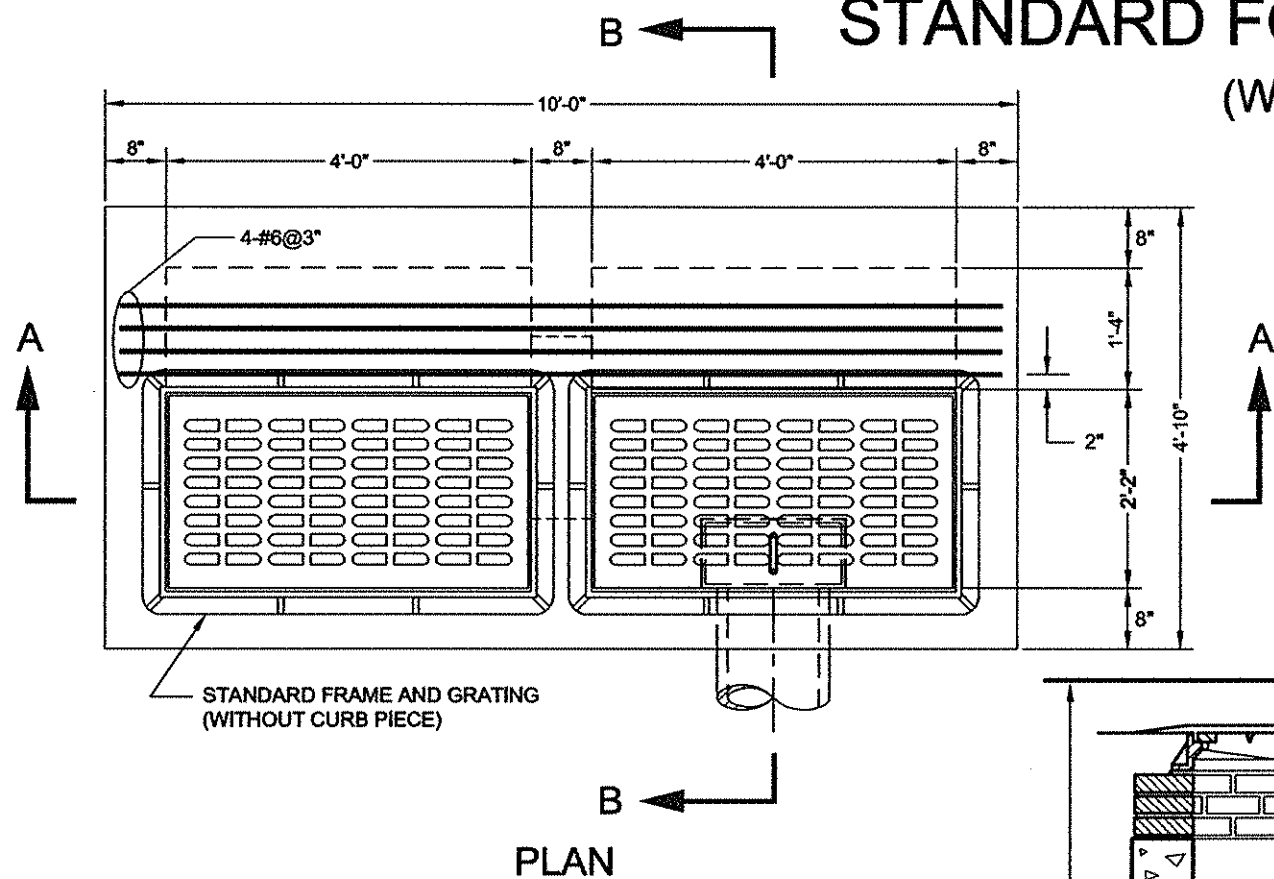
8/14/18
DATE

Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

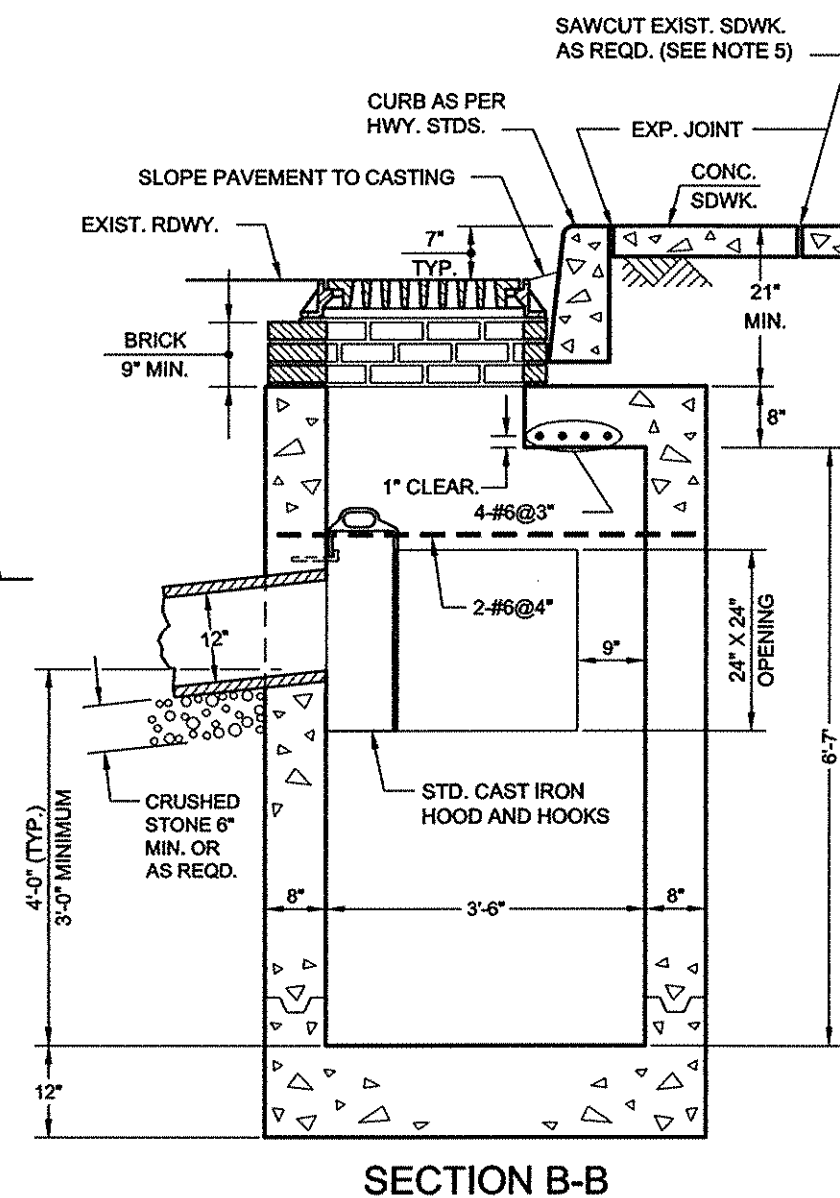
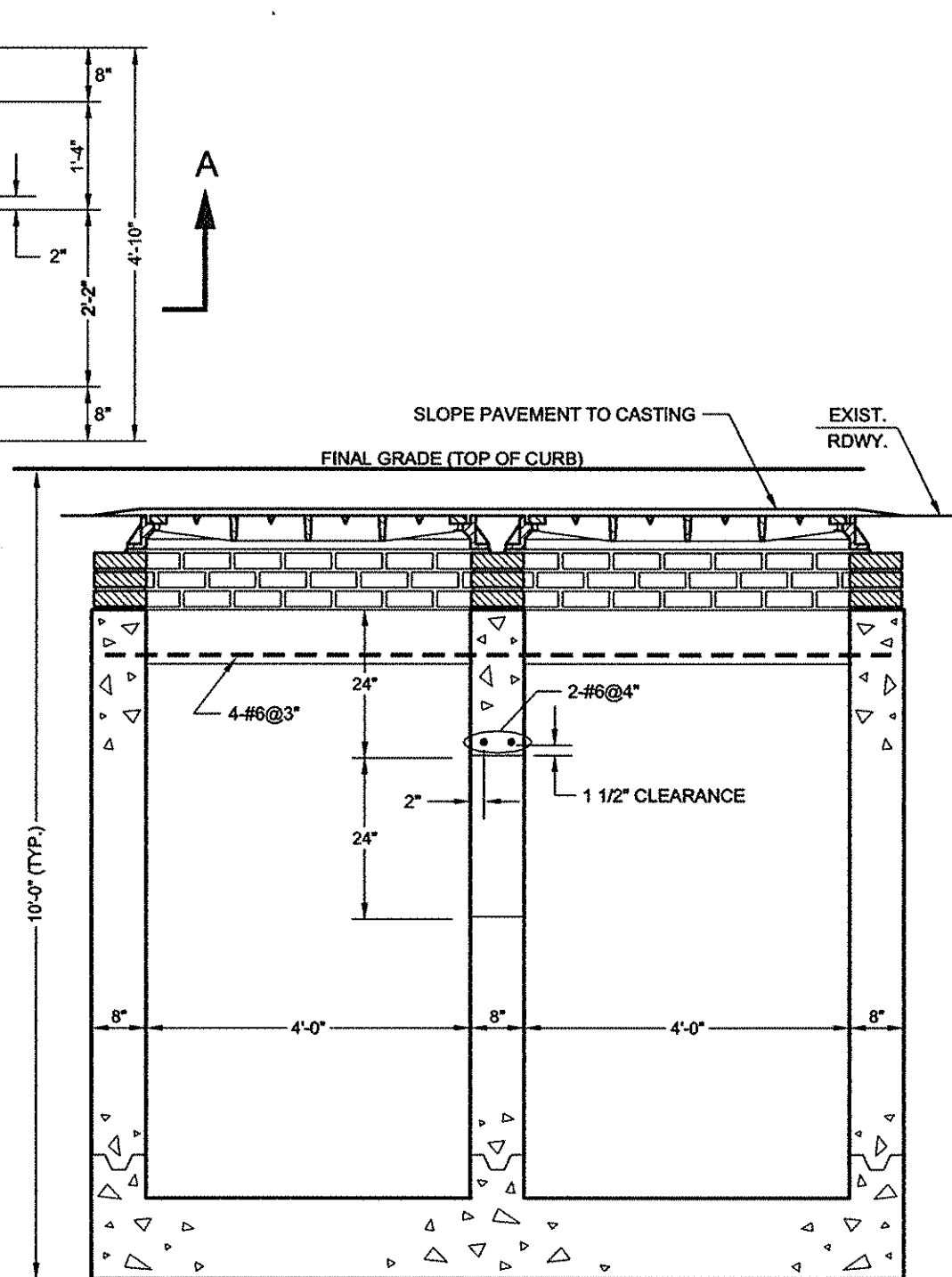
P.E.

8/14/18
DATE

STANDARD FOR DOUBLE CATCH BASIN (WITHOUT CURB PIECE)



- NOTES:
- (1) LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
 - (2) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
 - (3) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
 - (4) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
 - (5) EXPANSION JOINTS ARE REQUIRED IN THE CONCRETE SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
 - (6) CONCRETE IS TO BE CLASS 40. REBARS- GRADE 60.
 - (7) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.



REVISED DECEMBER 2017-P. LEUNG
W. PATALANO/P. MOY

Gurdeep S. Saini P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

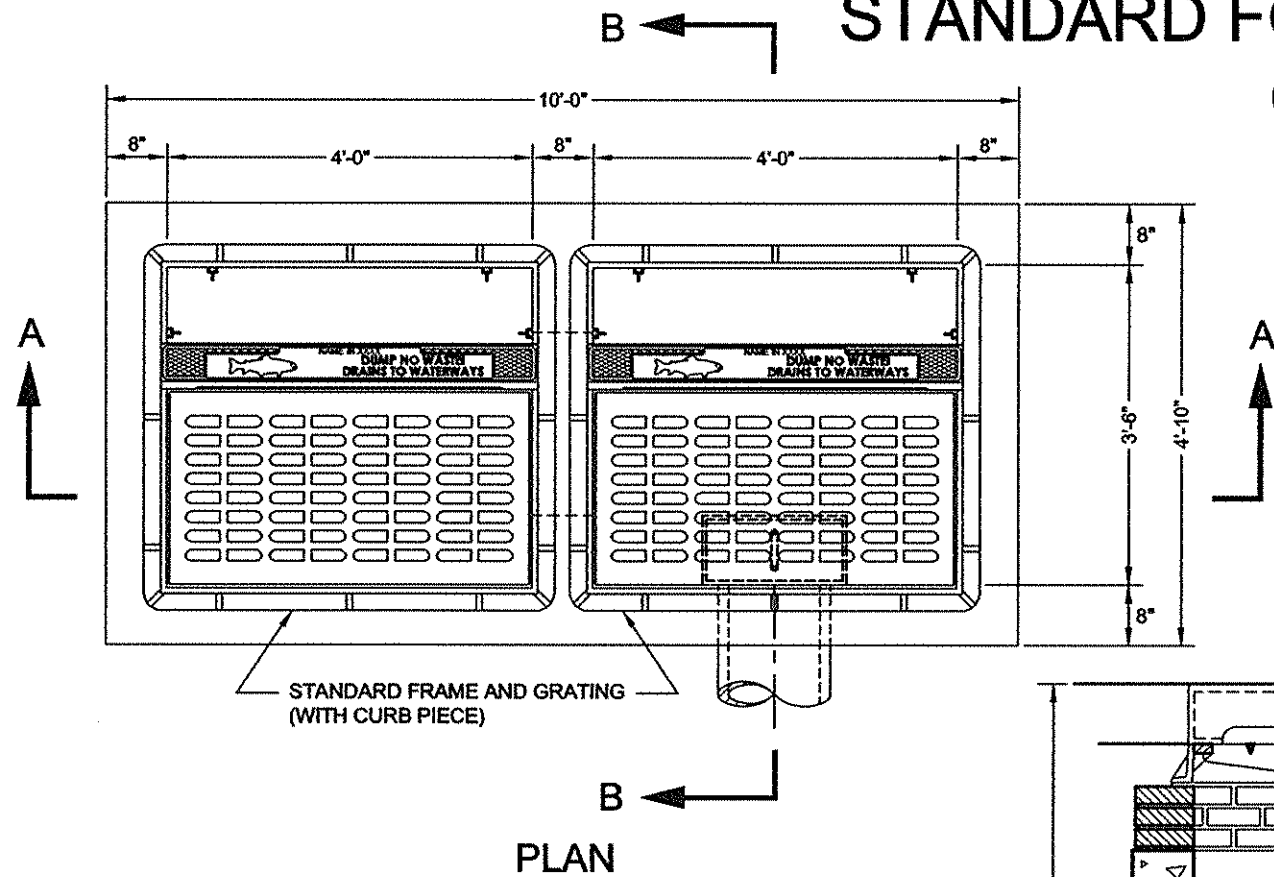
8/14/18
DATE

SECTION A-A

Thomas Wynne P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

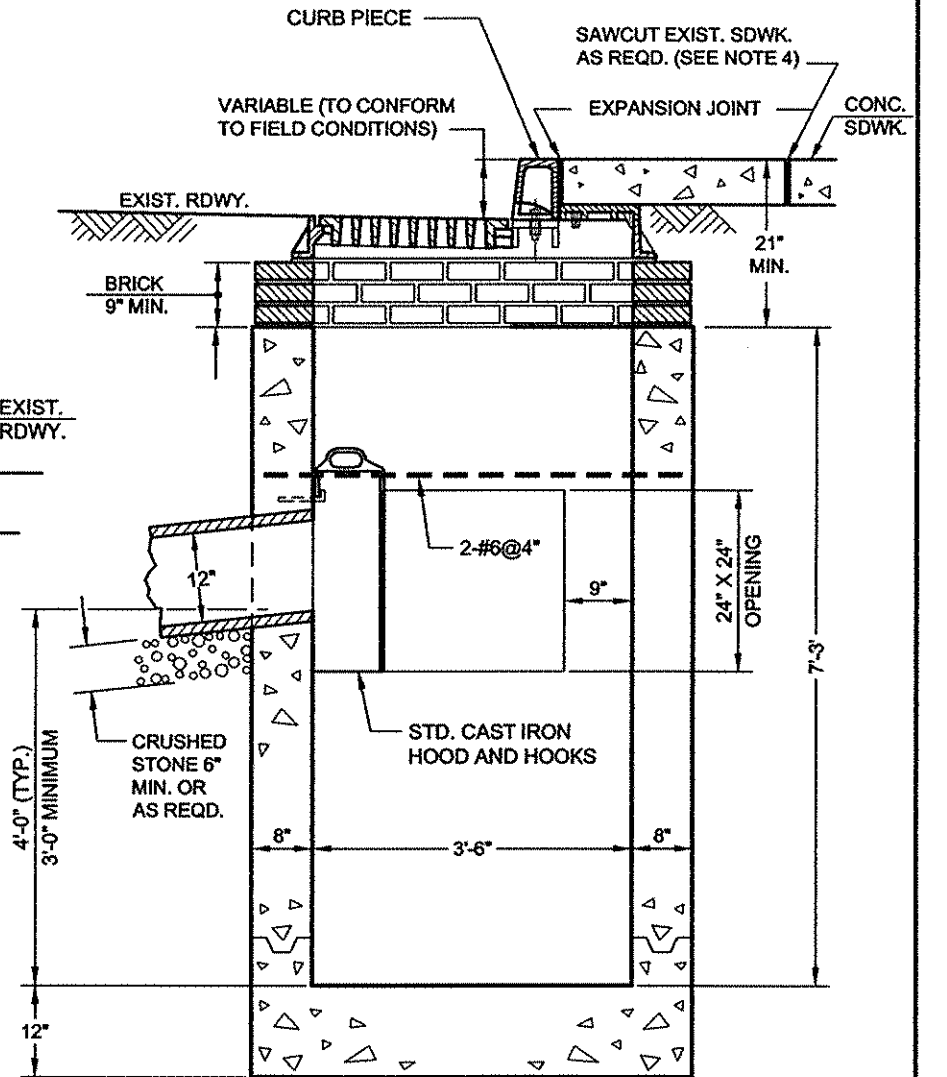
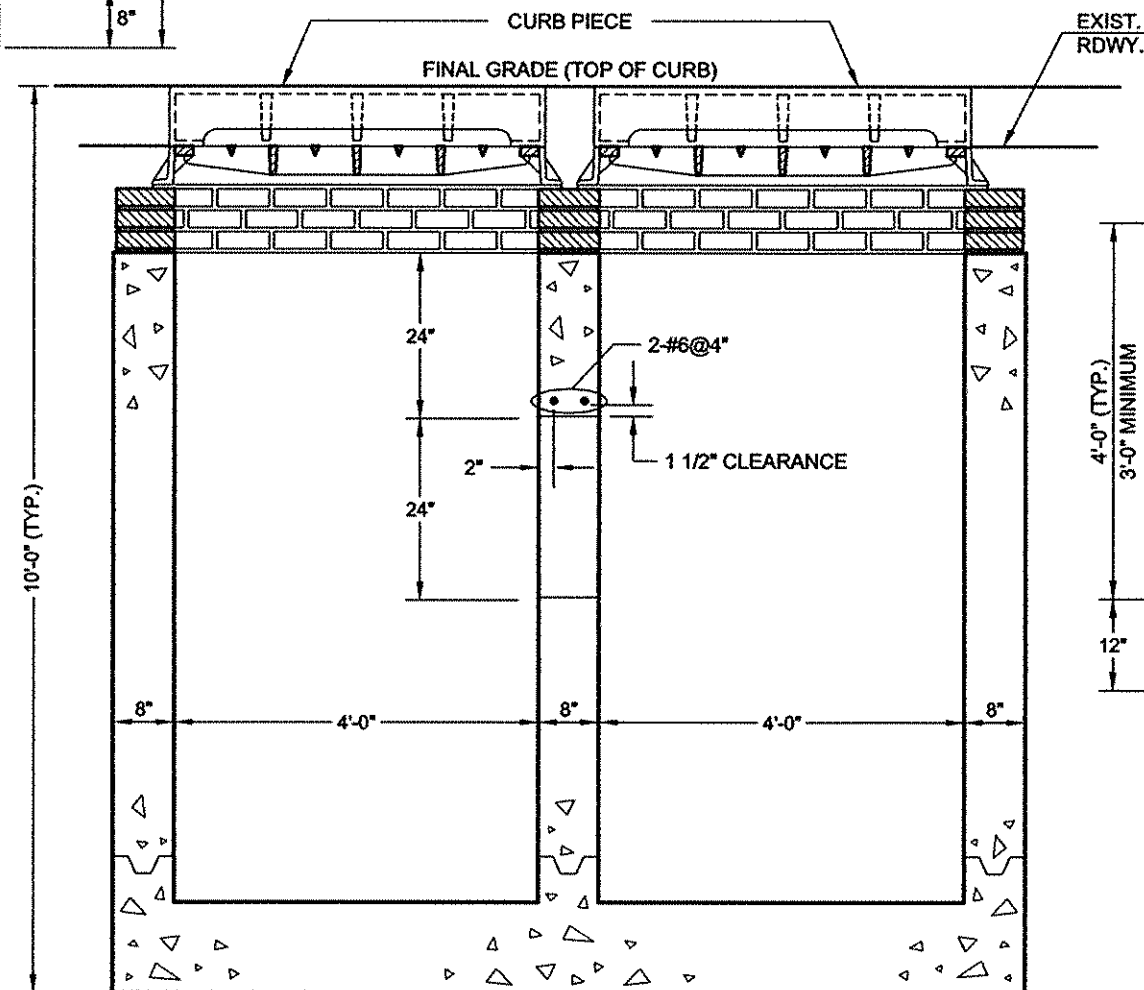
8/14/18
DATE

STANDARD FOR DOUBLE CATCH BASIN (WITH CURB PIECE)



NOTES:

- (1) LOCATION OF CURB SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- (2) LOCATION AND ANGLE OF BASIN CONNECTION MAY BE VARIED TO SUIT FIELD CONDITIONS.
- (3) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (4) THE MINIMUM DROP FROM BASIN TO SEWER SHALL BE 6".
- (5) EXPANSION JOINTS ARE REQUIRED IN THE CONCRETE SIDEWALK AREA AT A DISTANCE OF 1'-0" AROUND THE PERIMETER OF THE BASIN.
- (6) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.
- (7) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.



Gundip S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

SECTION A-A

Thomas Wayne

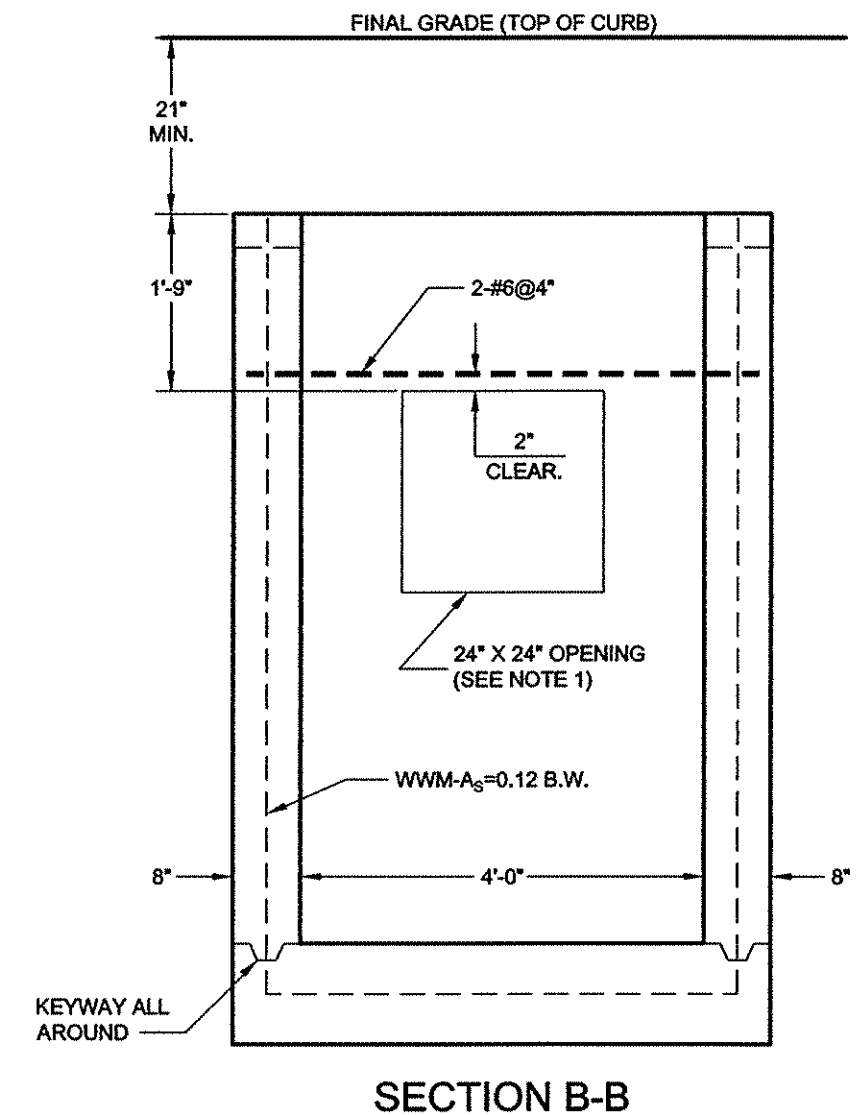
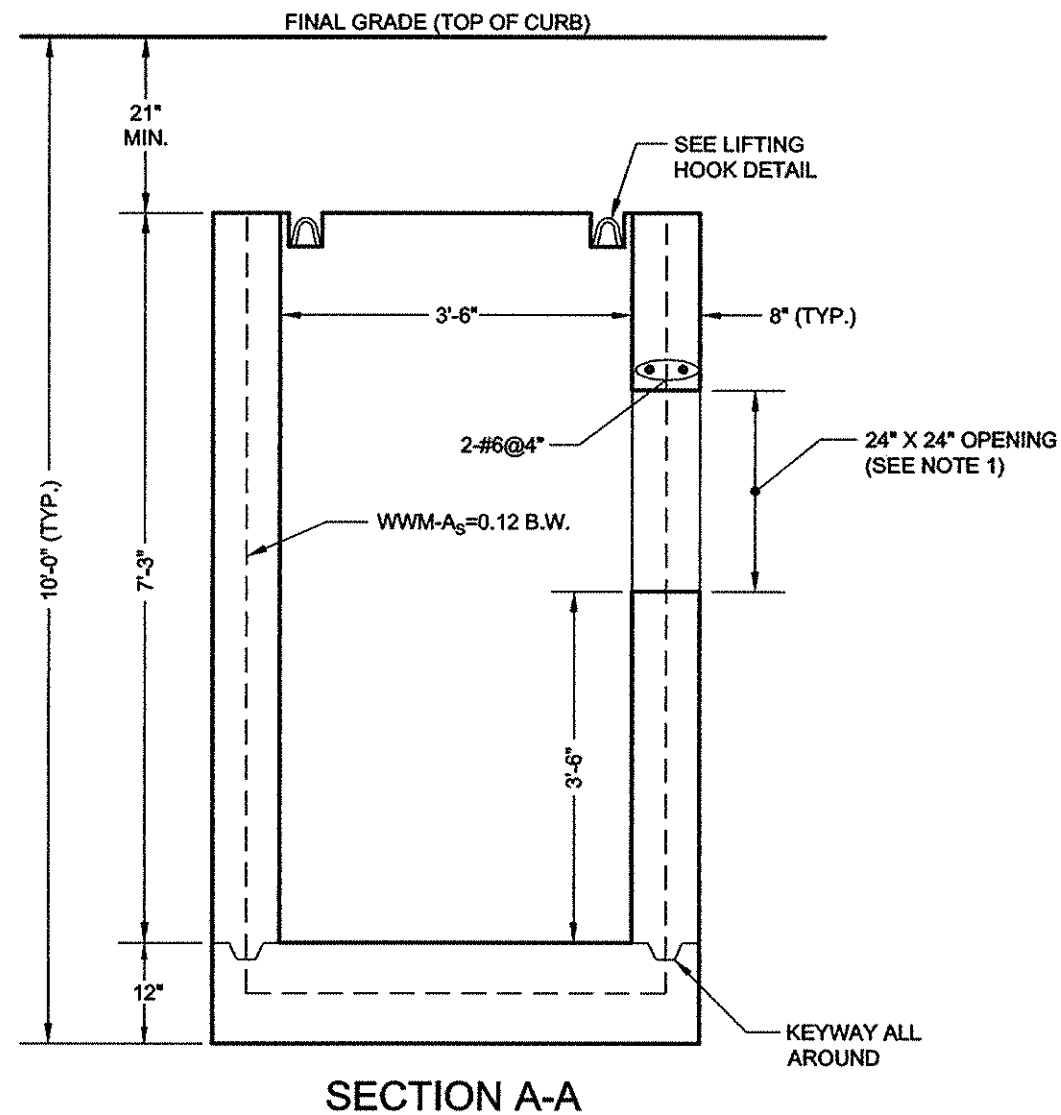
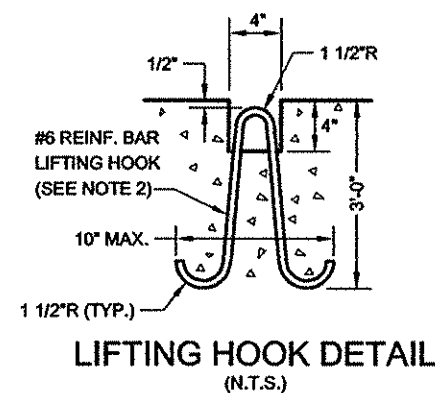
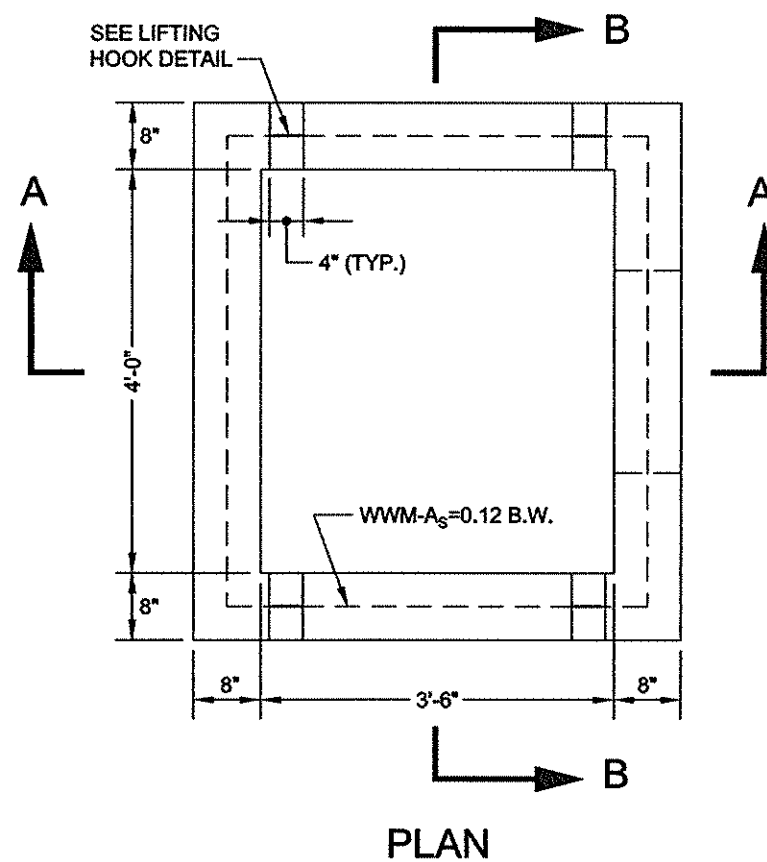
P.E.

