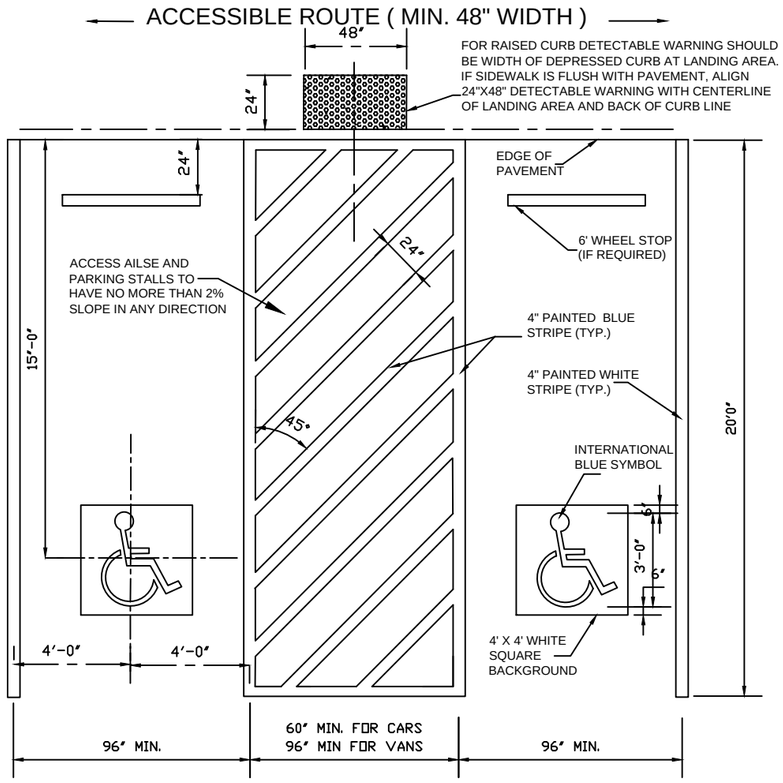


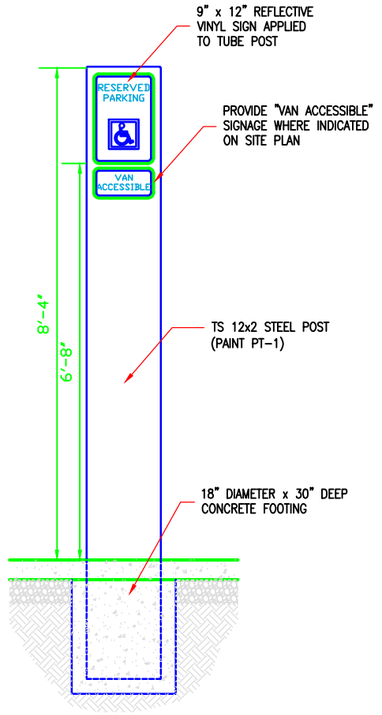
NOTE:

1. STRIPING AND CONSTRUCTION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND CITY OF GLENPOOL CODES AND SPECIFICATIONS.

2. ALL PAVEMENT MARKINGS AND STRIPING IN THE RIGHT-OF-WAY SHALL BE THERMOPLASTIC.

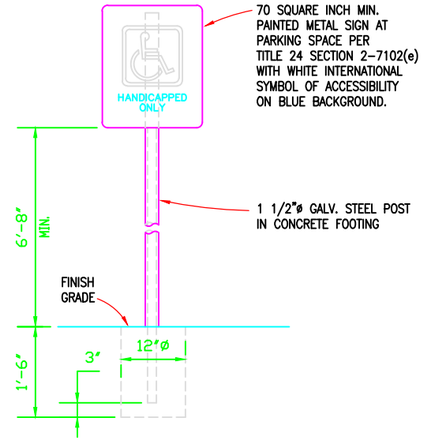
HANDICAP STRIPING AT PARKING SPACES

SCALE: N.T.S.



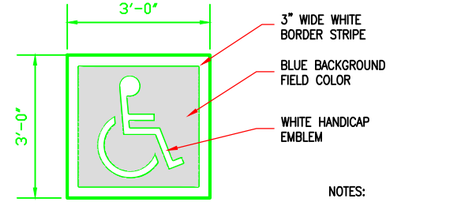
HANDICAP SIGNAGE AT PARKING SPACES

SCALE: N.T.S.



HANDICAP SIGNAGE AT PARKING SPACES

SCALE: N.T.S.



NOTES:

1. ALIGN BOTTOM OF BORDER STRIPE WITH END OF PARKING SPACE STRIPE.
2. CENTER PARKING EMBLEM IN SPACE.

HANDICAP EMBLEM FOR PARKING SPACES

SCALE: N.T.S.

BEFORE YOU DIG.. CALL OKIE 1-800-522-6543

ADA HANDICAP PARKING STANDARDS

.

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

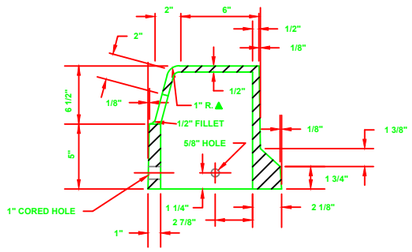
REVISION	BY	DATE

PLAN SCALE: 1"=

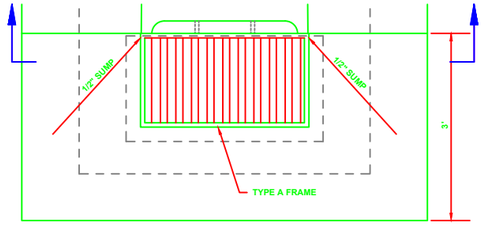
PROFILE SCALE: HORIZONTAL: . VERTICAL: .

DRAWN	.	.	APPROVED:
DESIGNED	.	.	
OFFICE ENGR.	.	.	
CHIEF ENGR.	.	.	
RECOMMENDED DIRECTOR			CITY ENGINEERING DEPT.
RECOMMENDED			DATE: .
ENGINEERING DIRECTOR			SHEET 1 OF 21

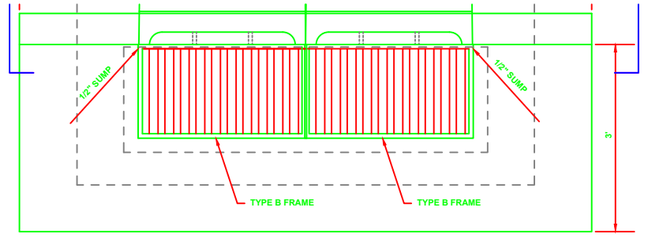
ATLAS PAGE NO:



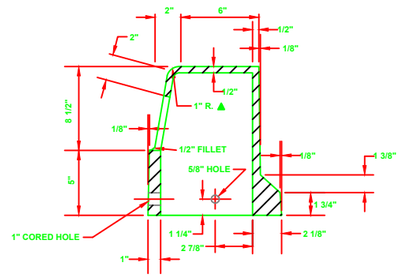
6" BARRIER CURB



CAST IRON STORM SEWER CURB INLET

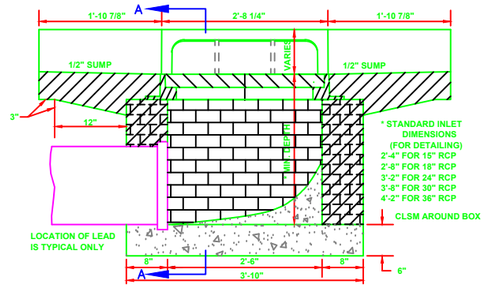


CAST IRON STORM SEWER CURB INLET



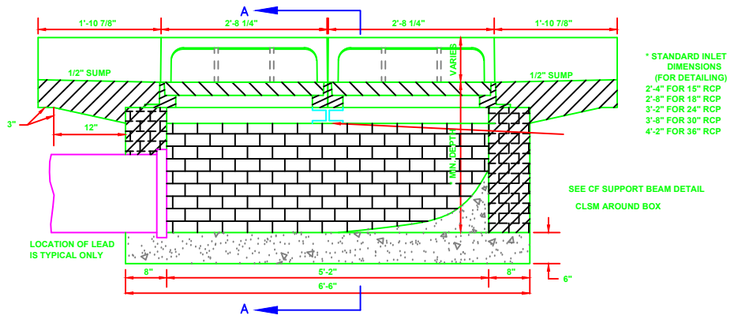
8" BARRIER CURB

BARRIER CURBS



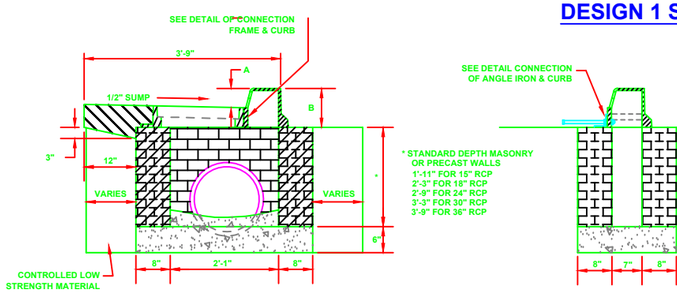
SECTION D-D

DESIGN 1 SINGLE GRATE

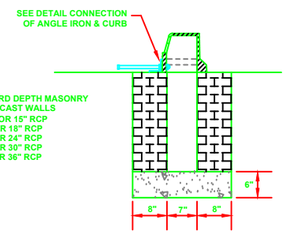


SECTION C-C

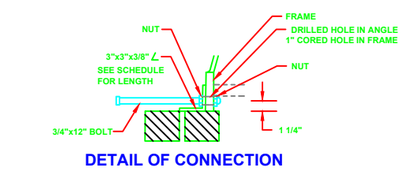
DESIGN 2 & 3 DOUBLE AND MULTIPLE GRATE



SECTION A-A

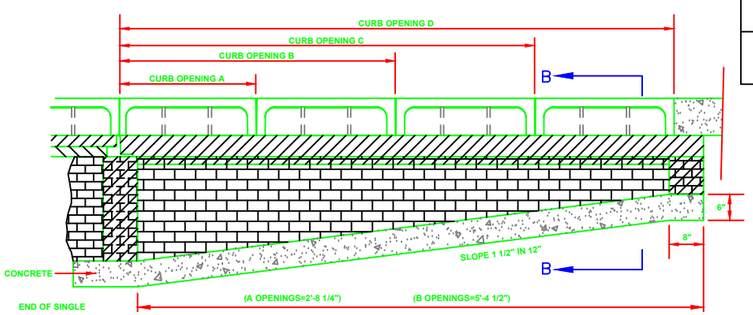


SECTION B-B



DETAIL OF CONNECTION

DESIGN NO.	TYPE OF CURB	DIMENSIONS A	DIMENSIONS B
1	4" MOUNTABLE	4 1/2"	9 1/2"
	6" MOUNTABLE	6 1/2"	11 1/2"
	8" BARRIER	8 1/2"	13 1/2"
2	4" MOUNTABLE	4 1/2"	9 1/2"
	6" MOUNTABLE	6 1/2"	11 1/2"
	8" BARRIER	8 1/2"	13 1/2"
	4" MOUNTABLE	4 1/2"	9 1/2"



QUANTITIES (FOR 18" RCSP MIN. DEPTH)									
INLET	CURB OPENING	CLASS A CONCRETE	INLET		INLET FRAME & GRATE	CAST IRON CURB INLET	ANGLE IRON		
DESIGN	DESIGNATION	CU. YD.	BASE AM'T	ADD'L C.F. PER VERT. FT.	EACH	EACH	NO.	LENGTH	
1		24	18.00	8.00	1	1			
	A	24	28.02	11.59	1	2	1	2'-5 3/8"	
	B	44	30.81	15.16	1	3	1	5'-1 5/8"	
	C	64	35.43	18.75	1	4	1	7'-9 7/8"	
	2A	44	32.63	15.16	1	3	2	2'-5 3/8"	2'-5 3/8"
	A-B	64	37.84	18.75	1	4	2	2'-5 3/8"	5'-1 5/8"
	A-C	84	42.44	22.33	1	5	2	2'-5 3/8"	7'-9 7/8"
	2B	64	43.66	22.33	1	5	2	5'-1 5/8"	5'-1 5/8"
	B-C	74	48.24	25.92	1	6	2	5'-1 5/8"	7'-9 7/8"
	2C	74	52.84	29.50	1	7	2	7'-9 7/8"	7'-9 7/8"
2		41	26.00	11.56	2	2			
	B	61	38.82	18.72	2	4	1	5'-1 5/8"	
	D	81	46.63	25.89	2	6	1	10'-4 1/8"	
	2B	81	51.66	25.89	2	6	2	5'-1 5/8"	5'-1 5/8"
	B-D	101	59.69	33.05	2	8	2	5'-1 5/8"	10'-4 1/8"
	2D	121	67.72	40.23	2	10	2	10'-4 1/8"	10'-4 1/8"
3 ■		74	41.50	18.45	4	4			
	B	94	54.32	25.61	4	6	1	5'-1 5/8"	
	D	114	62.32	32.78	4	8	1	10'-4 1/8"	
	2B	114	67.14	32.78	4	8	1	5'-1 5/8"	5'-1 5/8"
	B-D	134	74.95	39.95	4	10	2	5'-1 5/8"	10'-4 1/8"
	2D	154	83.22	47.11	4	12	2	10'-4 1/8"	10'-4 1/8"

■ QUANTITIES SHOWN ARE FOR 2 DOUBLE GRATE INLETS.

CAST IRON CURB INLETS

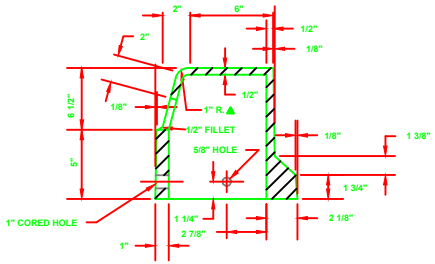
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

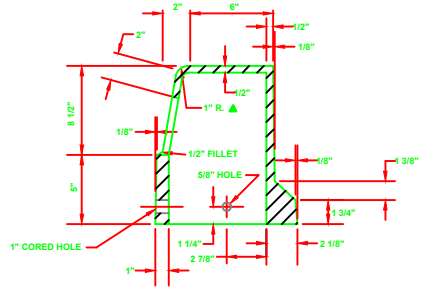
REVISION	BY	DATE

PLAN SCALE: 1" = ∞

DRAWN	-	-	APPROVED:
DESIGNED	-	-	
OFFICE ENGR.	-	-	

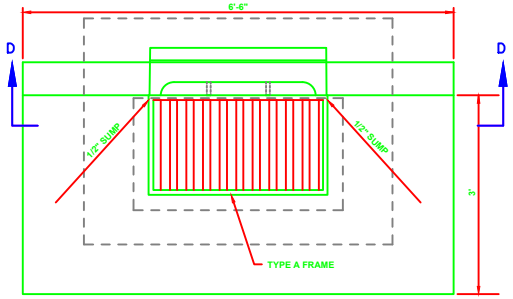


6" BARRIER CURB

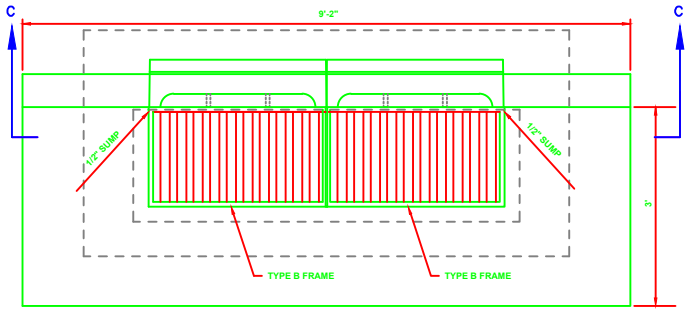


8" BARRIER CURB

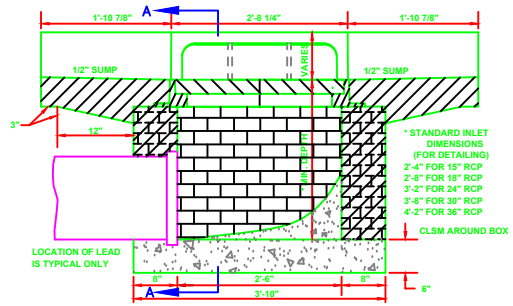
BARRIER CURBS



CAST IRON STORM SEWER CURB INLET

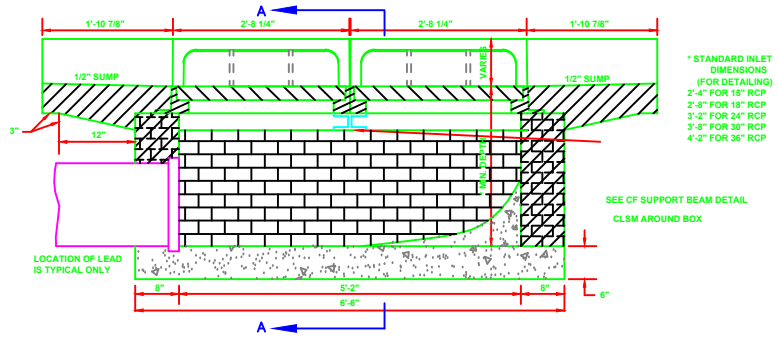


CAST IRON STORM SEWER CURB INLET



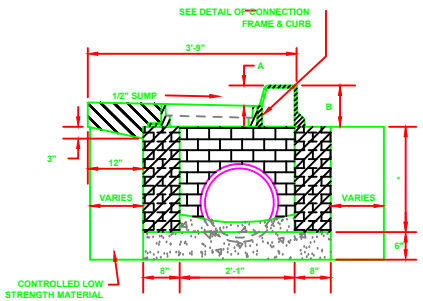
SECTION D-D

DESIGN 1 SINGLE GRATE

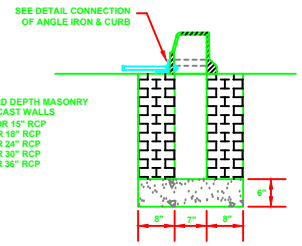


SECTION C-C

DESIGN 2 & 3 DOUBLE AND MULTIPLE GRATE



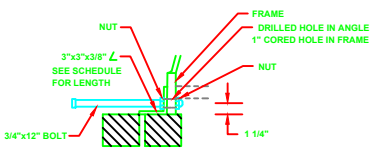
SECTION A-A



SECTION B-B

QUANTITIES (FOR 18" RCSP MIN. DEPTH)									
INLET	CURB OPENING	CLASS A CONCRETE	INLET		INLET FRAME & GRATE	CAST IRON CURB INLET	ANGLE IRON		
DESIGN	DESIGNATION	CU. YD.	BASE AM'T	ADD'L C.F. PER VERT. FT.	EACH	EACH	NO.	LENGTH	
1	A	.24	18.00	8.00	1	1			
	B	.34	25.02	11.66	1	2	1	2'-5 3/8"	
	C	.44	32.01	15.16	1	3	1	5'-1 5/8"	
	D	.54	38.43	18.75	1	4	1	7'-9 7/8"	
	2A	.44	32.03	15.16	1	3	2	2'-5 3/8"	2'-5 3/8"
	A-B	.64	47.44	18.75	1	4	2	2'-5 3/8"	5'-1 5/8"
	A-C	.64	47.44	22.33	1	5	2	2'-5 3/8"	7'-9 7/8"
	2B	.64	43.66	22.33	1	5	2	5'-1 5/8"	5'-1 5/8"
	B-C	.74	49.24	25.92	1	6	2	5'-1 5/8"	7'-9 7/8"
	2C	.84	52.66	29.50	1	7	2	7'-9 7/8"	7'-9 7/8"
2		.41	26.00	11.66	2	2			
	B	.61	38.42	15.72	2	3	1	5'-1 5/8"	
	C	.81	48.83	25.89	2	5	1	10'-6 1/8"	
	2B	.81	51.66	25.89	2	5	2	5'-1 5/8"	5'-1 5/8"
	B-D	1.01	59.49	33.05	2	6	2	5'-1 5/8"	10'-6 1/8"
	2D	1.21	67.72	40.23	2	10	2	10'-6 1/8"	10'-6 1/8"
3 ■		.74	41.99	18.45	4	4			
	B	.94	54.32	25.61	4	6	1	5'-1 5/8"	
	C	1.14	62.32	32.78	4	8	1	10'-6 1/8"	
	2B	1.14	67.14	32.78	4	8	2	5'-1 5/8"	5'-1 5/8"
	B-D	1.34	74.66	39.95	4	10	2	5'-1 5/8"	10'-6 1/8"
	2D	1.54	83.22	47.11	4	12	2	10'-6 1/8"	10'-6 1/8"

■ QUANTITIES SHOWN ARE FOR 2 DOUBLE GRATE INLETS.

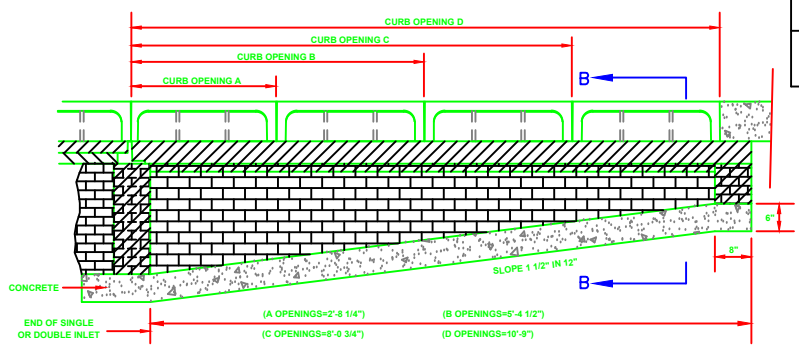


DETAIL OF CONNECTION ANGLE IRON & CAST IRON CURB

NOTE: ANGLE IRON TO BE BOLTED TO CURB WITH 3-3/4"x12" MACHINE BOLTS IN EACH CURB SECTION.

DESIGN NO.	TYPE OF CURB	DIMENSIONS A	DIMENSIONS B
1	4" MOUNTABLE	4 1/2"	9 1/2"
	6" MOUNTABLE	6 1/2"	11 1/2"
	6" BARRIER	6 1/2"	11 1/2"
	8" BARRIER	8 1/2"	13 1/2"
2	4" MOUNTABLE	4 1/2"	9 1/2"
	6" MOUNTABLE	6 1/2"	11 1/2"
	6" BARRIER	6 1/2"	11 1/2"
	8" BARRIER	8 1/2"	13 1/2"
3	4" MOUNTABLE	4 1/2"	9 1/2"
	6" MOUNTABLE	6 1/2"	11 1/2"
	6" BARRIER	6 1/2"	11 1/2"
	8" BARRIER	8 1/2"	13 1/2"

DESIGN 1 & 2 ADDITIONAL OPENINGS



SECTION C-C

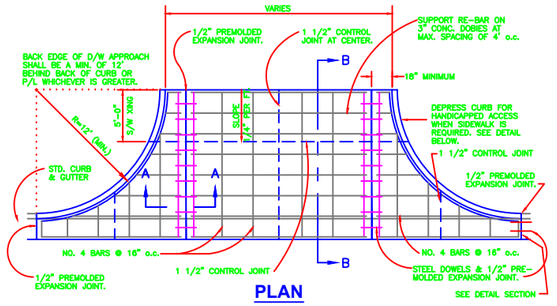
CAST IRON
CURB INLETS

CITY OF GLENPOOL, OKLAHOMA

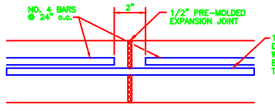
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"= . DRAWN . APPROVED: . DESIGNED . OFFICE ENGR. . PROFILE SCALE: CHIEF ENGR. . HORIZONTAL: . VERTICAL: . RECOMMENDED: DIRECTOR . RECOMMENDED: CITY ENGINEERING DEPT. ENGINEERING DIRECTOR DATE . ATLAS PAGE NO: SHEET X OF X

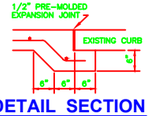


PLAN

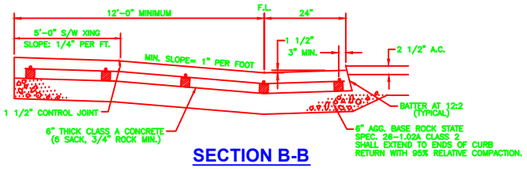


SECTION A-A

NOTE:
S/W XING MAY BE MOVED NO CLOSER THAN 7'-0" BEHIND F.L.

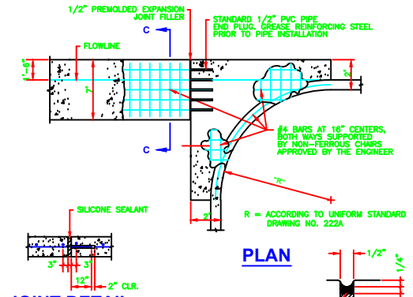


DETAIL SECTION



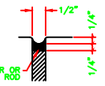
SECTION B-B

NOTE: MULTI FAMILY UNITS SHALL ALSO USE THIS APPROACH.
WHERE A NEW DRIVEWAY IS BEING INSTALLED IN EXISTING CURB, USE EPOXYED DOWELS OR SEE DETAIL SECTION FOR ALTERNATE INSTALLATION.

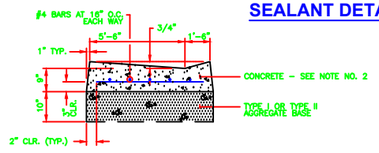


PLAN

JOINT DETAIL



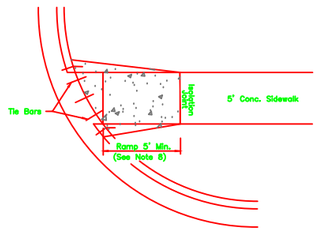
SEALANT DETAIL



SECTION C-C

NOTES:

1. FINISHED ASPHALT CONCRETE SURFACE TO BE FLUSH WITH CROSS GUTTER LIP.
2. ADJACENT SPANDREL SHALL BE 9" THICK P.C.C.



SIDEWALK HANDICAP ACCESS

NOTES

General Notes:

a. The standard curb-ramp lay-out shall be used whenever possible. Any deviation from the standard curb-ramp plans shall be approved by the City Engineer or designee on a case by case basis.

b. The standard curb-ramp drawings supersede all previous drawings and shall be part of the new curb ramp standard drawings.

c. All alternate ramps shall be approved by the City Engineer prior to construction.

Curb Ramp Notes:

1. A curb ramp is defined as the entire concrete surface which includes the ramp & flared sides. The 4' - 0" wide center portion, including the detectable surface, shall have the sloped plane of 8.33% (1:12) maximum, and cross slope, not to exceed 2%. The "flared side" of the ramp and shall lie on a slope of 10% (1:10) maximum measured along the curb. The curb ramp shall have a surface tolerance of 1/4" per 10 foot straight edge maximum.

2. The ramp center line and path of travel must be parallel to the sidewalk. The full width of the ramp shall lie within the crosswalk area. It is desirable that the location of the ramp be as close as possible to the center of the crosswalk.

3. The 4'-0" min. distance between flared sides of the two adjacent curb ramps may be reduced to 3'-0" with documentation of hardship indicating legal and or physical constraints provided to the City Engineer.

4. Existing utility boxes and covers shall be adjusted flush with the curb ramp surface and shall not straddle any change in plane or material. Existing utility box frames and covers shall have matching surface finish on the entire frame and cover. New utility boxes shall not be placed within the detectable border.

5. The surface of the curb ramp and detectable surface material shall be stable, firm and slip resistant. The concrete curb ramp surface shall be broom finished transverse to the axis of the ramp and shall be slightly rougher than the finish of the adjacent sidewalk surface.

6. A level landing 4'-0" deep, with a 2% maximum slope in each direction shall be provided at the upper end of each curb ramp to allow safe egress from the ramp surfaces. The width of the level landing shall be at least as wide as the width of the ramp.

7. When vertical obstructions are present near the curb at the end of the flared side or when the curb-ramp is diagonal to the curb which will result in an extremely long flared side surface, the affected flared side may be cut and terminated perpendicular to the curb, provided that the maximum slope of 10% is achieved on each of the resulting planes.

8. The length of ramp may be constructed up to 30 feet long to achieve the slope requirement.

9. Existing vertical utility poles or street light poles may be incorporated into the flared sides, if necessary. The vertical obstruction shall be a minimum of 6 inches away from the edge of the ramp. Pedestrian crosswalk push button poles, fire department call box poles and other poles with activated devices, may not be placed in the curb-ramp at any time. No new vertical obstructions may be located in the curb ramp or the grooved border.

10. Curb Ramp shall be constructed with 8" thick concrete at collector and arterial streets; and with 6" thick concrete at residential street. All on top of 2" sand cushion.

Sidewalk Notes:

1. Minimum Sidewalk width shall be 4'-0" for residential, 5'-0" for commercial, and 6'-0" clear width whenever attached to the curb.
2. Sidewalk slope shall be maximum of 2% cross slope.
3. Whenever the width of the sidewalk is less than 5'-0", a 5' x 5' passing area with a maximum 2% slope in any direction at intervals of 200' shall be installed.
4. Whenever changing direction in a sidewalk, install a 5' x 5' passing area with maximum 2%slope in any direction.
5. Objects such as tree branches, signs, water fountains, etc. shall not protrude into the sidewalk more than 4" at the heights between 27" and 80".
6. Sidewalk shall be constructed of 4" thick concrete on top of 2" sand cushion.

Ramps:

When the rise in elevation is greater than 30" a series of ramps and landings will be required.

- Landing shall be 5'-0" in length and no greater than 2% in any direction.
- The maximum of a run is determined by the rise (30" maximum) and slope, as shown in the following table

COMMERCIAL DRIVE DETAILS

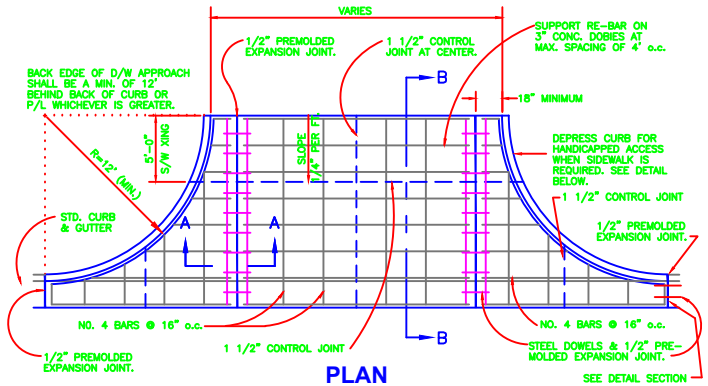
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

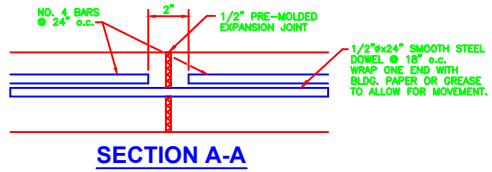
REVISION	BY	DATE

PLAN SCALE: 1" = 20'
PROFILE SCALE:
HORIZONTAL: -
VERTICAL: -
ATLAS PAGE NO:

DRAWN: - | - | APPROVED:
DESIGNED: - | -
OFFICE ENGR.: - | -
CHIEF ENGR.: - | -
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
CITY ENGINEERING DEPT.
DATE: -
SHEET X OF X

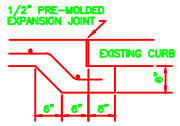


PLAN

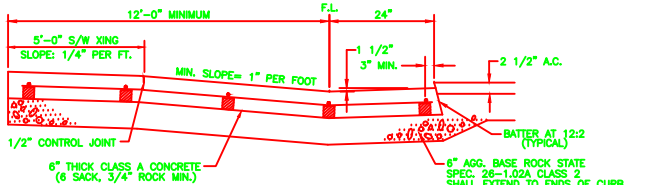


SECTION A-A

NOTE:
S/W XING MAY BE MOVED NO CLOSER THAN 7'-0" BEHIND F.L.

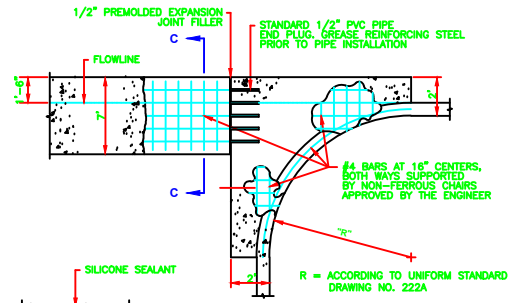


DETAIL SECTION

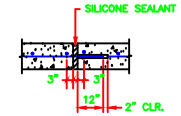


SECTION B-B

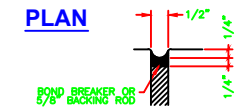
NOTE: MULTI FAMILY UNITS SHALL ALSO USE THIS APPROACH.
WHERE A NEW DRIVEWAY IS BEING INSTALLED IN EXISTING CURB, USE EPOXYED DOWELS OR SEE DETAIL SECTION FOR ALTERNATE INSTALLATION.



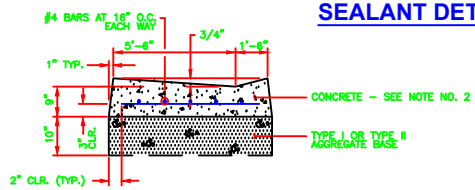
PLAN



JOINT DETAIL

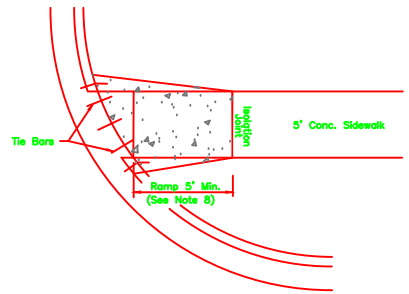


SEALANT DETAIL



SECTION C-C

NOTES:
1. FINISHED ASPHALT CONCRETE SURFACE TO BE FLUSH WITH CROSS GUTTER LIP.
2. ADJACENT SPANDREL SHALL BE 9" THICK P.C.C.



SIDEWALK HANDICAP ACCESS

NOTES

General Notes:

a. The standard curb-ramp lay-out shall be used whenever possible. Any deviation from the standard curb-ramp plans shall be approved by the City Engineer or designee on a case by case basis.

b. The standard curb-ramp drawings supersede all previous drawings and shall be part of the new curb ramp standard drawings.

c. All alternate ramps shall be approved by the City Engineer prior to construction.

Curb Ramp Notes:

1. A curb ramp is defined as the entire concrete surface which includes the ramp & flared sides. The 4' - 0" wide center portion, including the detectable surface, shall have the sloped plane of 8.33% (1:12) maximum, and cross slope, not to exceed 2%. The "flared side" of the ramp and shall lie on a slope of 10% (1:10) maximum measured along the curb. The curb ramp shall have a surface tolerance of 1/4" per 10 foot straight edge maximum.

2. The ramp center line and path of travel must be parallel to the sidewalk. The full width of the ramp shall lie within the crosswalk area. It is desirable that the location of the ramp be as close as possible to the center of the crosswalk.

3. The 4'-0" min. distance between flared sides of the two adjacent curb ramps may be reduced to 3'-0" with documentation of hardship indicating legal and or physical constraints provided to the City Engineer.

4. Existing utility boxes and covers shall be adjusted flush with the curb ramp surface and shall not straddle any change in plane or material. Existing utility box frames and covers shall have matching surface finish on the entire frame and cover. New utility boxes shall not be placed within the detectable border.

5. The surface of the curb ramp and detectable surface material shall be stable, firm and slip resistant. The concrete curb ramp surface shall be broom finished transverse to the axis of the ramp and shall be slightly rougher than the finish of the adjacent sidewalk surface.

6. A level landing 4'-0" deep, with a 2% maximum slope in each direction shall be provided at the upper end of each curb ramp to allow safe egress from the ramp surfaces. The width of the level landing shall be at least as wide as the width of the ramp.

7. When vertical obstructions are present near the curb at the end of the flared side or when the curb-ramp is diagonal to the curb which will result in an extremely long flared side surface, the affected flared side may be cut and terminated perpendicular to the curb, provided that the maximum slope of 10% is achieved on each of the resulting planes.

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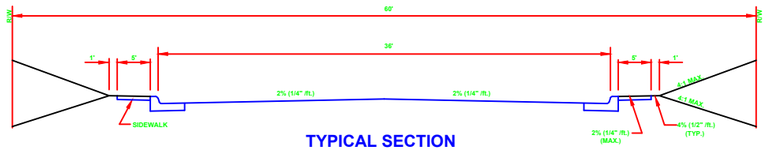
COMMERCIAL DRIVE DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
DRAWN . .
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE:
SHEET X OF X
ATLAS PAGE NO:



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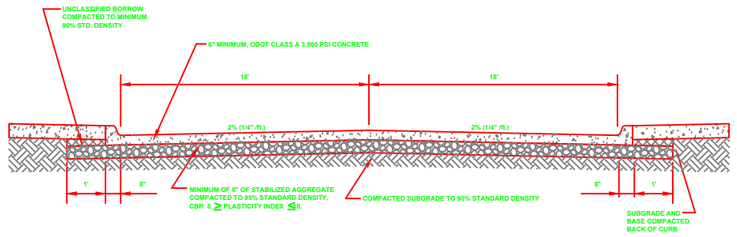
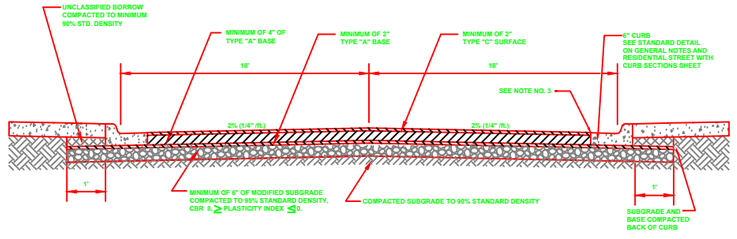


CONCRETE STREET SECTION



ASPHALT STREET SECTION

COMMERCIAL/INDUSTRIAL COLLECTOR STREET WITH CURB

NOTES:

1. PAVING SECTION SHOWN IS MINIMUM ALLOWED. STREET PAVING SHALL BE DESIGNED IN ACCORDANCE WITH THE AASHTO METHOD.
2. DOWELS REQUIRED FOR PCC PAVING 8" THICK, OR GREATER.
3. ASPHALT SURFACE SHALL BE 1/4 " ABOVE EDGE OF CONCRETE GUTTER.

COMMERCIAL/INDUSTRIAL COLLECTOR STREET WITH CURB SECTIONS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=80'
PROFILE SCALE: HORIZONTAL: " VERTICAL: "
ATLAS PAGE NO.

DRAWN:	.	.
DESIGNED:	.	.
OFFICE ENGR.:	.	.
CHIEF ENGR.:	.	.

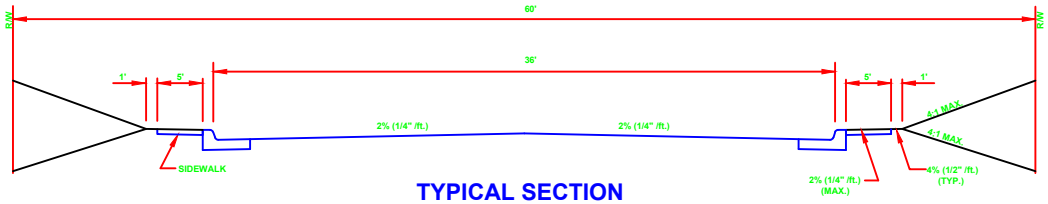
RECOMMENDED: DIRECTOR

RECOMMENDED: ENGINEERING DIRECTOR

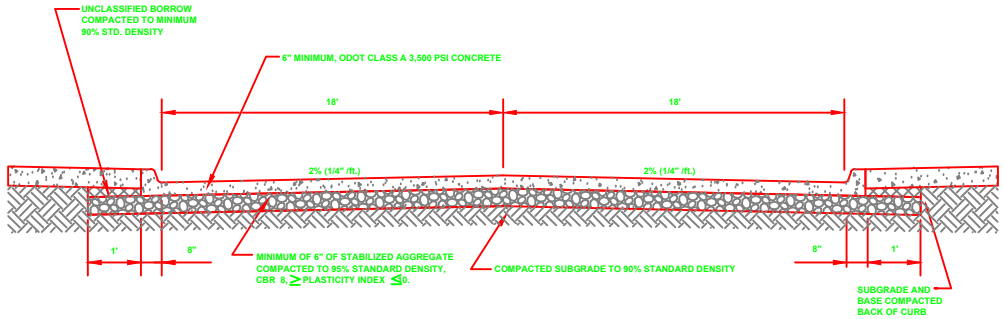
APPROVED: CITY ENGINEERING DEPT.

DATE: .

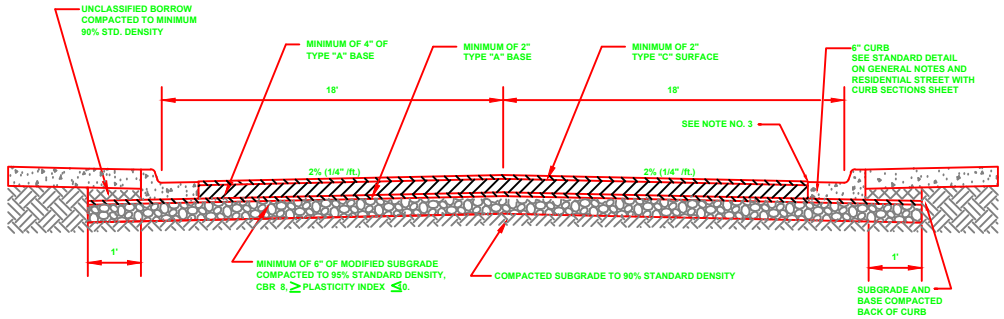
SHEET: X OF X



TYPICAL SECTION



CONCRETE STREET SECTION



ASPHALT STREET SECTION

COMMERCIAL/INDUSTRIAL COLLECTOR STREET WITH CURB

NOTES:

1. PAVING SECTION SHOWN IS MINIMUM ALLOWED. STREET PAVING SHALL BE DESIGNED IN ACCORDANCE WITH THE AASHTO METHOD
2. DOWELS REQUIRED FOR PCC PAVING 8" THICK, OR GREATER.
3. ASPHALT SURFACE SHALL BE 1/4 " ABOVE EDGE OF CONCRETE GUTTER.

COMMERCIAL/INDUSTRIAL COLLECTOR STREET WITH CURB SECTIONS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL: -
VERTICAL: -
ATLAS PAGE NO:

DRAWN - -
DESIGNED - -
OFFICE ENGR. - -
CHIEF ENGR. - -
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR

APPROVED: CITY ENGINEERING DEPT.
DATE: -
SHEET X OF X

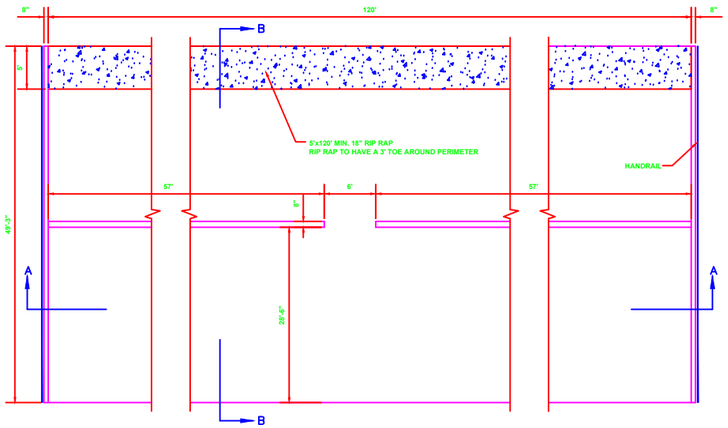
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

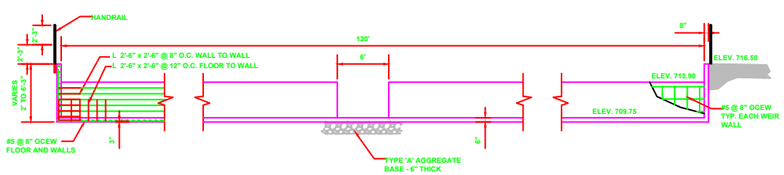
PLAN SCALE: 1" = [redacted]
PROFILE SCALE:
HORIZONTAL: [redacted]
VERTICAL: [redacted]

DRAWN: [redacted] APPROVED:
DESIGNED: [redacted]
OFFICE ENGR: [redacted]
CHIEF ENGR: [redacted]
RECOMMENDED: DIRECTOR
RECOMMENDED: CITY ENGINEERING DEPT
PROGRESSING DIRECTOR: DATE: [redacted]
ATLAS PAGE NO: SHEET [redacted] OF [redacted]

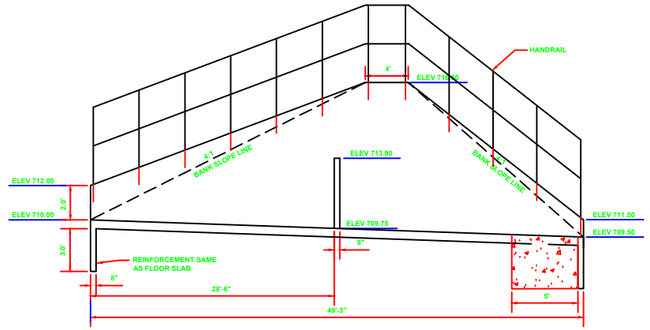


DETENTION POND OUTLET STRUCTURE TOP ELEVATION

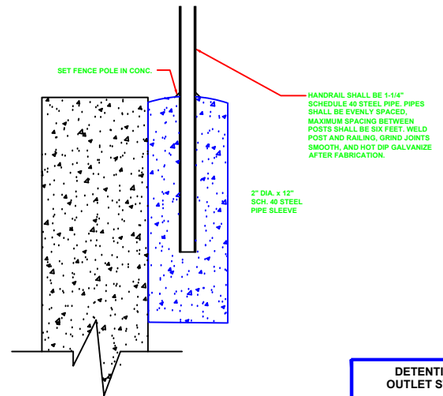
NOT TO SCALE



SECTION A-A



SECTION B-B



HANDRAIL POST SLEEVE

NOT TO SCALE

DETENTION POND OUTLET STRUCTURE

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=∞

PROFILE SCALE:

HORIZONTAL: "

VERTICAL: "

ATLAS PAGE NO:

DRAWN:	"	"
DESIGNED:	"	"
OFFICE ENGR.:	"	"
CHIEF ENGR.:	"	"

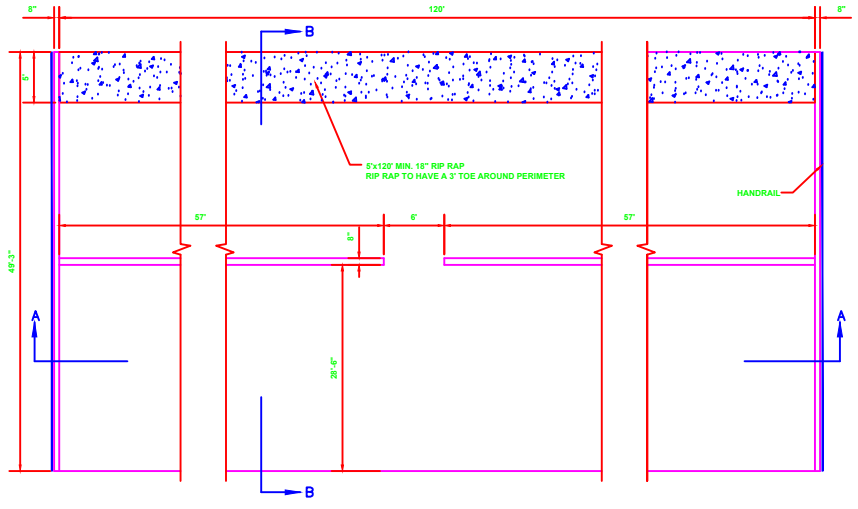
RECOMMENDED: DIRECTOR

RECOMMENDED: ENGINEERING DIRECTOR

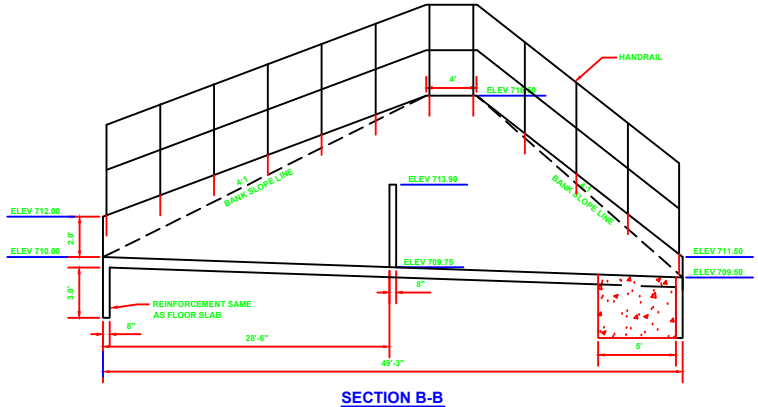
APPROVED: CITY ENGINEERING DEPT.

DATE: "

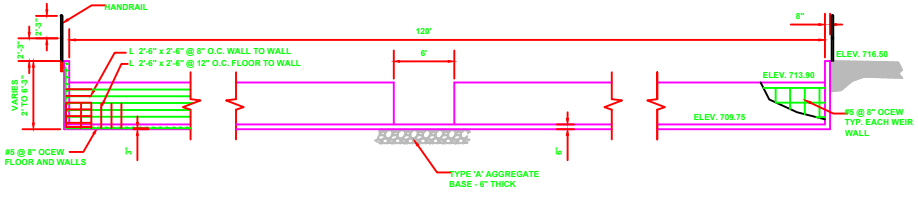
SHEET X OF X



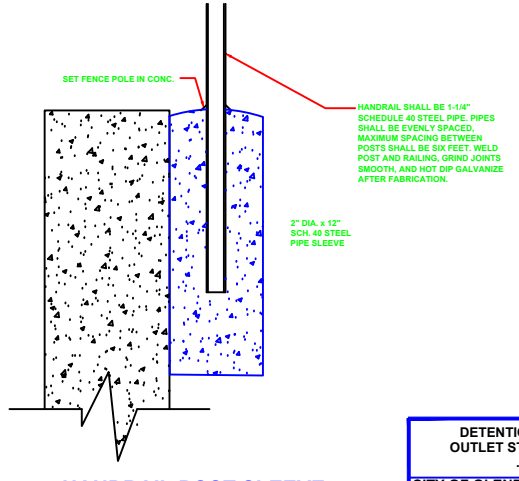
DETENTION POND OUTLET STRUCTURE
TOP ELEVATION
NOT TO SCALE



SECTION B-B



SECTION A-A



HANDRAIL POST SLEEVE
NOT TO SCALE

DETENTION POND OUTLET STRUCTURE

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

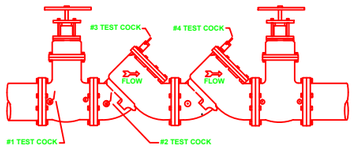
REVISION	BY	DATE

PLAN SCALE: 1" = "

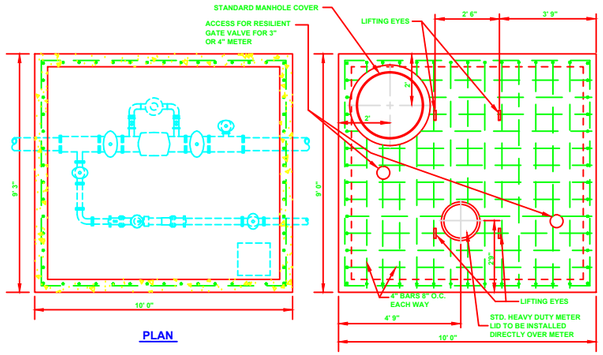
PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "

DRAWN: " "
DESIGNED: " "
OFFICE ENGR.: " "
CHIEF ENGR.: " "
RECOMMENDED: DIRECTOR
RECOMMENDED: CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR
APPROVED:
DATE: "
SHEET X OF X

ATLAS PAGE NO:

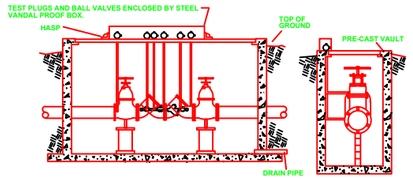


1. SHUT-OFF VALVES, CHECK VALVES, AND TEST COCKS SHALL BE STANDARD TO THE APPROVED BACKFLOW ASSEMBLY.
2. ALL ASSEMBLIES TO BE SUPPORTED BY A CRADLE.
3. ENCLOSURE FOUNDATIONS SHALL BE CONSTRUCTED OF6" OF CONCRETE.
4. ASSEMBLIES MUST BE ON CURRENT APPROVAL LIST.
5. 2 1/2" AND LARGER ASSEMBLIES SHALL BE FUSION BONDED EPOXY COATED INCLUDING SHUTOFF VALVES.



PLAN

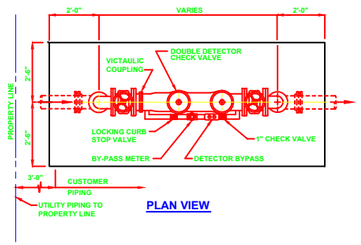
PLAN TOP SECTION



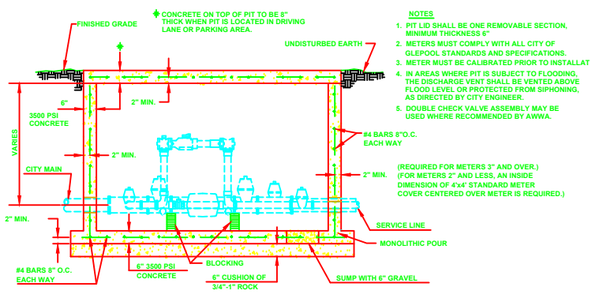
SIDE VIEW DOUBLE DETECTOR CHECK VALVE

END VIEW

NOTES:
1. PIPING FROM DCV OR DDCV TO TEST COCKS SHALL BE COPPER OR BRASS. AND SECURED TO VAULT WALL. SMALL TEST COCKS WILL BE 3/8" COPPER.
2. STEEL VANDAL PROOF BOX ENCLOSING TEST COCKS SHALL BE A MIN. OF 18" LONG, 8" WIDE AND 4" HIGH (BOX SHALL BE INSULATED).
3. DRAIN PIPE SHALL BE ANIMAL PROOF AND SHALL DRAIN TO OPEN AREA.(IE- DITCH, GRASS, STREET OR STREAM BED).
4. DRAIN PIPE SHALL BE 4 " CORRUGATED PVC PIPE.
5. ANIMAL PROOFING SHALL BE 1/2" HARDWARE CLOTH OVER END OF DRAIN, HELD IN PLACE WITH STAINLESS CLAMP.
6. LID TO VAULT SHALL BE LIGHTWEIGHT AND WATERPROOF.
7. STEPS SHALL BE INSTALLED IN THE VAULT WALL FOR EASY ACCESS TO VAULT.
8. THE LID AND TEST COCK COVER SHALL BE LOCKED WITH MATCHING LOCKS
9. PUBLIC UTILITIES CROSS CONNECTION CONTROL COORDINATOR WILL BE PROVIDED WITH A KEY TO LOCKS.
10. TEST COCKS WILL BE NUMBERED ON THE VAULT OR THE FRAME OF TEST COCK COVER.
11. VAULT SHALL DRAIN TO DAYLIGHT.



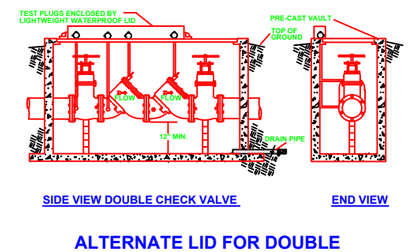
PLAN VIEW



NOTES
1. PIT LID SHALL BE ONE REMOVABLE SECTION, MINIMUM THICKNESS 6"
2. METERS MUST COMPLY WITH ALL CITY OF GLEPOOL STANDARDS AND SPECIFICATIONS.
3. METER MUST BE CALIBRATED PRIOR TO INSTALLATION.
4. IN AREAS WHERE PIT IS SUBJECT TO FLOODING, THE DISCHARGE VENT SHALL BE VENTED ABOVE FLOOD LEVEL OR PROTECTED FROM SIPHONING, AS DIRECTED BY CITY ENGINEER.
5. DOUBLE CHECK VALVE ASSEMBLY MAY BE USED WHERE RECOMMENDED BY AWWA.

ELEVATION

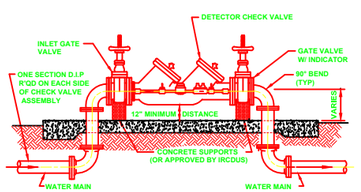
STANDARD METER VAULT FOR DOUBLE DETECTOR CHECK VALVE



SIDE VIEW DOUBLE CHECK VALVE

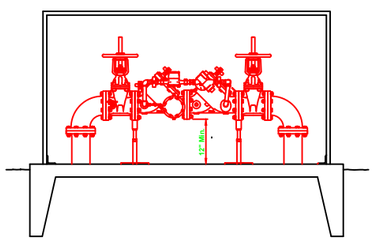
END VIEW

ALTERNATE LID FOR DOUBLE DETECTOR CHECK VALVE VAULT



ELEVATION

DOUBLE DETECTOR CHECK VALVE DETAILS



REDUCED PRESSURE DETECTOR ASSEMBLY OUTDOOR FREEZE PROTECTION INSTALLATION

DOUBLE DETECTOR CHECK VALVE & VAULT DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

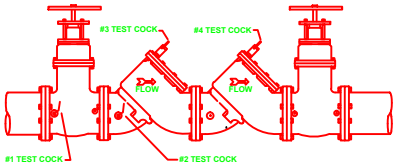
REVISION	BY	DATE

PLAN SCALE: 1"=5'
PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "
ATLAS PAGE NO:

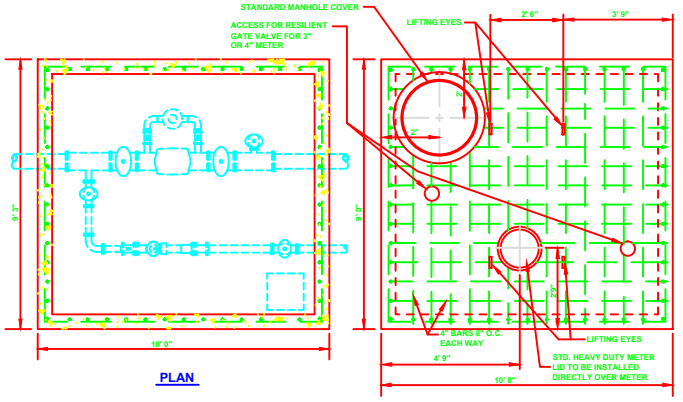
DRAWN	"	"
DESIGNED	"	"
OFFICE ENGR.	"	"
CHIEF ENGR.	"	"

RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE: "
SHEET X OF X

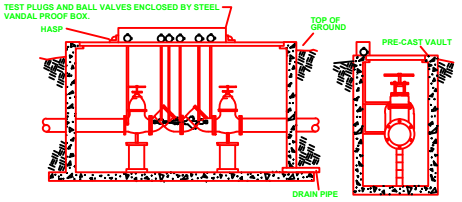


1. SHUT-OFF VALVES, CHECK VALVES, AND TEST COCKS SHALL BE STANDARD TO THE APPROVED BACKFLOW ASSEMBLY.
2. ALL ASSEMBLIES TO BE SUPPORTED BY A CRADLE.
3. ENCLOSURE FOUNDATIONS SHALL BE CONSTRUCTED OF6" OF CONCRETE.
4. ASSEMBLIES MUST BE ON CURRENT APPROVAL LIST.
5. 2 1/2" AND LARGER ASSEMBLIES SHALL BE FUSION BONDED EPOXY COATED INCLUDING SHUTOFF VALVES.



PLAN

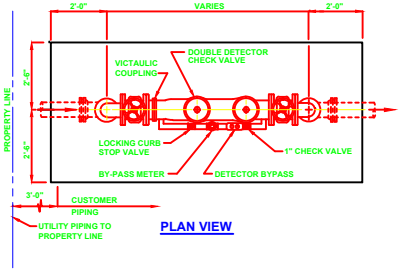
PLAN TOP SECTION



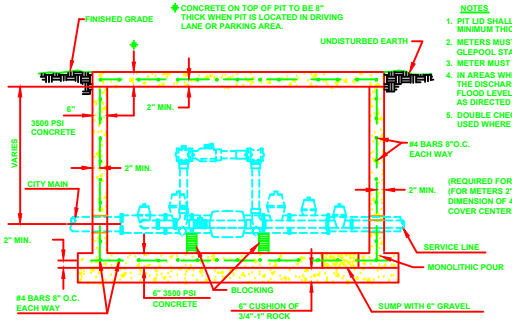
SIDE VIEW DOUBLE DETECTOR CHECK VALVE

END VIEW

NOTES:
1. PIPING FROM DCV OR DDCV TO TEST COCKS SHALL BE COPPER OR BRASS. AND SECURED TO VAULT WALL. SMALL TEST COCKS WILL BE 3/8" COPPER.
2. STEEL VANDAL PROOF BOX ENCLOSING TEST COCKS SHALL BE A MIN. OF 18" LONG, 8" WIDE AND 4" HIGH (BOX SHALL BE INSULATED).
3. DRAIN PIPE SHALL BE ANIMAL PROOF AND SHALL DRAIN TO OPEN AREA.(IE- DITCH, GRASS, STREET OR STREAM BED.
4. DRAIN PIPE SHALL BE 4" CORRUGATED PVC PIPE.
5. ANIMAL PROOFING SHALL BE 1/2" HARDWARE CLOTH OVER END OF DRAIN, HELD IN PLACE WITH STAINLESS CLAMP.
6. LID TO VAULT SHALL BE LIGHTWEIGHT AND WATERPROOF.
7. STEPS SHALL BE INSTALLED IN THE VAULT WALL FOR EASY ACCESS TO VAULT.
8. THE LID AND TEST COCK COVER SHALL BE LOCKED WITH MATCHING LOCKS.
9. PUBLIC UTILITIES CROSS CONNECTION CONTROL COORDINATOR WILL BE PROVIDED WITH A KEY TO LOCKS.
10. TEST COCKS WILL BE NUMBERED ON THE VAULT OR THE FRAME OF TEST COCK COVER.
11. VAULT SHALL DRAIN TO DAYLIGHT.



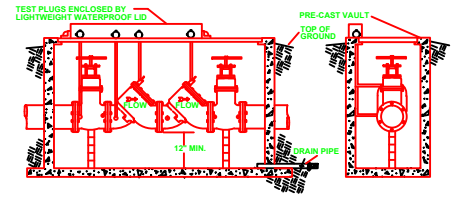
PLAN VIEW



NOTES
1. PIT LID SHALL BE ONE REMOVABLE SECTION, MINIMUM THICKNESS 6"
2. METERS MUST COMPLY WITH ALL CITY OF GLEPOOL STANDARDS AND SPECIFICATIONS.
3. METER MUST BE CALIBRATED PRIOR TO INSTALLATION.
4. IN AREAS WHERE PIT IS SUBJECT TO FLOODING, THE DISCHARGE VENT SHALL BE VENTED ABOVE FLOOD LEVEL OR PROTECTED FROM SIPHONING, AS DIRECTED BY CITY ENGINEER.
5. DOUBLE CHECK VALVE ASSEMBLY MAY BE USED WHERE RECOMMENDED BY AWWA.

ELEVATION

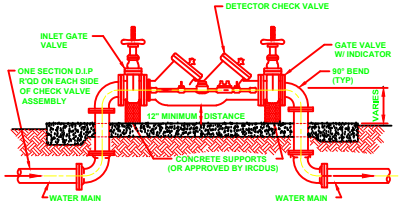
STANDARD METER VAULT FOR DOUBLE DETECTOR CHECK VALVE



SIDE VIEW DOUBLE CHECK VALVE

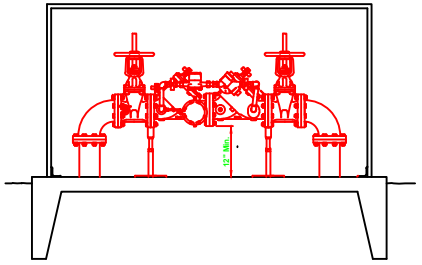
END VIEW

ALTERNATE LID FOR DOUBLE DETECTOR CHECK VALVE VAULT



ELEVATION

DOUBLE DETECTOR CHECK VALVE DETAILS



REDUCED PRESSURE DETECTOR ASSEMBLY OUTDOOR FREEZE PROTECTION INSTALLATION

DOUBLE DETECTOR CHECK VALVE & VAULT DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1" = [illegible]

PROFILE SCALE: HORIZONTAL: " VERTICAL: "

ATLAS PAGE NO.

DRAWN: * *
DESIGNED: * *
OFFICE ENGR.: * *
CHIEF ENGR.: * *
RECOMMENDED: DIRECTOR

RECOMMENDED:
ENGINEERING DIRECTOR

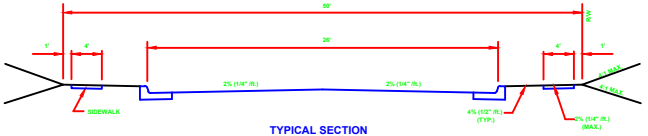
APPROVED:
CITY ENGINEERING DEPT.
DATE: *
SHEET X OF X

GENERAL NOTES

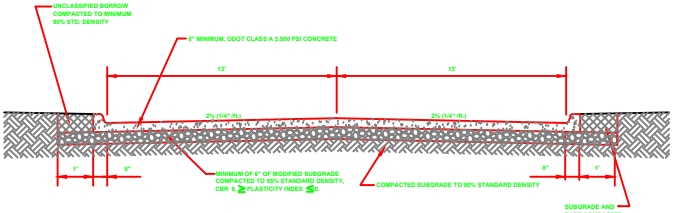
1. ALL CONSTRUCTION AND MATERIALS REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE THE STANDARD SPECIFICATIONS.
2. UNLESS OTHERWISE REQUIRED THE FOLLOWING TESTING SCHEDULE FOR EARTHWORK AND SUBGRADE TESTING SHALL BE FOLLOWED:

A. SOIL CLASSIFICATION -	1200 SQ. YDS. OF MATERIAL OR AS NECESSARY TO DETERMINED UNIFORMITY OF MATERIAL.
B. STANDARD PROCTOR-	AS NECESSARY TO PROVIDE INFORMATION FOR REQUIRED DENSITIES.
C. SUBGRADE DENSITY-	A MAXIMUM OF EVERY 1200 SQ. YDS. OF SURFACE AREA OR AS NECESSARY TO DETERMINE UNIFORMITY OF COMPACTION.
D. EMBANKMENT DENSITY-	EACH 8" LAYER AT A MAXIMUM OF EVERY 1200 SQ. YDS. OF SURFACE AREA, OR AS NECESSARY TO DETERMINE UNIFORMITY OF COMPACTION.
E. TRENCH UNDER PAVING-	EVERY 200 L.F. OF TRENCH OR ANY DISTINCT TRANSVERSE CROSSING.
F. CALIFORNIA BEARING RATIO-	AS DEEMED NECESSARY BY THE CITY ENGINEER TO ENSURE SUBGRADE MEETS SPECIFICATIONS.

