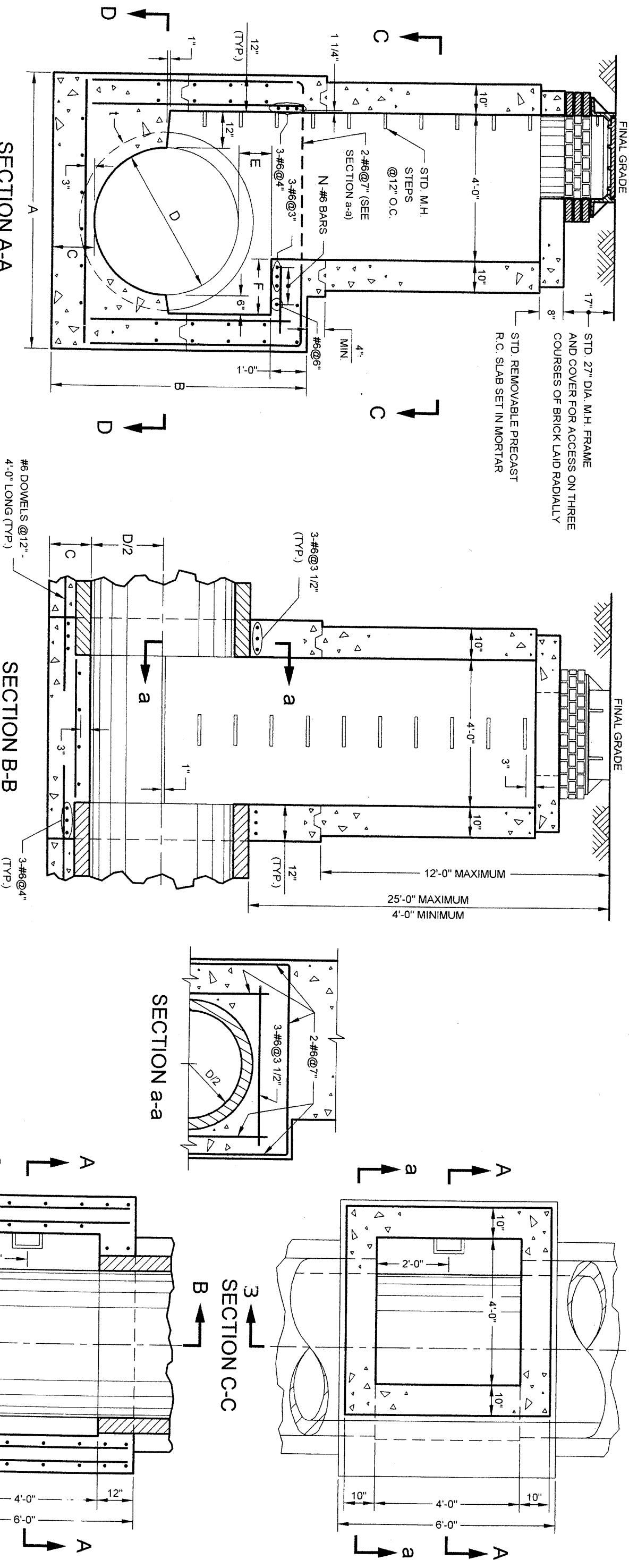


STANDARD FOR MANHOLE ON 36" DIA. TO 60" DIA. PIPE SEWERS
TYPE C-1 (12' MAX. COVER) AND TYPE C-2 (25' MAX. COVER)



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

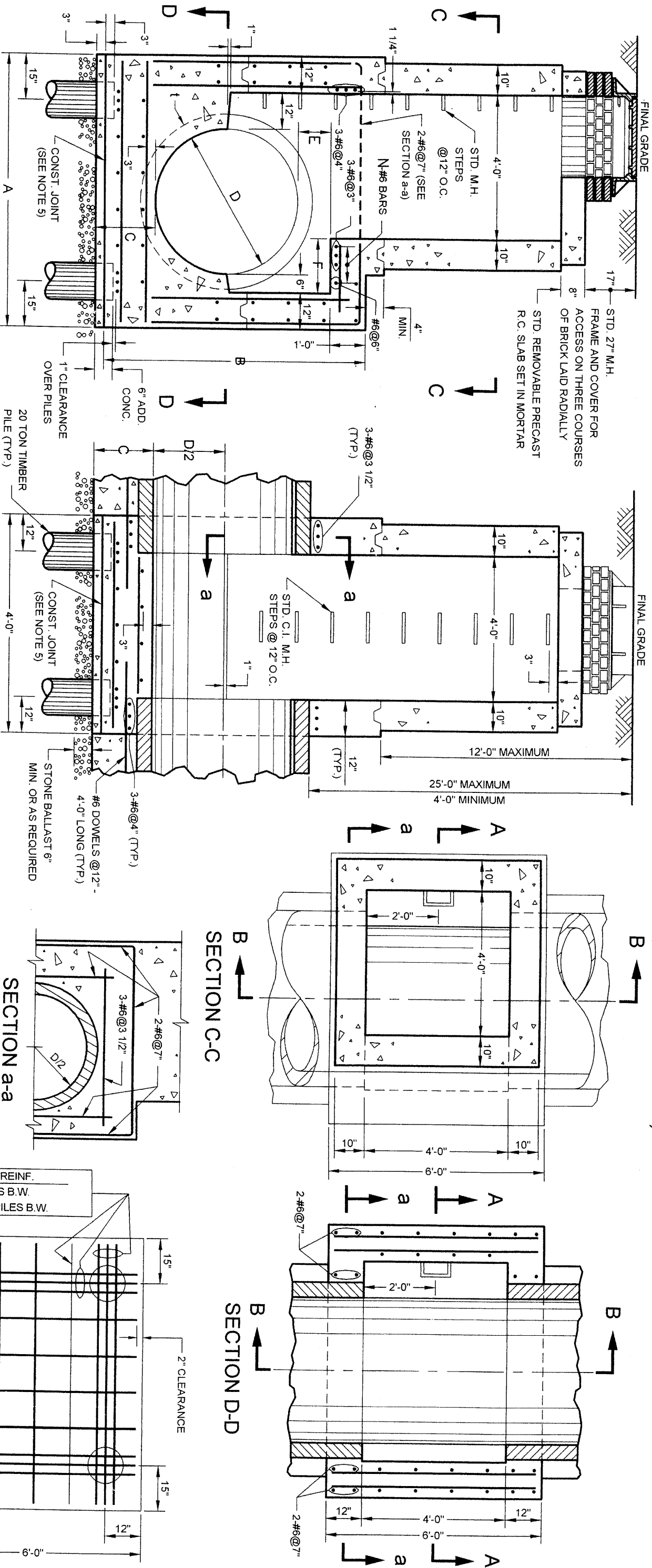
Geoff M. Brown
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
P.E.

7/9/07
DATE

Maedi Chua
DEPUTY DIRECTOR, ENGINEERING DEPARTMENT
OF ENVIRONMENTAL PROTECTION
P.E.

8/10/07
DATE

STANDARD FOR MANHOLE ON 36" DIA. TO 60" DIA. PIPE SEWERS ON PILES
TYPE C-1 (12' MAX. COVER) AND TYPE C-2 (25' MAX. COVER)



SECTION A-A

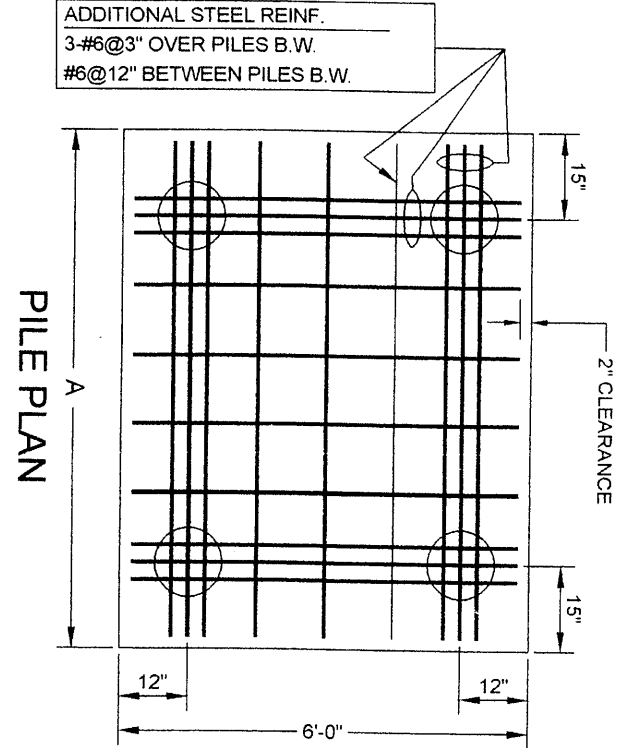
SECTION B-B

SECTION C-C

SECTION D-D

SECTION a-a

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



- NOTES:
- (1) WHEN LEGAL GRADE IS BELOW FINAL GRADE SEE SEWER STANDARD NO. 38.
 - (2) KEVED 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.

