MARYLAND
DEPARTMENT OF THE ENVIRONMENT

Maryland's Stormwater, Sediment Control and Dam Safety Program

Stormwater Management and Erosion and Sediment Control Update

MDE

Stormwater Management Act of 2007

- **Requires implementation of Environmental Site Design (ESD) to the maximum extent practicable**

- **ESD: "using small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources"**

Stormwater Regulation Changes 2000 vs. 2009

2000	2009
Nonstructural practices create incentive for environmentally friendly designs Intended to encourage planning for stormwater early in design	ESD to the MEP Approvals required during 3 phases of project design Stormwater planning now required to during concept design
Move from flood control to water quality Filtering practices (WQv) and control of frequent events (1- year, Cpv) BMP design criteria based on water quality performance (80 TSS/40 P)	Small scale ESD practices are required for minimum 1” of rainfall ESD criteria based on replicating hydrology for “ woods in good condition” (about 2.7” rainfall)
Water quality for redevelopment 20% reduction in impervious area On-site or Off-site BMPs Alternatives	Water quality for redevelopment 50% impervious area reduction On-site or off-site BMPs Alternatives

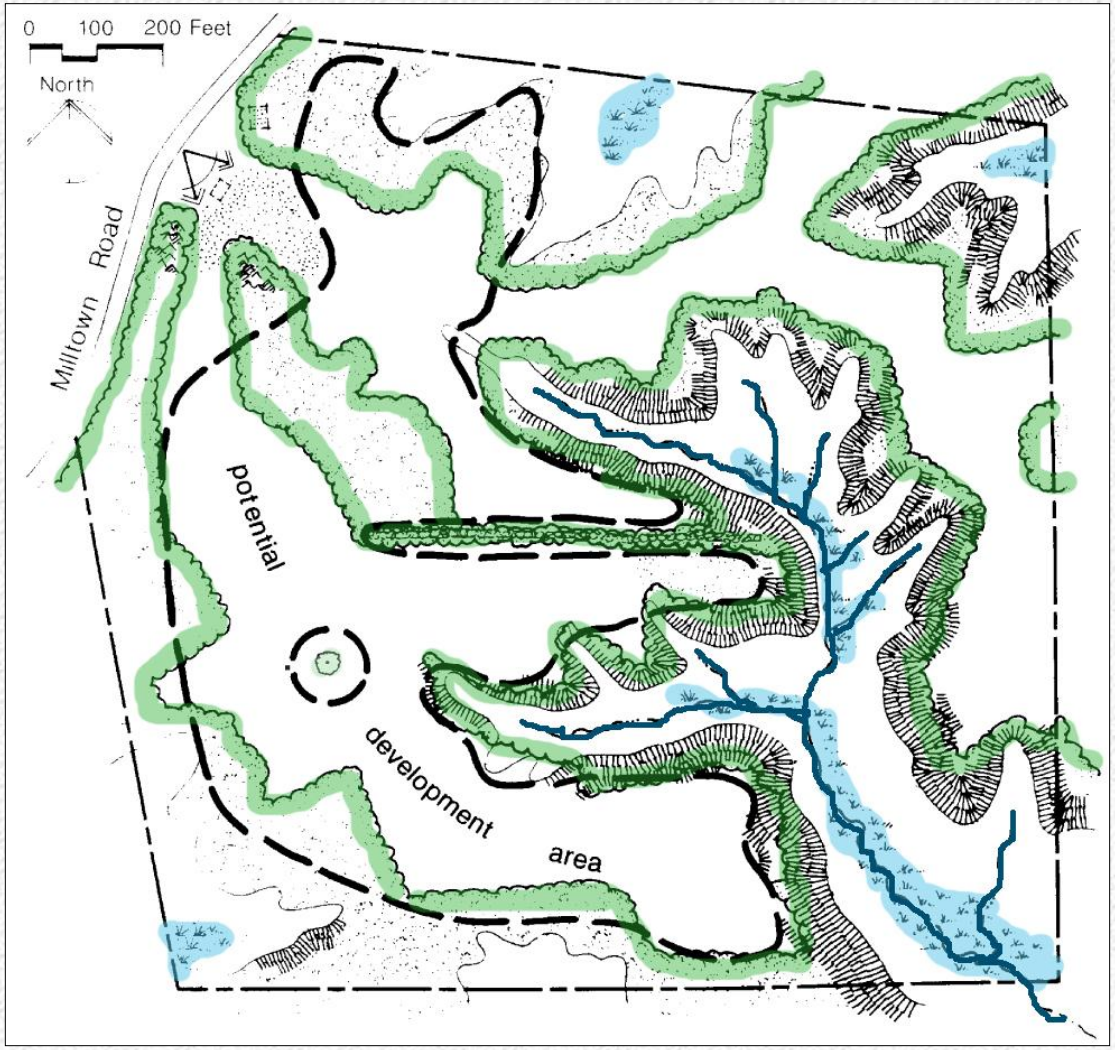
ESD Planning Techniques

- **Concept Phase**
  - Natural Resource Inventory and Protection
  - Implement Site Design Techniques to Minimize Impervious Area
  - Integrate ESD Practices into the Landscape
  - Using Natural Drainage Pathways for Stable Conveyance
- **Site Development Phase**
  - Examine Use of Alternative Surfaces
  - Use of Nonstructural Practices
  - Integrate E & S Design into Plan
- **Final Design and Approval Phase**
  - ESD to MEP

Site Mapping/Fingerprinting

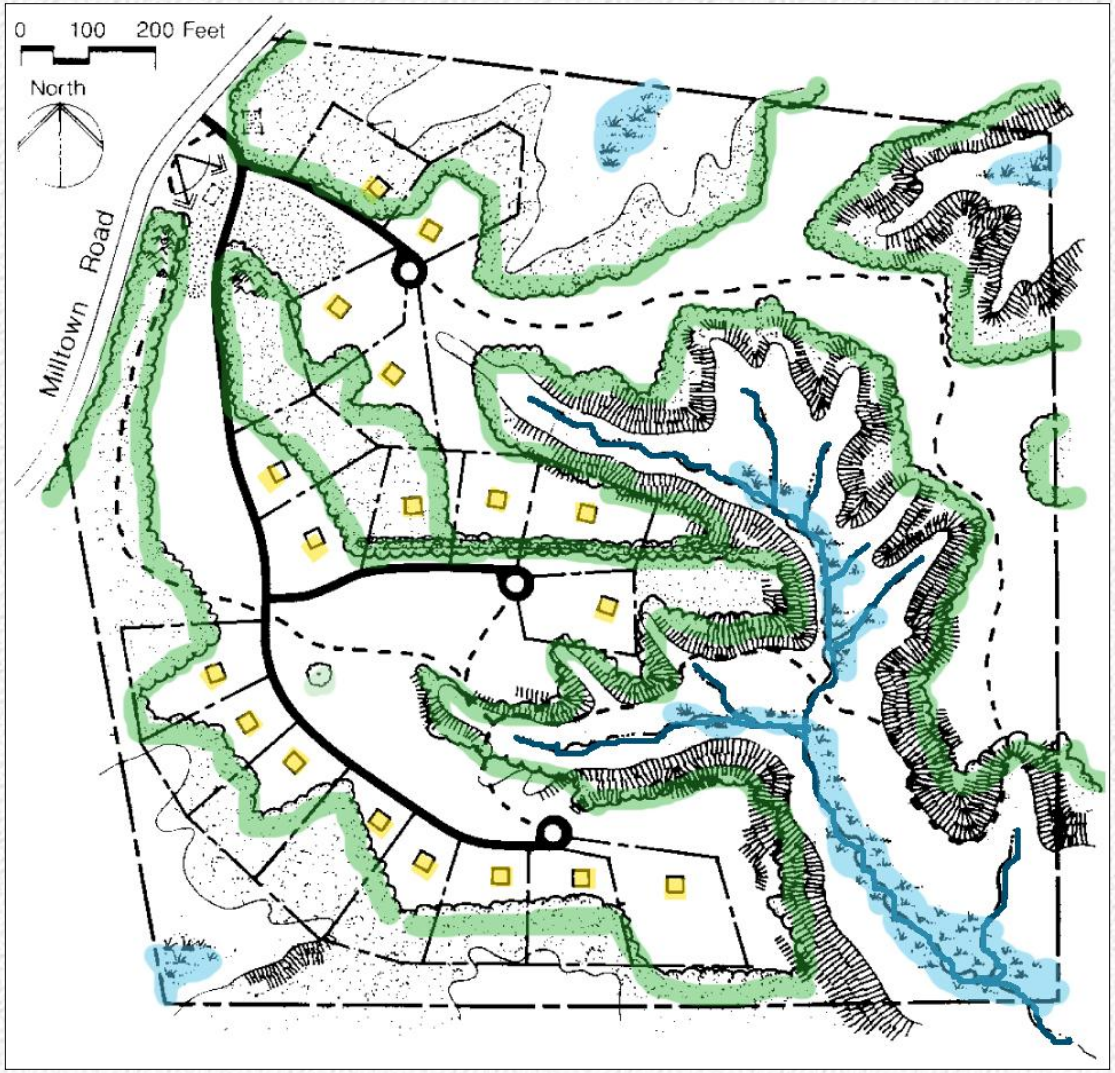
Natural Area Preservation
Minimize Clearing and Grading

