

## CONSTRUCTION AND MATERIAL SPECIFICATIONS

### SECTION I STORMWATER AND APPURTENANCES

#### A. Scope

The specifications outlined herein are for specific application to furnishing and installing Stormwater Sewer, Catch Basins, and Miscellaneous Drainage Structures.

#### B. Materials

1. Reinforced cement concrete pipe shall meet the requirements of AASHTO Designation M-170. Pipe class, height of cover, and pipe specifications shall be in accordance with Penn DOT Form 408, latest revision. Reinforced cement concrete pipe shall be used in all areas within the street right-of-way and shall be located within said right-of-way.
2. Corrugated Polyethylene pipe for tubing and fittings 4" to 6" shall meet the requirements of AASHTO Designation M252 and ASTM F405. Pipe gage, pipe class, height of cover, and pipe specifications shall be in accordance with Penn DOT 408, latest revision.
3. Corrugated Polyethylene pipe for pipe and fittings 15" to 48" with a integrally formed smooth interior shall meet the requirements of AASHTO Designation M294 & MP6-95 and ASTM F667. Pipe gage, pipe class, height of cover, and pipe specifications shall be in accordance with Penn DOT 408, latest revision. Minimum diameter for polyethylene pipe shall be 15". Polyethylene pipe may be used in areas outside the street right-of-way unless directed by the Township Engineer.
4. Concrete and Mortar:
  - a. Mortar – Materials for mortar for masonry joints shall conform to the following specifications:

Cement = Penn DOT Type NB or NC

Fine Aggregate = Penn DOT Type A or C

Water = Reasonably clean, free from vegetable matter, oil, acid, alkali, sugar, or other substances injurious to the finished product. Water shall be tested in accordance with PTM No. 500.

Mortar for laying and backing shall be composed of 1 part cement and 2 parts fine aggregate mixed with sufficient water to form a plastic composition.

For other special use mortar, materials and mixing shall be in accordance with Penn DOT Form 408, latest revision.

- b. Concrete – Concrete shall be mixed and placed in accordance with Section III herein.
5. Pre-cast reinforced concrete catch basins shall meet the requirements of AASHTO M-199, and shall be similar in all essential respects to the units as manufactured by York Concrete Septic Tank Co., York, Pennsylvania, and shall be constructed in accordance with the drawings contained at the end of this section.
6. Manholes shall be either pre-cast reinforced shallow type or typical type constructed in accordance with the drawings contained at the end of this section.
7. Headwalls and special structures shall be constructed in accordance with Penn DOT Form 408, latest revision, Penn DOT Standards and Roadway Construction, latest revision, and the drawings contained at the end of this section.
8. Special designs or other materials not outlined herein but approved for use by Penn DOT may be substituted or utilized only with the permission of the Township Engineer.
9. Manhole steps shall be made of non-corrosive aluminum, or steel reinforced fiberglass or polypropylene materials.
  - a. Steel reinforced copolymer polypropylene plastic steps shall be model No. PS-2-PFS, manufactured by M. A. Industries, Inc. of Peachtree City, Georgia, or approved equal.
  - b. Aluminum alloy steps (Alloy 6061-T6) shall be model No. F-140, manufactured by Washington Aluminum Company, Inc., of Baltimore, MD, or approved equal and shall have a protective coating consisting of asphalt coating conforming to AASHTO M-190 requirements applied to the portion to be embedded in the concrete.
  - c. Steel reinforced fiberglass steps shall be model No. 115 manufactured by R.J. Manufacturing, Inc., of San Antonio, Texas, or approved equal.
  - d. Steps in precast walls shall terminate 1" from outer surface and shall be cast in place wherever possible or grouted with a water proof, non-shrink grout.

10. Pavement base drains and pipe underdrains shall be constructed of the size and type indicated on Exhibit 9 and in accordance with Section 610, Publication 408 latest revision.

C. Construction Methods

1. Trench for pipe shall not be wider than twice the outside diameter of the pipe. The bottom of the trench shall be shaped carefully to fit the bottom of the pipe for a depth of approximately 30 percent of the outside diameter of the pipe plus 4 inches. A fine aggregate bedding not less than 4 inches thick shall be placed thereon and accurately shaped by means of a template to provide a uniform contact under the pipe. (Penn DOT Class B Bedding.) Do not advance trenching operations more than 100 feet ahead of completed pipeline, except as specified in the State Highway Occupancy Permit.

2. Backfilling

- a. In legal or dedicated right-of-way of existing or proposed Township streets and State Highways.

Material obtained in trench excavation in the legal or dedicated right-of-way of existing or proposed Township streets and State Highways shall not be utilized for backfill. Granular material (Penn DOT 2A minimum) shall be used to bed the pipe and to backfill the pipe within two inches of the road surface.

Methods of backfill placement shall conform to the requirements of Penn DOT Form 408.

Temporary repaving of the existing macadam surface shall consist of 1" thick ID-2A binder course applied and rolled prior to opening to traffic. Temporary paving repairs shall be maintained and repaired or replaced as needed until such time as permanent paving restoration is made.

Permanent surface restoration within the cartway of the streets shall consist of excavation to a depth of 6 inches below finished grade over the trenches, and a width sufficient to provide a one foot wide bearing on undisturbed subgrade on each side of the trench. The sides of this excavation shall be neatly cut, parallel lines, and vertical throughout their complete 6-inch depth. Upon completion of the cut back and on a properly prepared sub-base, the Contractor shall construct a 5" thick, when compressed, bituminous concrete base course, and a 1-1/2" thick, when compressed, ID-2A bituminous surface course. Construction shall be in accordance with Penn DOT Form 408, latest revision. In no case shall

permanent paving repairs be made in less than 60 days after completion of temporary repairs unless authorized by the Township Engineer.

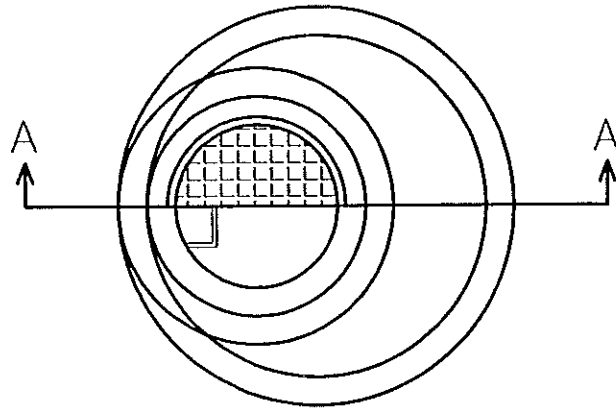
- b. In areas outside of existing or proposed legal/dedicated right-of-way, material obtained in trench excavation may be used for backfill. Material shall be placed in layers not to exceed 4 inches and thoroughly compacted using mechanical tampers. Special care shall be taken to ensure adequate compaction under the haunches and along the side of the pipe. Puddling or jetting may be considered if test demonstrations indicate that compaction requirements can be met.
- c. In areas outside of existing or proposed legal/dedicated right-of-way, material obtained in trench excavation may be used for backfill. Material shall be free of any large debris, roots etc. and approved by the Township inspector.
- d. Flowable backfill material may be substituted for the 2A aggregate, within right-of-way, or material obtained in trench excavation, outside right-of-way, conforming to PA DOT Special Provision S94 (52060130), Type A or B.
- e. Where storm sewer enters an inlet, headwall, manhole etc., concrete shall be poured, in accordance with section II, a minimum of 12-inches thick around the pipe to seal the outside.

### 3. Control of Excavated Material

- a. Keep the ground surface on both sides of the excavation free of excavated material to comply with Federal and State laws and codes.
- b. Provide temporary barricades to prevent excavated material from encroaching on private property, walks, gutters and storm drains.
- c. Maintain accessibility to all fire hydrants, valve pit covers, valve boxes, curb boxes, fire and police call boxes, and other utility controls at all times. Keep gutters clear or provide other satisfactory facilities for street drainage. Do not obstruct natural watercourses. Where necessary, provide temporary channels to allow the flow of water either along or across the site of work
- d. In areas where pipelines parallel or cross-streams, ensure that no material slides, is washed, or is dumped into the stream course. Remove cofferdams immediately upon completion of pipeline construction.

