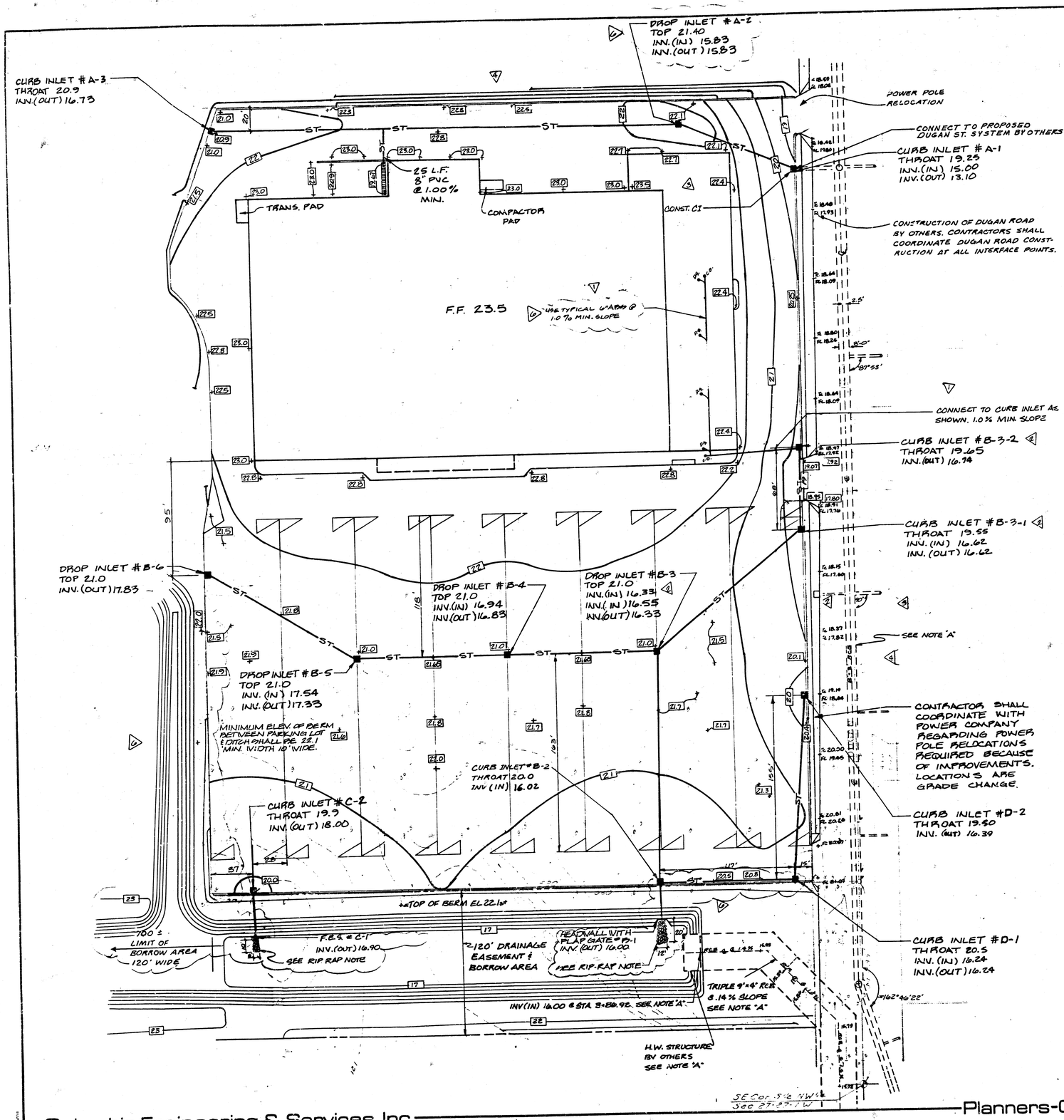


GRADING AND DRAINAGE PLAN NOTES

1. Existing topography, utilities, and roadway configurations shown are based upon a topographic survey prepared by:

   Baughman Company, P.A.
   330 Laura Street
   Wichita, Kansas 67211
   (316) 262-7271
   Dated: May 1986

2. Contractor shall verify existing topographic data, locations of existing utilities, and other site conditions prior to construction.

