

Town Of Yarmouth
Contractor Handbook



Town of Yarmouth

Contact List

Code Enforcement: Nicholas Ciarimboli: 846-2401

Director of Planning & Development: Erin Zwirko: 846-2401

Town Engineer: Steven Johnson, P.E.: 848-2401

Public Works Director: Erik Street: 846-2401

Water Pollution Superintendent: Chris Cline: 846-2415

Fire/Rescue Chief: Michael Robitaille: 846-2410

Police Chief: Daniel Gallant: 846-3333

Summit Natural Gas: 1-800-909-7642

Central Maine Power: Emergency: 1-800-696-1000

Consolidated Communications: 1-844-968-7224

The Town of Yarmouth has developed this Handbook to help contractors, citizens, engineers and others become familiar with the construction practices, permitting and other general requirements within the Town as it pertains to sewer utility work or street and sidewalk work. This Handbook provides general contact information, references to ordinances, available/required permits, stormwater compliance information and instructions and details for road and utility installation, restoration and repair.

The procedures provided in this Handbook reference other standard documents such as the Maine Best Stormwater Management Practices Manual, Manual on Uniform Traffic Control Devices (MUTCD) specifications, along with references to Maine Department of Environmental Protection Chapter 500 Stormwater Regulations.

The information and references within this Handbook provides basic standards for contractors working within the Town. Most larger scale projects will have site-specific construction drawings, with specialized details that apply to that project. These site-specific construction drawings typically have been reviewed and approved by town staff and the Planning Board to ensure that they meet town standards. Approved construction drawings and all Planning Board Conditions of Approval supersede the standardized information in this handbook.

This handbook is for guidance purposes only. The information in this handbook does not supersede any town, state, or federal ordinance, regulation, or laws.

PERMITTING PROCEDURES

The Contractor is required to obtain permits for various forms of work within the Town. These permits include, but are not limited to, building, electrical, plumbing, sewer connections, road opening, drive entrance location, posted road and sign permits. Additionally, some projects that disturb or move more than ninety-nine (99) cubic yards of material or add several parking spaces require site permitting through the Planning Department. The most recent version of permit application forms should be obtained from the Town website at www.yarmouth.me.us. Other permits may be required for, water main connection, septic system installation and environmental work.

The Contractor shall always be responsible for contacting Dig Safe (1-888-DIG-SAFE or 1-888-344-7233) prior to performing any excavation activities. The Contractor shall contact the Code Enforcement Officer (CEO) to meet and discuss the appropriate permits.

INSURANCE

The Town of Yarmouth requires that when work is performed in a public right of way the Contractor must be adequately insured. When performing work within a public right of way the contractor shall maintain insurance of the type and limits as noted below.

As part of the permitting process the Contractor will be required to file with the Town of Yarmouth, a Certificate of Insurance, executed by an insurance company or companies satisfactory to the Town and licensed by the State of Maine, stating that the Contractor carries insurance in accordance with the following requirements and stipulations:

(a) Workers Compensation Insurance: Per State of Maine Statute.

(b) Commercial General Liability: Public Liability Insurance, and Contractor's Protective Public Liability Insurance, including underground hazard and collapse each covering bodily injury liability on not less than two million dollars (\$2,000,000). The insurance certificated shall also name the Town as additional insured on Liability portions.

(c) Automobile Liability Insurance: The Contractor shall carry Automobile Liability Insurance covering the operation of all motor vehicles, including those hired or borrowed, used in connection with the contract, covering bodily injury liability of not less than one million dollars (\$1,000,000) for all damages arising out of injury to or destruction of property in one accident or occurrence.

The Contractor shall be aware that new development projects shall be constructed in accordance not only with the construction documents, but also in accordance with the Town's Zoning Ordinances and any Planning Board Conditions of Approval. Project requirements may be found within the ordinances.

The ordinances can be found online at the Official Website of the Town of Yarmouth, Maine.

www.yarmouth.me.us. Once on the Town's website, select Departments/Planning and the following:

- Chapter 701: Zoning Ordinance
 - Chapter 702 Site Plan Review Ordinance
- Chapter 601 Subdivision Ordinance and the Technical Appendices
- Chapter 320 Stormwater Ordinance

Within the Chapter 601 Subdivision Ordinances, Technical Appendix D, erosion and sedimentation control standards can be found..

The Contractor should be familiar with the ordinance requirements and/or confirm that the design provided to them meets the requirements of the Town.

Work Zone Safety

All construction work that will affect traffic, bicycle or pedestrian flow shall have an adequate Work Zone set up per MUTCD standards. Providing an adequate Work Zone that meets standards is the responsibility of the Contractor performing the work.

All Traffic Control Devices including, but not limited to, signs, barricades, traffic cones, temporary striping, lighting, Variable Message Boards (VMB's), vehicle placement, flaggers and flagging equipment along with the Work Zone layout itself must meet Federal Highway Administration's (FHA) Manual on Uniform Traffic Control Devices (MUTCD) specifications. A copy of this manual is available online or through the Maine Department of Transportation's (MDOT) office. A pocket handbook with Work Zone examples is available through MDOT's office.

With prior notice, Town staff will be available to review the Contractor's Traffic Control plan and proposed Work Zone to offer insight to the Town's requirements. However, the Contractor is responsible for providing a Work Zone that meets standards.

At the discretion of the Town Engineer or his designee, findings of the Contractor's Traffic Control Devices and/or Work Zone not being adequate, work will not be allowed to start or continue until the proper work zone is in place.

STORMWATER COMPLIANCE

The Town of Yarmouth is regulated by the Environmental Protection Agency and the Maine Department of Environmental Protection under the National Pollution Discharge Elimination System (NPDES) program for storm water discharge.

Yarmouth is required to develop and implement a Stormwater Management Plan, which is required for coverage under the Municipal Separate Storm Sewer System (MS4) General Permit.

Yarmouth's Stormwater Management Plan defines six (6) Minimum Control Measures (MCMs) that specify generally what the Town will do to address stormwater pollution impacts to receiving waters in the Town's urban area.

These MCM's include public education and outreach; public involvement and participation; illicit discharge detection and elimination; construction site stormwater runoff control; post construction stormwater management in new development and redevelopment; and pollution prevention/good housekeeping for municipal operations.

The goal of the NPDES permitting program and Yarmouth's Stormwater Management Plan is to mitigate and minimize pollution impacts from non-point source stormwater runoff by managing the municipal storm drain system to the best extent practical. This is intended to be achieved by implementing the six MCM's and the associated Best Management Practices (BMPs) as they relate to stormwater runoff.

Of particular importance to construction activities are MCMs 3 and 4. These respond to the need to not discharge materials as part of construction, such as oils, grease, chemicals, fertilizers, sediment, sewage, high level chlorine contamination, concrete wash water, etc. as well as installing and maintaining Erosion and Sedimentation Control BMPs.

The Town of Yarmouth requires that all construction activities that occur within the Town's boundaries comply with the latest edition of the Maine Erosion and Sediment Control BMP Handbook as well as the latest Chapter 500 Stormwater regulations. This includes the Urban Area as well as the remaining area of the Town.

Please refer to the Maine Department of Environmental Protection for the latest copy of the Maine Erosion and Sediment Control handbook as well as the most current Chapter 500 Stormwater regulations at www.maine.gov/dep/ and The Town of Yarmouth Code of Ordinance Chapter 601 Subdivision, Appendix D Erosion and Sedimentation Control.

Installation of the BMP's is not the end of the requirements. To properly function, it is important that the BMP's be maintained on a regular basis. Prior to expected storm events, the BMPs should be inspected by a competent person and any needed repairs made. Following significant storm events, the BMPs should be inspected again to ensure that they are functional and do not require maintenance.

A significant storm event is defined as one half inch of rainfall or greater.

It is required that a log of all inspections and maintenance activities performed be kept by the responsible person.

The Town of Yarmouth also prohibits the discharge of non-stormwater or non-groundwater to its storm drain infrastructure as well as receiving waters. This includes both the Town's closed, piped drainage system as well as the Town's open drainage system or "ditch" system. Please refer to Yarmouth's Chapter 320 Stormwater Discharge Ordinance for specific requirements regarding the connection to the Town's drainage infrastructure.

Catch Basin and Storm Drain Manhole Installation

The Town of Yarmouth requires that all catch basins and storm drain manhole have watertight flexible boots for pipe connections. The boots shall be Kor-N Seal elastomeric boots or approved equal.

The Town requires that all boots must accept double stainless-steel bands. It is also required that all catch basin structures must have a minimum of 2 feet of sump below the invert out of the structure unless otherwise approved by the Town. The Town also requires that all catch basins be four (4) foot precast concrete structures, unless otherwise approved by the Town. The use of "F" type catch basins shall be on a case-by-case basis and shall require Town approval.

The use of hydraulic cement or mortar mix without using flexible boots will not be allowed. The size of the pipe will govern the use of flexible boots. Any other type of connection must have prior approval from the Town.

All brick work on top of the structure may not exceed 6" in height. Precast concrete donut risers are acceptable for use.

All frames and grates will be square in shape and shall be 24 inches square by 6 inches deep. Three flange or open throat frames shall be used based on curb and curb inlet requirements. Manhole covers shall be round, cast of bitumastic coated ductile iron and must meet the Towns requirements. The cover shall be cast with the word "Drain" prominently located in the finish surface.

Pavement taper from the gutter line finish grade to the catch basin grates in roadways shall be in accordance with details.

Catch basin structures must be set on a minimum 12-inch-thick crushed stone base. The stone must continue to the crown of the outlet pipe, around the entire basin.

All structures shall be pre-cast concrete units capable of supporting H-20 loadings.

Sanitary Sewer Structures and Pipelines

All sanitary sewer infrastructure and installation shall be per Yarmouth's Code of Ordinance Chapter 304 Sewage Ordinance. All sanitary sewer structures shall be pre-cast concrete units capable of supporting H-20 loadings with a minimum diameter of four (4) feet.. Each precast concrete section shall be assembled using two rows of flexible bitumastic sealant at each barrel joint.

All sanitary sewer manholes shall have fiberglass or epoxy coated concrete inverts and shall provide adequate pitch through the structure to ensure solid transport. Epoxy coating shall be Duralkote 500 or approved equal.

All sewer manholes shall pass a vacuum test as per town standards.

Sanitary sewer structure frames and covers shall be of good quality ductile iron and coated with a bitumastic weather proofing. Covers shall be at least 24 inches in diameter and shall be cast with the words "Sewer" prominently located on the exterior.

Gravity sewer pipe shall be PVC SDR 35 and shall be installed per details section. For lateral connections to existing gravity mains, saddles, Inserta-Tees, and cut in tee wyes will be acceptable.

All Gravity and Low Pressure Mains shall pass a pressure tested as per town standards.

**TOWN OF YARMOUTH
TESTING REQUIREMENTS**

Testing of Gravity Sewer Pipe

- a. After the sewer pipe has been cleaned and the pneumatic plugs checked, place the plugs in the sewer line at each manhole and inflate them.
- b. Introduce low pressure air into the sealed sewer pipeline until the air pressure reaches 4 psig greater than the average groundwater pressure.
- c. Allow a minimum of 2 minutes for the air pressure to stabilize to a minimum of 3.5 psig greater than the groundwater pressure.
- d. After the stabilization period, disconnect the air hose from the control panel to the air supply.
- e. The pipeline will be acceptable if the pressure decrease is not greater than $\frac{1}{2}$ psig in the time stated in the following table for the length of pipe being tested:

<u>Pipe Diameter (inches)</u>	<u>Time (Min.) For Length of Pipe</u>			
	<u>0-100 ft</u>	<u>101-200 ft</u>	<u>201-300 ft</u>	<u>301-400 ft</u>
4.....	2.0	2.0	2.0	2.0
6.....	3.0	3.0	3.0	3.0
8.....	4.0	4.0	4.0	5.0
10.....	5.0	5.0	6.0	8.0
12.....	5.5	5.5	8.5	11.5

Pressure Test for Sewer Force Mains and Low Pressure Lines

- a. The section of pipe to be tested shall be filled with water of approved quality, and all air shall be expelled from the pipe. If blowoffs are not available at high points for releasing air the Contractor shall make the necessary excavations, backfilling and taps at such points and shall plug said holes after completion of the test.
- b. The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied.
- c. Perform pressure and leakage test at 1-1/2 times the maximum system pressure or 100 psi which ever is greater (based on the elevation of the lowest point of the section under test and corrected to the gage location).
- d. While maintaining this pressure, the Contractor shall make a leakage test by metering the flow of water into the pipe. If the average leakage during a two-hour period on buried pipelines exceeds a rate of 10 gallons per inch of diameter per 24 hours per mile of pipeline the section shall be considered as having failed the test. All pipes within structures and chambers and all flanged joints shall have no visible leakage.

Low Pressure pipe up to 2" shall be Ultraline HDPE service tubing, in IPS OD sizes. Larger Diameter low pressure or Force Main shall be welded SDR 11 HDPE or C 900 bell and socket pipe.

All low-pressure sanitary sewer connections shall use tracer wire installed per the Yarmouth tracer wire specification provided further on in this handbook.

All Force Mains shall pass a pressure test as per town standards.

Private pump stations shall be Barnes Eco-Tran or equivalent approved by the Town Engineer.

TOWN INSPECTED WORK

Sewer Connections

All sanitary sewer connections made to the Town system must be inspected by Yarmouth Wastewater Department staff.

When connecting to a manhole, the connection must be core drilled into the existing structure and the connection must be made using an approved flexible elastomeric boot, Kor-N-Seal or approved equal.

The Contractor shall not use a jackhammer, hammer, drill, or sledgehammer to fabricate a hole.

All types of connections must be approved and inspected by the Town prior to backfill. This includes private pump station and curb stop connections.

All gravity connecting fixtures must be capable of accepting double stainless-steel bands and double bands will be required on all connections.

The Contractor shall use a Kor-N-Seal elastomeric boot system or an approved equal for all manhole connections.

The Contractor shall provide the Town with twenty-four hours notice prior to all inspections. The Contractor must provide all coordination with the Town to schedule all inspections.

Underdrain and Storm Drainage Connections

All drains connected to the Town's storm drain system must be inspected by Town staff.

The Town requires that all connections made to an existing structure must be core drilled and the connection made using a flexible elastomeric boot approved by the Town, such as a Kor-N-Seal boot or approved equal.

The Contractor shall not use a jackhammer, hammer drill or sledgehammer to fabricate a hole.

All types of connections must be approved and inspected by the Town prior to backfill.

All connecting fixtures must be capable of accepting double stainless-steel bands and double bands will be required on all connections. Boot connections using single bands will be rejected.

All cellar drains or foundation drains connected to the Town's storm drain system shall have a back flow preventer of the size and type approved by the Town Engineer. The Contractor shall submit to the Town a shop drawing of the back flow preventer proposed to be used for approval.

All cellar drains, or foundation drain outlets must, if not connected to the Town's underdrain system, allow water to discharge at an appropriate location. The Contractor may discharge cellar or foundation drains to the Town's open ditch along the roadway if the pitch of the ditch system is 2% or greater. All drain systems that discharge to a Town right of way must be approved by the Town.

The Contractor shall note that connection to the Town's storm drain system and ditch system is regulated by the Town's Chapter 320 Stormwater Discharge Ordinance

Erosion Control Devices

All temporary erosion and sediment control measures including, but not limited to, silt fence, hay bales, stone check dams, temporary construction entrance, and other means of erosion and sedimentation control must be inspected by the Town prior to start of construction.

If an erosion and sedimentation plan is provided, all erosion control measures required by the plan must be installed prior to the start of construction activities.

The Contractor should be aware that if work begins prior to the Town performing an erosion control inspection or if during the inspection the Town discovers unsatisfactory conditions; work may be stopped, and the Contractor will be required to address erosion control concerns before work will be allowed to continue.

The Contractor shall be responsible for providing adequate erosion and sedimentation control measures throughout the construction process and shall maintain them until permanent vegetation has been established.

If the Town notes areas of deficiency in the Contractors BMP's, the Town may require additional or different erosion control measures to be installed by the Contractor in the deficient areas.

The Contractor shall be required to correct minor erosion problems within two (2) working days.

The Contractor shall be required to correct all serious erosion and sedimentation problems, as identified by the Town, within 24 hours of notification.

Failure to correct erosion and sedimentation deficiencies within the required time frame may be grounds for the Town to issue and enforce a Stop Work Order.

The Town or the Town's designee shall perform periodic inspections of the site in addition to the initial inspection of the erosion and sediment control measures.

