Division of Engineers
Environmental Engineering Section
June 23, 1988
Revised May 10, 1995

SOIL EROSION CONTROL PLAN
(SEWER INSTALLATION IN PAVED, NON-RURAL AREAS)

GENERAL

The control of soil erosion will be a dynamic process requiring flexibility to accommodate changing conditions as the sewer project progresses. The general erosion control measures are described on the plan and in this specification. Inlet Protection, Section A.1., shall be paid at a unit bid price. All other work under Sections A.2., B. and C. shall be included in the unit price bid for sewers. Any additional requirements for Inlet Protection ordered by the representative of the Commissioner of Public Works shall be paid at the unit bid price. All control measures protruding above the normal paved and/or ground surface shall be marked by barricades and flashers.

SECTION A. Control of surface runoff.

1. Storm water inlet and catch basin, hereinafter called inlet protection

Generally, inlets may be protected in one of three ways. Alternatives may be used, subject to approval by the Commissioner of Public Works. Protection shall be installed prior to disturbing any pavement or earth areas, and shall remain in place and maintained until the surface is restored with temporary or permanent pavement. Inlet protection shall be installed at all inlets that will receive runoff from the construction site, including adjacent streets, and where materials are stockpiled. Depending on the slope of the street, this will include inlets in the block(s) downstream from the work site due to anticipated bypassing.

a. Inlet Basket

1) Type of Inlet Baskets

a) City Frame (Type M)

Protection of City style inlets on paved surfaces shall conform to Figures 1, 1A and 1B, "Inlet Basket (Type M)", unless a modification is approved by the Commissioner of Public Works' representative.

b) State Frame (Type MM)

Protection of state style inlets shall conform to Figures 1C, 1D and 1E, "Inlet Basket (Type MM)", unless a modification is approved by the Commissioner of Public Works' representative.

2) The inlet basket shall be approximately 14 inches in depth. Certain non-typical inlets may require special configurations and/or shallower depth baskets.

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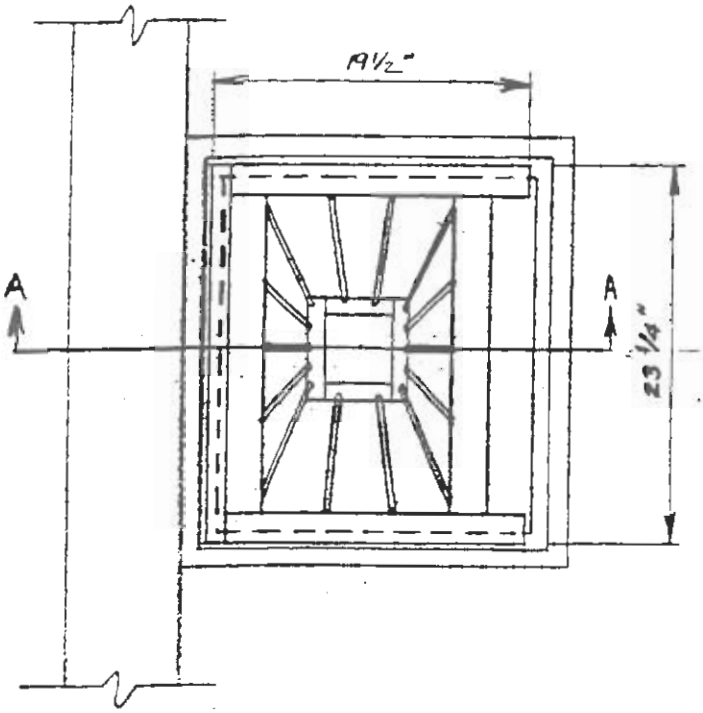
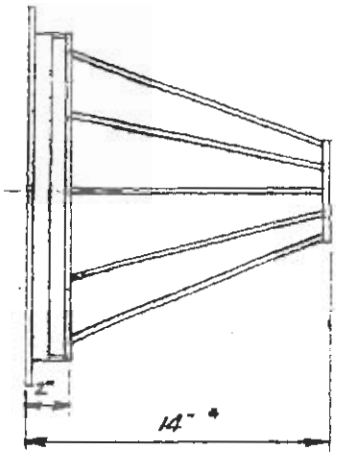
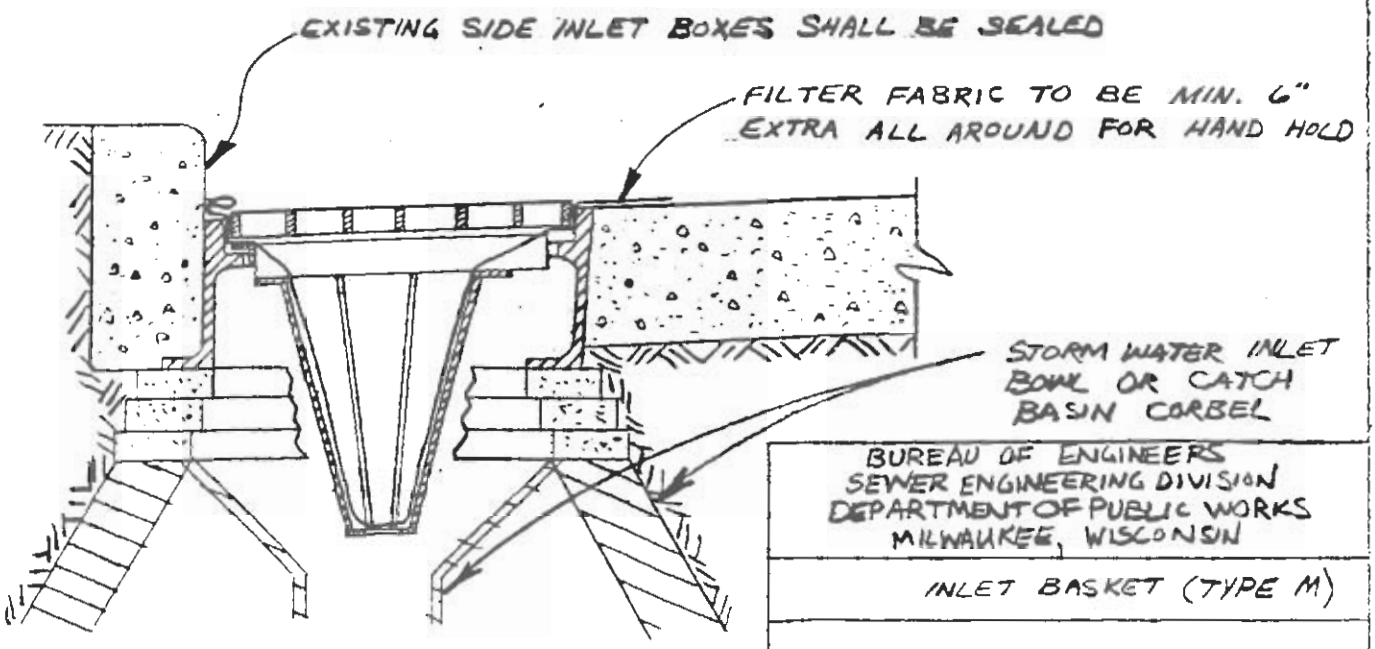