3. For site dimensional layout, see Drawing C-1, Staking Plan.

4. For utility information, see Drawing C-4, Utility Plan.

5. All construction within the Dugan Road and highway rights-of-way shall be coordinated with Dugan Road improvement plans prepared by Baughman Company.

6. All disturbed areas that are not proposed to be covered by blacktop or asphalt shall be grassed as soon as grading operations are completed. Areas shall be seeded with a mix of Kentucky 31 tall fesque and adelphi bluegrass. The mix shall be 90% fescue and 10% bluegrass by volume, sown at a rate of 5 lb/1000 s.f.

7. Borrow material will be required in order to bring the project site to the elevations shown. Borrow can be obtained from the 120' Ditch Easement at the South property line of the project. Limits of borrow would be Dugan Street to the east and 1300' to the west. The section and elevation of the drainage ditch in the easement shall be left as close as possible to the design of that ditch by:

   Baughman Company, P.A.
   330 Laura Street
   Wichita, Kansas 67211
   (316) 262-7271
   Dated: May 1986

8. Entire site shall be stripped of topsoil and organic matter prior to commencing filling operations. All fill should be placed in 8" maximum lifts at a minimum compaction of 88% of the modified proctor test. (ASTM)

NOTE "A"

SEE BAUGHMAN COMPANY STORM WATER SEWER PLAN PROJ. # 468-76-245-81589-000-000-001. FOR STORM & SANITARY SEWER SEE PROJ. # 472-76-245-81488-000-000-001 FOR DUGAN ROAD & TRIPLE 9'x4' BOX CULVERT.

RIP RAP NOTE

USE MINI d50=6" MINI THICKNESS OF THE RIP RAP = 12". USE PLASTIC FILTER CLOTH UNDER THE RIP RAP TO CONFORM TO ASTM D-1777 & ASTM D-1682 SEE DETAIL ON DRAWING C-5

NOTE TO CONTRACTOR

This project will be constructed under the supervision of the CITY ENGINEER and conforming to the SPECIFICATIONS of the CITY OF WICHITA. The CONTRACTOR will pay the City of Wichita for all costs of plan review, inspection and booking per contract.

APPROVED AS NOTED
BY CITY ENGINEER OF WICHITA

Sanitary Sewers _____
Storm Sewers VRH 10/22/86 Booked 8187 MCG
Driveway Approaches _____
Water Mains _____
Paving _____

PROJECT No. 468-76-245-80001-000-000-084

0 20 40 80 120 160
SCALE: 1" = 40'

Columbia Engineering & Services, Inc.
5775A Glenridge Drive
Suite 202
Atlanta, Georgia 30328
404 256-9088