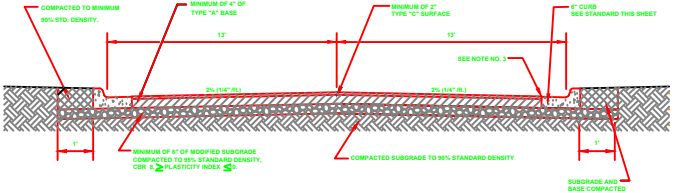
3. ADVANCE NOTIFICATION (2 HOURS MINIMUM) SHALL BE REQUIRED PRIOR TO THE TAKING OF ANY DENSITY TEST. NOTIFICATION SHALL BE MADE TO THE OFFICE OF THE ENGINEER.
4. UNLESS OTHERWISE SHOWN A MINIMUM OF 95% OF STANDARD PROCTOR DENSITY @ ±2% OF OPTIMUM MOISTURE IS REQUIRED FOR EACH DENSITY TAKEN. 2 ADDITIONAL TEST SHALL BE PERFORMED FOR EACH FAILED TEST ON TRANSVERSE CROSSINGS UNDER PAVING.
5. THE CENTERLINE SHALL FOLLOW THE EXISTING CENTERLINE UNLESS OTHERWISE NOTED ON THE PLANS.
6. ONLY APPROVED SEALANT MEETING REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS SHALL BE ACCEPTABLE FOR USE.
7. ALL JOINTS SHALL BE BLAST CLEANED WITH WATER. THE LOOSE PARTICLES SHALL BE BLOWN OUT WITH OIL-FREE COMPRESSED AIR. SURFACES MUST BE CLEAN, DRY, FROST-FREE AND DUST-FREE DURING INSTALLATION OF SEALER.
8. THE SHAPE FACTOR COMBINED WITH JOINT CLEANNESS IS THE CRITICAL COMBINATION NECESSARY TO GUARANTEE DESIRED BONDING AND FUNCTION OF SEALED JOINTS. NO TOLERANCE EXCEPT THOSE SHOWN ON DETAILS SHEETS WILL BE ALLOWED.
9. ANY DEVICE USED FOR SUPPORTING DOWELS SHALL HAVE SUFFICIENT RIGIDITY AND BE SO HELD IN PLACE DURING CONCRETE PLACEMENT THAT DOWELS WILL BE IN TRUE POSITION IN THE FINISHED PAVEMENT. ANY DEVICE NOT PRODUCING THE DESIRED RESULTS SHALL BE REJECTED.
10. PRODUCER AND CONTRACTOR SHALL AVOID PATENT INFRINGEMENT OF THE BASKET AND SHALL SAVE THE CITY HARMLESS IN THE USE OF ANY BASKET.
11. THE CONTRACTOR MAY SELECT THE TYPE OF BASKET TO BE USED, AFTER THE SELECTION IS MADE, THE SAME TYPE BASKET SHALL BE USED THROUGH THE PROJECT.
12. COLD-DRAWN STEEL WIRE FOR CONCRETE REINFORCEMENT MEETING THE REQUIREMENTS OF AASHTO M 32 SHALL BE USED FOR ALL BASKETS, SPACERS, AND STAKES.
13. DOWEL BARS SHALL CONFORM TO MATERIAL REQUIREMENTS OF ASSHTO SECTION M31, M42 OR M53; GRADE 60. DOWEL BARS SHALL BE CENTERED ON THE BASKET REGARDLESS OF THE WIDTH OF THE BASKET OR THE LENGTH OF THE DOWEL BAR. SEE TABLE THIS SECTION.
14. THE HEIGHT OF THE LOAD TRANSFER UNIT (MEASURED TO THE CENTER OF THE DOWEL BAR) SHALL BE 1/2 THE THICKNESS OF THE PAVEMENT.
15. DOWEL BARS SHALL HAVE A SHOP OR FIELD COAT OF LEAD OR ZINC CHROMATE PRIMER FOR FULL LENGTH OF BARS, AND ALTERNATE ENDS SHALL HAVE A FIELD COAT OF MC-70 (OR OTHER HEAVY LUBRICANT ADEQUATE FOR BREAKING THE BOND BETWEEN THE STEEL AND CONCRETE) FOR A MINIMUM OF 1/2 THE LENGTH OF THE BARS.
16. THE LUBRICATED ENDS OF THE DOWEL BARS SHALL HAVE EXPANSION CAPS WITH A MINIMUM 1" AND A MAXIMUM 2" AIR SPACE IN THE END OF THE EXPANSION CAPS (EXPANSION JOINT ASSEMBLIES).
17. THE CONTRACTOR SHALL FURNISH A SUFFICIENT NUMBER OF SAND PLATES TO SUPPORT THE LOAD TRANSFER UNIT WHEN NEEDED TO PREVENT SETTLEMENT OF THE LOAD TRANSFER UNIT.
18. IN ADDITION TO THE SUPPORTS INDICATED, THE CONTRACTOR SHALL PROVIDE SUITABLE INSTALLING DEVICES AND SUCH ADDITIONAL STAKES AS MAY BE REQUIRED TO HOLD THE JOINT FILLER VERTICAL AND SECURELY IN LINE AND POSITION. THE CONTRACTOR WILL ALSO BE REQUIRED TO SATISFACTORILY FORM THE UPPER PORTION OF THE JOINT FOR RECEIVING THE SEAL.
19. COST OF JOINT FILLERS, SEALING, AND REINFORCING STEEL SHALL BE INCLUDED IN THE PRICE FOR OTHER ITEMS OF WORK.
20. ALTERNATE DOWEL BARS SHALL BE OF THE SAME SIZE COATED IN ACCORDANCE WITH AASHTO M 254. THICKNESS OF COATING SHALL BE 10 MIL+ 2 MIL. NO COATING ON WELDED END. PAINT (ALTERNATE COATING) SHALL BE IN ACCORDANCE WITH FEDERAL SPECIFICATION TTP-664.
21. CITY MAY REQUIRE PROOF ROLLING WITH A LOADED TRUCK MIN. 50,000 LBS TO ENSURE STABILITY OF BASE.



TYPICAL SECTION



CONCRETE STREET SECTION

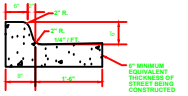


ASPHALT STREET SECTION

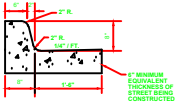
NOTES:

1. PAVING SECTION SHOWN IS MINIMUM ALLOWED. STREET PAVING SHALL BE DESIGNED IN ACCORDANCE WITH THE AASHTO METHOD
2. DOWELS REQUIRED FOR PCC PAVING 8" THICK, OR GREATER.
3. ASPHALT SURFACE SHALL BE 1/4 " ABOVE EDGE OF CONCRETE GUTTER.

RESIDENTIAL STREET WITH CURB



6" BARRIER CURB & GUTTER



8" BARRIER CURB & GUTTER

SIDEWALK ADJACENT TO CURB

CURB AND GUTTER DETAIL

GENERAL NOTES AND RESIDENTIAL STREET WITH CURB SECTIONS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

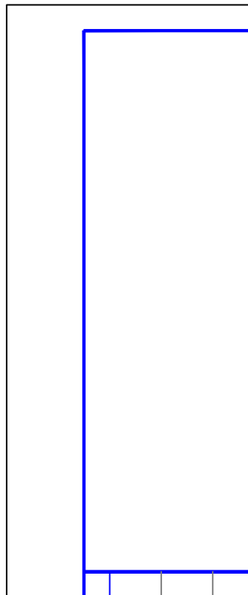
PLAN SCALE: 1"=10'
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN		
DESIGNED		
OFFICE ENGR.		
CHIEF ENGR.		
RECOMMENDED: DIRECTOR		
RECOMMENDED:	CITY ENGINEERING DEPT.	
ENGINEERING DIRECTOR		

APPROVED:

DATE:

SHEET NO. OF



CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=X'

PROFILE SCALE:

HORIZONTAL:

VERTICAL:

ATLAS PAGE NO:

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DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-

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RECOMMENDED: DIRECTOR

RECOMMENDED: CITY ENGINEERING DEPT.

ENGINEERING DIRECTOR

DATE: -

SHEET X OF X

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1" = 60'

PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "

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DESIGNED: " | "
OFFICE ENGR.: " | "
CHIEF ENGR.: " | "
RECOMMENDED: DIRECTOR
RECOMMENDED: CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR
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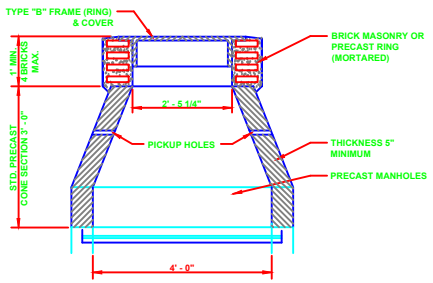
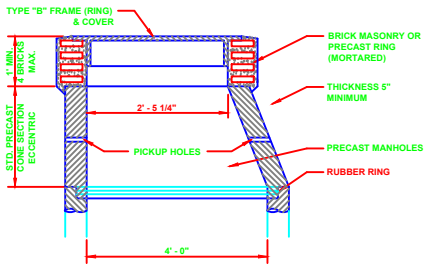
APPROVED:
DATE: "
SHEET " OF "

STANDARD DETAIL FOR 4' DIA. CONES

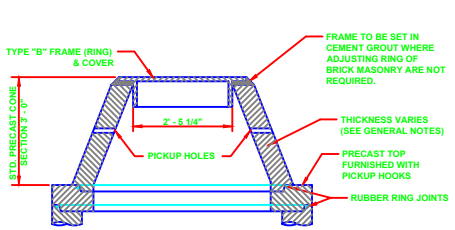


CONCENTRIC CONE



ECCENTRIC CONE

STANDARD DETAIL FOR LARGER THAN 4' DIA. CONES



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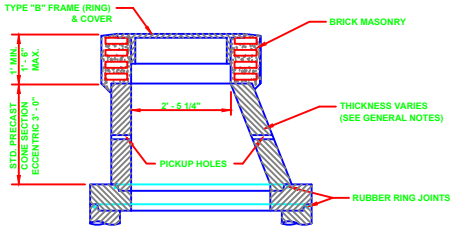
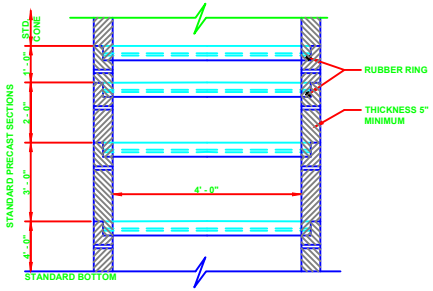
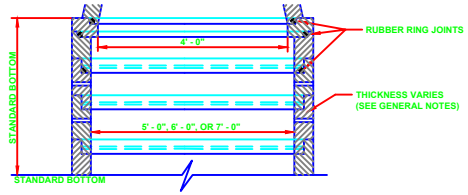


ECCENTRIC CONE

STANDARD 4' DIA. MANHOLE WALL



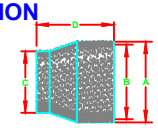
STANDARD FOR LARGER THAN 4' DIA. MANHOLE WALL



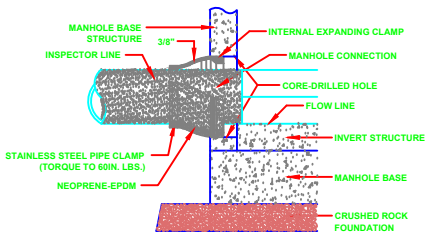
MANHOLE-PIPE CONNECTION

NOTE:

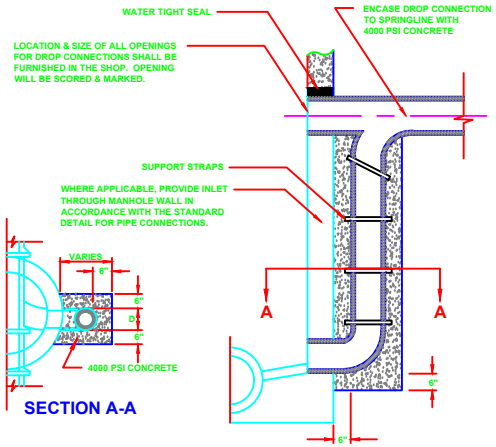
1. ALL PIPE SHALL BE STAINLESS STEEL
2. NEOPRENE–EPDM BLENDED COMPOUND BOOT SHALL MEET ASTM C-923



SUGGESTED PIPE O.D. RANGE (IN.)	HOLE & BOOT DIAMETER DIMENSIONS			
	A	B	C	D
3 1/2" - 4 1/2"	7"	6 1/8"	4 1/4"	6"
5 3/8" - 7"	12"	10 7/8"	6 1/2"	8"
7" - 8 1/2"	12"	10 7/8"	8"	8"
8 3/16" - 9 3/4"	12"	10 7/8"	9 1/4"	8"
9 1/4" - 11"	16"	14 7/8"	10 1/2"	8"
10 1/4" - 11"	16"	14 7/8"	12"	8"
12" - 13 3/4"	16"	14 7/8"	13 1/4"	8"
14 1/2" - 16 1/4"	20"	18 7/8"	15 3/4"	8"
15 3/4" - 17 1/2"	20"	18 7/8"	17"	8"
19 1/2" - 21 1/4"	24"	22 7/8"	20 3/4"	8"

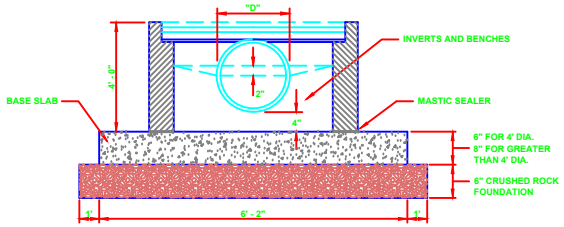


MANHOLE DROP CONNECTION

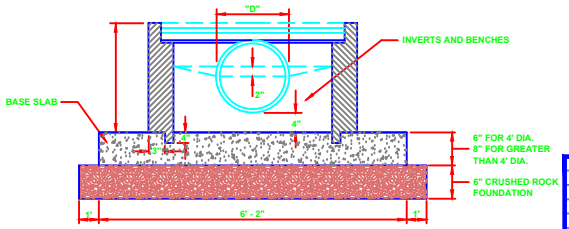


SECTION A-A

MANHOLE BASE SECTIONS

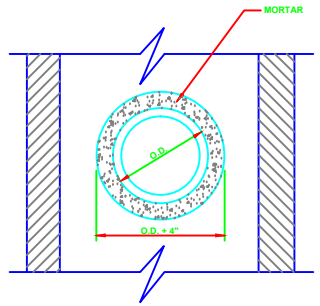


BASE RISER SECTION WITH MASTIC SEALER OPTION "A"



BASE RISER SECTION WITH PREFORMED SOCKET OPTION "B"

ABOVE INVERT PIPE CONNECTION



NOTE: SHOP SHALL SCORE CONCRETE WALLS TO DIMENSIONS SHOWN. REINFORCING TO BE CUT ON JOB SITE.

SANITARY SEWER STANDARD DETAILS FOR PRECAST REINFORCED CONCRETE MANHOLES

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
ATLAS PAGE NO:

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
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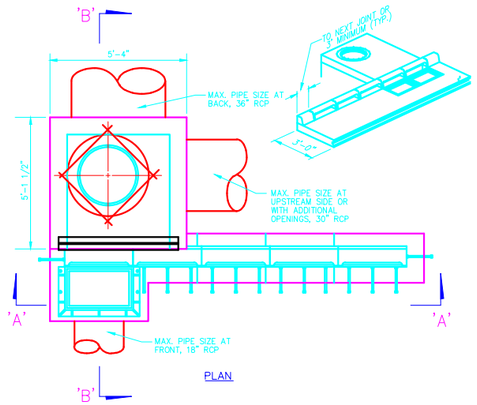
ENGINEERING DIRECTOR

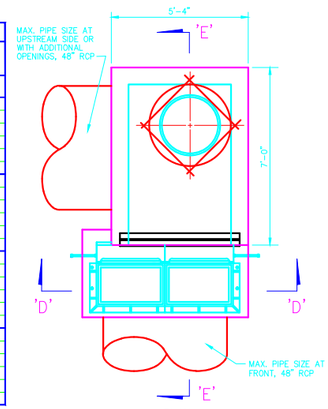
APPROVED:
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X



PLAN

QUANTITIES FOR INLETS

INLET	CURB OPENING	CLASS "A" CONCRETE	INLET		INLET FRAME AND GRATE	CAST IRON CURB INLET	MH FRAME AND COVER
DESIGN	DESIGNATION	CU. YD.	BASE AMT.	ADD'L. C.F. PER VERT. FT.	EACH	EACH	EACH
1 WITH SMALL JUNCT. BOX		1.50	43.56	15.84	1	1	1
	"A"	1.60	47.34	17.43	1	2	1
	"B"	1.73	55.44	21.03	1	3	1
	"C"	1.86	62.26	24.63	1	4	1
	"D"	1.99	66.03	28.23	1	5	1
2 WITH SMALL JUNCT. BOX		1.70	47.84	17.40	2	2	1
	"A"	1.83	57.01	21.00	2	3	1
	"B"	1.96	64.86	24.60	2	4	1
	"C"	2.08	71.70	28.20	2	5	1
	"D"	2.21	77.28	31.80	2	6	1
1 WITH LARGE JUNCT. BOX		2.11	50.44	18.34	1	1	1
	"A"	2.21	54.22	19.93	1	2	1
	"B"	2.34	62.32	23.53	1	3	1
	"C"	2.47	69.14	27.13	1	4	1
	"D"	2.60	74.91	30.73	1	5	1
2 WITH LARGE JUNCT. BOX		2.31	54.72	19.90	2	2	1
	"A"	2.43	63.89	23.50	2	3	1
	"B"	2.57	71.74	27.10	2	4	1
	"C"	2.69	78.58	30.70	2	5	1
	"D"	2.82	84.16	34.30	2	6	1

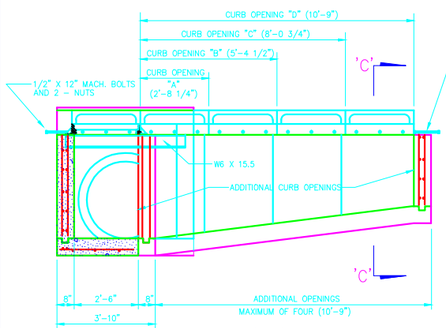


PLAN

NOTE:

1. (A) WHEN THE INLET IS BUILT IN EXISTING PAVEMENT, THE APRON AROUND THE INLET SHALL BE OF THE SIZE SHOWN IN THE PLAN ON THIS SHEET, AND BUILT OF P.C. CONCRETE TO A MINIMUM 8" THICKNESS.
   (B) THERE WILL BE NO DEDUCTION OF PAYMENT FOR CONCRETE CURB AND GUTTER FOR THE LENGTH OR AREA OCCUPIED BY THE CONSTRUCTON OF CAST IRON CURB INLETS OR CAST IRON CURB INLET FRAME AND GRATE.
2. RUBBER COATED REINFORCED STEEL STEPS SHALL BE PLACED AT THE HEADERS IN ALL INLETS 4' OR MORE IN DEPTH. COST OF STEPS SHALL BE INCLUDED IN THE PRICE BID FOR INLET.
3. GRATING AND FRAMES TO BE USED IN THIS INLET ARE SHOWN ON THE DRAWING CAST IRON CURB INLETS, DESIGNATED AS "STANDARD STORM SEWER GRATES AND FRAMES."
4. THE STANDARD DRAWING DESIGNATION NO., DESIGN NO., AND NUMBER OF ADDITIONAL OPENINGS SHALL BE INDICATED ON THE PLANS.
5. COST OF STRUCTURAL STEEL I-BEAMS AND ANGLE IRON TO BE INCLUDED IN THE PRICE BID FOR INLET. ANGLE IRON SHALL CONFORM TO ASTM-A7 OR A36.
6. CASTING SHALL CONFORM TO ASTM SPECIFICATION FOR GREY IRON CASTINGS, SERIAL DESIGNATION A-48-CLASS 20.
7. NO WORDING OR MARKING OF ANY KIND OTHER THAN THOSE SHOWN ON THE PLANS WILL BE PERMITTED ON THESE CASTINGS.
8. ALL NUTS AND BOLTS REQUIRED FOR THESE STRUCTURES SHALL BE CADMIUM PLATED OR GALVANIZED.
9. CAST IRON CURBS TO BE USED ON THIS INLET ARE SHOWN ON STANDARD DRAWING DESIGNATED AS "STANDARD CAST IRON CURB."
10. ALL MORTAR JOINTS TO BE 3/8" MAXIMUM, EVERY FIFTH COURSE OF BRICK MASONRY TO BE HEADER COURSE.
11. CURB INLETS SHALL BE PLACED ON UPSTREAM SIDE OF GRATE INLETS FOR TYPICAL INSTALLATIONS.
12. CONCRETE TROUGH FOR CURB INLETS AND STORM SEWER INLETS SHALL BE CONSTRUCTED AS ONE UNIT.
13. IF PRECAST INLET IS USED, FLOWABLE FILL MUST BE USED AS BACKFILL AROUND THE ENTIRE INLET.
14. USE MANHOLE FRAME AND COVER AS SHOWN ON STANDARD DRAWING NO. 754

* BASES TO BE FORMED WITH 1 X 6 FORMS AND POURED IN PLACE.

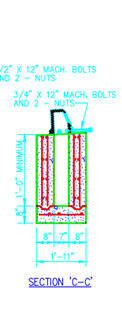


SECTION 'A-A'

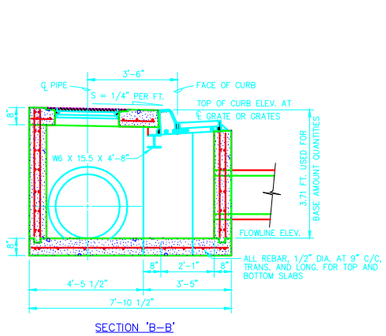
SINGLE GRATE CURB INLET WITH JUNCTION BOX

(DESIGN 1-D WITH SMALL JUNCTION BOX SHOWN)

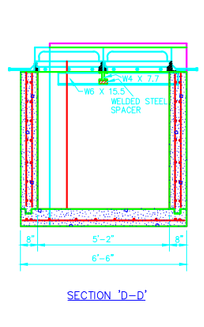
ALL REBAR IN WALLS #4 @ 12" CTRS. EA. WAY (TYPICAL)



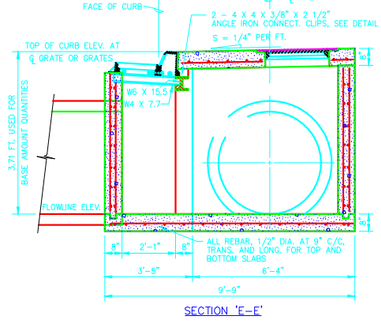
SECTION 'C-C'



SECTION 'B-B'



SECTION 'D-D'



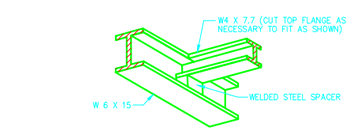
SECTION 'E-E'

DOUBLE GRATE CURB INLET WITH JUNCTION BOX

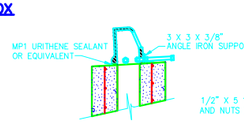
(DESIGN 2 WITH LARGE JUNCTION BOX SHOWN)

18" THRU 30" LONGITUDINAL PIPE REQUIRES SMALL JUNCTION BOX

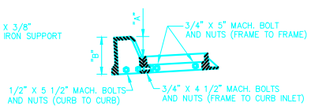
ALL REBAR IN WALLS #4 @ 12" CTRS. EA. WAY (TYPICAL)



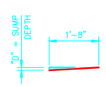
I-BEAM CONNECTION DETAIL FOR DOUBLE GRATE



ADDITIONAL CURB OPENING DETAILS



FRAME AND CURB DETAILS



"D" = CROSS SLOPE X 1.67 + 0.04

ANGLE IRON LENGTHS	
OPENING	LENGTH
"A"	2'-5 3/8"
"B"	5'-1 5/8"
"C"	7'-9 7/8"
"D"	10'-6 1/8"

C.I. CURB HEIGHTS		
TYPE	"A"	"B"
4" MOUNTABLE	4 1/2"	9 1/2"
6" MOUNTABLE	6 1/2"	11 1/2"
6" BARRIER	6 1/2"	11 1/2"
8" BARRIER	8 1/2"	13 1/2"

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
6.11.06 (E)	INLET	EA.
6.11.06 (F)	ADDITIONAL DEPTH IN INLET	VERT. FT.
6.11.06 (G)	INLET FRAME AND GRATE	EA.
6.11.06 (D)	MANHOLE FRAME AND COVER	EA.
6.11.06 (K)	CAST IRON CURB INLETS	EA.

PRECAST STANDARD INLETS & GRATES W/ ACCESS MANHOLE

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE: HORIZONTAL: - VERTICAL: -

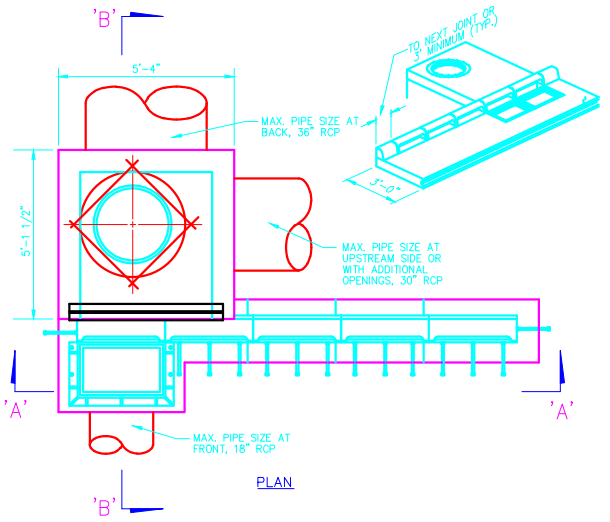
DRAWN . . | DESIGNED . . | OFFICE ENGR. . . | CHIEF ENGR. . . | RECOMMENDED: DIRECTOR | RECOMMENDED: CITY ENGINEERING DEPT. | ENGINEERING DIRECTOR

APPROVED:

DATE: .

SHEET X OF X

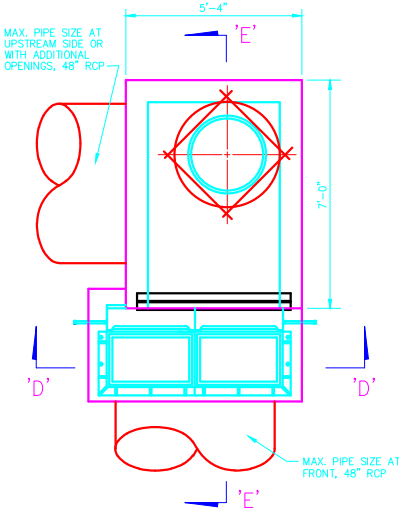
ATLAS PAGE NO.



PLAN

QUANTITIES FOR INLETS

INLET DESIGN	CURB OPENING DESIGNATION	CLASS "A" CONCRETE CU. YD.	INLET BASE AMT.	INLET ADD'L. C.F. PER VERT. FT.	INLET FRAME AND GRATE EACH	CAST IRON CURB INLET EACH	MH FRAME AND COVER EACH
1 WITH SMALL JUNCT. BOX		1.50	43.56	15.84	1	1	1
	"A"	1.60	47.34	17.43	1	2	1
	"B"	1.73	55.44	21.03	1	3	1
	"C"	1.86	62.26	24.63	1	4	1
	"D"	1.99	68.03	28.23	1	5	1
2 WITH SMALL JUNCT. BOX		1.70	47.84	17.40	2	2	1
	"A"	1.83	57.01	21.00	2	3	1
	"B"	1.96	64.86	24.60	2	4	1
	"C"	2.08	71.70	28.20	2	5	1
	"D"	2.21	77.28	31.80	2	6	1
1 WITH LARGE JUNCT. BOX		2.11	50.44	18.34	1	1	1
	"A"	2.21	54.22	19.93	1	2	1
	"B"	2.34	62.32	23.53	1	3	1
	"C"	2.47	69.14	27.13	1	4	1
	"D"	2.60	74.91	30.73	1	5	1
2 WITH LARGE JUNCT. BOX		2.31	54.72	19.90	2	2	1
	"A"	2.43	63.89	23.50	2	3	1
	"B"	2.57	71.74	27.10	2	4	1
	"C"	2.69	78.58	30.70	2	5	1
	"D"	2.82	84.16	34.30	2	6	1



PLAN

NOTE:

1. (A) WHEN THE INLET IS BUILT IN EXISTING PAVEMENT, THE APRON AROUND THE INLET SHALL BE OF THE SIZE SHOWN IN THE PLAN ON THIS SHEET, AND BUILT OF P.C. CONCRETE TO A MINIMUM 8" THICKNESS.
   (B) THERE WILL BE NO DEDUCTION OF PAYMENT FOR CONCRETE CURB AND GUTTER FOR THE LENGTH OR AREA OCCUPIED BY THE CONSTRUCTON OF CAST IRON CURB INLETS OR CAST IRON CURB INLET FRAME AND GRATE.
2. RUBBER COATED REINFORCED STEEL STEPS SHALL BE PLACED AT THE HEADERS IN ALL INLETS 4' OR MORE IN DEPTH. COST OF STEPS SHALL BE INCLUDED IN THE PRICE BID FOR INLET.
3. GRATING AND FRAMES TO BE USED IN THIS INLET ARE SHOWN ON THE DRAWING CAST IRON CURB INLETS, DESIGNATED AS "STANDARD STORM SEWER GRATES AND FRAMES."
4. THE STANDARD DRAWING DESIGNATION NO., DESIGN NO., AND NUMBER OF ADDITIONAL OPENINGS SHALL BE INDICATED ON THE PLANS.
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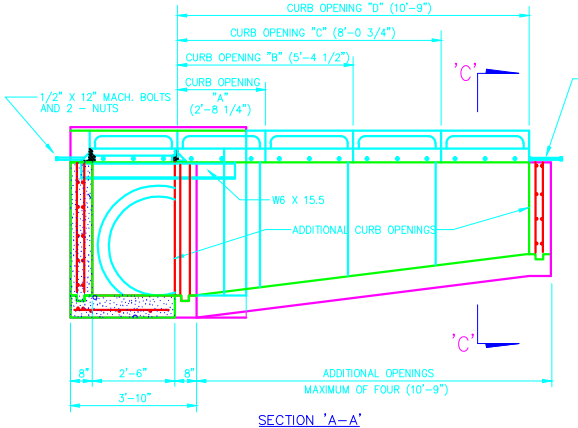
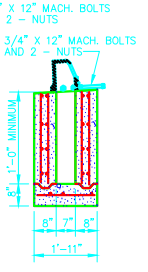
14. USE MANHOLE FRAME AND COVER AS SHOWN ON STANDARD DRAWING NO. 754

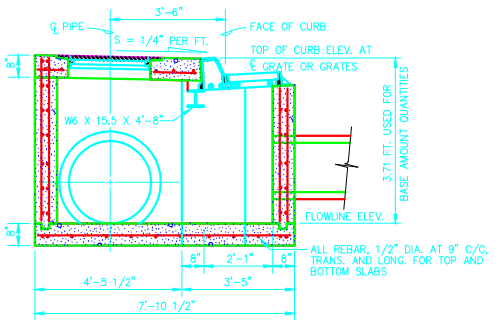
* BASES TO BE FORMED WITH 1 X 6 FORMS AND POURED IN PLACE.



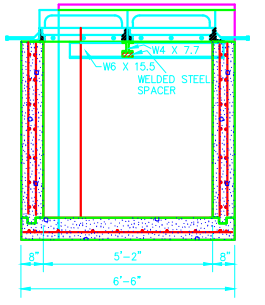
SECTION 'A-A'



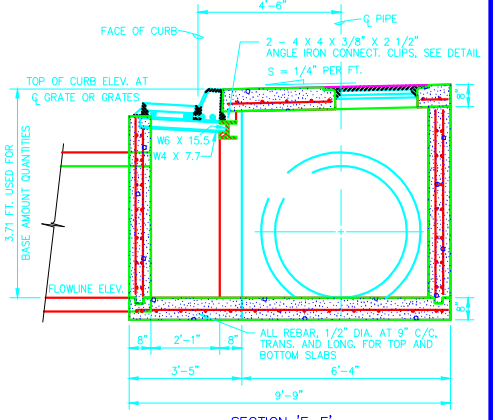
SECTION 'C-C'



SECTION 'B-B'



SECTION 'D-D'



SECTION 'E-E'

SINGLE GRATE CURB INLET WITH JUNCTION BOX

(DESIGN 1-D WITH SMALL JUNCTION BOX SHOWN)

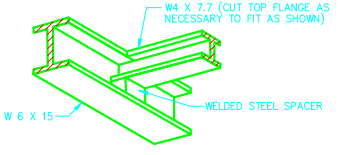
ALL REBAR IN WALLS #4 @ 12" CTRS. EA. WAY (TYPICAL)

DOUBLE GRATE CURB INLET WITH JUNCTION BOX

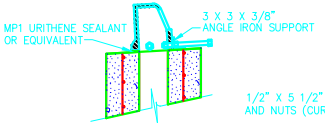
(DESIGN 2 WITH LARGE JUNCTION BOX SHOWN)

18" THRU 30" LONGITUDINAL PIPE REQUIRES SMALL JUNCTION BOX

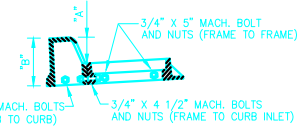
ALL REBAR IN WALLS #4 @ 12" CTRS. EA. WAY (TYPICAL)



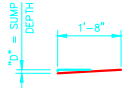
I-BEAM CONNECTION DETAIL FOR DOUBLE GRATE



ADDITIONAL CURB OPENING DETAILS



FRAME AND CURB DETAILS



"D" = CROSS SLOPE X 1.67 + 0.04

ANGLE IRON LENGTHS	
OPENING	LENGTH
"A"	2'-5 3/8"
"B"	5'-1 5/8"
"C"	7'-9 7/8"
"D"	10'-6 1/8"

C.I. CURB HEIGHTS		
TYPE	"A"	"B"
4" MOUNTABLE	4 1/2"	9 1/2"
6" MOUNTABLE	6 1/2"	11 1/2"
6" BARRIER	6 1/2"	11 1/2"
8" BARRIER	8 1/2"	13 1/2"

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
6.11.06 (E)	INLET	EA.
6.11.06 (F)	ADDITIONAL DEPTH IN INLET	VERT. FT.
6.11.06 (G)	INLET FRAME AND GRATE	EA.
6.11.06 (D)	MANHOLE FRAME AND COVER	EA.
6.11.06 (K)	CAST IRON CURB INLETS	EA.

PRECAST STANDARD INLETS & GRATES W/ ACCESS MANHOLE

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE:
SHEET X OF X
ATLAS PAGE NO:

BEFORE YOU DIG!

CALL OKIE 405-302-1941

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=∞

PROFILE SCALE:
HORIZONTAL:
VERTICAL:

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DESIGNED	.	.
OFFICE ENGR.	.	.
CHIEF ENGR.	.	.

APPROVED:

RECOMMENDED: DIRECTOR

RECOMMENDED: CITY ENGINEERING DEPT.

ENGINEERING DIRECTOR

DATE: .

SHEET X OF X

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE:

HORIZONTAL:

VERTICAL:

DRAWN	"	"
DESIGNED	"	"
OFFICE ENGR.	"	"
CHIEF ENGR.	"	"
RECOMMENDED: DIRECTOR		
RECOMMENDED: ENGINEERING DIRECTOR		

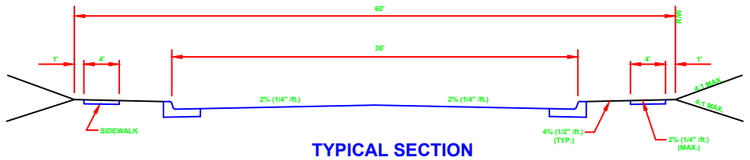
APPROVED:

CITY ENGINEERING DEPT.

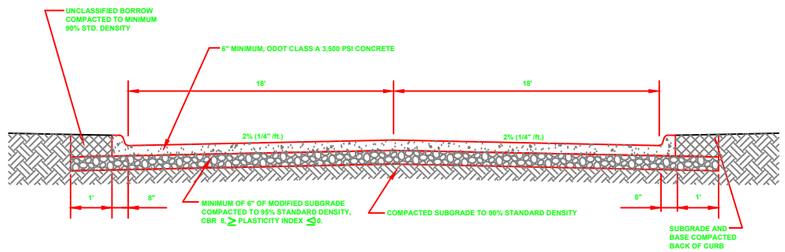
DATE: "

ATLAS PAGE NO:

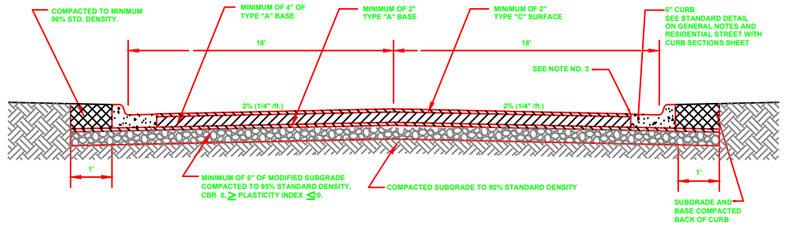
SHEET X OF X



TYPICAL SECTION



CONCRETE STREET SECTION



ASPHALT STREET SECTION

RESIDENTIAL COLLECTOR STREET WITH CURB

NOTES:

1. PAVING SECTION SHOWN IS MINIMUM ALLOWED. STREET PAVING SHALL BE DESIGNED IN ACCORDANCE WITH THE AASHTO METHOD
2. DOWELS REQUIRED FOR PCC PAVING 8" THICK, OR GREATER.
3. ASPHALT SURFACE SHALL BE 1/4 " ABOVE EDGE OF CONCRETE GUTTER.

RESIDENTIAL COLLECTOR STREET WITH CURB SECTIONS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

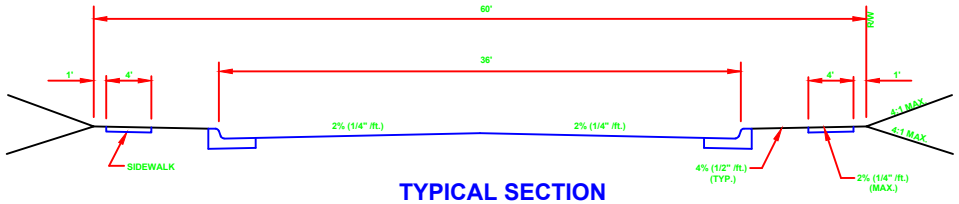
PLAN SCALE: 1"=

PROFILE SCALE:
HORIZONTAL:
"
VERTICAL:
"

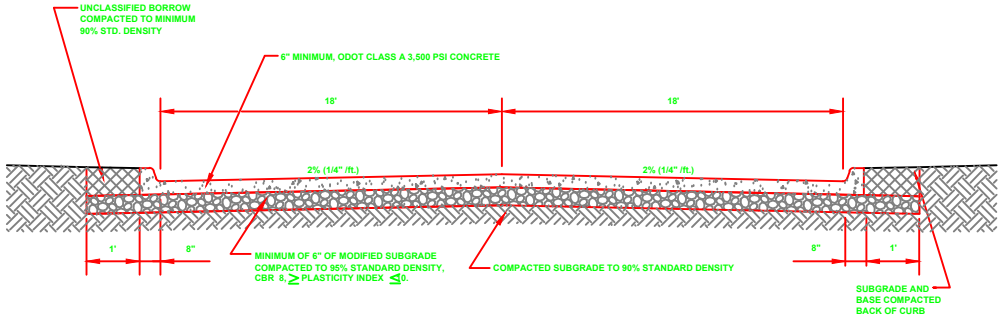
ATLAS PAGE NO.

DRAWN	"	"	APPROVED
DESIGNED	"	"	
OFFICE ENGR.	"	"	
CHIEF ENGR.	"	"	
RECOMMENDED: DIRECTOR			
RECOMMENDED: ENGINEERING DIRECTOR			CITY ENGINEERING DEPT.
		DATE: "	

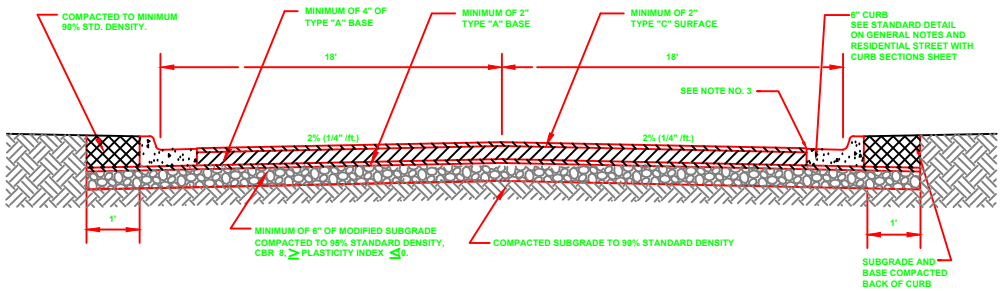
SHEET X OF X



TYPICAL SECTION



CONCRETE STREET SECTION



ASPHALT STREET SECTION

RESIDENTIAL COLLECTOR STREET WITH CURB

NOTES:

1. PAVING SECTION SHOWN IS MINIMUM ALLOWED. STREET PAVING SHALL BE DESIGNED IN ACCORDANCE WITH THE AASHTO METHOD
2. DOWELS REQUIRED FOR PCC PAVING 8" THICK, OR GREATER.
3. ASPHALT SURFACE SHALL BE 1/4 " ABOVE EDGE OF CONCRETE GUTTER.

RESIDENTIAL COLLECTOR STREET WITH CURB SECTIONS

.

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

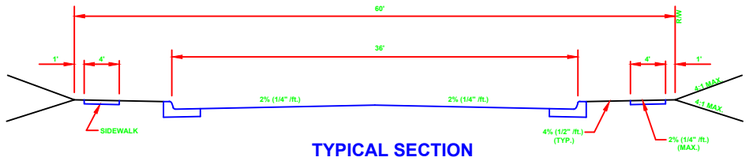
PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "

DRAWN: " "
DESIGNED: " "
OFFICE ENGR.: " "
CHIEF ENGR.: " "

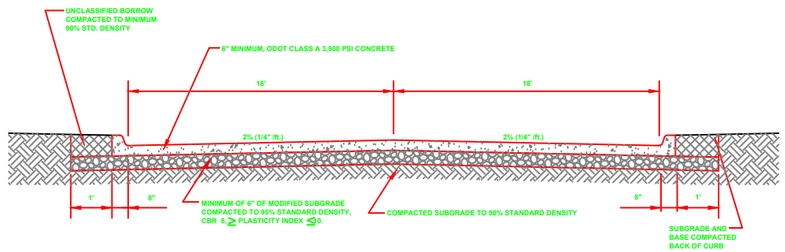
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE: "
SHEET X OF X

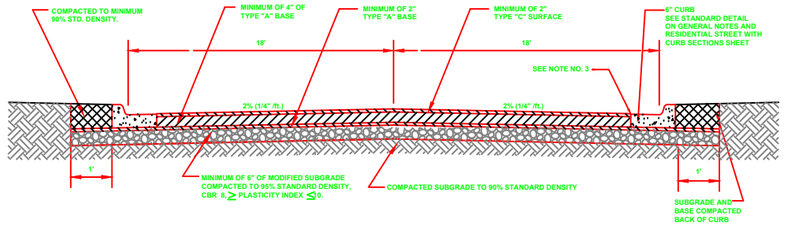
ATLAS PAGE NO:



TYPICAL SECTION



CONCRETE STREET SECTION



ASPHALT STREET SECTION

RESIDENTIAL COLLECTOR STREET WITH CURB

NOTES:

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RESIDENTIAL COLLECTOR STREET WITH CURB SECTIONS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
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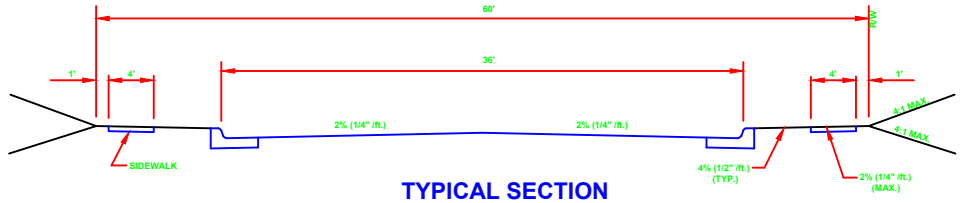
VERTICAL:

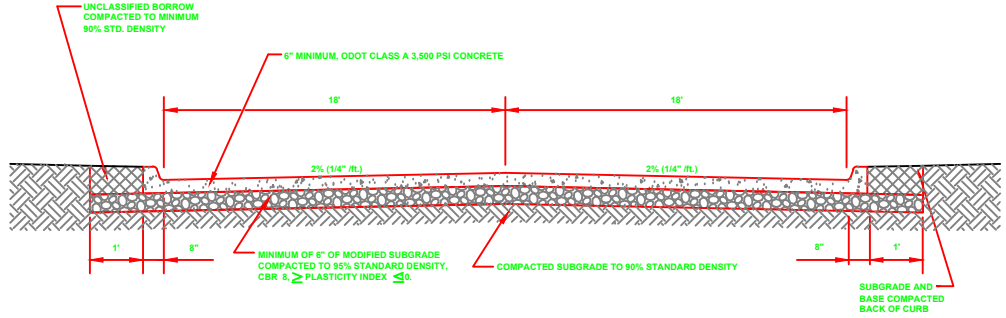
ATLAS PAGE NO.

DRAWN	-	-	APPROVED
DESIGNED	-	-	
OFFICE ENGR.	-	-	
CHIEF ENGR.	-	-	
RECOMMENDED: DIRECTOR			
RECOMMENDED:			CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR			DATE: -

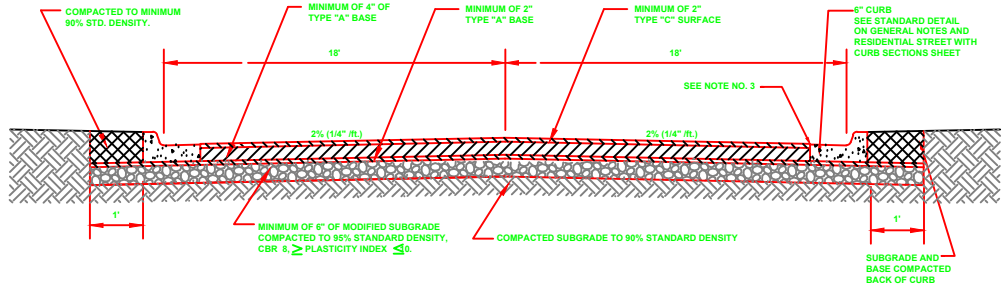
SHEET X OF X



TYPICAL SECTION



CONCRETE STREET SECTION



ASPHALT STREET SECTION

RESIDENTIAL COLLECTOR STREET WITH CURB

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RESIDENTIAL COLLECTOR STREET WITH CURB SECTIONS

.

CITY OF GLENPOOL, OKLAHOMA

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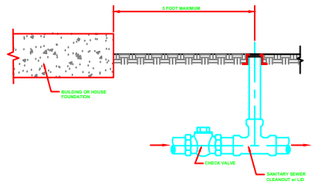
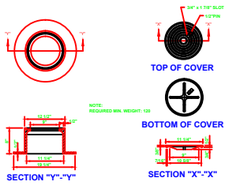
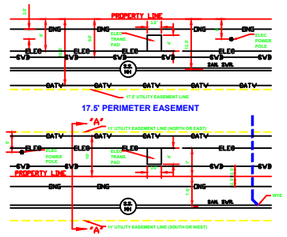
DATE: "
SHEET X OF X

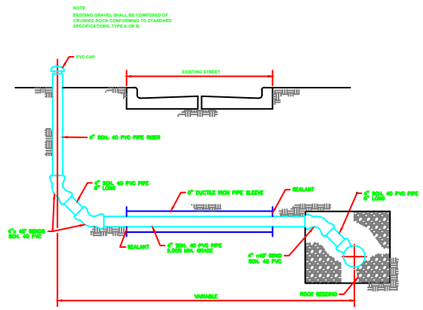


STANDARD DETAIL FOR SANITARY SEWER BACKFLOW PREVENTERS

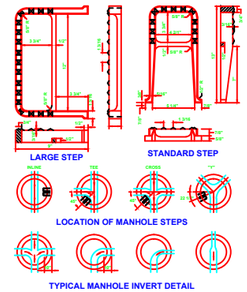


STANDARD DETAIL FOR CLEANOUT FRAME AND LID





LONG SERVICE CONNECTION



MANHOLE STEPS & INVERT DETAILS

SANITARY SEWER APPERTENANCES and STANDARD DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
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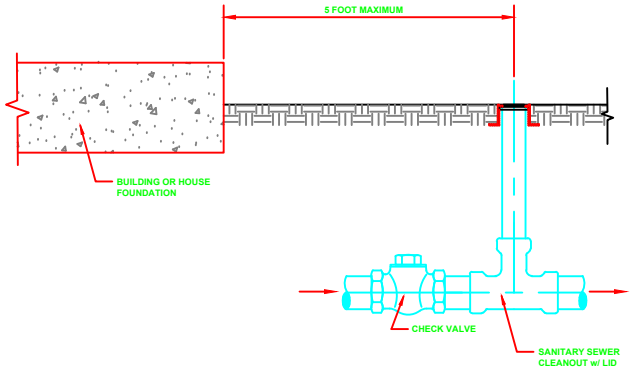
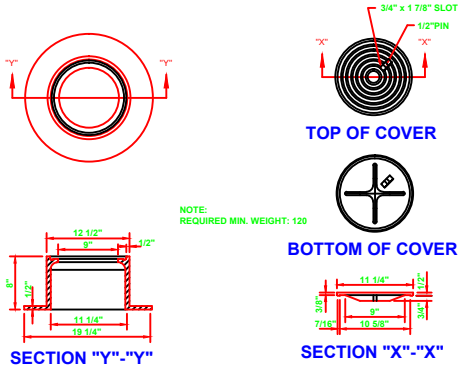
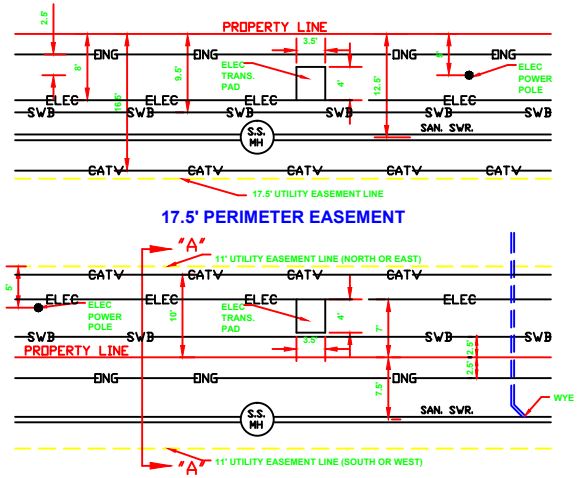
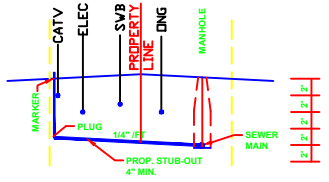


STANDARD DETAIL FOR SANITARY SEWER BACKFLOW PREVENTERS



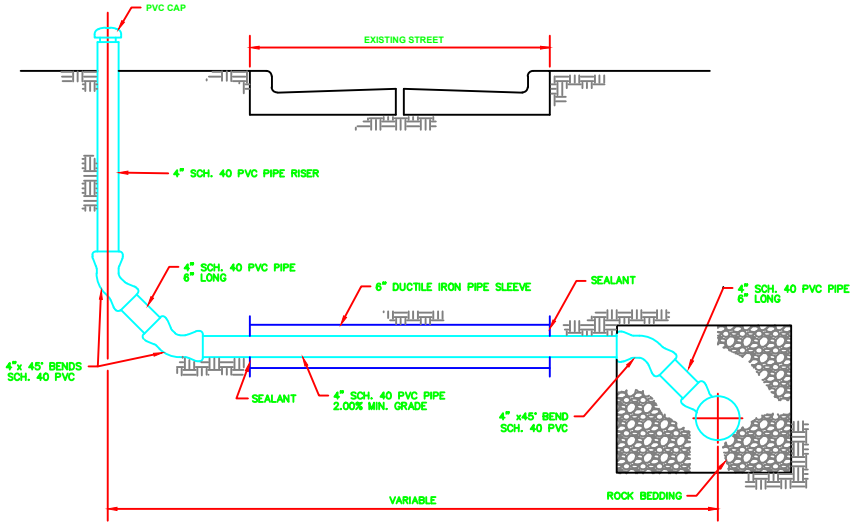
STANDARD DETAIL FOR CLEANOUT FRAME AND LID



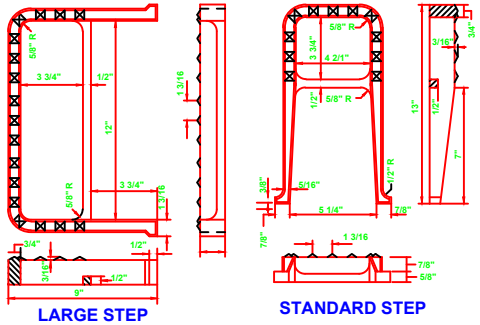


BACKYARD PERIMETER UTILITY LOCATIONS

NOTE:
BEDDING GRAVEL SHALL BE COMPOSED OF CRUSHED ROCK CONFORMING TO STANDARD SPECIFICATIONS, TYPE A OR B.



LONG SERVICE CONNECTION



MANHOLE STEPS & INVERT DETAILS

SANITARY SEWER APPERTENANCES and STANDARD DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
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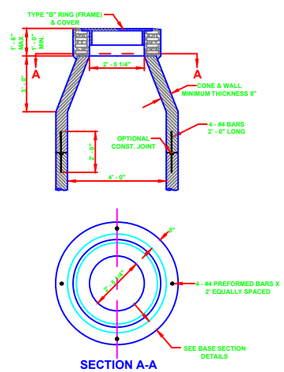
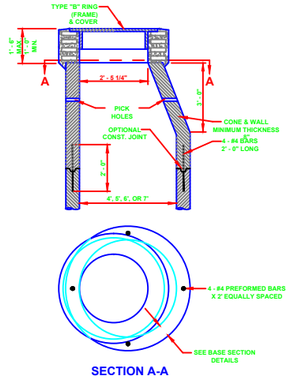
SHEET X OF X

CONCENTRIC MANHOLE DETAIL



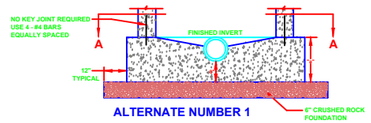
SECTION A-A

ECCENTRIC MANHOLE DETAIL

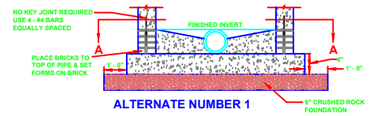


SECTION A-A

STANDARD DETAIL FOR MANHOLE BASE SECTION

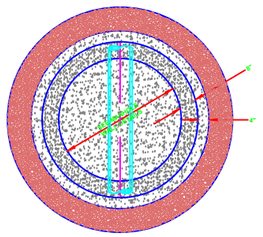


ALTERNATE NUMBER 1



ALTERNATE NUMBER 1

SCHEDULE OF THICKNESS ALTERNATE #1	
PIPE DIAMETER	t
8"	1' - 8"
10"	1' - 10"
12"	2' - 1"
15"	2' - 4"
18"	2' - 8"
21"	3' - 0"
24"	3' - 3"

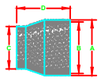


SECTION A-A

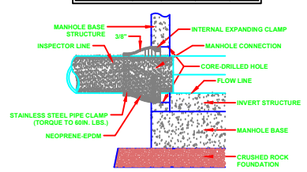
CAST-IN-PLACE NON-REINFORCED MANHOLE-PIPE CONNECTION

NOTE:

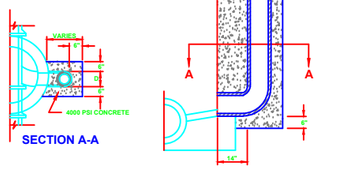
1. ALL PIPE SHALL BE STAINLESS STEEL
2. NEOPRENE-.EPDM BLENDED COMPOUND BOOT SHALL MEET ASTM C-923



SUGGESTED PIPE O.D. RANGE (IN.)	HOLE & BOOT DIAMETER DIMENSIONS			
	A	B	C	D
3 1/2" - 4 1/2"	17"	6 1/8"	4 1/4"	8"
5 3/8" - 7"	12"	10 7/8"	6 1/2"	8"
7" - 8 1/2"	12"	10 7/8"	8"	8"
8 3/16" - 9 3/4"	12"	10 7/8"	9 1/4"	8"
9 1/4" - 11"	16"	14 7/8"	10 1/2"	8"
10 1/4" - 11"	16"	14 7/8"	12"	8"
12" - 13 3/4"	16"	14 7/8"	13 1/4"	8"
14 1/2" - 16 1/4"	20"	18 7/8"	15 3/4"	8"
16 3/4" - 17 1/2"	20"	18 7/8"	17"	8"
19 1/2" - 21 1/4"	24"	22 7/8"	20 3/4"	8"

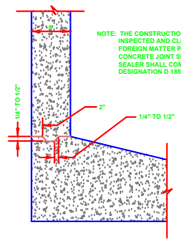


MANHOLE DROP CONNECTION



SECTION A-A

STANDARD DETAIL FOR MANHOLE JOINTS (OPTIONAL)



NOTE: THE CONSTRUCTION JOINT SHALL BE INSPECTED AND CLEANED OF ANY EXCESS FOREIGN MATTER PRIOR TO APPLICATION OF CONCRETE JOINT SEALER. CONCRETE JOINT SEALER SHALL COMPLY WITH A.S.T.M. DESIGNATION D 1850.

SANITARY SEWER DETAILS FOR CAST-IN-PLACE NON-REINFORCED CONCRETE MANHOLES

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=#
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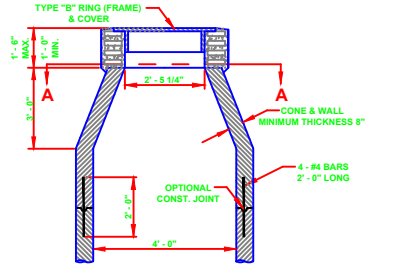
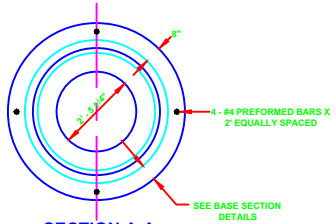
DRAWN	-	-
DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-

RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE: -
SHEET: X OF X

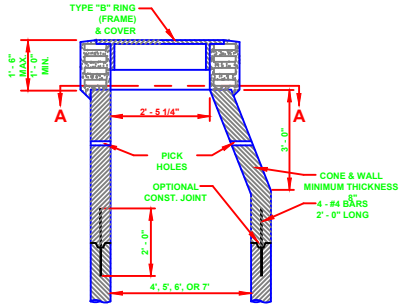
CONCENTRIC MANHOLE DETAIL

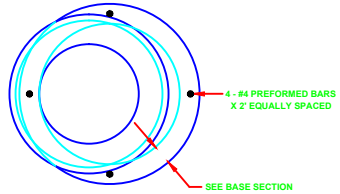




SECTION A-A

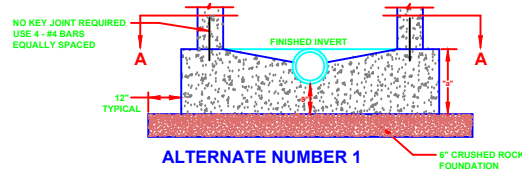
ECCENTRIC MANHOLE DETAIL



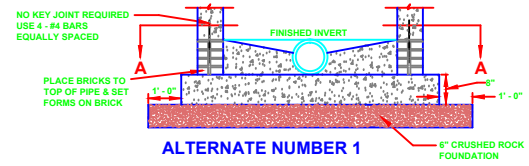


SECTION A-A

STANDARD DETAIL FOR MANHOLE BASE SECTION

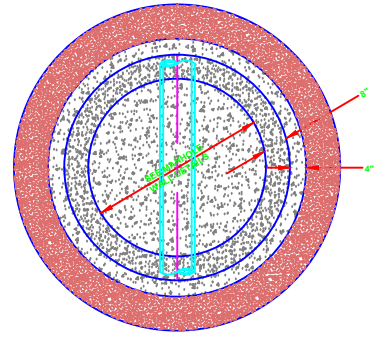


ALTERNATE NUMBER 1



ALTERNATE NUMBER 1

SCHEDULE OF THICKNESS ALTERNATE #1	
PIPE DIAMETER	a
8"	1' - 8"
10"	1' - 10"
12"	2' - 1"
15"	2' - 4"
18"	2' - 8"
21"	3' - 0"
24"	3' - 3"

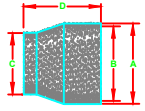


SECTION A-A

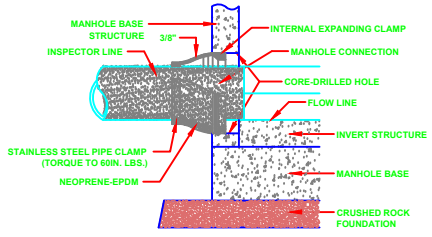
CAST-IN-PLACE NON-REINFORCED MANHOLE-PIPE CONNECTION

NOTE:

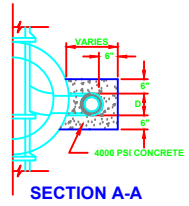
1. ALL PIPE SHALL BE STAINLESS STEEL
2. NEOPRENE--EPDM BLENDED COMPOUND BOOT SHALL MEET ASTM C-923



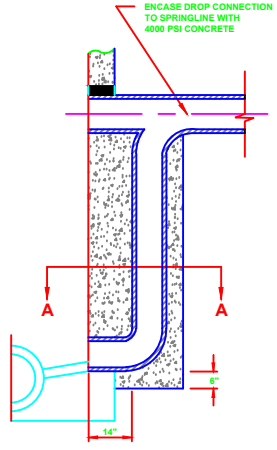
SUGGESTED PIPE O.D. RANGE (IN.)	HOLE & BOOT DIAMETER DIMENSIONS			
	A	B	C	D
3 1/2" - 4 1/2"	7"	6 1/8"	4 1/4"	6"
5 3/8" - 7"	12"	10 7/8"	6 1/2"	8"
7" - 8 1/2"	12"	10 7/8"	8"	8"
8 3/16" - 9 3/4"	12"	10 7/8"	9 1/4"	8"
9 1/4" - 11"	16"	14 7/8"	10 1/2"	8"
10 1/4" - 11"	16"	14 7/8"	12"	8"
12" - 13 3/4"	16"	14 7/8"	13 1/4"	8"
14 1/2" - 16 1/4"	20"	18 7/8"	15 3/4"	8"
15 3/4" - 17 1/2"	20"	18 7/8"	17"	8"
19 1/2" - 21 1/4"	24"	22 7/8"	20 3/4"	8"



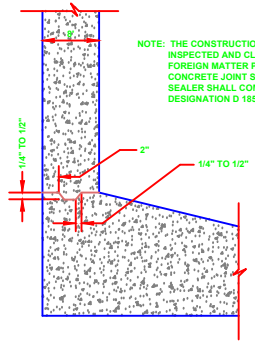
MANHOLE DROP CONNECTION



SECTION A-A



STANDARD DETAIL FOR MANHOLE JOINTS (OPTIONAL)



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SANITARY SEWER DETAILS FOR CAST-IN-PLACE NON-REINFORCED CONCRETE MANHOLES

CITY OF GLENPOOL, OKLAHOMA

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DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE:
ATLAS PAGE NO:
SHEET X OF X

GENERAL CONSTRUCTION NOTES

1 All construction shall be in accordance with The City of Glenpool Standard Specifications for Construction of Public Improvements.

2 All work not classified as a contract pay item shall be considered as an incidental and not paid for directly.

3 All excavation under existing and future pavement shall be backfilled with sand.

4 All waterlines exposed during construction shall be backfilled with sand.

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6 Deflection tests shall be performed on all flexible pipe. The test shall be conducted after the final backfill has been in place for at least thirty (30) days. No pipe shall exceed a deflection of more than five (5%) percent. If the deflection test is to be run using a rigid ball and mandrel, it shall have a diameter equal to ninety-five (95%) percent of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices.

7 Polyvinyl chloride (PVC) pipes shall conform to ASTM D-3034, ASTM F-679, and ASTM F-789: and ASTM F-89-49 for profile wall pipe. Regardless of size, open profile wall pipe will be allowed only on sections of pipe where there are no apparent service connections.

8 Special sanitary sewer pipe shall be required to satisfy minimum horizontal and vertical clearance requirements from waterlines, wells and petroleum storage tanks, as established by the Oklahoma State Department of Environmental Quality (ODEQ).

9 Special sanitary sewer pipe shall be either PVC or Ductile Iron Pipe (DIP). Special PVC pipe shall conform to ASTM D-2241 and SDR 32.5 for sizes four (4") inches to thirty-six (36") inches, or AWWA C-900 and AWWA C-905; with a minimum DR rating of eighteen (18) for pipe sizes four (4") inches to (12") inches and a minimum DR rating of 32.5 for pipe sizes greater than twelve (12") inches. DIP pipes shall meet the requirements specified below.

10 Ductile Iron Pipe (DIP) shall conform to the requirements of AWWA C-151.
- a EXTERIOR COATING -- The exterior surfaces of ductile iron pipe, specifications andfittings shall be coated with an asphaltic coating in accordance with ASTM A746, section 6.1; of AWWA E-151. The coating shall have a minimum thickness of one (1) mil.
- b INTERIOR COATING -- Interior surfaces of pipe and fittings shall be lined with fourty (40) mills of virgin Polyethylene complying with ASTM D-1248 or Madison Polyethylene Lining, Corporate II tx-5 Minute Number 17115, manufactured by Madison Chemicals, Inc., Canada, or approved equal. The lining materials shall be compounded with a minimum of two (2%) percent carbon black to resist ultra violate rays.
- c THICKNESS -- Unless otherwise specified, Ductile Iron Pipe shall have the following table.

Pipe Nominal Thickness (inches)	DEPTH of COVER (feet)									
	≤10'		>10' or ≤15'		>15' or ≤20'		>20' or ≤25'		>50' or ≤30'	
	Nominal Thickness (inches)	Standard Pressure Class AWWA C-151	Nominal Thickness (inches)	Standard Pressure Class AWWA C-151	Nominal Thickness (inches)	Standard Pressure Class AWWA C-151	Nominal Thickness (inches)	Standard Pressure Class AWWA C-151	Nominal Thickness (inches)	Standard Pressure Class AWWA C-151
3	0.25	350	0.25	350	0.25	350	0.25	350	0.25	350
4	0.25	350	0.25	350	0.25	350	0.25	350	0.25	350
6	0.25	350	0.25	350	0.25	350	0.25	350	0.25	350
8	0.25	350	0.25	350	0.25	350	0.25	350	0.25	350
10	0.26	350	0.26	350	0.26	350	0.26	350	0.26	350
12	0.28	350	0.28	350	0.28	350	0.28	350	0.28	350
18	0.31	250	0.31	250	0.31	250	0.31	250	0.34	300
24	0.33	200	0.33	200	0.33	300	0.38	200	0.38	300
30	0.34	150	0.34	150	0.34	250	0.42	150	0.45	300
36	0.38	150	0.38	150	0.38	250	0.47	150	0.50	300
42	0.41	150	0.41	150	0.41	250	0.52	150	0.63	350
48	0.46	150	0.46	150	0.46	300	0.64	150	0.70	350
54	0.51	150	0.51	150	0.51	300	0.72	150	0.79	350
60	0.54	150	0.54	150	0.54	300	0.76	150	0.83	350
64	0.56	150	0.56	150	0.56	300	0.80	150	0.87	350

MANHOLE TESTING

1 GENERAL -- When called for on the plans or specified, manholes shall be tested, before acceptance, by either performing exfiltration or vacuum test. The Engineer shall determine which test shall be performed.

