TECHNO-GRAM
002-2023
REVISION

DEPARTMENT OF PERMITTING, INSPECTIONS AND ENFORCEMENT

SUBJECT: Polypropylene Pipe

PURPOSE: The purpose of this revised techno-gram is to implement the use of Polypropylene Pipe in public and private storm drain systems. This techno-gram establishes requirements pertaining to the permitting, construction, and inspections of polypropylene storm drain pipes.

SCOPE: This applies to all applications of polypropylene storm drain pipes being reviewed by the Department of Permitting, Inspections and Enforcement (DPIE).

Effective immediately, polypropylene pipe may be used as an acceptable storm drain pipe material in the public or private system in Prince George's County, Maryland. The following requirements apply to the permitting, construction, and inspections of polypropylene pipe:

I. Permit Review:

A) Permit plans shall comply with the requirements prescribed in the Department of Public Works and Transportation (DPW&T) special provisions entitled "Polypropylene (PP) Corrugated Smooth Lined Thermoplastic Pipe for pipe diameters 60 inches and smaller." These special provisions are included as Attachment A to this techno-gram and shall be affixed to the permit plans.

B) Minimum and maximum cover requirements shall be complied with on the permit plans. These minimum and maximum cover requirements are as follows:

i. <u>Under Roadways, Parking Areas, and/or within the Public Right-of-Way</u>:

a) For typical installation under any public or private roadway or parking area, the minimum cover from the top of the pavement to the crown of the pipe shall be 3.0'.

b) For installations in sidewalk or grass areas adjacent to roadways and parking areas, the minimum cover from the ground surface to the crown of the pipe shall be 2.0'.

c) PP pipe shall not be used where the cover is less than 2.0'. If permit documents mistakenly indicate this condition, the Permittee shall revise the permit plans prior to ordering pipe.

d) Care must be taken when construction equipment loads cross the pipe trench during construction. In no case may pipe deflection exceed 5.0 percent. Any damaged pipe shall be replaced by the permittee at the permittee's expense.

ii. Non-Roadway Areas (except as specified above):

a) For installation in non-roadway and non-parking areas, a minimum cover from the top of the ground to the crown of the pipe shall be 2.0'.

b) Care should be taken when construction equipment loads cross the pipe trench during construction. If the passage of construction equipment over an installed pipeline is necessary during project construction, then adequate protection measures shall be implemented. In no case may pipe deflection exceed 5.0 percent. Any damaged pipe shall be replaced by the permittee at the permittee's expense.

iii. Maximum Cover

a) Maximum cover over PP pipe shall be 20 feet unless the permittee provides calculations sealed by a Professional Engineer and a letter from the manufacturer certifying this installation will meet applicable American Association of State Highway and Transportation Officials (AASHTO) Load Resistance and Factor Design (LRFD) requirements. The permittee shall review the specified cover prior to ordering pipe materials.

C) Trench Bedding and Backfill: Permit Plans shall include Type A and Type C Trench typical details, which are included in Attachment B of this techno-gram. Permit plans shall define Type A or Type C trench requirements on the pipe profiles.

i. Type A Trench: Type A trench installation shall be utilized, in general, where the pipe cover is 3.0' or greater. AASHTO No. 57 crushed stone shall be placed from 6 inches below the pipe to 6 inches above the crown of the pipe for the entire width of the trench. The 6 inches of stone above the crown of the pipe may be eliminated when installing the pipe in green space. Type A trench installations shall be installed in accordance with ASTM D 2321. Type A backfill must be constructed with Class SD Type II nonwoven filter fabric per MDOT SHA Specification 919 when the seasonal high groundwater level is anticipated within the excavated trench area, or the trench is within the paved roadway footprint. Type A trenches shall not be used where the trench may inadvertently drain adjacent areas, such as wetlands or ponds. If the pipe is closer than 20 horizontal feet from the wetland or pond edge, the Type C trench should be utilized instead. Type A trenches shall not be used for pipes through embankments for micro-bioretention, submerged gravel wetlands, or other non-MD 378 stormwater management embankments or under bioswales. Polypropylene pipe, regardless of trench type, shall not be utilized through or under MD 378 embankments.

ii. Type C Trench (Flowable Fill): Type C trench installation shall be utilized for pipe installations with a cover of less than 3.0 feet but greater than 2.0 feet. Polypropylene pipe closer than 20 feet from a wetland or pond edge shall be installed with a Type C trench. Polypropylene pipe through micro-bioretention, submerged gravel wetlands, or other non-MD 378 embankments and under bio-swales shall be installed with a Type C trench. Flowable fill shall conform to the requirements and references of Controlled Low-Strength Material (CLSM), Type A, Maryland Department of Transportation State Highway Administration (MDOT SHA) Standard Specification Section 314. Proposed material information shall be submitted to the Engineer for review and approval. Strapping/anchoring of PP Piping shall be installed when the flowable trench fill method is utilized.

