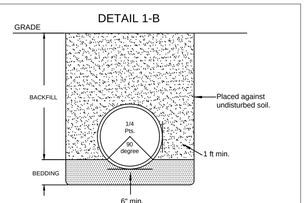
## DETAIL 1-B

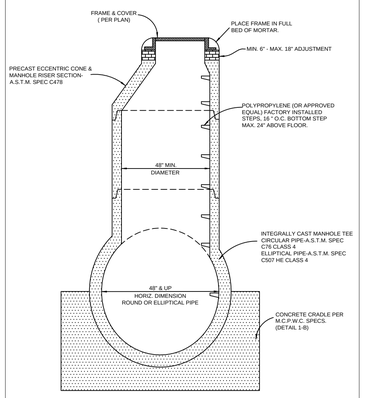



**BEDDING**

Cradle must be for the entire length of the item(s) when required.
(See Bedding Requirements-Section 5 A.)

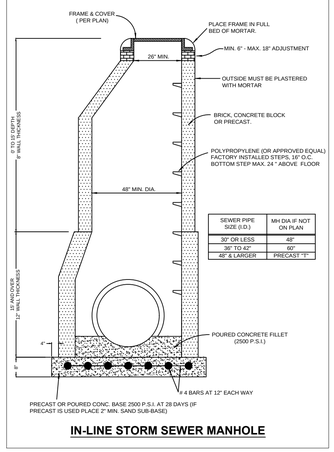
**CONCRETE CRADLE**

## DETAIL 1-C



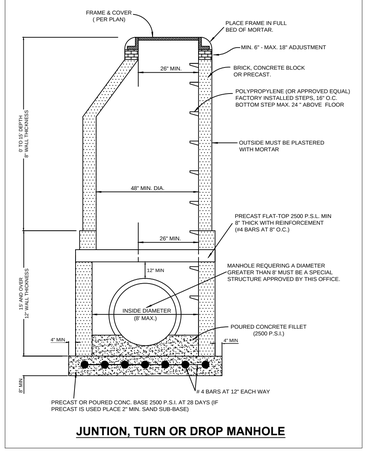

**STORM SEWER TEE MANHOLE**

## DETAIL 1-D




**IN-LINE STORM SEWER MANHOLE**

## DETAIL 1-DD




**JUNTION, TURN OR DROP MANHOLE**

## DETAIL 1-Z.1

**ROAD R.O.W. UTILITY TRENCH**
**TYPE B**

Bedding and Backfill of pipe within the Road R.O.W. must meet the requirements of MDOT as specified in the MDOT Standards IV-83G **TYPE B** Utility Trench dated 10-22-91. (See Detail 1-Z.2)

Class IIIA material shall be as defined by MDOT Supplemental Specifications for Utility Trench dated 4-25-91. (See Detail 1-Z.3)

Class III Granular Material shall consist of sand which meets the specifications described in Table 8.02-3, 1990 MDOT Standard Specifications for Construction. (See Detail 1-Z.4)

If pea gravel is used for Class IIIA material within the Road R.O.W. a filter fabric must be placed between the Class IIIA material and Class III material. Said filter fabric must meet requirements of MDOT Standards 8.09.02 Geotextiles. (See Detail 1-Z.5)

And acceptable alternative to using the filter fabric is to add a sand cement dry mix (Grade C-2500 P.S.I.) to the Class IIIA material within the Road R.O.W.

## DETAIL 1-Z.3

**MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS**
**SUPPLEMENTAL SPECIFICATION FOR UTILITY TRENCH BACKFILL**

5.12 (3c) 1 of 1 10-10-90
FHWA Aprroval 04-25-91

a. Description.- This work shall consist of backfilling trenches where called for on the plans with a porous bedding material in accordance with the typical trench sections shown on Standard Plan IV-83 Series. Granular Material Class IIIA for use as trench backfill may also consist of crushed concrete.

b. Material.- The porous bedding materials for backfilling sewer trenches shall be Granular Material Class IIIA and shall meet the requirements specified in Subsection 8.02.06 of the 1990 Standard Specifications with the following additions:

The following material is hereby added to Table 8.02-3:

| MATERIAL | SIEVE ANALYSIS (ASTM C 136) TOTAL PERCENT PASSING (a) | | | | | | | | | Lost by Washing (a) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 6" | 3" | 2" | 1" | 1/2" | 3/8" | No. 4 | No. 30 | No. 100 | |
| | 150 mm | 75 mm | 50 mm | 25 mm | 12.5 mm | 9.5 mm | 4.75 mm | 0.60 mm | 0.150 mm | Percent |
| Class IIIA | | | | | | 100 | | | 0-30 | 0-15 |

(a) Based on dry weights.