2 EXFILTRATION TEST -- All incoming and outgoing lines (including services) shall be plugged and the manhole filled with water up to the bottom of the manhole ring. If the water loss exceeds the maximum allowable as shown, the manhole shall be considered to have failed the test. the contractor shall drain, perform the necessary repairs as directed by the Engineer, and then reset the manhole until it passes, all at no additional cost to the City.

Manhole Depth (feet)	Maximum Allowable Water Loss
≤ 8	One (1") inch over Five (5) minutes
≥ 8	One - Eighth(1/8") inch pe rvertical foot of depth over five (5) minutes

3 VACUUM TESTING -- All incoming and outgoing sewer and service lines shall be plugged, the plugs restrained and the vacuum tester head placed on the manhole ring and sealed. A vacuum of ten (10") inches Hg (Mercury) shall then be drawn on the manhole and the time measured for the vacuum to drop to nine (9") inches Hg. The time measured shall be not less than that shown on the following table.

Manhole Internal Diameter (feet)	Time Measured (seconds)
4	60
5	60
6	60
7	70

MANHOLE NOTES

1 MANHOLE -- PIPE CONNECTION AT INVERTS -- Flexible gaskets seals shall be required where pipe enters the wall of all manholes. Where possible, the opening for each connecting sewer pipe shall be circular and match the diameter of the pipe. For manholes built over existing lines or for special conditions, horseshoe shaped openings shall be accepted. Flexible gaskets shall be A-Lok, or approved equal. The method and material used for grouting any remaining angular space shall be approved by the Engineer prior to construction.

2 FINISHING MANHOLE TO GRADE --The manhole ring and cover shall be adjusted to grade with concrete rings or courses of brick masonry.

3 OUTSIDE WATERPROOFING -- When called for on the plans or specified, waterproofing shell be required on the outside of the manholes. The waterproofing material shall be TNEMEC Series 66 III of approved equal. The coating shall have a minimum thickness of four (4) mills. Coating shall be environmentally non-hazadous. Spray applications shall be shop applied and field applications are limited to brush or roller. Acceptance of material used for waterproofing shall be on the basis of Type "D" Certifications, provided that all applicable requirements are met.

4 VERTICAL DROP -- The vertical drop of concrete pours shall not exceed ten (10') feet. The Contractor may select to use either a construction joint as shown on the standard detail or use a tremmie.

5 CONCRETE PLACEMENT -- Monolithic pours of the manhole bottom and walls shall be permitted provided that all concrete (bottom and walls) is vibrated according to the specifications for the construction of sanitary sewers and appurtenances.

6 COMPRESSION STRENGTH -- All concrete for manhole bases, inverts and wall shall have a minimum compression strength of 3500 psi.

7 FORMING -- Forms shall be provided for the shaping and finishing of the manhole bottoms. a minimum of twenty-four (24) hours shall elapse prior to pouring the manhole walls.

8 CONCRETE FINISH -- Mortar for finishing and sealing shall be class "C". Any honeycombing of concrete less than two (2") inches deep in manhole walls may be repaired using Class "D" mortar.

A. CAST-IN-PLACE MANHOLES

1. DIMENSIONS -- The manholes shall be constructed pursuant to appropriate Standard Details for Precast-In-Place Non-Reinforced Concrete Manholes.
2. PROTECTIVE COATING -- Protective coating shall not be required unless otherwise called for on the plans or as directed by the Engineer.

B. PRECAST MANHOLES

1. APPLICABLE STANDARD -- Pre-cast manholes shall be constructed in accordance with ASTM C-478.
2. DIMENSIONS -- The manholes shall be constructed pursuant to the appropriate Standard Details for precast reinforced concrete manholes, and/or as specified in ASTM C-478. the minimum wall thickness shall be as specified in the following table and not less than one-twelth (1/12) of the internal diameter of the largest cone or riser section of five (5") inches, whichever is greater.

Manhole Internal Diameter (feet)	Minimum Wall Thickness (inches)
4	5
5	5
6	6
7	7

3. MANHOLE STEPS AND LADDERS -- Steps and ladders shall not be constructed unless otherwise directed by the Engineer. If called for, they shall conform with Section 13 of ASTM C-478.
4. HANDLING -- All lifting holes shall be repaired with a mixture of cement and sand grout firmly packed.
5. PROTECTIVE COATING -- All inside surfaces (walls, bottoms and etc.) of precast concrete manholes shall be shop coated with a total dry film thickness of not less than eight (8) mils of TNEMEC Series 69 Hi-Build Epoxoline II, or approved equal.
6. FIELD TESTING -- When directed by the Engineer, a set of three (3) cylinders, three (3") inches in diameter shall be cut from randomly selected manholes.
7. ACCEPTANCE -- Acceptance of manhole structure shall be based on the conformance and performance of materials required in ASTM C-478, and the Engineer's inspection of the installed product.

SANITARY SEWER GENERAL REQUIREMENTS FOR CONSTRUCTION

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=80'
PROFILE SCALE
HORIZONTAL: "
VERTICAL: "
ATLAS PAGE NO.

DRAWN . . APPROVED:
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
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SANITARY SEWER GENERAL REQUIREMENTS FOR CONSTRUCTION

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1" = 60'
PROFILE SCALE: HORIZONTAL: " VERTICAL: "
ATLAS PAGE NO:

DRAWN " "
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CHIEF ENGR. " "
APPROVED:
RECOMMENDED: DIRECTOR
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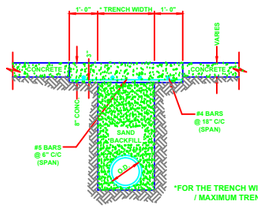
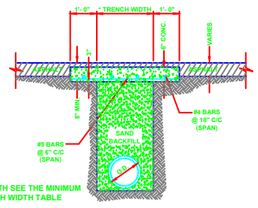
ENGINEERING DIRECTOR DATE: "
SHEET X OF X

PAVING CUT AND PERMANENT REPAIR

(RIGID PAVEMENT)



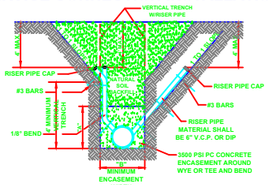
(FLEXIBLE PAVEMENT)



*FOR THE TRENCH WIDTH SEE THE MINIMUM / MAXIMUM TRENCH WIDTH TABLE

TYPICAL SECTION

SERVICE CONNECTION INSTALLATION



CONCRETE ENCASEMENT FOR RISER PIPE

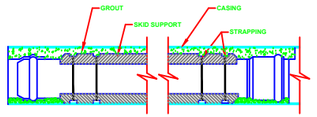
PIPE SIZE (inches)	"A" (feet)	"B" (feet)	LENGTH OF ENCASEMENT (feet)
8	1.5	2.2	2.0
10	2.0	2.2	2.0
12	2.0	2.2	2.0
15	2.5	2.6	2.0
18	3.0	3.0	2.5

ADD 1.0' "B" WHEN USING BRACING OR SHORING

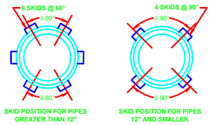
CONNECTION TYPES

1. EXTERNAL CONNECTIONS FOR NEW CONSTRUCTION WYE BRANCHES -- For new construction there shall be installed wye branches of size and type shown on the plans with six (6") inch openings at locations shown on the plans or as described by the Engineer.
2. EXTERNAL CONNECTION TO EXISTING MAIN -- Connections to existing main may be accomplished as follows:
   a. SADDLES -- Connections may be made by excavating the existing main and cutting a hole using approved equipment and installing a saddle. Sewer service connections constructed with saddles shall include straps, a one-eighth (1/8") degree bend, and a closure piece. when existing main has been rehabilitated by trenchless method of construction, the saddle connection shall be made to the pipe/or liner.
   b. TEES -- Connections maybe made by removing a section of existing pipe and installing a wye branch. Fittings and closure assembly shall be used to make the connection and shall be supplied in a normal diameter or six (6") inches. The external connection shall be considered complete when backfilling and surface restoration is complete. Service connections constructed with wye branches shall include a on-eighth (1/8") degree bend, elbow, and when required, a closure piece.
3. RISER
   a. INSTALLATION -- The pipe may be installed in one of three ways shown above.
   b. SIZE AND MATERIAL -- The riser pipe shall be six (6") inch PVC or DIP.
   c. CONCRETE ENCASEMENT -- Concrete encasement around riser shall meet the requirement established above.
4. LOCATOR TAPE -- A locator tape, green in color stating "CAUTION -- SANITARY SEWER RISER BURIED BELOW" shall be attached to the sanitary sewer riser and extended to a minimum of two (2') feet above the ground, the tape shall be three (3") inch wide DuraTac as manufactured by THOR Enterprises, Inc., of Sun Prairie, Wisconsin or approved equal.

BORING STANDARD DETAIL



PROFILE



SECTION

NOTES:

1. WOOD SKID SUPPORTS -- Wood skid supports, from bell to spigot, shall be used and fastened securely to pipe with steel strapping, cables or clamps. Use of petroleum products shall not be allowed as a lubricant to ease installation. When wood skids are used they shall be pressure treated with creosote pentachlorophenol, or salt type preservative in accordance with APWA C-2. Cut surfaces shall be given two (2) heavy brush coats of the same preservative.
2. PLUGGED PIPE ENDS -- both ends of the casing pipe shall be plugged with a grout or concrete having a minimum compressive strength of twenty-five hundred (2500 psi) pounds per square inch or grouted masonry. Each plug shall be a minimum length of eighteen (18) inches. the grouting presser shall be in accordance with the pipe manufactures recommendations.
3. FILLING ANNULAR SPACE -- The annular space between the sanitary sewer pipe and the steel casing shall be filled with a flowable fill consisting of a Portland cement grout having a minimum twenty-eight (28) day compressive strength of one-thousand (1,000 psi) pounds per square inch. the contractor shall install a vent pipe higher than the upper end of the pipe to ensure the annulus is completely filled with grout.
4. CASING PIPE SIZE -- Steel casing pipe shall have the following suggested minimum diameters:

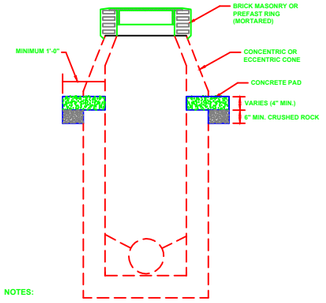
PIPE NOMINAL SIZE (inches)	SUGGESTED CASING PIPE INSIDE DIAMETER (inches)
4	8 to 10
6	10 to 12
8	14 to 16
10	16 to 18
12	18 to 20
15	20 to 22
18	24 to 26
24	31 to 33
27	33 to 36
30	36 to 42
36	42 to 48
42	54 to 60
48	60 to 66

5. CASING PIPE THICKNESS -- Steel casing pipe shall have the following minimum thickness(ess), in inches, for the indicated maximum depth of cover(s), in feet:

OUTSIDE DIAMETER (inches)	UNDER HIGHWAY		UNDER RAILROAD	
	WALL THICKNESS (inches)	WALL THICKNESS (inches)	WALL THICKNESS (inches)	WALL THICKNESS (inches)
< 12.3/4	0.188	30	0.259	30
16	0.250	30	0.281	30
18	0.250	30	0.322	30
20	0.250	30	0.344	30
24	0.250	30	0.406	30
30	0.322	30	0.469	30
36	0.375	30	0.531	30
42	0.375	25	0.531	30
48	0.438	25	0.531	25
54	0.438	25	0.531	20
60	0.438	25	0.531	20
66	0.438	20	0.531	20

6. CASING MATERIAL -- Steel casing pipe shall conform with ASTM A-139, Standard Specification for Electric-Fusion (ARC)-Welded Steel Pipe (NPS4 and over). The steel material shall be new, smooth wall, carbon steel, Grade B, with a minimum tensile strength, and minimum thrity-five-thousand (35,000 psi) pounds per square inch yield strength.

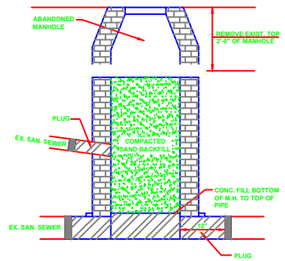
STANDARD DETAILS FOR REBUILDING MANHOLES



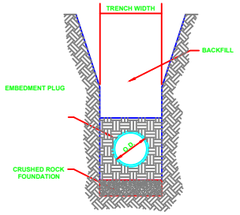
NOTES:

1. CAST-IN-PLACE NON-REINFORCED CONCRETE AND BRICK MANHOLES -- The existing cone and wall, if necessary, shall be removed to a level which will allow installation of new cone to the proper grade. The exposed cut-off surfaces of the existing manhole wall shall be cleaned by removing loose material and wetted, prior to construction of concrete pad. All loose backfill around the manhole wall shall be removed and replaced with compacted crushed rock. the new concrete pad shall be constructed, and a new cone shall be formed or placed to the proper grade using fifteen (1500 psi) pounds per square inch mortar.
2. PRECAST REINFORCED CONCRETE MANHOLES -- Precast sections shall be removed to a level where the new cone can be installed to the desired grade. Installation shall be in accordance with the appropriate Standard Detail for Precast Manhole cones. A new rubber gasket shall be used to seal each section.

STANDARD DETAILS FOR ABANDONING MANHOLES



EMBEDMENT PLUG STANDARD DETAIL



NOTES:

Two types of embedment plugs may be used, at the Contractors option, as follows:

1. CLAY PLUGS -- the embedment and backfill material shall be select clay separated from excavated material and shall be approved by the Engineer prior to placement. This material shall be free of clods, clumps, debris, organic material and stones. all clay plug material shall be compacted to a minimum of ninety (90%) percent of Standard Proctor Density (ASTM D-698) at plus or minus three (3%) percent of Optimum Moisture Content.
2. FLOWABLE FILL PLUGS -- Flowable fill plugs shall consist of a Portland Cement grout having a minimum twenty-eight (28) day compressive strength of five hundred (500 psi) pounds per square inch.

SANITARY SEWER MISCELLANEOUS DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

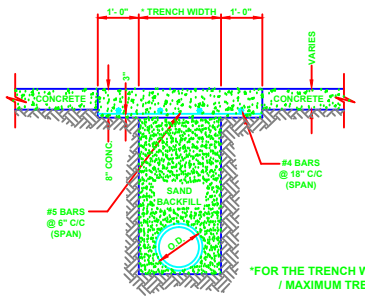
REVISION	BY	DATE

PLAN SCALE: 1" = 1'-0"
PROFILE SCALE: HORIZONTAL: " VERTICAL: "
ATLAS PAGE NO:

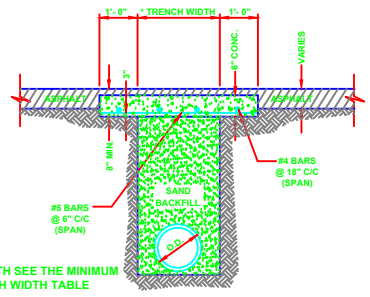
DRAWN: " APPROVED:
DESIGNED: "
OFFICE ENGR: "
CHIEF ENGR: "
RECOMMENDED: DIRECTOR
RECOMMENDED: CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR
DATE: "
SHEET X OF X

PAVING CUT AND PERMANENT REPAIR

(RIGID PAVEMENT)

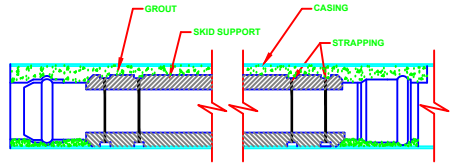


(FLEXIBLE PAVEMENT)

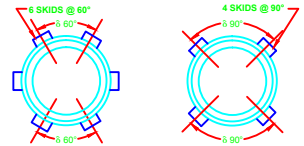


*FOR THE TRENCH WIDTH SEE THE MINIMUM / MAXIMUM TRENCH WIDTH TABLE

BORING STANDARD DETAIL



PROFILE



SKID POSITION FOR PIPES GREATER THAN 12"

SKID POSITION FOR PIPES 12" AND SMALLER

SECTION

NOTES:

1. WOOD SKID SUPPORTS -- Wood skid supports, from bell to spigot, shall be used and fastened securely to pipe with steel strapping, cables or clamps. Use of petroleum products shall not be allowed as a lubricant to ease installation. When wood skids are used they shall be pressure treated with creosote pentachlorophenol, or salt type preservative in accordance with APWA C-2. Cut surfaces shall be given two (2) heavy brush coats of the same preservative.

2. PLUGGED PIPE ENDS -- both ends of the casing pipe shall be plugged with a grout or concrete having a minimum compressive strength of twenty-five hundred (2500 psi) pounds per square inch or grouted masonry. Each plug shall be a minimum length of eighteen (18) inches. the grouting presser shall be in accordance with the pipe manufactures recommendations.

3. FILLING ANNULAR SPACE -- The annular space between the sanitary sewer pipe and the steel casing shall be filled with a flowable fill consisting of a Portland cement grout having a minimum twenty-eight (28) day compressive strength of one-thousand (1,000 psi) pounds per square inch. the contractor shall install a vent pipe higher than the upper end of the pipe to ensure the annulus is completely filled with grout.

4. CASING PIPE SIZE -- Steel casing pipe shall have the following suggested minimum diameters:

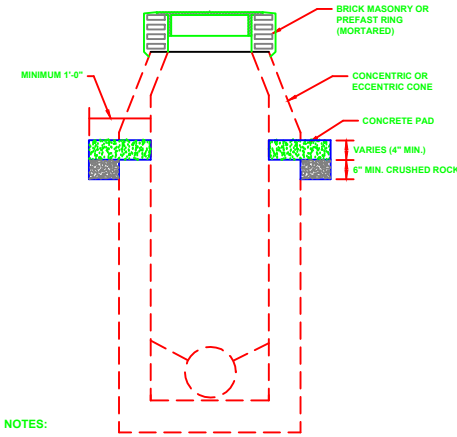
PIPE NOMINAL SIZE (inches)	SUGGESTED CASING PIPE INSIDE DIAMETER (inches)
4	8 to 10
6	10 to 12
8	14 to 16
10	16 to 18
12	18 to 20
15	20 to 22
18	24 to 26
24	31 to 33
27	33 to 36
30	36 to 42
36	42 to 48
42	54 to 60
48	60 to 66

5. CASING PIPE THICKNESS -- Steel casing pipe shall have the following minimum thickness(es), in inches, for the indicated maximum depth of cover(s), in feet:

OUTSIDE DIAMETER (inches)	UNDER HIGHWAY		UNDER RAILROAD	
	WALL THICKNESS (inches)	WALL THICKNESS (inches)	WALL THICKNESS (inches)	WALL THICKNESS (inches)
< 12 3/4	0.188	30	0.250	30
16	0.250	30	0.281	30
18	0.250	30	0.322	30
20	0.250	30	0.344	30
24	0.250	30	0.406	30
30	0.322	30	0.469	30
36	0.375	30	0.531	30
42	0.375	25	0.531	30
48	0.438	25	0.531	25
54	0.438	25	0.531	20
60	0.438	25	0.531	20
66	0.438	20	0.531	20

6. CASING MATERIAL -- Steel casing pipe shall conform with ASTM A-139, Standard Specification for Electric-Fusion (ARC)-Welded Steel Pipe (NPS4 and over). The steel material shall be new, smooth wall, carbon steel, Grade B, with a minimum tensile strength, and minimum thrity-five-thousand (35,000 psi) pounds per square inch yield strength.

STANDARD DETAILS FOR REBUILDING MANHOLES

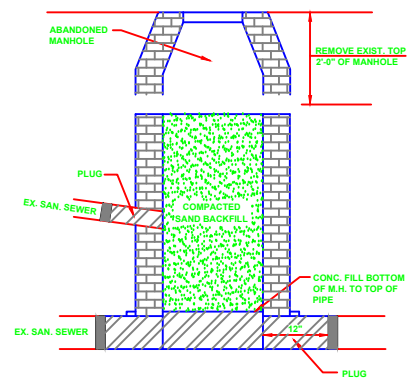


NOTES:

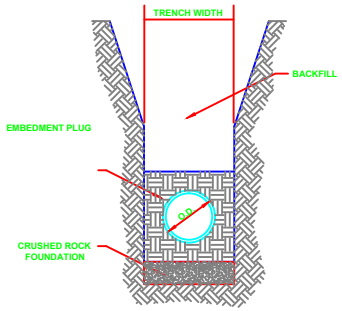
1. CAST-IN-PLACE NON-REINFORCED CONCRETE AND BRICK MANHOLES -- The existing cone and wall, if necessary, shall be removed to a level which will allow installation of new cone to the proper grade. The exposed cut-off surfaces of the existing manhole wall shall be cleaned by removing loose material and wetted, prior to construction of concrete pad. All loose backfill around the manhole wall shall be removed and replaced with compacted crushed rock. the new concrete pad shall be constructed, and a new cone shall be formed or placed to the proper grade using fifteen (1500 psi) pounds per square inch mortar.

2. PRECAST REINFORCED CONCRETE MANHOLES -- Precast sections shall be removed to a level where the new cone can be installed to the desired grade. Installation shall be in accordance with the appropriate Standard Detail for Precast Manhole cones. A new rubber gasket shall be used to seal each section.

STANDARD DETAILS FOR ABANDONING MANHOLES



EMBEDMENT PLUG STANDARD DETAIL



NOTES:

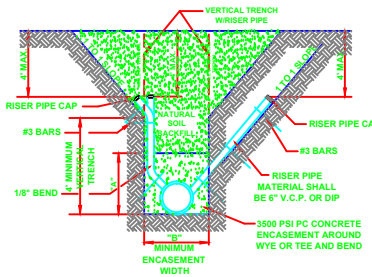
Two types of embedment plugs may be used, at the Contractors option, as follows:

1. CLAY PLUGS -- the embedment and backfill material shall be select clay separated from excavated material and shall be approved by the Engineer prior to placement. This material shall be free of clods, clumps, debris, organic material and stones. all clay plug material shall be compacted to a minimum of ninety (90%) percent of Standard Proctor Density (ASTM D-698) at plus or minus three (3%) percent of Optimum Moisture Content.

2. FLOWABLE FILL PLUGS -- Flowable fill plugs shall consist of a Portland Cement grout having a minimum twenty-eight (28) day compressive strength of five hundred (500 psi) pounds per square inch.

TYPICAL SECTION

SERVICE CONNECTION INSTALLATION



CONCRETE ENCASEMENT FOR RISER PIPE

PIPE SIZE (inches)	"A" (feet)	"B" (feet)	LENGTH OF ENCASEMENT (feet)
8	1.5	2.2	2.0
10	2.0	2.2	2.0
12	2.0	2.2	2.0
15	2.5	2.6	2.0
18	3.0	3.0	2.5

ADD 1.0' "B" WHEN USING BRACING OR SHORING

CONNECTION TYPES

1. EXTERNAL CONNECTIONS FOR NEW CONSTRUCTION WYE BRANCHES -- For new construction there shall be installed wye branches of size and type shown on the plans with six (6") inch openings at locations shown on the plans or as described by the Engineer.

2. EXTERNAL CONNECTION TO EXISTING MAIN -- Connections to existing main may be accomplished as follows:
   a. SADDLES -- Connections may be made by excavating the existing main and cutting a hole using approved equipment and installing a saddle. Sewer service connections constructed with saddles shall include straps, a one-eighth (1/8°) degree bend, and a closure piece. when existing main has been rehabilitated by trenchless method of construction, the saddle connection shall be made to the pipe/or liner.
   b. TEES -- Connections maybe made by removing a section of existing pipe and installing a wye branch. Fittings and closure assembly shall be used to make the connection and shall be supplied in a normal diameter or six (6") inches. The external connection shall be considered complete when backfilling and surface restoration is complete. Service connections constructed with wye branches shall include a on-eighth (1/8°) degree bend, elbow, and when required, a closure piece.

3. RISER
   a. INSTALLATION -- The pipe may be installed in one of three ways shown above.
   b. SIZE AND MATERIAL -- The riser pipe shall be six (6") inch PVC or DIP.
   c. CONCRETE ENCASEMENT -- Concrete encasement around riser shall meet the requirement established above.

4. LOCATOR TAPE -- A locator tape, green in color stating "CAUTION -- SANITARY SEWER RISER BURIED BELOW" shall be attached to the sanitary sewer riser and extended to a minimum of two (2') feet above the ground, the tape shall be three (3") inch wide DuraTac as manufactured by THOR Enterprises, Inc., of Sun Prairie, Wisconsin or approved equal.

SANITARY SEWER MISCELLANEOUS DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE: HORIZONTAL: VERTICAL:

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.

RECOMMENDED: DIRECTOR

RECOMMENDED: ENGINEERING DIRECTOR

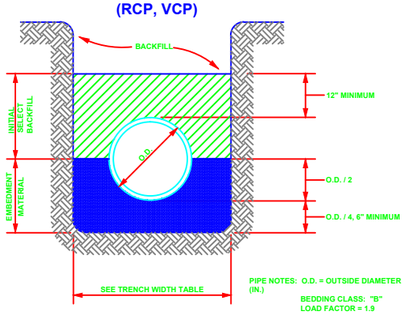
APPROVED: CITY ENGINEERING DEPT.

DATE:

SHEET X OF X

ATLAS PAGE NO:

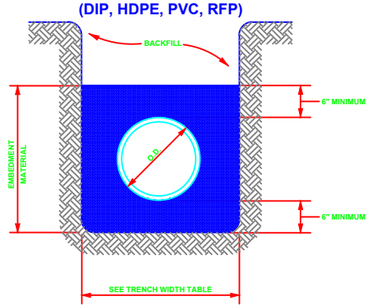
RIDGED PIPE INSTALLATION (RCP, VCP)



PIPE NOTES: O.D. = OUTSIDE DIAMETER (IN.)

BEDDING CLASS: "B"
LOAD FACTOR = 1.9

FLEXIBLE PIPE INSTALLATION (DIP, HDPE, PVC, RFP)



General Location	Percent Compaction (%)	
	Standard Proctor Density (ASTM D-698)	Standard Proctor Density (ASTM D-698)
Under Traffic Area or Improved Existing Surfaces	95	75
Urban & Residential Areas	90	70
Underdeveloped & Other Areas	85	70

3. COMPACTING METHODS -- Compacting methods may vary depending on the materials or as approved by the Engineer.
   a COHESIVE MATERIALS -- Compaction of cohesive materials may be obtained by the use of impact type equipment in confined areas; pneumatic tampers and engine driven rammers may also be used. In relatively narrow trenches, self propelled rammers may also be used. In wide trenches, sheepsfoot rollers may be used.

EMBEDMENT MATERIAL

Embedment is that material to be placed from a minimum of six (6") inches below bottom of the pipe to the springline (half pipe diameter) or to a minimum of six (6") inches above top of pipe for rigid and flexible pipes, respectively. the remaining material to be placed over the embedment is considered backfill.

MATERIAL MATERIAL REQUIREMENTS

1. GENERAL -- Embedment material for all rigid and flexible pipes shall be sand or in areas that is unstable crushed rock meeting the requirement of either ASTM D-2321, Class 1A, or ASTM C-33, Number 57 or 67 and graduations shown below:

Nominal Sieve Size	Percent Passing		
	ASTM D-2321	ASTM C-33	
	Class 1A	Number 57	Number 67
1 1/2 inch	100%	100%	.....
1 inch	ASTM D-2321	95 to 100%	100%
3/4 inch	.....	.....	90 to 100%
1/2 inch	.....	25 to 60%	.....
3/8 inch	.....	.....	20 to 55%
Number 4	≤10%	0 to 10%	0 to 10%
Number 8	.....	0 to 5%	0 to 5%
Number 200	≤5%	.....	.....

2. COMPACTION REQUIREMENTS -- All embedment material shall be placed in six (6") inch lefts to the following minimum percent of Standard Proctor Density as determined by ASTM D-698, "Tests for Moisture -- Density Relations of Soil-- Aggregate Mixtures', and ASTM D-2049, "Test for Related Density of Cohesionless Soils", respectively.

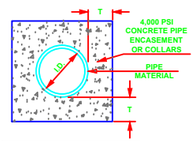
Compaction Test	Compaction Requirement
Standard Proctor Density	95%
Relative Density	75%

3. COMPACTION METHODS -- All embedment material shall be compacted in accordance with the methods described in Part "3" of "Backfilling."

TRENCH WIDTH TABLE

Pipe Nominal Size (inches)	Minimum Trench Width (feet)	Maximum Trench Width (feet)
<12	3.00	5.00
15	3.25	5.00
18	3.50	5.00
21	3.75	5.25
24	4.00	6.00
27	4.25	6.25
30	4.50	6.75
33	4.75	8.25
36	5.25	9.00
42	6.25	9.50
48	7.00	11.00
54	8.00	11.50
60	9.00	12.00
66	9.75	13.00
72	10.50	13.00
78	10.50	13.50
84	11.00	14.00
90	11.50	14.50
96	12.00	15.00
102	12.50	15.50

PIPE ENCASEMENT AND COLLARS



NOMINAL DIAMETER (INCHES)	T (INCHES)
≤18"	6"
>18" & <30"	8"
>30" & <42"	10"
≤42"	12"

NOTE: FOR COLLARS, THE CONCRETE ENCASEMENT SHALL BE PLACED TO A MINIMUM OF TWELVE (12") INCHES ON EITHER SIDE OF THE JOINT.

REINFORCED CONCRETE PIPE (RCP) MINIMUM PIPE DESIGN

1. HIGHWAYS -- Minimum pipe class for diameter twenty-four (24") inches to one-hundred-two (102") inches meeting the requirements of ASTM C-76 shall be as follows:

MAXIMUM DEPTH OF COVER (feet)	MINIMUM CLASS
10	III
10	III
10	III

For maximum depth of cover of thirty (30') feet, pipes ranging from twenty-four (24") inches to fifty-four (54") inches in diameter shall be designed and manufactured in accordance with ASTM C-655 and shall have the following minimum three-edge bearing strength for 0.01 crack (D 0.01) in pounds per lineal foot of inside diameter.

PIPE NOMINAL SIZE (in.)	D 0.01(lb./lineal ft. per ft. of inside diameter)
24	3200
27	3050
30	3050
33	3475
36	3475
42	3450
48	3300
54	3125

Pipes ranging in diameter from sixty (60") to one-hundred-two (102") inches in diameter shall be class V for a minimum depth of cover of thirty (30') feet when manufactured in accordance with ASTM C-76.

2. RAILROADS -- Minimum pipe class for E-80 Railroad live load pipe size twenty-four (24") inches to one-hundred-two (102") inches in diameter meeting the requirements of ASTM C-76, or ASTM C-655 shall be as follows:
   a MAXIMUM DEPTH OF COVER TEN (10') FEET -- Diameters twenty-four (24") inches to one-hundred-two (102") inches shall be Class VI.
   b MAXIMUM DEPTH OF COVER FIFTEEN (15') FEET -- diameters twenty-four (24") inches to forty-two (42") inches shall be Class V and forty-eight (48") inches to one-hundred-two (102") inches shall be Class VI.
   c MAXIMUM DEPTH OF COVER TWENTY (20') FEET -- Diameter twenty-four (24") inches to one-hundred-two inches shall be class V.
   d MAXIMUM DEPTH OF COVER TWENTY-FIVE (925") FEET -- Diameter twenty-four (24") inches shall have D 0.01 of thirty-one-hundred (3100lb./l.f.) pound/lineal foot per foot of inside diameter. Diameters twenty-seven (27") inches to one-hundred-two (102") inches shall be Class V.

PIPE NOMINAL SIZE (in.)	D 0.01(lb./lineal ft. per ft. of inside diameter)
24	3300
27	3125
30	3150
33	3575
36	3575
42	3550
48	3400
54	3225
60	3100

Diameters sixty-six (66") inches to one-hundred-two (102") inches shall be Class V.

BACKFILLING

1. DESCRIPTION -- Backfill is that portion of the total backfill down to but not including the pipe embedment material. The back fill shall be only material approved by the Engineer consisting of loose earth, free of clods, stones, organic matter, debris or other objectionable material. All backfilling shall be done in such a manner as not to disturb or injure the pipe or structures over or against which it is being placed. Any pipe or structure injured or moved from its proper line or grade during backfilling operations shall be opened up and repaired then rebackfilled as herein specified.
   The placing of backfill mater shall not begin until approved for so doing has been given by the Engineer, but backfilling about structures or portion of structures shall be done immediately when so ordered by the Engineer. The top surface of all slopes of all backfill shall be neatly graded off where selected topsoil, or sod or other material is removed and piled separately, such material shall be carefully replaced in a manner satisfactory to the Engineer. The top twelve inches of backfill shall be of as good quality as the original topsoil, which is removed.
2. COMPACTING REQUIREMENTS -- All backfill shall be placed and compacted in six (6") inch lifts for hand-tamped equipment and thirty (30") lifts of self-propelled or power driven equipment to the following minimum percent of Standard Proctor Density of Related Density as determined by ASTM D-698, "Test for Moisture-Density Relations of Soil and Soil Aggregate Mixtures", and ASTM D-2049 "Text for Relative Density of Cohesionless Soils", respectively. ASTM Test D-2049 shall be performed on cohesionless (Granular) soils.
   Cohesive backfill material shall reach the indicated compaction levels at plus (+) or minus (-) three (3%) percent of optimum moisture content. The lift thickness shall be reduced, if necessary, to meet the compaction requirements specified herein.

SANITARY SEWER PIPE INSTALLATION DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE:

HORIZONTAL:

VERTICAL:

DRAWN	-	-
DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-
RECOMMENDED: DIRECTOR		
RECOMMENDED:		CITY ENGINEERING DEPT
ENGINEERING DIRECTOR		DATE: -

APPROVED:

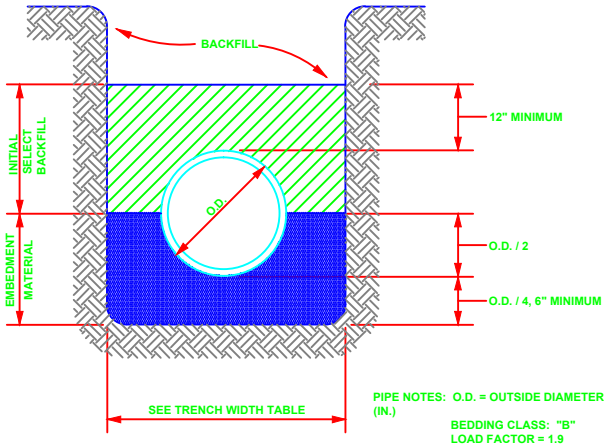
CITY ENGINEERING DEPT

DATE:

SHEET: X OF X

• SAS PAGE NO:

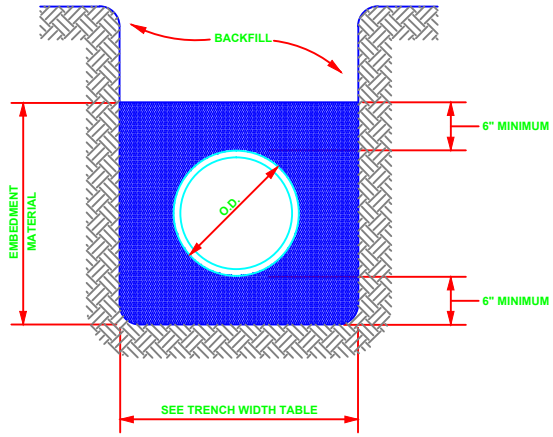
RIDGED PIPE INSTALLATION (RCP, VCP)



PIPE NOTES: O.D. = OUTSIDE DIAMETER (IN.)

BEDDING CLASS: "B"
LOAD FACTOR = 1.9

FLEXIBLE PIPE INSTALLATION (DIP, HDPE, PVC, RFP)



General Location	Percent Compaction (%)	
	Standard Proctor Density (ASTM D-698)	Standard Proctor Density (ASTM D-698)
Under Traffic Area or Improved Existing Surfaces	95	75
Urban & Residential Areas	90	70
Underdeveloped & Other Areas	85	70

3. COMPACTING METHODS -- Compacting methods may vary depending on the materials or as approved by the Engineer.
   a COHESIVE MATERIALS -- Compaction of cohesive materials may be obtained by the use of impact type equipment in confined areas; pneumatic tampers and engine driven rammers may also be used. In relatively narrow trenches, self propelled rammers may also be used. In wide trenches, sheepsfoot rollers may be used.

TRENCH WIDTH TABLE

Pipe Nominal Size (inches)	Minimum Trench Width (feet)	Maximum Trench Width (feet)
≤12	3.00	5.00
15	3.25	5.00
18	3.50	5.00
21	3.75	5.25
24	4.00	6.00
27	4.25	6.25
30	4.50	6.75
33	4.75	8.25
36	5.25	9.00
42	6.25	9.50
48	7.00	11.00
54	8.00	11.50
60	9.00	12.00
66	9.75	13.00
72	10.50	13.00
78	10.50	13.50
84	11.00	14.00
90	11.50	14.50
96	12.00	15.00
102	12.50	15.50

REINFORCED CONCRETE PIPE (RCP) MINIMUM PIPE DESIGN

1. HIGHWAYS -- Minimum pipe class for diameter twenty-four (24") inches to one-hundred-two (102") inches meeting the requirements of ASTM C-76 shall be as follows:

MAXIMUM DEPTH OF COVER (feet)	MINIMUM CLASS
10	III
10	III
10	III

For maximum depth of cover of thirty (30') feet, pipes ranging from twenty-four (24") inches to fifty-four (54") inches in diameter shall be designed and manufactured in accordance with ASTM C-655 and shall have the following minimum three-edge bearing strength for 0.01 crack (D 0.01) in pounds per lineal foot of inside diameter.

PIPE NOMINAL SIZE (in.)	$D_{0.0}$ (lb./lineal ft. per ft. of inside diameter)
24	3200
27	3050
30	3050
33	3475
36	3475
42	3450
48	3300
54	3125

Pipes ranging in diameter from sixty (60") to one-hundred-two (102") inches in diameter shall be class V for a minimum depth of cover of thirty (30') feet when manufactured in accordance with ASTM C-76.

2. RAILROADS -- Minimum pipe class for E-80 Railroad live load pipe size twenty-four (24") inches to one-hundred-two (102") inches in diameter meeting the requirements of ASTM C-76. or ASTM C-655 shall be as follows:
   a MAXIMUM DEPTH OF COVER TEN (10') FEET -- Diameters twenty-four (24") inches to one-hundred-two (102") inches shall be Class VI.
   b MAXIMUM DEPTH OF COVER FIFTEEN (15') FEET -- diameters twenty-four (24") inches to forty-two (42") inches shall be Class V and forty-eight (48") inches to one-hundred-two (102") inches shall be Class VI.
   c MAXIMUM DEPTH OF COVER TWENTY (20') FEET -- Diameter twenty-four (24") inches to one-hundred-two inches shall be class V.
   d MAXIMUM DEPTH OF COVER TWENTY-FIVE (925") FEET -- Diameter twenty-four (24") inches shall have D 0.01 of thirty-one-hundred (3100lb./l.f.) pound/lineal foot per foot of inside diameter. Diameters twenty-seven (27") inches to one-hundred-two (102") inches shall be Class V.

PIPE NOMINAL SIZE (in.)	$D_{0.0}$ (lb./lineal ft. per ft. of inside diameter)
24	3300
27	3125
30	3150
33	3575
36	3575
42	3550
48	3400
54	3225
60	3100

Diameters sixty-six (66") inches to one-hundred-two (102") inches shall be Class V.

BACKFILLING

1. DESCRIPTION -- Backfill is that portion of the total backfill down to but not including the pipe embedment material. The back fill shall be only material approved by the Engineer consisting of loose earth, free of clods, stones, organic matter, debris or other objectionable material. All backfilling shall be done in such a manner as not to disturb or injure the pipe or structures over or against which it is being placed. Any pipe or structure injured or moved from its proper line or grade during backfilling operations shall be opened up and repaired then rebackfilled as herein specified.
   The placing of backfill mater shall not begin until approved for so doing has been given by the Engineer, but backfilling about structures or portion of structures shall be done immediately when so ordered by the Engineer. The top surface of all slopes of all backfill shall be neatly graded off where selected topsoil, or sod or other material is removed and piled separately, such material shall be carefully replaced in a manner satisfactory to the Engineer. The top twelve inches of backfill shall be of as good quality as the original topsoil, which is removed.
2. COMPACTING REQUIREMENTS -- All backfill shall be placed and compacted in six (6") inch lifts for hand-tamped equipment and thirty (30") lifts of self-propelled or power driven equipment to the following minimum percent of Standard Proctor Density of Related Density as determined by ASTM D-698, "Test for Moisture-Density Relations of Soil and Soil Aggregate Mixtures", and ASTM D-2049 "Text for Relative Density of Cohesionless Soils", respectively. ASTM Test D-2049 shall be performed on cohesionless (Granular) soils.
   Cohesive backfill material shall reach the indicated compaction levels at plus (+) or minus (-) three (3%) percent of optimum moisture content. The lift thickness shall be reduced, if necessary, to meet the compaction requirements specified herein.

EMBEDMENT MATERIAL

Embedment is that material to be placed from a minimum of six (6") inches below bottom of the pipe to the springline (half pipe diameter) or to a minimum of six (6") inches above top of pipe for rigid and flexible pipes, respectively. the remaining material to be placed over the embedment is considered backfill.

MATERIAL MATERIAL REQUIREMENTS

1. GENERAL -- Embedment material for all rigid and flexible pipes shall be sand or in areas that is unstable crushed rock meeting the requirement of either ASTM D-2321, Class 1A, or ASTM C-33, Number 57 or 67 and graduations shown below:

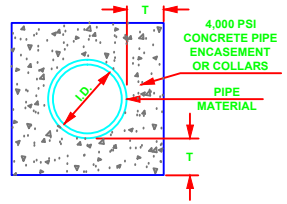
Nominal Sieve Size	Percent Passing		
	ASTM D-2321	ASTM C-33	
	Class 1A	Number 57	Number 67
1 1/2 inch	100%	100%	.....
1 inch	ASTM D-2321	95 to 100%	100%
3/4 inch	.....	.....	90 to 100%
1/2 inch	.....	25 to 60%	.....
3/8 inch	.....	.....	20 to 55%
Number 4	≤10%	0 to 10%	0 to 10%
Number 8	.....	0 to 5%	0 to 5%
Number 200	≤5%	.....	.....

2. COMPACTION REQUIREMENTS -- All embedment material shall be placed in six (6") inch lefts to the following minimum percent of Standard Proctor Density as determined by ASTM D-698. "Tests for Moisture -- Density Relations of Soil-- Aggregate Mixtures', and ASTM D-2049, "Test for Related Density of Cohesionless Soils", respectively.

Compaction Test	Compaction Requirement
Standard Proctor Density	95%
Relative Density	75%

3. COMPACTION METHODS -- All embedment material shall be compacted in accordance with the methods described in Part "3" of "Backfilling."

PIPE ENCASEMENT AND COLLARS



NOMINAL DIAMETER (INCHES)	T (INCHES)
≤18"	6"
>18" & <30"	8"
>30" & <42"	10"
≤42"	12"

NOTE: FOR COLLARS, THE CONCRETE ENCASEMENT SHALL BE PLACED TO A MINIMUM OF TWELVE (12") INCHES ON EITHER SIDE OF THE JOINT.

SANITARY SEWER PIPE INSTALLATION DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
ATLAS PAGE NO:

DRAWN . .
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE: ,
SHEET X OF X

GENERAL NOTES
FRAME (RING) & COVER

1. GENERAL -- Cast iron rings, tops, covers, grating and all cast iron fitting shall be sound, true to form and thickness, and neatly finished and shall fit together in a satisfactory manner. Castings shall be clean, uniform and whole without blow or sand holes, dorosit, hard spots, shrinkage distortion or any other surface defects which would impair serviceability. Casting surfaces shall be smooth and well-cleaned by shot blasting or other approved cleaning method. Plugging or filling holes or other defects shall not be permitted. Parting fins and pouring gates shall be removed. Sharp edges resulting from fabrication shall be dulled by acceptable method to ensure safety in handling. Casting shall conform to the requirements of the Standard Specification for Grey Iron Fittings ASTM A-48, Class "30 B" for rings and "35 B" for covers and the approved Standard Details for Manhole Rings and Covers.

   All rings and covers shall be accurately and carefully placed. All rings shall be beaded in a substantial layer of mortar, shall have a full bearing and shall be set to the exact grade. Unless other wise shown, top of covers shall be flush with or slightly above the surrounding surface. When each cover is placed in any position on the ring, the side play shall not exceed one-eighth (1/8") inch in any direction.

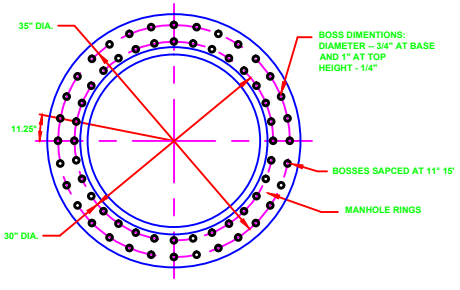
2. RINGS -- Rings may be manufactured in accordance with the Standard Detail for Reversible Manhole Rings.

3. COVERS --
   - A GENERAL -- Manhole covers may be manufactured in accordance with the appropriate Standard Details for Vented of Non-Vented Covers.
   - B COATING -- When called for on the plans or specified, the underside of all manhole covers shall be given one (1) coat of asphalt varnish after visual inspection and approval on the job site.
   - C APPLICATION -- All lids (covers) in street right-of-way shall be non-vented.

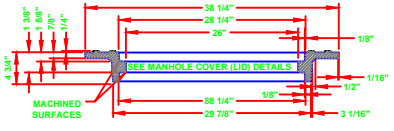
4. CASTING WEIGHTS -- The average weight of casting will be not less than 95% of \ weights shown below:

Ring Only	235 LBS.
Cover Only	195 LBS.
Totals	430 LBS

REVERSIBLE MANHOLE FRAME



PLAN



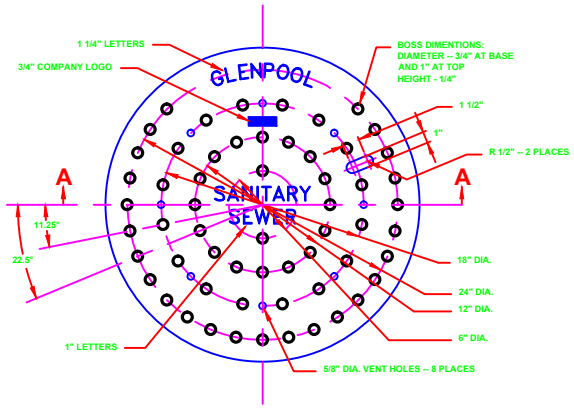
SECTION

AS SHOWN FOR OUT OF PAVING INSTALLATION
REVISED FOR IN PAVING INSTALLATION

GENERAL NOTES:

1. FINISH EXCESS IRON AND FINS; MACHINE SEATING SURFACES FLAT TO NOTED DIMENSIONS.
2. FILLETS SHALL BE 1/4" UNLESS OTHERWISE SPECIFIED.
3. UNLESS OTHERWISE SHOWN, ALL DIMENTIONS ARE IN INCHES.

VENTED MANHOLE COVER (LID)



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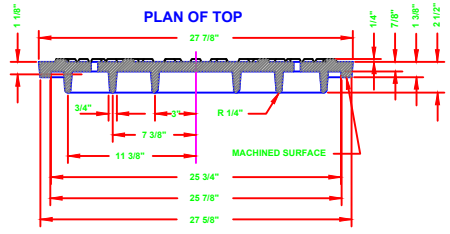
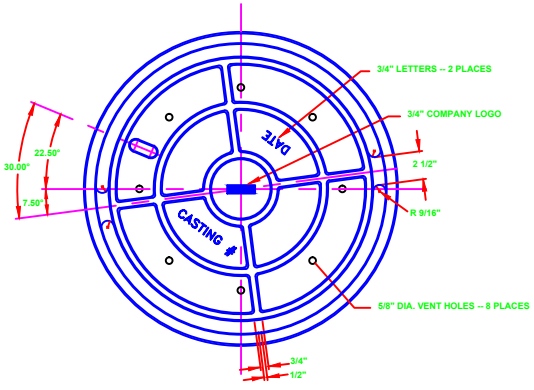


SECTION A-A



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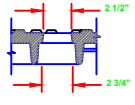
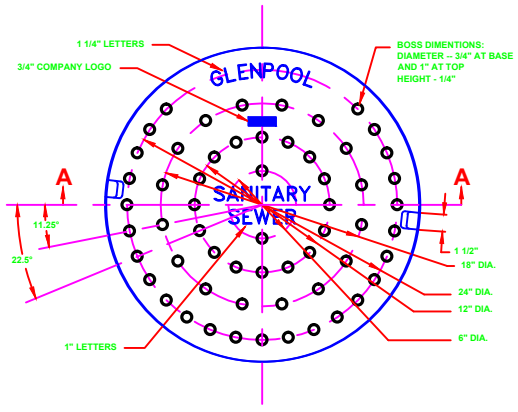


SECTION THRU PICK SLOT

NON-VENTED MANHOLE COVER



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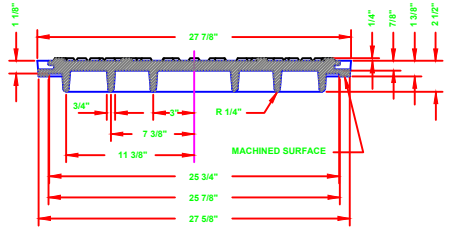
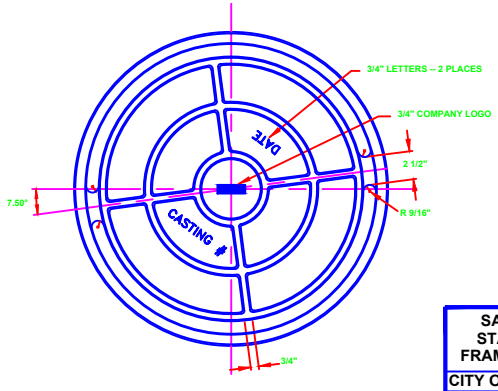
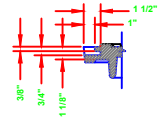


SECTION A-A



PLAN OF UNDERSIDE



SECTION THRU PICK SLOT

GENERAL NOTES:

1. FINISH EXCESS IRON AND FINS; MACHINE SEATING SURFACES FLAT TO NOTED DIMENSIONS.
2. FILLETS SHALL BE 1/4" UNLESS OTHERWISE SPECIFIED.
3. UNLESS OTHERWISE SHOWN, ALL DIMENTIONS ARE IN INCHES.

SANITARY SEWER PIPE STANDARD DETAILS FOR FRAME (RING) & COVER (LID)

CITY OF GLENPOOL, OKLAHOMA

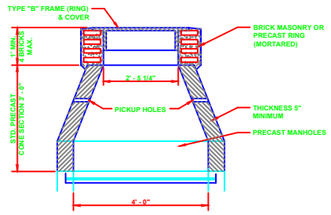
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

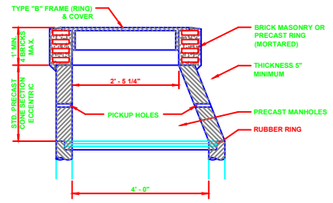
PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
ATLAS PAGE NO:

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE:
SHEET X OF X

STANDARD DETAIL FOR 4' DIA. CONES

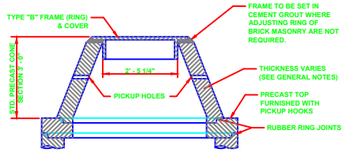


CONCENTRIC CONE



ECCENTRIC CONE

STANDARD DETAIL FOR LARGER THAN 4' DIA. CONES



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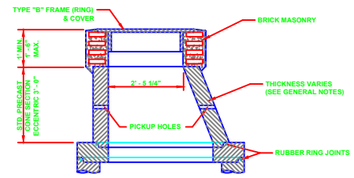
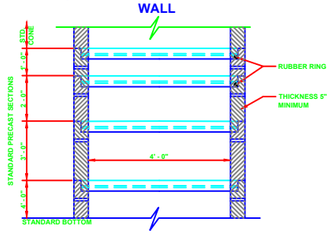
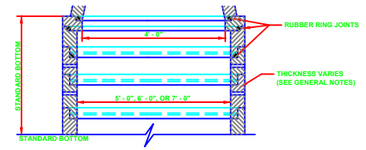


ECCENTRIC CONE

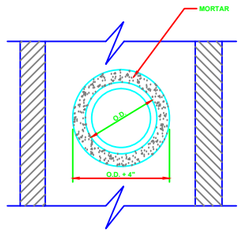
STANDARD 4' DIA. MANHOLE WALL



STANDARD FOR LARGER THAN 4' DIA. MANHOLE WALL



ABOVE INVERT PIPE CONNECTION

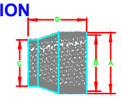


NOTE: SHOP SHALL SCORE CONCRETE WALLS TO DIMENSIONS SHOWN. REINFORCING TO BE CUT ON JOB SITE.

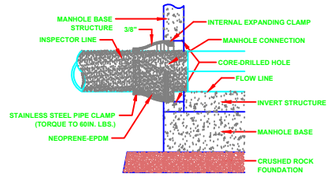
MANHOLE-PIPE CONNECTION

NOTE:

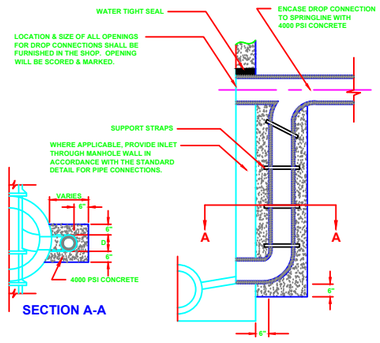
1. ALL PIPE SHALL BE STAINLESS STEEL.
2. NEOPRENE--EPDM BLENDED COMPOUND BOOT SHALL MEET ASTM C-923



SUGGESTED PIPE O.D. RANGE (IN.)	HOLE & BOOT DIAMETER DIMENSIONS			
	A	B	C	D
3 1/2" - 4 1/2"	7"	6 1/8"	4 1/4"	6"
5 3/8" - 7"	12"	10 7/8"	6 1/2"	8"
7" - 8 1/2"	12"	10 7/8"	8"	8"
8 3/16" - 9 3/4"	12"	10 7/8"	9 1/4"	8"
9 1/4" - 11"	16"	14 7/8"	10 1/2"	8"
10 1/4" - 11"	16"	14 7/8"	12"	8"
12" - 13 3/4"	16"	14 7/8"	13 1/4"	8"
14 1/2" - 16 1/4"	20"	18 7/8"	15 3/4"	8"
15 3/4" - 17 1/2"	20"	18 7/8"	17"	8"
19 1/2" - 21 1/4"	24"	22 7/8"	20 3/4"	8"

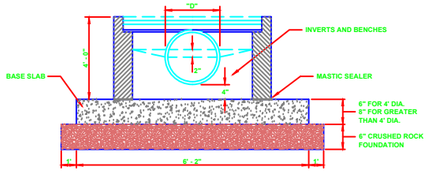


MANHOLE DROP CONNECTION

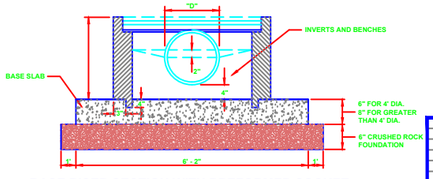


SECTION A-A

MANHOLE BASE SECTIONS



BASE RISER SECTION WITH MASTIC SEALER OPTION "A"



BASE RISER SECTION WITH PREFORMED SOCKET OPTION "B"

SANITARY SEWER STANDARD DETAILS FOR PRECAST REINFORCED CONCRETE MANHOLES

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

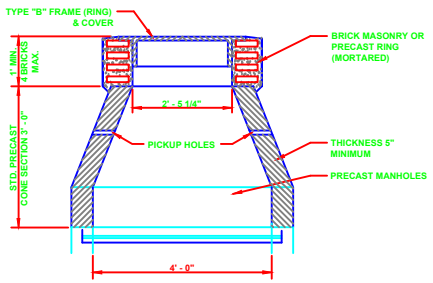
REVISION	BY	DATE

PLAN SCALE: 1"=8'
PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "
ATLAS PAGE NO:

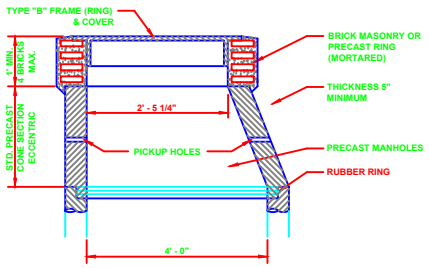
DRAWN: - -
DESIGNED: - -
OFFICE ENGR: - -
CHIEF ENGR: - -
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE: -
SHEET X OF X

STANDARD DETAIL FOR 4' DIA. CONES

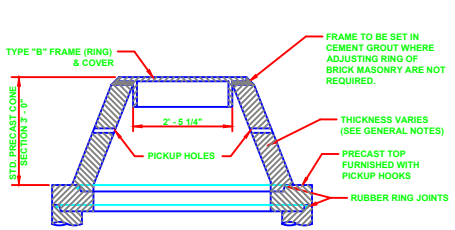


CONCENTRIC CONE



ECCENTRIC CONE

STANDARD DETAIL FOR LARGER THAN 4' DIA. CONES



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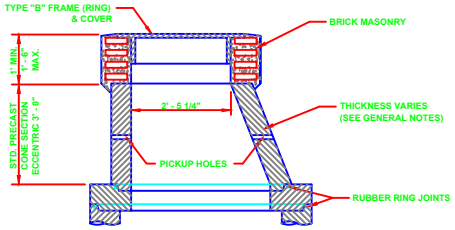
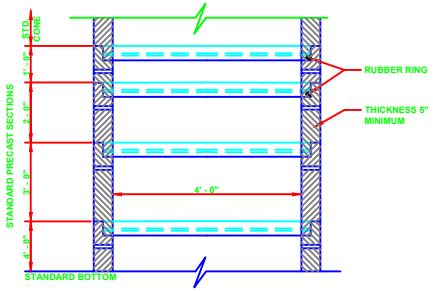
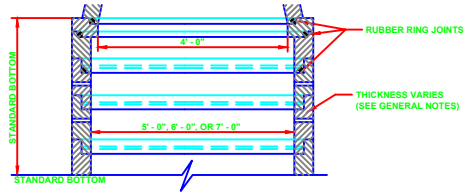


ECCENTRIC CONE

STANDARD 4' DIA. MANHOLE WALL



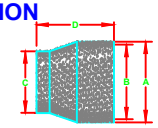
STANDARD FOR LARGER THAN 4' DIA. MANHOLE WALL



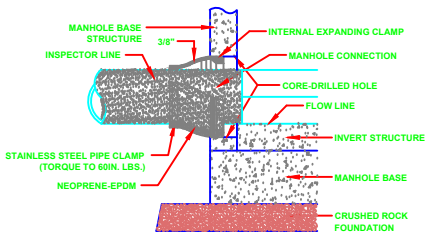
MANHOLE-PIPE CONNECTION

NOTE:

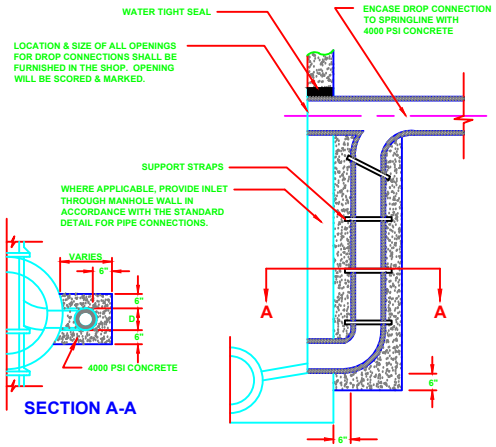
1. ALL PIPE SHALL BE STAINLESS STEEL
2. NEOPRENE–EPDM BLENDED COMPOUND BOOT SHALL MEET ASTM C-923



SUGGESTED PIPE O.D. RANGE (IN.)	HOLE & BOOT DIAMETER DIMENSIONS			
	A	B	C	D
3 1/2" - 4 1/2"	7"	6 1/8"	4 1/4"	6"
5 3/8" - 7"	12"	10 7/8"	6 1/2"	8"
7" - 8 1/2"	12"	10 7/8"	8"	8"
8 3/16" - 9 3/4"	12"	10 7/8"	9 1/4"	8"
9 1/4" - 11"	16"	14 7/8"	10 1/2"	8"
10 1/4" - 11"	16"	14 7/8"	12"	8"
12" - 13 3/4"	16"	14 7/8"	13 1/4"	8"
14 1/2" - 16 1/4"	20"	18 7/8"	15 3/4"	8"
15 3/4" - 17 1/2"	20"	18 7/8"	17"	8"
19 1/2" - 21 1/4"	24"	22 7/8"	20 3/4"	8"

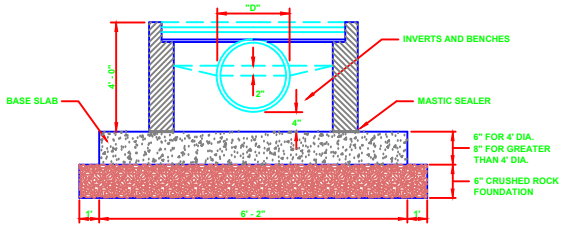


MANHOLE DROP CONNECTION

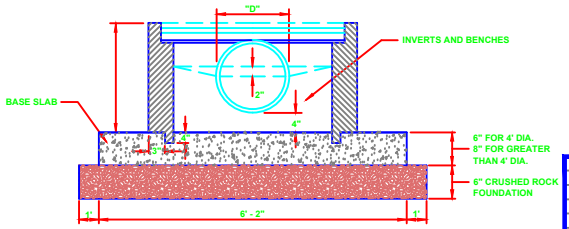


SECTION A-A

MANHOLE BASE SECTIONS

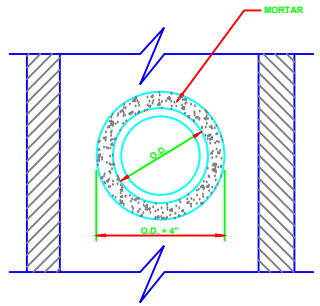


BASE RISER SECTION WITH MASTIC SEALER OPTION "A"



BASE RISER SECTION WITH PREFORMED SOCKET OPTION "B"

ABOVE INVERT PIPE CONNECTION



NOTE: SHOP SHALL SCORE CONCRETE WALLS TO DIMENSIONS SHOWN. REINFORCING TO BE CUT ON JOB SITE.

SANITARY SEWER STANDARD DETAILS FOR PRECAST REINFORCED CONCRETE MANHOLES

CITY OF GLENPOOL, OKLAHOMA

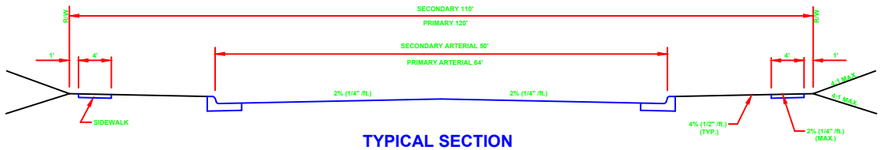
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

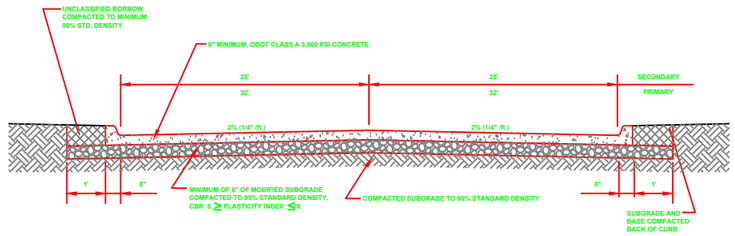
PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
ATLAS PAGE NO:

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

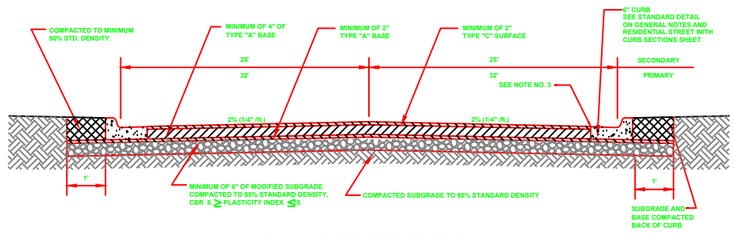
APPROVED:
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X



TYPICAL SECTION



CONCRETE STREET SECTION



ASPHALT STREET SECTION

SECONDARY/PRIMARY ARTERIAL STREET WITH CURB

NOTES:

1. PAVING SECTION SHOWN IS MINIMUM ALLOWED. STREET PAVING SHALL BE DESIGNED IN ACCORDANCE WITH THE AASHTO METHOD
2. DOWELS REQUIRED FOR PCC PAVING 8" THICK, OR GREATER.
3. ASPHALT SURFACE SHALL BE 1/4 " ABOVE EDGE OF CONCRETE GUTTER.

SECONDARY/PRIMARY ARTERIAL STREET WITH CURB SECTIONS

CITY OF GLENPOOL, OKLAHOMA

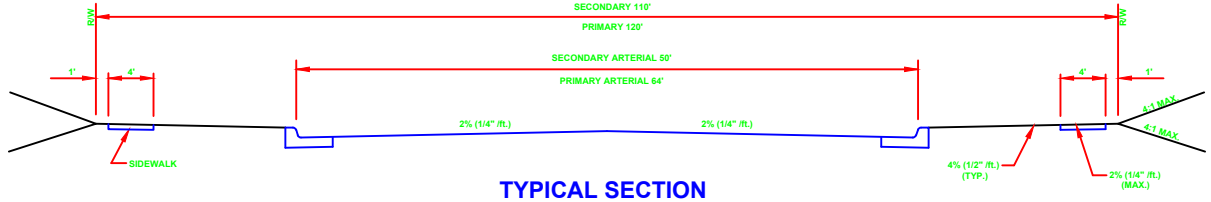
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

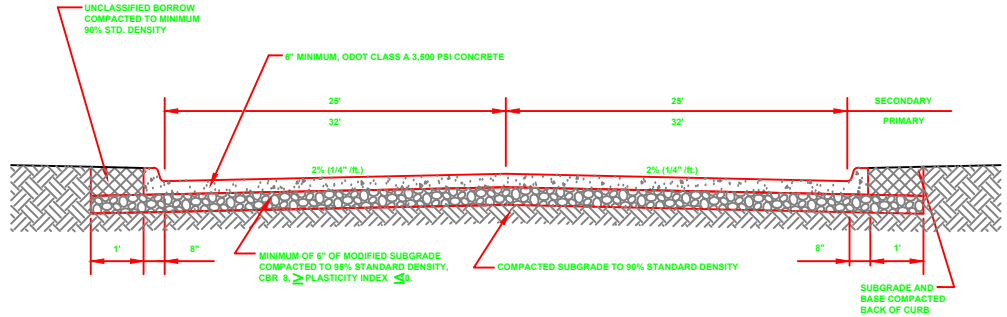
PLAN SCALE: 1"=80'
PROFILE SCALE: HORIZONTAL: " VERTICAL: "
ATLAS PAGE NO.

DRAWN:	.	.
DESIGNED:	.	.
OFFICE ENGR.:	.	.
CHIEF ENGR.:	.	.