D) Permit plans shall include the following conditions affixed to the plan.

POLYPROPYLENE PIPE REQUIREMENTS

1. The polypropylene pipe shall comply with ASTM F2881 and AASHTO M330. This pipe material is not approved for diameters exceeding 60 inches.
2. For this permit, Prince George's County is allowing polypropylene pipe as an alternate storm drain pipe material in lieu of reinforced concrete pipe (RCP), as shown on the pipe profiles. This pipe material is approved with the condition that all polypropylene pipe shall be inspected by a third-party inspector approved by DPIE's Inspections Division. The third-party inspection shall be performed in accordance with the permit conditions stated below. The name and contact information of the **third-party inspector** is as follows:

   _____
3. During the third-party inspection, if any deviations from these conditions are observed, the third-party inspector shall immediately notify the permittee and the DPIE Inspections Division. The permittee shall, at their expense, make repairs in accordance with these procedures.
4. Conformance with Prince George's County Department of Public Works and Transportation (DPW&T) Specifications (latest version) for "Polypropylene (PP) Corrugated Smooth-Lined Thermoplastic Pipe — Pipe Diameters 60-inches and smaller" is required. These specifications are included in Techno-gram 002.
5. The third-party Inspector shall have the following qualifications: Mid-Atlantic Regional Technician Certification Program (MARTCP) Soils & Aggregate Compaction Technician certification and documented experience with Polypropylene Pipe installation requirements and quality assurance during construction.
6. A third-party inspector shall be present on the job site continuously during pipe installation of the Polypropylene Pipe (PP).
7. The permittee shall provide the pipe manufacturer's pipe certification to the third-party inspector and DPIE inspector.
8. Permitting shall provide a video inspection of the installed PP to the third-party inspector. The video inspection shall comply with the requirements listed herein. Note that video inspection is required for all storm drains and stormwater management pipes.
9. The inspection of PP shall comply with the above-referenced DPW&T specification for polypropylene pipe.
10. Digital photos shall be provided by the third-party inspector for the entire PP installation operation to confirm appropriate installation, bedding, and backfill placement.

D) Permit Plans shall include the following conditions affixed to the plan, *cont'd.*

11. The third-party inspector shall review and approve the final horizontal and vertical alignment of the pipe (as prescribed by the permit plans) prior to, throughout, and after the backfilling over the pipe to ensure that there are no deficiencies (e.g., no sags, pipe bulges, kinks in alignment, differential joints, joints that are not tight, etc.). The third-party inspector shall identify all deficiencies in writing to the permittee and the DPIE inspector. This shall be done immediately as the deficiencies are noticed and remedied prior to backfill, when feasible.
12. Pipes shall be reinspected a minimum of 30 days after installation of the final backfill. Review of pipes after backfilling to be performed via review of pipe video inspection for pipe sizes smaller than 48" diameter, walk-through of pipes 48" and larger, and field-surveyed as-built plans.
13. Post-Installation Pipe Video Inspection
    i. A post-installation video camera inspection shall be conducted for all storm drain and stormwater management pipes.
    ii. Video inspection shall be performed prior to final acceptance of the storm drain system.
    iii. Pipe video must be of high resolution to allow the viewer to see high detail of the pipe to confirm the adequacy of the pipe installation and the quality of the material. The contractor shall use robotic sewer inspection camera equipment such as the ROVVER X manufactured by Envirosight or equivalent.
    iv. Pipe video must show the pipe joints through a 360-degree rotated examination at ALL JOINTS and at any point in the pipe exhibiting possible deficiency (e.g., gap, separated joint, damaged joint, leakage, differential settlement, debris, etc.).
    v. A high-resolution video shall be provided and shall be examined by the third-party inspector prior to acceptance. The County inspector shall also review the pipe video prior to acceptance.
    vi. The permittee shall use a color pan and tilt camera, or a side-wall scanning (panoramic) camera specifically designed and constructed for sewer inspection. The inspection shall provide panoramic and clear footage of deficient joints and areas of visible damage. The pan and tilt camera shall pause, pan, and visually inspect all service connections, pipe ends, and/or structural defects.
    vii. Shape, focus, proper lighting, and clear, distortion-free viewing during camera operations shall be maintained. Failure to maintain these conditions will result in the rejection of the video and/or photographs by the inspector.
    viii. Videos or photographs recorded showing steam, inadequate lighting, or other poor image quality will be cause for rejection by the inspector.
    ix. Any reach of the storm drain where recording quality, inspections, and/or report is not acceptable to the inspector shall be re-televised or data modified.