The following sentence is hereby added at the end of the first paragraph:

Granular Material Class IIIA for use as trench backfill may also consist of crushed concrete.

c. Construction Methods.- Trenches shall be backfilled and compacted in accordance with the methods specified under Backfilling. Subsection 5.13.08, of the 1990 Standard Specifications, except the third paragraph is hereby deleted and is replaced with the following paragraph:

Backfill for sewer within the limits of the roadbed as shown on the plans or as directed by the Engineer shall be Granular Material as shown on the plans and shall be compacted to 95 percent of Maximum Unit Weight.

d. Measurement and Payment.- The completed work as measured for UTILITY TRENCH will not be paid for separately. Payment for such work will be considered as having been included in the contract unit prices bid for pay items in the contract.

## DETAIL 1-Z.4

Table 8.02-3 Grading Requirements for Granular Materials 1990

| MATERIAL | SIEVE ANALYSIS (ASTM C 136) TOTAL PERCENT PASSING (a) | | | | | | | | | Lost by Washing (a) Percent |
|---|---|---|---|---|---|---|---|---|---|---|
| | 6" | 3" | 2" | 1" | 1/2" | 3/8" | No. 4 | No. 30 | No. 100 | |
| | 150 mm | 75 mm | 50 mm | 25 mm | 12.5 mm | 9.5 mm | 4.75 mm | 0.60 mm | 0.150 mm | |
| Class I | | | 100 | | | 45-85 | 20-85 | 5-30 | | 0-5 |
| Class II(b) | | 100 | | 60-100 | | | | | 0-30 | 0-7(c) |
| Class IIA(b) | | 100 | | 60-100 | | | | | 0-35 | 0-10(c) |
| Class III | 100 | 95-100 | | | | | | | | 0-15(c) |

(a) Based on dry weights.
(b) Except for use in Granular Blankets. Class IIA granular material may be substituted for Class II granular material for projects located in the following counties. Arenac, Bay, Genesee, Gladwin, Huron, Lapeer,Macomb, Midland, Oakland, Saginaw, Sanilac, Shawassee, St. Clair, Tuscola, and Wayne counties.
(c) To be determined on that portion of the sample which passes the 1 inch sieve.

## DETAIL 1-Z.5

8.08.17
obtain specimens of the shape and size specified for the Compression Set Test, a specimen of the largest obtainable size shall be used and the Compression Set shall not be more than 30 percent.

c. External Type Rubber Gaskets.- External rubber gaskets, mastic, and protective film for seating culvert and sewer joints shall meet the requirements of ASTM C 877.

8.08.18 Metal End Sections.- Metal end section shall be fabricated in accordance with the details shown on the plans and shall be furnished complete with coupling bands or hardware as indicated in the plans. The metallic coating on the end sections shall be the same as the metallic coating on the pipe, except zinc coated steel end sections ma be used with aluminum coated steel pipe. Metal end sections shall conform to AASHTO M 36, where applicable.

8.08.19 Concrete End Sections.- Precast concrete sections shall be constructed of concrete and reinforcement conforming to the requirements of AASHTO M 170 (ASTM C 76). Class II as modified by details shown on the plans. Concrete for end sections made by the dry-pack process shall contain a minimum of 658 pounds of cement per cubic yard and a liquid air entraining agent used at four times the dosage as needed for conventional slump concrete.
Concrete to pipe culvert shall be by of tongue and groove joints.

8.09 GEOTEXTILES

8.09.01 General Requirements.- Geotextiles shall be stored and handled carefully and in accordance with the manufacturer's recommendations. Torn or punctured geotextiles shall not be used unless repaired to the satisfaction of the Engineer.
The minimum certifiable values will be based on a 95 percent confidence level and for directional properties the minimum principle direction will control.