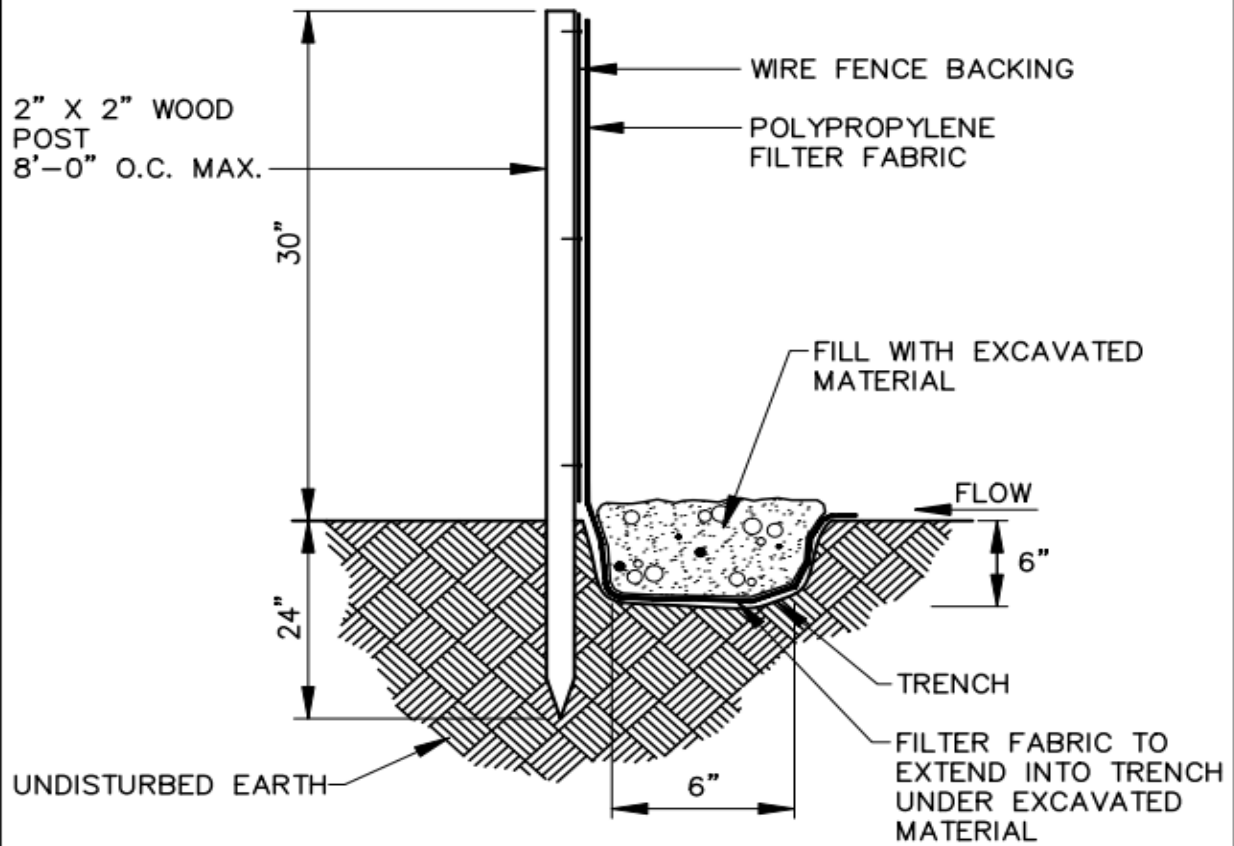
The Town will complete an inspection report noting any deficiencies and if required will issue a Notice of Violation or Stop Work Order to the Contractor

The periodic inspections that are performed by the Town in no way excuses the Contractor from providing the required pre and post storm event inspections, to ensure functionality and effectiveness of the erosion and sedimentation control measures.

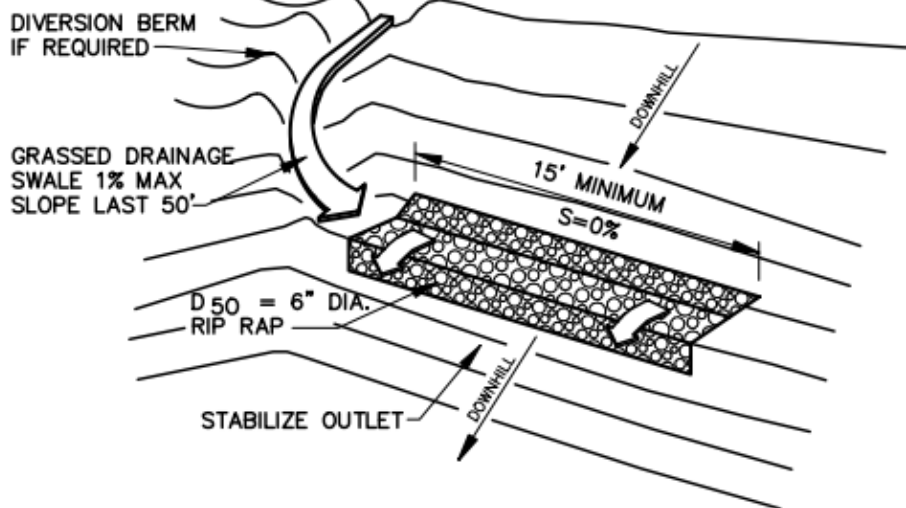
Shop Drawings and Yarmouth Tracer Wire Specification:

The details below are generic examples only. Each project will have project specific design specifications, and each project plan's details should be adhered to.

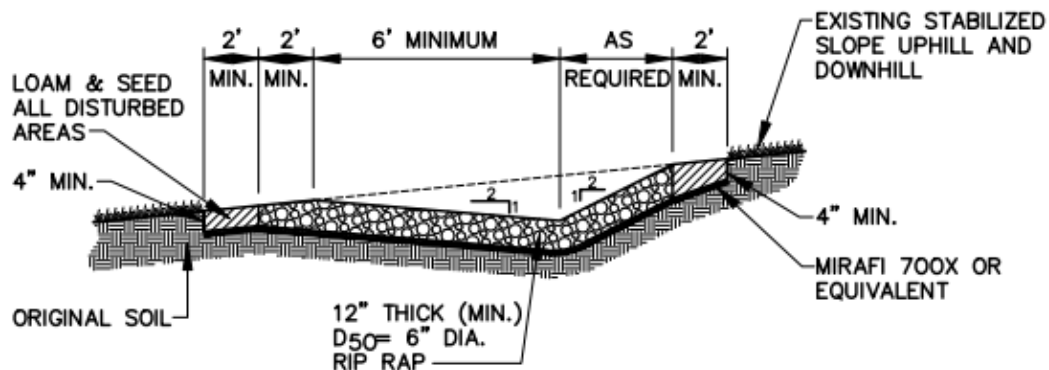
Erosion Control and Sedimentation:



EROSION CONTROL FENCE DETAIL
NOT TO SCALE



PLAN

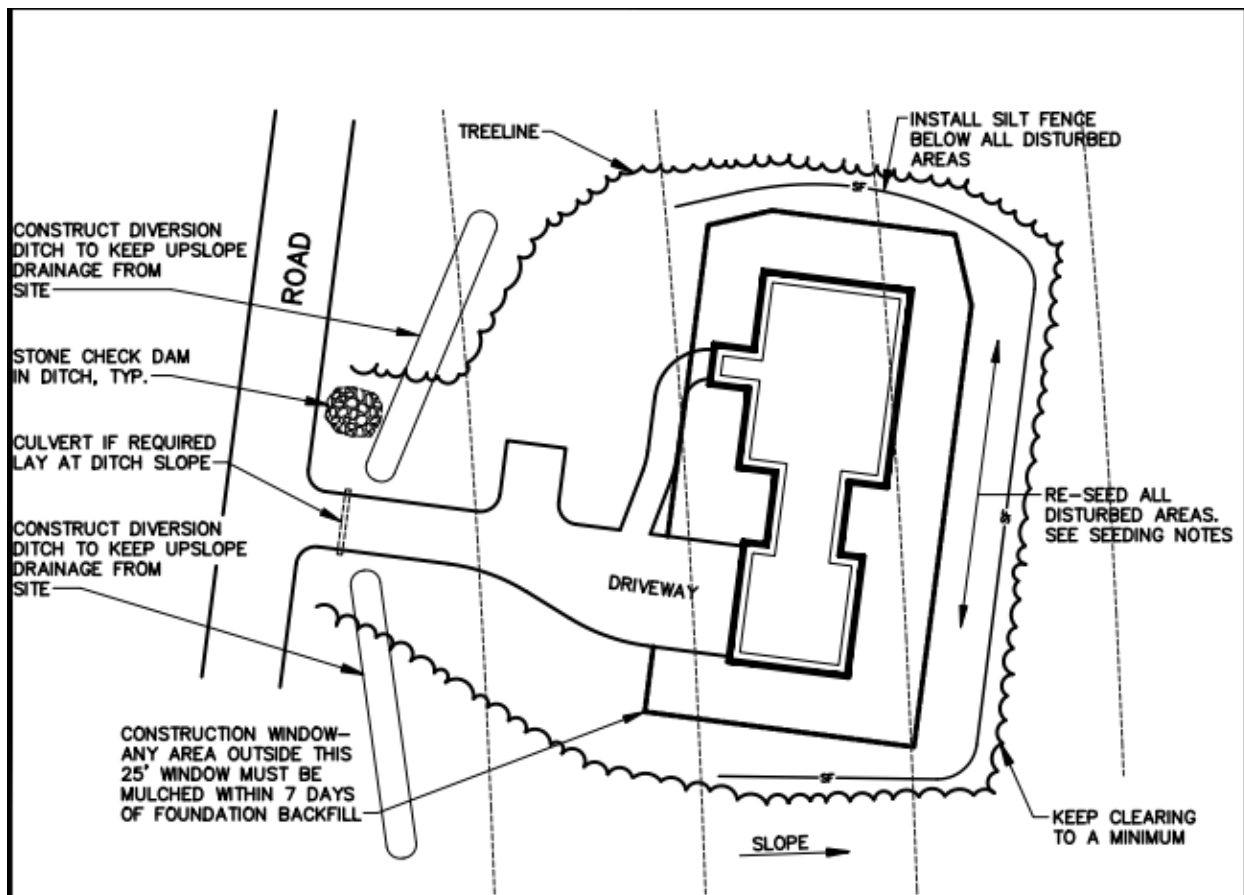


SECTION

NOTE:
AREA IMMEDIATELY DOWNHILL FROM LEVEL
SPREADER SHALL BE LEFT UNDISTURBED.

LEVEL SPREADER DETAIL

NOT TO SCALE

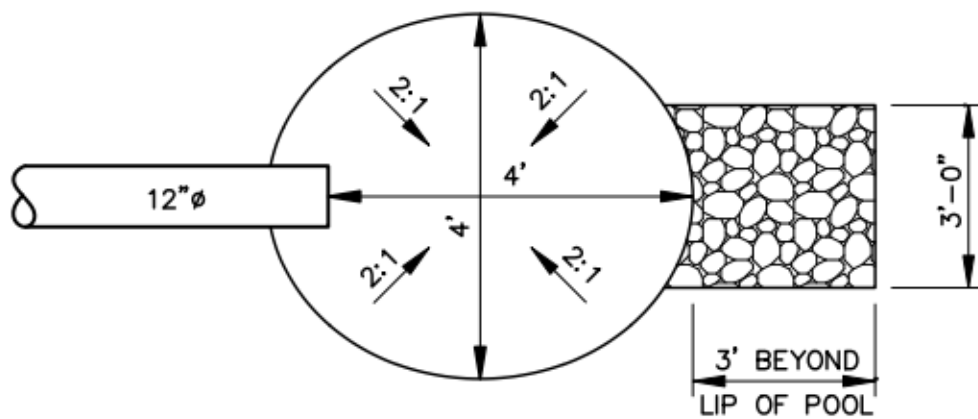


NOTES:
THIS DETAIL INDICATES THE INTENT OF THE SOIL EROSION CONTROL MEASURES. ACTUAL SITE CONDITIONS AND LAYOUTS WILL VARY FROM SITE TO SITE.

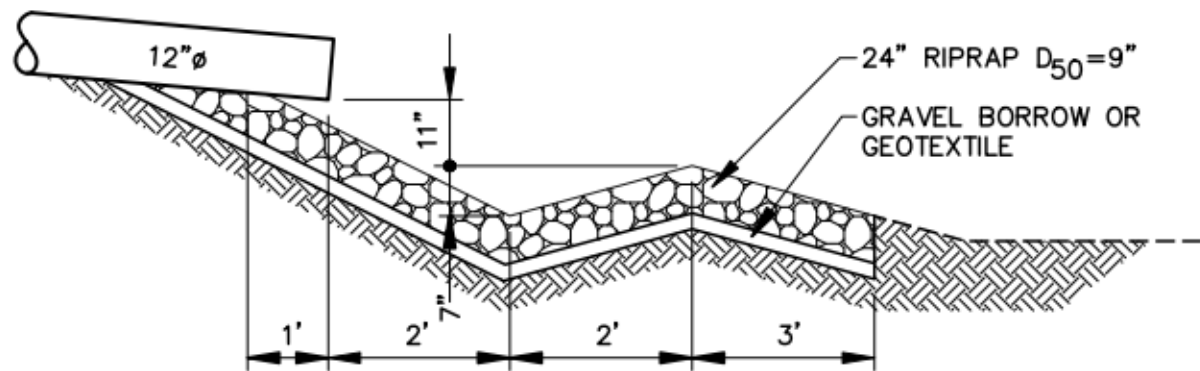
BUILDING CONTRACTORS MUST COMPLY WITH THE EROSION CONTROL NOTES SHOWN ON THESE DRAWINGS AND WITH "MAINE EROSION AND SEDIMENT CONTROL HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES."

LOT SPECIFIC SOIL EROSION CONTROL MEASURES

NOT TO SCALE

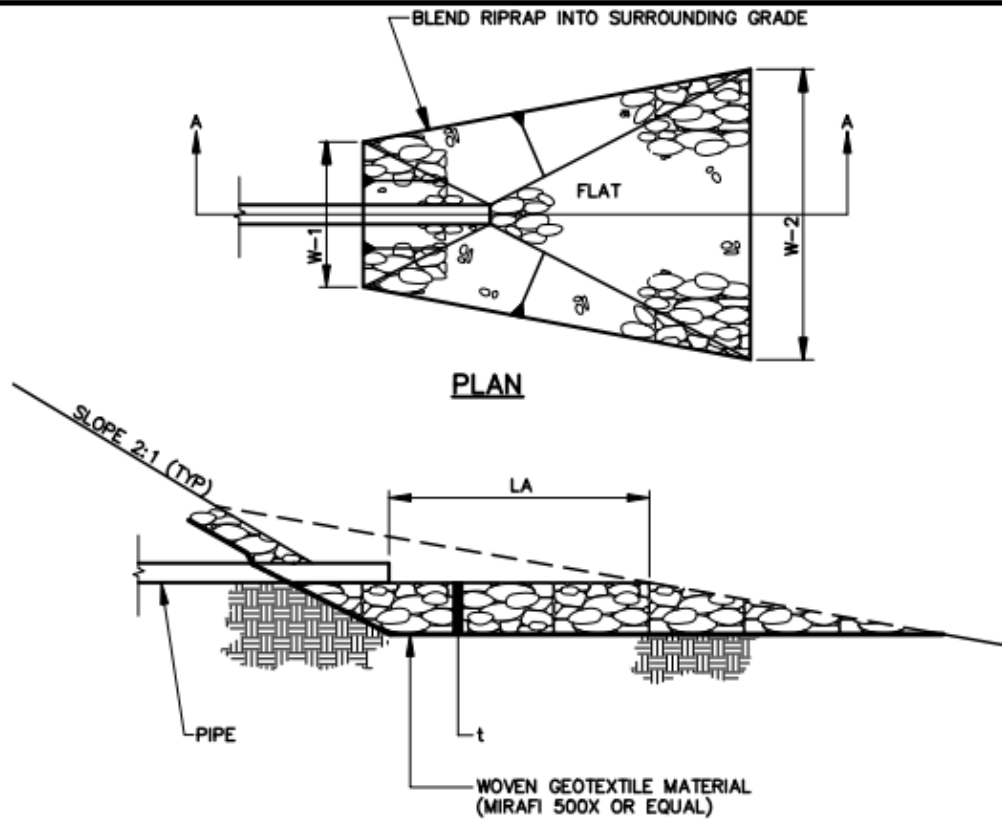


PLAN



SECTION

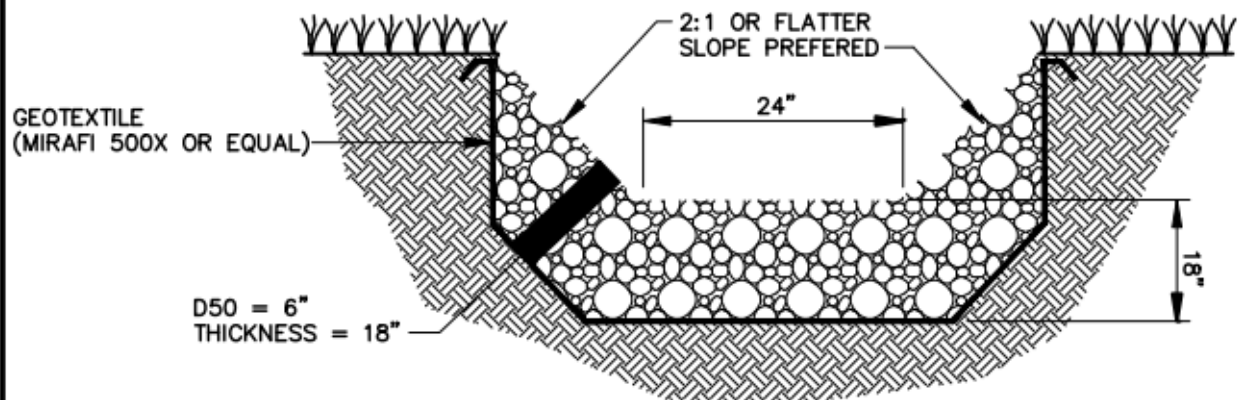
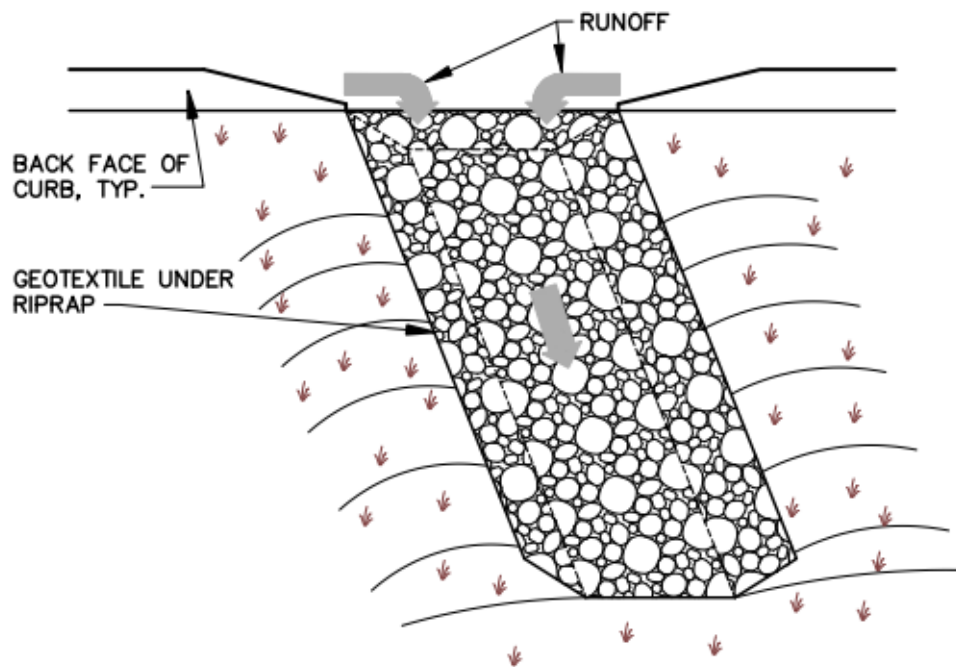
OUTLET PLUNGE POOL **NOT TO SCALE**