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

DATE

STANDARD FOR PRECAST TYPE 1 CATCH BASIN



NOTES:

- (1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.
- (2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)
- (3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-F_s=65,000 PSI.
- (4) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

Gundip S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

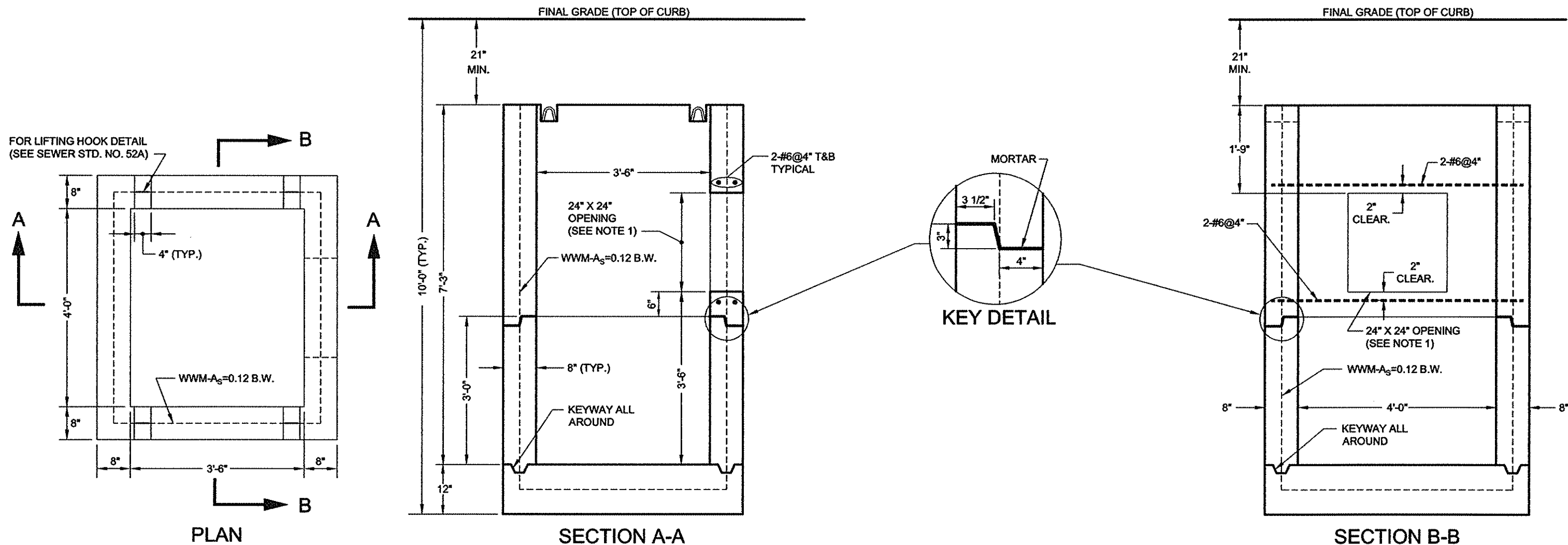
8/14/18
DATE

Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

STANDARD FOR SPLIT PRECAST TYPE 1 CATCH BASIN



NOTES:

- (1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.
- (2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)
- (3) SPLIT BASINS WILL ONLY BE PERMITTED WHERE STANDARD BASINS CAN NOT BE INSTALLED DUE TO VERTICAL HEIGHT RESTRICTIONS.
- (4) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-F_s=65,000 PSI.
- (5) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

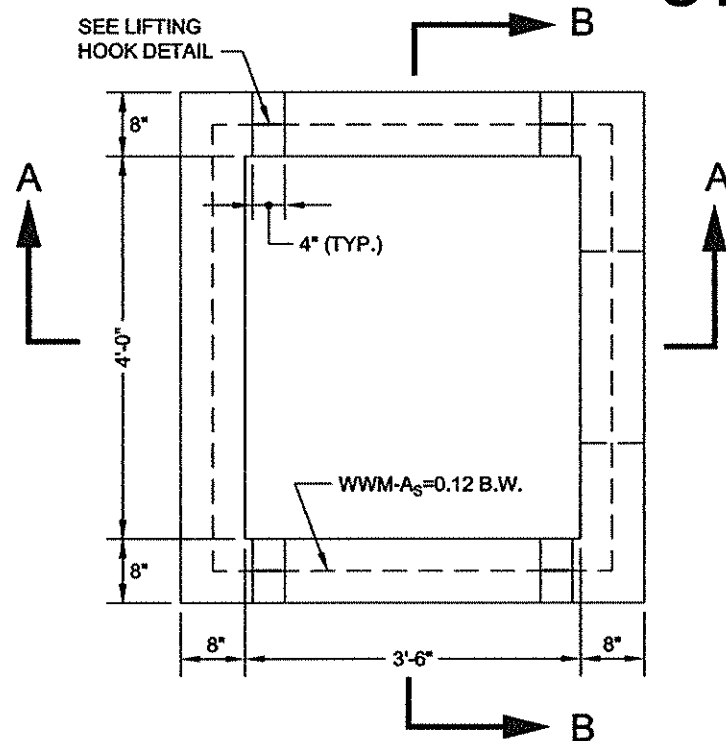
Gurdip S. Saini
P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

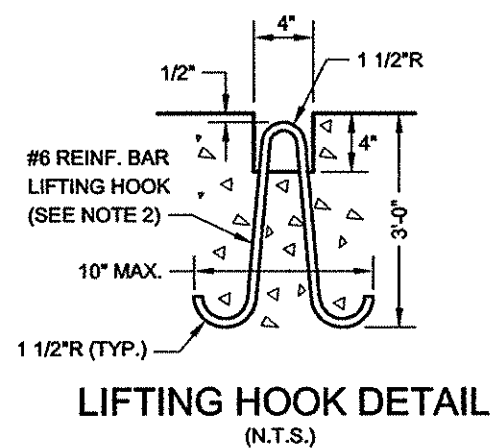
Thomas Wayne
P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

STANDARD FOR PRECAST TYPE 2 CATCH BASIN

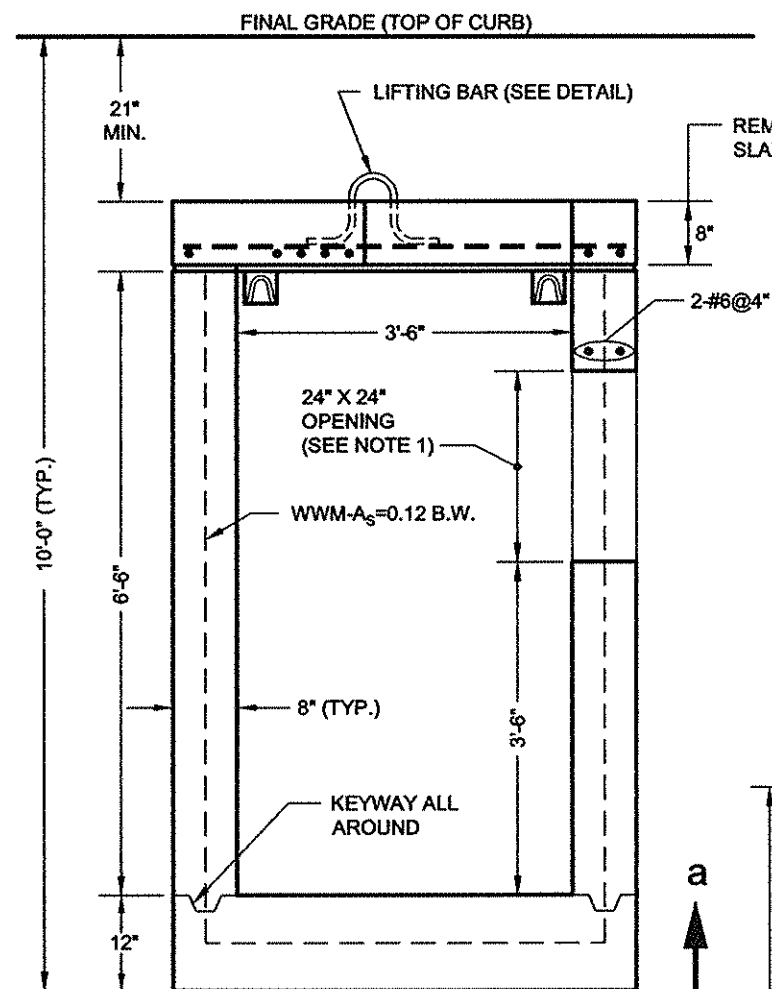


PLAN

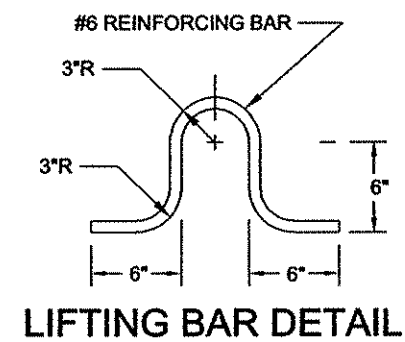
LIFTING HOOK DETAIL
(N.T.S.)

NOTES:

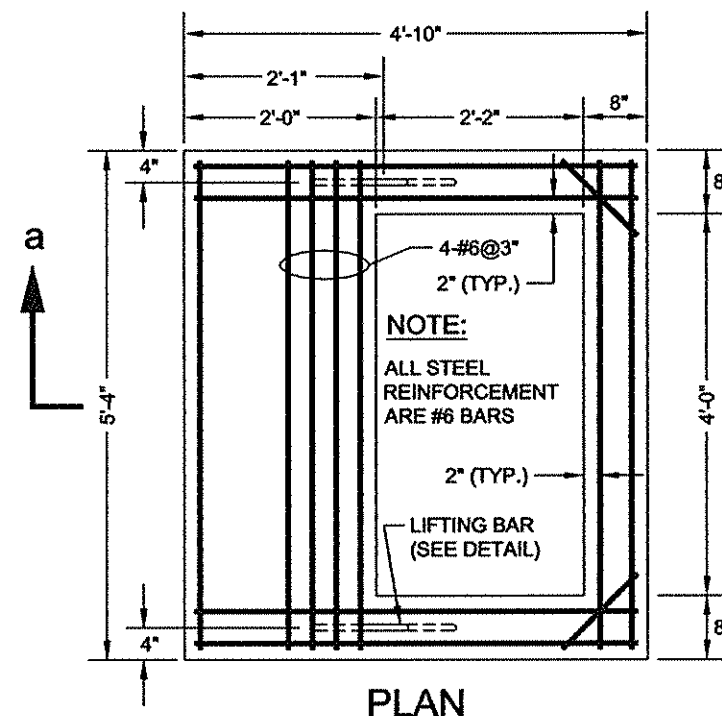
- (1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.
- (2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)
- (3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-F₈=65,000 PSI.
- (4) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.



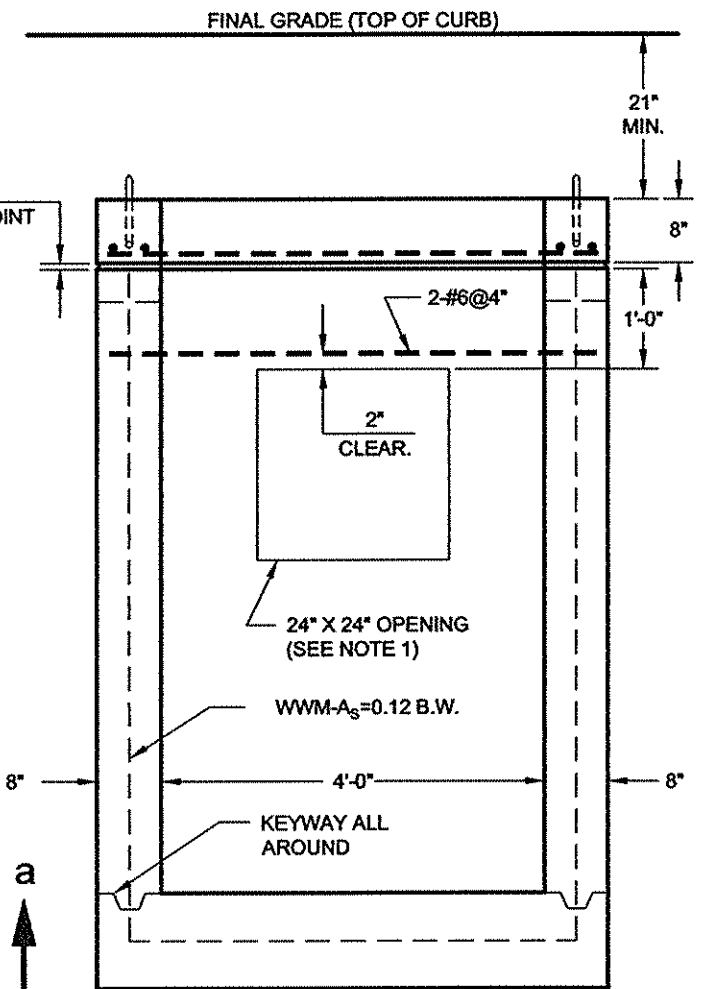
SECTION A-A



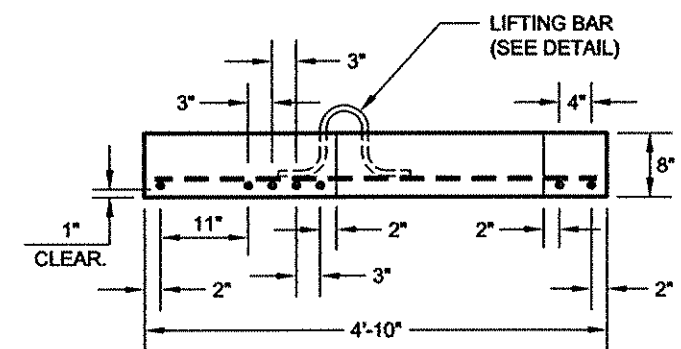
LIFTING BAR DETAIL



PLAN



SECTION B-B

SECTION a-a
REMOVABLE PRECAST TYPE 2 SLAB

Sanjay S. Seini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

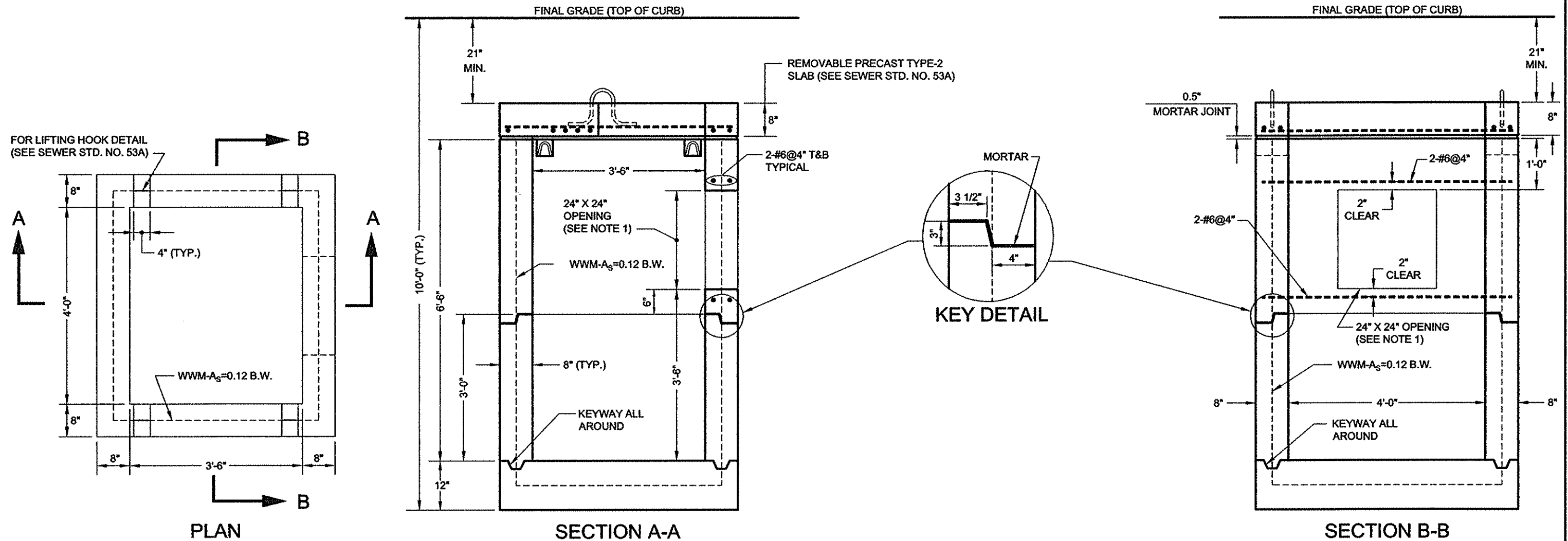
8/14/18
DATE

Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

STANDARD FOR SPLIT PRECAST TYPE 2 CATCH BASIN



NOTES:

- (1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.
- (2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURERS RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)
- (3) SPLIT BASINS WILL ONLY BE PERMITTED WHERE STANDARD BASINS CAN NOT BE INSTALLED DUE TO VERTICAL HEIGHT RESTRICTIONS.
- (4) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-F_s=65,000 PSI.
- (5) COVER FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED.

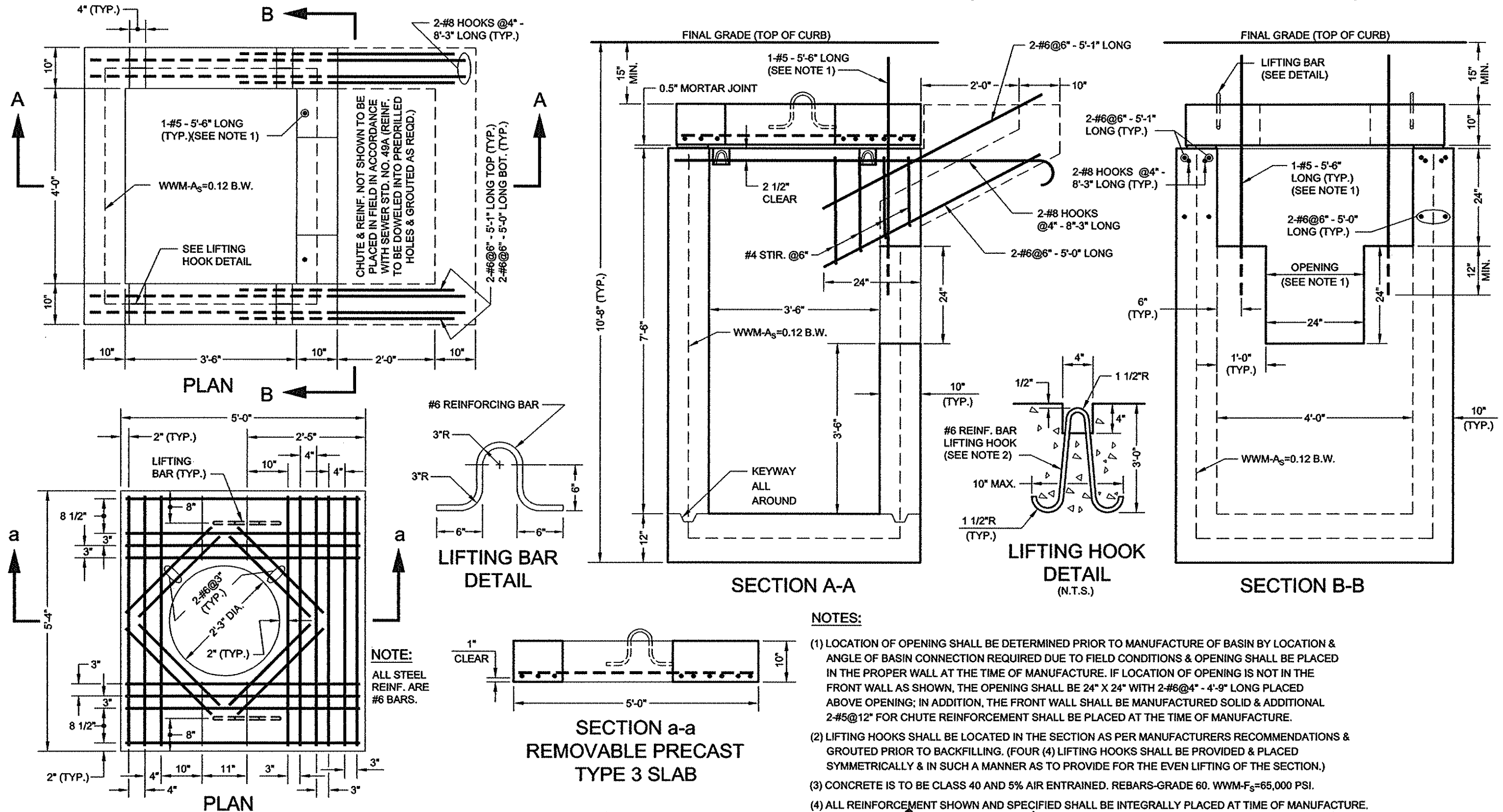
Gurdeep S. Seervi
P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

Thomas Wyne
P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

STANDARD FOR PRECAST TYPE 3 CATCH BASIN (WITHOUT CURB PIECE)



Associate Commissioner, Design
Department of Design and Construction

DATE

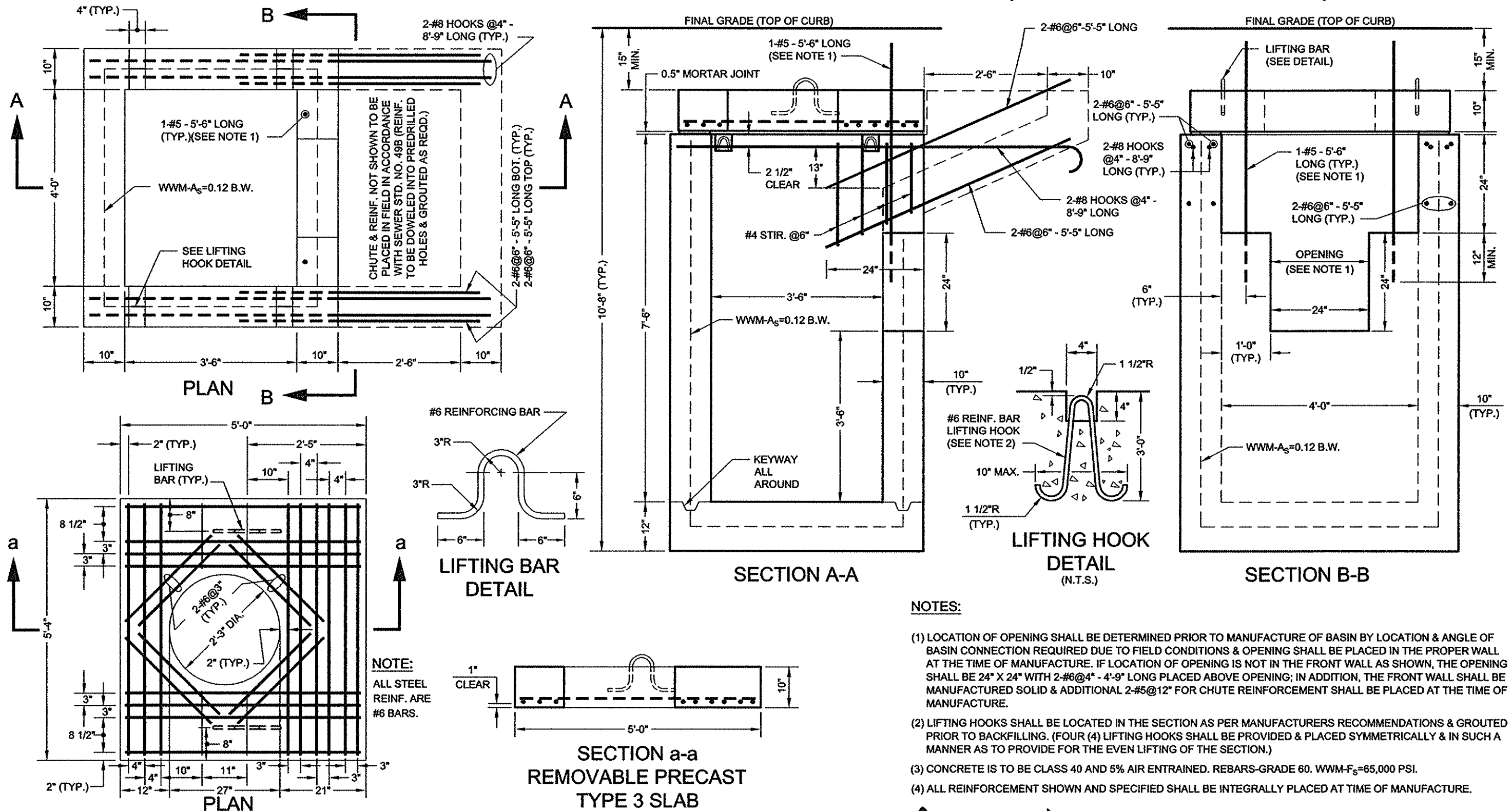
8/14/18

Executive Director of Engineering
Department of Environmental Protection

DATE

8/14/18

STANDARD FOR PRECAST TYPE 3 CATCH BASIN (WITH CURB PIECE)



NOTES:

- (1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION & ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS & OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE. IF LOCATION OF OPENING IS NOT IN THE FRONT WALL AS SHOWN, THE OPENING SHALL BE 24" X 24" WITH 2-#6 @ 4" - 4'-9" LONG PLACED ABOVE OPENING; IN ADDITION, THE FRONT WALL SHALL BE MANUFACTURED SOLID & ADDITIONAL 2-#5 @ 12" FOR CHUTE REINFORCEMENT SHALL BE PLACED AT THE TIME OF MANUFACTURE.
- (2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURER'S RECOMMENDATIONS & GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED & PLACED SYMMETRICALLY & IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTION.)
- (3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-F_s=65,000 PSI.
- (4) ALL REINFORCEMENT SHOWN AND SPECIFIED SHALL BE INTEGRALLY PLACED AT TIME OF MANUFACTURE.

