EXHIBITS

US HIGHWAY

INTERSTATE HIGHWAY

STATE ROUTES

TOWNSHIP ROADS

DIRECTION

TOWNSHIP BUILDING

AIRPORT

HOSPITAL

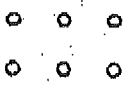
STATE PARK

FORESTS

MOUNTAINS

RECYCLING CENTER

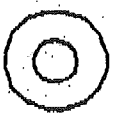
WATER WELL



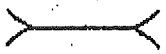
SEPTIC DRAINFIELD/SYSTEM

PERC TEST HOLE/PIT

SCALE

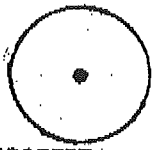


OPEN GAS, OIL, WATER WELL



CULVERT

STREAM



PROPERTY LINE
MONUMENT/PIN

SETBACK LINE

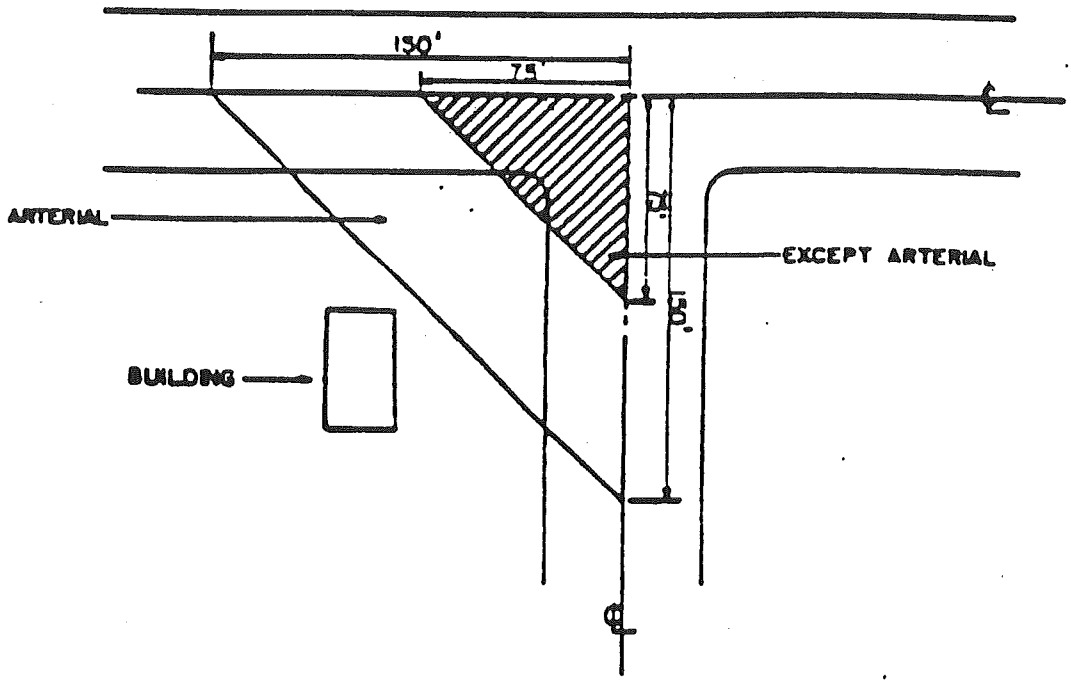
UTILITY LINES
ABOVE GROUND

UTILITY LINES
BURIED

PROPERTY LINE

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #1
STANDARD MAP SYMBOLS

CLEAR SIGHT
TRIANGLE



O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #2
CLEAR SIGHT TRIANGLE

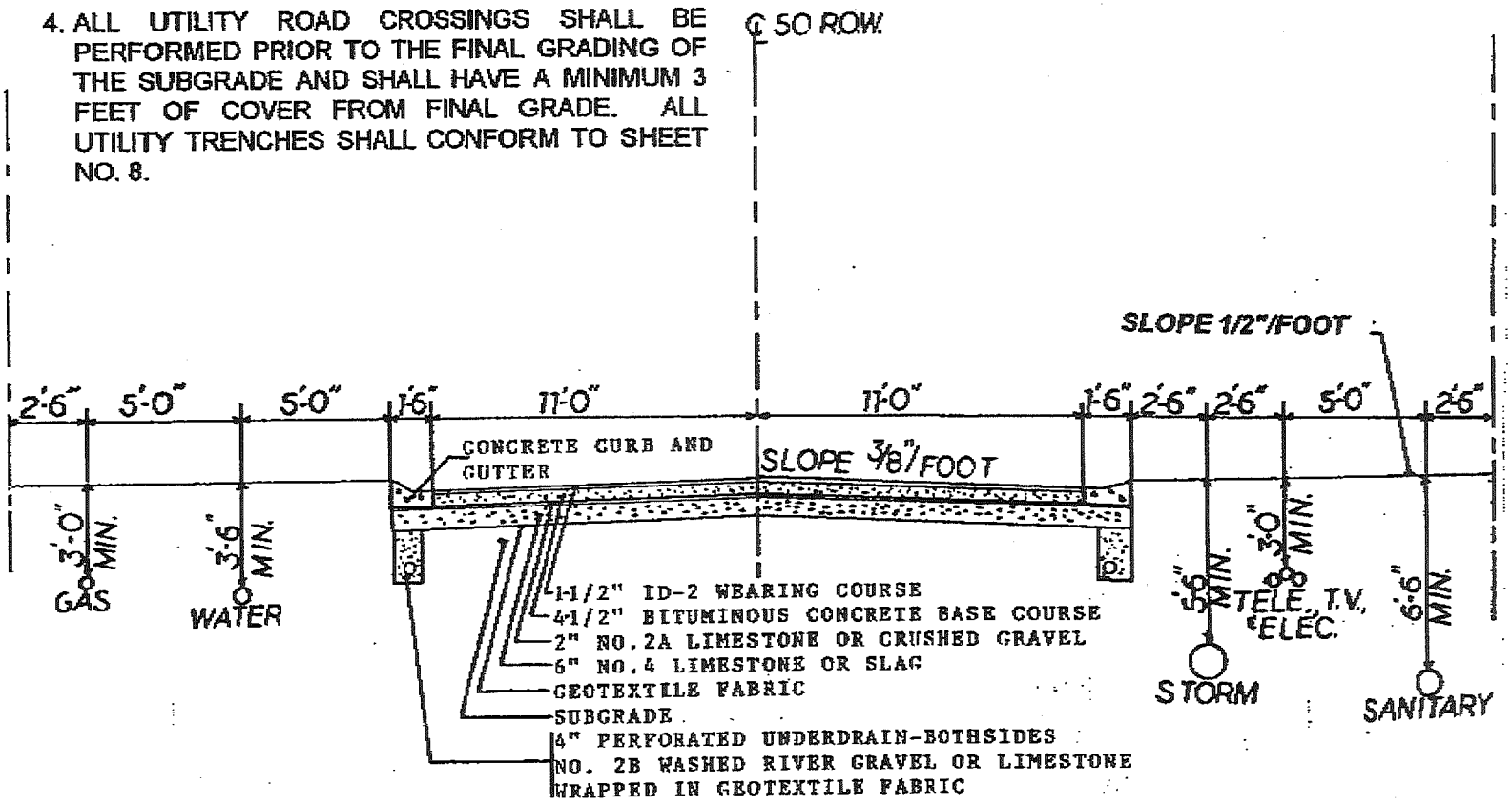
O'HARA TOWNSHIP STANDARD DETAILS

EXHIBIT #3

TYPICAL CROSS SECTION

NOTES:

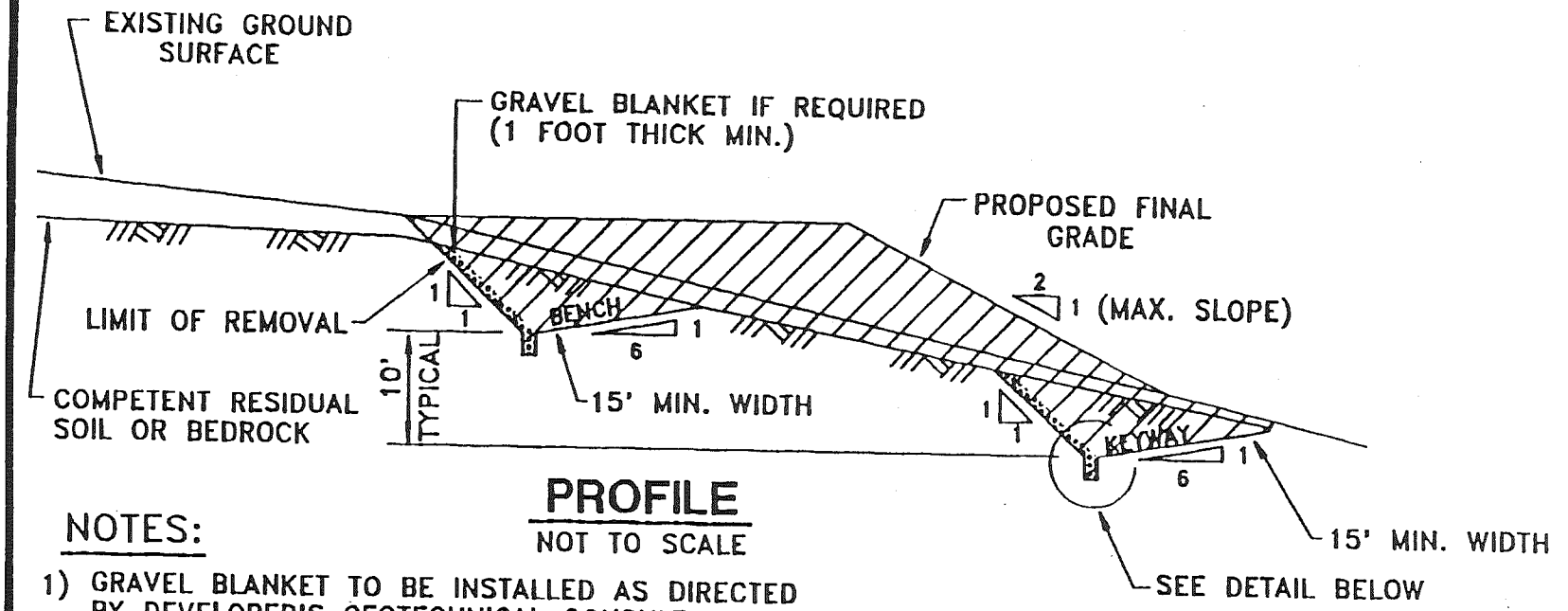
1. THE SUBGRADE SHALL BE SLOPED THE SAME AS THE ROAD SURFACE.
2. ADDITIONAL UNDERDRAIN SHALL BE PLACED AS REQUIRED BY THE TOWNSHIP ENGINEER.
3. ALL UTILITY ROAD CROSSINGS SHALL BE INSTALLED IN CONDUIT.
4. ALL UTILITY ROAD CROSSINGS SHALL BE PERFORMED PRIOR TO THE FINAL GRADING OF THE SUBGRADE AND SHALL HAVE A MINIMUM 3 FEET OF COVER FROM FINAL GRADE. ALL UTILITY TRENCHES SHALL CONFORM TO SHEET NO. 8.



