Carroll County Stormwater Management

Carroll County Supplement to the 2000 Maryland Stormwater Design Manual Volumes I and II, May 2010

Additional/Amended/Alternate items after adoption (post 2010) for Comment	Distributed	Effective Date
Stormwater Management Plan Review Checklist Amended	Oct. 15, 2018	Nov. 15, 2018
Required Plan Certifications	April 20, 2016	May 20, 2016
Fee-In-Lieu Computation Sheet	April 20, 2016	May 20, 2016
Page 29 (Alternate) Downspout Drywell Fittings	March 21, 2012	April, 2012
Use of Drywells to Achieve SWM when Creating New Lots	April 20, 2016	May 20, 2016
Carroll County ESD to the MEP Design Procedures	Oct. 15, 2018	Nov. 15, 2018
Carroll County Stormwater Management (SWM) Bond Release Procedures	March 16, 2011	May 18, 2011
Acceptable SWM Practices in Carroll County for Individual Houses	N/A	May 18, 2011
Policy on Redevelopment Sites Draining into Regional Stormwater Management Facilities	N/A	July 18, 2012
Carroll County Stormwater Management Table for Wide Shoulder Technique	Sept. 19, 2011	Nov. 16, 2011
Carroll County Heavy Commercial/Industrial Chain Link Fence Railing	Jan. 18, 2012	Feb., 2012
Page 42b (Amended) Drop Structure and Outfall Pipe for Velocity Reduction	April 20, 2016	May 20, 2016
Page 42c (Amended) Pipe Railing Detail	March 18, 2015	May 20, 2015
Page 42c Alternate (Amended) Pipe Railing Detail	March 18, 2015	May 20, 2015
Page 42d (Alternate) Modified End-walls for Runoff Reduction (2' filter)	April 20, 2016	May 20, 2016
Page 73 (Amended) Modified Sand Filter Profile for Runoff Reduction (2' filter)	April 20, 2016	May 20, 2016
Page 74 (Amended) Emergency Spillway Profile showing limiting velocities and Riprap	May 20, 2010	Mar. 20, 2013
Page 76 (Alternative) Stilling Basin Modified for Runoff Reduction (2' filter)	Nov. 20, 2013	Dec., 2013
Page 42e (Amended) Pipe Outfall Rack	March 18, 2015	May 20, 2015
Page 77 (Amended) Temporary Stand Pipe Detail revised to match 2011 Stds. & Specs.	March 20, 2013	May 22, 2013
Page 90 (Amended) Guidance for Dam Safety Review, revised per 2013 contract	April 20, 2016	May 20, 2016
Stone Bedding Detail (57 base & CR-6)	March 18, 2015	May 20, 2015
Page 86 (Amended) Modified Method of Cutting and Repairing Roadways	April 20, 2016	May 20, 2016
Modified Method of Flexible Pipe Installation in Unpaved Areas	April 20, 2016	May 20, 2016
CC SWM Pond Retrofit Construction Specifications	May, 2013	Sept. 17, 2014
Policy on use of Underground Stormwater Management Structures	Jan. 20, 2016	Feb. 24, 2016
As-Built Submission Procedure	April 20, 2016	May 20, 2016
Stormwater Management Easements in the Incorporated Towns/Cities	Oct. 15, 2018	Nov. 15, 2018
Underdrain Outfall Protection (Headwall and Rodent Guard)	April 20, 2016	May 20, 2016
Water Quality Structure Exempt from MD-378 Criteria	April 20, 2016	May 20, 2016
Page 27 (Amended) Stormwater Management Standard Drywell Installation	Nov. 16, 2016	Dec. 16, 2016
Page 28 (Amended) Standard Drywell Detail	Nov. 16, 2016	Dec. 16, 2016
Pages 43 & 44 (Amended) Carroll County Soils Testing Policy	Oct. 15, 2018	Nov. 15, 2018
Pages 12-20 (Amended) Carroll County Maintenance Agreement (Constructed by Developer)	Oct. 15, 2018	Nov. 15, 2018
Pages 12-18 (Amended) Carroll County Maintenance Agreement (Constructed by the County/Town/City)	Oct. 15, 2018	Nov. 15, 2018

Note

On March 20, 2014 the Carroll County Commissioners adopted a New County Code. Existing Chapters, Articles, and Section numbers were changed and incorporated into the new County Code as follows:

Chapter 191	is now	Chapter 151
Chapter 103	is now	Chapter 155
Chapter 218	is now	Chapter 154
Chapter 114	is now	Chapter 153

When referencing the above Chapters, please use the NEW Chapter number. Please keep in mind when using information from the "Carroll County Supplement to the 2000 Maryland Stormwater Design Manual Volumes I and II, May 2010", Article and Section numbers may have changed as well. Please refer to the new chapter to insure that you are referencing the correct article and section in your plans and documents.

Carroll County Stormwater Management

Carroll County Supplement to the 2000 Maryland Stormwater Design Manual Volumes I and II, May 2010

List of Eratta & Additional/Amended/Alternate Items

A. Stormwater Management Plan Review Checklist
   1. Pages ii to xii-Replace with "amended" Effective with adoption Pages 92-102
B. Table of Contents
   1. Page b, add "Design Storms in Carroll County page 60" as the first item under "design Guidelines and Aids".
   2. Page c, add "Additional/Amended/Alternate items after adoption (post 2010) Page 91a

C. Carroll County Disconnection Wide Shoulder Technique (pages 32a, b, c, and 33) Replace "2 1/2 in." with "1 1/2 in." one time each page.
D. Drywell typical Lot Layout (page 27), replace with page 27 Amended, see page 138
E. Standard Drywell Detail, page 28 replace with page 28 Amended, see page 139
F. Standard Drywell Downspout Fittings (page 29), Add "Very Important For ease of maintenance do not glue the wye to the PVC pipe or downspout adapter".

G. Carroll County Modified Type “C” Endwall, Add Clean-Out Elevation, see detail page 120.

H. Pipe Outfall Rack
Page 42e replace with page 42e amended, see page 124.

I. Carroll County Soils Testing Policy for Proposed Infiltration/Recharge Facilities
1. Page 43 replace “pages vi-vii” with “pages vi, vii, and viii.”
2. Page 44 replace “effective June 8, 2004, Page 5” with “amended effective with adoption, page vi, see page 96.”

J. Carroll County Pond – Sand Filter Pond Without Riser Principal Spillway Profile.
1. Page 73 Replace the “10 in. No. 8 stone” with an *.
2. Page 73 Add: *Chart 1

Slotted Pipe Diameter	Minimum No 8 stone depth
4”	10”
6”	14”
8”	18”
10”	22”

K. Carroll County Pond – Sand Filter Pond Without Riser Emergency Spillway Profile and Cut-off Trench.
Page 74, replace with page 74 amended, see page 122

L. Carroll County Pond – Sand Filter Pond Without Riser – top of embankment profile 1. Page 75, Replace “19” CL I Rip-rap” with 19” CL 1 Riprap or 32” CL II Rip-rap”.

M. Carroll County Pond – Sand Filter Pond Without Riser – Temporary Stand Pipe Detail
Page 77, Replace with Page 77 amended, see page 125

N. Guidance for Dam Safety Review in Carroll County, Maryland
Page 90, Replace with Page 90 amended, see page 126

Carroll County Supplement to the 2000 Maryland Stormwater Management Manual Volumes I & II, May 2010

Additional/Amended/Alternate Items

After adoption (post July 29th 2010)

Carroll County Bureau of Resource Management

November 2018

Adopted by Resolution November 2018

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STORMWATER MANAGEMENT PLAN REVIEW CHECKLIST

NOTES:

1. All page numbers referenced are in the Carroll County Supplement to the 2000 Maryland Stormwater Management Design Manual May 4, 2010 as amended (the Supplement).
2. Check each blank or place N/A as appropriate.
3. Submit completed checklist, signed by the responsible professional engineer or land surveyor with each phase.
4. A narrative responding point by point to each comment is required with each re-submission of the plans during each phase.

CHAPTER 151 CONCEPT PLAN PHASE. APPLIES TO ALL PLANS

_____ 1. Environmental Site Delineation performed in accordance with the requirements of §155.055(H) of the Carroll County Code of Public Local Laws and Ordinance

_____ 2. Features Shown on Concept Plan

a. From Environmental Site Delineation

____ 100-year floodplain (FEMA and ultimate development county floodplains)
____ Wetlands
____ Streams and watercourses on or adjacent to the property
____ Forest Boundaries
____ 25% Slopes
____ Existing water impoundments on or adjacent to the property and any associated dam breach inundation areas
____ Erodible soils
____ Sensitive Areas to be protected

b. From Field Work

____ The location of infiltratable areas using the soils testing procedure on pages 43 and 44

c. From Concept Design

____ All proposed impervious areas (buildings, roadways, parking, sidewalks, etc.) utilities and other site improvements
____ Proposed limits of disturbance
____ Location of all points of stormwater discharge into natural watercourses or off-site (see pages 42a and 117)

(Yes/No) ____ New Development ____ Redevelopment (Page 107)
____ PE and ESDv required calculated (Page 107)
____ PE and ESDv achieved calculated (Page 107)
____ Location, size, and site of ESD techniques and practices. Preliminary structural sizing must be done using the curve number reduction method in Chapter 5 of the Manual.

(Yes/No) ____ Are any proposed land uses Stormwater Hotspots per Table 2.6 of the 2000 MD stormwater Design Manual?

(Yes/No) ____ Downstream Regional SWM facility with capacity for the proposed development

_____ 3. Stormwater Management narrative (not on the plan sheets) that supports the conceptual Design and states that Chapter 151 of the Code of Public Laws will be addressed by the use of planning techniques, ESD and nonstructural practices to the maximum

extend practical (MEP) (P_E Volume) thus reducing or eliminating the need for structural SWM facilities. In order of priority, either explain how the following techniques and ESD and non-structural practices will be employed to meet SWM requirements or why they cannot be used on the project.

a. Planning Techniques

____ Preserving and protecting natural resources
____ Conserving natural drainage patterns
____ Minimizing impervious areas
____ Reducing runoff volume
____ Limiting soil disturbance, mass grading and compaction
____ Clustering development
____ Maintaining 100% of the predevelopment groundwater recharge volume.
____ Other – Specify _____

b. ESD Practices

____ All houses disconnected by use of rooftop runoff credits (grading or drywells) see pages 24-31, 105-111, 138, and 139
____ Open section roadways disconnected by use of non rooftop runoff credits (wide shoulders) see pages 32-36
____ Sheet flow to conservation areas with spreader
____ Alternative surfaces

c. Micro scale (non-structural) practices

____ Grass swales (see pages 42i-42p and 88a-88b)
____ Landscape infiltration
____ Micro-Bio-retention
____ Rain gardens
____ Enhanced filters
____ Rainwater harvesting
____ Other – Specify _____

d. Conceptual phased erosion and sediment controls

____ Integrated into the SWM strategy.

_____ 4. Certifications

a. Narrative, plans, supporting documentation and filled out Environmental Site Delineation and concept portions of the checklist signed and sealed by the licensed professional engineer or land surveyor that is in charge of the work.
b. All items in 4a included in submission

_____

Signature and date by responsible professional engineer or land surveyor as appropriate

CHAPTER 151 PRELIMINARY PLAN PHASE. APPLIES TO: PRELIMINARY PLAN (SUBDIVISION PLANS), FINAL PLAN (SITE PLANS)

1. Concept Plan Approvals
   ___ Concept Plan SWM approval letter included
   ___ Concept Plan Sediment Control approval letter included
   ___ All information from concept phase included
2. Construction Plan

___ Final site layout with exact impervious areas
___ Existing and proposed topography (2 ft. contours minimum) including the area necessary to perform the downstream analysis for proposed SWM facilities.
___ Easements for stream and forest buffers and floodplains
___ Plan view with proposed grading for all ESD planning techniques, treatments, and non-standard and standard practices
___ Publicly maintained facilities
    ___ No slopes greater than 4:1
    ___ Stormwater parcels
    ___ Access road, in fee, to public road, paved and graded to use-in-common driveway standard 12' wide, 4:1 side slopes, 17% maximum grade. Strip at least 20 ft. wide.

3. Phased erosion and sediment control plan
___ Overlay plan showing all temporary erosion and sediment control measures and permanent ESD and structural stormwater management measures.
___ An overall sequence of construction phased to match the plan. If SWM facilities are used for sediment control the sequence must reference but not duplicate the sequence for the SWM facility.
___ Limits on earth disturbance.
___ Protection of natural resources.

4. Report
a. Hydrologic Mapping for Erosion & Sediment (E&S) Control and Stormwater Management
___ Vicinity Map
___ Drainage Area Maps
    ___ Existing (Pre-development) conditions with time of concentration (tc) paths shown
    ___ Interim (Phased sediment control) conditions with time of concentration (tc) paths shown
    ___ Proposed (Post-development) conditions with time of concentration (tc) paths shown
    ___ Topography (two foot contours)
    ___ Soil types
    ___ Land Use
    ___ Location of geotechnical testing
    ___ Clearly delineated drainage areas to each planning technique, ESD non-structural and structural practice and to each sediment control practice at each phase of construction as well as all discharge points.
    ___ Any downstream regional facilities utilized by the project shown.

b. Hydrology, Hydraulics and Interim (E & S) and Permanent SWM volumes.
    ___ Use TR-55 and TR-20
    ___ SWM volume Calculations for all planning techniques, ESD and nonstructural practices performed in accordance with the Curve Number Reduction Method in Chapter 5 of the Manual or in accordance with the March 16, 2011 Carroll County ESD to the MEP Simplified (short cut) Design Procedures, Page 107

___ Interim SWM (E&S) volume calculations for each phase of construction.
Quantity Control (Q_{10}) provided at all discharge points
___ Stable outlets at all discharge points at all phases
___ SWM Volume calculations for structural practices
___ Volume provided in offsite regional facilities with supporting documentation.
___ Recharge (Re_v)
___ Water Quality (WQ_v)
___ Channel Protection (CP_v)
___ Quantity Control (Q_{10}) achieved at all discharge points (TR-55 & TR-20)

Geotechnical Investigation

___ Soil Investigation –Infiltration/Recharge facilities must have at least two double- ring infiltrometer tests and sieve analyses performed at the proposed bottom elevation and sieve analyses performed four feet below the proposed bottom elevation of the technique, practice or facility. These tests must be spaced to be representative of soil conditions. If the bottom of the proposed technique, practice or facility exceeds 10,000 square feet, an additional test is required for each 5,000 square feet.

___ Soil Investigation performed and certified in accordance with the Carroll County Soils Testing policy for Proposed Infiltration/Recharge Facilities (pages 43 & 44)

c. Stormwater Management Narrative (part of the report and not on the plan sheets) that supports the preliminary design, states that, and describes how, ESD has been implemented to the MEP (P_E Volume) and justifies any proposed interim (E &S) or permanent structural stormwater management measures necessary to meet the requirements of Chapter 151 or protect public health and safety, the environment or downstream properties from flooding.

5. Certifications

___ a. Narrative, plans, supporting documentation and filled out Concept and Preliminary portions of this checklist signed and sealed by the licensed professional engineer or land surveyor that is in charge of the work

___ b. All items in 5a included in the submission.

_____

Signature and date by responsible professional engineer or land surveyor.

<u>CHAPTER 151 FINAL PLAN PHASE. APPLIES TO: FINAL PLAN (SUBDIVISION PLANS), MYLAR APPROVAL (SITE PLANS)</u>

1. Preliminary Plan Approvals

____ a. Preliminary (Subdivision) or Final (Site) Plan SWM approval letter included

____ b. Preliminary (Subdivision) or Final (Site) Plan Sediment Control approval letter included.

____ c. All information from Preliminary phase included.

2. Finalized phased (E&S) plans from Preliminary according to COMAR 26.17.01.05
3. Finalized Stormwater Management Plans as follows:

____ a. All proposed improvements including locations of buildings, structures, impervious surfaces, storm drainage facilities, and all grading.
____ b. All easements and rights-of-way
____ c. Structural and construction details including representative cross-sections for all components of the proposed drainage system or systems and SWM facilities.
____ d. An overall sediment control sequence of construction and detailed individual sequence for each interim or permanent ESD practice, technique or nonstructural or structural SWM facility.
____ e. An overall site table with total site area, total disturbed area, new impervious and total impervious area.

4. **Vicinity Map:**

____ Bench mark described and location shown.

5. **Drainage area map:**

____ a. Shown on plans, conforms to approved map(s), submitted with hydrology meeting applicable standards.
____ b. Storm drainage design **must** correspond to the Drainage Area Map.
____ c. One hundred percent (100%) pick up and conveyance of the SCS method 10-year storm runoff to the facilities must be demonstrated at each drainage area boundary shown on the Drainage Area Map. Note: 150% pick up of the rational method runoff is equivalent to 100% pick up of the SCS method. (See pages 53-54)
____ d. Commercial Entrances designed per pages 51 and 52

6. **Stormwater management plan:**

____ a. Coordinates for all stormwater management ESD practices and facilities shall be based upon the Maryland Coordinate System, North American Datum of 1983/99.
____ b. Elevations and topographic information shall be based upon the North American Vertical Datum of 1988 (NAD 88).
____ c. Existing and proposed ground (two-foot contours):
____ Proposed contours on pond embankments are uniformly spaced at indicated slope.
____ Emergency spillway.
____ d. Soil Investigation locations shown (minimum of two required. See SCS MD-378 for pond requirements and this Checklist, Section 10 for infiltration requirements.
____ e. Stabilization indicated.
____ f. Barrel outlet and outlet protection (plunge pool is preferred). See pages 117-120 and 123.
____ g. Property lines, property owner's name and lot number or liber/folio.
____ h. Slopes and elevations.
____ i. Stationing along embankment.
____ j. Scale.
____ k. Forty-two inch fence and gate (may be required).
____ l. Access road- swing gate required (if fenced)
____ m. Existing and proposed easements shown (see "Standard Language for Floodplain and Stormwater Easements," pages 2-6).
____ n. Publicly maintained facilities:
____ No loose rip-rap exposed.

____ Access road, in fee, to public road, paved, and graded to use-in-common driveway standards (12 feet wide – 17% slope maximum, 3% cross slope and 4:1 grading – 20' strip minimum)

7. **Principle Spillway Profile:**

____ a. Existing ground.
____ b. Proposed ground (slopes, top width) [378.4]
____ c. Cutoff trench (minimum 4-foot bottom; 1:1 slopes, 4-foot depth).
____ d. Impervious core (top width, top elevation) – up to 10-year storm.
____ e. Concrete riser:
____ No barrel pipe exposed.
____ Riser set back into the embankment to the first major opening.
____ 15-inch minimum barrel.
____ 12- inch minimum low-flow pipe with orifices located inside riser.
____ f. Trash rack – anti-vortex device shown [378-8].
____ g. Riser base shown.
____ h. Low flow structure (diameter class, type, trash rack, filter)
____ i. Concrete barrel (diameter: ASTM C-361, length, slope, saturated length – specify ASTM C361 and class).
____ j. Phreatic line at 4:1.
____ k. Anti seep collars [378.7] must be a minimum two-foot projection beyond concrete bedding.
____ Minimum – maximum spacing.
____ Size (design computations submitted)
____ Located primarily within saturated zone.
____ Note indicating location two-foot from pipe joint.
____ Preformed joint filler specified.
____ l. Publicly maintained facilities:
____ Embankment and pond side slopes no greater than 4:1.
____ m. Outlet protection shown – details cross referenced.
____ n. Elevations:
____ Emergency spillway (dotted line at crest).
____ 1.0 feet of freeboard below settled top of dam, built with emergency spillway, to 100-year WSEL.
____ 2.0 feet of freeboard below settled top of dam, without emergency spillway, to 100-year WSEL.
____ 3.0 feet of freeboard sump in road, where a County road serves as the embankment, to 100-year WSEL.
____ Riser crest.
____ Design storms water surfaces shown.
____ Inlet and outlet pipe elevations (low-flow, barrel).
____ Embankment side slopes specified.

8. **Emergency Spillway Profile [378-5-14]:** (See example page 122)

____ a. Existing ground (spillway in cut) – level section stabilization (armor: gabions, riprap, etc.) required for spillways which will carry storms more frequent than 10-year storm.
____ b. Disturbed ground (spillway in fill) – Engineer designed weir wall- not open channel spillway.
____ c. Inlet, control, and outlet sections (lengths, elevations).

____ d. Slopes.
____ e. Flow quantity and velocity (along exit channel).
____ f. Limits of channel protection.
____ g. Adequate outfall.
____ h. Minimum one-foot of freeboard between settled top of dam and emergency spillway design storm (usually 100-year).

9. **Profile of Dam Along Centerline (as stationed on plan):** (See example page 75)

____ a. Top of dam (constructed and settled shown with elevations).
____ b. Emergency and principal spillways stationed.
____ c. Existing ground – top of dam must extend to existing ground.
____ d. Proposed ground line within pond.
____ e. Impervious core to 10-year storm.
____ f. Cutoff trench.
____ g. Horizontal control.

10. **Soil Investigation:**

A minimum of one (1) soil test in the centerline of the embankment and two (2) soil tests in the pond area (see page v for number of tests required). The soil test in the centerline of the embankment must extend to the bottom of the core trench. The soil classification must be determined and a standard penetration test performed. Infiltration facilities must have double-ring infiltrometer tests and sieve analyses performed at a proposed bottom elevation and a sieve analysis performed four feet below the proposed bottom elevation of the facility.

____ Soil investigation performed and certified in accordance with the "Carroll County Soils Testing Policy for Proposed Infiltration/Recharge Facilities" (pages 43 and 44).

11. **Details to be Shown on Plan:**

a. Riser:
____ Riser base (length, width, thickness shown).
____ Dimensions from riser crest to barrel & low-flow pipe shown.
____ Vertical angles between barrel & riser, low-flow pipe &riser specified.
____ Horizontal angle between barrel & low-flow pipe specified.
____ Standard notes and dimensions.
____ Reinforcing steel details.
____ All holes in riser or weir wall to be framed with additional reinforcing steel.

___ b. Anti-seep collar
___ c. All flows enter stormwater management ponds through drop structures and pipes. (See pages 69-78 & 120-125)
___ d. Storm drain pipes entering ponds must be rigid with sealed joints up to the elevation of the higher of the emergency spillway or top of riser. (see pages 69-78 &120-125)
___ e. Pipes outfall at bottom of stilling basin, plunge pool or forebay. End treatment is concrete headwalls (DPW Roads and Storm Drains 6-13). (see pages 69-78 & 120-125)
___ f. Underdrained plunge pools/forebays at all pipe outfalls that meet the pretreatment volume requirements of the 2000 Maryland Stormwater Design Manual. (see pages 69-78, 120-125)
___ g. Conveyance channels designed with minimum 4:1 side slopes, profiles, and cross

sections shown (DWP Road and Storm Drains 6-16, 17).

___ h. Pipe bedding for concrete pipes. See NRCS Technical Release 46

___ i. Dewatering device detail. See pages 77 & 125.

___ j. Fence crossing detail.

___ k. Trash rack & anti-vortex device:

____ 1:1 slope.

____ Minimum #4 rebar at 6-inches on center.

____ Five foot span or greater – double center bar or use #6 rebar throughout.

____ Welding detail/trash rack detail.

____ Trash racks hot dipped galvanized after fabrication & prior to installation

____ Trash racks anchored to riser

____ Access provided through trash rack

___ l. Emergency spillway typical cross-sections.

____ Rip-rap armor from centerline of dam to adequate outfall below the dam if the 100- year velocity exceeds 5ft per second in the steepest section of the outfall channel. See pages 74 & 122.

____ All rip-rap choked with topsoil and seeded and mulched.

12. **Construction Specifications [378-15-19]:**

___ a. Site preparation

___ b. Earth fill (embankment, core/cutoff):

___ Compaction: 95% of AASHTO T-99 or equivalent.

___ Core & cutoff trench: use type GC, SC, CH, or CL material.

___ c. Structural backfill.

___ d. Pipe conduit.

___ e. Concrete – meets minimum MD SHA requirements, mix #6 for precast structures and mix #3 for cast in place structures

___ f. Stabilization.

___ g. Fence.

___ h. Filter cloth.

___ i. Gabions (PVC coated).

___ j. Stormwater management sequence of construction:

(located on Plan sheet showing the facility)

___ Give the certifying professional engineer's or land surveyor's name and telephone number.

___ State all steps of construction and when the engineer must be contacted and inspection performed prior to further work.

___ No water may be allowed into the facility until: all buildings are constructed, the entire drainage area to the facility is paved or supporting a 2" stand of grass and the certifying engineer has inspected and given his approval.

___ Broken into two phases: sediment control and stormwater management.

___ k. Inspection table: (See example page 78)

___ Give the certifying professional's name and telephone number.

___ Include all steps that must be inspected in accordance with Chapter 151 of the Code of Public Local Laws and Ordinances of Carroll County.

___ Include blocks for signature and date at each inspection step.

___ Table corresponds to stormwater management sequence of construction.

___ Broken into two phases, sediment control and stormwater management.

13. Stormwater Management Table for each ESD Practice, Non-structural and

Structural SWM Facility:

____ a. Facility ownership and maintenance responsibility.

____ b. Structure classification, MD- 378 dam Type A, B, or C or non MD-378 dam or ESD technique or non-structural practice. Is the area in the danger reach protected from future development? Will it remain the same structure classification?

____ c. Drainage area to the ESD practice, non-structural or structural SWM facility (in acres). Small scale drainage area map (with coordinates) shown next to the table.

____ d. Impervious area to the ESD technique or non-structural or structural SWM facility (in acres).

____ e. Height and top width of any embankment.

____ f. Watershed name and receiving stream classification.

____ g. Levels of stormwater management required and provided along with associated storage volumes and water surface elevations (Re_v, WQ_v, CP_v, Q_{10}, Q_{100}).