D) Permit Plans shall include the following conditions affixed to the plan, *cont'd.*

x. Any reach of the storm drain where recording quality, inspection, and/or report is not acceptable to the inspector shall be re-televised.
xi. Deficiencies identified in the pipe video inspection that show a lack of compliance with the above-referenced DPW&T specification for PP will require the appropriate level of removal, repair, and/or replacement as prescribed by the referenced DPW&T specification.

14. Post-Installation Pipe Deflection Testing
    i. The permittee must perform deflection testing after pipe installation. Deflection shall be measured by any of these three techniques: 1) Laser deflection measuring device, 2) Mandrel, 3) Physical Measuring Tools for pipes 48" diameter or greater.
    ii. Pipes with a deflection of 5.0% or less will not require remediation.
    iii. Pipes with a deflection greater than 5.0% but less than or equal to 7.5% will require a review of the inspection footage and deflection test results by a Maryland-licensed Professional Engineer. The engineer shall certify if the pipe installation is acceptable or if remediation is required. If remediation is required, the contractor shall propose a remediation method recommended by the pipe manufacturer. If the County Inspector does not approve the remediation method, the pipe will require removal and replacement by the contractor.
    iv. Pipes with a deflection greater than 7.5% will require removal and replacement by the contractor.
15. The permittee must provide field verification to ensure compliance with all County requirements.
16. The third-party inspector shall issue a Third-Party Inspection Certification to the DPIE inspector prior to the final inspection and final acceptance of the permit. This certification is included in Techno-gram 002-2023.

APPROVED BY:

Dawit Abraham (Jun 6, 2025 09:59 EDT)

Dawit Abraham, P.E.,
Director

May 12, 2025

TECHNO-GRAM
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DEPARTMENT OF PERMITTING, INSPECTIONS AND ENFORCEMENT

ATTACHMENT A:

DPW&T Special Provisions for Polypropylene (PP) Corrugated Smooth-Lined Thermoplastic Pipe

30xx POLYPROPYLENE (PP) CORRUGATED SMOOTH LINED THERMOPLASTIC PIPE– PIPE DIAMETERS 60-INCHES & SMALLER

DESCRIPTION

This item shall include furnishing and installing Polypropylene (PP) Type S pipe and all related connections and fittings, all of which shall conform to AASHTO M330 *Polypropylene Pipe 300 to 1500 mm Diameter*, latest editions. In addition, it shall include all connections and joints to new or existing pipes, storm sewer manholes, inlets, headwalls, and other appurtenances as may be required to complete the work.

MATERIALS

Unless otherwise specified on the plans or herein, thermoplastic pipe and joint fittings shall conform to the following:

A. Polypropylene (PP) Corrugated Smooth Lined Thermoplastic Pipe & Fittings shall be manufactured in accordance with requirements of AASHTO M330 *Polypropylene Pipe 300 to 1500 mm Diameter,* latest edition.

B. Polypropylene (PP) – shall be manufactured from virgin polypropylene material and shall use polymerized propylene as the sole monomer (ASTM D 883),

C. All pipe joints shall be "water tight," having two gaskets meeting the requirements of ASTM D 3212.

CONSTRUCTION

Construction shall be in accordance with ASTM D 2321, "Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications", and as specified below.

A. General Installation Requirements:

Pipe shall be unloaded and handled with reasonable care in accordance with manufacturer's recommendations. Pipe shall be placed in the bed starting at the downstream end. Pipe shall be laid with bells upgrade. Trenches must be excavated in such a manner as to ensure that the sides will be stable under all working conditions. Trench walls shall be sloped or supported in conformance with all standards of safety. Only as much trench as can be safely maintained shall be opened. All trenches shall be backfilled as soon as practicable, but no later than the end of each working day. Water infiltration during trench excavation shall be controlled as required. **Pipe shall be backfilled simultaneously from both sides to maintain the alignment of the pipe**.

B. Trench Widths:

Trench width shall be sufficient to ensure working room to properly and safely place and compact haunching and other backfill materials. Minimum trench width shall be at least twice the outside diameter of the pipe, or the outside diameter of the pipe plus 18 inches on each side, whichever is less.

For multiple pipe barrel runs, the clear distance between pipes is as follows:

Less than 24" Diameters: Clear distance = 12"
24" Diameters & Greater: Clear distance = ½ x Diameter

C. Trench Backfill:

Type A Trench Backfill: AASHTO No. 57 Crushed Stone.

No. 57 stone may be used in certain installations (as specified by ASTM D 2321 and as qualified below) where minimum cover is 3.0'. Proposed material information shall be submitted to the Engineer for review and approval. Type A backfill must be constructed with Class SD Type II nonwoven geotextile fabric per MDOT SHA Specification 919 installed along the top of the trench embedment zone and tucked-in at two inches (minimum) and four inches (recommended) along each side. The trench embedment zone shall be wrapped on all sides with Class SD Type II nonwoven geotextile fabric when the seasonal high ground water level is anticipated within the excavated trench embedment zone. Type A Trench Backfill shall not be used where trench may inadvertently drain adjacent areas, such as wetlands, ponds, etc. Proposed locations for use on the project shall be submitted to the Engineer for approval. No. 57 stone shall be placed to a point 6 inches above the crown of the pipe for the width of the trench. The 6-inches of stone above the crown of the pipe may be eliminated when installing the pipe in greenspace.