#### 4. Dewatering

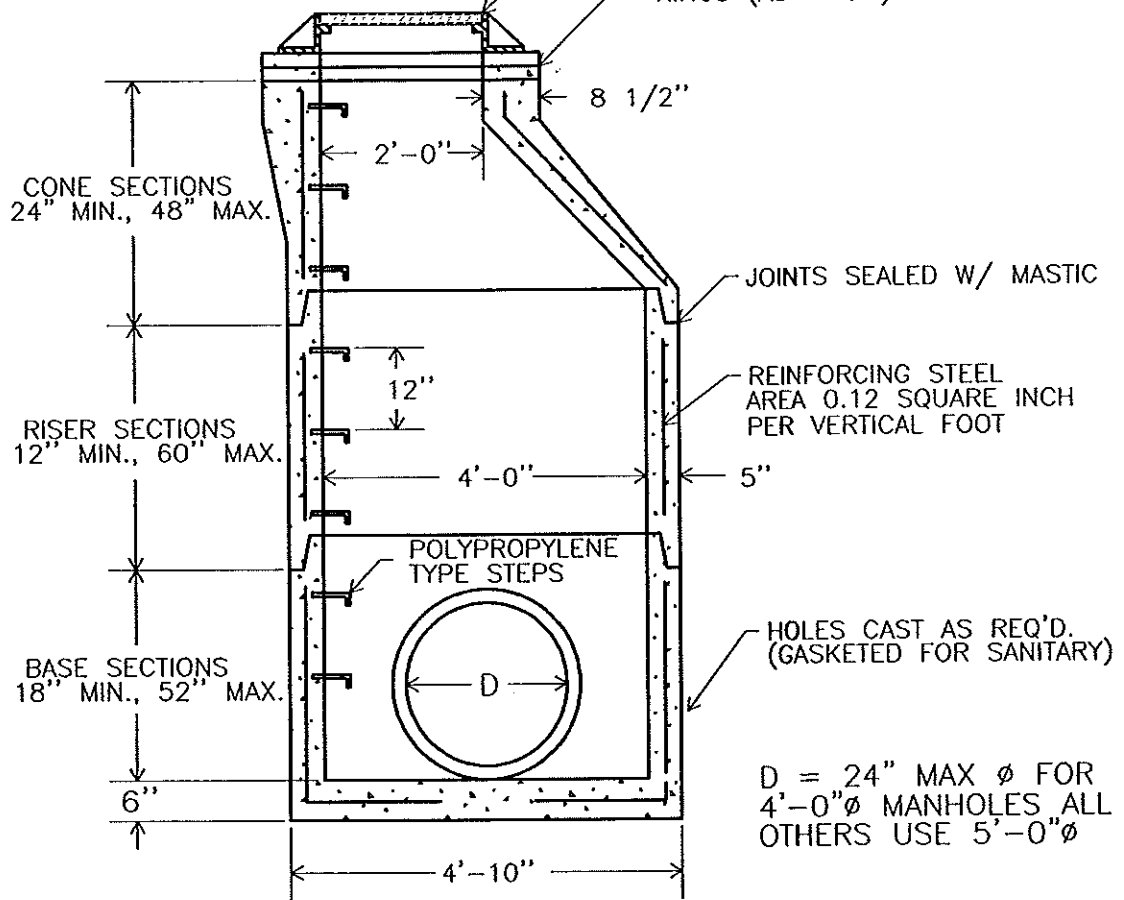
- a. Keep excavations dry and free of water. Dispose of precipitation and subsurface water clear of work.
- b. Intercept and divert surface drainage away from excavations. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water.
- c. Comply with Federal and State requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.



PRECAST MANHOLES SHALL CONFORM TO ASTM-C478-64T SPECIFICATIONS

CAST IRON FRAME AND COVER  
\*TOTAL WEIGHT OF FRAME AND COVER NOT LESS THAN 400 Lbs.

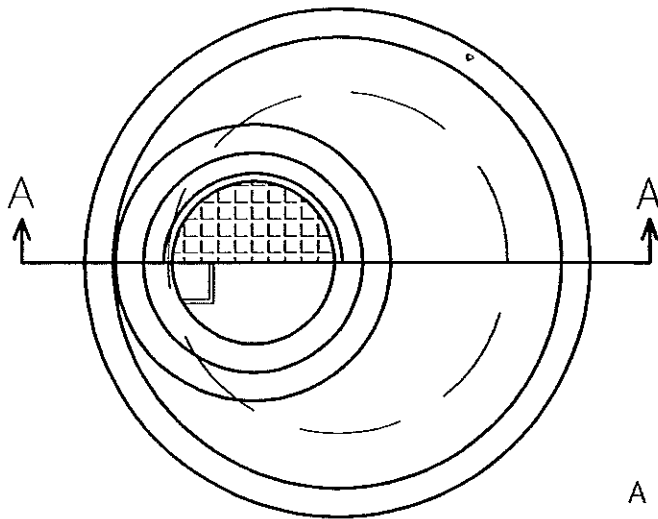
CONCRETE ADJUSTING RINGS (AS REQ'D)