____ h. North and east coordinates of the centroid of the ESD practice, non-structural or structural SWM facility.

14. **Certifications: (page 103)**

____ a. Plans, signed and sealed by the licensed professional engineer or surveyor as appropriate that is in responsible charge of the work.

____ b. Developer certification signed.

____ c. As-built certification block on the plans.

15. **Pond Summary Sheet (MD-14)**

16. **Right of Way Plats**

17. **Maintenance Schedule (owner responsibility or public ownership) (see pages 11-20)**

18. **Computations Required as Part of Plan Submission:**

____ a. Hydrology

- ____ 10-year management provided.
- ____ 100-year storm for dam/breach/emergency spillway.
- ____ Storm drain systems "pick up" and convey the 10-year storm to the facilities. (see pages 47-53)

____ b. Hydraulics

- ____ Hydraulic Performance Table:
  - ____ 1. Riser hydraulics must be "balanced."
  - ____ 2. Barrel must control before riser orifice controls.
- ____ Elevation – discharge curve or table.

____ c. Channel Protection if required – 1-year storm:

- ____ Off-site: Allowable discharge computed.
- ____ Class I and II Waters- extended detention over 24 hours.
- ____ Class III and IV Waters- extended detention 12 hours.
- ____ Size orifice in accordance with Appendix D.11 of the 2000 Maryland Stormwater Design Manual.

____ d. Infiltration (see Checklist, Section 19):

- ____ Required volume computations (In accordance with Appendix D.13 of the 2000 Maryland Stormwater Design Manual or Infiltration Practices, Maryland Department of the Environment publication No. 21).
- ____ 100% of predevelopment groundwater recharge provided (see pages 82-84)
- ____ Required size of structure.

____ Both relief drain and emergency spillway to safe outfall.

____ e. Emergency Spillway – Becomes Token Spillway if Principal Spillway Accepts 100-Year Discharge:

____ Capacity sized by 378 criteria [378.4] (Not applicable for token spillways).

____ Design by Engineering Field Manual.

____ f. Routings:

____ TR-20 (including schematic).

____ Elevation – storage curve and/or table.

____ Inflow hyrdrographs.

____ 1-year, 10-year, 100-year routing (pass safely).

____ g. Outfall Study:

____ Existing and proposed channel velocity.

____ V_{10} less than or equal to 2 ft/sec. (see page 42b)

____ Dam breach analysis in accordance with MD-378 Peak Breach Discharge and Criteria (see page 45):

____ Narrative.

____ Danger reach and cross sections including all downstream structures and roadways, and potential development. Reach and sections shown on plain view.

____ Reach Length Calculated per SCS-TSC-UD-16

____ Hydraulic computations.

____ Pond classification statement.

____ Danger reach shown on **plats** – no new structures in danger reach.

____ Easements obtained from off-site property owners in the danger reach.

____ h. Riser Flotation Computations

____ i. Anti-Seep Collar Design

____ j. Estimate of Stormwater Management Construction Costs

____ k. Estimate of Stormwater Management Engineering Costs During Construction Including Inspections During Construction and As-built Plan Preparation

19. **Carroll County Standard Design Details:**

_____ a. Surface Designed Facilities (see pages 69-72,75,76, & 121-125): (must be underdrained to prevent surface ponding)

_____ Twenty four inch layer 4 parts sand (ASTM C-33), 1 part loam soil, 1 part green untreated wood chips engineer inspected and approved.

_____ Ten inch minimum layer of No. 8 stone. (more if underdrain is larger than six inch)

_____ Ten, eight, six, or four inch slitted PVC pipe or HDPE Type SP to adequate outfall. (see page 87)

_____ Two feet or greater layer of No. 57 stone under perforated PVC or HDPE Type SP pipe to provide recharge requirements.

_____ No filter fabric.

_____ Start principal spillway profile at drop structure of largest incoming storm drain, extend across pond bottom, through principal spillway and down to receiving water course. (Show stream buffer edge)

_____ Underdrains discharging onto dense grass not plowed fields or forest duff.

_____ b. Underground Facilities (see pages 63-68):

_____ Pretreatment volume provided per Section 3.3.3 of the manual.

_____ Must have (2) access points to pretreatment tanks for inspection and maintenance.

_____ Manifold fed from inlet through PVC or HDPE Type SP slitted pipe. (see page 87)

_____ Filter fabric sides and top only.

_____ Bottom located in virgin ground.

_____ No.2 or No. 57 washed stone reservoir.

_____ Twelve inches of sand below stone (ASTM C-33).

_____ Inlet (concrete):

_____ Minimum three feet of depth below invert of PVC or HPDE Type SP manifold pipes.

_____ An emergency PVC pipe installed in bottom with a cap to allow dewatering (if necessary).

_____ Ninety degree elbow turn down on PVC to HPDE Type SP manifold pipe. Screw on cap to temporarily block water from entering facility. If pipe is too large for manufactured elbow, design baffle plate to open at the top and bottom with projecting pipe and manufactured cap.

_____ Carroll County standard details, easements, sequence of construction, inspection, and bonds.

_____ c. Dry Wells:

_____ Carroll County standard details, easements, sequence of construction, inspection, and bonds.

20. **Finalized Stormwater Management Report**

_____ a. Updated/Finalized Preliminary SWM report (Tables, Calculations, Figures)

_____ b. Description of all watercourses, impoundments and wetlands on or adjacent to the site or into which stormwater discharges, including any regional facilities.

_____ c. Data for total site area, disturbed area, new impervious and total impervious areas

_____ d. Data for total ESD and unified sizing criteria at all points of discharge, including any regional facilities. The sum of all discharge points must be equal (c).

_____ e. Hydrologic & Hydraulic Study at all final and interim points of discharge into streams, stream buffers, watercourses, and adjoining properties showing effects. (Pre and post construction flow rates and velocities and a determination that adequate outfalls exist.) ($V_{10} \leq 2$ feet per second)

_____ f. If any stormwater hot spot is proposed, provide a statement that either; infiltration/recharge is not being proposed or that adequate pretreatment in accordance with Section 2.8 of the MD SWM Design Manual is being provided with a detailed explanation.

_____ g. Final narrative that supports the final integrated stormwater management and sediment control designs, provides information to evaluate the effectiveness of the design, and demonstrates that ESD will be achieved to the MEP. A statement must be included that ESD to the MEP has been provided with a detailed explanation. If less than the P_E value is provided as ESD then the narrative must have a complete chronology of ESD practices considered, why rejected, and when County concurrence to reject was obtained.

21. **Certifications**

_____ a. Narrative, plans, supporting documentation and entirely filled out checklist

signed and sealed by the licensed professional engineer or land surveyor that is in charge of the work.

_____ b. All items in (21a) included in the submission

_____

Signature and date by responsible professional engineer or land surveyor

M.B. Covington III, P.E.
SWM Program Engineer
Originally effective June 21, 2006
Revised to include ESD to the MEP.
Distributed for comment May 3, 2010.
Comments received at the Carroll County Surveyor's Meeting on May 19, 2010
Revised Effective Date: July 29, 2010
Amended to: move Environmental Site Delineation to Concept Phase, reference the Carroll County ESD to the MEP Short Cut Method and add Cross References.
Distributed at Carroll County Surveyors Meeting March 20, 2013 for comment
Amended Effective Date: May 22, 2013
Amended to: Correct Chapter References from 191 to 151, update emergency spillway rip-rap armor, underground infiltration & sand filter criteria.
Distributed at Carroll County Surveyors Meeting Nov. 19, 2014 for comment.
Effective Date: January 21, 2015
Amended to correct all references to correspond to the amended items, adopted in 2015.
Amended to remove references to Environmental Site Delineation Checklist June 2015.
Distributed at Carroll County Surveyors Meeting April 20, 2016 for comment.
Effective Date: May 20, 2016
Amended to correct Geotechnical Investigation criteria to match MDE requirements, identify stormwater hot spots, stress ESD requirements, identify Regional Stormwater Management Facilities, and reduce drywell drainage areas.
Distributed at Carroll County Surveyor's Meeting for comment Nov. 16, 2016
Effective Date: Dec. 16, 2016
Amended to include pretreatment requirements.
Distributed at Carroll County Surveyors Meeting for comment October 15, 2018.
Effective Date: November 15, 2018

CARROLL COUNTY, MT AIRY, NEW WINDSOR, SYKESVILLE, MANCHESTER, HAMPSTEAD

REQUIRED PLAN CERTIFICATIONS

Note: Only Professional Engineers may design and certify MD-378 structures.

Engineer's Design Certification

I hereby certify that these plans have been designed according to Chapter 151 of the Code of Public Local Laws and Ordinances of Carroll County and I hereby certify that these documents were prepared or approved by me, and I am a duly licensed Professional Engineer or Professional Land Surveyor, as appropriate, under the laws of the State of Maryland.

Signed_____ Date _____
License No. _____ Expiration Date _____

Developer's Certification

I hereby certify that all proposed work shown on these construction drawing(s) will be conducted in strict accordance with these plans. I also understand that it is my responsibility to have the construction supervised and certified, including the submittal of "as- Built" plans certified by a registered Professional Engineer or Professional Land Surveyor, as appropriate, within thirty (30) days of completion of work on the stormwater management facility/facilities. I also certify that this/these stormwater management facility/facilities will be inspected during construction by a registered Professional Engineer or Professional Land Surveyor, as appropriate, in accordance with Sections § 151.095 and § 151.096 of the Code of Public Local Laws and Ordinances of Carroll County.

Signed _____ Date _____

Engineer's "As-Built" Certification

I hereby certify that the facility/facilities shown on this/these plan(s) was constructed as shown on the "As-Built" plans and meets the approved plans and specifications. I also certify that this/these facilities were inspected in accordance with Sections § 151.095 and § 151.096 of the Code of Public Local Laws and Ordinances of Carroll County and I hereby certify that these documents were prepared or approved by me, and I am a duly licensed Professional Engineer or Professional Land Surveyor, as appropriate, under the laws of the State of Maryland.

Signed_____ Date _____
License No. _____ Expiration Date _____

Effective November 1, 2001
Updated on 4/22/03 & 06/20/05
Revised and distributed at the Carroll County Surveyors Meeting on December 20, 2006
Engineer's Design and As-Built Certification revised in accordance with COMAR changes July 2007, distributed at the Carroll County Surveyors Meeting August 15, 2007
Revised to add Professional Land Surveyors, Distributed for comment May 3, 2010
Comments received at the Carroll County Surveyors Meeting on May 19, 2010. Effective Date: July 29, 2010
Revised to change code references and sections. Distributed March 18, 2015, Effective Date: March 18, 2015
Revised to remove "Landowner's" Certification and "We" from Developer's and Engineer's Certifications, October 31, 2018

CITY OF WESTMINSTER

REQUIRED PLAN CERTIFICATIONS

Note: Only Professional Engineers may design and certify MD-378 structures.

Engineer's Design Certification

I hereby certify that these plans have been designed according to Chapter 136 of the Charter and Code of the City of Westminster, MD and I hereby certify that these documents were prepared or approved by me, and I am a duly licensed Professional Engineer or Professional Land Surveyor, as appropriate, under the laws of the State of Maryland.

Signed_____ Date _____
License No. _____ Expiration Date _____

Developer's Certification

I hereby certify that all proposed work shown on these construction drawing(s) will be conducted in strict accordance with these plans. I also understand that it is my responsibility to have the construction supervised and certified, including the submittal of "as- Built" plans certified by a registered Professional Engineer or Professional Land Surveyor, as appropriate, within thirty (30) days of completion of work on the stormwater management facility/facilities. I also certify that this/these stormwater management facility/facilities will be inspected during construction by a registered Professional Engineer or Professional Land Surveyor, as appropriate, in accordance with Sections § 136-22 and § 136-23 of the Charter and Code of the City of Westminster, MD.

Signed _____ Date _____

Engineer's "As-Built" Certification

I hereby certify that the facility/facilities shown on this/these plan(s) was constructed as shown on the "As-Built" plans and meets the approved plans and specifications. I also certify that this/these facilities were inspected in accordance with Sections § 136-22 and § 136-23 of the Charter and Code of the City of Westminster, MD and I hereby certify that these documents were prepared or approved by me, and I am a duly licensed Professional Engineer or Professional Land Surveyor, as appropriate, under the laws of the State of Maryland.

Signed_____ Date _____
License No. _____ Expiration Date _____

Distributed for comment at the Carroll County Surveyors Meeting on April 20, 2016
Effective May 20, 2016
Revised to remove "Landowner's" Certification and "We" from Developer's and Engineer's Certifications, October 31, 2018

UNION BRIDGE

REQUIRED PLAN CERTIFICATIONS

Note: Only Professional Engineers may design and certify MD-378 structures.

Engineer's Design Certification

I hereby certify that these plans have been designed according to Chapter 170 of the Union Bridge Code and I hereby certify that these documents were prepared or approved by me, and I am a duly licensed Professional Engineer or Professional Land Surveyor, as appropriate, under the laws of the State of Maryland.

Signed_____ Date _____
License No. _____ Expiration Date _____

Developer's Certification

I hereby certify that all proposed work shown on these construction drawing(s) will be conducted in strict accordance with these plans. I also understand that it is my responsibility to have the construction supervised and certified, including the submittal of "as- Built" plans certified by a registered Professional Engineer or Professional Land Surveyor, as appropriate, within thirty (30) days of completion of work on the stormwater management facility/facilities. I also certify that this/these stormwater management facility/facilities will be inspected during construction by a registered Professional Engineer or Professional Land Surveyor, as appropriate, in accordance with Chapter 170 of the Union Bridge Code.

Signed _____ Date _____

Engineer's "As-Built" Certification

I hereby certify that the facility/facilities shown on this/these plan(s) was constructed as shown on the "As-Built" plans and meets the approved plans and specifications. I also certify that this/these facilities were inspected in accordance with Chapter 170 of the Union Bridge Code and I hereby certify that these documents were prepared or approved by me, and I am a duly licensed Professional Engineer or Professional Land Surveyor, as appropriate, under the laws of the State of Maryland.

Signed_____ Date _____
License No. _____ Expiration Date _____

Distributed for comment at the Carroll County Surveyors Meeting on April 20, 2016
Effective: May 20, 2016
Revised to remove "Landowner's" Certification and "We" from Developer's and Engineer's Certifications, October 31, 2018

Carroll County
Stormwater Management
Fee-In-Lieu Computation Sheet

Fee in lieu of providing on-site management of stormwater runoff for Variances and Redevelopment Projects when no other alternative is available.*

FEE:

_____	X	$0.75	=	_____
Square Footage of Impervious Within the Limits of Disturbance		Fee / Ft^2		Stormwater Management Fee-In-Lieu **

FEE DERIVIATION:

Carroll County Stormwater Management Retrofit Projects that are comparable to redevelopment projects:

1. Treating small to medium (less than 5-acres) amounts of impervious surfaces.
2. Constructed since January 1, 2009.***

	Construction Costs		Engineering	Impervious Area Treated
Totals:	$725,215.00		$143,577.00	26.46 acres= 1,152,597 Ft^2
Fee	=	$868,792.00 =	$0.75 / Ft^2	
Square Foot	1,152,597 Ft^2			

* See Section §151.019 and §151.020 of the Carroll County Code.

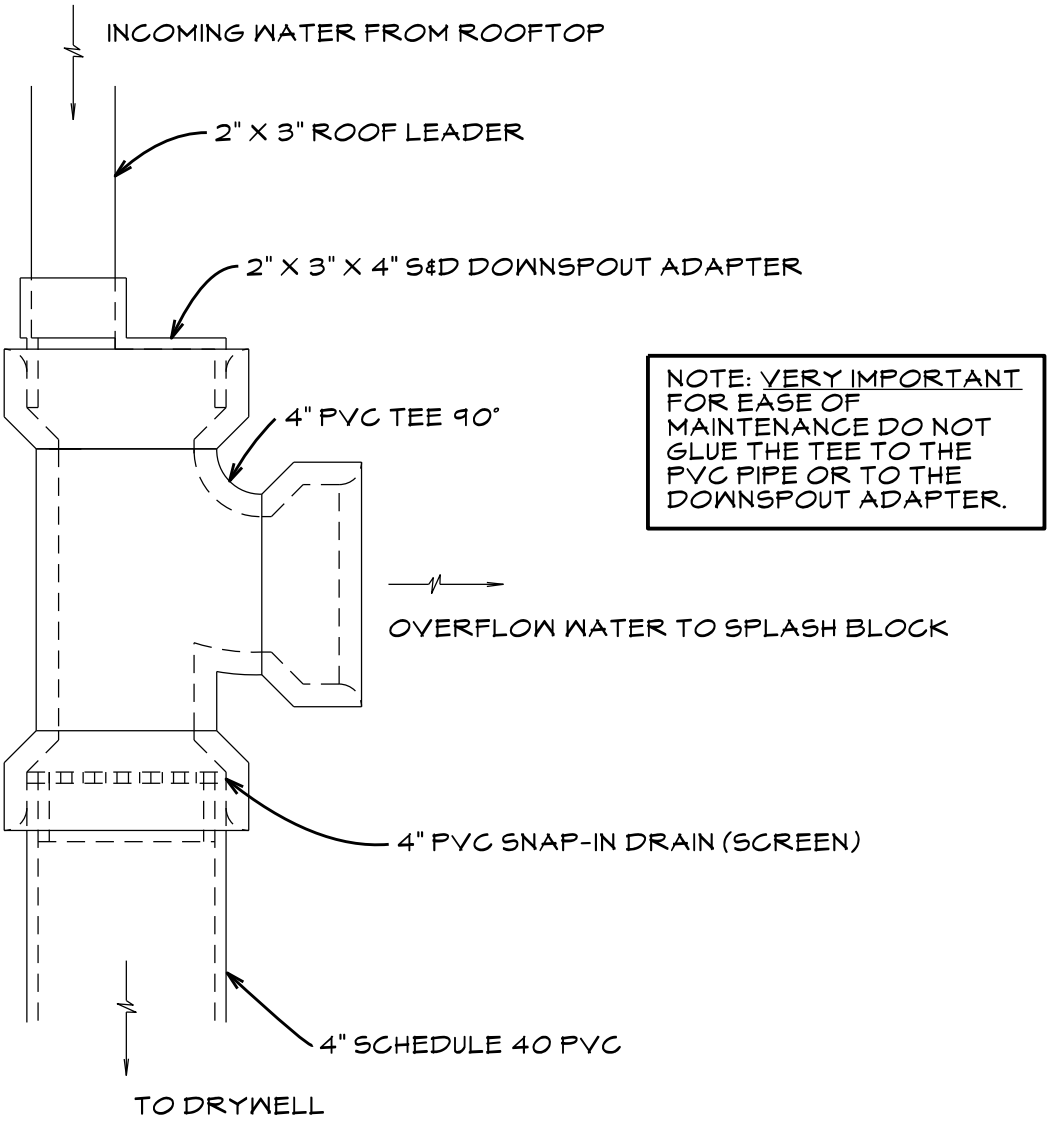
** Fees paid into the Stormwater Management Fund established in §151.067 for the exclusive purpose of providing management of stormwater.

*** This fee will be updated annually to include all applicable County retrofit projects.

Note: If the development drains to a county regional project a prorated portion of the total costs will be applied. Please see Carroll County's agreement with MDE pages 112 & 113.

Martin B. Covington, III, P.E.
Distributed for comment May 3, 2010
Comments received at the Carroll County Surveyors Meeting on May 19, 2010.
Effective Date: July 29, 2010
Revised to reflect retrofit projects since 2010 and new code numbers, adopted in 2015.
Distributed for comment at Carroll County Surveyors Meeting April 20, 2016.
Effective Date: May 20, 2016

FIGURE 3
STANDARD DRYWELL DOWNSPOUT FITTINGS (ALTERNATE)



NOTES:

1. THE SNAP IN SCREEN IS REQUIRED TO PREVENT CLOGGING OF THE DRYWELL WITH DEBRIS.
2. SEE FIGURE 3a "LIST OF POTENTIAL SUPPLIERS TO ACCOMPANY FIGURE 3 STANDARD DRYWELL DOWNSPOUT FITTINGS" FOR INFORMATION ON SOME LOCAL RETAILERS THAT SUPPLY COMPONENTS FOR THIS SYSTEM.

Martin B. Covington III, PE
DISTRIBUTED AT C.C. SURVEYORS MTG.
MARCH 21, 2012
EFFECTIVE APRIL, 2012

Use of Drywells to Achieve SWM When Creating New Lots When No Other BMPs Are Needed

Required Items April 2006

Off Conveyances Only

1. Drywell Detail and Sequence on Plan (Specify Drywell Dimensions)
2. Engineer's, Developer's/Landowner's and Engineer's As-Built Certifications on Plan.
3. Bonding at time of Building Permit.
4. Copy of easement with metes and bounds description, see easement comment 1 on page 3.

Subdivision Lots Only

1. Drywell Detail and Sequence on Plan (Specify Drywell Dimensions)
2. Engineer's, Developer's/Landowner's and Engineer's As-Built Certifications on Plan.
3. Appropriate **Private Facility** Maintenance Schedule on Plan. (Replace County / Town / City with correct jurisdiction).
4. Copy of record plat with easement language (Give lot numbers of lots containing drywells).
5. Bonding at time of Building Permit.

Martin B. Covington, III, P.E., Carroll County Stormwater Management Program Engineer
First Effective April 19, 2006
Revised and Distributed for comment May 3, 2010.
Comments received at the Carroll County Surveyors Meeting on May 19, 2010.
Effective Date: July 29, 2010
Revised to include metes and bounds
Distributed for comment at Carroll County Surveyors Meeting April 20, 2016.
Effective Date: May 20, 2016

Carroll County ESD to the MEP Design Procedures
Overall Site PE and ESDv Required
Redevelopment

Existing Land Use: Commercial, Industrial, Institutional, or Multi-Family Residential

Site DA (ac)*
Existing Site IA (ac) *

*Note:
1. May be calculated per drainage area with concurrence of Carroll County
2. Unusable Areas: Septic's, SHA R-O-W, etc, may be excluded with concurrence of Carroll County

Is the existing IA ≥ 40%?
usable DA

If yes, may provide stormwater management for area within limit of disturbance (L.O.D.) only! If no, skip to New Development.

All calculations from here on are L.O.D. only

Existing DA _____ (ac) % IA = $\frac{IA}{DA} x\ 100$

Existing IA _____ (ac)

Proposed IA _____ (ac) $R_v = 0.009\ x\ \%IA + 0.05$

Existing IA x 50% = existing IA requiring treatment
Subtract any existing IA being returned to pervious (vegetated) conditions = net existing IA

ESD_vRequired = Net existing IA x .95 $x\ \frac{1"}{12}\ x$ 43,560

New Impervious IA = All new impervious areas placed over pervious areas

ESD_vRequired = New Impervious IA x .95 $x\ \frac{PE}{12}\ x$ 43,560

PE=

A Soil = 2.5
B Soil = 2.5
C Soil = 2.2
D Soil = 2.0

1. Total ESD_v required, then calculate PE required using:
2. $PE = \frac{ESD_{v\ total}\ (12)}{R_{v(L.O.D.)}\ x\ DA_{(L.O.D.)}\ x\ 43{,}560}$
3. 1 and 2 are the ESD to the MEP targets

Carroll County ESD to the MEP Design Procedures
Overall Site PE and ESDv Required
New Development

Site DA (ac)*
Site IA (ac) *

*Note: May be calculated per drainage area with concurrence of Carroll County

% IA = $\frac{IA}{DA} x\ 100$

$R_v = 0.009\ x\ \%IA + 0.05$

PE required from charts in Maryland Stormwater Management Manual per soils type.

$ESD_v = \frac{PE}{12} x\ R_v\ x\ DA\ (43{,}560)$

1. Total all ESD_v required, then calculate PE required using:
2. $PE = \frac{ESD_{v\ total}\ (12)}{Rv_{site}\ x\ DA_{site}\ x\ 43{,}560}$
3. 1 and 2 are the ESD to MEP targets

Carroll County ESD to the MEP Design Procedures
ESD_v Provided Summary Chart

ESD # And Type	DA (ac)	IA (ac)	%IA	R_v	Maximum		Provided
					PE (in)	ESD_v (ft^3)	ESD_v (ft^3)
1 Drywell					2.5		Calculated on individual pages for each practice in order to match chart
2 Bioretention					2.5		
3 Grass Channel					2.5		
4 Bio-Swale					2.5		
5 Wide Shoulder					1.0		
Conservation Area					1.0		
Totals						③	④

% IA = $\frac{IA}{DA} x\ 100$

$R_v = 0.009\ x\ \%IA + 0.05$

$ESD_v = \frac{PE}{12} x\ R_v\ x\ DA\ (43{,}560)$

$$PE\ Achieved = \frac{④ x\ 12}{R_{v\ (site\ or\ L.O.D.)}\ x\ DA_{(site\ or\ L.O.D.)}\ x\ 43{,}560}$$

PE achieved and total ESD_v are the ESD provided. They must equal or exceed the ESD to the MEP targets.

M.B. Covington, III, P.E.
Carroll County Stormwater Management Program Engineer
This procedure replaces the design procedure presented Nov. 4, 2010, Jan. 18, 2011, and Nov. 18, 2014
Distributed at Carroll County Surveyor's Meeting for comments October 15, 2018
Effective Date: November 15, 2018

Carroll County Stormwater Management (SWM) Bond Release Procedures

Individual Lot SWM

A. Lots created through subdivision process after September 27, 2001

1. SWM provided for the subdivision roads and schematic individual lot Environmental Site Design (ESD) practices shown (drywells, rain gardens, etc.). Stormwater management easements recorded for all lots.

2. To obtain a building permit, an engineered plot plan must be provided with private, on lot SWM designed to correspond to the house. Any approved ESD practice may be utilized. Bond amounts are set and the money received by the Bureau of Resource Management (the Bureau).