DONALD V. SHILLINGTON LICENSED PROFESSIONAL ENGINEER KANSAS

Project
U.S. HWY. 54 & DUGAN STREET
WICHITA, KANSAS

Developer
TERRA VENTURE INC.
OVERLAND PARK, KANSAS

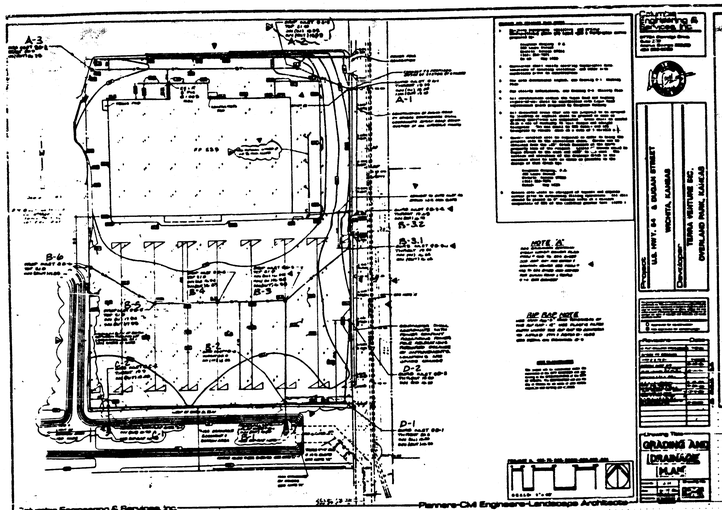
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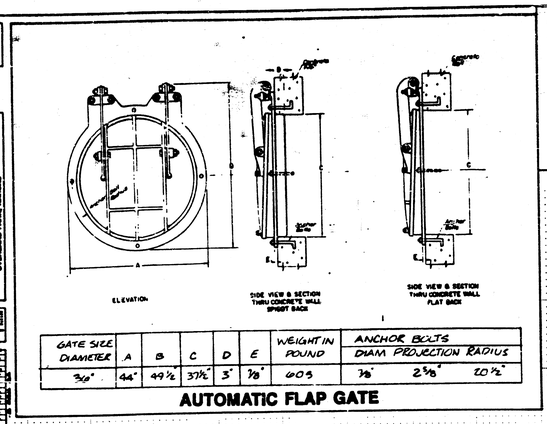
■ Approved for construction
□ Not approved for construction

Revisions	Date
15' FLAT SHOULDER DITCH GRADING	7-22-86
DUGAN RD GRADING	
LINE B-3 TO B1	7-30-86
GARDEN SHOP DR 2-24DC-1	8-25-86
PIPE LENGTH B2 TO B1	9-11-86
GRADING & CI @ B5-1	
A-2, A-1 & I/GRADING	9-18-86
ROAD ELEV. REVISIONS	9-30-86
GRADING BETWEEN A-3 & A-2	
ROAD CHANGES AND STORM STRUCTURES TIE DOWN	10-3-86
NOTE A & PIPE LENGTHS	
C-2 TO C-1 & C-2 TO B-1	
PIPE LENGTHS & INVERSIONS AT THE CURVE & TOP OF A-2	10-14-86

Drawing Title
GRADING AND DRAINAGE PLAN 1/3

Drawn By	J.H.	Drawing No.
Date	6-12-86	C-2
Project No.	1065	





GATE SIZE DIAMETER	A	B	C	D	E	WEIGHT IN POUND	ANCHOR BOLTS DIAM	PROJECTION	RADIUS
30"	44"	49½"	37½"	3"	⅞"	605	⅞"	2⅝"	20½"

AUTOMATIC FLAP GATE

NOTE:

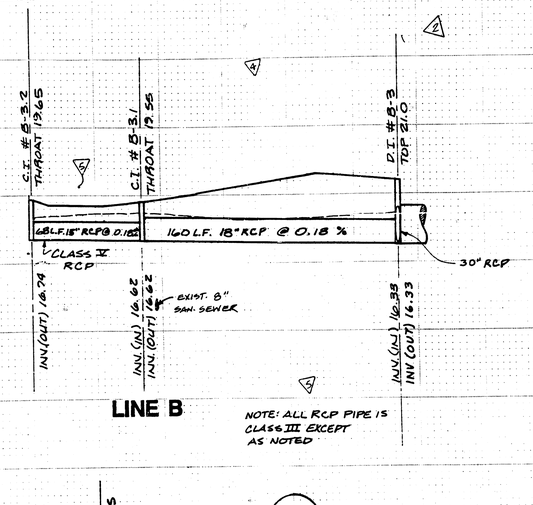
Automatic flap gates shall conform to the dimensions and approximate weights shown in the tables. The gate shall be installed in accordance with the manufacturers' recommendations.

When no water is against the face of the gate, the flap shall seat on the finished frame. Seating surfaces of both frame and flap shall be cast iron and machined to a close fit.

The gate flap, frame and links shall be cast iron. Anchor bolts, assembly bolts and nuts shall be galvanized steel.