O'HARA TOWNSHIP STANDARD DETAILS

EXHIBIT #4

FILL BENCH DETAIL

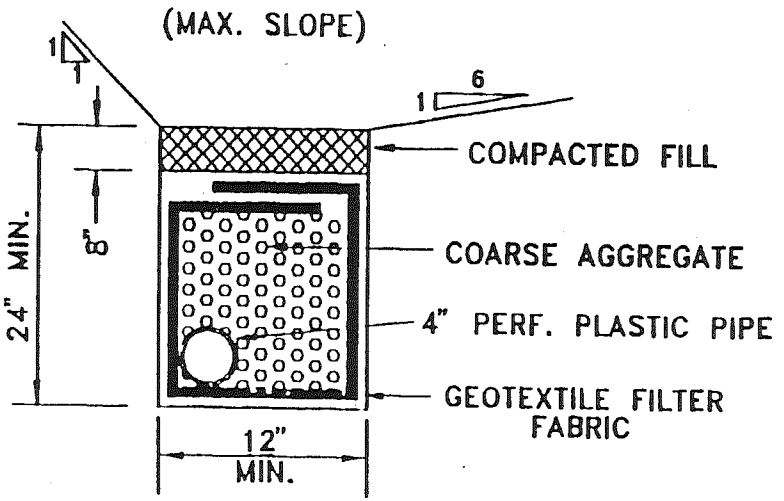


PROFILE

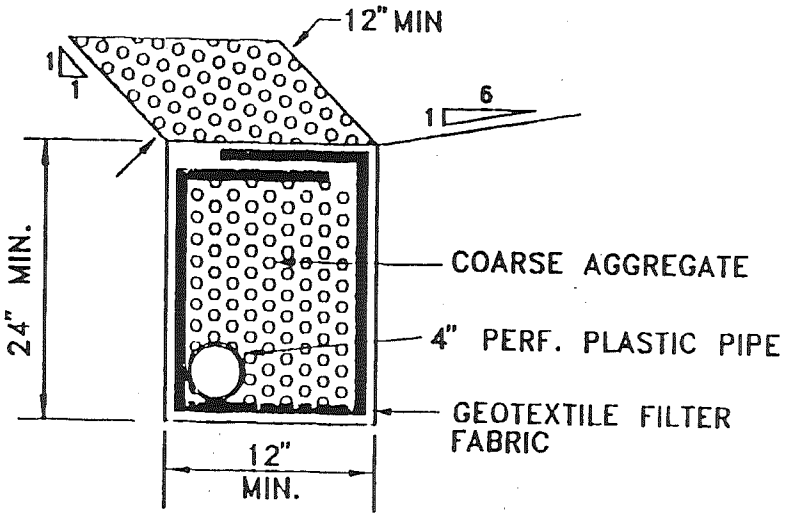
NOT TO SCALE

NOTES:

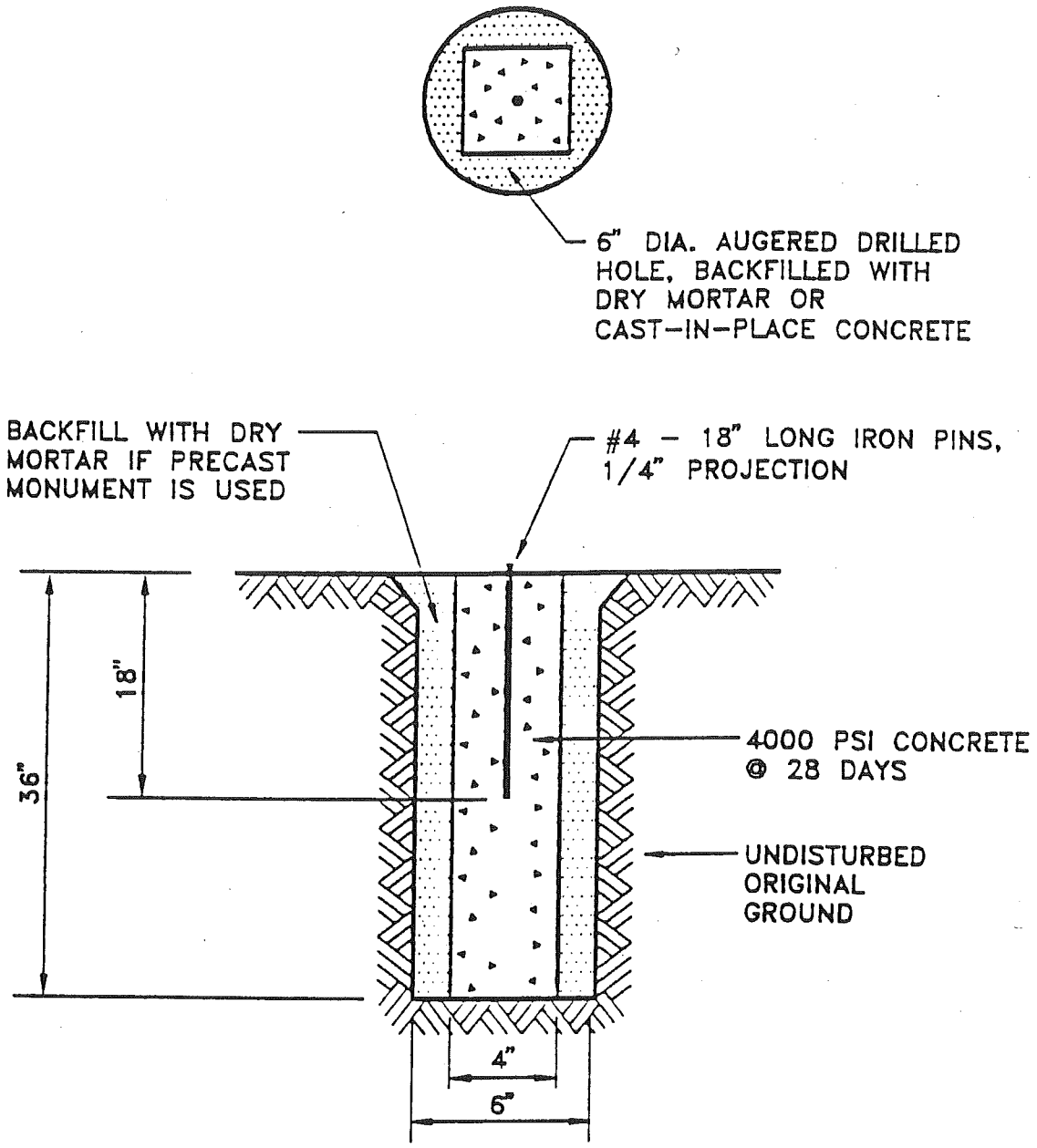
1) GRAVEL BLANKET TO BE INSTALLED AS DIRECTED BY DEVELOPER'S GEOTECHNICAL CONSULTANT.
2) 4" PERF. PLASTIC PIPE TO DRAIN TO OUTSLOPE AND THE WATER DIVERTED OR COLLECTED IF NECESSARY TO PREVENT DOWNSTREAM DAMAGE.



(IF GRAVEL BLANKET IS NOT REQUIRED)



(IF GRAVEL BLANKET IS REQUIRED)

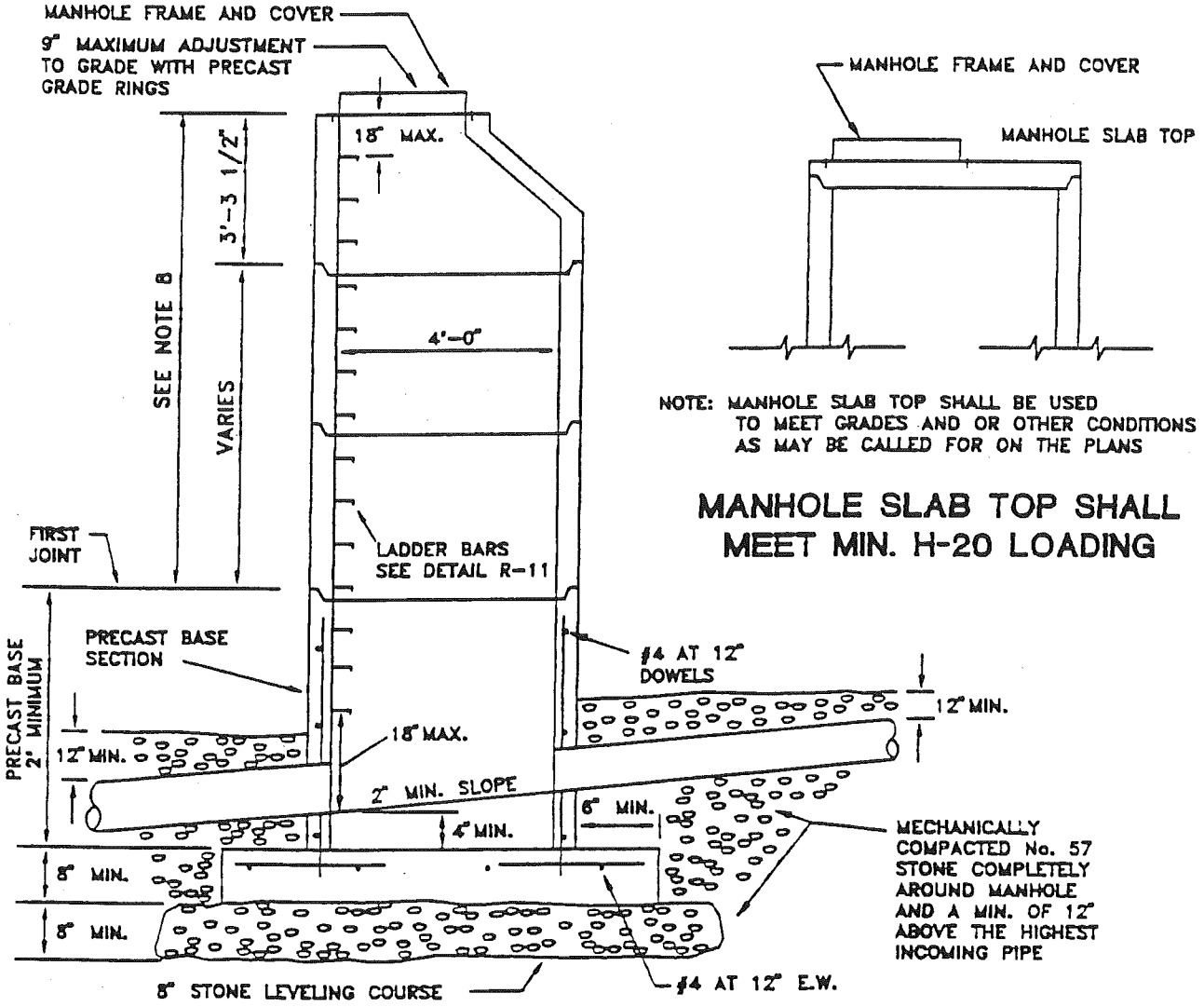


NOTE:
LOCATE MONUMENT PER RECORDED PLAN (AS APPROVED BY TWP. ENGINEER), 5'-6" OFF P/L WITHIN PUBLIC DEDICATED R.O.W., INSTALL AFTER GRADING AND ROADWAY IS COMPLETE

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #5
CONCRETE MONUMENT

NOTES:

1. ALL CONCRETE SHALL BE CLASS A CONCRETE, 4000 PSI, 5% AIR ENTRAINED
2. MANHOLE BARREL JOINTS TO BE SEALED WITH 1" DIA. FLEXIBLE BUTYL RUBBER JOINT SEALANT, USE 1/2" DIA. FOR FRAME AND COVER
3. FRAME AND COVER TO BE ANCHORED WITH 2-3/4" DIA. S.S. ANCHOR BOLTS SET 6-INCHES INTO CONCRETE
4. LIFTING HOLES TO BE POINTED WITH NON-SHRINK GROUT, AND LEFT WATERTIGHT, NEAT AND SMOOTH
5. MAXIMUM ADJUSTMENT TO FINISHED GRADE USING PRECAST GRADE RINGS SHALL NOT EXCEED NINE INCHES (9")
6. PRECAST SECTIONS SHALL CONFORM TO ASTM C-478 AS REVISED
7. MANHOLE INVERT SHALL BE CONCRETE TO THE SPRING LINE OF PIPE WITH SIDES SLOPING 1/2" TO 1'-0" TO INSIDE FACE OF PRECAST BASE SECTION
8. IF THIS DIMENSION IS 3'-3" USE PRECAST SLAB TOP DESIGNED TO MEET LOAD CONDITIONS