3. After engineer or surveyor certified as-builts are submitted and approved by the Bureau, the bond is released.

B. Lots of record or off-conveyances created prior to September 27, 2001

At building permit, an applicant may elect to follow steps A2 & A3 above.

Or:

The grading inspector will visit the site and determine if the lot can meet the SWM requirements through grading. If not, the inspector will size a drywell for the applicant.

Bond amounts are set and the money received by the Bureau.

The grading inspector will inspect installation of the drywell. After approval by the Bureau, the bond is released.

Subdivision SWM

SWM provided for the subdivision itself (roads, mass grading, and utilities). Schematic individual lot ESD practices shown.

A. Roadways and common use drives

1. SWM must be provided for the subdivision roads (wide shoulders, grass channels, etc.). Any approved linear ESD practice may be utilized along common use driveways.

2. Bond amounts are set from the approved plans. A 10 percent contingency is added to the contractor's price with affidavit while a 50 percent contingency is added to a simple engineer's estimate. The SWM bond becomes part of the Public Works Agreement (PWA).

3. Complete the utilities, roadways, common use drives, associated ESD practices, and establish a 2" stand of dense grass.

4. After engineer or surveyor certified as-builts are submitted and approved by the Bureau, the SWM portion of the bond is released via the PWA process.

   Very Important The inspection chart and engineer's certification must be specific to the ESD practice for each road or common use drive. Therefore, it is possible to certify the construction and obtain release of the portion of the SWM bond pertaining to that facility as the project proceeds.

B. County owned structural SWM facilities (ponds, underground infiltration, etc.)

1. SWM must be provided for all impervious areas in the drainage area through the use of ESD practices to the Maximum Extent Practical (ESD to the MEP). Any remaining ESD and quantity (flood) control volumes must be included in the structural facility.

2. Bond amounts follow step A2 above.

3. Construct sediment control phase of facility per plan and sequence.

4. Complete the work. Entire contributing drainage area to the pond is paved. All houses and buildings are constructed and a 2" stand of dense grass established.

5. Convert to stormwater management per plan and sequence.

6. After engineer or surveyor certified as-builts are submitted and approved by the Bureau, if requested, up to 75 percent of the SWM portion of the bond can be released via the PWA process.

7. After a 2-year maintenance period and inspection and approval by the Bureau and the Bureau of Facilities, the SWM parcel is conveyed to the County by deed. After acceptance of the deed by the County Attorney's Office, the remaining SWM bond is released via the PWA process.

   Very Important The inspection chart and engineer's certification must be specific to each facility. Therefore, once all the work in the drainage area to a facility is complete, it is possible to certify that facility's construction and start the process to release that portion of the SWM bond as the project proceeds.

Site Plans

A. Privately owned ESD practices and structural SWM facilities

1. SWM must be provided for all on site impervious areas through ESD to the MEP. Any approved ESD practice may be utilized.

2. Any remaining ESD and quantity (flood) control volumes must be included in the structural facility.

3. Bond amounts follow step A2 under Subdivision SWM.

4. Construction follows steps B4 & B5 under Subdivision SWM.

5. After engineer or surveyor certified as-builts are submitted and approved by the Bureau, the SWM portion of the bond is released via the PWA process.

This procedure distributed for comment at the Carroll County Surveyor's Meeting March 16, 2011.

Effective date: May 18, 2011.

Martin B. Covington III, P.E.
C.C. Stormwater Management Program Engineer

Acceptable SWM Practices in Carroll County

for

Individual Houses

1. Disconnection of rooftop runoff

    a. Grading- Complete details in Supplement, Easement Comment 6 on plat, individual plot plan @ building permit, no bond.

    b. Drywells- Complete details in Supplement, Easement Comment 1 on plat, location of drywell not shown, bond @ building permit.

2. ESD Planning Techniques & Practices

    a. Green roofs- Schematic details in Manual, site specific design required. Easement Comment 1 on plat, location of practice shown, bond @ building permit.

3. Microscale (non-structural)

    a. Landscape infiltration -
    b. Micro-bioretention
    c. Rain Garden
    d. Rainwater harvesting
    e. Submerged gravel wetlands
    f. Infiltration berms

    Schematic details in Manual, site specific design required. Easement Comment 1 on plat, location of practice shown, bond @ building permit.

Issued at the Carroll County Surveyor's Meeting May 18, 2011.

Effective immediately

Martin B. Covington, III, P.E.
Carroll County SWM Program Engineer

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
MDE 410-537-3000 • 1-800-633-6101 • www.mde.state.md.us

April 17, 2012

Mr. Martin Covington
Bureau of Resource Management
Department of Planning
Carroll County Government
225 North Center St.
Westminster, MD 21157

Dear Ms. Engles:

Thank you for submitting the proposed policy for redevelopment projects in Carroll County to the Maryland Department of the Environment, Water Management Administration (MDE/WMA). The policy applies to specific redevelopment projects within the County that drain to a regional stormwater management facility. This letter is to provide you with MDE's approval for the attached policy.

MDE considers the proposed redevelopment policy acceptable according to the Code of Maryland Regulations (COMAR). According to COMAR 26.17.02.05 the County may develop separate policies for providing water quality treatment for redevelopment projects, subject to the review and approval of MDE. The proposed policy will provide full water quality treatment, channel protection volume, and peak management for a proposed project draining to a regional facility. Therefore, the stormwater management provided for these projects will be greater than currently required for redevelopment under COMAR. In addition, MDE commends the County's efforts to provide incentives to the development community to provide an enhanced level of stormwater treatment. These efforts will be important toward meeting County goals for local water quality improvement and the Chesapeake Bay restoration.

Thank you again. If you have any questions, please call me at 410-537-3533 or email at dcappuccitti@mde.state.md.us.

Sincerely,

Deborah J. Cappuccitti
Regulatory Compliance Engineer
Water Management Administration

Attachment

CARROLL COUNTY CODE IMPLEMENTATION POLICY
STORMWATER MANAGEMENT – CHAPTER 191

EFFECTIVE DATE: April 20, 2012

ISSUE: REDEVELOPMENT POLICY

CHAPTER 191-8 REDEVELOPMENT

Policy on Redevelopment Sites
Draining into Regional Stormwater Management (SWM) Facilities

If the runoff from a proposed redevelopment site drains into a county owned regional SWM facility that provides at least: Water Quality (WQ_v) and Channel Protection (CP_v) as well as Quantity Control (Q_{10}), when needed for downstream protection, special methods of meeting SWM requirements are available.

In such cases, the developer may choose to contribute a portion of the cost of providing SWM for all onsite impervious surfaces to the design/construction/repair of the regional facility in lieu of onsite SWM measures.

Carroll County is providing this opportunity to further its joint objectives of:

1. Providing cost effective SWM to treat runoff from currently untreated impervious surfaces.
2. Encouraging redevelopment by eliminating onsite SWM and offering this alternative way to address full WQ_v, CP_v, and Q_{10}.

NOTE:

a. Adequate pre-treatment, runoff capture and stable conveyance to the regional facility must be provided.
b. If the onsite impervious area is increased, new development SWM criteria will apply.

Martin B. Covington, III, PE
CC SWM Program Engineer

17 April 2012
Date

Gale Engles, Bureau Chief
Bureau of Resource Management

4-18-12
Date

Gail D. Kessler, Deputy County Attorney
Department of the County Attorney

4-20-12
Date

R:\Martin\Policy on Redevelopment Sites.doc

Martin B. Covington, III, P.E.
Stormwater Management Program Engineer
Distributed at Carroll County Surveyors Meetin
July 18, 2012

Carroll County Stormwater Management Table for Wide Shoulder Technique

a. Wide Shoulder Technique (Non-Structural)
b. Ownership and Maintenance Responsibility
c. Names, stationing and impervious area treated listed by Roadway or Use-in-Common Drive
d. Small Scale drainage area map (with NAD 83 coordinates) adjacent to the table with portions of Roadways and Use-in-Common Drives treated shown and labeled.
e. Watershed name and receiving stream classification.
f. Table on sheet with As-built Certification and inspection charts

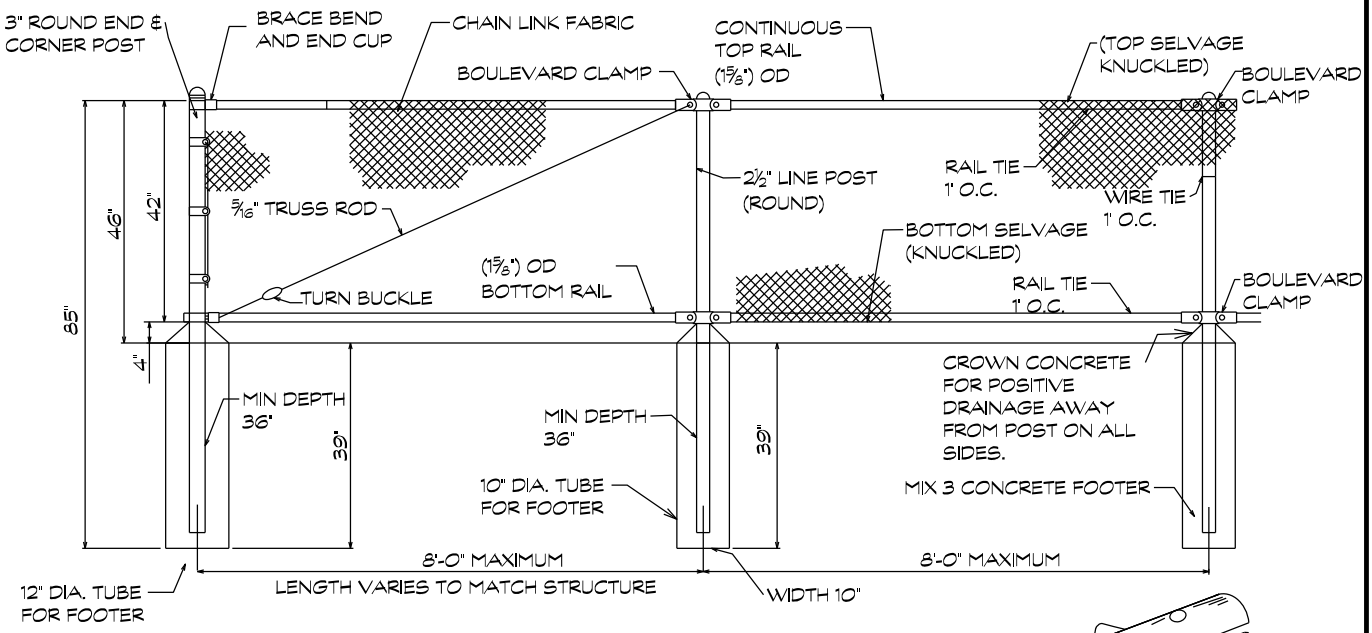
Issued for comment at the
Carroll County Surveyor's meeting
Sept. 19, 2011
Effective Nov. 16, 2011

Martin B. Covington III, PE
Carroll Co. SWM Program Engineer

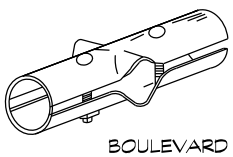
CARROLL COUNTY HEAVY COMMERCIAL/INDUSTRIAL CHAIN LINK FENCE RAILING

BEHIND THE TOP OF SEGMENTAL (REINFORCED EARTH) RETAINING WALLS USED IN STORMWATER MANAGEMENT FACILITIES

(FOR LEVEL RUNS OF RAILING)



NOT TO SCALE



BOULEVARD CLAMP
(REQUIRED FOR RAILS)

GENERAL NOTES FOR CHAIN LINK FENCE RAILING

MATERIAL-ALL MATERIAL MUST COMPLY WITH ASTM F1043 TYPE B EXCEPT WHERE MODIFIED BY THIS DETAIL. ALL PIPE, POSTS, RAILS, CLAMPS, TIES, BARS, CLAMP SLEEVES, CAPS, TRUSS RODS, ETC. MUST BE STEEL 100% GALVANIZED INSIDE AND OUT, BE FACTORY BLACK PVC COATED, AND MEET OR EXCEED TIE PERFORMANCE SPECIFICATIONS FOR SCHEDULE 40 PIPE. 42" CHAIN LINK FABRIC TO BE 9 GAUGE, 2" MESH STEEL CORE, GALVANIZED, BLACK PVC COATED. TIES ARE TO MATCH FABRIC.

INSTALLATION- CORNER POSTS WITH TRUSS RODS EACH WAY SHALL BE INSTALLED AT EACH END AND BREAK OF LINE OR GRADE. NO PIPE JOINTS ARE ALLOWED EXCEPT FOR FACTORY MADE CUPS OR CLAMPS. CAPS AND CUPS MUST BE PRESSED STEEL. ALL RAILS MUST BE PARALLEL TO THE TOP OF THE STRUCTURE. ALL POSTS MUST BE VERTICAL.

PRIORITY- TUBES MUST BE SET IMMEDIATELY ADJACENT TO THE WALL DURING CONSTRUCTION TO RECEIVE THE POSTS AND FOOTER. ALL MATERIAL & WORKMANSHIP TO CONFORM TO: THE PLANS, THEN THIS DETAIL, THEN THE LATEST SHA SPECIFICATIONS.

ACCEPTANCE- RAILING MUST BE STRAIGHT AND RIGID WITH INTACT JOINTS AND TIGHT FABRIC.

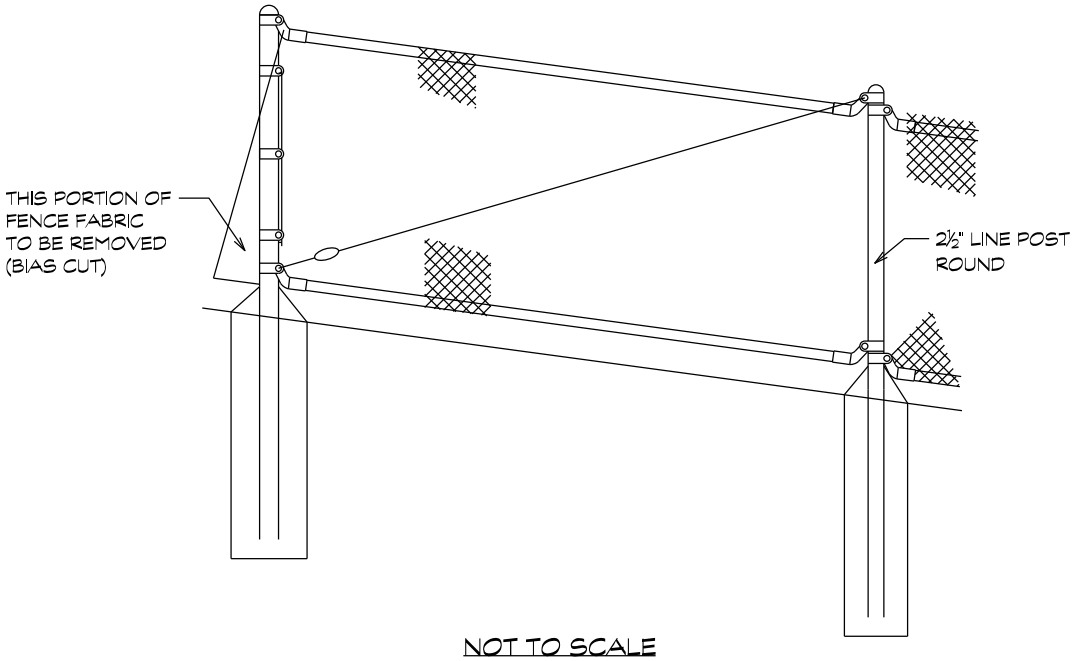
STANDARD BOOK- CURRENT STATE OF MD, SHA BOOK OF STANDARDS

SPECIFICATIONS- MD DOT-STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, JULY 2008.

MARTIN B. COVINGTON III, PE
C.C. SWM PROGRAM ENGINEER
DISTRIBUTED FOR COMMENT
JANUARY 18, 2012
EFFECTIVE DATE: FEBRUARY, 2012

MODIFICATIONS TO CARROLL COUNTY HEAVY COMMERCIAL/ INDUSTRIAL CHAIN LINK FENCE RAILING

DETAIL FOR STEEP SLOPES



NOT TO SCALE

GENERAL NOTES

1. ALL NOTES, DIMENSIONS, AND SPECIFICATIONS CONTAINED ON THE LEVEL RUN DETAIL APPLY UNLESS SPECIFICALLY NOTED OTHERWISE.

2. CUT THE FENCE FABRIC ON A BIAS TO MATCH THE VERTICAL CORNER POSTS BY CUTTING THE WEAVES AND REMOVING THEM UNTIL FULL DIAMONDS ARE LEFT AT THE CORRECT ANGLE. IF NECESSARY, PULL THE END DIAMONDS BACK INTO THE FABRIC UNTIL THE PROPER ANGLE IS CREATED. THEN BEND THE DIAMONDS COMPLETELY AROUND THE FIRST FULL WEAVES IN THE FABRIC.

SHEET 2 OF 2

MARTIN B. COVINGTON III, PE
C.C. SWM PROGRAM ENGINEER
DISTRIBUTED FOR COMMENT
JANUARY 18, 2012
EFFECTIVE DATE: FEBRUARY, 2012

b-4/13/2016-8:26:21 AM-G:\CLS\CC_SWM_Details\details(V8).dgn--Default

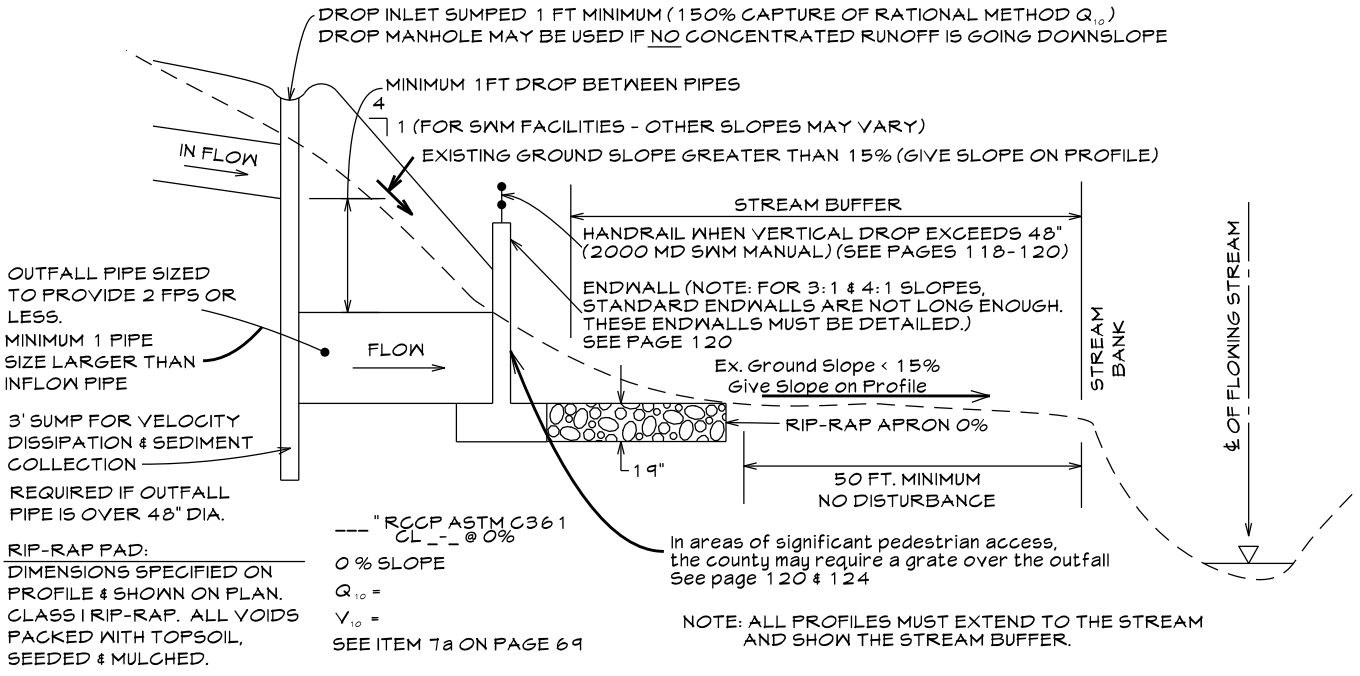
DESIGN PROCEDURE FOR SATISFYING CARROLL COUNTY WATER RESOURCE MANAGEMENT MANUAL SECTION IV C3b2

"STORM DRAINAGE UP TO AND INCLUDING THE 10 YEAR DESIGN STORM SHALL NOT PRODUCE DISCHARGE VELOCITIES EXCEEDING 2 FEET PER SECOND PRIOR TO ENTERING THE BUFFER"

Carroll County Drop Structure and Oversized Outfall Pipe Technique

Option 2 is used in the following situations:

1. When a full sized stilling basin and underdrain cannot be cut into and discharge onto the existing ground outside of the stream buffer.
2. When the Q_{10} is too large for table 1 on 42a
3. Outfalls are not allowed on existing steep slopes. When steep slopes intersect the edge of the buffer and no area can be found to discharge outside the buffer area, the riprap apron is allowed in the buffer for the minimum distance to tie into the flood plain. In extreme situations, with prior permission of the C.C. Water Resources Reviewer, the outfall may be allowed in the buffer.



IF: THE DROP STRUCTURE AND OUTFALL PIPE ARE CONSTRUCTED AS SHOWN ABOVE,
THEN: THE OUTFALL MEETS THE 2 FT/SECOND CRITERIA FOR DISCHARGES UP TO THOSE FOUND IN TABLE 2

TABLE 2	
PIPE DIAMETER (in)	MAXIMUM Q_{10} (cfs)
15"	2.0
18"	3.0
24"	6.0
27"	8.0
30"	10.0
36"	14.0
42"	19.0
48"	25.0
54"	32.0
60"	40.0
72"	55.0
84"	75.0
96"	100.0
108"	125.0
120"	155.0

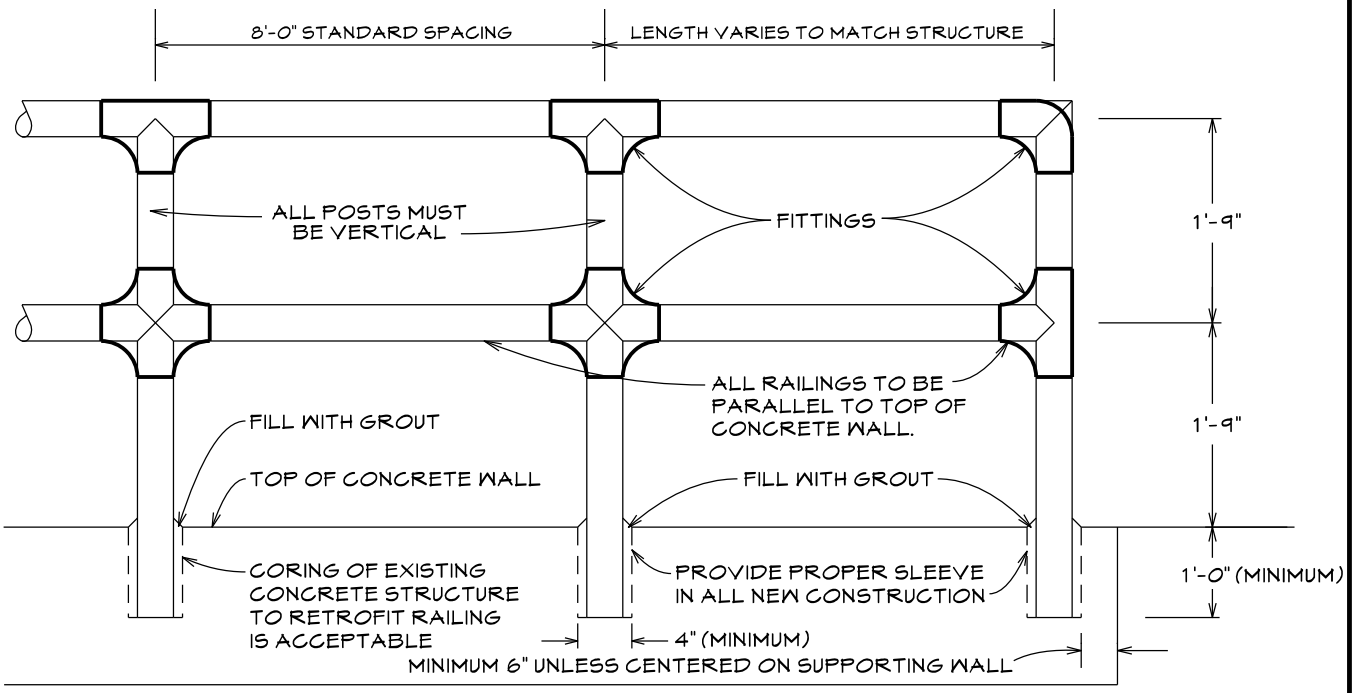
MINIMUM SIZE OF FLAT GRADE OUTFALL PIPES SHALL BE 30" FOR MAINTENANCE (C.C.D.P.W.)

THEREFORE, THE MINIMUM STRUCTURES ARE:
60" MANHOLE MD-384.03 OR
STD TYPE-S INLET DOUBLE GRATE TANDEM
MD 374.70 & BAR GRATE MD 379.05 (NON TRAFFIC) OR
MD 374.70 & RETICULAR GRATE MD 374.02 (TRAFFIC AREAS)

* BEYOND 155 cfs A CUSTOM DESIGN IS REQUIRED. CONTACT APPROVING AUTHORITY.