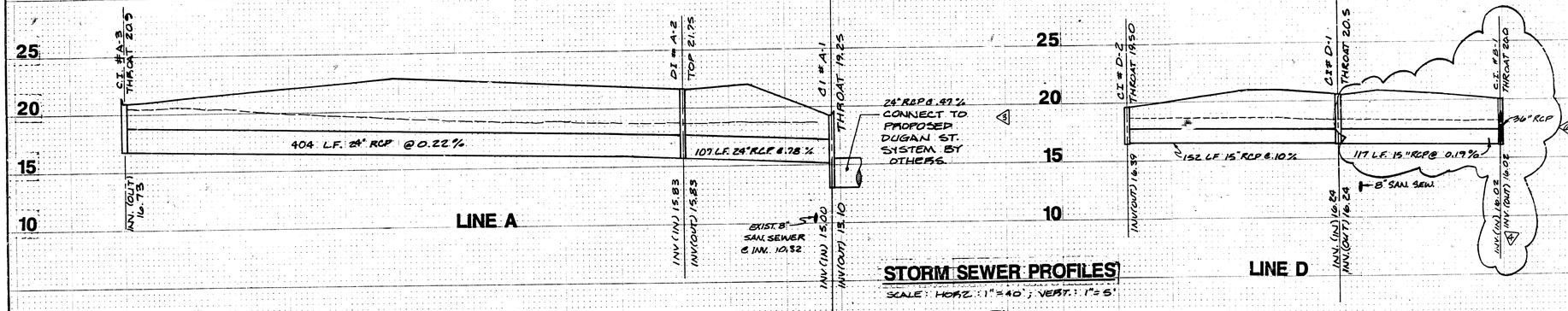
The gate is designed to withstand a maximum operating hood of ten (10) feet on the check side, measured from the center line of the gate to the high water level.

The illustrations, notes and table of dimensions shown are for the Armco Model 20C. However, a standard Waterman Model F-10 Flap Gate or equal may be used.



LINE B

NOTE: ALL RCP PIPE IS CLASS III EXCEPT AS NOTED

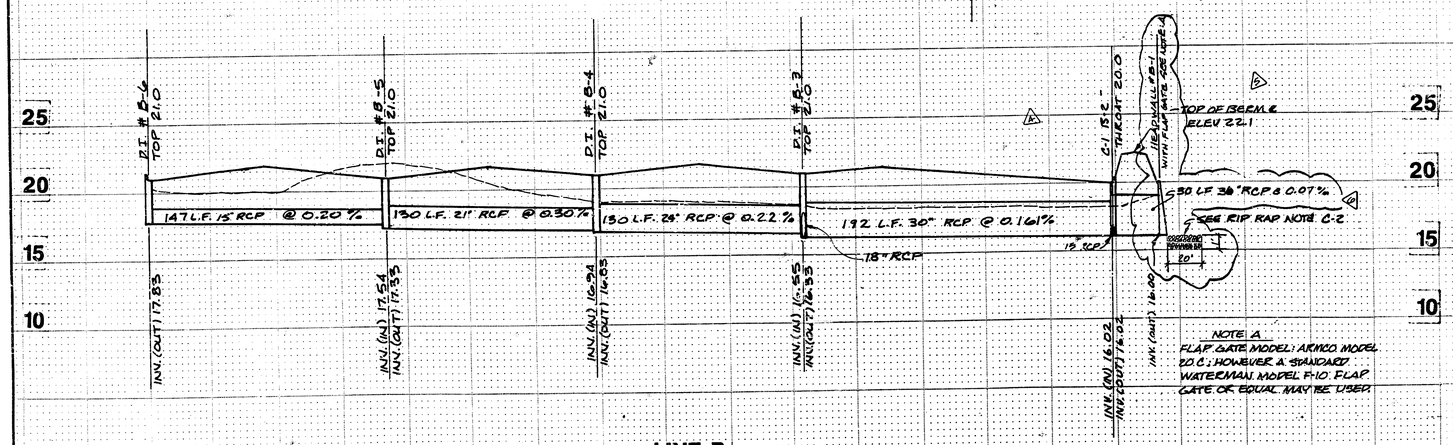


LINE A

LINE D

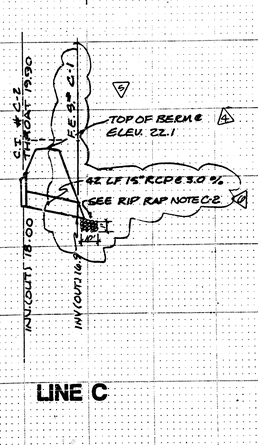
STORM SEWER PROFILES

SCALE: HORZ.: 1"=40'; VERT.: 1"=5'



LINE B

NOTE A
FLAP GATE MODEL: ARMCO MODEL 20 C; HOWEVER A STANDARD WATERMAN MODEL F-10 FLAP GATE OR EQUAL MAY BE USED.