D = 24" MAX  $\phi$  FOR 4'-0"  $\phi$  MANHOLES, ALL OTHERS USE 5'-0"  $\phi$

-SECTION A-A-

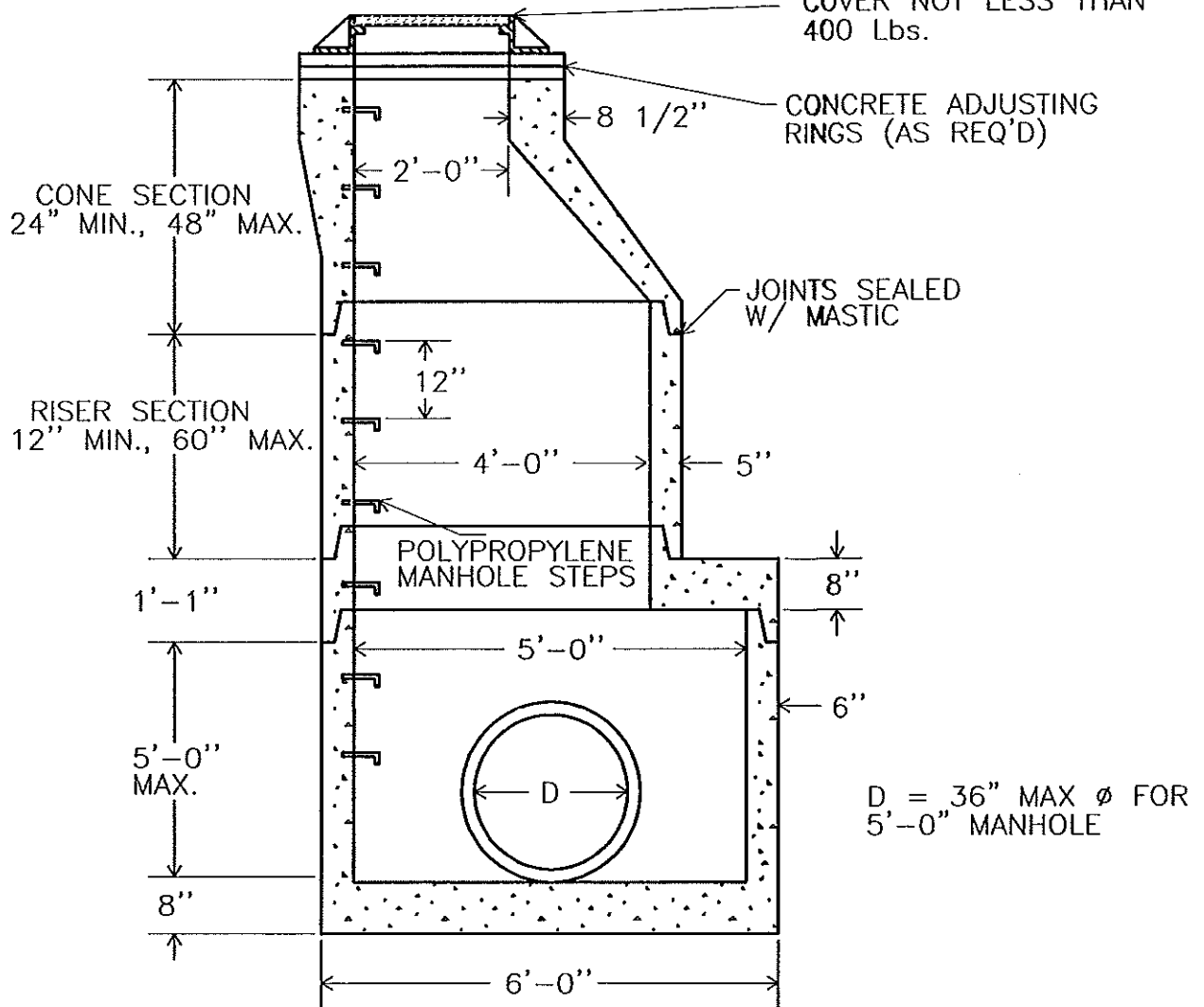
I-5



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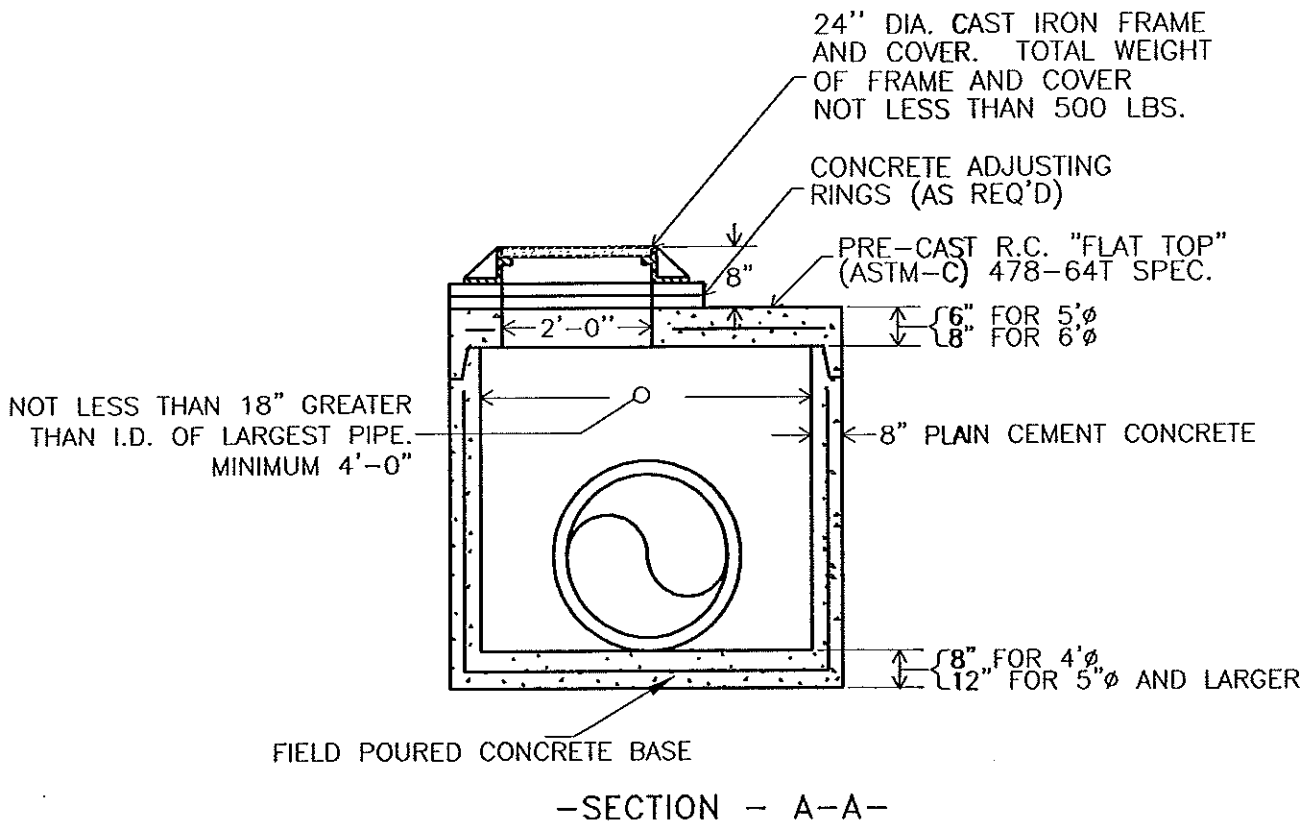
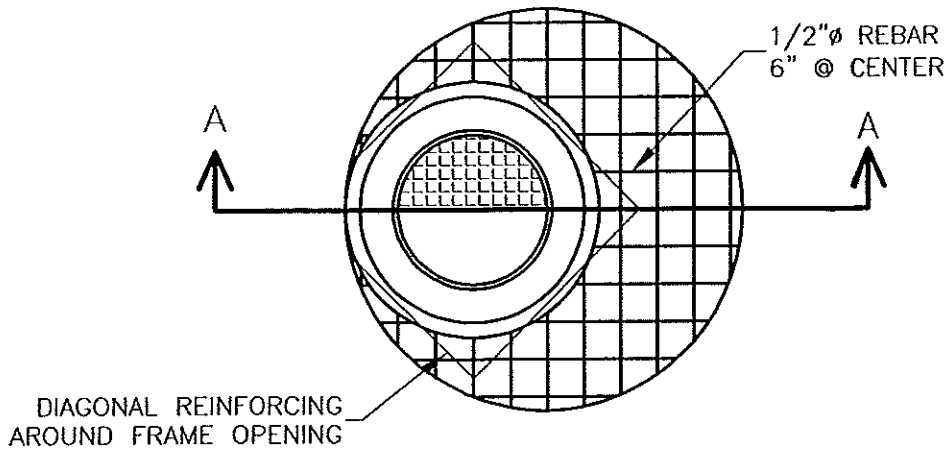
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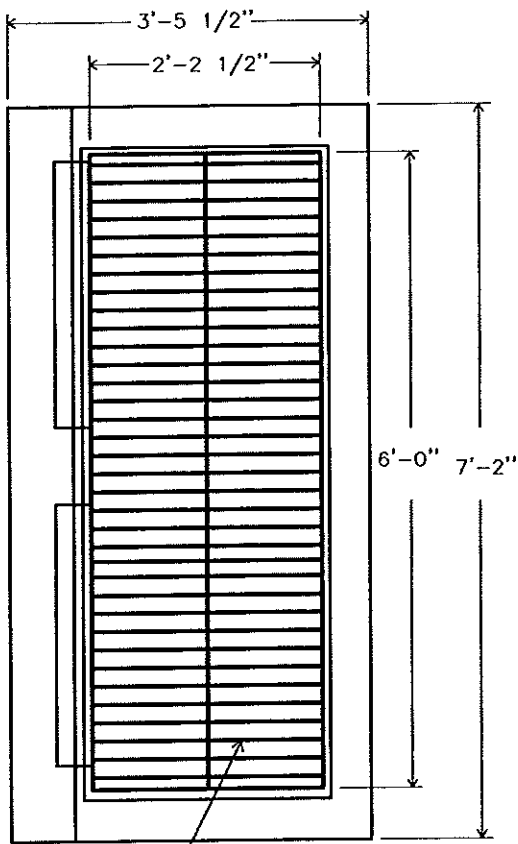
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I-6



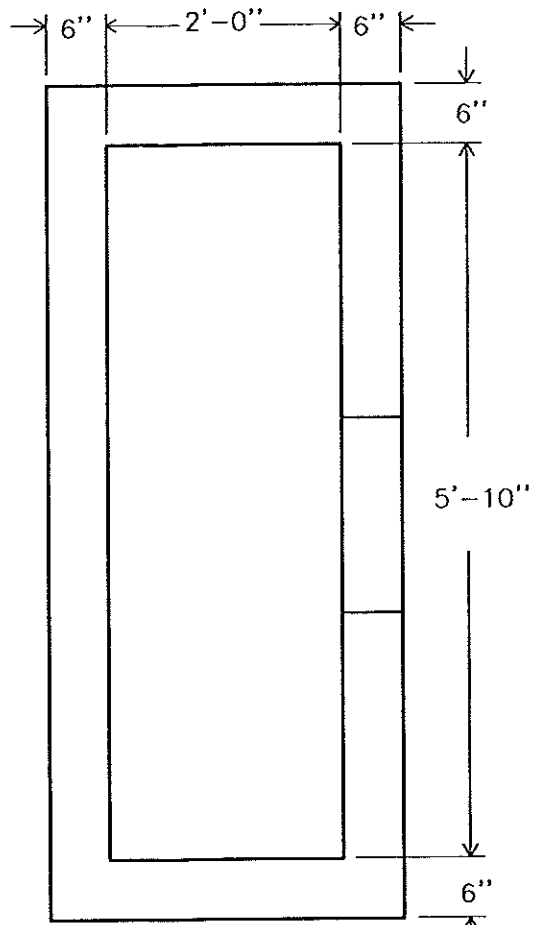
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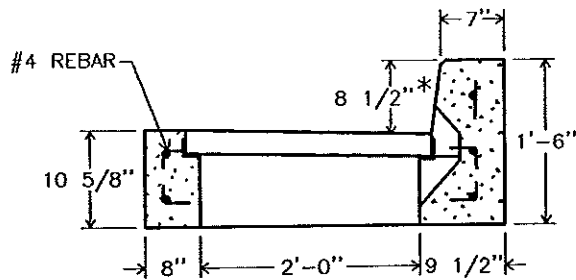