PLAN
(WITH FILTER FABRIC AND GRATE REMOVED)



FRONT VIEW
(BASKET ONLY)

* MAY BE DECREASED IF INLET IS OF INSUFFICIENT DEPTH



SECTION A-A

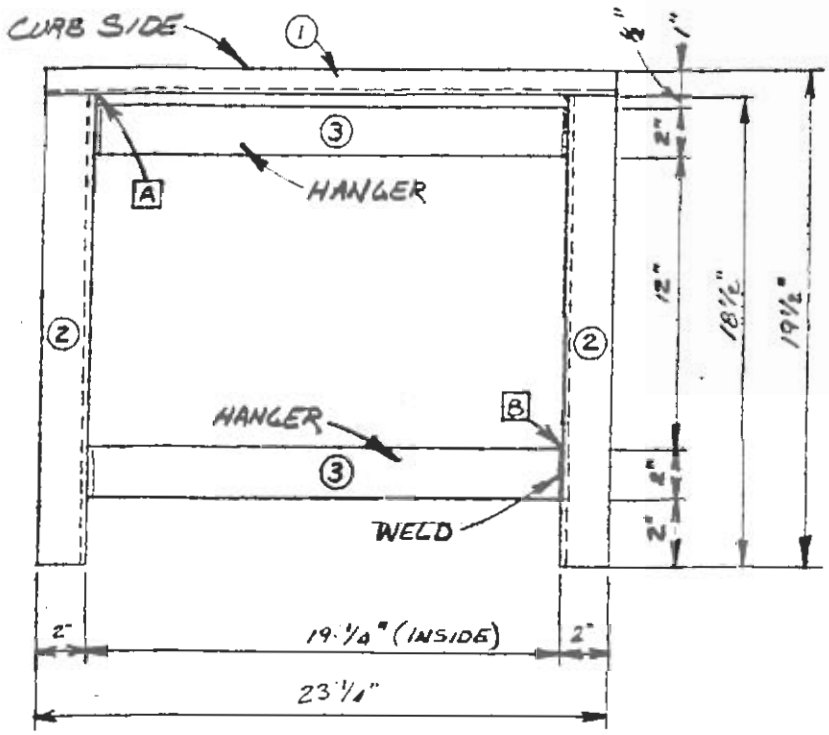
BUREAU OF ENGINEERS
SEWER ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
MILWAUKEE, WISCONSIN

INLET BASKET (TYPE M)

FIGURE 1

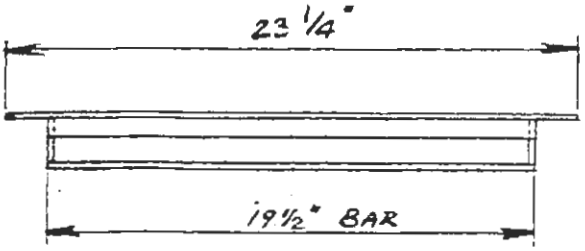
JUNE 23, 1988 SCALE = NONE

TOP FRAME AND BASKET HANGER

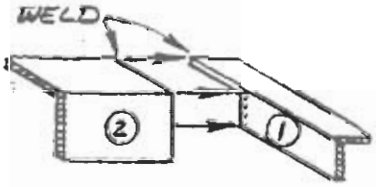


PLAN

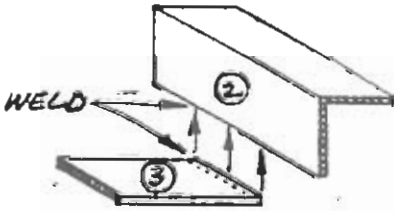
SIDE VIEW



FRONT VIEW



CONNECTION - A
TOP FRAME



CONNECTION - B
BASKET HANGER
TO TOP FRAME

BAR SCHEDULE

No.	SHAPE	SIZE	THICKNESS	LENGTH	QUANTITY
1	ANGLE	1" x 1"	1/8"	23¼"	1
2	ANGLE	2" x 2"	1/8"	18½"	2
3	BAR	2"	1/4"	19½"	2

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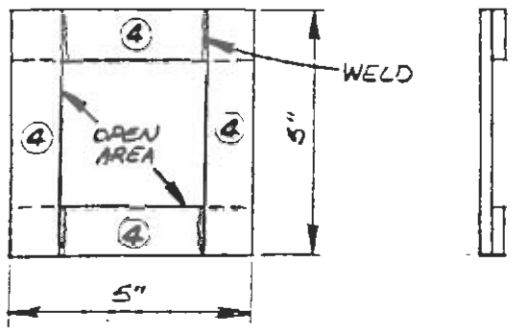
INLET BASKET - SHOP DRAWING
(TYPE M)