LINE C

Columbia Engineering & Services, Inc.
5775A Glenridge Drive.
Suite 202
Atlanta, Georgia 30328
404 256-9088

DONALD W. SMITHSON LICENSED PROFESSIONAL ENGINEER 1934 KANSAS

Project
U.S. HWY. 54 & DUGAN STREET
WICHITA, KANSAS

Developer
TERRA VENTURE INC.
OVERLAND PARK, KANSAS

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■ Approved for construction
□ Not approved for construction

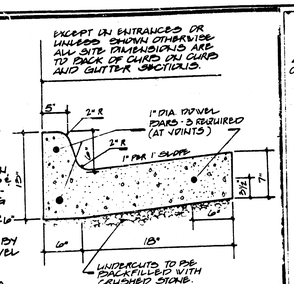
Revisions	Date
LINES "C" & "D" & "B2-1" TO BOX CONNECTION	7-22-86
LINE "B", "C", "D", RIP RAP INFO.	7-30-86
PIPE MATERIAL FROM C-2 TO B2-1 C-2 TO C-1	9-11-86
PIPE LENGTH A-2 TO A-1	
NEW THROAT ELEV. @ B3-1	
LINE A-2 TO A-1	9-18-86
SAN. SEWER REMOVAL	9-23-86
LINE B, C, D REVISIONS	9-30 86
LINE B & C REVISIONS	10-3-86
LINE D REV. INVERT IN B-2 & REV. TO H.W. ON B-1 & C-1	10-15-86

Drawing Title
PROFILES
2/3

Drawn By	A.M.	Drawing No. C-4
Date	6-12-86	
Project No.	1065	

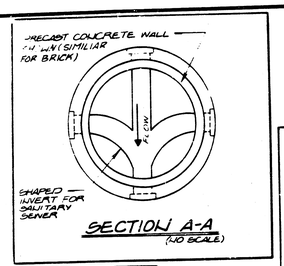
1. ALL CONCRETE TO BE 3000 P.S.I. 28 DAY, AIR ENTRAINED, BROOM FINISH.
2. CONCRETE TO TO BE CURED WITH A.A.S.H.T.O. APPROVED LIQUID MEMBRANE SEAL.
3. MINIMUM VERTICAL GRADE 0.50%.
4. MAXIMUM VERTICAL GRADE 9.00%.
5. PROVIDE REINFORCING AT ALL EXPANSION JOINTS. COLD JOINTS AND WHERE CURB & GUTTER WILL NOT BE POURED MONOLITHIC BY EITHER OF THE FOLLOWING METHODS:
   a. 1" DIA. SMOOTH DOWEL BARS(3) BY 1'-6" LONG W/ EXPANSION CAPS.
   b. 1" DIA. SMOOTH DOWEL BARS(3) BY 1'-6" LONG, COAT ONE END OF DOWEL W/ BITUMINOUS COATING.
6. A COLD JOINT WILL BE DEFINED AS A 20" MINUTE OR LONGER PERIOD ELAPSING BETWEEN POURS.

EXCEPT ON ENTRANCES OR UNLESS SHOWN OTHERWISE ALL SITE DIMENSIONS ARE TO BACK OF CURB ON CURB AND GUTTER SECTIONS.