Sanjiv S. Scriver
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

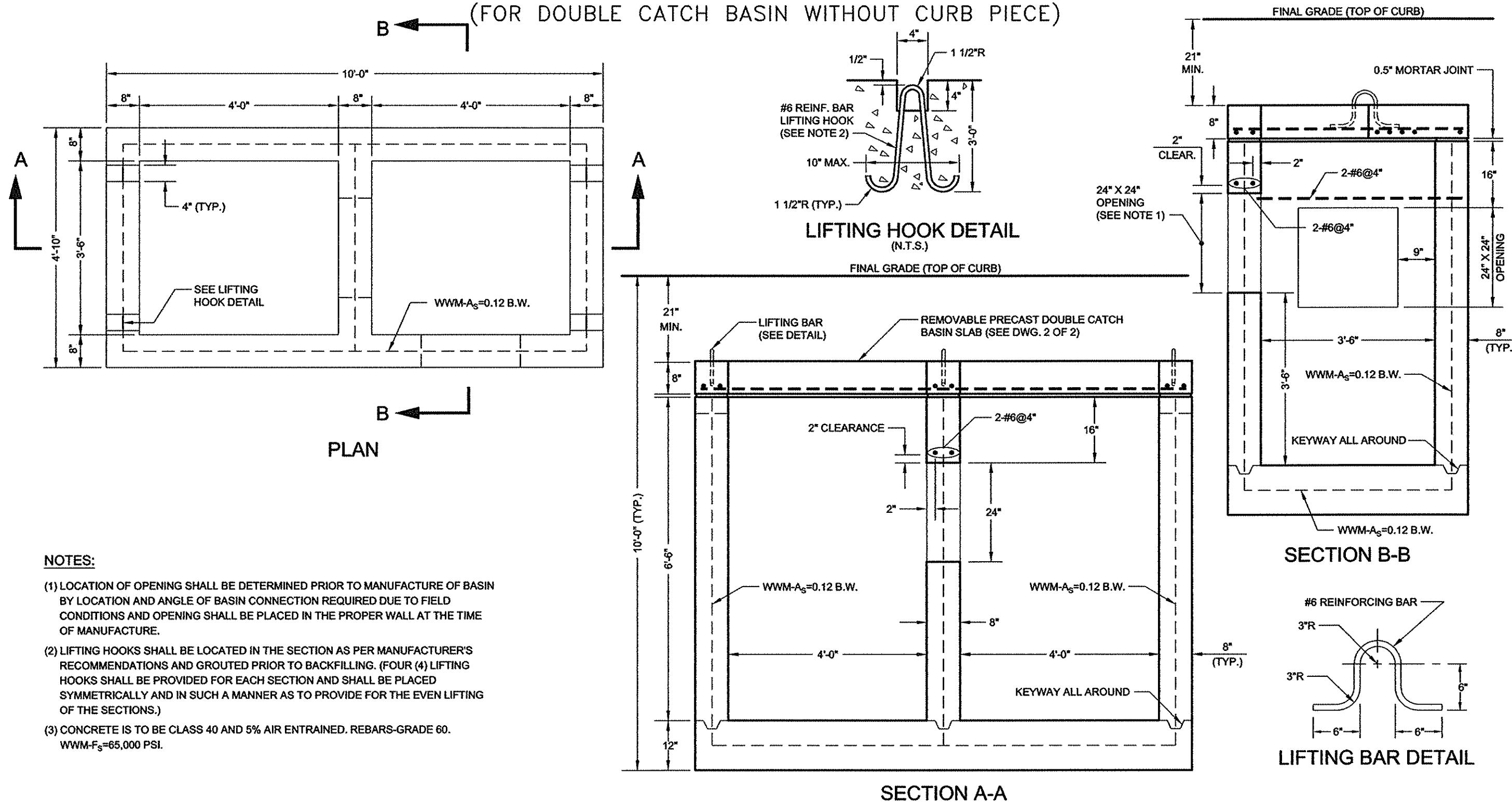
Thomas Wyne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

STANDARD FOR PRECAST DOUBLE CATCH BASIN (DWG. 1 OF 2)

(FOR DOUBLE CATCH BASIN WITHOUT CURB PIECE)



NOTES:

- (1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.
- (2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTIONS.)
- (3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-F_c=65,000 PSI.

Gurdeep S. Sairi
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

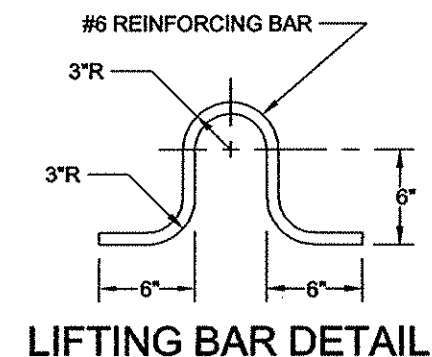
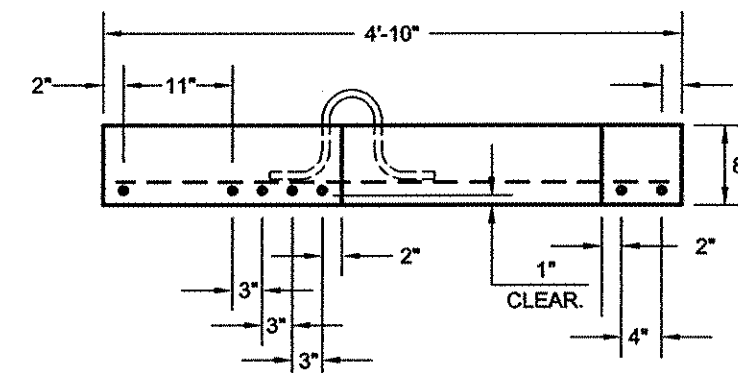
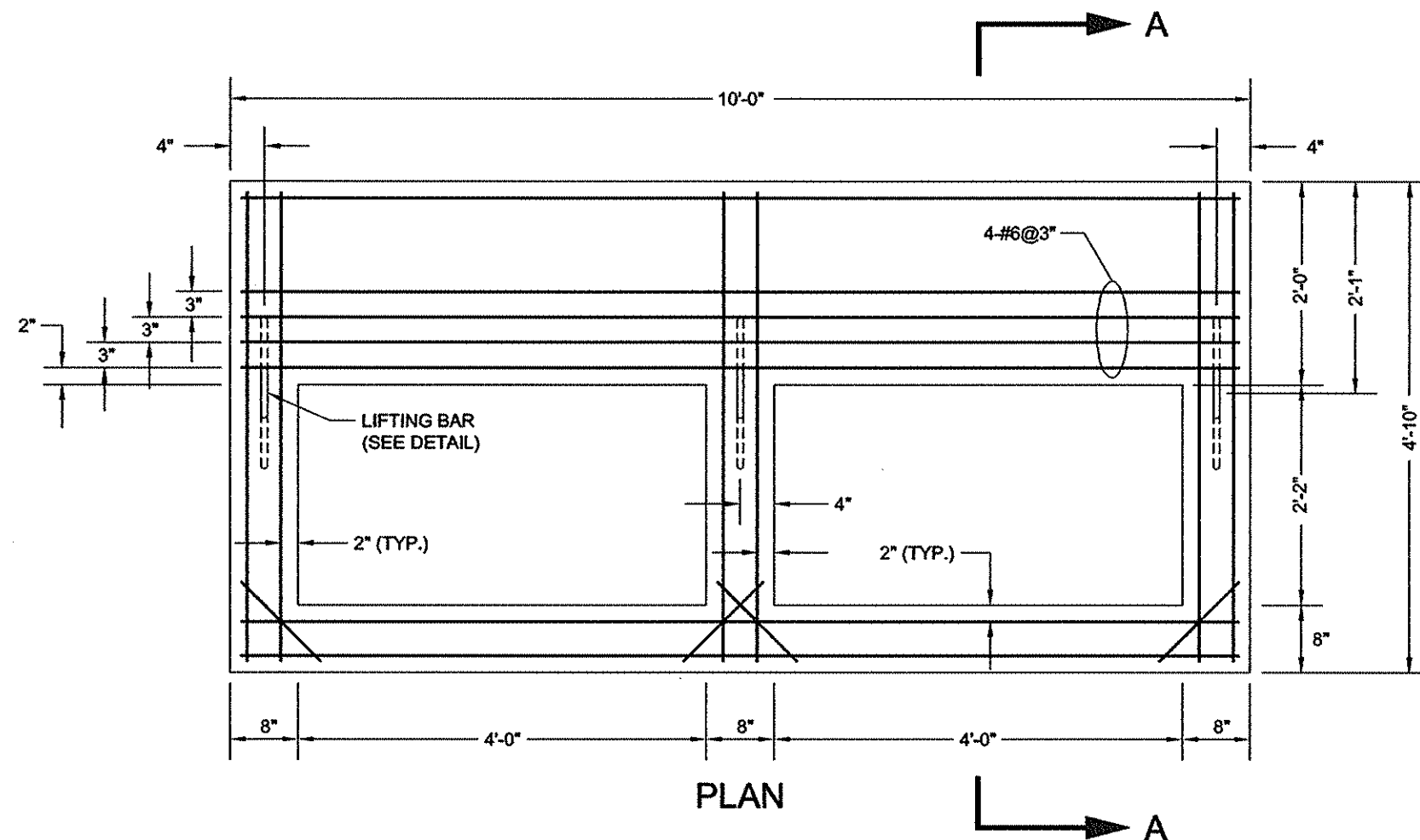
8/14/18
DATE

SECTION A-A

Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

STANDARD FOR PRECAST DOUBLE CATCH BASIN (DWG. 2 OF 2)

(FOR DOUBLE CATCH BASIN WITHOUT CURB PIECE)
(REMOVABLE PRECAST DOUBLE CATCH BASIN SLAB)

NOTES:

- (1) ALL STEEL REINFORCEMENT ARE #6 BARS.
- (2) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.

Sandeep S. Saini
P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

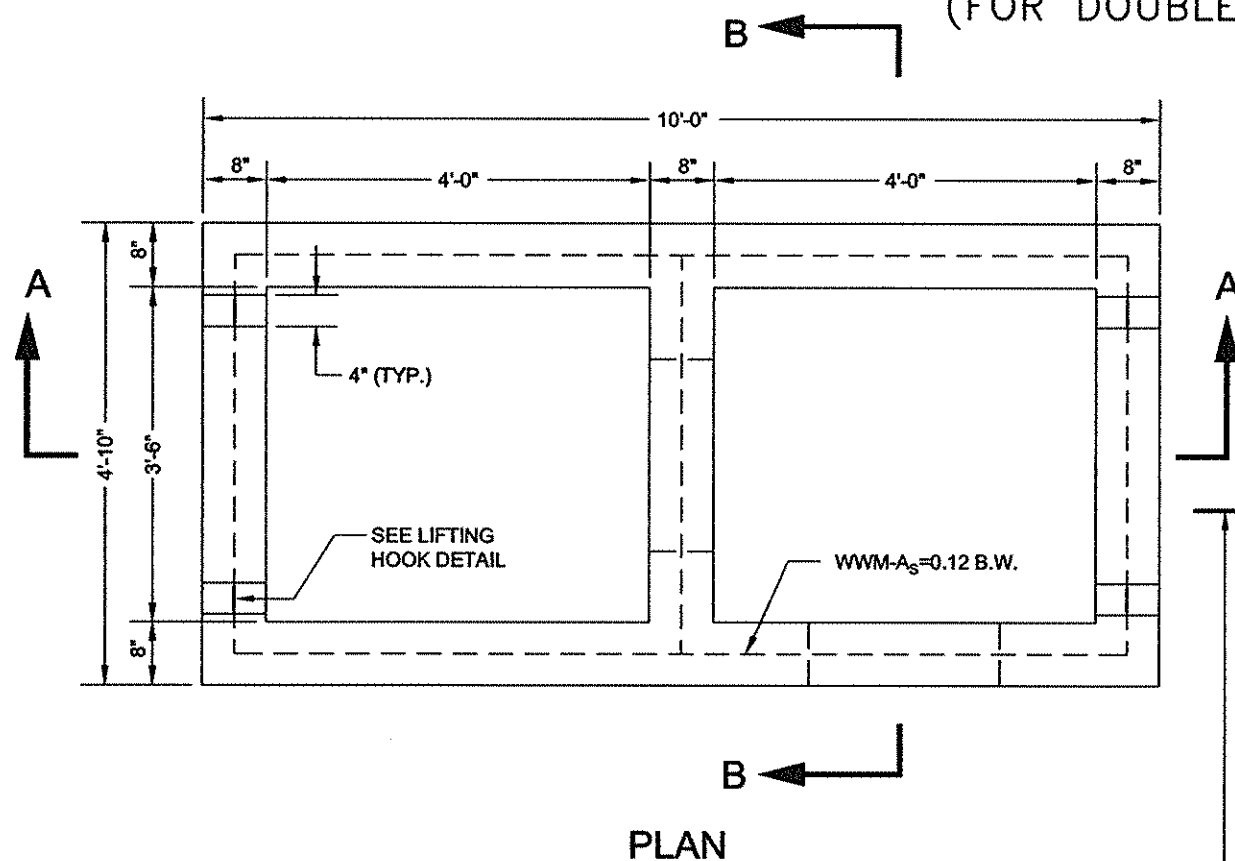
8/14/18
DATE

Thomas Wyne
P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

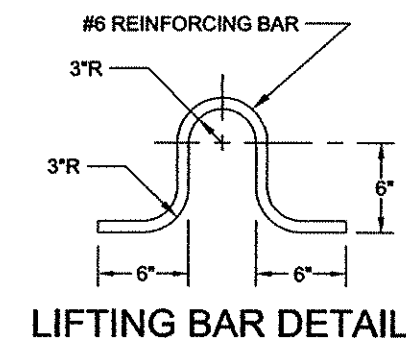
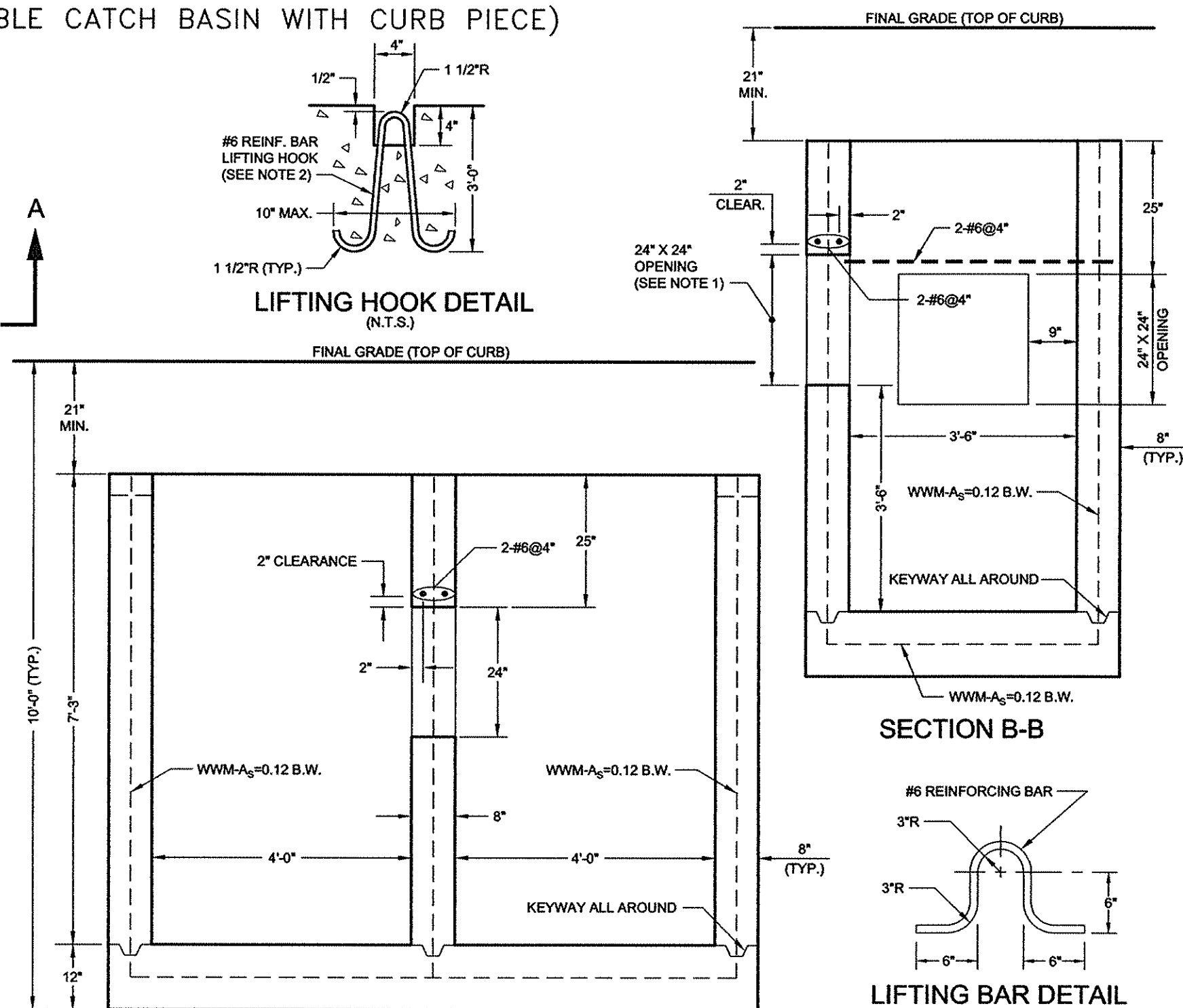
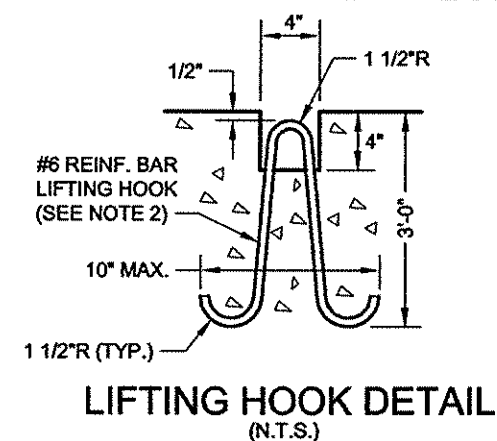
STANDARD FOR PRECAST DOUBLE CATCH BASIN

(FOR DOUBLE CATCH BASIN WITH CURB PIECE)



NOTES:

- (1) LOCATION OF OPENING SHALL BE DETERMINED PRIOR TO MANUFACTURE OF BASIN BY LOCATION AND ANGLE OF BASIN CONNECTION REQUIRED DUE TO FIELD CONDITIONS AND OPENING SHALL BE PLACED IN THE PROPER WALL AT THE TIME OF MANUFACTURE.
- (2) LIFTING HOOKS SHALL BE LOCATED IN THE SECTION AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING. (FOUR (4) LIFTING HOOKS SHALL BE PROVIDED FOR EACH SECTION AND SHALL BE PLACED SYMMETRICALLY AND IN SUCH A MANNER AS TO PROVIDE FOR THE EVEN LIFTING OF THE SECTIONS.)
- (3) CONCRETE IS TO BE CLASS 40 AND 5% AIR ENTRAINED. REBARS-GRADE 60. WWM-F₅=65,000 PSI.



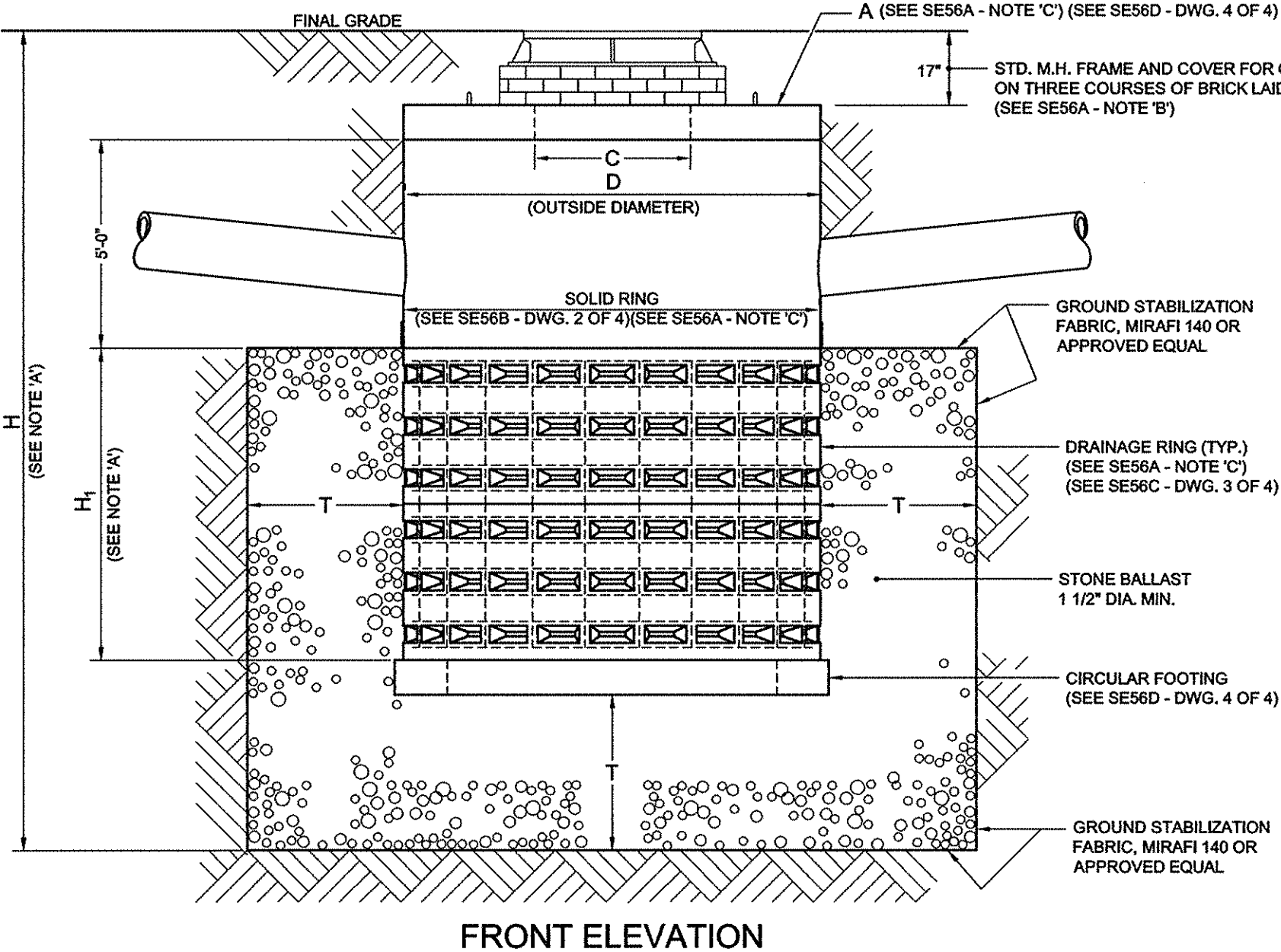
Sanjay S. Scaria
P.E.
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

Thomas Wynne
P.E.
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

STANDARD FOR PRECAST SEEPAGE BASIN (DWG. 1 OF 4)
(SEEPAGE BASIN INSTALLATION)



D OUTSIDE DIAMETER	C STD. M.H. FRAME & COVER	A BASIN TOP SLAB	T STONE BALLAST	H ₁ DEPTH OF DRAINAGE RINGS
4'-0"	27"	STD. REMOVABLE R.C. CIRCULAR SLAB	2'-0" MIN.	7'-0"
6'-0", 8'-0", 10'-0" AND 12'-0"	36"	STD. REMOVABLE R.C. CIRCULAR SLAB	3'-0" MIN.	6'-0"

- NOTES:
- (A) UNLESS OTHERWISE SPECIFIED, THE TOTAL DEPTH OF A SEEPAGE BASIN SHALL BE APPROXIMATELY SEVENTEEN (17) FEET, WITH H₁ AS SPECIFIED IN CHART ABOVE.
- (B) THE LOCATION OF ALL SEEPAGE BASINS SHALL BE SUCH THAT THE OPENING IN THE TOP SLAB TOGETHER WITH FRAME AND COVER SHALL BE TOTALLY IN THE ROADWAY AREA OR TOTALLY IN THE SIDEWALK AREA.
- (C) ALL SLABS AND RINGS SHALL BE PLACED ON A ONE-HALF (1/2) INCH THICK FULL BED OF FRESH MORTAR.
- (D) WHEN IMPERMEABLE STRATUM IS ENCOUNTERED, SEEPAGE BASIN INSTALLATION SHALL BE JUSTIFIED BEFORE CONSTRUCTION.