Site Mapping/Fingerprinting



Courtesy of Natural Lands Trust

Site Development Layout



Courtesy of Natural Lands Trust

Site Development Layout

ESD Techniques to Minimize Imperviousness

Clustered Development

Shared Driveways

Cul-de-sac Island

Site Development Layout

ESD Techniques to Minimize Imperviousness

Permeable Pavers in Residential and Commercial Development

Impervious Cover Reduction

Site Development Layout

Integrate ESD Practices into the Landscape


Frederick County


Worcester County

Rooftop Disconnections in Commercial and Residential Development

New ESD - BMPS

- Nonstructural BMPs (New Chapter 5)
  - Expanding and Enhancing Buffers
  - Reducing Imperviousness
  - Alternative Surfaces
    - Green Roofs
    - Permeable Pavements
  - Micro-Scale Practices
    - Rainwater Harvesting
    - Submerged Gravel Wetlands
    - Landscape Infiltration
    - Infiltration Berms
    - Dry Wells
    - Micro-Bioretention
    - Swales
    - Enhanced Filters

Residential Landscape Planters

Residential Raingardens

Anne Arundel County


Worcester County

Micro-scale Treatment Systems

Worcester County

University of Maryland, Prince Georges County

Streetscape Projects

MARYLAND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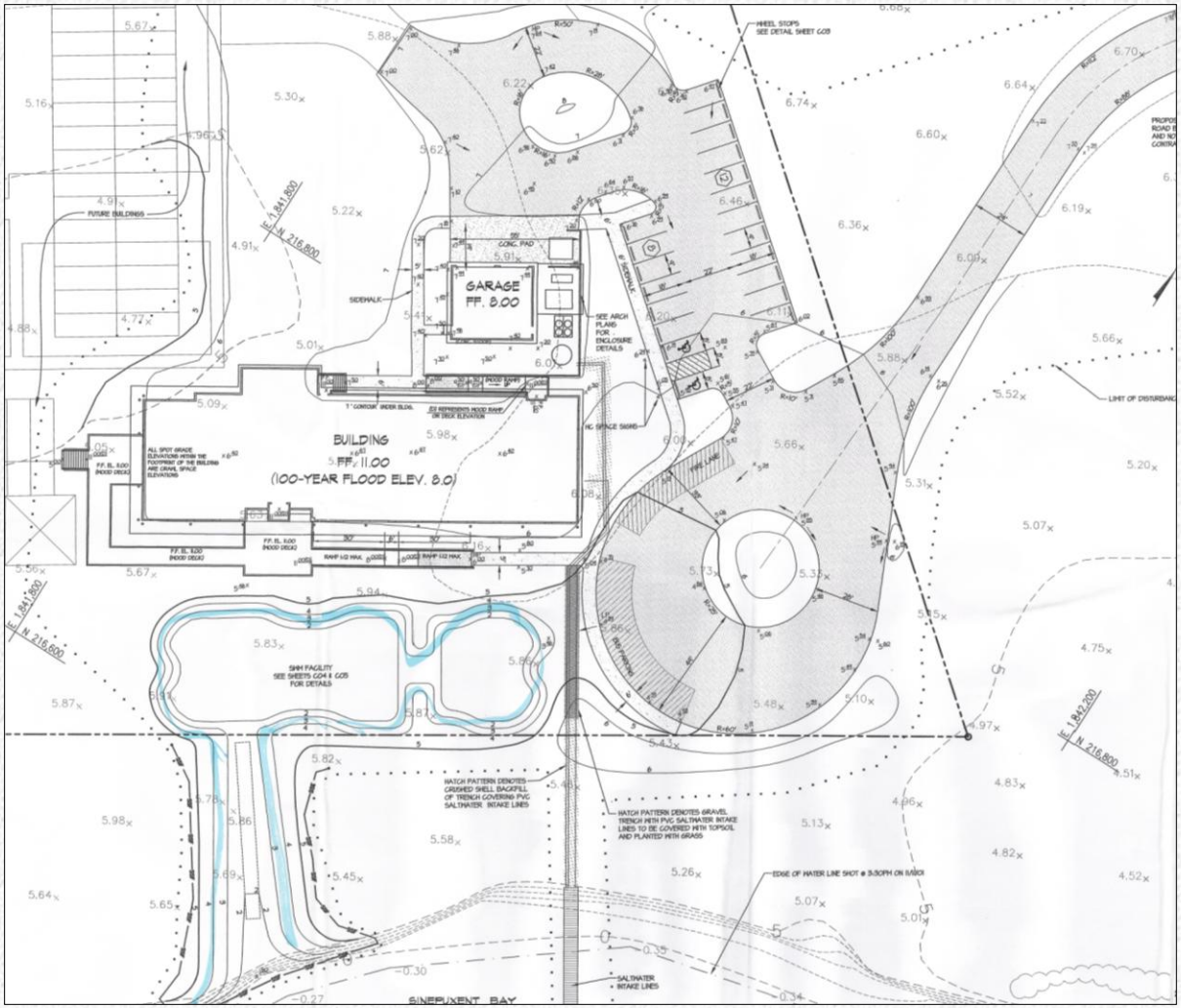
MDE


GARAGE
FF. 8.00
BUILDING
FF. 11.00
(100-YEAR FLOOD ELEV. 8.0)
SINEPUXENT BAY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MDE


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MDE

Addressing the Unified Sizing Criteria

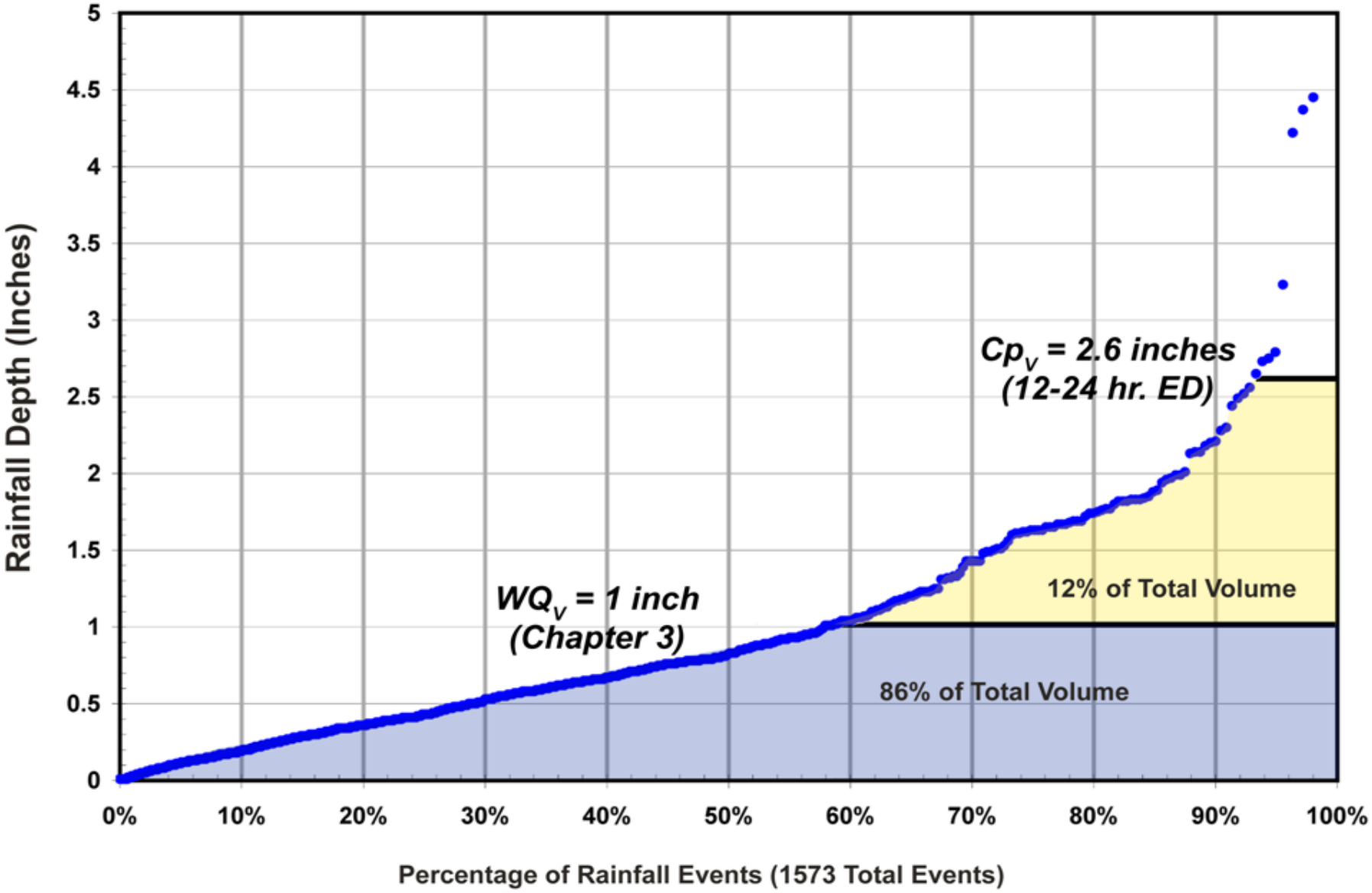
Water Quality Volume (WQ_v):

- Nonstructural practices (Old Chapter 5) are encouraged
- Structural practices (Chapter 3) must meet minimum standards (80%TSS / 40%TP)

Channel Protection Storage Volume (Cp_v):

