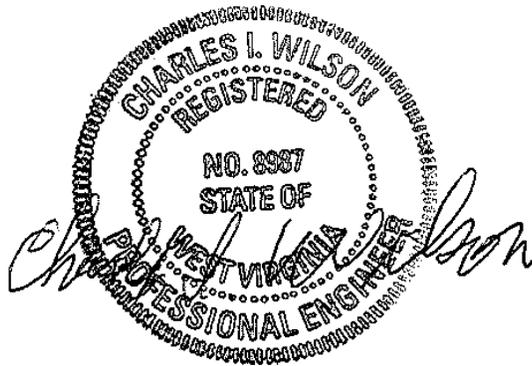




**EROSION & SEDIMENT CONTROL
AND
STORMWATER MANAGEMENT NARRATIVE
AND
STORMWATER POLLUTION PREVENTION PLAN**

**ADULT DAY CARE BUILDING
VA MEDICAL CENTER
BECKLEY, WEST VIRGINIA**

Date: 5 August 2011



This Narrative is to be used in conjunction with the Site Plans entitled "Adult Day Care Building VA Medical Center" dated 5 August, 2011 by Anderson & Associates, Inc.

**Written by: BEC
QA/QC: CIW**

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Appendix B - Water Quality Calculations

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A. PROJECT DESCRIPTION

1. General

The purpose of this project is for the construction of an Adult Day Care facility on the Beckley VAMC campus. The proposed building will connect to the existing main hospital building via an enclosed breezeway / walkway. This project will involve modifying an existing parking lot for Medical trailer parking, replacing an existing sidewalk on the north side of the new building and the construction of new sidewalk and driveway to access the lower (south side) level of the building. A retaining wall will be constructed on the lower level to allow construction of the driveway and lower sidewalk area. A second retaining wall will be constructed west of the new building between the new building and the existing building. A garden area, with sidewalks, will be constructed in the area created by the new western retaining wall. The garden area will connect by new sidewalk and stairs to an existing driveway/loading located on the south side of the existing building.

The work proposed by this project includes demolition of existing sidewalk, construction of two retaining walls, installation of storm drainage and stormwater management facilities, structures and piping, installation of sanitary sewer piping, roadway / parking area curbing and pavement installations, mobile MRI concrete pad installation, and reseeding / restoration of lawn areas. Other utilities will either be relocated or installed as new service such as fiber optic cable and conduit, watermain relocation, and the relocation of two 480 volt power/phone connection pedestals for medical trailer hookup.

The proposed land-disturbing activities consist of earthwork associated with the demolition and installation of facilities as well as the installation of the related erosion and sediment control measures indicated on the plans. Approximately 1.27 acres of land will be disturbed to construct this project.

2. Intended Sequence

Major components of the project which disturb soils are anticipated to occur as follows:

- a. Clearing and Grubbing
- b. Initial Grading/Demolition
- c. Utility Installation
- d. Building construction
- e. Site Concrete and Paving Installation
- f. Final Grading of Site & Seeding/Restoration

B. EXISTING SITE CONDITIONS

To the north of the site is an existing sidewalk and parking lot with grades ranging from 0.6% to 2%. The majority of parking lot drainage is directed to an inlet in the parking lot by a 6" high concrete wall / curb located between the parking lot and sidewalk. The route of this outfall piping from this structure is not evident, but appears to run southeast. Runoff from the sidewalk area sheet flows to the adjacent slope immediately south of the sidewalk. The ground grade quickly drops with slopes varying from 40% to 50% down this slope. To the east is a private asphalt road. This road continues southward, changing to gravel, and then turns west to continue along the southern property line. A small utility building is located to the southeast of this site with



a small gravel lot that connects to the private road. Stormwater runoff from slope and gravel lot is intercepted by culverts passing under the roadway. Flow continues south and off the property. A hospital power supply building is located immediately south west of this proposed building site with steep 40% to 50% slopes between the power supply building and the main hospital building north of power building and west of site.

C. ADJACENT AREAS

The site is part of the overall medical center complex which contains various support buildings, the main hospital facility, and parking lots to the northeast, east, and southeast. Farther north and east the property is bounded by residential neighborhoods. Undeveloped woodland bounds the south and west of the property. Stormwater runoff from this site is collected by culverts and unnamed tributaries draining south offsite to Whitestick Creek, which flows to Piney Creek, a tributary of the New river which is Hydrologic unit 05050006.

D. OFFSITE AREAS

No off-site areas will be disturbed by this project. If it is necessary to import borrow material or dispose of surplus material, the contractor shall be responsible for providing approved erosion and sediment control plan for the off-site borrow or waste areas.

E. SOILS

See Appendix A.

F. CRITICAL AREAS

Care must be taken in order to adequately stabilize the proposed rip rap channel on the relatively steep slopes between the proposed retaining wall and maintenance road on the southern side of the site. It will also be very important to prevent tracking of mud onto parking lot and private roads within the site.

G. OTHER POTENTIAL POLLUTION SOURCES

Potential pollution sources include onsite fueling operations for construction equipment and storage of fertilizer on site used in establishing temporary and permanent seeding.