Type C Trench Backfill: Flowable Fill – Controlled Low Strength Material (CLSM)

Materials shall conform to the requirements and references of MD SHA Standard Specification Section 902.16, Controlled Low Strength Material, Type A (hereinafter referred to as "Flowable Fill" in this special provision). Proposed material information shall be submitted to the Engineer for review and approval.

Flowable fill shall be permitted in any installation application. Strapping/anchoring of PP Piping will be mandatory when the flowable trench fill method is utilized.

D. Minimum Cover:

1. **Under Roadways and/or within the public right-of-way:**
   a.) For typical installation under any roadway, minimum cover from top of roadway to crown of pipe shall be 3.0'.

b.) Care must be taken when construction equipment loads cross the pipe trench during construction. In no case may pipe deflection exceed 5.0 percent. Any damaged pipe shall be replaced at the Contractor's expense.
c.) Should pipe profiles indicate shallow pipe runs (cover less than 3.0' and greater than 2.0', as defined above), then Type C trench backfill must be used.
d.) PP pipe shall not be used where cover is less than 2.0'. Should design documents indicate this condition, the Contractor shall notify the Engineer during the submittal process and prior to ordering pipe.

2. **Non-Roadway Areas (except as specified above):**
   a.) For installation in non-roadway areas, minimum cover from top of ground to crown of pipe shall be 2.0'.
   b.) Care should be taken when construction equipment loads cross the pipe trench during construction. If the passage of construction equipment over an installed pipeline is necessary during project construction, then adequate protection measures shall be implemented. In no case may pipe deflection exceed 5.0 percent. Any damaged pipe shall be replaced at the Contractor's expense.

E. Maximum Cover

Review specified cover prior to the ordering of pipe materials. Notify the Engineer if cover indicated on plans exceeds the manufacturer's recommendations for piping. For any bury depths in excess of 20 feet, a letter from the manufacturer certifying this installation will meet applicable LRFD requirements is required.

F. Joints:

Joints shall be installed so that the connection of pipe sections will form a continuous line free from irregularities in the flow line. All joints installed in public space shall be "water tight". Water tight joints must meet a 74kPa (10.8 psi) third party laboratory test per the latest edition of ASTM D3212 *Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals*. Suitable watertight joints are the following:

1. Water Tight Integral Bell-N-Spigot:
   The bell shall overlap a minimum of two (2) corrugations of the spigot end when fully engaged. The spigot end shall have an "O"-Ring gasket that meets ASTM F 477, "*Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe*".

2. Water Tight Exterior Bell-N-Spigot (Fittings):
   All fabricated fillings shall have a welded bell/spigot that provide water tight gasketed connections that meet ASTM F 477, "*Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe*".

G. Location and Alignment:

Comply with ASTM D2321 and pipe manufacturer's recommendations for installation. Provide temporary blocking, anchoring, strapping and tie-downs as required to achieve horizontal alignment and vertical profiles as indicated on the contract plans. Take necessary measures to minimize potential movement during installation of bedding and trench backfill. Do not subject piping, to excessive live loads from construction equipment and operations. Bedding shall be a nominal depth of six-inches and of the same backfill material type of the remainder of the trench embedment zone.

H. Pipe Connections to Structures and Manholes

Inlet and outlet pipes shall be set or cut flush with the inside faces of structures and manholes. Openings in precast and cast-in-place drainage structures shall not exceed the outside diameter of the pipe plus six (6) inches. A water stop gasket shall be placed on the pipe at all structure connections and the joint around the pipe/water stop gasket and structure wall shall be completely and neatly closed with mortar or other specified materials. Pipe bedding and support shall be carefully maintained adjacent to all structures.