MARTIN B. COVINGTON III, P.E.
STORMWATER MANAGEMENT PROGRAM ENGINEER
EFFECTIVE DATE: JAN. 21, 2009
REVISED AND DISTRIBUTED FOR COMMENT AT CARROLL COUNTY SURVEYOR'S MEETING: JAN 20, 2010
EFFECTIVE DATE: MARCH 17, 2010
AMENDED TO CLARIFY WHEN RAILINGS AND GRATES ARE REQUIRED. DISTRIBUTED FOR COMMENT AT CARROLL COUNTY SURVEYOR'S MEETINGS: MARCH 18, 2015, APRIL 20, 2016
EFFECTIVE DATES: MAY 20, 2015, MAY 20, 2016

CARROLL COUNTY FIELD WELDED PIPE RAILING FOR HEADWALLS, ENDWALLS & RISER BOXES USED IN STORMWATER MANAGEMENT FACILITIES WITH VEHICLE ACCESS AND LOW VOLUMES OF FOOT TRAFFIC ANTICIPATED



General Notes for Field Welded Pipe Railings

MATERIAL - Pipe Posts, Railing & Welded Fittings to be Standard Steel Pipe, 2 1/2" ϕ inside diameter. ASTM A-53 or A-500, Schedule 40. Grout to be a commercially prepaired 5,000 psi nonshrink product per section 902.11 (c)

JOINTS - No Pipe Joints are allowed except at corners or tees. Corners and tees may be formed by field cutting and welding or use of standard fittings. If field formed they must approximate the fitting geometry.

WELDING - Full penetration of metal. Welds to be free of holes, gaps or defects and ground off smooth to the touch. All welding to be in accordance with section 430.03.19.

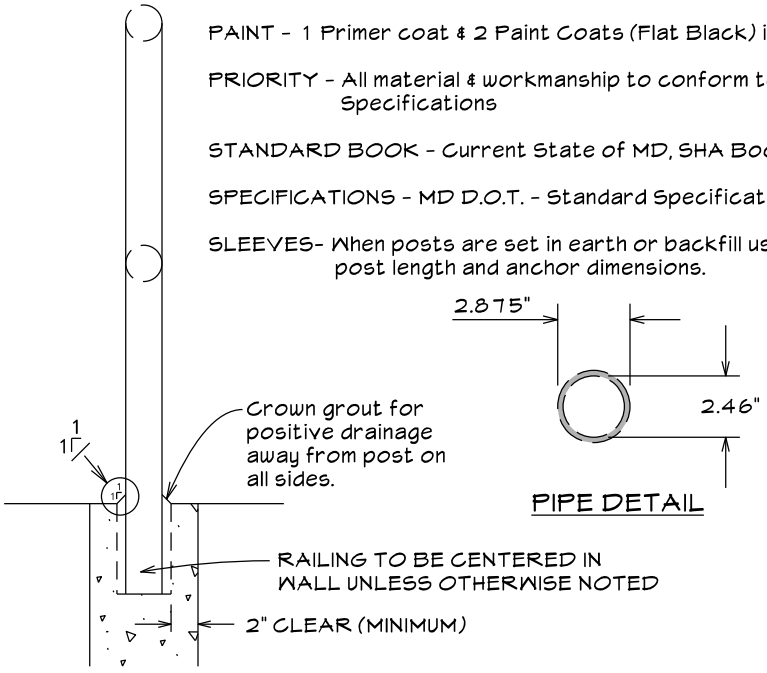
PAINT - 1 Primer coat & 2 Paint Coats (Flat Black) in accordance with section 435

PRIORITY - All material & workmanship to conform to: the plans, then this detail, then the latest SHA Specifications

STANDARD BOOK - Current State of MD, SHA Book of Standards

SPECIFICATIONS - MD D.O.T. - Standard Specifications for Construction and Materials, July 2008

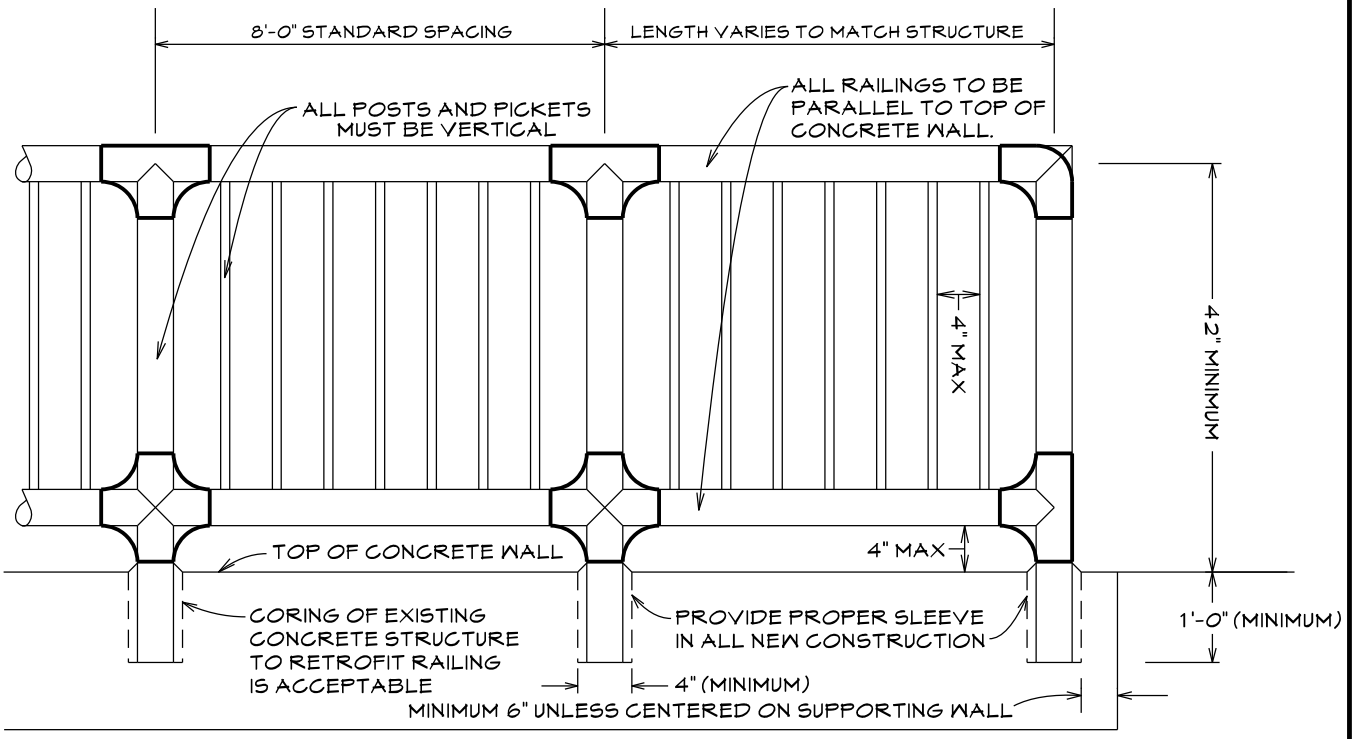
SLEEVES- When posts are set in earth or backfill use chain link fence railing detail (Page 115) for post length and anchor dimensions.



PIPE DETAIL

FIRST DISTRIBUTED FOR COMMENT AT THE C.C.SURVEYOR'S MEETING: NOV. 19, 2008. REVISED TO CORRECT SPECIFICATIONS DISTRIBUTED FOR COMMENT MAY 3, 2010
COMMENTS RECEIVED AT C.C. SURVEYORS MTG. MAY 19, 2010
EFFECTIVE DATE: JULY 29, 2010
REVISED TO ALLOW NON-PRESSURE PIPE AND SPECIFY SLEEVE DIMENSIONS. DISTRIBUTED FOR COMMENT AT C.C. SURVEYOR'S MTG: MARCH 18, 2015
EFFECTIVE DATE: MAY 20, 2015

CARROLL COUNTY FIELD WELDED PIPE RAILING FOR HEADWALLS, ENDWALLS & RISER BOXES USED IN STORMWATER MANAGEMENT FACILITIES WITH VEHICLE ACCESS AND HIGH VOLUMES OF FOOT TRAFFIC AND SMALL CHILDREN ANTICIPATED



General Notes for Field Welded Pipe Railings

MATERIAL - Pipe Posts, Railing & Welded Fittings to be Standard Steel Pipe, 2 1/2" ϕ inside diameter. ASTM A-53 or A-500, Schedule 40. Grout to be a commercially prepaired 5,000 psi nonshrink product per section 902.11 (c)
Pickets to be AISI 1018 cold finished steel square bars 1" x 1"

JOINTS - No Pipe Joints are allowed except at corners or tees. Corners and tees may be formed by field cutting and welding or use of standard fittings. If field formed they must approximate the fitting geometry.

WELDING - Full penetration of metal. Welds to be free of holes, gaps or defects and ground off smooth to the touch. All welding to be in accordance with section 430.03.19.

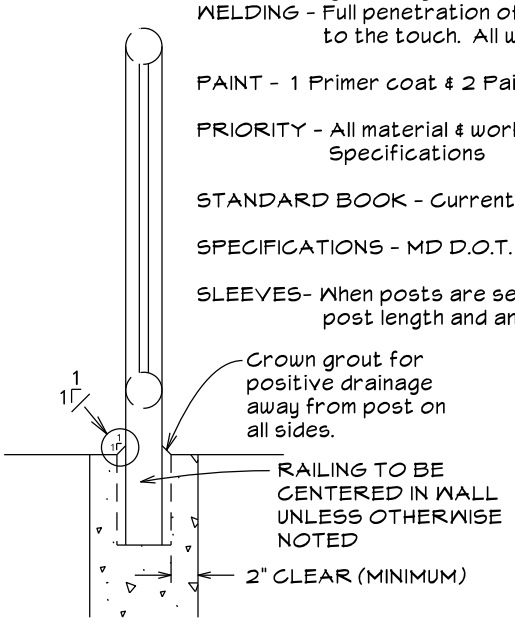
PAINT - 1 Primer coat & 2 Paint Coats (Flat Black) in accordance with section 435

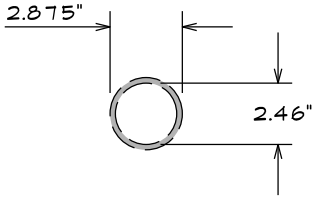
PRIORITY - All material & workmanship to conform to: the plans, then this detail, then the latest SHA Specifications

STANDARD BOOK - Current State of MD, SHA Book of Standards

SPECIFICATIONS - MD D.O.T. - Standard Specifications for Construction and Materials, July 2008

SLEEVES- When posts are set in earth or backfill use chain link fence railing detail (Page 115) for post length and anchor dimensions.





PIPE DETAIL

DISTRIBUTED FOR COMMENT MAY 3, 2010
COMMENTS RECEIVED AT C.C. SURVEYORS MTG. MAY 19, 2010
EFFECTIVE DATE: JULY 29, 2010
REVISED TO ALLOW NON-PRESSURE PIPE AND SPECIFY SLEEVE DIMENSIONS. DISTRIBUTED FOR COMMENT AT C.C. SURVEYOR'S MTG: MARCH 18, 2015.
EFFECTIVE DATE: MAY 20, 2015

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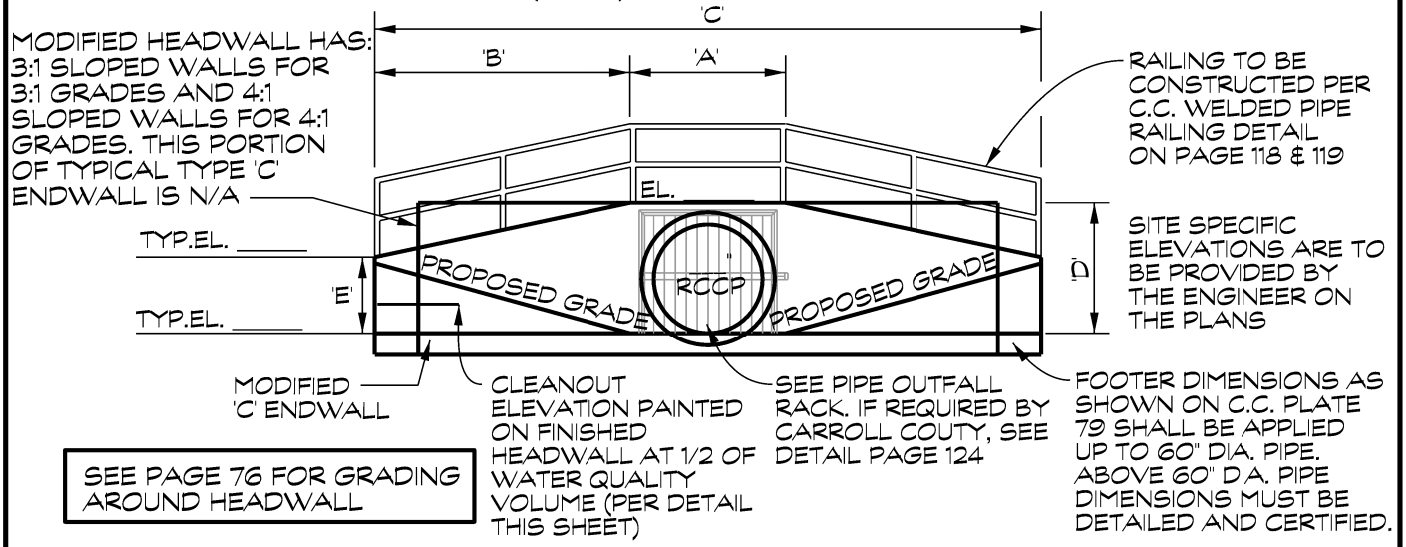
CARROLL COUNTY MODIFIED TYPE "C" ENDWALLS FOR USE IN STORMWATER MANAGEMENT FACILITIES WITH 3:1 OR 4:1 SLOPES MODIFIED FOR 2' FILTER MEDIA - RUNOFF REDUCTION (R/R) PRACTICE



SEE PAGE 76 FOR GRADING AROUND HEADWALL

THE MODIFICATIONS TO THIS ENDWALL ARE MINIMAL. STANDARD TYPE 'C' SPECIFICATIONS REGARDING REINFORCING, STEEL, CONCRETE, AND CHAMFERS AS SHOWN ON C.C. PLATE 79 SHALL BE APPLIED.

FOR CIRCULAR CONCRETE PIPES

3:1 GROUND SLOPES					
OUTFALL PIPE DIA.	ENDWALL DIMENSIONS				
	"A"	"B"	"C"	"D"	"E"
(IN.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)
15"	2.5	2.625	7.75	2.00	1.25
18"	3.0	3.0	9.00	2.25	1.375
24"	4.0	3.75	11.50	2.75	1.625
30"	5.0	4.875	14.75	3.50	2.00
36"	6.0	5.50	17.00	4.00	2.33
42"	7.0	6.625	20.25	4.75	2.75
48"	8.0	7.375	22.75	5.25	3.00
54"	9.0	8.125	25.25	5.75	3.25
60"	10.0	8.875	27.75	6.25	3.50
72"	12.0	10.75	33.50	7.50	4.25
84"	14.0	12.625	39.25	8.75	4.75
96"	16.0	14.125	44.25	9.75	5.25
108"	18.0	16.00	50.00	11.00	6.00
120"	20.0	17.50	55.00	12.00	6.50

RAILING NOT REQUIRED
OUTFALL RACK NOT REQUIRED
RAILING & OUTFALL RACK REQUIRED

4:1 GROUND SLOPES					
OUTFALL PIPE DIA.	ENDWALL DIMENSIONS				
	"A"	"B"	"C"	"D"	"E"
(IN.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)
15"	2.5	3.31	9.25	2.0	1.25
18"	3.0	3.75	10.5	2.25	1.50
24"	4.0	4.625	13.25	2.75	1.75
30"	5.0	6.00	17.0	3.50	2.00
36"	6.0	6.75	19.5	4.00	2.25
42"	7.0	8.125	23.25	4.75	2.75
48"	8.0	9.00	26.0	5.25	3.00
54"	9.0	10.00	29.0	5.75	3.25
60"	10.0	11.00	32.0	6.25	3.50
72"	12.0	13.50	39.0	7.50	4.00
84"	14.0	16.00	46.0	8.75	4.75
96"	16.0	18.00	52.0	9.75	5.25
108"	18.0	20.5	59.0	11.0	5.75
120"	20.0	22.5	65.0	12.0	6.25

CLEANOUT ELEVATION DETAIL

CLEANOUT ELEVATION "____" — 2" LETTERS, 1/2" WIDE LINES BLACK EPOXY CONCRETE PAINT, LETTERS AND SPACING BY STENCIL

REVISED FOR R/R DESIGN

DISTRIBUTED FOR COMMENT MAY 3, 2010
COMMENTS RECEIVED AT C.C. SURVEYORS MEETING MAY 19, 2010
EFFECTIVE DATE: JULY 29, 2010
DISTRIBUTED FOR COMMENT MARCH 18, 2015
EFFECTIVE DATE: MAY 2015
AMENDED TO CLARIFY WHEN RACKS ARE REQUIRED
DISTRIBUTED FOR COMMENT APRIL 20, 2016
EFFECTIVE DATE: MAY 20, 2016

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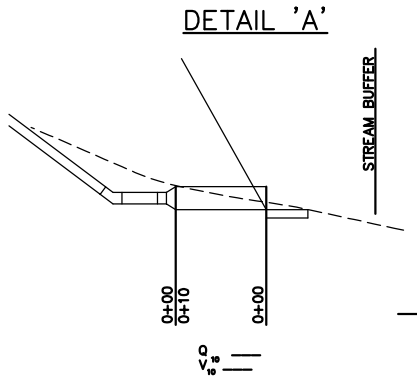
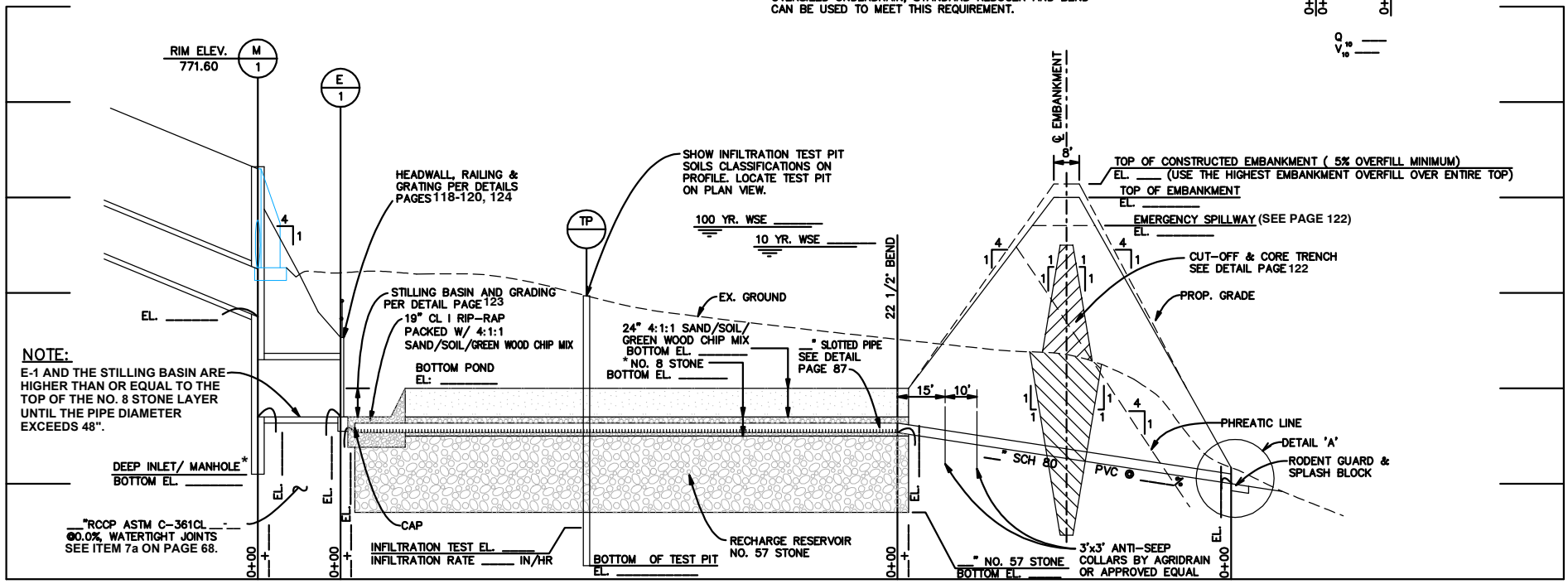
CARROLL COUNTY POND– SAND FILTER
POND WITHOUT RISER
PRINCIPAL SPILLWAY PROFILE
MODIFIED FOR 2' FILTER MEDIA
R/R PRACTICE



VERY IMPORTANT:

IF THE UNDERDRAIN DISCHARGES INTO THE STREAM BUFFER V^{10} MAY NOT EXCEED 2 FT/SEC. AT THE EDGE OFTHE BUFFER PER C.C. WRM IV C3B2. A 10 FT. FLAT SECTION OF OVERSIZED UNDERDRAIN, STANDARD REDUCER AND BEND CAN BE USED TO MEET THIS REQUIREMENT.



*DEEP INLET/ MANHOLE SUMP NOT REQUIRED UP TO AND INCLUDING 48" OUTFALL PIPE.

* Chart 1

Slotted Pipe Diameter	Minimum No. 8 stone depth
4"	10"
6"	14"
8"	18"
10"	22"

Martin B. Covington III, PE
SWM Program Engineer

DISTRIBUTED FOR COMMENT MAY 3, 2010
COMMENTS RECEIVED AT C.C. SURVEYORS MTG. MAY 19,2010
EFFECTIVE DATE: JULY 29, 2010
COMMENTS RECEIVED AT C.C. SURVEYORS MTG. NOV 20, 2013
EFFECTIVE DATE: DECEMBER, 2013
REVISED TO LIMIT SUMP USAGE
DISTRIBUTED FOR COMMENT APRIL 20, 2016
EFFECTIVE DATE: MAY 20, 2016

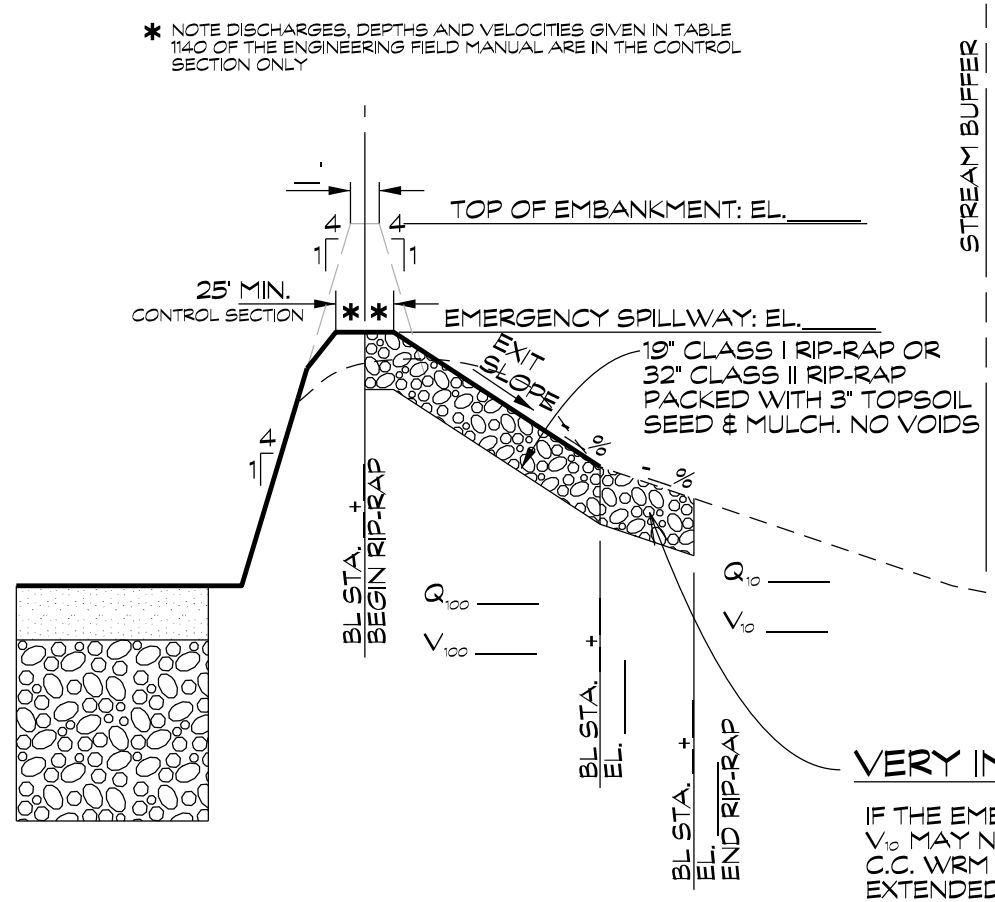
REVISED FOR R/R DESIGN

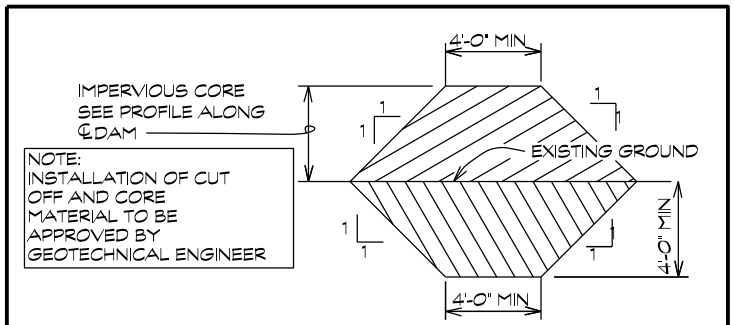
121 [73 (AMENDED)[

CARROLL COUNTY POND- SAND FILTER
POND WITHOUT RISER
EMERGENCY SPILLWAY PROFILE & CUT-OFF TRENCH

122 [74 AMENDED]

RIP-RAP	LIMITING VELOCITIES			MINIMUM PAD THICKNESS
	D 50	MANNINGS "N"	VELOCITY (FPS)	
CLASS I	9.5"	.038	8.5	19
CLASS II	16"	.041	10.5	32





CUT-OFF TRENCH

VERY IMPORTANT

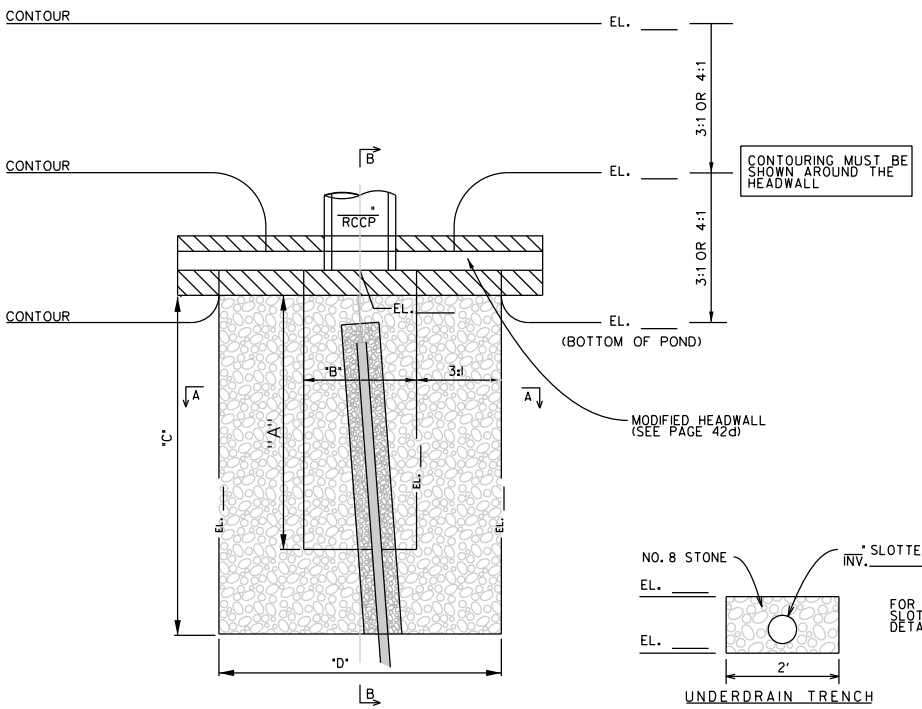
IF THE EMERGENCY SPILLWAY DISCHARGES INTO THE STREAM BUFFER V_{10} MAY NOT EXCEED 2 FT./SEC. AT THE EDGE OF THE BUFFER PER C.C. WRM IV C3B2. THE EMERGENCY SPILLWAY MAY NEED TO BE EXTENDED ONTO THE EXISTING GROUND TO MEET THIS CRITERIA.