H. DISCHARGE FROM INDUSTRIAL ACTIVITY

No discharges from industrial activities are anticipated on this project other than construction.

I. EROSION AND SEDIMENT CONTROL MEASURES

The construction-phase erosion and sediment controls shall be designed to retain sediment on site to the maximum extent practicable. All control measures must be properly selected, installed, and maintained in accordance with the manufacturers' specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the



permittee must replace or modify the control for site situations. If sediment escapes the construction site, offsite accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts (e.g. fugitive sediment in street could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets). Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%. Litter, construction debris, and construction chemicals exposed to storm water shall be prevented from becoming a pollutant source for storm water discharges (e.g., screening outfalls, picked up daily).

The following measures, from the West Virginia Department of Environmental Protection Best Management Practices Manual, 2006, will be used to control erosion and sediment-laden runoff on this project. See the Erosion & Sediment Control Plan for locations of specific erosion control measures.

1. Construction Entrance: will be used to prevent mud being tracked onto public and private roads causing dangerous driving conditions and muddy runoff when it rains (WVDEP Standard 3.02.)
2. Surface Roughening: will aid in establishment of vegetative cover with seed, reduce runoff velocity, and increase infiltration, reducing erosion and providing for sediment trapping (WVDEP Standard 3.08.)
3. Topsoiling: will provide a suitable growth medium for final site stabilization with vegetation (WVDEP Standard 3.09.)
4. Temporary Seeding: will be used to reduce erosion on exposed soils that may be redisturbed or permanently stabilized at a later date (WVDEP Standard 3.10.)
5. Permanent Seeding: will be used to establish vegetative cover and to reduce silt runoff for any areas not paved or roofed (WVDEP Standard 3.11.)
6. Mulching: will prevent erosion by protecting the soil surface from raindrop impact and reducing the velocity of overland flow. This will also foster the growth of vegetation by increasing available moisture and providing insulation against extreme heat and cold (WVDEP Standard 3.12.)
7. Outlet protection: To prevent scour at stormwater system outlets, a flow transition structure is needed, which will absorb the initial impact of the flow and reduce the flow velocity to a level which will not erode the receiving channel or overland area (WVDEP Standard 3.17.)
8. Riprap: Will be used to protect the soil from the erosive forces of concentrated runoff, to slow the velocity of concentrated runoff while enhancing the potential for infiltration, and to stabilize slopes with seepage problems and/or non-cohesive soils (WVDEP Standard 3.23.)
9. Silt Fence: will be used to reduce runoff velocity and allow sediment to become trapped behind or up slope of the silt fence. Silt fence is a temporary barrier of geotextile fabric. (WVDEP Standard 3.27.)
10. Super Silt Fence: will be used to reduce runoff velocity and allow sediment to become trapped behind or up slope of the super silt fence. A super silt fence is a temporary barrier of geotextile fabric over chain link fence. It is used to intercept



sediment-laden runoff from areas that are too large for regular silt fence (WVDEP Standard 3.28.)

11. Storm Drain Protection: will be used to prevent sediment from entering the storm drain system prior to permanent stabilization of the disturbed area (WVDEP Standard 3.33.)

Supplementary E&S structures shall be constructed as required by the erosion control inspector, or as necessary to adequately control erosion and sediment deposition. E&S structures may be removed only when they have served their useful purpose but not before the upstream/upslope area has been stabilized.

J. STABILIZATION PRACTICES

1. General

No specific schedule other than those guidelines given in the above descriptions of the vegetative practices will be used for temporary and permanent seeding measures. Riprap for areas requiring outlet protection shall be placed within two days after the outlet structures are functional.

The Permittee shall keep a comprehensive log of all major grading activities, any cessation, temporary or permanent, of construction activity, and when stabilization measures are implemented. This record shall be kept throughout the duration of the project. The permittee shall ensure that these records are updated, maintained, and become a permanent part of this overall plan.

Construction shall be sequenced so that grading operations can begin and end as quickly as possible. Stabilization measures shall be implemented on disturbed areas as soon as practicable. Embankment walls, upon reaching final grade, must be immediately seeded and fertilized to ensure proper stabilization. Permanent seeding shall be installed within 7 days of reaching final grade. Denuded areas which are not at final grade but which will remain dormant for more than 30 days shall be temporarily seeded. Areas that are not to be disturbed must be clearly marked by flags, signs, etc.

2. Permanent Stabilization

After the construction is completed, the site will be permanently stabilized with a combination of buildings, pavement, landscaping, stormwater management features, and permanent seeding in accordance with WVDEP Standard 3.11.

K. STORM WATER RUNOFF CONSIDERATIONS

1. Stormwater Management Regulations

- a. Approximately 1.27 acres of area will be disturbed during the construction of this project. Since the disturbance is more than 1-acre in size, but less than 3-acres, the DEP Notice of Intent (NOI) Construction Stormwater WV / NPDES General Permit will be required prior to any land disturbance.
- b. A Stormwater Pollution Prevention Plan will be submitted by the Contractor as a separate document in addition to this narrative.