FIGURE 1A

JUNE 23 1988 SCALE = NONE

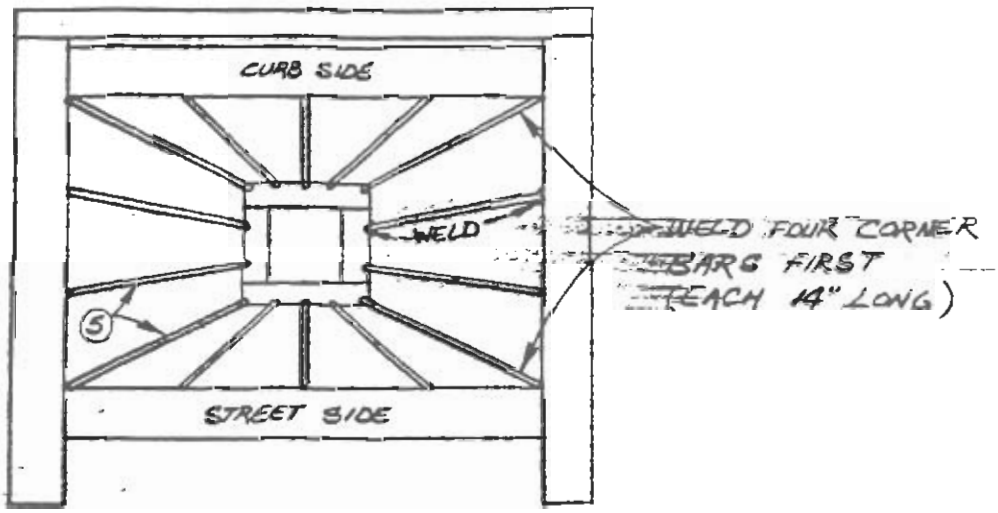
BOTTOM FRAME



BAR SCHEDULE

NO.	SHAPE	SIZE	THICKNESS	LENGTH	QUANTITY
4	BAR	1"	1/4"	5"	4

ROD PLACEMENT



ROD SCHEDULE

No.	SHAPE	SIZE	THICKNESS	LENGTH	QUANTITY
5	ROD	1/4" MIN.	–	12" TO 14" (CUT TO FIT)	14

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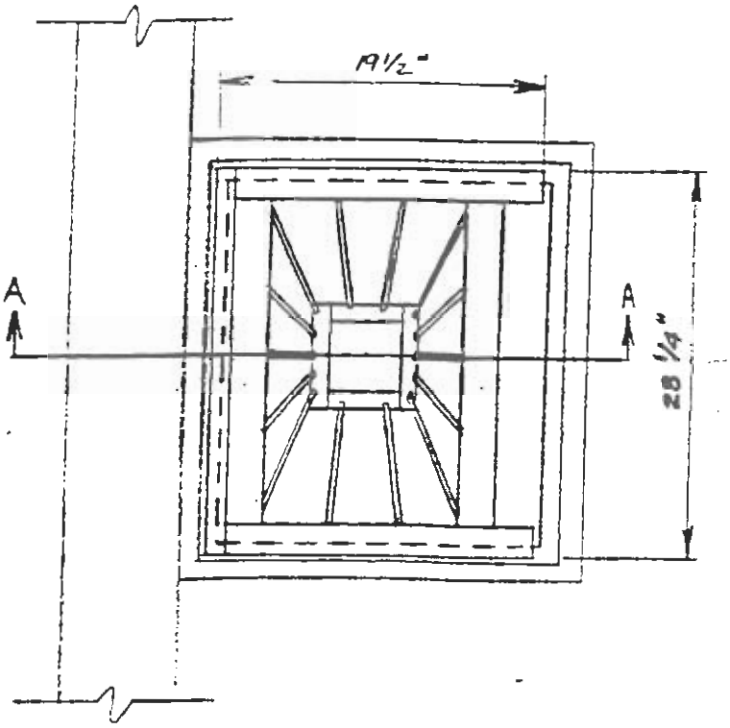
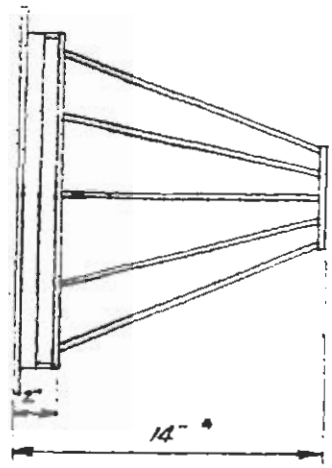
INLET BASKET - SHOP DRAWING
(TYPE M)

FIGURE 1B

JUNE 23 1988 SCALE: NONE

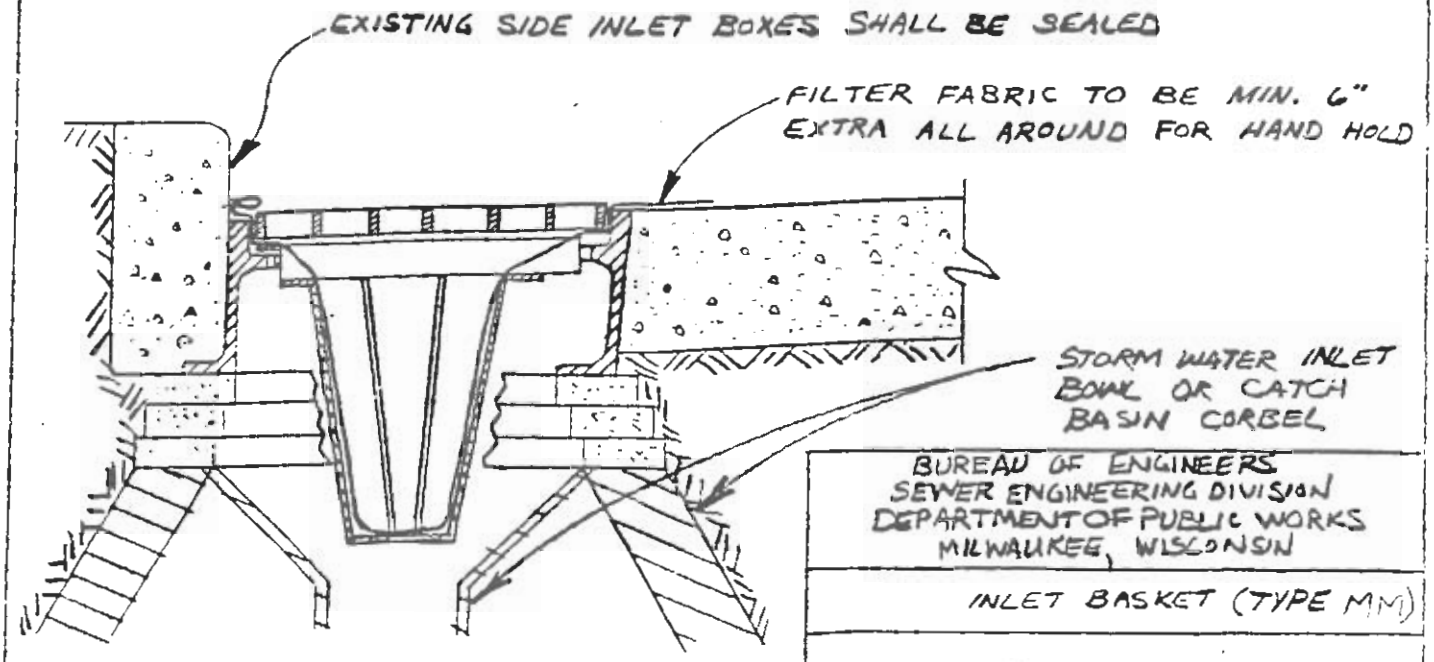


PLAN
(WITH FILTER FABRIC AND GRATE REMOVED)



FRONT VIEW
(BASKET ONLY)

* MAY BE DECREASED IF INLET IS OF INSUFFICIENT DEPTH



SECTION A-A

BUREAU OF ENGINEERS
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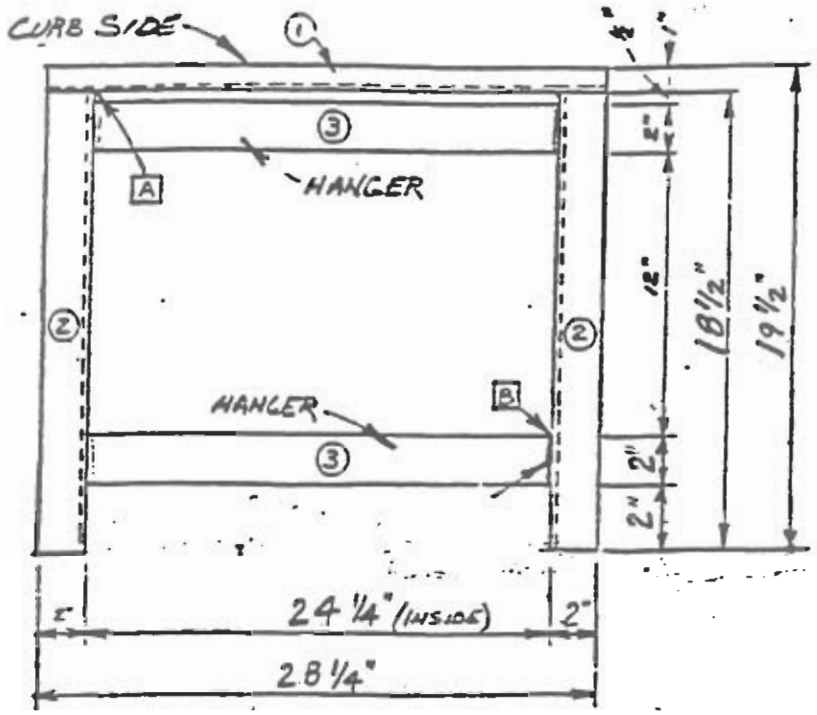
DEPARTMENT OF PUBLIC WORKS
MILWAUKEE, WISCONSIN