I. Post Installation Pipe Video Inspection

1. A post installation visual or video camera inspection shall be conducted for all pipes.
2. The video inspection shall be performed prior to final acceptance of the storm drain pipe system.
3. Pipe video must be of high resolution to allow the viewer to see high detail of the pipe to confirm adequacy of the pipe installation and the quality of the material.
4. Pipe video must show the pipe joints through a 360 degree rotated examination at ALL JOINTS and at any point in the pipe exhibiting possible deficiency (e.g., gap, separated joint, damaged joint, leakage, differential settlement, debris, etc.).
5. A high resolution video shall be provided and shall be examined by the inspector prior to acceptance. If the image quality is not adequate in accordance with NASSCO Performance Specification Guideline, October 2014, then it shall be repeated at the Permittee's expense.
6. The Permittee shall use a color pan and tilt camera or a side wall scanning (panoramic) camera specifically designed and constructed for sewer inspection. The inspection shall provide panoramic and clear footage of deficient joints and areas of visible damage. The pan and tilt camera shall pause, pan, and visually inspect all service connections, pipe ends, and/or structural defects.
7. Shape, focus, proper lighting, and clear, distortion-free viewing during the camera operations shall be maintained. Failure to maintain these conditions will result in the rejection of the video and/or photographs by the inspector.
8. Videos or photographs recorded showing steam, inadequate lighting, or other poor image quality will be cause for rejection by the inspector.
9. Any reach of storm drain where recording quality, inspection, and/or report is not acceptable to the inspector shall be re-televised, or data modified.
10. Deficiencies identified in the pipe video inspection that show lack of compliance with the above-referenced DPW&T specification for polypropylene pipe will

require the appropriate level of removal, repair and/or replacement as prescribed by the referenced DPW&T specification.

MEASUREMENT AND PAYMENT

This item shall be measured for payment by the linear foot for each diameter of pipe. Such measurements shall be made between the ends of the barrel along its flow line. For multiple pipes, the measured length shall be the sum of the lengths of the barrels, measured as described above. Pipe shall be paid for at the contract unit price per linear foot, complete in place, for each size of pipe. The contract price per linear foot shall be the total compensation for the furnishing of all labor, materials, tools, equipment, and incidentals necessary to complete the work including excavation, dewatering, backfill, blocking, strapping and disposal of surplus materials in accordance with the Contract Documents. Unit prices shall include the installation of Type A and Type C trench backfill. The entire storm system including PP piping shall be pipe video inspected as specified above. All costs associated with the pipe video inspection will be incidental to the unit costs for pipe and shall include provisions for maintenance of traffic for the pipe video inspection as required.

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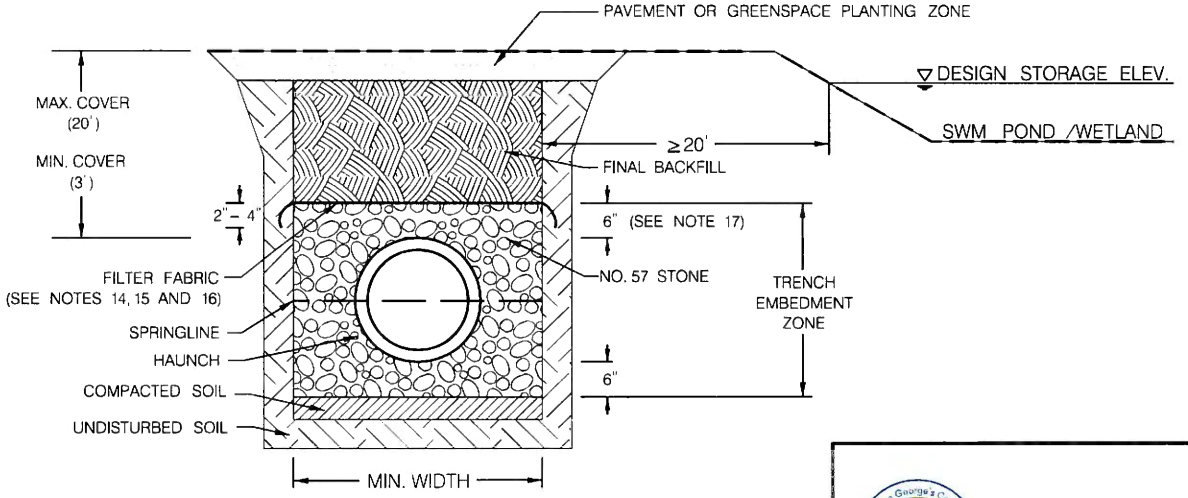
DEPARTMENT OF PERMITTING, INSPECTIONS AND ENFORCEMENT

ATTACHMENT B:

Trench Details for Polypropylene (PP)
Corrugated Smooth-Lined Thermoplastic Pipe

NOTES

1. THIS DETAIL APPLIES TO POLYPROPYLENE (PP) CORRUGATED SMOOTH LINED THERMOPLASTIC PIPE UP TO 60 INCHES IN DIAMETER.
2. INSTALL ALL PIPE IN ACCORDANCE WITH ASTM D2321 – STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS, LATEST EDITION.
3. TRENCH WIDTH SHALL BE IN ACCORDANCE WITH SECTION 303 OF THE LATEST VERSION OF THE MDOT SHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS. ENSURE TRENCH WIDTH IS AT LEAST TWICE THE OUTSIDE DIAMETER OF THE PIPE OR THE OUTSIDE DIAMETER PLUS 18 INCHES ON EACH SIDE, WHICHEVER IS LESS.
4. FOUNDATION: TRENCH BOTTOMS WITH UNSTABLE OR UNYIELDING MATERIAL SHALL BE EXCAVATED TO A DEPTH DIRECTED BY THE ENGINEER AND REPLACED WITH SUITABLE MATERIAL. FOR UNSTABLE MATERIALS, GEOTEXTILE MAY BE USED TO STABILIZE THE TRENCH BOTTOM, IF DIRECTED BY THE ENGINEER.
5. BEDDING: APPROPRIATE BEDDING IS REQUIRED TO PROVIDE UNIFORM SUPPORT FOR THE PIPE AND TO SUSTAIN GRADE. BEDDING MATERIAL SHALL BE AASHTO NO. 57 STONE. AVOID BLOCKING TO BRING THE PIPE TO GRADE AND DO NOT ALLOW ROCKS OVER 1.5 INCHES TO COME IN CONTACT WITH PIPE SURFACES. A SHOVEL OR RAKE SHOULD BE USED TO LEVEL THE SURFACE.
6. HAUNCHING: ADEQUATE HAUNCH SUPPORT IS CRITICAL TO THE INSTALLED PERFORMANCE OF BURIED PIPE. THE HAUNCH AREA ENCOMPASSES THE BEDDING ZONE UP TO THE SPRINGLINE OF THE PIPE. IF COMPACTION IS NECESSARY, AVOID DISTURBING PIPE ALIGNMENT DURING COMPACTION OPERATIONS. ALWAYS WORK ENOUGH MATERIAL UNDER THE HAUNCH TO PROVIDE ADEQUATE COMPACTION. EXCAVATION OF TRENCH SIDES SHALL BE VERTICAL FROM THE BOTTOM OF THE TRENCH TO THE SPRINGLINE.
7. BACKFILLING: AASHTO NO. 57 STONE SHALL BE USED IN THE TRENCH EMBEDMENT ZONE. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION. DURING BACKFILL PLACEMENT, CARE SHOULD BE TAKEN TO PREVENT ROCKS LARGER THAN 1.5 INCHES FROM ENTERING THE BACKFILL MATERIAL IMMEDIATELY AROUND THE PIPE.
8. MINIMUM COVER: TO WITHSTAND H-25 LOADING, THE AMOUNT OF COVER ABOVE THE PIPE CROWN SHOULD BE NO LESS THAN 36 INCHES FOR ANY DIAMETER PIPE. THE CONTRACTOR SHALL REROUTE HEAVY CONSTRUCTION TRAFFIC TO ENSURE THE PIPE IS PROTECTED FROM TEMPORARY OVERLOADING AND DAMAGE. IF HEAVY CONSTRUCTION TRAFFIC CANNOT BE REROUTED, AND THE PIPE IS BURIED LESS THAN 36 INCHES, ADDITIONAL COMPACTED SOIL SHOULD BE TEMPORARILY MOUNDED OVER THE PIPE TO CREATE AT LEAST 36 INCHES OF COVER OVER THE PIPE CROWN. PIPE DEFLECTION MAY NOT EXCEED 5.0%. DAMAGED PIPE SHALL BE REPLACED BY THE PERMITEE AT THE PERMITEE'S EXPENSE.
9. MAXIMUM COVER: COVER OVER PP PIPE CROWN SHALL NOT EXCEED 20 FEET.
10. TYPE A TRENCH SHALL NOT BE INSTALLED THROUGH SWM/ESD FACILITY EMBANKMENTS OR OTHER NON MD378 SWM EMBANKMENTS.
11. TYPE A TRENCH SHALL NOT BE USED THROUGH OR UNDER MD378 EMBANKMENTS.
12. TYPE A TRENCH SHALL NOT BE USED UNDER ANY TYPE OF INFILTRATION FACILITY.
13. TYPE A TRENCH SHALL NOT BE USED WHERE THE TRENCH IS LESS THAN 20' HORIZONTALLY FROM A WETLAND/POND OR SWM/ESD FACILITY WATERS EDGE.
14. FILTER FABRIC SHALL BE CLASS SD TYPE II NONWOVEN IN ACCORDANCE WITH SECTION 919 OF THE LATEST VERSION OF THE MDOT SHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS.
15. FILTER FABRIC SHALL BE INSTALLED ALONG THE TOP OF THE TRENCH EMBEDMENT ZONE AND TUCKED-IN AT LEAST 2-INCHES (4-INCHES RECOMMENDED) ALONG THE SIDES OF THE TRENCH EMBEDMENT ZONE.
16. WHEN THE SEASONAL HIGH GROUND WATER LEVEL IS ANTICIPATED WITHIN THE TRENCH EMBEDMENT ZONE FILTER FABRIC SHALL BE WRAPPED AROUND ALL FOUR SIDES OF THE TRENCH.
17. THE 6" OF NO. 57 STONE ABOVE THE CROWN OF THE PIPE MAY BE ELIMINATED WHEN INSTALLING THE PIPE IN GREENSPACE.