2. Stormwater Quantity Control



- a. This development is adding impervious area thus increasing runoff. To address this increase a proposed stormwater detention pipe system is to be constructed to reduce post-development peak runoff rates at or below pre-development peak rates. This pipe detention system is sized based on the 10 year storm event of 3.27 inches from NOAA Atlas 14 point precipitation frequency estimates. The facility is also designed based on the 95th percentile storm event as required in EPA standards, which apply to Federal projects. The 95th percentile storm requires use of a 1.20 inch storm event.
- b. Stormwater calculations are included in Appendix B.

3. Stormwater Quality Control

- a. Storm water quality will be addressed by the use of 2 bioretention filters. All of the proposed impervious surfaces, except for a small area of access road paving too low in elevation to drain to the filters, is treated by the filters. Earlier discussions with the local review agency indicated that it would be acceptable to utilize the design guidelines provided by the Virginia Stormwater BMP Clearinghouse. The stormwater quality design utilizes the SWM New Development Excel worksheet to calculate the total removal rate of the bioretention filters. The provided BMP design satisfies the EPA requirements in that they treat maximum amount of the site practicable.
- b. Stormwater quality calculations are provided in Appendix C.

L. OTHER CONTROLS

1. Materials, Garbage, Debris

No solid materials, including building materials, garbage, and debris shall be discharged to surface waters of the State. The permittee shall ensure that these items are not left in a location where they could be transported by stormwater runoff off the site.

2. Compliance with State & Local Waste, Sanitary, and/or Septic Regulations

No temporary sewer facilities are planned for the site during construction.

3. Expected Construction and Waste Materials

Construction and waste materials that could potentially be stored on site include topsoil, fill dirt, excavated material, storm drainage and utility piping, concrete and metal building materials, roofing materials, fertilizer for seeding operations, stone to be placed on gravel areas, stone for riprap, fuel and silt fence material.

Any stockpiles of topsoil, excavated material or fill dirt that are needed shall be surrounded on the downslope side by silt fence. Fertilizer must be kept in watertight containers, preferably in portable storage units and out from exposure to the weather, during storage on site. Care must be taken to minimize spillage of fertilizer if mixing operations are required to prepare the fertilizer for application. If overnight storage of fuel is required, the fuel storage container must be equipped with a fueling mechanism disable device. To minimize the affect of any potential spills, maintain all on-site fueling operations as far away from surrounding wetlands, surface



waters and drainage facilities as is practical. Daily inspections of the fuel storage container must be implemented to detect the presence of leaks. The fueling operator shall have a safe fill, shutdown, and transfer procedure in place to minimize spillage during fueling activities. The operator must maintain a fully equipped spill kit on site at all times with the stored fuel. The kit must at least include absorbent mats or material to cleanup any spilled fuel. For any fuel spill on site equal to or exceeding 25 gallons, immediately create an appropriately sized berm around the area of spillage to minimize surface movement of the fuel. Contact local HAZMAT authorities, the engineer, and the regional DEP office as quickly as possible to report the spill and seek further assistance with spill cleanup.

Construction materials that could be carried offsite by stormwater (plastics, paper, timber, roofing materials, etc) shall be picked up daily and placed in appropriate waste disposal containers.

M. APPROVED STATE/LOCAL PLANS:

The stormwater pollution prevention plan is consistent with and integrated into the Erosion and Sediment Control Narrative prepared for this project, which has been submitted to the appropriate reviewing authorities for approval.

N. MAINTENANCE

All erosion and sediment control structures and systems shall be maintained, inspected, and repaired as needed to ensure continued performance of their intended function. In general, all erosion and sediment control measures shall be checked at least every 14 days and after each rain event over 0.5 inches of precipitation. The following items shall be checked in particular:

1. The seeded areas shall be checked every 7 days to ensure that a good stand of grass is maintained. Grassed areas shall be fertilized and reseeded as needed.
2. Silt fence shall be checked for undermining or deterioration (of the fabric) and cleaned when sediment levels have reached half of the silt fence height.
3. Inlet and outlet protection areas around culverts, and drop inlets shall be checked for buildup of sediment. If significant clogging is found (the capacity of the structure has been reduced by half), they shall either be cleaned out or replaced.

Specific requirements related to inspection and maintenance of each erosion control measure is discussed in the WVDEP Standards included in Appendix E. The contractor shall be responsible for maintenance of all erosion control measures to the satisfaction of local review authorities, as well as the installation of additional measures as needed to ensure that sediment-laden runoff does not leave the site.

O. INSPECTION

Disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site shall be inspected at least once every 14 calendar days and within 48 hours of the end of a storm event that is 0.5 inches or greater. In those areas that have been finalized, temporarily stabilized, or runoff is unlikely due to winter conditions, inspections shall take place at least once a month.



Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. E&SC measures shall be checked to see they are operating correctly. At accessible discharge points, inspection shall take place to ensure these control measures are effective at preventing significant impacts to receiving waters. Nearby downstream locations shall be inspected if discharge points are inaccessible. Sites of vehicle entrance or exit shall be inspected for evidence of offsite sediment tracking.