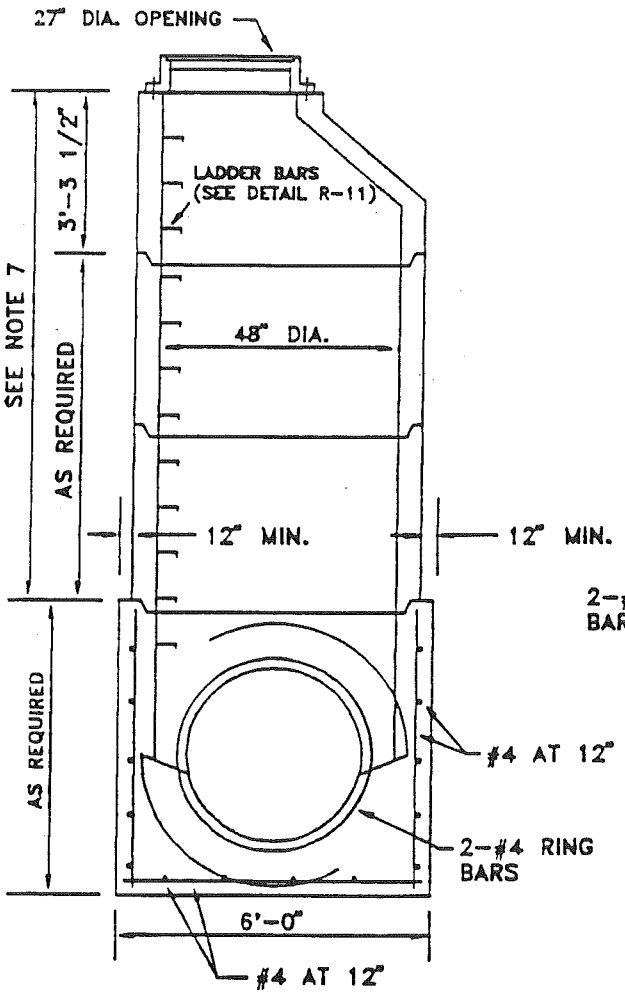


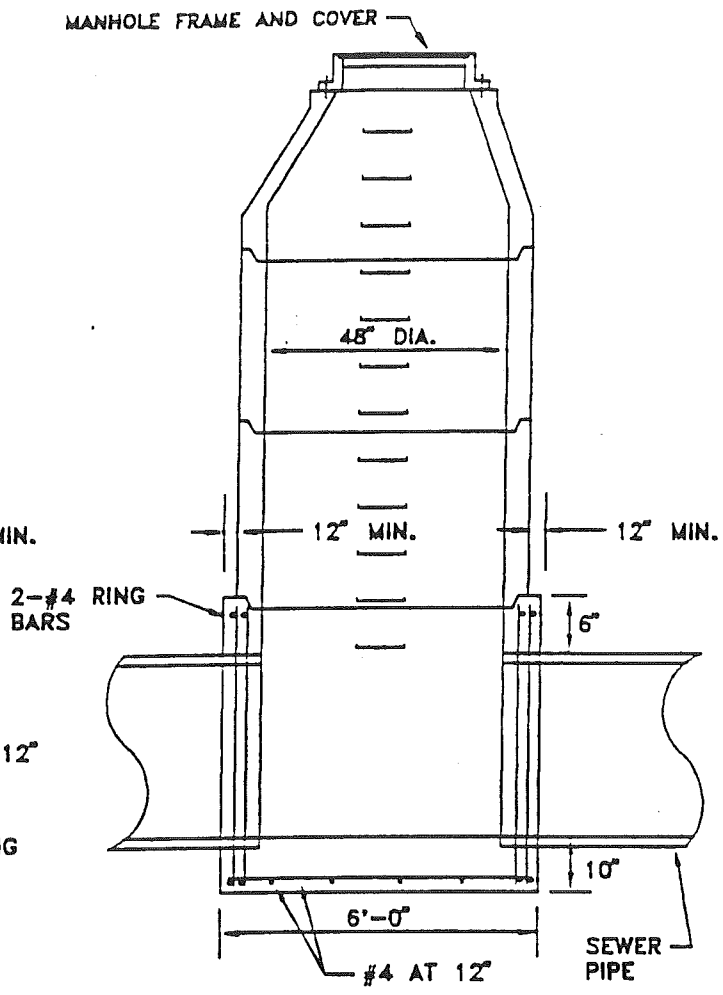
NOTE: MANHOLE SLAB TOP SHALL BE USED TO MEET GRADES AND OR OTHER CONDITIONS AS MAY BE CALLED FOR ON THE PLANS

MANHOLE SLAB TOP SHALL MEET MIN. H-20 LOADING

PRECAST CONCRETE MANHOLE WITH MONOLITHICALLY POURED BASE SECTION

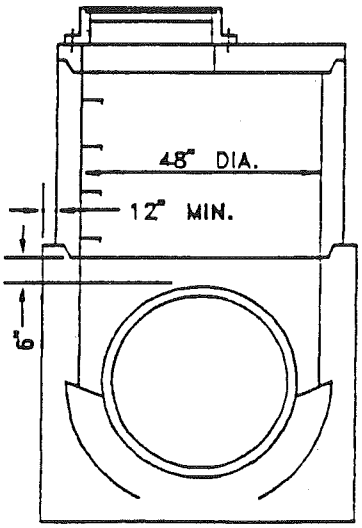
O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #6
PRECAST CONCRETE MANHOLE (8" TO 18")



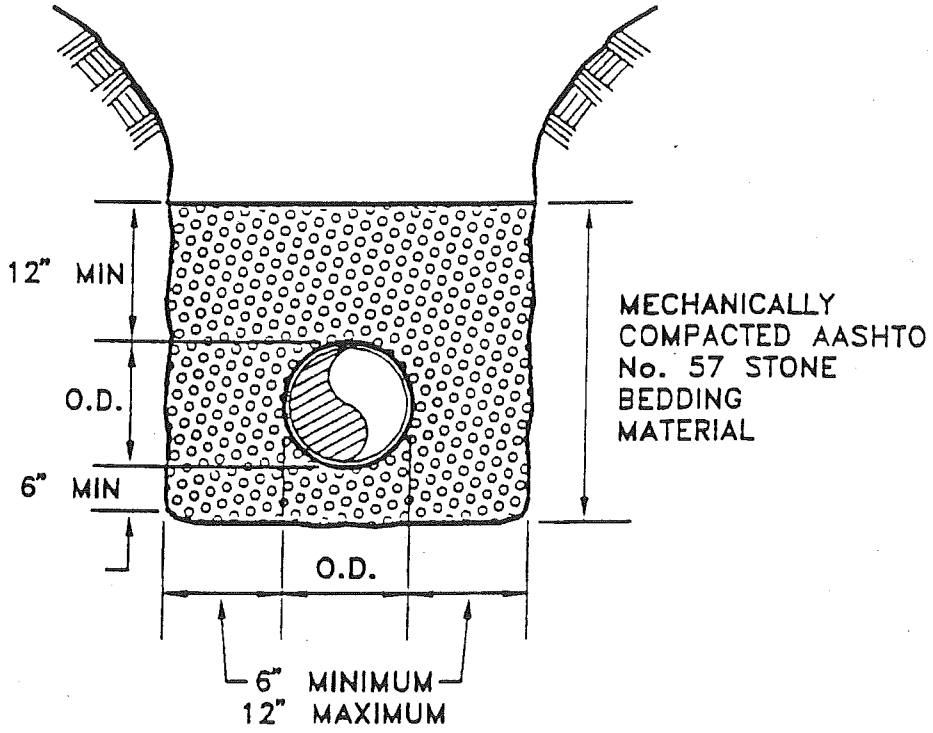


NOTES:

1. ALL CONCRETE SHALL BE CLASS A CONCRETE, 4000 PSI, 5% +/- 1% AIR ENTRAINED
2. MANHOLE BARREL JOINTS TO BE SEALED WITH FLEXIBLE BUTYL RUBBER JOINT SEALANT
3. FRAME AND COVER TO BE ANCHORED WITH 2-3/4" DIA. S.S. ANCHOR BOLTS SET 6-INCHES INTO CONCRETE
4. LIFTING HOLES TO BE POINTED WITH NON-SHRINK GROUT, AND LEFT WATERTIGHT, NEAT AND SMOOTH
5. MAXIMUM ADJUSTMENT TO FINISHED GRADE USING PRECAST GRADE RINGS SHALL NOT EXCEED NINE INCHES (9")
6. PRECAST SECTIONS SHALL CONFORM TO ASTM C-478 AS REVISED
7. IF THIS DIMENSION IS 3'-3" USE PRECAST SLAB TOP DESIGNED TO MEET LOAD CONDITIONS



O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #7
PRECAST CONCRETE MANHOLE (20" TO 33")



TYPICAL BEDDING AND PIPE ZONE
POLYETHYLENE PIPE
N.T.S.

POLYETHYLENE PIPE SPECIFICATIONS

PIPE AND FITTINGS SHALL BE MADE OF POLYETHYLENE COMPOUNDS WHICH MEET OR EXCEED THE REQUIREMENTS OF TYPE III, CATEGORY 4 OR 5, GRADE P33 OR P34, CLASS C PER ASTM D-1248 WITH THE APPLICABLE REQUIREMENTS DEFINED IN ASTM D-1248.

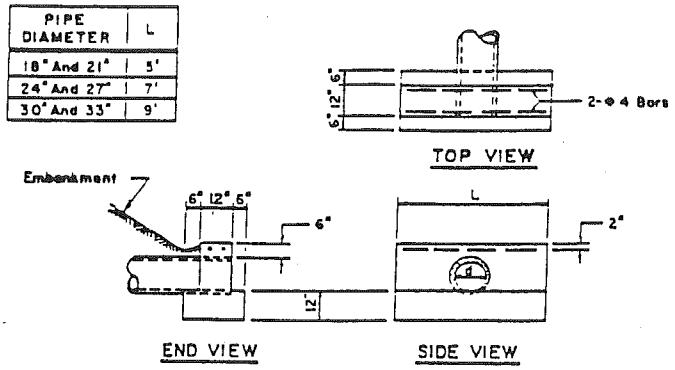
MIN. COVER IS TO BE 2 FT. WITH AASHTO No. 57 STONE A MIN. OF 12" ABOVE THE TOP OF PIPE. IF THE PIPE IS TO BE LAID UNDER DRIVEWAYS OR PARKING AREAS WITH MINIMUM COVER, THE 2 FEET SHALL BE No. 57 STONE. MAXIMUM COVER OVER THE PIPE IS NOT TO EXCEED 30 FEET.

MANNING'S "n" FOR DESIGN SHALL BE 0.012 FOR SMOOTH INTERIOR, AND SHALL BE 0.018 FOR SIZES UP TO AND INCLUDING 15", AND 0.020 FOR SIZES FROM 18" UP TO AND INCLUDING 36" FOR CORRUGATED INTERIOR.

POLYETHYLENE PIPE SHALL BE IN ACCORDANCE WITH PADOT FORM 408, SECTION 601.

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #8
POLYETHYLENE PIPE SPECIFICATIONS

PIPE DIAMETER	L
18" And 21"	5'
24" And 27"	7'
30" And 33"	9'



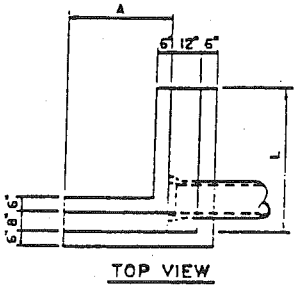
TYPE D ENDWALL

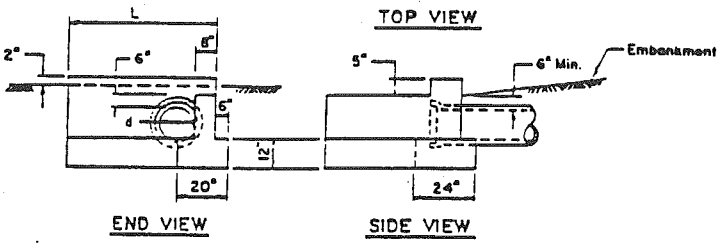
Local conditions will govern dimension A.

L = 2.5d + 12"

NOTES

1. Construct in accordance with the requirements of Publication 408, Section 605.
2. Use Class A Cement Concrete or better.
3. Chamfer exposed edges one inch.

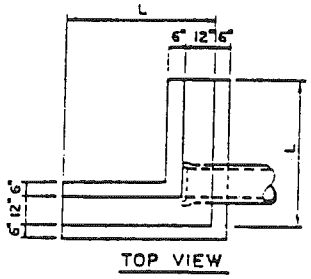


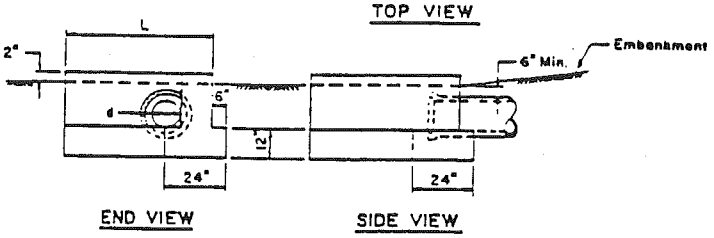


TYPE D-E ENDWALL

Side road wall to be parallel to side road.