REVISED DECEMBER 2017. P. LEUNG
W. PATALANO/P. MOY

Gurdeep S. Saini
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DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

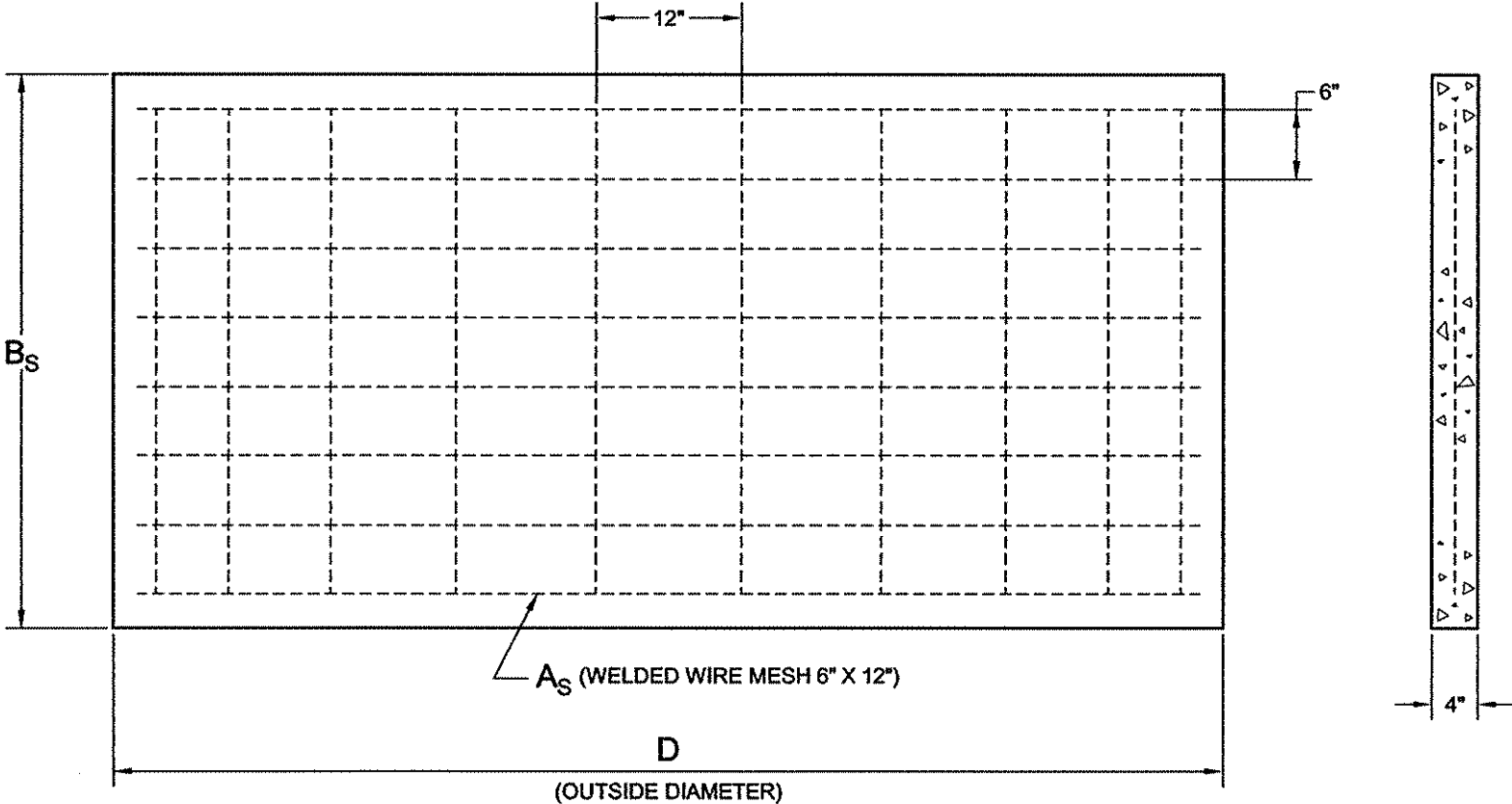
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Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

STANDARD FOR PRECAST SEEPAGE BASIN (DWG. 2 OF 4)
(PRECAST SOLID RING)



ELEVATION

SECTION

NOTES:

- (1) SEEPAGE BASIN SOLID RING AND DRAINAGE RING REINFORCING COMPLIES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH WWM, A_s =(SEE CHARTS), PLACED IN CENTER OF WALL. IN SOLID RING 1-#4 HOOP SHALL BE PLACED AROUND ALL CAST PIPE OPENINGS. (THE 1-#4 HOOP WILL NOT BE REQUIRED AT CORED OPENINGS FOR BASIN CONNECTIONS IN SOLID RING.) (ALL VALUES OF AREA OF STEEL (A_s) ARE IN SQUARE INCHES AND ARE A MINIMUM.)
- (2) CAST PIPE OPENINGS AND CORED OPENINGS WILL BE PLACED IN SOLID RING ONLY. NO CAST PIPE OPENING OR CORED OPENING WILL BE ALLOWED IN DRAINAGE RING AND NO BASIN CONNECTION SHALL BE MADE INTO A DRAINAGE RING.
- (3) CORED OPENINGS IN SOLID RING WILL BE PERMITTED FOR 12" DIA. BASIN CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 16" FOR THESE BASIN CONNECTIONS.
- (4) PIPE OPENINGS WILL NOT BE PERMITTED THROUGH JOINTS. DISTANCE FROM TOP OR BOTTOM OF ANY SOLID RING SECTION SHALL BE A MINIMUM OF 3" FOR CAST PIPE OPENINGS AND A MINIMUM OF 6" FOR CORED OPENINGS FOR BASIN CONNECTIONS.
- (5) CONCRETE DESIGN MIX = 5,000 PSI (MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47). REBARS - F_s = 60,000 PSI. WWM - F_s = 65,000 PSI.
- (6) OPENINGS FOR SPACING AND HANDLING WILL BE ALLOWED IN UPPER PORTION OF SOLID RING. HOWEVER, THE CONTRACTOR SHALL FILL ALL SUCH OPENINGS WITH NONSHRINK GROUT IMMEDIATELY AFTER INSTALLATION.
- (7) IN NO CASE SHALL THE AREA OF THE DRAIN OPENING BE LESS THAN 3.0 SQ. IN.

B_s	A_s				
	D = 4'-0" O.D.	D = 6'-0" O.D.	D = 8'-0" O.D.	D = 10'-0" O.D.	D = 12'-0" O.D.
2'-0"	0.058 CIR.	0.068 CIR.	0.080 CIR.	0.093 CIR.	0.108 CIR.
3'-0"	BY	BY	BY	BY	BY
5'-0"	0.029 LONG.	0.034 LONG.	0.040 LONG.	0.047 LONG.	0.054 LONG.

REVISED DECEMBER 2017: P. LEUNG
W. PATALANO/P. MOY

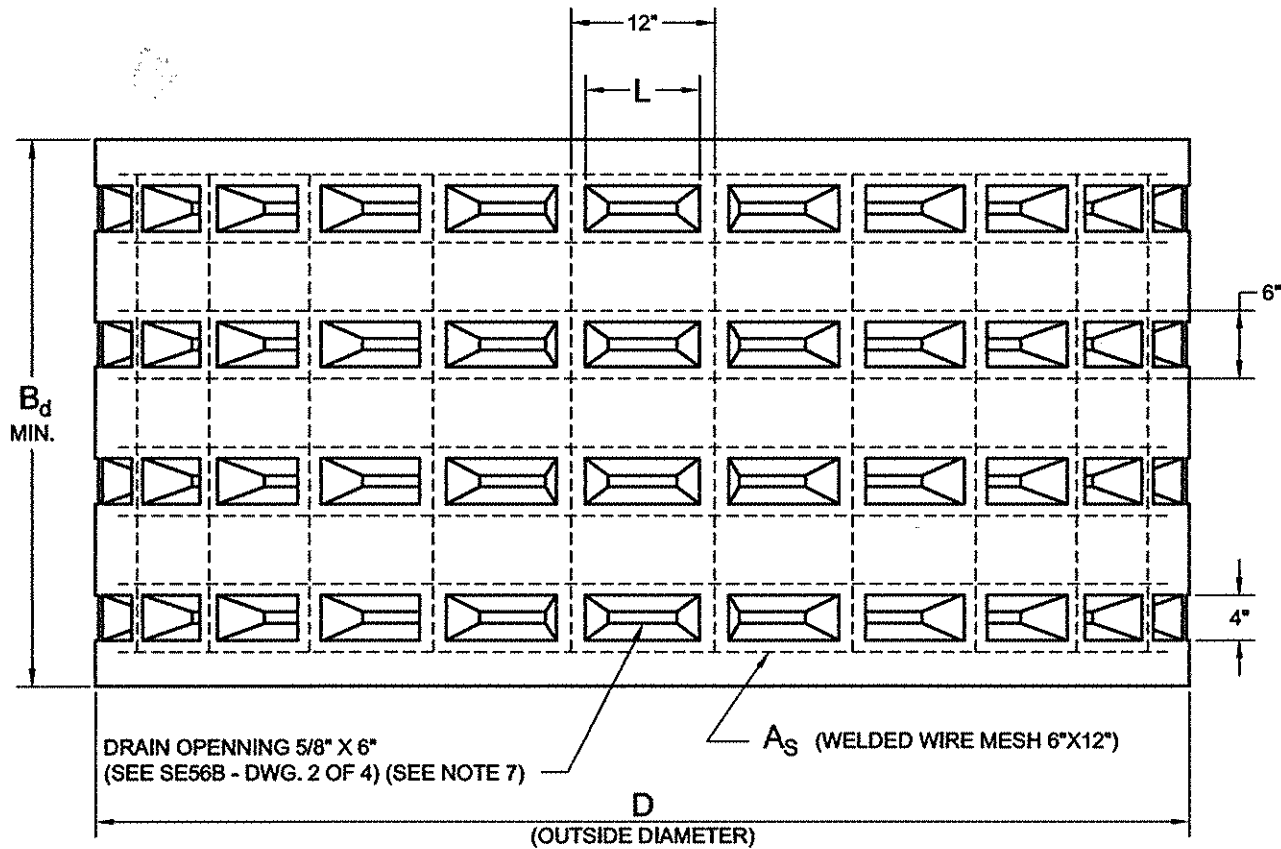
Chandip S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
P.E.

8/14/18
DATE

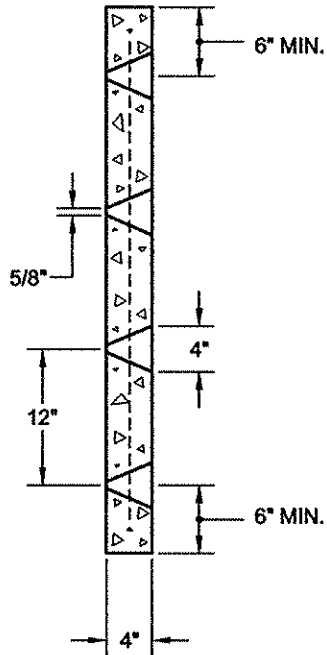
Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
P.E.

8/14/18
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR PRECAST SEEPAGE BASIN (DWG. 3 OF 4)
(PRECAST DRAINAGE RING)



ELEVATION



SECTION

B _d MIN.	MIN. INTERNAL VOL.		MIN. DRAIN OPENINGS		ROWS OF DRAIN OPENINGS PER SECTION	L MAX.	A _s
	CU. FT.	GALS.	TOTAL	PER ROW			
D = 4'-0" O.D.							
2'-0"	17.4	130	20	10	2	9"	0.058 CIR. BY 0.029 LONG.
3'-0"	26.1	195	30	10	3	9"	
4'-0"	34.9	261	40	10	4	9"	
5'-0"	43.6	326	50	10	5	9"	
6'-0"	52.3	391	60	10	6	9"	
D = 6'-0" O.D.							
2'-0"	44.6	333	32	16	2	10"	0.068 CIR. BY 0.034 LONG.
3'-0"	67.0	501	48	16	3	10"	
4'-0"	89.3	667	64	16	4	10"	
5'-0"	111.7	835	80	16	5	10"	
6'-0"	134.0	1002	96	16	6	10"	
D = 8'-0" O.D.							
2'-0"	84.4	631	46	23	2	10"	0.080 CIR. BY 0.040 LONG.
3'-0"	126.7	947	69	23	3	10'	
4'-0"	168.9	1263	92	23	4	10"	
5'-0"	211	1579	115	23	5	10"	
6'-0"	253	1895	138	23	6	10"	
D = 10'-0" O.D.							
2'-0"	136.8	1023	58	29	2	10"	0.093 CIR. BY 0.047 LONG.
3'-0"	205.2	1535	87	29	3	10"	
4'-0"	273.6	2047	116	29	4	10"	
5'-0"	342.0	2558	145	29	5	10"	
6'-0"	410.5	3070	174	29	6	10"	
D = 12'-0" O.D.							
2'-0"	201.7	1509	70	35	2	10"	0.108 CIR. BY 0.054 LONG.
3'-0"	302.6	2263	105	35	3	10"	
4'-0"	403.5	3018	140	35	4	10'	
5'-0"	504.4	3773	175	35	5	10"	
6'-0"	605.2	4527	210	35	6	10"	

REVISED DECEMBER 2017: P. LEUNG
W. PATALANO/P. MOY

Sandeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

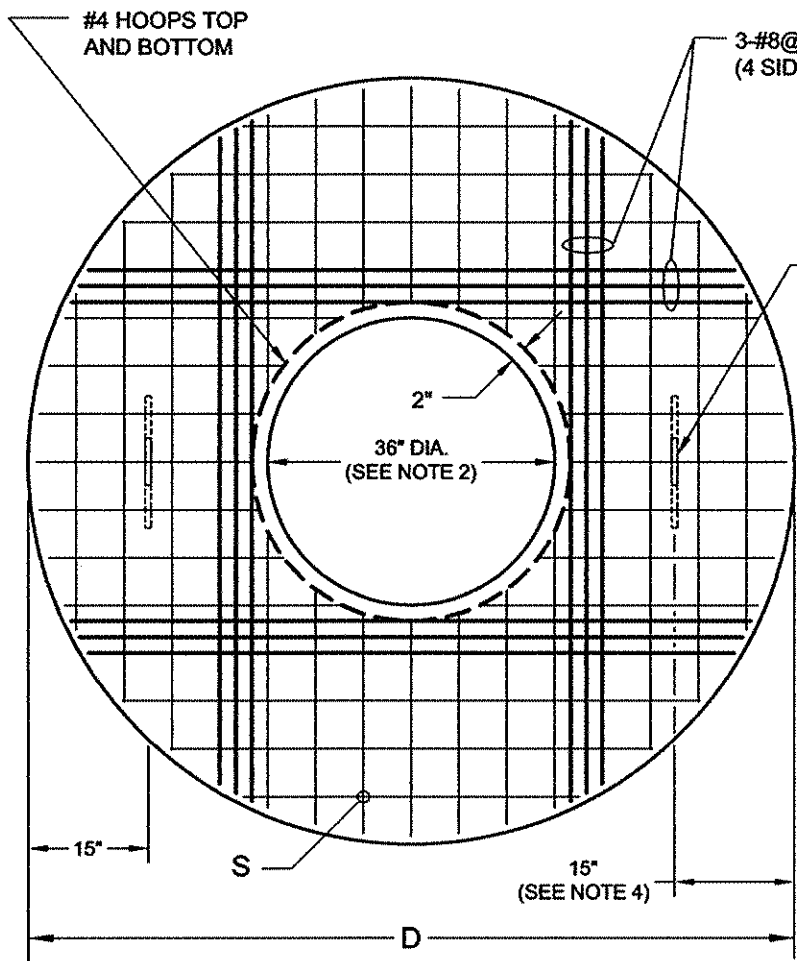
8/14/18
DATE

Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

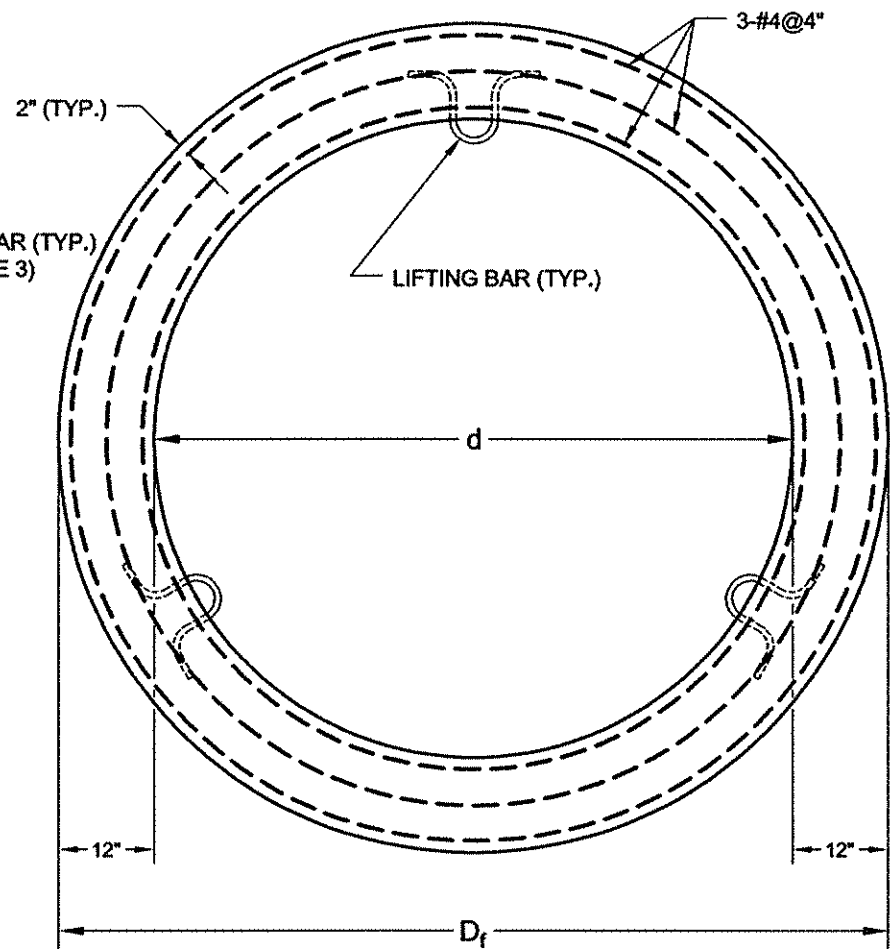
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DATE

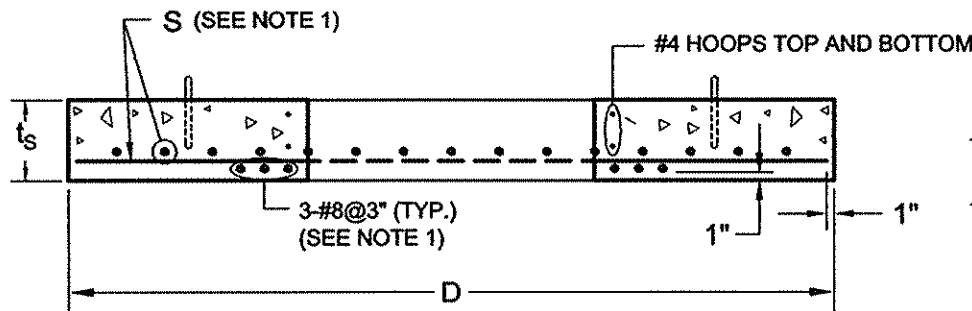
STANDARD FOR PRECAST SEEPAGE BASIN (DWG. 4 OF 4)
(CIRCULAR REINFORCED CONCRETE SLAB AND FOOTING)



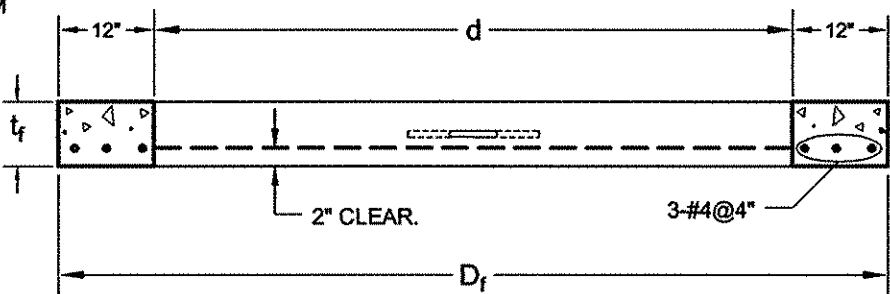
PLAN OF CIRCULAR SLAB



PLAN OF CIRCULAR FOOTING



SECTION OF CIRCULAR SLAB

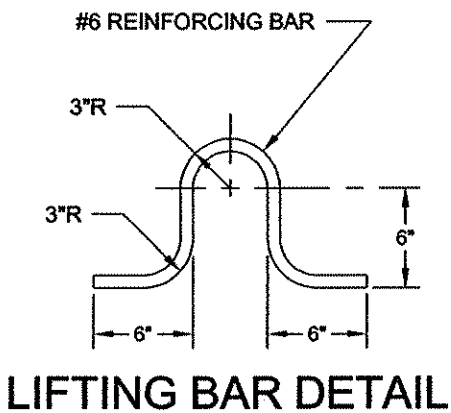


SECTION OF CIRCULAR FOOTING

CIRCULAR SLAB		
D	S	t _S MIN.
4'-0"	SEE NOTE 1	8"
6'-0"	#4@6"	10"
8'-0"	#5@6"	10"
10'-0"	#6@6"	12"
12'-0"	#6@4"	12"

CIRCULAR FOOTING		
D _f MAX.	d MAX.	t _f MIN.
4'-4"	2'-4"	6"
6'-4"	4'-4"	8"
8'-4"	6'-4"	8"
10'-4"	8'-4"	8"
12'-4"	10'-4"	8"

* IN NO CASE SHALL "D_f" BE LESS THAN THE OUTSIDE DIAMETER OF THE DRAINAGE RING.



LIFTING BAR DETAIL

NOTES:

- (1) FOR 4'-0" DIA. CIRCULAR SLAB, THE REINFORCEMENT SHALL BE 3-#4 HOOPS @3" PLACED 2" CLEAR FROM THE BOTTOM. IN ADDITION #4 HOOPS TOP AND BOTTOM SHALL BE PLACED AROUND 27" OPENING.
- (2) OPENING FOR 4'-0" DIA. CIRCULAR SLAB SHALL BE 27" DIAMETER.
- (3) THREE (3) LIFTING BARS IN THE 4'-0" DIA. CIRCULAR SLAB SHALL BE PLACED IN THE MANNER SHOWN ON THE PLAN AND SECTION VIEWS OF CIRCULAR FOOTING.
- (4) LIFTING BARS IN THE 6'-0" DIA. CIRCULAR SLAB SHALL BE PLACED AT A DISTANCE OF 10" FROM THE EDGE OF THE CIRCULAR SLAB.

REVISED DECEMBER 2017: P. LEUNG
W. PATALANO/P. MOY

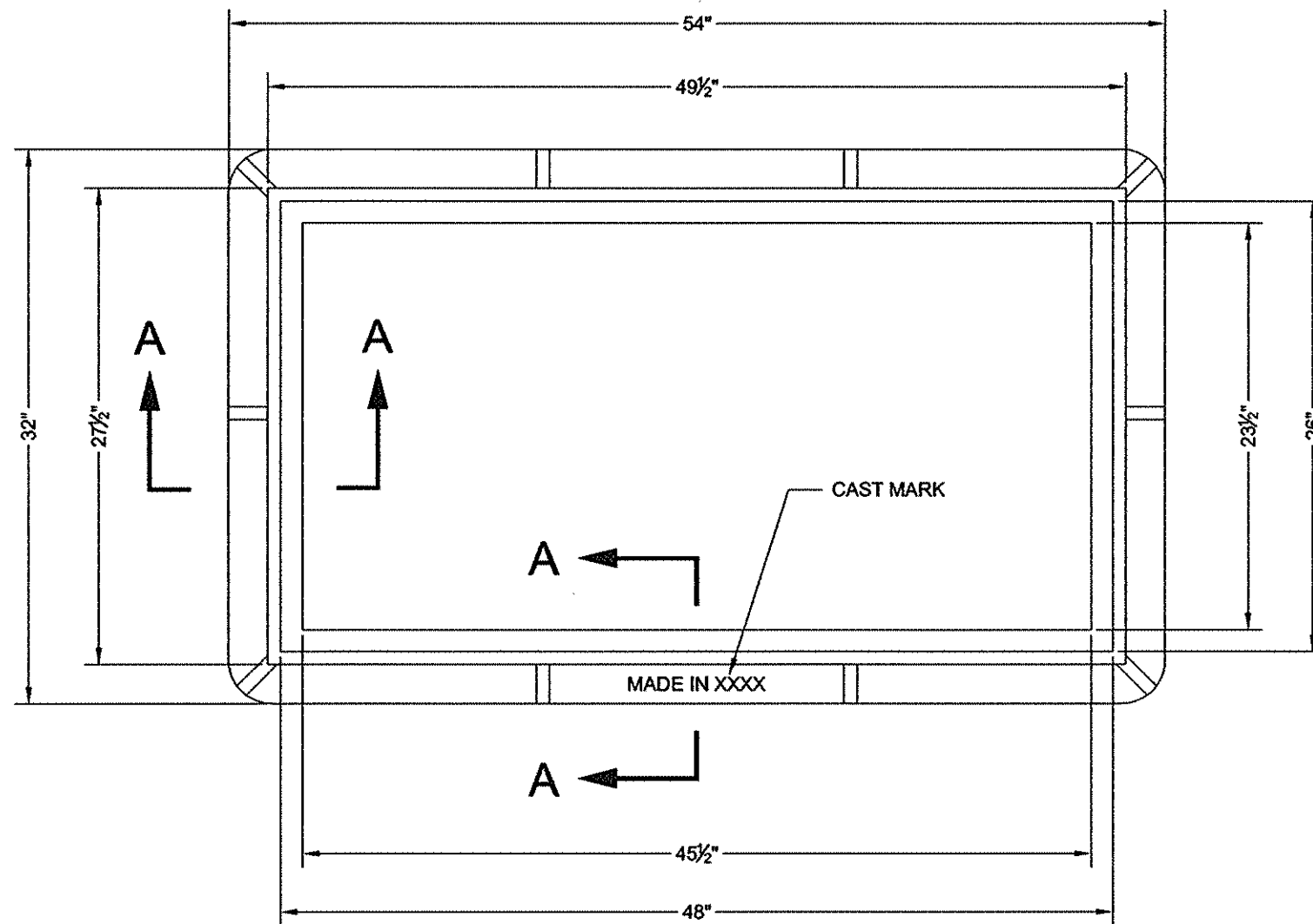
Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18
DATE

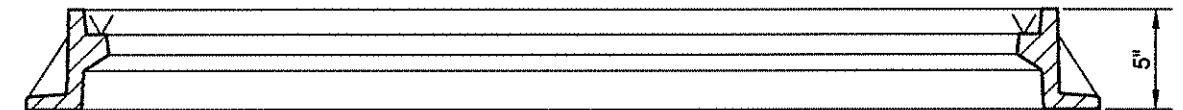
Thomas Wyne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18
DATE

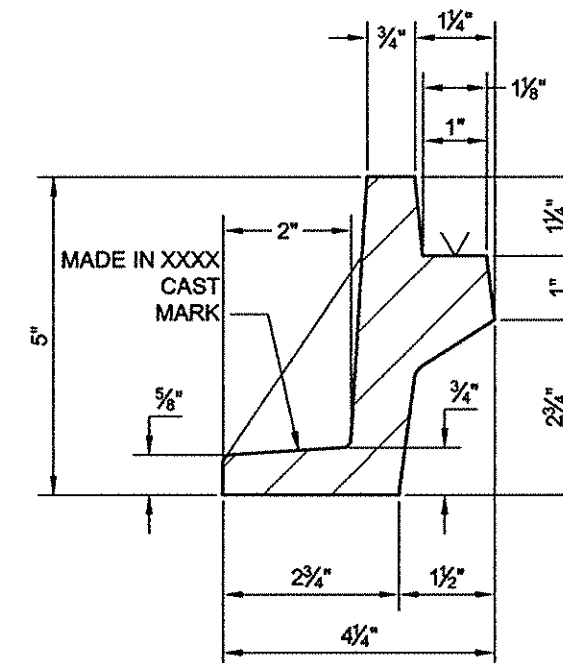
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR CAST IRON FRAME FOR CATCH BASINS
(WITHOUT CURB PIECE)



PLAN



SECTION



SECTION A-A

NOTES:

- (1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF FRAME IS 275 LBS.
- (2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
- (3) ALL FRAMES SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wynne

P.E.