If existing control measures or Best Management Practices (BMPs) require modification or additional measures, such changes shall be made within 7 calendar days of the inspection or before the next anticipated storm event, as implementation is practicable.

Include inspection reports of all stormwater and erosion & sediment control measures along with any required actions as a result of inspections, with the stormwater pollution prevention plan. These reports shall include the name and qualifications of the inspector, dates of inspection, major observations and actions taken in response to inspections. Major observations include: the location of discharge of sediment or pollutant from the site, locations of BMPs that need to be maintained, locations of BMPs that failed to operate or proved inadequate, and locations where additional BMPs are needed that didn't exist at the time of inspection. These reports shall include incidents of noncompliance. If the report does not include any noncompliance incidents, the report shall contain a certification that the facility is in compliance with the stormwater pollution prevention plan and permit.

P. NON-STORM WATER DISCHARGES

No non-storm water discharges are anticipated during this project.



APPENDIX A
VICINITY MAP



APPENDIX B
STORMWATER CALCULATIONS



APPENDIX C

WATER QUALITY CALCULATIONS



APPENDIX D

**WVDEP NOI AND GENERAL PERMIT
INFORMATION**



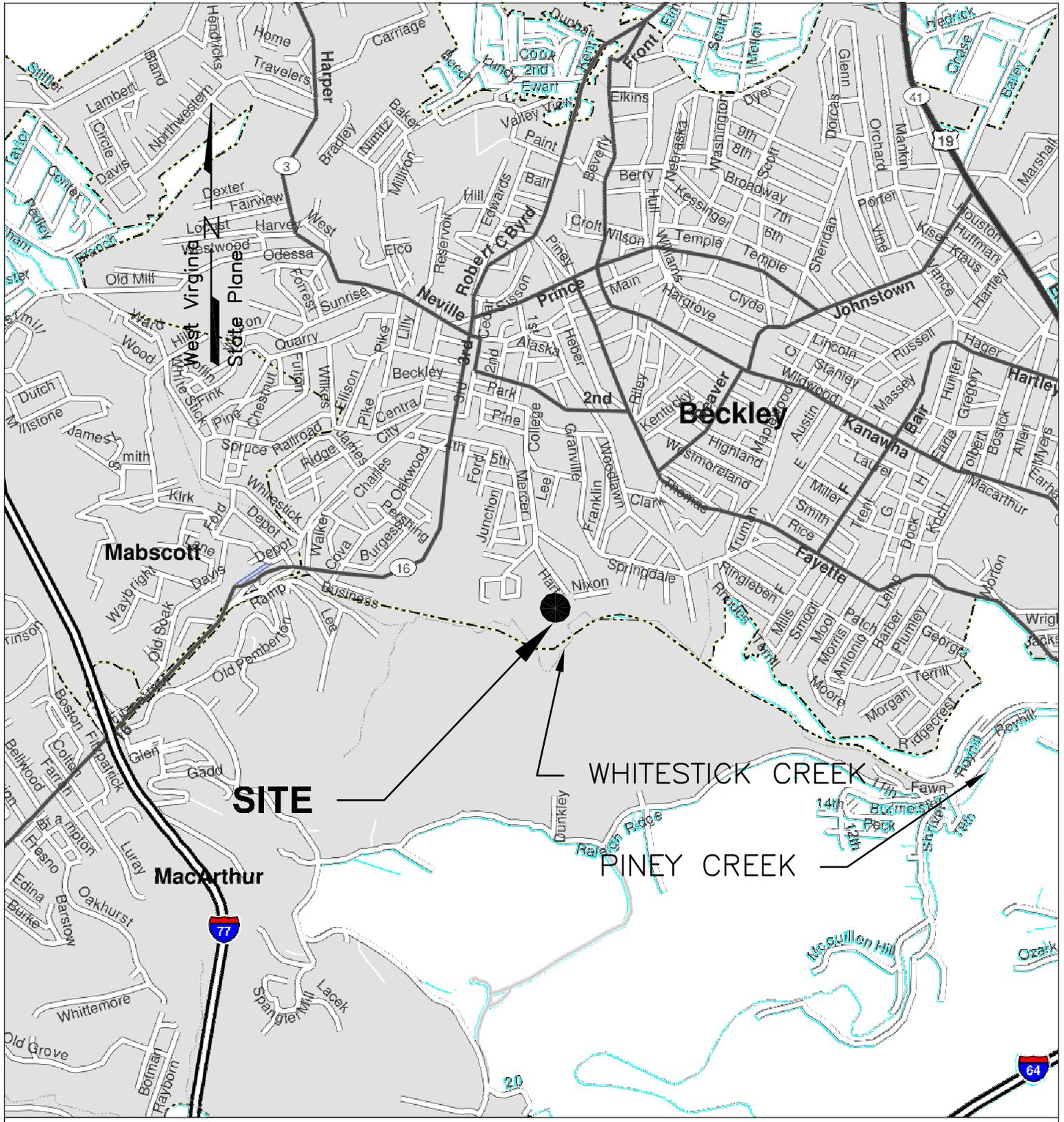
APPENDIX E

**WVDEP EROSION AND SEDIMENT
CONTROL STANDARDS**

As an attempt to save paper, the pages of measures (as listed in this narrative under section I) from the West Virginia Department of Environmental Protection best management practice standards are not included. These sheets will be included in the approved documents provided to the review agencies, the Owner, and the Contractor.