CURB & GUTTER SECTION

NO SCALE



SECTION A-A

(NO SCALE)

DIMENSION CHART FOR BRICK OR PRECAST MANHOLE OR INLET		
Casting***	Inside Top Dimension	Application
R-1729	27" Circular	Sanitary Manhole
R-1730	27" Circular	Storm Manhole
R-3015	25" x 24"	Curb Inlet
R-3339 B	26" x 26"	Drop Inlet
R-3457 B	36 3/8" x 48 5/8"	Double Grate Drop Inlet**
R-4343	21" x 24"	Drop Inlet (Ditch or Non-pavement)

Depth "D"	Box Dimensions "W"
0' to 4'	Same as inside top dimensions for grate
4' and up (excluding double grate drop inlet)	4' Min. up to 36" dia. pipe Dia. of largest pipe plus 1'-0" for pipes larger than 36" *
Greater than 10' and double grate drop inlet	5' min. up to 48" dia. pipe Dia. of largest pipe plus 1'-0" for pipes larger than 48" *

*For pipe arches use span dimension instead of diameter.

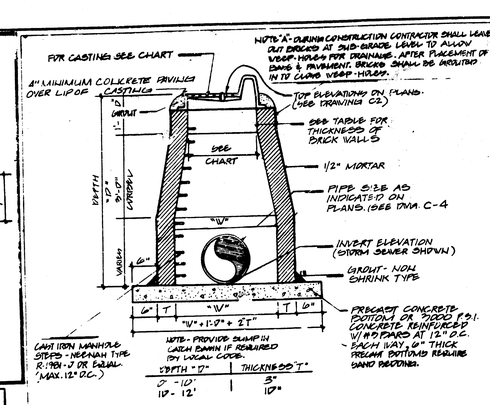
**Use round to rectangular adapter section when using precast manhole sections.

***Neenah Foundry (or equal)

FOR CASTING SEE CHART

4" MINIMUM CONCRETE FAIRING OVER LIP OF CASTING

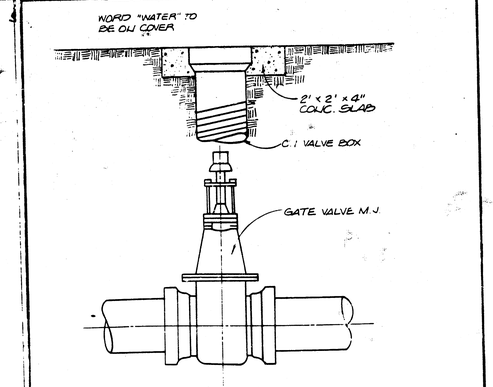
NOTE "A" DURING CONSTRUCTION CONTRACTOR SHALL LEAVE OUT BRICKS AT SIDE BRACES, LEAVE TO ALLOW WEEP HOLES FOR DRAINAGE. AFTER PLACEMENT OF BASE & PAVEMENT, BRICKS SHALL BE INSERTED IN TO CLOSE WEEP HOLES.



DEPTH - "D"	THICKNESS "T"
0' - 10'	8"
10' - 12'	10"

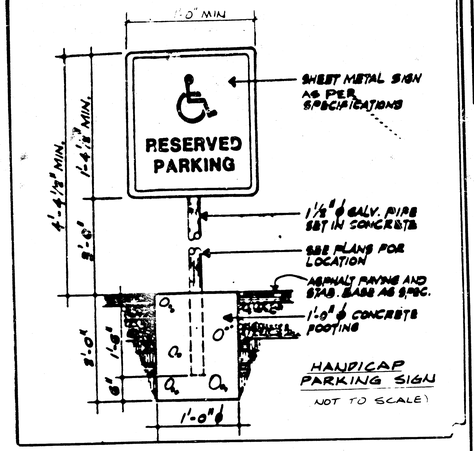
STORM SEWER BRICK MANHOLE OR INLET

SCALE: 3/8" = 1'-0"



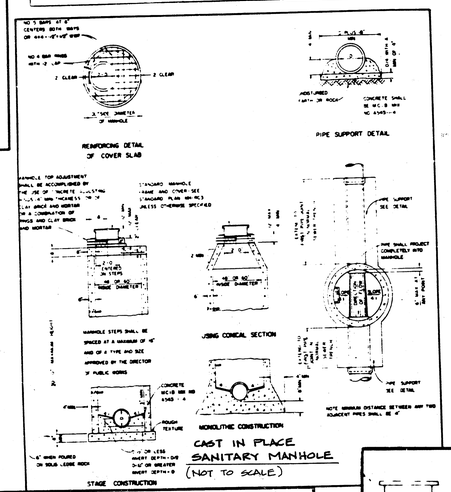
TYPICAL WATER VALVE INSTALLATION DETAIL

(NO SCALE)