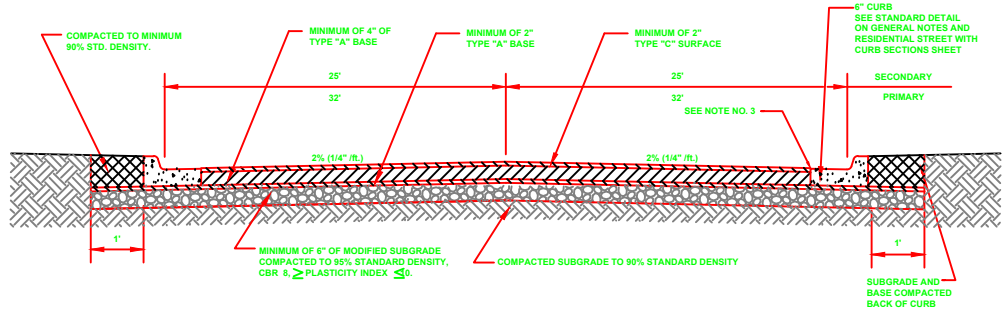
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE: .
SHEET: X OF X



TYPICAL SECTION



CONCRETE STREET SECTION



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SECONDARY/PRIMARY ARTERIAL STREET WITH CURB

NOTES:

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SECONDARY/PRIMARY ARTERIAL STREET WITH CURB SECTIONS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "
ATLAS PAGE NO:

DRAWN " "
DESIGNED " "
OFFICE ENGR. " "
CHIEF ENGR. " "
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE: "
SHEET X OF X

APRON CURTAIN/HEAD/WING WALL SCHEDULE

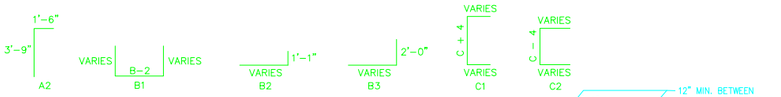
T"	PIPE SIZE	DIMENSIONS A	B	C	APRON/CURTAIN WALL REINFORCING ① A1 BARS NO.	SIZE	SPC	LENGTH	A2 BARS* NO.	SIZE	SPC	LENGTH	A3 BARS NO.	SIZE	SPC	LENGTH	WING WALL REINFORCING ② B1 BARS* NO.	SIZE	SPC	LENGTH	B2 BARS* NO.	SIZE	SPC	LENGTH	B3 BARS* NO.	SIZE	SPC	LENGTH	HEAD WALL REINFORCING ③ C1 BARS* NO.	SIZE	SPC	LENGTH	C2 BARS* NO.	SIZE	SPC	LENGTH	C3 BARS NO.	SIZE	SPC	LENGTH	QUANTITIES CONCRETE	REINFORCING
3"	15"	7'-4"	3'-4"	2'-6"	14	#4	6"	7'-0" 14	#4	6"	5'-3" 5	#4	12"	4'-6" 14	#4	5"	6'-6" TO 10'-6" 7	#4	6"	1'-0" TO 6'-0" 2	#4	EA	8'-0" 4	#4	EA	9'-6" 4	#4	EA	8'-4" 4	#4	EA	2'-6"						
3"	18"	8'-4"	3'-4"	2'-9"	14	#4	6"	8'-0" 14	#4	6"	5'-3" 5	#4	12"	5'-0" 17	#4	6"	6'-8" TO 10'-10" 7	#4	6"	1'-0" TO 8'-0" 2	#4	EA	10'-2" 4	#4	EA	10'-2" 4	#4	EA	8'-10" 4	#4	EA	3'-0"						
3"	24"	10'-4"	3'-4"	3'-3"	14	#4	6"	10'-0" 14	#4	6"	5'-3" 5	#4	12"	5'-6" 21	#4	6"	6'-8" TO 10'-10" 7	#4	6"	1'-0" TO 10'-0" 2	#4	EA	12'-0" 4	#4	EA	10'-8" 4	#4	EA	9'-4" 4	#4	EA	3'-6"						
4"	30"	12'-8"	3'-10"	3'-10"	14	#4	6"	12'-4" 14	#4	6"	5'-5" 5	#4	12"	5'-6" 25	#4	7"	7'-2" TO 13'-10" 9	#4	6"	1'-0" TO 12'-4" 2	#4	EA	14'-8" 4	#4	EA	11'-11" 4	#4	EA	10'-6" 4	#4	EA	4'-0"						
4"	36"	14'-8"	3'-4"	4'-4"	16	#4	6"	14'-4" 16	#4	6"	5'-3" 5	#4	12"	6'-0" 29	#4	6"	7'-8" TO 15'-4" 10	#4	6"	1'-0" TO 14'-4" 2	#4	EA	16'-6" 4	#4	EA	3'-0" 4	#4	EA	11'-7" 8	#4	EA	4'-6"						
5"	42"	17'-0"	6'-10"	4'-11"	16	#4	6"	16'-8"	16	#4	6"	5'-3"	5	#4	12"	6'-6"	35	#4	6"	8'-2" TO 17'-0"	11	#4	6"	1'-0" TO 16'-8"	2	#4	EA	19'-2"	4	#4	EA	14'-3"	4	#4	EA	12'-9"	8	#4	EA	5'-0"		

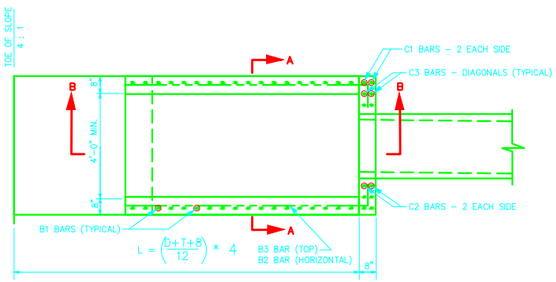
A' = L' - 2 + 0.66'

B' = ID' + 3.33' OR 5.33' MIN.

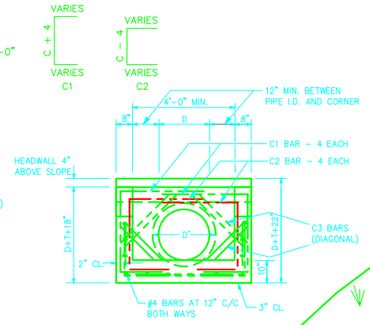
$C' = \left(\frac{D" + T" + 12"}{12}\right)$

$L' = \left(\frac{D + T + 8}{12}\right) * 4$

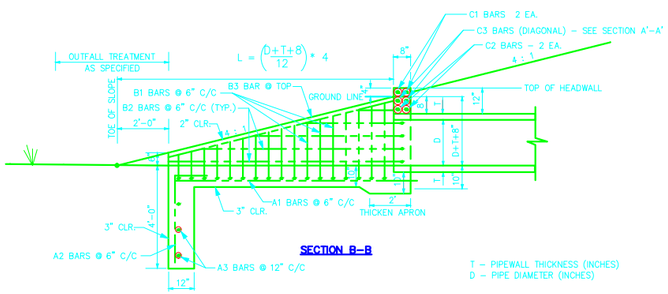




PLAN VIEW



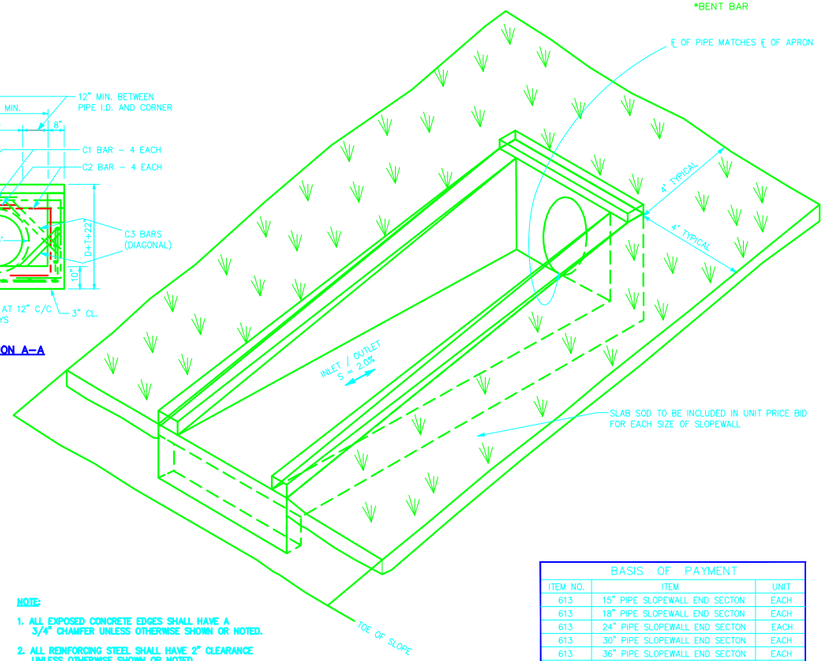
SECTION A-A



SECTION B-B

T = PIPEWALL THICKNESS (INCHES)
D = PIPE DIAMETER (INCHES)

*BENT BAR



NOTE:

1. ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" CHAMFER UNLESS OTHERWISE SHOWN OR NOTED.
2. ALL REINFORCING STEEL SHALL HAVE 2" CLEARANCE UNLESS OTHERWISE SHOWN OR NOTED.
3. ROUGHEN SURFACE AT ALL CONCRETE JOINTS.
4. IF ROCK IS ENCOUNTERED DURING EXCAVATION FOR CURTAIN WALLS, THE CURTAIN WALLS WILL BE KEYED A MINIMUM OF 6" INTO THE ROCK.
5. PIPE SHALL BE PAID FOR SEPARATELY. FOR DETAILS SEE PAY ITEM NOTES.
6. QUANTITIES SHOWN ARE FOR ONE END ONLY. CONCRETE SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF SECTION 509 OF THE 1999 ENGLISH STANDARD SPECIFICATIONS. CLASS P CONCRETE, HAVING MINIMUM STRENGTH OF 5000 PSI, SHALL BE USED ON PRECAST UNITS. CLASS A CONCRETE SHALL BE USED ON CAST-IN-PLACE UNITS.
7. ALL REINFORCING STEEL TO BE #4 BARS AT 6" CENTERS, WITH MINIMUM 12" OVERLAPPING REINFORCING STEEL BETWEEN ADJACENT WALLS, WINGS, TOE WALL, AND FLOOR.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
613	15" PIPE SLOPEWALL END SECTON	EACH
613	18" PIPE SLOPEWALL END SECTON	EACH
613	24" PIPE SLOPEWALL END SECTON	EACH
613	30" PIPE SLOPEWALL END SECTON	EACH
613	36" PIPE SLOPEWALL END SECTON	EACH
613	42" PIPE SLOPEWALL END SECTON	EACH

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE: HORIZONTAL . VERTICAL

ATLAS PAGE NO:

DRAWN . . APPROVED:
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED: CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR
DATE: .
SHEET X OF X

STANDARD 15" TO 42" SLOPEWALL

.

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

APRON CURTAIN/HEAD/WING WALL SCHEDULE

T"	PIPE SIZE	DIMENSIONS A	B	C	APRON/CURTAIN WALL REINFORCING ① A1 BARS NO.	SIZE	SPC	LENGTH	A2 BARS* NO.	SIZE	SPC	LENGTH	A3 BARS NO.	SIZE	SPC	LENGTH	WING WALL REINFORCING ② B1 BARS* NO.	SIZE	SPC	LENGTH	B2 BARS* NO.	SIZE	SPC	LENGTH	B3 BARS* NO.	SIZE	SPC	LENGTH	HEAD WALL REINFORCING ③ C1 BARS* NO.	SIZE	SPC	LENGTH	C2 BARS* NO.	SIZE	SPC	LENGTH	C3 BARS NO.	SIZE	SPC	LENGTH	QUANTITIES CONCRETE	REINFORCING
3"	15"	7'-4"	6'-4"	2'-6"	14	#4	6"	7'-0"	14	#4	6"	5'-3"	5	#4	12"	4'-6"	14	#4	6"	6'-6"	TO 10'-6"	7	#4	6"	1'-0" TO 6'-0"	2	#4	EA	8'-0"	4	#4	EA	9'-6"	4	#4	EA	8'-4"	4	#4	EA	2'-6"			
3"	18"	8'-4"	6'-4"	2'-9"	14	#4	6"	8'-0"	14	#4	6"	5'-3"	5	#4	12"	5'-0"	17	#4	6"	6'-8"	TO 10'-10"	7	#4	6"	1'-0" TO 8'-0"	2	#4	EA	10'-2"	4	#4	EA	10'-2"	4	#4	EA	9'-10"	4	#4	EA	3'-0"			
3"	24"	10'-4"	5'-4"	3'-3"	14	#4	6"	10'-0"	14	#4	6"	5'-3"	5	#4	12"	5'-0"	21	#4	6"	6'-8"	TO 10'-10"	7	#4	6"	1'-0" TO 10'-0"	2	#4	EA	12'-0"	4	#4	EA	10'-8"	4	#4	EA	9'-4"	4	#4	EA	3'-6"			
4"	30"	12'-8"	5'-10"	3'-10"	14	#4	6"	12'-4"	14	#4	6"	5'-3"	5	#4	12"	5'-6"	25	#4	6"	7'-2"	TO 13'-10"	9	#4	6"	1'-0" TO 12'-4"	2	#4	EA	14'-8"	4	#4	EA	11'-11"	4	#4	EA	10'-6"	4	#4	EA	4'-0"			
4"	36"	14'-8"	6'-4"	4'-4"	16	#4	6"	14'-4"	16	#4	6"	5'-3"	5	#4	12"	6'-0"	29	#4	6"	7'-8"	TO 15'-4"	10	#4	6"	1'-0" TO 14'-4"	2	#4	EA	16'-6"	4	#4	EA	13'-0"	4	#4	EA	11'-7"	8	#4	EA	4'-6"			
5"	42"	17'-0"	6'-10"	4'-11"	16	#4	6"	16'-8"	16	#4	6"	5'-3"	5	#4	12"	6'-6"	35	#4	6"	8'-2" TO 17'-0"		11	#4	6"	1'-0" TO 16'-8"	2	#4	EA	19'-2"	4	#4	EA	14'-3"	4	#4	EA	12'-9"	8	#4	EA	5'-0"			

*BENT BAR

A' = L' - 2 + 0.66'

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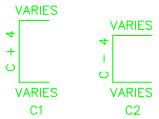
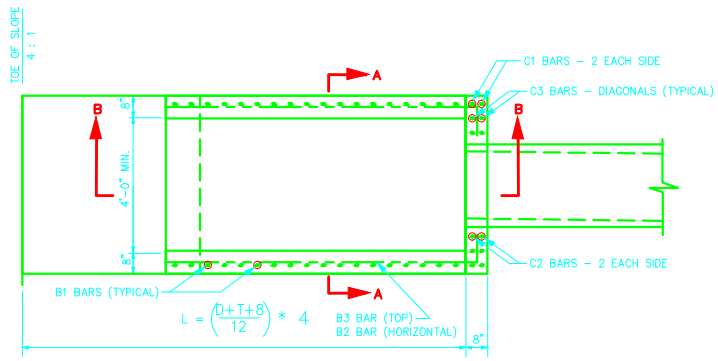
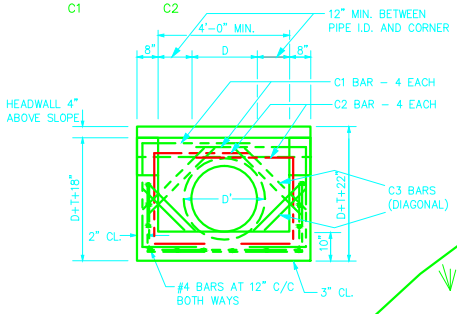
C' = $\left(\frac{D" + T" + 12"}{12}\right)$

L' = $\left(\frac{D + T + 8}{12}\right) * 4$

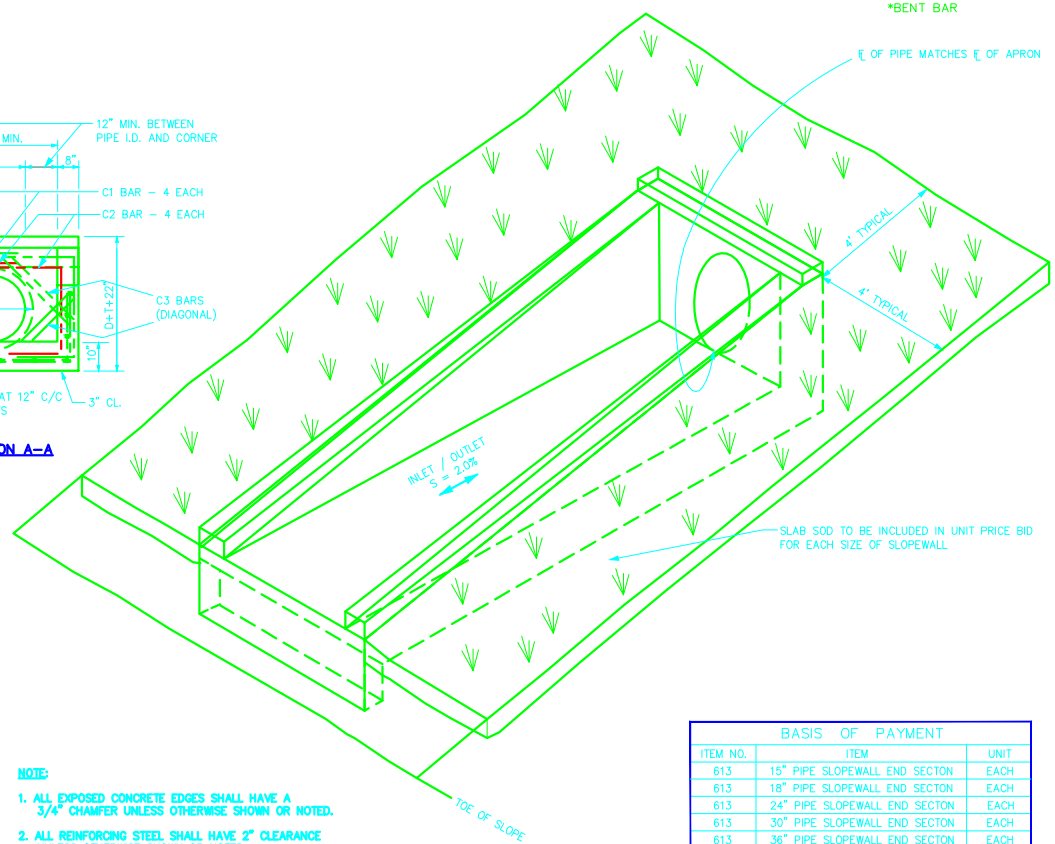


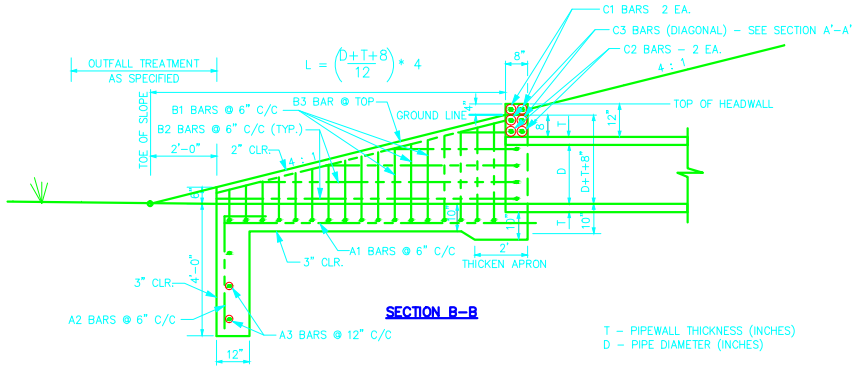


PLAN VIEW



SECTION A-A





SECTION B-B

T = PIPEWALL THICKNESS (INCHES)
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NOTE:

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613	42" PIPE SLOPEWALL END SECTON	EACH

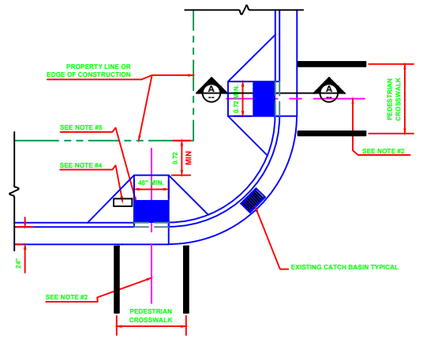
STANDARD 15" TO 42" SLOPEWALL

CITY OF GLENPOOL, OKLAHOMA

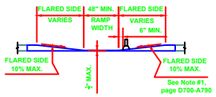
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

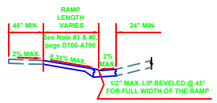
PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR
APPROVED:
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X
ATLAS PAGE NO:



TYPICAL LAYOUT



FRONT ELEVATION

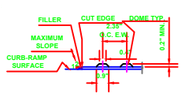


SECTION A-A

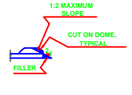
STANDARD CURB RAMP

Detectable Truncated Dome Specifications:

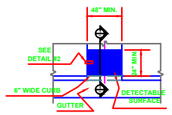
- Bottom diameter of 0.9 in.
- Top diameter of 0.4 in.
- Height of 0.2 in.
- Center-to-center spacing of 2.35 in.
- Visual contrast.



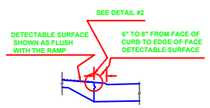
SECTION CUT EDGE



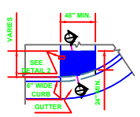
DETAIL AT CUT DOME



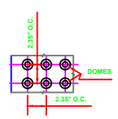
DETECTABLE SURFACE LAYOUT RAMP ON STRAIGHT EDGE



SECTION 1-1

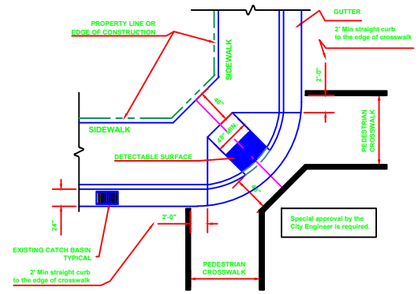


DETECTABLE SURFACE LAYOUT RAMP ON CURVED EDGE



DETAIL 2

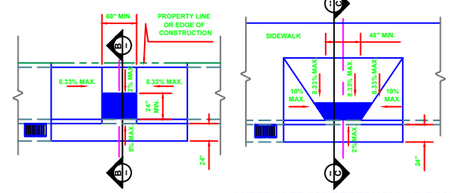
DETECTABLE SURFACE FOR RAMPS



DIAGONAL CURB RAMP

NOTES:
Diagonal curb-ramps should only be considered during retrofitting where the following circumstances apply:
1. When utilities prevent the installation of two perpendicular ramps.
2. At intersection that are not signalized.

ALTERNATIVE DIAGONAL CURB RAMP

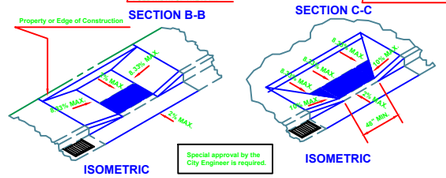


ALTERNATE "B" PARALLEL RAMP

ALTERNATE "C" RECTANGULAR RAMP

SECTION B-B

SECTION C-C



ISOMETRIC

ISOMETRIC

ALTERNATE "B" CURB-RAMP SHALL BE USED ON NARROW SIDEWALK AT MID BLOCK LOCATIONS WHEN STANDARD CURB RAMP LAY-OUT IS NOT FEASIBLE. THE 6" CURB SHALL BE INSTALLED ALONG THE EDGE OF THE BACK OF SIDEWALK

ALTERNATE "C" CURB-RAMP SHALL BE USED AS A VARIATION OF A STANDARD RAMP FOR MID-BLOCK LOCATIONS WHERE THERE IS ENOUGH ROOM FOR TOP LEVEL LANDING.

ALTERNATE RAMPS "B" & "C"

PLAN

SECTION A-A

NOTES:
1. A 5' - 0" minimum radius is approved for one & two family residences not abutting a limited access or major street. All other Driveways will have a 10' 0 " minimum radius.
2. The Driveway Contractor may saw cut & remove the complete Curb & Gutter section or the Curb only. Saw cuts shall be 2" or 1/3 the depth of the gutter, which ever is greater. Saw cuts shall include the top & face of curb as well as the gutter. Saw cuts shall be made prior to the removal of concrete.
3. If a gutter holds water prior to any construction by driveway Contractor, he shall notify the City Engineer of the situation before doing any work. The completed driveway work will not be accepted if the gutter holds water due to poor construction by the Contractor.
4. It is recognized that this driveway detail will not cover every possible situation encountered in construction. Additional expansion joints will be required as needed.
5. Clean and seal all joints and saw cuts in accordance with standard specifications.
6. Do not turn radius in front of adjacent property without written permission from adjacent property owner.
7. Curb cuts exceeding 42' must be approved by the City Engineer.

STANDARD DRIVEWAY DETAILS FOR EXISTING PAVING

NOTES

General Notes:

a. The standard curb-ramp lay-out shall be used whenever possible. Any deviation from the standard curb-ramp plans shall be approved by the City Engineer or designee on a case by case basis.

b. The standard curb-ramp drawings supersede all previous drawings and shall be part of the new curb ramp standard drawings.

c. All alternate ramps shall be approved by the City Engineer prior to construction.

Curb Ramp Notes:

1. A curb ramp is defined as the entire concrete surface which includes the ramp & flared sides. The 4' - 0" wide center portion, including the detectable surface, shall have the sloped plane of 8.33% (1:12) maximum, and cross slope, not to exceed 2%. The "flared side" of the ramp and shall lie on a slope of 10% (1:10) maximum measured along the curb. The curb ramp shall have a surface tolerance of 1/4" per 10 foot straight edge maximum.

2. The ramp center line and path of travel must be parallel to the sidewalk. The full width of the ramp shall lie within the crosswalk area. It is desirable that the location of the ramp be as close as possible to the center of the crosswalk.

3. The 4'-0" min. distance between flared sides of the two adjacent curb ramps may be reduced to 3'-0" with documentation of hardship indicating legal and or physical constraints provided to the City Engineer.

4. Existing utility boxes and covers shall be adjusted flush with the curb ramp surface and shall not straddle any change in plane or material. Existing utility box frames and covers shall have matching surface finish on the entire frame and cover. New utility boxes shall not be placed within the detectable border.

5. The surface of the curb ramp and detectable surface material shall be stable, firm and slip resistant. The concrete curb ramp surface shall be broom finished transverse to the axis of the ramp and shall be slightly rougher than the finish of the adjacent sidewalk surface.

6. A level landing 4'-0" deep, with a 2% maximum slope in each direction shall be provided at the upper end of each curb ramp to allow safe egress from the ramp surfaces. The width of the level landing shall be at least as wide as the width of the ramp.

7. When vertical obstructions are present near the curb at the end of the flared side or when the curb-ramp is diagonal to the curb which will result in an extremely long flared side surface, the affected flared side may be cut and terminated perpendicular to the curb, provided that the maximum slope of 10% is achieved on each of the resulting planes.

8. The length of ramp may be constructed up to 30 feet long to achieve the slope requirement.

9. Existing vertical utility poles or street light poles may be incorporated into the flared sides, if necessary. The vertical obstruction shall be a minimum of 6 inches away from the edge of the ramp. Pedestrian crosswalk push button poles, fire department call box poles and other poles with activated devices, may not be placed in the curb-ramp at any time. No new vertical obstructions may be located in the curb ramp or the grooved border.

10. Curb Ramp shall be constructed with 8" thick concrete at collector and arterial streets; and with 6" thick concrete at residential street. All on top of 2" sand cushion.

Sidewalk Notes:

1. Minimum Sidewalk width shall be 4'-0" for residential, 5'-0" for commercial, and 6'-0" clear width whenever attached to the curb.
2. Sidewalk slope shall be maximum of 2% cross slope.
3. Whenever the width of the sidewalk is less than 5'-0", a 5' x 5' passing area with a maximum 2% slope in any direction at intervals of 200' shall be installed.
4. Whenever changing direction in a sidewalk, install a 5' x 5' passing area with maximum 2% slope in any direction.
5. Objects such as tree branches, signs, water fountains, etc. shall not protrude into the sidewalk more than 4" at the heights between 27" and 80".
6. Sidewalk shall be constructed of 4" thick concrete on top of 2" sand cushion.

Ramps:

When the rise in elevation is greater than 30" a series of ramps and landings will be required.
- Landing shall be 5'-0" in length and no greater than 2% in any direction.
- The maximum of a run is determined by the rise (30" maximum) and slope, as shown in the following table

Max. Rise	Slope	Max. Length	Max. Rise	Slope	Max. Length
30 in.	1:12	30 ft.	30 in.	1:16	40 ft.
30 in.	1:13	32.5 ft.	30 in.	1:17	42.5 ft.
30 in.	1:14	35 ft.	30 in.	1:18	45 ft.
30 in.	1:15	37.5 ft.	30 in.	1:19	47.5 ft.

STANDARD ADA CURB RAMP, SIDEWALK AND DRIVEWAY DETAILS

CITY OF GLENPOOL, OKLAHOMA

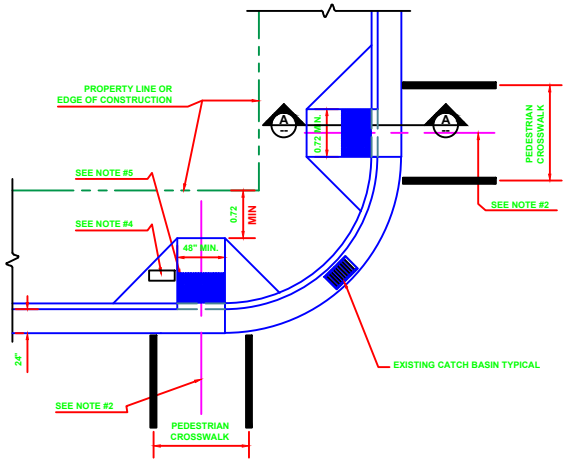
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

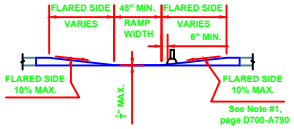
PLAN SCALE: 1" = 10'
PROFILE SCALE: HORIZONTAL: " VERTICAL: "
ATLAS PAGE NO:

DRAWN:	"	"
DESIGNED:	"	"
OFFICE ENGR.:	"	"
CHIEF ENGR.:	"	"
RECOMMENDED: DIRECTOR		
RECOMMENDED:		
ENGINEERING DIRECTOR:		

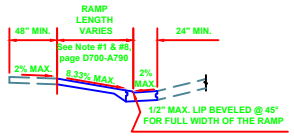
APPROVED:
CITY ENGINEERING DEPT.
DATE: "
SHEET: X OF X



TYPICAL LAYOUT



FRONT ELEVATION

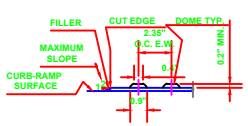


SECTION A-A

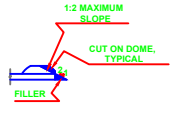
STANDARD CURB RAMP

Detectable Truncated Dome Specifications:

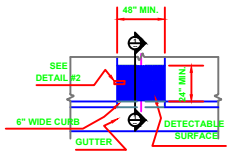
- Bottom diameter of 0.9 in.
- Top diameter of 0.4 in.
- Height of 0.2 in.
- Center-to-center spacing of 2.35 in.
- Visual contrast.



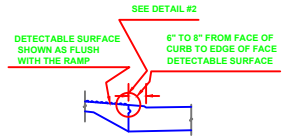
SECTION CUT EDGE



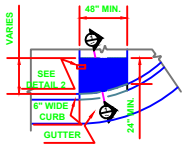
DETAIL AT CUT DOME



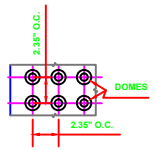
DETECTABLE SURFACE LAYOUT
RAMP ON STRAIGHT EDGE



SECTION 1-1

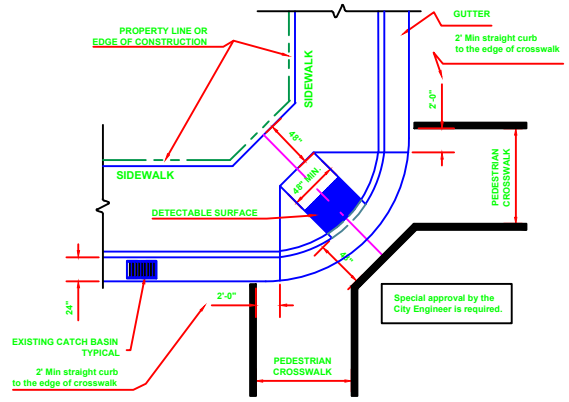


DETECTABLE SURFACE LAYOUT
RAMP ON CURVED EDGE



DETAIL 2

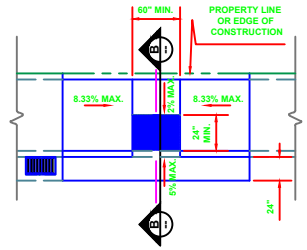
DETECTABLE SURFACE FOR RAMPS



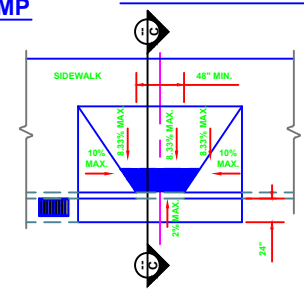
DIAGONAL CURB RAMP

NOTES:
Diagonal curb-ramps should only be considered during retrofitting where the following circumstances apply:
1. When utilities prevent the installation of two perpendicular ramps.
2. At intersection that are not signalized.

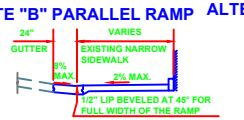
ALTERNATIVE DIAGONAL CURB RAMP



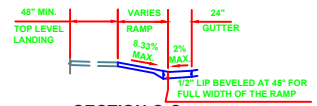
ALTERNATE "B" PARALLEL RAMP



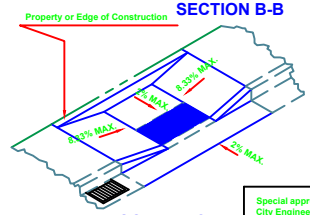
ALTERNATE "C" RECTANGULAR RAMP



SECTION B-B

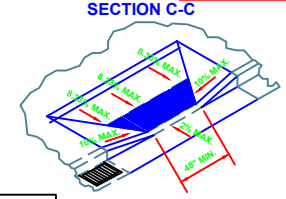


SECTION C-C



ISOMETRIC

Special approval by the City Engineer is required.

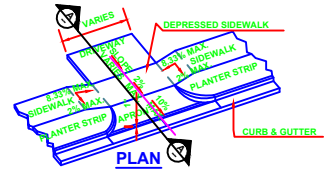


ISOMETRIC

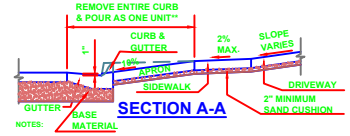
ALTERNATE "B" CURB-RAMP SHALL BE USED ON NARROW SIDEWALK AT MID BLOCK LOCATIONS WHEN STANDARD CURB RAMP LAY-OUT IS NOT FEASIBLE. THE 6" CURB SHALL BE INSTALLED ALONG THE EDGE OF THE BACK OF SIDEWALK

ALTERNATE "C" CURB-RAMP SHALL BE USED AS A VARIATION OF A STANDARD RAMP FOR MID-BLOCK LOCATIONS WHERE THERE IS ENOUGH ROOM FOR TOP LEVEL LANDING.

ALTERNATE RAMPS "B" & "C"



PLAN



SECTION A-A

NOTES:

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5. Clean and seal all joints and saw cuts in accordance with standard specifications.
6. Do not turn radius in front of adjacent property without written permission from adjacent property owner.
7. Curb cuts exceeding 42' must be approved by the City Engineer.

STANDARD DRIVEWAY DETAILS FOR EXISTING PAVING

NOTES

General Notes:

a. The standard curb-ramp lay-out shall be used whenever possible. Any deviation from the standard curb-ramp plans shall be approved by the City Engineer or designee on a case by case basis.

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7. When vertical obstructions are present near the curb at the end of the flared side or when the curb-ramp is diagonal to the curb which will result in an extremely long flared side surface, the affected flared side may be cut and terminated perpendicular to the curb, provided that the maximum slope of 10% is achieved on each of the resulting planes.

8. The length of ramp may be constructed up to 30 feet long to achieve the slope requirement.

9. Existing vertical utility poles or street light poles may be incorporated into the flared sides, if necessary. The vertical obstruction shall be a minimum of 6 inches away from the edge of the ramp. Pedestrian crosswalk push button poles, fire department call box poles and other poles with activated devices, may not be placed in the curb-ramp at any time. No new vertical obstructions may be located in the curb ramp or the grooved border.

10. Curb Ramp shall be constructed with 8" thick concrete at collector and arterial streets; and with 6" thick concrete at residential street. All on top of 2" sand cushion.

Sidewalk Notes:

1. Minimum Sidewalk width shall be 4'-0" for residential, 5'-0" for commercial, and 6'-0" clear width whenever attached to the curb.
2. Sidewalk slope shall be maximum of 2% cross slope.
3. Whenever the width of the sidewalk is less than 5'-0", a 5' x 5' passing area with a maximum 2% slope in any direction at intervals of 200' shall be installed.
4. Whenever changing direction in a sidewalk, install a 5' x 5' passing area with maximum 2% slope in any direction.
5. Objects such as tree branches, signs, water fountains, etc. shall not protrude into the sidewalk more than 4" at the heights between 27" and 80".
6. Sidewalk shall be constructed of 4" thick concrete on top of 2" sand cushion.

Ramps:

When the rise in elevation is greater than 30" a series of ramps and landings will be required.

- Landing shall be 5'-0" in length and no greater than 2% in any direction.
- The maximum of a run is determined by the rise (30" maximum) and slope, as shown in the following table

Max. Rise	Slope	Max. Length	Max. Rise	Slope	Max. Length
30 in.	1:12	30 ft.	30 in.	1:16	40 ft.
30 in.	1:13	32.5 ft.	30 in.	1:17	42.5 ft.
30 in.	1:14	35 ft.	30 in.	1:18	45 ft.
30 in.	1:15	37.5 ft.	30 in.	1:19	47.5 ft.

STANDARD ADA CURB RAMP, SIDEWALK AND DRIVEWAY DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

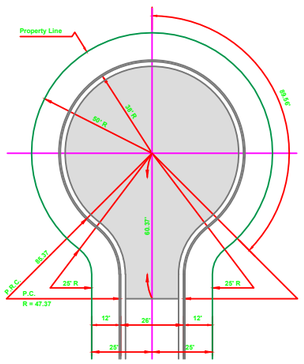
DRAWN	.	.
DESIGNED	.	.
OFFICE ENGR.	.	.
CHIEF ENGR.	.	.
RECOMMENDED: DIRECTOR		
RECOMMENDED:		
ENGINEERING DIRECTOR	DATE:	.

PROFILE SCALE:
HORIZONTAL: .
VERTICAL: .

APPROVED:
CITY ENGINEERING DEPT.

ATLAS PAGE NO:

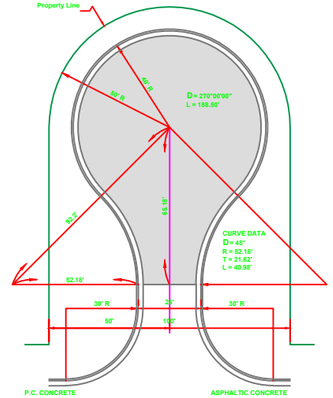
SHEET X OF X



MATERIAL IN SAC BYOND P.C.
531.6 S.Y. ASPHALTIC CONCRETE
687.9 S.Y. P.C. CONCRETE
646.9 S.Y BASE (10" Back of Curb)
253.62 l.f. CURB

CURVE DATA
Δ = 45°
R = 47.37'
T = 19.62'
L = 37.20'

STANDARD CUL-DE-SAC -- 38' R

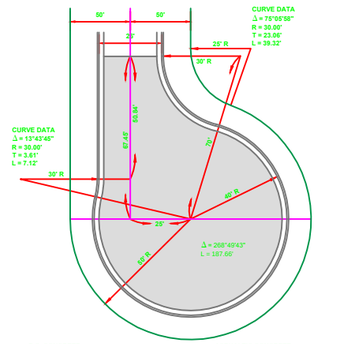


CURVE DATA
D = 45°
R = 52.18'
T = 21.62'
L = 40.98'

P.C. CONCRETE
270.46 L.F. CONCRETE
653.32 S.Y. P.C. CONCRETE
702.10 S.Y. BASE (Includes to 10" Back of Curb)

ASPHALTIC CONCRETE
270.46 L.F. CONCRETE & GUTTER
593.92 S.Y. ASPHALTIC CONCRETE
702.10 S.Y. BASE (Includes to 10" Back of Curb)

STANDARD CUL-DE-SAC -- 40' R



CURVE DATA
Δ = 75°05'58"
R = 30.00'
T = 23.06'
L = 39.32'

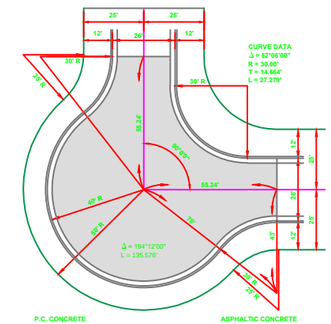
CURVE DATA
Δ = 13°43'45"
R = 30.00'
T = 3.61'
L = 7.12'

Δ = 268°49'43"
L = 187.66'

P.C. CONCRETE
289.94 L.F. CONCRETE
684.40 S.Y. P.C. CONCRETE
735.75 S.Y. BASE (Includes to 10" Back of Curb)

ASPHALTIC CONCRETE
289.94 L.F. CONCRETE & GUTTER
621.77 S.Y. ASPHALTIC CONCRETE
735.75 S.Y. BASE (Includes to 10" Back of Curb)

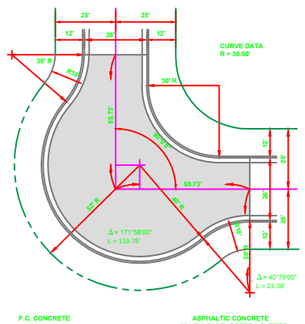
OFF-SET CUL-DE-SAC



P.C. CONCRETE
261.74 L.F. CONCRETE
678.66 S.Y. P.C. CONCRETE
653.10 S.Y. BASE (Includes to 10" Back of Curb)

ASPHALTIC CONCRETE
261.74 L.F. CONCRETE & GUTTER
578.46 S.Y. ASPHALTIC CONCRETE
653.10 S.Y. BASE (Includes to 10" Back of Curb)

90° CUL-DE-SAC TYPE 1

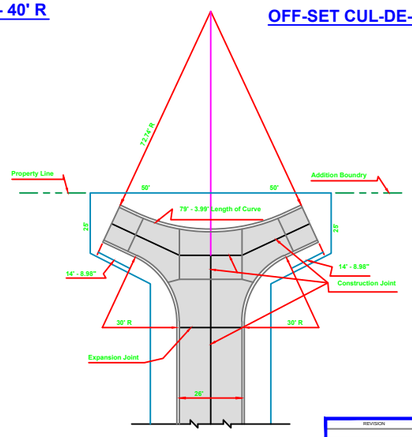


P.C. CONCRETE

ASPHALTIC CONCRETE
234.97 L.F. CONCRETE & GUTTER

27.64 LF curb shorter w/ 10' offset.
Approx. 91 sy smaller area.

90° CUL-DE-SAC TYPE 2



STANDARD "T" TURN AROUND

STANDARD DETAILS FOR CUL-DE-SACS

.

CITY OF GLENPOOL, OKLAHOMA

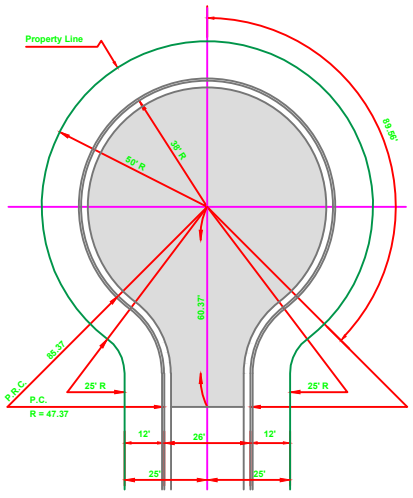
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=∞
PROFILE SCALE:
HORIZONTAL: -
VERTICAL: -
ATLAS PAGE NO:

DRAWN: - -
DESIGNED: - -
OFFICE ENGR.: - -
CHIEF ENGR.: - -
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

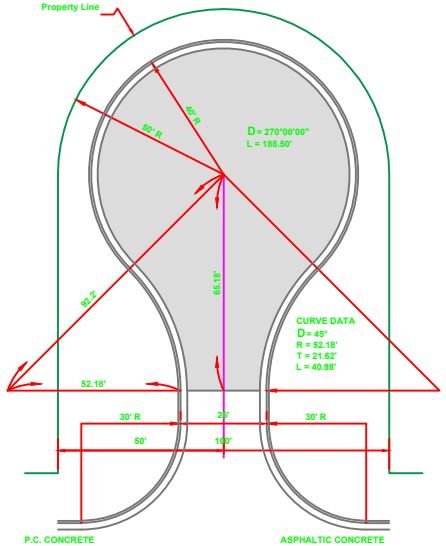
APPROVED:
CITY ENGINEERING DEPT.
DATE: -
SHEET X OF X



MATERIAL IN SAC BYOND P.C.
531.6 S.Y. ASPHALTIC CONCRETE
587.9 S.Y. P.C. CONCRETE
646.9 S.Y BASE (10" Back of Curb)
253.52 l.f. CURB

CURVE DATA
Δ = 45°
R = 47.37'
T = 19.62'
L = 37.20'

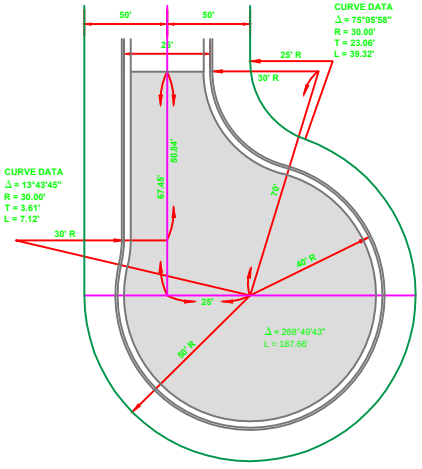
STANDARD CUL-DE-SAC -- 38' R



P.C. CONCRETE
270.46 L.F. CONCRETE
653.32 S.Y. P.C. CONCRETE
702.10 S.Y. BASE (Includes to 10" Back of Curb)

ASPHALTIC CONCRETE
270.46 L.F. CONCRETE & GUTTER
593.92 S.Y. ASPHALTIC CONCRETE
702.10 S.Y. BASE (Includes to 10" Back of Curb)

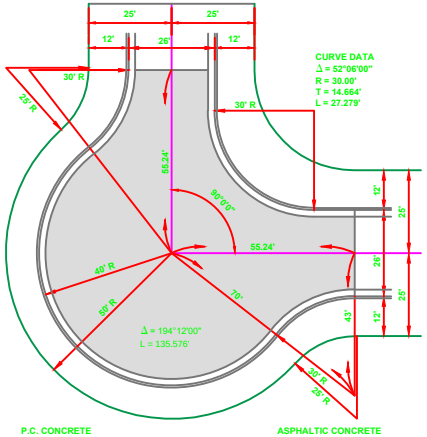
STANDARD CUL-DE-SAC -- 40' R



P.C. CONCRETE
289.94 L.F. CONCRETE
684.40 S.Y. P.C. CONCRETE
735.75 S.Y. BASE (Includes to 10" Back of Curb)

ASPHALTIC CONCRETE
289.94 L.F. CONCRETE & GUTTER
621.77 S.Y. ASPHALTIC CONCRETE
735.75 S.Y. BASE (Includes to 10" Back of Curb)

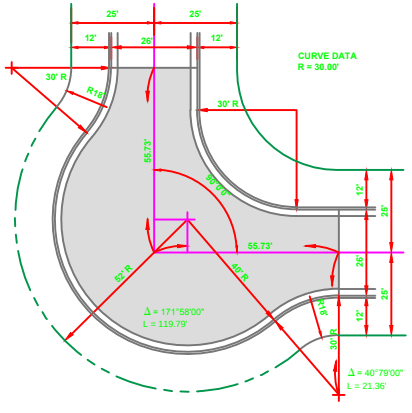
OFF-SET CUL-DE-SAC



P.C. CONCRETE
261.74 L.F. CONCRETE
678.56 S.Y. P.C. CONCRETE
683.10 S.Y. BASE (Includes to 10" Back of Curb)

ASPHALTIC CONCRETE
261.74 L.F. CONCRETE & GUTTER
578.40 S.Y. ASPHALTIC CONCRETE
683.10 S.Y. BASE (Includes to 10" Back of Curb)

90° CUL-DE-SAC TYPE 1

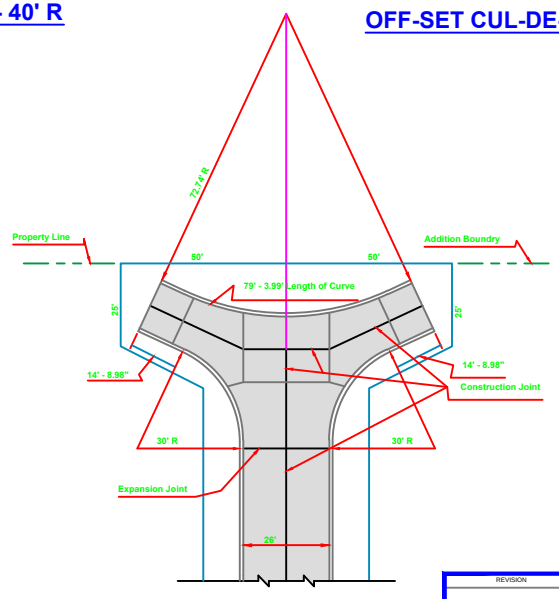


P.C. CONCRETE

ASPHALTIC CONCRETE
234.97 L.F. CONCRETE & GUTTER

27.64 LF curb shorter w/ 10' offset.
Approx. 91 sy smaller area.

90° CUL-DE-SAC TYPE 2



STANDARD "T" TURN AROUND

STANDARD DETAILS FOR CUL-DE-SACS

.

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

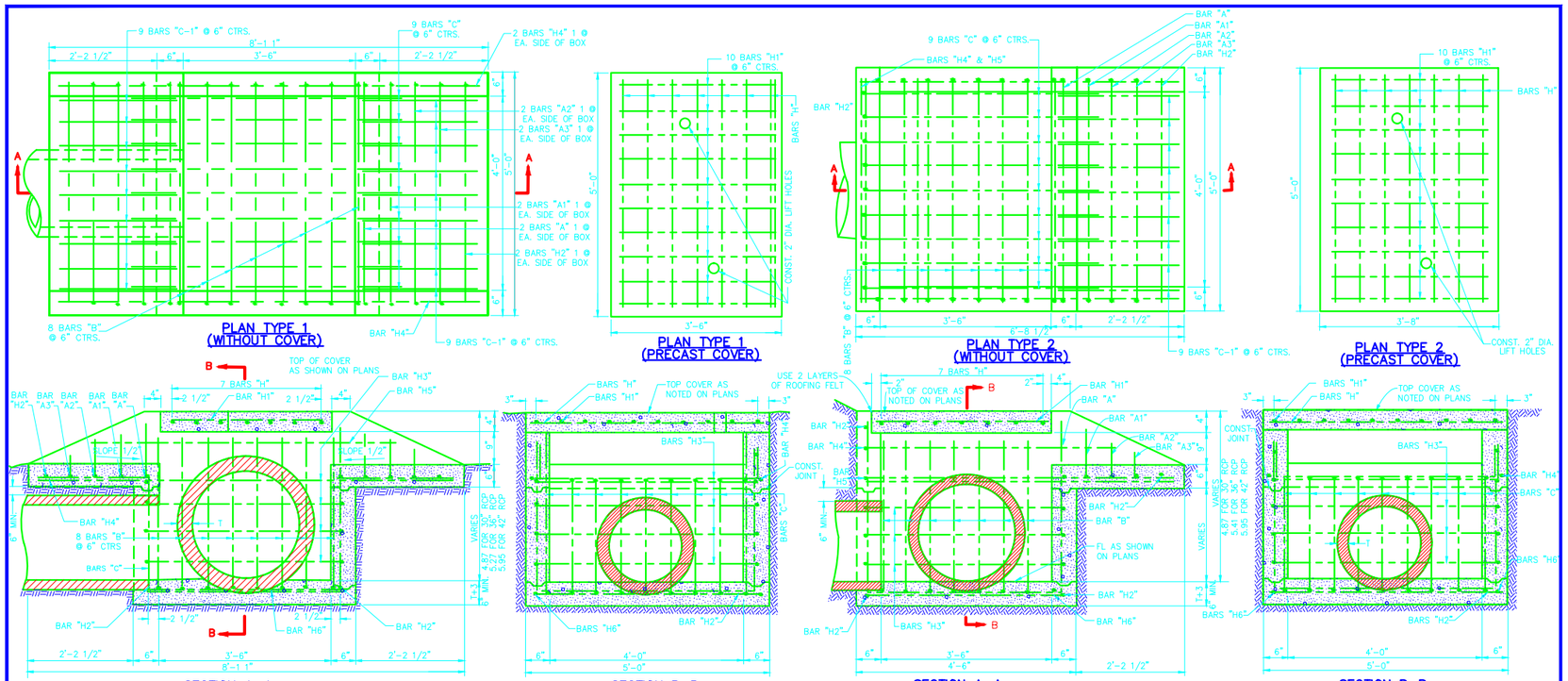
PLAN SCALE: 1" = ∞
PROFILE SCALE: HORIZONTAL: - VERTICAL: -

DRAWN . .
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .

RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR

APPROVED: CITY ENGINEERING DEPT.
DATE: .
SHEET X OF X

ATLAS PAGE NO:



GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF GLENPOOL STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONC. SURFACES TO BE CARBORUNDUM FINISHED.
3. ALL EXPOSED CONC. EDGES SHALL HAVE A 1/2" CHAMFER.
4. ALL REINFORCING STEEL TO BE DEFORMED BARS.
5. FOR EACH FT. ADDITIONAL HEIGHT, ADD 2" TO BARS B & G, ADD BARS H3 AT 6" C/C.
6. REINFORCED CONC. PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-76-596 (AASHTO M-170-60) CLASS III UNLESS OTHERWISE DESIGNATED.
7. CLASS A CONC. QUANTITIES ARE COMPUTED USING WALL THICKNESS TAKEN FROM WALL B COLUMN OF ASTM & AASHTO TABLES.

DESIGN NO. 1

MARK	30" RCP SIZE	30" RCP QUAN.	30" RCP SHAPE	30" RCP LENGTH	36" RCP QUAN.	36" RCP SHAPE	36" RCP LENGTH	42" RCP QUAN.	42" RCP SHAPE	42" RCP LENGTH
A	3/8	2	BENT	6'-7"	2	BENT	6'-7"	2	BENT	6'-7"
A1	3/8	2	BENT	6'-2"	2	BENT	6'-2"	2	BENT	6'-2"
A2	3/8	2	BENT	5'-9"	2	BENT	5'-9"	2	BENT	5'-9"
A3	3/8	2	BENT	5'-4"	2	BENT	5'-4"	2	BENT	5'-4"
B	3/8	8	BENT	13'-5"	8	BENT	14'-7"	8	BENT	15'-7"
C	3/8	9	BENT	12'-1"	9	BENT	14'-1"	9	BENT	15'-1"
C1	3/8	8	STR.	2'-4"	8	STR.	2'-4"	8	STR.	2'-4"
H	1/2	7	STR.	4'-8"	7	STR.	4'-8"	7	STR.	4'-8"
H1	1/2	10	STR.	3'-1"	10	STR.	3'-1"	10	STR.	3'-1"
H2	3/8	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"
H3	3/8	7	BENT	17'-1"	7	BENT	17'-1"	7	BENT	17'-11"
H4	3/8	2	STR.	8'-6"	2	STR.	8'-6"	2	STR.	8'-6"
H5	3/8	2	STR.	6'-0"	2	STR.	6'-0"	2	STR.	6'-0"
H6	3/8	2	STR.	4'-1"	2	STR.	4'-1"	2	STR.	4'-1"

QUANTITIES

ITEM	30" RCP	36" RCP	42" RCP
CLASS "A" CONCRETE	2.49	2.65	2.80
REINFORCING STEEL	228	241	260

QUANTITIES PER FT.OF VERTICAL HEIGHT CLASS "A" CONC. 0.31
REINFORCING STEEL 26.26 LBS. PER C.Y.

DESIGN NO. 2

MARK	30" RCP SIZE	30" RCP QUAN.	30" RCP SHAPE	30" RCP LENGTH	36" RCP QUAN.	36" RCP SHAPE	36" RCP LENGTH	42" RCP QUAN.	42" RCP SHAPE	42" RCP LENGTH
A	3/8	1	BENT	6'-7"	1	BENT	6'-7"	1	BENT	6'-7"
A1	3/8	1	BENT	6'-2"	1	BENT	6'-2"	1	BENT	6'-2"
A2	3/8	1	BENT	5'-9"	1	BENT	5'-9"	1	BENT	5'-9"
A3	3/8	1	BENT	5'-4"	1	BENT	5'-4"	1	BENT	5'-4"
B	3/8	8	BENT	13'-0"	8	BENT	14'-2"	8	BENT	15'-2"
C	3/8	9	BENT	13'-6"	9	BENT	14'-6"	9	BENT	15'-6"
C1	3/8	9	STR.	2'-4"	9	STR.	2'-4"	9	STR.	2'-4"
H	1/2	7	STR.	4'-8"	7	STR.	4'-8"	7	STR.	4'-8"
H1	1/2	10	STR.	3'-3"	10	STR.	3'-3"	10	STR.	3'-3"
H2	3/8	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"
H3	3/8	7	BENT	17'-1"	7	BENT	17'-1"	7	BENT	17'-11"
H4	3/8	1	BENT	14'-7"	1	BENT	14'-7"	1	BENT	14'-7"
H5	3/8	1	BENT	17'-2"	1	BENT	17'-2"	1	BENT	17'-2"
H6	3/8	2	STR.	4'-1"	2	STR.	4'-1"	2	STR.	4'-1"

QUANTITIES

ITEM	30" RCP	36" RCP	42" RCP
CLASS "A" CONCRETE	2.32	2.49	2.66
REINFORCING STEEL	262	278	294

QUANTITIES PER FT. OF VERTICAL HEIGHT CLASS "A" CONC. 0.31
REINFORCING STEEL 26.26 LBS. PER C.Y.

NOTE: REINFORCING STEEL TO BE CUT AND/OR BENT TO CLEAR PIPES IN THE FIELD.

STANDARD DROP INLETS
30 in, 36 in, & 42 in PIPE

CITY OF GLENPOOL, OKLAHOMA

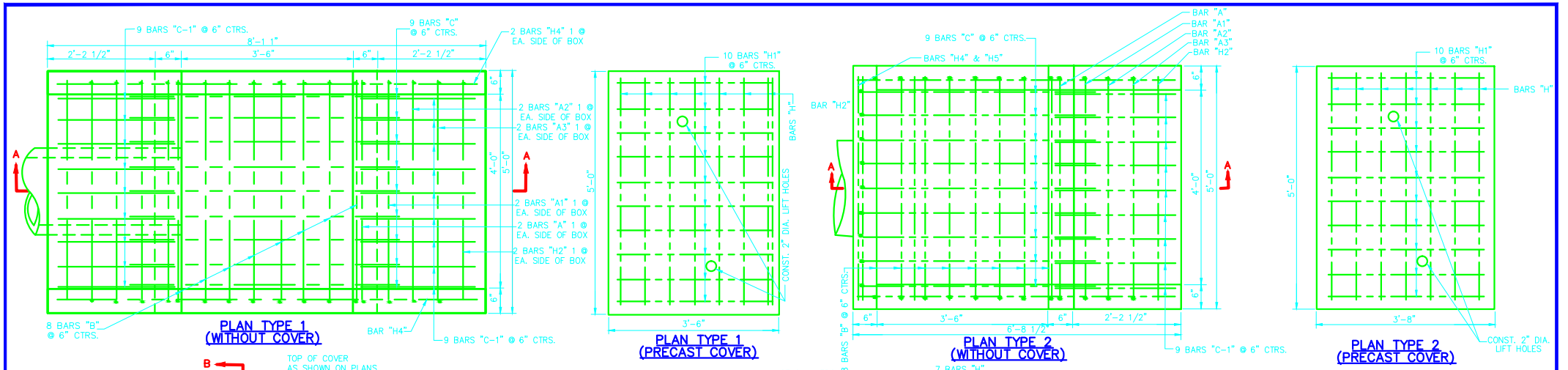
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL - VERTICAL -
ATLAS PAGE NO.

APPROVED

DRAWN	-	-
DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-
RECOMMENDED DIRECTOR		
RECOMMENDED		CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR	DATE: -	
SHEET	X OF X	

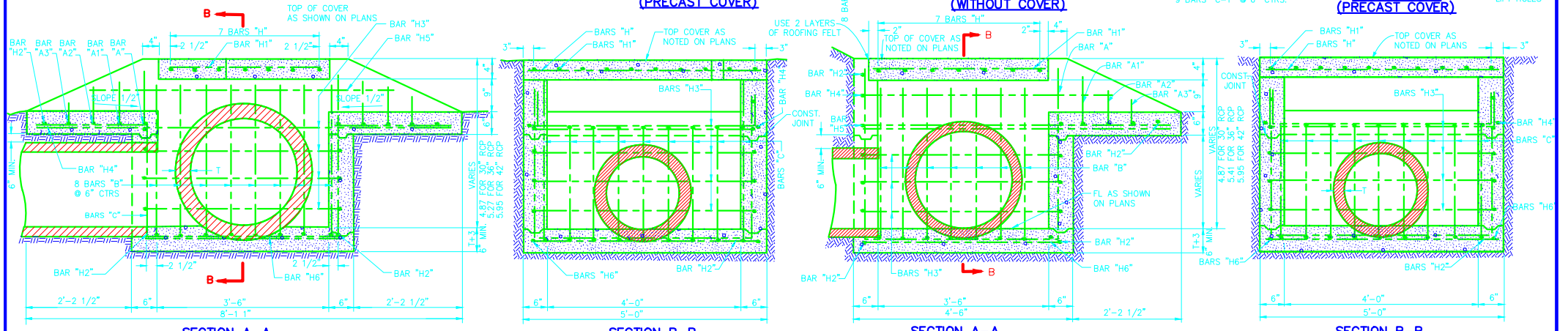


PLAN TYPE 1 (WITHOUT COVER)

PLAN TYPE 1 (PRECAST COVER)

PLAN TYPE 2 (WITHOUT COVER)

PLAN TYPE 2 (PRECAST COVER)



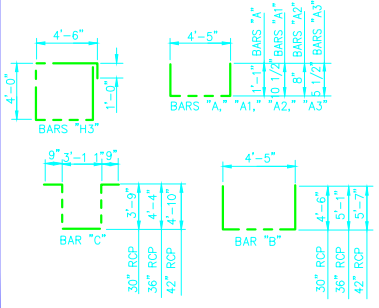
SECTION A-A

SECTION B-B

SECTION A-A

SECTION B-B

NOTE:
REINFORCING STEEL TO BE CUT AND/OR BENT TO CLEAR PIPES IN THE FIELD.



BAR BENDING DIAGRAMS

DESIGN NO. 1

BAR LIST

DESIGN NO. 1

		30" RCP			36" RCP			42" RCP		
MARK	SIZE	QUAN.	SHAPE	LENGTH	QUAN.	SHAPE	LENGTH	QUAN.	SHAPE	LENGTH
A	3/8"	2	BENT	6'-7"	2	BENT	6'-7"	2	BENT	6'-7"
A1	3/8"	2	BENT	6'-2"	2	BENT	6'-2"	2	BENT	6'-2"
A2	3/8"	2	BENT	5'-9"	2	BENT	5'-9"	2	BENT	5'-9"
A3	3/8"	2	BENT	5'-4"	2	BENT	5'-4"	2	BENT	5'-4"
B	3/8"	8	BENT	13'-5"	8	BENT	14'-7"	8	BENT	15'-7"
C	3/8"	9	BENT	12'-1 1"	9	BENT	14'-1"	9	BENT	15'-1"
C1	3/8"	9	STR.	2'-4"	18	STR.	2'-4"	18	STR.	2'-4"
H	1/2"	7	STR.	4'-8"	7	STR.	4'-8"	7	STR.	4'-8"
H1	1/2"	10	STR.	3'-1"	10	STR.	3'-1"	10	STR.	3'-1"
H2	3/8"	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"
H3	3/8"	7	BENT	17'-1 1"	7	BENT	17'-1 1"	7	BENT	17'-11"
H4	3/8"	2	STR.	8'-6"	2	STR.	8'-6"	2	STR.	8'-6"
H5	3/8"	2	STR.	6'-0"	2	STR.	6'-0"	2	STR.	6'-0"
H6	3/8"	2	STR.	4'-1"	2	STR.	4'-1"	2	STR.	4'-1"

QUANTITIES

ITEM	30" RCP	36" RCP	42" RCP
CLASS "A" CONCRETE	2.49	2.65	2.80
REINFORCING STEEL	228	241	260
QUANTITIES PER FT.OF VERTICAL HEIGHT CLASS "A" CONC.			0.31
REINFORCING STEEL 26.26 LBS. PER C.Y.			

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF GLENPOOL STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONC. SURFACES TO BE CARBORUNDUM FINISHED.
3. ALL EXPOSED CONC. EDGES SHALL HAVE A 1/2" CHAMFER.
4. ALL REINFORCING STEEL TO BE DEFORMED BARS.
5. FOR EACH FT. ADDITIONAL HEIGHT, ADD 2" TO BARS B & C, ADD BARS H3 AT 6" C/C.
6. REINFORCED CONC. PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-76-596 (AASHTO M-170-60) CLASS III UNLESS OTHERWISE DESIGNATED.
7. CLASS A CONC. QUANTITIES ARE COMPUTED USING WALL THICKNESS TAKEN FROM WALL B COLUMN OF ASTM & AASHTO TABLES.

DESIGN NO. 2

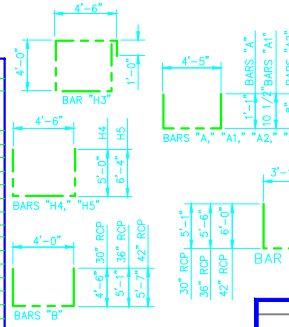
BAR LIST

DESIGN NO. 2

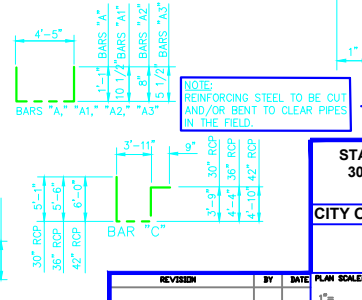
		30" RCP			36" RCP			42" RCP		
MARK	SIZE	QUAN.	SHAPE	LENGTH	QUAN.	SHAPE	LENGTH	QUAN.	SHAPE	LENGTH
A	3/8"	1	BENT	6'-7"	1	BENT	6'-7"	1	BENT	6'-7"
A1	3/8"	1	BENT	6'-2"	1	BENT	6'-2"	1	BENT	6'-2"
A2	3/8"	1	BENT	5'-9"	1	BENT	5'-9"	1	BENT	5'-9"
A3	3/8"	1	BENT	5'-4"	1	BENT	5'-4"	1	BENT	5'-4"
B	3/8"	8	BENT	13'-0"	8	BENT	14'-2"	8	BENT	15'-2"
C	3/8"	9	BENT	13'-6"	9	BENT	14'-6"	9	BENT	15'-6"
C1	3/8"	9	STR.	2'-4"	9	STR.	2'-4"	9	STR.	2'-4"
H	1/2"	7	STR.	4'-8"	7	STR.	4'-8"	7	STR.	4'-8"
H1	1/2"	10	STR.	3'-3"	10	STR.	3'-3"	10	STR.	3'-3"
H2	3/8"	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"
H3	3/8"	7	BENT	17'-1 1"	7	BENT	17'-1 1"	7	BENT	17'-11"
H4	3/8"	1	BENT	14'-7"	1	BENT	14'-7"	1	BENT	14'-7"
H5	3/8"	1	BENT	17'-2"	1	BENT	17'-2"	1	BENT	17'-2"
H6	3/8"	2	STR.	4'-1"	2	STR.	4'-1"	2	STR.	4'-1"

QUANTITIES

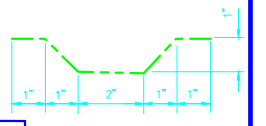
ITEM	30" RCP	36" RCP	42" RCP
CLASS "A" CONCRETE	2.32	2.49	2.66
REINFORCING STEEL	262	278	294
QUANTITIES PER FT. OF VERTICAL HEIGHT CLASS "A" CONC.			0.31
REINFORCING STEEL 26.26 LBS. PER C.Y.			