SECTION A-A

APRON SCHEDULE					
CULVERT	RIPRAP		RIPRAP		
	d50 SIZE (FT)	THICKNESS t (INCH)	LENGTH LA (FT) (MIN)	WIDTH W1 (FT)	WIDTH W2 (FT)
12" OR LESS	0.5'	15"	10'	3.0'	12'
15"	0.5'	15"	10'	3.75'	12'
18"	0.5'	15"	10'	4.5'	12'
24"	0.5'	15"	14'	6.0'	12'
30"	0.5'	15"	16'	7.5'	12'
36"	0.5'	18"	24'	9.0'	27'
42"	1.0'	24"	32'	10.5'	36'
48"	1.0'	24"	34'	12'	38'

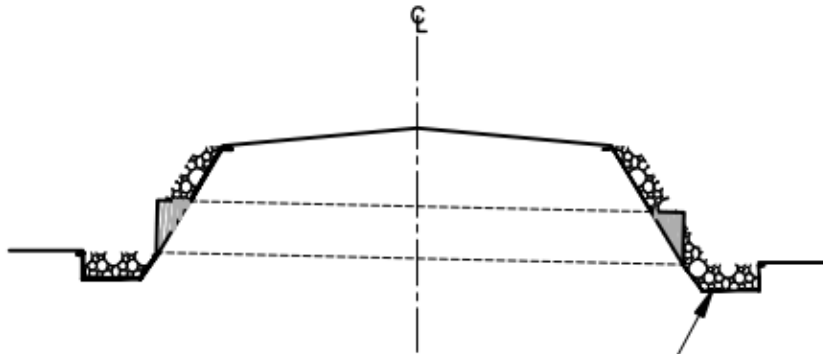
RIPRAP APRON DETAIL
NOT TO SCALE



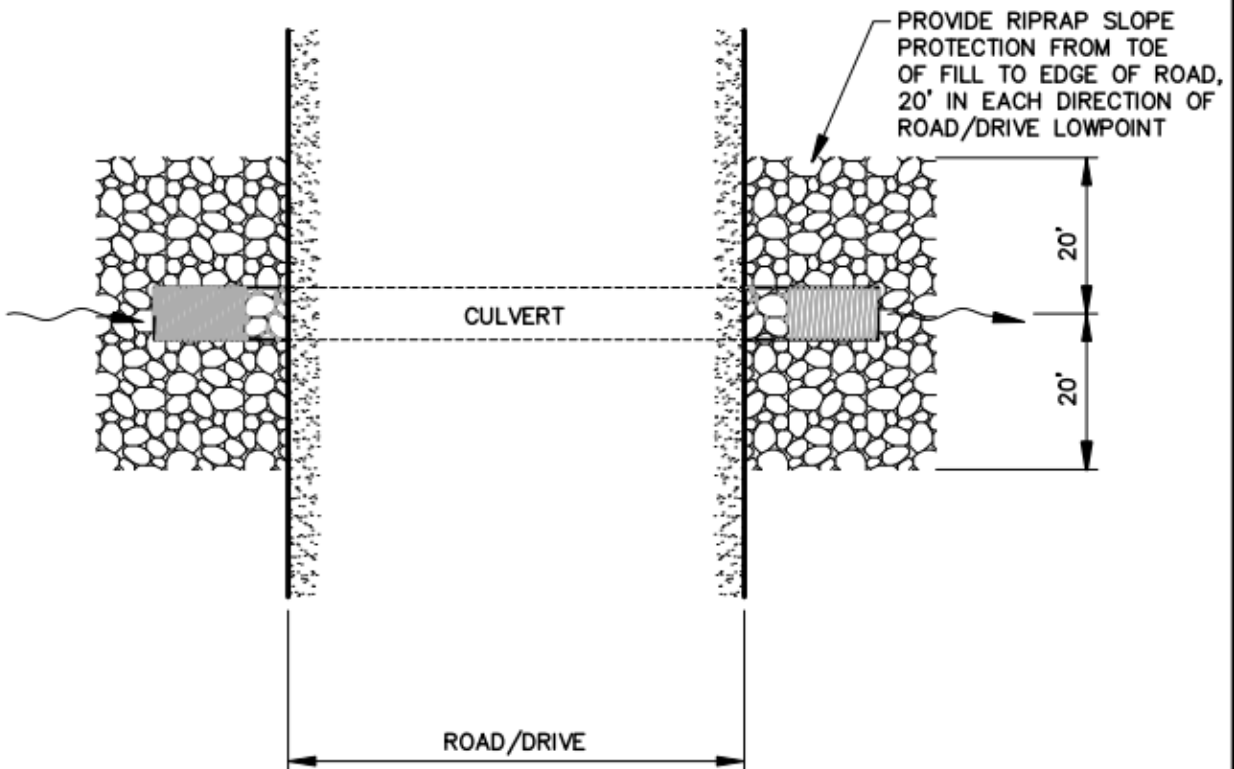
SECTION

RIPRAP SLOPE DRAIN

NOT TO SCALE

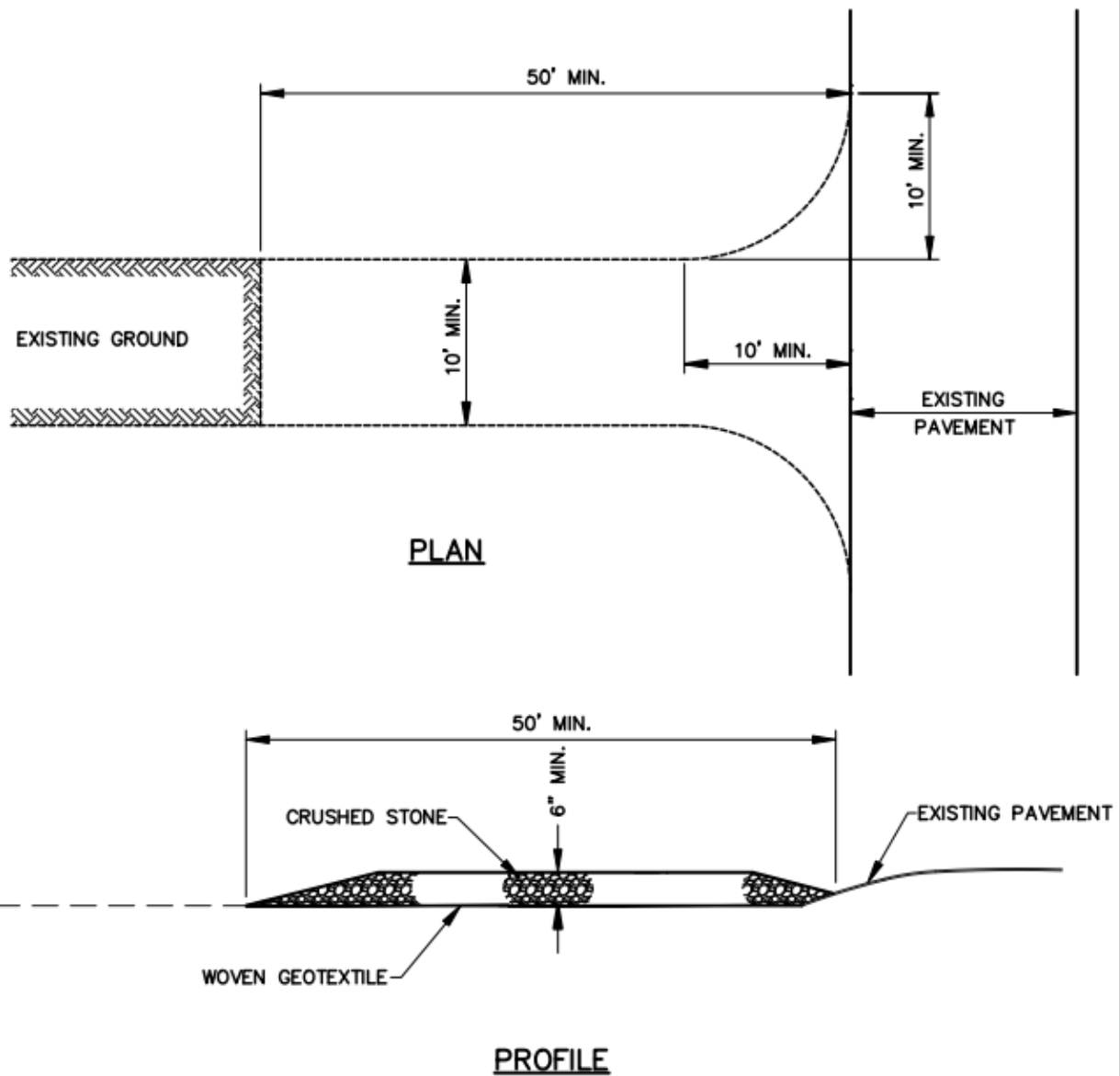


INSTALL MIRAFI
700x OR EQUAL



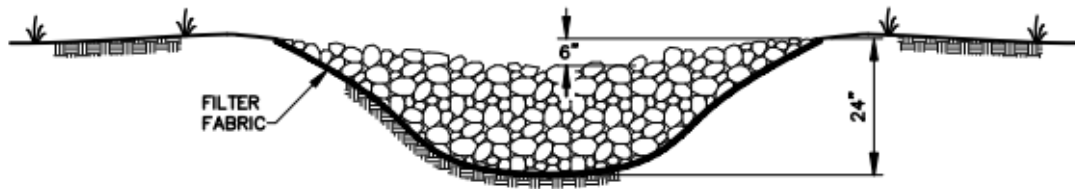
RIPRAP SLOPE PROTECTION

NOT TO SCALE

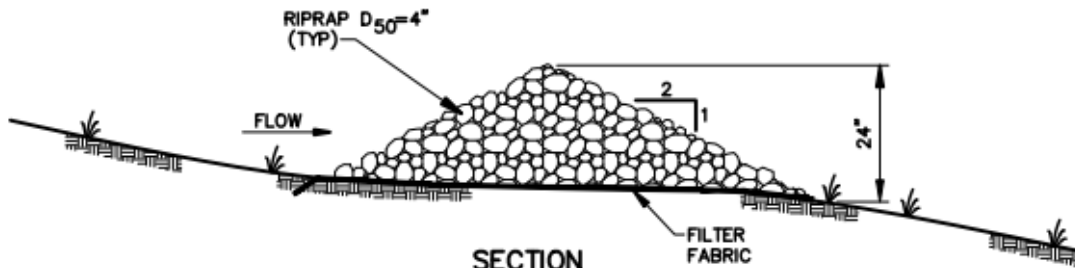


STABILIZED CONSTRUCTION ENTRANCE

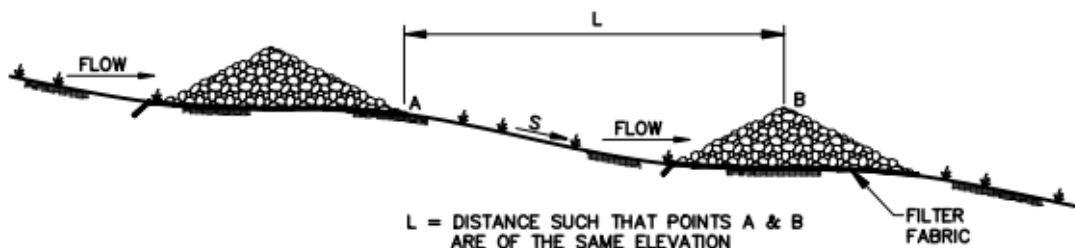
NOT TO SCALE



ELEVATION



SECTION

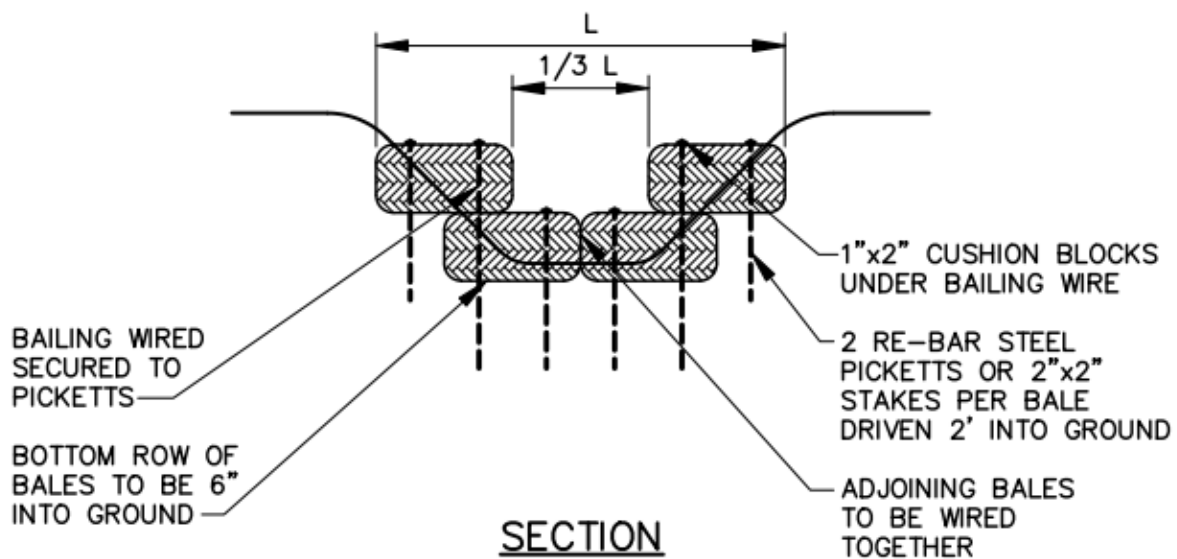
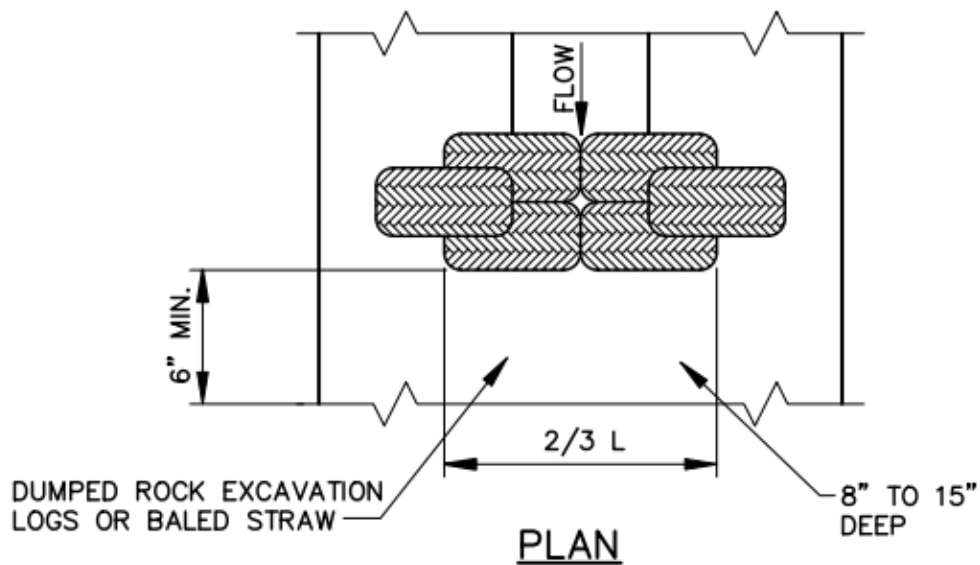