Greg M. Davis
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

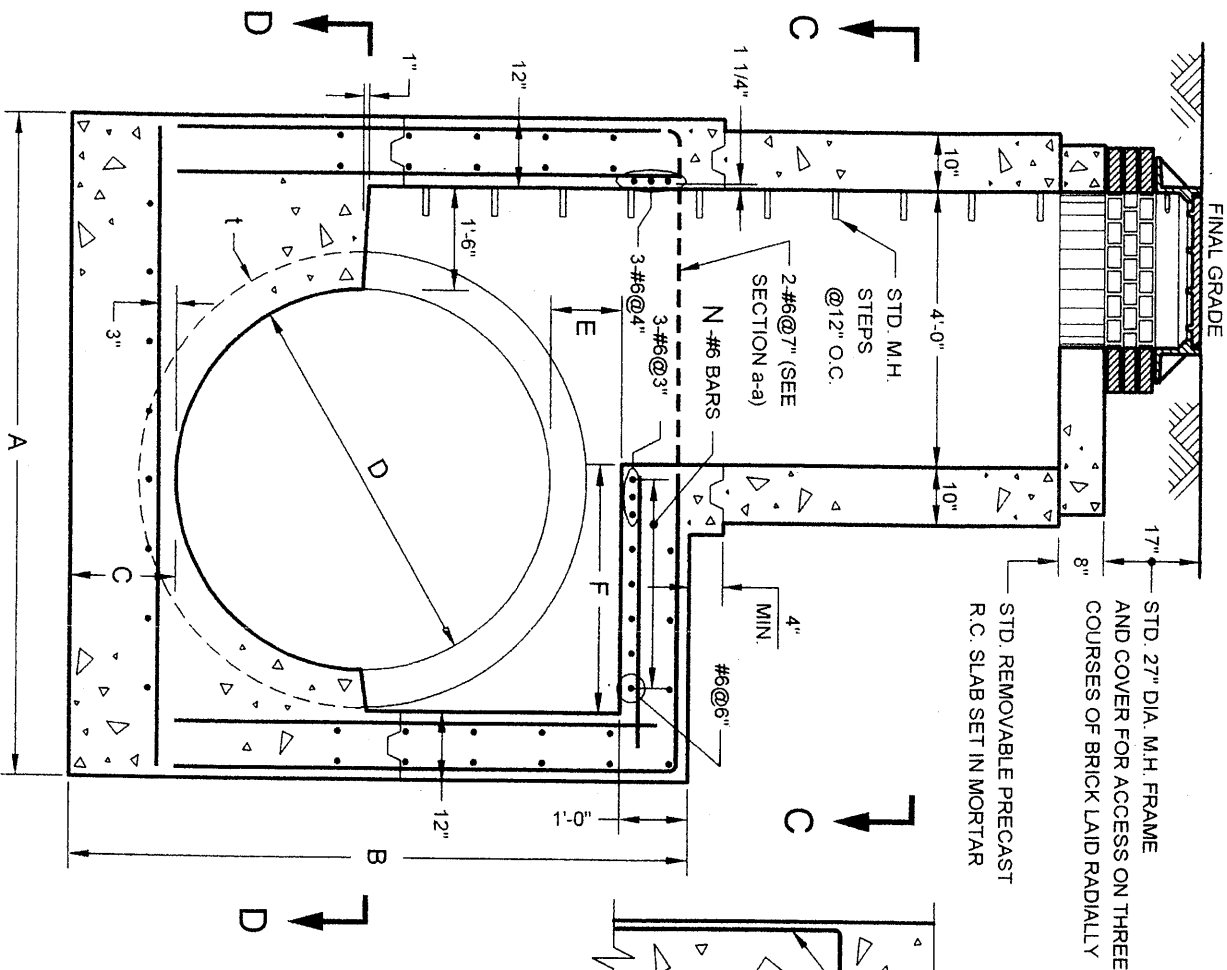
P.E.
7/9/07
DATE

Maedie Funn
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

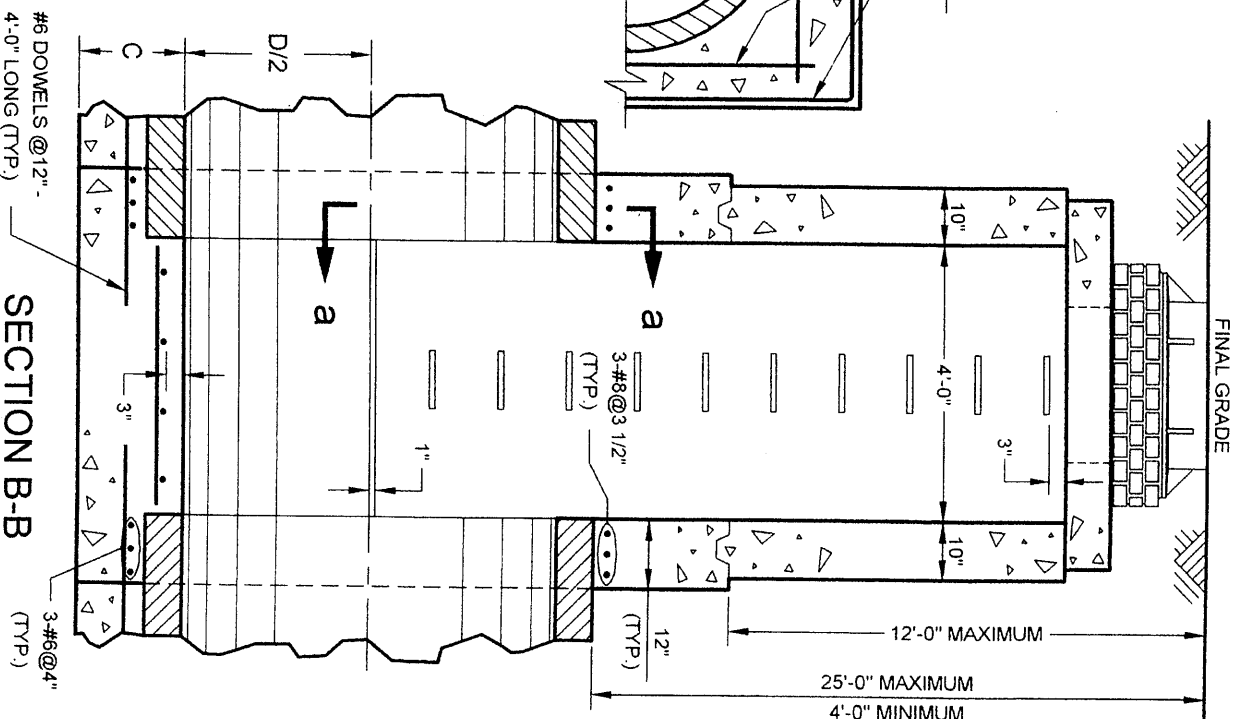
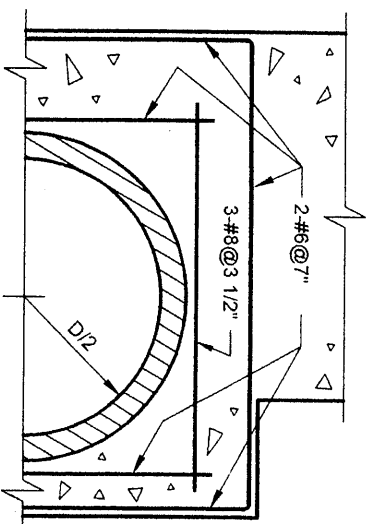
P.E.
8/10/07
DATE

STANDARD FOR MANHOLE ON 66" DIA. TO 96" DIA. PIPE SEWERS

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



SECTION a-a

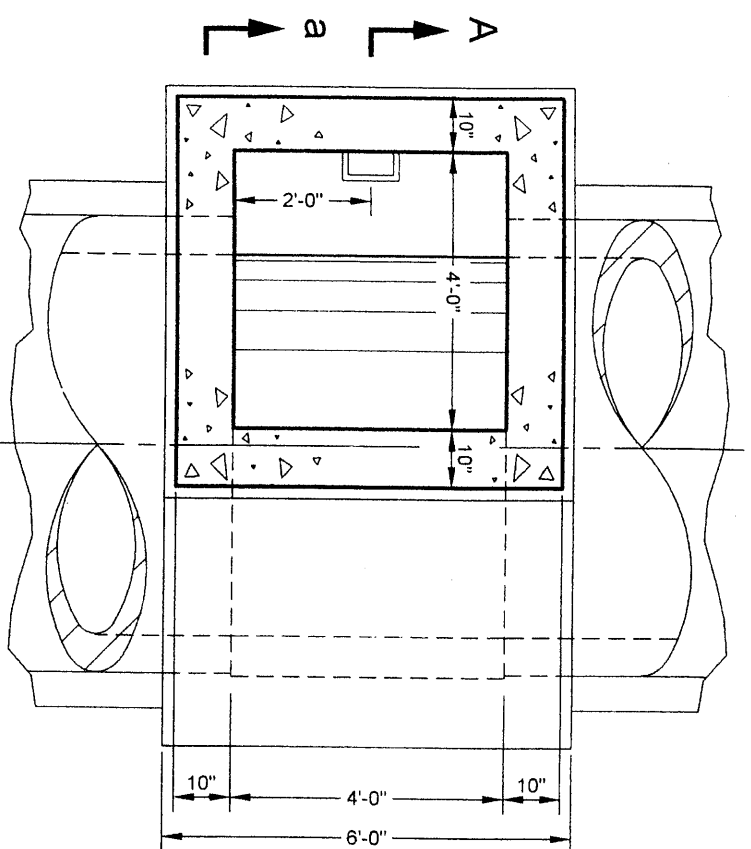


SECTION B-B

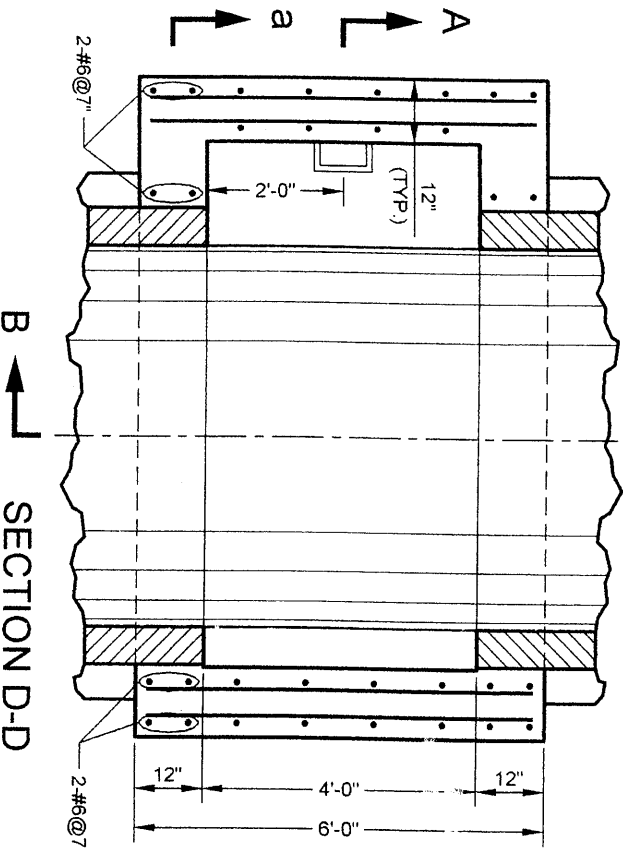
D	t	A	B	C	E	F	N
66"	6 1/2"	9'-7"	9'-1"	18 1/2"	12 1/2"	3'-7"	8
72"	7"	10'-1"	9'-9"	20"	13"	4'-1"	9
78"	7 1/2"	10'-8"	10'-5"	21 1/2"	13 1/2"	4'-8"	10
84"	8"	11'-2"	11'-1"	23"	14"	5'-2"	11
90"	8 1/2"	11'-9"	11'-10"	25 1/2"	14 1/2"	5'-9"	12
96"	9"	12'-3"	12'-5"	27"	15"	6'-3"	13

#6 DOWELS @ 12" - 4'-0" LONG (TYP.)

SECTION C-C



SECTION D-D



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.

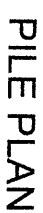
Joe M. Lane
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
P.E.

7/9/07
DATE

Wendi Fara
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
P.E.

8/10/07
DATE

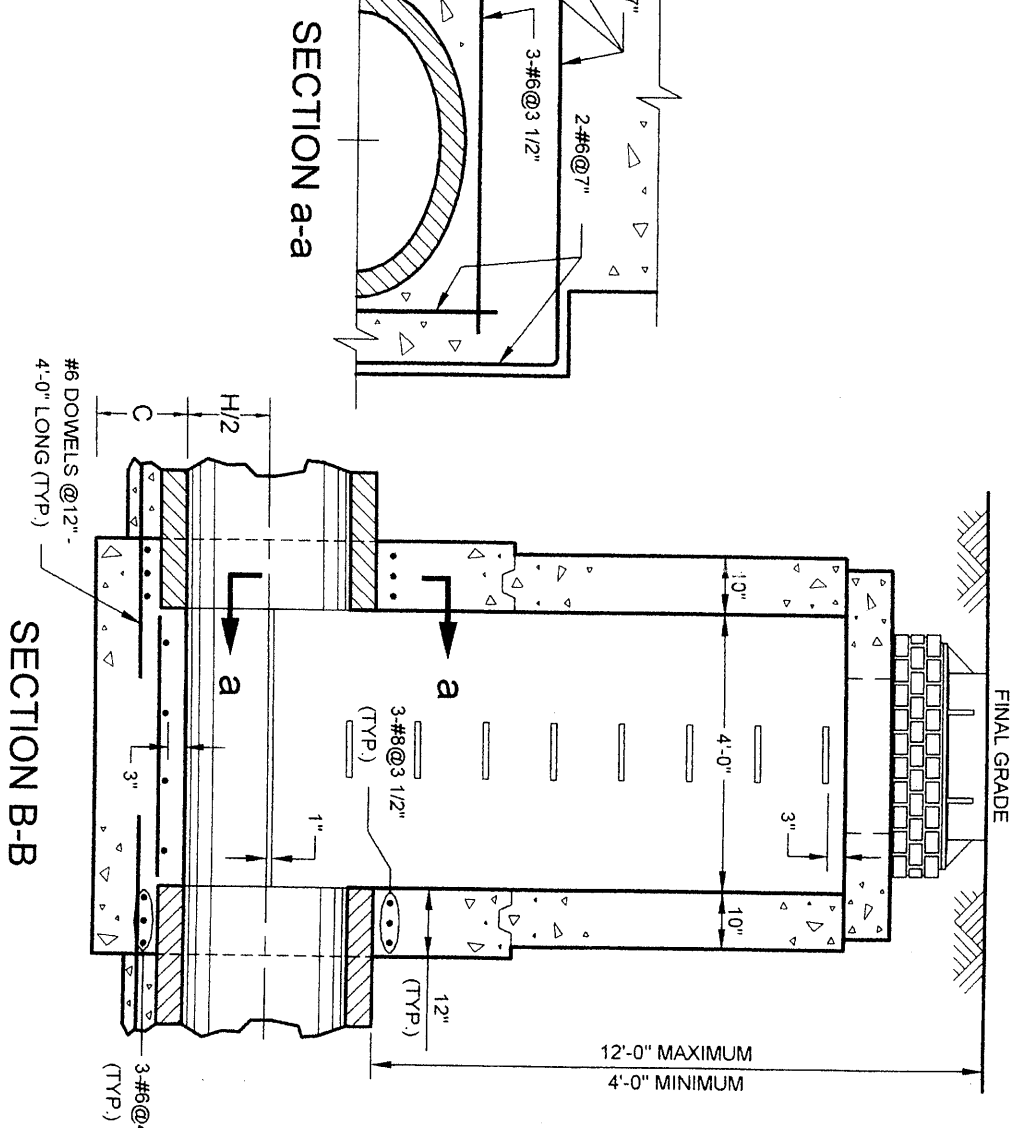
TYPE D-1 (12' MAX. COVER) AND TYPE D-2 (25' MAX. COVER)