APPENDIX A
VICINITY MAP



VICINITY MAP

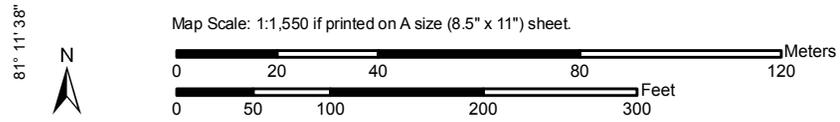
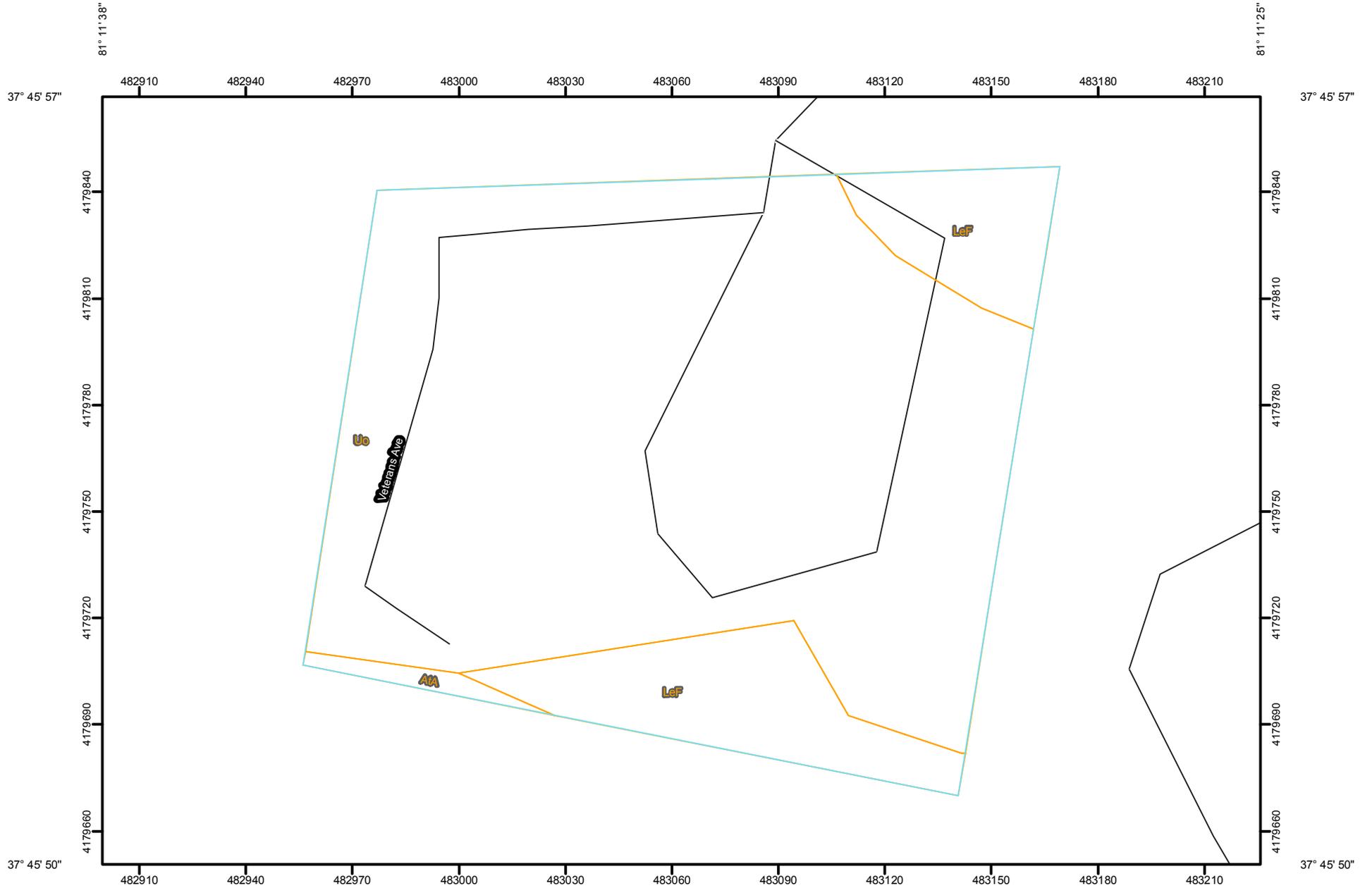
SCALE: 1" = 1000'
1:12,000



SCALE IN FEET

© ESRI

Soil Map—Fayette and Raleigh Counties Area, West Virginia
(JN: 28463 VA Adult Day Care)