L = DISTANCE SUCH THAT POINTS A & B
ARE OF THE SAME ELEVATION

S = SLOPE

S (FT/FT)	L (FT)
0.020	100
0.030	66
0.040	50
0.050	40
0.080	25
0.100	20
0.120	17
0.150	13

STONE CHECK DAM **NOT TO SCALE**

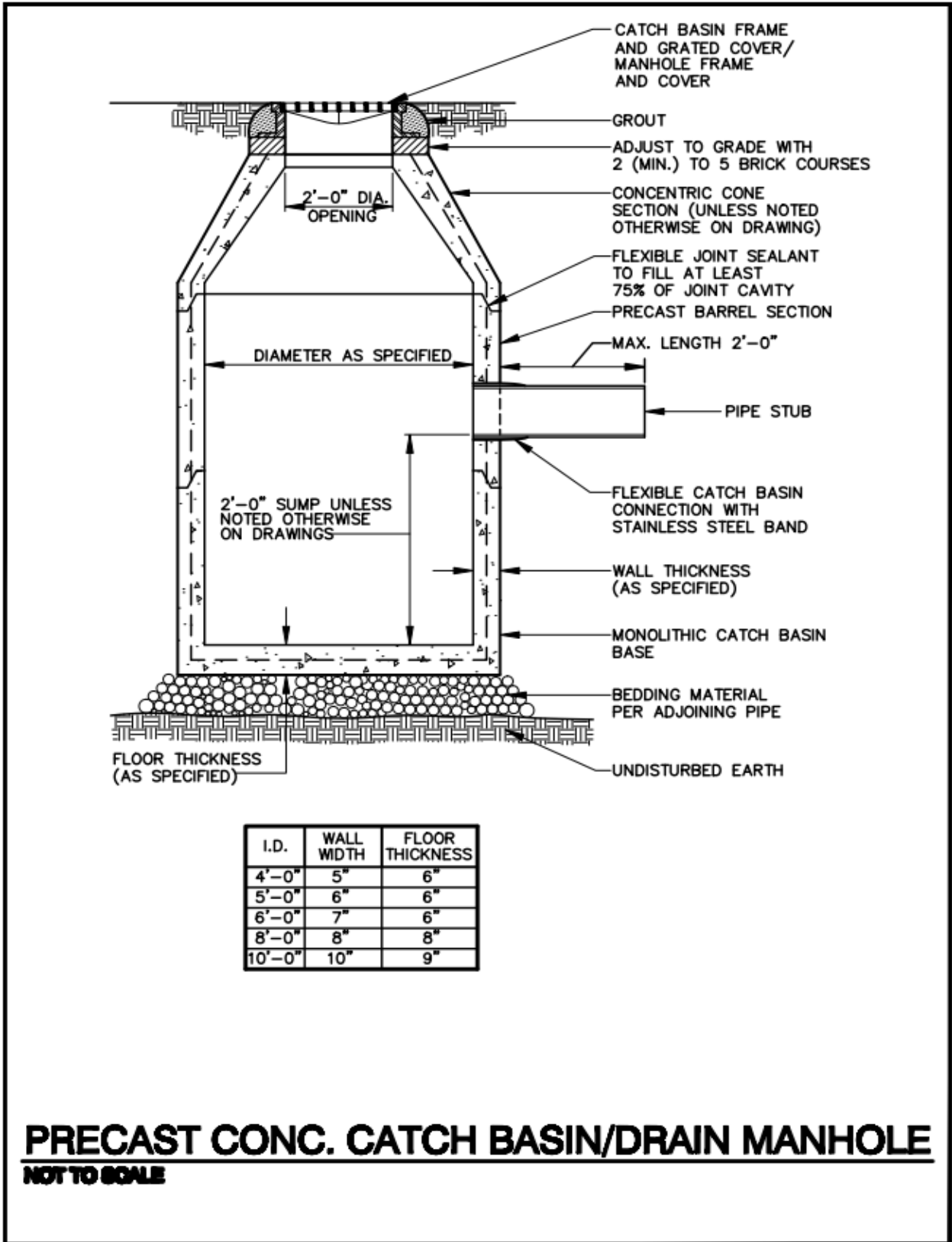


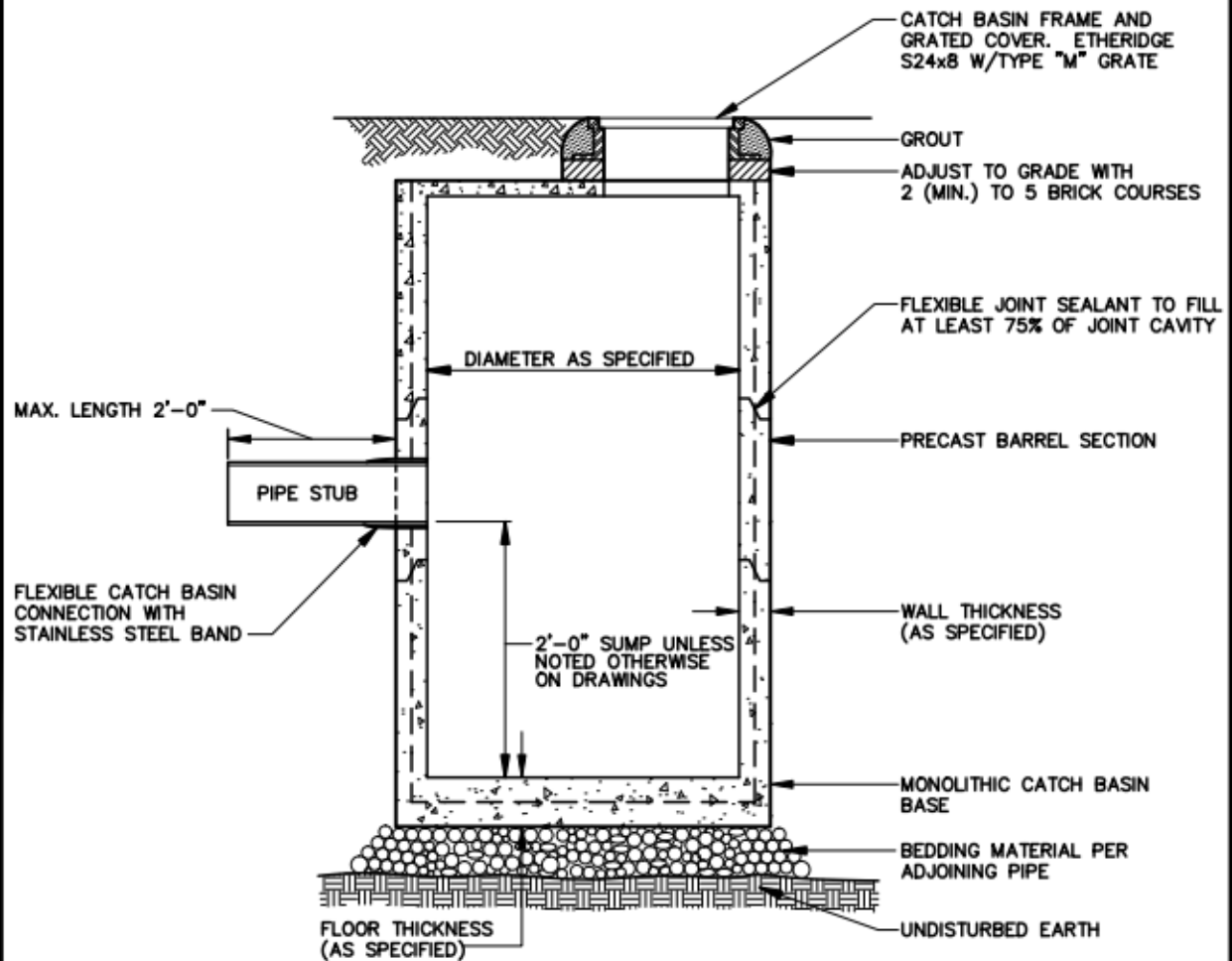
NOTES:

STRAW BALES ARE TO BE BOUND.

STRAW BALE CHECK DAM
NOT TO SCALE

Underdrain and Storm Drain Connections:

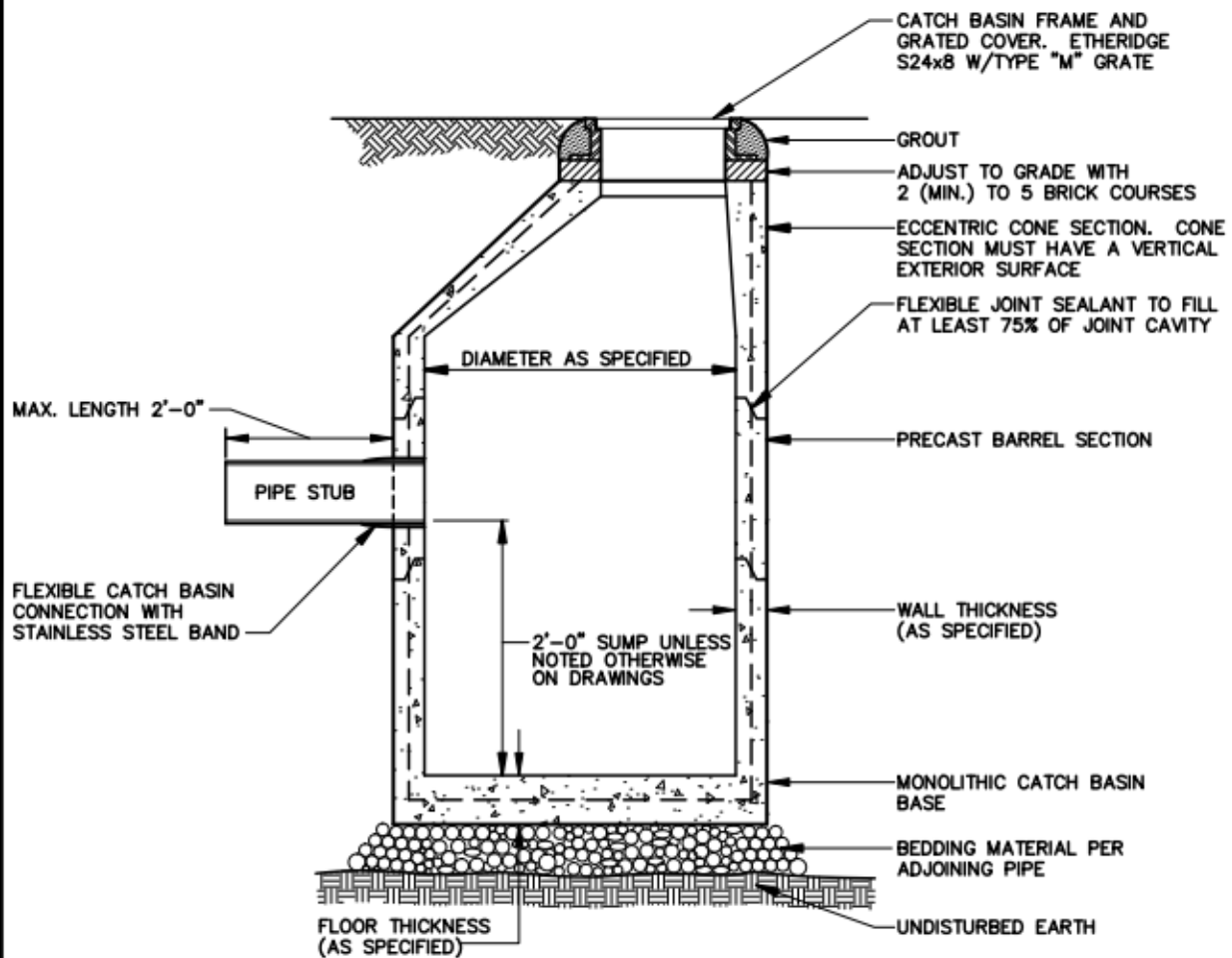




I.D.	WALL WIDTH	FLOOR THICKNESS
4'-0"	5"	6"
5'-0"	6"	6"
6'-0"	7"	6"
8'-0"	8"	8"
10'-0"	10"	9"

PRECAST CONC. CATCH BASIN/DRAIN MANHOLE

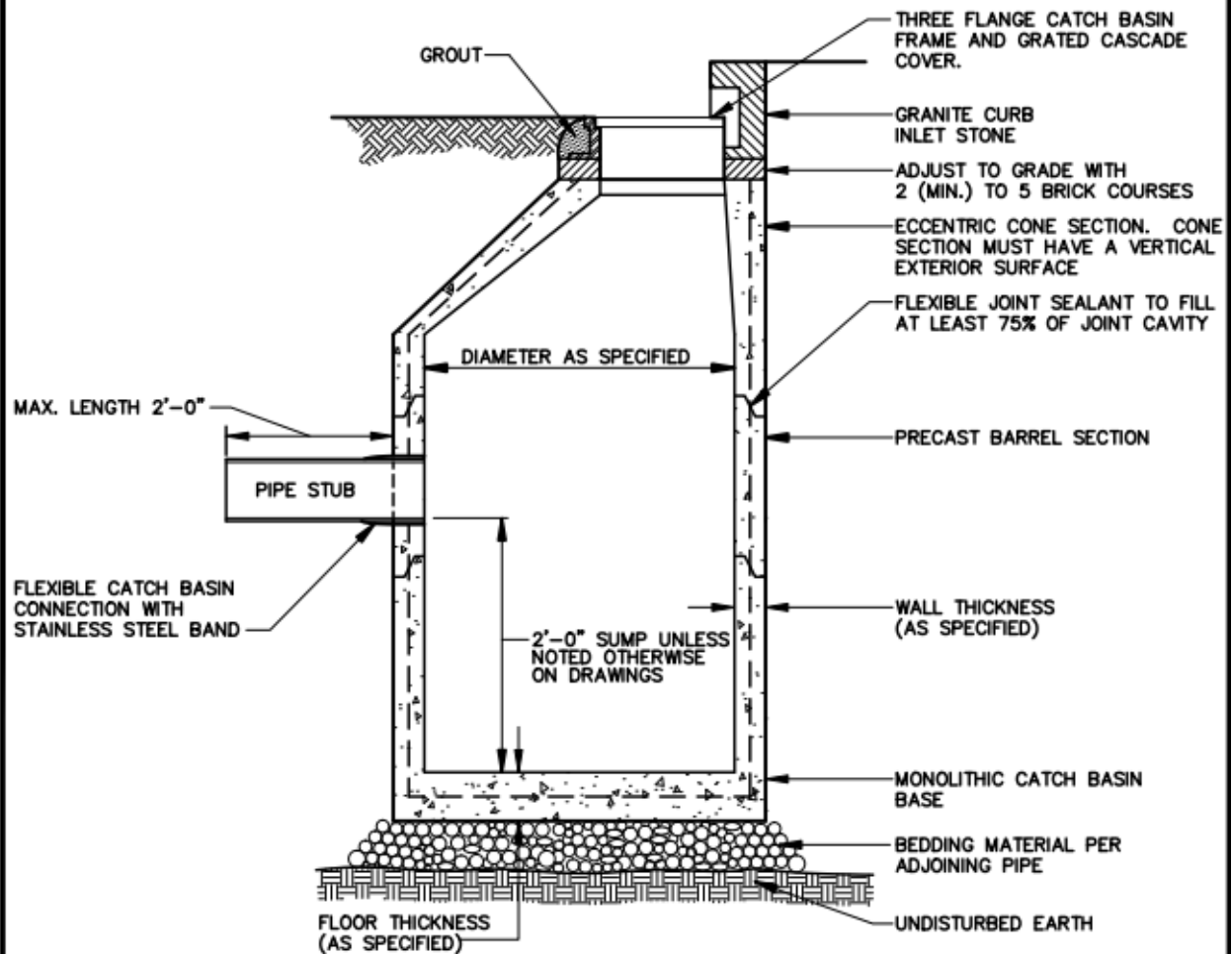
NOT TO SCALE



I.D.	WALL WIDTH	FLOOR THICKNESS
4'-0"	5"	6"
5'-0"	6"	6"
6'-0"	7"	6"
8'-0"	8"	8"
10'-0"	10"	9"

PRECAST CONCRETE CATCH BASIN/MANHOLE

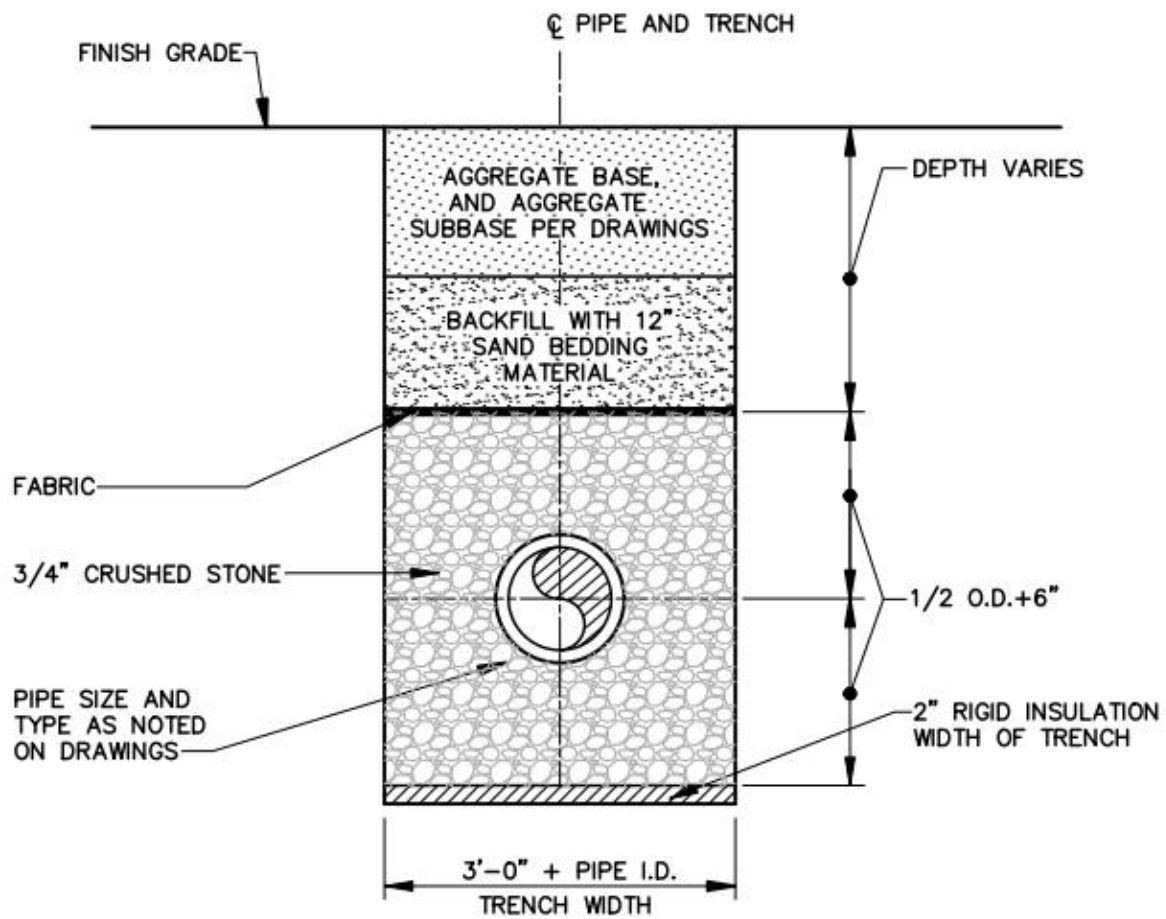
NOT TO SCALE



I.D.	WALL WIDTH	FLOOR THICKNESS
4'-0"	5"	6"
5'-0"	6"	6"
6'-0"	7"	6"
8'-0"	8"	8"
10'-0"	10"	9"