INLET BASKET (TYPE MM)

FIGURE 1C

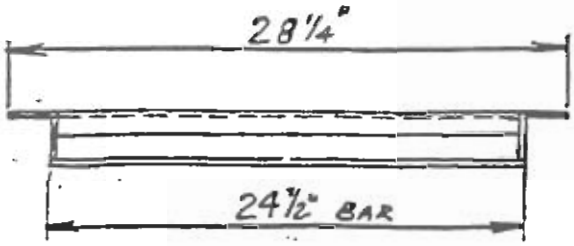
JUNE 23, 1988 SCALE = NONE

TOP FRAME AND BASKET HANGER

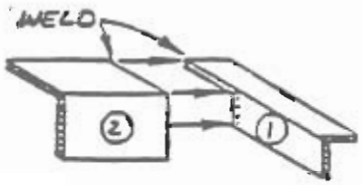


PLAN

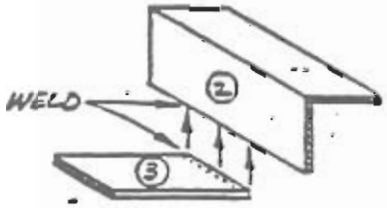
SIDE VIEW



FRONT VIEW



CONNECTION - A
TOP FRAME



CONNECTION - B
BASKET HANGER
TO TOP FRAME

BAR SCHEDULE

No.	SHAPE	SIZE	THICKNESS	LENGTH	QUANTITY
1	ANGLE	1" x 1"	⅛"	28¼"	1
2	ANGLE	2" x 2"	⅛"	18½"	2
3	BAR	2"	¼"	24½"	2

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INLET BASKET (SHOP DRAWING)
(TYPE MM)

FIGURE 1 D

JUNE 23 1968

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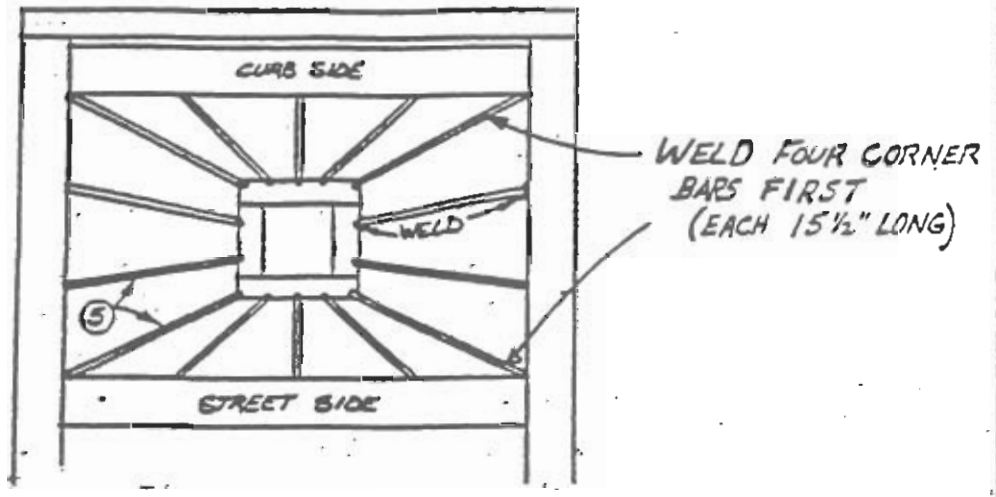
BOTTOM FRAME

BAR SCHEDULE

NO.	SHAPE	SIZE	THICKNESS	LENGTH	QUANTITY
4	BAR	1"	1/4"	5"	4

ROD PLACEMENT



ROD SCHEDULE

NO.	SHAPE	SIZE	THICKNESS	LENGTH	QUANTITY
5	ROD	1/4" MIN.	-	12" TO 15½" (CUT TO FIT)	14

BUREAU OF ENGINEERS
SEWER ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
MILWAUKEE, WISCONSIN

INLET BASKET (SHOP DRAWING)

FIGURE 1 E (TYPE MP)

JUNE 23 1988 SCALE: AS SHOWN

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3) The top frame of the basket shall be constructed with two short sides of 2 inch by 2 inch and a single long side of 1 inch by 1 inch, ⅛ inch angle iron. The basket hangers shall be constructed of 2 inch by ¼ inch iron bars. The bottom frame shall be constructed of 1 inch by ¼ inch iron bar or ¼ inch plate with center 3 inches removed.

4) The sides of the inlet basket shall be a minimum ¼ inch diameter iron rods or equal. A minimum of 14 rods shall be welded in place between the top frame/basket hanger and the bottom frame.

5) Filter fabric shall be pushed down and formed to the shape of the basket. The sheet of fabric shall be large enough to be supported by the basket frame when holding sediment and extend at least 6 inches past the frame. The inlet grate shall be placed over the basket/frame and will serve as the fabric anchor.

6) The filter fabric shall be a woven geo-textile fabric; polyester, polypropylene, stabilized nylon, polyethylene or polyvinylidene chloride meeting the following specifications:

Grab Strength: 200 lb. minimum in any principal direction (ASTM D-4632)

Mullen Burst Strength: Minimum 400 psi (ASTM D-3786)

The fabric shall have an opening no greater than a number 40 U.S. Standard Sieve and a minimum permeability of 140 gpm/sq.ft. (Multiply the Permittivity in Sec.$^{-1}$ from ASTM D4491-85 Constant Head Test using the conversion factor of 74.)

7) The inlet basket shall be inspected within 24 hours after each rainfall or daily during extended periods of precipitation. Repairs shall be made immediately, as necessary, to prevent particles from reaching the sewerage system and/or causing surface flooding.

8) Sediment deposits shall be removed after each storm event, or more often if the fabric becomes clogged.