\*STRUCTURAL STEEL GRATE

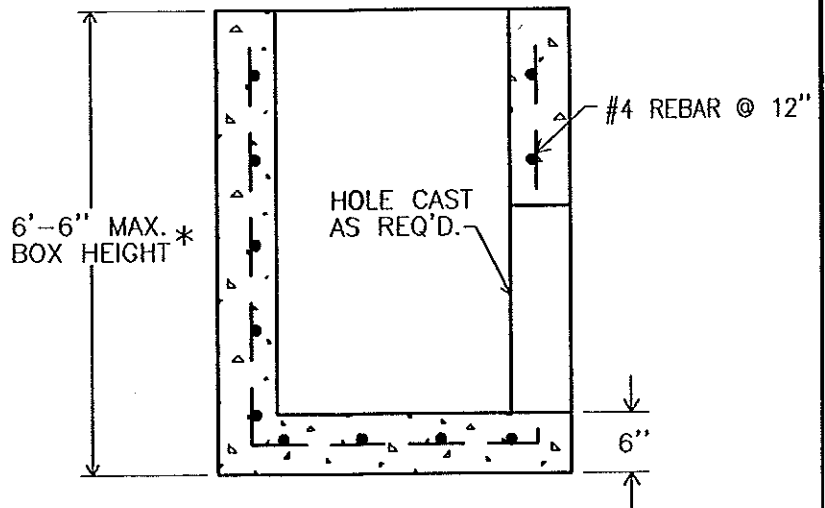
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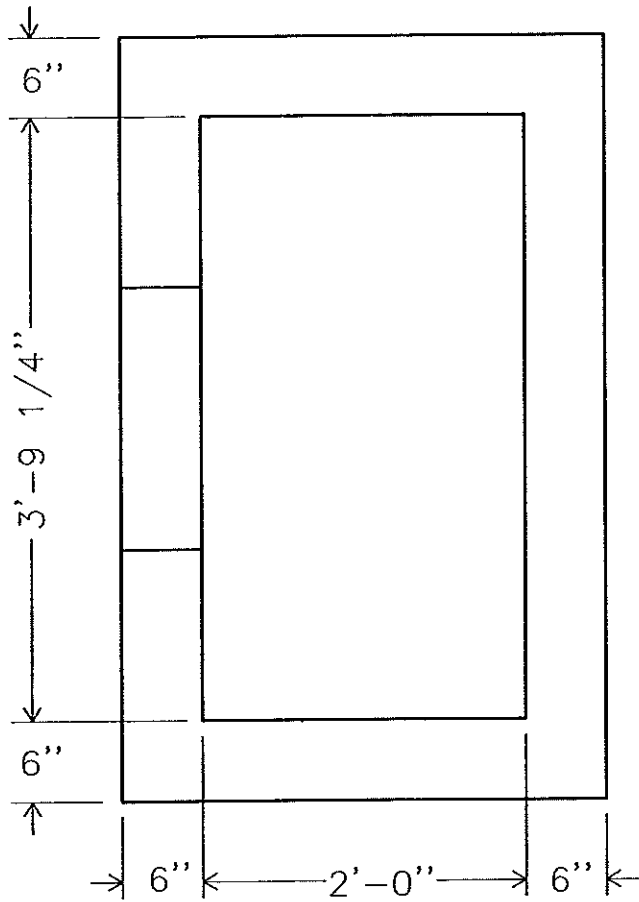
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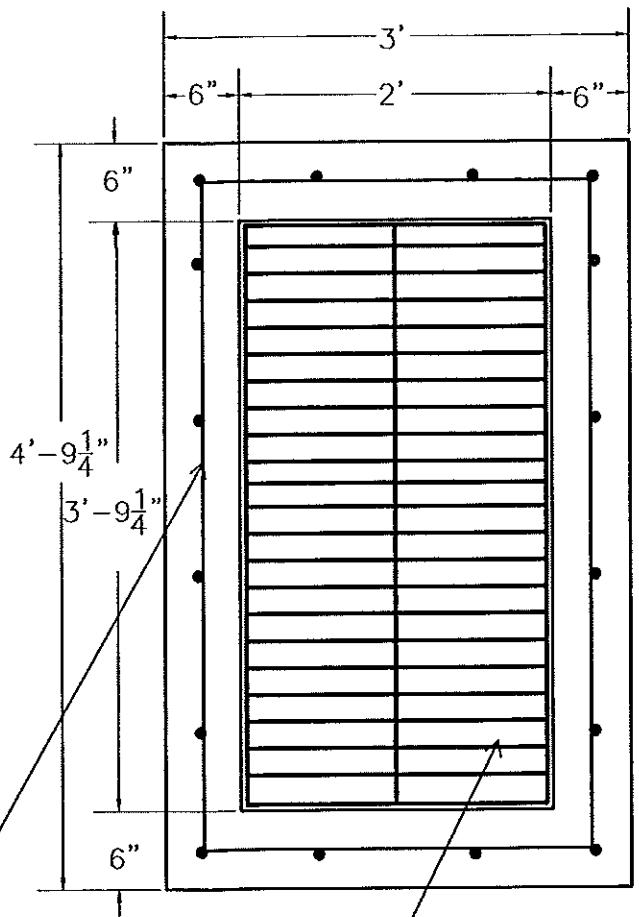
\* NOTE:

1. AS REQUIRED BY THE TOWNSHIP, A TYPE "L" OR TYPE "V" INLET GRATE MAY BE REQUIRED.
2. ALSO AVAILABLE WITH 7" CURB HEIGHTS



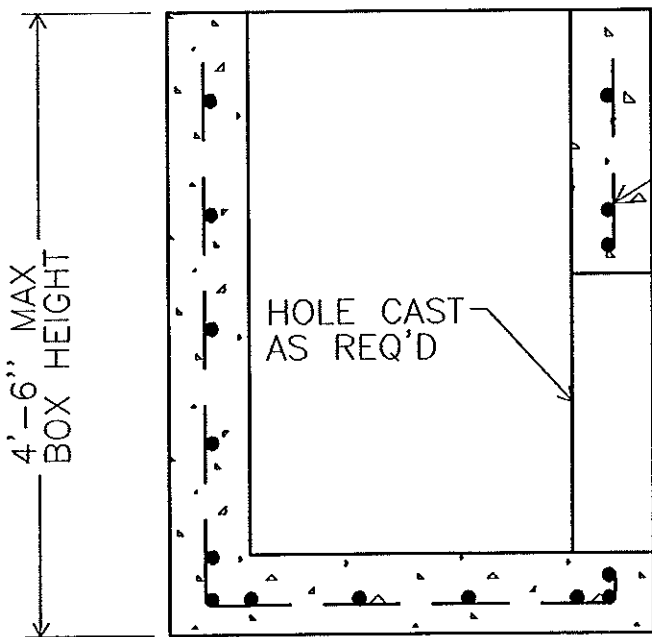
-PLAN-

#3 REBAR @ 12"