BAR BENDING DIAGRAMS



NOTE:
REINFORCING STEEL TO BE CUT AND/OR BENT TO CLEAR PIPES IN THE FIELD.



CONSTRUCTION JOINT DETAIL

STANDARD DROP INLETS
30 in, 36 in, & 42 in PIPE

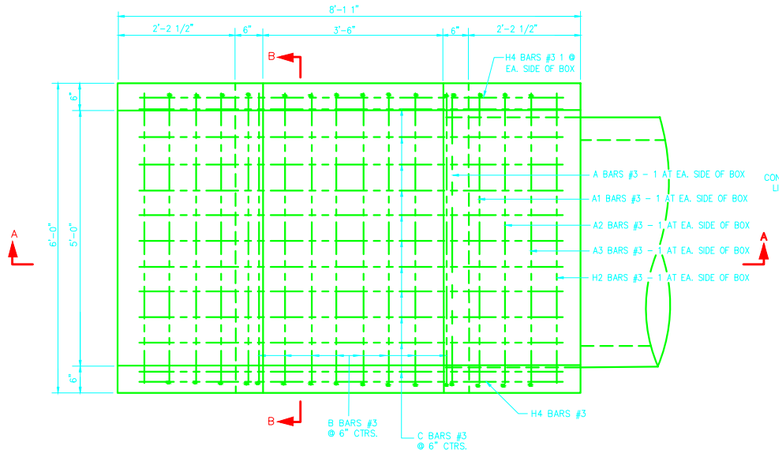
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

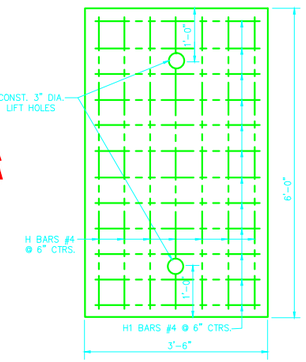
REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
ATLAS PAGE NO.

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED DIRECTOR
RECOMMENDED ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE:
SHEET X OF X



PLAN (WITHOUT COVER)



PLAN (PRECAST COVER)

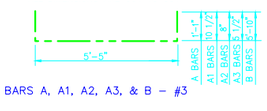
REINFORCING STEEL SCHEDULE

BARS LIST

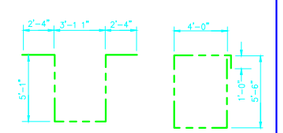
MARK	NO.	SIZE	TYPE	LENGTH
A	2	#3	BENT	7'-2"
A1	2	#3	BENT	7'-2"
A2	2	#3	BENT	6'-6"
A3	2	#3	BENT	6'-4"
B	8	#3	BENT	17'-1"
C	11	#3	BENT	18'-9"
H	7	#4	STR.	5'-8"
H1	12	#4	STR.	3'-1"
H2	4	#3	STR.	5'-7"
H3	9	#3	BENT	20'-0"
H4	2	#3	STR.	8'-6"
H5	2	#3	STR.	6'-0"
H6	2	#3	STR.	4'-1"

BEND DIAGRAMS

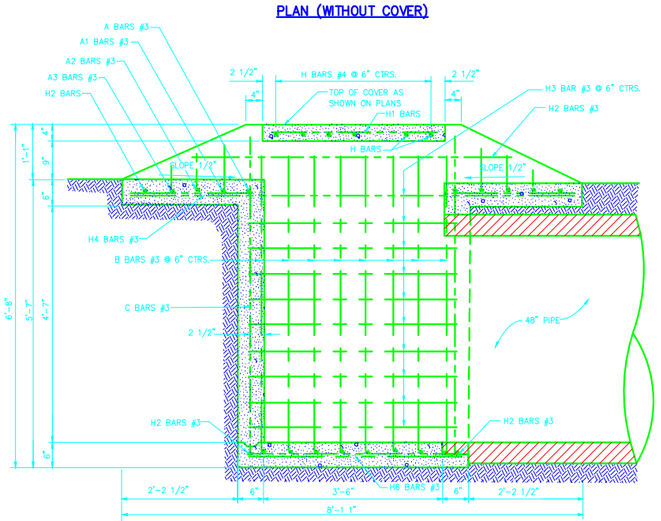
ALL DIMENSIONS ARE OUT TO OUT



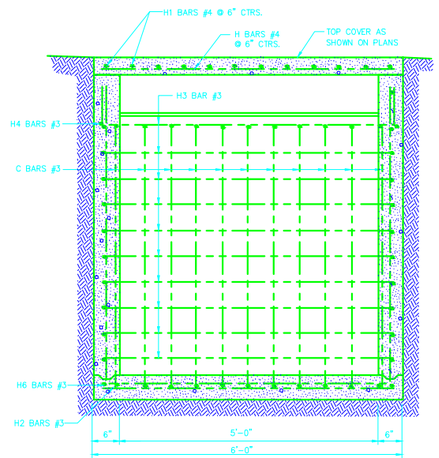
BARS A, A1, A2, A3, & B - #3



C BARS #3x18'-9" H3 BARS #3x20'-0"



SECTION A-A



SECTION B-B

ESTIMATED QUANTITIES

QUANTITIES FOR STRUCTURE (MIN. HEIGHT)

CLASS A CONCRETE	3.22 C.Y.
REINFORCING STEEL	292 LBS.

QUANTITIES PER FOOT OF VERTICAL HEIGHT

CLASS A CONCRETE	.35 C.Y.
REINFORCING STEEL	29 LBS.

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF GLENPOOL STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONC. SURFACES TO BE CARBORUNDUM FINISHED.
3. ALL EXPOSED CONC. EDGES SHALL HAVE A 1/2" CHAMFER.
4. ALL REINFORCING STEEL TO BE DEFORMED BARS.
5. FOR EACH FT. ADDITIONAL HEIGHT, ADD 2' TO BARS B & C, ADD BARS H3 AT 6" C/C.
6. REINFORCED CONC. PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-76-59T (AASHTO M-170-60) CLASS III UNLESS OTHERWISE DESIGNATED.
7. CLASS A CONC. QUANTITIES ARE COMPUTED USING WALL THICKNESS TAKEN FROM WALL B COLUMN OF ASTM & AASHTO TABLES.

STANDARD DROP INLET
48 in PIPE

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

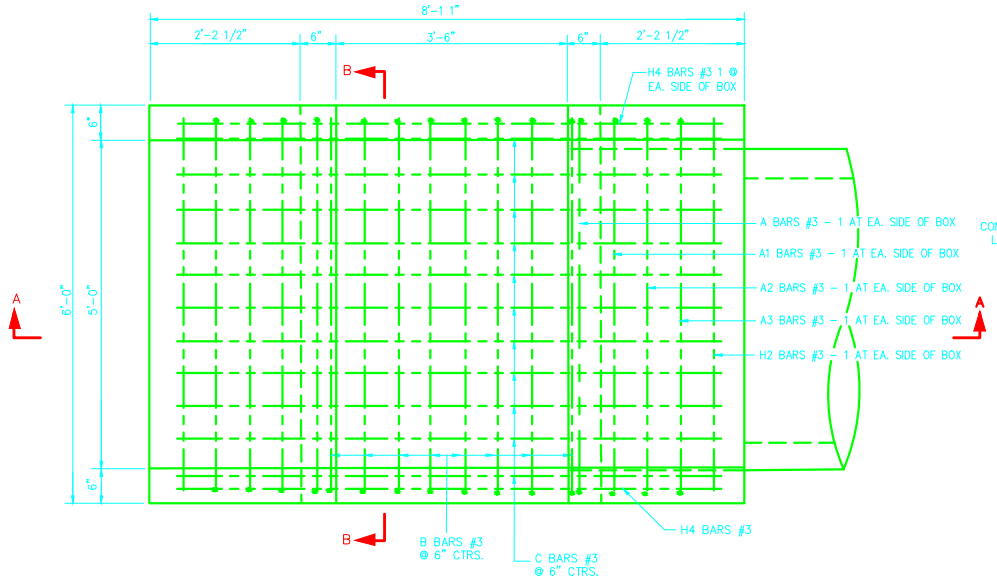
REVISION	BY	DATE

PLAN SCALE: 1"=

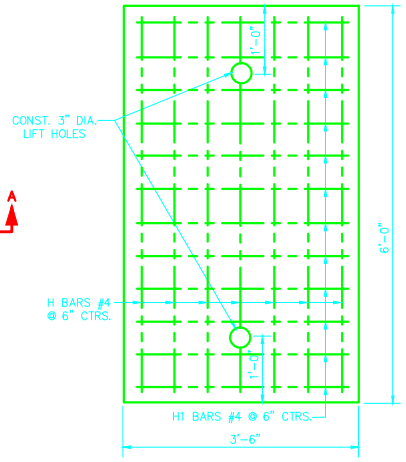
PROFILE SCALE: HORIZONTAL: VERTICAL:

ATLAS PAGE NO.

DRAWN - -
DESIGNED - -
OFFICE ENGR. - -
CHIEF ENGR. - -
RECOMMENDED DIRECTOR
RECOMMENDED ENGINEERING DIRECTOR
APPROVED
CITY ENGINEERING DEPT.
DATE: -
SHEET X OF X



PLAN (WITHOUT COVER)



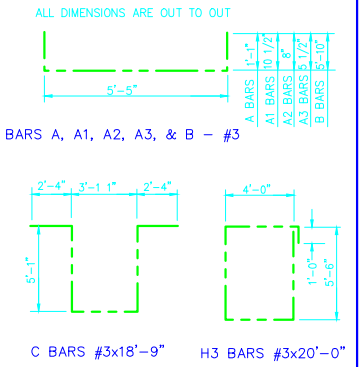
PLAN (PRECAST COVER)

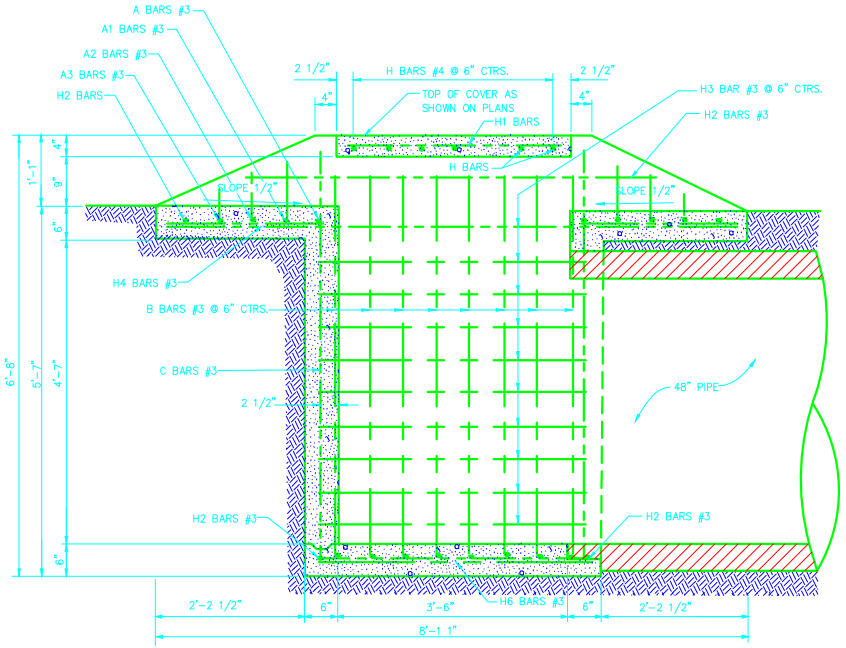
REINFORCING STEEL SCHEDULE

BARS LIST

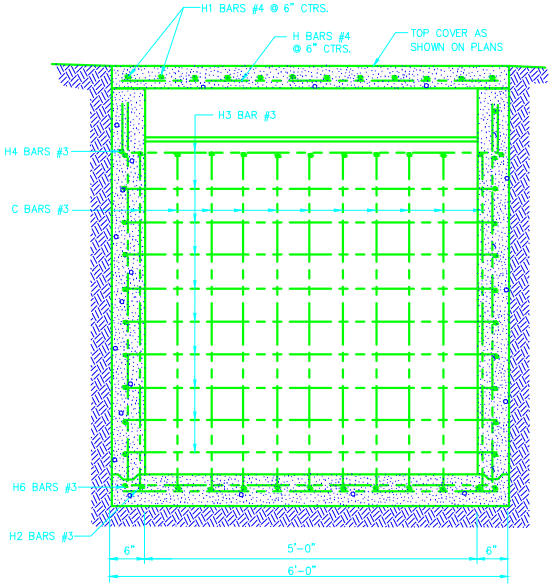
MARK	NO.	SIZE	TYPE	LENGTH
A	2	#3	BENT	7'-7"
A1	2	#3	BENT	7'-2"
A2	2	#3	BENT	6'-9"
A3	2	#3	BENT	6'-4"
B	8	#3	BENT	17'-1"
C	11	#3	BENT	18'-9"
H	7	#4	STR.	5'-8"
H1	12	#4	STR.	3'-1"
H2	4	#3	STR.	5'-7"
H3	9	#3	BENT	20'-0"
H4	2	#3	STR.	8'-6"
H5	2	#3	STR.	6'-0"
H6	2	#3	STR.	4'-1"

BEND DIAGRAMS





SECTION A-A



SECTION B-B

ESTIMATED QUANTITIES

QUANTITIES FOR STRUCTURE (MIN. HEIGHT)	
CLASS A CONCRETE	3.22 C.Y.
REINFORCING STEEL	292 LBS.
QUANTITIES PER FOOT OF VERTICAL HEIGHT	
CLASS A CONCRETE	.35 C.Y.
REINFORCING STEEL	29 LBS.

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF GLENPOOL STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONC. SURFACES TO BE CARBORUNDUM FINISHED.
3. ALL EXPOSED CONC. EDGES SHALL HAVE A 1/2" CHAMFER.
4. ALL REINFORCING STEEL TO BE DEFORMED BARS.
5. FOR EACH FT. ADDITIONAL HEIGHT, ADD 2' TO BARS B & C, ADD BARS H3 AT 6" C/C.
6. REINFORCED CONC. PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-76-59T (AASHTO M-170-60) CLASS III UNLESS OTHERWISE DESIGNATED.
7. CLASS A CONC. QUANTITIES ARE COMPUTED USING WALL THICKNESS TAKEN FROM WALL B COLUMN OF ASTM & AASHTO TABLES.

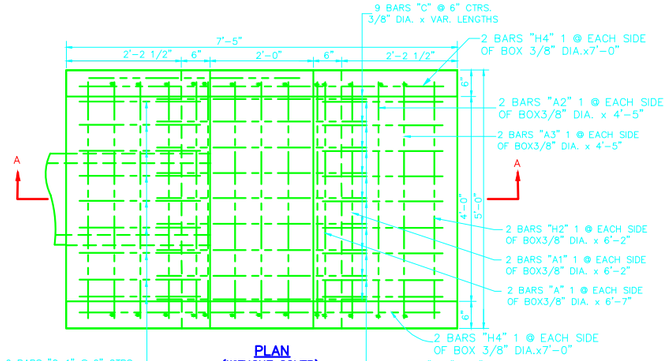
STANDARD DROP INLET
48 in PIPE

CITY OF GLENPOOL, OKLAHOMA

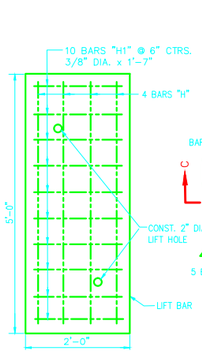
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

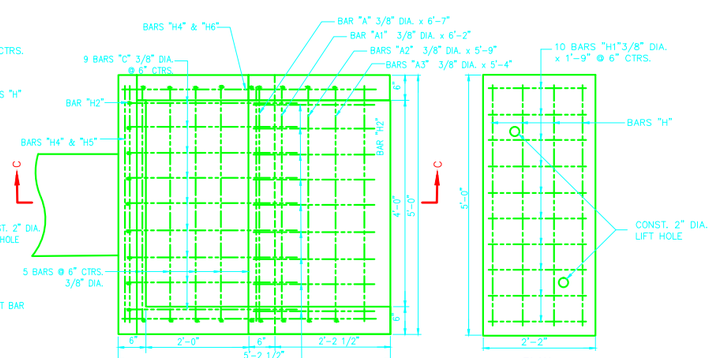
PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED DIRECTOR
RECOMMENDED
ENGINEERING DIRECTOR
APPROVED:
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X
ATLAS PAGE NO.



PLAN
(WITHOUT COVER)



PLAN
(PRECAST COVER)



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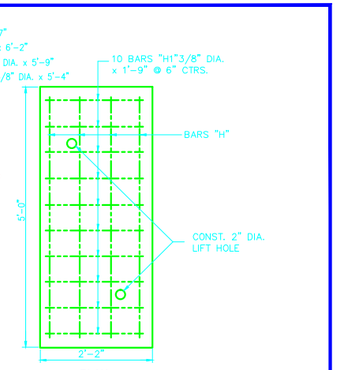

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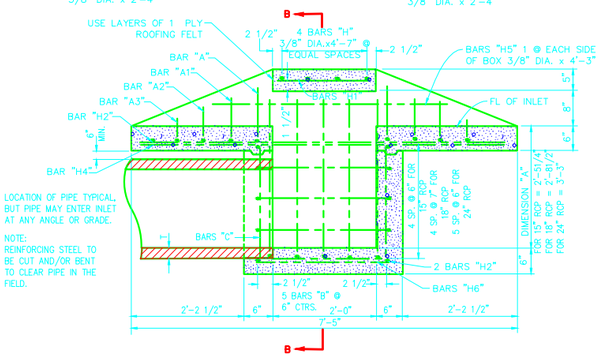
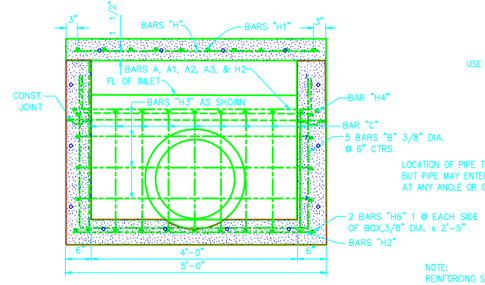
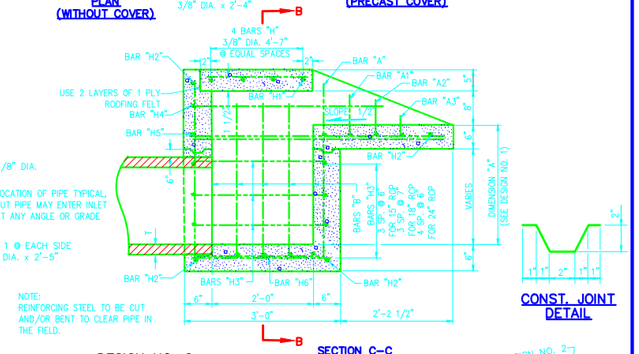
(PRECAST COVER)



SECTION A-A



SECTION B-B

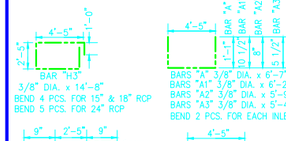


SECTION C-C

CONST. JOINT DETAIL

DESIGN NO. 1

DESIGN NO. 2

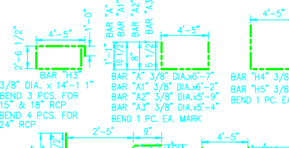


BAR BENDING DIAGRAMS
DESIGN NO. 1

DESIGN NO. 1									DESIGN NO. 2								
	15" RCP			18" RCP			24" RCP			15" RCP			18" RCP			24" RCP	
MARK	NO. REQ.	SHAPE	LENGTH	NO. REQ.	SHAPE	LENGTH	NO. REQ.	SHAPE	LENGTH	MARK	NO. REQ.	SHAPE	LENGTH	NO. REQ.	SHAPE	LENGTH	NO. REQ.	SHAPE	LENGTH
A	2	BENT	6'-7"	2	BENT	6'-7"	2	BENT	6'-7"	A	1	BENT	6'-7"	1	BENT	6'-7"	1	BENT	6'-7"
A1	2	BENT	6'-2"	2	BENT	6'-2"	2	BENT	6'-2"	A1	1	BENT	6'-2"	1	BENT	6'-2"	1	BENT	6'-2"
A2	2	BENT	5'-9"	2	BENT	5'-9"	2	BENT	5'-9"	A2	1	BENT	5'-9"	1	BENT	5'-9"	1	BENT	5'-9"
A3	2	BENT	5'-4"	2	BENT	5'-4"	2	BENT	5'-4"	A3	1	BENT	5'-4"	1	BENT	5'-4"	1	BENT	5'-4"
B	5	BENT	10'-7 1/2"	5	BENT	11'-3"	5	BENT	12'-3"	B	5	BENT	10'-7 1/2"	5	BENT	11'-2"	5	BENT	12'-3"
C	9	BENT	8'-7 1/2"	9	BENT	9'-2"	9	BENT	10'-3"	C	9	BENT	9'-1 1/2"	9	BENT	9'-7 1/2"	9	BENT	10'-81/2"
H1	10	STR.	2'-5"	10	STR.	2'-5"	10	STR.	2'-5"	H1	10	STR.	2'-4"	10	STR.	2'-4"	10	STR.	2'-4"
H2	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"	H2	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"
H3	10	STR.	1'-7"	10	STR.	1'-7"	10	STR.	1'-7"	H3	10	STR.	1'-9"	10	STR.	1'-9"	10	STR.	1'-9"
H4	2	STR.	4'-5"	4	STR.	4'-5"	4	STR.	4'-5"	H4	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"
H5	4	BENT	14'-8"	4	BENT	14'-8"	5	BENT	14'-8"	H5	3	BENT	14'-1 1	3	BENT	14'-1 1	4	BENT	14'-1 1
H6	2	STR.	7'-0"	2	STR.	7'-0"	2	STR.	7'-0"	H6	1	BENT	11'-4"	1	BENT	11'-4"	1	BENT	11'-4"
H7	2	STR.	7'-0"	2	STR.	7'-0"	2	STR.	7'-0"	H7	2	BENT	14'-1"	2	BENT	14'-1"	2	BENT	14'-1"
H8	2	STR.	2'-5"	2	STR.	2'-5"	2	STR.	2'-5"	H8	2	STR.	2'-5"	2	STR.	2'-5"	2	STR.	2'-5"

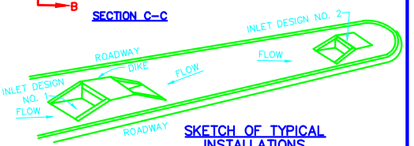
QUANTITIES							
ITEM	15" RCP	18" RCP	24" RCP	ITEM	15" RCP	18" RCP	24" RCP
CLASS 'A' CONCRETE	1.67 C.Y.	1.73 C.Y.	1.77 C.Y.	CLASS 'A' CONCRETE	1.52 C.Y.	1.59 C.Y.	1.64 C.Y.
REINFORCING STEEL	135 LBS.	141 LBS.	147 LBS.	REINFORCING STEEL	118 LBS.	121 LBS.	132 LBS.

QUANTITIES PER FT. OF VERT. HT.-CLASS 'A' CONC. =0.28 C.Y.-REINFORCING STEEL=21.79 LBS. (SEE NOTE 5)



BAR BENDING DIAGRAMS
DESIGN NO. 2

DESIGN NO. 2



SKETCH OF TYPICAL INSTALLATIONS

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF TULSA STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONCRETE SURFACES TO BE CORBORUNDUM FINISHED.
3. ALL EXPOSED CONCRETE EDGES SHALL HAVE A1/2" CHAMFER.
4. ALL REINFORCING STEEL TO BE3/6" DIAMETER DEFORMED BARS.
5. FOR EACH FOOT ADDITIONAL HEIGHT, ADD 2'-0" TO BARS "B" AND "C". BARS "H3" AT 6" CTR. TO CTR.

STANDARD DROP INLETS
15 in, 18 in, & 24 in PIPE

CITY OF GLENPOOL, OKLAHOMA

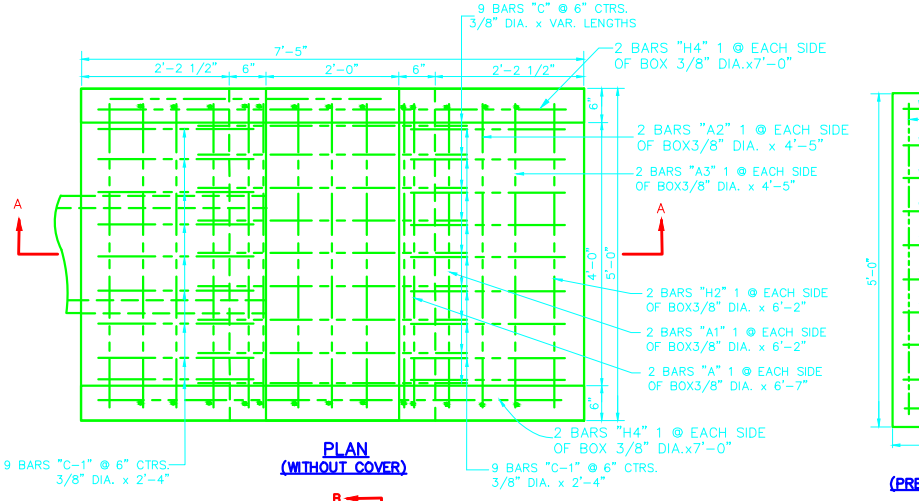
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

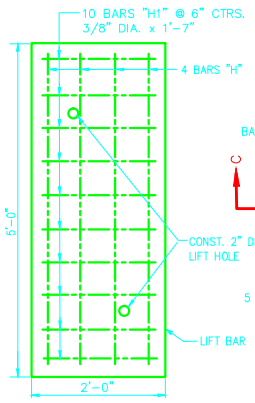
PLAN SCALE 1"=5'
PROFILE SCALE HORIZONTAL
PROFILE SCALE VERTICAL
ATLAS PAGE NO

DRAWN	-	-
DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-
RECOMMENDED DIRECTOR		
RECOMMENDED ENGINEERING DIRECTOR		CITY ENGINEERING DEPT.

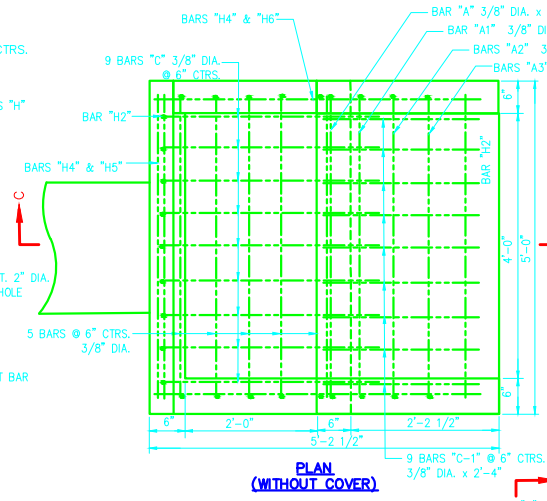
APPROVED
DATE: -
SHEET X OF X



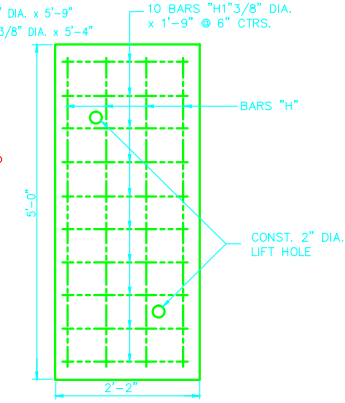
PLAN
(WITHOUT COVER)



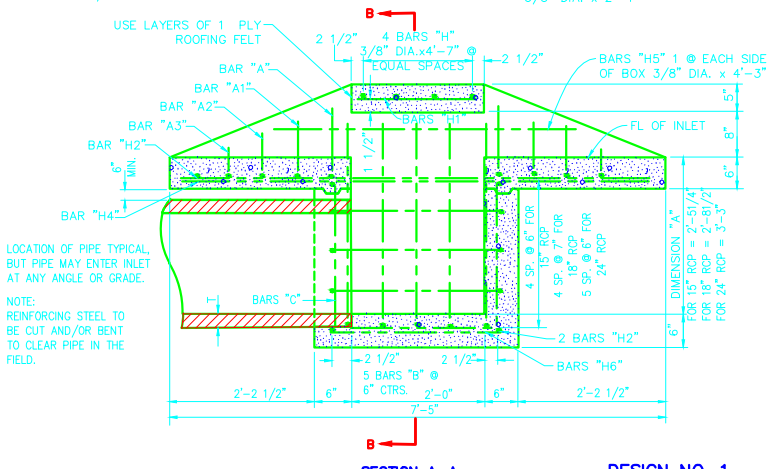
PLAN
(PRECAST COVER)



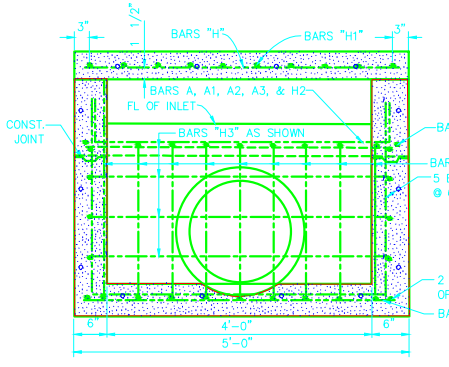
PLAN
(WITHOUT COVER)



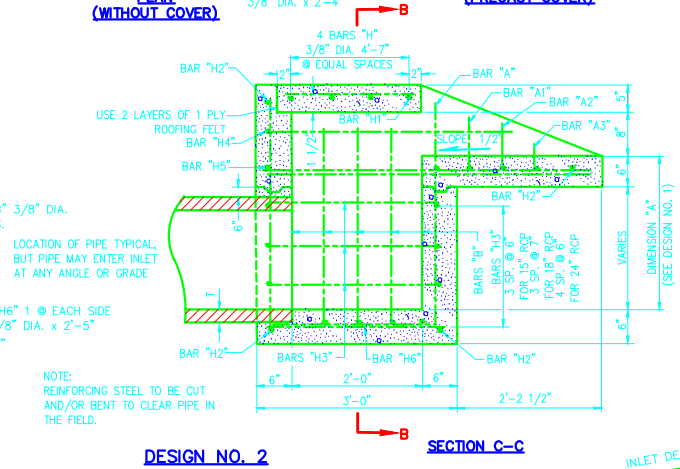
PLAN
(PRECAST COVER)



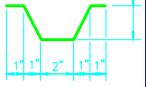
SECTION A-A



SECTION B-B



SECTION C-C



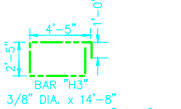
CONST. JOINT DETAIL

LOCATION OF PIPE TYPICAL, BUT PIPE MAY ENTER INLET AT ANY ANGLE OR GRADE

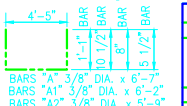
NOTE:
REINFORCING STEEL TO BE CUT AND/OR BENT TO CLEAR PIPE IN THE FIELD.

DESIGN NO. 1

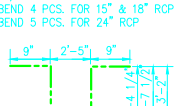
DESIGN NO. 2



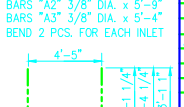
BAR "H3"
3/8" DIA. x 14'-8"
BEND 4 PCS. FOR 15" & 18" RCP
BEND 5 PCS. FOR 24" RCP



BARS "A" 3/8" DIA. x 6'-7"
BARS "A1" 3/8" DIA. x 6'-2"
BARS "A2" 3/8" DIA. x 5'-9"
BARS "A3" 3/8" DIA. x 5'-4"
BEND 2 PCS. FOR EACH INLET



BAR "C"
3/8" DIA. x 8'-71/2" FOR 15" RCP
3/8" DIA. x 9'-2" FOR 18" RCP
3/8" DIA. x 10'-3" FOR 24" RCP
BEND 9 PCS. FOR EA. INLET



BAR "B"
3/8" DIA. x 9'-1 1/2" FOR 15" RCP
3/8" DIA. x 10'-6" FOR 18" RCP
3/8" DIA. x 1 1'-7" FOR 24" RCP
BEND 5 PCS. FOR EA. INLET

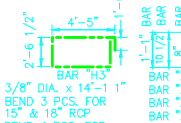
DESIGN NO. 1										DESIGN NO. 2									
	15" RCP			18" RCP			24" RCP				15" RCP			18" RCP			24" RCP		
MARK	NO. PCS	SHAPE	LENGTH	NO. PCS	SHAPE	LENGTH	NO. PCS	SHAPE	LENGTH	MARK	NO. PCS	SHAPE	LENGTH	NO. PCS	SHAPE	LENGTH	NO. PCS	SHAPE	LENGTH
A	2	BENT	6'-7"	2	BENT	6'-7"	2	BENT	6'-7"	A	1	BENT	6'-7"	1	BENT	6'-7"	1	BENT	6'-7"
A1	2	BENT	6'-2"	2	BENT	6'-2"	2	BENT	6'-2"	A1	1	BENT	6'-2"	1	BENT	6'-2"	1	BENT	6'-2"
A2	2	BENT	5'-9"	2	BENT	5'-9"	2	BENT	5'-9"	A2	1	BENT	5'-9"	1	BENT	5'-9"	1	BENT	5'-9"
A3	2	BENT	5'-4"	2	BENT	5'-4"	2	BENT	5'-4"	A3	1	BENT	5'-4"	1	BENT	5'-4"	1	BENT	5'-4"
B	5	BENT	10'-7 1/2"	5	BENT	11'-2"	5	BENT	12'-3"	B	5	BENT	10'-7 1/2"	5	BENT	11'-2"	5	BENT	12'-3"
C	9	BENT	8'-7 1/2"	9	BENT	9'-2"	9	BENT	10'-3"	C	9	BENT	9'-1 1/2"	9	BENT	9'-7 1/2"	9	BENT	10'-81/2"
C1	18	STR.	2'-4"	18	STR.	2'-4"	18	STR.	2'-4"	C	9	STR.	2'-4"	9	STR.	2'-4"	9	STR.	2'-4"
H	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"	H	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"
H1	10	STR.	1'-7"	10	STR.	1'-7"	10	STR.	1'-7"	H1	10	STR.	1'-9"	10	STR.	1'-9"	10	STR.	1'-9"
H2	4	STR.	4'-5"	4	STR.	4'-5"	4	STR.	4'-5"	H2	4	STR.	4'-7"	4	STR.	4'-7"	4	STR.	4'-7"
H3	4	BENT	14'-8"	4	BENT	14'-8"	5	BENT	14'-8"	H3	3	BENT	14'-1 1"	3	BENT	14'-1 1"	4	BENT	14'-1 1"
H4	2	STR.	7'-0"	2	STR.	7'-0"	2	STR.	7'-0"	H4	1	BENT	1 1'-4"	1	BENT	1 1'-4"	1	BENT	1 1'-4"
H5	2	STR.	4'-3"	2	STR.	4'-3"	2	STR.	4'-3"	H5	1	BENT	14'-1"	1	BENT	14'-1"	1	BENT	14'-1"
H6	2	STR.	2'-5"	2	STR.	2'-5"	2	STR.	2'-5"	H6	2	STR.	2'-5"	2	STR.	2'-5"	2	STR.	2'-5"

QUANTITIES

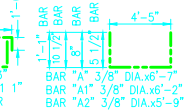
ITEM	15" RCP	18" RCP	24" RCP	ITEM	15" RCP	18" RCP	24" RCP
CLASS "A" CONCRETE	1.67 C.Y.	1.73 C.Y.	1.77 C.Y.	CLASS "A" CONCRETE	1.52 C.Y.	1.59 C.Y.	1.64 C.Y.
REINFORCING STEEL	135 LBS.	141 LBS.	147 LBS.	REINFORCING STEEL	118 LBS.	121 LBS.	132 LBS.

QUANTITIES PER FT. OF VERT. HT.-CLASS 'A' CONC. -0.26 C.Y.-REINFORCING STEEL-21.79 LBS. (SEE NOTES)

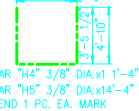
BAR BENDING DIAGRAMS
DESIGN NO. 1



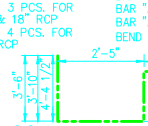
BAR "H3"
3/8" DIA. x 14'-1 1"
BEND 3 PCS. FOR 15" & 18" RCP
BEND 4 PCS. FOR 24" RCP



BAR "A" 3/8" DIA.x6'-7"
BAR "A1" 3/8" DIA.x6'-2"
BAR "A2" 3/8" DIA.x5'-9"
BAR "A3" 3/8" DIA.x5'-4"
BEND 1 PC. EA. MARK



BAR "H4" 3/8" DIA.x1 1'-4"
BAR "H5" 3/8" DIA.x14'-4"
BEND 1 PC. EA. MARK



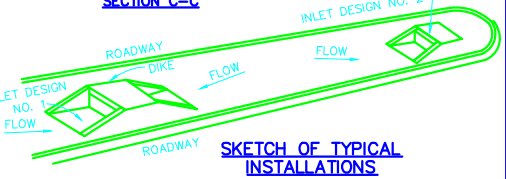
BAR "C"
3/8" DIA.x9'-1 1/2" FOR 15" RCP
3/8" DIA.x9'-7 1/2" FOR 18" RCP
3/8" DIA.x10'-8 1/2" FOR 24" RCP
BEND 9 PCS. EA. INLET

BAR "B"
3/8" DIA.x10'-10 1/2" FOR 15" RCP
3/8" DIA.x1 1'-2" FOR 18" RCP
3/8" DIA.x12'-3" FOR 24" RCP
BEND 5 PCS. EA. INLET

BAR BENDING DIAGRAMS
DESIGN NO. 2

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF TULSA STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONCRETE SURFACES TO BE CORBORUNDUM FINISHED.
3. ALL EXPOSED CONCRETE EDGES SHALL HAVE A1/2" CHAMFER.
4. ALL REINFORCING STEEL TO BE 3/8" DIAMETER DEFORMED BARS.
5. FOR EACH FOOT ADDITIONAL HEIGHT, ADD 2'-0" TO BARS "B" AND "C," BARS "H3" AT 6" CTR. TO CTR.



SKETCH OF TYPICAL INSTALLATIONS

STANDARD DROP INLETS
15 in, 18 in, & 24 in PIPE

CITY OF GLENPOOL, OKLAHOMA

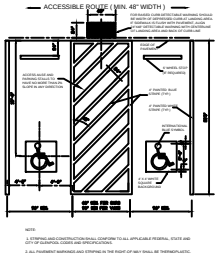
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

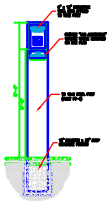
REVISION	BY	DATE

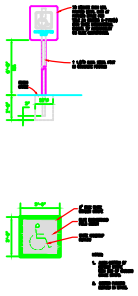
PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
ATLAS PAGE NO.

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED DIRECTOR
RECOMMENDED ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X





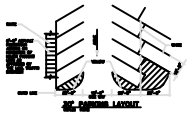


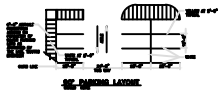
HANDICAP SIGNAGE
AT PARKING SPACES

HANDICAP SIGNAGE
AT PARKING SPACES

HANDICAP STRIPING
AT PARKING SPACES

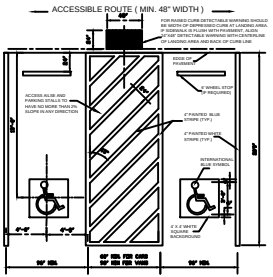
HANDICAP EMBLEM
FOR PARKING SPACES





HANDICAP SIGNAGE AT PARKING SPACES

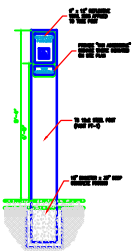
SCALE: N.T.S.

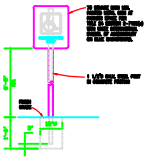


NOTE:

1. STRIPING AND CONSTRUCTION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND CITY OF GLENPOOL CODES AND SPECIFICATIONS.

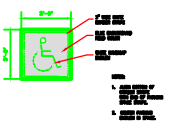
2. ALL PAVEMENT MARKINGS AND STRIPING IN THE RIGHT-OF-WAY SHALL BE THERMOPLASTIC.





HANDICAP STRIPING AT PARKING SPACES

SCALE: N.T.S.

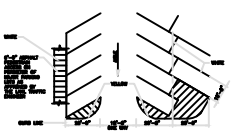


HANDICAP SIGNAGE AT PARKING SPACES

SCALE: N.T.S.

HANDICAP EMBLEM FOR PARKING SPACES

SCALE: N.T.S.

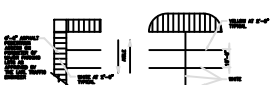


90° PARKING LAYOUT

SCALE: N.T.S.

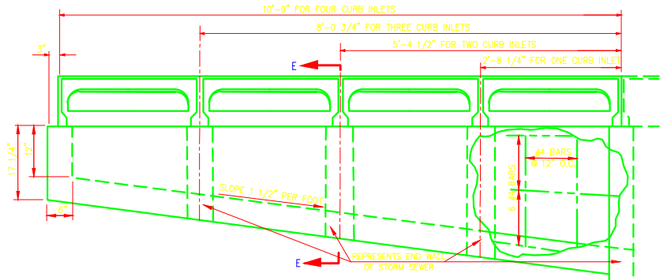
GENERAL NOTES:

1. PAINT ALL LINES 4" WIDE (5 COATS).



90° PARKING LAYOUT

SCALE: N.T.S.

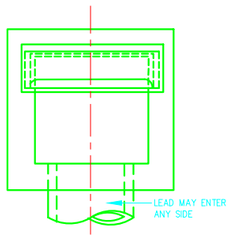


ELEVATION

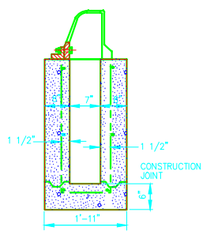
ALL PRE-CAST INLET JOINTS SHALL HAVE BUTYL ROPE INSTALLED AND GROUTING SHALL BE PLACED INSIDE THE INLET AT EACH JOINT.

CURB INLETS SHALL BE PLACED ON UPSTREAM SIDE OF GRATE INLETS UNLESS OTHERWISE SPECIFIED.

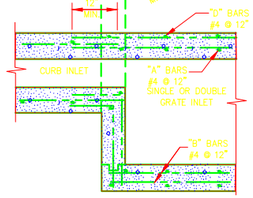
CONCRETE TROUGH FOR CURB INLETS AND CONCRETE STORM SEWER INLETS SHALL BE CONSTRUCTED AS TWO PARTS WITH OMNI-FLEX.



PLAN



SECTION E-E

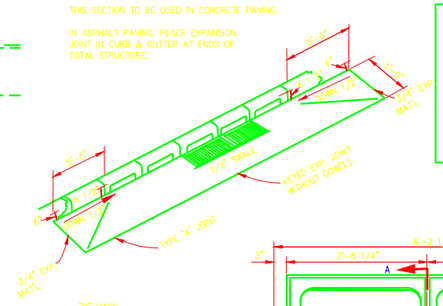


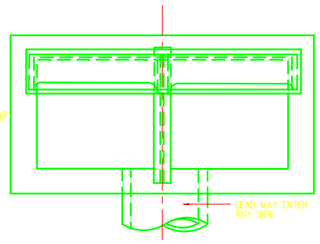
PLAN VIEW OF THROAT CONNECTION

* DOUBLE GRATE IN SUMP AREAS ONLY.

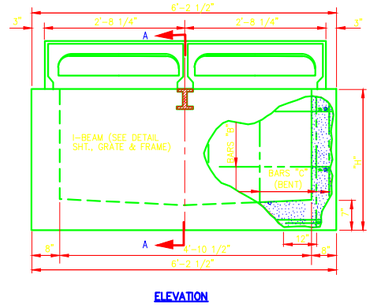
THIS SECTION TO BE USED IN CONCRETE PAVING.

IN ASPHALT PAVING, PLACE EXPANSION JOINT IN CURB & GUTTER AT ENDS OF TOTAL STRUCTURE.

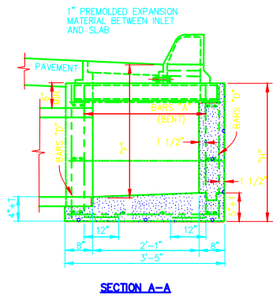




PLAN



ELEVATION



SECTION A-A

ADDITIONAL CURB INLETS

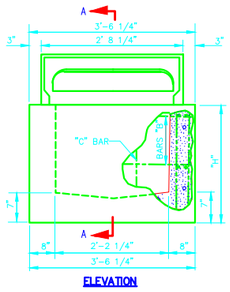
DOUBLE GRATE & CURB INLET

DESIGN - 2

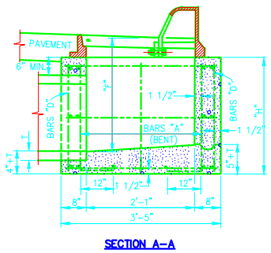
BAR LIST FOR SINGLE GRATE & CURB INLET			
SIZE OF LEAD	H MINIMUM	I MINIMUM	
15"	2'-6"	2.42 FT.	
18"	2'-9"	2.67 FT.	
24"	3'-7"	3.50 FT.	
BARS "A" SIZE	BARS "B" SIZE	BARS "C" SIZE	BARS "D" SIZE
#4xH+8"	#4x3'-2"	#4xH+8"	#4xH-4"

BAR LIST FOR DOUBLE GRATE & CURB INLET			
SIZE OF LEAD	H MINIMUM	I MINIMUM	
18"	2'-9"	2.67 FT.	
24"	3'-7"	3.50 FT.	
30"	4'-1"	4'-0"	
BARS "A" SIZE	BARS "B" SIZE	BARS "C" SIZE	BARS "D" SIZE
#4xH+8"	#4x5'-0"	#4xH+8"	#4xH-4"

* FOR INDUSTRIAL & ARTERIAL STREETS



ELEVATION



SECTION A-A

SINGLE GRATE & CURB INLET

DESIGN - 1

GENERAL NOTES

1. (a) WHEN THE INLET IS BUILT IN EXISTING PAVEMENT, THE APRON AROUND THE INLET SHALL BE OF THE SIZE SHOWN IN THE PLAN ON THIS SHEET, AND BUILT OF P.C. CONCRETE TO A MINIMUM 8" THICKNESS.
   (b) THERE WILL BE NO DEDUCTION OF PAYMENT FOR CONCRETE CURB & GUTTER FOR THE LENGTH OR AREA OCCUPIED BY THE CONSTRUCTION OF CAST IRON CURB INLETS OR CAST IRON CURB INLET FRAME & GRATE.
2. RUBBER COATED REINFORCED STEEL STEPS SHALL BE PLACED AT HEADERS IN ALL INLETS 3' OR MORE IN DEPTH. COST OF STEPS SHALL BE INCLUDED IN THE PRICE BID FOR INLET.
3. GRATING AND FRAMES TO BE USED IN THIS INLET ARE SHOWN ON THE STANDARD DRAWING DESIGNATED AS "STANDARD STORM SEWER GRATES & FRAMES."
4. THE STANDARD DRAWING DESIGNATION NO., DESIGN NO., AND NUMBER OF ADDITIONAL OPENINGS SHALL BE INDICATED ON THE PLANS.
5. COST OF STRUCTURAL STEEL I-BEAMS AND ANGLE IRON TO BE INCLUDED IN THE PRICE BID FOR INLET. ANGLE IRON SHALL CONFORM TO ASTM-A7 OR A36.
6. CASTING SHALL CONFORM TO ASTM SPECIFICATION FOR GREY-IRON CASTINGS, SERIAL DESIGNATION A-48-76 CLASS 30-B OR BETTER.
7. NO WORDING OR MARKINGS OF ANY KIND OTHER THAN THOSE SHOWN ON THE PLANS WILL BE PERMITTED ON THESE CASTINGS.
8. ALL NUTS AND BOLTS REQUIRED FOR THESE STRUCTURES SHALL BE CADMIUM PLATED GALVANIZED.
9. CAST IRON CURBS TO BE USED ARE SHOWN ON STANDARD DRAWING FOR CAST IRON CURB.

STANDARD REINFORCED CONCRETE STORM WATER INLETS

CITY OF GLENPOOL, OKLAHOMA

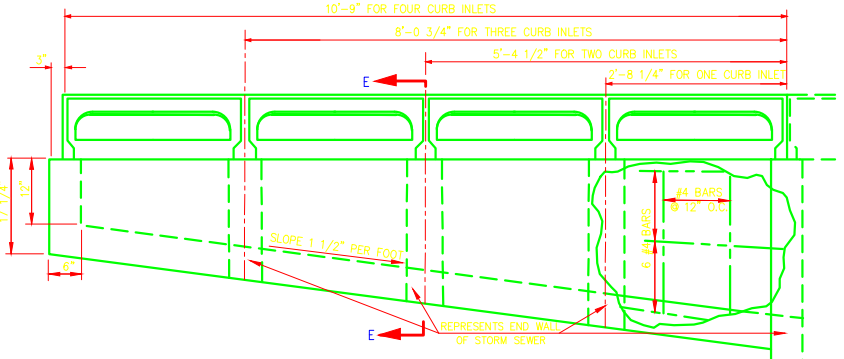
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=∞
PROFILE SCALE: HORIZONTAL: - VERTICAL: -
ATLAS PAGE NO:

DRAWN	-	-
DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-
RECOMMENDED DIRECTOR		
RECOMMENDED		CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR		

APPROVED:
DATE: -
SHEET X OF X

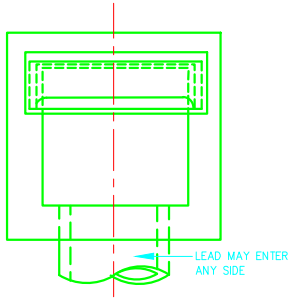


ELEVATION

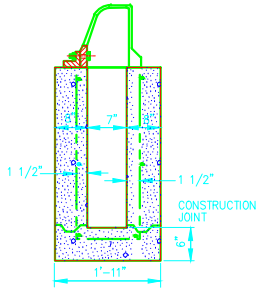
ALL PRE-CAST INLET JOINTS SHALL HAVE BUTYL ROPE INSTALLED AND GROUTING SHALL BE PLACED INSIDE THE INLET AT EACH JOINT.

CURB INLETS SHALL BE PLACED ON UPSTREAM SIDE OF GRATE INLETS UNLESS OTHERWISE SPECIFIED.

CONCRETE TROUGH FOR CURB INLETS AND CONCRETE STORM SEWER INLETS SHALL BE CONSTRUCTED AS TWO PARTS WITH OMNI-FLEX.



PLAN

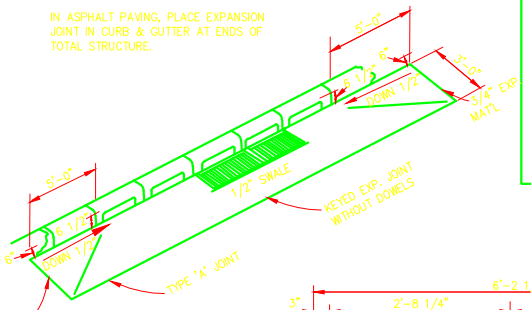


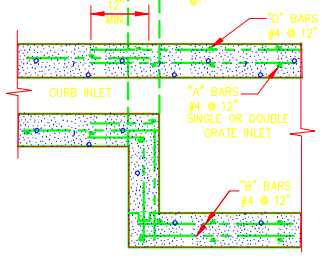
SECTION E-E

* DOUBLE GRATE IN SUMP AREAS ONLY.

THIS SECTION TO BE USED IN CONCRETE PAVING.

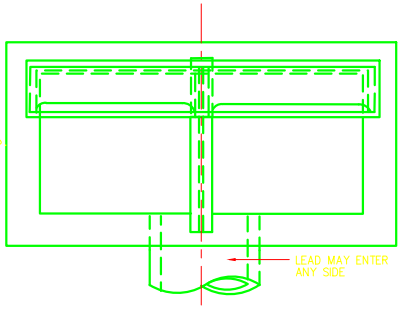
IN ASPHALT PAVING, PLACE EXPANSION JOINT IN CURB & GUTTER AT ENDS OF TOTAL STRUCTURE.



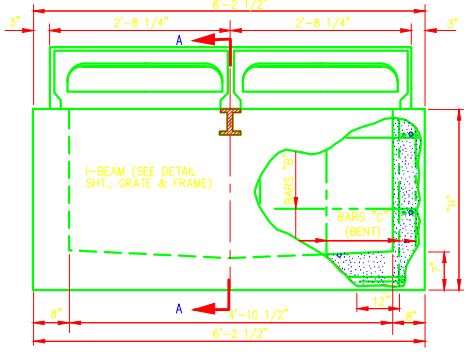


PLAN VIEW OF THROAT CONNECTION

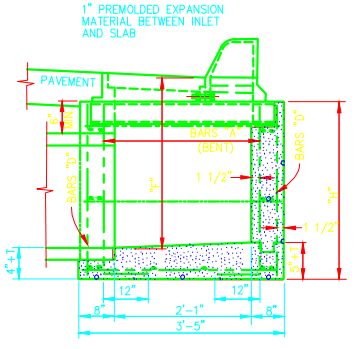
ADDITIONAL CURB INLETS



PLAN



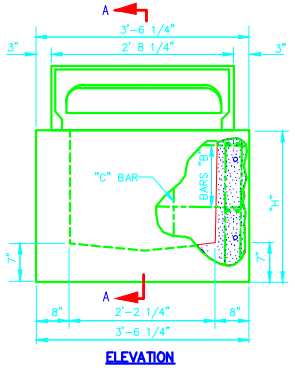
ELEVATION



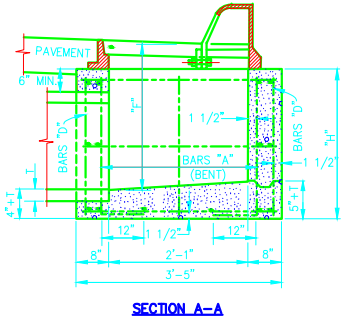
SECTION A-A

DOUBLE GRATE & CURB INLET

DESIGN - 2



ELEVATION



SECTION A-A

SINGLE GRATE & CURB INLET

DESIGN - 1

GENERAL NOTES

1. (a) WHEN THE INLET IS BUILT IN EXISTING PAVEMENT, THE APRON AROUND THE INLET SHALL BE OF THE SIZE SHOWN IN THE PLAN ON THIS SHEET, AND BUILT OF P.C. CONCRETE TO A MINIMUM 8" THICKNESS.
   (b) THERE WILL BE NO DEDUCTION OF PAYMENT FOR CONCRETE CURB & GUTTER FOR THE LENGTH OR AREA OCCUPIED BY THE CONSTRUCTION OF CAST IRON CURB INLETS OR CAST IRON CURB INLET FRAME & GRATE.
2. RUBBER COATED REINFORCED STEEL STEPS SHALL BE PLACED AT HEADERS IN ALL INLETS 3' OR MORE IN DEPTH. COST OF STEPS SHALL BE INCLUDED IN THE PRICE BID FOR INLET.
3. GRATING AND FRAMES TO BE USED IN THIS INLET ARE SHOWN ON THE STANDARD DRAWING DESIGNATED AS "STANDARD STORM SEWER GRATES & FRAMES."
4. THE STANDARD DRAWING DESIGNATION NO., DESIGN NO., AND NUMBER OF ADDITIONAL OPENINGS SHALL BE INDICATED ON THE PLANS.
5. COST OF STRUCTURAL STEEL I-BEAMS AND ANGLE IRON TO BE INCLUDED IN THE PRICE BID FOR INLET. ANGLE IRON SHALL CONFORM TO ASTM-A7 OR A36.
6. CASTING SHALL CONFORM TO ASTM SPECIFICATION FOR GREY-IRON CASTINGS, SERIAL DESIGNATION A-48-76 CLASS 30-B OR BETTER.
7. NO WORDING OR MARKINGS OF ANY KIND OTHER THAN THOSE SHOWN ON THE PLANS WILL BE PERMITTED ON THESE CASTINGS.
8. ALL NUTS AND BOLTS REQUIRED FOR THESE STRUCTURES SHALL BE CADMIUM PLATED GALVANIZED.
9. CAST IRON CURBS TO BE USED ARE SHOWN ON STANDARD DRAWING FOR CAST IRON CURB.

BAR LIST FOR SINGLE GRATE & CURB INLET			
SIZE OF LEAD	H MINIMUM	F MINIMUM	
15"	2'-6"	2.42 FT.	
18"	2'-9"	2.67 FT.	
24"	3'-7"	3.50 FT.	
BARS "A"	BARS "B"	BARS "C"	BARS "D"
SIZE	SIZE	SIZE	SIZE
#4xH+8"	#4x3'-2"	#4xH+8"	#4xH-4"

BAR LIST FOR DOUBLE GRATE & CURB INLET			
SIZE OF LEAD	H MINIMUM	F MINIMUM	
18"	2'-9"	2.67 FT.	
24"	3'-7"	3.50 FT.	
30"	4'-1"	4'-0"	
BARS "A"	BARS "B"	BARS "C"	BARS "D"
SIZE	SIZE	SIZE	SIZE
#4xH+8"	#4x5'-0"	#4xH+8"	#4xH-4"

* FOR INDUSTRIAL & ARTERIAL STREETS

STANDARD REINFORCED CONCRETE STORM WATER INLETS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE: HORIZONTAL: - VERTICAL: -

DRAWN . .
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR

APPROVED: CITY ENGINEERING DEPT.

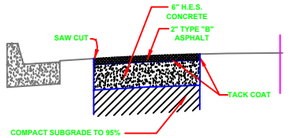
DATE: -

SHEET X OF X

ATLAS PAGE NO.

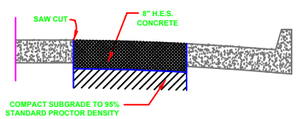
PAVEMENT REPAIR DETAILS

ASPHALT CONCRETE PAVING



REMOVE 8" OF EXISTING FLEXIBLE PAVEMENT SECTION AND REPLACE WITH 8" TYPE "B" ASPHALT CONCRETE, OR REPLACE WITH 2" AC TYPE "B" ASPHALT ON 6" H.E.S. P.C. CONCRETE.

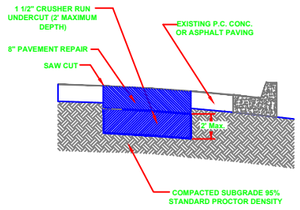
P.C. CONCRETE PAVING



REMOVE 8" OF EXISTING CONCRETE PAVING. REPLACE WITH 8" H.E.S. CONCRETE TO FINISH GRADE.

NOTE: WHEN UTILITY TRENCH IS THE REASON FOR PAVEMENT REPAIR, SEE TYPICAL PERMANENT REPAIR SECTION FOR DETAILS ON REINFORCING STEEL, BACKFILL MATERIAL, AND TRENCH WIDTH, ETS.

BASE REPAIR DETAIL



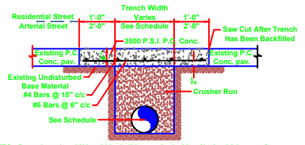
NOTE:

1 - EXCAVATION AND AGGREGATE BASE MATERIAL FOR UNDERCUT MATERIAL BEGINNING EIGHT INCHES (8") BELOW THE SURFACE OF THE EXISTING PAVEMENT AND EXTENDING DOWNWARD A MAXIMUM DEPTH OF 2 FEET.

2 - THE CONTRACTOR SHALL NOT BEGIN THE FILL OPERATION UNTIL MEASUREMENT OF THE EXCAVATION HAS BEEN MADE AND AGREED UPON BY THE ENGINEER AND THE CONTRACTOR.

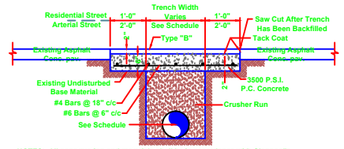
3 - THIS MATERIAL WILL BE PLACED IN LIFTS NOT TO EXCEED SIX INCHES (6") AND COMPACTED TO 95% PROCTOR DENSITY AND SHALL BE PLACED IMMEDIENTLY BELOW THE BINDER MATERIAL i.e., TYPE "A" ASPHALT OR SPECIFIED BY THE TYPICAL PAVING SECTION SHOWN ON THE PLANS.

PAVING CUT & REPAIR DETAIL



NOTES: Street less than 30' in width shall be repaired with a 6" min. thickness of P.C. concrete. Street over 30' in width shall be repaired with 8" min. thickness of P.C. concrete. Full Panel Replacement Downtown.

TYPICAL PERMANENT REPAIR SECTION FOR P.C. CONC. PAVING

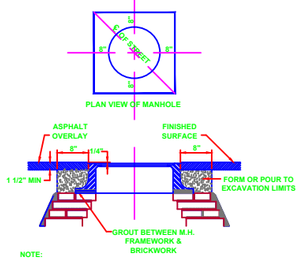


NOTES: All construction and materials shall be in accordance with Glenpool's Standard Specification or Pavements and Appurtenances.

TYPICAL PERMANENT REPAIR SECTION FOR ASPHALT CONC. PAVING

TRENCH WIDTH SCHEDULE					
PIPE SIZE I.D.	12" & LESS	15" TO 21"	24" TO 30"	33" TO 54"	60" & OVER
TRENCH WIDTH (W/O SHORING)	24"	O.D. + 12"	O.D. + 18"	O.D. + 15"	O.D. + 15"
TRENCH WIDTH (W SHORING)	36"	O.D. + 24"	O.D. + 30"	O.D. + 30"	O.D. + 36"

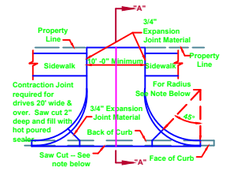
ADJUSTMENT OF MANHOLE TO GRADE



NOTE:

1. THE MANHOLE FRAME SHALL BE SET TO GRADE AND CONCRETE BASE POURED AHEAD OF RESURFACING OPERATIONS.
2. CONCRETE BASE SHALL BE H.E.S. CONCRETE.
3. THE WORK SHALL BE PROTECTED BY BARRIERS AND LIGHTS, ECT... AND SHALL NOT BE REMOVED FOR A PERIOD OF 72 HOURS AFTER THE POUR IS MADE.

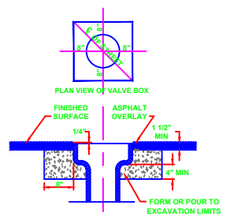
DRIVEWAY DETAIL



NOTES:

1. A 5' - 0" minimum radius is approved for one & two family residences not abutting a limited access or major street. All other Driveways will have a 10' 0 " minimum radius.
2. The Driveway Contractor may saw cut & remove the complete Curb & Gutter section or the Curb only. Saw cuts shall be 2" of 1/3 the depth on the gutter, which ever id greater. Saw cuts shall include the top & face of curb as well as the gutter. Saw cuts shall be made prior to the removal of concrete.
3. If a gutter holds water prior to any construction by driveway Contractor, he should notify the City Engineer of the situation before doing any work. the completed driveway work will not be accepted if the gutter holds water due to poor construction by the Contractor.
4. It is recognized that this driveway detail will not cover every possible situation encountered in construction. Additional expansion joints will be required as needed.
5. Clean and seal all joints and saw cuts in accordance with standard specifications.
6. Do not turn radius in front of adjacent property without written permission from adjacent property owner.
7. Curb cuts exceeding 42' must be approved by the City Engineer.

ADJUSTMENT OF VALVE BOX TO GRADE



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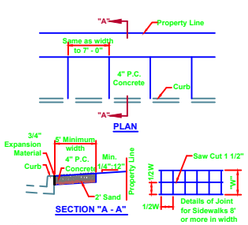
DETAILS FOR SIDEWALK

LOCATED AT CURB FOR LOCAL STREET

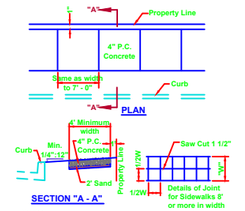


NOTES:

1. 3/4" 4" premoulded expansion material around P.P. or other structures in walk.
2. Expansion joints maximum distance = 100', used 3/4" x 4" premoulded expansion material.
3. Contraction joints maximum distance = 7', saw cut 1 1/2" deep and fill with hot poured sealer.
4. Saw cut joints within 24 hours.
5. Use 3/4" x 4" premoulded expansion joint at curb.

DETAILS FOR SIDEWALK

LOCATED ON PROPERTY LINE For Collector & Arterial Streets



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STANDARD REPAIR DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

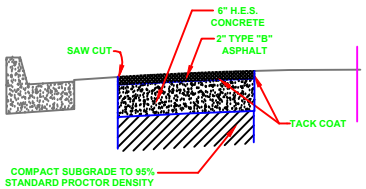
REVISION	BY	DATE

PLAN SCALE: 1" = 40'
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
ATLAS PAGE NO:

DRAWN: , APPROVED:
DESIGNED: ,
OFFICE ENGR. ,
CHIEF ENGR. ,
RECOMMENDED: DIRECTOR
RECOMMENDED: CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR
DATE ,
SHEET X OF X

PAVEMENT REPAIR DETAILS

ASPHALT CONCRETE PAVING



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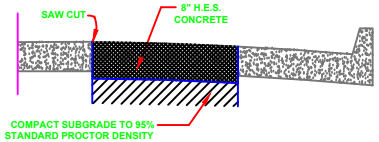

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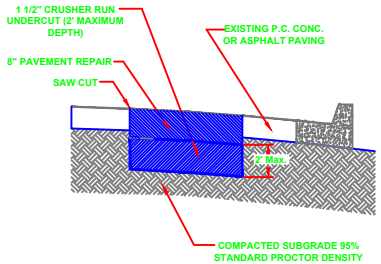
BASE REPAIR DETAIL



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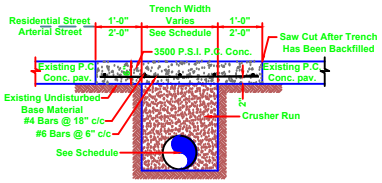

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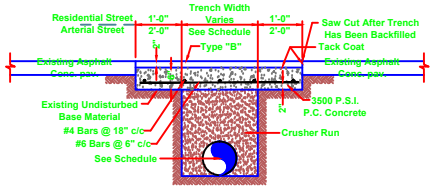
TYPICAL PERMANENT REPAIR SECTION FOR P.C. CONC. PAVING



NOTES: All construction and materials shall be in accordance with Glenpool's Standard Specification or Pavements and Appurtenances.

TYPICAL PERMANENT REPAIR SECTION FOR ASPHALT CONC. PAVING

TRENCH WIDTH SCHEDULE					
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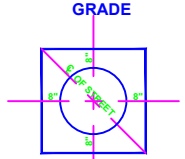
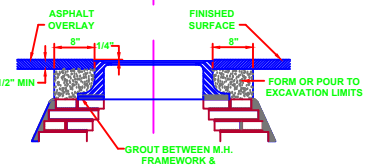
TRENCH WIDTH (W SHORING)	36"	O.D. + 24"	O.D. + 30"	O.D. + 30"	O.D. + 36"

ADJUSTMENT OF MANHOLE TO GRADE





NOTE:

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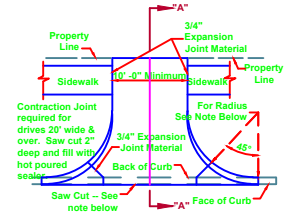
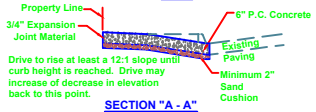
2. CONCRETE BASE SHALL BE H.E.S. CONCRETE.
3. THE WORK SHALL BE PROTECTED BY BARRIERS AND LIGHTS, ECT.. AND SHALL NOT BE REMOVED FOR A PERIOD OF 72 HOURS AFTER THE POUR IS MADE.