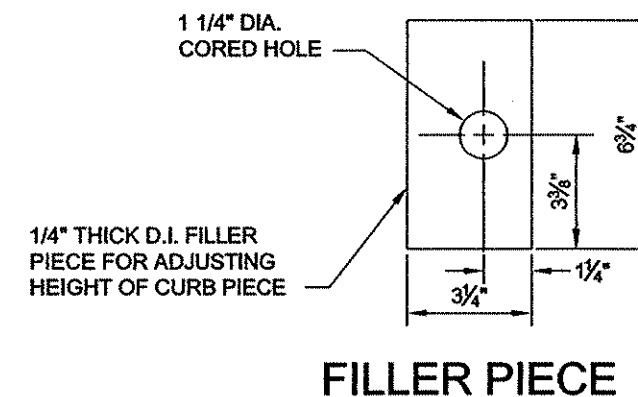
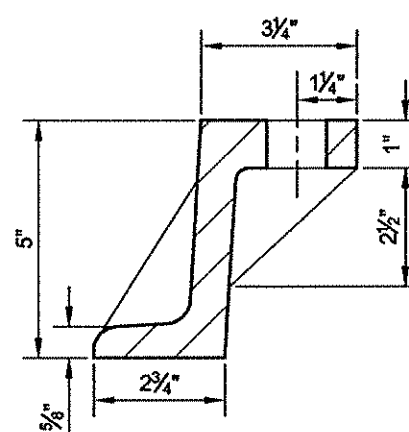
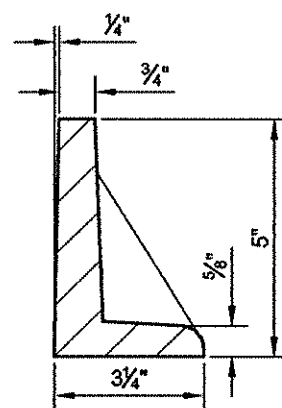
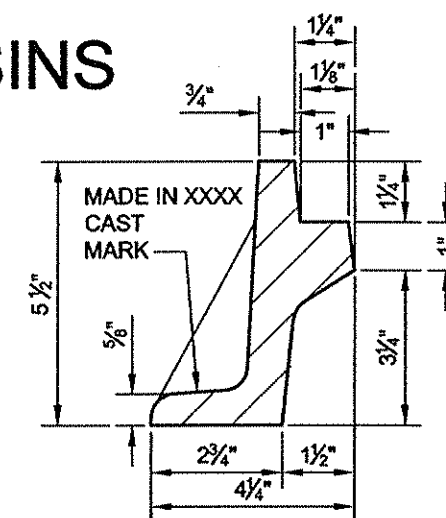
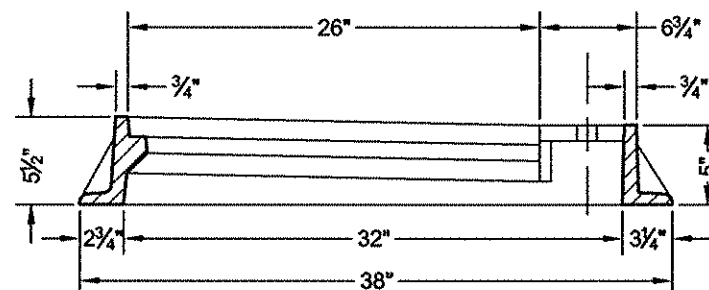
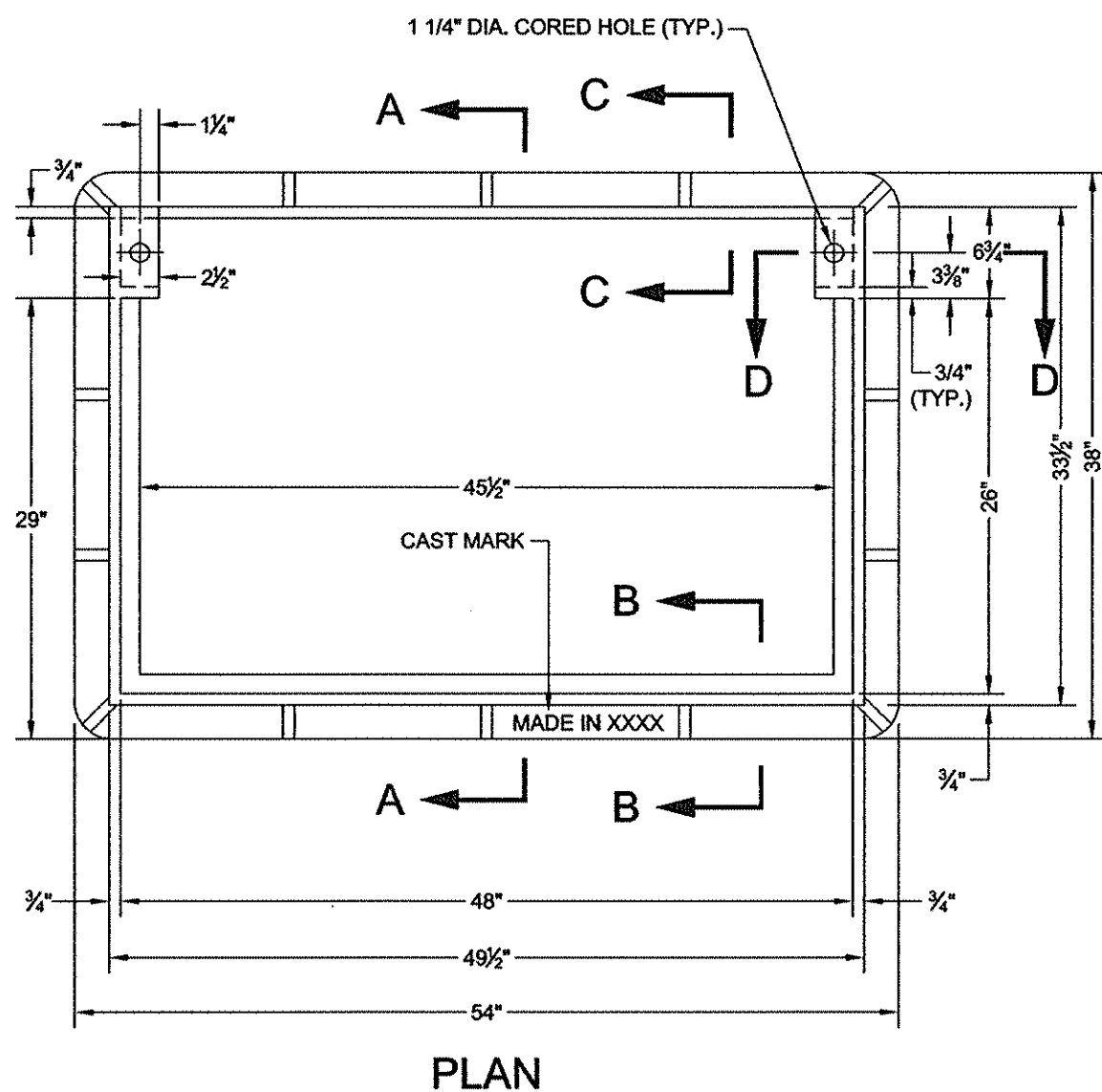
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR CAST IRON FRAME FOR TYPE 3 CATCH BASINS (WITH CURB PIECE)



NOTES:

- (1) MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF FRAME IS 360 LBS.
- (2) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
- (3) TWO (2) - 3/4" DIA. CARBON STEEL BOLTS ASTM 307 GRADE - 3 1/2" LONG WITH HEXAGONAL HEAD AND NUT WITH TWO (2) FLAT WASHERS PER BOLT TO BE FURNISHED WITH EACH FRAME TOGETHER WITH 6" CURB PIECE OR 8" CURB PIECE. LONGER BOLTS TO BE FURNISHED FOR CURB HEIGHTS GREATER THAN 6" WHERE FILLER PIECES ARE USED.
- (4) ALL CATCH BASIN FRAMES SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

Gurdeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

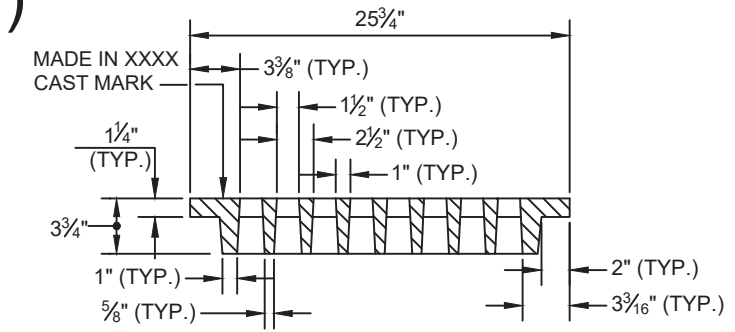
P.E.

8/14/18
DATE

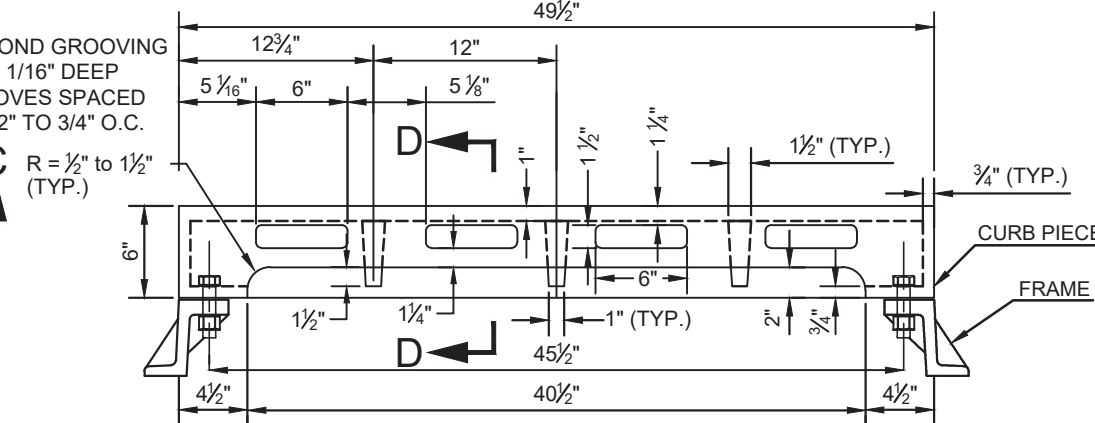
Thomas W. Byrne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

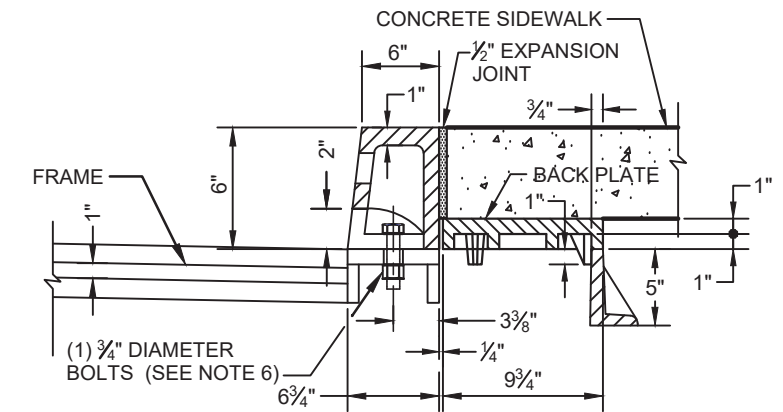
8/14/18
DATE



SECTION B-B



SECTION C-C ELEVATION OF CURB PIECE

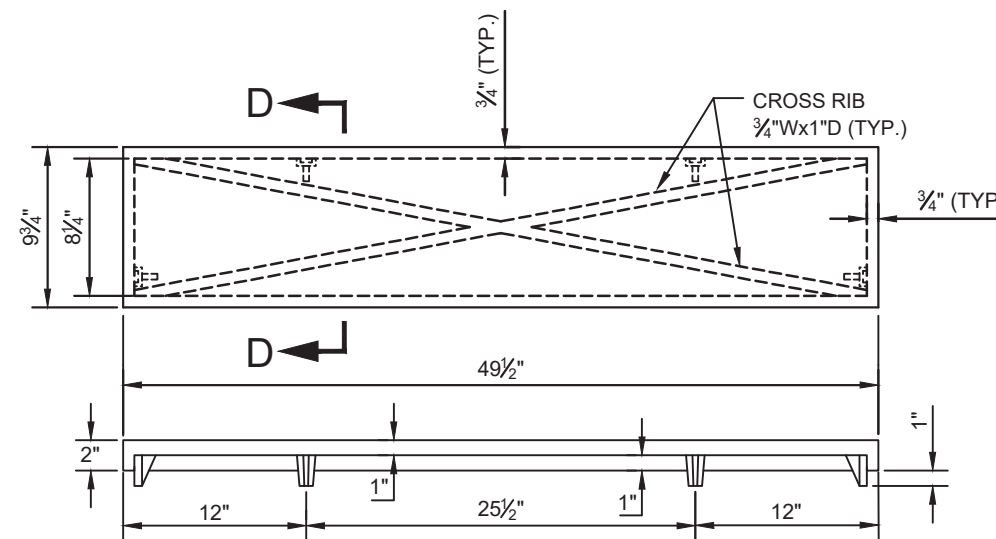


SECTION D-D

- (1) GRATING MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT OF TYPE R GRATING IS 425 LBS.
- (2) CURB PIECE MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT OF 6" IS 163 LBS.
MINIMUM WEIGHT OF 8" IS 210 LBS.
- (3) BACK PLATE MATERIAL: GRAY CAST IRON ASTM A-48 CLASS 35B.
MINIMUM WEIGHT IS 165 LBS.
- (4) DESIGN LOADING: HS20-44 HIGHWAY LOADING.
- (5) ALL CATCH BASIN FRAMES AND GRATES MUST HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.
- (6) TWO (2) - 3/4" DIA. CARBON STEEL BOLTS ASTM 307 GRADE - 3 1/2" LONG WITH HEXAGONAL HEAD AND NUT WITH TWO (2) FLAT WASHERS PER BOLT TO BE FURNISHED WITH EACH FRAME TOGETHER WITH 6" CURB PIECE OR 8" CURB PIECE. LONGER BOLTS TO BE FURNISHED FOR CURB HEIGHTS GREATER THAN 6" WHERE FILLER PIECES ARE USED.

THE FOLLOWING INFORMATION MUST BE INCLUDED ON THE TOP SIDE OF THE BACK PLATE:

- * NAME OF PRODUCING FOUNDRY
- * DATE OF MANUFACTURE
- * PRODUCT NUMBER
- * CAST IRON ASTM A-48



BACK PLATE

Michael S. Farnan, P.E. Digitally signed by Michael S. Farnan, P.E.
Date: 2023.03.22 16:44:13 -04'00'
P.E.

EXECUTIVE DIRECTOR OF OPERATIONS	DATE
DEPARTMENT OF ENVIRONMENTAL PROTECTION	

The drawing consists of two views of a grating piece:

- Top View (PLAN OF GRATING (TYPE R)):** Shows a rectangular grid of 8 rows and 12 columns of rounded rectangular openings. Dimensions include a width of 49 1/2" and a height of 6 3/4". Labels include "MADE IN XXXX" and "CAST MARK".
- Side View:** Shows the profile of the grating with a height of 6". It features a central area with a "TROUT LOGO" and the text "DUMP NO WASTE! DRAINS TO WATERWAYS". The text is labeled as "1" RAISED LETTERING (RECESSED FLUSH)". Other labels include "CAST MARK" and "DRAINAGE WITH GROOVE AT 1/2\"".

THE FOLLOWING INFORMATION MUST BE INCLUDED ON THE TOP SIDE OF THE CURB PIECE:

- * NAME OF PRODUCING FOUNDRY

PLAN OF CURB PIECE

THE FOLLOWING INFORMATION MUST BE INCLUDED ON THE TOP SIDE OF THE BACK PLATE:

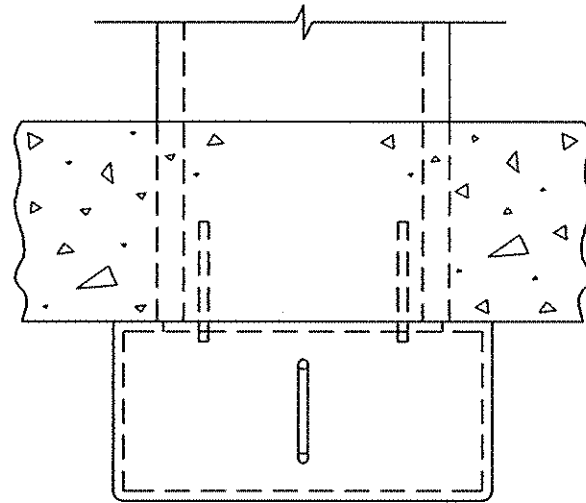
- * NAME OF PRODUCING FOUNDRY
- * DATE OF MANUFACTURE
- * PRODUCT NUMBER
- * CAST IRON ASTM A-48

Michael S. Farnan, P.E. Digitally signed by Michael S. Farnan,
P.E.
Date: 2023.03.22 17:16:35 -04'00'

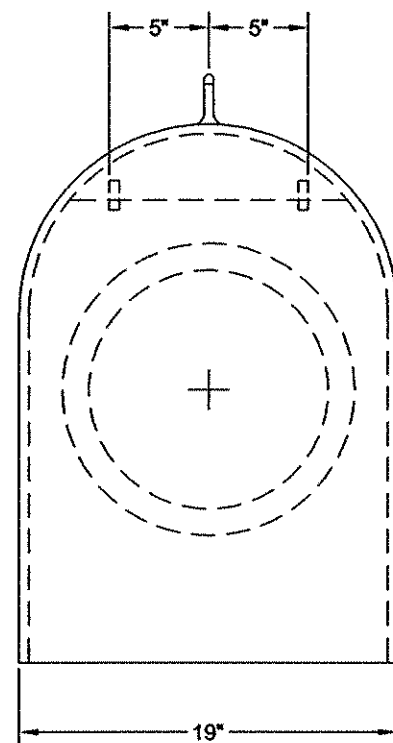
EXECUTIVE DIRECTOR OF OPERATIONS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE

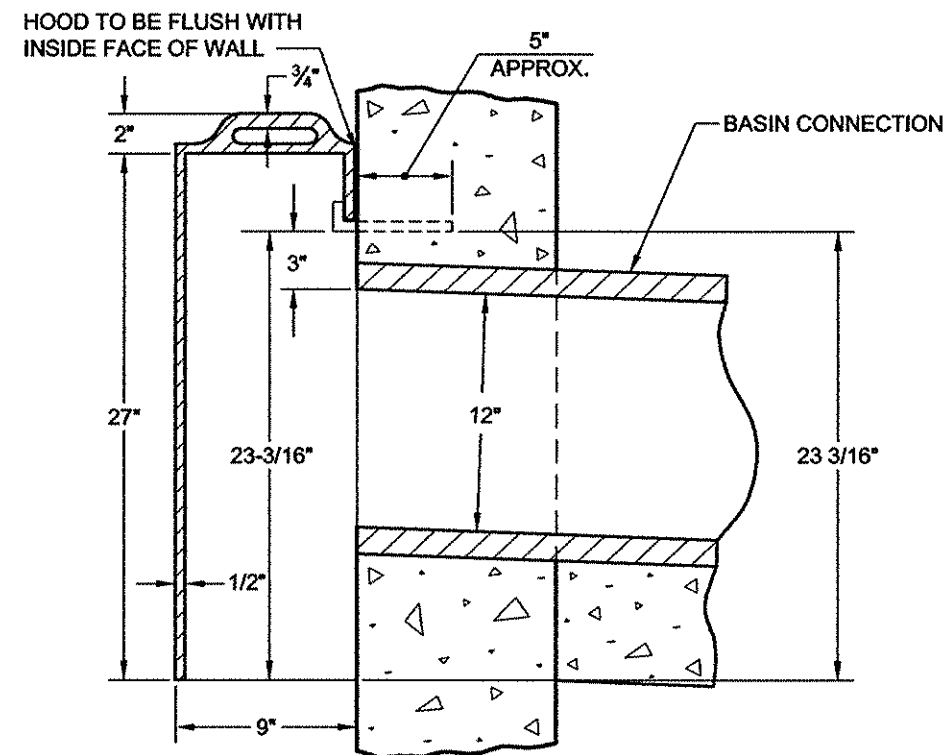
STANDARD FOR CAST IRON HOOD AND HOOKS FOR CATCH BASINS



PLAN OF HOOD
IN PLACE



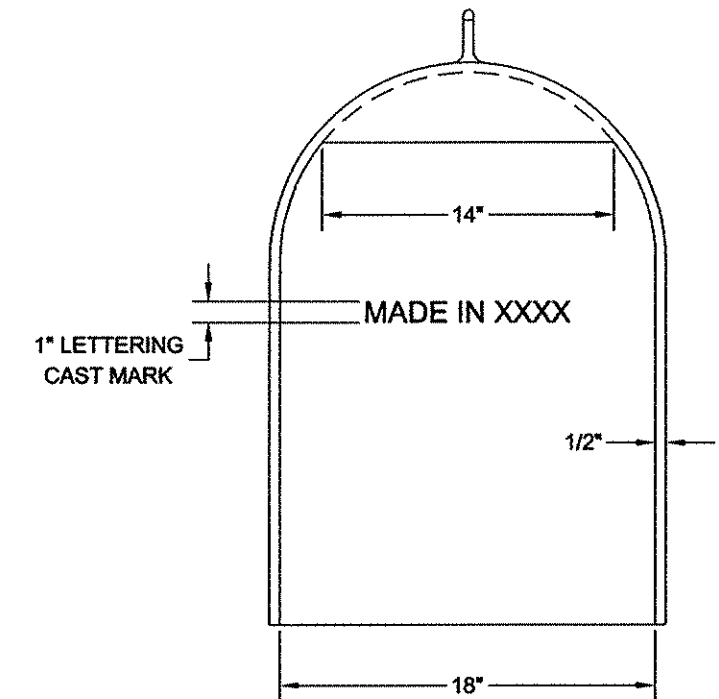
REAR ELEVATION
OF HOOD IN PLACE



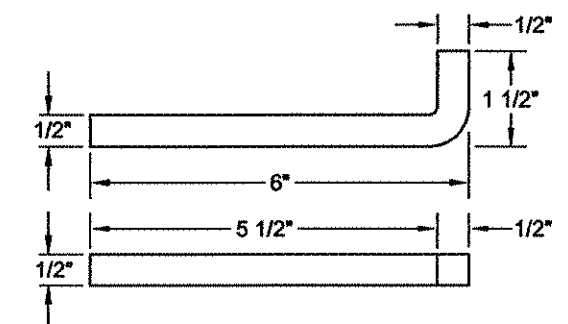
SECTION OF HOOD
IN PLACE

NOTES:

- (1) MATERIAL FOR HOOD: GRAY CAST IRON ASTM A-48 CLASS 35B. MINIMUM WEIGHT OF HOOD IS 140 LBS.
- (2) MATERIAL FOR HOOK: 18-8 STAINLESS STEEL 1/2" SQUARE BAR STOCK TYPE 303 ASTM A-582.
- (3) ALL CATCH BASIN HOODS SHALL HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.



FRONT ELEVATION
OF HOOD



HOOK DETAIL
(2 REQUIRED)

Gundeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

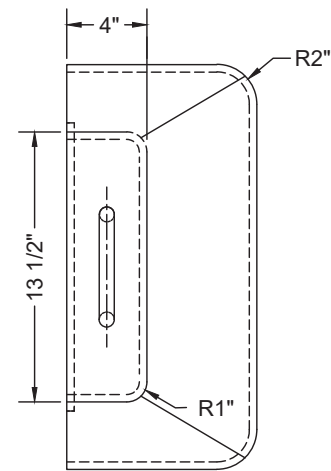
8/14/18
DATE

Thomas Wynne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

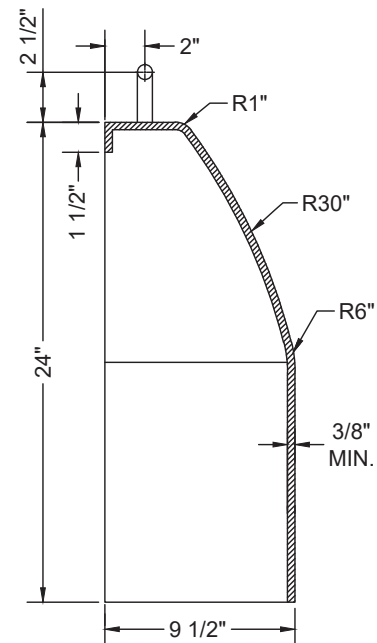
P.E.