NOTES:
1. ALL VELOCITIES ARE TO BE CALCULATED ALONG THE EXIT CHANNEL.
2. LIMITING VELOCITY & PAD THICKNESS REQUIREMENTS ARE TAKEN FROM THE 1981 SHA HIGHWAY DRAINAGE MANUAL PAGES I - 3 - A - 3 & 4

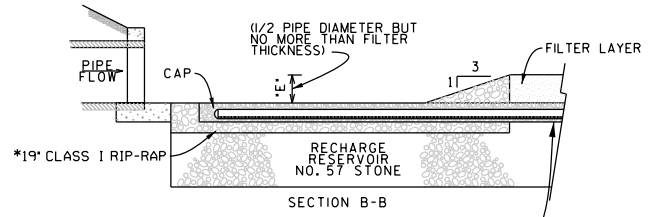
Martin B. Covington III, PE
SWM Program Engineer
DISTRIBUTED FOR COMMENT MAY 3, 2010
COMMENTS RECIEVED AT C.C. SURVEYORS MTG. MAY 19, 2010
EFFECTIVE DATE: JULY 29, 2010
AMENDED AND DISTRIBUTEDAT C.C. SURVEYORS MTG. MARCH 20, 2013

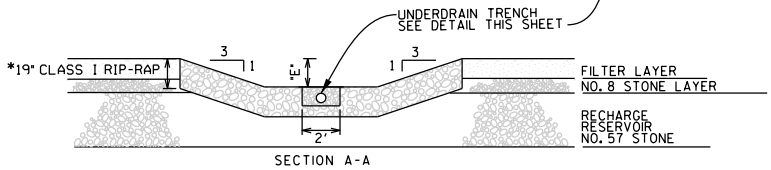
CARROLL COUNTY POND- SAND FILTER
STILLING BASIN CUT INTO POND BOTTOM
MODIFIED FOR 2' FILTER MEDIA - R/R PRACTICE

123 [76 (ALTERNATIVE)]



SITE SPECIFIC GRADING DETAIL TO BE SHOWN WITH DIMENSIONS ON THE SWM PLAN; GRADING AND POSITIONING OF THE UNDERDRAIN MUST CORRESPOND TO THE PLAN VIEW.





REVISED FOR R/R DESIGN

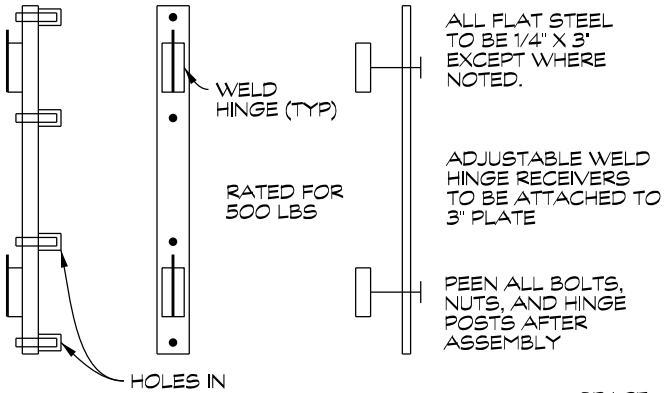
STILLING BASIN DIMENSIONS

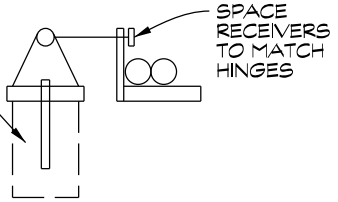
LEGEND					
PIPE DIA.	"A"	"B"	"C"	"D"	"E"
(IN.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)
15"	5.64	2.50	7.50	6.28	0.63
18"	6.75	3.00	9.00	7.50	0.75
21"	7.89	3.50	10.50	8.78	0.88
24"	9.00	4.00	12.00	10.00	1.00
27"	10.14	4.50	13.50	11.28	1.13
30"	11.25	5.00	15.00	12.50	1.25
36"	13.50	6.00	18.00	15.00	1.50
42"	15.00	7.00	20.25	17.50	1.75
48"	16.50	8.00	22.50	20.00	2.00
54"	18.00	9.00	24.00	21.00	2.00
60"	19.50	10.00	25.50	22.00	2.00
72"	22.50	12.00	28.50	24.00	2.00
84"	25.50	14.00	31.50	26.00	2.00
96"	28.50	16.00	34.50	28.00	2.00
108"	31.50	18.00	37.50	30.00	2.00
120"	34.50	20.00	40.50	32.00	2.00

NOTES: DEPTH OF STILLING BASIN IS ½ PIPE DIAMETER UP TO THICKNESS OF FILTER LAYER. THIS TABLE IS BASED ON A 24" LAYER.

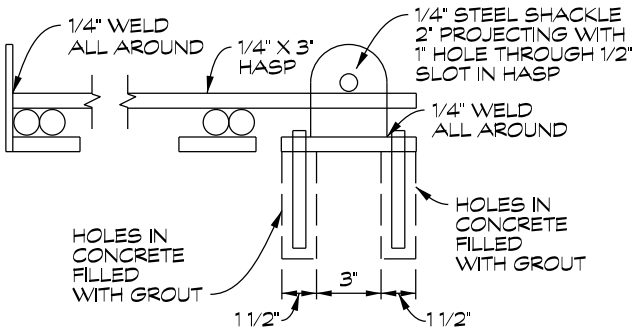
Martin B. Covington III, PE
SWM Program Engineer
DISTRIBUTED FOR COMMENT MAY 3, 2010
COMMENTS RECEIVED AT C.C. SURVEYORS MTG. MAY 19, 2010
EFFECTIVE DATE: JULY 29, 2010
COMMENTS RECEIVED AT C.C. SURVEYORS MTG. NOV 20, 2013
EFFECTIVE DATE: DECEMBER, 2013

PIPE OUTFALL RACK





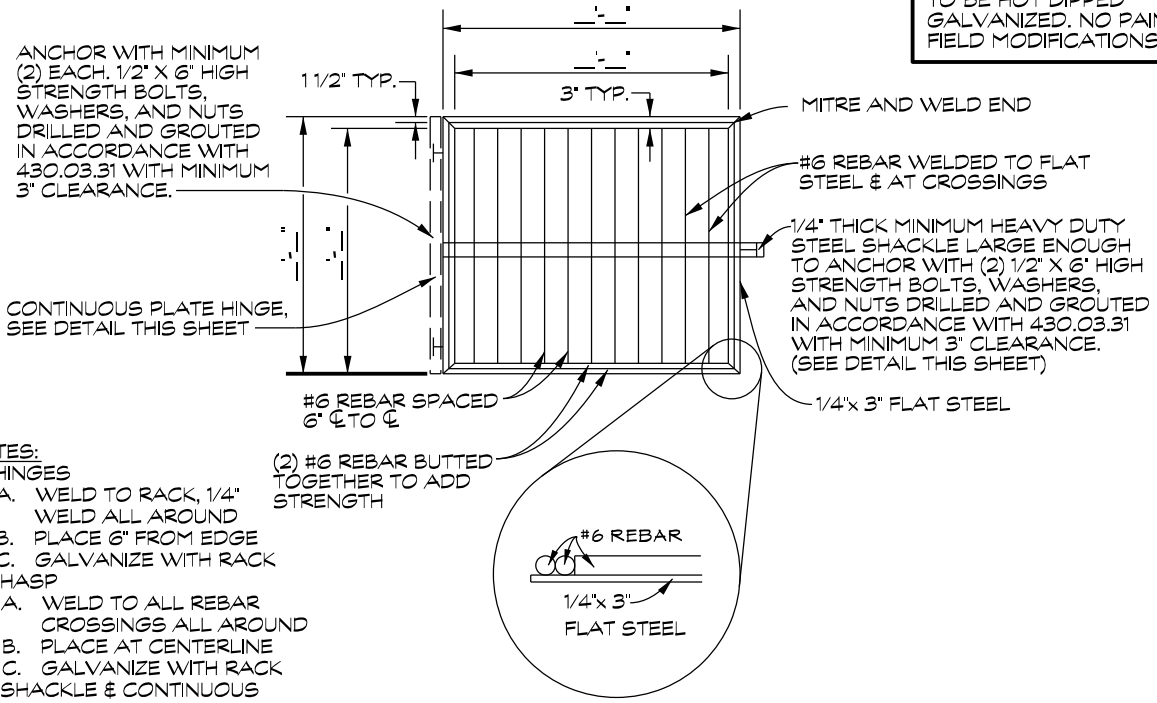
CONTINUOUS PLATE HINGE DETAIL



HASP & SHACKLE DETAIL

NOTE: DIMENSIONS TO BE SPECIFIED ON PLAN. OVERALL DIMENSIONS SHALL BE 6" LARGER THAN PIPE OUTSIDE DIAMETER.

NOTE: PIPE OUTFALL RACK TO BE HOT DIPPED GALVANIZED. NO PAINTED FIELD MODIFICATIONS.



SIDE VIEW OF FRAME

NOTES:
1. HINGES
   A. WELD TO RACK, 1/4" WELD ALL AROUND
   B. PLACE 6" FROM EDGE
   C. GALVANIZE WITH RACK
2. HASP
   A. WELD TO ALL REBAR CROSSINGS ALL AROUND
   B. PLACE AT CENTERLINE
   C. GALVANIZE WITH RACK
3. SHACKLE & CONTINUOUS PLATE HINGE
   A. 1/4" WELDS ALL AROUND
   B. GALVANIZE WITH RACK

USE AS DIRECTED BY CARROLL COUNTY

TO BE INSTALLED ON POND INFLOWS WHEN:
1. PIPE IS GREATER THAN 36" DIA.
2. THERE ARE STILLING POOLS IN THE STORM DRAIN SYSTEM.
3. THE STORM DRAIN SYSTEM IS INLET FED (NO OPEN PIPES)

Martin B. Covington III, PE
SWM Program Engineer
DISTRIBUTED FOR COMMENT MAY 3, 2010
COMMENTS RECIEVED AT C.C. SURVEYORS MEETING MAY 19, 2010
EFFECTIVE DATE: JULY 29, 2010
REVISED TO SPECIFY MOUNTING HARDWARE AND DISTRIBUTED FOR COMMENT AT C.C. SURVEYORS MEETING NOV. 19, 2014
REVISED TO INCORPORATE COMMENTS AND CLARIFY WHEN USED. DISTRIBUTED FOR COMMENT MARCH 18, 2015.
EFFECTIVE DATE: MAY 20, 2015

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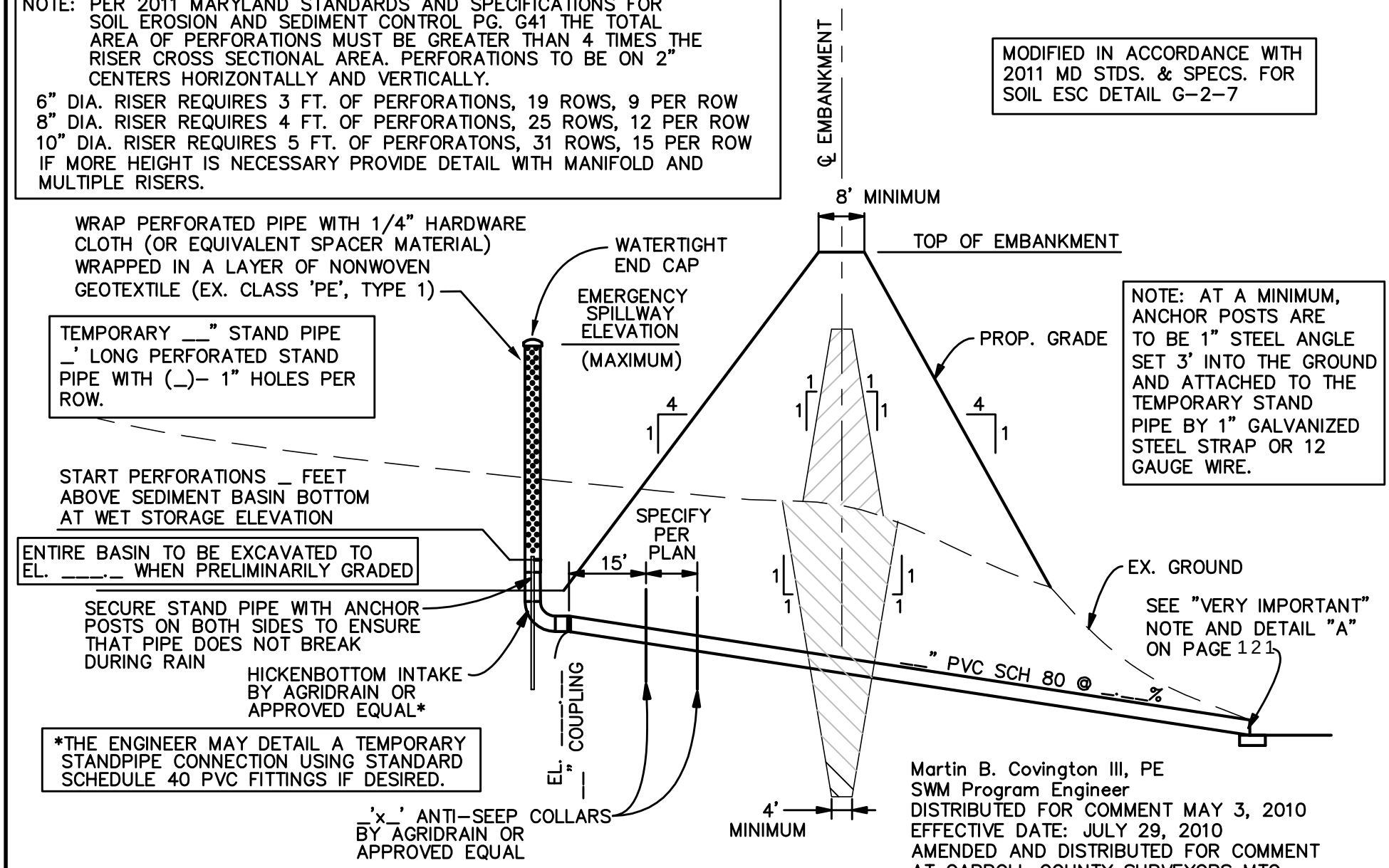
CARROLL COUNTY POND- SAND FILTER
POND WITHOUT RISER
TEMPORARY STAND PIPE DETAIL

NOTE: PER 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL PG. G41 THE TOTAL AREA OF PERFORATIONS MUST BE GREATER THAN 4 TIMES THE RISER CROSS SECTIONAL AREA. PERFORATIONS TO BE ON 2" CENTERS HORIZONTALLY AND VERTICALLY.

6" DIA. RISER REQUIRES 3 FT. OF PERFORATIONS, 19 ROWS, 9 PER ROW
8" DIA. RISER REQUIRES 4 FT. OF PERFORATIONS, 25 ROWS, 12 PER ROW
10" DIA. RISER REQUIRES 5 FT. OF PERFORATONS, 31 ROWS, 15 PER ROW
IF MORE HEIGHT IS NECESSARY PROVIDE DETAIL WITH MANIFOLD AND MULTIPLE RISERS.

MODIFIED IN ACCORDANCE WITH 2011 MD STDS. & SPECS. FOR SOIL ESC DETAIL G-2-7



Martin B. Covington III, PE
SWM Program Engineer
DISTRIBUTED FOR COMMENT MAY 3, 2010
EFFECTIVE DATE: JULY 29, 2010
AMENDED AND DISTRIBUTED FOR COMMENT AT CARROLL COUNTY SURVEYORS MTG. MARCH 20, 2013. EFFECTIVE DATE MAY 22, 2013

125 [77 AMENDED [

Guidance for Dam Safety Review in Carroll County, Maryland

Area of Responsibility

Carroll County Government [1] (Martin B. Covington, III, P.E.)

Hazard Classification	A
Diameter of Barrel Pipe	48-inches or less
Fill Height of Dam	less than 20 feet
Surface Area of Pond	less than 12 acres
Drainage Area	less than 320 acres
Height of Weir Wall	15 feet or less

Carroll Soil Conservation District [2] (Warren Johnson, P.E.)

Hazard Classification	A
Fill Height of Dam	20 feet or less
Drainage Area	640 acres or less (1 sq. Mile)

Maryland Department of the Environment Dam Safety [3]
(Charles Wallis, P.E. or Cas Taherion)

Hazard Classification	B or C
Fill Height of Dam	greater than 20 feet
Drainage Area-All dams in Use III watersheds with wet ponds, stream, or spring capture regardless of size.	greater than 640 acres (1 sq. Mile)

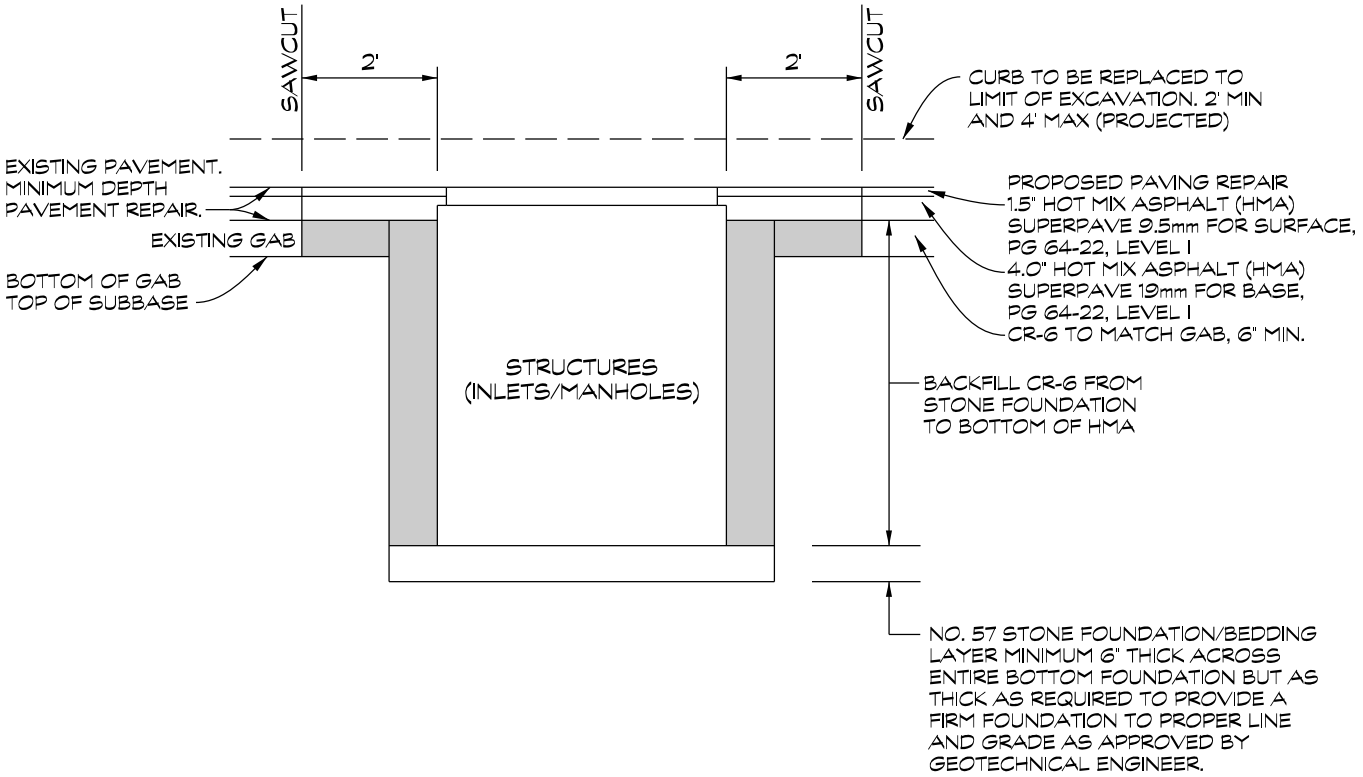
Note:

1. If a wet pond exists in a Use III watershed and the permanent pool surface area is being reduced, dam safety approval may be deferred to the Carroll Soil Conservation District (SCD). Maryland Department of the Environment briefly reviews and issues an exemption letter deferring to the Carroll SCD unless other concerns are raised.
2. Carroll County reviews plans for stormwater management facilities. If the dam is to impound water primarily for commercial/industrial uses, it will be reviewed by Carroll Soil Conservation District. [4]

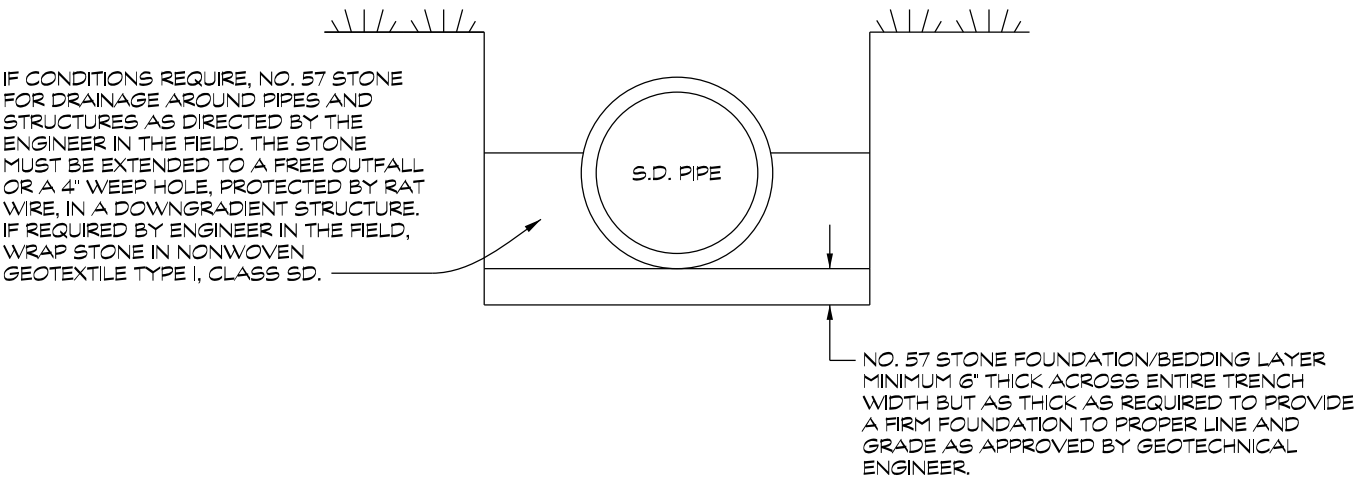
Martin B. Covington, III, P.E.
Carroll County Government
Distributed for Comment at the
Carroll County Surveyor's
Meeting: Sept. 16, 2009, March 19, 2012, Nov. 19, 2014, April 20, 2016
Effective Date: Nov. 18, 2009, Jan. 30, 2014, Jan. 21, 2015, May 20, 2016

[1] 28 January, 1994 Agreement Carroll Soil Conservation District and Carroll County Government as Revised on 15 May 1997 and 18 December 2013.
[2] Appendix B.1.2 Small Pond Approval Criteria, 2000 Maryland Stormwater Design Manual
[3] Small Pond Maintenance and Repair Flow Chart, Maryland Department of the Environment, 19 March 2009.
[4] Conversation with Warren Johnson 30 January 2014.