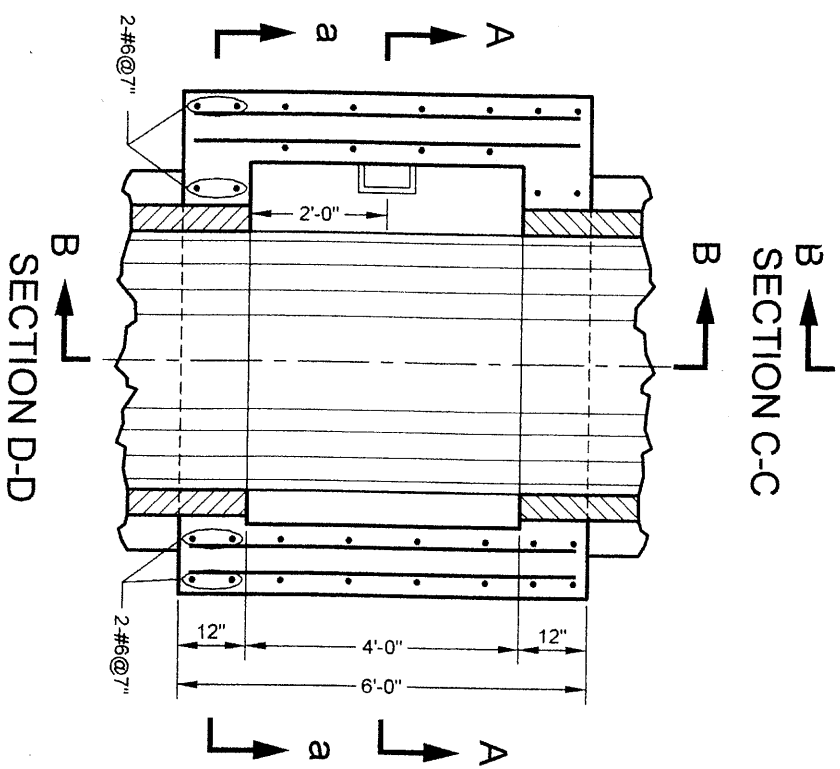
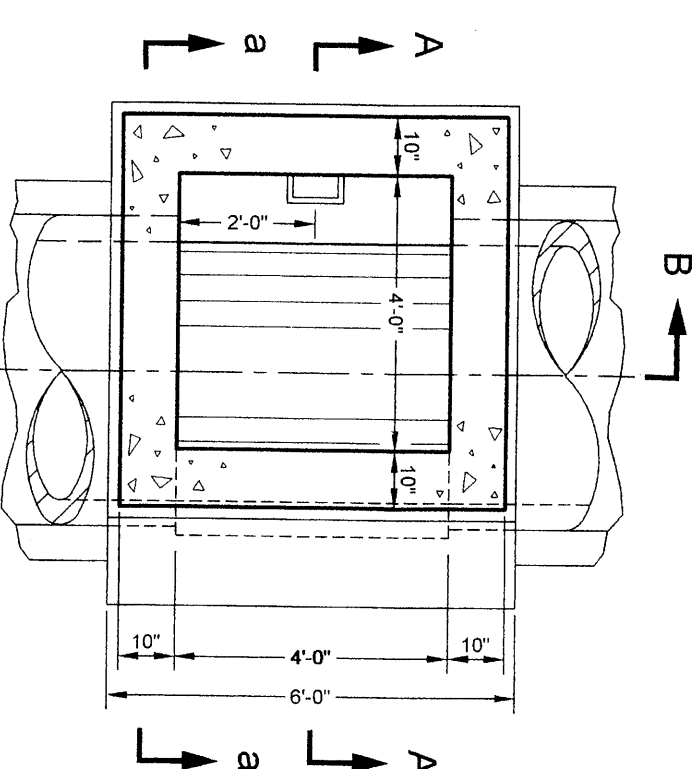
* USE FOUR PILES PER BENT FOR COVER OVER 15'

DATE 10/07

HORIZONTAL ELLIPTICAL PIPE SEWERS



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



- Scott M. Davis*
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
P.E.

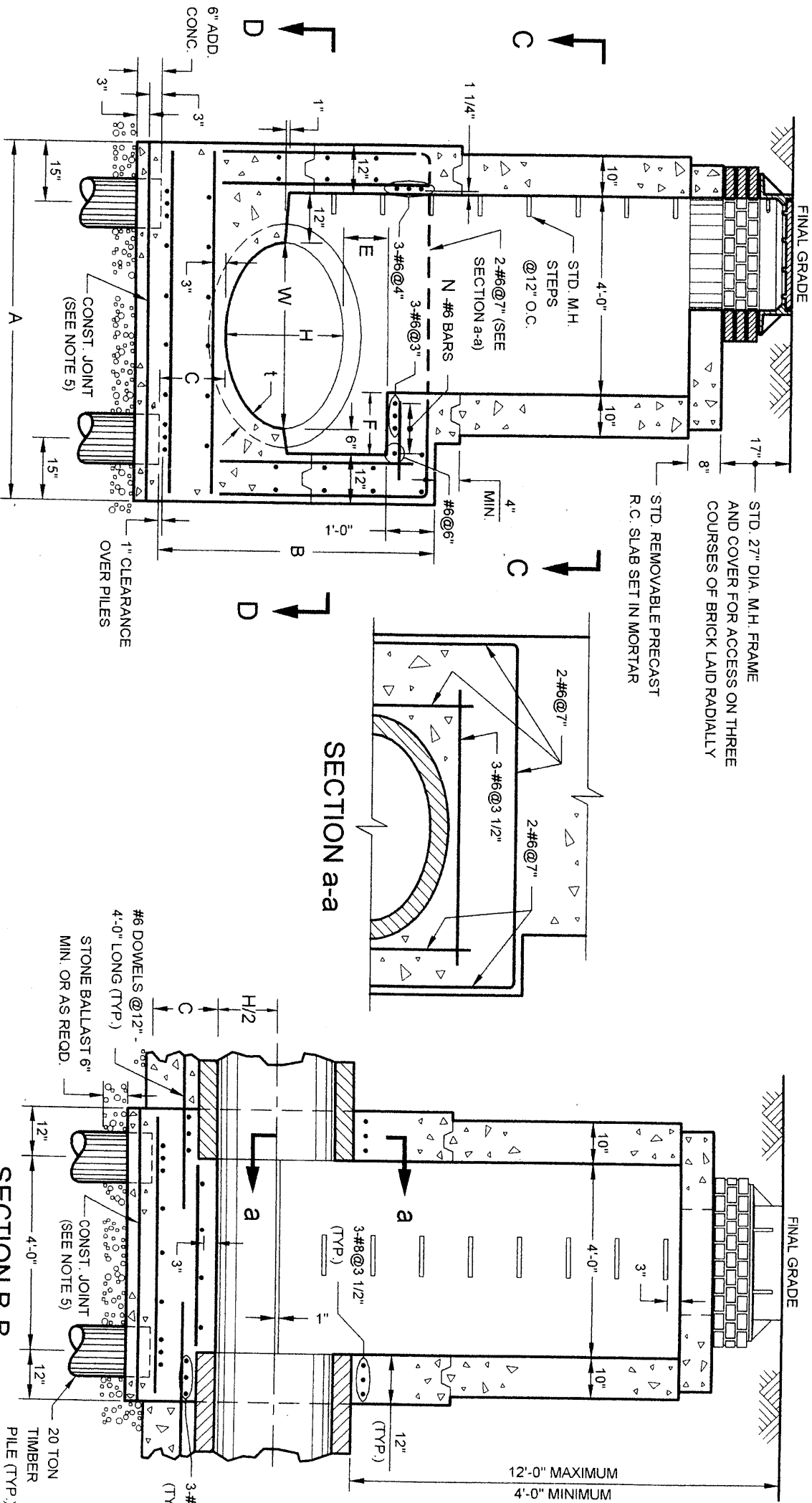
DATE 1/9/07

medi fund

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E. 8/10/07
DATE

STANDARD FOR MANHOLE ON 23"W X 14"H TO 60"W X 38"H
HORIZONTAL ELLIPTICAL PIPE SEWERS ON PILES
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.
- (5) CONSTRUCTION JOINT TO BE UTILIZED WHENEVER GROUND CONDITIONS PREVENT SUPPORT OF PIPE.

SECTION A-A

SECTION a-a

SECTION B-B

SECTION C-C/SECTION D-D

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

ADDITIONAL STEEL REINF.
3 #6@3" OVER PILES B.W.
#6@12" BETWEEN PILES B.W.

PILE PLAN

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

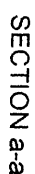
DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

DATE

TYPE E-2 (12" MAX. COVER)



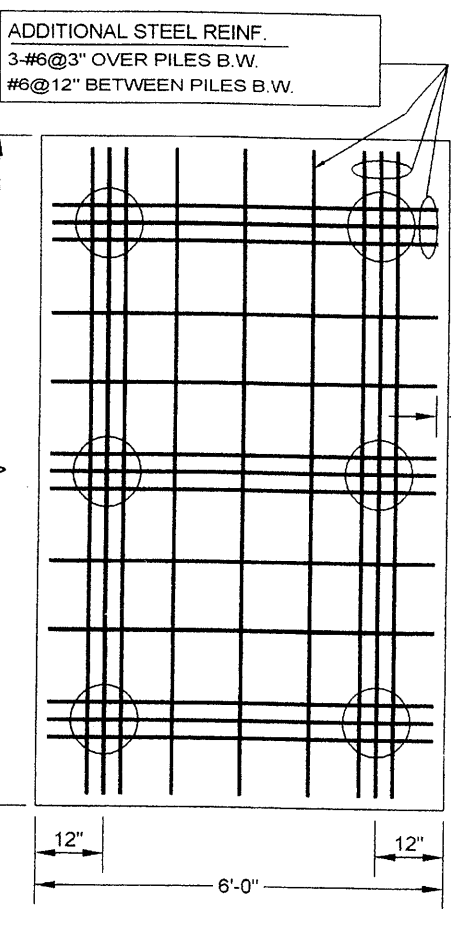
— 3-#6@4'
(TYP.)



- FOR ALL REINFORCEMENT IS 2" CLEARANCE UNLESS OTHERWISE SPECIFIED

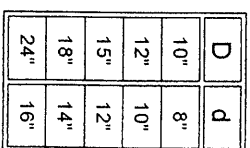
DATE _____

TYPE E-2 (12" MAX. COVER)



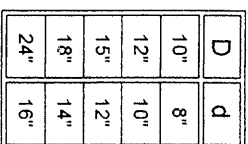
- P.E. _____
DATE 8/10/07

(25' MAX. COVER)



- DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
- Maedi Farooq*
- P.E.
- 8/10/07
- DATE

(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.

ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

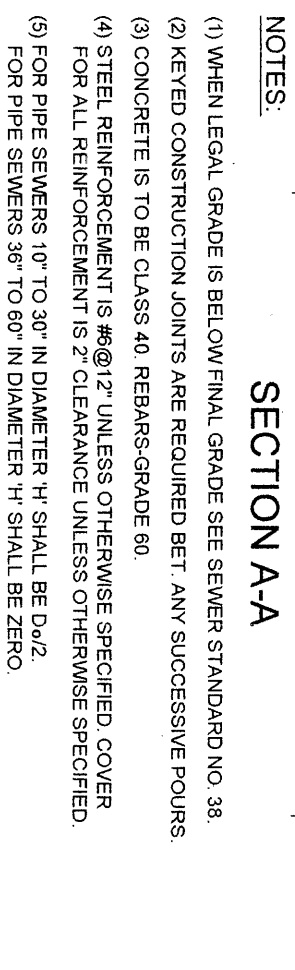
Julie M. Lavarre P.E.