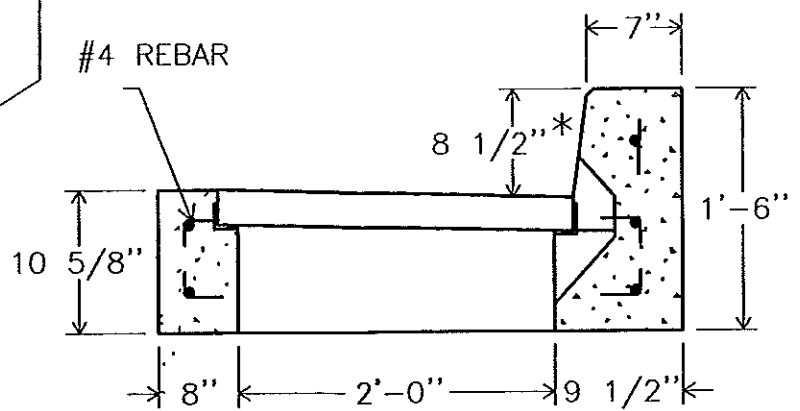


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\*STRUCTURAL STEEL GRATE



-SECTION-

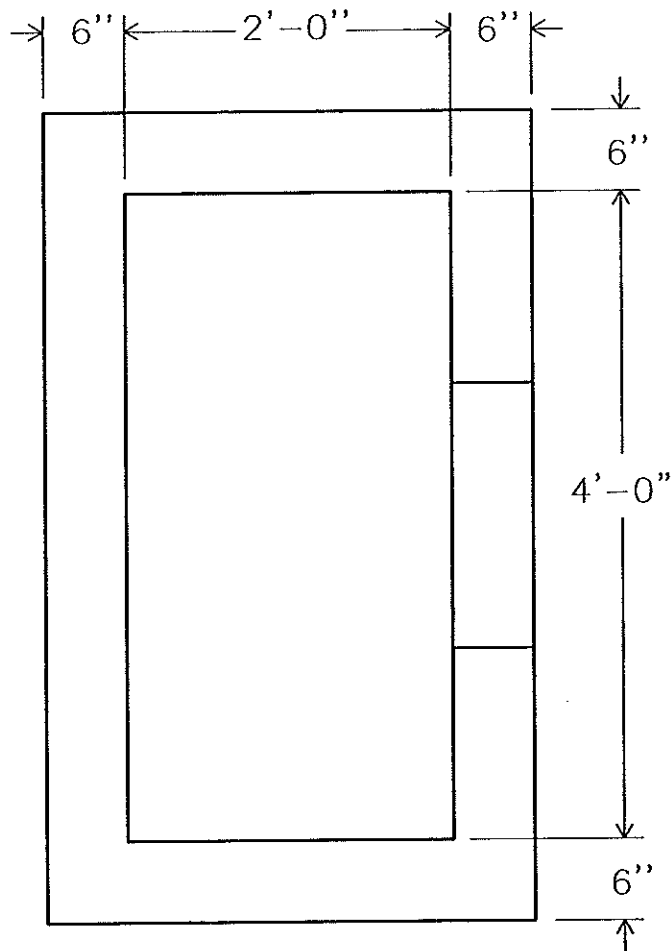


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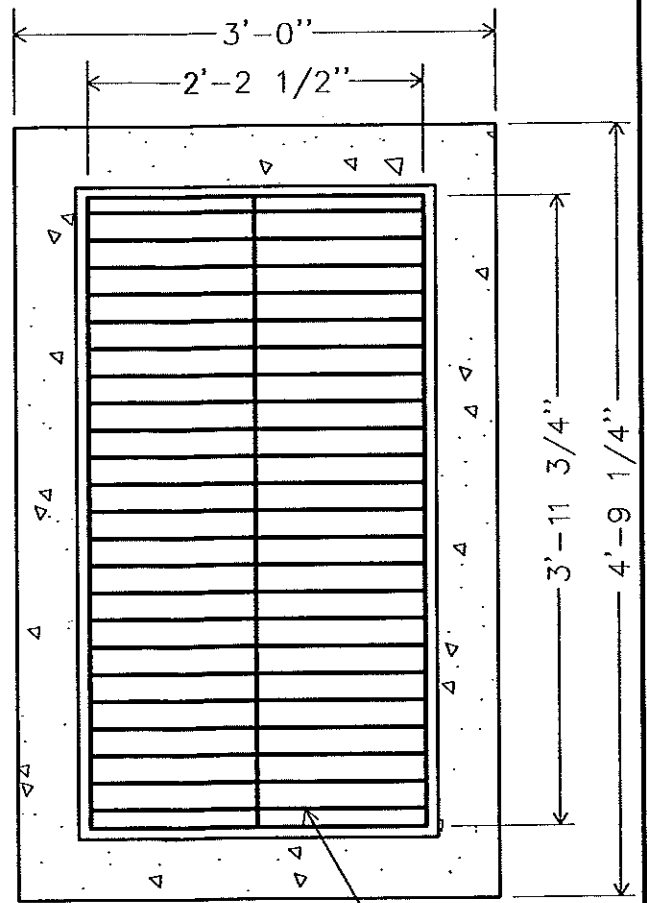
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I-9

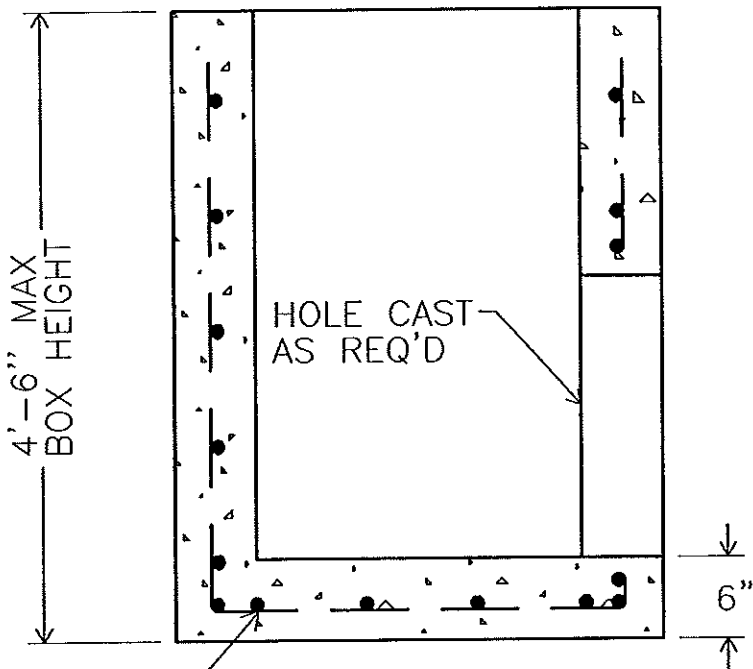


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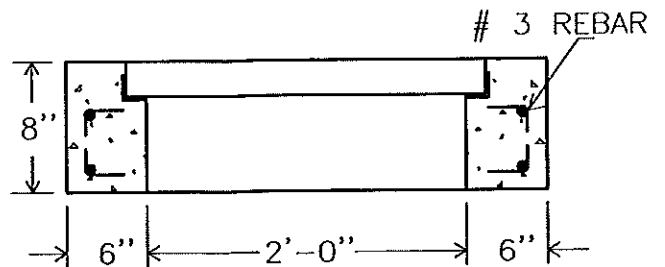
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\*STRUCTURAL STEEL GRATE



-SECTION-

#3 REBAR @ 12"



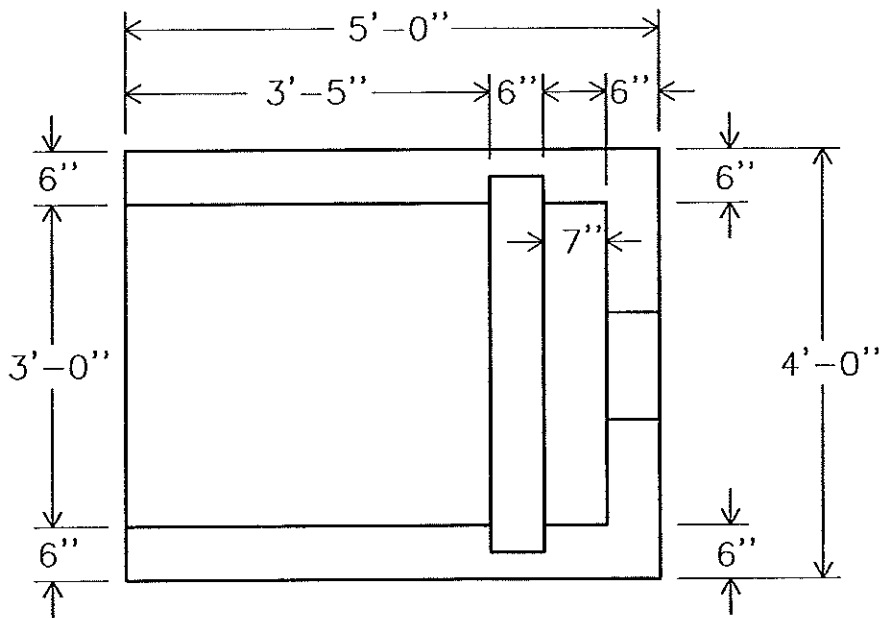
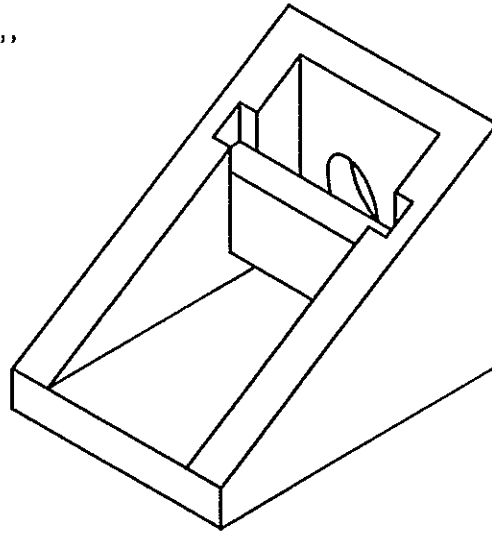
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GRATE MAY BE REQUIRED.