STONE BEDDING DETAIL FOR NEW STRUCTURES WITHIN EXISTING PAVING FOR STORMWATER MANAGEMENT RETROFIT PROJECTS



NO. 57 STONE BEDDING DETAIL FOR PIPE CONSTRUCTION (ALL SURFACES)

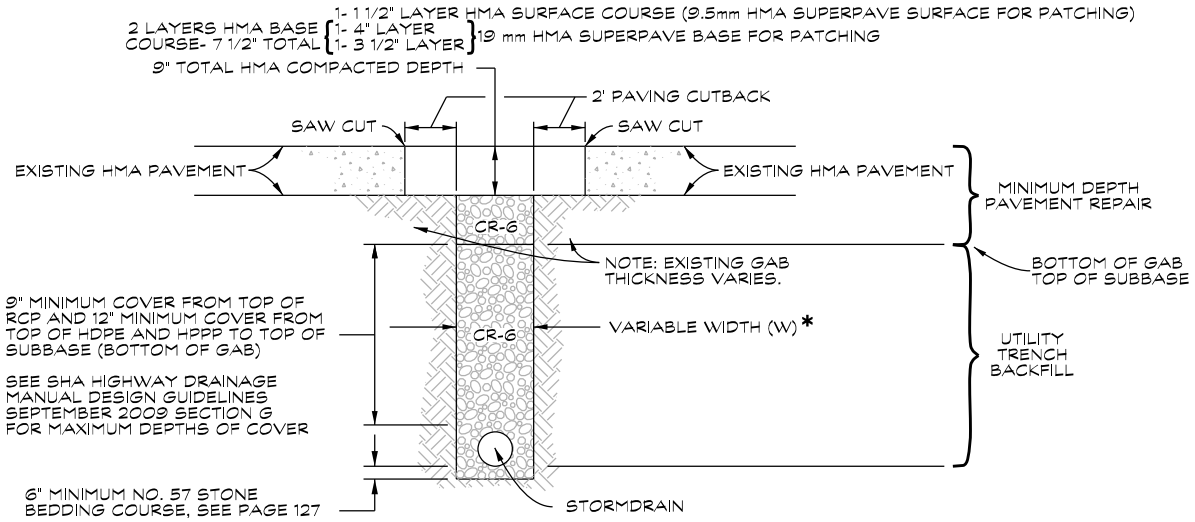


Martin B. Covington III, PE
C.C. SWM PROGRAM ENGINEER
DISTRIBUTED FOR COMMENT
CARROLL COUNTY SURVEYORS MTG
MARCH 18, 2015
EFFECTIVE DATE: MAY 20, 2015

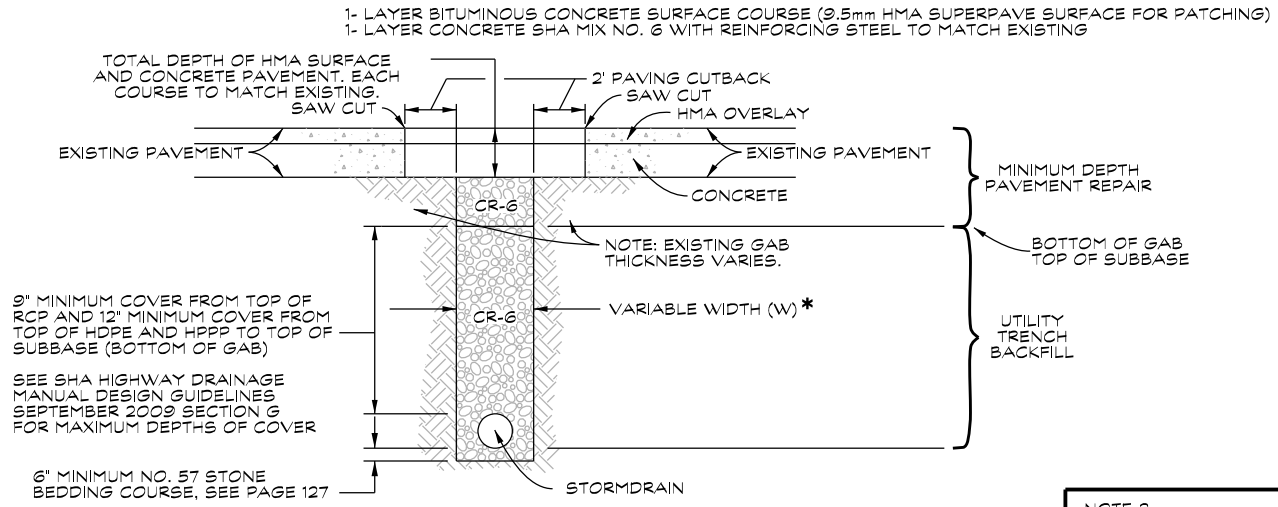
b-4/27/2015-3:12:08 PM-G:\CLS\CC_SWM_Details\details(V8).dgn--Default

MODIFIED METHOD OF CUTTING AND REPAIRING ROADWAYS FOR STORMWATER MANAGEMENT RETRO-FIT PROJECTS

BASED ON C.C.D.P.W. ROADS AND STORM DRAINS MANUAL PLATE 47



FOR EXISTING HOT MIX ASPHALT (HMA) PAVED ROADWAYS



FOR EXISTING CONCRETE PAVED ROADWAYS WITH HOT MIX ASPHALT (HMA) OVERLAYS

NOTE 3:

ABOVE A 42" PIPE A 6" SHAPED DEPRESSION MUST BE CUT INTO THE ORIGINAL GROUND FOR THE PIPE TO FIT INTO PER 303.03.02.

NOTE 1: CUTTING & REMOVING PAVEMENT, STONE & SOIL REMOVAL AND DISPOSAL, CR-6 AND EMBANKMENT SLOPE BACKFILL AND PAVEMENT PATCH ARE ALL INCLUDED IN LUMP SUM BID PRICE.

NOTE 2:

WHERE UTILITY TRENCHES EXTEND BEYOND THE ROADWAY INTO EMBANKMENT SLOPES, CR-6 BACKFILL SHALL BE USED TO THE TOE OF EMANKMENT. THE TOP ONE FOOT OF TRENCH SHALL BE TOPSOIL STABILIZED WITH SEED AND MULCH

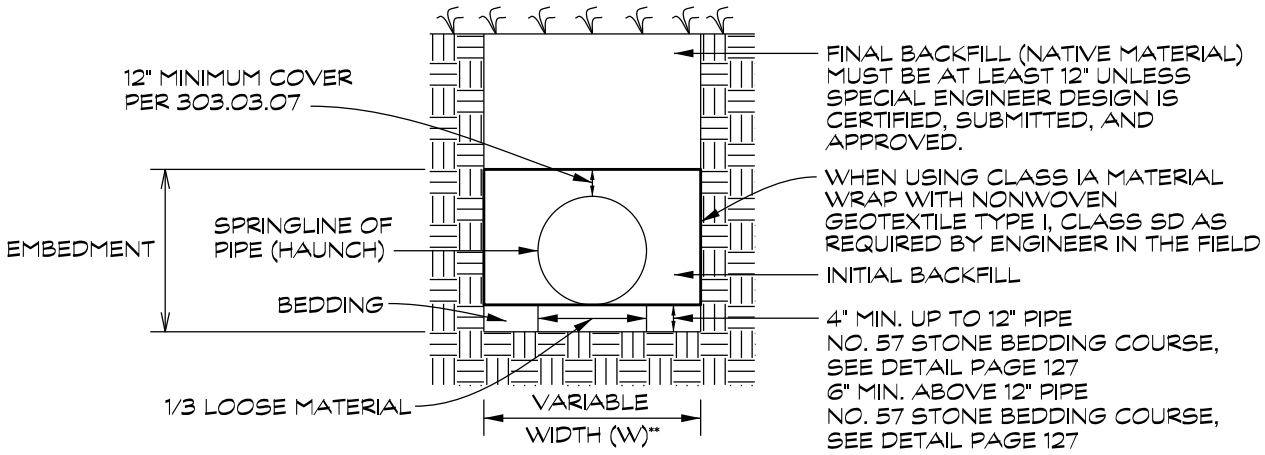
* TRENCH WIDTH FOR STORM DRAIN INSTALLATION SHALL BE EITHER TWICE THE OUTSIDE DIAMETER OF THE PIPE, OR OUTSIDE DIAMETER PLUS 3 FEET, WHICHEVER IS LESS.

Martin B. Covington III, PE
SWM Program Engineer
DISTRIBUTED FOR COMMENT
C.C. SURVEYORS MTG. SEPT. 16, 2009, MARCH 19, 2014,
NOV. 19, 2014, JAN. 21, 2015
(CORRECT REFERENCES APRIL 20, 2016)
EFFECTIVE DATES: NOV. 18, 2009, JAN. 21, 2015, MAY 20, 2016

MODIFIED METHOD OF FLEXIBLE PIPE INSTALLATION UP TO 60" PIPES (CMP,PVC,HDPE,ETC) IN UNPAVED AREAS (OPEN FIELD INSTALLATION)

FOR STORMWATER MANAGEMENT RETRO-FIT PROJECTS

BASED ON INFORMATION FROM CONTECH,ADS, LANE & HANSEN*



NOT TO SCALE

EMBEDMENT MATERIALS

1. INSTALLATION IN ACCORDANCE WITH ASTM D 2321.
2. BEDDING AND INITIAL BACKFILL CAN BE CLASS I, II, OR III MATERIAL. IF GROUNDWATER IS ENCOUNTERED THE EMBEDMENT MATERIAL MUST BE CLASS IA WRAPPED WITH GEOTEXTILE.
3. ALL PLACED IN MAXIMUM 6" LIFTS WITH CLASS IB, II, & III MATERIAL COMPACTED TO 90% PROCTOR.

SANDS & GRAVELS

MAN MADE:

CLASS IA MANUFACTURED AGGREGATES, OPEN GRADED, CLEAN CRUSHED STONE OR GRAVEL WITH LARGE VOIDS. (NO. 57)
CLASS IB MANUFACTURED PROCESSED AGGREGATES WITH SAND (GAB OR CR-6).

NATURAL:

CLASS II CLEAN, COARSE GRAINED SOILS, 1 1/2" MAXIMUM SIZE. SOIL CLASSIFICATIONS GW,GP, SW, SP, AND GW BORDERLINE GC, OR SP BORDERLINE SM.
CLASS III COARSE GRAINED SOILS WITH FINES, 1 1/2" MAXIMUM SIZE. SOIL CLASSIFICATIONS GM, GC, SM, OR SC.

*CONTECH "A-2000/D-2000/A 2026 UNLOADING/HANDLING AND INSTALLATION GUIDE" PAGES 20-25.

ADS "N-12 HP STORM TRENCH INSTALLATION DETAIL" DRAWING NO. STD-108. JAN 29, 2009.

LANE HIGH DENSITY POLYETHYLENE PIPE INSTALLATION PRACTICE PAGES 2 & 3.

HANSEN: PERSONAL COMMUNICATION

**TRENCH WIDTH FOR STORM DRAIN INSTALLATION USING CLASS IA, BACKFILL SHALL BE EITHER TWICE THE OUTSIDE DIAMETER OF THE PIPE OR OUTSIDE DIAMETER PLUS 3 FEET, WHICHEVER IS LESS.
TRENCH WIDTH FOR STORM DRAIN INSTALLATION USING CLASS IB, II, OR III BACKFILL MAY BE NO LESS THAN OUTSIDE DIAMETER OF THE PIPE PLUS 3 FEET TO ALLOW FOR COMPACTION.

MARTIN B. COVINGTON III, PE
SWM PROGRAM ENGINEER
DISTRIBUTED FOR COMMENT
C.C. SURVEYORS MTG NOV 16, 2011, MARCH 19, 2014
(CORRECT REFERENCES APRIL 20, 2016)
EFFECTIVE DATES: JAN, 2011, JAN 21, 2015, MAY 20, 2016

C. C. SWM POND RETROFIT CONSTRUCTION SPECIFICATIONS

THESE SPECIFICATIONS ARE APPROPRIATE TO ALL PONDS WITHIN THE SCOPE OF THE STANDARD FOR PRACTICE MD-378. ALL REFERENCES TO ASTM, AASHTO & MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS (MD SHA STD'S & SPEC'S), AND THE CARROLL COUNTY SUPPLEMENT TO THE 2000 MARYLAND STORMWATER DESIGN MANUAL (THE SUPPLEMENT) APPLY TO THE MOST RECENT VERSION. THESE SPECIFICATIONS ONLY APPLY TO AREAS THAT ARE PART OF OR CONTIGUOUS TO STORMWATER MANAGEMENT PONDS.

SITE PREPARATION

AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENT, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL. ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS AND SHARP BREAKS SHALL BE SLOPED TO NO STEEPER THAN 1:1. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT UNLESS OTHERWISE SPECIFIED ON THE PLANS.

AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH, AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE. FOR DRY STORMWATER MANAGEMENT PONDS, A MINIMUM OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED.

ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

EARTH FILL

MATERIAL - THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6", FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUT OFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR CL AND MUST HAVE AT LEAST 30% PASSING THE #200 SIEVE. CONSIDERATION MAY BE GIVEN TO THE USE OF OTHER MATERIALS IN THE EMBANKMENT IF DESIGNED BY A GEOTECHNICAL ENGINEER. SUCH SPECIAL DESIGNS MUST HAVE CONSTRUCTION SUPERVISED BY A GEOTECHNICAL ENGINEER.

MATERIALS USED IN THE OUTER SHELL OF THE EMBANKMENT MUST HAVE THE CAPABILITY TO SUPPORT VEGETATION OF THE QUALITY REQUIRED TO PREVENT EROSION OF THE EMBANKMENT.

PLACEMENT - AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. FILL MATERIALS SHALL BE PLACED IN MAXIMUM 8 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL. THE MOST PERMEABLE BORROW MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE PRINCIPAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

COMPACTION - THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OF HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF A SHEEPSFOOT, RUBBER TIRED OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT.

WHEN REQUIRED BY THE REVIEWING AGENCY THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN ± 2% OF THE OPTIMUM. EACH LAYER OF FILL SHALL BE COMPACTED AS NECESSARY TO OBTAIN THAT DENSITY, AND IS TO BE CERTIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY AASHTO METHOD T-99 (STANDARD PROCTOR).

CUT OFF TRENCH - THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION, WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GRADE OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

EMBANKMENT CORE - THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL BE A MINIMUM OF FOUR FEET. THE HEIGHT SHALL EXTEND UP TO AT LEAST THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. IN ADDITION, THE CORE SHALL BE PLACE CONCURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.

STRUCTURE BACKFILL

BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL NEEDS TO FILL COMPLETELY ALL SPACES UNDER AND ADJACENT TO THE PIPE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF A STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE, UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE.

FLOWABLE FILL

STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MD SHA STD'S & SPEC'S, SECTION 314 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 PSI; 28 DAY UNCONFINED COMPRESSIVE STRENGTH. THE FLOWABLE FILL SHALL HAVE A MINIMUM PH OF 4.0 AND A MINIMUM RESISTIVITY OF 2,000 OHM-CM. WHEN USED TO FILL THE ANNULAR SPACES IN SLEEVED OR ABANDONED PIPES OR CULVERTS THE FLOWABLE FILL MUST CONTAIN AT LEAST 600 LBS OF FLY ASH PER CUBIC YARD ALONG WITH THE SAND, PORTLAND CEMENT AND WATER. PRIOR TO FLOWABLE FILLING THE CERTIFYING ENGINEER MUST APPROVE THE PLUGS AND VENT/STAND PIPES AS WELL AS ALL BRACING, WEIGHTS, ETC. USED TO HOLD ANY SLEEVES, LINES, OR OTHER UTILITIES TO LINE AND GRADE. WHEN USED IN AN OPEN CUT IN AN EMBANKMENT, IN PLACE OF CORE MATERIAL, FLOWABLE FILL MATERIAL SHALL BE PLACED SUCH THAT A MINIMUM OF 6'(MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE UNDER (BEDDING), OVER AND, ON THE SIDES OF THE PIPE. IT ONLY NEEDS TO EXTEND UP TO THE SPRING LINE FOR RIGID CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE NO MORE THAN 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE. WHEN USING FLOWABLE FILL, ALL METAL PIPE SHALL BE BITUMINOUS COATED. ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL VOIDS ADJACENT TO THE FLOWABLE FILL ZONE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF A STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE. BACKFILL MATERIAL OUTSIDE THE STRUCTURAL BACKFILL (FLOWABLE FILL) ZONE SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

Martin B. Covington III, PE
C.C. SWM PROGRAM ENGINEER
MAY 2013, SEPT 17, 2014

C. C. SWM POND RETROFIT CONSTRUCTION SPECIFICATIONS

PIPE CONDUITS

ALL PIPES SHALL BE CIRCULAR IN CROSS SECTION.

NOTE: CORRUGATED METAL PIPE MAY NOT BE USED IN THE CONSTRUCTION OF PONDS IN CARROLL COUNTY.

CORRUGATED METAL PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR CORRUGATED METAL PIPE:

1A. MATERIALS - (POLYMER COATED STEEL PIPE) - STEEL PIPES WITH POLYMERIC COATINGS SHALL HAVE A MINIMUM COATING THICKNESS OF 0.01 INCH (10 MIL) ON BOTH SIDES OF THE PIPE. THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATIONS M-245 & M-246 WITH WATERTIGHT COUPLING BANDS OR FLANGES.

1B. MATERIALS - ALUMINUM COATED STEEL PIPE (CMP) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-274 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM COATED STEEL PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COMPOUND. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT.

1C. MATERIALS - ALUMINUM PIPE (ALCMP) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-196 OR M-211 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT. HOT DIP GALVANIZED BOLTS MAY BE USED FOR CONNECTIONS. THE PH OF THE SURROUNDING SOILS SHALL BE BETWEEN 4 AND 9.

2. COUPLING BANDS, ANTI-SEEP COLLARS, END SECTIONS, ETC., MUST BE COMPOSED OF THE SAME MATERIAL AND COATINGS AS THE PIPE. METALS MUST BE INSULATED FROM DISSIMILAR MATERIALS WITH USE OF RUBBER OR PLASTIC INSULATING MATERIALS AT LEAST 24 MILS IN THICKNESS.

3. CONNECTIONS - ALL CONNECTIONS WITH PIPES MUST BE COMPLETELY WATERTIGHT. THE DRAIN PIPE OR BARREL CONNECTION TO THE RISER SHALL BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ANTI-SEEP COLLARS SHALL BE CONNECTED TO THE PIPE IN SUCH A MANNER AS TO BE COMPLETELY WATERTIGHT. DIMPLE BANDS ARE NOT CONSIDERED TO BE WATERTIGHT.

ALL CONNECTIONS SHALL USE A RUBBER OR NEOPRENE GASKET WHEN JOINING PIPE SECTIONS. THE END OF EACH PIPE SHALL BE RE-ROLLED AN ADEQUATE NUMBER OF CORRUGATIONS TO ACCOMMODATE THE BANDWIDTH. THE FOLLOWING TYPE CONNECTIONS ARE ACCEPTABLE FOR PIPES LESS THAN 24 INCHES IN DIAMETER: FLANGES ON BOTH ENDS OF THE PIPE WITH A CIRCULAR 3/8 INCH CLOSED CELL NEOPRENE GASKET, PRE-PUNCHED TO THE FLANGE BOLT CIRCLE, SANDWICHED BETWEEN ADJACENT FLANGES; A 12-INCH WIDE STANDARD LAP TYPE BAND WITH 12-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET; AND A 12-INCH WIDE HUGGER TYPE BAND WITH O-RING GASKETS HAVING A MINIMUM DIAMETER OF 1/2 INCH GREATER THAN THE CORRUGATION DEPTH. PIPES 24 INCHES IN DIAMETER AND LARGER SHALL BE CONNECTED BY A 24 INCH LONG ANNULAR CORRUGATED BAND USING A MINIMUM OF 4 (FOUR) RODS AND LUGS, 2 ON EACH CONNECTING PIPE END. A 24-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET WILL BE INSTALLED WITH 12 INCHES ON THE END OF EACH PIPE. FLANGED JOINTS WITH 3/8 INCH CLOSED CELL GASKETS THE FULL WIDTH OF THE FLANGE ARE ALSO ACCEPTABLE. HELICALLY CORRUGATED PIPE SHALL HAVE EITHER CONTINUOUSLY WELDED SEAMS OR HAVE LOCK SEAMS WITH INTERNAL CAULKING OR A NEOPRENE BEAD.

4. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

5. BACKFILLING SHALL CONFORM TO 'STRUCTURE BACKFILL".

6. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

REINFORCED CONCRETE PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR REINFORCED CONCRETE PIPE:

NOTE: REINFORCED CONCRETE PIPE, ASTM C-361 IS REQUIRED IN CARROLL COUNTY FOR BARRELL PIPE AND LEVEL INCOMING STORM DRAINS AND LEVEL OUTFALLS. SEE PAGES 171 & 121 OF THE SUPPLEMENT.

1. MATERIALS - REINFORCED CONCRETE PIPE (RCCP, ASTM C-361) 15"-120" DIAMETER SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS AND SHALL EQUAL OR EXCEED ASTM C-361.

2. BEDDING - REINFORCED CONCRETE BARRELL PIPE CONDUITS SHALL BE LAID IN A CONCRETE BEDDING / CRADLE FOR THEIR ENTIRE LENGTH. THIS BEDDING / CRADLE SHALL CONSIST OF HIGH SLUMP CONCRETE PLACED UNDER THE PIPE AND UP THE SIDES OF THE PIPE AT LEAST 50% OF ITS OUTSIDE DIAMETER WITH A MINIMUM THICKNESS OF 6 INCHES. WHERE A CONCRETE CRADLE IS NOT NEEDED FOR STRUCTURAL REASONS, FLOWABLE FILL MAY BE USED AS DESCRIBED IN THE "STRUCTURE BACKFILL" SECTION OF THIS STANDARD. GRAVEL BEDDING IS NOT PERMITTED.

3. LAYING PIPE - BELL AND SPIGOT PIPE SHALL BE PLACED WITH THE BELL END UPSTREAM. JOINTS SHALL BE MADE IN ACCORDANCE WITH RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL. AFTER THE JOINTS ARE SEALED FOR THE ENTIRE LINE, THE BEDDING SHALL BE PLACED SO THAT ALL SPACES UNDER THE PIPE ARE FILLED. CARE SHALL BE EXERCISED TO PREVENT ANY DEVIATION FROM THE ORIGINAL LINE AND GRADE OF THE PIPE. THE FIRST JOINT MUST BE LOCATED WITHIN 4 FEET FROM THE RISER.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

NOTE: REINFORCED CONCRETE PIPE, CLASS IV IS REQUIRED IN CARROLL COUNTY FOR NON-PRESSURE STORM DRAIN APPLICATIONS IN PAVED AREAS. THIS DOES NOT INCLUDE LEVEL OUTFALLS.

1. MATERIAL - AASHTO SPECIFICATIONS M170 WITH JOINTS PER SHA 303.03.04

2. BEDDING - PER SHA 303.03.02 EXCEPT UNDER EXISTING ROADWAYS WHERE THE "MODIFIED METHOD OF CUTTING AND REPAIRING ROADWAYS" (PAGE 128 OF THE SUPPLIMENT) APPLIES.

3. LAYING PIPE - PER SHA 303.03.03

4. BACKFILL - PER SHA 303.03.07 EXCEPT UNDER EXISTING ROADWAYS WHERE THE "MODIFIED METHOD OF CUTTING AND REPAIRING ROADWAYS" (PAGE 128 OF THE SUPPLIMENT) APPLIES.

PLASTIC PIPE - THE FOLLOWING CRITERIA SHALL APPLY FOR PLASTIC PIPE:

NOTE: PLASTIC PIPE MAY ONLY BE USED IN CARROLL COUNTY STORMWATER MANAGEMET PONDS AS FOLLOWS.

1A. MATERIALS - POLYVINYL CHLORIDE (PVC PIPE) FOR USE AS UNDERDRAIN PIPE PER PAGE 87 OF THE SUPPLEMENT. 4"-15" DIAMETER PVC PIPE SHALL BE PVC-1120 OR PVC-1220 CONFORMING TO ASTM D-1785 OR ASTM D-2241.

Martin B. Covington III, PE
C.C. SWM PROGRAM ENGINEER
MAY 2013, SEPT 17, 2014

C. C. SWM POND RETROFIT CONSTRUCTION SPECIFICATIONS

1B. MATERIALS - CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE FOR UNDERDRAIN PIPE PER PAGE 87 OF THE SUPPLEMENT. DOUBLE WALL HDPE PIPE, COUPLINGS AND FITTINGS SHALL CONFORM TO THE FOLLOWING: 4'-10' DIAMETER PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M252 TYPE S, AND 12" THROUGH 15" DIAMETER SHALL MEET THE REQUIREMENTS OF AASHTO M294 TYPE S.

1C. MATERIALS - HIGH PERFORMANCE POLYPROPYLENE (HPPP) PIPE FOR LEVEL INCOMING STORM DRAINS. 15"-30" DIAMETER DOUBLE WALLED PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F2736 WITH WATERTIGHT JOINTS MEETING OR EXCEEDING ASTM D3212 TO 25-FEET OF HEAD. 36" TO 60" DIAMETER TRIPLE WALLED PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F2764 WITH WATERTIGHT JOINTS MEETING OR EXCEEDING ASTM D3212 TO 25-FEET OF HEAD (10.8 PSI).