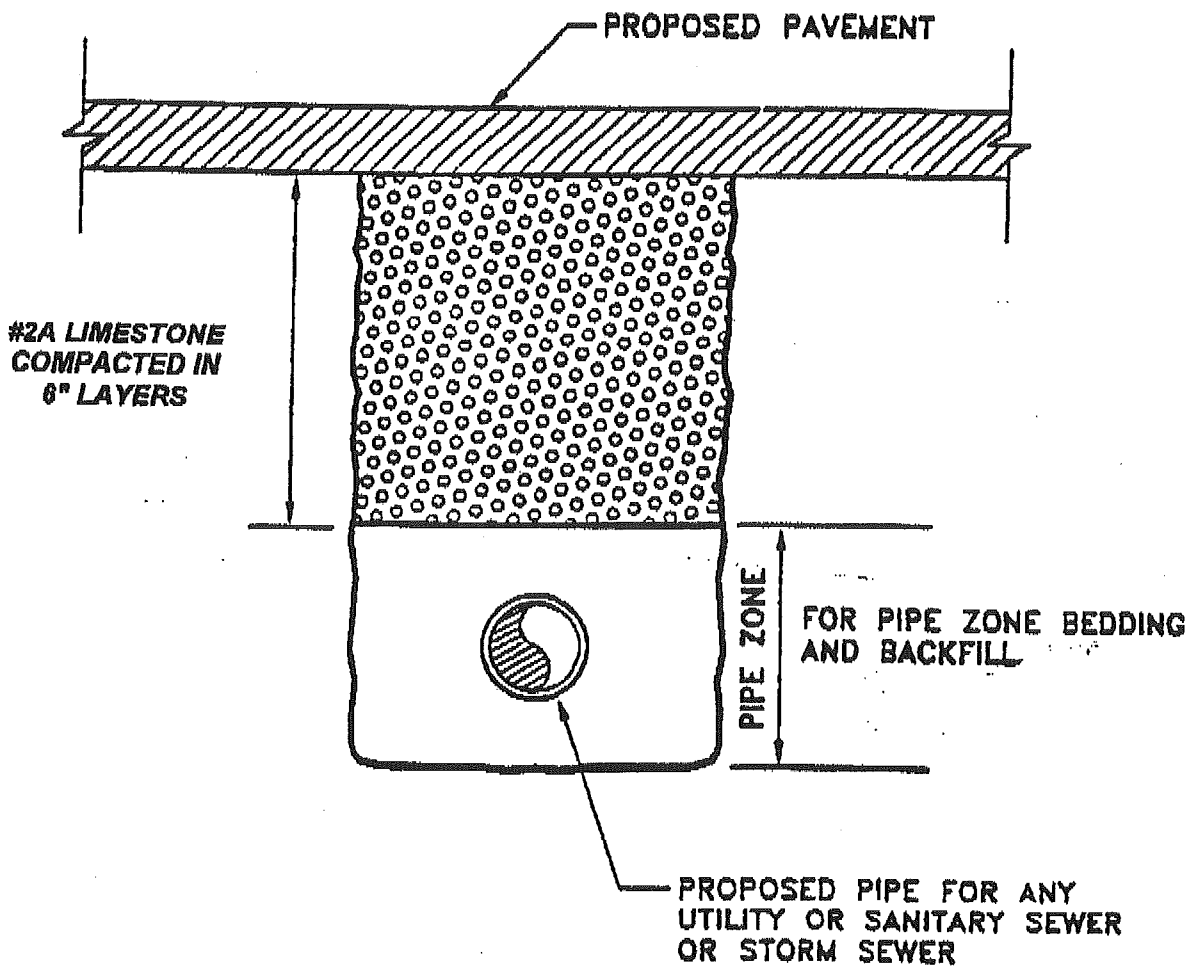
L = 2.5d + 12"





TYPE E-S ENDWALL

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #9
HEADWALLS AND ENDWALLS

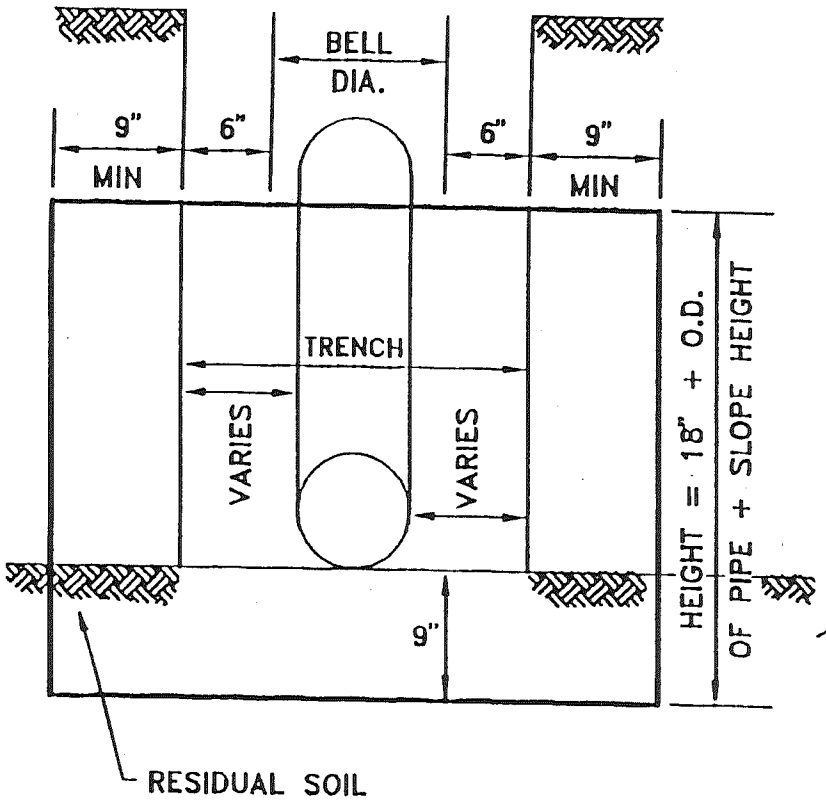


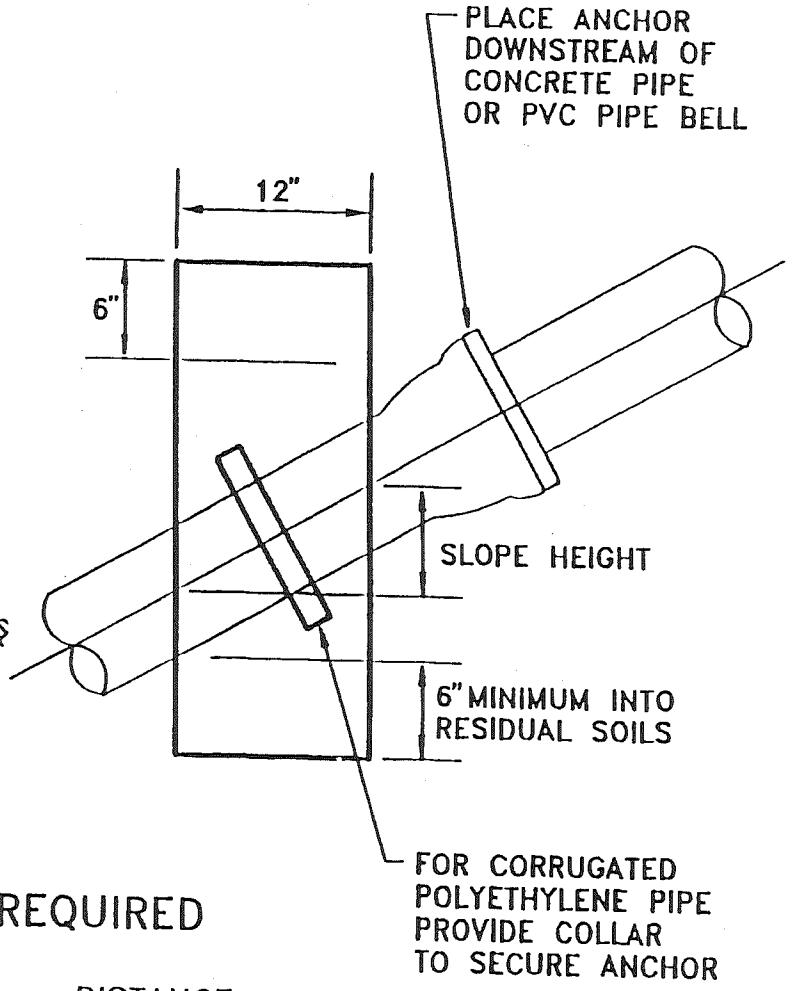
O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #10
TRENCH BACKFILL

O'HARA TOWNSHIP STANDARD DETAILS

EXHIBIT #1

PIPE ANCHOR

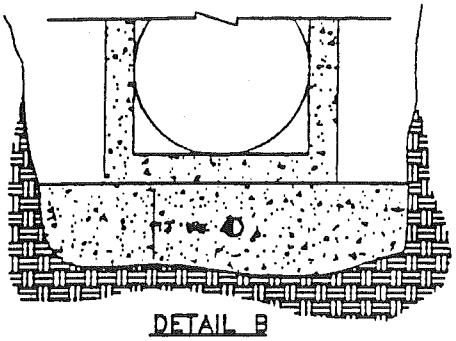




SPACING REQUIRED

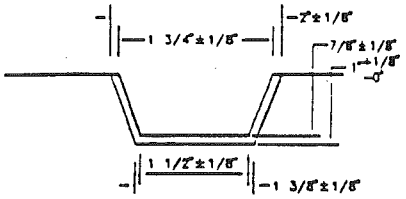
% GRADE	DISTANCE CENTER TO CENTER
20% TO 30%	36' C.C.
30% TO 50%	24' C.C.
50% +	18' C.C.

1. Construct in accordance with the requirements of Publication 408, Section 605, for Cast-in-Place units and Section 713.2 for Precast Cement Concrete units.
2. Precast concrete inlet boxes may be used in lieu of cast-in-place boxes shown. Only precast inlet boxes supplied by a manufacturer listed in Bulletin 15 will be permitted. See Note 9, this sheet.
3. Provide inlet boxes with 24" X 45 1/2" standard opening to accommodate the standard top components.
4. Provide 6" inlet walls, unless otherwise indicated, for concrete construction.
5. Inlets that exceed the maximum height, as shown, will require a special design.
6. Do not extend pipe block-outs into the base when base is not monolithic with the inlet walls.
7. Locate pipe or pipes, as indicated, with the inlet bottom shaped to channel the flow toward the outlet pipe.
8. Place precast inlet boxes on a properly prepared base as shown in Detail B.
9. Construct inlets that exceed 5 feet in height with steps similar to manholes. See RC-38.
10. Place #4 reinforcement bars, minimum 12 inches long, space at 12 inches C. to C., as dowels between the inlet base and walls when the concrete walls and inlet base are no constructed monolithically. The dowels may be eliminated if the alternate joint shown in Detail A is constructed.
11. Brick or concrete block inlets shall not be permitted.
12. All inlets for pipes > 36"ø shall have expanded type inlet box, design of which shall be approved by the township engineer.
13. Construct in accordance with PaDOT specifications.