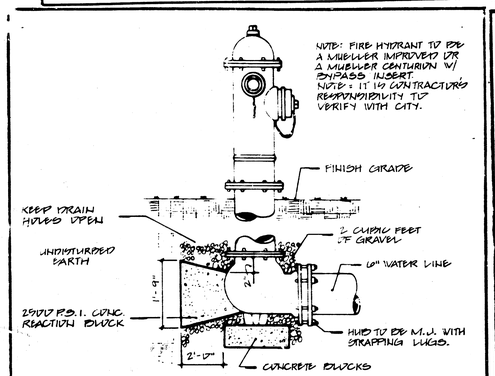
HANDICAP PARKING SIGN

NOT TO SCALE)



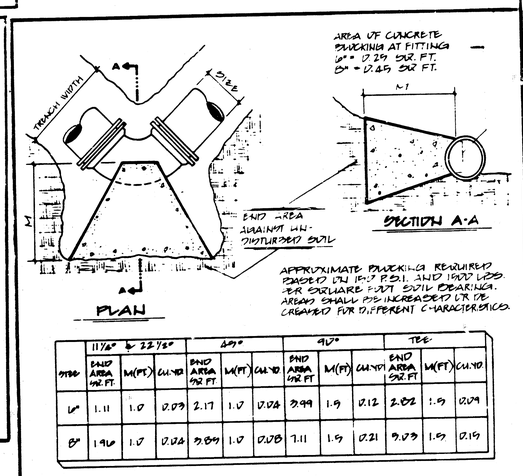
CAST IN PLACE SANITARY MANHOLE

(NOT TO SCALE)



TYPICAL FIRE HYDRANT

NO SCALE

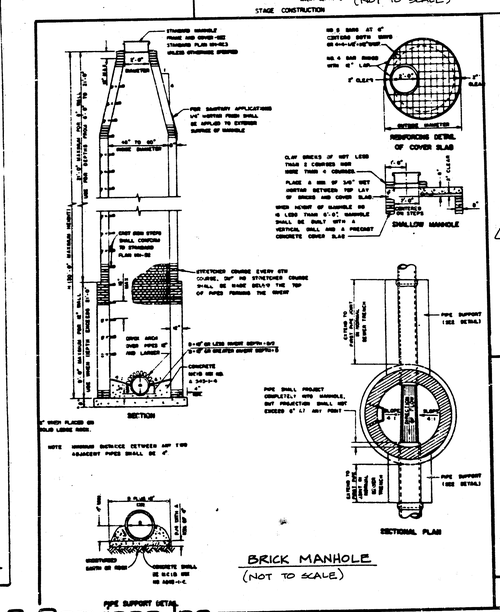


APPROXIMATE BLOCKING REQUIRED BASED ON 150 P.S.I. AND 1000 LBS. PER SQUARE FOOT SOIL BEARING. AREAS SHALL BE INCREASED FOR DIFFERENT CHARACTERISTICS. CREATED FOR DIFFERENT CHARACTERISTICS.

	11 1/4° & 22 1/2°			45°			90°			TEE		
PIPE DIA	END AREA SQ FT	M (FT)	CU. YD	END AREA SQ FT	M (FT)	CU. YD	END AREA SQ FT	M (FT)	CU. YD	END AREA SQ. FT	M (FT)	CU. YD
6"	1.11	1.0	0.09	2.17	1.0	0.06	3.99	1.9	0.12	2.02	1.9	0.09
8"	1.96	1.0	0.06	3.89	1.0	0.08	7.11	1.9	0.21	9.03	1.9	0.19