- 12 or 24 hour extended-detention of 1-year storm
- Dry ED Ponds typically used

BWI-Thurgood Marshall Airport Rainfall (1996 - 2008)




Pharmacy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Your Prescriptions
While You Shop
SAFEWAY
PHARMACY


ONE
WAY

Design Requirements

- One predevelopment standard - "woods in good condition" – for all sites
- ESD targets (MEP) based on replicating wooded conditions
- ESD used to address Cp_v
- WQ_v & Re_v as a minimum standard
- Flexible sizing criteria (.2" – 2.6"); practices may be used in series to meet targets

ESD Sizing Criteria

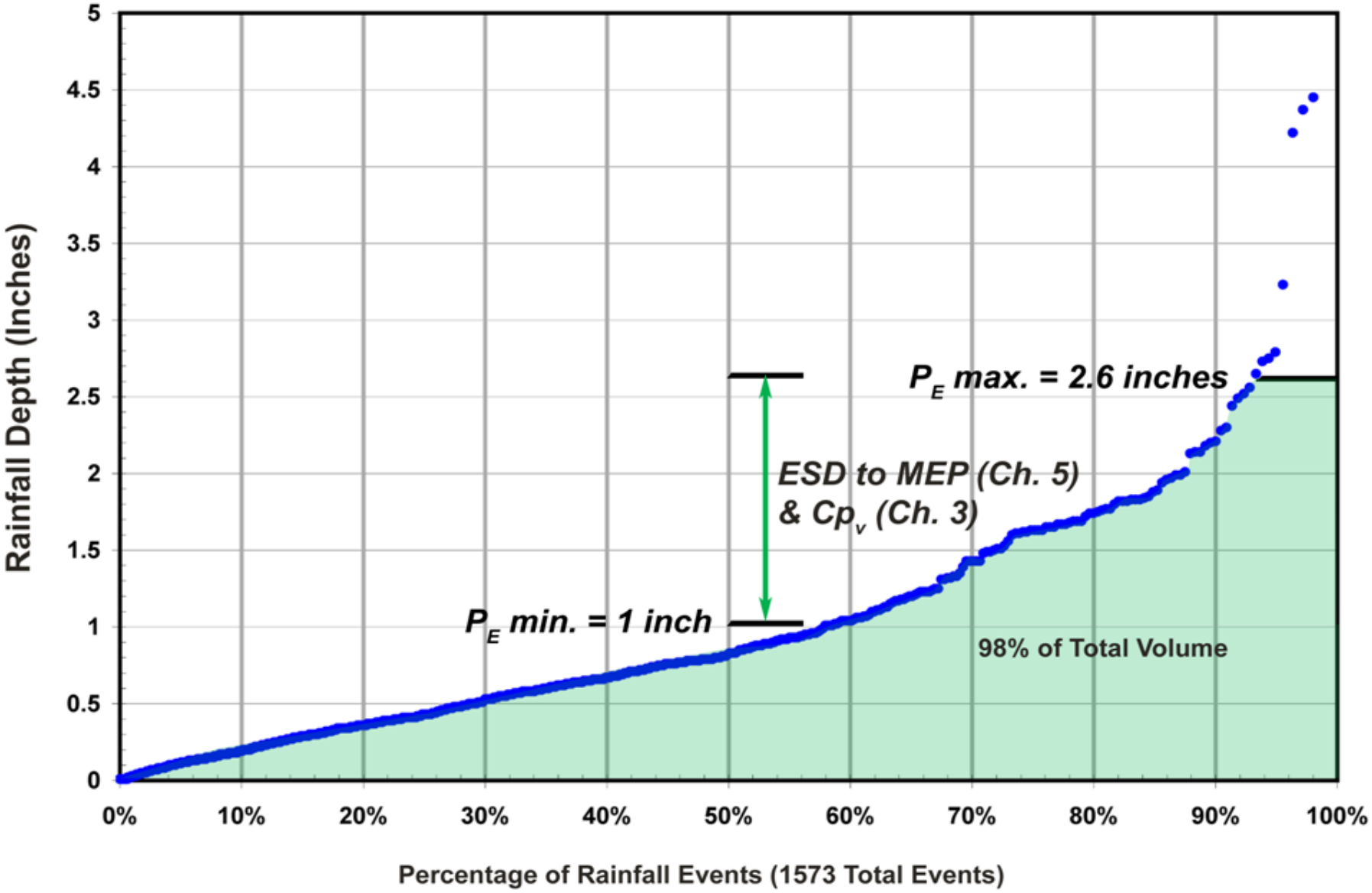
- **During Planning:**

  Imperviousness & soils are used to determine a target rainfall to mimic wooded conditions (see Table 5.3).

- **During Design:**

  Table 5.3 is used to determine the reduced RCNs for calculating Cp_v if targeted rainfall goals cannot be met.

BWI-Thurgood Marshall Airport Rainfall (1996 - 2008)




STOP

Claytor Community Center

Site Data:

- **Area - 3.0 Acres**
- **Drainage Area – 3.0 Acres**
- **Soils – 100% B (Silt Loam or Loam)**
- **Impervious Area – 1.9 Acres (63.3%)**
- **Existing Conditions:**
  - **80% Meadow / 20% Woods**
  - **RCN – 57**

Claytor Community Center

Step 1: Determine ESD Goals

A: RCN (woods in good condition) – 55

B: Target P_E – 2.0 inches

		Hydrologic Soil Group B						
%I	RCN*	P_E = 1"	1.2"	1.4"	1.6"	1.8"	2.0"	2.2"
15%	67	**55**						
20%	68	60	**55**	**55**				
25%	70	64	61	58				
30%	72	65	62	59	**55**			
35%	74	66	63	60	56			
40%	75	66	63	60	56			
45%	78	68	66	62	58			
50%	80	70	67	64	60			
55%	81	71	68	65	61	**55**		
60%	83	73	70	67	63	58		
65%	85	75	72	69	65	60	**55**	
70%	87	77	74	71	67	62	57	

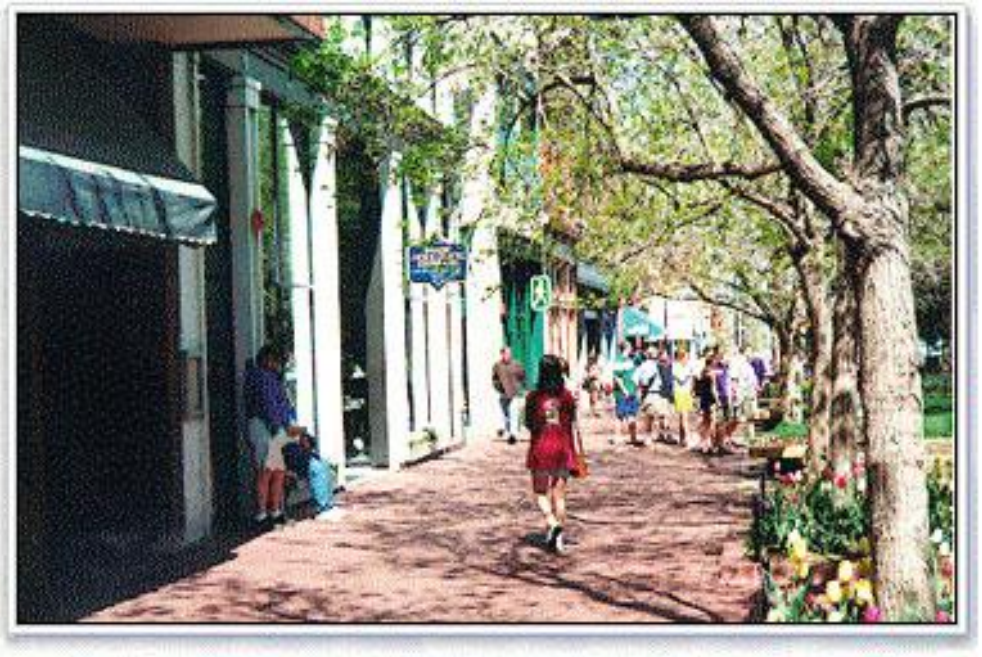
Claytor Community Center

Compute Q_E:

$Q_E = P_E \times R_V$
$= 2.0" \times (.05+.009I)$ where I = 63.3%
$= 2.0" \times 0.62 = 1.24"$

Using ESD practices to meet these targets will satisfy Re_v, WQ_v, and Cp_v. Potential practices include permeable pavements, micro-bioretention, or landscape infiltration.