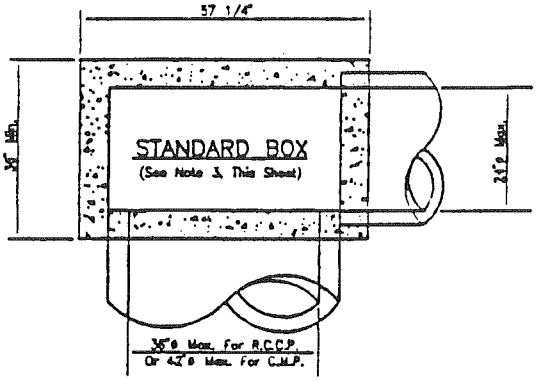


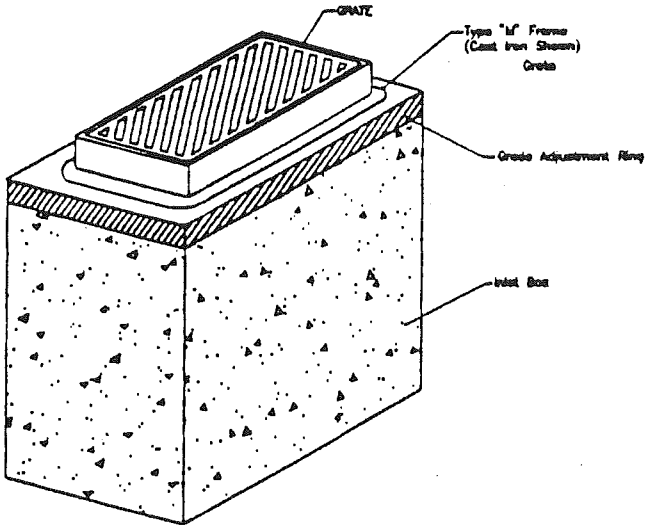
DETAIL B
PRECAST INLET BOX
BASE PREPARATION

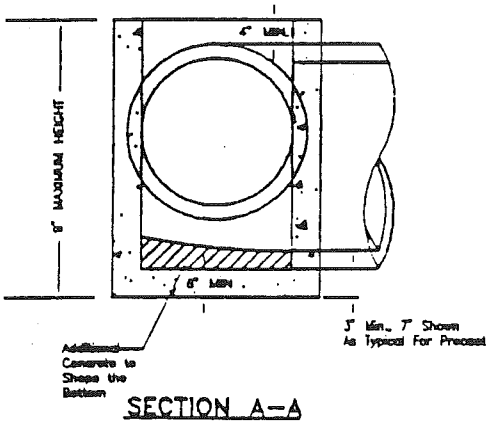
◐ Place material meeting the requirements of Publication 408, Section 350.2, in 4 inch layers, compacted to a density satisfactory to the Engineer, incidental to the inlet pay item.



DETAIL A
ALTERNATE JOINT

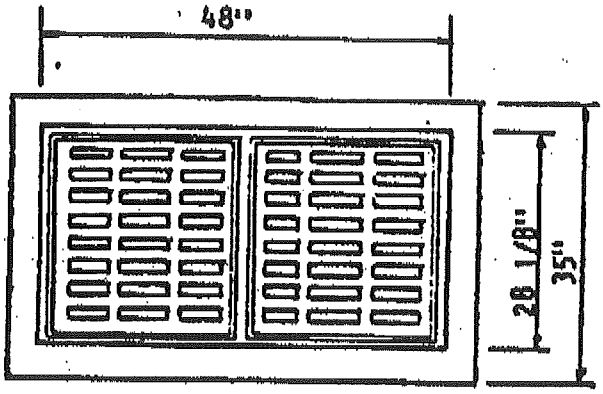






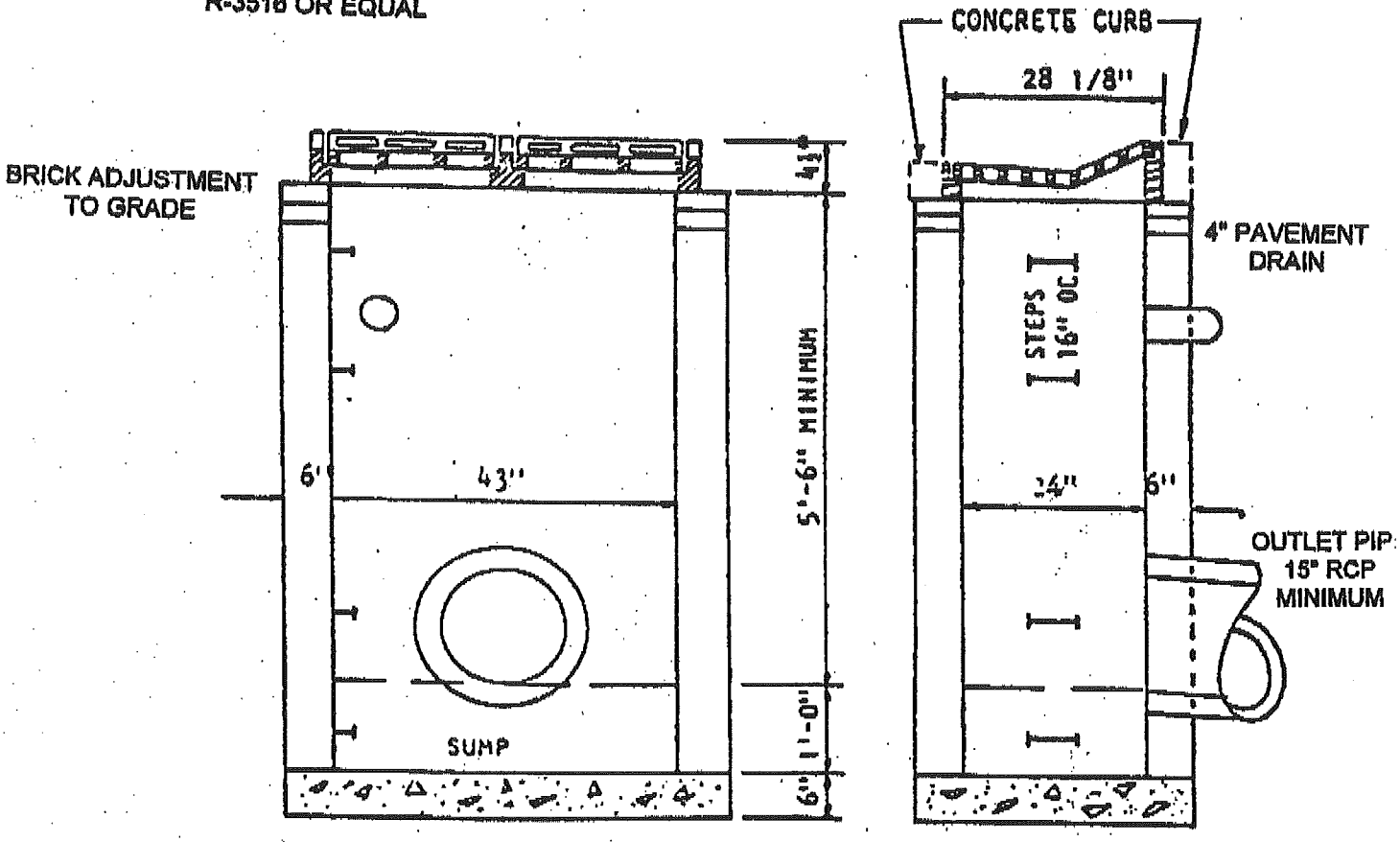
SECTION A-A

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #12
TYPE-M INLET



1. ALL INLETS SHALL BE PRECAST CONCRETE OF THE SIZE SHOWN UNLESS OTHERWISE SPECIFIED BY THE TOWNSHIP ENGINEER.
2. SOLID BRICK INLETS MAY ALLOWED AT THE DISCRETION OF THE TOWNSHIP ENGINEER.

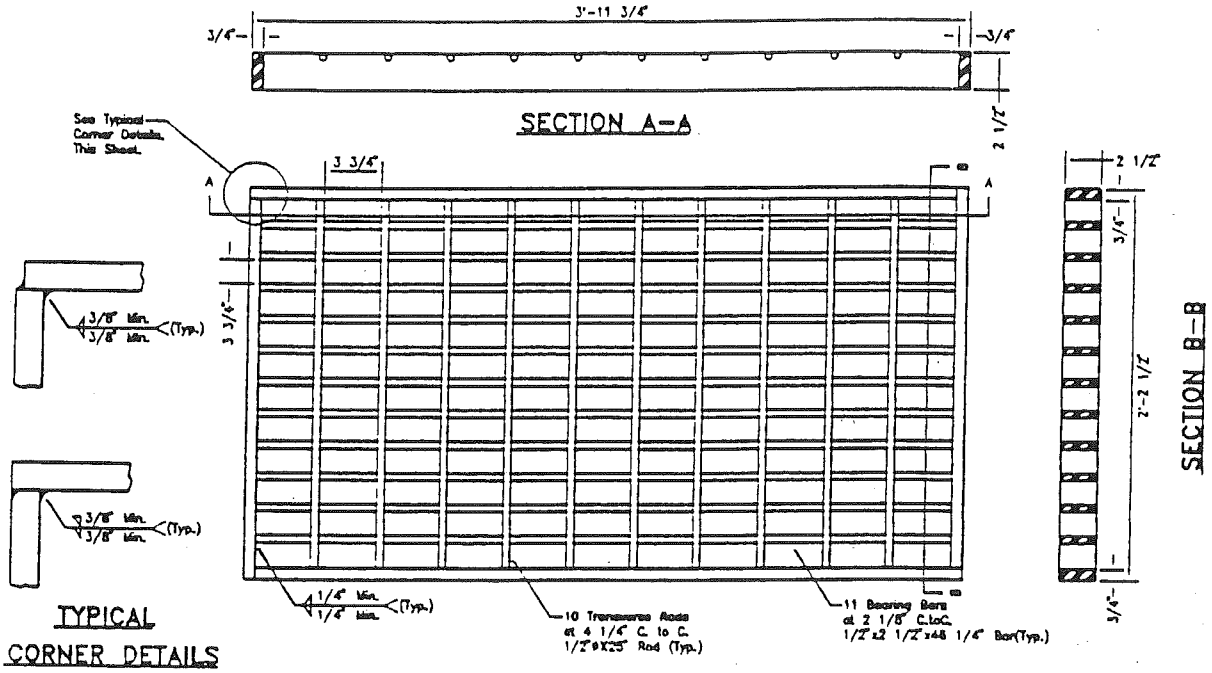
FRAME AND GRATE: NEENAH R-3516 OR EQUAL



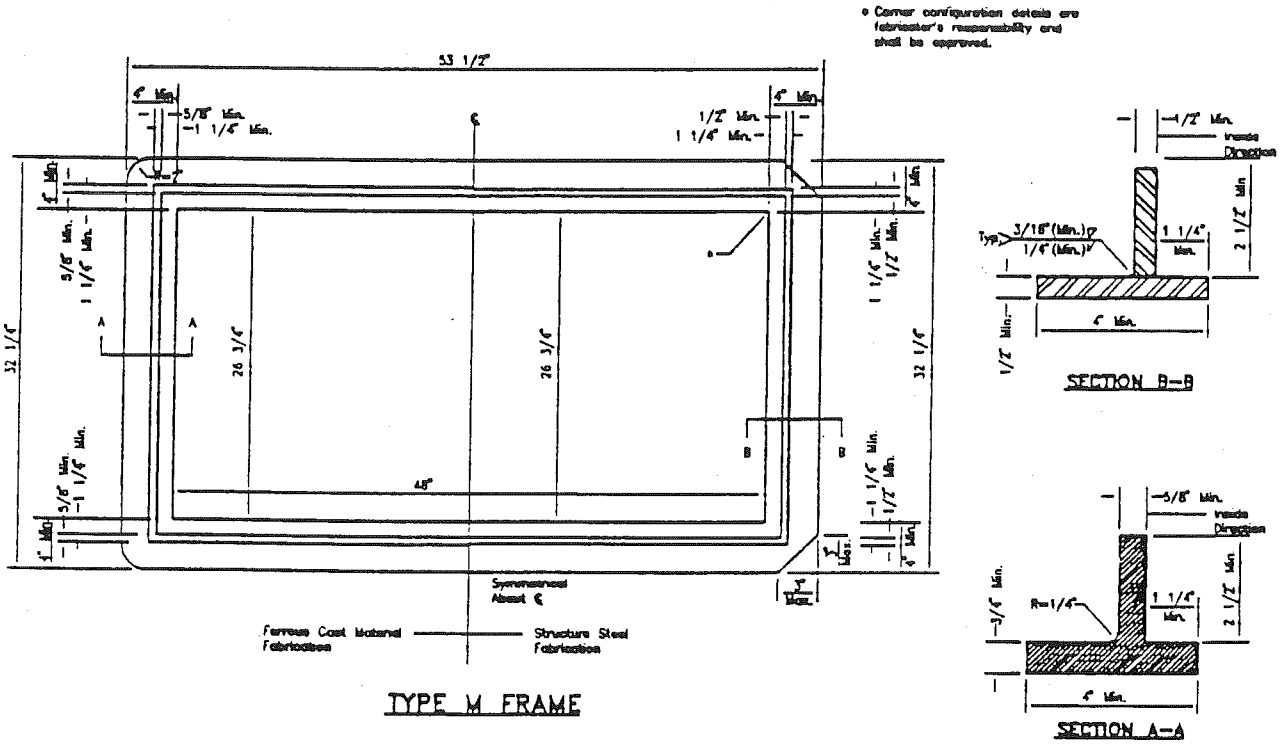
INLET DETAIL

SCALE: 1/2" = 1' - 0"