8/14/18
DATE

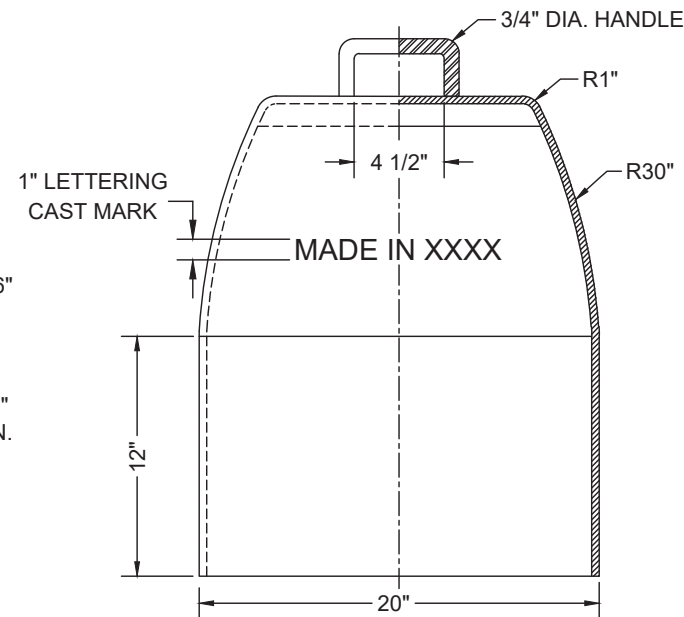
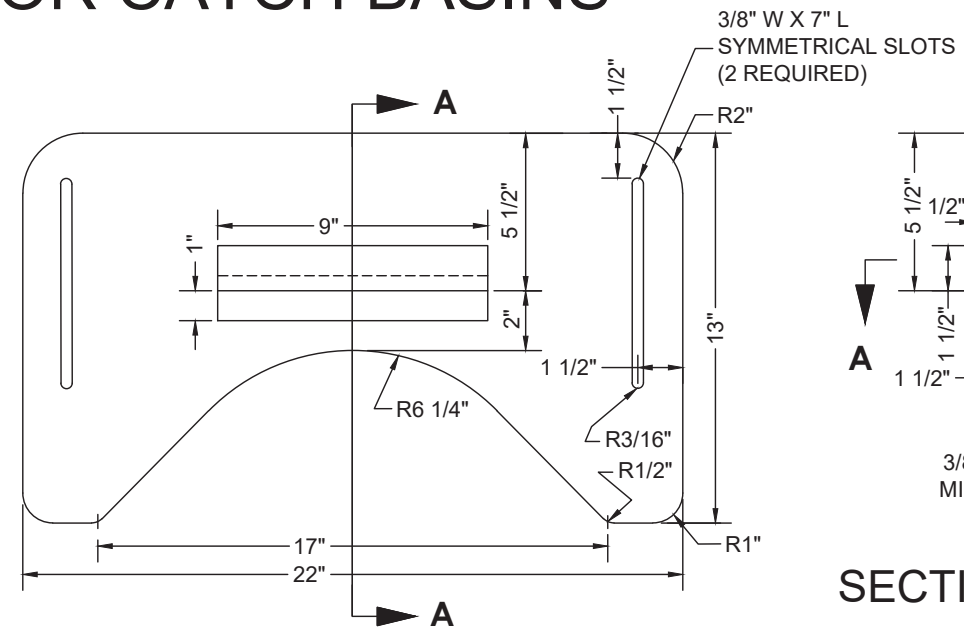
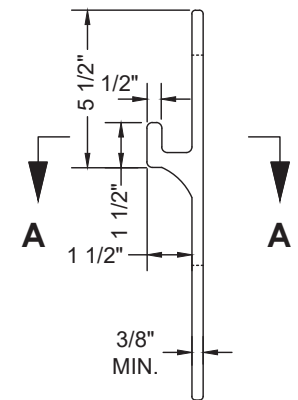
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
**STANDARD FOR ALUMINUM
HOOD AND HOOD HANGER FOR CATCH BASINS**



PLAN OF HOOD



SECTION OF HOOD

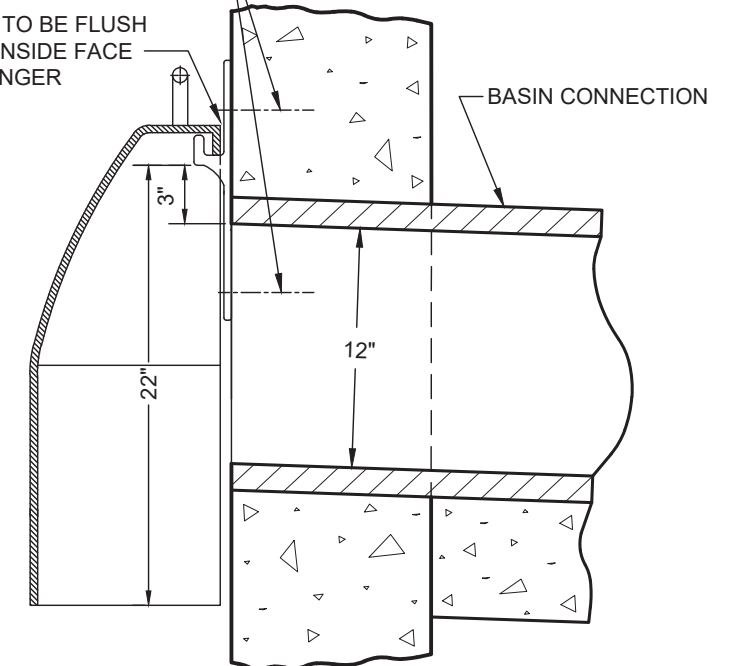
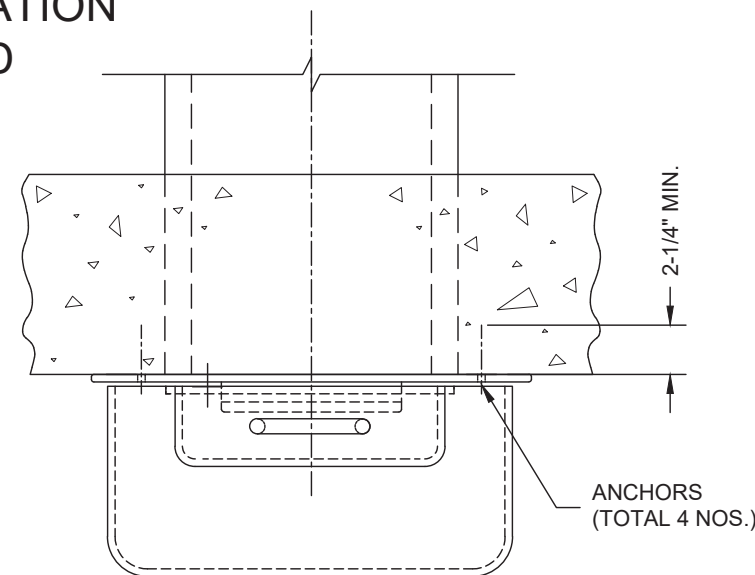
FRONT ELEVATION
OF HOODFRONT OF HOOD
HANGER

SECTION A - A

ANCHORS (TOTAL 4 NOS.)
(STAINLESS STEEL GRADE 316
MIN. 1/4" DIA., 2-1/4" EMBEDMENT)

HOOD TO BE FLUSH
WITH INSIDE FACE
OF HANGER

BASIN CONNECTION

SECTION OF HOOD
IN PLACEPLAN OF HOOD
IN PLACE**NOTES:**

- (1) MATERIAL FOR HOOD: ALUMINUM ASTM B26, MARINE GRADE, WITH A MINIMUM TENSILE STRENGTH OF 22 KSI. MINIMUM WEIGHT OF HOOD IS 35 LBS.
- (2) MATERIAL FOR HOOD HANGER: ALUMINUM ASTM B26, MARINE GRADE, WITH A MINIMUM TENSILE STRENGTH OF 22 KSI. MINIMUM WEIGHT OF HOOD HANGER IS 10 LBS.
- (3) COATING FOR HOOD AND HOOD HANGER: POLYESTER POWDER COATING, COLORED "OSHA SAFETY YELLOW". MINIMUM DRY FILM THICKNESS OF HOOD COATING AND HOOD HANGER COATING IS 6 MILS.
- (4) ALL CATCH BASIN HOODS MUST HAVE THE MANUFACTURER'S IDENTIFICATION, CAST DATE OR HEAT NUMBER, AND COUNTRY OF ORIGIN INTEGRALLY CAST ON INDIVIDUAL PIECES AT THE TIME OF MANUFACTURE IN ACCORDANCE WITH THE DEP SPECIFICATION.

How Sheen Pau, P.E.
Digitally signed by How Sheen Pau, P.E.
Date: 2025.09.22 10:01:23 -04'00'

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

09/22/2025

DATE

Jerry Fragias, PE

Digitally signed by Jerry Fragias, PE
Date: 2025.09.18 17:41:25 -04'00'

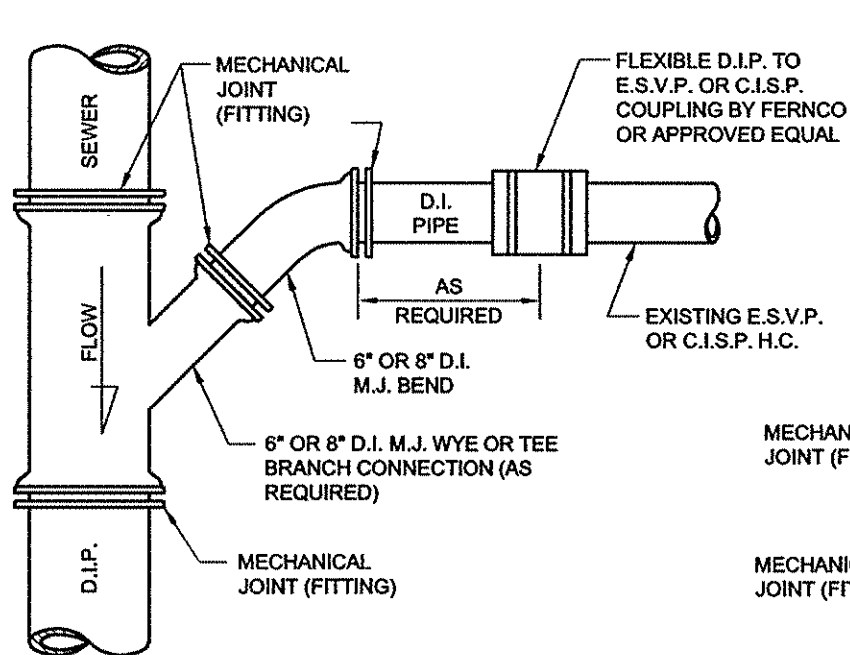
ASSISTANT COMMISSIONER, OPERATIONS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

09/18/2025

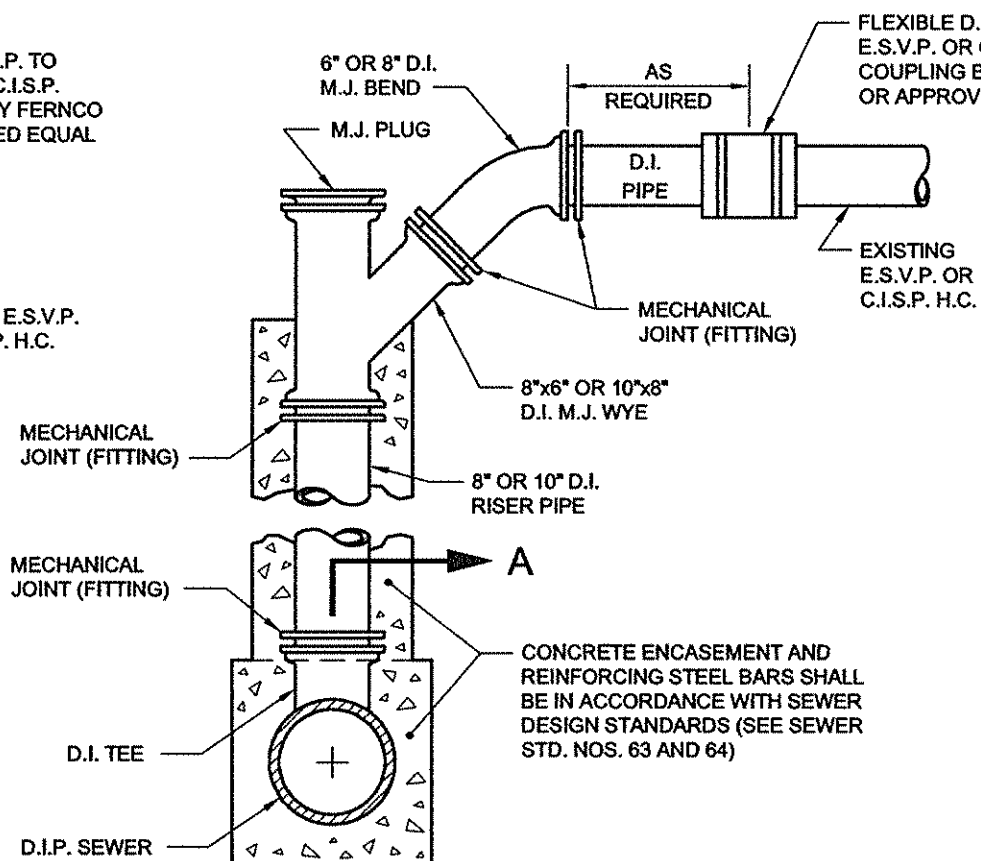
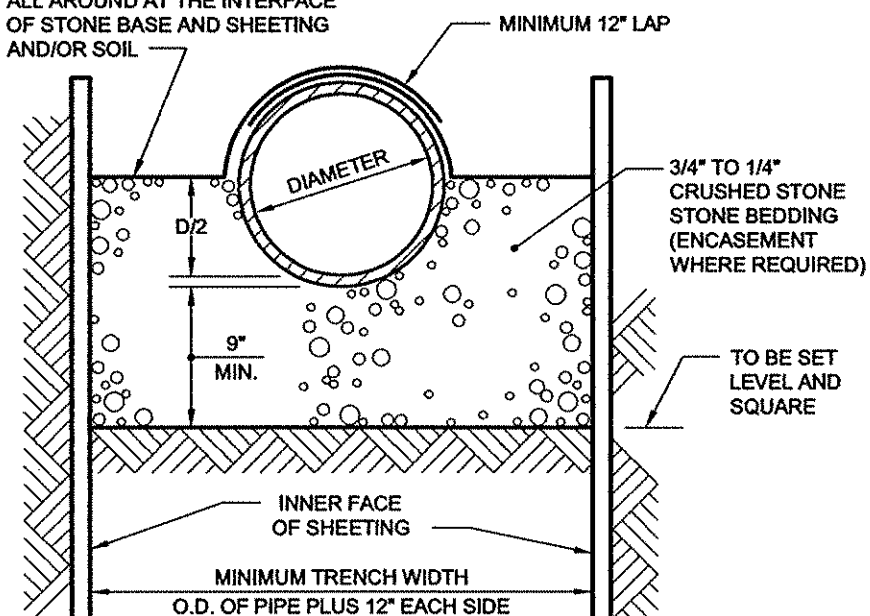
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STANDARD FOR DUCTILE IRON PIPE ALTERNATE



PLAN
TYPICAL HOUSE CONNECTION
(D.I.P.) OFF D.I.P. SEWER

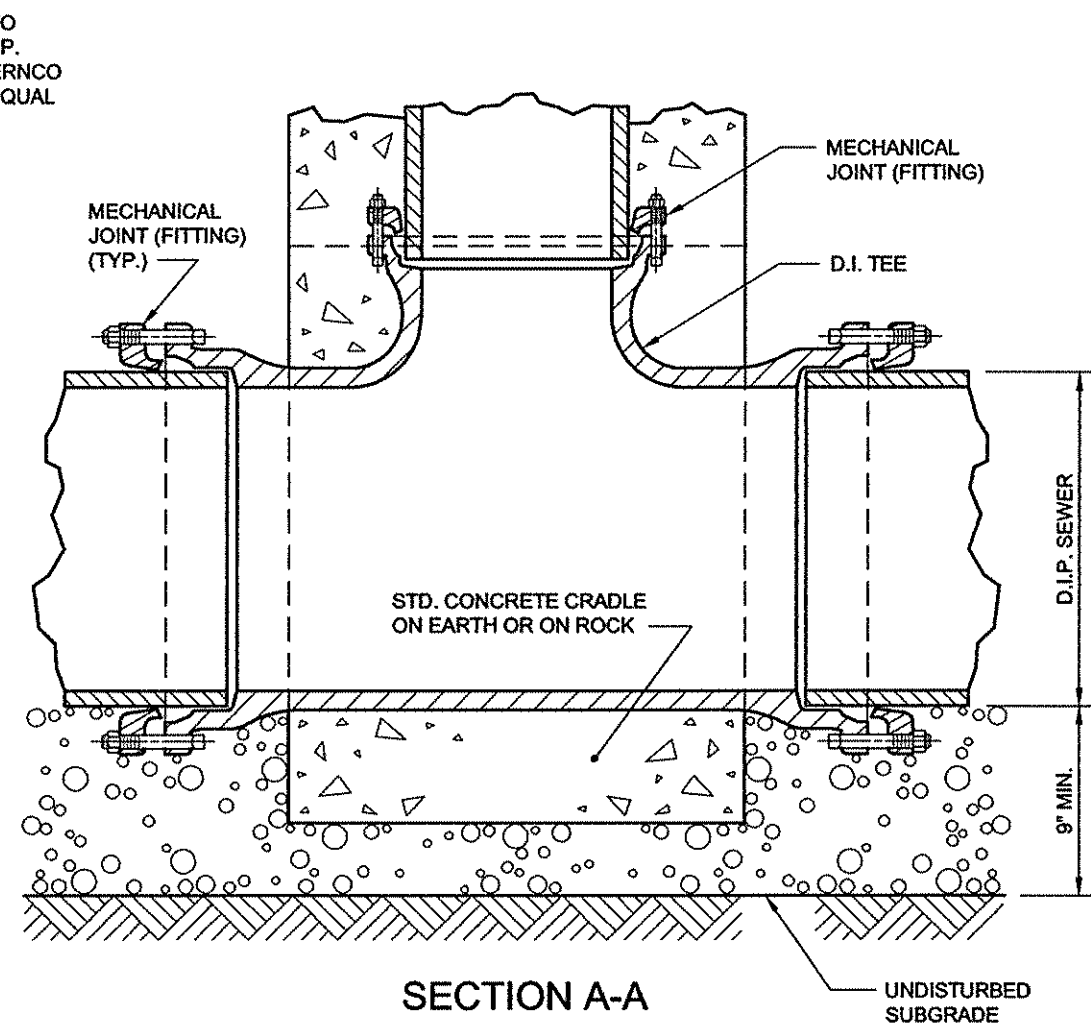
FILTER FABRIC, MIRAFI 140 OR
APPROVED EQUAL, TO BE PLACED
ALL AROUND AT THE INTERFACE
OF STONE BASE AND SHEETING
AND/OR SOIL



TYPICAL D.I.P. RISER FOR HOUSE
CONNECTION OFF D.I.P. SEWER

NOTES:

- (1) THIS ALTERNATE WILL BE PERMITTED ONLY WHEN SO STATED IN THE SPECIFICATIONS.
- (2) MATERIAL: THE DUCTILE IRON PIPE SHALL BE 60-42-10 GRADE AND CLASS 56, UNLESS OTHERWISE SPECIFIED. THE DUCTILE IRON PIPE SHALL BE LINED WITH CERAMIC EPOXY.
- (3) JOINTS: (A) ALL JOINTS FOR DUCTILE IRON PIPE SEWERS SHALL BE "PUSH-ON" JOINT TYPE, EXCEPT AS NOTED ABOVE FOR SPUR AND RISER PIPE WHICH SHALL BE MECHANICAL JOINT TYPE, MEETING THE REQUIREMENTS OF ANSI STANDARD A.21.11, LATEST REVISION.
(B) JOINTS SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR ASSEMBLING THE TYPE OF JOINT FURNISHED.
(C) FITTINGS SHALL BE DUCTILE IRON OR GRAY IRON (250 PSI) MECHANICAL JOINTS IN ACCORDANCE WITH THE LATEST REVISIONS OF ANSI/AWWA C110/A21.10 AND ANSI/AWWA C111/A21.11.
- (4) LEVELING BLOCKS ARE NOT PERMITTED.



SECTION A-A

PIPE DIA.	
FOR E.S.V.P.	USE D.I.P.
15"	16"

SUBSTITUTION
CHART

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wyne

P.E.

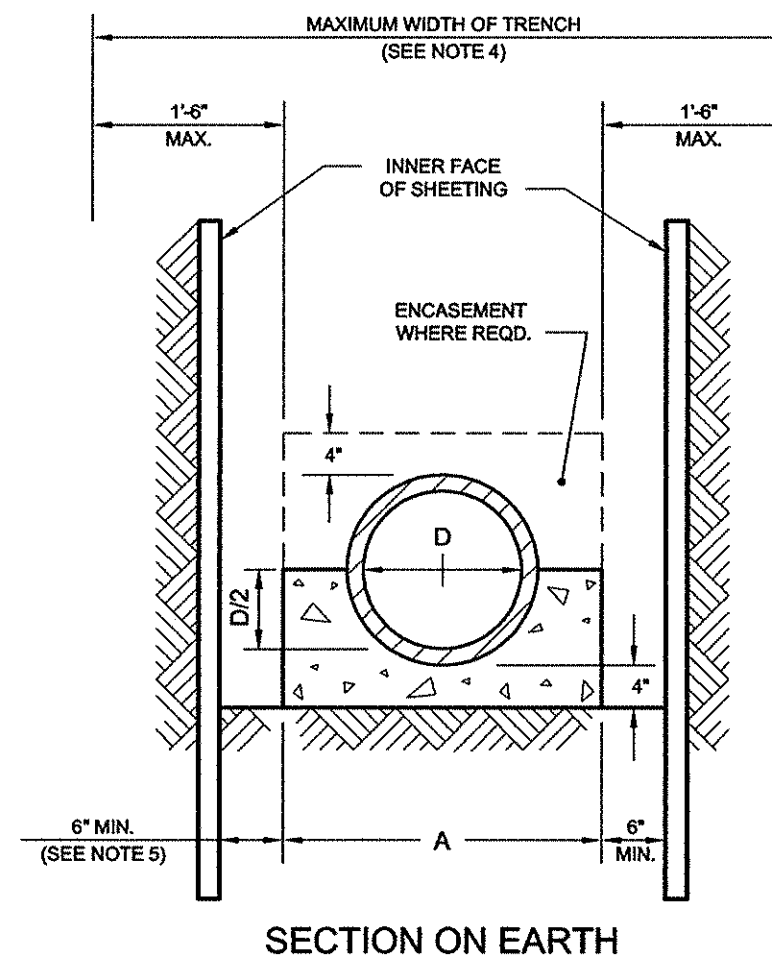
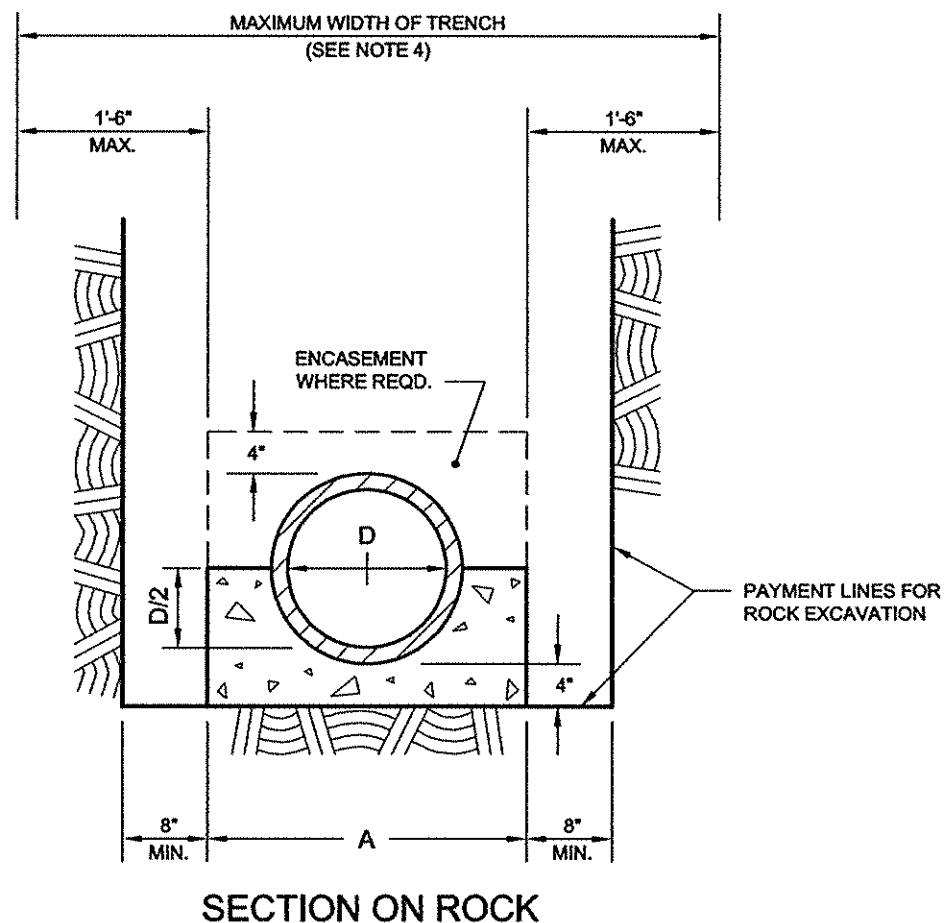
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

DATE

STANDARD FOR HOUSE CONNECTIONS

(FOR 6" AND 8" DIA. CAST IRON SOIL PIPE OR VITRIFIED CLAY PIPE
ON CONCRETE CRADLE OR ENCASED IN CONCRETE ON EARTH OR ON ROCK)

**NOTES:**

- (1) CRADLE AND ENCASEMENT ARE CLASS 40 CONCRETE FOR ALL HOUSE CONNECTIONS.
- (2) ENTIRE CRADLE OR ENCASEMENT IS TO BE PLACED MONOLITHICALLY.
- (3) ENCASEMENT REQUIRED ON H.C. PIPE WHICH HAS A COVER, FROM FINAL GRADE TO THE OUTER TOP OF THE PIPE, OF LESS THAN THREE (3) FEET OR WHEN THE UPPER LIMIT OF COVER IS EXCEEDED.
- (4) UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE MAXIMUM WIDTH OF TRENCH BETWEEN INNER FACES OF THE LOWEST STAGE OF SHEETING OR ROCK CUT LINES, FROM SUBGRADE OF TRENCH TO A MINIMUM HEIGHT OF TWO (2) FEET ABOVE THE OUTER TOP OF THE PIPE, SHALL NOT EXCEED THE WIDTH OF THE CRADLE BY MORE THAN THREE (3) FEET (1'-6" MAXIMUM EACH SIDE OF CRADLE).
- (5) SIX (6) INCH MINIMUM SHALL BE MAINTAINED AT ALL TIMES, EXCEPT WHERE SHEETING IS TO BE USED AS FORMWORK.