1D. MATERIALS- STEEL REINFORCED POLYETHYLENE RIBBED (SRPE) PIPE FOR LEVEL INCOMING STORM DRAINS. 24"-72" DIAMETER PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM F2562 WITH WATERTIGHT JOINTS MEETING OR EXCEEDING ASTM D3212 TO 25-FEET OF HEAD.

2. JOINTS AND CONNECTIONS TO ANTI-SEEP COLLARS SHALL BE COMPLETELY WATERTIGHT.

3. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE SHOWN ON THE DRAWINGS.

NOTE: CORRUGATED SMOOTH CORE HDPE AND PVC PIPE MAY BE USED IN CARROLL COUNTY FOR NON- PRESSURE STORM DRAINS IN UNPAVED AREAS. THIS DOES NOT INCLUDE LEVEL OUTFALLS.

1. MATERIAL- HDPE AASHTO SPECIFICATION M294 AND PVC AASHTO SPECIFICATION M304 WITH JOINTS PER SHA 303.03.04.

2. BEDDING & BACKFILL- PER THE "MODIFIED METHOD OF FLEXIBLE PIPE INSTALLATION IN UNPAVED AREAS" (PAGE 129 OF THE SUPPLEMENT).

3. LAYING PIPE- PER SHA 303.03.03.

DRAINAGE DIAPHRAGMS - WHEN A DRAINAGE DIAPHRAGM IS USED, A REGISTERED PROFESSIONAL ENGINEER WILL SUPERVISE THE DESIGN AND CONSTRUCTION INSPECTION.

CONCRETE

MATERIALS

CONCRETE SHALL MEET THE REQUIREMENTS OF MD SHA STD'S & SPEC'S, SECTION 902, MIX NO. 3 FOR CAST IN PLACE STRUCTURES AND MIX NO. 6 FOR PRECAST STRUCTURES.

STRUCTURES

ALL CONCRETE STRUCTURES SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS. WHERE STANDARD OR MODIFIED CARROLL COUNTY OR STATE HIGHWAY ADMINISTRATION STRUCTURES ARE CALLED FOR, ALL STANDARD SPECIFICATIONS APPLY UNLESS OTHERWISE NOTED ON THE PLANS. ALL EXPOSED EDGES ON CONCRETE STRUCTURES SHALL HAVE 1" x 1" CHAMFERS OR AS DIRECTED.

CAST IN PLACE STRUCTURES

PLACE CONCRETE IN ONE CONTINUOUS OPERATION IN A SMOOTH FLOW WITHOUT SEGREGATION. CONCRETE MAY BE DROPPED INSIDE THE FORMS UP TO 4 FEET PROVIDING THAT FORMS AND REINFORCING STEEL ARE SUFFICIENTLY STRONG TO WITH STAND THE IMPACT WITHOUT BUCKLING. MECHANICAL VIBRATION MUST BE PERFORMED, INSIDE THE FORMS, THROUGHOUT THE FILLING OPERATION TO CONSOLIDATE THE ENTIRE MASS OF CONCRETE FROM BOTTOM TO TOP. USE CHUTES, TREMIES OR PUMPING WHERE A DROP OF MORE THAN 4 FEET IS REQUIRED.

A YEAR BUILT DATE MUST BE CAST INTO THE LARGEST CAST IN PLACE STRUCTURE ON EACH PROJECT. PER MD SHA STANDARDS AND SPECIFICATIONS SECTION 420.03.02 (P). A COUNTY SUPPLIED SURVEY MARKER MUST BE CAST INTO THE TOP OF ONE UNOBSTRUCTED CAST IN PLACE STRUCTURE ON EACH PROJECT.

ROCK RIP-RAP

ROCK RIP-RAP SHALL MEET THE REQUIREMENTS OF MD SHA STD'S & SPEC'S, SECTION 311.

GEOTEXTILE SHALL BE PLACED UNDER RIP-RAP WHERE SHOWN ON THE PLANS AND SHALL MEET THE REQUIREMENTS OF MD SHA STD'S & SPEC'S, SECTION 921.09, CLASS SD.

FILTER MEDIA (STANDARD)

SAND: SHALL MEET THE GRADATION REQUIREMENTS OF ASTM C-33. NATURAL OR MANUFACTURED SAND MAY BE USED.

SOIL: SHALL BE SANDY LOAM OR SILTY LOAM AS DEFINED BY THE USDA TEXTURAL TRIANGELE WITH 20% OR LESS CLAY CONTINGENT.

GREEN WOOD CHIPS: SHALL BE UNTREATED LIVE WOOD GROUND TO MAXIMUM CHIP DIMENSION OF 2".

MIXTURE: UNLESS OTHERWISE NOTED ON THE PLANS THE FILTER MEDIA SHALL BE THROUGHLY MIXED AT A 4:1:1 SAND, SOIL, GREEN WOOD CHIP RATIO.

FILTER MEDIA (NUTRIENT REMOVAL)

ENHANSED NITROGEN REMOVAL FILTER

SUBSTITUTE GREEN WOOD CHIPS FOR STONE IN THE RECHARGE RESERVOIR BELOW THE NO. 8 STONE CHOKER COURSE. CALCULATIONS REMAIN AS PER PAGE 70 SECTION 1 (A) OF THE SUPPLEMENT.

ENHANSED PHOSPHORUS REMOVAL FILTER

THOROUGHLY MIX IRON INTO THE FILTER MEDIA AT A 6:2:1:1 SAND, SOIL, GREEN WOOD CHIP, IRON RATIO.

IRON

IRON AGGREGATE BYPRODUCT MATERIAL CONTAINING AT LEAST 50% IRON OXIDES BY WEIGHT WITH THE REMAINDER OTHER METALS SUBSTITUTING FOR IRON IN THE OXIDE STRUCTURE. THE AGGREGATE CANNOT BE COURSER THAN THE GRADATION REQUIREMENTS OF NO. 7 STONE AS DEFINED IN SECTION 901 OF THE MD SHA STD'S AND SPEC'S. A REPRESENTATIVE CHEMICAL AND SIZE DISTRICUTION ANALYSIS OF THE MATERIAL MUST BE APPROVED BY THE ENGINEER PRIOR TO DELIVERY. THE PRESENCE OF TOXIC COMPOUNDS OR COURSER MATERIAL WILL BE GROUNDS FOR REJECTION.

CARE OF WATER DURING CONSTRUCTION

ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DIKES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT THE AREAS TO BE OCCUPIED BY THE PERMANENT WORKS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL NECESSARY PUMPING AND OTHER EQUIPMENT REQUIRED FOR REMOVAL OF WATER FROM VARIOUS PARTS OF THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER AS REQUIRED OR DIRECTED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE WHATSOEVER OF THE FLOW OF WATER TO THE SPILLWAY OR OUTLET WORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OR MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL THE FULL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM OF REQUIRED EXCAVATIONS AND THAT WILL ALLOW SATISFACTORY PERFORMANCE OF ALL CONSTRUCTION OPERATIONS. DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS, THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE EXCAVATION. AT SUCH LOCATIONS THE WATER SHALL BE PUMPED FROM EXCAVATED SUMPS.

STABILIZATION

ALL BORROW AREAS SHALL BE GRADED TO PROVIDE PROPER DRAINAGE AND LEFT IN A SIGHTLY CONDITION. ALL EXPOSED SURFACES OF THE EMBANKMENT, SPILLWAY, SPOIL AND BORROW AREAS, AND BERMS SHALL BE STABILIZED BY SEEDING, LIMING, FERTILIZING AND MULCHING IN ACCORDANCE WITH THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

EROSION AND SEDIMENT CONTROL

CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND AIR POLLUTION MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.

Martin B. Covington III, PE
C.C. SWM PROGRAM ENGINEER
MAY 2013, SEPT 17, 2014

Gale J. Engles, Chief
Bureau of Resource Management
410-386-2210
Fax: 410-386-2924
Toll Free 1-888-302-3978
MD RELAY Call 711 or 800-735-2258 (TTY)

Department of
Land and Resource Management
Carroll County Government
225 North Center Street
Westminster, MD 21157

Carroll County Code Implementation Policy
Stormwater Management Chapter 151

Policy on Use of Underground Stormwater Management Structures in Carroll County, Maryland.

Multiple collapses of "Milk Crate" underground systems have occurred in Carroll County, beyond the 2 year bond period. Therefore, concern for public safety requires that such systems no longer be allowed as stormwater management in Carroll County. This will be effective starting February 24, 2016.

As is current policy, the only underground systems that may be transferred to public ownership are stone/distribution pipe combinations.

MBC

Martin B. Covington, III, P.E.
CC SWM Program Engineer

12 Jan 2016
Date

Gale J. Engles

Gale J. Engles, Bureau Chief
Bureau of Resource Management

1-12-16
Date

Gail D. Kessler

Gail D. Kessler, Deputy County Attorney
Department of the County Attorney

Jan. 12 20016
Date

MBC/clm

Martin B Covington III, P.E.
Stormwater Management Program Engineer
Distributed for comment at Carroll County Surveyor's Meeting January 20, 2016

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Carroll County Stormwater Management
As-Built Submission Procedure

Please refer to Section 21 of the checklist (Page 102 and Section 151.096 (B) of the Carroll County Maryland Code of Public Local Laws and Ordinances.

Step 1
Submit a paper copy of the as-built plans comparing the approved stormwater management plan to the completed construction. All deviations are to be shown in red. The as-built block and inspection charts must be completed, signed, sealed, and certified.

Submit a paper copy of the stormwater management report with all revisions to match the completed construction shown in red.

Step 2
Once Carroll County approves the paper as-built and report, submit the completed, signed, sealed, and certified as-built plans as black and white 600 DPI TIF files. Plan views with redlined contours shall be in color 600 DPI TIF files.

Submit the as-built stormwater management report in a PDF format.

Submission to be made on a CD-R, DVD ± R, or flash drive.

If this is not within your firm's technical capability, please contact us to discuss alternatives for as-built submission.

Martin B. Covington, III, P.E.
C. C. SWM Program Engineer
Distributed at Carroll County
Surveyors Meeting April 20, 2016
for comment. Effective May 20, 2016

Stormwater Managements Easements in the Incorporated Towns/Cities

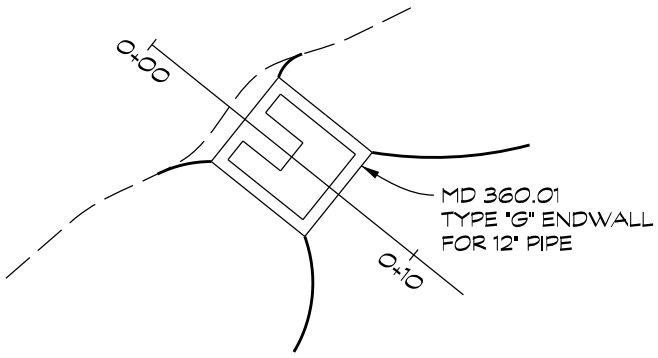
When located within an incorporated town/city, any required stormwater management easements must be granted to the municipality and recorded in the Land Records of Carroll County. To modify the easement language on the plat or plan to reference the incorporated town/city, the following language may be substituted for: County Commissioners of Carroll County, County Commissioners, or Carroll County Government:

Manchester:	"Town of Manchester"
Mount Airy:	"Town of Mount Airy"
New Windsor:	"Town of New Windsor"
Sykesville:	"Town of Sykesville"
Union Bridge	"Town of Union Bridge"
City of Westminster:	"The Mayor and Common Council of Westminster"

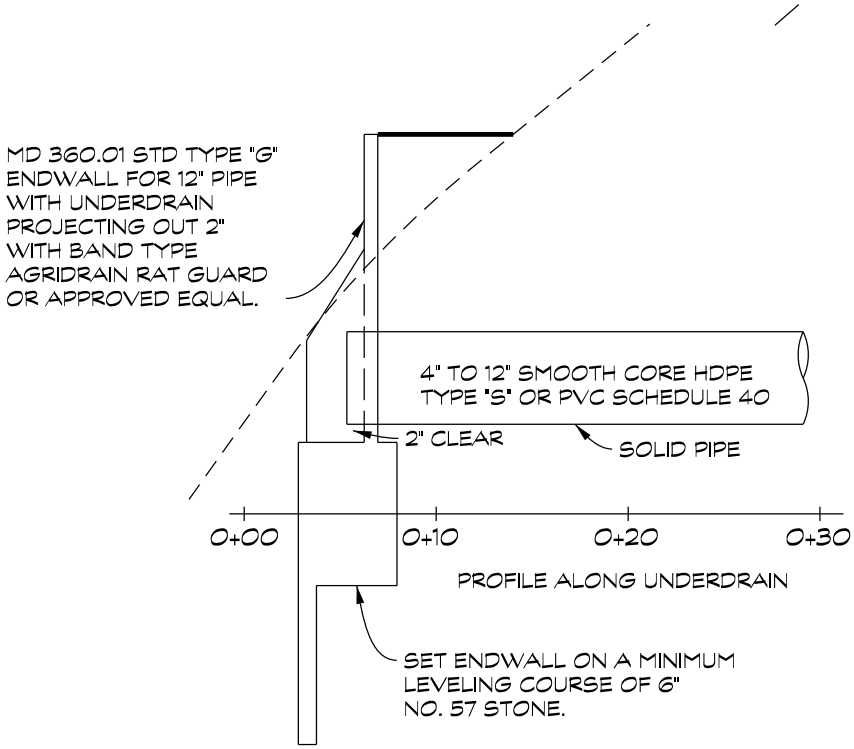
Please note: In June 2006, the Town of Hampstead elected to have all stormwater management and floodplain easements conveyed to the Commissioners of Carroll County. In April, 2016 the Town of Hampstead returned to accepting stormwater management and floodplain easements. In 2018, the Carroll County Commissioners agreed to accept stormwater management easements for drywells on residential lots in the above incorporated towns and the City of Westminster.

Effective Date: June 21, 2006
Distributed at the Carroll County Surveyor's and Engineer's Meeting
Revised to Eliminate Union Bridge
Distributed at the Carroll County Surveyors Mtg. December 20, 2006
Revised after Carroll County Surveyor's Meeting May 19, 2010
Effective Date: July 29, 2010
Revised to add Union Bridge and change easements in Town of Hampstead.
Distributed at the Carroll County Surveyors Meeting April 20, 2016.
Effective Date: May 20, 2016
Revised to require Town/City ownership of easements
Distributed at the WRCC meeting January 25, 2017 for comment
Effective Date March 1, 2017
Distributed at the Carroll County Surveyor's Meeting October 15, 2018.
Effective Date: October 15, 2018

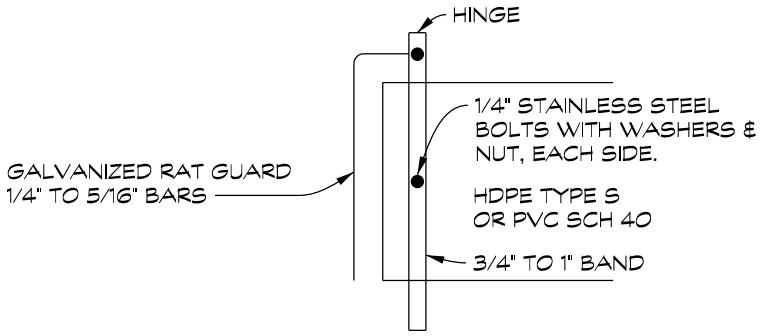
CARROLL COUNTY UNDERDRAIN OUTFALL PROTECTION (HEADWALL AND RODENT GUARD)



PLAN

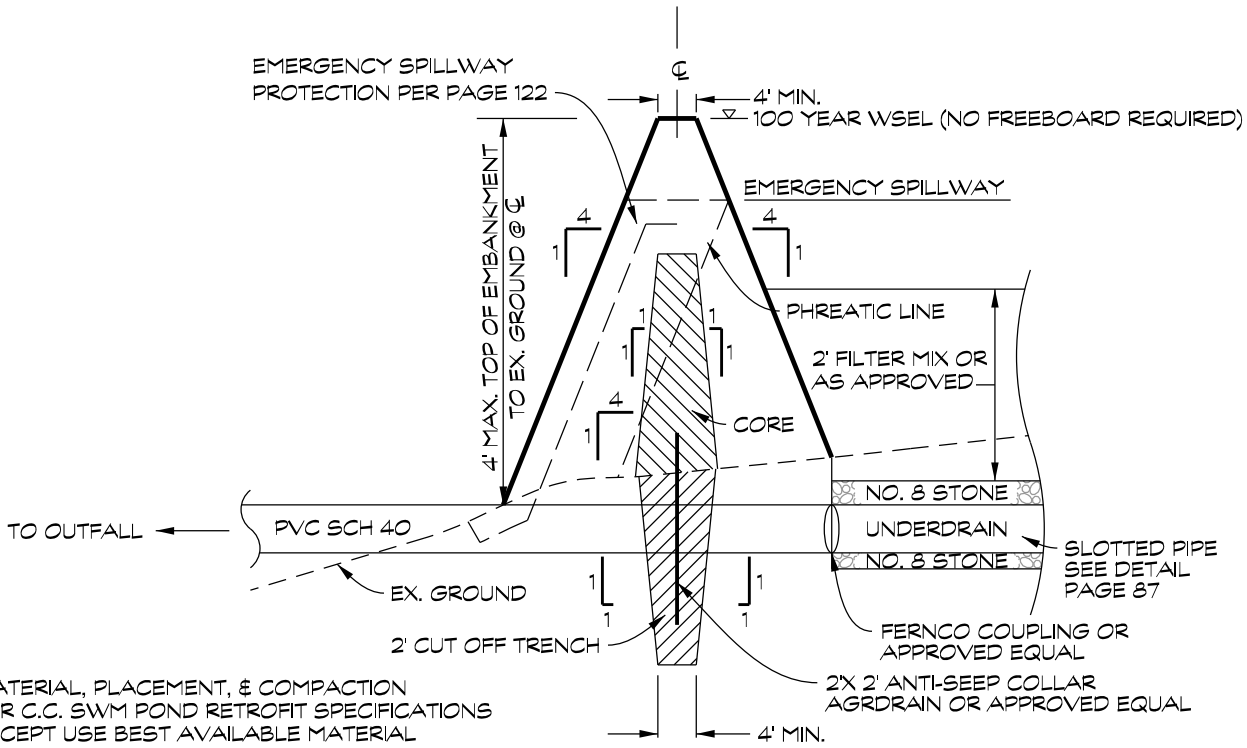


PROFILE



MARTIN B. COVINGTON III, PE
SWM PROGRAM ENGINEER
DISTRIBUTED FOR COMMENT AT
CARROLL COUNTY SURVEYORS MEETING
APRIL 20, 2016
EFFECTIVE DATE: MAY 20, 2016

WATER QUALITY STRUCTURE EXEMPT FROM MD-378 CRITERIA



MATERIAL, PLACEMENT, & COMPACTION PER C.C. SWM POND RETROFIT SPECIFICATIONS EXCEPT USE BEST AVAILABLE MATERIAL (ML MINIMUM, OR AS APPROVED BY A GEOTECHNICAL ENGINEER, TO BACK FILL CUTOFF TRENCH AND FOR EMBANKMENT CORE.

PROFILE

SCALE: HORIZ. 1"= 20'
VERT. 1"= 2'

MARTIN B. COVINGTON III, PE
SWM PROGRAM ENGINEER
DISTRIBUTED FOR COMMENT AT
CARROLL COUNTY SURVEYORS MEETING
APRIL 20, 2016
EFFECTIVE DATE: MAY 20, 2016

STORMWATER MANAGEMENT STANDARD DRYWELL INSTALLATION

MARTIN BRYAN COVINGTON, III. P.E. [1]

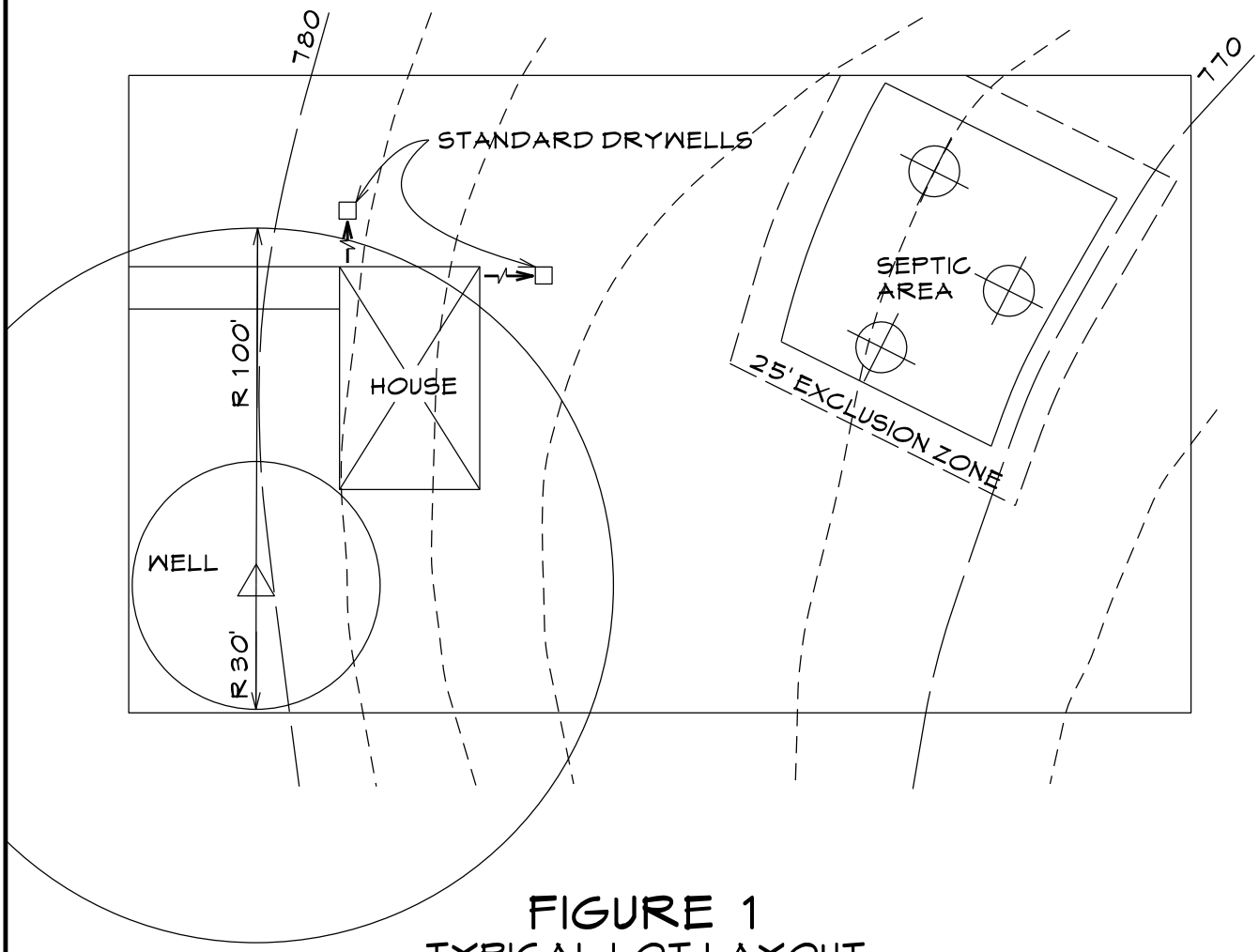


FIGURE 1
TYPICAL LOT LAYOUT

NOTES:

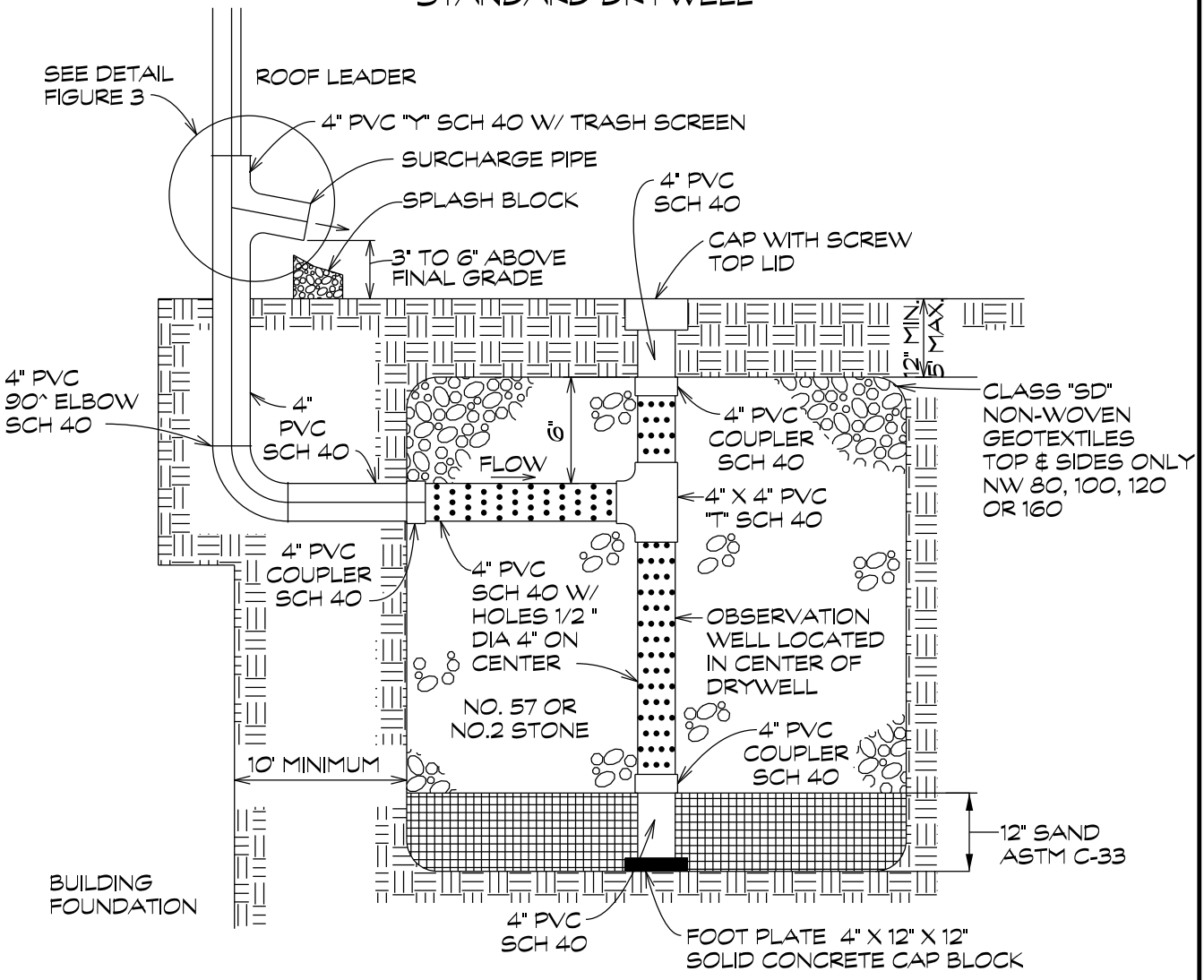
1. STANDARD CARROLL COUNTY DRYWELLS ARE NORMALLY 8'x8'x5' WITH SAND FILLING THE BOTTOM FOOT. THIS PROVIDES MINIMUM ESD STORMWATER CONTROL AND GROUNDWATER RECHARGE FOR 1000 SQUARE FEET OF ROOFTOP.
2. STANDARD DRYWELLS MUST BE LOCATED AT LEAST 100 FEET FROM ANY WELL AND AT LEAST 25 FEET FROM THE SEPTIC AREA.
3. DRY WELLS ARE TO BE INSTALLED AT OR AFTER FINAL GRADING. (WHEN DOWNSPOUTS ARE INSTALLED)
4. ALL ROOF LEADERS MUST BE CONNECTED TO THE DRYWELLS

[1] MARTIN BRYAN COVINGTON, III. P.E., PROGRAM ENGINEER, CARROLL COUNTY GOVERNMENT, MD
225 NORTH CENTER STREET, WESTMINSTER, MD 21157-2194 MCOVINGTON@CCG.CARR.ORG

REVISED TO REDUCE SIZE OF DRYWELLS
DISTRIBUTED FOR COMMENT AT
C.C. SURVEYORS MTG NOV 16, 2016
EFFECTIVE DATE: DEC 16, 2016

b-10/17/2016-9:23:11 AM-G:\CLS\CC_SWM_Details\details(V8).dgn--Default

FIGURE 2
STANDARD DRYWELL



NOTES:

1. IF USING ONE DRYWELL THE STANDARD DRYWELL IS 8' X 8' X 5' WITH SAND FILLING THE BOTTOM FOOT. THIS PROVIDES MINIMUM ESD ("1") STORMWATER CONTROL FOR 1000 SQUARE FEET OF ROOFTOP. IF ADDITIONAL CONTROL IS REQUIRED TO PROVIDE TOTAL ESD TO MEP (UP TO 2.6") LARGER PRACTICES MAY BE USED. DRYWELLS LARGER THAN 216 FT^3 OF STORAGE VOLUME MUST BE DESIGNED AS INFILTRATION FACILITIES.