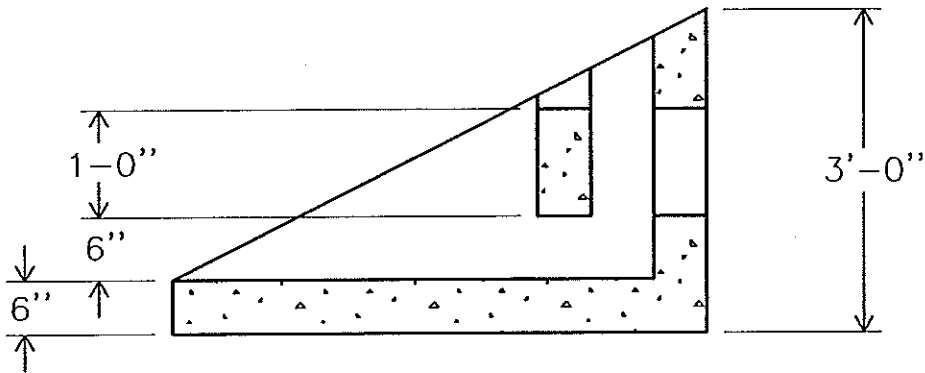
I-10

N.T.S.

- MAX. PIPE SIZE 15"
- LARGER CUSTOM SIZES AVAILABLE

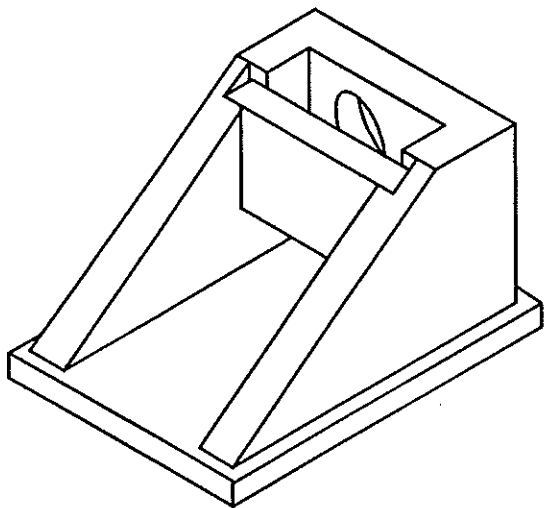


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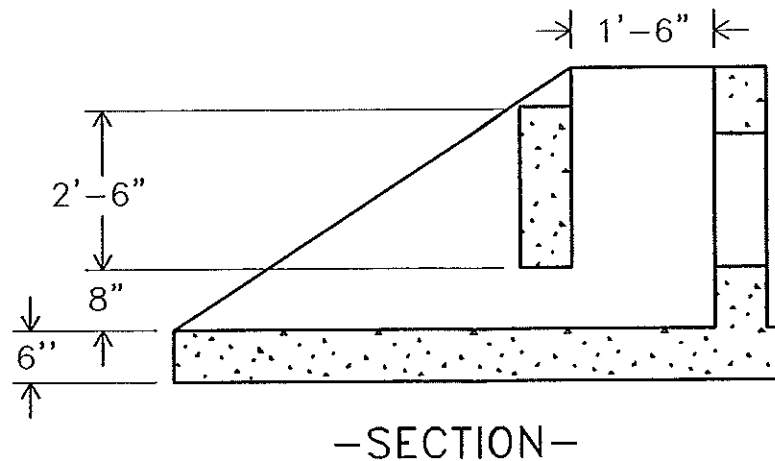
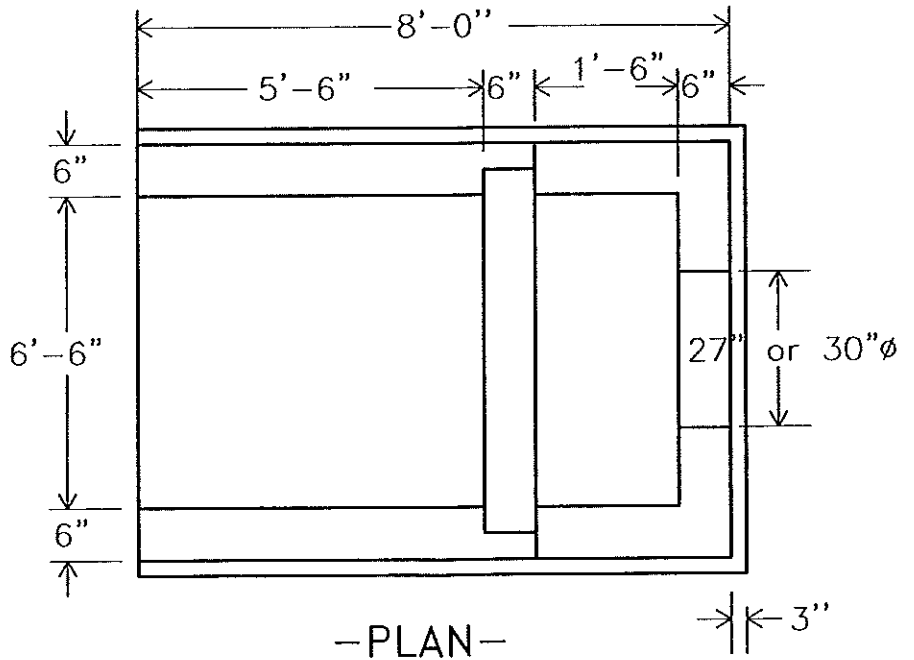


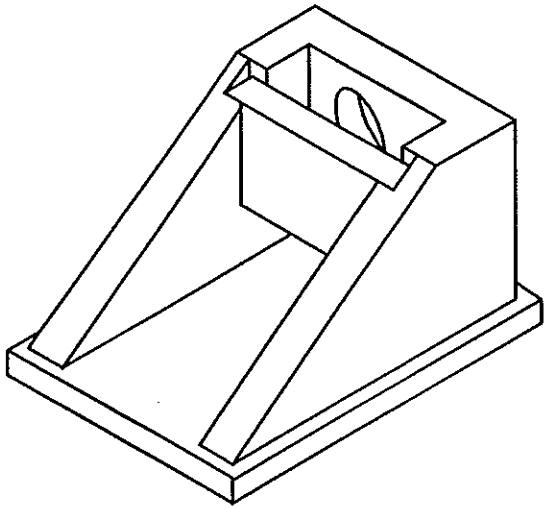
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I-11

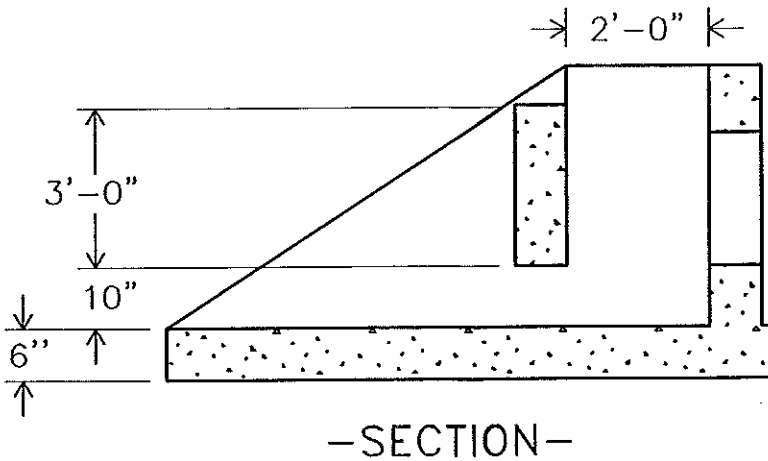
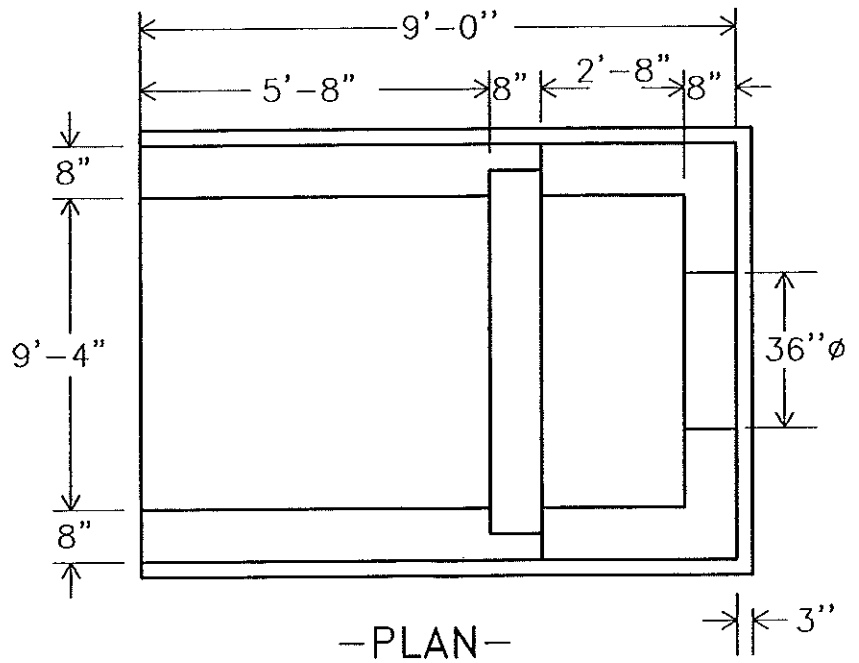