8.09.02 Geotextiles for Pipe-Wrap, Trench Linings, and Ditch Linings.- Geotextiles for pipe wrap, trench linings, and ditch linings, shall weigh at least 3.5 ounces per square yard in the condition of use and shall meet the requirements of AASHTO M 288, with the following modifications to the values listed in Table 1:

The range for Apparent Opening Size (A.O.S.) shall be 70-120
(U.S. Standard Sieve Size),
The minimum requirement for Coefficient of Permeability shall be 0.02 cm/sec.
The minimum requirement for Flow Rate shall be 60 gal/min/ft2.

For pipe wrap where the backfill being used around the pipe is

Granular Material Class II or better polyester geotextiles having an A.O.S. in the range of 20 to 100, weighing at least 3.0 ounces per square yard in the condition of use, and having a nominal Burst Strength of 100 psi when tested in accordance with ASTM D 3786 will be permitted as an alternate pipe wrap.

8.09.03 Geotextiles for Granular Blanket.- Geotextiles used in granular blankets shall meet the requirements for geotextiles used for trench and ditch linings with an additional requirements that the fabric shall have a rough surface to provide a high soil-to-fabric friction value.

8.09.04 Geotextile Liner for Riprap.- The geotextiles liner for areas to be riprapped shall weigh at least 4.5 ounces per square yard in the condition of use, shall contain a small amount of non-toxic lampblack as an ultraviolet inhibitor, and shall meet the requirements of AASHTO M 288, with the following modifications to the valued listed in Table 1:

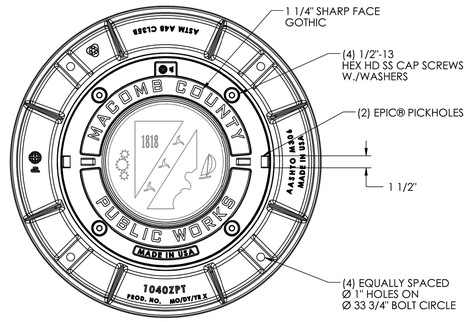
The minimum requirement for Tensile Strength shall be 200 lbs
The minimum requirement for Burst Strength shall be 250 psi.
The range for Apparent Opening Size (A.O.S.) shall be 70-120
(U.S. Standard Sieve Size)

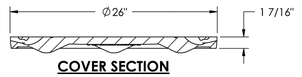
8.09.05 Three- Dimensional Mesh.- Three dimensional mesh meeting the approval of the Engineer may be used as an alternate to open-graded aggregate used as a drainage layer. The Engineer's approval of a three-dimensional mesh will be based on such characteristics as durability, strength, resistance to crushing, and thickness. The geotextile to be placed above and below the three dimensional mesh may be heat-bonded or otherwise attached to the mesh.

8.09.06 Geotextile Silt Fence.- Geotextile silt fence shall be commercially produced product for that purpose which has the following properties:

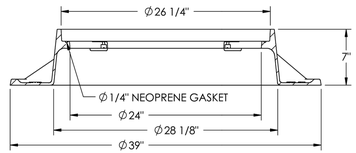
| Property | Value | Unit | Test Method |
|---|---|---|---|
| Grab Tensil Strength | 100 (minimum) | lbs | ASTM D 463 |
| Trapezoid Tear Strength | 45 (minimum) | lbs | ASTM D 453 |
| Mullen Burst Strength | 280 (minimum) | psi | ASTM D 378 |
| U.V. Resistance (Strength Retained) | 70 (minimum) | % | ASTM D 435 |
| Water Flow Rate | 30 (minimum) | gal/min/ft2 | AASHTO M 28 |
| Apparent Opening Size | 0.600 (minimum) No. 30 (minimum) | mm (U.S. Std. mesh) | AASTM D 475 |

# 1040ZPT APT Assembly




**COVER SECTION**




**FRAME SECTION**

**Product Number**
**00104300**

**Design Features**
-Materials
Frame
Gray Iron (CL35B)
Cover
Gray Iron (CL35B)

-Design Load
Heavy Duty
-Open Area
n/a
-Coating
Dipped
-√ Designates Machined Surface