POLYPROPYLENE DUAL-WALL TYPE A TRENCH DETAIL

NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
PRINCE GEORGE'S COUNTY, MARYLAND

POLYPROPYLENE PIPE
TYPE A TRENCH DETAIL

SCALE: NOT TO SCALE DWG. OF 1

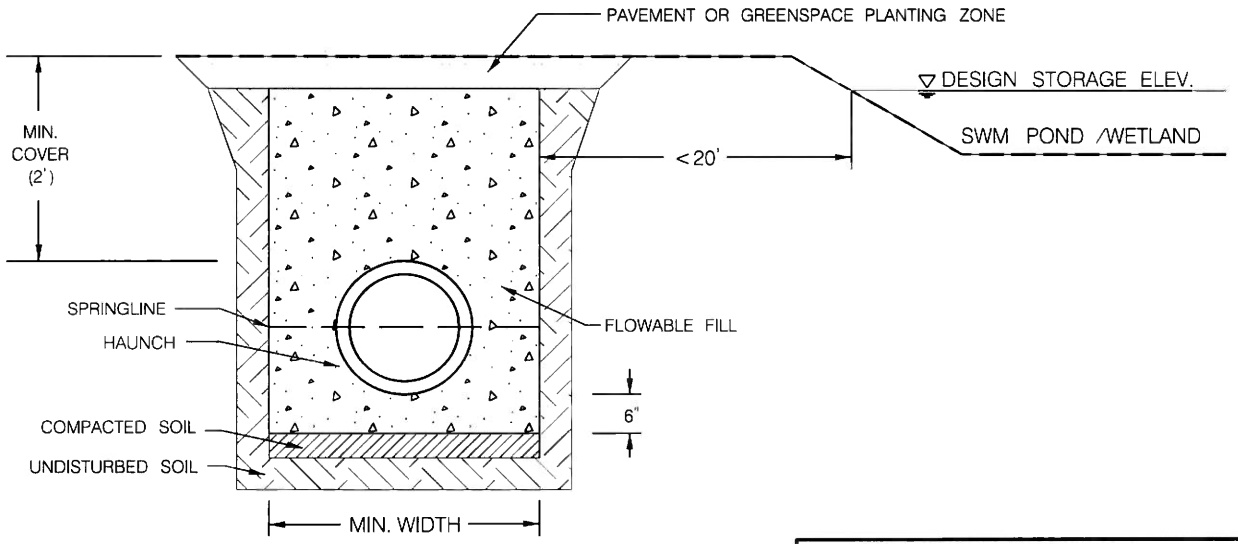
APPROVED ORIG. 5/8/2023 REV. 2/5/2025
FOR MICHAEL D. JOHNSON, P.E., DIRECTOR DATE

DESIGNED: T.M.R.
DRAWN: M.B.R.
CHECKED: E.T.B.
APPROVED:
Eric T. Beckert, P.E., CHIEF, HIGHWAY AND BRIDGE DESIGN DIVISION 1/5/2025 DATE