7/19/07

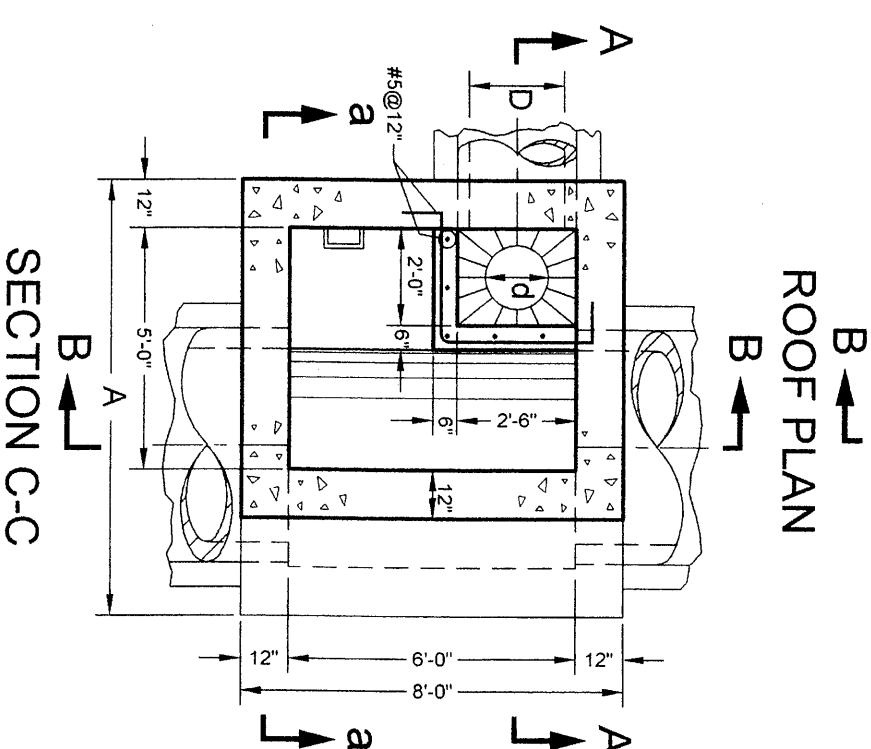
DATE

Maedi Faraf
P.E.
8/10/07

- 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



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



Sept. 21. 1890

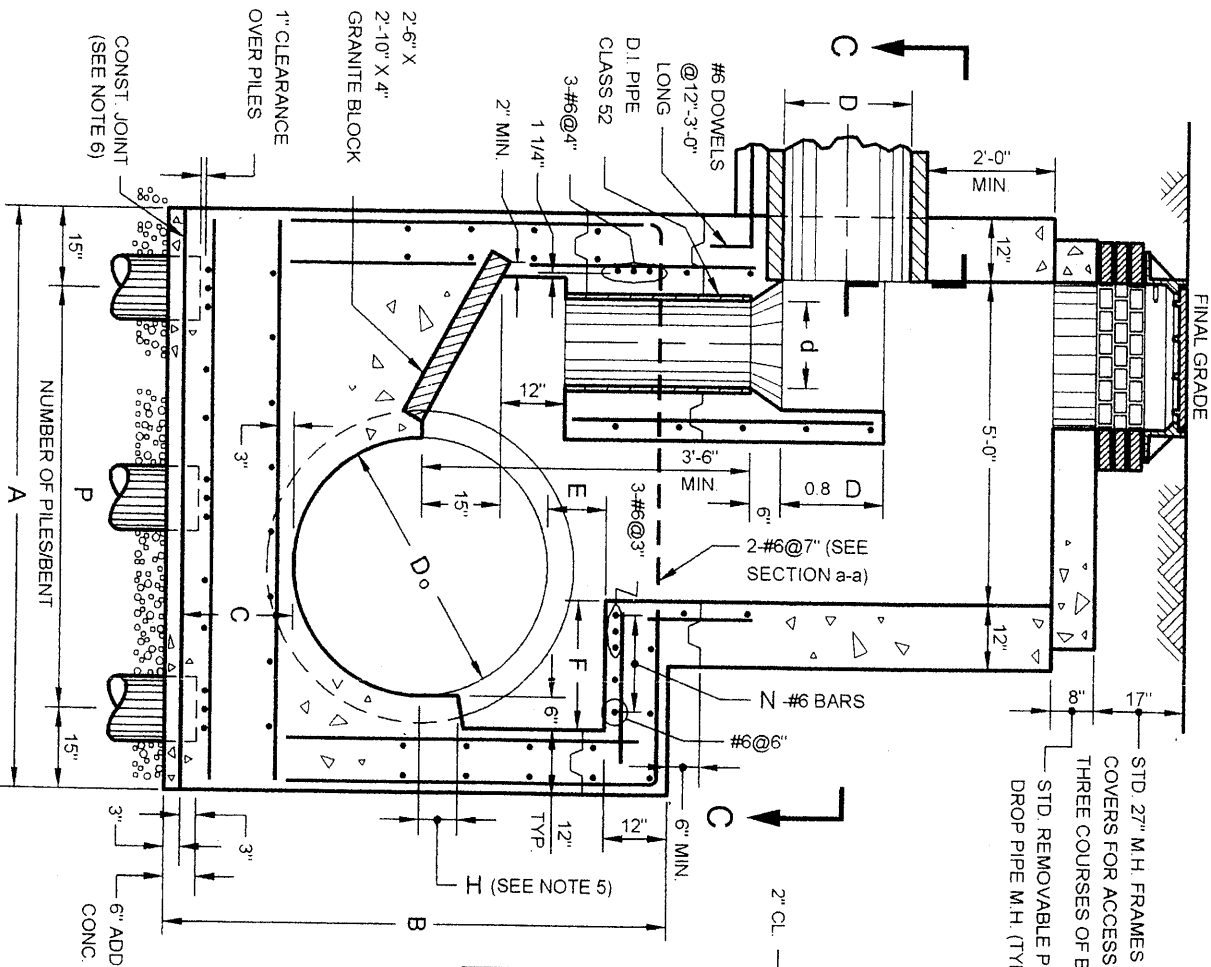
DATE _____

modi
fandi

DATE

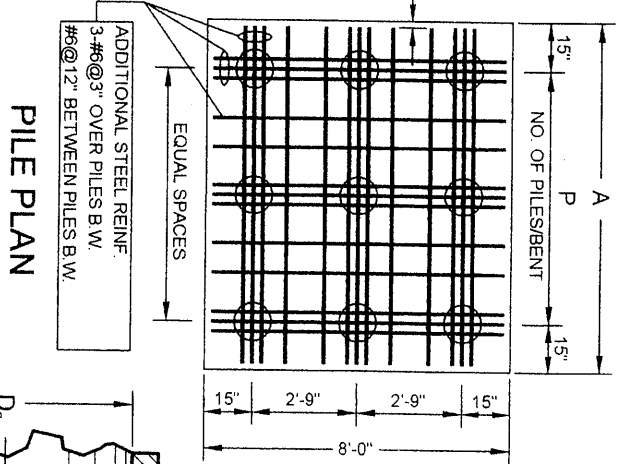
8/10/07

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

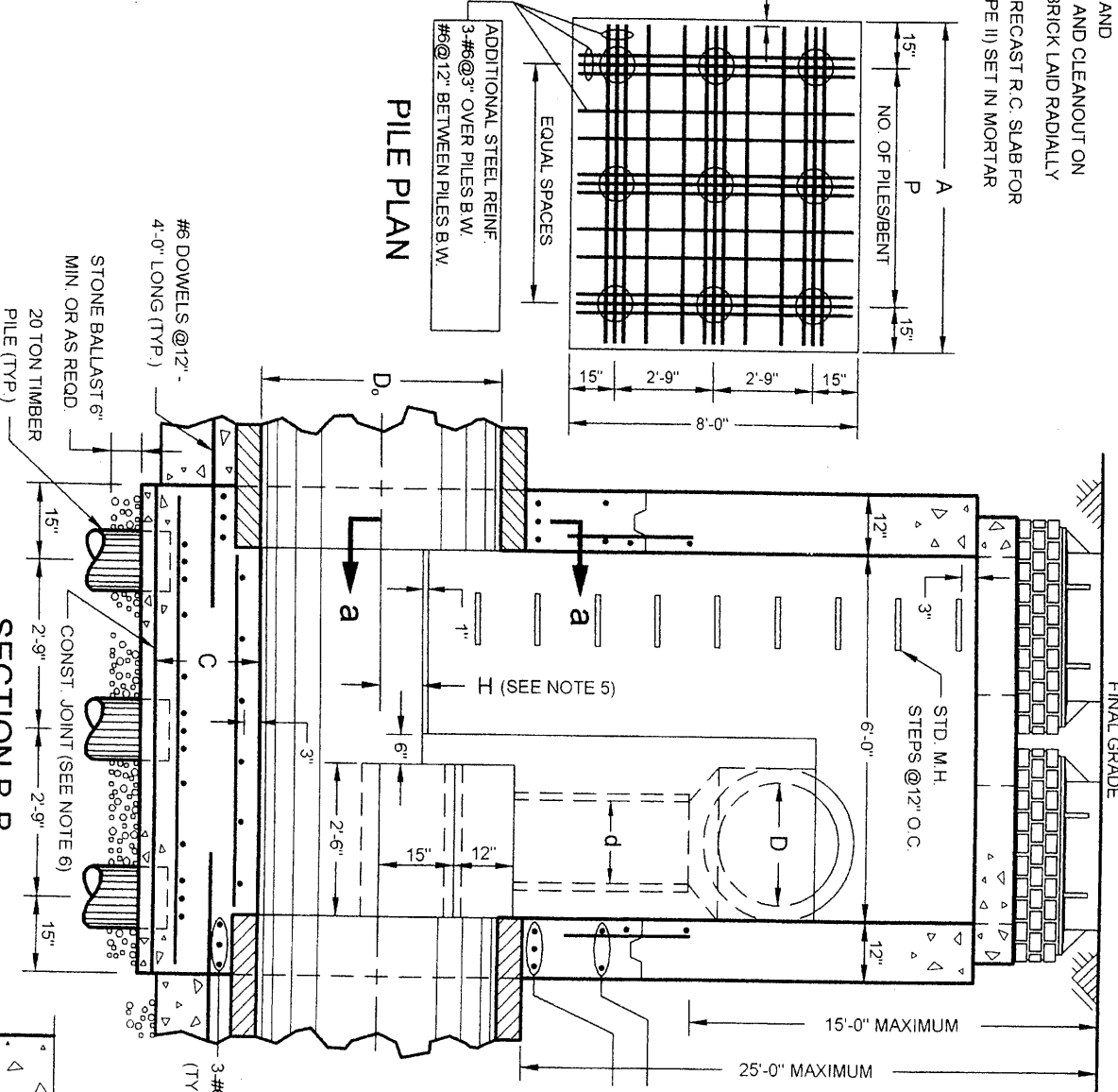


SECTION A-A

- 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÷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.