DRIVEWAY DETAIL



PLAN



SECTION "A - A"

NOTES:

1. A 5' - 0" minimum radius is approved for one & two family residences not abutting a limited access or major street. All other Driveways will have a 10' 0 " minimum radius.
2. The Driveway Contractor may saw cut & remove the complete Curb & Gutter section or the Curb only. Saw cuts shall be 2" of 1/3 the depth on the gutter, which ever id greater. Saw cuts shall include the top & face of curb as well as the gutter. Saw cuts shall be made prior to the removal of concrete.
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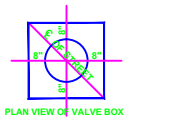
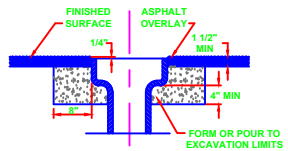
5. Clean and seal all joints and saw cuts in accordance with standard specifications.
6. Do not turn radius in front of adjacent property without written permission from adjacent property owner.
7. Curb cuts exceeding 42' must be approved by the City Engineer.

ADJUSTMENT OF VALVE BOX TO GRADE





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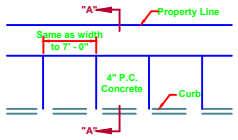
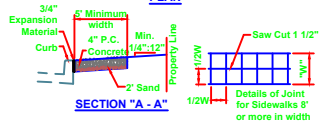
DETAILS FOR SIDEWALK

LOCATED AT CURB FOR LOCAL STREET



PLAN



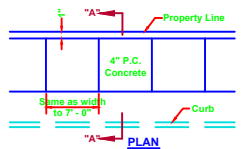
SECTION "A - A"

NOTES:

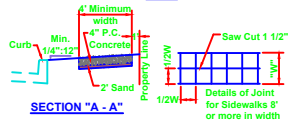
1. 3/4" 4" premoulded expansion material around P.P. or other structures in walk.
2. Expansion joints maximum distance = 100', used 3/4" x 4" premoulded expansion material.
3. Contraction joints maximum distance = 7', saw cut 1 1/2" deep and fill with hot poured sealer.
4. Saw cut joints within 24 hours.
5. Use 3/4" x 4" premoulded expansion joint at curb.

DETAILS FOR SIDEWALK

LOCATED ON PROPERTY LINE
For Collector & Arterial Streets



PLAN



SECTION "A - A"

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STANDARD REPAIR DETAILS

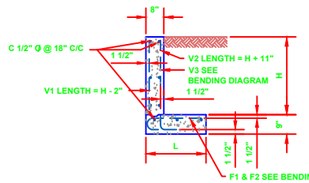
.

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

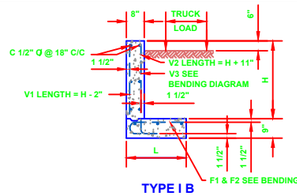
REVISION	BY	DATE

PLAN SCALE: 1"= .
PROFILE SCALE: . HORIZONTAL: . VERTICAL: .
DRAWN . . APPROVED:
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED: CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR
DATE: .
ATLAS PAGE NO:
SHEET X OF X



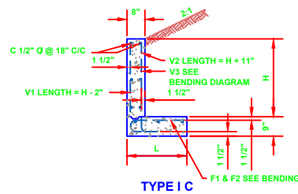
TYPE I A

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	--------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.105
3	3' - 0"	2' - 7"	1/2" Ø @ 12"	--------	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.11	0.146
4	4' - 0"	3' - 3"	1/2" Ø @ 12"	--------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.34	0.189
5	5' - 0"	4' - 0"	1/2" Ø @ 12"	--------	10	5/8" Ø @ 18"	1/2" Ø @ 12"	--------	16.29	0.235
6	6' - 0"	4' - 8"	5/8" Ø @ 12"	--------	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	22.00	0.278
7	7' - 0"	5' - 0"	1/2" Ø @ 12"	--------	14	7/8" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	27.76	0.321
8	8' - 0"	6' - 0"	7/8" Ø @ 12"	--------	17	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	40.67	0.364
9	9' - 0"	6' - 8"	1/2" Ø @ 12"	7/8" Ø @ 12"	19	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	57.51	0.407



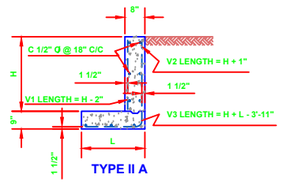
TYPE I B

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	--------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.105
3	3' - 0"	2' - 10"	1/2" Ø @ 12"	--------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.95	0.164
4	4' - 0"	3' - 7"	1/2" Ø @ 12"	--------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.56	0.198
5	5' - 0"	4' - 4"	5/8" Ø @ 12"	--------	12	5/8" Ø @ 18"	1/2" Ø @ 12"	--------	19.16	0.244
6	6' - 0"	5' - 1"	1/2" Ø @ 12"	--------	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	28.64	0.298
7	7' - 0"	5' - 10"	7/8" Ø @ 12"	--------	15	7/8" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	36.83	0.335
8	8' - 0"	6' - 7"	1/2" Ø @ 12"	7/8" Ø @ 12"	17	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	54.97	0.390



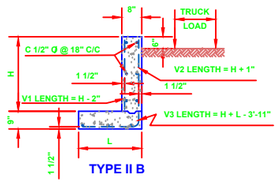
TYPE I C

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	--------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.105
3	3' - 0"	2' - 7"	1/2" Ø @ 12"	--------	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.11	0.146
4	4' - 0"	3' - 4"	1/2" Ø @ 12"	--------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.40	0.191
5	5' - 0"	4' - 1"	5/8" Ø @ 12"	--------	12	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	18.25	0.237
6	6' - 0"	4' - 11"	1/2" Ø @ 12"	5/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	27.62	0.285
7	7' - 0"	5' - 8"	1/2" Ø @ 12"	7/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	39.78	0.330



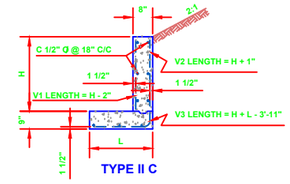
TYPE II A

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 0"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	7.55	0.105
3	3' - 0"	2' - 1"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	10.06	0.132
4	4' - 0"	2' - 11"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	12.40	0.180
5	5' - 0"	3' - 11"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	15.51	0.232
6	6' - 0"	5' - 1"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	24.20	0.289
7	7' - 0"	6' - 5"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	31.99	0.351
8	8' - 0"	7' - 10"	18	1/2" Ø @ 18"	1/2" Ø @ 12"	3/4" Ø @ 12"	44.04	0.415



TYPE II B

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 2"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	7.66	0.110
3	3' - 0"	3' - 3"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.50	0.164
4	4' - 0"	4' - 5"	10	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	14.07	0.221
5	5' - 0"	5' - 8"	12	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	21.86	0.281
6	6' - 0"	7' - 2"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	31.12	0.347
7	7' - 0"	8' - 8"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	41.90	0.414



TYPE II C

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 0"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	7.55	0.105
3	3' - 0"	2' - 7"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	10.39	0.146
4	4' - 0"	3' - 8"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	12.90	0.201
5	5' - 0"	4' - 11"	12	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	20.86	0.260
6	6' - 0"	6' - 4"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	26.53	0.324
7	7' - 0"	8' - 0"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	3/4" Ø @ 12"	40.45	0.395

STANDARD RETAINING WALL DETAILS (SHEET ONE)

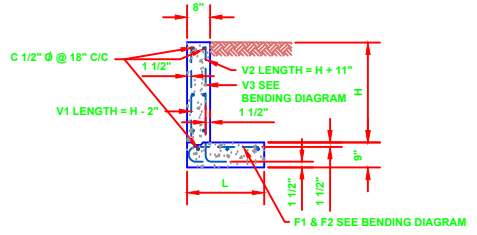
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION:	BY:	DATE:

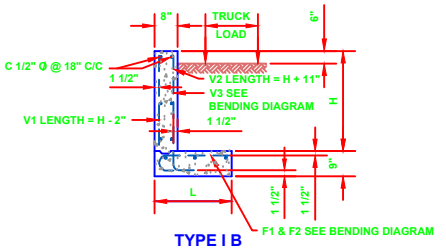
PLAN SCALE: 1" = as shown
PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "
ATLAS PAGE NO.

DRAWN: " "
DESIGNED: " "
OFFICE ENGR.: " "
CHIEF ENGR.: " "
RECOMMENDED: DIRECTOR:
"
RECOMMENDED: CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR:
APPROVED:
DATE: "
SHEET X OF X



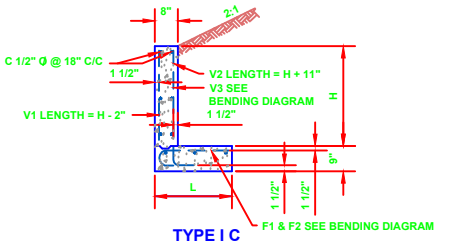
TYPE I A

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	-------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	8.28	0.105
3	3' - 0"	2' - 7"	1/2" Ø @ 12"	-------	8	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	11.11	0.146
4	4' - 0"	3' - 3"	1/2" Ø @ 12"	-------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	13.34	0.189
5	5' - 0"	4' - 0"	1/2" Ø @ 12"	-------	10	5/8" Ø @ 18"	1/2" Ø @ 12"	-------	16.29	0.235
6	6' - 0"	4' - 8"	5/8" Ø @ 12"	-------	11	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	22.00	0.278
7	7' - 0"	5' - 0"	1/2" Ø @ 12"	-------	14	7/8" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	27.76	0.321
8	8' - 0"	6' - 0"	7/8" Ø @ 12"	-------	17	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	40.67	0.364
9	9' - 0"	6' - 8"	1/2" Ø @ 12"	7/8" Ø @ 12"	19	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	57.51	0.407



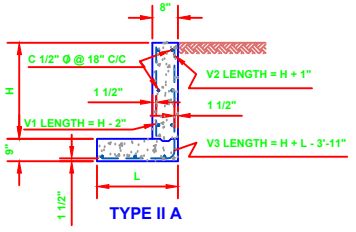
TYPE I B

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	-------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	8.28	0.105
3	3' - 0"	2' - 10"	1/2" Ø @ 12"	-------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	11.95	0.164
4	4' - 0"	3' - 7"	1/2" Ø @ 12"	-------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	13.56	0.198
5	5' - 0"	4' - 4"	5/8" Ø @ 12"	-------	12	5/8" Ø @ 18"	1/2" Ø @ 12"	-------	19.16	0.244
6	6' - 0"	5' - 1"	1/2" Ø @ 12"	-------	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	25.64	0.298
7	7' - 0"	5' - 10"	7/8" Ø @ 12"	-------	15	7/8" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	36.83	0.335
8	8' - 0"	6' - 7"	1/2" Ø @ 12"	7/8" Ø @ 12"	17	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	54.97	0.380



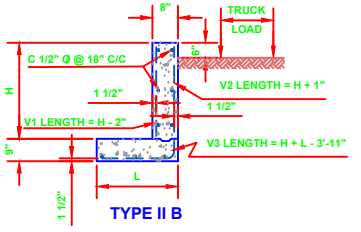
TYPE I C

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	-------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	8.28	0.105
3	3' - 0"	2' - 7"	1/2" Ø @ 12"	-------	8	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	11.11	0.146
4	4' - 0"	3' - 4"	1/2" Ø @ 12"	-------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	13.40	0.191
5	5' - 0"	4' - 1"	5/8" Ø @ 12"	-------	12	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	18.25	0.237
6	6' - 0"	4' - 11"	1/2" Ø @ 12"	5/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	27.62	0.285
7	7' - 0"	5' - 8"	1/2" Ø @ 12"	7/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	39.78	0.330



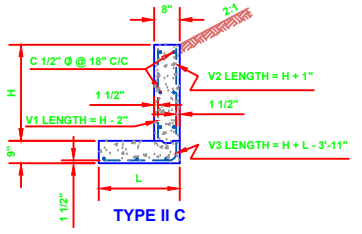
TYPE II A

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	7.55	0.105
3	3' - 0"	2' - 1"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	10.06	0.132
4	4' - 0"	2' - 11"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	12.40	0.180
5	5' - 0"	3' - 11"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	15.51	0.232
6	6' - 0"	5' - 1"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	24.20	0.289
7	7' - 0"	6' - 5"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	31.99	0.351
8	8' - 0"	7' - 10"	18	1/2" Ø @ 18"	1/2" Ø @ 12"	3/4" Ø @ 12"	44.04	0.415



TYPE II B

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 2"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	7.66	0.110
3	3' - 0"	3' - 3"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	11.50	0.164
4	4' - 0"	4' - 5"	10	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	14.07	0.221
5	5' - 0"	5' - 8"	12	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	21.86	0.281
6	6' - 0"	7' - 2"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	31.12	0.347
7	7' - 0"	8' - 8"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	41.90	0.414



TYPE II C

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	7.55	0.105
3	3' - 0"	2' - 7"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	10.39	0.146
4	4' - 0"	3' - 8"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	12.90	0.201
5	5' - 0"	4' - 11"	12	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	20.86	0.260
6	6' - 0"	6' - 4"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	26.53	0.324
7	7' - 0"	8' - 0"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	3/4" Ø @ 12"	40.45	0.395

STANDARD RETAINING WALL DETAILS (SHEET ONE)

CITY OF GLENPOOL, OKLAHOMA

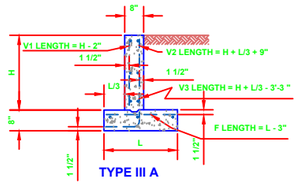
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: " VERTICAL: "
ATLAS PAGE NO:

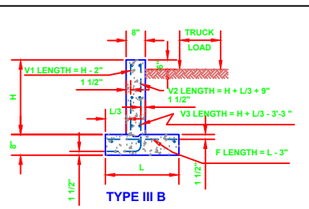
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X



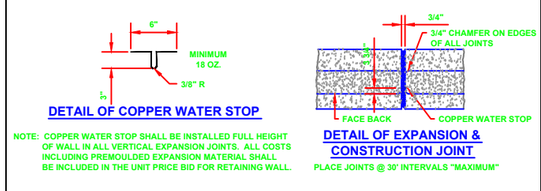
TYPE III A

DESIGN NUMBER	H	L	F BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.099
3	3' - 0"	2' - 0"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	10.72	0.123
4	4' - 0"	2' - 8"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.10	0.165
5	5' - 0"	3' - 3"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	16.07	0.204
6	6' - 0"	3' - 10"	1/2" Ø @ 12"	13	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	19.04	0.243
7	7' - 0"	4' - 5"	5/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	26.40	0.282
8	8' - 0"	5' - 0"	1/2" Ø @ 12"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	34.17	0.321
9	9' - 0"	5' - 7"	7/8" Ø @ 12"	19	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	50.84	0.360



TYPE III B

DESIGN NUMBER	H	L	F BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.099
3	3' - 0"	2' - 5"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.10	0.134
4	4' - 0"	3' - 1"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.47	0.175
5	5' - 0"	3' - 9"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	16.51	0.216
6	6' - 0"	4' - 4"	5/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	24.48	0.255
7	7' - 0"	4' - 11"	1/2" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	30.52	0.294
8	8' - 0"	5' - 7"	7/8" Ø @ 12"	17	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	46.35	0.335

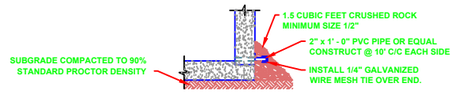


DETAIL OF COPPER WATER STOP

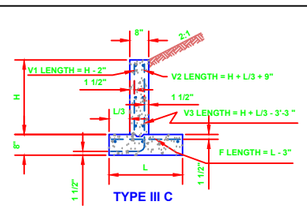
NOTE: COPPER WATER STOP SHALL BE INSTALLED FULL HEIGHT OF WALL IN ALL VERTICAL EXPANSION JOINTS. ALL COSTS INCLUDING PREMOULDED EXPANSION MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR RETAINING WALL.

DETAIL OF EXPANSION & CONSTRUCTION JOINT

PLACE JOINTS @ 30' INTERVALS "MAXIMUM"

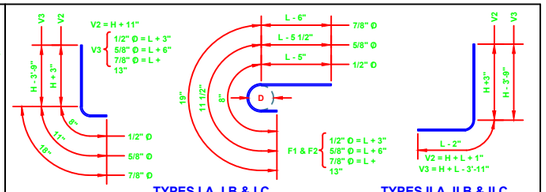


DETAIL OF WEEP HOLES & CONSTRUCTION JOINT



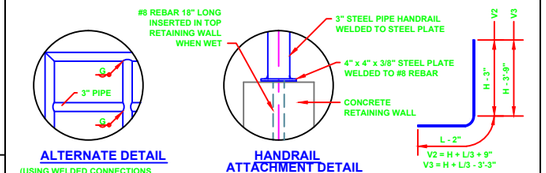
TYPE III C

DESIGN NUMBER	H	L	F BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER L.F.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.105
3	3' - 0"	2' - 0"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.95	0.164
4	4' - 0"	2' - 7"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.56	0.198
5	5' - 0"	3' - 2"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	19.16	0.244
6	6' - 0"	3' - 9"	5/8" Ø @ 12"	13	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	25.64	0.298
7	7' - 0"	4' - 5"	3/4" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	36.83	0.335
8	8' - 0"	5' - 0"	1" Ø @ 12"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	54.97	0.380



TYPES I A, I B & I C

TYPES II A, II B & II C



ALTERNATE DETAIL

(USING WELDED CONNECTIONS ON PIPE HANDRAIL)

HANDRAIL ATTACHMENT DETAIL

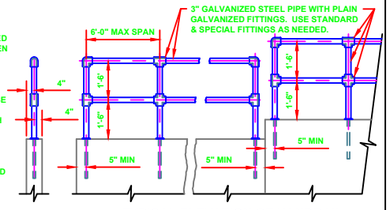
TYPES III A, III B & III C

HANDRAIL NOTES:

PIPE HANDRAIL SHALL BE PLACED ON RETAINING WALLS ONLY WHEN CALLED FOR ON THE PLANS.

WELDED CONNECTIONS MAY BE USED FOR PIPE HANDRAILS. WELDED CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH AND SPOT PAINTED WITH TWO COATS OF ALUMINUM PAINT.

SHOP DETAILS FOR ALL PIPE HANDRAILS SHALL BE SUBMITTED FOR APPROVAL.



TYPICAL ELEVATION OF HANDRAIL

GENERAL NOTES:
ALL CONSTRUCTION AND MATERIAL SHALL BE IN ACCORDANCE WITH THEGLENPOOL STANDARD SPECIFICATIONS.
ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" CHAMFER.
ALL CONCRETE SHALL BE CLASS "A" CONCRETE 3500 PSI.
EXPANSION JOINTS SHALL BE AT A MAXIMUM OF 30'-0" INTERVALS.
ALL REINFORCING STEEL BARS SHALL BE DEFORMED BARS COLD BENT, NO WELDS PERMITTED.
ALL EXPOSED CONCRETE SURFACES SHALL HAVE A CARBORUNDUM FINISH.
THIS DETAIL ADAPTED FROM O.D.O.T RETAINING WALL RW-1.

STANDARD RETAINING WALL DETAILS (SHEET TWO)

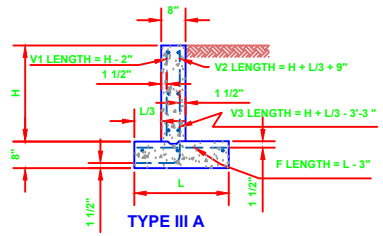
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

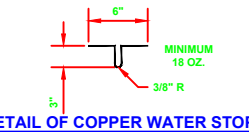
PLAN SCALE: 1"=∞
PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "
ATLAS PAGE NO.

DRAWN: " "
DESIGNED: " "
OFFICE ENGR. " "
CHIEF ENGR. " "
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE: "
SHEET X OF X



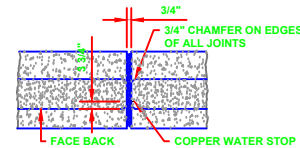
TYPE III A

DESIGN NUMBER	H	L	F BAR SIZE SPC.	C BAR # REQ'D	V1 BAR SIZE SPC.	V2 BAR SIZE SPC.	V3 BAR SIZE SPC.	QUANTITIES REINF STEEL LBS. PER L.F.	QUANTITIES CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	8.28	0.099
3	3' - 0"	2' - 0"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	10.72	0.123
4	4' - 0"	2' - 8"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	13.10	0.165
5	5' - 0"	3' - 3"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	16.07	0.204
6	6' - 0"	3' - 10"	1/2" Ø @ 12"	13	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	19.04	0.243
7	7' - 0"	4' - 5"	5/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	26.40	0.282
8	8' - 0"	5' - 0"	1/2" Ø @ 12"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	34.17	0.321
9	9' - 0"	5' - 7"	7/8" Ø @ 12"	19	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	50.84	0.360



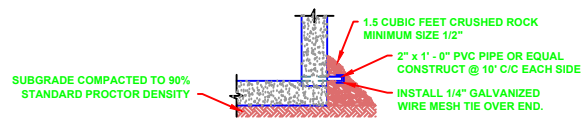
DETAIL OF COPPER WATER STOP

NOTE: COPPER WATER STOP SHALL BE INSTALLED FULL HEIGHT OF WALL IN ALL VERTICAL EXPANSION JOINTS. ALL COSTS INCLUDING PREMOULDED EXPANSION MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR RETAINING WALL.

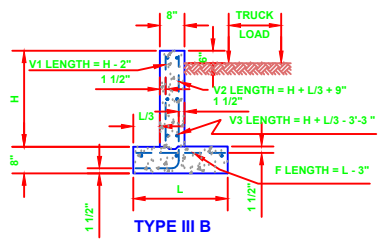


DETAIL OF EXPANSION & CONSTRUCTION JOINT

PLACE JOINTS @ 30' INTERVALS "MAXIMUM"

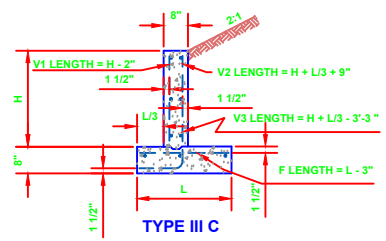


DETAIL OF WEEP HOLES & CONSTRUCTION JOINT



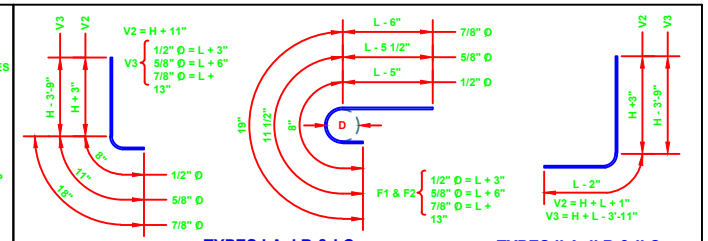
TYPE III B

DESIGN NUMBER	H	L	F BAR SIZE SPC.	C BAR # REQ'D	V1 BAR SIZE SPC.	V2 BAR SIZE SPC.	V3 BAR SIZE SPC.	QUANTITIES REINF STEEL LBS. PER L.F.	QUANTITIES CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	8.28	0.099
3	3' - 0"	2' - 5"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	11.10	0.134
4	4' - 0"	3' - 1"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	13.47	0.175
5	5' - 0"	3' - 9"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	16.51	0.216
6	6' - 0"	4' - 4"	5/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	24.48	0.255
7	7' - 0"	4' - 11"	1/2" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	30.52	0.294
8	8' - 0"	5' - 7"	7/8" Ø @ 12"	17	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	46.35	0.335



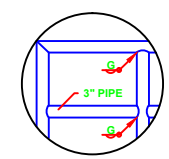
TYPE III C

DESIGN NUMBER	H	L	F BAR SIZE SPC.	C BAR # REQ'D	V1 BAR SIZE SPC.	V2 BAR SIZE SPC.	V3 BAR SIZE SPC.	QUANTITIES REINF STEEL LBS. PER L.F.	QUANTITIES CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	8.28	0.105
3	3' - 0"	2' - 0"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	11.95	0.164
4	4' - 0"	2' - 7"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	13.56	0.198
5	5' - 0"	3' - 2"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	-------	19.16	0.244
6	6' - 0"	3' - 9"	5/8" Ø @ 12"	13	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	25.64	0.298
7	7' - 0"	4' - 5"	3/4" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	36.83	0.335
8	8' - 0"	5' - 0"	1" Ø @ 12"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	54.97	0.380



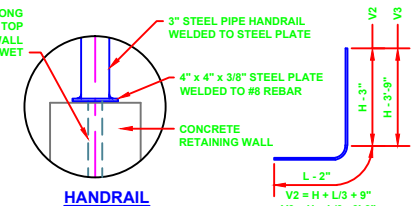
TYPES I A, I B & I C

TYPES II A, II B & II C



ALTERNATE DETAIL

(USING WELDED CONNECTIONS ON PIPE HANDRAIL)



HANDRAIL ATTACHMENT DETAIL

TYPES III A, III B & III C

HANDRAIL NOTES:

PIPE HANDRAIL SHALL BE PLACED ON RETAINING WALLS ONLY WHEN CALLED FOR ON THE PLANS.

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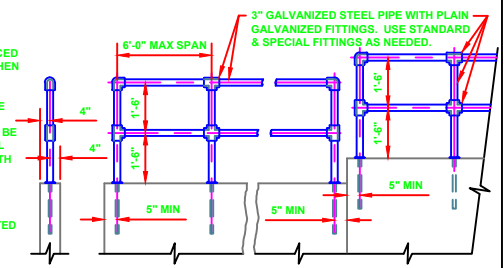
SHOP DETAILS FOR ALL PIPE HANDRAILS SHALL BE SUBMITTED FOR APPROVAL.



TYPICAL ELEVATION OF HANDRAIL

GENERAL NOTES:
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ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" CHAMFER.
ALL CONCRETE SHALL BE CLASS "A" CONCRETE 3500 PSI.
EXPANSION JOINTS SHALL BE AT A MAXIMUM OF 30'-0" INTERVALS.
ALL REINFORCING STEEL BARS SHALL BE DEFORMED BARS COLD BENT, NO WELDS PERMITTED.
ALL EXPOSED CONCRETE SURFACES SHALL HAVE A CARBORUNDUM FINISH.
THIS DETAIL ADAPTED FROM O.D.O.T RETAINING WALL RW-1.

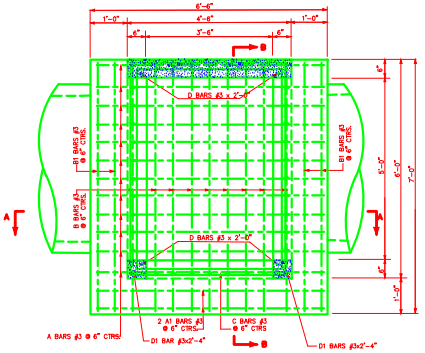
STANDARD RETAINING WALL DETAILS (SHEET TWO)

CITY OF GLENPOOL, OKLAHOMA

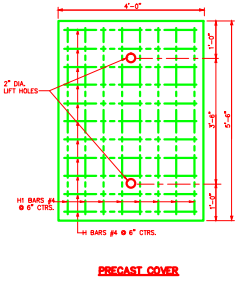
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE:
ATLAS PAGE NO:
SHEET X OF X



PLAN (WITHOUT COVER)



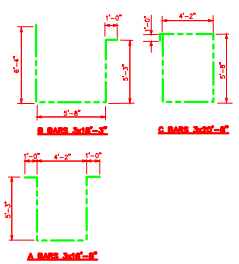
PRECAST COVER

REINFORCING STEEL SCHEDULE

BARS LIST

MARK	NO.	SIZE	TYPE	LENGTH
A	12	#3	BENT	10'-8"
A1	2	#3	STR.	6'-2"
A2	2	#3	STR.	4'-2"
B	6	#3	BENT	18'-3"
B1	4	#3	STR.	6'-8"
C	10	#3	BENT	20'-8"
D	4	#3	STR.	2'-0"
D1	2	#3	STR.	2'-4"
H	11	#4	STR.	5'-8"
H1	8	#4	STR.	5'-2"

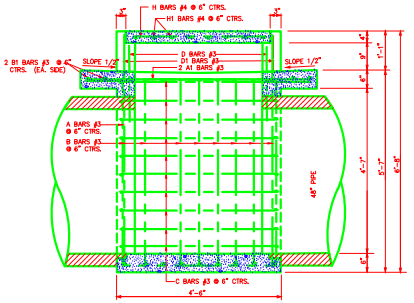
BEND DIAGRAMS



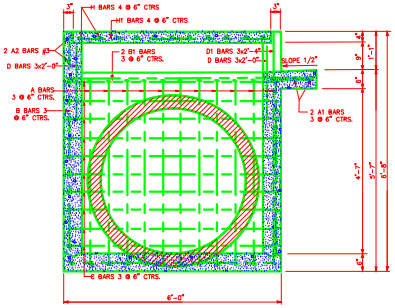
QUANTITIES

FOR INLET WITH MINIMUM HEIGHT
CLASS "A" CONCRETE 2.16 C.Y.
GRADE 40 REINF. STEEL 282 LBS.

FOR ADD'L FOOT OF VERT. HEIGHT
CLASS "A" CONCRETE .352 C.Y.
GRADE 40 REINF. STEEL 29.82 LBS.



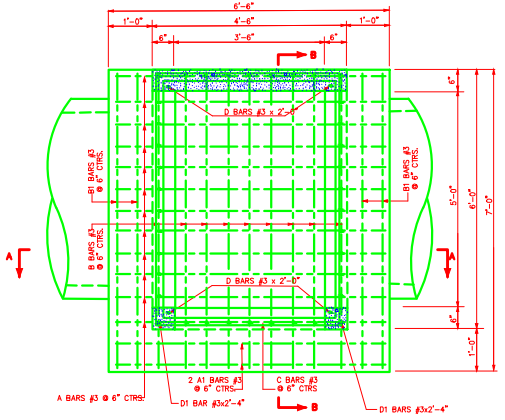
SECTION A–A



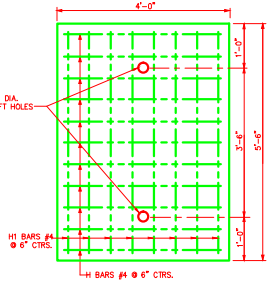
SECTION B–B

NOTE:
FOR OPENING HEIGHTS GREATER THAN 9", ADD #7 HORIZONTAL BAR ACROSS OPENING. (SEE ODOT STD. CET 65-1-00 FOR PIPE GRATE DETAIL)

STANDARD THREE WAY DROP INLET 48" PIPE
GLENPOOL RETAIL DEVELOPMENT
CITY OF GLENPOOL, OKLAHOMA
BRUESCH & ASSOCIATES, INC.



PLAN (WITHOUT COVER)



PRECAST COVER

REINFORCING STEEL SCHEDULE

BARS LIST

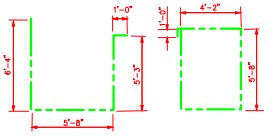
MARK	NO.	SIZE	TYPE	LENGTH
A	12	#3	BENT	16'-8"
A1	2	#3	STR.	6'-2"
A2	2	#3	STR.	4'-2"
B	9	#3	BENT	18'-3"
B1	4	#3	STR.	6'-8"
C	10	#3	BENT	20'-8"
D	4	#3	STR.	2'-0"
D1	2	#3	STR.	2'-4"
H	11	#4	STR.	3'-8"
H1	8	#4	STR.	5'-2"

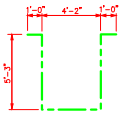
QUANTITIES

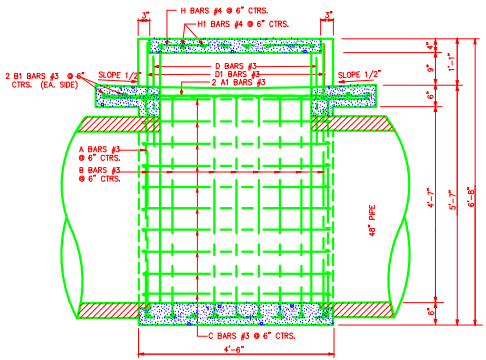
FOR INLET WITH MINIMUM HEIGHT
CLASS "A" CONCRETE 2.16 C.Y.
GRADE 40 REINF. STEEL 282 LBS.

FOR ADD'L FOOT OF VERT. HEIGHT
CLASS "A" CONCRETE .352 C.Y.
GRADE 40 REINF. STEEL 29.82 LBS.

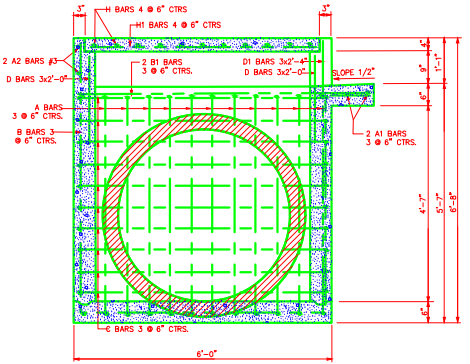
BEND DIAGRAMS







SECTION A-A



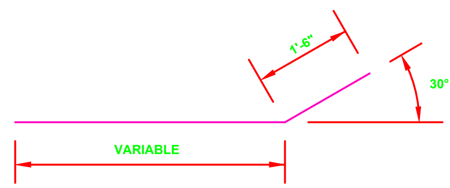
SECTION B-B

NOTE:
FOR OPENING HEIGHTS GREATER THAN 9", ADD 9" HORIZONTAL BAR ACROSS OPENING. (SEE ODOT STD. CET 65-1-00 FOR PIPE GRATE DETAIL)

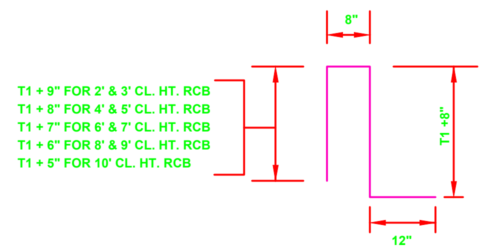
STANDARD THREE WAY DROP INLET 48" PIPE
GLENPOOL RETAIL DEVELOPMENT
CITY OF GLENPOOL, OKLAHOMA
BREISCH & ASSOCIATES, INC.

REVISION	BY	DATE

PLAN SHEET: DRAWN JMT 12/20; DESIGNED WD 12/20; CHECKED
PROFILE SHEET: CHIEF ENGR.; HORIZONTAL N/A; VERTICAL N/A; CONSTRUCTION ENGINEER
FED. PROJECT NO. ; ATLAS PAGE NO.
CITY ENGINEERING DEPT.
DATE DECEMBER, 2020
SHEET OF



BAR BENDING FOR "F" BARS



BAR BENDING FOR "S" BARS

DESIGN NO.	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	X (FT.)	Y (FT.)	WING DIMENSIONS T (IN.)	H (FT.-IN.)	M (FT.-IN.)	N (FT.-IN.)	R (FT.-IN.)	REINFORCING BARS – APRON "D" BARS NO.	SIZE #	LGTH. (FT.-IN.)	"E" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)
1	2		3.33							4					5-5
2	3	2	3.83		8	3-0	4-8	4-0		5	4	4-10	4	4	6-5
3	4		4.33							6					7-5
4	5		4.83							7					8-5
5	3		4.96							5					7-7
6	4		5.46							6					8-7
7	5	3	5.96		8	4-0	6-11	6-0		7	4	6-10	6	4	9-7
8	6		6.46							8					10-7
9	8		7.46							10					12-7
10	4		6.63							6					9-9
11	5		7.13							7					10-9
12	6	4	7.63		8	5-0	9-3	8-0		8	4	8-10	8	4	11-9
13	8		8.63							10					13-9
14	10		9.63							12					15-9
15	5		8.25							7					11-11
16	6		8.75							8					12-11
17	8	5	9.75		8	6-0	11-6	10-0		10	4	10-10	10	4	14-11
18	10		10.75							12					16-11
19	5		9.42	5.32						7					11-11
20	6	6	9.92	5.82	8	7-0	13-10	10-0	2-0	8	4	10-10	10	4	12-11
21	8		10.92	6.82						10					14-11
22	10		11.92	7.82						12					16-11
23	5		10.58	4.48						7					11-11
24	6	7	11.08	4.98	10	8-0	16-2	10-0	4-0	8	4	10-10	10	4	12-11
25	8		12.08	5.98						10					14-11
26	10		13.08	6.98						12					16-11
27	6		12.25	3.90						8					12-11
28	8	8	13.25	4.90	10	9-0	18-6	10-0	6-0	10	4	10-10	10	4	14-11
29	10		14.25	5.90						12					16-11
30	10	9	15.38	4.87	10	10-0	20-9	10-0	8-0	12	4	10-10	10	4	16-11
31	10	10	16.54	3.79	10	11-0	23-1	10-0	10-0	12	4	10-10	10	4	16-11

DESIGN NO.	TWO WINGS "F1" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"F2" BARS NO.	SIZE #	LGTH. (FT.-IN.)	"F3" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"F4" BARS NO.	SIZE #	LGTH. (FT.-IN.)	"G1" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)
1															
2	2	4	6-2	6	4	6-6	2	4	5-8	2	4	6-0	12	4	3-9
3															
4															
5															
6															
7	4	4	7-3 1/2	6	4	8-9	2	4	5-8	2	4	8-3	18	4	4-6
8															
9															
10															
11															
12	6	4	8-5	6	4	11-1	4	4	7-4 1/2	2	4	10-7	24	4	5-3 1/2
13															
14															
15															
16															
17	8	4	9-7	6	4	13-4	6	4	9-1	2	4	12-10	30	4	6-1
18															
19															
20	10	4	10-9	8	4	15-8	6	4	9-1	2	4	15-2	28	4	7-6
21															
22															
23															
24	12	4	11-11	8	4	16-0	8	4	10-10	2	4	17-6	26	4	9-3
25															
26															
27															
28	14	4	13-1	10	4	20-4	10	4	12-7	2	4	19-10	24	4	10-7 1/2
29															
30	16	4	14-2 1/2	10	4	22-7	10	4	12-7	2	4	22-1	22	4	12-0
31	18	4	15-4	12	4	24-11	12	4	14-3 1/2	2	4	24-5	20	4	13-5

DESIGN NO.	"G2" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"G3" BARS NO.	SIZE #	h (FT.-IN.)	LGTH. (FT.-IN.)	"G4" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)
1										
2								6	4	2-2
3										
4										
5										
6										
7								10	4	2-6
8										
9										
10										
11										
12								12	4	3-2 1/2
13										
14										
15										
16										
17								16	4	3-7
18										
19										
20	8	4	4-4 1/2					18	4	4-3
21										
22										
23										
24	16	4	5-5 1/2					22	4	4-7
25										
26										
27										
28	24	4	6-7 1/2	12	4	2-0	5-7	24	4	5-3
29										
30	32	4	7-9 1/2	18	4	3-0	6-10	28	4	5-7
31	40	4	8-10 1/2	24	5	4-3	8-4	30	4	6-3

DESIGN NO.	ONE CURB "CH" BARS NO.	SIZE #	LGTH. (FT.-IN.)	"S" BARS NO.	SIZE #	MIN. LGTH. (FT.-IN.)	TOTAL* ONE HEADWALL CONC (CU.YD.)	STEEL (LBS.)
1			2-8	5		4-1	1.43	133
2	2	4	3-8	6	4	4-1	1.59	143
3			4-8	7		4-3	1.75	154
4			5-8	8		4-5	1.91	165
5			3-8	6		4-1	2.57	218
6			4-8	7		4-3	2.78	232
7	2	4	5-8	8	4	4-5	2.99	245
8			6-8	9		4-7	3.20	259
9			8-8	11		4-11	3.62	287
10			4-8	7		4-2	4.06	336
11			5-8	8		4-4	4.32	352
12	2	4	6-8	9	4	4-6	4.58	368
13			8-8	11		4-10	5.11	402
14			11-0	13		5-0	5.63	435
15			5-10	8		4-4	5.86	480
16			6-10	9		4-6	6.16	498
17	2	4	8-10	11	4	4-10	6.79	537
18			11-0	13		5-0	7.41	575
19			6-0	8		4-3	7.01	588
20	2	4	7-0	9	4	4-5	7.32	607
21			9-0	11		4-9	7.95	645
22			11-0	13		4-11	8.56	682
23			6-2	8		4-3	10.38	722
24	2	4	7-2	9	4	4-5	10.76	741
25			9-2	11		4-9	11.50	779
26			11-2	13		4-11	12.24	818
27			7-4	9		4-4	12.75	955
28	2	4	9-4	11	4	4-8	13.49	993
29			11-4	13		4-10	14.24	1032
30	2	4	11-6	14	4	4-10	16.46	1208
31	2	4	11-8	14	4	4-9	19.00	1545

*INCLUDES TWO WINGS, ONE APRON, & ONE CURB

STORM SEWER HEADWALLS
FOR CONCRETE PIPE
(SHEET FOUR)

CITY OF GLENPOOL, OKLAHOMA

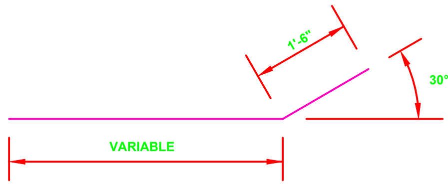
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

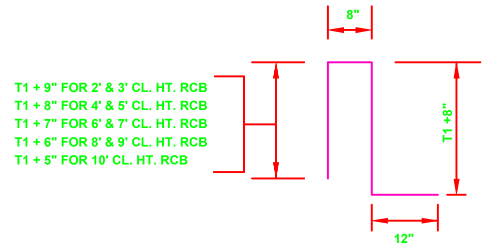
PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
ATLAS PAGE NO:

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED :
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X



BAR BENDING FOR "F" BARS



BAR BENDING FOR "S" BARS

DESIGN NO.	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	X (FT.)	Y (FT.)	WING DIMENSIONS T (IN.)	WING DIMENSIONS H (FT.-IN.)	WING DIMENSIONS M (FT.-IN.)	WING DIMENSIONS N (FT.-IN.)	WING DIMENSIONS R (FT.-IN.)	APRON "D" BARS NO.	APRON "D" BARS SIZE #	APRON "D" BARS LGTH. (FT.-IN.)	APRON "E" BARS NO.	APRON "E" BARS SIZE #	APRON "E" BARS AVG. LGTH. (FT.-IN.)
1	2	2	3.33		8	3-0	4-8	4-0		4	4	4-10	4	4	5-5
2	3		3.83							5					6-5
3	4		4.33							6					7-5
4	5		4.83							7					8-5
5	3	3	4.96		8	4-0	6-11	6-0		5	4	6-10	6	4	7-7
6	4		5.46							6					8-7
7	5		5.96							7					9-7
8	6		6.46							8					10-7
9	8		7.46							10					12-7
10	4	4	6.63		8	5-0	9-3	8-0		6	4	8-10	8	4	9-9
11	5		7.13							7					10-9
12	6		7.63							8					11-9
13	8		8.63							10					13-9
14	10		9.63							12					15-9
15	5	5	8.25		8	6-0	11-6	10-0		7	4	10-10	10	4	11-11
16	6		8.75							8					12-11
17	8		9.75							10					14-11
18	10		10.75							12					16-11
19	5	6	9.42	5.32	8	7-0	13-10	10-0	2-0	7	4	10-10	10	4	11-11
20	6		9.92	5.82						8					12-11
21	8		10.92	6.82						10					14-11
22	10		11.92	7.82						12					16-11
23	5	7	10.58	4.48	10	8-0	16-2	10-0	4-0	7	4	10-10	10	4	11-11
24	6		11.08	4.98						8					12-11
25	8		12.08	5.98						10					14-11
26	10		13.08	6.98						12					16-11
27	6	8	12.25	3.90	10	9-0	18-6	10-0	6-0	8	4	10-10	10	4	12-11
28	8		13.25	4.90						10					14-11
29	10		14.25	5.90						12					16-11
30	10	9	15.38	4.87	10	10-0	20-9	10-0	8-0	12	4	10-10	10	4	16-11
31	10	10	16.54	3.79	10	11-0	23-1	10-0	10-0	12	4	10-10	10	4	16-11

DESIGN NO.	"F1" BARS NO.	"F1" SIZE #	"F1" AVG. LGTH. (FT.-IN.)	"F2" BARS NO.	"F2" SIZE #	"F2" LGTH. (FT.-IN.)	"F3" BARS NO.	"F3" SIZE #	"F3" AVG. LGTH. (FT.-IN.)	"F4" BARS NO.	"F4" SIZE #	"F4" LGTH. (FT.-IN.)	"G1" BARS NO.	"G1" SIZE #	"G1" AVG. LGTH. (FT.-IN.)	"G2" BARS NO.	"G2" SIZE #	"G2" AVG. LGTH. (FT.-IN.)	"G3" BARS NO.	"G3" SIZE #	"G3" h (FT.-IN.)	"G3" LGTH. (FT.-IN.)	"G4" BARS NO.	"G4" SIZE #	"G4" AVG. LGTH. (FT.-IN.)	ONE CURB "CH" BARS NO.	"CH" SIZE #	"CH" LGTH. (FT.-IN.)	"S" BARS NO.	"S" SIZE #	"S" MIN. LGTH. (FT.-IN.)	TOTAL* ONE HEADWALL CONC (CU.YD.)	TOTAL* ONE HEADWALL STEEL (LBS.)
1	2	4	6-2	6	4	6-6	2	4	5-8	2	4	6-0	12	4	3-9								6	4	2-2	2	4	2-8	5	4	4-1	1.43	133
2																												3-8	6		4-1	1.59	143
3																												4-8	7		4-3	1.75	154
4																												5-8	8		4-5	1.91	165
5	4	4	7-3 1/2	6	4	8-9	2	4	5-8	2	4	8-3	18	4	4-6								10	4	2-6	2	4	3-8	6	4	4-1	2.57	218
6																												4-8	7		4-3	2.78	232
7																												5-8	8		4-5	2.99	245
8																												6-8	9		4-7	3.20	259
9																												8-8	11		4-11	3.62	287
10	6	4	8-5	6	4	11-1	4	4	7-4 1/2	2	4	10-7	24	4	5-3 1/2								12	4	3-2 1/2	2	4	4-8	7	4	4-2	4.06	336
11																												5-8	8		4-4	4.32	352
12																												6-8	9		4-6	4.58	368
13																												8-8	11		4-10	5.11	402
14																												11-0	13		5-0	5.63	435
15	8	4	9-7	6	4	13-4	6	4	9-1	2	4	12-10	30	4	6-1								16	4	3-7	2	4	5-10	8	4	4-4	5.86	480
16																												6-10	9		4-6	6.16	498
17																												8-10	11		4-10	6.79	537
18																												11-0	13		5-0	7.41	575
19	10	4	10-9	8	4	15-8	6	4	9-1	2	4	15-2	28	4	7-6	8	4	4-4 1/2					18	4	4-3	2	4	6-0	8	4	4-3	7.01	588
20																												7-0	9		4-5	7.32	607
21																												9-0	11		4-9	7.95	645
22																												11-0	13		4-11	8.56	682
23	12	4	11-11	8	4	16-0	8	4	10-10	2	4	17-6	26	4	9-3	16	4	5-5 1/2					22	4	4-7	2	4	6-2	8	4	4-3	10.38	722
24																												7-2	9		4-5	10.76	741
25																												9-2	11		4-9	11.50	779
26																												11-2	13		4-11	12.24	818
27	14	4	13-1	10	4	20-4	10	4	12-7	2	4	19-10	24	4	10-7 1/2	24	4	6-7 1/2	12	4	2-0	5-7	24	4	5-3	2	4	7-4	9	4	4-4	12.75	955
28																												9-4	11		4-8	13.49	993
29																												11-4	13		4-10	14.24	1032
30	16	4	14-2 1/2	10	4	22-7	10	4	12-7	2	4	22-1	22	4	12-0	32	4	7-9 1/2	18	4	3-0	6-10	28	4	5-7	2	4	11-6	14	4	4-10	16.46	1208
31	18	4	15-4	12	4	24-11	12	4	14-3 1/2	2	4	24-5	20	4	13-5	40	4	8-10 1/2	24	5	4-3	8-4	30	4	6-3	2	4	11-8	14	4	4-9	19.00	1545

*INCLUDES TWO WINGS, ONE APRON, & ONE CURB

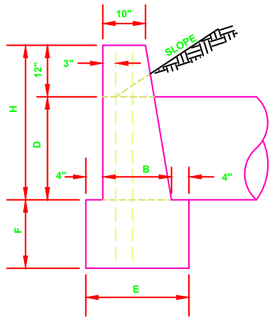
STORM SEWER HEADWALLS FOR CONCRETE PIPE (SHEET FOUR)

CITY OF GLENPOOL, OKLAHOMA

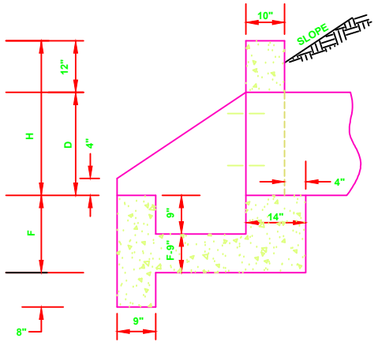
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

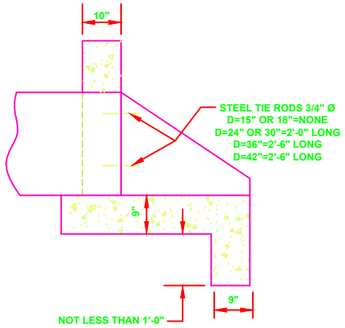
PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR
APPROVED :
CITY ENGINEERING DEPT.
DATE:
ATLAS PAGE NO:
SHEET X OF X

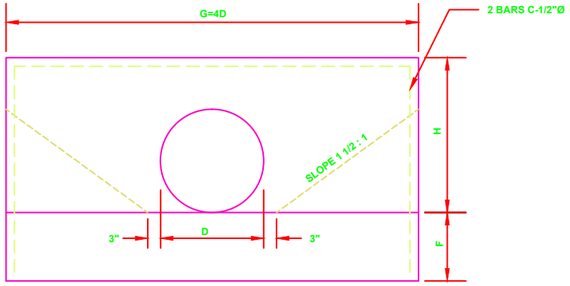


SIDE ELEVATION

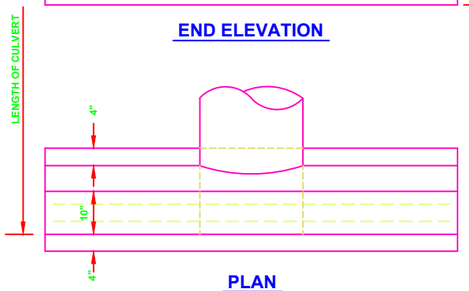


SECTION R-R



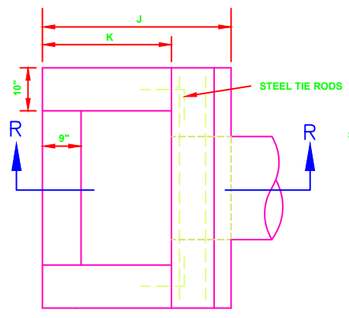


END ELEVATION

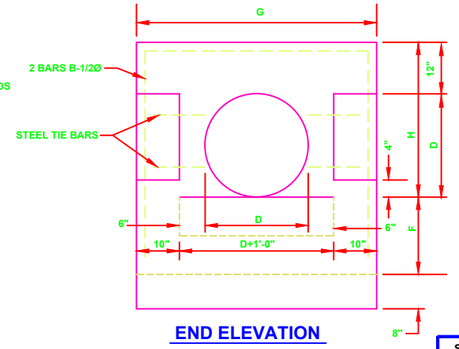


PLAN

CONCRETE ENDWALL
FOR PIPE CULVERT
WITH STRAIGHT WINGS



PLAN



END ELEVATION
DOWNSTREAM END

CONCRETE ENDWALL
FOR PIPE CULVERT
WITH U-TYPE WINGS

STORM SEWER HEADWALLS
FOR CONCRETE PIPE
(SHEET ONE)

CITY OF GLENPOOL, OKLAHOMA

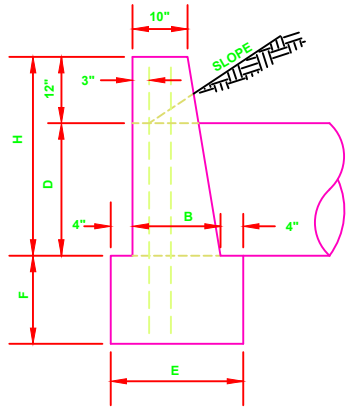
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

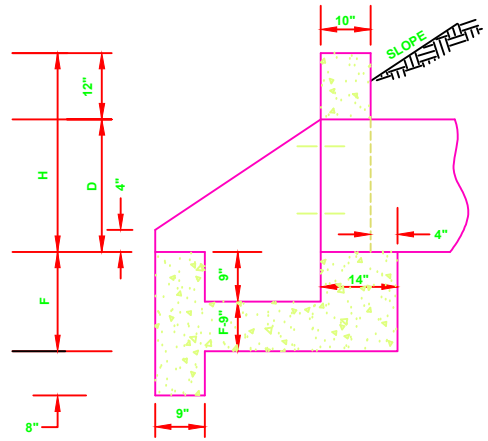
PLAN SCALE: 1"=5'
PROFILE SCALE:
HORIZONTAL: -
VERTICAL: -
ATLAS PAGE NO:

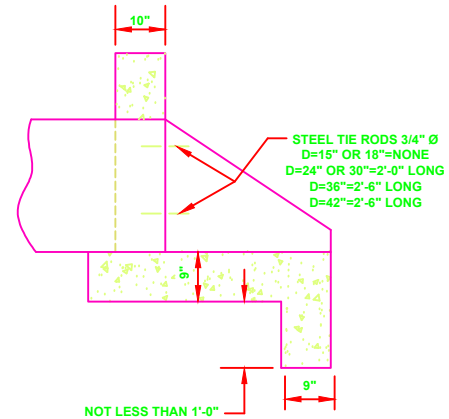
DRAWN	-	-
DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-
RECOMMENDED: DIRECTOR		
RECOMMENDED:		
ENGINEERING DIRECTOR		

APPROVED:
CITY ENGINEERING DEPT.
DATE: -
SHEET X OF X

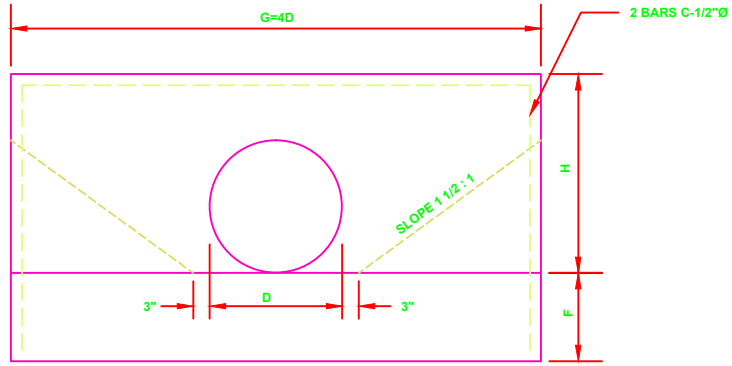


SIDE ELEVATION





SECTION R-R



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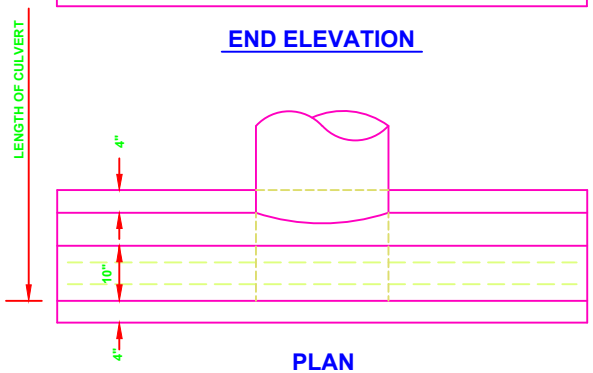
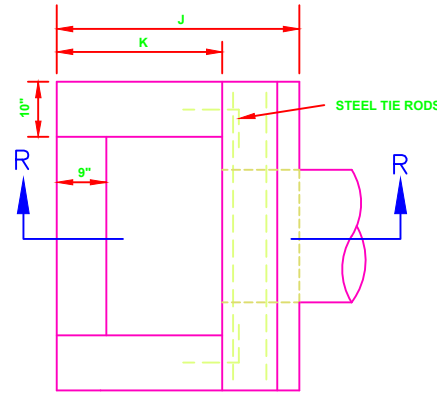
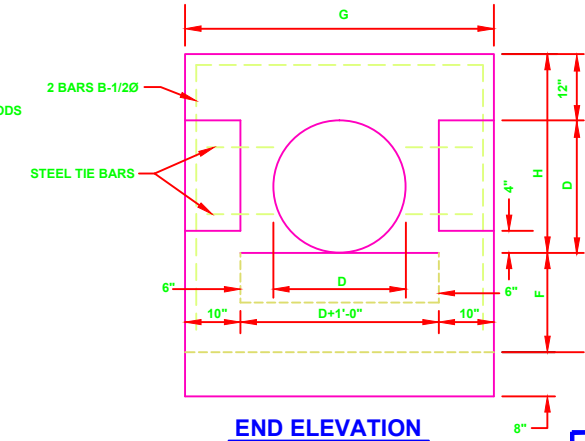


PLAN

CONCRETE ENDWALL
FOR PIPE CULVERT
WITH STRAIGHT WINGS



PLAN



END ELEVATION
DOWNSTREAM END

CONCRETE ENDWALL
FOR PIPE CULVERT
WITH U-TYPE WINGS

STORM SEWER HEADWALLS
FOR CONCRETE PIPE
(SHEET ONE)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1" = ,
PROFILE SCALE: HORIZONTAL: , VERTICAL: ,
ATLAS PAGE NO:

DRAWN , ,
DESIGNED , ,
OFFICE ENGR. , ,
CHIEF ENGR. , ,
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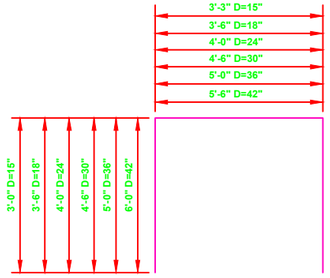
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE: ,
SHEET X OF X



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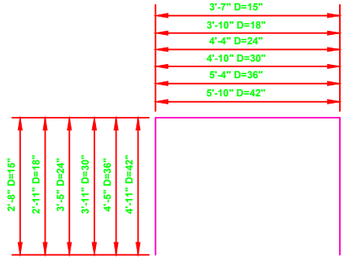
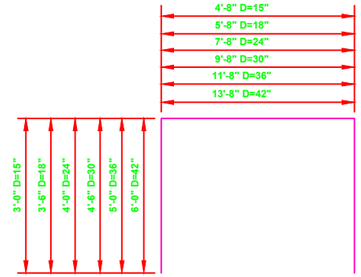
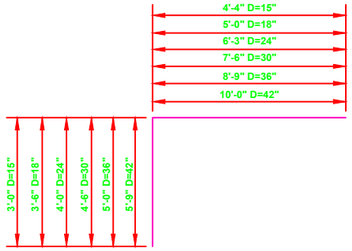


BENDING OF BARS "B"



BENDING OF BARS "C"



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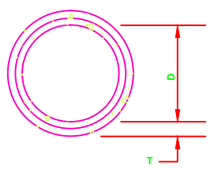
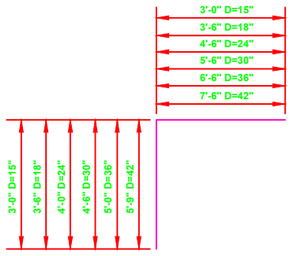


DIMENSIONS	
D	T
15"	2 1/4"
18"	2 1/2"
24"	3"
30"	3 1/2"
36"	4"
42"	4 1/2"

REINFORCED CONCRETE PIPE



BENDING OF BARS "E"

DIMENSIONS & QUANTITIES FOR STRAIGHT ENDWALL

DIMENSIONS							CONCRETE IN ONE ENDWALL				REINF. STEEL ONE ENDWALL LBS.
OPENING		WALL			FOOTING		CLASS A				
D	AREA SQ. FT.	G	H	B	E	F	WALL CU. FT.	FOOTING CU. FT.	TOTAL CU. FT.	TOTAL CU. YD.	
15"	1.2	6'-0"	2'-3"	1'-2"	1'-10"	1'-2"	9.0	10.7	19.7	.73	15
18"	1.8	6'-0"	2'-6"	1'-3"	1'-11"	1'-3"	12.3	14.4	26.7	.99	17
24"	3.1	8'-0"	3'-0"	1'-4"	2'-0"	1'-4"	20.3	21.3	41.6	1.54	21
30"	4.9	10'-0"	3'-6"	1'-5"	2'-1"	1'-5"	31.4	32.5	63.9	2.37	25
36"	7.1	12'-0"	4'-0"	1'-6"	2'-2"	1'-6"	45.7	46.7	92.4	3.42	29
42"	9.6	14'-0"	4'-6"	1'-10"	2'-6"	1'-10"	63.5	64.2	127.7	4.73	35

DIMENSIONS & QUANTITIES FOR ENDWALL WITH U-TYPE WINGS

DIMENSIONS							QUANITIES IN ONE ENDWALL				REINF. STEEL LBS.	ADDITIONAL MATERIAL REQUIRED FOR CATCH BASIN
OPENING		WALL			FOOTING		CLASS A CONCRETE					
D	AREA SQ. FT.	G	H	K	F	J	WALL CU. FT.	FOOTING CU. FT.	TOTAL CU. FT.	TOTAL CU. YD.		
15"	1.2	3'-11"	2'-3"	1'-6"	1'-3"	2'-8"	7.6	10.8	18.4	.68	12	NONE
18"	1.8	4'-2"	2'-6"	1'-9"	1'-3"	2'-11"	8.5	12.3	21.2	.78	13	NONE
24"	3.1	4'-8"	3'-0"	2'-6"	1'-4"	3'-8"	12.4	16.3	28.7	1.06	27	.29 CU. YD.
30"	4.9	5'-2"	3'-6"	3'-3"	1'-5"	4'-5"	16.5	21.0	37.5	1.39	29	.34 CU. YD.
36"	7.1	5'-8"	4'-0"	4'-0"	1'-9"	5'-2"	21.2	26.2	47.4	1.76	34	.67 CU. YD.
42"	9.6	6'-2"	4'-4"	4'-9"	1'-9"	5'-11"	26.5	32.0	58.5	2.17	36	.79 CU. YD.

DIMENSIONS & QUANTITIES FOR ENDWALL WITH 45° WINGS

DIMENSIONS							QUANITIES IN ONE ENDWALL				REINF. STEEL LBS.	ADDITIONAL MATERIAL REQUIRED FOR APRON
OPENING		WALL				FOOTING	CLASS A CONCRETE					
D	AREA SQ. FT.	H	G	L	M	F	WALL CU. FT.	FOOTING CU. FT.	TOTAL CU. FT.	TOTAL CU. YD.		
15"	1.2	2'-3"	3'-7"	1'-0"	1'-1"	1'-2"	6.3	7.7	14.0	.52	13	.02 CU. YD.
18"	1.8	2'-6"	3'-10"	1'-2"	1'-7"	1'-3"	8.3	10.6	18.9	.70	14	.07 CU. YD.
24"	3.1	3'-0"	4'-4"	1'-5"	2'-1"	1'-4"	11.7	14.3	26.0	.96	28	.16 CU. YD.
30"	4.9	3'-6"	4'-10"	1'-9"	2'-5"	1'-6"	15.2	18.7	33.9	1.25	30	.27 CU. YD.
36"	7.1	4'-0"	5'-4"	2'-0"	2'-11"	1'-8"	19.7	24.6	44.3	1.64	38	.47 CU. YD.
42"	9.6	4'-6"	5'-10"	2'-3"	3'-6"	1'-10"	25.3	31.6	56.9	2.11	45	.77 CU. YD.

DIMENSIONS & QUANTITIES FOR SIDE DRAIN & FARM ENDWALLS

DIMENSIONS					CONCRETE IN ONE ENDWALL				REINF. STEEL ONE ENDWALL LBS.
OPENING		WALL			FOOTING		CLASS A				
D	AREA SQ. FT.	G	H	B	E	F	WALL CU. FT.	FOOTING CU. FT.	TOTAL CU. FT.	TOTAL CU. YD.	
15"	1.29	2'-6"	2'-3"	1'-2"	1'-10"	1'-2"	14.4	16.2	30.6	1.13	18
18"	1.80	3'-0"	2'-6"	1'-3"	1'-11"	1'-3"	19.1	21.0	40.1	1.49	21
24"	3.10	4'-0"	3'-0"	1'-4"	2'-0"	1'-4"	27.6	29.5	59.1	2.19	25
30"	4.80	5'-0"	3'-6"	1'-5"	2'-1"	1'-5"	42.7	39.8	82.3	3.05	30
36"	7.07	6'-0"	4'-0"	1'-6"	2'-2"	1'-6"	59.1	51.3	110.4	4.09	34
42"	9.62	7'-0"	4'-6"	1'-7"	2'-3"	1'-7"	78.2	64.4	142.6	5.28	39

STORM SEWER HEADWALLS FOR CONCRETE PIPE (SHEET THREE)

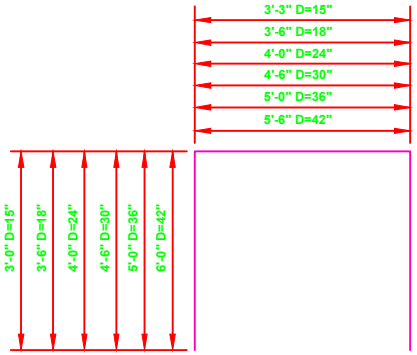
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1" = ft.
PROFILE SCALE: HORIZONTAL: " VERTICAL:
ATLAS PAGE NO.