9) If the inlet being protected has a side inlet box, the inlet box shall be sealed until inlet protection is no longer needed.

b. Inlet Screen (Paved)

1) Type of Inlet Screen

a) Inlet Screen, Horizontal Grate (Type N)

An alternate method of protection of inlets, having a horizontal grate or horizontal grate and side inlet box on paved surfaces, shall conform to Figure 2, "Inlet Screen (Paved)(Type N)", unless a modification is approved by the Commissioner of Public Works' representative.

b) Inlet Screen, Vertical Grate (Type NN)

An alternate method of protection of "Bulldog" type frame and grate inlets, having a sloping vertical side inlet, shall conform to Figure 2A, "Inlet Screen (Paved)(Type NN), unless a modification is approved by the Commissioner of Public Works' representative.

2) Comments from Sec. A.1.a., sub. (6) and (7) shall apply.

3) The inlet screen shall be 12 to 14 inches in height.

4) Filter fabric shall be supported by minimum 14 gauge welded wire support fence with a maximum 1 inch x 2 inch mesh. The wire mesh shall extend 4 inches to 6 inches along the surface of the pavement.

5) Filter fabric shall fold over the top of the support at least 2 inches and be wired in place or fastened with wire rings, 12 inches on center. Fabric shall extend along pavement at least 12 inches to form a seal that prevents silt from flowing underneath. Gravel filled nylon bags shall be placed on top of the filter material to keep it in contact with the pavement. The bags shall be placed end to end and continuous along the outside edge of the screen so that a seal is maintained.

6) Sediment deposits shall be removed after each storm event, or when reaching a maximum depth of 3 inches.

7) If the street is open for traffic, at least one barricade and flasher shall be placed at each protected inlet.

8) In paved areas without curb, the Inlet Screen (Paved)(Type N) shall be 36 inches square. The welded wire support fence and filter fabric shall extend 6" and 12" respectively on all four sides and flush with the pavement. The Inlet Screen (Paved) shall be held in place by gravel filled nylon bags previously described.

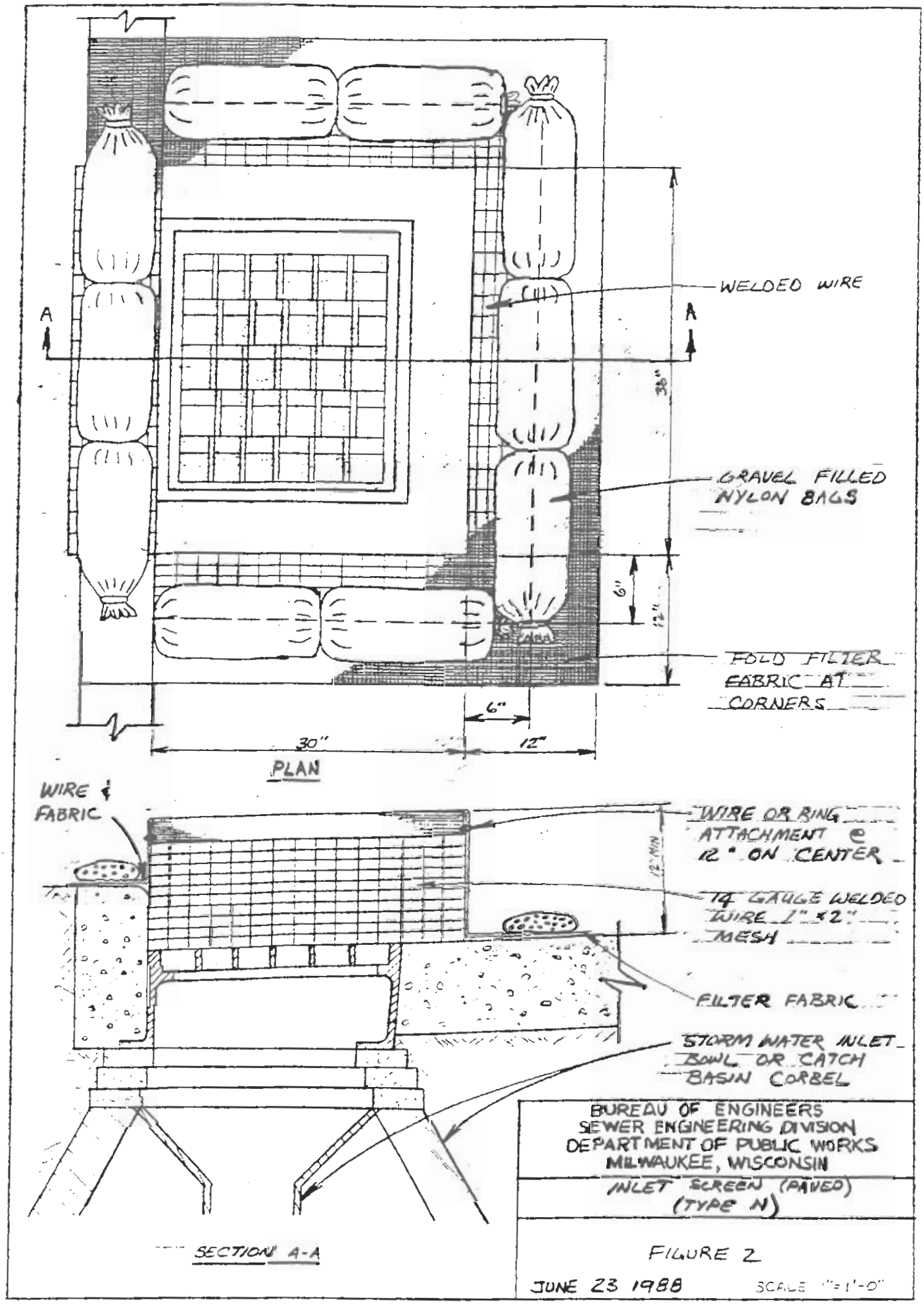
c. Inlet Grate Screen (Type P)

1) In certain instances such as for inlets on side streets or other places where it is not necessary to have a full inlet basket or would not be practical to place an Inlet Screen (Paved) on the surface, the protection may be placed under the grate as shown in Figure 3, "Inlet Grate Screen".

2) Comments from Sec. A.1.a. sub. (6) and (7) shall apply.

3) The inlet grate is removed and a single sheet of filter fabric shall be held stretched across the opening. A reinforcing material may be added to prevent sagging. The inlet grate is replaced to secure the filter fabric. For handling purposes the fabric shall extend at least 6 inches beyond the inlet opening in each direction.

4) Sediment deposits shall be removed after each storm event, or when reaching a maximum depth of 1".