PRECAST CONCRETE/GRANITE CURB INLET

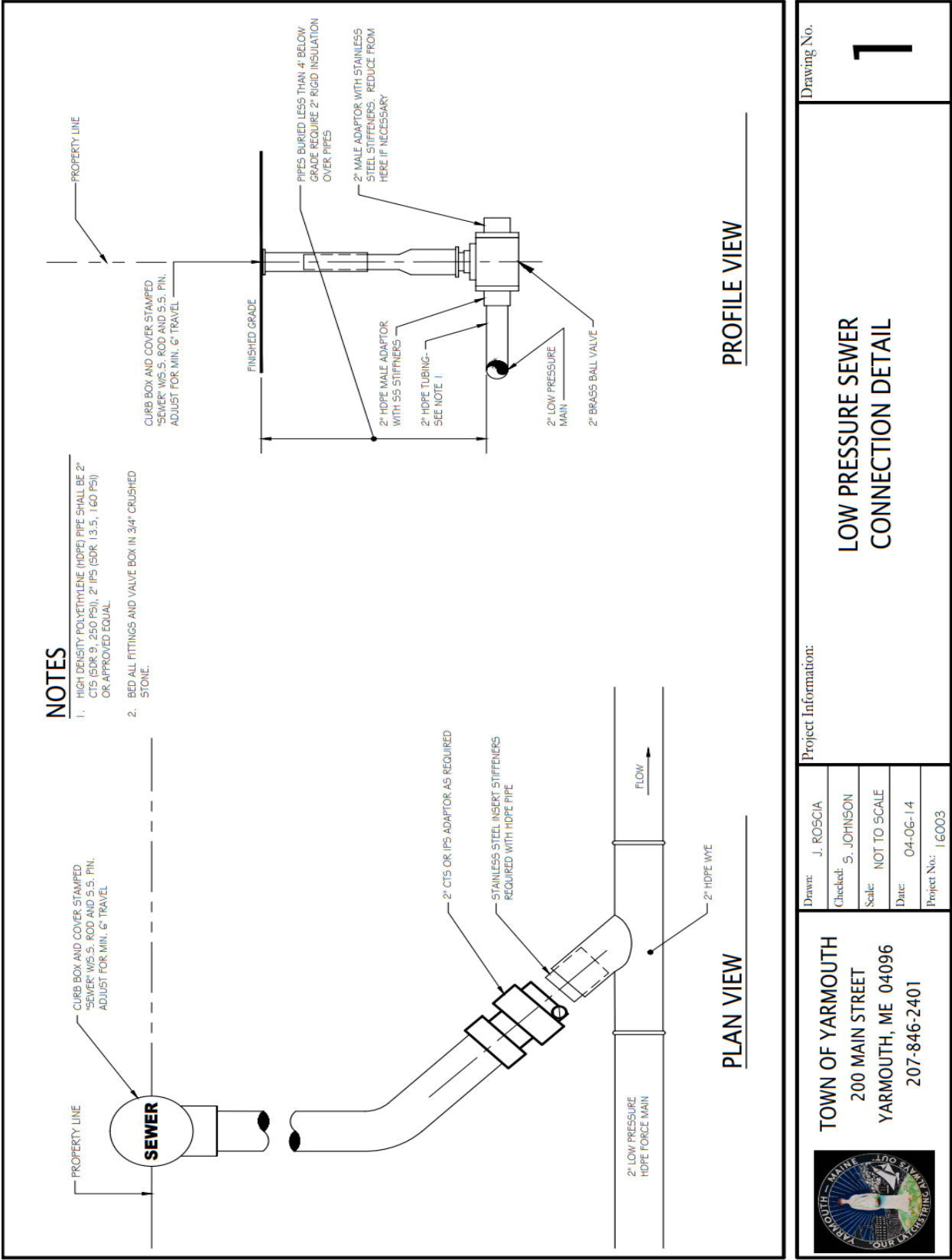
NOT TO SCALE

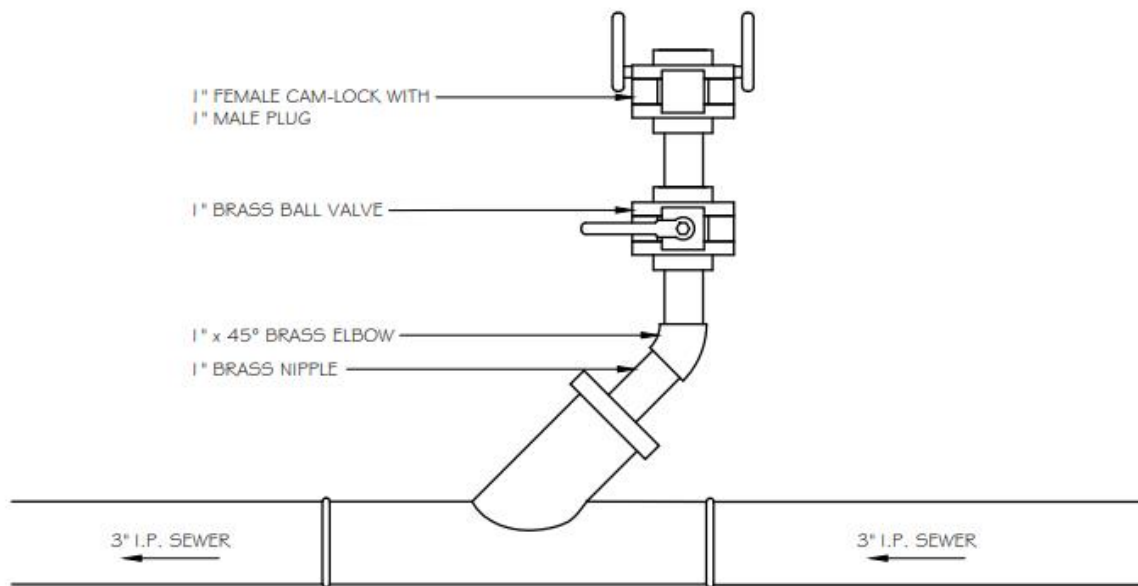


1. SAND BACKFILL AND RIGID INSULATION AS REQUIRED.

TYPICAL UNDERDRAIN TRENCH DETAIL **NOT TO SCALE**

Sanitary Sewer Connections, Manhole Details and trench Paving Details:





NOTES

1. ALL MATERIALS SHALL BE THREADED BRASS.
2. LOW PRESSURE SEWER BLOW-OFF TO BE LOCATED IN A SEWER MANHOLE.



TOWN OF YARMOUTH
200 MAIN STREET
YARMOUTH, ME 04096
207-846-2401

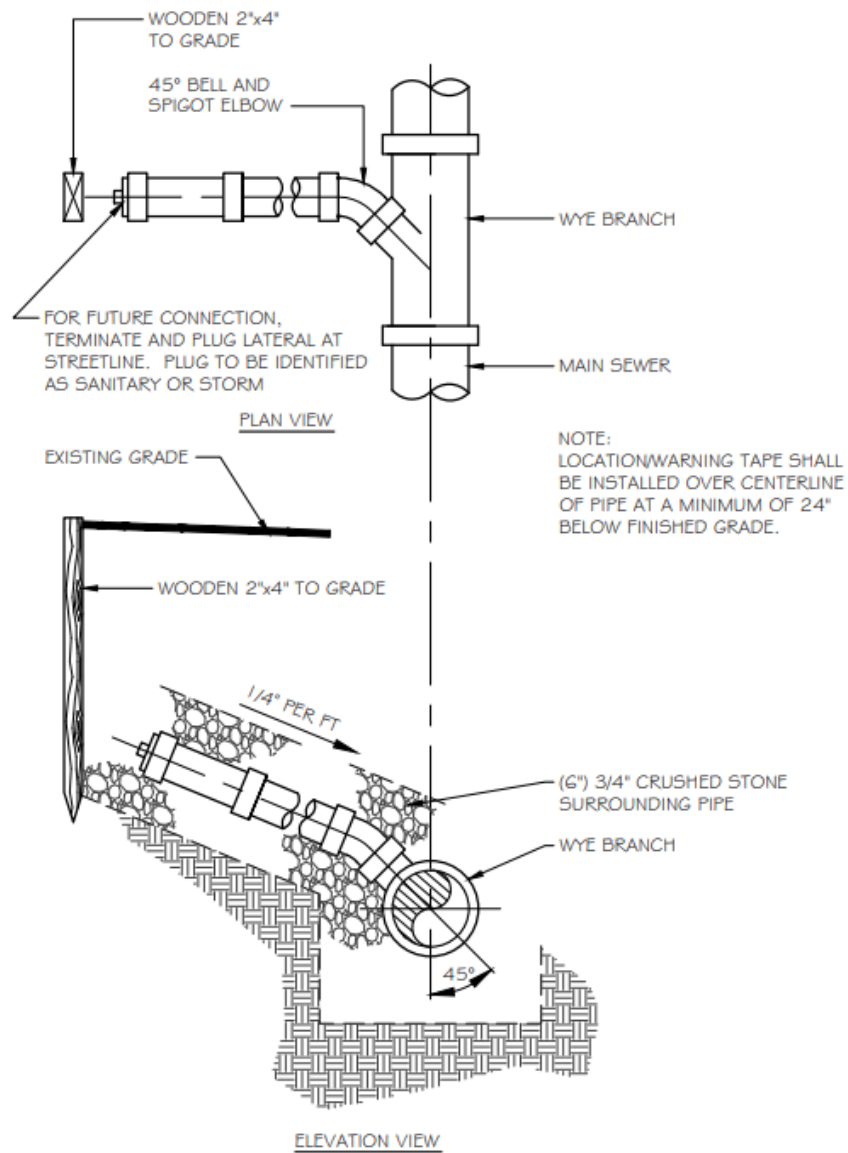
ALTERNATE LOW PRESSURE SEWER BLOW-OFF

Scale: N.T.S.

Date: 04/06/16

Drawing No.

1



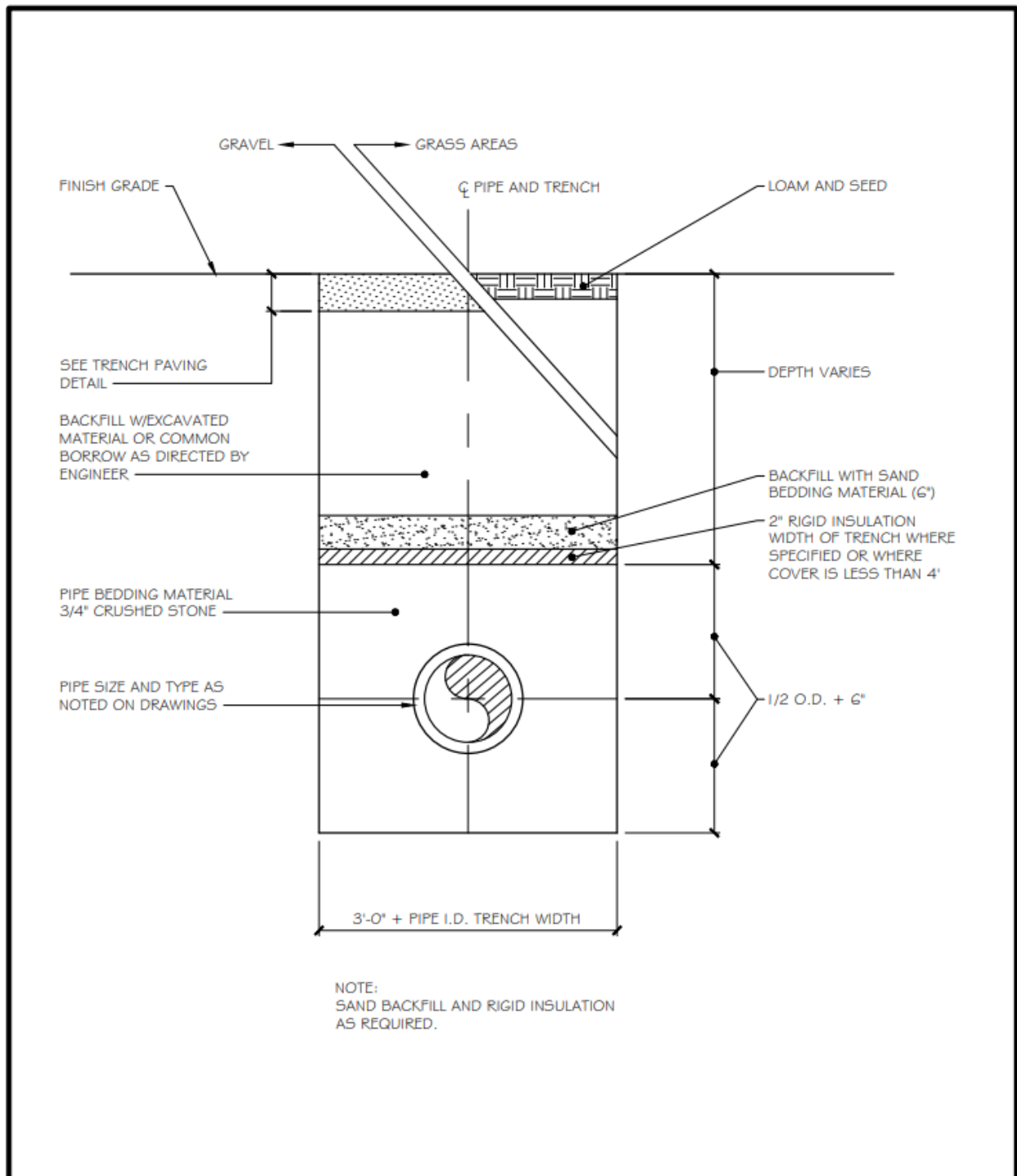
TOWN OF YARMOUTH
200 MAIN STREET
YARMOUTH, ME 04096
207-846-2401

TYPICAL HOUSE LATERAL WYE
CONNECTION DETAIL

File: I G025-SEWER DETAILS.dwg Date: 10/13/16

Detail:

2



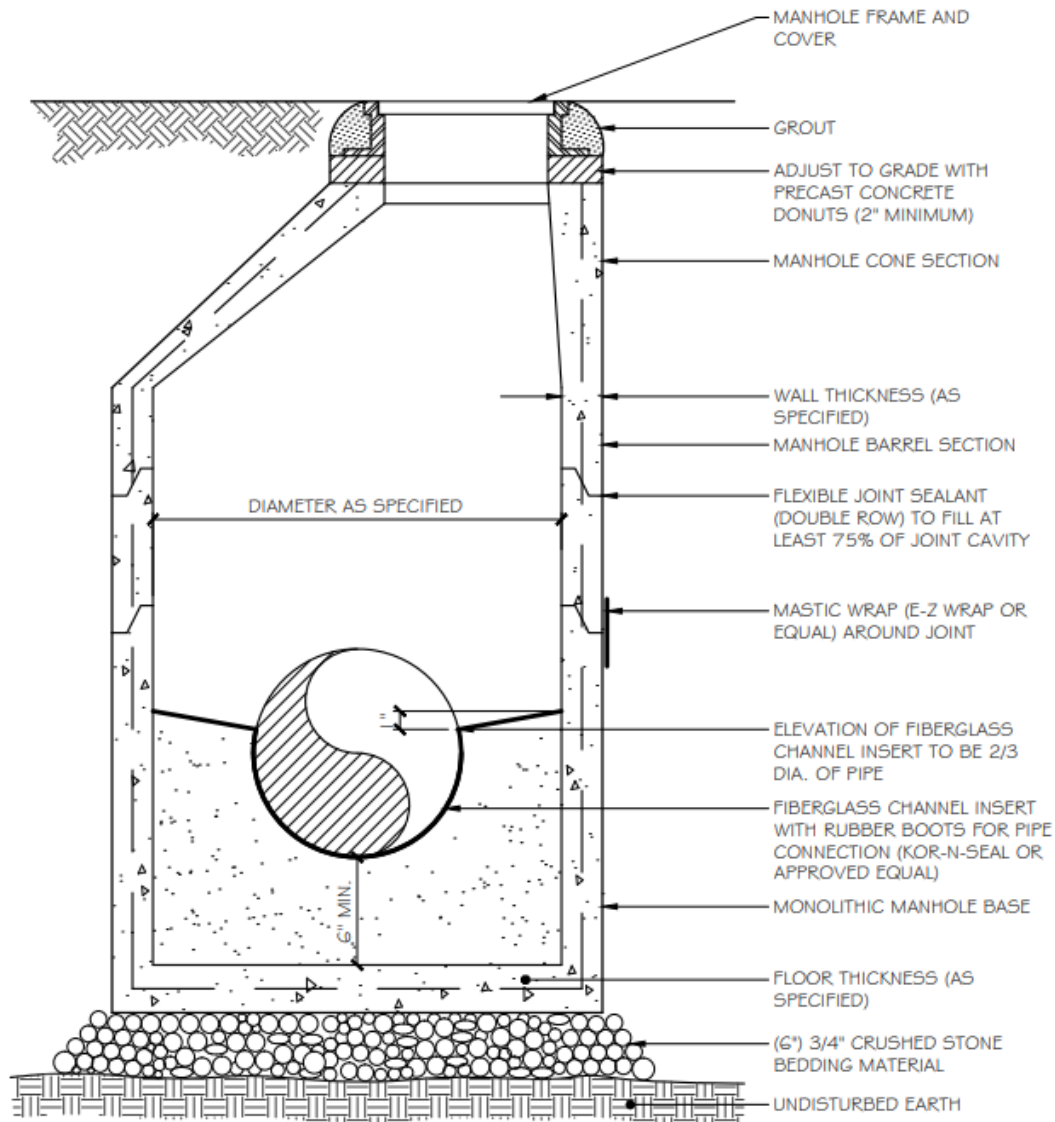
TOWN OF YARMOUTH
200 MAIN STREET
YARMOUTH, ME 04096
207-846-2401

TYPICAL TRENCH DETAIL

File: I 6025-SEWER DETAILS.dwg Date: 10/13/16

Detail:

4



I.D.	WALL WIDTH	FLOOR THICKNESS
4'-0"	5"	6"
5'-0"	6"	6"
6'-0"	7"	6"
8'-0"	8"	8"
10'-0"	10"	9"



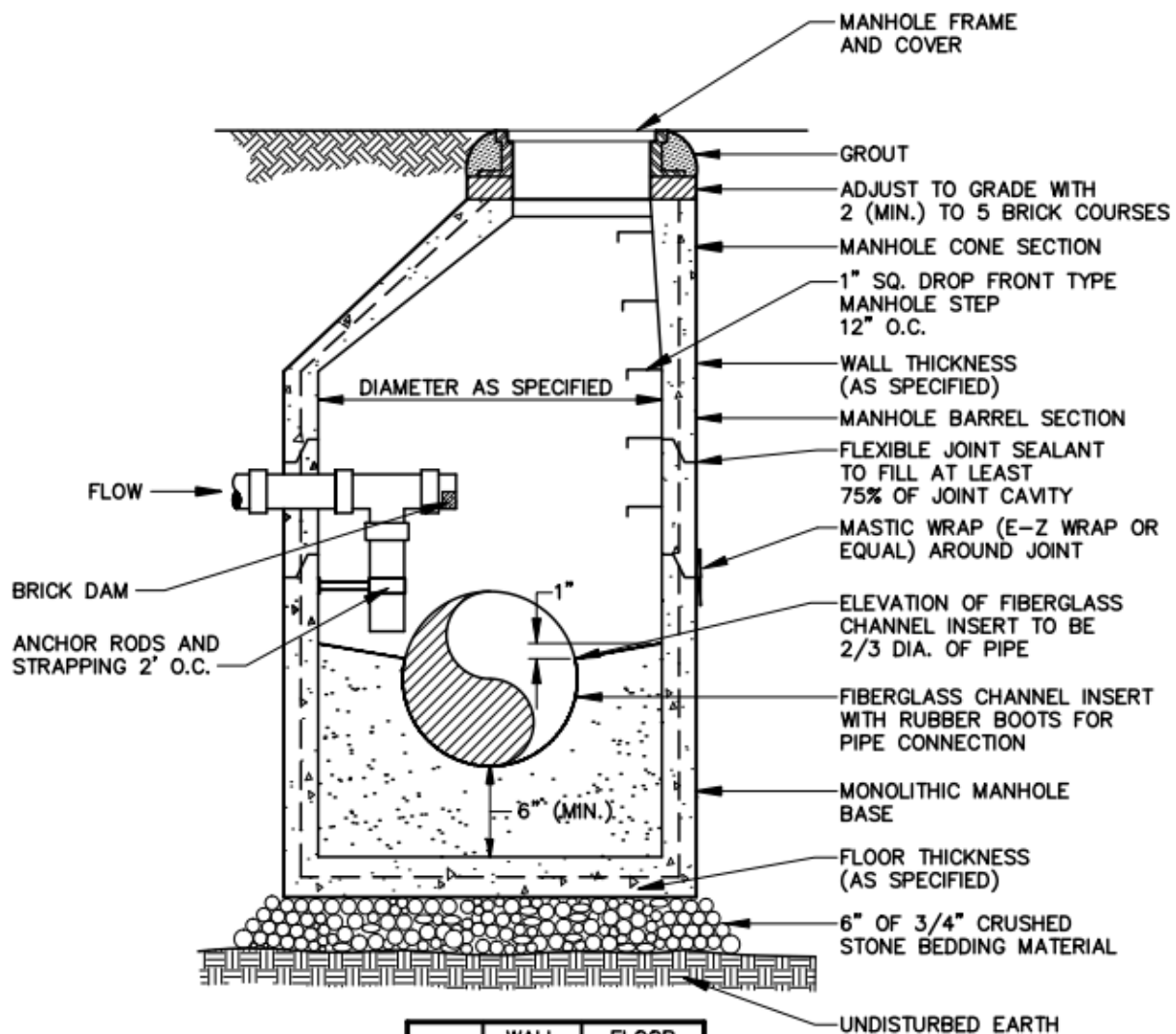
TOWN OF YARMOUTH
 200 MAIN STREET
 YARMOUTH, ME 04096
 207-846-2401

PRECAST CONCRETE SANITARY MANHOLE DETAIL

File: I 6025-SEWER DETAILS.dwg Date: 01/31/16

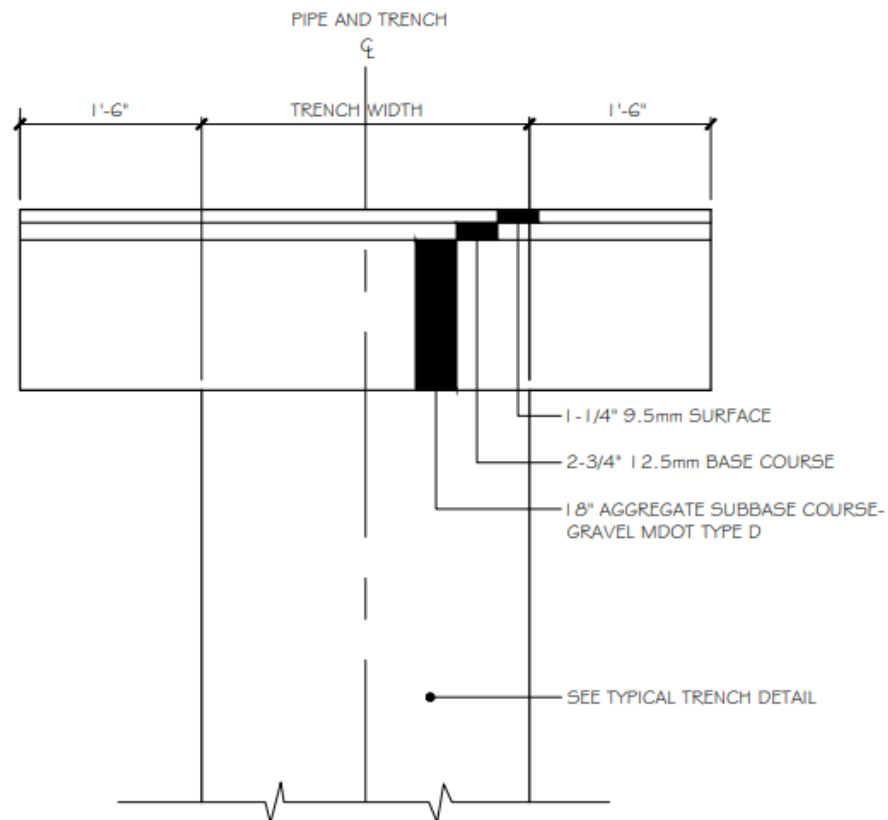
Detail:

1



I.D.	WALL WIDTH	FLOOR THICKNESS
4'-0"	5"	6"
5'-0"	6"	6"
6'-0"	7"	6"
8'-0"	8"	8"
10'-0"	10"	9"

PRECAST CONCRETE SANITARY DROP MANHOLE **NOT TO SCALE**



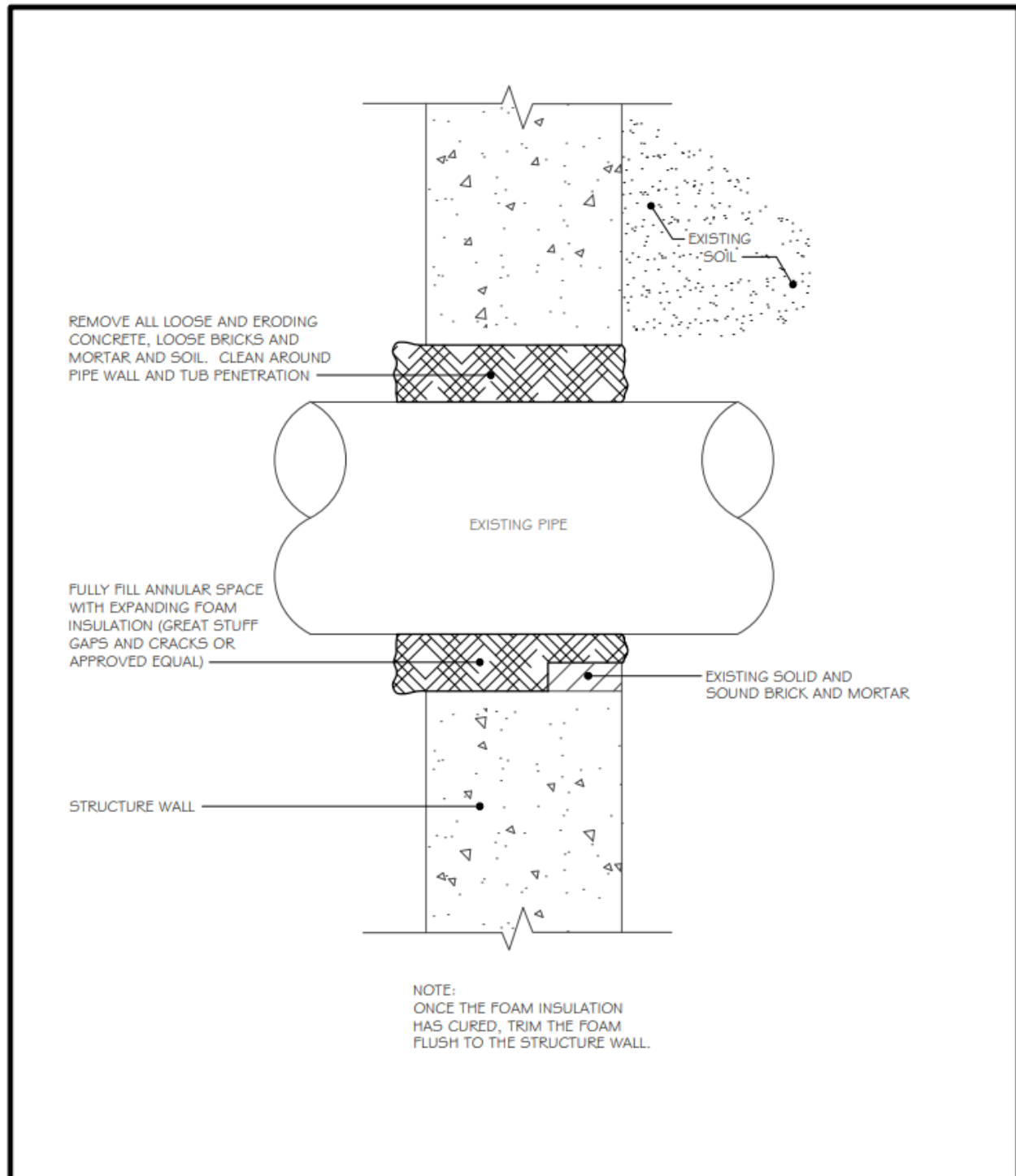
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TYPICAL TRENCH PAVING DETAIL

File: I 6025-SEWER DETAILS.dwg Date: 10/13/16

Detail:

5



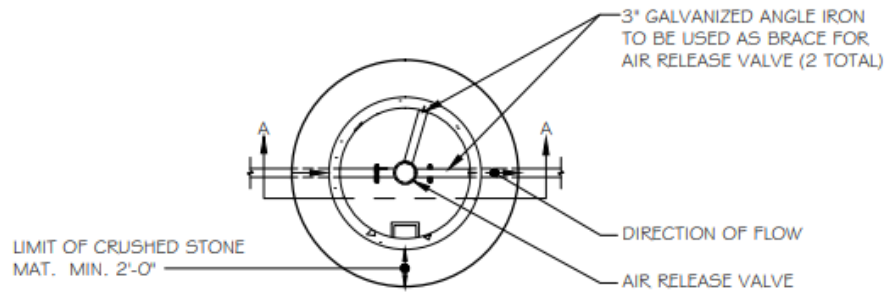
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207-846-2401

PIPE/MANHOLE CONNECTION
REHAB DETAIL

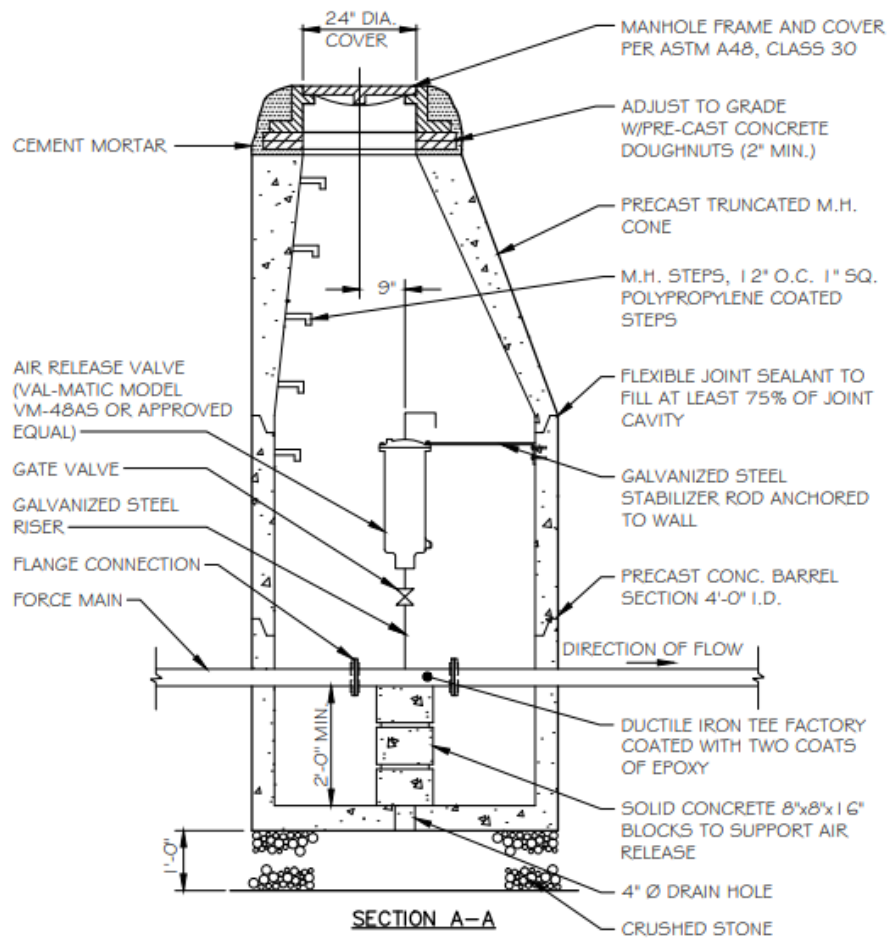
File: I GO25-SEWER DETAILS.dwg Date: 10/13/16

Detail:

3



PLAN VIEW



TOWN OF YARMOUTH
200 MAIN STREET
YARMOUTH, ME 04096
207-846-2401

AIR RELEASE MANHOLE

Scale: N.T.S.

Date: 3/29/13

Drawing No.

2

TOWN OF YARMOUTH

Sewer – Trace Wire Specification

- Brass fittings with trace wire connection lugs.
- Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc.
- Connecting trace wire to existing conductive utilities.

Testing

- All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership.
- This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.
- Continuity testing in lieu of actual line tracing shall not be accepted.

ACCEPTABLE PRODUCTS

The following products have been deemed acceptable and appropriate. These products are a guide only to help you choose the correct applications for your tracer wire project.