**Certification**
-ASTM A48
-
-Country of Origin: USA

**Major Components**
00104011
00104415

**Drawing Revision**
10/20/2009 Designer: DVDS-RN
8/27/2013 Revised By: MAH

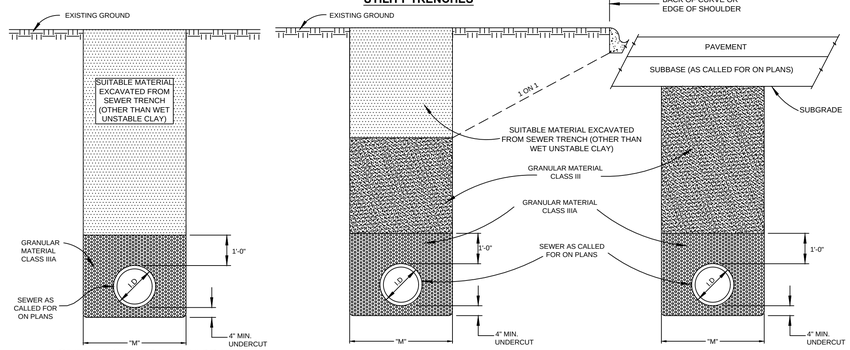
**Disclaimer**
Weights (lbs/kg), dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.



**Contact**
800 626 4653
ejco.com

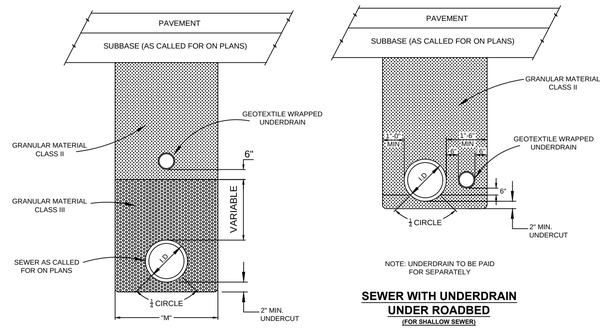
## DETAIL 1-Z.2

**UTILITY TRENCHES**




**SEWER NOT UNDER ROADBEB**

** UTILITY TRENCH "B" **
**SEWER UNDER ROADBEB OR WITHIN INFLUENCE OF ROADBED**




NOTE: UNDERDRAIN TO BE PAID FOR SEPARATELY

**SEWER WITH UNDERDRAIN UNDER ROADBED**

NOTE: UNDERDRAIN TO BE PAID FOR SEPARATELY

**SEWER WITH UNDERDRAIN UNDER ROADBED**
**(FOR SHALLOW SEWER)**

DATE ISSUED 10/01/2020
SCALE NTS
DRAWN BY FR
CHECKED BY DG

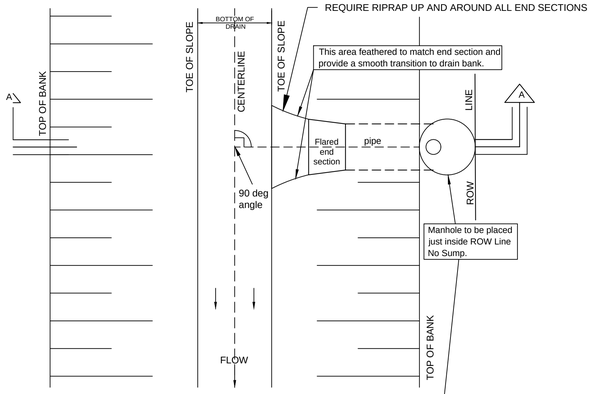
MACOMB COUNTY PUBLIC WORKS OFFICE
21777 DUNHAM ROAD
CLINTON TOWNSHIP, MI 48036
(586) 469-5325

Macomb County Public Works Commissioner
CANDICE S. MILLER

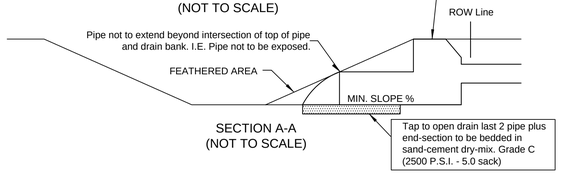
STANDARD DETAILS SHEET
STORM WATER MANAGEMENT

SHEET 1 OF 2

# DETAIL 1-G



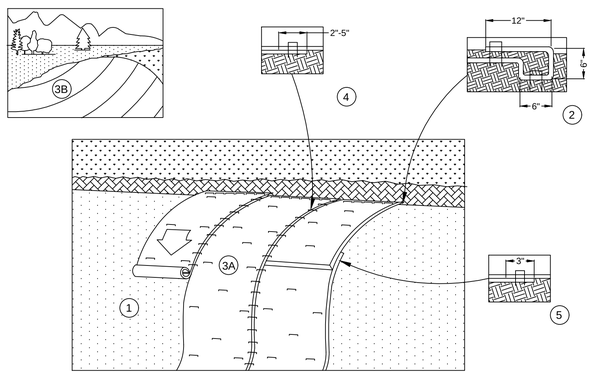

PLAN VIEW
(NOT TO SCALE)