D	A	MAX. COVER WITHOUT ENCSMT.	CONC. CRADLE CU. YD./L.F.	CONC. ENCSMT. CU. YD./L.F.
6"	1'-4"	20'	0.0262	0.0523
8"	1'-6"	22'	0.0315	0.0630

Sandeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

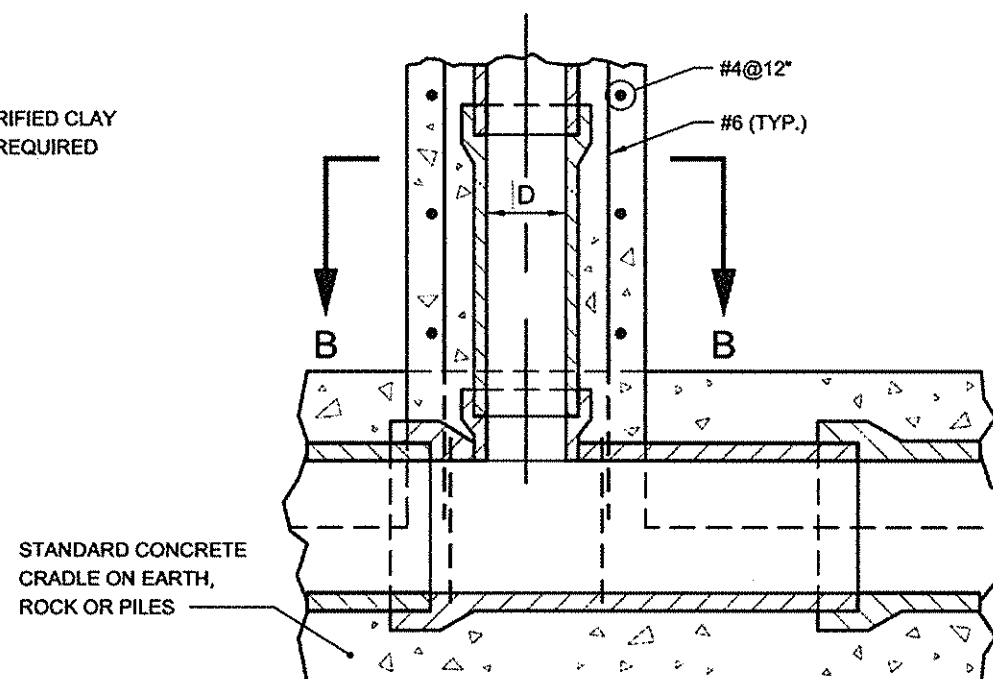
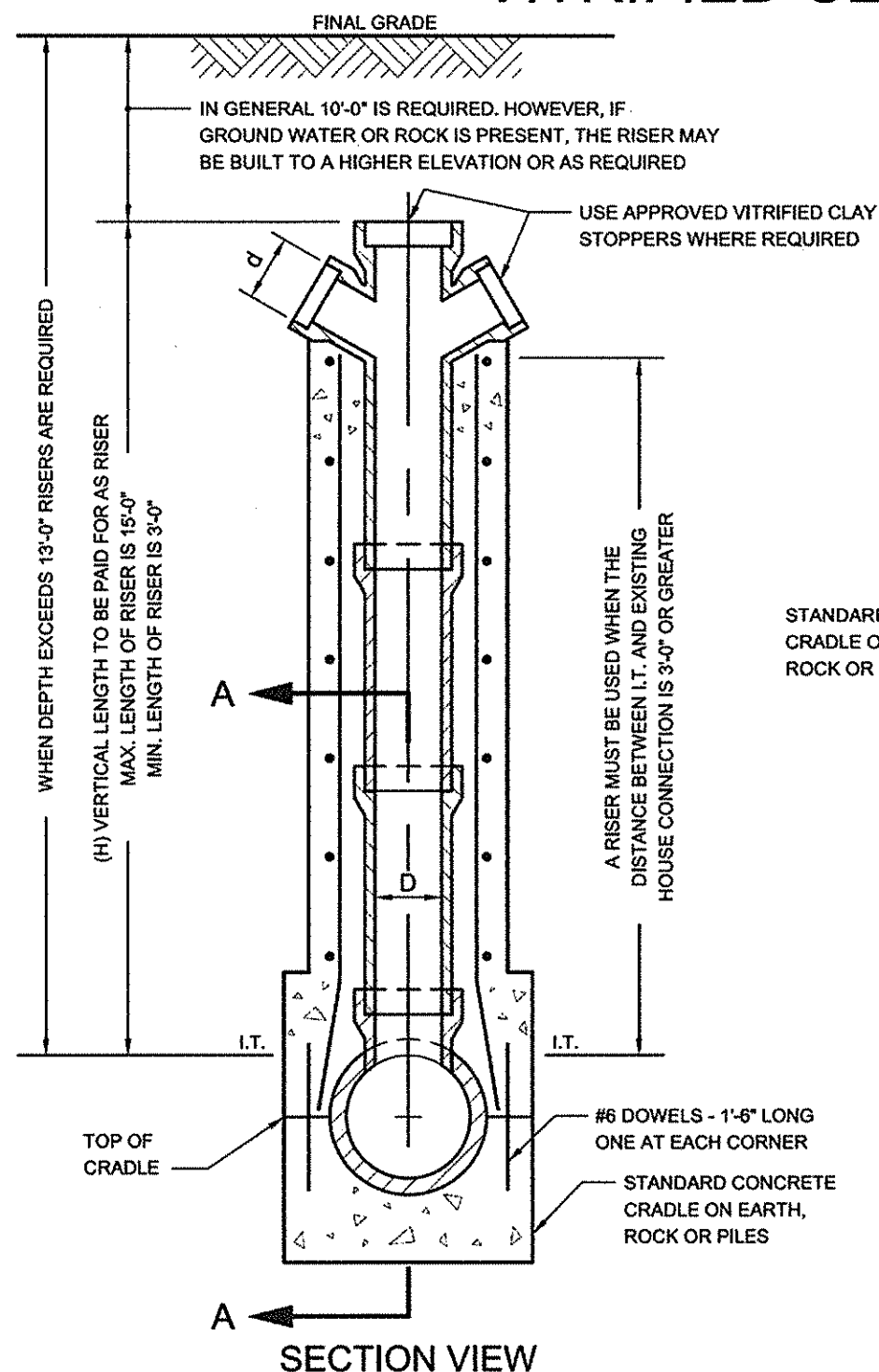
Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

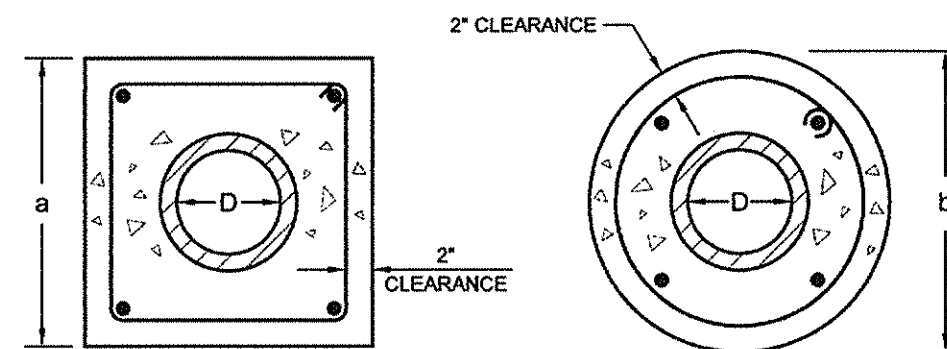
8/14/18
DATE

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR RISER ON 10" DIA. TO 18" DIA.
VITRIFIED CLAY PIPE SEWERS ON CONCRETE CRADLE



SECTION A-A



SQUARE

CIRCULAR

SHAPE OF ENCASEMENT TO BE OPTIONAL

SECTION B-B

NOTES:

- (1) ALL PIPES AND FITTINGS SHALL BE EXTRA STRENGTH FULL DIAMETER VITRIFIED CLAY.
- (2) THE COST OF ADDITIONAL CONCRETE, STEEL REINFORCEMENT BARS AND VITRIFIED CLAY RISER PIPE AND FITTINGS REQUIRED SHALL BE INCLUDED IN THE PRICE BID FOR RISERS.
- (3) KEYED CONSTRUCTION JOINTS ARE REQUIRED BETWEEN ANY SUCCESSIVE POURS.
- (4) USE STANDARD "Y" OR "DOUBLE Y" FITTING AS REQUIRED.
- (5) CONCRETE IS TO BE CLASS 40. REBARS-GRADE 60.

D	d	a	b
8"	6"	22"	23"
10"	8"	24"	25"

Gandep S. Saini

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18

DATE

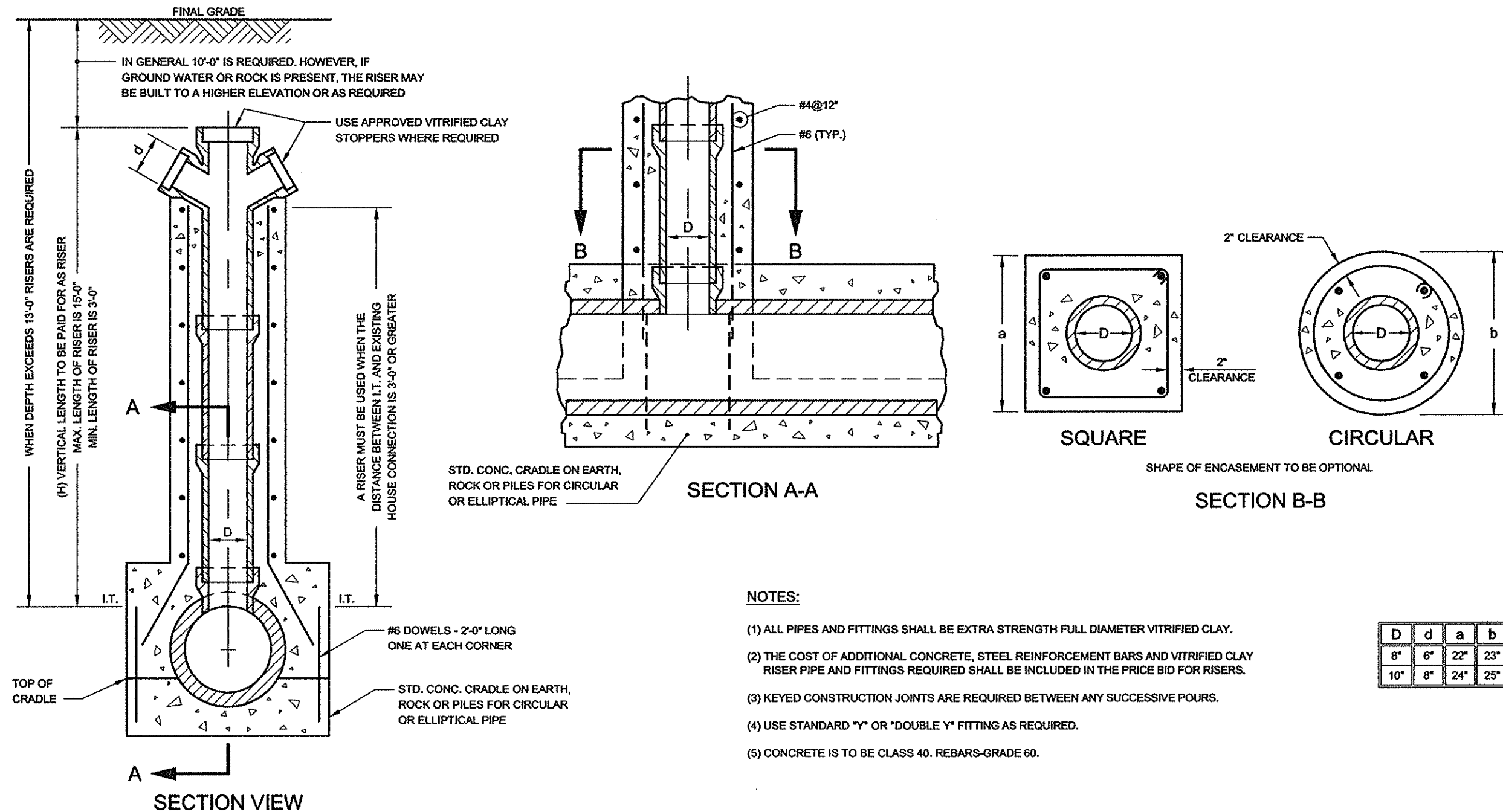
Thomas Wayne

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18

DATE

STANDARD FOR RISER ON PRECAST REINFORCED
CONCRETE PIPE SEWERS ON CONCRETE CRADLE

Gardip S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

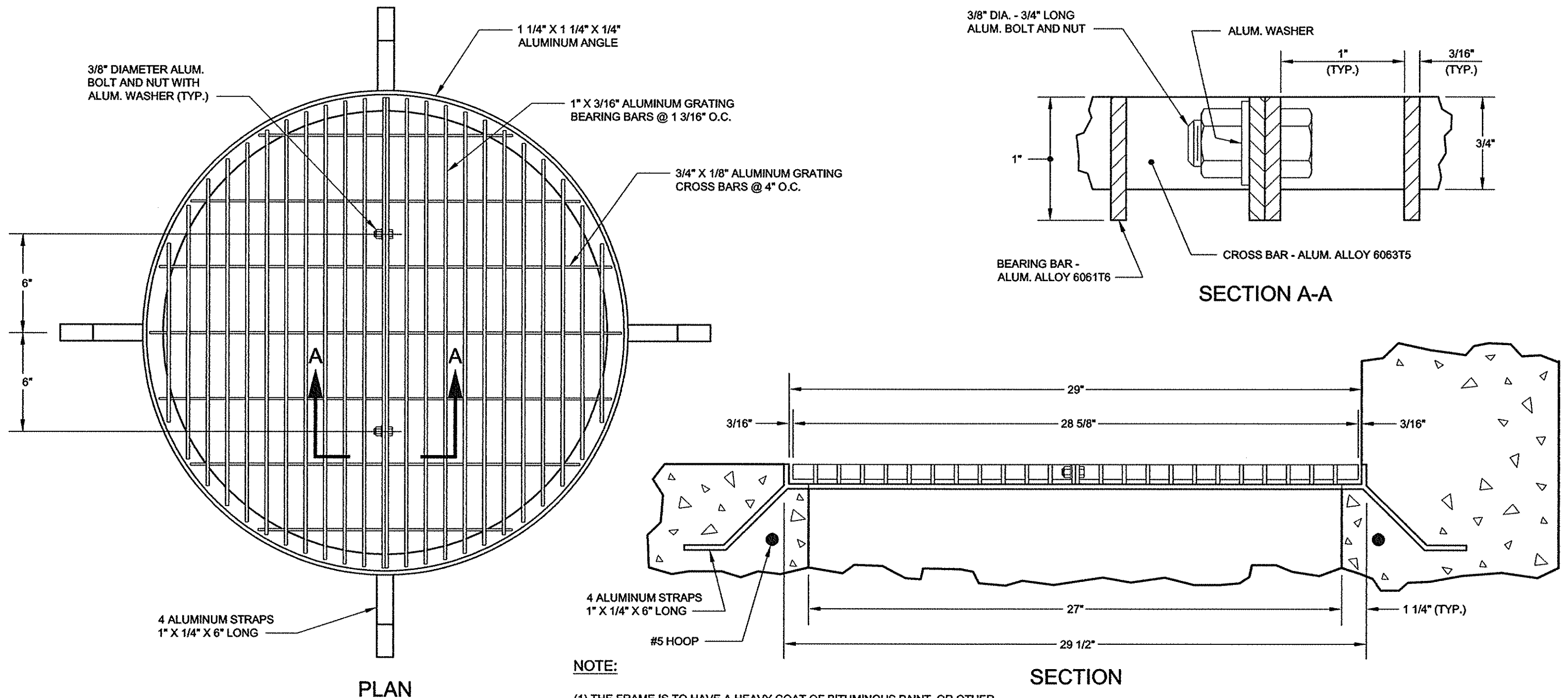
8/14/18
DATE

Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

8/14/18
DATE

STANDARD FOR 27" DIAMETER ALUMINUM FLOOR GRATING



NOTE:

- (1) THE FRAME IS TO HAVE A HEAVY COAT OF BITUMINOUS PAINT, OR OTHER APPROVED INSULATING MATERIAL.
- (2) TYPE "A" OR TYPE "B" ALUMINUM GRATINGS MAY BE USED. HOWEVER, ONE TYPE OF GRATING SHALL BE USED EXCLUSIVELY THROUGHOUT ANY PROJECT.

Gurdip S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wynne

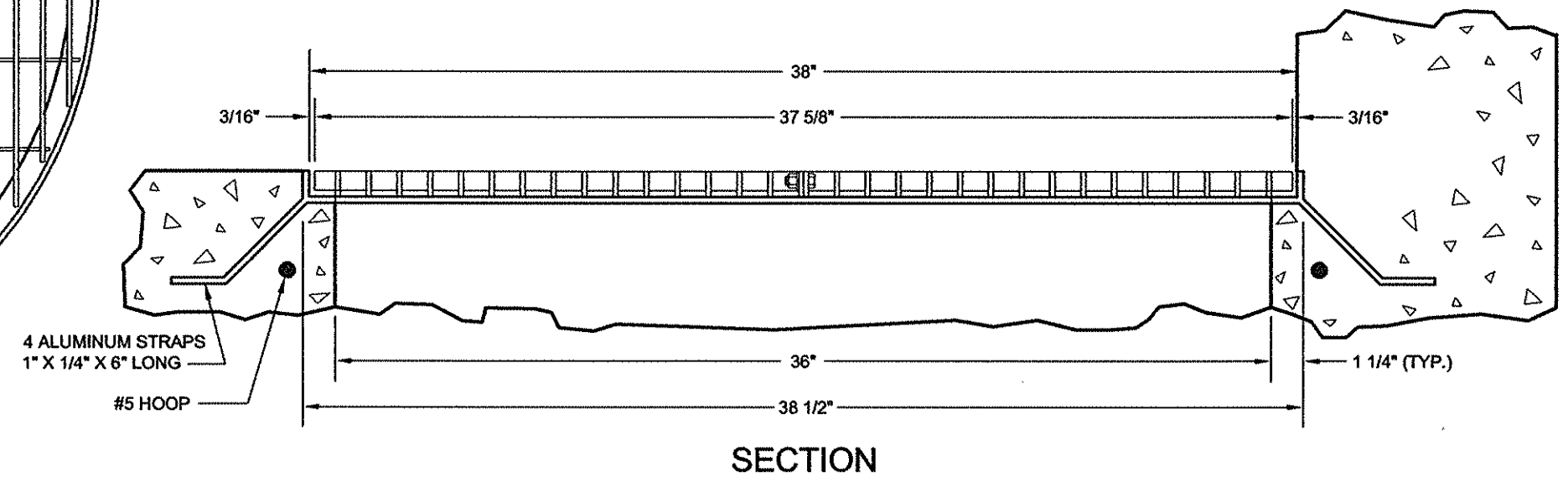
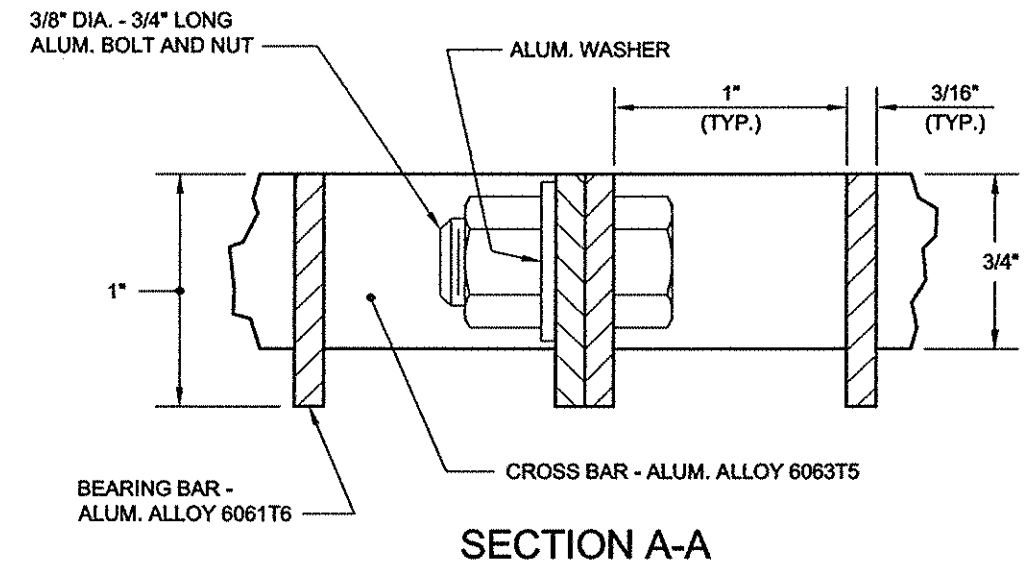
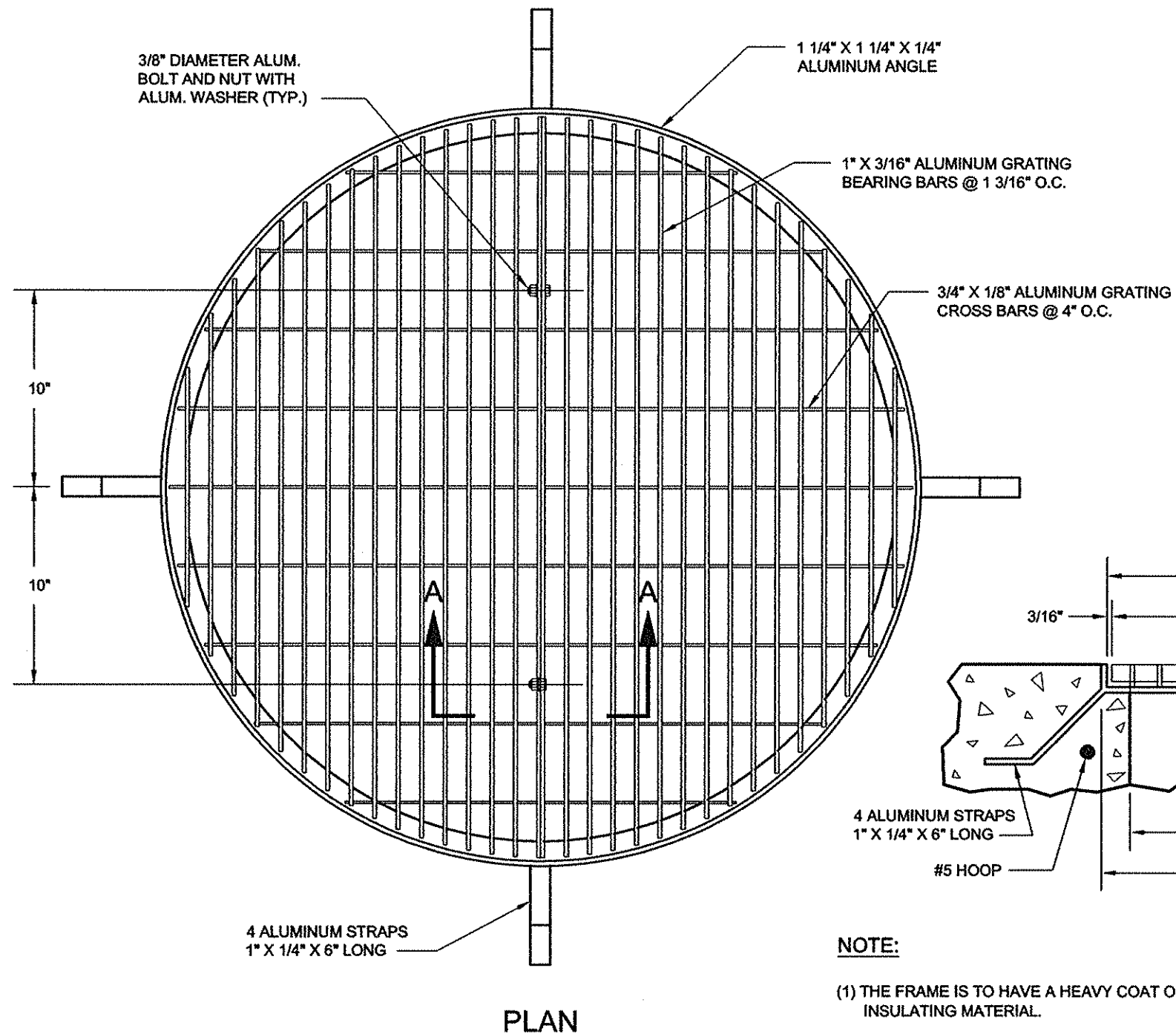
P.E.

EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

8/14/18

DATE

STANDARD FOR 36" DIAMETER ALUMINUM FLOOR GRATING



NOTE:

- (1) THE FRAME IS TO HAVE A HEAVY COAT OF BITUMINOUS PAINT, OR OTHER APPROVED INSULATING MATERIAL.
- (2) TYPE "A" OR TYPE "B" ALUMINUM GRATINGS MAY BE USED. HOWEVER, ONE TYPE OF GRATING SHALL BE USED EXCLUSIVELY THROUGHOUT ANY PROJECT.