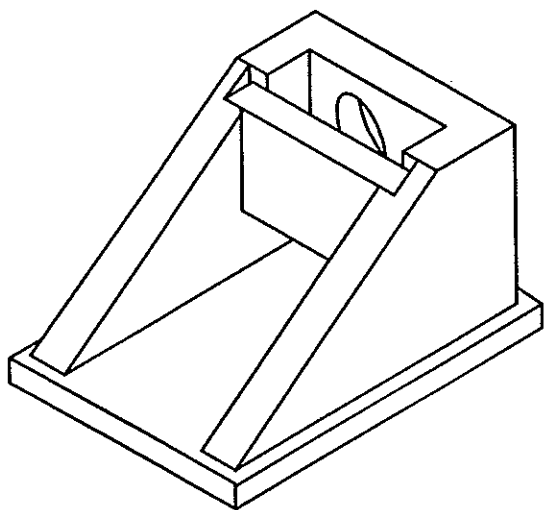
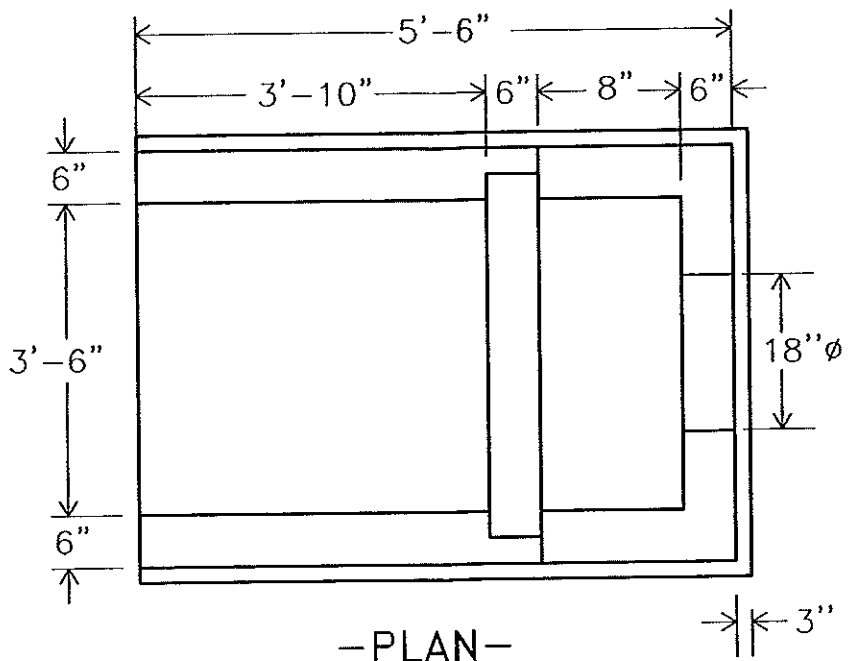
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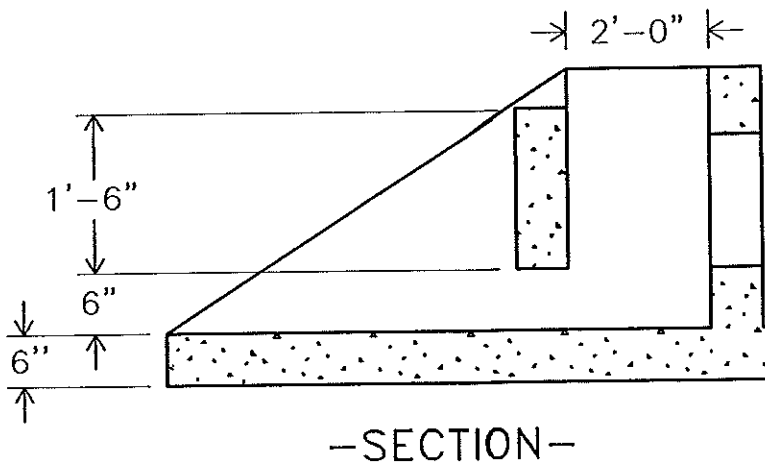


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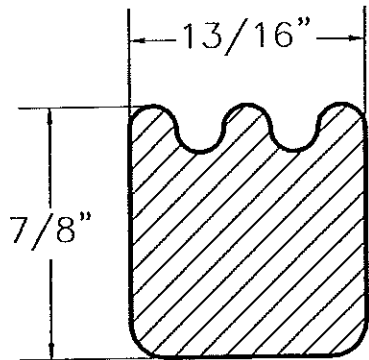




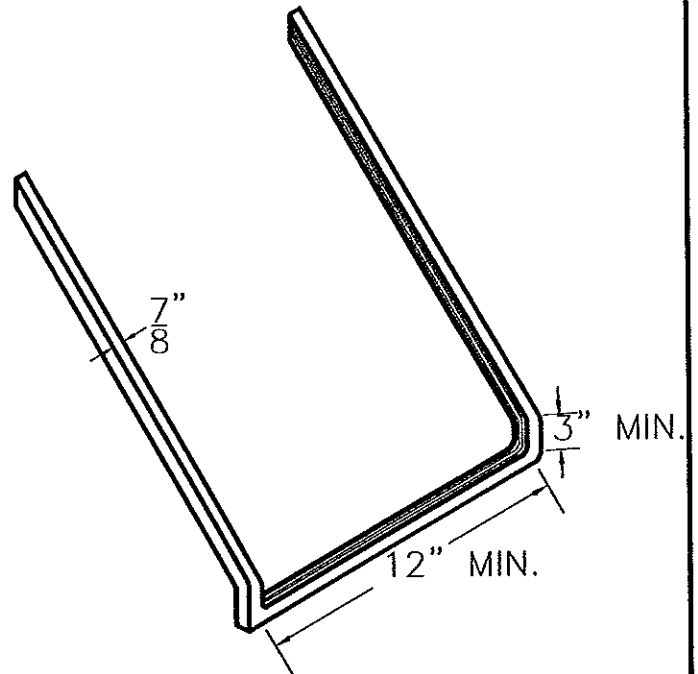
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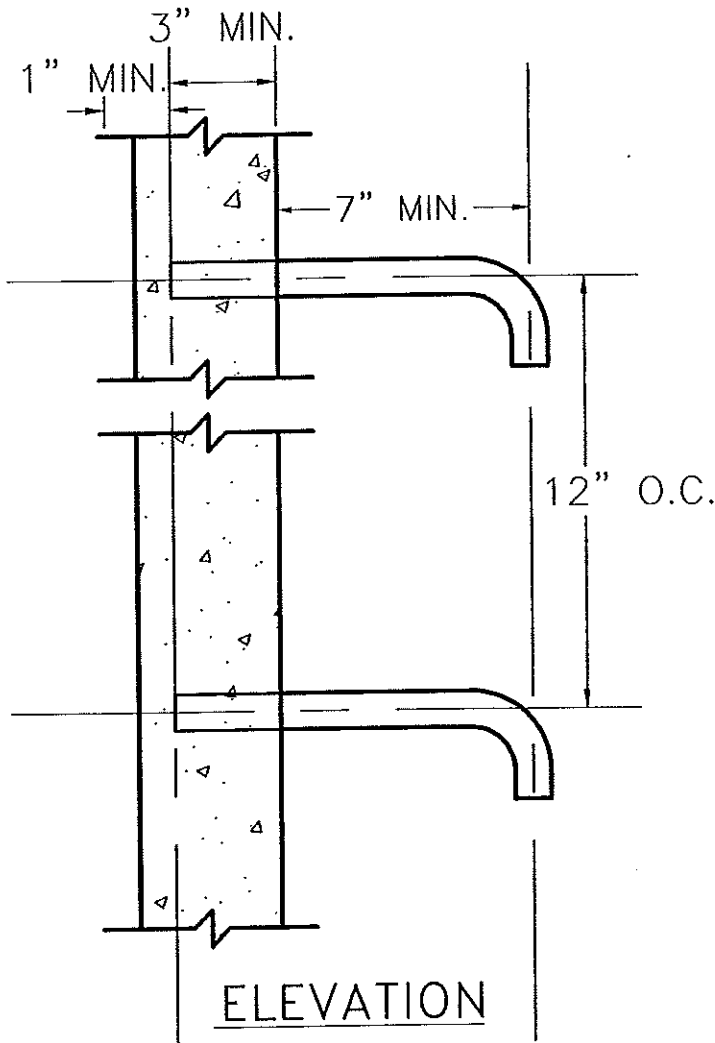
I-14