SECTION A-A
(NOT TO SCALE)

**TYPICAL DETAIL OF TAP TO OPEN DRAIN**

# MULCH BLANKET SLOPE INSTALLATION (SESC-15)

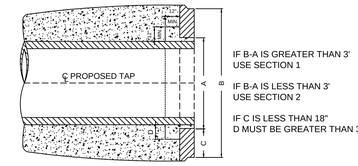



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATE 12" OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/ STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING, APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" APART IN THE RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/ STAKES SPACED APPROXIMATELY 12" ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE (SEE DETAIL SESC-16). WHEN USING THE DOT SYSTEM, STAPLES/ STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN (SEE DETAIL SESC-16).
4. THE EDGES OF THE PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATE 2"-5" OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECP's WIDTH.

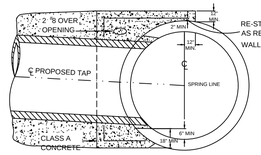
NOTE:
IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.

# DETAIL 1-F2

## PROPOSED TAP 27" OR LARGER

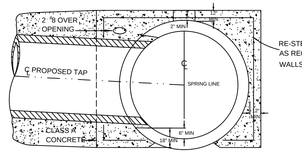



PLAN




SECTION DETAIL I

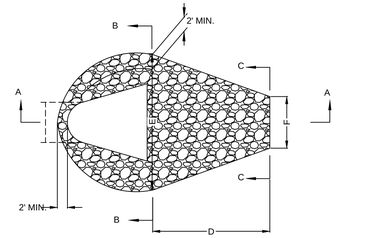
CONCRETE COLLAR IS REQUIRED SHALL BE A MINIMUM OF 12" X 12". SHALL BE PLACED ON UNDISTURBED SOIL AND EXTENDED TO THE FIRST JOINT OF THE PROPOSED TAP.



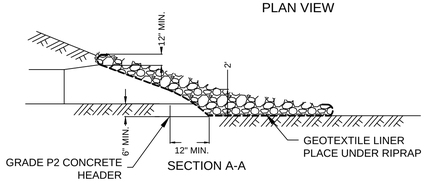

SECTION DETAIL II

GENERAL NOTES

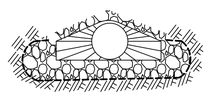
1) All TAPS TO MANHOLES AND PIPES NEED TO BE CORED.
2) ALL JOINTS IN RCP HAVING A DIAMETER OF 36" AND LARGER SHALL BE POINTED UP ON THE INSIDE WITH MORTAR AFTER BACKFILLING AND/ OR GROUTING HAS BEEN COMPLETED.



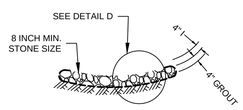

PLAN VIEW




SECTION A-A

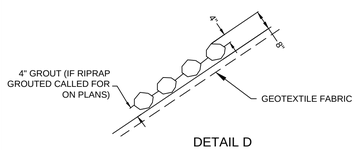


SECTION B-B




SECTION C-C

| PIPE DIA. | D | E | F | Syd |
|---|---|---|---|---|
| 12" | 5'-0" | 6'-6" | 3'-0" | 3.7 |
| 15" | 5'-0" | 7'-0" | 3'-0" | 4.1 |
| 18" | 5'-0" | 7'-6" | 3'-6" | 4.3 |
| 21" | 5'-6" | 8'-0" | 4'-0" | 5.4 |
| 24" | 6'-0" | 8'-6" | 4'-6" | 6.3 |
| 27" | 6'-6" | 9'-0" | 5'-0" | 7.3 |
| 30" | 7'-0" | 9'-9" | 5'-6" | 8.4 |
| 36" | 8'-0" | 10'-9" | 6'-0" | 10.3 |
| 42" | 9'-0" | 11'-9" | 6'-6" | 12 |
| 48" | 10'-0" | 13'-0" | 7'-0" | 14.2 |
| 54" | 11'-0" | 13'-6" | 7'-6" | 15.9 |
| 60" | 12'-0" | 14'-0" | 8'-0" | 17.6 |