CONTRACT NO. XXX
ROAD NO. - JOB NO. XXX
FILE NO. -

NOTES

1. THIS DETAIL APPLIES TO POLYPROPYLENE (PP) CORRUGATED SMOOTH LINED THERMOPLASTIC PIPE UP TO 60 INCHES IN DIAMETER.
2. FLOWABLE FILL SHALL SHALL BE CONTROLLED LOW STRENGTH MATERIAL (CLSM), TYPE A, PER SECTION 902 OF THE LATEST VERSION OF THE MDOT SHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, HEREINAFTER REFERRED TO AS "FLOWABLE FILL".
3. INSTALL ALL PIPE IN ACCORDANCE WITH ASTM D2321 – STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS, LATEST EDITION.
4. TRENCH WIDTH SHALL BE IN ACCORDANCE WITH SECTION 303 OF THE LATEST VERSION OF THE MDOT SHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS. ENSURE TRENCH WIDTH IS AT LEAST TWICE THE OUTSIDE DIAMETER OF THE PIPE OR THE OUTSIDE DIAMETER PLUS 18 INCHES ON EACH SIDE, WHICHEVER IS LESS.
5. FOUNDATION: TRENCH BOTTOMS WITH UNSTABLE OR UNYIELDING MATERIAL SHALL BE EXCAVATED TO A DEPTH DIRECTED BY THE ENGINEER AND REPLACED WITH SUITABLE MATERIAL. FOR UNSTABLE MATERIALS, GEOTEXTILE MAY BE USED TO STABILIZE THE TRENCH BOTTOM, IF DIRECTED BY THE ENGINEER.
6. TEMPORARY MINIMUM COVER: TO WITHSTAND H-25 LOADING, THE AMOUNT OF COVER ABOVE THE PIPE CROWN SHOULD BE NO LESS THAN 36 INCHES FOR ANY DIAMETER PIPE. THE CONTRACTOR SHALL REROUTE HEAVY CONSTRUCTION TRAFFIC TO ENSURE THE PIPE IS PROTECTED FROM TEMPORARY OVERLOADING AND DAMAGE. IF HEAVY CONSTRUCTION TRAFFIC CANNOT BE REROUTED, AND THE PIPE IS BURIED LESS THAN 36 INCHES, ADDITIONAL COMPACTED SOIL SHOULD BE TEMPORARILY MOUNDED OVER THE PIPE TO CREATE AT LEAST 36 INCHES OF COVER OVER THE PIPE CROWN. PIPE DEFLECTION MAY NOT EXCEED 5.0%. DAMAGED PIPE SHALL BE REPLACED BY THE PERMITEE AT THE PERMITEE'S EXPENSE.
7. MAXIMUM COVER: COVER OVER PP PIPE CROWN SHALL NOT EXCEED 20 FEET.
8. TYPE C TRENCH DETAIL TO BE USED WHERE MINIMUM COVER IS LESS THAN 36 INCHES BUT GREATER THAN 24 INCHES.
9. TYPE C TRENCH DETAIL TO BE USED WHERE TRENCH IS LESS THAN 20 FEET HORIZONTALLY OF A SWM/ESD FACILITY OR WETLAND/POND WATERS EDGE.
10. PP PIPE THROUGH SWM/ESD FACILITY EMBANKMENTS, OR OTHER NON MD378 SWM EMBANKMENTS SHALL BE INSTALLED USING TYPE C TRENCH DETAIL.
11. TYPE C TRENCH DETAIL TO BE USED UNDER ALL INFILTRATION FACILITIES.
12. PP PIPE SHALL BE ANCHORED OR STRAPPED WHEN FLOWABLE FILL IS UTILIZED.



POLYPROPYLENE DUAL-WALL TYPE C TRENCH DETAIL

NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
PRINCE GEORGE'S COUNTY, MARYLAND

POLYPROPYLENE PIPE
TYPE C TRENCH DETAIL

SCALE: NOT TO SCALE DWG. OF 1

APPROVED _____ ORIG. 5/8/2023 REV. 2/5/2025
FOR MICHAEL D. JOHNSON, P.E., DIRECTOR DATE

DESIGNED: T.M.R.
DRAWN: M.B.R.
CHECKED: E.T.B.
APPROVED: _____ 1/5/2025
Eric T. Beckert, P.E., CHIEF, HIGHWAY AND BRIDGE DESIGN DIVISION DATE

CONTRACT NO. XXX
ROAD NO. - JOB NO. XXX
FILE NO. -

TECHNO-GRAM
002-2023
REVISION

DEPARTMENT OF PERMITTING, INSPECTIONS AND ENFORCEMENT

ATTACHMENT C:

Third-Party Inspection Certification for Polypropylene Storm Drain Pipe

Third-Party Inspection Certification — Polypropylene Storm Drain Pipe

Permit Number _____

I hereby certify that the polypropylene pipe was constructed in accordance with the permit plans and all County requirements. This certification further confirms the following:

1. Joint performance/certification is based on ASTM D3212 with a deflection limit of 5.0% or less. The County requirement of a deflection tolerance of less than 5.0% of the certified actual mean diameter of the pipe has been met. Pipes with deflections greater than 5.0% were repaired as outlined below. Any pipe with deflections greater than 7.5% was replaced.

2. Pipe deflections greater than 5.0% and less than 7.5% were tested to ensure water tightness according to the pipe manufacturer's procedures (5 psi – ASTM F1417).

   a) All joints passed these test requirements, and, therefore, no remediation is required. _____ Yes/_____ No

   b) Some joints did not pass this test. These joints were remediated using one of the procedures outlined by the pipe manufacturer and approved by the County Inspector. _____ Yes/_____ No

3. The permittee has provided a pipe video inspection for all storm drain and stormwater management pipes. I have inspected this pipe, through a review of video inspection, and determined that the pipe meets all requirements of Prince George's County. (If no, list exceptions.)

   _____

4. Third-party daily inspection reports and photographs of the polypropylene pipe installation are attached to this certification. Certification is to be signed and sealed by a Maryland Professional Engineer.

_____	_____
Third-Party Inspector *(typed)*	Third-Party Inspector Phone
_____	_____
Third-Party Inspector *(signature)*	Third-Party Inspector Email
_____	_____
Date	Third-Party Inspector Address