Eurthy S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

8/14/18
DATE

Thomas Wayne
EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

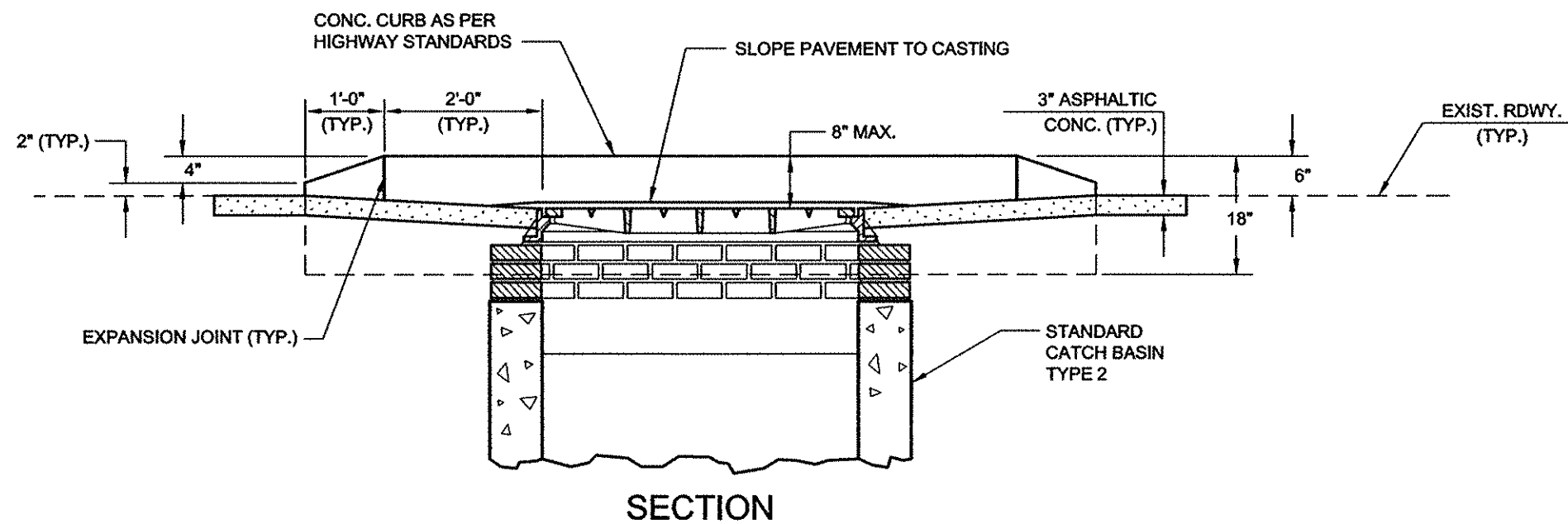
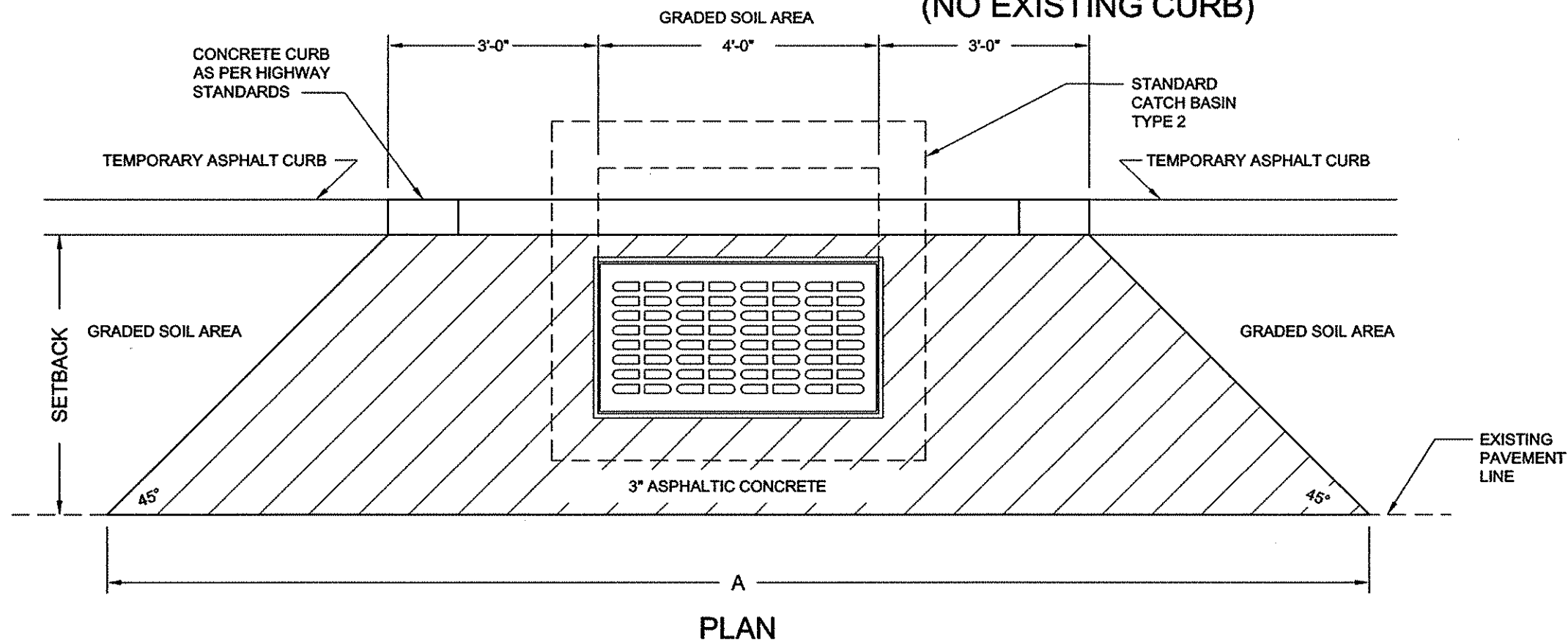
P.E.

8/14/18
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STANDARD FOR CONSTRUCTION OF CATCH BASIN

(NO EXISTING CURB)

GRADED SOIL AREA



SETBACK	A	ASPH. CONC. SQ. YDS.
3'-0"	16'-0"	3.283
4'-0"	18'-0"	5.172
5'-0"	20'-0"	7.283
6'-0"	22'-0"	9.617
7'-0"	24'-0"	12.172
8'-0"	26'-0"	14.950
9'-0"	28'-0"	17.950
10'-0"	30'-0"	21.172

REVISED DECEMBER 2017: P. LEUNG
W. PATALANO/P. MOY

Gurdeep S.Saini

P.E.

8/14/18

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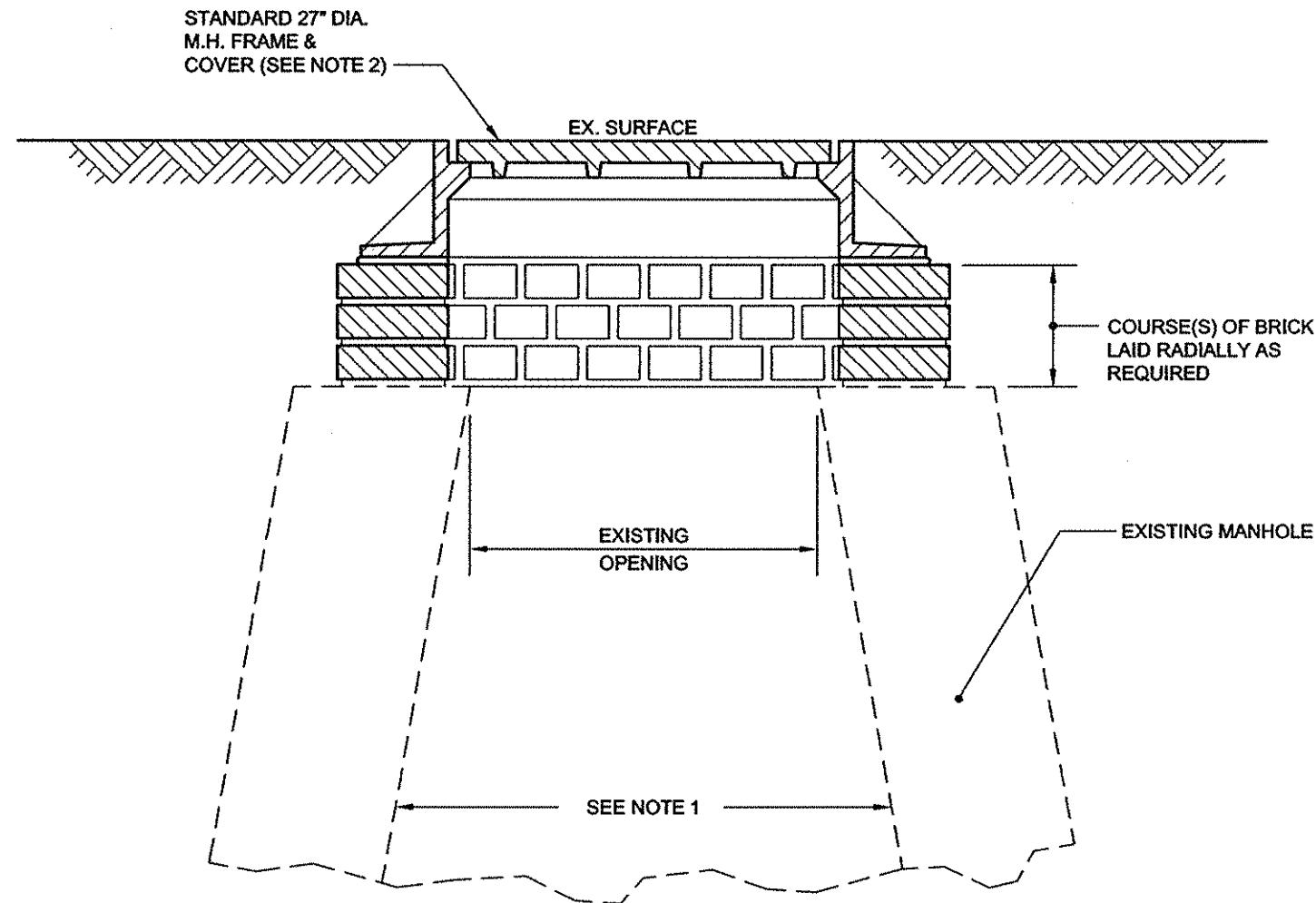
8/14/18

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EXECUTIVE DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR RECONSTRUCTION OF EXISTING MANHOLE AND REPLACEMENT OF EXISTING M.H. FRAME AND COVER



NOTES:

- (1) AT ALL LOCATIONS SHOWN ON THE PLANS, SPECIFIED IN THE CONTRACT DOCUMENTS OR ORDERED BY THE ENGINEER REQUIRING THE RECONSTRUCTION OF EXISTING MANHOLES, THE FOLLOWING WORK SHALL BE PERFORMED:

(A) ON GUNITED SEWERS:

FROM THE INNER TOP OF THE LARGEST SEWER TO THE BOTTOM OF THE CASTING, ALL LOOSE AND MISSING BRICK, MASONRY OR CONCRETE SHALL BE REPAIRED AND/OR REMOVED AS DIRECTED BY THE ENGINEER AND ALL DEBRIS, EXCESS MORTAR, ETC. SHALL BE REMOVED SO THAT THE FACES OF THE MANHOLE WALLS ARE LEFT SMOOTH AND CLEAN. IF ANY STEP(S) IS DAMAGED OR UNSAFE, ALL THE STEPS IN THE MANHOLE CHIMNEY SHALL BE REMOVED AND NOT REPLACED. FINALLY, THE WHOLE AREA SHALL BE PARGED OR FLASHED (RECEIVE A ONE HALF (1/2) INCH MINIMUM FINISHING COAT OF MORTAR WITH A FLOAT FINISH).

(B) ON LINED SEWERS:

FROM THE INVERT OF THE MANHOLE TO THE BOTTOM OF THE CASTING, ALL LOOSE AND MISSING BRICK, MASONRY OR CONCRETE SHALL BE REPAIRED AND/OR REMOVED AS DIRECTED BY THE ENGINEER AND ALL DEBRIS, EXCESS MORTAR, ETC. SHALL BE REMOVED SO THAT THE FACES OF THE MANHOLE WALLS AND THE INVERT ARE LEFT SMOOTH AND CLEAN. IF ANY STEP(S) IS DAMAGED OR UNSAFE, ALL STEPS IN THE MANHOLE CHIMNEY SHALL BE REMOVED AND NOT REPLACED. FINALLY, THE WHOLE AREA SHALL BE PARGED OR FLASHED (RECEIVE A ONE HALF (1/2) INCH MINIMUM FINISHING COAT OF MORTAR WITH A FLOAT FINISH). (THE INVERT DISH SHALL RECEIVE A PROPORTIONATELY THICKER FINISH COAT SO AS TO PROVIDE A SMOOTH TRANSITION FROM EXISTING SEWER TO THE INSIDE SURFACE OF THE LINER.)

- (2) AT ALL LOCATIONS SHOWN ON THE PLANS, SPECIFIED IN THE CONTRACT DOCUMENTS OR ORDERED BY THE ENGINEER REQUIRING THE REPLACEMENT OF EXISTING MANHOLE FRAMES AND COVERS, THE CONTRACTOR SHALL REMOVE EXISTING MANHOLE FRAMES AND COVERS WHICH ARE TWENTY-FOUR (24) INCHES IN DIAMETER OR OTHERWISE DAMAGED, DEFECTIVE OR NONSTANDARD AND REPLACE THEM WITH NEW STANDARD TWENTY-SEVEN (27) INCH CAST IRON MANHOLE FRAMES AND COVERS.

Gurdeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

8/14/18

DATE

Thomas Wynne

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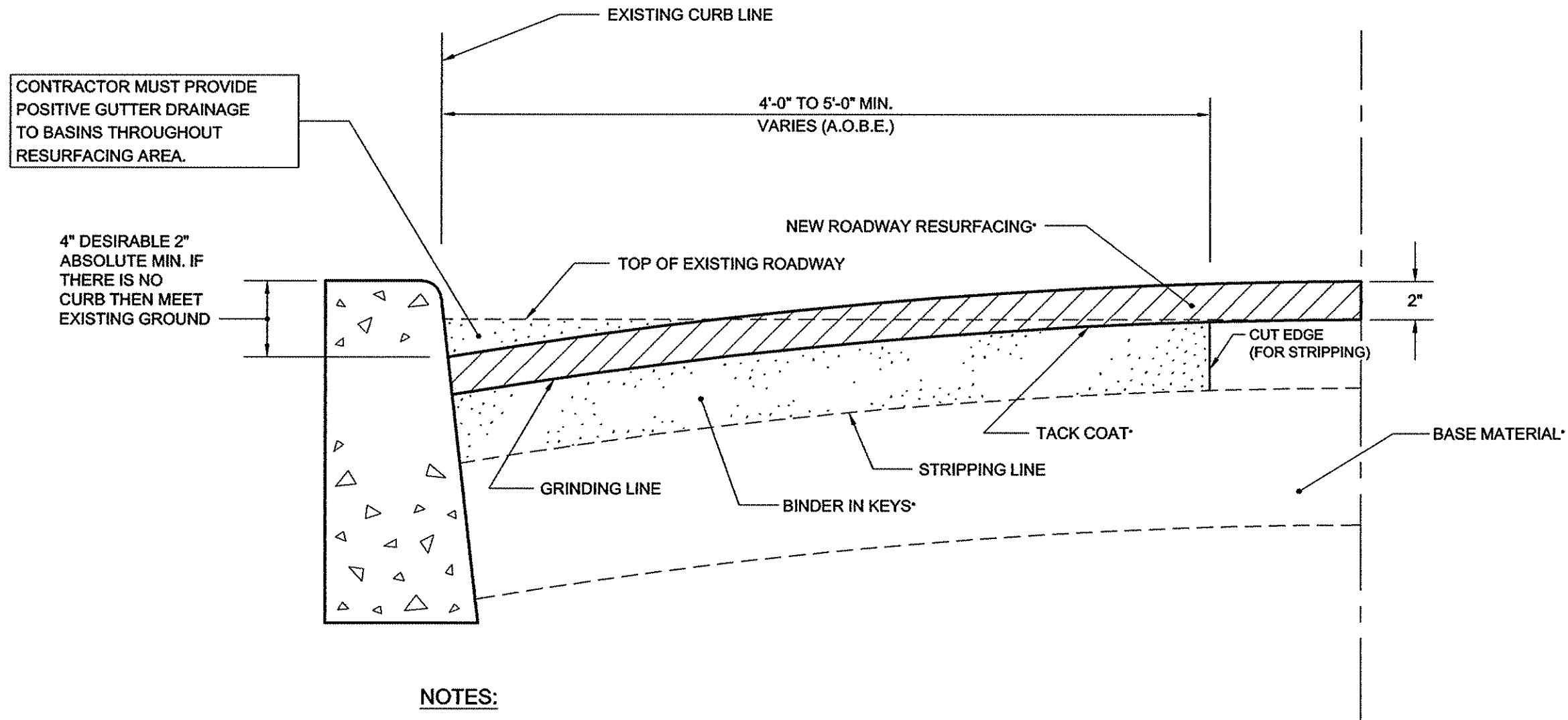
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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR ROADWAY RESURFACING (PAVEMENT KEY - TYPE B)



NOTES:

- (1) CONTRACTOR MAY AT HIS OPTION EITHER STRIP OR GRIND THE AREA TO THE REQUIRED DEPTH.
- (2) ALL CITY OWNED CASTINGS TO BE ADJUSTED TO MATCH NEW ROADWAY.
- (3) PAVEMENT KEY IS TYPE B.
- (4) (A.O.B.E.) - AS ORDERED BY ENGINEER.
- (5) * - REFER TO DEPARTMENT OF TRANSPORTATION STANDARD HIGHWAY SPECIFICATIONS.
- (6) ALL ASSOCIATED COSTS TO BE INCLUDED IN UNIT PRICES BID FOR THE APPROPRIATE ROADWAY RESTORATION ITEMS.

Sandeep S. Saini

P.E.

ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

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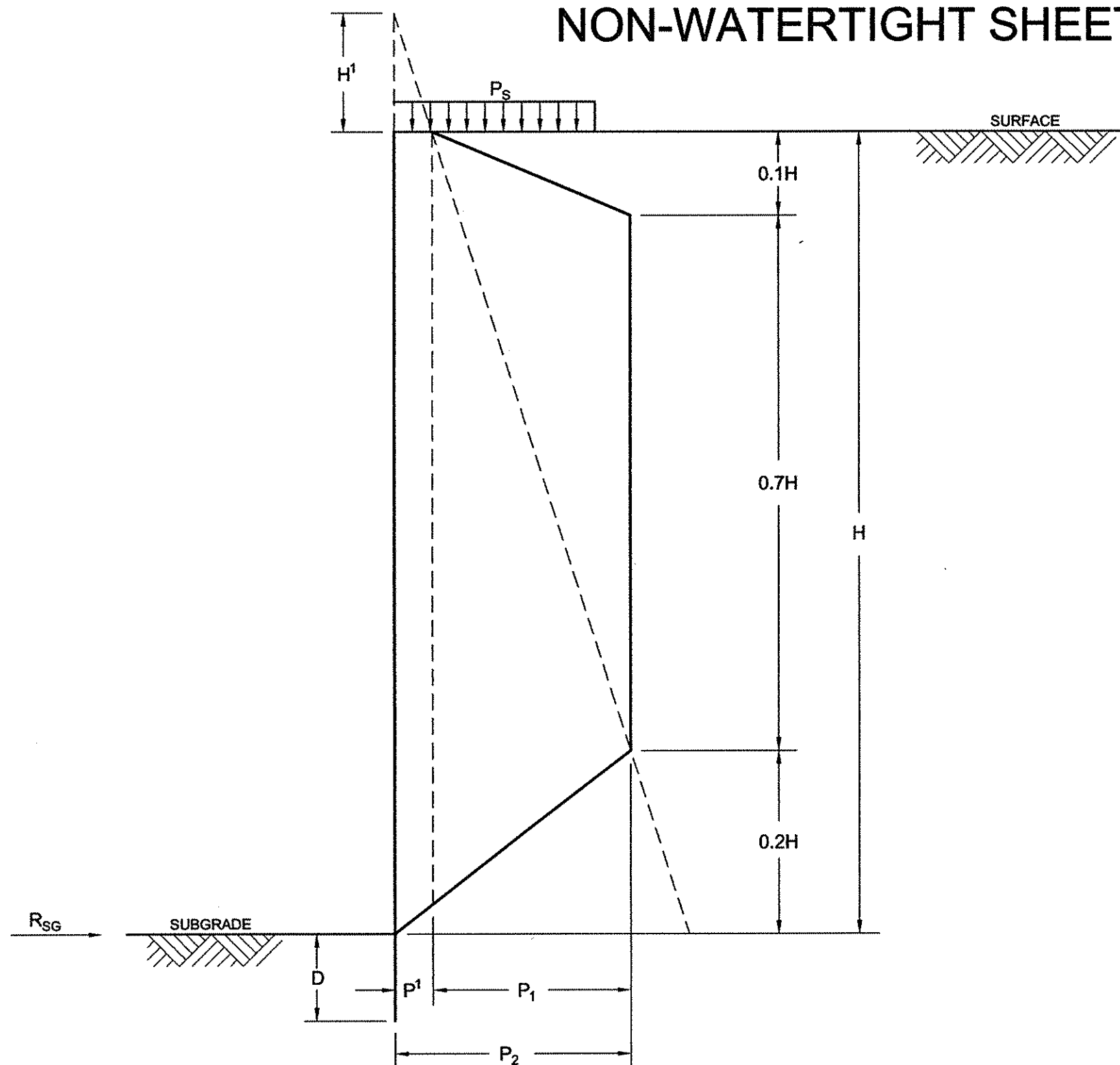
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STANDARD FOR MINIMUM LOAD DIAGRAM FOR
NON-WATERTIGHT SHEETING DESIGN

DESIGN CRITERIA:

 γ = UNIT WEIGHT OF SOIL γ_w = UNIT WEIGHT OF WATER γ_s = UNIT WEIGHT OF SUBMERGED SOIL ϕ = ANGLE OF INTERNAL FRICTION OF SOIL $K_{ra} = \frac{(1-\sin\phi)}{(1+\sin\phi)}$ FOR ACTIVE EARTH PRESSURE $K_{rp} = \frac{(1+\sin\phi)}{(1-\sin\phi)}$ FOR PASSIVE EARTH PRESSURE $H^1 = 3$ FEET MINIMUM $P_s = \gamma \times H^1 =$ SURCHARGE-MIN. 300 PSF $P^1 = K_{ra} \times P_s$ $P_1 = (0.8K_{ra}) \times \gamma \times H$ $P_2 = P^1 + P_1$

$$D = \sqrt{\frac{2R_{SG}}{\gamma(K_{rp} - K_{ra})}}$$

NOTES:

- (1) THIS CRITERIA IS FOR BRACED SHEETING ONLY.
- (2) FOR ALL DESIGN CRITERIA SUCH AS FACTOR OF SAFETY AND TOE PENETRATION LIMITS, SEE THE LATEST NYC DEP STANDARD SEWER AND WATER MAIN SPECIFICATIONS UNDER SECTION "SHEETING AND BRACING".

Sandeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

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DATE

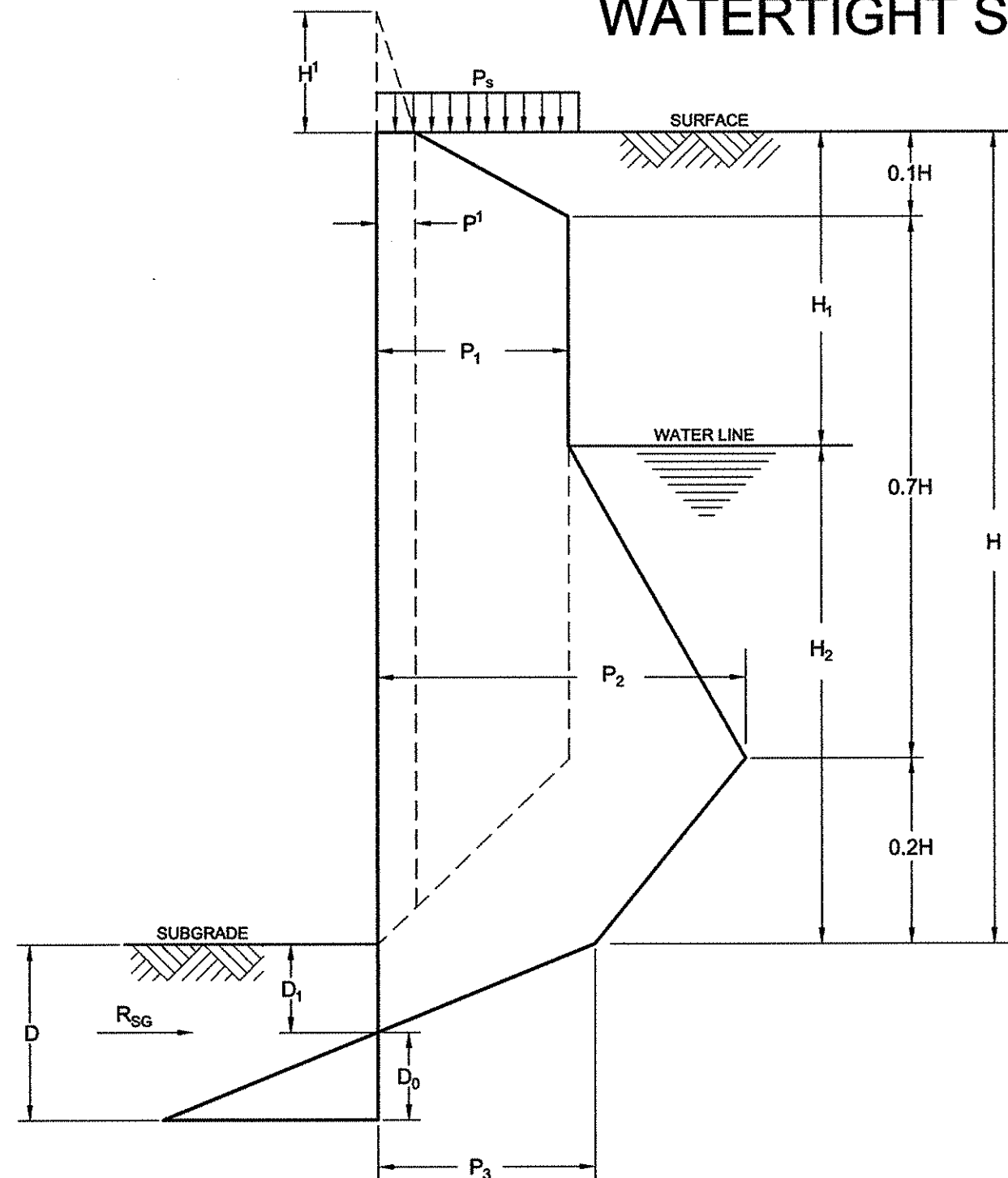
Thomas Wynne
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CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD FOR MINIMUM LOAD DIAGRAM FOR WATERTIGHT SHEETING DESIGN



DESIGN CRITERIA:

γ = UNIT WEIGHT OF SOIL

γ_w = UNIT WEIGHT OF WATER

γ_s = UNIT WEIGHT OF SUBMERGED SOIL

ϕ = ANGLE OF INTERNAL FRICTION OF SOIL

$K_{ra} = \frac{(1-\sin\phi)}{(1+\sin\phi)}$ FOR ACTIVE EARTH PRESSURE

$K_{rp} = \frac{(1+\sin\phi)}{(1-\sin\phi)}$ FOR PASSIVE EARTH PRESSURE

$H' = 3$ FEET MINIMUM

$P_s = \gamma \times H' =$ SURCHARGE-MIN. 300 PSF

$P^1 = K_{ra} \times P_s$

$P_1 = P^1 + (0.8K_{ra}) \times (\gamma H_1 + \gamma_s H_2)$

$P_2 = P_1 + \gamma_w (H_2 - 0.2H)$

$P_3 = \gamma_w \times H_2$

$D_1 = \frac{P_3}{\gamma_s (K_{rp} - K_{ra})}$

$D_0 = \sqrt{\frac{2R_{SG}}{\gamma_s (K_{rp} - K_{ra})}}$

$D = D_1 + D_0$

NOTES:

(1) THIS CRITERIA IS FOR BRACED SHEETING ONLY.

(2) FOR ALL DESIGN CRITERIA SUCH AS FACTOR OF SAFETY AND TOE PENETRATION LIMITS, SEE THE LATEST NYC DEP STANDARD SEWER AND WATER MAIN SPECIFICATIONS UNDER SECTION "SHEETING AND BRACING".

Sandeep S. Saini
ASSOCIATE COMMISSIONER, DESIGN
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