PILE PLAN

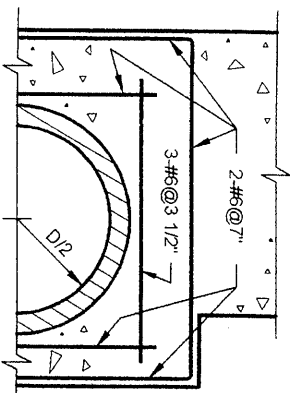


SECTION B-B

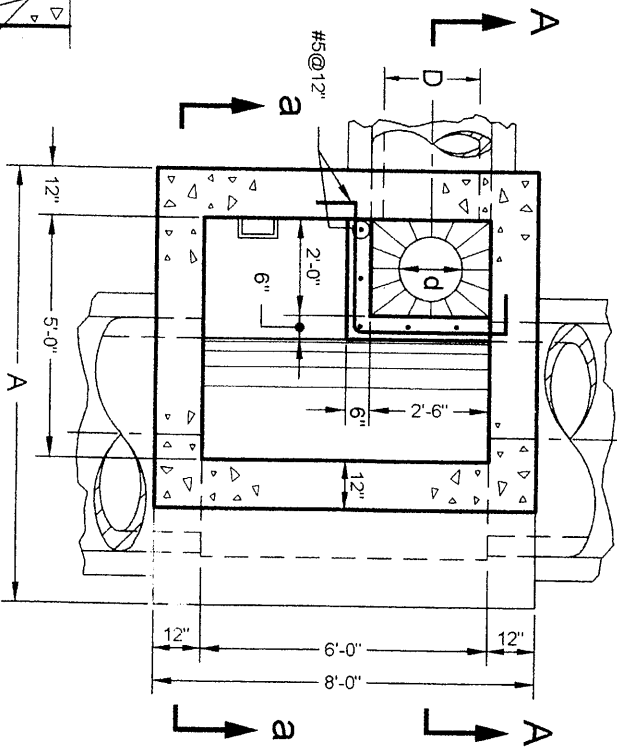
D _o	A	B	C	E	F	N	P
10" TO 24"	7'-0"	NA	15 1/2"	NA	NA	NA	2
30"	7'-6"	5'-9"	17"	10"	0'-6"	1	3
36"	8'-0"	6'-5"	19"	10"	1'-0"	3	3
42"	8'-6"	7'-1"	20 1/2"	10 1/2"	1'-6"	4	3
48"	9'-0"	7'-8"	21"	11"	2'-0"	5	3
54"	9'-6"	8'-3"	21 1/2"	11 1/2"	2'-6"	6	3
60"	10'-0"	8'-11"	23"	12"	3'-0"	7	3

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

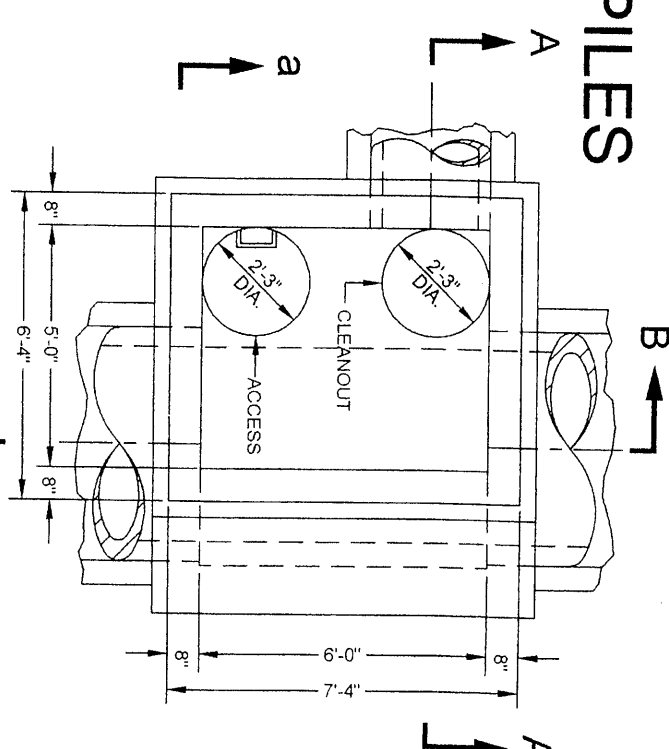
SECTION a-a



SECTION C-C



ROOF PLAN



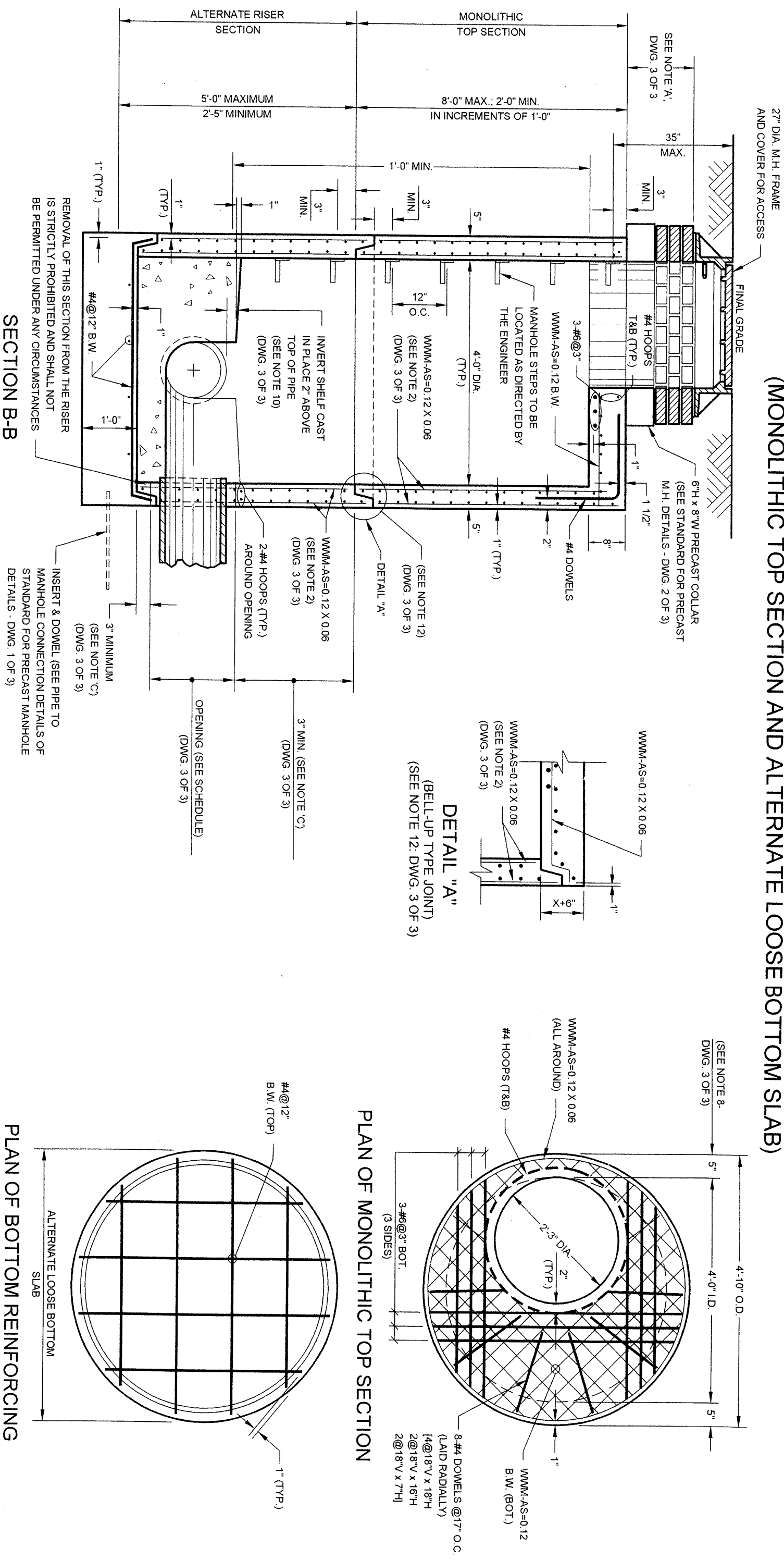
27" DIA. M.H. FRAME AND
COVER FOR ACCESS



OTTOM RE

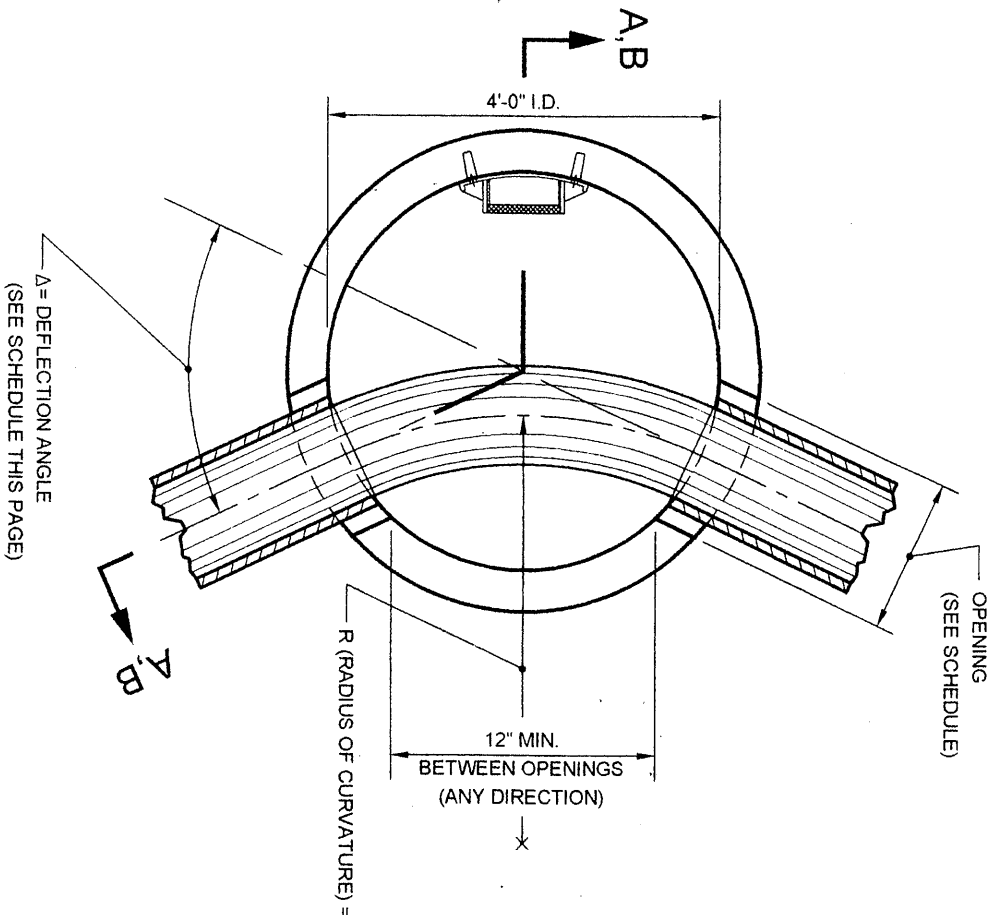
8/10/07
DATE

(MONOLITHIC TOP SECTION AND ALTERNATE LOOSE BOTTOM SLAB)



P.E. _____
8/10/07
DATE _____

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD FOR 4'-0" DIAMETER PRECAST MANHOLE (DWG. 3 OF 3)
(MISCELLANEOUS DETAIL, NOTES AND SCHEDULE)



$$R \text{ (RADIUS OF CURVATURE)} = \frac{2}{\tan(\Delta/2)}$$

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

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. 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".

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, AS=0.12 CIR. X 0.06 LONG. - E.F. WITH 2-#4 HOOPS AROUND ALL CAST PIPE OPENINGS (I-E-F). (THE 2-#4 HOOPS WILL NOT BE REQUIRED AT CORED OPENINGS FOR BASIN CONNECTIONS.) (ALL VALUES OF AREA OF STEEL (AS) 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.
- (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 MANUFACTURERS 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 - FS = 60,000 PSI. WWM - FS = 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) AND (B) THE EMBEDMENT LENGTH SHALL BE T-1" (WHERE T IS THE THICKNESS OF RISER WALL); SEE DETAIL 'A' ON DWG. 2 OF 3.