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #12A
CURB INLET



STRUCTURAL STEEL GRATE
BICYCLE SAFE



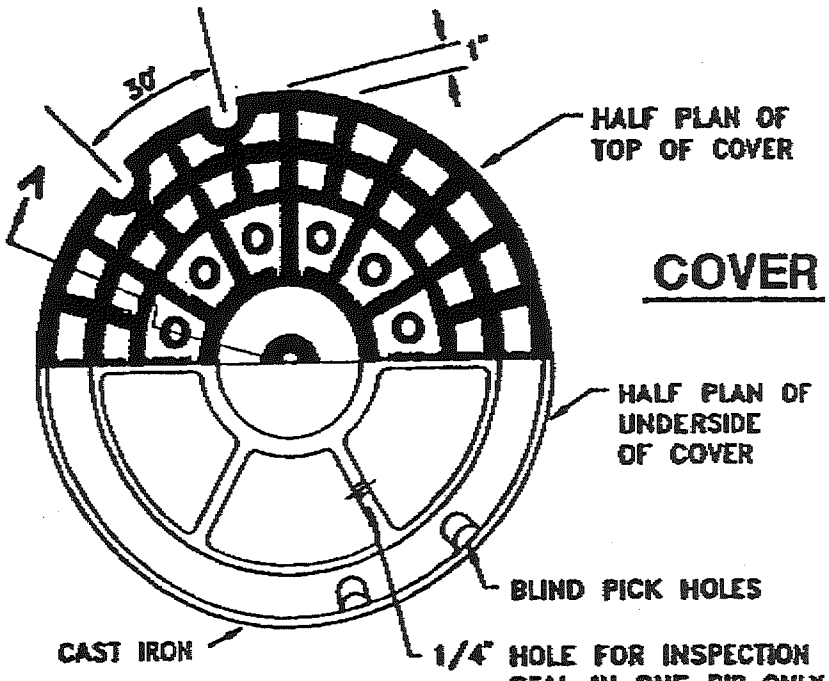
TYPE M FRAME

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #13
TYPE-M INLET GRATE

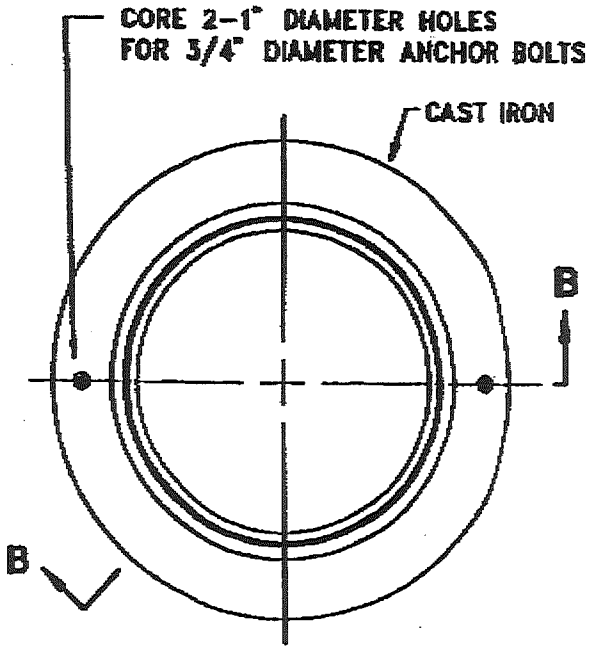
O'HARA TOWNSHIP STANDARD DETAILS

EXHIBIT #14

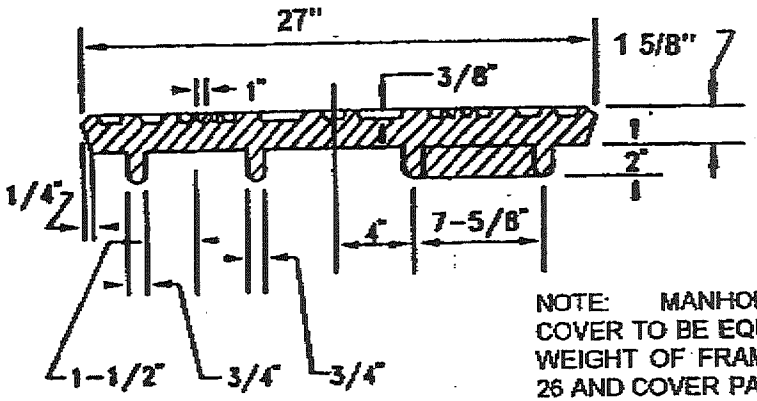
CIRCULAR MANHOLE FRAME AND COVER



COVER

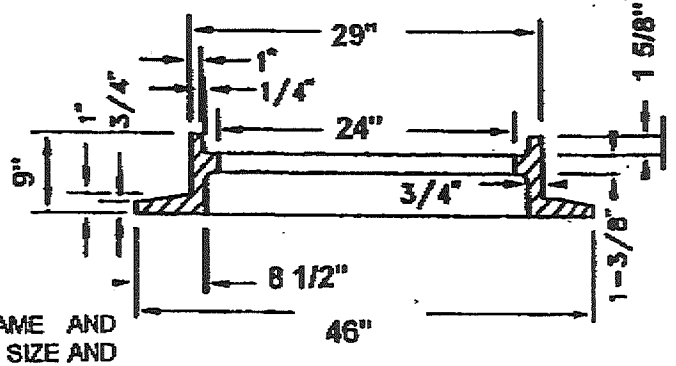


FRAME

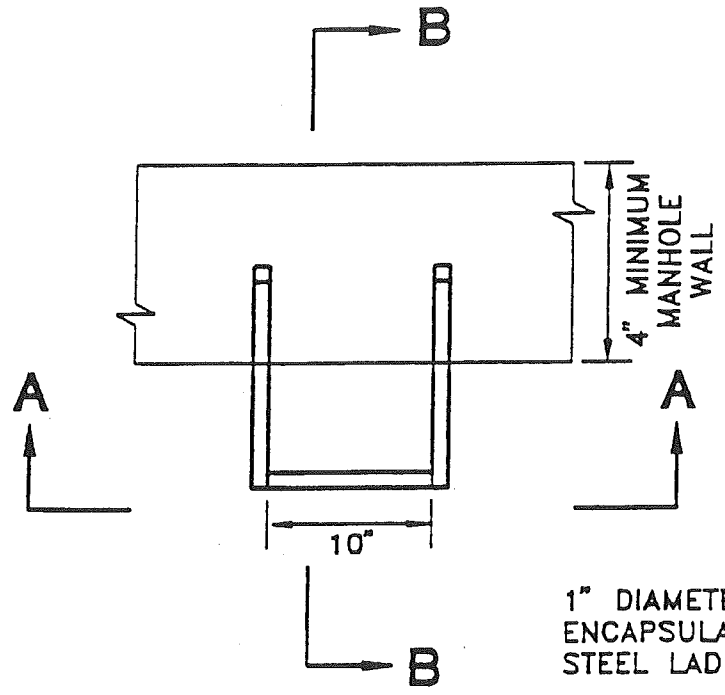


SECTION A-A

NOTE: MANHOLE FRAME AND COVER TO BE EQUAL TO SIZE AND WEIGHT OF FRAME PATTERN NO. 26 AND COVER PATTERN NO. 25 AS MADE BY ALLEGHENY FOUNDRY COMPANY.

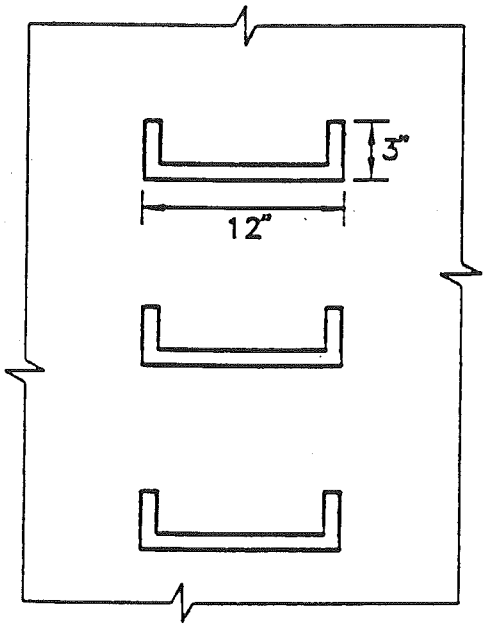


SECTION B-B

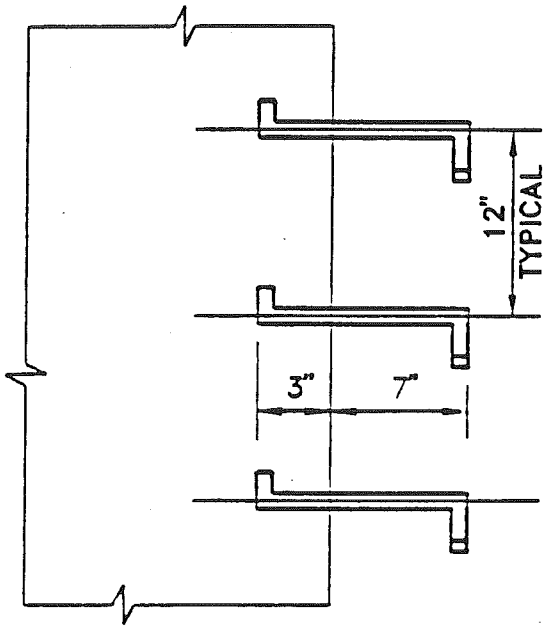


1" DIAMETER (MIN.) PLASTIC ENCAPSULATED IRON OR STEEL LADDER BARS

PLAN



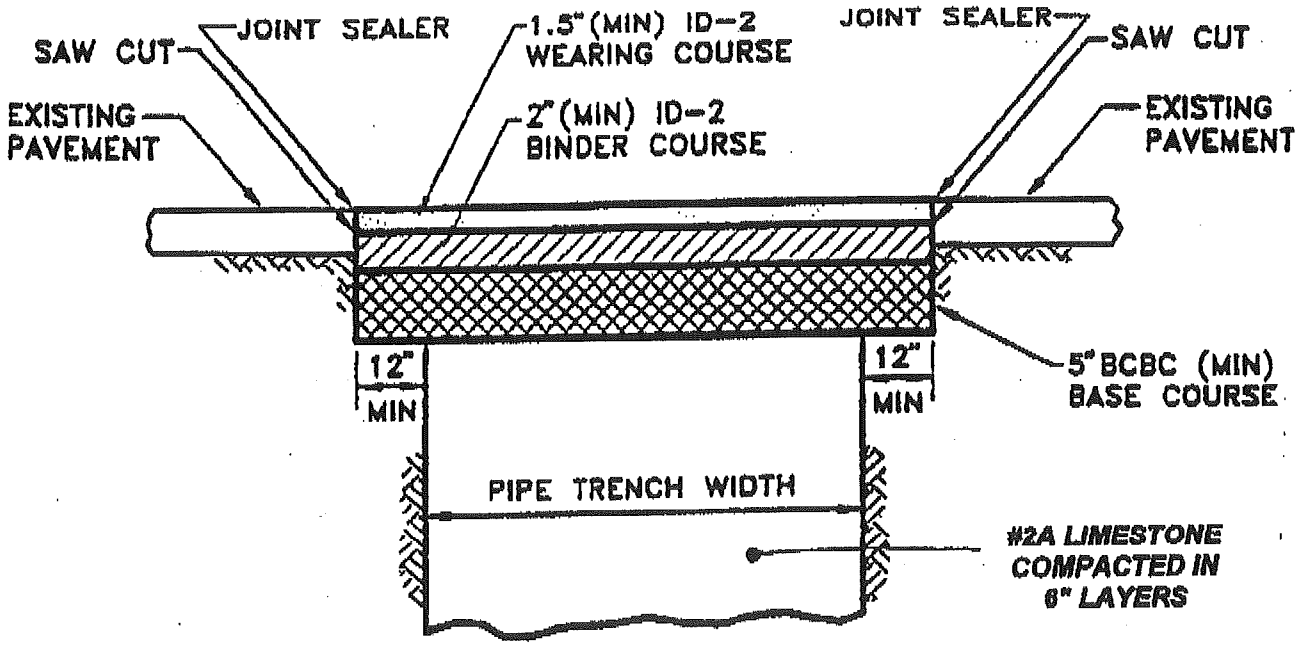
ELEVATION A-A



SECTION B-B

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #15
LADDER BARS FOR MANHOLES