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

-  Very Stony Spot
-  Wet Spot
-  Other

Special Line Features

-  Gully
-  Short Steep Slope
-  Other

Political Features

-  Cities

Water Features

-  Oceans
-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

MAP INFORMATION

Map Scale: 1:1,550 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fayette and Raleigh Counties Area, West Virginia
Survey Area Data: Version 3, Mar 9, 2011

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Fayette and Raleigh Counties Area, West Virginia (WV705)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AtA	Atkins loam, 0 to 3 percent slopes, frequently flooded	0.1	1.1%
LeF	Layland-Dekalb-Guyandotte complex, 35 to 70 percent slopes, extremely stony	1.2	16.1%
Uo	Urban land	6.1	82.8%
Totals for Area of Interest		7.3	100.0%

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

Engineering Properties— Fayette and Raleigh Counties Area, West Virginia												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<i>In</i>				<i>Pct</i>	<i>Pct</i>					<i>Pct</i>	
AtA—Atkins loam, 0 to 3 percent slopes, frequently flooded												
Atkins	0-1	*Slightly decomposed plant material	PT	A-8	0	0	—	—	—	—	—	—
	1-2	*Moderately decomposed plant material	PT	A-8	0	0	—	—	—	—	—	—
	2-5	*Loam, Silt loam, mucky loam	CL, SM, ML, SC	A-4, A-6	0	0	85-100	66-100	50-95	33-69	20-35	1-15
	5-8	*Loam	ML, SC, SM, CL	A-4, A-6	0	0	85-100	66-100	50-95	33-69	20-35	1-15
	8-26	*Loam, Silt loam, silty clay loam, fine sandy loam	SC, CL, SM, ML	A-6, A-4	0	0-4	90-100	71-100	55-100	37-82	20-40	3-20
	26-38	*Silty clay loam, Silt loam, loam, fine sandy loam	SM, ML, SC, CL	A-4, A-6	0	0-5	90-100	71-100	66-100	48-97	20-40	3-20
	38-65	*Clay loam, Stratified silty clay loam to gravelly sandy loam, silt loam, sandy clay loam	ML, CL, SM, GM	A-2-4, A-4, A-6	0	0-14	64-100	28-100	19-94	15-80	20-40	1-15

Engineering Properties– Fayette and Raleigh Counties Area, West Virginia												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<i>In</i>				<i>Pct</i>	<i>Pct</i>					<i>Pct</i>	
LeF—Layland-Dekalb-Guyandotte complex, 35 to 70 percent slopes, extremely stony												
Layland	0-1	*Slightly decomposed plant material	PT	A-8	45-85	26-60	—	—	—	—	—	—
	1-2	*Moderately decomposed plant material	PT	A-8	24-42	24-58	—	—	—	—	—	—
	2-6	*Gravelly loam, Silt loam, very gravelly loam	SM, ML, GM	A-7-5, A-2-5	0	0-38	20-90	17-90	15-90	11-69	42-78	10-12
	6-9	*Gravelly loam, Very gravelly loam, silt loam	SC, ML, GC	A-2-6, A-6	0	0-37	22-92	20-91	18-91	13-72	31-40	11-14
	9-46	*Very gravelly loam, Gravelly loam, silt loam	SC, GC	A-2-6, A-6	0-35	0-45	25-93	23-93	20-93	15-72	28-39	12-18
	46-57	*Very gravelly loam, Gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	SC, GC	A-2-6, A-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20

Engineering Properties– Fayette and Raleigh Counties Area, West Virginia												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<i>In</i>				<i>Pct</i>	<i>Pct</i>					<i>Pct</i>	
	57-79	*Very gravelly loam, Gravelly silt loam, extremely flaggy clay loam, extremely channery silty clay loam	GC, SC	A-2-6, A-6	4-60	23-93	11-79	8-78	7-78	5-65	27-38	11-20
Dekalb	0-0	*Stony slightly decomposed plant material	PT	A-8	25-43	26-60	—	—	—	—	—	—
	0-1	*Moderately decomposed plant material	PT	A-8	24-42	24-58	—	—	—	—	—	—
	1-3	*Highly organic very channery sandy loam, Channery highly organic loam, very channery sandy loam	ML, SM, GM	A-2-5, A-2-4, A-5	0	12-36	65-95	30-91	24-80	14-52	33-69	1-8
	3-8	*Very channery sandy loam, Very channery sandy loam, channery loam	GM, ML, SM	A-2-5, A-2-4, A-5	0	11-33	64-92	30-92	24-83	14-56	21-43	2-11
	8-26	*Very channery loam, Channery loam, very channery sandy loam	GM, GC, SM, ML	A-2-4, A-4	0-8	4-40	64-91	32-91	24-84	16-60	18-35	2-13
	26-31	*Extremely channery loam, Very channery sandy loam, very flaggy loamy sand	GC, SM, GM, SC	A-4, A-2-4	4-20	19-63	57-88	9-88	7-80	5-55	17-32	2-12
	31-35	*Bedrock	—	—	—	—	—	—	—	—	—	—
Guyandotte	0-1	*Slightly decomposed plant material	PT	A-8	25-43	0	—	—	—	—	—	—
	1-12	*Very gravelly loam, Gravelly silt loam, very gravelly sandy loam	GM, ML, SM	A-2-5, A-2-4, A-4	4-16	6-22	23-88	15-86	11-77	6-52	25-61	5-12