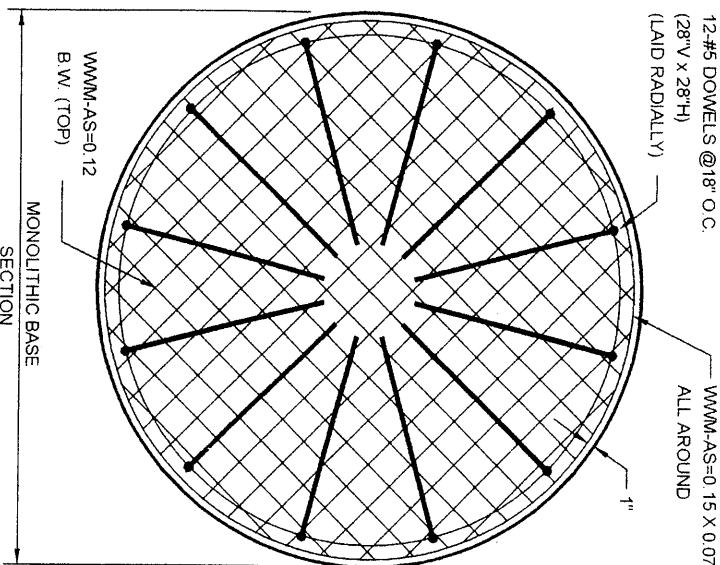
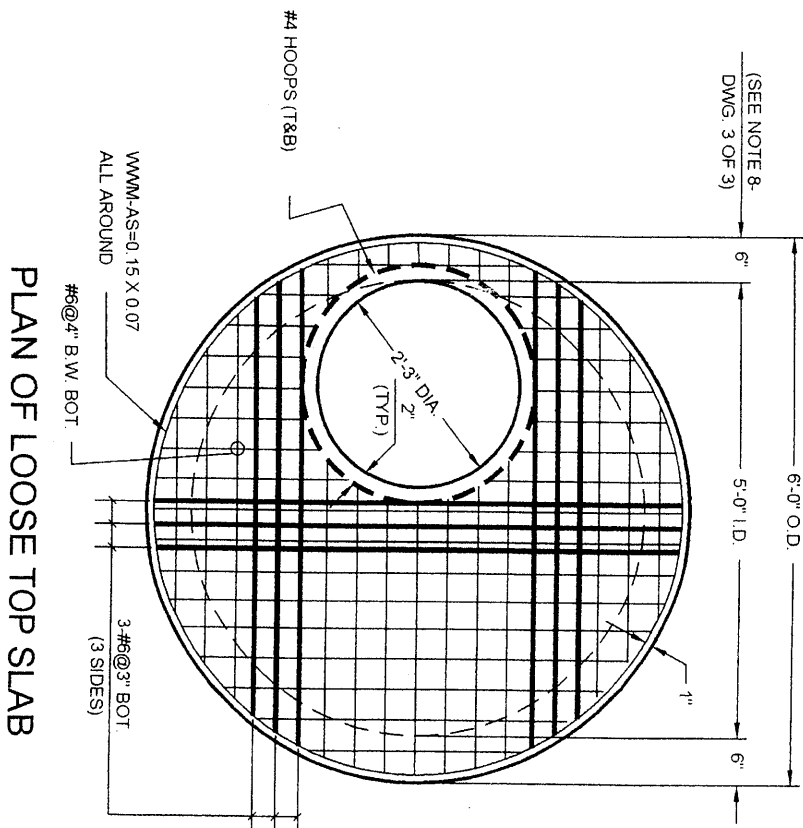
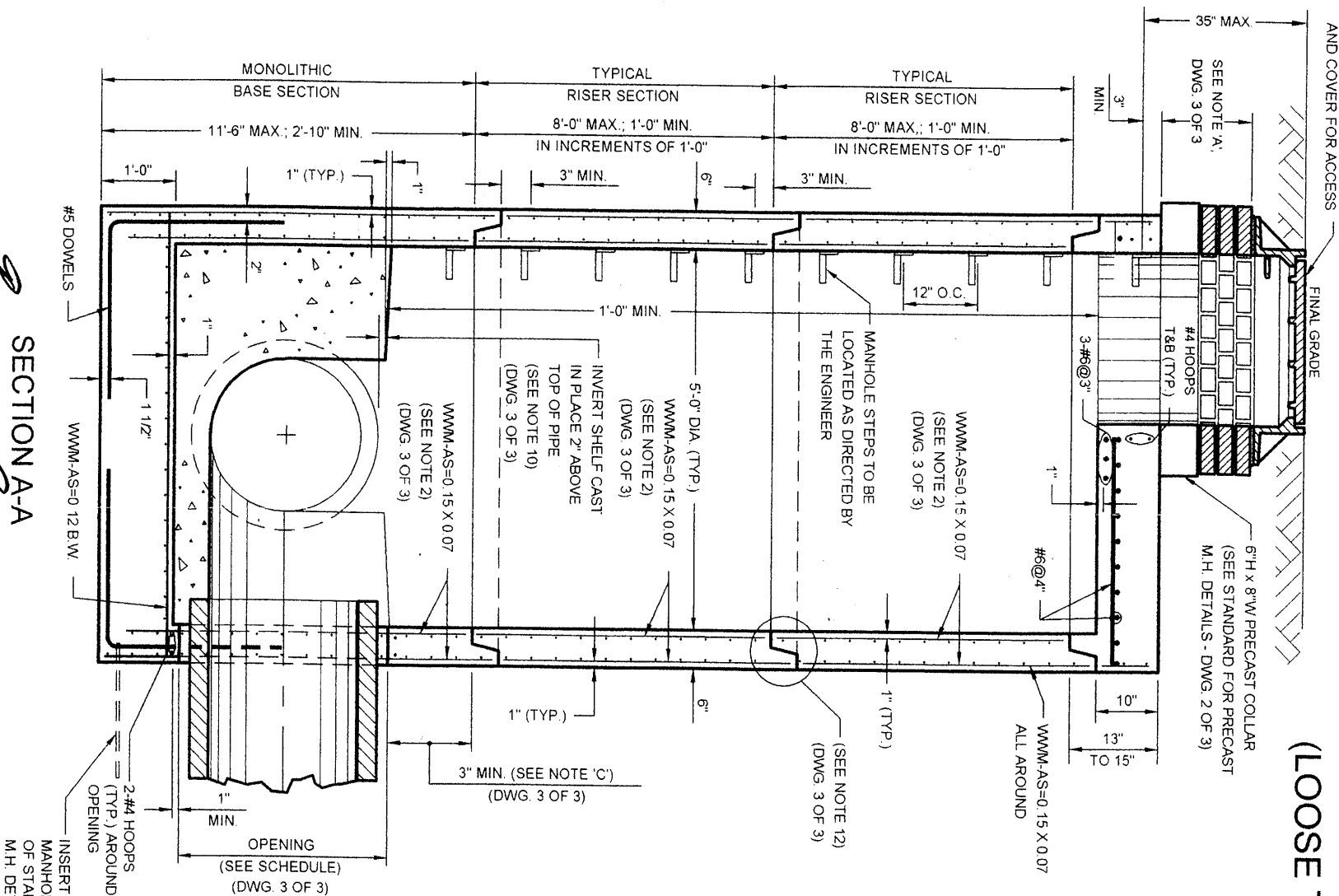
John M. Fournier
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
P.E.

7/19/07
DATE

Magedi Fawzi
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
P.E.

8/10/07
DATE

STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 1 OF 3)
(LOOSE TOP SLAB AND MONOLITHIC BASE SECTION)



SECTION A-A
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION

P.E.

DATE

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.E.

DATE

27" DIA. M.H. FRAME
AND COVER FOR ACCESS



REMOVAL OF THIS SECTION FROM THE RISER IS STRICTLY PROHIBITED AND SHALL NOT BE PERMITTED UNDER ANY CIRCUMSTANCES

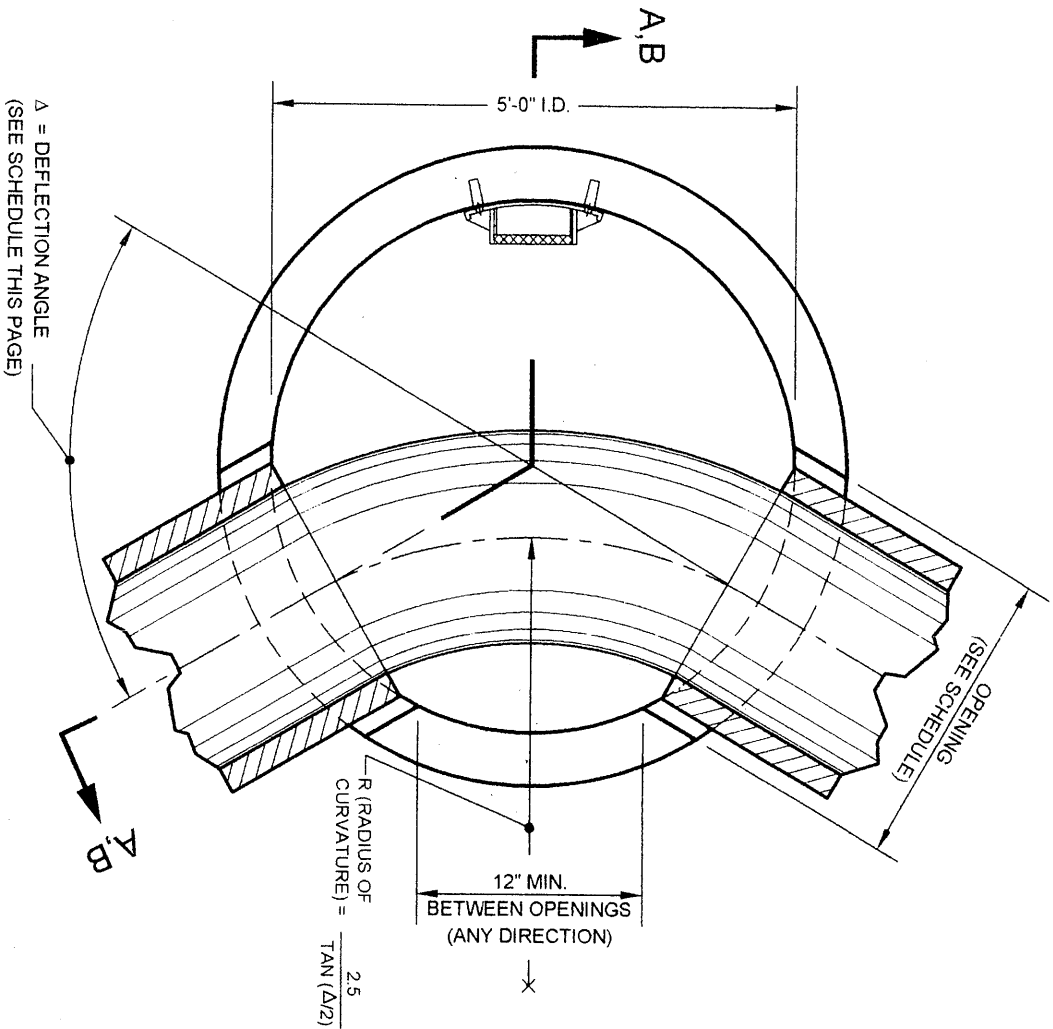
(BELL-UP TYPE JOINT)
(SEE NOTE 12: DWG. 3 OF 3)

PLAN OF BOTTOM REINFORCING
(SEE NOTE 'B' - DWG. 3 OF 3)

DATE _____

DATE _____

STANDARD FOR 5'-0" DIAMETER PRECAST MANHOLE (DWG. 3 OF 3)
(MISCELLANEOUS DETAIL, NOTES AND SCHEDULE)



PLAN OF BASE SECTION

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

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. 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"

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 MANUFACTURE R 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 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 COMPLEES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH WWM, AS=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 (AS) 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.
- (4) FOR DETAILS OF STEPS, JOINTS, GASKETS, PRECAST COLLARS, PIPE TO MANHOLE CONNECTIONS, PILE CAP AND PCURED 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 MANUFACTURERS 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 - FS = 60,000 PSI, WWM - FS = 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 1'-1" (WHERE '1' IS THE THICKNESS OF RISER WALL); SEE DETAIL 'A'.

George W. Loran
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
P.E.

7/9/07
DATE

Maedie Fano
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
P.E.

8/10/07
DATE

[illegible]

DATE _____

(MONOLITHIC TOP SECTION AND ALTERNATE LOOSE BOTTOM SLAB)

The drawing consists of two parts: a plan view and a detail view.

Plan View: Shows a cross-section of a slab with a grid of reinforcement bars. The top edge is labeled "F (B.W.)(TOP)" and "(SEE CHART A - DWG. 4 OF 4)". The bottom edge is labeled "ALTERNATE LOOSE BOTTOM SLAB". A dimension of "1\" is shown at the bottom edge, with "(TYP.)" below it.