Redevelopment



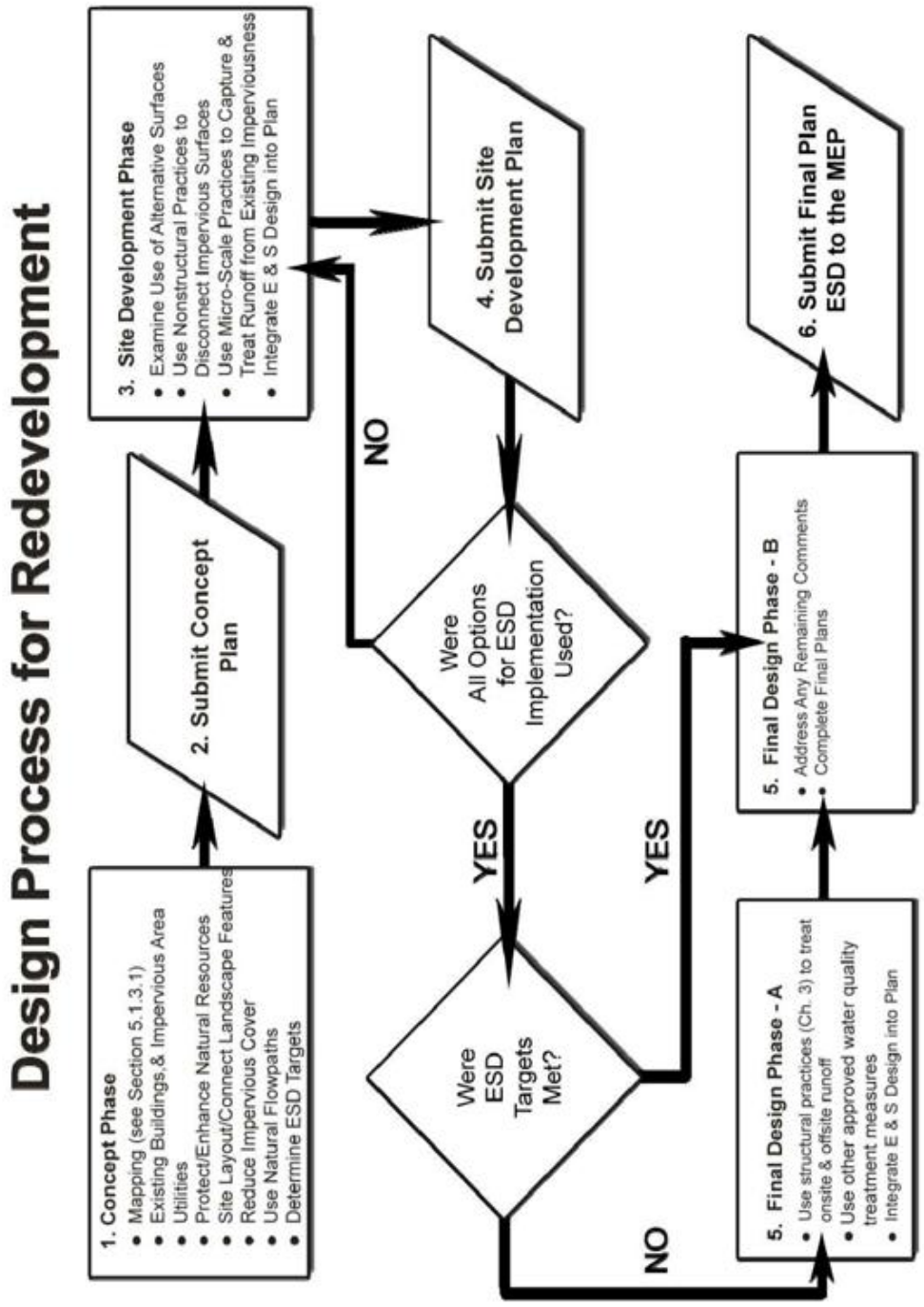


Figure 5.21 Design Process for Redevelopment

Redevelopment Policy

Require more management in less densely developed sites

1. An approving agency shall require that stormwater management be addressed according to new development requirements when existing site impervious area is less than or equal to 40%.

Determining Site %I

- **Design Manual: "the local approving agency may allow lands protected by forest preservation, conservation easements, or other mechanism to be subtracted from the total site area."**
  - **Flexibility for case by case review**
  - **Master plans and local priorities are considered during review process**
- **Promote ESD project designs:**
  - **Preserve natural areas**
  - **Reduce impervious area**
  - **Develop watershed plans**

When Existing I<40%
New Development Requirements

- Existing I = 39%, P_E = 1.8” (Table 5.3)
- ESD on sites with **61% pervious** areas

Implement ESD techniques and micro-scale practices to the MEP

- Disconnections
- Sheetflow
- Minimize impervious area
- Use available landscaping for storage and treatment

North Bay Environmental Education Camp

Redevelopment in Cecil County


06/02/2008 11:58 AM

Redevelopment Policy

2. Proposed redevelopment project designs shall:

   a. Reduce existing impervious area by 50% within the LOD;

   b. Implement ESD to the MEP to provide water quality treatment for 50% of the existing impervious area within the LOD; or

   c. Use a combination a. and b.

Redevelopment Policy

3. **Alternative stormwater management measures:**

   a. **Structural stormwater BMP;**

   b. **Off-site BMP; or**

   c. **Any combination of impervious area reduction, ESD implementation, structural practices or off-site treatment.**

Redevelopment Policy

Need to keep requirements flexible and provide incentive for redevelopment

4. An approving agency may develop other policies that may include:

   a. Retrofitting existing structural BMPs;

   b. Stream restoration;

   c. Watershed management plans;

   d. Trading policies that involve other pollution control programs;

   e. Fees paid in an amount specified by the approving agency; or

   f. Other practices

Redevelopment Policy

- **Provide greater water quality treatment**
- **Flexibility and options to integrate local priorities into watershed specific goals.**
- **Redevelopment is encouraged by reduced requirements compared to new development**

Redevelopment Requirement Comparison

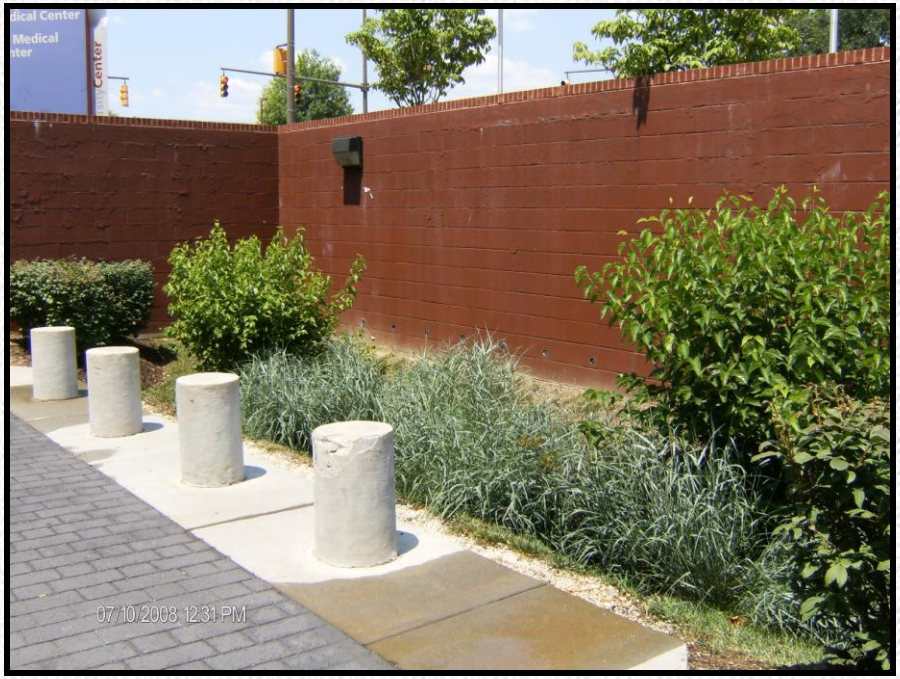
Impervious Area	Old Regs (20%)	New Regs (50%)	If New Development
1.0 acre existing	0.20 acre (1 inch)	0.50 acre (1 inch)	
1.0 acre proposed			1.0 acres (2.7 inch)
Volume Requirements	690 cu. ft.	1,724 cu.ft.	9,311 cu. ft.

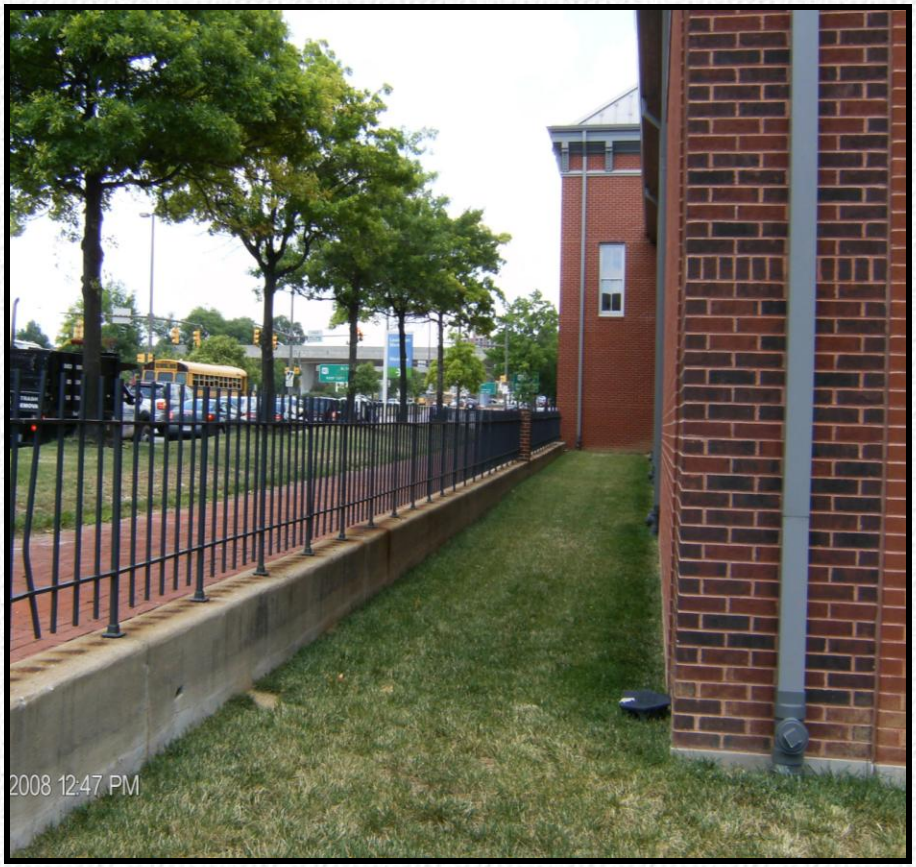
Redevelopment Requirement Comparison

Impervious Area	Old Regs (20%)	New Regs (50%)	If New Development
0.50 acres existing	0.10 acre (1 inch)	0.25 acre (1 inch)	
0.68 acres proposed	0.18 acre (1 inch)	0.18 acre (2.7 inch)	0.68 acres (2.7 inch)
Volume Requirements	1,076 cu. ft.	2,538 cu. ft.	6,331 cu. ft.