WELDED WIRE
A
A
GRAVEL FILLED NYLON BAGS
FOLD FILTER FABRIC AT CORNERS
30"
6"
12"
6"
30"
12"
PLAN
WIRE & FABRIC
WIRE OR RING ATTACHMENT @ 12" ON CENTER
12" MIN
14 GAUGE WELDED WIRE 1" x 2" MESH
FILTER FABRIC
STORM WATER INLET BOWL OR CATCH BASIN CORBEL
SECTION A-A
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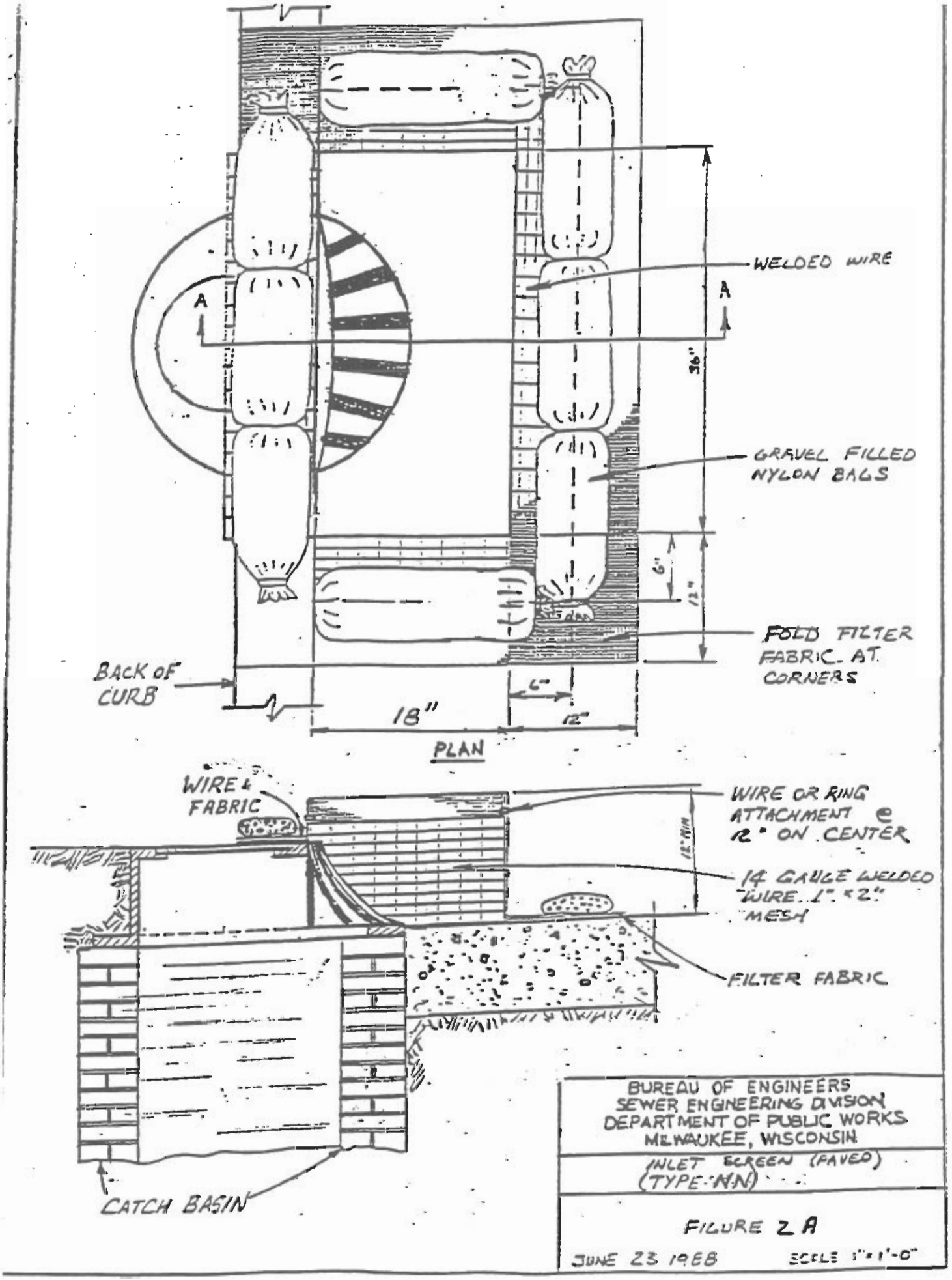
MILWAUKEE, WISCONSIN
INLET SCREEN (PAVED)
(TYPE N)
FIGURE 2
JUNE 23 1988
SCALE 1"=1'-0"


WELDED WIRE
A
A
36"
GRAVEL FILLED NYLON BAGS
6"
12"
FOLD FILTER FABRIC AT CORNERS
BACK OF CURB
6"
18"
12"
PLAN
WIRE & FABRIC
WIRE OR RING ATTACHMENT @ 12" ON CENTER
12" MIN
14 GAUGE WELDED WIRE 1" x 2" MESH
FILTER FABRIC
CATCH BASIN
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DEPARTMENT OF PUBLIC WORKS
MILWAUKEE, WISCONSIN
INLET SCREEN (PAVED)
(TYPE-NN)
FIGURE 2A
JUNE 23 1968
SCALE 1" = 1'-0"

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5) Extreme care must be taken in cleaning and removing the filter material. After the sediment is removed from around the inlet area and the filter material secured, the grate may be lifted. The filter material can then be removed and cleaned or replaced if clogged.

2. Gutter Detention

a. In areas where the street grade is greater than 4%, additional control is necessary to reduce flow velocity and to prevent sediment from bypassing the inlet screen/inlet grate screen.

b. Gravel filled nylon bags each containing a minimum of ½ cubic foot of material shall be placed in the gutter section with the long dimension of the bag perpendicular to the street line, butting against the curb face at approximately 75 foot intervals.

c. Sediment deposits shall be cleaned after each storm event.

d. If the street is open for traffic, a barricade with flashers shall be placed by each bag.

e. The protection shall be installed prior to disturbing any pavement or earth areas, and shall remain in place and be maintained until the surface is restored with temporary or permanent pavement.

SECTION B. Control of Trench Sediment

1. Dewatering

a. If it becomes necessary to pump water from any trench or excavation, it shall be the contractor's responsibility to remove particles greater than 100 microns. To demonstrate that settling or filtering is not required, all particles must pass through a U.S. Standard No. 140 sieve.