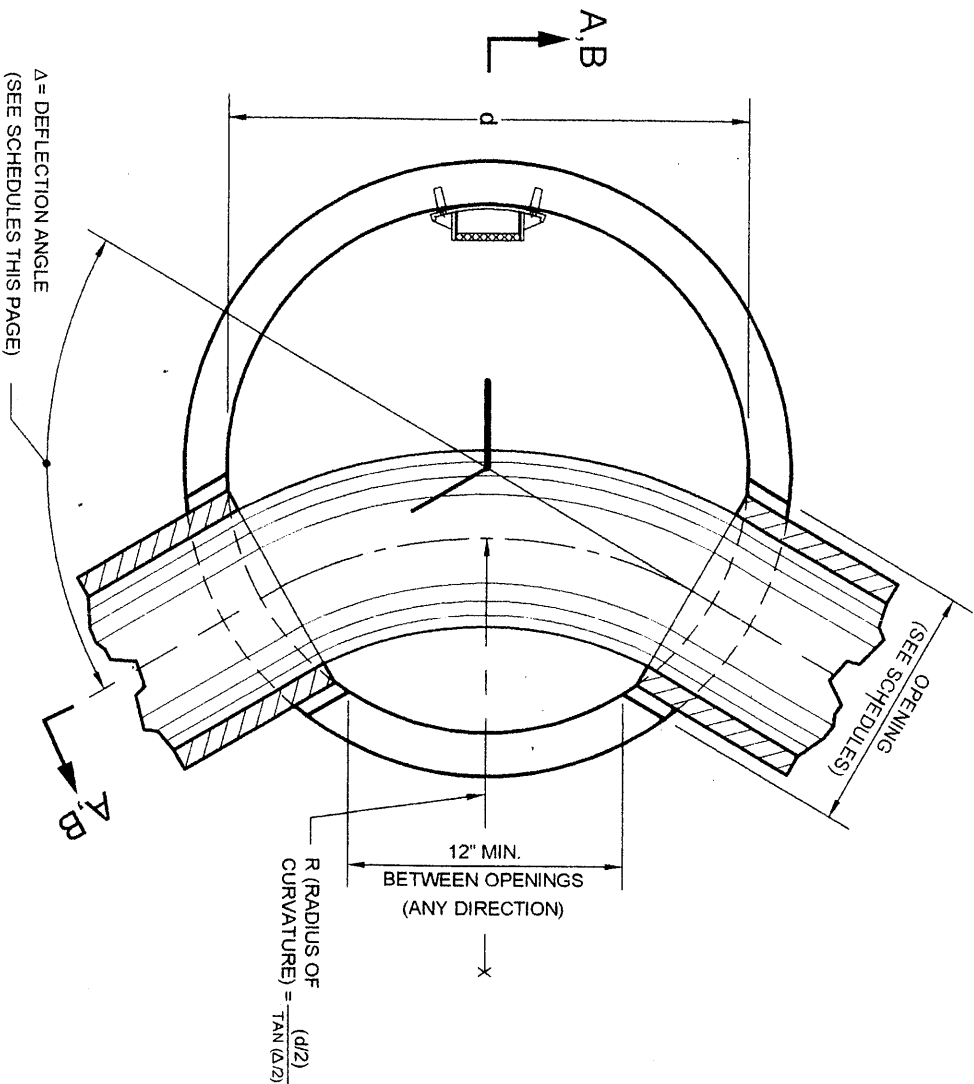
Detail View: Labeled "DETAIL 'A'", it shows a cross-section of the bell-up joint. It includes a reinforcement bar labeled "#6@4\". A dimension of "1\" is shown for the top edge. A dimension of "X+6\" is shown for the bottom edge, with "12\" MIN." below it. The label "AS" is shown near the bottom edge. A note "(SEE NOTE 2 AND CHART A - DWG. 4 OF 4)" is shown near the bottom edge.

DATE _____

DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE _____

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

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. 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". MINIMUM HEADROOM FOR SHALLOW MANHOLE SHALL BE 1'-0".

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 (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:

- 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).
- MANHOLE RISER REINFORCING COMPLIES WITH AREA REQUIREMENTS OF ASTM C478, EXCEPT THAT ALL WALL SECTIONS SHALL BE REINFORCED WITH WWM, AS-(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 (AS) ARE IN SQUARE INCHES AND ARE A MINIMUM.)
- CORED OPENINGS WILL BE PERMITTED FOR 12" DIA. BASIN CONNECTIONS ONLY. THE MAXIMUM CORED OPENING SHALL BE 16" FOR THESE BASIN CONNECTIONS.
- 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 AND STD. FOR ALTERNATE MONOLITHIC BASE SECTIONS FOR PRECAST MANHOLES (POURED IN PLACE).
- 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.
- ALL COVER DISTANCES SHOWN FOR REINFORCEMENT ARE CLEAR DISTANCES.
- LIFTING HOLES SHALL BE LOCATED IN THE SECTIONS AS PER MANUFACTURER'S RECOMMENDATIONS AND GROUTED PRIOR TO BACKFILLING.
- THE VALUES OF THE WALL AND SLAB THICKNESSES ARE A MINIMUM.
- CONCRETE DESIGN MIX = 5,000 PSI (MIN. 28 DAY STRENGTH = 4,000 PSI; MAX. W/C = 0.47). REBARS - FS = 60,000 PSI, WWM - FS = 65,000 PSI.
- INVERT SHELVES SHALL HAVE A 1/2" PER LINEAR FOOT PITCH TOWARDS THE SEWER.
- THE OPENING DIAMETERS SHOWN IN THE SCHEDULE ARE MAXIMUM. THE MINIMUM OPENING DIAMETERS SHALL BE AS FOLLOWS: 8" TO 24" DIA. PIPES = O.D.+3", 30" TO 36" DIA. PIPES = O.D.+4" AND 54" TO 8" DIA. PIPES = O.D.+5".
- 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 10" THICK AND (B) THE EMBEDMENT LENGTH SHALL BE T-1" (WHERE T IS THE THICKNESS OF RISER WALL); SEE DETAIL "A" ON DRAWING 30B.

Scott M. Lavan
ASSISTANT COMMISSIONER, DESIGN
DEPARTMENT OF DESIGN AND CONSTRUCTION
P.E.

7/9/07
DATE

Maedi Chana
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
P.E.

8/10/07
DATE

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	F	h
			MONOLITHIC BASE SECTION	ALTERNATE RISER SECTION				
6'-0"	7'-2"	7"	11'-6" MAX.; 3'-5" MIN.	7'-4" MAX.; 3'-5" MIN.	0.18 X 0.09	#4	#5@12"	15" TO 18"
7'-0"	8'-4"	8"	11'-6" MAX.; 3'-5" MIN.	7'-11" MAX.; 3'-5" MIN.	0.21 X 0.10	#4	#6@12"	15" TO 18"
8'-0"	9'-6"	9"	11'-6" MAX.; 4'-1" MIN.	9'-1" MAX.; 4'-1" MIN.	0.24 X 0.12	#5	#6@9"	15" TO 20"
10'-0"	11'-10"	11"	11'-6" MAX.; 5'-4" MIN.	10'-10" MAX.; 5'-0" MIN.	0.30 X 0.15	#6	#7@8"	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)

ASSISTANT COMMISSIONER, DESIGN
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Joseph M. Lavan

P.E.

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7/9/07

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Maedi Fawad

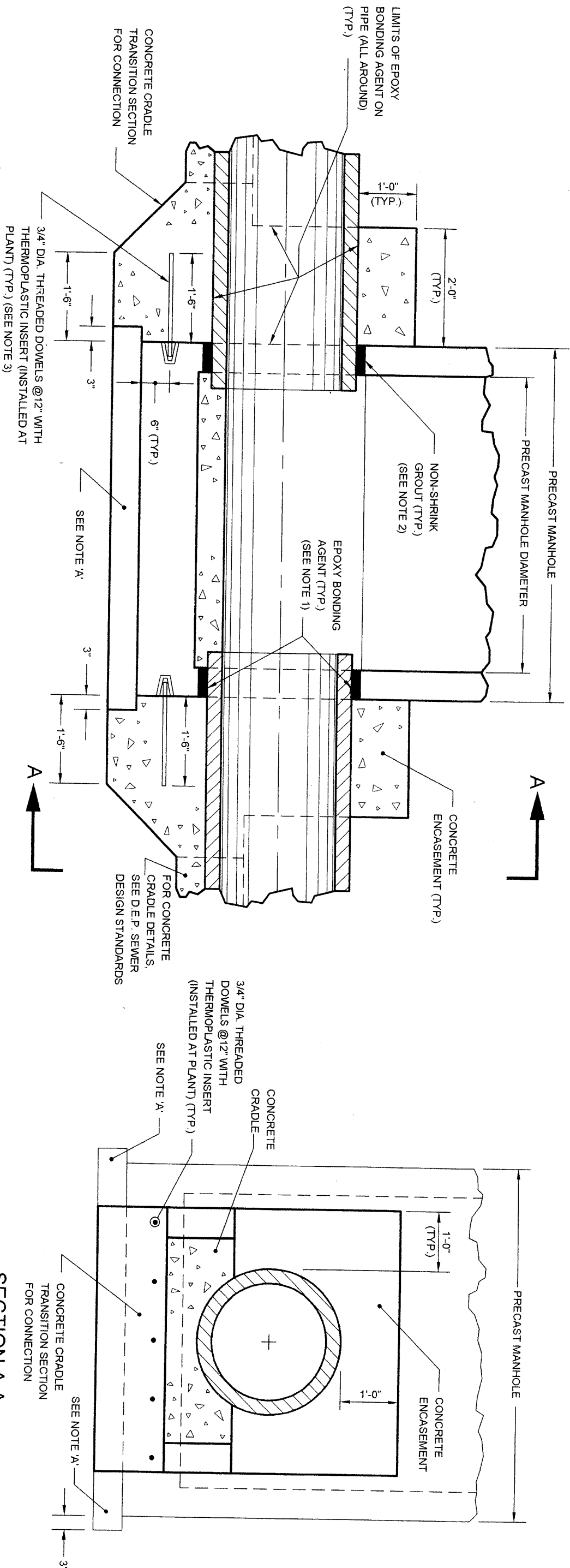
P.E.

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8/10/07

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

(PIPE TO MANHOLE CONNECTION DETAILS)



NOTE A:

LEVELING PAD AND/OR PILE CAP - FOR MHS ON GRADE, USE 6" WELL COMPACTED STONE BALLAST. FOR MHS 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.

SECTIONAL PROFILE

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.

SECTION A-A

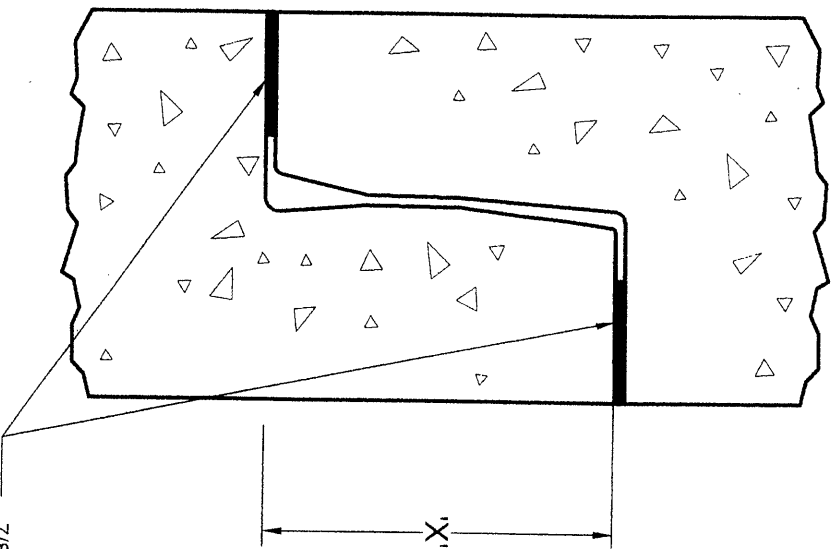
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7/9/07
DATE