- Copper Clad Steel (CCS) Trace Wire
 - Open Trench – Copperhead #12 High Strength part # 1230-HS, or approved equal.
 - Directional Drilling/Boring - Copperhead Extra High Strength part # 1245*EHS, or approved equal.
 - Pipe Bursting/Slip Lining – Copperhead SoloShot Extreme Strength 7 x 7 Stranded part # PBX-50, or approved equal.
- Connectors
 - Copperhead 3-way locking connector part # LSC1230*, or approved equal.
 - DryConn 3- way Direct Bury Lug: Copperhead Part # 3WB-01, or approved equal.
- Termination/Access
 - Non-roadway access boxes applications: Trace wire access boxes Grade Level Copperhead adjustable lite duty Part # LD14*TP, or approved equal.
 - Concrete / Driveway access box applications: Trace wire access boxes Grade Level Copperhead Part # CD14*TP 14", or approved equal.
- Grounding
 - Drive in Magnesium Anode: Copperhead Part # ANO-1005 (1.5 lbs.), or approved equal.

TRACE WIRE SHALL BE ROUTED
AROUND MANHOLES ON THE
NORTH AND/OR EAST SIDE

MAINLINE TO GROUNDING
ANODE LUG CONNECTOR

#14 AWG COPPER CLAD
STEEL, FACTORY CONNECTED
TO GROUND ROD

DRIVE-IN MAGNESIUM
GROUNDING ANODE ROD

TAPE OR PLASTIC TIE,
TYPICAL

#12 AWG COPPER CLAD
STEEL, TYPICAL

1.0'
MAX.

5.0'
MAX.

PLAN VIEW

MAINLINE TO MAGNESIUM
GROUNDING ANODE LUG
CONNECTOR

DRIVE-IN MAGNESIUM
GROUNDING ANODE ROD

TAPE OR PLASTIC TIE,
TYPICAL

#12 AWG COPPER CLAD
STEEL, TYPICAL

1.0'
MAX.

5.0'
MAX.

SECTION VIEW



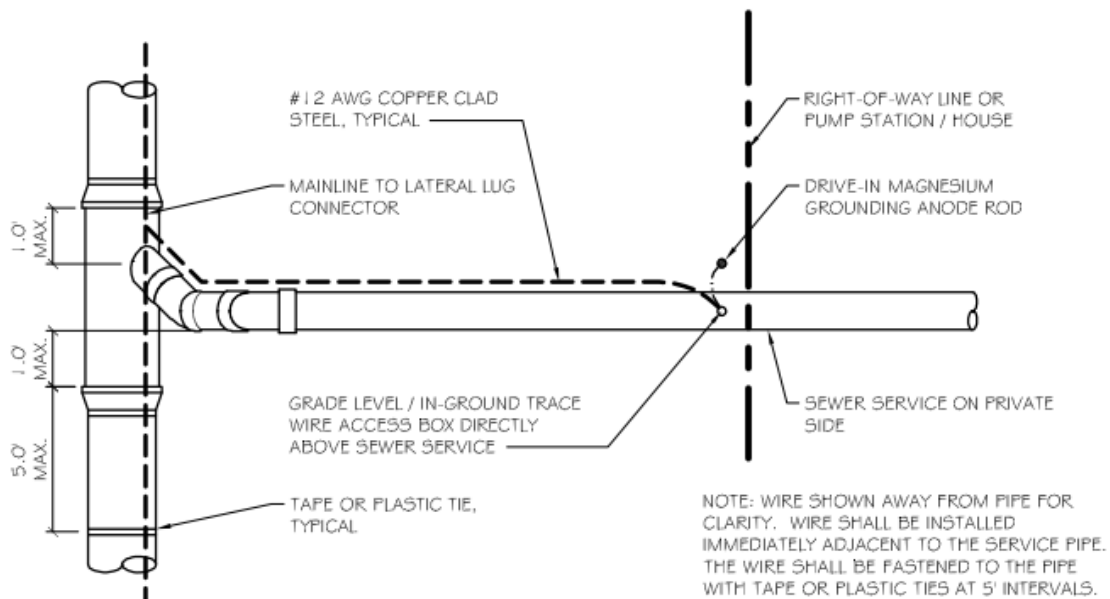
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TRACE WIRE
SEWER MANHOLE DETAIL

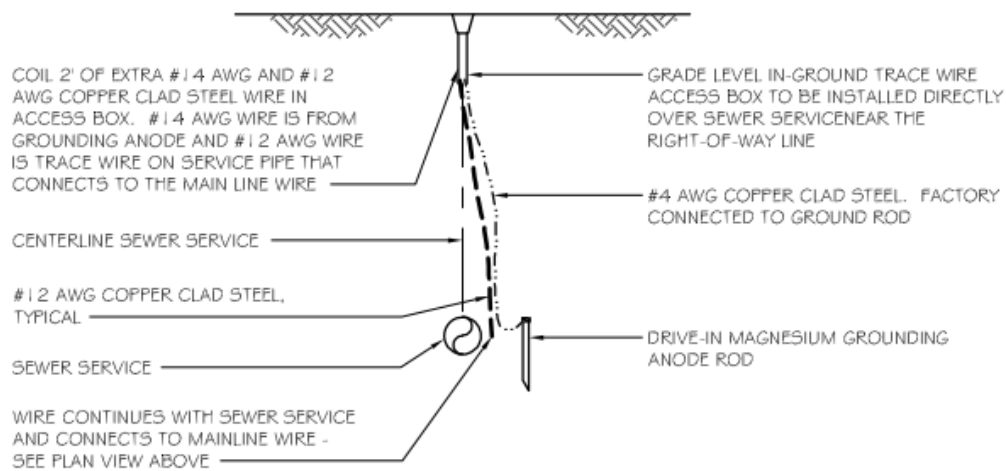
File: I 6003-TRACE WIRE-SMH.dwg Date: 2/12/17

Detail:

1



PLAN VIEW



SECTION VIEW



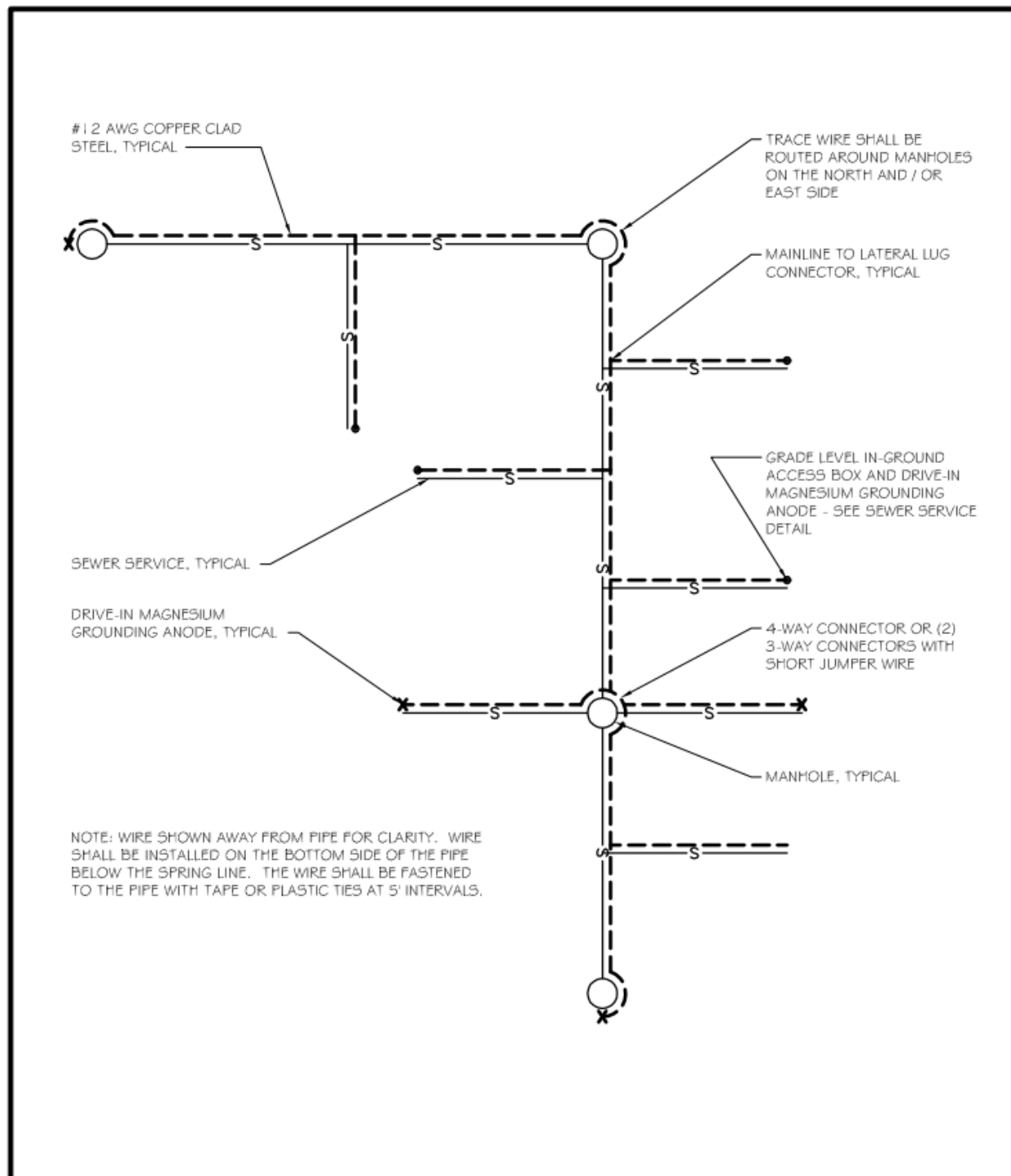
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**TRACE WIRE
SEWER SERVICE DETAIL**

File: I 6003-TRACE WIRE-SS.dwg Date: 2/12/17

Detail:

2



TOWN OF YARMOUTH
200 MAIN STREET
YARMOUTH, ME 04096
207-846-2401

TRACE WIRE SAMPLE SEWER PLAN

File: I 6003-TRACE WIRE-SSP.dwg Date: 1/29/17

Detail:

3

Materials and specifications:



ULTRALINE® HDPE WATER SERVICE PIPE & TUBING



DRISCOPLEX® 5100 ULTRALINE® WATER SERVICE PIPE & TUBING

Produced to AWWA C901 from PE4710 HDPE

Certified to NSF 14 / NSF 61

Certified to ISO 9001

Available in ASTM D2239 SDR ID sizes
 ASTM D2737 CTS sizes
 ASTM D3350 IPS OD sizes



When Performance Matters Rely on
Performance Pipe

Bulletin PP 410 BL

PerformancePipe.com

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ULTRALINE® HDPE WATER SERVICE PIPE & TUBING

ASTM D2239 Inside Diameter Controlled HDPE Pipe (IPS / SDR)

SIZE	SDR	NOMINAL OD / ID	COIL LENGTH / PALLET QTY	COIL LENGTH / PALLET QTY	WEIGHT LB/100FT	PRESSURE CLASS
3 / 4 "	7	1.074 / .824	100' / 1800'	400' / 4000'	16	250 psi
1"	7	1.367 / 1.049	100' / 1800'	300' / 2400'	25	250 psi
1-1 / 4 "	7	1.798 / 1.380	100' / 1500'	300' / 2100'	43	250 psi
1-1 / 2 "	7	2.098 / 1.610	100' / 1400'	300' / 1800'	59	250 psi
2"	7	2.692 / 2.067	100' / 1000'	300' / 2100'	97	250 psi

ASTM D2737 Outside Diameter Controlled HDPE Tubing (CTS)

SIZE	SDR	NOMINAL OD / ID	COIL LENGTH / PALLET QTY	COIL LENGTH / PALLET QTY	WEIGHT LB/100FT	PRESSURE CLASS
3 / 4 "	9	0.875 / 0.669	100' / 1800'	500' / 7500'	10	250 psi
1"	9	1.125 / 0.860	100' / 1600'	300' / 4200'	17	250 psi
1-1 / 4 "	9	1.375 / 1.051	100' / 1400'	300' / 2400'	26	250 psi
1-1 / 2 "	9	1.625 / 1.241	100' / 1300'	300' / 2400'	36	250 psi
2"	9	2.125 / 1.625	100' / 1300'	300' / 2700'	61	250 psi

ASTM D3035 Outside Diameter Controlled HDPE Pipe (IPS/SDR)

SIZE	SDR	NOMINAL OD / ID	COIL LENGTH / PALLET QTY	COIL LENGTH / PALLET QTY	WEIGHT LB/100FT	PRESSURE CLASS
3 / 4 "	11	1.050" / 0.849"	150' / 1800'	500' / 3500'	13	200 psi
1"	11	1.315" / 1.061"	150' / 1800'	500' / 3000'	20	200 psi
1-1 / 4 "	11	1.660" / 1.358"	150' / 1500'	500' / 6000'	31	200 psi
1-1 / 2 "	11	1.900" / 1.554"	250' / 2500'	500' / 4000'	41	200 psi
2"	13.5	2.375" / 2.002"	150' / 1800'	500' / 3500'	53	160 psi
2"	11	2.375" / 1.917"	150' / 1800'	500' / 3500'	64	200 psi
3"	17	3.500" / 3.063"	250' / 1750'	1000' / 2000'	94	125 psi
3"	13.5	3.500" / 2.951"	250' / 1750'	1000' / 2000'	116	160 psi
3"	11	3.500" / 2.826"	250' / 1750'	1000' / 2000'	140	200 psi

Contact your Performance Pipe representative for additional sizes and information.

Performance Pipe Ultraline® Water Service Pipe and Tubing is intended for applications to 80°F, contact Performance Pipe for guidance on operating at higher temperatures.

See the PPI 'FIELD SERVICE MANUAL FOR MUNICIPAL WATER' for installation guidance. Available as a free download at www.PerformancePipe.com in the Water/Wastewater section.

Generally speaking there are 3 different densities used to manufacture polyethylene pipe.

High Density polyethylene is commonly referred to as HDPE or 3408. The molecular structure of HDPE is such that there is very little side branching in the molecular chains that make up the HDPE resin. This resin is more dense than other resins, therefore it requires relatively less raw material to obtain a specific pressure rating for the pipe.

Medium Density polyethylene is commonly referred to as MDPE or 2406. The molecular structure of 2406 material has more side branching in the molecular chains, therefore they do not stack on top of each other as well as HDPE molecular chains do. It requires more material to get the same pressure rating as the same pipe manufactured with HDPE. However, because the MDPE material is less dense, it is more flexible than HDPE.

Linear Low Density polyethylene is commonly referred to as LLDPE. The side branching of the molecules that make up LLDPE is significant. Pipe manufactured from this type of resin is primarily used for no pressure rated applications, such as drip or microirrigation.

HDPE molecular chains stack on top of each other very neatly, much like 2 x 4 wood would stack:

MDPE molecular chains do not stack as neatly as HDPE chains do and stack like twigs from a tree.

LLDPE molecular chains do not stack on top of each other neatly at all.

So, as the density of polyethylene resin increases, the flexibility of the pipe decreases. But, as the density of polyethylene increase, less raw material is required to get identical pressure ratings.

Polyethylene pipe is generally manufactured in the United States using 3 different dimensions.

Iron Pipe size pipe has the identical dimensions as iron pipe does. This pipe is commonly referred to as IPS or SDR pipe. The outside diameter of IPS pipe is the controlling dimension. In other words, all 4" IPS polyethylene pipe will have a 4.500" outside diameter (OD).

The pressure carrying capabilities of this pipe then, is directly related to the wall thickness of the pipe. As the wall thickness increases, the inside diameter decreases, because the OD remains constant. The thicker the wall, the higher the pressure rating of the pipe.

IPS polyethylene pipe can also be called SDR pipe. SDR stands for Standard Dimension Ratio. The ratio referred to is the ratio between the Outside Diameter (OD) and the wall thickness. The resulting number is often used to determine the pressure capacity of the pipe.

For example:

As stated 4" IPS polyethylene pipe has 4.500" OD. The wall thickness of 160 Pound (PSI) pipe is roughly .409". If you divide 4.5 by .409 the resulting number is 11.002. Therefore this pipe may be referred to as SDR 11. If the wall changes, the resulting number from the ratio will also change.

For example:

4" IPS 100 Pound (PSI) pipe has a wall thickness of .265". The OD remains constant and therefore the ratio is 4.500" to roughly .265" and the resulting number is obtained from the ratio is 16.981. 100 Pound pipe may then be referred to as SDR 17.

Copper Tube size polyethylene pipe is sized like copper pipe and is also manufactured with the Outside Diameter (OD) as the controlling dimension. Copper Tube size or CTS pipe is commonly referred to as tubing. In virtually all CTS applications the pressure rating of the pipe will be 200 PSI. Because the OD is the controlling dimension, this pipe may also be called SDR pipe, but is different than IPS pipe. Since the applications using CTS pipe virtually always require 200 PSI pipe the resulting number from the ratio of the OD to the wall will be 9.

For example:

2" CTS polyethylene pipe has an OD of 2.125" and has a wall thickness of roughly .236". If you divide 2.125 by .236 the resulting number is 9. Therefore, CTS polyethylene pipe may be referred to as SDR 9 or 200 PSI CTS.

The third way polyethylene pipe is manufactured is where the controlling dimension is the Inside Diameter or ID. With this pipe, the ID will always be the same and the wall thickness will change, therefore, changing the OD. This pipe may be referred to as SIDR or Standard Inside Dimension Ratio. That is the

ration of the ID to the wall thickness.