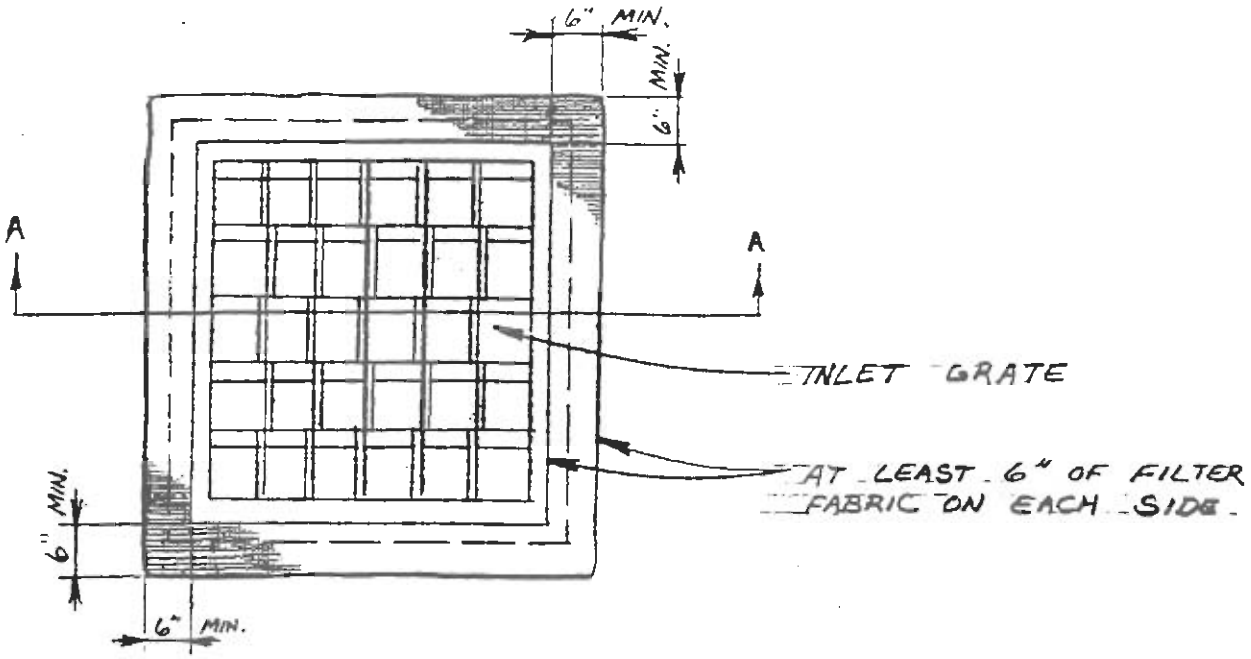
b. Methods of Removal

1) Pumped water requiring particle removal may be settled in portable tanks. The tank capacity must be large enough to allow for sufficient settling time to remove particles greater than 100 microns. The contractor may add a flocculation substance to enhance the settlement process.

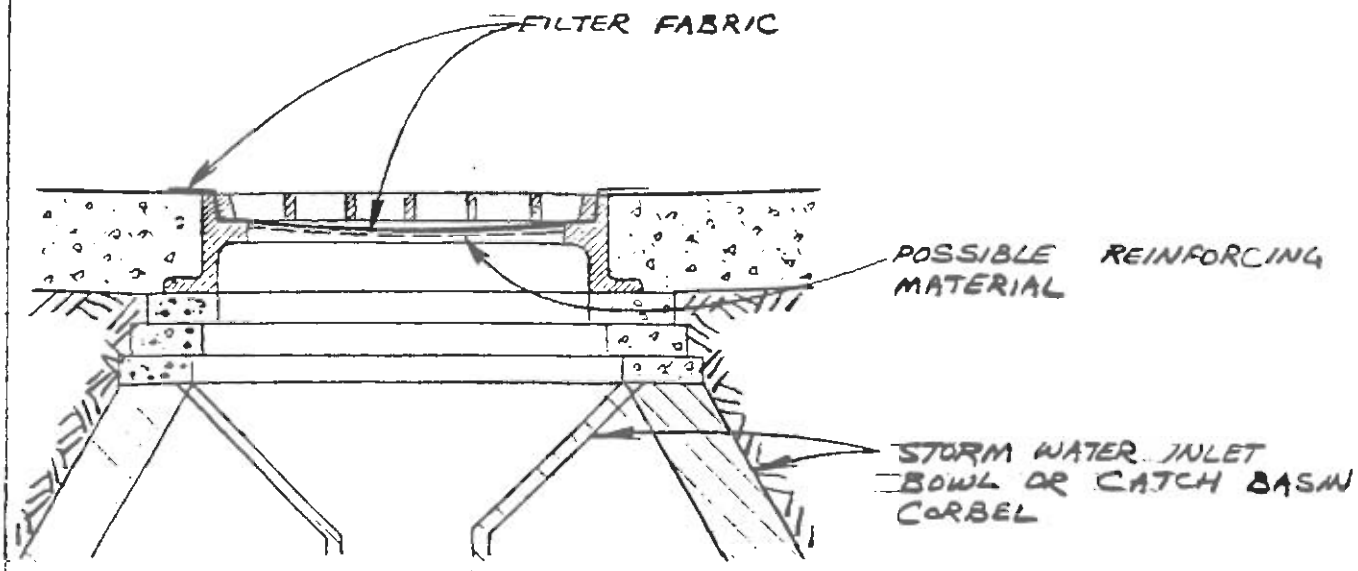
2) A second method of treating pumped water may be as shown in Figure 4, "Temporary Settling Basin". This basin should be placed on the paved surface near a protected inlet. If a temporary settling basin is to be left unattended, it shall be covered with a half inch plywood or similar safety cover. Due to space and traffic constraints, this method must have prior approval from the Commissioner of Public Works' representative.

3) The fabric shall be geo-textile fabric; polyester, polypropylene, stabilized nylon, polyethylene or polyvinylidene chloride meeting the following specifications:

Grab Strength: 400 lb minimum in any principal direction
(ASTM D1682)



PLAN



SECTION A-A

BUREAU OF ENGINEERS
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DEPARTMENT OF PUBLIC WORKS
MILWAUKEE, WISCONSIN

INLET GRATE SCREEN
(TYPE P)

FIGURE 3

JUNE 23 1988 SCALE: 1" = 1'-0"

Mullen Burst Strength: Minimum 600 psi (ASTM D774)

The fabric shall have an opening no greater than a number 140 U.S. Standard Sieve, and a minimum permeability of 25 gpm/sq.ft. (Multiply the Permittivity in Sec.$^{-1}$ from ASTM. D4491-85 Constant Head Test using the conversion factor of 74.)

4) Other methods demonstrated to produce the desired results may be submitted for approval by the Commissioner of Public Works.

2. Downstream Sewer Protection

a. Relay Sewer Work

At the end of each work day, the contractor shall protect the entire exposed length of the sewer. At the end of the new sewer, the flume shall go through a plywood shield "dog house" that fits tightly around the pipe. At the other end, the flume shall extend a minimum of 2 ft. inside the old sewer, and it shall be covered tightly. No sediment is allowed to go through the sewer at any time during construction. (See Figure 4A)

Section C. Material Stockpiles

1. Material stockpile protection plan is the responsibility of the contractor as provided in Section 290-11.1.a. of the Milwaukee Code of Ordinances, and must be approved by the Department of Public Works before a permit is issued.