University of Maryland School of Nursing

University of Maryland School of Nursing






Ocean City
Porous asphalt

Gateway Grande Redevelopment, Ocean City

Alternative Stormwater Management Measures

Martin Plaza Redevelopment

Baltimore County and Martin Financial Assoc.

Public – Private Partnership

WQ treatment of 85 acres of existing impervious

Stony Run Stream Restoration

December, 2006

Stony Run Stream Restoration

February, 2007

July, 2008

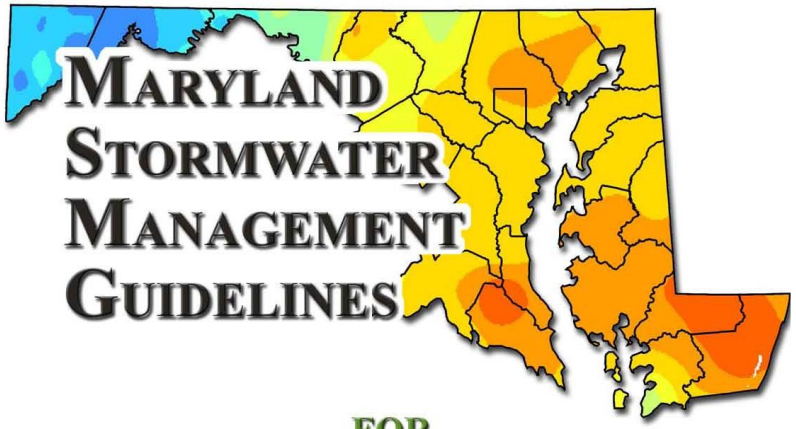
Off-Site Stormwater Management

Baltimore City School Retrofits:

Impervious area reduction

Rooftop disconnection to rain garden

Stormwater Guidelines



FOR

STATE & FEDERAL PROJECTS

APRIL 15, 2010

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MARYLAND

ESD Process & Computations

ENVIRONMENTAL
SITE DESIGN (ES
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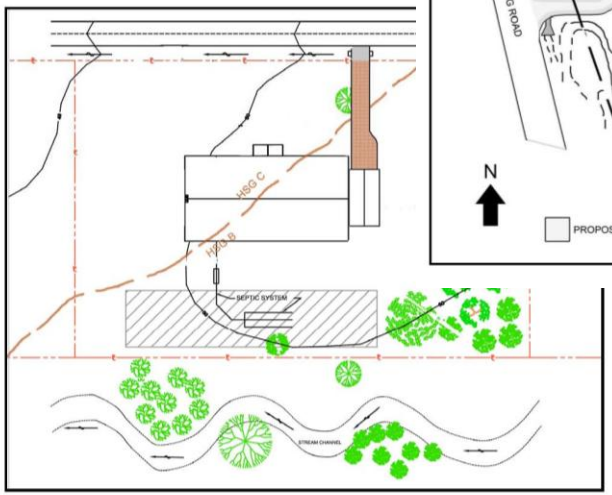
Example No. 1 – Single Family Residential Construction

The proposed project involves the construction of a house, garage, residential lot. Sketches of the existing lot and proposed work are

Concept Plan Design and Computations

The Concept Plan represents the first steps in a project's developm natural resources, initial project layout, and the preliminary design techniques. During this phase, the designer demonstrates how ESI the MEP standard. The purpose is to show the review authorities tl implementing ESD have been exhausted before proceeding with m

Figure 1. Single Family Lot – Proposed Layout



Example No. 2 – Commercial Construction

The project for this example consists of a multi-story office building and parking lot. A sketch of the proposed site is shown in Figure 4.

Figure 4. Proposed Commercial Site

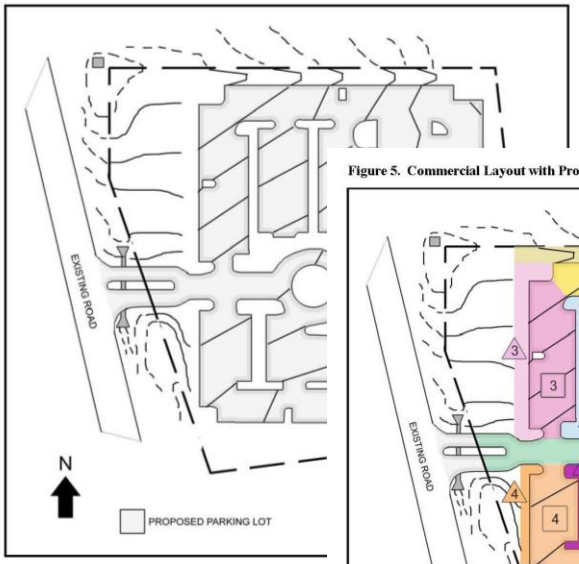


Figure 5. Commercial Layout with Proposed Drainage Areas

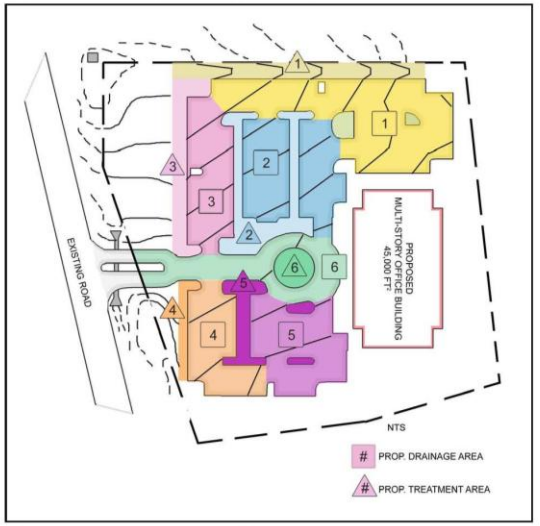


Table 2. Preliminary Drainage Area Information

Drainage (DA)	Impervious Area	Landscaped Area	Approx. %Site	Target ESD$_v$
1	24,500 ft^2	3,200 ft^2	16%	3,950 ft^3
2	20,000 ft^2	1,000 ft^2	12%	2,950 ft^3
3	15,000 ft^2	2,500 ft^2	10%	2,460 ft^3
4	13,000 ft^2	2,000 ft^2	9%	2,215 ft^3
5	17,000 ft^2	3,000 ft^2	12%	2,950 ft^3
6	5,000 ft^2	300 ft^2	3%	740 ft^3
Building	45,000 ft^2	---	26%	6,400 ft^3
Open Space	---	22,740 ft^2	13%	2,935 ft^3
Σ	139,500 ft^2	34,740 ft^2	100%	24,600 ft^3

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Water Programs

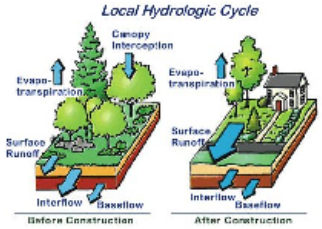
- Guidelines for State and Federal Projects
- Maryland Stormwater Design Manual
- Publications List
- Sediment and Stormwater Home
- Soil Erosion and Sediment Control
- Stream Response to BMPs in Maryland

Maryland's Stormwater Management Program

- **Need to report pollution problems?** Please click here!
- **Looking for information on the Stormwater Management Act? -** Please click here!
- **Draft "2010 Maryland Standards and Specifications for Soil Erosion and Sediment Control"** Click here for details.
- **Looking for fact sheets or additional resources? -** Please click here!
- **Looking for guidance on ESD processes & computations? -** Please click here!

Why Stormwater Matters: Impacts of Runoff on Maryland's Watersheds

Urban development has a profound influence on the quality of Maryland's waters. To start, development dramatically alters the local hydrologic cycle (see below). The hydrology of a site changes during the initial clearing and grading that occur during construction. Trees, meadow grasses, and agricultural crops that intercept and absorb rainfall are removed and natural depressions that temporarily pond water are graded to a uniform slope. Cleared and graded sites erode, are often severely compacted, and can no longer prevent rainfall from being rapidly converted into stormwater runoff.



The situation worsens after construction. Roof tops, roads, parking lots, driveways and other impervious surfaces no longer allow rainfall to soak into the ground. Consequently, most rainfall is converted directly to runoff. The increase in stormwater can be too much for the existing natural drainage system to handle. As a result, the natural drainage system is often altered to rapidly collect runoff and quickly convey it away (using curb and gutter, enclosed storm sewers, and lined channels). The stormwater runoff is subsequently discharged to downstream waters such as streams, reservoirs, lakes or estuaries.