For example:

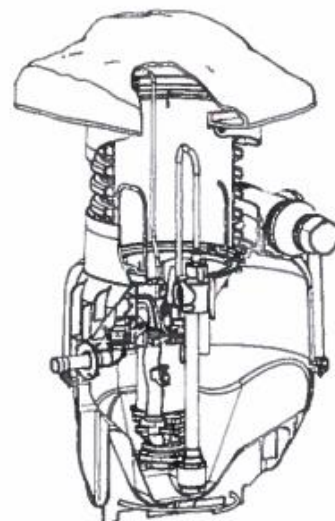
2" 100 PSI ID controlled polyethylene pipe has an ID of 2.067" and a wall thickness of .138". The resulting number from this ratio is 14.978 and may be referred to as SDR 15.

2" 200 PSI ID controlled pipe will have the identical Inside Diameter of 2.067", but a wall thickness of .295". The resulting number will be 7 and this pipe may be referred to as SDR 7. Any fittings used with the 3 above mentioned dimensions will be designed accordingly. SDR pipe will require a fitting capable of meeting the Outside Diameters of that pipe. Fittings for SDR pipe will need to fit the ID or inside of the pipe.

Specifications:

inches
(mm)

BASIN	Engineered Polypropylene Copolymer, 2-piece construction, factory assembled with preformed corrosion resistant rebar installed. Includes POD for pump support and orientation
RISER	HDPE 18" Dia. (457mm) corrugated drainpipe, day-of-installation adjustment sets basin depth (limit 9ft. 6inches (2.9m) to bottom of basin)
DISCHARGE OUTLET	1-1/4" NPT Flexible, stainless steel. Connects to a basin mounted bronze tank receiver.
INLET	3 positions, 4" (Sch 40/80 or SDR35) Flexible Inlet Flange (For Field Installation)
COVER	Rock-Shaped Polyethylene Cover, interlocking with Riser Adapter, vented or unvented. Keyed lock included. Load rating of 150 lb per sq ft.
ALARM BOX	Model 1500 Alarm Panel, NEMA 4X Non-metallic Enclosure with Keyed Lock, Alarm Light, Alarm Horn w/ Push Button, Pump and Alarm Circuit Breakers
DIRECT BURIAL CABLE	12/5 Type TC, STOOV Round U.L. Listed. 30ft (9m) length standard
MOVEABLE DISCHARGE FITTING w/ CHECK VALVE:	(Removed with Pump)
Housing	Powder Coated Cast Iron
Diaphragm	Fiber Reinforced Neoprene
Flapper	Fiber Reinforced Nitrile
Size	1-1/4" Full Port
Valve Seal	Bronze
BALL VALVE:	Toggle actuated via polypropylene harness from top side, removable without basin entry
Material	Bronze, with Stainless Steel ball & stem, and Teflon seats
Size	1-1/4" Full Port
LIFTING HARNESS	1/8" x 3/4" Polypropylene (POD). 1/2" Dia. Polypropylene (PUMP) Breaking strength 3750 lbs.
HARDWARE	300 Series Stainless Steel
LEVEL CONTROL	ESPS™ - Environmentally sealed pressure switch with CPVC housing, Nitrile diaphragm, Custom molded quick connect for sealing and strain relief.
ANTI-SIPHON	Integral to cast iron motor housing.
Flapper	Fiber Reinforced Nitrile
Seal	Valox with stainless steel rivet
PUMP	OGP2022CE (Std), 240 Volt, 1 Phase
OPTIONS	Direct Burial Cable lengths, Rock Cover Vented or Flood Plain, Depth, OGVF2022CE Pump, Model 1550 Alarm Panel w/ Generator Receptacle



EcoTRAN™ System

For use with OGP and OGV pumps, 1 1/4" NPT

Vented 52"-74" Depth

Vented 76"-114" Depth

Flood Plain 52"-74" Depth

Flood Plain 76"-114" Depth

This product may be covered by one or more of the following patents and other patent(s) pending:
US Patent 7,357,341 & US Patent 7,578,657



LR16567
NSF 46



CERTIFIED TO
NSF/ANSI 46



LISTED BASIN ASSEMBLY E161664 2N87
UL1951

BARNES



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SECTION ECO
PAGE 1
DATE 10/09

<p>1. Depth</p> <p>52"-74" (1.3m-1.8m) Vented 76"-114" (1.9m-2.9m) Vented 52"-74" (1.3m-1.8m) Flood Plain 76"-114" (1.9m-2.9m) Flood Plain</p> <p>2. Pump Type (240V / 1 Phase)</p> <p>2 HP OGP2022CE (STD.) 2 HP OGVF2022CE</p> <p>3. Direct Burial Cable Length</p> <p>30 Feet (STD.) 50 Feet 100 Feet</p> <p>4. Rock Cover Options (Select One)</p> <p>Sandstone Flood Plain, Sandstone</p> <p>5. Alarm Box Options</p> <p>Model 1500 w/Alarm Light, Horn, Silence Button & Circuit Breaker Model 1550, includes 1500 features, Plus Generator Receptacle and Automatic Transfer Switch</p> <p>NOTES:</p> <ol style="list-style-type: none"> Unit shipped boxed complete including Basin Package, Pump, Level Control and Alarm Box (Riser shipped separately). Riser depth can be shortened in the field during installation. All moving parts and seals serviceable from ground level without entry into the basin. 	
--	--

EcoTRAN™ System

Simplex



www.cranepumps.com

Short Set EcoTRAN Package - Vented Cover								
Direct Burial Cable Length	OGP Pump				OGV Pump			
	Standard Alarm Box		Alarm with Generator Receptacle		Standard Alarm		Alarm with Generator Receptacle	
	Part No.	SC	Part No.	SC	Part No.	SC	Part No.	SC
30 Ft.	122848	NS	122854	CF	122851	NS	122857	CF
50 Ft.	122849	NS	122855	CF	122852	NS	122858	CF
100 Ft.	122850	NS	122856	CF	122853	NS	122859	CF
Long Set EcoTRAN Package - Vented Cover								
Direct Burial Cable Length	OGP Pump				OGV Pump			
	Standard Alarm Box		Alarm with Generator Receptacle		Standard Alarm		Alarm with Generator Receptacle	
	Part No.	SC	Part No.	SC	Part No.	SC	Part No.	SC
30 Ft.	124146	NS	124152	CF	124149	NS	124155	CF
50 Ft.	124147	NS	124153	CF	124150	NS	124156	CF
100 Ft.	124148	NS	124154	CF	124151	NS	124157	CF
Short Set EcoTRAN Package - Non-Vented Cover								
Direct Burial Cable Length	OGP Pump				OGV Pump			
	Standard Alarm Box		Alarm with Generator Receptacle		Standard Alarm		Alarm with Generator Receptacle	
	Part No.	SC	Part No.	SC	Part No.	SC	Part No.	SC
30 Ft.	122860	CF	122866	CF	122863	CF	122869	CF
50 Ft.	122861	CF	122867	CF	122864	CF	122870	CF
100 Ft.	122862	CF	122868	CF	122865	CF	122871	CF
Long Set EcoTRAN Package - Non-Vented Cover								
Direct Burial Cable Length	OGP Pump				OGV Pump			
	Standard Alarm Box		Alarm with Generator Receptacle		Standard Alarm		Alarm with Generator Receptacle	
	Part No.	SC	Part No.	SC	Part No.	SC	Part No.	SC
30 Ft.	124158	CF	124164	CF	124161	CF	124167	CF
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100 Ft.	124160	CF	124166	CF	124163	CF	124169	CF

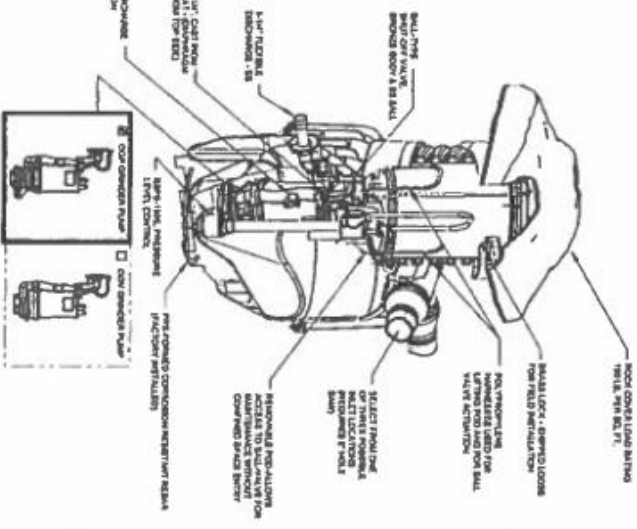
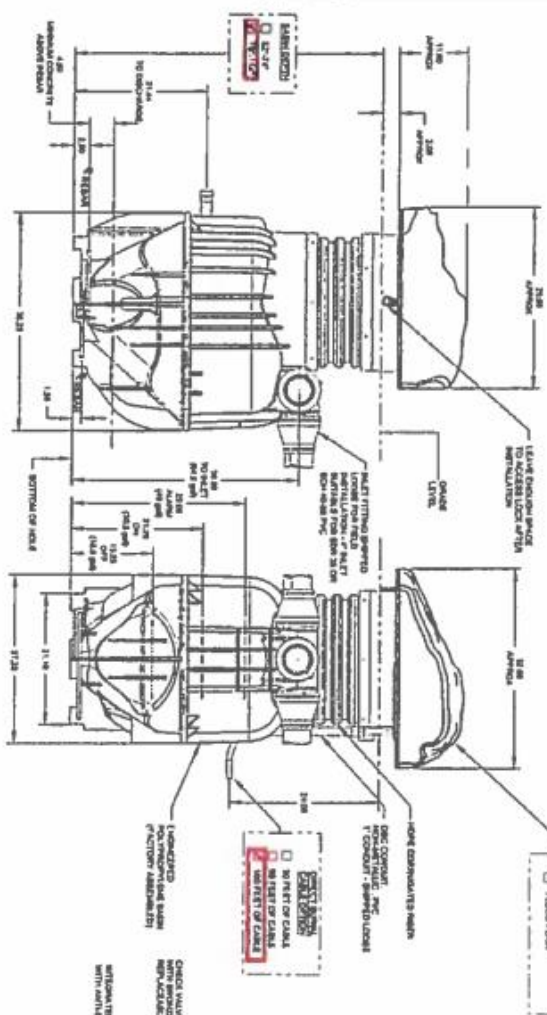
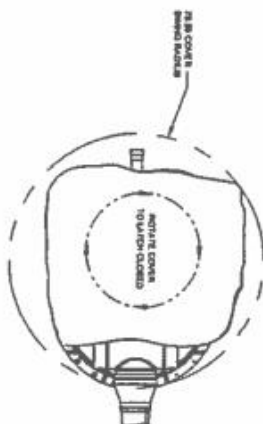
SECTION ECO
PAGE 2
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SHEET 1 OF 1

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CRANE PUMPS & SYSTEMS

96046

NOTES

1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED



EUCLID CHEMICAL

DURALKOTE 500

ULTRA HIGH BUILD EPOXY LINER

COATINGS - INDUSTRIAL

DURALKOTE 500

MasterFormat #:
07 18 16

DESCRIPTION

DURALKOTE 500 is a 100% solids, solvent free, low odor epoxy liner system. It is impervious to a wide variety of acids, caustic solutions, oils, grease and many other chemicals. DURALKOTE 500 is particularly resistant to sulfuric acid up to a concentration of 75%. No special precautions are necessary to contain odors or solvents often found in many other liner systems. DURALKOTE 500 is ideal for use as a protection system in the wastewater and chemical industries.

PRIMARY APPLICATIONS

DURALKOTE 500 is used as a lining system for protection against chemical attack to:

- Manholes
- Lift stations
- Headwork
- Sewer pipes
- Grit chambers
- Clarifiers
- Wastewater and containment areas
- Walls
- Sumps
- Trenches
- Pits

TECHNICAL INFORMATION

The following are typical values obtained under laboratory conditions. Expect reasonable variation under field conditions.

Mixing Ratio by volume	1:1
Gel Time (150 g), minutes.....	30 to 40
Tensile Strength, ASTM D638, psi (MPa) @ 7 days.....	4200 (28.9)
Elongation, ASTM D638, % psi (MPa) @ 7 days	3 to 6
Compressive Strength, ASTM D695, psi (MPa)	8,780 (60.5)
Shore D Hardness, ASTM D2240 @ 7 days	88
Bond to Damp Concrete ASTM D4541 @ 7 days	Concrete Failure
Flexural Strength, ASTM D790, @ 7 days psi (MPa)	5,100 (35.1)
VOC Content	≤ 100 g/L
Appearance: DURALKOTE 500 is available in Light Gray and White.	

PACKAGING

DURALKOTE 500 is packaged in 4 gal cases (15.14 L) containing two 2 gal (7.6 L) kits.

SHELF LIFE

2 years in original, unopened containers

COVERAGE

Liner System	ft ² /gal
Duralkote 500, 1st coat	25 @ 1/16" (1.6 mm)
Duralkote 500, 2nd coat	12.8 @ 1/8" (3.2 mm)
Duralkote 500 w/ 2.5 parts sand	32 @ 1/8" (3.2 mm)

Note: Coverage rates are approximate. Actual coverage depends on temperature, texture, and substrate porosity.

DIRECTIONS FOR USE

Surface Preparation: The surface must be structurally sound, clean and free of grease, oil, curing compounds, soil, dust and other contaminants. See note in "Precautions/Limitations" section if coating is to be placed over old/ existing epoxy or urethane coatings. New concrete and masonry must be at least 28 days old. Surface laitance must be removed. Concrete surfaces must be roughened and made absorptive, preferably by mechanical means, and then thoroughly cleaned of all dust and debris. If the surface was prepared by chemical means (acid etching), a water/baking soda or water/ammonia mixture, followed by a clean water rinse, must be used for cleaning, in order to neutralize the substrate. The Concrete Surface Profile (CSP) should be equal to CSP 2-4 in accordance with Guideline 310.2R-2013, published by the International Concrete Repair Institute (ICRI).

Following surface preparation, the strength of the surface can be tested if quantitative results are required by project specifications. An elcometer or similar tensile pull tester may be used in accordance with ASTM C1583, and the tensile pull-off strength should be at least 250 psi (1.7 MPa).

After surface preparation, a test section application of the coating system is recommended to confirm good adhesion and compatibility of the coating with the surface, and also to confirm appearance and aesthetics.

When coating steel, all contamination should be removed and the steel surface prepared to a "near white" finish (SSPC SP10) using clean, dry blasting media.

Mixing: Mix DURALKOTE 500 using a low-speed drill and a mixing paddle. Pre-mix Part A and Part B separately for approximately 3 minutes each. Combine Part A and Part B in a 1 to 1 ratio by volume, then mix thoroughly for 3 to 5 minutes. Scrape the bottom and sides of the containers at least once during mixing. Do not scrape bottom or sides of the container once mixing operations have ceased; doing so may result in unmixed resin or hardener being applied to the substrate. Unmixed resin or hardener will not cure properly. Do not aerate the material during mixing. To keep aeration to a minimum, the recommended mixing paddles are #P1 or #P2 as found in ICRI Guideline 320.5R-2014.

To make DURALKOTE 500 mortar, gradually add clean, dry, 60 mesh silica sand to previously mixed DURALKOTE 500 epoxy and mix thoroughly for 3 to 5 minutes. Combine 1 part by volume of mixed DURALKOTE 500 with 2 to 3 parts by volume of 60 mesh silica sand.

Application: Apply properly mixed DURALKOTE 500 using a brush, short nap roller, trowel, or spray to the properly prepared surface. **Roller and Brush:** Apply at a rate up to 100 mils (16 ft²/gal) in one application. **Trowel:** DURALKOTE 500 can be trowel-applied "neat" or mixed with silica sand to make a mortar (see instructions listed in the "Mixing" section above). **Spray:** DURALKOTE 500 can be applied by plural component spray equipment. A 125 mil (1/8", or 3.2 mm) thickness can be applied in one application.

CLEAN-UP

Clean tools and application equipment immediately with acetone, xylene, or MEK. Clean spills or drips with the same solvents while still wet. Hardened DURALKOTE 500 will require mechanical abrasion for removal.

PRECAUTIONS/LIMITATIONS

- Store DURALKOTE 500 indoors, protected from moisture, at temperatures between 50°F and 90°F (10°C and 32°C)
- Surface and ambient temperature during coating applications should be between 50°F and 90°F (10°C and 32°C)
- Material temperatures should be at least 50°F (10°C) and rising
- Do not apply DURALKOTE 500 if surface temperature is within 5°F (3°C) of the dew point in the work area
- Working time and cure time will decrease as the temperature increases, and will increase as the temperature decreases
- Do not thin DURALKOTE 500
- Do not apply DURALKOTE 500 to slabs on grade unless an uninterrupted vapor barrier has been installed under the slab
- Do not apply DURALKOTE 500 if the substrate is subject to excessive moisture vapor drive or hydrostatic pressure
- Although DURALKOTE 500 is chemically resistant, surface staining of the coating may occur after contact with some chemicals.
- DURALKOTE 500 will discolor upon prolonged exposure to ultraviolet light and high-intensity artificial lighting.
- Depending on the condition of the substrate, minor surface defects can appear in the coating when applied. Proper surface prep, patching of substrate imperfections, and priming will ensure a better overall finish.
- If coating over old/existing epoxy or urethane coatings, or if more than 24 hours elapses between coats: sand the previous coat, wipe clean, and proceed with coating operations. If old/existing coatings are peeling, flaking, etc., all unsound material must be removed prior to new coating applications.
- Application of a test area is recommended to confirm final appearance and texture of the system with the end user
- In all cases, consult the product Safety Data Sheet before use

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