2. All pre-cast manholes delivered to the construction site shall be clean from particle/sediment deposits.

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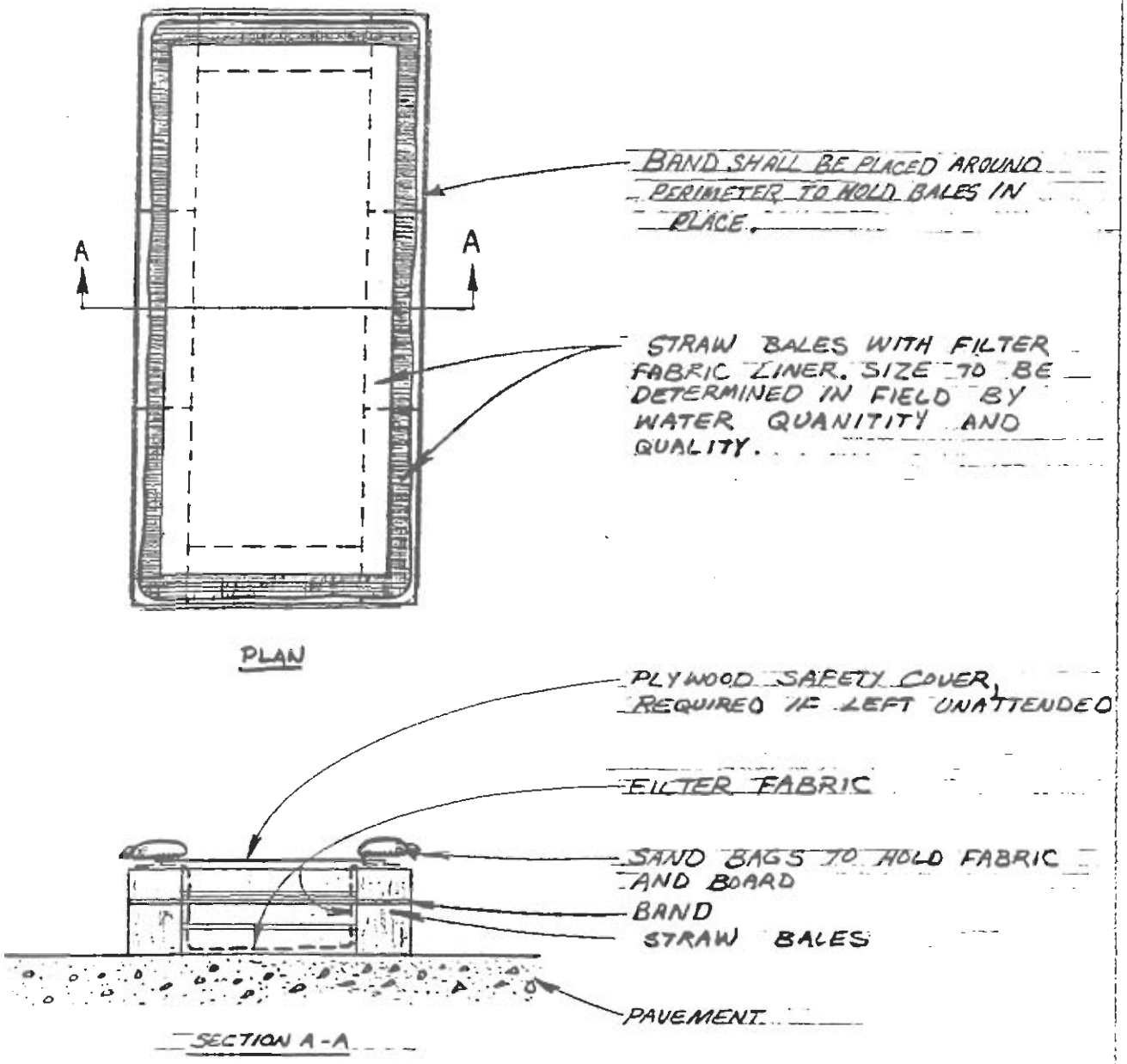

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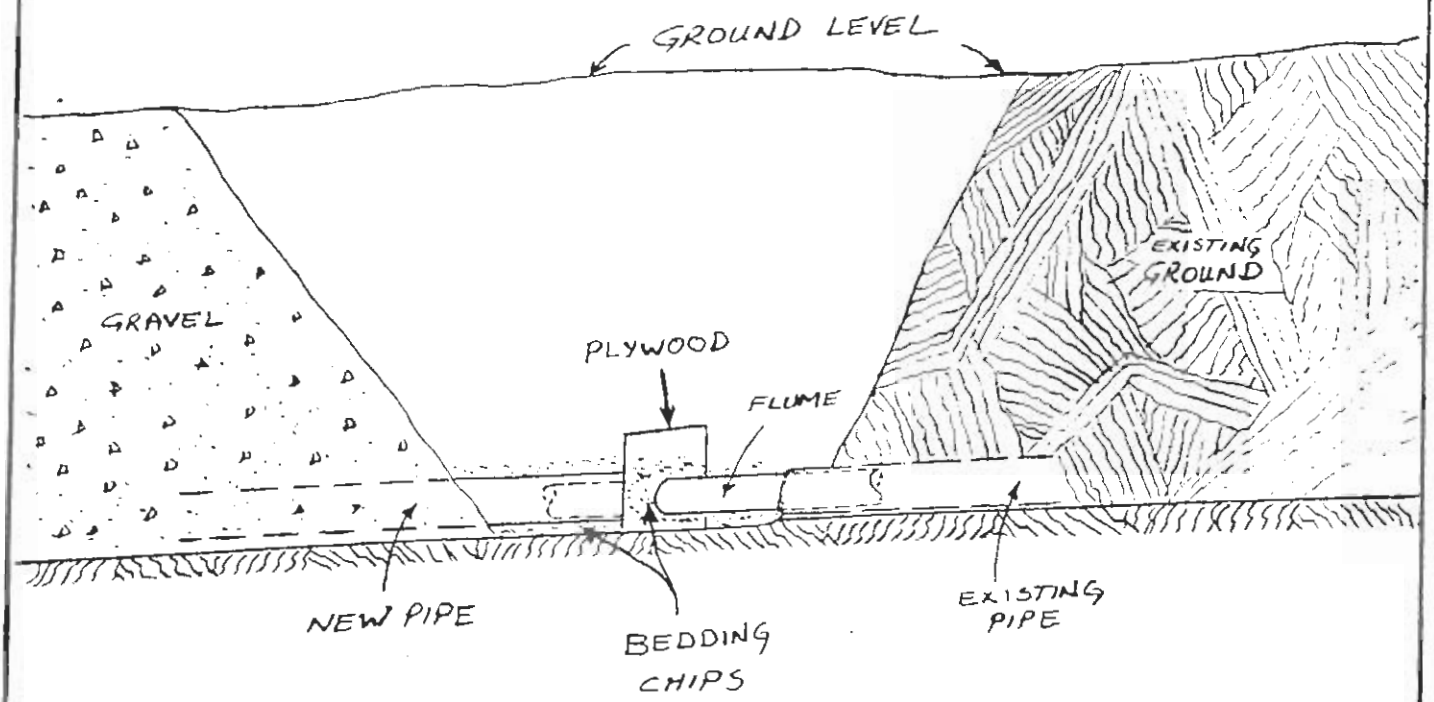
MILWAUKEE, WISCONSIN

TEMPORARY SETTLING BASIN

FIGURE 4

JUNE 23 1988

SCALE: 1"=3'0"



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MILWAUKEE, WISCONSIN

DOWNSTREAM SEWER PROTECTION

FIGURE 4A

MAY 10, 1995 SCALE = NONE