Water Quality is affected by the accumulation of trash, oil and rubber from cars, fertilizers and pesticides applied to lawns, sediment from bare or poorly vegetated ground and other pollutants entering streams, rivers and the Chesapeake Bay. Inflow of sediment can cloud water, blocking sunlight from submerged plants. Sediment also settles to the bottom of streams, clogging the gravel beds used by fish for laying their eggs. Nutrients, such as phosphorus and nitrogen, from fertilizers enter the water and promote unusually rapid algae growth. As this algae dies, its decomposition reduces or eliminates oxygen needed by fish, shellfish, and other aquatic life for survival.

MARYLAND

Poultry Houses

Environmental Article '4-204 Submission of management plan prior to development of land.

(a) Required - After July 1, 1984, unless exempted, a person may not develop any land for residential, commercial, industrial or institutional use without submitting a stormwater management plan to the county or municipality that has jurisdiction, and obtaining approval of the plan form the county or municipality. A grading or building permit may not be issued for a property unless a stormwater management plan has been approved that is consistent with this subtitle.

Title 26 Department of the Environment, Subtitle 17 Water Management, Chapter 02 Stormwater Management.

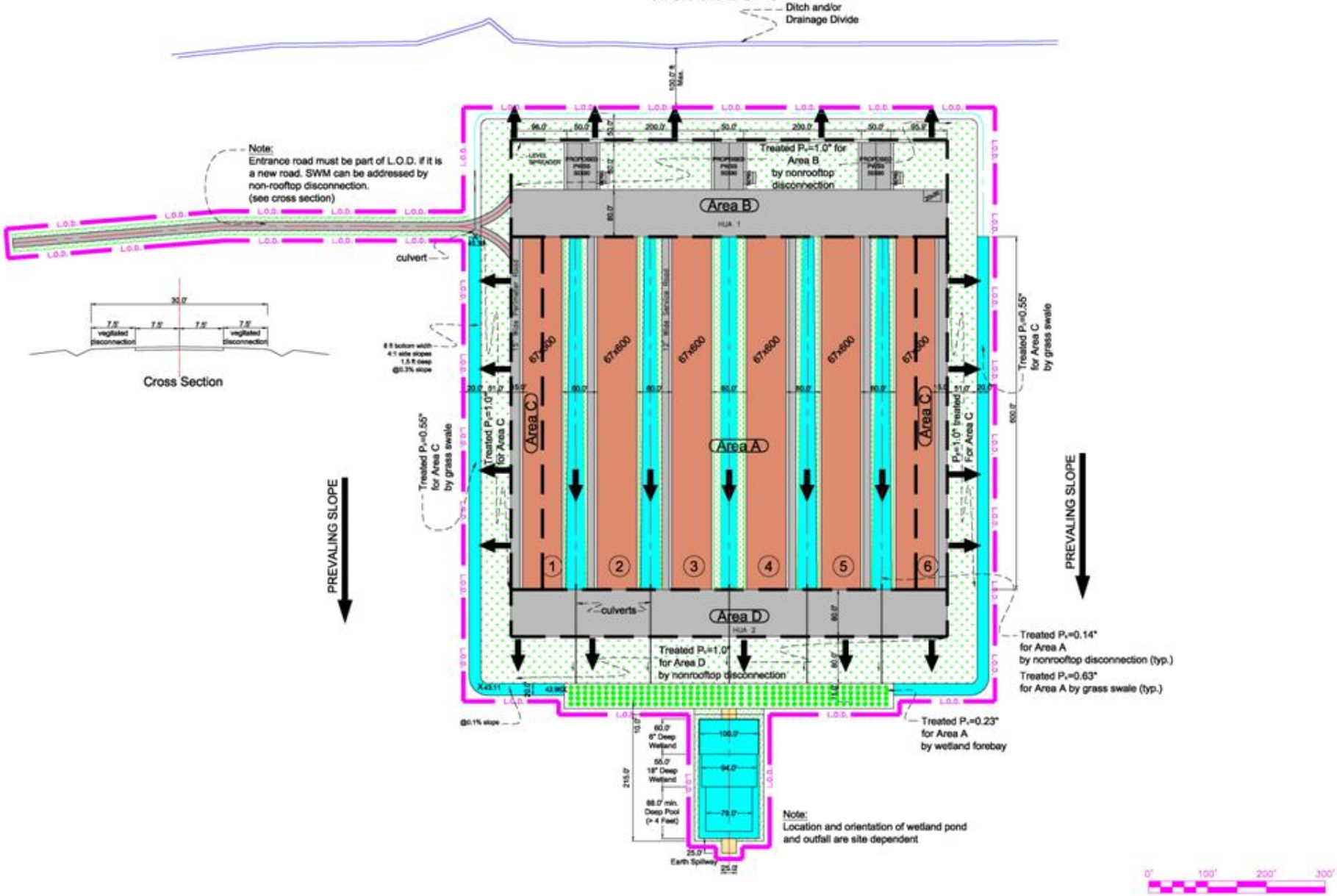
01 Purpose and Scope.

B. These regulations for stormwater management apply to the development of land for residential, commercial, industrial, or institutional use, but do not apply to agricultural land management practices.

Under the State stormwater management law and regulations as well as locally approved stormwater management ordinances, agricultural land management practices, defined as *those methods and procedures used in the cultivation of land in order to further crop and livestock production and conservation of related soil and water resources,* are exempt from stormwater requirements; however, buildings constructed to support agricultural operations (poultry houses, etc.) are not exempt and need to address stormwater management requirements.

SIX POULTRY HOUSES

Width = 67 ft; Length = 600 ft



SIX POULTRY HOUSES

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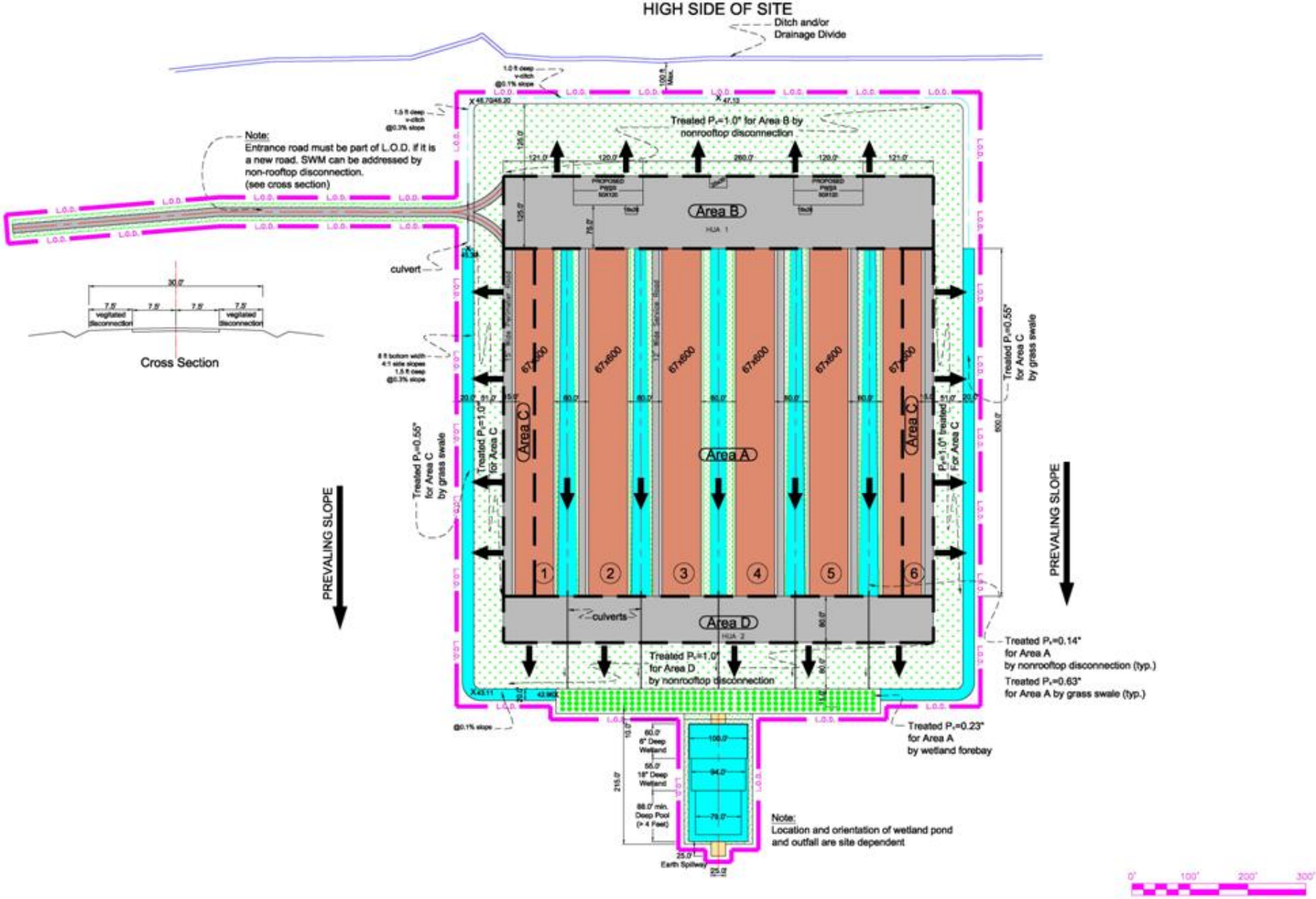
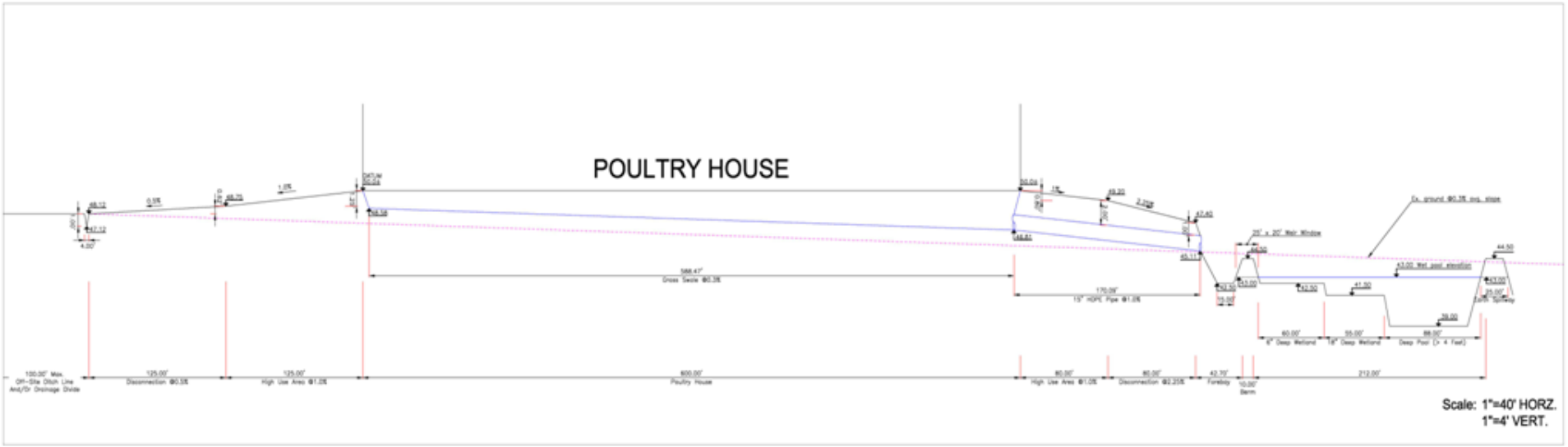