DRAWN . . APPROVED :
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED: CITY ENGINEERING DEPT.
ENGINEERING DIRECTOR
DATE : .
SHEET X OF X



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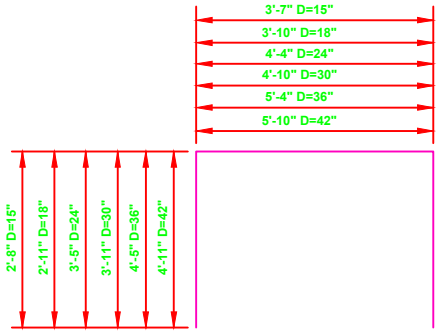

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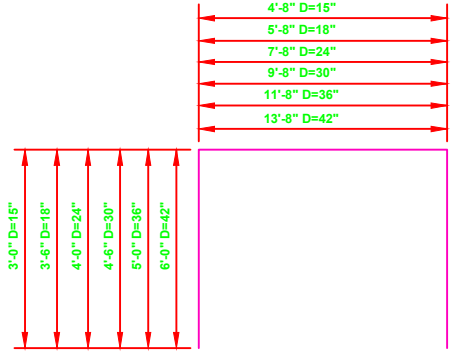
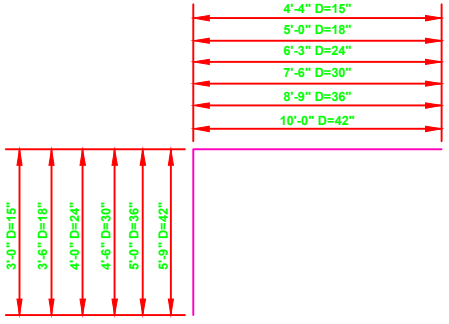


BENDING OF BARS "C"



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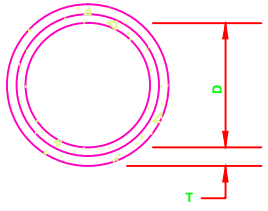
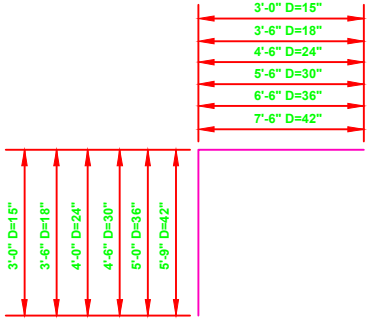


DIMENSIONS	
D	T
15"	2 1/4"
18"	2 1/2"
24"	3"
30"	3 1/2"
36"	4"
42"	4 1/2"

REINFORCED CONCRETE PIPE



BENDING OF BARS "E"

DIMENSIONS & QUANTITIES FOR STRAIGHT ENDWALL

DIMENSIONS							CONCRETE IN ONE ENDWALL				REINF. STEEL ONE ENDWALL LBS.
OPENING		WALL			FOOTING		CLASS A				
D	AREA SQ. FT.	G	H	B	E	F	WALL CU. FT.	FOOTING CU. FT.	TOTAL CU. FT.	TOTAL CU. YD.	
15"	1.2	5'-0"	2'-3"	1'-2"	1'-10"	1'-2"	9.0	10.7	19.7	.73	15
18"	1.8	5'-0"	2'-6"	1'-3"	1'-11"	1'-3"	12.3	14.4	26.7	.99	17
24"	3.1	5'-0"	3'-0"	1'-4"	2'-0"	1'-4"	20.3	21.3	41.6	1.54	21
30"	4.9	10'-0"	3'-6"	1'-5"	2'-2"	1'-5"	31.4	32.5	63.9	2.37	25
36"	7.1	12'-0"	4'-0"	1'-8"	2'-4"	1'-8"	45.7	46.7	92.4	3.42	29
42"	9.6	14'-0"	4'-6"	1'-10"	2'-6"	1'-10"	63.5	64.2	127.7	4.73	35

DIMENSIONS & QUANTITIES FOR ENDWALL WITH U-TYPE WINGS

DIMENSIONS							QUANITIES IN ONE ENDWALL					ADDITIONAL MATERIAL REQUIRED FOR CATCH BASIN
OPENING		WALL			FOOTING		CLASS A CONCRETE				REINF. STEEL LBS.	
D	AREA SQ. FT.	G	H	K	F	J	WALL CU. FT.	FOOTING CU. FT.	TOTAL CU. FT.	TOTAL CU. YD.		
15"	1.2	3'-11"	2'-3"	1'-6"	1'-3"	2'-8"	7.6	10.8	18.4	.68	12	NONE
18"	1.8	4'-2"	2'-6"	1'-9"	1'-3"	2'-11"	8.5	12.3	21.2	.78	13	NONE
24"	3.1	4'-8"	3'-0"	2'-6"	1'-6"	3'-8"	12.4	16.3	28.7	1.06	27	.29 CU. YD.
30"	4.9	5'-2"	3'-6"	3'-3"	1'-6"	4'-5"	16.5	21.0	37.5	1.39	29	.34 CU. YD.
36"	7.1	5'-8"	4'-0"	4'-0"	1'-9"	5'-2"	21.2	26.2	47.4	1.76	34	.67 CU. YD.
42"	9.6	6'-2"	4'-6"	4'-9"	1'-9"	5'-11"	26.5	32.0	58.5	2.17	36	.79 CU. YD.

DIMENSIONS & QUANTITIES FOR ENDWALL WITH 45° WINGS

DIMENSIONS							QUANITIES IN ONE ENDWALL					ADDITIONAL MATERIAL REQUIRED FOR APRON
OPENING		WALL				FOOTING	CLASS A CONCRETE				REINF. STEEL LBS.	
D	AREA SQ. FT.	H	G	L	M	F	WALL CU. FT.	FOOTING CU. FT.	TOTAL CU. FT.	TOTAL CU. YD.		
15"	1.2	2'-3"	3'-7"	1'-0"	1'-1"	1'-2"	6.3	7.7	14.0	.52	13	.02 CU. YD.
18"	1.8	2'-6"	3'-10"	1'-2"	1'-7"	1'-3"	8.3	10.6	18.9	.70	14	.07 CU. YD.
24"	3.1	3'-0"	4'-4"	1'-5"	2'-1"	1'-4"	11.7	14.3	26.0	.96	28	.16 CU. YD.
30"	4.9	3'-6"	4'-10"	1'-9"	2'-5"	1'-6"	15.2	18.7	33.9	1.25	30	.27 CU. YD.
36"	7.1	4'-0"	5'-4"	2'-0"	2'-11"	1'-8"	19.7	24.6	44.3	1.64	38	.47 CU. YD.
42"	9.6	4'-6"	5'-10"	2'-3"	3'-6"	1'-10"	25.3	31.6	56.9	2.11	45	.77 CU. YD.

DIMENSIONS & QUANTITIES FOR SIDE DRAIN & FARM ENDWALLS

DIMENSIONS							CONCRETE IN ONE ENDWALL				REINF. STEEL ONE ENDWALL LBS.
OPENING		WALL			FOOTING		CLASS A				
D	AREA SQ. FT.	G	H	B	E	F	WALL CU. FT.	FOOTING CU. FT.	TOTAL CU. FT.	TOTAL CU. YD.	
15"	1.29	2'-6"	2'-3"	1'-3"	1'-10"	1'-3"	14.4	16.2	30.6	1.13	18
18"	1.80	3'-0"	2'-6"	1'-3"	1'-11"	1'-3"	19.1	21.0	40.1	1.49	21
24"	3.10	4'-0"	3'-0"	1'-4"	2'-0"	1'-4"	29.6	29.5	59.1	2.19	25
30"	4.90	5'-0"	3'-6"	1'-5"	2'-1"	1'-5"	42.7	39.6	82.3	3.05	30
36"	7.07	6'-0"	4'-0"	1'-6"	2'-2"	1'-6"	59.1	51.3	110.4	4.09	34
42"	9.62	7'-0"	4'-6"	1'-7"	2'-3"	1'-7"	78.2	64.4	142.6	5.28	39

STORM SEWER HEADWALLS FOR CONCRETE PIPE (SHEET THREE)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

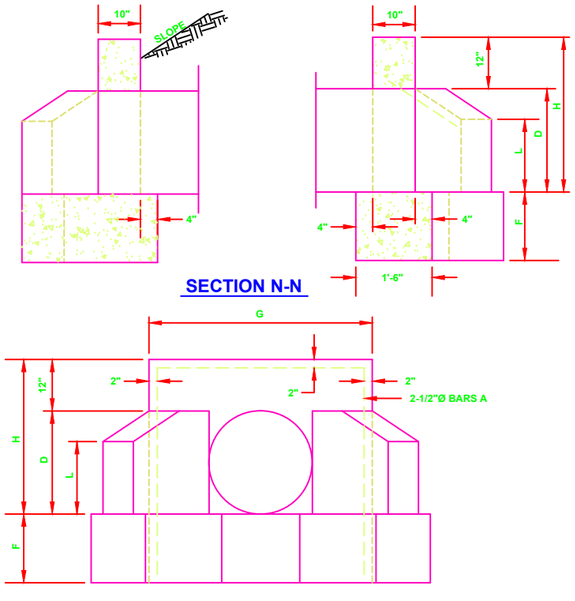
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE:

ATLAS PAGE NO:

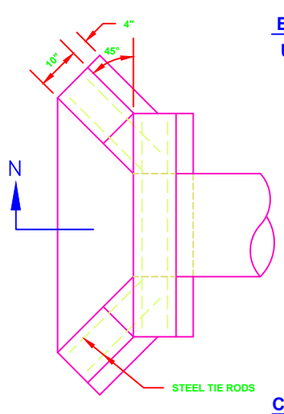
SHEET X OF X

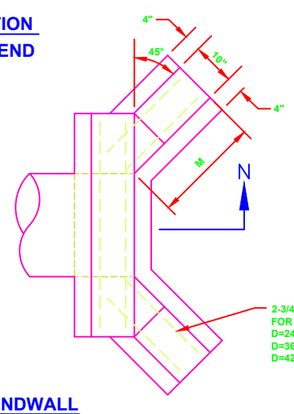


SECTION N-N

END ELEVATION

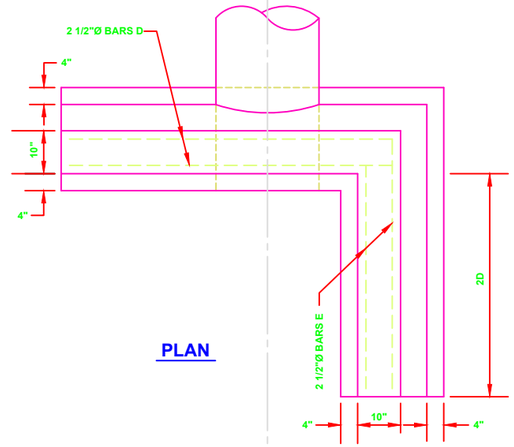
UPSTREAM END



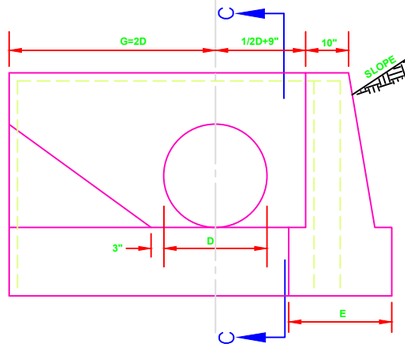


PLAN

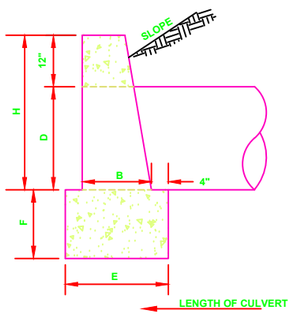
CONCRETE ENDWALL
FOR PIPE CULVERT
WITH 45° WINGS



PLAN



END ELEVATION



SECTION C-C

CONCRETE ENDWALL
FOR PIPE CULVERT
USED AS SIDE DRAINS
& FARM ENTRANCES

STORM SEWER HEADWALLS
FOR CONCRETE PIPE
(SHEET TWO)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE:

HORIZONTAL:

VERTICAL:

ATLAS PAGE NO:

DRAWN	-	-
DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-

RECOMMENDED: DIRECTOR

RECOMMENDED:

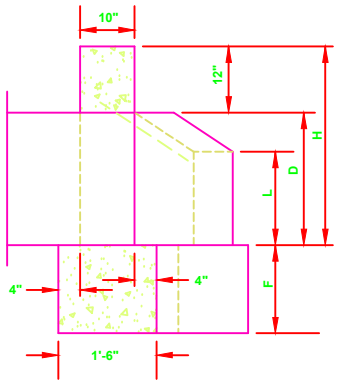
ENGINEERING DIRECTOR

APPROVED

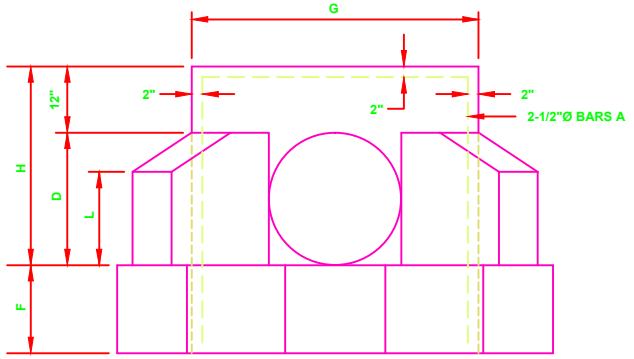
CITY ENGINEERING DEPT.

DATE: -

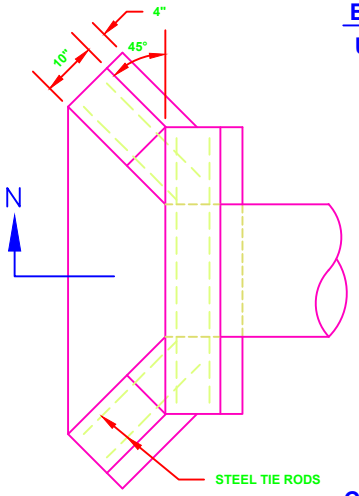
SHEET X OF X

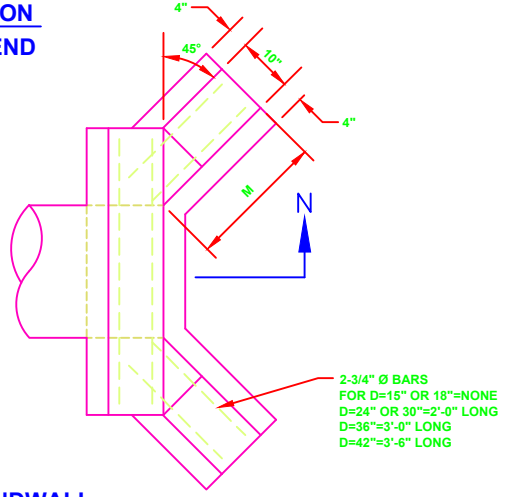


SECTION N-N



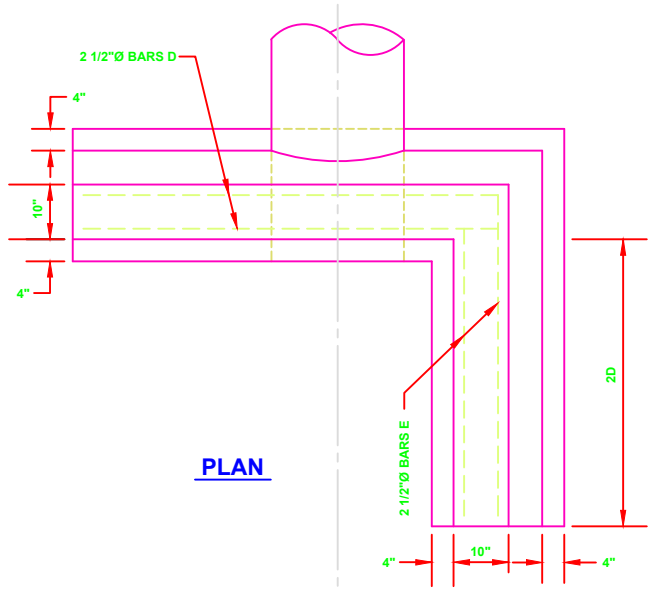
END ELEVATION
UPSTREAM END



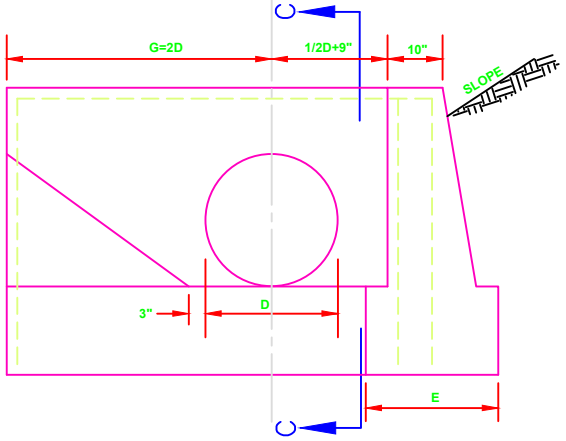


PLAN

CONCRETE ENDWALL
FOR PIPE CULVERT
WITH 45° WINGS



PLAN



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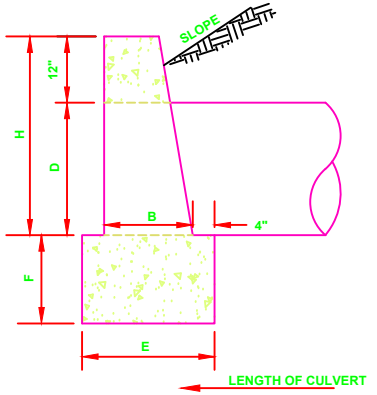

SECTION C-C

CONCRETE ENDWALL
FOR PIPE CULVERT
USED AS SIDE DRAINS
& FARM ENTRANCES

STORM SEWER HEADWALLS
FOR CONCRETE PIPE
(SHEET TWO)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
ATLAS PAGE NO:

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DESIGNED		
OFFICE ENGR.		
CHIEF ENGR.		

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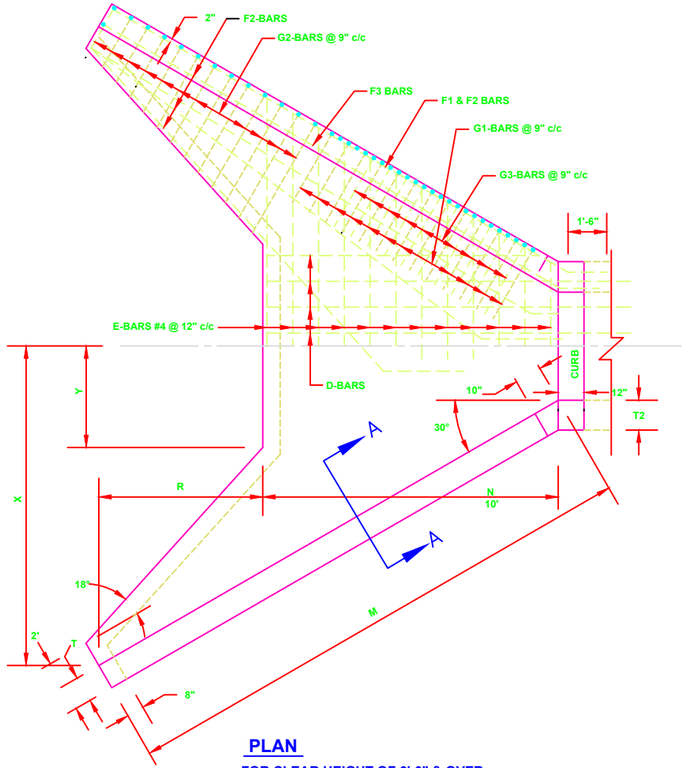
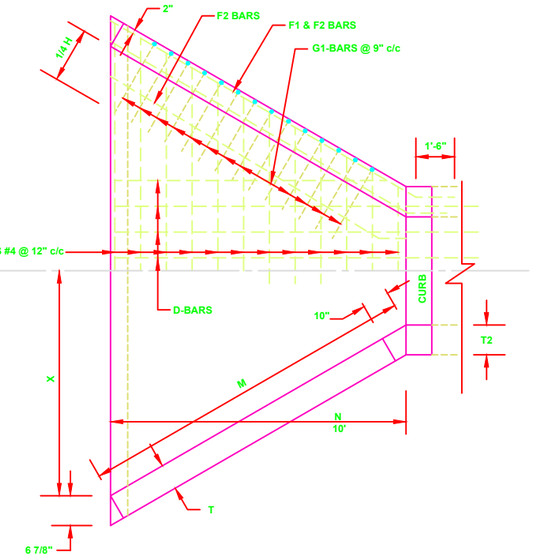
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE:
SHEET X OF X



PLAN

FOR CLEAR HEIGHT OF 6'-0" & OVER



PLAN

FOR CLEAR HEIGHT OF 5'-0" & UNDER

STORM SEWER HEADWALLS FOR RCB'S (SHEET ONE)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=n
PROFILE SCALE:
HORIZONTAL:
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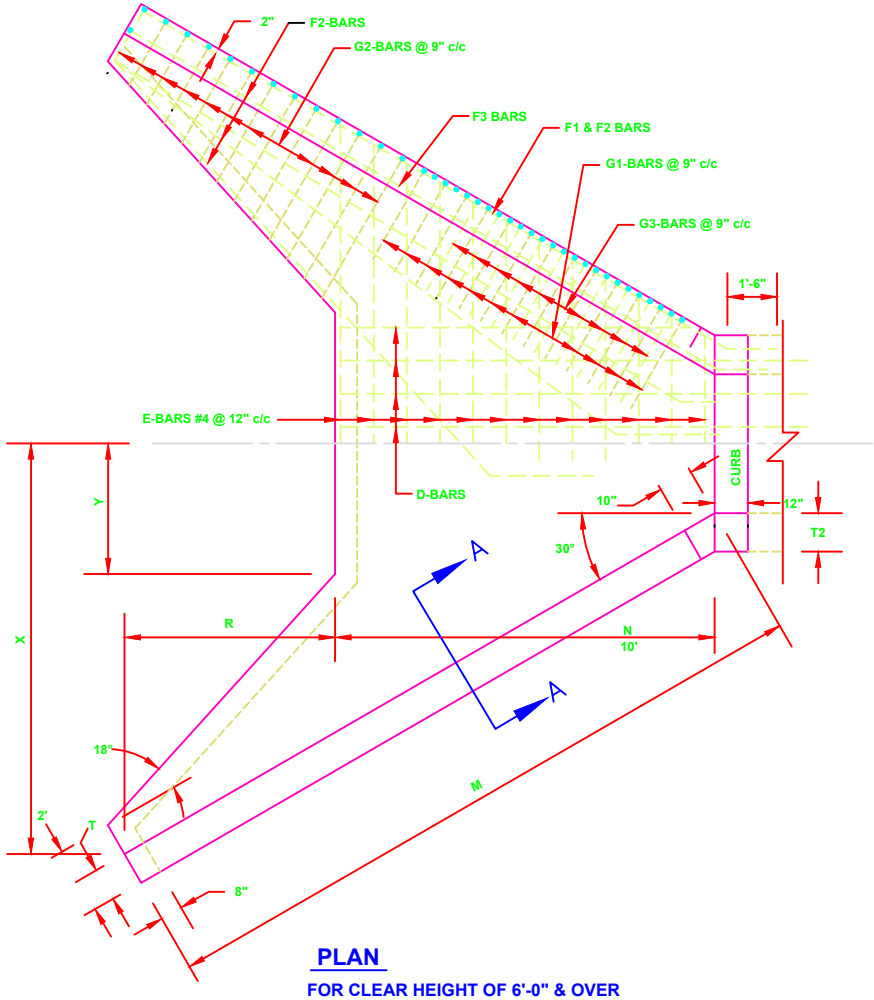
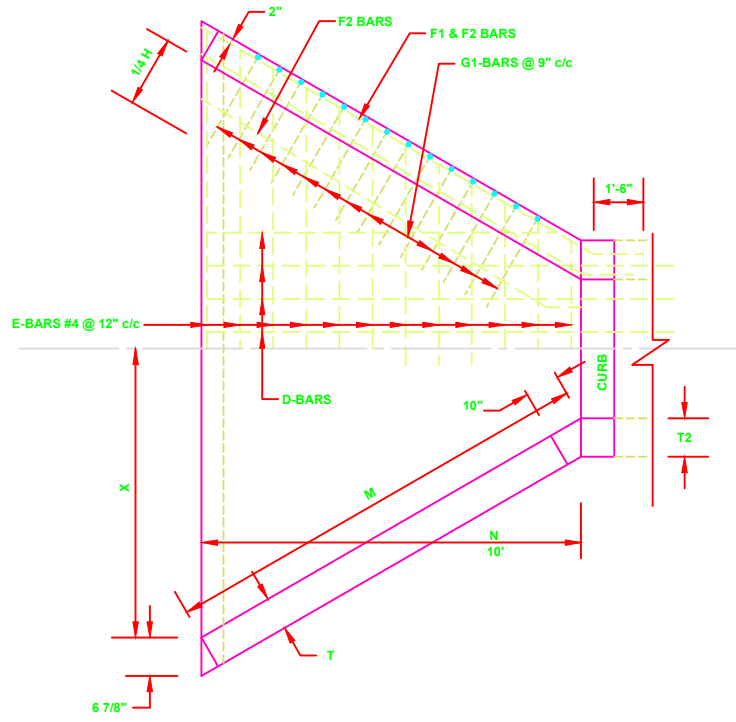
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X



PLAN

FOR CLEAR HEIGHT OF 6'-0" & OVER



PLAN

FOR CLEAR HEIGHT OF 5'-0" & UNDER

STORM SEWER HEADWALLS FOR RCB'S (SHEET ONE)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE: HORIZONTAL: " VERTICAL: "

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DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-

RECOMMENDED: DIRECTOR

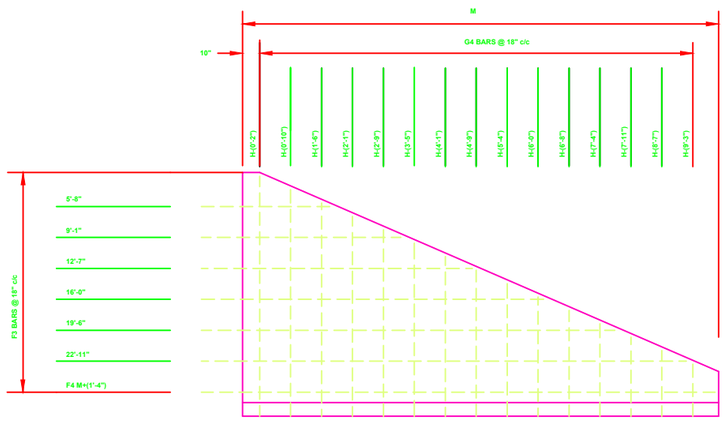
RECOMMENDED: ENGINEERING DIRECTOR

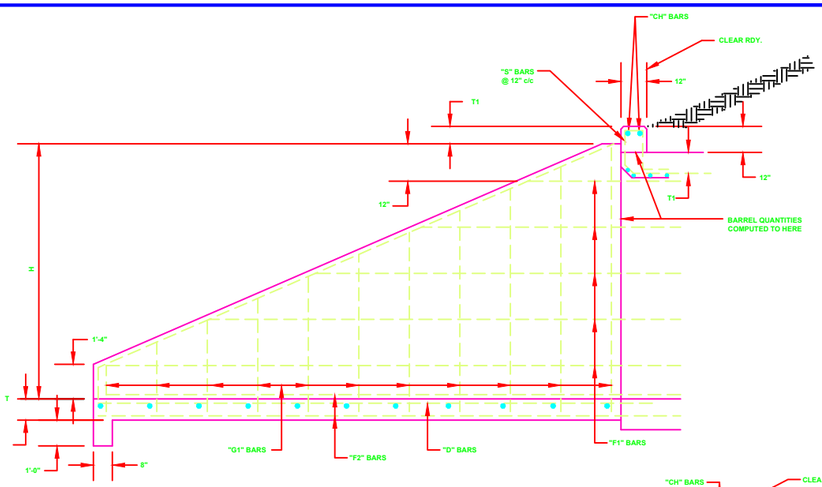
APPROVED: CITY ENGINEERING DEPT.

DATE: -

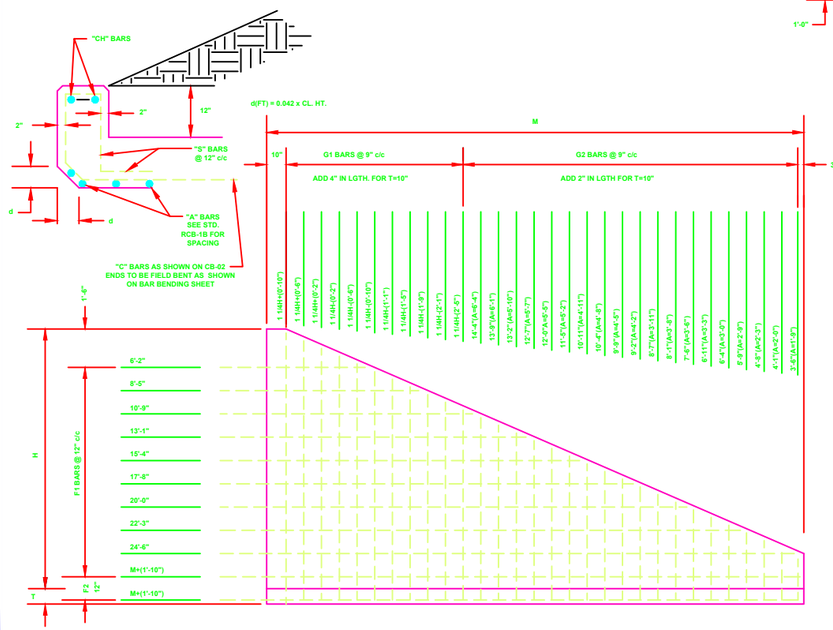
SHEET X OF X

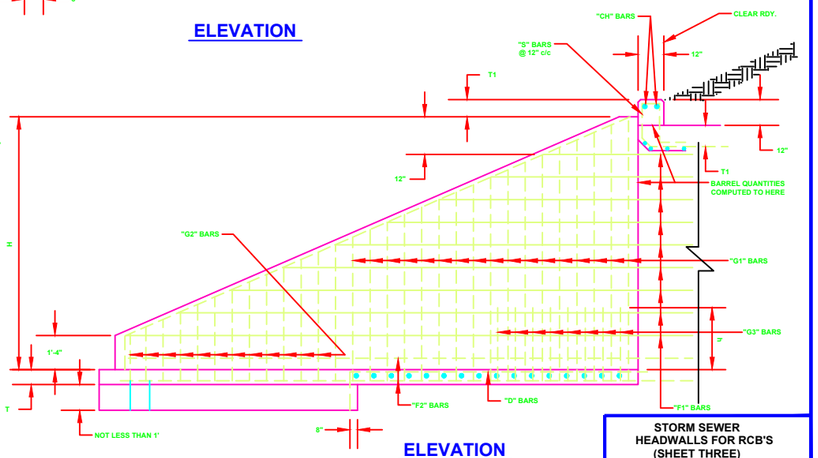
ATLAS PAGE NO:





ELEVATION





ELEVATION

STORM SEWER HEADWALLS FOR RCB'S (SHEET THREE)

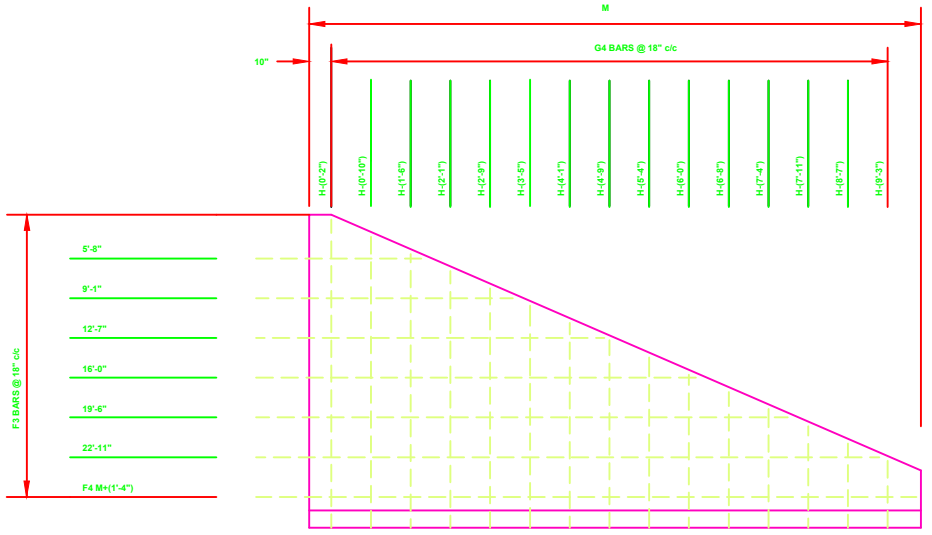
CITY OF GLENPOOL, OKLAHOMA

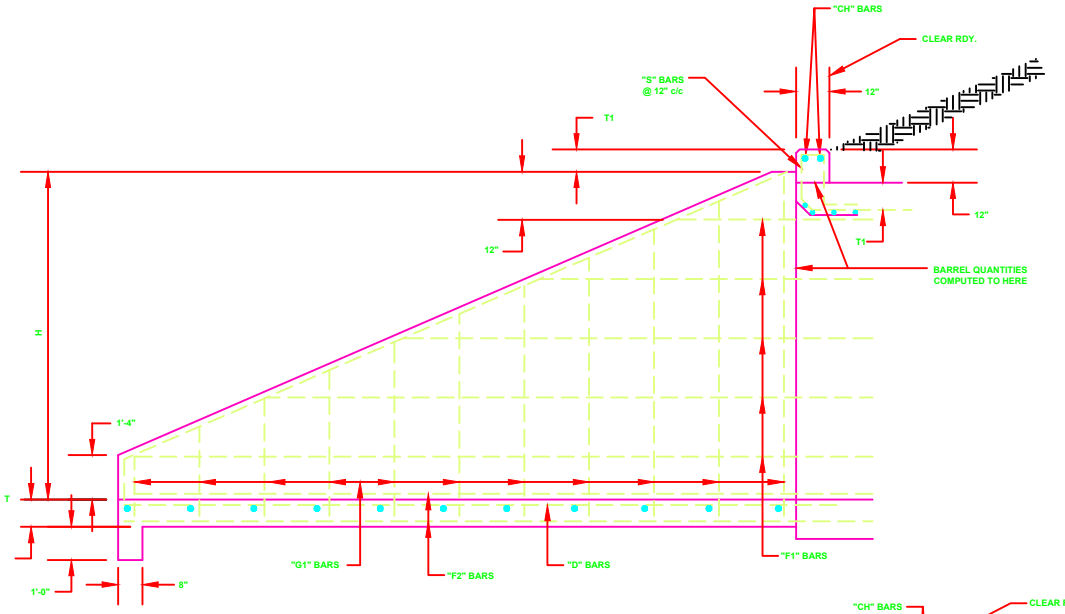
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

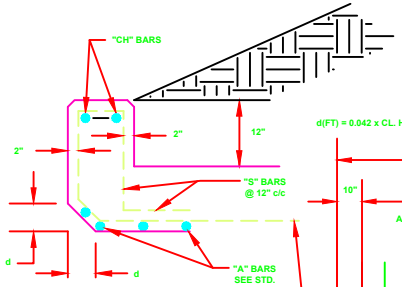
PLAN SCALE: 1" = 8'
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
ATLAS PAGE NO.

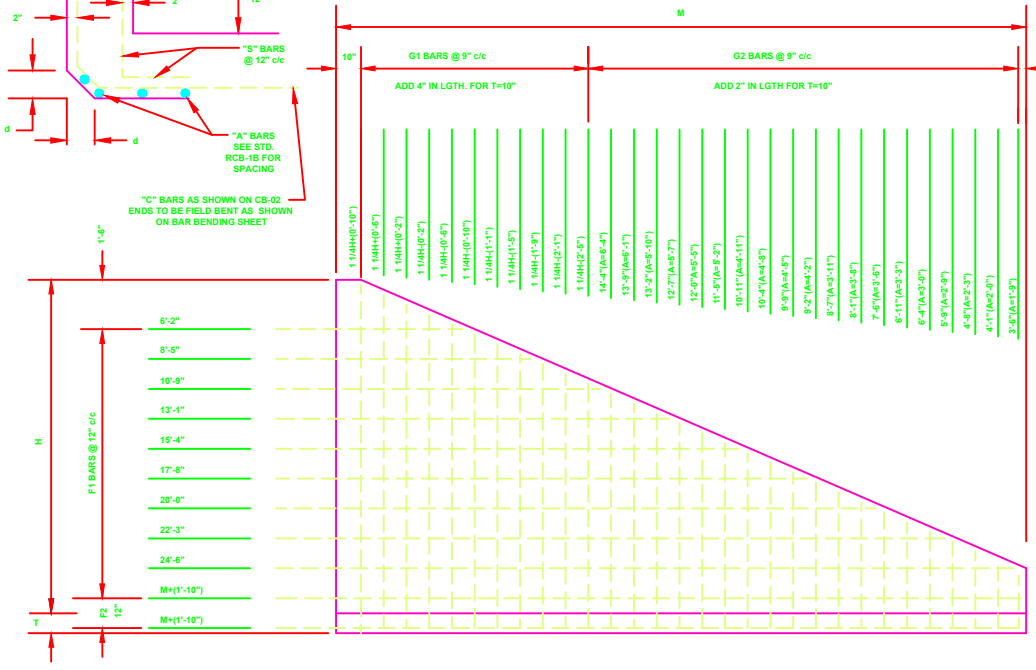
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR
APPROVED:
CITY ENGINEERING DEPT.
DATE:
SHEET X OF X

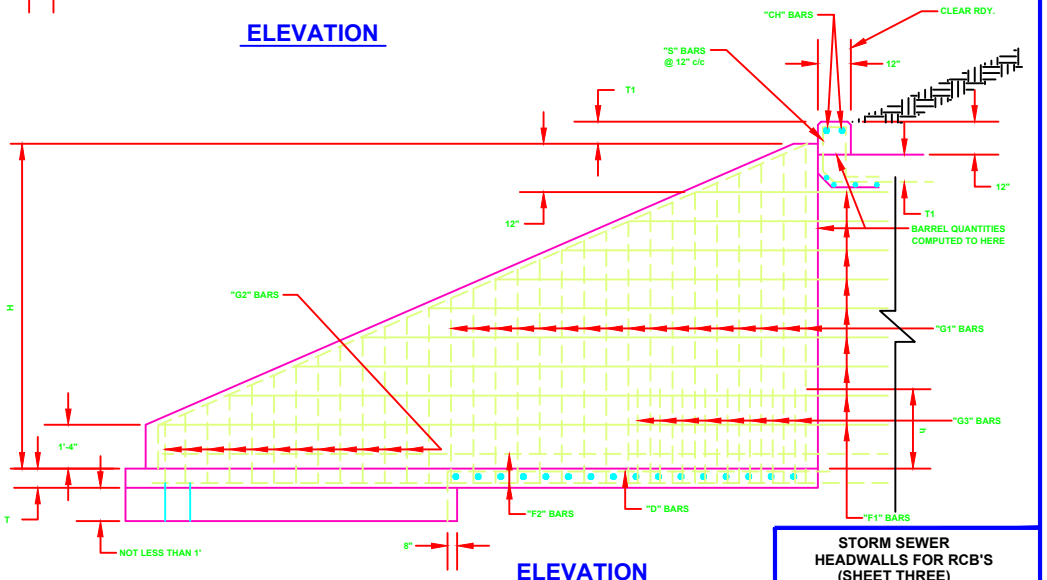




ELEVATION







ELEVATION

STORM SEWER HEADWALLS FOR RCB'S (SHEET THREE)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE:
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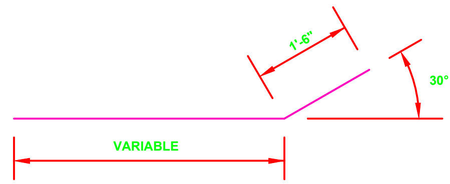
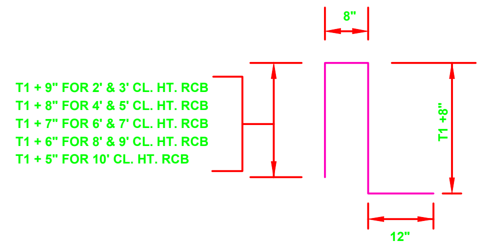
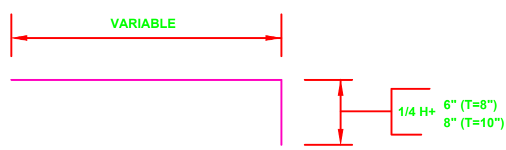
SHEET X OF X



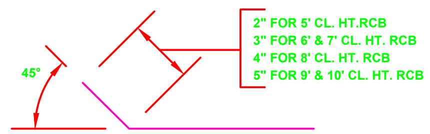
BAR BENDING FOR "F" BARS



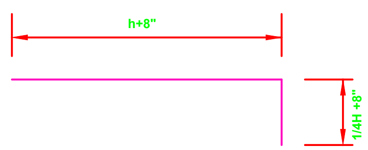
BAR BENDING FOR "S" BARS



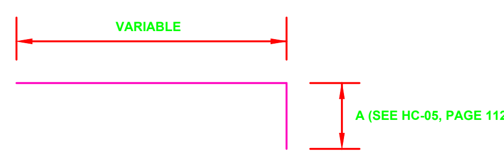
BAR BENDING FOR "GI" BARS



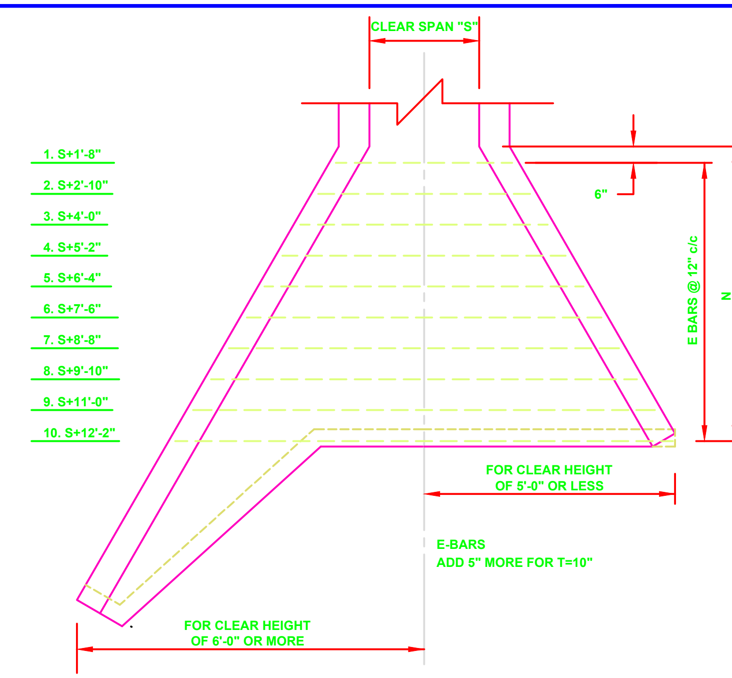
BAR BENDING FOR "C" BARS



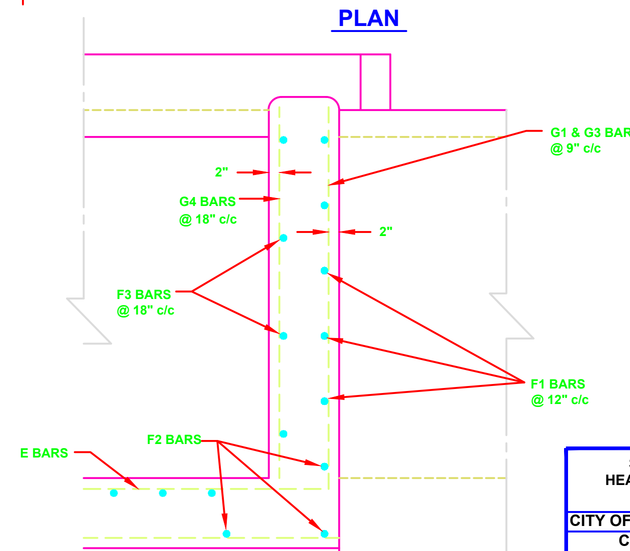
BAR BENDING FOR "G3" BARS



BAR BENDING FOR "G2" BARS



PLAN



SECTION A-A

DESIGN NO.	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	X (FT.)	Y (FT.)	WING DIMENSIONS: T (IN.)	H (FT.-IN.)	M (FT.-IN.)	N (FT.-IN.)	R (FT.-IN.)	APRON "D" BARS: NO.	SIZE #	LGTH. (FT.-IN.)	APRON "E" BARS: NO.	SIZE #	AVG. LGTH. (FT.-IN.)
1	2	2	3.33		8	3-0	4-8	4-0		4	4	4-10	4	4	5-5
2	3		3.83							5					6-5
3	4		4.33							6					7-5
4	5		4.83							7					8-5
5	3	3	4.96		8	4-0	6-11	6-0		5	4	6-10	6	4	7-7
6	4		5.46							6					8-7
7	5		5.96							7					9-7
8	6		6.46							8					10-7
9	8		7.46							10					12-7
10	4	4	6.63		8	5-0	9-3	8-0		6	4	8-10	8	4	9-9
11	5		7.13							7					10-9
12	6		7.63							8					11-9
13	8		8.63							10					13-9
14	10		9.63							12					15-9
15	5	5	8.25		8	6-0	11-6	10-0		7	4	10-10	10	4	11-11
16	6		8.75							8					12-11
17	8		9.75							10					14-11
18	10		10.75							12					16-11
19	5	6	9.42	5.32	8	7-0	13-10	10-0	2-0	7	4	10-10	10	4	11-11
20	6		9.92	5.82						8					12-11
21	8		10.92	6.82						10					14-11
22	10		11.92	7.82						12					16-11
23	5	7	10.58	4.48	10	8-0	16-2	10-0	4-0	7	4	10-10	10	4	11-11
24	6		11.08	4.98						8					12-11
25	8		12.08	5.98						10					14-11
26	10		13.08	6.98						12					16-11
27	6	8	12.25	3.90	10	9-0	18-6	10-0	6-0	8	4	10-10	10	4	12-11
28	8		13.25	4.90						10					14-11
29	10		14.25	5.90						12					16-11
30	10	9	15.38	4.87	10	10-0	20-9	10-0	8-0	12	4	10-10	10	4	16-11
31	10	10	16.54	3.79	10	11-0	23-1	10-0	10-0	12	4	10-10	10	4	16-11

DESIGN NO.	"F1" BARS: NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"F2" BARS: NO.	SIZE #	LGTH. (FT.-IN.)	"F3" BARS: NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"F4" BARS: NO.	SIZE #	LGTH. (FT.-IN.)	"G1" BARS: NO.	SIZE #	AVG. LGTH. (FT.-IN.)
1–4	2	4	6-2	6	4	6-6	2	4	5-8	2	4	6-0	12	4	3-9
5–9	4	4	7-3 1/2	6	4	8-9	2	4	5-8	2	4	8-3	18	4	4-6
10–14	6	4	8-5	6	4	11-1	4	4	7-4 1/2	2	4	10-7	24	4	5-3 1/2
15–18	8	4	9-7	6	4	13-4	6	4	9-1	2	4	12-10	30	4	6-1
19–22	10	4	10-9	8	4	15-8	6	4	9-1	2	4	15-2	28	4	7-6
23–26	12	4	11-11	8	4	16-0	8	4	10-10	2	4	17-6	26	4	9-3
27–29	14	4	13-1	10	4	20-4	10	4	12-7	2	4	19-10	24	4	10-7 1/2
30	16	4	14-2 1/2	10	4	22-7	10	4	12-7	2	4	22-1	22	4	12-0
31	18	4	15-4	12	4	24-11	12	4	14-3 1/2	2	4	24-5	20	4	13-5

DESIGN NO.	"G2" BARS: NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"G3" BARS: NO.	SIZE #	h (FT.-IN.)	LGTH. (FT.-IN.)	"G4" BARS: NO.	SIZE #	AVG. LGTH. (FT.-IN.)	ONE CURB "CH" BARS: NO.	SIZE #	LGTH. (FT.-IN.)	"S" BARS: NO.	SIZE #	MIN. LGTH. (FT.-IN.)	TOTAL* ONE HEADWALL: CONC (CU.YD.)	STEEL (LBS.)
1								6	4	2-2	2	4	2-8	5	4	4-1	1.43	133
2													3-8	6		4-1	1.59	143
3													4-8	7		4-3	1.75	154
4													5-8	8		4-5	1.91	165
5								10	4	2-6	2	4	3-8	6	4	4-1	2.57	218
6													4-8	7		4-3	2.78	232
7													5-8	8		4-5	2.99	245
8													6-8	9		4-7	3.20	259
9													8-8	11		4-11	3.62	287
10								12	4	3-2 1/2	2	4	4-8	7	4	4-2	4.06	336
11													5-8	8		4-4	4.32	352
12													6-8	9		4-6	4.58	368
13													8-8	11		4-10	5.11	402
14													11-0	13		5-0	5.63	435
15								16	4	3-7	2	4	5-10	8	4	4-4	5.86	480
16													6-10	9		4-6	6.16	498
17													8-10	11		4-10	6.79	537
18													11-0	13		5-0	7.41	575
19	8	4	4-4 1/2					18	4	4-3	2	4	6-0	8	4	4-3	7.01	588
20													7-0	9		4-5	7.32	607
21													9-0	11		4-9	7.95	645
22													11-0	13		4-11	8.56	682
23	16	4	5-5 1/2					22	4	4-7	2	4	6-2	8	4	4-3	10.38	722
24													7-2	9		4-5	10.76	741
25													9-2	11		4-9	11.50	779
26													11-2	13		4-11	12.24	818
27	24	4	6-7 1/2	12	4	2-0	5-7	24	4	5-3	2	4	7-4	9	4	4-4	12.75	955
28													9-4	11		4-8	13.49	993
29													11-4	13		4-10	14.24	1032
30	32	4	7-9 1/2	18	4	3-0	6-10	28	4	5-7	2	4	11-6	14	4	4-10	16.46	1208
31	40	4	8-10 1/2	24	5	4-3	8-4	30	4	6-3	2	4	11-8	14	4	4-9	19.00	1545

*INCLUDES TWO WINGS, ONE APRON, & ONE CURB

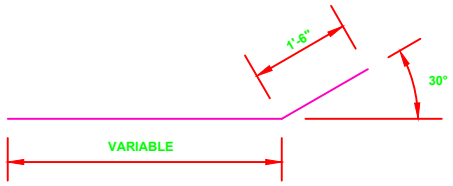
REVISION	BY	DATE

STORM SEWER
HEADWALLS FOR RCB'S
(SHEET TWO)

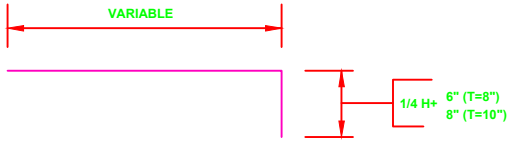
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

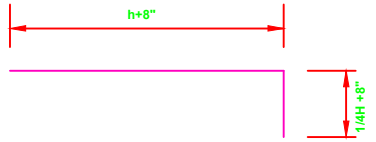
PLAN SCALE: 1"=
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
APPROVED :
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR
CITY ENGINEERING DEPT.
DATE:
ATLAS PAGE NO:
SHEET X OF X



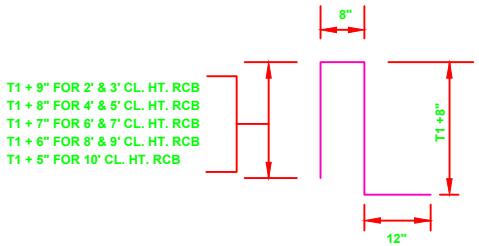
BAR BENDING FOR "F" BARS



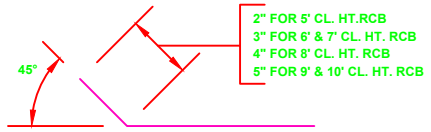
BAR BENDING FOR "GI" BARS



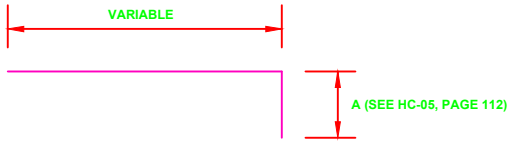
BAR BENDING FOR "G3" BARS



BAR BENDING FOR "S" BARS

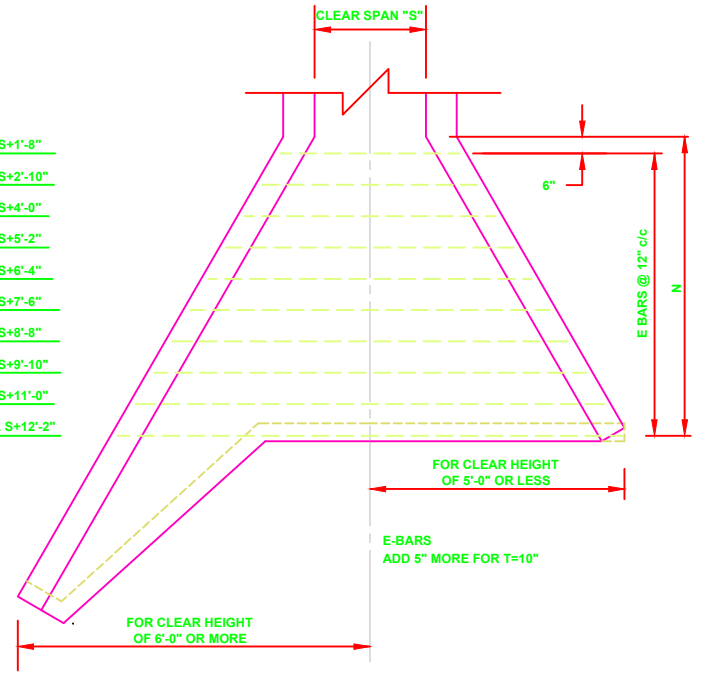


BAR BENDING FOR "C" BARS

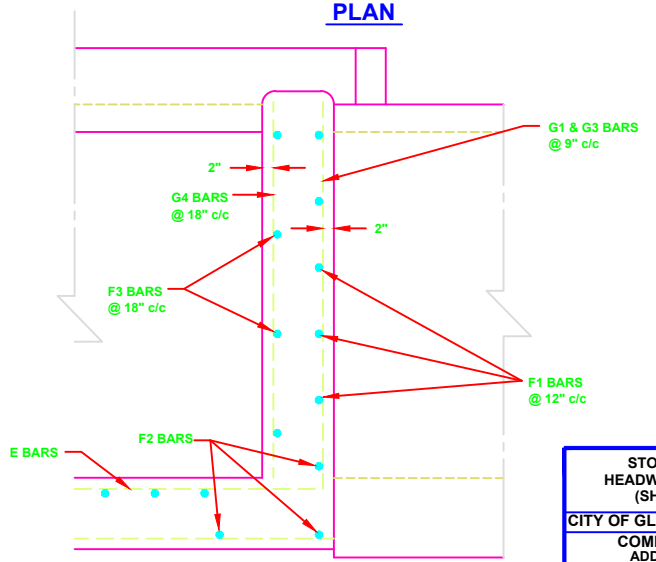


BAR BENDING FOR "G2" BARS

1. S+1'-8"
2. S+2'-10"
3. S+4'-0"
4. S+5'-2"
5. S+6'-4"
6. S+7'-6"
7. S+8'-8"
8. S+9'-10"
9. S+11'-0"
10. S+12'-2"



PLAN



SECTION A-A

DESIGN NO.	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	X (FT.)	Y (FT.)	WING DIMENSIONS T (IN.)	H (FT.-IN.)	M (FT.-IN.)	N (FT.-IN.)	R (FT.-IN.)	REINFORCING BARS APRON "D" BARS NO.	SIZE #	LGTH. (FT.-IN.)	APRON "E" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	TWO WINGS "F1" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"F2" BARS NO.	SIZE #	LGTH. (FT.-IN.)	"F3" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"F4" BARS NO.	SIZE #	LGTH. (FT.-IN.)	"G1" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"G2" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	"G3" BARS NO.	SIZE #	h (FT.-IN.)	LGTH. (FT.-IN.)	"G4" BARS NO.	SIZE #	AVG. LGTH. (FT.-IN.)	ONE CURB "CH" BARS NO.	SIZE #	LGTH. (FT.-IN.)	"S" BARS NO.	SIZE #	MIN. LGTH. (FT.-IN.)	TOTAL* ONE HEADWALL CONC. (CU.YD.)	STEEL (LBS.)
1	2		3.50							4	4	3'-5				2	4	6-2	6	4	6-6	2	4	5-8	2	4	6-0	12	4	3-9								6	4	2-2	2	4	4'-8	4	4	4'-1	1.43	133
2	2		3.83							4	4	3'-8																																		4'-3	1.75	154
3	2		4.17							4	4	4'-0																																		4'-3	2.07	185
4	2		4.50							4	4	4'-3																																		4'-3	2.41	216
5	2		4.83							4	4	4'-6																																		4'-3	2.76	232
6	3	3	5.46		8	4-0	6-11	6-0		4	4	6'-0	6	4	5'-7	4	4	7-3 1/2	6	4	8-9	2	4	5-8	2	4	8-3	18	4	4-6								10	4	2-6	2	4	4'-8	4	4	4'-3	2.78	232
7	3		5.79							4	4	6'-3																																		4'-3	3.13	248
8	3		6.46							4	4	6'-9																																		4'-3	3.82	279
9	3		7.46							4	4	7'-6																																		4'-11	3.82	287
10	4		6.83							4	4	7'-3																																		4'-2	3.81	332
11	4		7.19							4	4	7'-6																																		4'-2	4.20	350
12	4	4	7.83		8	5-0	9-3	8-0		4	4	8-10	8	4	8'-4	6	4	8-5	6	4	11-1	4	4	7-4 1/2	2	4	10-7	24	4	5-3 1/2								12	4	3-2 1/2	2	4	6'-8	4	4	4'-6	4.58	388
13	4		8.63							4	4	9'-0																																		4'-10	5.11	402
14	4		9.04							4	4	9'-3																																		5'-0	5.61	435
15	5		8.25							7	4	8'-6																																		4'-4	5.86	480
16	5		8.75							7	4	8'-9																																		4'-4	6.16	499
17	5	5	9.75		8	6-0	11-6	10-0		10	4	10-10	10	4	10'-4	8	4	9-7	6	4	13-4	6	4	9-1	2	4	12-10	30	4	6-1								16	4	3-7	2	4	6'-10	4	4	4'-10	6.75	527
18	10		10.75							12			16-11																																5'-0	7.41	575
19	6		8.42	2.50						8	4	7'-9																																		4'-3	5.21	509
20	6	6	9.92	2.92	8	7-0	13-10	10-0	2-0	8	4	10-10	10	4	10'-4	10	4	10-9	8	4	15-8	6	4	9-1	2	4	15-2	28	4	7-6	8	4	4-4 1/2							18	4	4-3	2	4	7'-0	4	4	4'-3	7.91	607
21	6		10.83	3.83						10			14-11																																		5'-0	9.06	645
22	6		11.29	4.29						12			16-11																																		5'-0	9.58	682
23	6		11.75	4.75						12			16-11																																		4'-3	10.38	725
24	6	7	11.08	4.38	10	8-0	16-2	10-0	4-0	8	4	10-10	10	4	10'-4	12	4	11-11	8	4	16-0	8	4	10-10	2	4	17-6	26	4	9-3	16	4	5-5 1/2							22	4	4-7	2	4	7'-2	4	4	4'-5	10.76	741
25	6		12.08	5.08						12			16-11																																		5'-0	11.50	774
26	10		13.08	6.08						12			16-11																																		5'-0	12.29	816
27	6		12.25	5.00						8			12-11																																		4'-4	12.75	955
28	8	8	12.75	5.50	10	9-0	18-6	10-0	6-0	10	4	10-10	10	4	10'-4	14	4	13-1	10	4	20-4	10	4	12-7	2	4	19-10	24	4	10-7 1/2	24	4	6-7 1/2	12	4	2-0	5-7	24	4	5-3	2	4	11-6	4	4	4'-10	12.40	893
29	10		13.25	6.00						12			16-11																																		5'-0	13.20	1032
30	10	9	18.38	4.87	10	10-0	20-8	10-0	8-0	12	4	10-10	10	4	10'-4	16	4	14-2 1/2	10	4	22-7	10	4	12-7	2	4	22-1	22	4	12-0	36	4	7-9 1/2	18	4	3-0	6-10	28	4	5-7	2	4	11-6	14	4	4'-10	16.46	1208
31	10	10	16.54	3.79	10	11-0	23-1	10-0	10-0	12	4	10-10	10	4	10'-4	18	4	15-4	12	4	24-11	12	4	14-3 1/2	2	4	24-5	26	4	13-5	30	4	8-10 1/2	24	4	4-3	8-4	30	4	6-3	2	4	11-8	14	4	4'-9	19.00	1546

*INCLUDES TWO WINGS, ONE APRON, & ONE CURB

STORM SEWER
HEADWALLS FOR RCB'S
(SHEET TWO)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

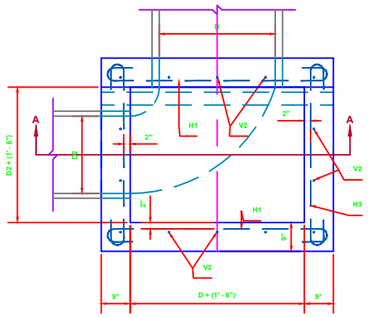
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

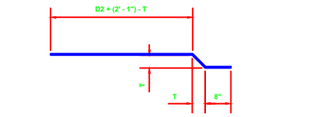
APPROVED:
CITY ENGINEERING DEPT.
DATE:

ATLAS PAGE NO:

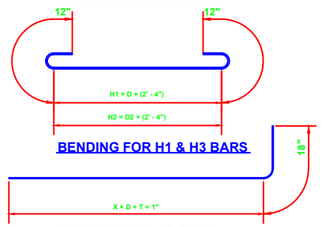
SHEET X OF X



PLAN

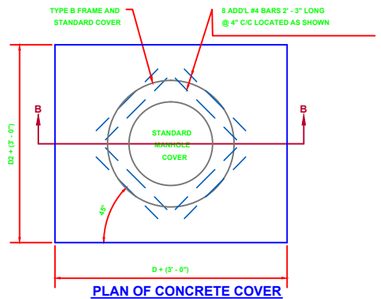


BENDING FOR H2 BARS

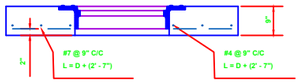


BENDING FOR H1 & H3 BARS

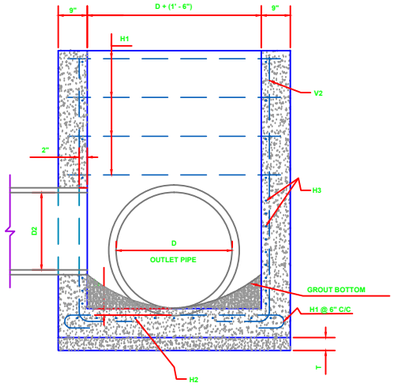
BENDING FOR V2 BARS



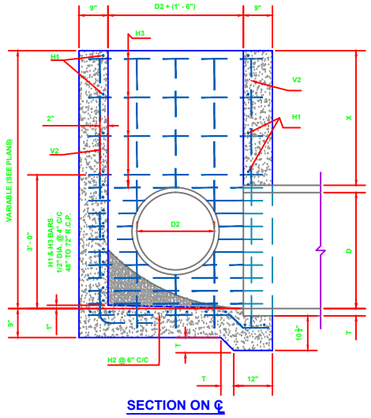
PLAN OF CONCRETE COVER



SECTION B-B



SECTION A-A



SECTION ON ℄

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH GLENPOOL STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONCRETE SURFACES SHALL HAVE A CARBORUNDUM FINISH.
3. ALL EXPOSED CONCRETE SURFACES SHALL HAVE A 3/4" CHAMFER
4. ALL REINFORCED STEEL SHALL BE 1/2" DIAMETER, EXCEPT AS NOTED. ALL HORIZONTAL BARS SHALL BE SPACED AS SHOWN. (18" MAXIMUM)
5. MAXIMUM DEPTHS OF BOXES FOR 48" TO 72" R.C.P. SHALL BE AS FOLLOWS: 48" - 18'; 54" - 16'; 60" - 12'; 72" - 10'.
6. REINFORCED CONCRETE PIPE SHALL CONFORM TO THE REQUIREMENTS OF A.A.S.H.T.O. M-170 (ASTM C-78) CLASS III UNLESS OTHERWISE DESIGNATED.
7. WALL THICKNESS (DIMENSION "T") OF PIPES SHOWN, ARE FROM "WALL B" COLUMN OF A.A.S.H.T.O. TABLES.

D	36"	42"	48"	54"	60"	66"	72"
T	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"	7"

8. DIMENSION D2 IS THE DIAMETER OF THE LARGEST PIPE ENTERING THE JUNCTION BOX THROUGH THE SIDE.
9. DIMENSION "X" DEPENDS ON THE DEPTHS AS CALLED FOR IN THE PLANS.