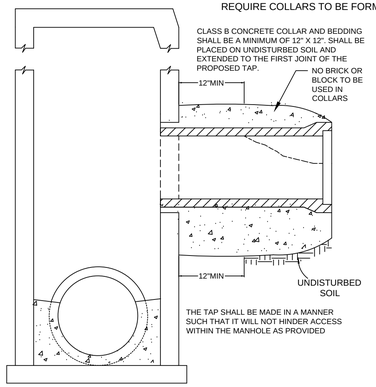

DETAIL D

**RIPRAP DETAIL**

# DETAIL 1-F

## TAP CONNECTION DETAILS

### MANHOLE TAP

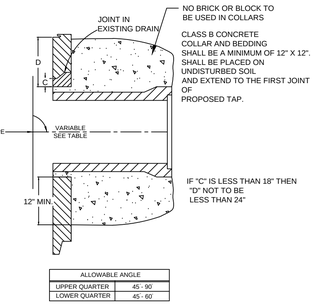



THE TAP SHALL BE MADE IN A MANNER SUCH THAT IT WILL NOT HINDER ACCESS WITHIN THE MANHOLE AS PROVIDED

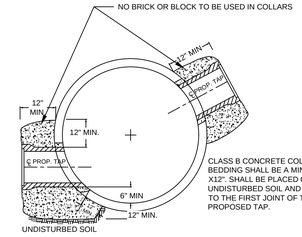
MAXIMUM ALLOWABLE TAP TO A MANHOLE SHALL BE 24" DIAMETER.
THE PROPOSED TAP SHALL BE ABOVE THE EXISTING CONCRETE FILLET.

### PROPOSED TAP 12"-24"

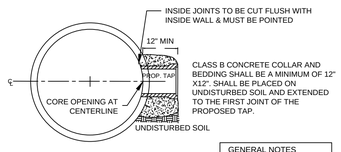
REQUIRE COLLARS TO BE FORMED AND POURED IN PLACE




| ALLOWABLE ANGLE | |
|---|---|
| UPPER QUARTER | 45 - 90 |
| LOWER QUARTER | 45 - 60 |




WHEN THE C OF THE PROPOSED TAP IS BELLOW THE SPRING LINE THE TOP SHALL BE MADE HORIZONTAL AND PARALLEL TO THE SPRING LINE.




**CORE DETAIL TAP**

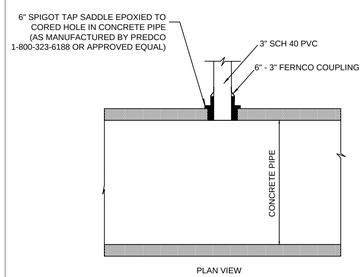
GENERAL NOTES

BLIND TAPS CAN NOT BE CORED ON JOINTS

**GENERAL NOTES**

**1) All TAPS TO MANHOLES AND PIPES NEED TO BE CORED.**
**2) ALL JOINTS IN RCP HAVING A DIAMETER OF 36" AND LARGER SHALL BE POINTED UP ON THE INSIDE WITH MORTAR AFTER BACKFILLING AND/ OR GROUTING HAS BEEN COMPLETED.**

# DETAIL 1-H



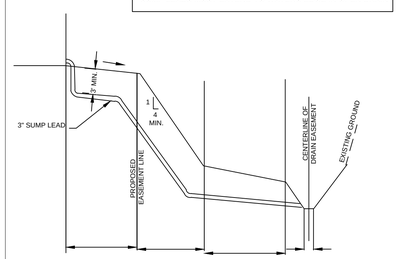

PLAN VIEW

**SUMP PUMP LEAD CONNECTION DETAIL**
**FERNCO COUPLING (NO SCALE)**

# SUMP LEAD DETAIL

GENERAL NOTES

SUMP LEADS MUST EXTEND TO WATERS EDGE IN OPEN DRAIN




DATE ISSUED 10/01/2020
DRAWN BY FR
SCALE NTS
CHECKED BY DG

MACOMB COUNTY PUBLIC WORKS OFFICE
21777 DUNHAM ROAD
CLINTON TOWNSHIP, MI 48036
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Macomb County Public Works Commissioner
CANDICE S. MILLER

STANDARD DETAILS SHEET
STORM WATER MANAGEMENT

SHEET
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