NOTE: 2 SEPARATE SAW CUTS:
1 CUT BEFORE CONSTRUCTION
1 CUT BEFORE FINAL PAVING



1.5" (MIN) ID-2 WEARING COURSE

2" (MIN) ID-2 BINDER COURSE

5" (MIN) BCBC BASE COURSE

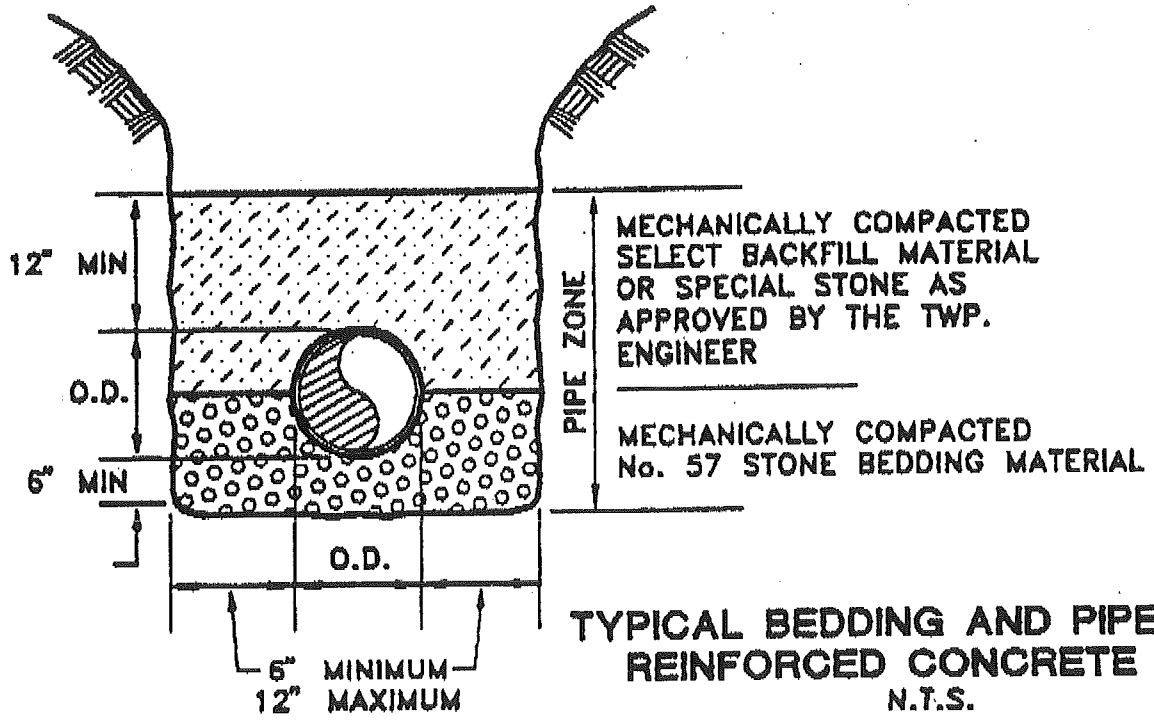
NOTE:
1. DURING COLD WEATHER MONTHS PROVIDE AND MAINTAIN A TEMPORARY BITUMINOUS COLD PATCH SURFACE UNTIL WEATHER PERMITS HOT ASPHALT PAVING
2. THE TOWNSHIP MUST BE NOTIFIED 24 HOURS IN ADVANCE OF ROAD OPENING AND SURFACING

BCBC BASE COURSE SHALL BE AS THICK AS EXISTING OR 5" MINIMUM, (AFTER COMPACTION) WHICH EVER IS GREATER

BINDER COURSE SHALL BE AS THICK AS EXISTING OR 2" MINIMUM, (AFTER COMPACTION) WHICH EVER IS GREATER

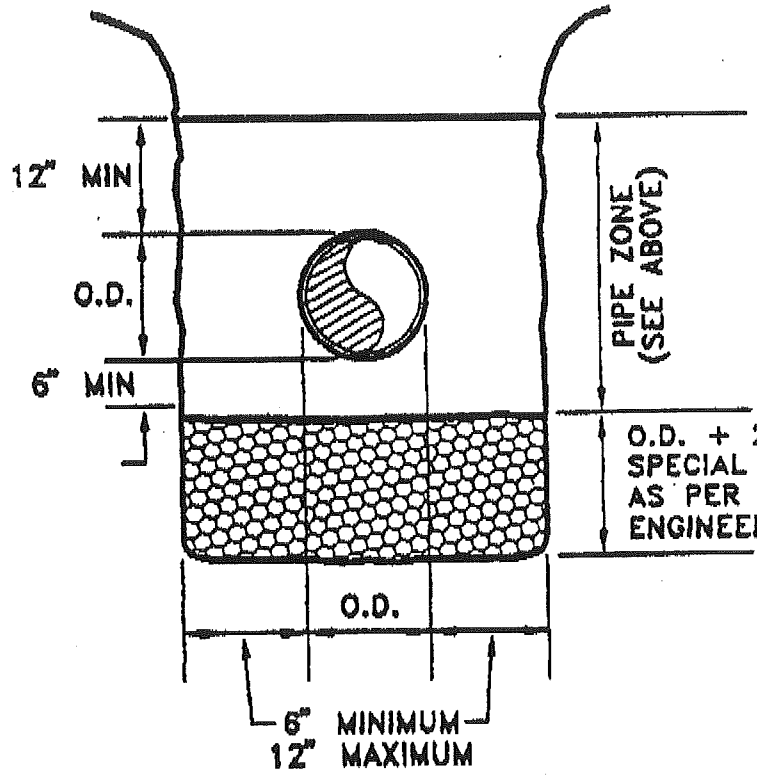
WEARING COURSE SHALL BE AS THICK AS EXISTING OR 1.5" MINIMUM, (AFTER COMPACTION) WHICH EVER IS GREATER

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #16
ASHPHALT PAVEMENT REPLACEMENT FOR EXISTING ROADS/STREETS



TYPICAL BEDDING AND PIPE ZONE REINFORCED CONCRETE PIPE

N.T.S.

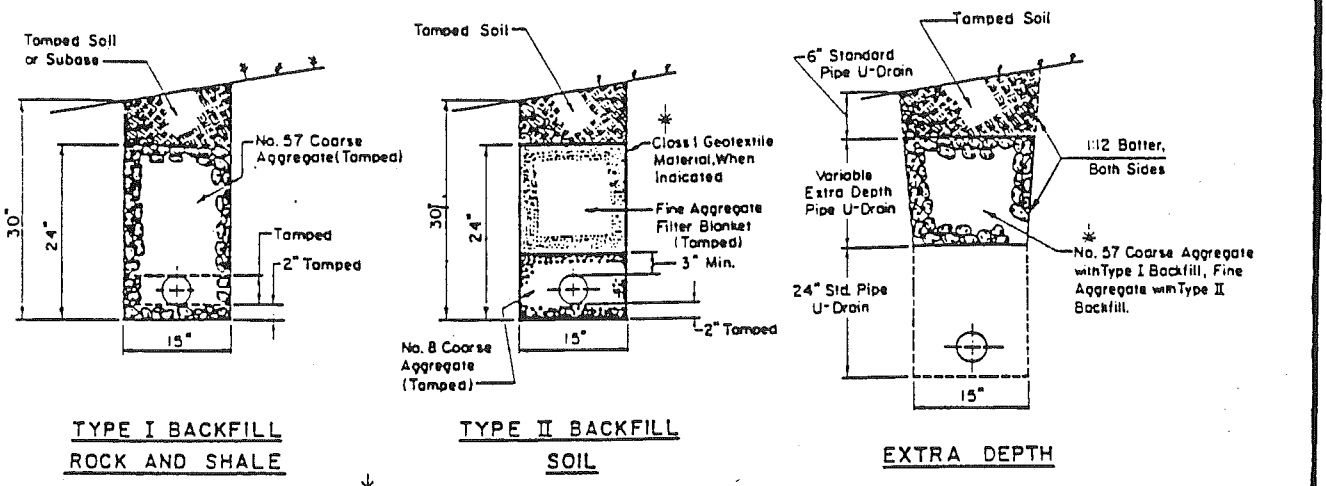


NOTE: SPECIAL BEDDING MAY BE REQUIRED BY THE TOWNSHIP ENGINEER IF FIELD CONDITIONS OR LOADS WARRANT THE ADDITIONAL BEDDING

SPECIAL BEDDING

N.T.S.

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #17
TYPICAL BEDDING FOR RCP



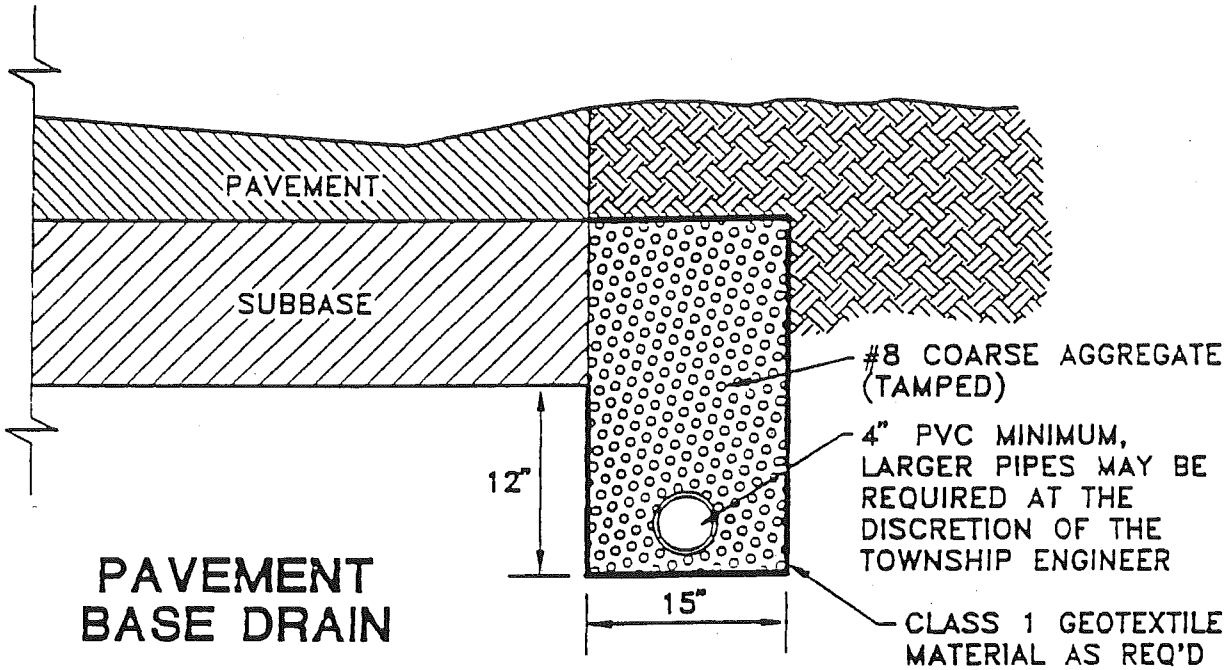
TYPE I BACKFILL
ROCK AND SHALE

TYPE II BACKFILL
SOIL

EXTRA DEPTH

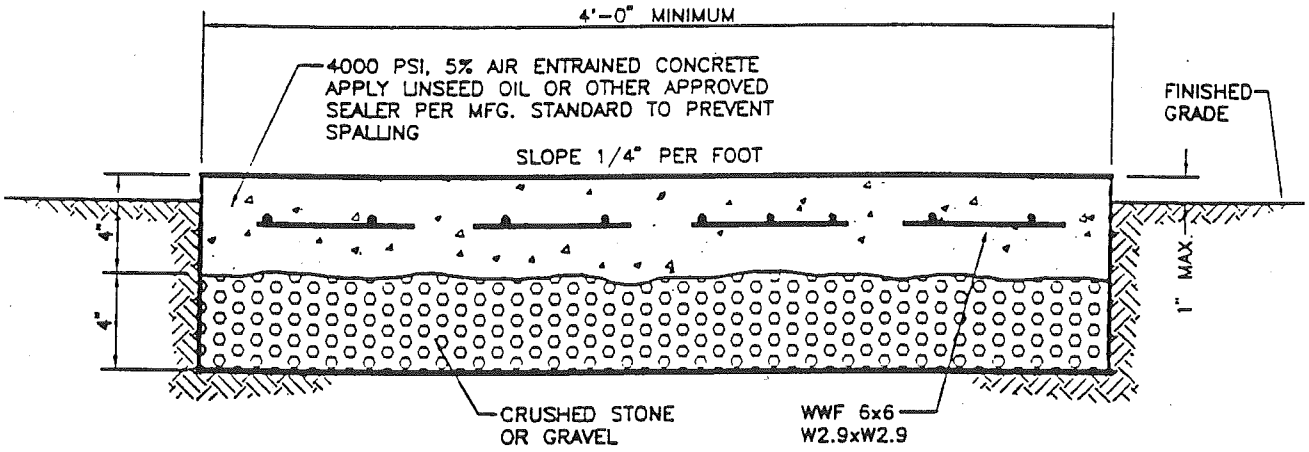
* When Geotextile Material is used for Type II Backfill, replace Fine Aggregate Filter Blanket with equivalent depth of No. 8 Coarse Aggregate.