JUNCTION BOX 36" TO 72" REINFORCED CONCRETE PIPE

STORM SEWER
JUNCTION BOX 36" to 72"
REINFORCED CONCRETE PIPE

CITY OF GLENPOOL, OKLAHOMA

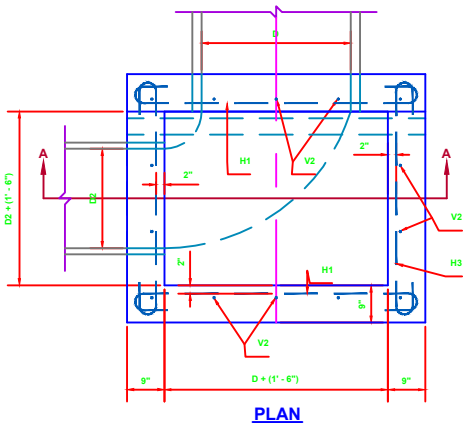
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

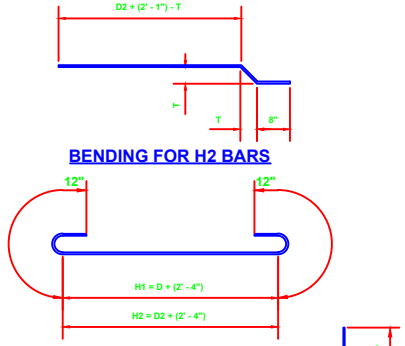
PLAN SCALE: 1" = 60'
PROFILE SCALE:
HORIZONTAL: "
VERTICAL: "
ATLAS PAGE NO:

DRAWN - -
DESIGNED - -
OFFICE ENGR. - -
CHIEF ENGR. - -
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE: -
SHEET X OF X



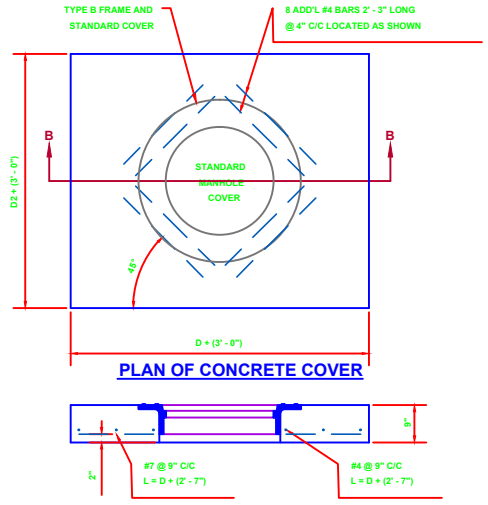
PLAN



BENDING FOR H2 BARS

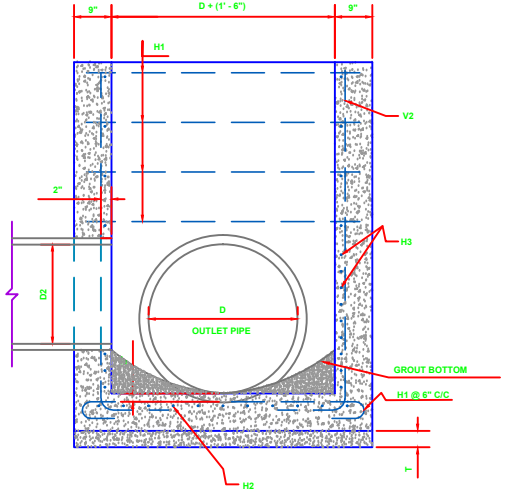
BENDING FOR H1 & H3 BARS

BENDING FOR V2 BARS

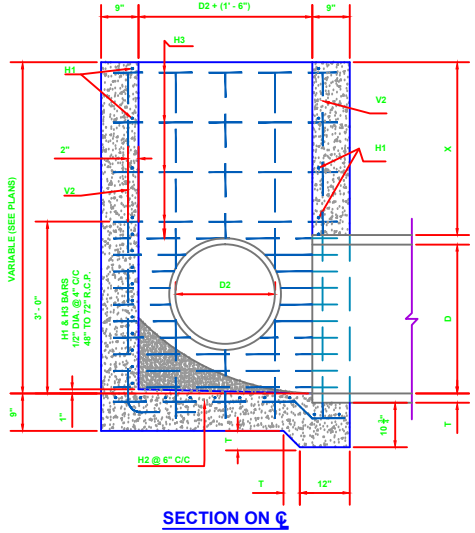


PLAN OF CONCRETE COVER

SECTION B-B



SECTION A-A



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JUNCTION BOX 36" TO 72" REINFORCED CONCRETE PIPE

STORM SEWER
JUNCTION BOX 36" to 72"
REINFORCED CONCRETE PIPE

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

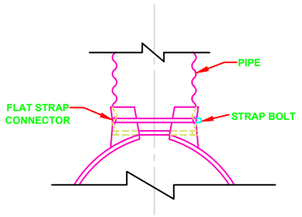
REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE:
HORIZONTAL:
-
VERTICAL:
-

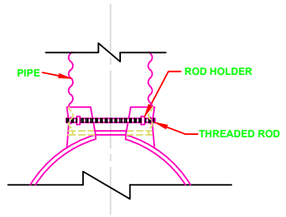
DRAWN . .
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
ATLAS PAGE NO:

APPROVED:
CITY ENGINEERING DEPT.
DATE: .
SHEET X OF X



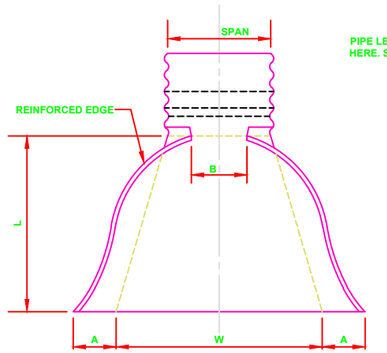
TYPE 1

FOR 15" THRU 24" ROUND AND EQUIVALENT ROUND PIPE ARCH SIZES



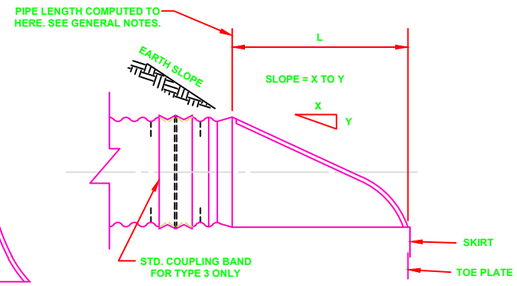
TYPE 2

FOR 30" THRU 36" ROUND AND 30" THRU 48" EQUIVALENT ROUND PIPE- ARCH SIZES



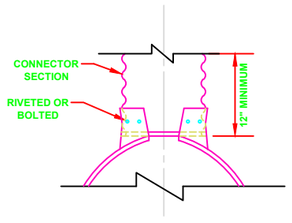
METAL END SECTION

PLAN VIEW



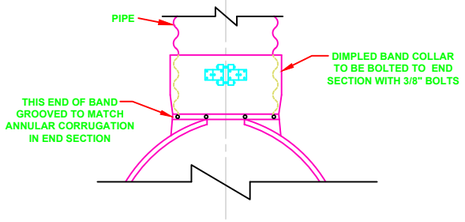
METAL END SECTION

SIDE VIEW



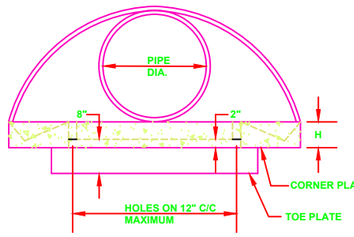
TYPE 3

FOR 42" THRU 84" ROUND AND 54" THRU 72" EQUIVALENT ROUND PIPE- ARCH SIZES



TYPE 5

FOR USE WITH ALL ROUND AND PIPE ARCH SIZES

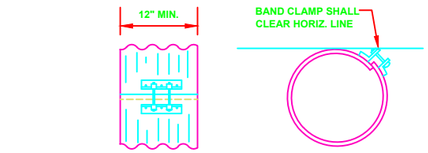


ROUND METAL PIPE

END SECTION END VIEW

GENERAL NOTES

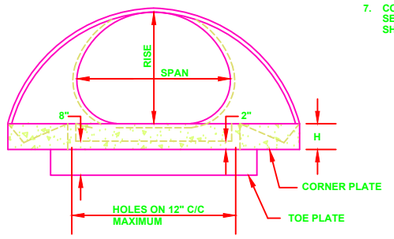
1. WHEN CULVERT END SECTIONS ARE OPTIONAL, THEY SHALL BE OF THE SAME MATERIAL AS THE PIPE ON WHICH THEY ARE INSTALLED.
2. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARD SPECIFICATIONS.
3. WHEN CULVERT PIPE IS SPECIFIED, THE END SECTION PAID FOR SHALL BE OF THE SAME TYPE (STEEL, ALUMINUM, OR CONCRETE) AND SHAPE (ROUND, ARCH, OR ELLIPTICAL). IF ELLIPTICAL CONCRETE PIPE IS USED, THE ELLIPTICAL END SECTION SHALL BE USED AND PAID FOR AS PREFAB. CULV. END SEC., ARCH.
4. TRENCH EXCAVATION REQUIRED FOR INSTALLATION OF CULVERT END SECTIONS SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS OF WORK.
5. DIMENSIONS SHOWN FOR END SECTIONS ARE SUBJECT TO MANUFACTURER'S TOLERANCES.
6. TOE PLATE WILL BE REQUIRED ON ALL METAL END SECTIONS UNLESS SOLID ROCK IS ENCOUNTERED. HOLES IN TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP, 3/8" BOLTS TO BE FURNISHED. LENGTH OF TOE PLATES FOR ROUND PIPE END SECTIONS SHALL BE W=10" FOR 15" TO 30" DIA. PIPE, W=20" FOR 36" TO 84" DIA. PIPE. LENGTH OF TOE PLATES FOR ARCH PIPE END SECTIONS SHALL BE W=10" FOR A RISE OF 13" TO 29" AND W=20" FOR A RISE OF 33" TO 57".
7. CONNECTOR SECTION, CORNER PLATE, AND TOE PLATE ON METAL END SECTIONS SHALL BE THE SAME GAGE AND MATERIAL AS THE SKIRT AND SHALL BE INCLUDED IN PRICE BID FOR END SECTION.



STANDARD COUPLING BAND

DIMPLED COUPLING BAND

TYPICAL METAL END SECTION CONNECTIONS



ARCH METAL PIPE

END SECTION END VIEW

STORM SEWER PREFABRICATED END SECTIONS (SHEET ONE)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

PROFILE SCALE:

HORIZONTAL:

VERTICAL:

ATLAS PAGE NO.

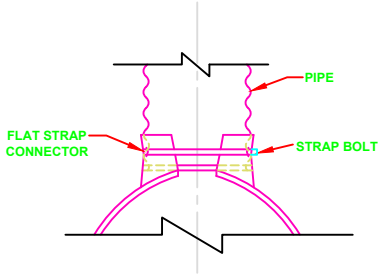
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:

CITY ENGINEERING DEPT.

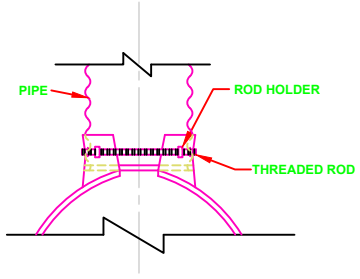
DATE:

SHEET X OF X



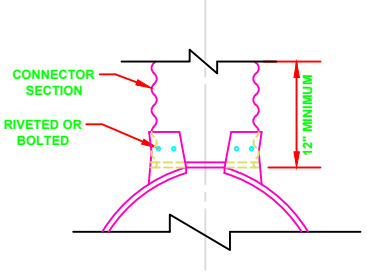
TYPE 1

FOR 15" THRU 24" ROUND AND EQUIVALENT ROUND PIPE ARCH SIZES



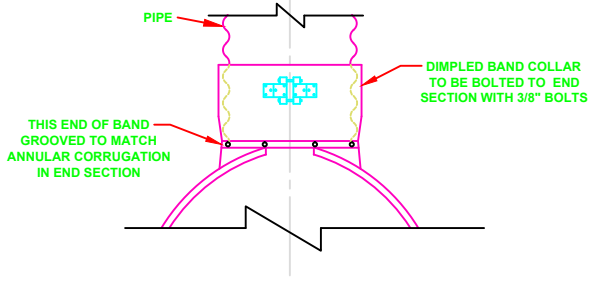
TYPE 2

FOR 30" THRU 36" ROUND AND 30" THRU 48" EQUIVALENT ROUND PIPE- ARCH SIZES



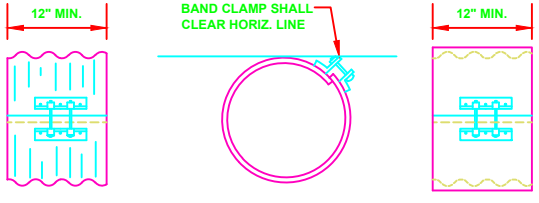
TYPE 3

FOR 42" THRU 84" ROUND AND 54" THRU 72" EQUIVALENT ROUND PIPE- ARCH SIZES



TYPE 5

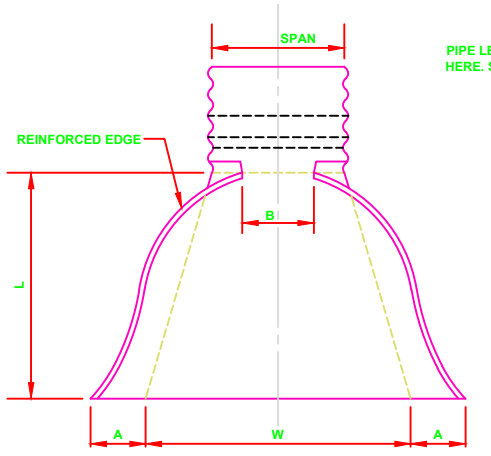
FOR USE WITH ALL ROUND AND PIPE ARCH SIZES



STANDARD COUPLING BAND

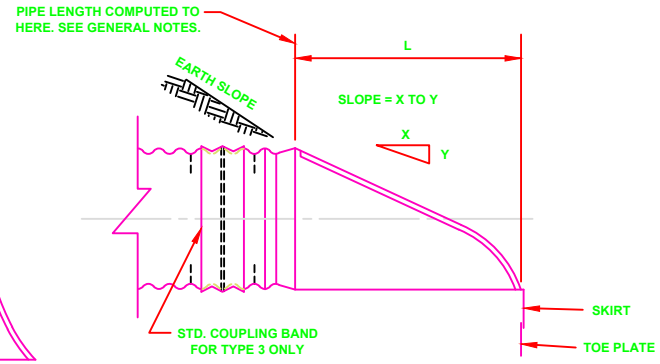
DIMPLED COUPLING BAND

TYPICAL METAL END SECTION CONNECTIONS



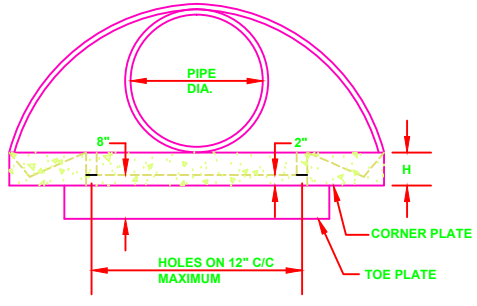
METAL END SECTION

PLAN VIEW



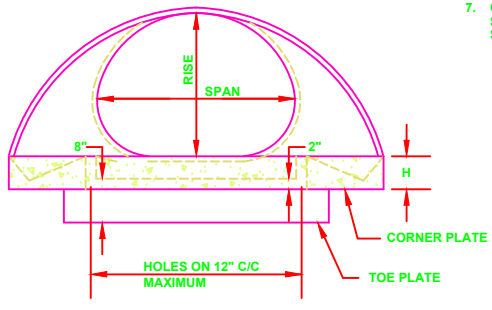
METAL END SECTION

SIDE VIEW



ROUND METAL PIPE

END SECTION END VIEW



ARCH METAL PIPE

END SECTION END VIEW

GENERAL NOTES

1. WHEN CULVERT END SECTIONS ARE OPTIONAL, THEY SHALL BE OF THE SAME MATERIAL AS THE PIPE ON WHICH THEY ARE INSTALLED.
2. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARD SPECIFICATIONS.
3. WHEN CULVERT PIPE IS SPECIFIED, THE END SECTION PAID FOR SHALL BE OF THE SAME TYPE (STEEL, ALUMINUM, OR CONCRETE) AND SHAPE (ROUND, ARCH, OR ELLIPTICAL). IF ELLIPTICAL CONCRETE PIPE IS USED, THE ELLIPTICAL END SECTION SHALL BE USED AND PAID FOR AS PREFAB. CULV. END SEC., ARCH.
4. TRENCH EXCAVATION REQUIRED FOR INSTALLATION OF CULVERT END SECTIONS SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS OF WORK.
5. DIMENSIONS SHOWN FOR END SECTIONS ARE SUBJECT TO MANUFACTURER'S TOLERANCES.
6. TOE PLATE WILL BE REQUIRED ON ALL METAL END SECTIONS UNLESS SOLID ROCK IS ENCOUNTERED. HOLES IN TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP, 3/8" BOLTS TO BE FURNISHED. LENGTH OF TOE PLATES FOR ROUND PIPE END SECTIONS SHALL BE W=10" FOR 15" TO 30" DIA. PIPE, W=20" FOR 36" TO 84" DIA. PIPE. LENGTH OF TOE PLATES FOR ARCH PIPE END SECTIONS SHALL BE W=10" FOR A RISE OF 13" TO 29" AND W=20" FOR A RISE OF 33" TO 57".
7. CONNECTOR SECTION, CORNER PLATE, AND TOE PLATE ON METAL END SECTIONS SHALL BE THE SAME GAGE AND MATERIAL AS THE SKIRT AND SHALL BE INCLUDED IN PRICE BID FOR END SECTION.

STORM SEWER PREFABRICATED END SECTIONS (SHEET ONE)

CITY OF GLENPOOL, OKLAHOMA

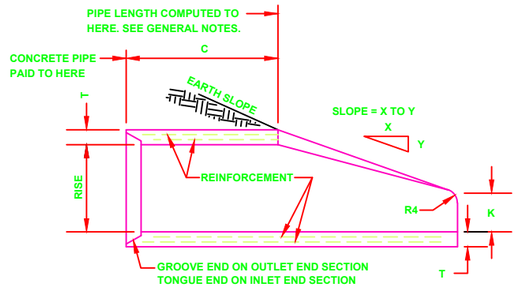
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

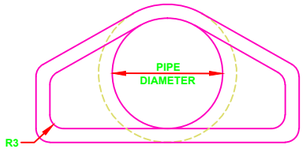
PLAN SCALE: 1"=
PROFILE SCALE:
HORIZONTAL: -
VERTICAL: -
ATLAS PAGE NO:

DRAWN	.	.
DESIGNED	.	.
OFFICE ENGR.	.	.
CHIEF ENGR.	.	.

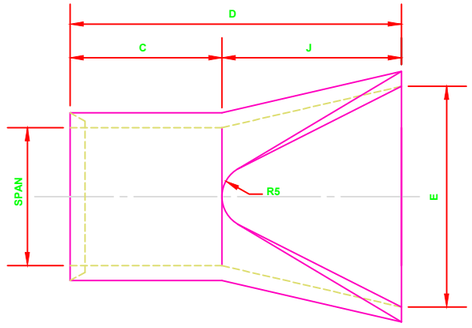
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR
APPROVED: CITY ENGINEERING DEPT.
DATE: .
SHEET X OF X



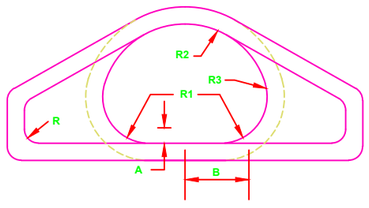
CONCRETE PIPE END SECTION
LONGITUDINAL SECTION



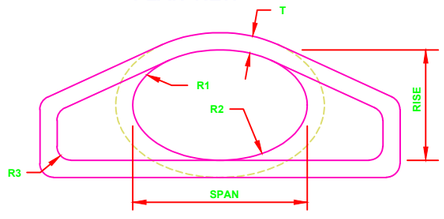
ROUND CONCRETE PIPE
END SECTION END VIEW



CONCRETE PIPE END SECTION
PLAN VIEW



ARCH CONCRETE PIPE
END SECTION END VIEW



ELLIPTICAL CONCRETE PIPE
END SECTION END VIEW

DIMENSIONS OF END SECTIONS FOR ROUND METAL PIPES

PIPE DIA.	GA. DIA.	A IN.	B IN.	H IN.	L IN.	W IN.	APPROX. SLOPE	BODY
15	16	7	8	6	26	30	2 1/2	1 PC.
18	16	8	10	6	31	36	2 1/2	1 PC.
21	16	9	12	6	36	42	2 1/2	1 PC.
24	16	10	13	6	41	48	2 1/2	1 PC.
30	14	12	16	8	51	60	2 1/2	1 PC.
36	14	14	19	9	60	72	2 1/2	2 PC.
42	12	16	22	11	69	84	2 1/2	2 PC.
48	12	18	27	12	78	90	2 1/4	2 PC.
54	12	18	30	12	84	102	2	2 PC.
60	12	18	33	12	87	114	1 3/4	3 PC.
66	12	18	36	12	87	120	1 1/2	3 PC.
72	12	18	39	12	87	126	1 1/3	3 PC.
78	12	18	42	12	87	132	1 1/4	3 PC.
84	12	18	45	12	87	138	1 1/6	3 PC.

DIMENSIONS OF END SECTIONS FOR ARCH METAL PIPES

SPAN/ RISE	PIPE DIA.	GA. DIA.	A IN.	B IN.	H IN.	L IN.	W IN.	APPROX. SLOPE	BODY
17x13	15	16	7	9	6	19	30	2 1/2	1 PC.
21x15	18	16	7	10	6	23	36	2 1/2	1 PC.
24x18	21	16	8	12	6	28	42	2 1/2	1 PC.
28x20	24	16#	9	14	6	32	48	2 1/2	1 PC.
35x24	30	14	10	16	6	39	60	2 1/2	1 PC.
42x29	36	14#	12	18	8	46	75	2 1/2	1 PC.
49x33	42	12	13	21	9	53	85	2 1/2	2 PC.
57x38	48	12	18	26	12	63	90	2 1/2	2 PC.
64x43	54	12	18	30	12	70	102	2 1/4	2 PC.
71x47	60	12	18	33	12	77	114	2 1/4	3 PC.
77x52	66	12	18	36	12	77	126	2	3 PC.
83x57	72	12	18	39	12	77	138	2	3 PC.

FOR ALUMINUM END SECTIONS THE 28x20 SHALL BE 14 GAGE AND THE 42x29 SHALL BE 12 GAGE

DIMENSIONS OF PRECAST END SECTIONS FOR ROUND PIPE

DIAMETER IN.	R3 IN.	R4 IN.	R5 IN.	T IN.	K IN.	J FT.	C FT.	D FT.	E FT.	SLOPE
18	3	3	6	2 1/2	9	2.25	3.83	6.08	3.00	3 TO 1
24	3	3	7	3	9 1/2	3.83	2.50	6.12	4.00	3 TO 1
30	3	3	8	3 1/2	12	4.50	1.65	6.16	5.00	3 TO 1
36	3	3	10 1/2	4	15	5.25	2.90	8.15	6.00	3 TO 1
42	3	3	10 1/2	4 1/2	21	5.25	2.92	8.17	6.50	3 TO 1
48	6	6	14	5	24	6.00	2.17	8.17	7.00	3 TO 1
54	6	6	7	5 1/2	27	5.42	2.92	8.34	7.50	2.4 TO 1
60	6	6	7	6	30	5.00	3.25	8.25	8.00	2 TO 1
66	6	6	7	6 1/2	24	6.50	1.75	8.25	8.50	2 TO 1
72	6	6	7	7	24	6.50	1.75	8.25	9.00	2 TO 1

DIMENSIONS OF PRECAST END SECTIONS FOR ELLIPTICAL PIPE

APPROX. EQUIV. DIAMETER IN.	RISE IN.	SPAN IN.	R1 IN.	R2 IN.	R3 IN.	R4 IN.	R5 IN.	T IN.	K IN.	J FT.	C FT.	D FT.	E FT.	SLOPE
24	19	30	8 9/32	25 1/32	3	3	7	3 1/4	9 1/2	3.25	2.75	6.00	4.00	3 TO 1
30	24	38	10 11/32	32 9/16	3	3	9	3 3/4	9 1/2	4.50	1.50	6.00	5.00	3 TO 1
36	29	45	12 7/16	39 1/16	3	3	12	4 1/2	11 1/4	5.00	3.00	8.00	6.00	3 TO 1
42	34	53	14 1/2	45 9/16	6	6	13	5	15 3/4	5.00	3.00	8.00	6.50	3 TO 1
48	38	60	16 9/16	52 3/32	6	6	14	5 1/2	21	5.00	3.00	8.00	7.00	3 TO 1
54	43	68	18 5/8	58 19/32	6	6	16	6	25 1/2	5.00	3.00	8.00	7.50	3 TO 1
60	48	76	20 11/16	65 3/32	6	6	36 11/16	6 1/2	30	5.00	3.25	8.25	8.00	2 TO 1
66	53	83	22 3/4	71 5/8	6	6	36 1/8	7	24	6.50	1.75	8.25	8.50	2 TO 1
72	58	91	24 27/32	78 1/8	6	6	39	7 1/2	24	6.50	1.75	8.25	9.00	2 TO 1

DIMENSIONS OF PRECAST END SECTIONS FOR ARCH PIPE

APPROX. EQUIV. DIAMETER IN.	RISE IN.	SPAN IN.	A IN.	B IN.	R IN.	R1 IN.	R2 IN.	R3 IN.	R4 IN.	R5 IN.	T IN.	K IN.	J FT.	C FT.	D FT.	E FT.	SLOPE
24	18	28 1/2	3 7/16	9 21/32	3	40 11/16	14 9/16	4 19/22	3	16 13/16	3	9 1/2	3.58	2.50	6.08	4.00	3 TO 1
30	22 1/2	36 1/4	3 3/4	12 3/32	3	51	18 3/4	6 17/32	3	18 1/2	3 1/2	12	4.50	1.58	6.05	5.00	3 TO 1
36	26 5/8	43 3/4	4 1/8	17 1/2	6	62	22 1/2	6 3/8	3	24 5/16	4	15	5.25	2.90	8.15	6.00	3 TO 1
42	31 5/16	51 1/8	5 1/16	16	6	73	26 1/4	7 3/16	3	27 1/2	4 1/2	21	5.25	2.92	8.17	6.50	3 TO 1
48	36	58 1/2	6	20 1/2	6	84	30	8 3/4	3	28 1/2	5	24	6.00	2.17	8.17	7.00	3 TO 1
54	40	65	6 1/2	22 11/16	6	92 1/2	33 3/8	9 13/16	6	33 1/8	5 1/2	27	5.42	2.92	8.34	7.50	2.4 TO 1
60	45	73	7 1/2	25 9/32	6	105	37 1/2	11 7/32	6	33 11/16	6	30	5.00	3.25	8.25	8.00	2 TO 1
72	54	88	9	31 7/16	6	126	45	12 9/16	6	38 15/16	7	24	6.50	1.75	8.25	9.00	2 TO 1

STORM SEWER
PREFABRICATED END SECTIONS
(SHEET TWO)

CITY OF GLENPOOL, OKLAHOMA

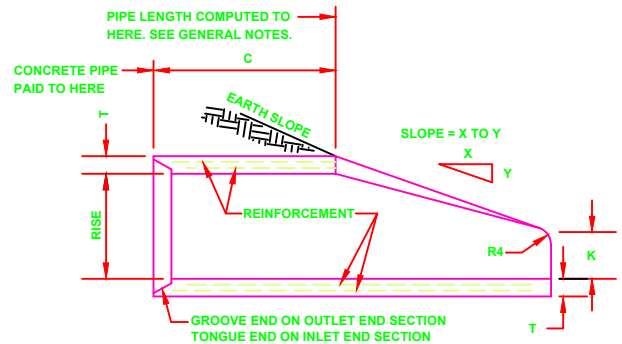
COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

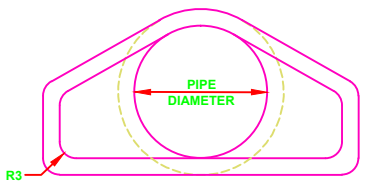
PLAN SCALE: 1" =

PROFILE SCALE: HORIZONTAL: VERTICAL:

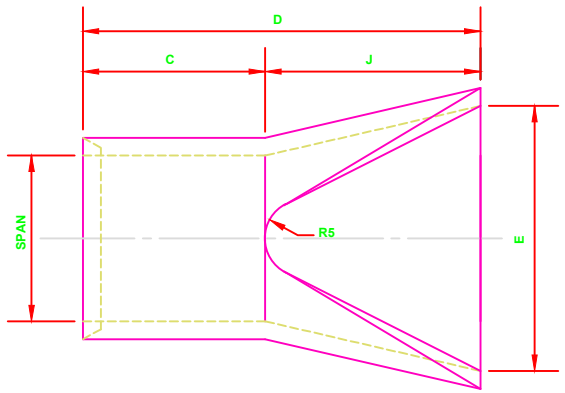
DRAWN . .
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED:
CITY ENGINEERING DEPT.
APPROVED:
DATE:



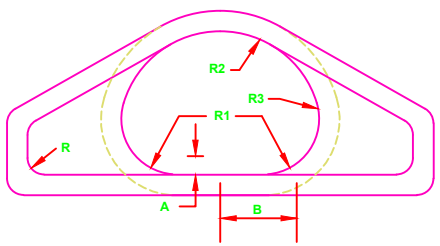
CONCRETE PIPE END SECTION
LONGITUDINAL SECTION



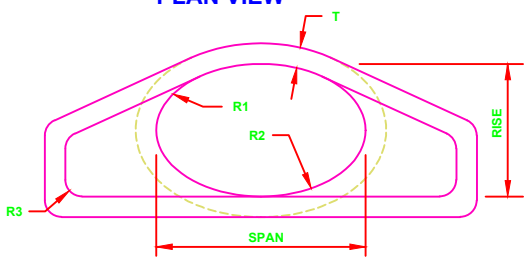
ROUND CONCRETE PIPE
END SECTION END VIEW



CONCRETE PIPE END SECTION
PLAN VIEW



ARCH CONCRETE PIPE
END SECTION END VIEW



ELLIPTICAL CONCRETE PIPE
END SECTION END VIEW

DIMENSIONS OF END SECTIONS FOR ROUND METAL PIPES

PIPE DIA.	GA. DIA.	A IN.	B IN.	H IN.	L IN.	W IN.	APPROX. SLOPE	BODY
15	16	7	8	6	26	30	2 1/2	1 PC.
18	16	8	10	6	31	36	2 1/2	1 PC.
21	16	9	12	6	36	42	2 1/2	1 PC.
24	16	10	13	6	41	48	2 1/2	1 PC.
30	14	12	16	8	51	60	2 1/2	1 PC.
36	14	14	19	9	60	72	2 1/2	2 PC.
42	12	16	22	11	69	84	2 1/2	2 PC.
48	12	18	27	12	78	90	2 1/4	2 PC.
54	12	18	30	12	84	102	2	2 PC.
60	12	18	33	12	87	114	1 3/4	3 PC.
66	12	18	36	12	87	120	1 1/2	3 PC.
72	12	18	39	12	87	126	1 1/3	3 PC.
78	12	18	42	12	87	132	1 1/4	3 PC.
84	12	18	45	12	87	138	1 1/6	3 PC.

DIMENSIONS OF END SECTIONS FOR ARCH METAL PIPES

SPAN/ RISE	PIPE DIA.	GA. DIA.	A IN.	B IN.	H IN.	L IN.	W IN.	APPROX. SLOPE	BODY
17x13	15	16	7	9	6	19	30	2 1/2	1 PC.
21x15	18	16	7	10	6	23	36	2 1/2	1 PC.
24x18	21	16	8	12	6	28	42	2 1/2	1 PC.
28x20	24	16#	9	14	6	32	48	2 1/2	1 PC.
35x24	30	14	10	16	6	39	60	2 1/2	1 PC.
42x29	36	14#	12	18	8	46	75	2 1/2	1 PC.
49x33	42	12	13	21	9	53	85	2 1/2	2 PC.
57x38	48	12	18	26	12	63	90	2 1/2	2 PC.
64x43	54	12	18	30	12	70	102	2 1/4	2 PC.
71x47	60	12	18	33	12	77	114	2 1/4	3 PC.
77x52	66	12	18	36	12	77	126	2	3 PC.
83x57	72	12	18	39	12	77	138	2	3 PC.

FOR ALUMINUM END SECTIONS THE 28x20 SHALL BE 14 GAGE AND THE 42x29 SHALL BE 12 GAGE

DIMENSIONS OF PRECAST END SECTIONS FOR ROUND PIPE

DIAMETER IN.	R3 IN.	R4 IN.	R5 IN.	T IN.	K IN.	J FT.	C FT.	D FT.	E FT.	SLOPE
18	3	3	6	2 1/2	9	2.25	3.83	6.08	3.00	3 TO 1
24	3	3	7	3	9 1/2	3.63	2.50	6.12	4.00	3 TO 1
30	3	3	8	3 1/2	12	4.50	1.65	6.16	5.00	3 TO 1
36	3	3	10 1/2	4	15	5.25	2.90	8.15	6.00	3 TO 1
42	3	3	10 1/2	4 1/2	21	5.25	2.92	8.17	6.50	3 TO 1
48	6	6	14	5	24	6.00	2.17	8.17	7.00	3 TO 1
54	6	6	7	5 1/2	27	5.42	2.92	8.33	7.50	2.4 TO 1
60	6	6	7	6	30	5.00	3.25	8.25	8.00	2 TO 1
66	6	6	7	6 1/2	24	6.50	1.75	8.25	8.50	2 TO 1
72	6	6	7	7	24	6.50	1.75	8.25	9.00	2 TO 1

DIMENSIONS OF PRECAST END SECTIONS FOR ELLIPTICAL PIPE

APPROX. EQUIV. DIAMETER IN.	RISE IN.	SPAN IN.	R1 IN.	R2 IN.	R3 IN.	R4 IN.	R5 IN.	T IN.	K IN.	J FT.	C FT.	D FT.	E FT.	SLOPE
24	19	30	8 9/32	26 1/32	3	3	7	3 1/4	8 1/2	3.25	2.75	6.00	4.00	3 TO 1
30	24	38	10 11/32	32 9/16	3	3	9	3 3/4	9 1/2	4.50	1.50	6.00	5.00	3 TO 1
36	29	45	12 7/16	39 1/16	3	3	12	4 1/2	11 1/4	5.00	3.00	8.00	6.00	3 TO 1
42	34	53	14 1/2	45 9/16	6	6	13	5	15 3/4	5.00	3.00	8.00	6.50	3 TO 1
48	38	60	16 9/16	52 3/32	6	6	14	5 1/2	21	5.00	3.00	8.00	7.00	3 TO 1
54	43	68	18 5/8	58 19/32	6	6	16	6	25 1/2	5.00	3.00	8.00	7.50	3 TO 1
60	48	76	20 11/16	65 3/32	6	6	36 11/16	6 1/2	30	5.00	3.25	8.25	8.00	2 TO 1
66	53	83	22 3/4	71 5/8	6	6	36 1/8	7	24	6.50	1.75	8.25	8.50	2 TO 1
72	58	91	24 27/32	78 1/8	6	6	38	7 1/2	24	6.50	1.75	8.25	9.00	2 TO 1

DIMENSIONS OF PRECAST END SECTIONS FOR ARCH PIPE

APPROX. EQUIV. DIAMETER IN.	RISE IN.	SPAN IN.	A IN.	B IN.	R IN.	R1 IN.	R2 IN.	R3 IN.	R4 IN.	R5 IN.	T IN.	K IN.	J FT.	C FT.	D FT.	E FT.	SLOPE
24	18	28 1/2	3 7/16	9 21/32	3	40 11/16	14 9/16	4 19/22	3	16 13/16	3	9 1/2	3.58	2.50	6.08	4.00	3 TO 1
30	22 1/2	36 1/4	3 3/4	12 3/32	3	51	18 3/4	6 1/32	3	18 1/2	3 1/2	12	4.50	1.58	6.08	5.00	3 TO 1
36	26 5/8	43 3/4	4 1/8	17 1/2	6	62	22 1/2	6 3/8	3	24 5/16	4	15	5.25	2.90	8.15	6.00	3 TO 1
42	31 5/16	51 1/8	5 1/16	18	6	73	26 1/4	7 3/16	3	27 1/2	4 1/2	21	5.25	2.92	8.17	6.50	3 TO 1
48	36	58 1/2	6	20 1/2	6	84	30	8 3/4	3	28 1/2	5	24	6.00	2.17	8.17	7.00	3 TO 1
54	40	65	6 1/2	22 11/16	6	92 1/2	33 3/8	9 13/16	6	33 1/8	5 1/2	27	5.42	2.92	8.34	7.50	2.4 TO 1
60	45	73	7 1/2	25 9/32	6	105	37 1/2	11 7/32	6	33 11/16	6	30	5.00	3.25	8.25	8.00	2 TO 1
72	54	88	9	31 7/16	6	126	45	12 9/16	6	38 15/16	7	24	6.50	1.75	8.25	9.00	2 TO 1

STORM SEWER PREFABRICATED END SECTIONS (SHEET TWO)

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=

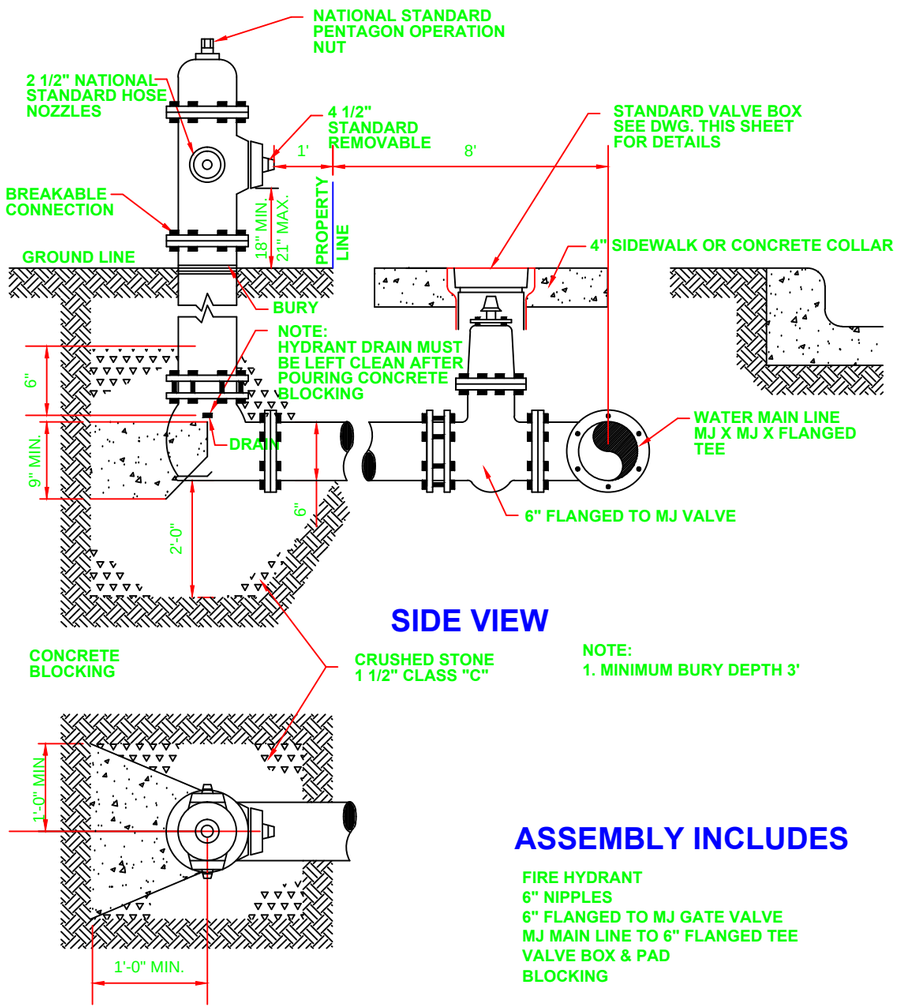
PROFILE SCALE:
HORIZONTAL: .
VERTICAL: .

DRAWN . .
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED: ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE: .

ATLAS PAGE NO:

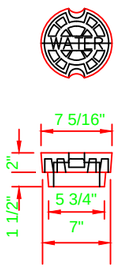
SHEET X OF X



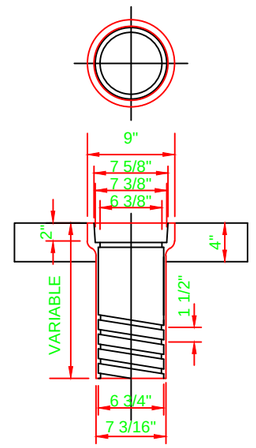
ASSEMBLY INCLUDES

FIRE HYDRANT
6" NIPPLES
6" FLANGED TO MJ GATE VALVE
MJ MAIN LINE TO 6" FLANGED TEE
VALVE BOX & PAD
BLOCKING

FIRE HYDRANT ASSEMBLY DETAIL



LID



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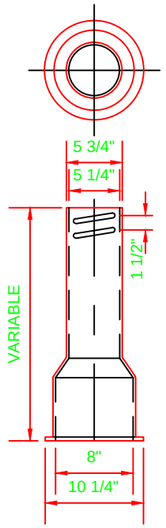


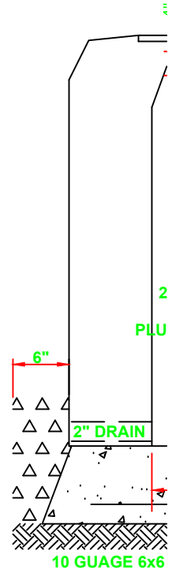
BOTTOM

4" - 12" VALVE BOX DETAIL

REQUIRED WEIGHTS	
LID	15 LBS
TOP (16")	30 LBS
BOTTOM (24")	35 LBS

NOTES:
1. WATER LINE CONTRACTOR TO PLACE 2 FOOT SQUARE CONCRETE PAD AROUND EACH WATER VALVE AFTER FINAL GRADING HAS BEEN COMPLETED AND TRENCHES HAVE SETTLED.
2. VALVE BOXES REQUIRING OVER 2 ADDITIONAL BOTTOM SECTIONS SHALL BE EXTENDED USING C900 DR14 PVC PIPE WITH A BOTTOM AND TOP SECTION PLACED ON TOP OF THE C900 DR14 PVC PIPE.

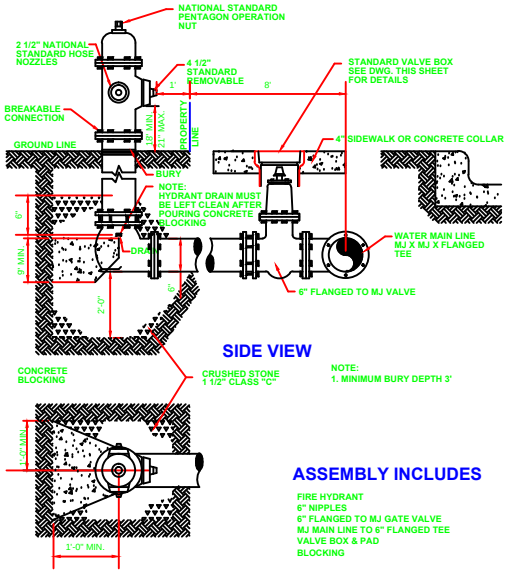
VALVE BOX DETAIL



TOP

NOTES:
1. ALL PIPING AND
2. STAINLESS STEE
3. FRAME AND LID

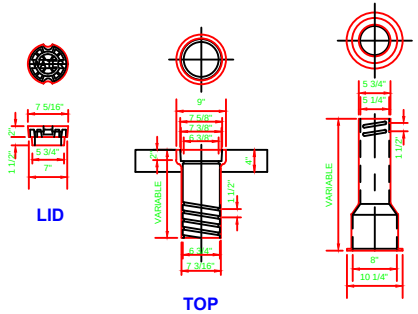
AIR RE



ASSEMBLY INCLUDES

FIRE HYDRANT
6" NIPPLES
6" FLANGED TO MJ GATE VALVE
MJ MAIN LINE TO 6" FLANGED TEE
VALVE BOX & PAD
BLOCKING

FIRE HYDRANT ASSEMBLY DETAIL

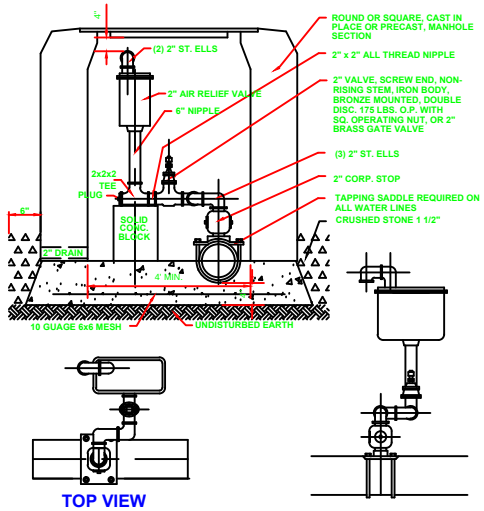


4" - 12" VALVE BOX DETAIL

REQUIRED WEIGHTS	
LID	15 LBS
TOP (16")	30 LBS
BOTTOM (24")	35 LBS

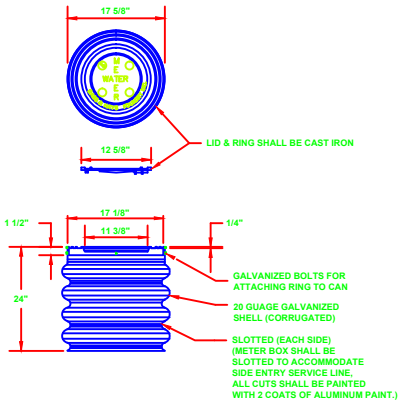
NOTES:
1. WATER LINE CONTRACTOR TO PLACE 2 FOOT SQUARE CONCRETE PAD AROUND EACH WATER VALVE AFTER FINAL GRADING HAS BEEN COMPLETED AND TRENCHES HAVE SETTLED.
2. VALVE BOXES REQUIRING OVER 2 ADDITIONAL BOTTOM SECTIONS SHALL BE EXTENDED USING C900 DR14 PVC PIPE WITH A BOTTOM AND TOP SECTION PLACED ON TOP OF THE C900 DR14 PVC PIPE.

VALVE BOX DETAIL

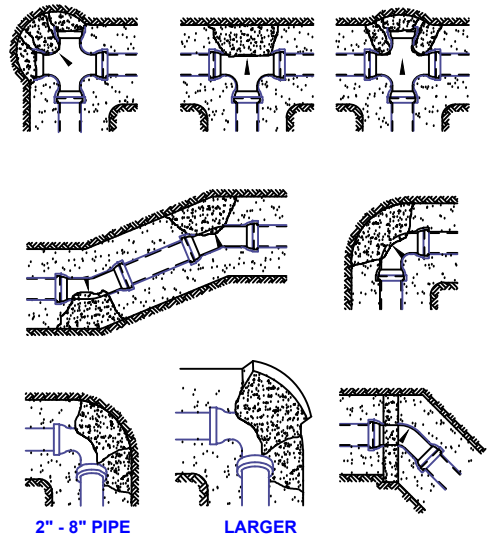


NOTES:
1. ALL PIPING AND CONNECTORS SHALL BE BRONZE, EXCEPT TAPPING SADDLE.
2. STAINLESS STEEL BOLTS WILL BE USED ON TAPPING SADDLES.
3. FRAME AND LID FOR VAULT SHALL BE AS SHOWN ON STANDARD DRAWING W 03.

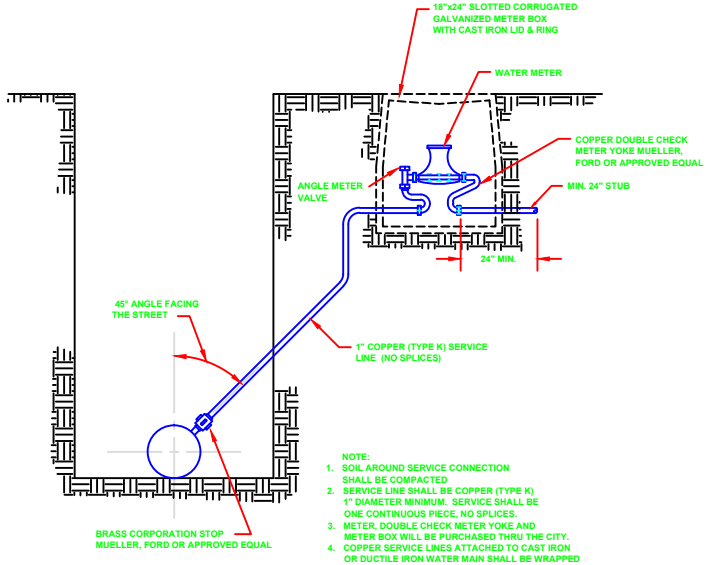
AIR RELIEF VALVE AND VAULT DETAIL



METER BOX RING & COVER

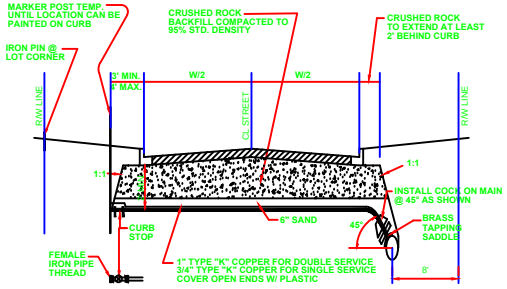


THRUST BLOCK LOCATION DETAILS



NOTE:
1. SOIL AROUND SERVICE CONNECTION SHALL BE COMPACTED
2. SERVICE LINE SHALL BE COPPER (TYPE K) 1" DIAMETER MINIMUM. SERVICE SHALL BE ONE CONTINUOUS PIECE, NO SPLICES.
3. METER, DOUBLE CHECK METER YOKE AND METER BOX WILL BE PURCHASED THRU THE CITY.
4. COPPER SERVICE LINES ATTACHED TO CAST IRON OR DUCTILE IRON WATER MAIN SHALL BE WRAPPED A MINIMUM OF 3' FROM THE MAIN WITH PLASTIC-BACKED ADHESIVE TAPE, POLYKAN #900 OR SCOTTRAP #50 OR EQUAL, 2" IN WIDTH

WATER SERVICE LINE CONNECTION



NOTES:
1. LOT CORNERS SHALL BE STAKED PRIOR TO CONSTRUCTION OF SERVICE LINES, CROSSING TO BE ON LOT LINE.
2. DETECTABLE MYLAR MARKING TAPE (LIFEGUARD TYPE II OR EQUAL) TO BE INSTALLED OVER COPPER SERVICE AS SHOWN.
3. CROSSING NOT REQUIRED IN LOOPED CUL-DE-SAC.
4. COPPER SHALL NOT BE SPLICED.
5. CROSSING TO BE INSPECTED BEFORE TRENCH IS BACKFILLED.
6. IF ROCK IS USED IN BACKFILL, COPPER SHALL BE PLACED IN SCHEDULE 40 PVC SLEEVE

WATER LINE STREET CROSSING DETAIL

WATER LINE APPURTENANCES INSTALLATION DETAILS

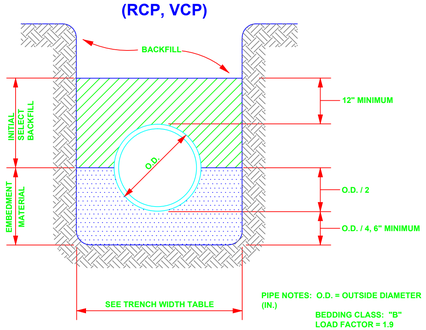
CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1"=
PROFILE SCALE: HORIZONTAL: VERTICAL:
DRAWN
DESIGNED
OFFICE ENGR.
CHIEF ENGR.
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR
APPROVED:
CITY ENGINEERING DEPT.
DATE:
ATLAS PAGE NO:
SHEET X OF X

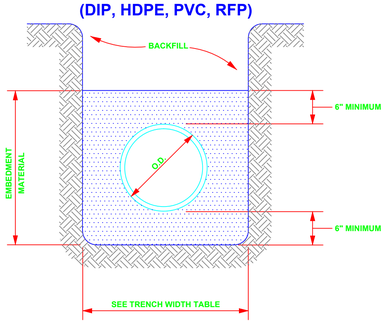
RIDGED PIPE INSTALLATION (RCP, VCP)



PIPE NOTES: O.D. = OUTSIDE DIAMETER (IN.)

BEDDING CLASS: "B"
LOAD FACTOR = 1.9

FLEXIBLE PIPE INSTALLATION (DIP, HDPE, PVC, RFP)



General Location	Percent Compaction (%)	
	Standard Proctor Density (ASTM D-698)	Standard Proctor Density (ASTM D-698)
Under Traffic Area or Improved Existing Surfaces	95	75
Urban & Residential Areas	90	70
Underdeveloped & Other Areas	85	70

3. COMPACTING METHODS -- Compacting methods may vary depending on the materials or as approved by the Engineer.
   a COHESIVE MATERIALS -- Compaction of cohesive materials may be obtained by the use of impact type equipment in confined areas; pneumatic tampers and engine driven rammers may also be used. In relatively narrow trenches, self propelled rammers may also be used. In wide trenches, sheepsfoot rollers may be used.

TRENCH WIDTH TABLE

Pipe Nominal Size (inches)	Minimum Trench Width (feet)	Maximum Trench Width (feet)
≤12	3.00	5.00
15	3.25	5.00
18	3.50	5.00
21	3.75	5.25
24	4.00	6.00
27	4.25	6.25
30	4.50	6.75
33	4.75	8.25
36	5.25	9.00
42	6.25	9.50
48	7.00	11.00
54	8.00	11.50
60	9.00	12.00
66	9.75	13.00
72	10.50	13.00
78	10.50	13.50
84	11.00	14.00
90	11.50	14.50
96	12.00	15.00
102	12.50	15.50

EMBEDMENT MATERIAL

Embedment is that material to be placed from a minimum of six (6") inches below bottom of the pipe to the springline (half pipe diameter) or to a minimum of six (6") inches above top of pipe for rigid and flexible pipes, respectively. the remaining material to be placed over the embedment is considered backfill.

MATERIAL MATERIAL REQUIREMENTS

1. GENERAL -- Embedment material for all rigid and flexible pipes shall be sand or in areas that is unstable crushed rock meeting the requirement of either ASTM D-2321, Class 1A, or ASTM C-33, Number 57 or 67 and graduations shown below:

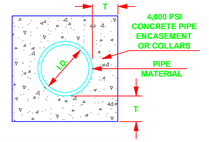
Nominal Sieve Size	Percent Passing		
	ASTM D-2321	ASTM C-33	
	Class 1A	Number 57	Number 67
1 1/2 inch	100%	100%	.....
1 inch	ASTM D-2321	95 to 100%	100%
3/4 inch	.....	.....	90 to 100%
1/2 inch	.....	25 to 60%	.....
3/8 inch	.....	.....	20 to 55%
Number 4	≤10%	0 to 10%	0 to 10%
Number 8	.....	0 to 5%	0 to 5%
Number 200	≥5%	.....	.....

2. COMPACTION REQUIREMENTS -- All embedment material shall be placed in six (6") inch lefts to the following minimum percent of Standard Proctor Density as determined by ASTM D-698. "Tests for Moisture -- Density Relations of Soil-- Aggregate Mixtures', and ASTM D-2049, "Test for Related Density of Cohesionless Soils", respectively.

Compaction Test	Compaction Requirement
Standard Proctor Density	95%
Relative Density	75%

3. COMPACTION METHODS -- All embedment material shall be compacted in accordance with the methods described in Part "3" of "Backfilling."

PIPE ENCASEMENT AND COLLARS



NOMINAL DIAMETER (INCHES)	T (INCHES)
≤18"	6"
>18" & <30"	8"
>30" & <42"	10"
≤42"	12"

NOTE: FOR COLLARS, THE CONCRETE ENCASEMENT SHALL BE PLACED TO A MINIMUM OF TWELVE (12") INCHES ON EITHER SIDE OF THE JOINT.

REINFORCED CONCRETE PIPE (RCP) MINIMUM PIPE DESIGN

1. HIGHWAYS -- Minimum pipe class for diameter twenty-four (24") inches to one-hundred-two (102") inches meeting the requirements of ASTM C-76 shall be as follows:

MAXIMUM DEPTH OF COVER (feet)	MINIMUM CLASS
10	III
10	III
10	III

For maximum depth of cover of thirty (30') feet, pipes ranging from twenty-four (24") inches to fifty-four (54") inches in diameter shall be designed and manufactured in accordance with ASTM C-655 and shall have the following minimum three-edge bearing strength for 0.01 crack (D 0.01) in pounds per lineal foot of inside diameter.

PIPE NOMINAL SIZE (in.)	D 0.01(lb./lineal ft. per ft. of inside diameter)
24	3200
27	3050
30	3050
33	3475
36	3475
42	3450
48	3300
54	3125

Pipes ranging in diameter from sixty (60") to one-hundred-two (102") inches in diameter shall be class V for a minimum depth of cover of thirty (30') feet when manufactured in accordance with ASTM C-76.

2. RAILROADS -- Minimum pipe class for E-80 Railroad live load pipe size twenty-four (24") inches to one-hundred-two (102") inches in diameter meeting the requirements of ASTM C-76. or ASTM C-655 shall be as follows:
   a MAXIMUM DEPTH OF COVER TEN (10') FEET -- Diameters twenty-four (24") inches to one-hundred-two (102") inches shall be Class VI.
   b MAXIMUM DEPTH OF COVER FIFTEEN (15') FEET -- diameters twenty-four (24") inches to forty-two (42") inches shall be Class V and forty-eight (48") inches to one-hundred-two (102") inches shall be Class VI.
   c MAXIMUM DEPTH OF COVER TWENTY (20') FEET -- Diameter twenty-four (24") inches to one-hundred-two inches shall be class V.
   d MAXIMUM DEPTH OF COVER TWENTY-FIVE (925") FEET -- Diameter twenty-four (24") inches shall have D 0.01 of thirty-one-hundred (3100lb./l.f.) pound/lineal foot per foot of inside diameter. Diameters twenty-seven (27") inches to one-hundred-two (102") inches shall be Class V.

PIPE NOMINAL SIZE (in.)	D 0.01(lb./lineal ft. per ft. of inside diameter)
24	3300
27	3125
30	3150
33	3575
36	3575
42	3550
48	3400
54	3225
60	3100

Diameters sixty-six (66") inches to one-hundred-two (102") inches shall be Class V.

BACKFILLING

1. DESCRIPTION -- Backfill is that portion of the total backfill down to but not including the pipe embedment material. The back fill shall be only material approved by the Engineer consisting of loose earth, free of clods, stones, organic matter, debris or other objectionable material. All backfilling shall be done in such a manner as not to disturb or injure the pipe or structures over or against which it is being placed. Any pipe or structure injured or moved from its proper line or grade during backfilling operations shall be opened up and repaired then rebackfilled as herein specified.
   The placing of backfill mater shall not begin until approved for so doing has been given by the Engineer, but backfilling about structures or portion of structures shall be done immediately when so ordered by the Engineer. The top surface of all slopes of all backfill shall be neatly graded off where selected topsoil, or sod or other material is removed and piled separately, such material shall be carefully replaced in a manner satisfactory to the Engineer. The top twelve inches of backfill shall be of as good quality as the original topsoil, which is removed.
2. COMPACTING REQUIREMENTS -- All backfill shall be placed and compacted in six (6") inch lifts for hand-tamped equipment and thirty (30") lifts of self-propelled or power driven equipment to the following minimum percent of Standard Proctor Density of Related Density as determined by ASTM D-698, "Test for Moisture-Density Relations of Soil and Soil Aggregate Mixtures", and ASTM D-2049 "Test for Relative Density of Cohesionless Soils", respectively. ASTM Test D-2049 shall be performed on cohesionless (Granular) soils.
   Cohesive backfill material shall reach the indicated compaction levels at plus (+) or minus (-) three (3%) percent of optimum moisture content. The lift thickness shall be reduced, if necessary, to meet the compaction requirements specified herein.

WATER LINE PIPE INSTALLATION DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1" = --

PROFILE SCALE
HORIZONTAL:
VERTICAL:
=

ATLAS PAGE NO.

DRAWN	--	-
DESIGNED	-	-
OFFICE ENGR.	-	-
CHIEF ENGR.	-	-

RECOMMENDED: DIRECTOR

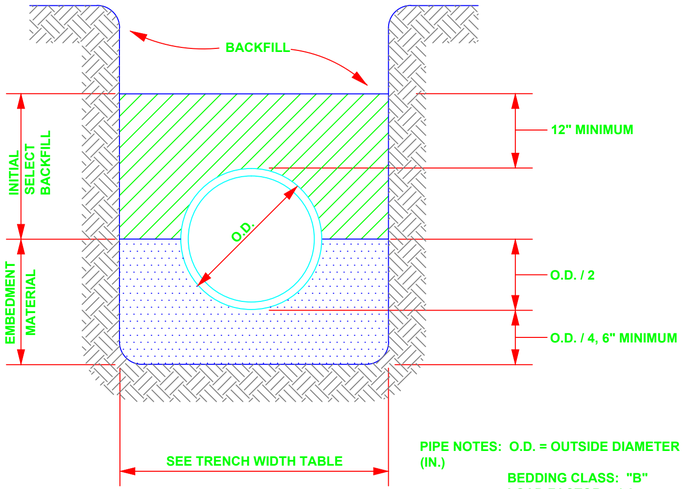
RECOMMENDED: ENGINEERING DIRECTOR

APPROVED: CITY ENGINEERING DEPT.

DATE: --

SHEET X OF X

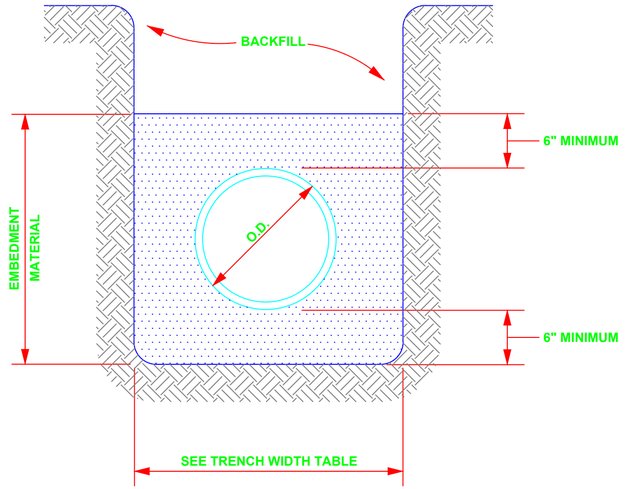
RIDGED PIPE INSTALLATION (RCP, VCP)



PIPE NOTES: O.D. = OUTSIDE DIAMETER (IN.)

BEDDING CLASS: "B"
LOAD FACTOR = 1.9

FLEXIBLE PIPE INSTALLATION (DIP, HDPE, PVC, RFP)



REINFORCED CONCRETE PIPE (RCP) MINIMUM PIPE DESIGN

1. HIGHWAYS -- Minimum pipe class for diameter twenty-four (24") inches to one-hundred-two (102") inches meeting the requirements of ASTM C-76 shall be as follows:

MAXIMUM DEPTH OF COVER (feet)	MINIMUM CLASS
10	III
10	III
10	III

For maximum depth of cover of thirty (30') feet, pipes ranging from twenty-four (24") inches to fifty-four (54") inches in diameter shall be designed and manufactured in accordance with ASTM C-655 and shall have the following minimum three-edge bearing strength for 0.01 crack (D 0.01) in pounds per lineal foot of inside diameter.

PIPE NOMINAL SIZE (in.)	D 0.01(lb./lineal ft. per ft. of inside diameter)
24	3200
27	3050
30	3050
33	3475
36	3475
42	3450
48	3300
54	3125

Pipes ranging in diameter from sixty (60") to one-hundred-two (102") inches in diameter shall be class V for a minimum depth of cover of thirty (30') feet when manufactured in accordance with ASTM C-76.

2. RAILROADS -- Minimum pipe class for E-80 Railroad live load pipe size twenty-four (24") inches to one-hundred-two (102") inches in diameter meeting the requirements of ASTM C-76. or ASTM C-655 shall be as follows:
   a MAXIMUM DEPTH OF COVER TEN (10') FEET -- Diameters twenty-four (24") inches to one-hundred-two (102") inches shall be Class VI.
   b MAXIMUM DEPTH OF COVER FIFTEEN (15') FEET -- diameters twenty-four (24") inches to forty-two (42") inches shall be Class V and forty-eight (48") inches to one-hundred-two (102") inches shall be Class VI.
   c MAXIMUM DEPTH OF COVER TWENTY (20') FEET -- Diameter twenty-four (24") inches to one-hundred-two inches shall be class V.
   d MAXIMUM DEPTH OF COVER TWENTY-FIVE (925") FEET -- Diameter twenty-four (24") inches shall have D 0.01 of thirty-one-hundred (3100lb./l.f.) pound/lineal foot per foot of inside diameter. Diameters twenty-seven (27") inches to one-hundred-two (102") inches shall be Class V.

PIPE NOMINAL SIZE (in.)	D 0.01(lb./lineal ft. per ft. of inside diameter)
24	3300
27	3125
30	3150
33	3575
36	3575
42	3550
48	3400
54	3225
60	3100

Diameters sixty-six (66") inches to one-hundred-two (102") inches shall be Class V.

BACKFILLING

1. DESCRIPTION -- Backfill is that portion of the total backfill down to but not including the pipe embedment material. The back fill shall be only material approved by the Engineer consisting of loose earth, free of clods, stones, organic matter, debris or other objectionable material. All backfilling shall be done in such a manner as not to disturb or injure the pipe or structures over or against which it is being placed. Any pipe or structure injured or moved from its proper line or grade during backfilling operations shall be opened up and repaired then rebackfilled as herein specified.
   The placing of backfill mater shall not begin until approved for so doing has been given by the Engineer, but backfilling about structures or portion of structures shall be done immediately when so ordered by the Engineer. The top surface of all slopes of all backfill shall be neatly graded off where selected topsoil, or sod or other material is removed and piled separately, such material shall be carefully replaced in a manner satisfactory to the Engineer. The top twelve inches of backfill shall be of as good quality as the original topsoil, which is removed.
2. COMPACTING REQUIREMENTS -- All backfill shall be placed and compacted in six (6") inch lifts for hand-tamped equipment and thirty (30") lifts of self-propelled or power driven equipment to the following minimum percent of Standard Proctor Density of Related Density as determined by ASTM D-698, "Test for Moisture-Density Relations of Soil and Soil Aggregate Mixtures", and ASTM D-2049 "Text for Relative Density of Cohesionless Soils", respectively. ASTM Test D-2049 shall be performed on cohesionless (Granular) soils.
   Cohesive backfill material shall reach the indicated compaction levels at plus (+) or minus (-) three (3%) percent of optimum moisture content. The lift thickness shall be reduced, if necessary, to meet the compaction requirements specified herein.

General Location	Percent Compaction (%)	
	Standard Proctor Density (ASTM D-698)	Standard Proctor Density (ASTM D-698)
Under Traffic Area or Improved Existing Surfaces	95	75
Urban & Residential Areas	90	70
Underdeveloped & Other Areas	85	70

3. COMPACTING METHODS -- Compacting methods may vary depending on the materials or as approved by the Engineer.
   a COHESIVE MATERIALS -- Compaction of cohesive materials may be obtained by the use of impact type equipment in confined areas; pneumatic tampers and engine driven rammers may also be used. In relatively narrow trenches, self propelled rammers may also be used. In wide trenches, sheepsfoot rollers may be used.

EMBEDMENT MATERIAL

Embedment is that material to be placed from a minimum of six (6") inches below bottom of the pipe to the springline (half pipe diameter) or to a minimum of six (6") inches above top of pipe for rigid and flexible pipes, respectively. the remaining material to be placed over the embedment is considered backfill.

MATERIAL MATERIAL REQUIREMENTS

1. GENERAL -- Embedment material for all rigid and flexible pipes shall be sand or in areas that is unstable crushed rock meeting the requirement of either ASTM D-2321, Class 1A, or ASTM C-33, Number 57 or 67 and graduations shown below:

Nominal Sieve Size	Percent Passing		
	ASTM D-2321	ASTM C-33	
	Class 1A	Number 57	Number 67
1 1/2 inch	100%	100%	.....
1 inch	ASTM D-2321	95 to 100%	100%
3/4 inch	.....	.....	90 to 100%
1/2 inch	.....	25 to 60%	.....
3/8 inch	.....	.....	20 to 55%
Number 4	≤10%	0 to 10%	0 to 10%
Number 8	.....	0 to 5%	0 to 5%
Number 200	≤5%	.....	.....

2. COMPACTION REQUIREMENTS -- All embedment material shall be placed in six (6") inch lefts to the following minimum percent of Standard Proctor Density as determined by ASTM D-698. "Tests for Moisture -- Density Relations of Soil-- Aggregate Mixtures', and ASTM D-2049, "Test for Related Density of Cohesionless Soils", respectively.

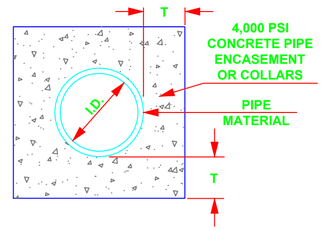
Compaction Test	Compaction Requirement
Standard Proctor Density	95%
Relative Density	75%

3. COMPACTION METHODS -- All embedment material shall be compacted in accordance with the methods described in Part "3" of "Backfilling."

TRENCH WIDTH TABLE

Pipe Nominal Size (inches)	Minimum Trench Width (feet)	Maximum Trench Width (feet)
≤12	3.00	5.00
15	3.25	5.00
18	3.50	5.00
21	3.75	5.25
24	4.00	6.00
27	4.25	6.25
30	4.50	6.75
33	4.75	8.25
36	5.25	9.00
42	6.25	9.50
48	7.00	11.00
54	8.00	11.50
60	9.00	12.00
66	9.75	13.00
72	10.50	13.00
78	10.50	13.50
84	11.00	14.00
90	11.50	14.50
96	12.00	15.00
102	12.50	15.50

PIPE ENCASEMENT AND COLLARS



NOMINAL DIAMETER (INCHES)	T (INCHES)
≤18"	6"
>18" & <30"	8"
>30" & <42"	10"
≤42"	12"

NOTE: FOR COLLARS, THE CONCRETE ENCASEMENT SHALL BE PLACED TO A MINIMUM OF TWELVE (12") INCHES ON EITHER SIDE OF THE JOINT.

WATER LINE PIPE INSTALLATION DETAILS

CITY OF GLENPOOL, OKLAHOMA

COMPANY NAME
ADDRESS, ETC.
ADDRESS, ETC.

REVISION	BY	DATE

PLAN SCALE: 1" =
PROFILE SCALE:
HORIZONTAL:
VERTICAL:
ATLAS PAGE NO:

DRAWN . .
DESIGNED . .
OFFICE ENGR. . .
CHIEF ENGR. . .
RECOMMENDED: DIRECTOR
RECOMMENDED:
ENGINEERING DIRECTOR

APPROVED:
CITY ENGINEERING DEPT.
DATE: .
SHEET X OF X