WATER MAIN BLOCKING DETAIL

NO SCALE

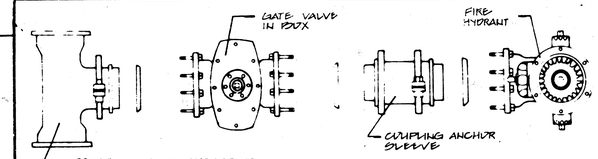


PRECAST STORM SEWER CATCH BASIN & MANHOLE

SCALE: 3/8" = 1'-0"

BRICK MANHOLE

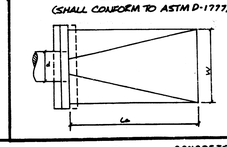
(NOT TO SCALE)



TYPICAL FIRE HYDRANT INSTALLATION

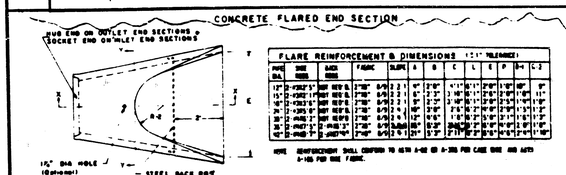
NO SCALE

NOTE: PLASTIC FILTER CLOTH UNDER RIP RAP (SHALL CONFORM TO ASTM D-1777, ASTM D 1682)



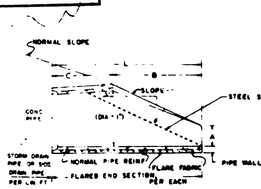
OUTLET B-1	OUTLET C-1
La = 20'	La = 10'
W = 12'	W = 6'
Q = 24.6 CFS	Q = 4.4 CFS
d = 36"	d = 15"
d_{50} = 6" STONE MIN.	d_{50} = 6" STONE MIN.
THICKNESS OF RIP RAP 12"	THICKNESS OF RIP RAP 12"

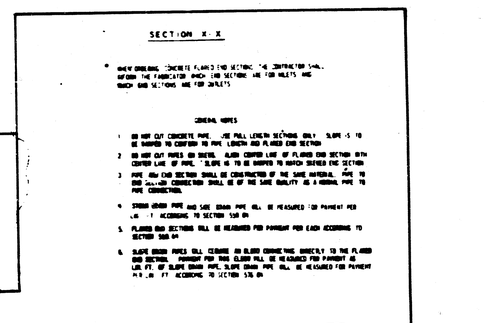
CONCRETE FLARED END SECTION



FLARE REINFORCEMENT & DIMENSIONS (1/2" TOLERANCE)													
PIPE DIA.	SIDE SLOPE	BACK SLOPE	FRAME	SLOPE	A	B	C	L	E	P	R+	C-2
12"	2 HOR 1 VERT	2 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"
12"	3 HOR 1 VERT	3 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"
12"	4 HOR 1 VERT	4 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"
15"	2 HOR 1 VERT	2 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"
15"	3 HOR 1 VERT	3 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"
15"	4 HOR 1 VERT	4 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"
18"	2 HOR 1 VERT	2 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"
18"	3 HOR 1 VERT	3 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"
18"	4 HOR 1 VERT	4 HOR 1 VERT	2 PIN	8.0%	2'-1"	3'-0"	1'-7"	4'-11"	2'-0"	1'-0"	1'-0"	1'-11"

NOTE: REINFORCEMENT SHALL CONFORM TO ASTM A-82 OR A-185 FOR CAST IRON AND ASTM A-496 FOR WIRE FABRIC.





Columbia Engineering & Services, Inc.
5775A Glenridge Drive,
Suite 202
Atlanta, Georgia 30328
404 256-9088

DONALD V. SHILLINGTON — LICENSED — KANSAS — NATIONAL COUNCIL

Project: U.S. HWY. 54 & DUGAN STREET
WICHITA, KANSAS

Developer: TERRA VENTURE INC.
OVERLAND PARK, KANSAS

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■ Approved for construction
□ Not approved for construction

Revisions	Date
CAST-IN-PLACE AND BRICK SANITARY MANHOLE DETAIL	7-22-86
CONC FES. DETAIL	7-30-86
RIP RAP	10-3-86

Drawing Title: **DETAILS** 3/3

Drawn By	J.H.
Date	10-12-86
Project No.	1065
Drawing No.	C-5