PIPE UNDERDRAIN



PAVEMENT BASE DRAIN

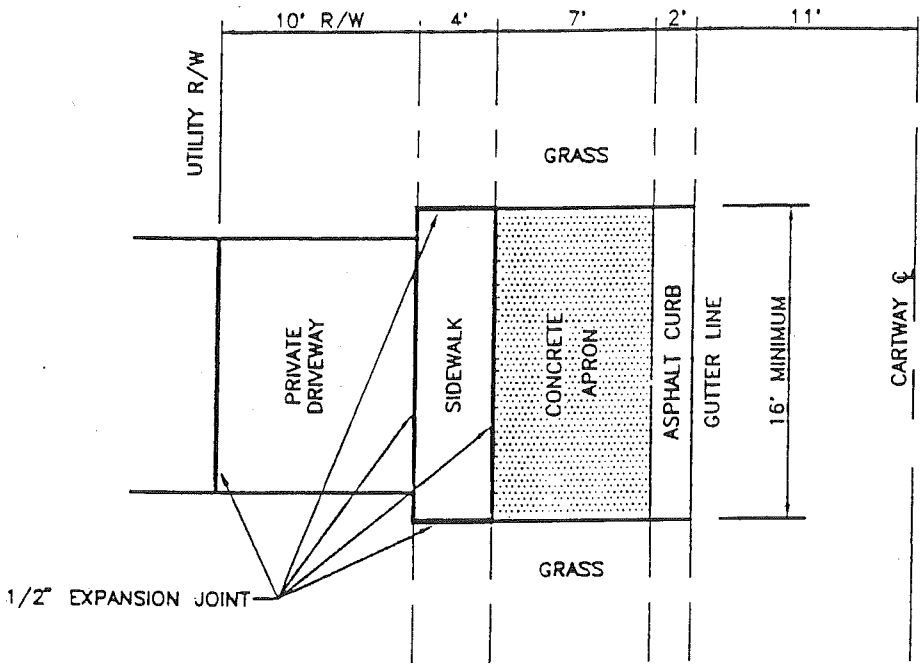
O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #18
PIPE UNDERDRAIN, PAVEMENT BASE DRAIN

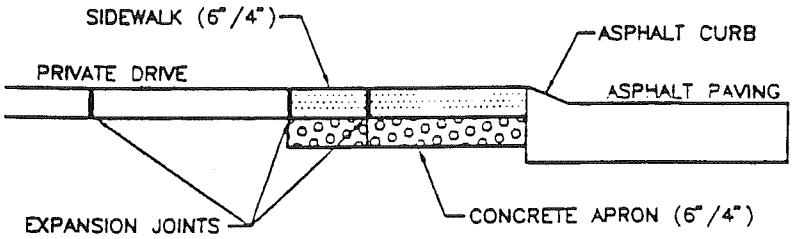


N O T E S :

1. WALK SHALL BE CROSS SCORED EVERY FOUR FEET (4'). 1/2" PREFORMED EXPANSION JOINTS EVERY 20 FEET (20'). WALK SHALL HAVE A STIFF BROOM FINISH WITH TROWELED EDGES.
2. IF A DRIVEWAY IS TO BE CONSTRUCTED OVER A SIDEWALK, THE CONCRETE BE PLACED AT 6" DEPTH, SEE DETAIL R-16.
3. PROVIDE TWO (2) No. 4 DOWELS AT PROPERTY LINES.

O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #19
CONCRETE SIDEWALK



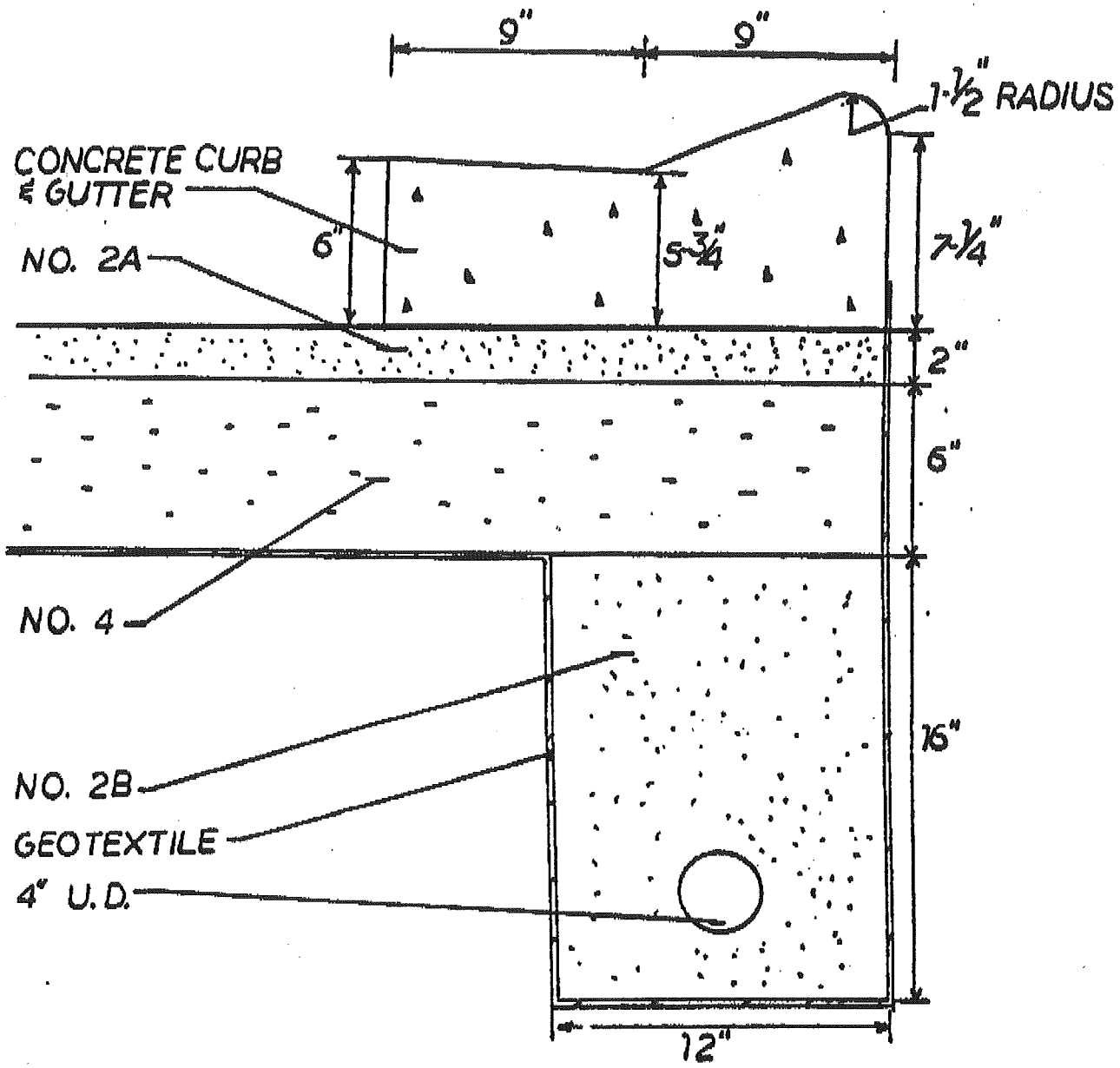


N O T E S :

1. SIDEWALK TO HAVE STIFF BROOM FINISH WITH TROWELED EDGES.
2. PROVIDE 1/2" EXPANSION JOINT AT NEW SIDEWALK ABUTTING EXISTING SIDEWALK.
3. THE CONCRETE APRON SHALL BE 6" THICK CONCRETE ON A 4" COMPACTED STONE BASE, 4000 PSI CONCRETE WITH 10x10x10 MESH IN APRON AND SIDEWALK.
4. SIDEWALK MAY BE LOWERED IN VICINITY OF APRON SO THAT AN ORDERLY TRANSITION IS POSSIBLE.
5. THE DRIVEWAY SHALL NOT EXCEED 10%.
6. THE DEPRESSED SIDEWALK IS NOT TO EXCEED 1/4" PER FOOT LONGITUDINALLY.

O'HARA TOWNSHIP
EXHIBIT #20
CONCRETE DRIVEWAY/SIDEWALK APRON

NOTE: A fibre reinforcement meeting the approval of the township engineer shall be added to the concrete mix to reduce shrinkage cracks.

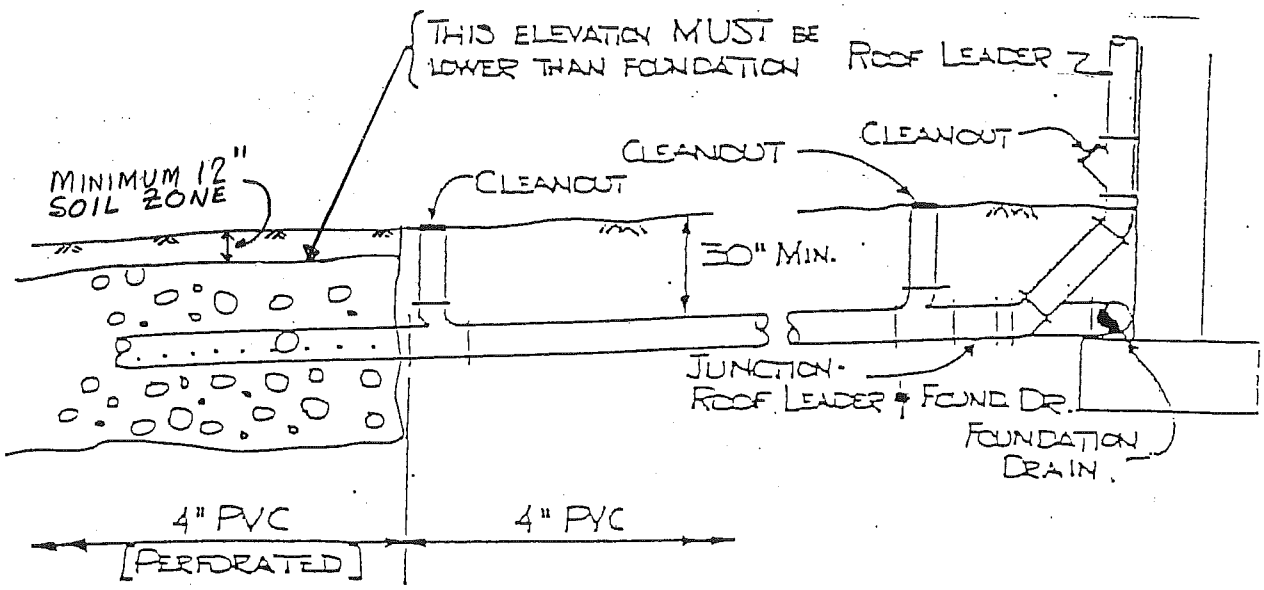


O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT #21
CONCRETE CURB

V = Volume of Runoff in cubic feet
A = Impervious surface in square feet
R = Rainfall in feet = 1/12
S = Required storage area in cubic feet
S/.40 = Gross Volume Required

EXAMPLE

A = 18 X 14.6 = 263
V = 263/12 = 21.9
S = 21.9 X 2 = 43.8 CUBIC FEET (NET VOLUME REQUIRED)
43.8/.40 = 109.5 CUBIC FEET (GROSS VOLUME REQUIRED)



O'HARA TOWNSHIP STANDARD DETAILS
EXHIBIT # 22
ON-LOT STORMWATER DETENTION SUMP