Profile


POULTRY HOUSE
588.47'
Grass Swale @0.3%
600.00'
Poultry House
170.09'
15" HDPE Pipe @1.0%
125.00'
Disconnection @0.5%
125.00'
High Use Area @1.0%
80.00'
High Use Area @1.0%
80.00'
Disconnection @2.25%
42.70'
Forebay
10.00'
Berm
212.00'
60.00'
6" Deep Wetland
55.00'
18" Deep Wetland
88.00'
Deep Pool (> 4 Feet)
20' x 20' Weir Window
Ex. ground @0.3% avg. slope
43.00 Wet pool elevation
100.00' Min.
Off-Site Ditch Line
And/Or Drainage Divide
Scale: 1"=40' HORZ.
1"=4' VERT.

2010 Standards

MARYLAND

What's New?

- ESD to the MEP!
- Planning and Design Section
- Stabilization Requirements
- Grading Unit
- TMDLs and Tier II, Etc.
- Revised Standard Practices
- New Standard Practices

Planning and Design

Stormwater Management and Erosion & Sediment Control Integrated

- Concept Design Plan
- Site Development Plan
- Final Design Plan

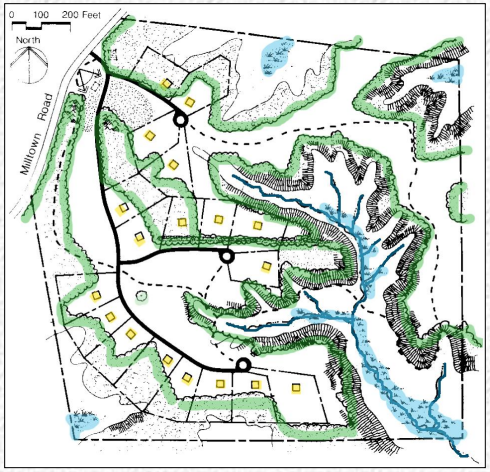


Table of ESC Practices

Table A.4: Erosion and Sediment Control Practices Matrix

Practice	Primary Purpose	Design Criteria	Associated Practices	Remarks
Stabilized Construction Entrance	Stabilize soil	Access points	Mountable Berms, Silt Fence, Super Silt Fence	All Ingress/Egress Points
Stabilized Construction Entrance with Wash Rack	Stabilize soil; prevent tracking of mud	Access points	Sediment Traps, Mountable Berms, Silt Fence, Super Silt Fence	All Ingress/Egress Points
Serrated Slopes	Stabilize extreme grade changes	Site specific	Temporary and Permanent Stabilization	Divert overland flow from top of slope
Benching	Minimize erosion	20 ft cut/fill- 2:1 slopes 30 ft cut/fill- 3:1 slopes 40 ft cut/fill- 4:1 slopes	Temporary and Permanent Stabilization, Pipe Slope Drain	Can apply to stockpiles
Temporary Stabilization	Stabilize soil	Site specific	Soil Stabilization Matting	Maximum six month duration, Soil Testing
Permanent Stabilization	Stabilize soil	Site specific	Soil Stabilization Matting	Soil Testing
Heavy Use Area Protection	Stabilize Soil	Construction routes, staging and material storage areas	Dust Control, Temporary Swales, Temporary or Permanent Seeding	SCE, Soil Stabilization
Earth Dike	Convey runoff	Drainage area $\leq$ 10 ac; slope $\leq$ 10%	Sediment Trap, TSOS, TGOS, Outlet Protection	Engineering Design if > 10 ac or slope > 10%.
Temporary Swale	Convey runoff	Drainage area $\leq$ 10 ac; slope $\leq$ 10%	Sediment Trap, TSOS, TGOS; Outlet Protection	Engineering Design if > 10 ac or slope > 10%.
Perimeter Dike/ Swale	Convey runoff	Drainage area $\leq$ 2 ac; slope $\leq$ 10%	Sediment Trap, Temporary Stabilization	Smaller footprint than ED and TS
Storm Drain System Temporary Diversion	Convey runoff	Site specific	Sediment Trap or Basin, Outlet Protection,	
Temporary Asphalt Berm	Convey runoff on paved areas	Site specific	Earth Dikes, TSOS, TGOS, Outlet Protection	
Clear Water Diversion Pipe	Convey channel flow around construction area	Design storm = Q_2; 1 ft freeboard at inlet	Dewatering Practices, Outlet Protection	Possible review by Wetlands and Waterways Program
Temporary Barrier Diversion	Convey stream flow around construction	Design storm = Q_2; 1 ft freeboard at inlet	Dewatering Practices; Outlet Protection	

Standard Stabilization Note

STANDARD STABILIZATION NOTE

Following initial soil disturbance or redisturbance, permanent or temporary stabilization is required within [seven (7)] three (3) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes greater than 3 horizontal to 1 vertical (3:1); and [fourteen (14)] seven (7) days as to all other disturbed areas on the project site.

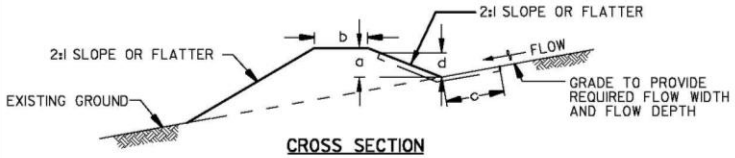
Grading Unit

“Grading Unit” means the maximum contiguous area allowed to be graded at given time. For the purpose of proposed regulation change, a grading unit is 20 acres or less.

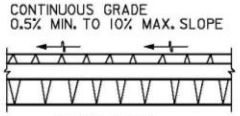
Revised Standard Practices

DETAIL C-I EARTH DIKE

STANDARD SYMBOL
A-I
PLACE DESIGNATION (A-1, B-2, etc.) ON FLOW CHANNEL SIDE OF DIKE.



CROSS SECTION



PLAN VIEW

	DIKE TYPE A	DIKE TYPE B
a - DIKE HEIGHT	18 IN MIN.	30 IN MIN.
b - DIKE WIDTH	24 IN MIN.	36 IN MIN.
c - FLOW WIDTH	4 FT MIN.	6 FT MIN.
d - FLOW DEPTH	12 IN MIN.	24 IN MIN.

FLOW CHANNEL STABILIZATION

A-I SEED WITH STRAW MULCH AND TACK.

A-2/B-2 SEED WITH SOIL STABILIZATION MATTING OR LINE WITH SOD.

A-3/B-3 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PRESSED INTO SOIL FLUSH WITH GROUND 7 INCHES MINIMUM.