FULL SIZE SECTION



PERSPECTIVE



ELEVATION

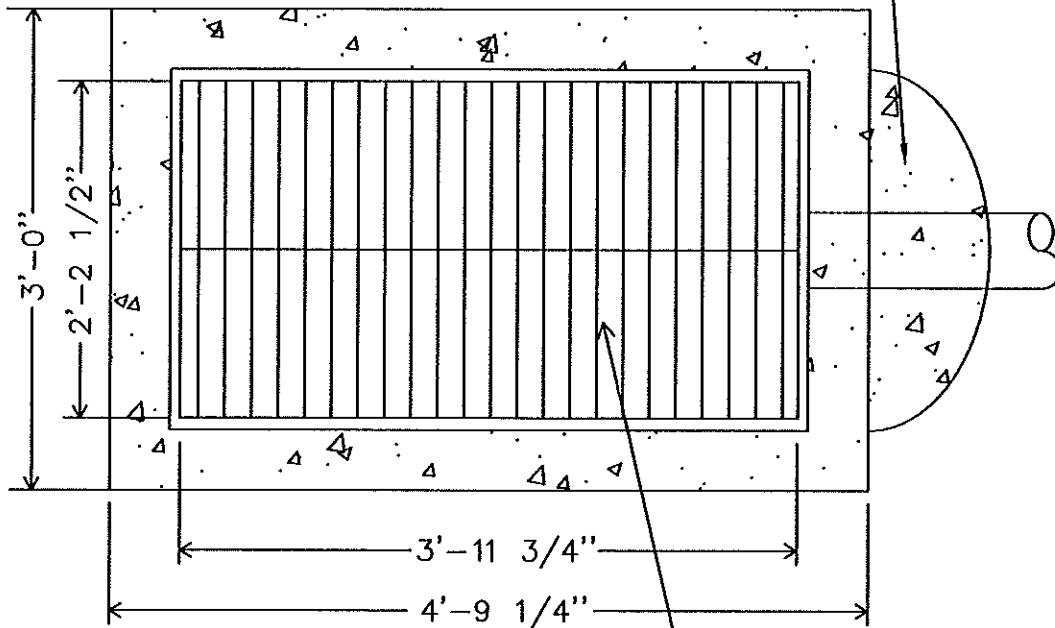
NOTES

1. STEPS TO BE CONSTRUCTED OF POLYPROPYLENE.
2. DISTANCE FROM RIM OF MANHOLE TO TOP STEP SHALL NOT BE GREATER THAN 30".
3. DISTANCE FROM BOTTOM STEP TO FLOOR OF MANHOLE SHALL NO BE GREATER THAN 2 FEET.
4. EMBEDDED PORTION OF STEP TO BE WITH ASPHALT CONFORMING TO AASHTO M-190.
5. DO NOT LOCATE STEPS OVER CHANNELS.

I-15

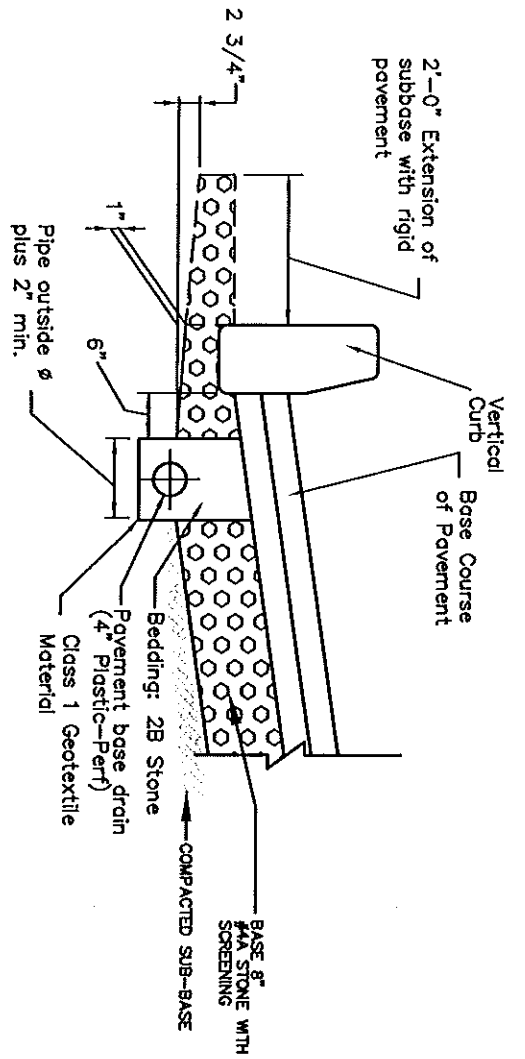


MIN. OF 12" OF  
3000 psi CONCRETE  
AROUND ALL OPENINGS.



- PLAN -

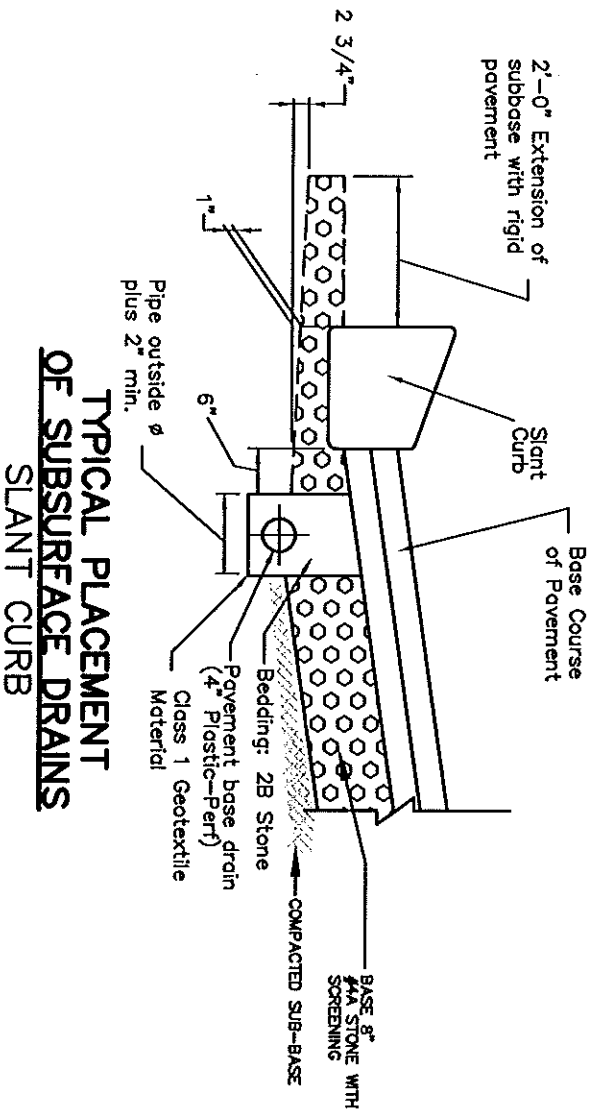
N.T.S.



**TYPICAL PLACEMENT OF SUBSURFACE DRAINS VERTICAL CURB**

NO SCALE

\*NOTE: Underdrain shall be provided 50' each way/each side of the Low Point.



**TYPICAL PLACEMENT OF SUBSURFACE DRAINS SLANT CURB**

NO SCALE

\*NOTE: Underdrain shall be provided 50' each way/each side of the Low Point.