2. MINIMUM SETBACKS:
   A. 100 FT FROM WELLS
   B. 25 FT FROM SEPTIC AREAS
   C. 10 FT FROM BUILDINGS

3. FROM THE DOWNSPOUT TO THE DRYWELL THE DRAIN PIPE MUST BE AT LEAST 6" BELOW GRADE.

4. THE LOCATIONS AND SIZE OF ALL DRYWELLS MUST BE SHOWN ON THE GRADING PLOT PLAN.

5. THESE GEOTEXTILES ARE AVAILABLE IN FINKSBURG @ ES&G DISTRIBUTORS 2601 EMORY RD. BLDG 8. 866-744-5001, ANY EQUIVALENT GEOTEXTILE IS ACCEPTABLE.

Martin B. Covington III, PE
ORIGINALLY EFFECTIVE APRIL, 2006
REVISED TO REDUCE DA AUGUST, 2016
DISTRIBUTED AT C.C. SURVEYORS MTG
FOR COMMENT NOV 16, 2016
EFFECTIVE DATE: DEC 16, 2016

CARROLL COUNTY SOILS TESTING POLICY FOR PROPOSED INFILTRATION/RECHARGE FACILITIES

Soils classifications and field infiltration rate testing must be performed for all proposed structural infiltration/recharge facilities.

Testing is to be conducted by a qualified professional. This professional shall either be a registered professional engineer, or soils scientist or geologist and licensed by the State of Maryland.[1]

Follow Test Pit/Boring Requirements per Appendix D.1, Pages 2 and 3 of the "Manual".

TEST PITS:

Test pits must be used where the bottom of the proposed facility can be within 16 feet of the existing ground elevation. Infiltration/recharge must be accomplished, if possible. Facilities may not arbitrarily be designed greater than 16 feet below grade to avoid test pit requirements.

Proposed infiltration facilities must have double-ring infiltrometer tests and sieve analyses performed at the proposed bottom elevation. Then the test pits must be extended 4 feet below the proposed bottom elevation of the facility with additional sieve analyses performed.[2] The presence or absence of bedrock, groundwater, or indicators of seasonal high water table must be noted. The double-ring infiltrometer tests must be performed in accordance with ASTM-D 3385 "Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer".

SOIL BORINGS:

When the bottom of the proposed facility must be 16 feet or greater below the existing ground elevation, you may use soil borings and the "Falling Head Infiltration Rate Test" at your own risk. If the soil borings produce disputed information, the County reserves the right to require test pits.

Follow Infiltration Testing Requirements per Appendix D.1, Pages 3 and 4 of the "Manual" with the following exceptions:

1. A 6" solid casing may be used in place of the specified 5" casing. A 5" casing is the minimum diameter casing that Carroll County will accept.
2. Two inches of No. 8 stone (pea gravel) must be placed in the bottom of the casing to protect the soil from scouring and sedimentation.
3. Only 24" of water is to be used in the pre-soak and the infiltration testing. It is the registered professional engineer, soils scientist or geologist's responsibility to have the necessary equipment to accurately measure water levels in the casing.

GENERAL:

1. All test pits or borings must be backfilled immediately, labeled and staked.[3] If the area is to be developed, the backfill should be adequately compacted to support the intended use,
2. Reports must be certified by the registered professional on site during testing. The attached certification block must be completed and on the cover page of the report. Uncertified reports will not be accepted.

1 2000 MD Stormwater Design Manual, Volumes I and II, Appendix D.1, Page 1.
2 *Carroll County Stormwater Management Plan Review Checklist, pages vi-vii.*
3 *2000 MD Stormwater Design Manual, Volumes I and II, Appendix D.1, Page 3.*

Infiltration Testing Certification

I was on site and either I or personnel under my direct supervision conducted the field infiltration testing described in this report. I certify that the testing met the requirements of the current Carroll County Soils Testing Policy for Proposed Infiltration/Recharge Facilities and all referenced standards.

_____	_____
Signature of Registered Professional Engineer, Soils Scientist or Geologist	*Date*
_____	_____
Maryland License Number	*Seal*

Originally issued March 16, 2005 Martin B. Covington, III, P.E.
Revision effective October 18, 2006 Myron R. Frock
Distributed at C.C. Surveyor's Meeting
Revised after Carroll County Surveyors Meeting on May 19, 2010.
Effective Date: July 29, 2010
Revised to add specific requirements for bedrock, groundwater, and seasonal high water
Distributed for comments at Carroll county Surveyor's Meeting October 15, 2018
Effective Date: November 15, 2018

1 *2000 MD Stormwater Design Manual, Volumes I and II, Appendix D.1, Page 1.*
2 *Carroll County Stormwater Management Plan Review Checklist, effective June 8, 2004, Page* 5.
3 *2000 MD Stormwater Design Manual, Volumes I and II, Appendix D.1, Page 3.*

CARROLL COUNTY-PUBLIC FACILITY
CONSTRUCTED BY THE DEVELOPER
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the developer.

2. The developer shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage until it is accepted by Carroll County. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The developer shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the developer is responsible to make repairs as quickly as possible (30 day maximum). If after 30 days, Carroll County Government performs the necessary work to place the facility in proper working condition, the developer of the facility shall be assessed the cost of the work and any penalties. These monies shall first be collected from a bond, which the developer is required to post with the County to cover such expenses. Should the bond be insufficient, the remaining monies may be collected by placing a lien on the property or by including the costs and penalties on the property tax bill and collecting them as ordinary taxes. The bond and/or lien and/or tax bill will be used until such time as the County takes the facility into its system.

4. Maintenance of the facility shall be until accepted for maintenance by the County which will be no sooner than two years after completion of the facility at which time the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. The developer shall provide in a deed, an in-fee parcel for the site of the facilities and an in-fee access from the facility to a public right-of-way.

First Effective January 21, 2004
Revised after Carroll County Surveyor's Meeting May 19, 2010
Effective Date: July 29, 2010
Revised to include specifics for ESD
Distributed for comments at the Carroll County Surveyor's Meeting October 15, 2018
Effective Date: November 15, 2018

12 Amended

TOWN OF SYKESVILLE – PUBLIC FACILITY
CONSTRUCTED BY THE DEVELOPER
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the developer.

2. The developer shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs and debris and repairing any structural damage until it is accepted by the Town of Sykesville. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The developer shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the developer is responsible to make repairs as quickly as possible (30 day maximum). If after 30 days, the Town of Sykesville performs the necessary work to place the facility in proper working condition, the developer of the facility shall be assessed the cost of the work and any penalties. These monies shall first be collected from a bond, which the developer is required to post with the Town to cover such expenses. Should the bond be insufficient, the remaining monies may be collected by placing a lien on the property or by including the costs and penalties on the property tax bill and collecting them as ordinary taxes. This bond will be used until such time as the Town takes the facility into its system. The bond and/or lien and/or tax bill will be used until such time as the Town takes the facility into its system.

4. Maintenance of the facility shall be until accepted for maintenance by the Town which will be no sooner than two years after completion of the facility at which time the Carroll County Bureau of Resource Management shall certify that the facility is in proper working conditions. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. The developer shall provide in a deed, an in-fee parcel for the site of the facilities and an in-fee access from the facility to a public right-of –way.

First effective January 21, 2004
Revised after Carroll County Surveyor's Meeting May 19, 2010
Effective Date: July 29, 2010
Revised to include specifics for ESD
Distributed for comments at the Carroll County Surveyor's Meeting October 15, 2018
Effective Date: November 15, 2018

TOWN OF NEW WINDSOR – PUBLIC FACILITY
CONSTRUCTED BY THE DEVELOPER
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the developer.

2. The developer shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs and debris and repairing any structural damage until it is accepted by the Town of New Windsor. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The developer shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the developer is responsible to make repairs as quickly as possible (30 day maximum). If after 30 days, the Town of New Windsor performs the necessary work to place the facility in proper working condition, the developer of the facility shall be assessed the cost of the work and any penalties. These monies shall first be collected from a bond, which the developer is required to post with the Town to cover such expenses. Should the bond be insufficient, the remaining monies may be collected by placing a lien on the property or by including the costs and penalties on the property tax bill and collecting them as ordinary taxes. The bond and/or lien and/or tax bill will be used until such time as the Town takes the facility into its system.

4. Maintenance of the facility shall be until accepted for maintenance by the Town which will be no sooner than two years after completion of the facility at which time the Carroll County Bureau of Resource Management shall certify that the facility is in proper working conditions. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. The developer shall provide in a deed, an in-fee parcel for the site of the facilities and an in-fee access from the facility to a public right-of –way.

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TOWN OF MOUNT AIRY – PUBLIC FACILITY
CONSTRUCTED BY THE DEVELOPER
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the developer.

2. The developer shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs and debris and repairing any structural damage until it is accepted by the Town of Mount Airy. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The developer shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the developer is responsible to make repairs as quickly as possible (30 day maximum). If after 30 days, the Town of Mount Airy performs the necessary work to place the facility in proper working condition, the developer of the facility shall be assessed the cost of the work and any penalties. These monies shall first be collected from a bond, which the developer is required to post with the Town to cover such expenses. Should the bond be insufficient, the remaining monies may be collected by placing a lien on the property or by including the costs and penalties on the property tax bill and collecting them as ordinary taxes. The bond and/or lien and/or tax bill will be used until such time as the Town takes the facility into its system.

4. Maintenance of the facility shall be until accepted for maintenance by the Town which will be no sooner than two years after completion of the facility at which time the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified the "As-Built" plans meet the plans and specifications for construction.

5. The developer shall provide in a deed, an in-fee parcel for the site of the facilities and an in-fee access from the facility to a public right-of-way.

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TOWN OF MANCHESTER – PUBLIC FACILITY
CONSTRUCTED BY THE DEVELOPER
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the developer.

2. The developer shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage until it is accepted by the Town of Manchester. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The developer shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the developer is responsible to make repairs as quickly as possible (30 day maximum). If after 30 days, the Town of Manchester performs the necessary work to place the facility in proper working condition, the developer of the facility shall be assessed the cost of the work and any penalties. These monies shall first be collected from a bond, which the developer is required to post with the Town to cover such expenses. Should the bond be insufficient, the remaining monies may be collected by placing a lien on the property or by including the costs and penalties on the property tax bill and collecting them as ordinary taxes. The bond and/or lien and/or tax bill will be used until such time as the Town takes the facility into its system.

4. Maintenance of the facility shall be until accepted for maintenance by the Town which will be one year after 80% of the houses in the development are completed, but no sooner than two years after completion of the facility at which time the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified the "As-Built" plans meet the plans and specifications for construction.

5. The developer shall provide in a deed, an in-fee parcel for the site of the facilities and an in-fee access from the facility to a public right-of-way.

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TOWN OF HAMPSTEAD- PUBLIC FACILITY
CONSTRUCTED BY THE DEVELOPER
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the developer.

2. The developer shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage until it is accepted by the Town of Hampstead. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The developer shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the developer is responsible to make repairs as quickly as possible (30 day maximum). If after 30 days, the Town of Hampstead performs the necessary work to place the facility in proper working condition, the developer of the facility shall be assessed the cost of the work and any penalties. These monies shall first be collected from a bond, which the developer is required to post with the Town to cover such expenses. Should the bond be insufficient, the remaining monies may be collected by placing a lien on the property or by including the costs and penalties on the property tax bill and collecting them as ordinary taxes. The bond and/or lien and/or tax bill will be used until such time as the Town takes the facility into its system.

4. Maintenance of the facility shall be until accepted for maintenance by the Town which will be no sooner than two years after completion of the facility at which time the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. “After completion of the facility” is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the “As-Built” plans meet the plans and specifications for construction.

5. The developer shall provide in a deed, an in-fee parcel for the site of the facilities and an in-fee access from the facility to a public right-of-way.

First effective January 21, 2004
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CITY OF WESTMINSTER - PUBLIC FACILITY
CONSTRUCTED BY THE DEVELOPER
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the developer.

2. The developer shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage until it is accepted by the City of Westminster. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The developer shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the developer is responsible to make repairs as quickly as possible (30 day maximum). If after 30 days, the City of Westminster performs the necessary work to place the facility in proper working condition, the developer of the facility shall be assessed the cost of the work and any penalties. These monies shall first be collected from a bond, which the developer is required to post with the City to cover such expenses. Should the bond be insufficient, the remaining monies may be collected by placing a lien on the property or by including the costs and penalties on the property tax bill and collecting them as ordinary taxes. The bond and/or lien and/or tax bill will be used until such time as the City takes the facility into its system.

4. Maintenance of the facility shall be until accepted for maintenance by the City which will be no sooner than two years after completion of the facility at which time the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. The developer shall provide in a deed, an in-fee parcel for the site of the facilities and an in-fee access from the facility to a public right-of-way.

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CARROLL COUNTY, HAMPSTEAD, WESTMINSTER, MT AIRY, NEW WINDSOR, SYKESVILLE, MANCHESTER
PRIVATE FACILITIES
CONSTRUCTED BY THE DEVELOPER
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed and maintained by the owner(s).

2. Owner/his heirs or assigns shall be responsible for continuing maintenance of the facility/facilities, which shall include such items as mowing, cleaning and removing sediment, trees, shrubs and debris. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included. The time period for this continuing maintenance shall be on "as-needed" basis but shall not be delayed longer than thirty (30) days.

3. Owner, his heirs or assigns shall be responsible for any structural damages or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, owner shall be responsible to make the necessary repairs as quickly as possible but in any case within thirty (30) days.

4. If after notice by the County/Town/City to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within (30) days the County/Town/City may perform all necessary work to place the facility in proper working condition. The owners of the facility shall be assessed the cost of the work and any penalties. These monies shall be collected from a bond, which the developer is required to post with the County/Town/City to cover such expenses until "completion of the facility". "Completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction. After "completion of the facility" the moneys may be collected by placing a lien on the property, or by including the costs and penalties on the property tax bill and collecting them as ordinary taxes by the County/Town/City.

5. Owner(s) shall grant right of entry to authorized County/Town/City personnel for purposes of inspection monitoring and/or repair. Site visits for inspection and/or monitoring shall be conducted only during normal County working hours (8:00 a.m. to 5:00 p.m. Monday – Friday).

6. This agreement including right-of entry for inspection/maintenance and repair shall be recorded in the Land Records of the County.

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CARROLL COUNTY-PUBLIC FACILITY
CONSTRUCTED BY THE COUNTY
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by Carroll County.

2. The County or its heirs or assigns shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The County or its heirs or assigns shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the County or its heirs or assigns is responsible to make repairs as quickly as possible (30 day maximum).

4. After completion of the facility the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. If this facility is ever transferred to private ownership, the County's heirs or assigns are responsible for the agreement. In such a case, if after notice by the County to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within (30) days the County may perform all necessary work to place the facility in proper working condition. The owners of the facility shall be assessed the cost of the work and any penalties. The monies may be collected by placing a lien on the property, or by including the costs and penalties in the property tax bill and collecting them as ordinary taxes by the County.

6. Owner(s) shall grant right of entry to authorized County/Town/City personnel for purposes of inspection monitoring and/or repair. Site visits for inspection and/or monitoring shall be conducted only during normal County working hours (8:00 a.m. to 5:00 p.m. Monday – Friday).

7. This agreement including right of entry for inspection/maintenance and repair shall be recorded in the Land Records of the County.

TOWN OF SYKESVILLE – PUBLIC FACILITY
CONSTRUCTED BY THE TOWN
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the Town of Sykesville.

2. The Town or its heirs or assigns shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The Town or its heirs or assigns shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the Town or its heirs or assigns is responsible to make repairs as quickly as possible (30 day maximum).

4. After completion of the facility the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. If this facility is ever transferred to private ownership, the Town's heirs or assigns are responsible for the agreement. In such a case, if after notice by the Town to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within (30) days the Town may perform all necessary work to place the facility in proper working condition. The owners of the facility shall be assessed the cost of the work and any penalties. The monies may be collected by placing a lien on the property, or by including the costs and penalties in the property tax bill and collecting them as ordinary taxes by the Town.

6. Owner(s) shall grant right of entry to authorized County/Town/City personnel for purposes of inspection monitoring and/or repair. Site visits for inspection and/or monitoring shall be conducted only during normal Town working hours (8:00 a.m. to 5:00 p.m. Monday – Friday).

7. This agreement including right of entry for inspection/maintenance and repair shall be recorded in the Land Records of the County.

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TOWN OF NEW WINDSOR – PUBLIC FACILITY
CONSTRUCTED BY THE TOWN
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the Town of New Windsor.

2. The Town or its heirs or assigns shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The Town or its heirs or assigns shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the Town or its heirs or assigns is responsible to make repairs as quickly as possible (30 day maximum).

4. After completion of the facility the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. If this facility is ever transferred to private ownership, the Town's heirs or assigns are responsible for the agreement. In such a case, if after notice by the Town to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within (30) days the Town may perform all necessary work to place the facility in proper working condition. The owners of the facility shall be assessed the cost of the work and any penalties. The monies may be collected by placing a lien on the property, or by including the costs and penalties in the property tax bill and collecting them as ordinary taxes by the Town.

6. Owner(s) shall grant right of entry to authorized County/Town/City personnel for purposes of inspection monitoring and/or repair. Site visits for inspection and/or monitoring shall be conducted only during normal Town working hours (8:00 a.m. to 5:00 p.m. Monday – Friday).

7. This agreement including right of entry for inspection/maintenance and repair shall be recorded in the Land Records of the County.

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TOWN OF MOUNT AIRY – PUBLIC FACILITY
CONSTRUCTED BY THE TOWN
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the Town of Mount Airy.

2. The Town or its heirs or assigns shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The Town or its heirs or assigns shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the Town or its heirs or assigns is responsible to make repairs as quickly as possible (30 day maximum).

4. After completion of the facility the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. If this facility is ever transferred to private ownership, the Town's heirs or assigns are responsible for the agreement. In such a case, if after notice by the Town to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within (30) days the Town may perform all necessary work to place the facility in proper working condition. The owners of the facility shall be assessed the cost of the work and any penalties. The monies may be collected by placing a lien on the property, or by including the costs and penalties in the property tax bill and collecting them as ordinary taxes by the Town.

6. Owner(s) shall grant right of entry to authorized County/Town/City personnel for purposes of inspection monitoring and/or repair. Site visits for inspection and/or monitoring shall be conducted only during normal Town working hours (8:00 a.m. to 5:00 p.m. Monday – Friday).

7. This agreement including right of entry for inspection/maintenance and repair shall be recorded in the Land Records of the County.

Effective Date: November 15, 2018
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TOWN OF MANCHESTER – PUBLIC FACILITY
CONSTRUCTED BY THE TOWN
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the Town of Manchester.

2. The Town or its heirs or assigns shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The Town or its heirs or assigns shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the Town or its heirs or assigns is responsible to make repairs as quickly as possible (30 day maximum).

4. After completion of the facility the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. If this facility is ever transferred to private ownership, the Town's heirs or assigns are responsible for the agreement. In such a case, if after notice by the Town to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within (30) days the Town may perform all necessary work to place the facility in proper working condition. The owners of the facility shall be assessed the cost of the work and any penalties. The monies may be collected by placing a lien on the property, or by including the costs and penalties in the property tax bill and collecting them as ordinary taxes by the Town.

6. Owner(s) shall grant right of entry to authorized County/Town/City personnel for purposes of inspection monitoring and/or repair. Site visits for inspection and/or monitoring shall be conducted only during normal Town working hours (8:00 a.m. to 5:00 p.m. Monday – Friday).

7. This agreement including right of entry for inspection/maintenance and repair shall be recorded in the Land Records of the County.

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TOWN OF HAMPSTEAD- PUBLIC FACILITY
CONSTRUCTED BY THE TOWN
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the Town of Hampstead.

2. The Town or its heirs or assigns shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The Town or its heirs or assigns shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the Town or its heirs or assigns is responsible to make repairs as quickly as possible (30 day maximum).

4. After completion of the facility the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. If this facility is ever transferred to private ownership, the Town's heirs or assigns are responsible for the agreement. In such a case, if after notice by the Town to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within (30) days the Town may perform all necessary work to place the facility in proper working condition. The owners of the facility shall be assessed the cost of the work and any penalties. The monies may be collected by placing a lien on the property, or by including the costs and penalties in the property tax bill and collecting them as ordinary taxes by the Town.

6. Owner(s) shall grant right of entry to authorized County/Town/City personnel for purposes of inspection monitoring and/or repair. Site visits for inspection and/or monitoring shall be conducted only during normal Town working hours (8:00 a.m. to 5:00 p.m. Monday – Friday).

7. This agreement including right of entry for inspection/maintenance and repair shall be recorded in the Land Records of the County.

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CITY OF WESTMINSTER - PUBLIC FACILITY
CONSTRUCTED BY THE CITY
STORMWATER MANAGEMENT MAINTENANCE AGREEMENT
SCHEDULE

1. The Stormwater Management Facility/Facilities shown on these plans shall be constructed by the City of Westminster.

2. The City or its heirs or assigns shall be responsible for continuing maintenance of the facility/facilities which shall include such items as mowing, cleaning, removing sediment, trees, shrubs, and debris and repairing any structural damage. Requirements and schedules for specific types of facilities and practices as listed on the plans are hereby included.

3. The City or its heirs or assigns shall be responsible for any structural damage or failure which may occur as a result of negligence, accident or misuse. In the event of structural damage, the City or its heirs or assigns is responsible to make repairs as quickly as possible (30 day maximum).

4. After completion of the facility the Carroll County Bureau of Resource Management shall certify that the facility is in proper working condition. "After completion of the facility" is construed to mean that all contributory drainage areas are paved or supporting a 2" stand of dense grass and that all buildings are constructed and that the Carroll County Bureau of Resource Management has inspected construction and a registered professional engineer has certified that the "As-Built" plans meet the plans and specifications for construction.

5. If this facility is ever transferred to private ownership, the City's heirs or assigns are responsible for the agreement. In such a case, if after notice by the City to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within (30) days the City may perform all necessary work to place the facility in proper working condition. The owners of the facility shall be assessed the cost of the work and any penalties. The monies may be collected by placing a lien on the property, or by including the costs and penalties in the property tax bill and collecting them as ordinary taxes by the City.

6. Owner(s) shall grant right of entry to authorized County/Town/City personnel for purposes of inspection monitoring and/or repair. Site visits for inspection and/or monitoring shall be conducted only during normal City working hours (8:00 a.m. to 5:00 p.m. Monday – Friday).

7. This agreement including right of entry for inspection/maintenance and repair shall be recorded in the Land Records of the County.

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