CONSTRUCTION SPECIFICATIONS

1. CONSTRUCT FLOW CHANNEL ON AN UNINTERRUPTED, CONTINUOUS GRADE, ADJUSTING THE LOCATION DUE TO FIELD CONDITIONS AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE.
2. PROVIDE OUTLET PROTECTION AS REQUIRED ON PLAN.
3. REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF EARTH DIKE.
4. EXCAVATE OR SHAPE EARTH DIKE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES THAT IMPEDE FLOW ARE NOT ALLOWED.
5. COMPACT FILL.
6. STABILIZE EARTH DIKE WITHIN THREE DAYS OF INSTALLATION. STABILIZE FLOW CHANNEL FOR CLEAR WATER DIKE WITHIN 24 HOURS OF INSTALLATION.
7. INSPECT AND PROVIDE NECESSARY MAINTENANCE PERIODICALLY AND AFTER EACH RAIN EVENT.
8. UPON REMOVAL OF EARTH DIKE, GRADE AREA FLUSH WITH EXISTING GROUND AND STABILIZE DISTURBED AREA WITH TOPSOIL, SEED, AND MULCH, OR AS SPECIFIED WITHIN 24 HOURS OF REMOVAL.

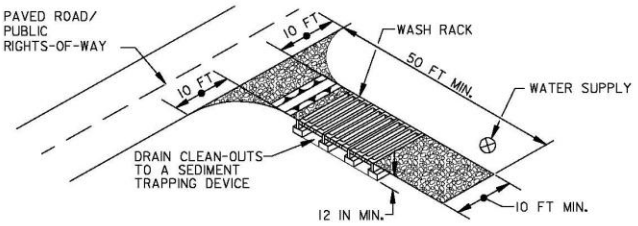
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE		MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

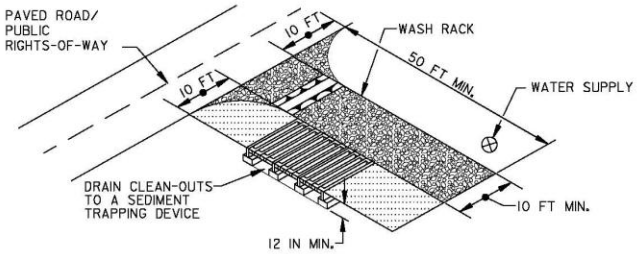
Wash Rack

DETAIL B-2 WASH RACK OPTION

STANDARD SYMBOL: WR



ISOMETRIC - WASH RACK IN SCE



ISOMETRIC - WASH RACK ALONG SCE

CONSTRUCTION SPECIFICATIONS

1. USE A WASH RACK DESIGNED AND CONSTRUCTED/MANUFACTURED FOR THE ANTICIPATED TRAFFIC LOADS.
2. INSTALL PRIOR TO, ALONG SIDE OF, OR AS PART OF THE SCE.
3. DIRECT WASH WATER TO AN APPROVED SEDIMENT TRAPPING DEVICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE		MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

New Tables

TABLE B.1: Temporary Seeding for Site Stabilization

Plant Species	Seeding Rate [1/]		Seeding Depth (inches) [2/]	Recommended Seeding Dates by Plant Hardiness Zone [3/]		
	lbs./ac.	lbs./ 1,000 sq.ft.		5b and 6a	6b	7a and 7b
Cool-Season Grasses						
Annual Ryegrass Lolium perenne ssp. multiflorum	40	1.0	0.5	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Nov 30
Barley Hordeum vulgare	96	2.2	1.0	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Nov 30
Oats Avena sativa	72	1.7	1.0	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Nov 30
Wheat Triticum aestivum	120	2.8	1.0	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Nov 30
Cereal Rye Secale cereale	112	2.8	1.0	Mar 15 to May 31 Aug 1 to Oct 31	Mar 1 to May 15 Aug 1 to Nov 15	Feb 15 to Apr 30 Aug 15 to Dec 15
Warm-Season Grasses						
Foxtail Millet Setaria italica	30	0.7	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14
Pearl Millet Pennisetum glaucum	20	0.5	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14

NOTES:

1. Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season grasses.

   Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5% (by weight) of the overall permanent seeding mix. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be used as a nurse crop, seed at 1/3 of the rate listed above.

   Oats are the recommended nurse crop for warm-season grasses.

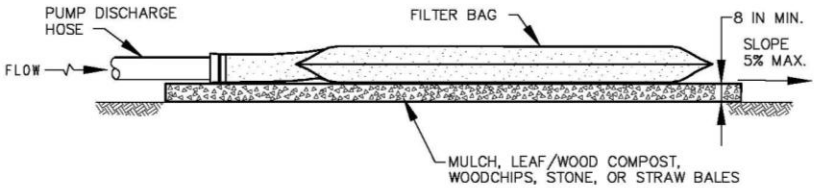
2. For sandy soils, plant seeds at twice the depth listed above.
3. The planting dates listed are averages for each Zone, and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

Filter Bag

DETAIL F-4 FILTER BAG

STANDARD SYMBOL

☒FB



CONSTRUCTION SPECIFICATIONS

1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., MULCH, LEAF/WOOD COMPOST, WOODCHIPS, STONE, OR STRAWBALES) LOCATED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. USE NONWOVEN GEOTEXTILE WITH A MINIMUM SURFACE AREA OF 225 SQUARE FEET PER SIDE AND WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG WILL BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS:

GRAB TENSILE	210 LB	ASTM D-4632
PUNCTURE	150 LB	ASTM D-4833
FLOW RATE	70 GAL/MIN/FT^2	ASTM D-4491
PERMITTIVITY (SEC^{-1})	1.3 SEC^{-1}	ASTM D-4491
UV RESISTANCE	70% STRENGTH @ 500 HOURS	ASTM D-4355
APPARENT OPENING SIZE (AOS)	0.15-0.18 MM	ASTM D-4751
SEAM STRENGTH	100 POUNDS/INCH	ASTM D-4884

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

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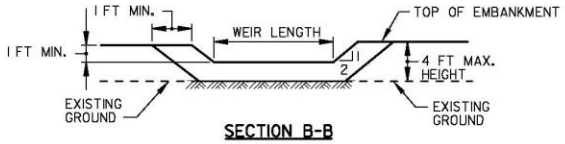
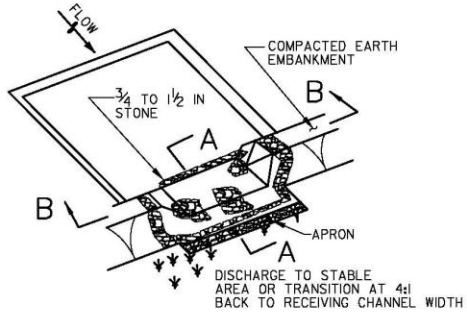
Sediment Trap II

DETAIL G-I-2 - STONE RIPRAP OUTLET SEDIMENT TRAP - ST II

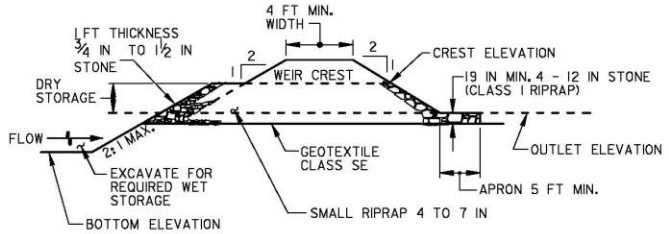
STANDARD SYMBOL



SECTION B-B



PERSPECTIVE VIEW



SECTION A-A

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MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

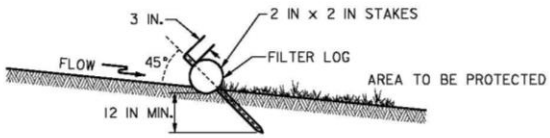
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE		MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DRAFT September 2009

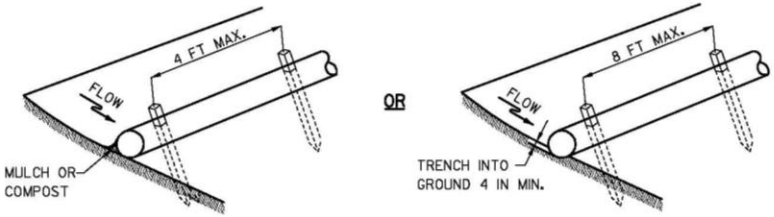
Filter Log

DETAIL E-5-2 FILTER LOG

STANDARD SYMBOL
FL-18
NOTE: DESIGNATION FL-18 REFERS TO FILTER LOG WITH 18 INCH DIAMETER.

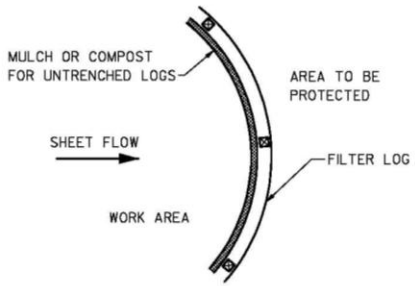


SECTION



•THIS APPLICATION MAY NOT BE USED WITH LOGS SMALLER THAN 12 IN.

PERSPECTIVE VIEW



PLAN

1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE		MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Areas of future change …

- EPA's 280 NTU Requirement for NPDES Construction Activities (On Hold!)
- EPA's 20 acre/10 acre (2011/2014) threshold for passive controls (On Hold)
- Changes to Maryland Standards and Specifications for Soil Erosion and Sediment Control – 12/2010 – Est. Effective 1/2011

Future…

- **ESD to the MEP!**
- **New Standards**
- **New Guidelines**
- **More Education and Outreach – Design Examples, Workshops, etc.;**


Protecting Our Streams, Rivers…


And the Chesapeake and Coastal Bays!


Updates are available on MDE's Website:
http://www.mde.state.md.us

MARYLAND DEPARTMENT of the ENVIRONMENT

Sediment, Stormwater & Dam Safety Program

WATER MANAGEMENT ADMINISTRATION

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