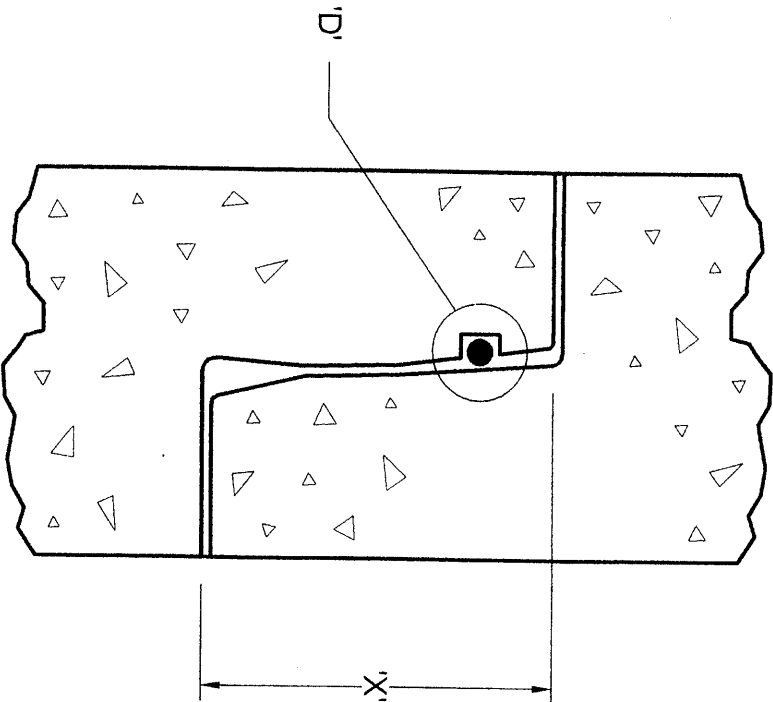
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8/10/07
DATE

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

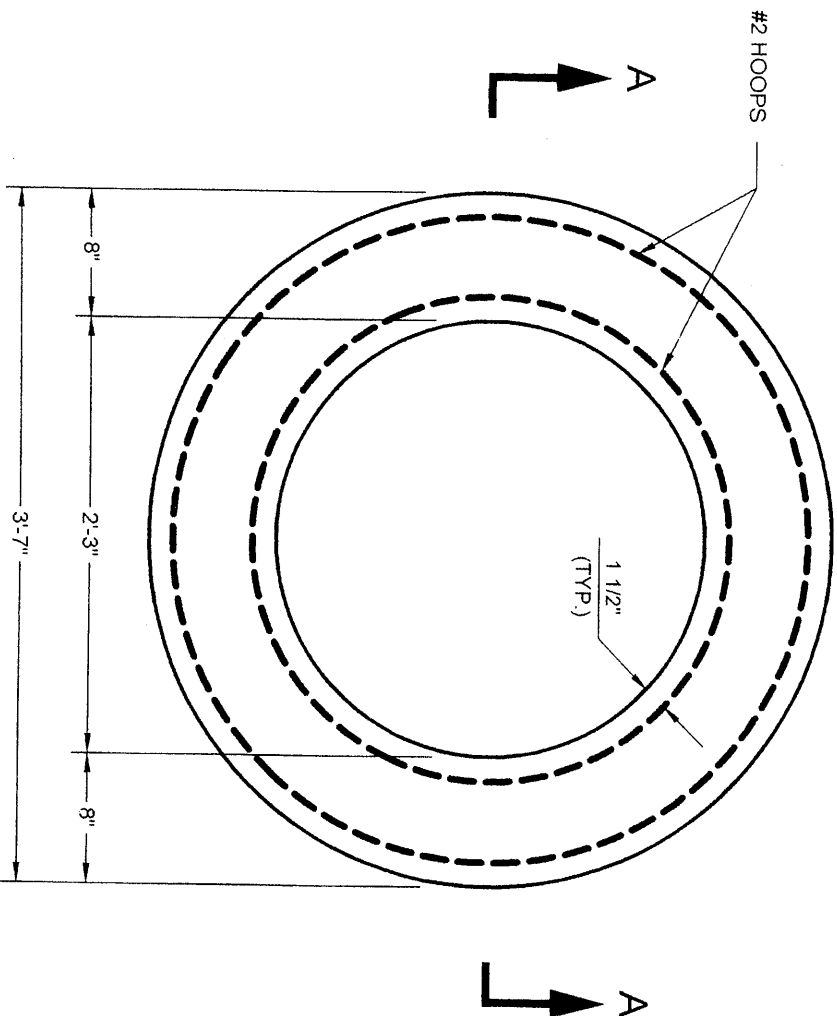


7/8" X 7/8" OR 1" DIA. SELF
SEALING BUTYL GASKET.
QUALITY EQUAL TO FEDERAL
SPEC. #SS-S-00210 (TYP.)

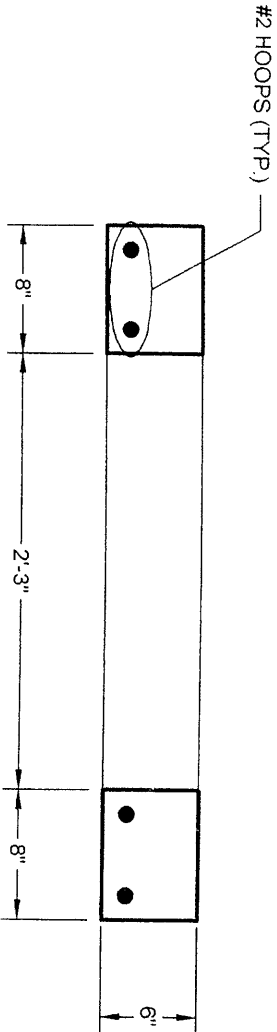


'O' RING JOINT

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.



PLAN OF 6"H X 8"W PRECAST COLLAR

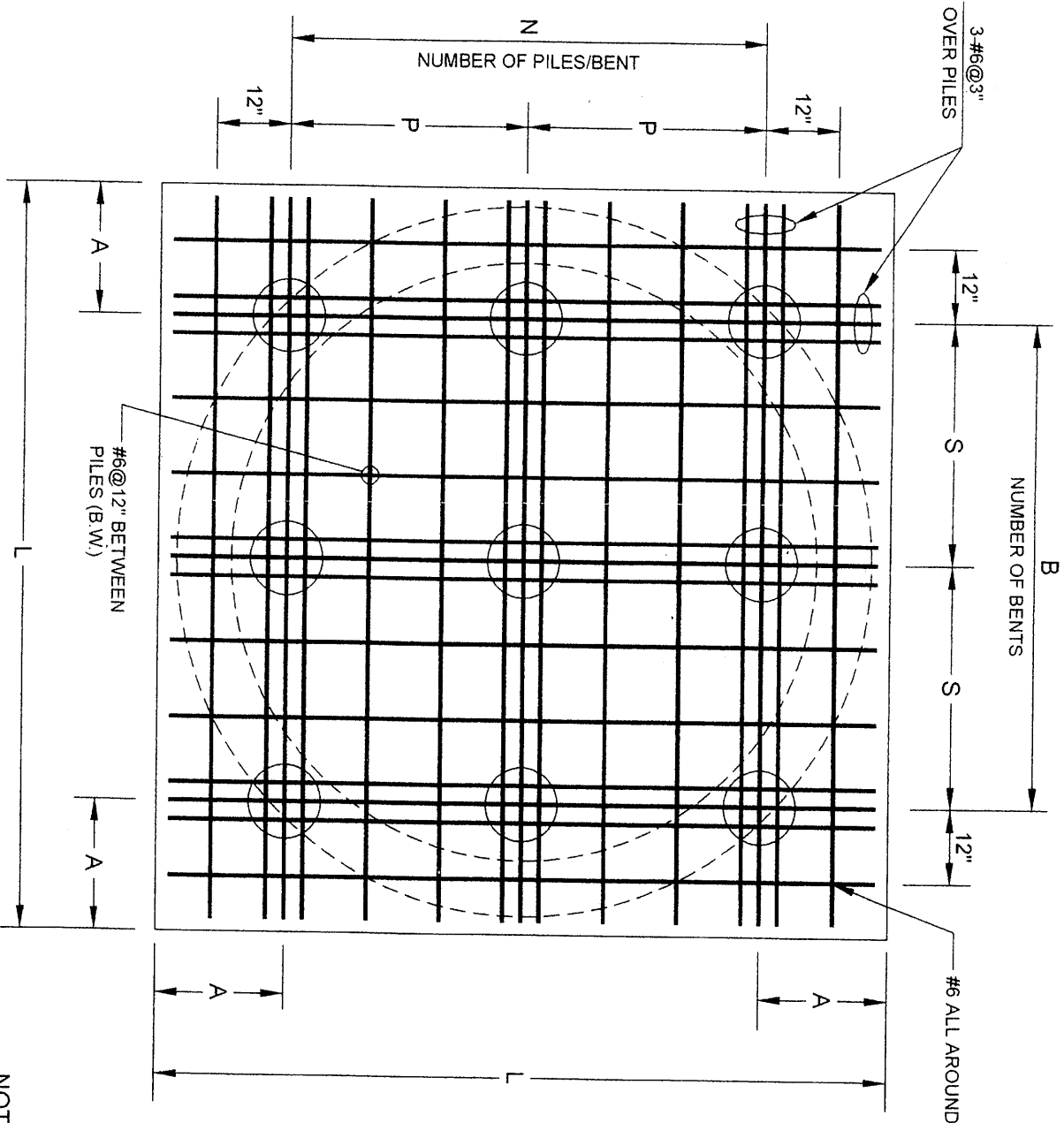


SECTION A-A

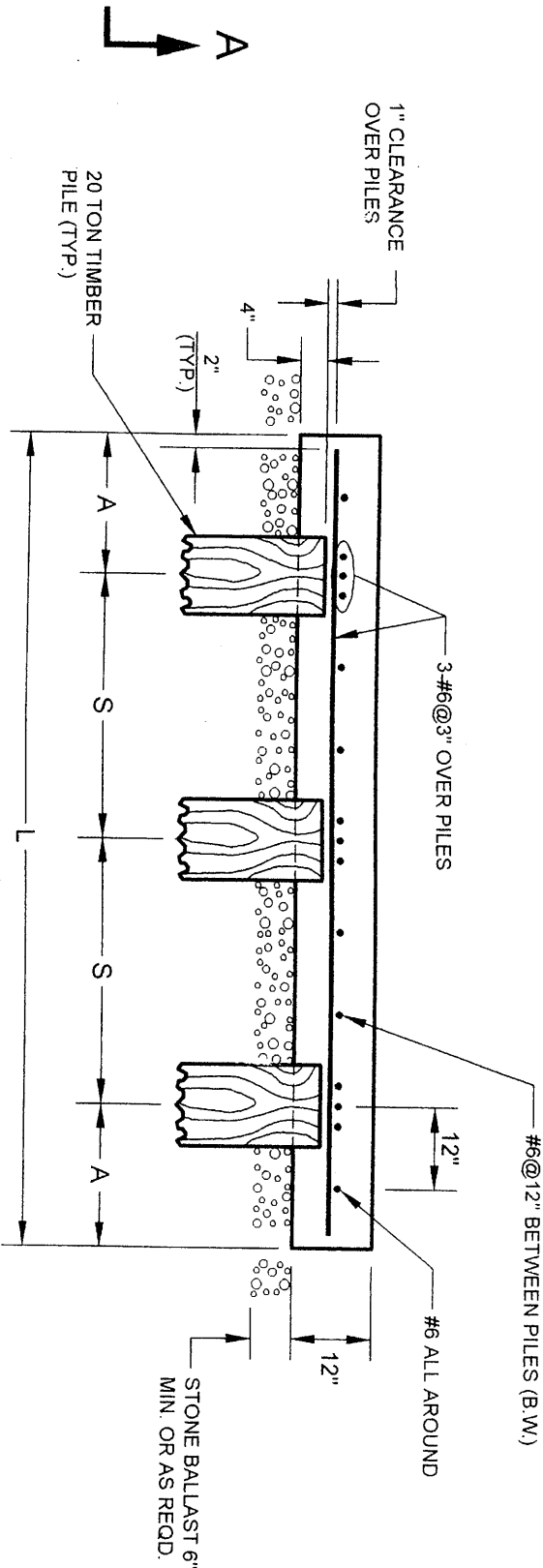
Greg M. Lamm P.E. 7/9/07
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Magedi Farah P.E. 8/10/07
DIRECTOR OF ENGINEERING
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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



PILE PLAN



SECTION A-A

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
 - (B) ADDITIONAL CONCRETE
 - (C) ADDITIONAL STEEL REINFORCING BARS
 - (D) STONE BALLAST

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P.E.

7/9/07
DATE

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