Engineering Properties— Fayette and Raleigh Counties Area, West Virginia												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<i>In</i>				<i>Pct</i>	<i>Pct</i>					<i>Pct</i>	
	12-18	*Very gravelly loam, Very gravelly sandy loam, gravelly silt loam	GC, CL-ML, SC	A-6, A-2-4, A-2-6	4-12	1-17	30-84	23-82	17-74	11-52	24-38	6-17
	18-55	*Very gravelly loam, Gravelly silt loam, very gravelly sandy loam	GC, CL-ML, SC	A-6, A-2-6, A-2-4	4-24	7-27	32-88	24-86	18-78	12-57	21-39	6-18
	55-79	*Extremely gravelly loam, Very gravelly silt loam, very flaggy sandy loam	GC, CL-ML, SC	A-6, A-2-6, A-2-4	4-23	6-26	31-81	25-79	19-73	13-54	21-36	6-17
Uo—Urban land												
Urban land	—	*Variable	—	—	0	0	—	—	—	—	—	—

Data Source Information

Soil Survey Area: Fayette and Raleigh Counties Area, West Virginia
 Survey Area Data: Version 3, Mar 9, 2011



APPENDIX B
STORMWATER CALCULATIONS



POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14



West Virginia 37.764 N 81.193 W 2345 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 2, Version 3
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2004

Extracted: Mon Mar 21 2011

Confidence Limits	Seasonality	Related Info	GIS data	Maps	Docs	Return to State Map
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Precipitation Frequency Estimates (inches)																		
ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.31	0.48	0.60	0.81	1.00	1.15	1.22	1.45	1.71	2.06	2.48	2.86	3.39	3.95	5.53	6.95	8.82	10.68
2	0.36	0.58	0.72	0.97	1.21	1.39	1.46	1.73	2.02	2.45	2.94	3.39	4.00	4.66	6.47	8.11	10.27	12.39
5	0.43	0.69	0.85	1.20	1.52	1.73	1.82	2.12	2.47	2.96	3.52	4.01	4.69	5.41	7.41	9.17	11.49	13.75
10	0.48	0.76	0.95	1.35	1.74	1.99	2.09	2.44	2.83	3.37	3.97	4.50	5.21	5.97	8.11	9.96	12.41	14.76
25	0.55	0.85	1.07	1.55	2.04	2.34	2.46	2.88	3.34	3.95	4.60	5.16	5.88	6.70	8.99	10.94	13.52	15.96
50	0.59	0.92	1.15	1.70	2.27	2.61	2.75	3.23	3.75	4.41	5.09	5.66	6.40	7.24	9.64	11.64	14.31	16.80
100	0.63	0.98	1.23	1.83	2.49	2.88	3.05	3.58	4.18	4.89	5.60	6.17	6.90	7.76	10.25	12.29	15.03	17.55
200	0.67	1.04	1.30	1.97	2.72	3.15	3.35	3.95	4.63	5.38	6.11	6.67	7.38	8.26	10.81	12.89	15.67	18.22
500	0.72	1.10	1.39	2.13	3.01	3.51	3.75	4.46	5.25	6.05	6.80	7.32	7.99	8.88	11.51	13.60	16.44	18.98
1000	0.76	1.15	1.44	2.25	3.23	3.79	4.05	4.86	5.75	6.58	7.33	7.81	8.43	9.33	12.00	14.10	16.96	19.49

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval. Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.34	0.54	0.67	0.90	1.11	1.26	1.34	1.58	1.85	2.21	2.64	3.03	3.60	4.18	5.81	7.26	9.20	11.12
2	0.41	0.64	0.80	1.08	1.35	1.53	1.61	1.89	2.19	2.62	3.13	3.59	4.24	4.93	6.81	8.49	10.71	12.90
5	0.48	0.76	0.95	1.33	1.69	1.91	2.00	2.32	2.67	3.17	3.74	4.25	4.97	5.71	7.80	9.59	11.99	14.33
10	0.54	0.84	1.05	1.50	1.93	2.19	2.29	2.66	3.06	3.61	4.22	4.77	5.52	6.31	8.54	10.42	12.94	15.37
25	0.60	0.95	1.19	1.72	2.26	2.57	2.70	3.13	3.60	4.21	4.88	5.45	6.23	7.07	9.46	11.44	14.10	16.61
50	0.66	1.02	1.28	1.88	2.52	2.87	3.02	3.52	4.04	4.70	5.40	5.98	6.77	7.64	10.14	12.18	14.93	17.50
100	0.70	1.09	1.37	2.04	2.77	3.17	3.34	3.90	4.51	5.20	5.93	6.51	7.30	8.19	10.79	12.85	15.69	18.28
200	0.75	1.16	1.45	2.19	3.03	3.47	3.67	4.30	4.99	5.71	6.47	7.04	7.80	8.71	11.39	13.48	16.37	18.98
500	0.81	1.23	1.54	2.38	3.36	3.87	4.13	4.87	5.67	6.42	7.20	7.72	8.46	9.37	12.14	14.24	17.19	19.79
1000	0.85	1.29	1.61	2.52	3.62	4.18	4.48	5.31	6.23	6.97	7.76	8.25	8.92	9.84	12.66	14.76	17.75	20.34

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.

** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.28	0.43	0.54	0.73	0.90	1.04	1.12	1.33	1.59	1.93	2.34	2.70	3.21	3.73	5.24	6.64	8.46	10.24
2	0.33	0.52	0.64	0.88	1.09	1.26	1.34	1.59	1.88	2.30	2.78	3.20	3.78	4.40	6.14	7.75	9.84	11.89
5	0.39	0.61	0.77	1.07	1.36	1.57	1.66	1.96	2.29	2.77	3.32	3.79	4.42	5.10	7.03	8.76	11.02	13.20
10	0.43	0.68	0.85	1.21	1.56	1.80	1.91	2.23	2.62	3.16	3.75	4.25	4.91	5.64	7.69	9.51	11.88	14.16
25	0.48	0.76	0.95	1.38	1.82	2.10	2.23	2.62	3.06	3.68	4.32	4.86	5.54	6.32	8.52	10.43	12.94	15.31

50	0.52	0.82	1.02	1.50	2.01	2.33	2.48	2.91	3.42	4.10	4.78	5.33	6.01	6.82	9.13	11.10	13.69	16.11
100	0.56	0.86	1.08	1.62	2.20	2.56	2.72	3.20	3.77	4.53	5.23	5.78	6.46	7.30	9.69	11.70	14.36	16.82
200	0.59	0.91	1.14	1.72	2.38	2.77	2.97	3.50	4.13	4.97	5.69	6.24	6.90	7.75	10.21	12.25	14.96	17.45
500	0.63	0.96	1.20	1.85	2.61	3.06	3.28	3.89	4.62	5.57	6.31	6.82	7.45	8.31	10.85	12.91	15.67	18.16
1000	0.65	0.99	1.24	1.94	2.78	3.27	3.52	4.19	4.99	6.03	6.77	7.26	7.84	8.71	11.29	13.35	16.14	18.64

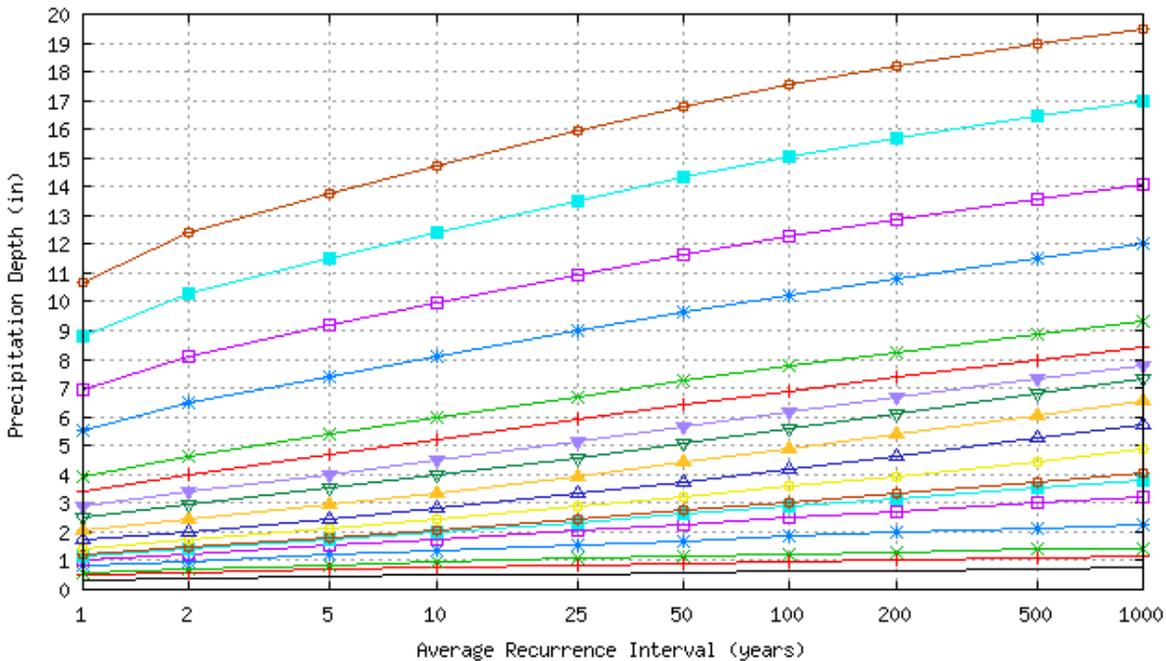
* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.

Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Text version of tables

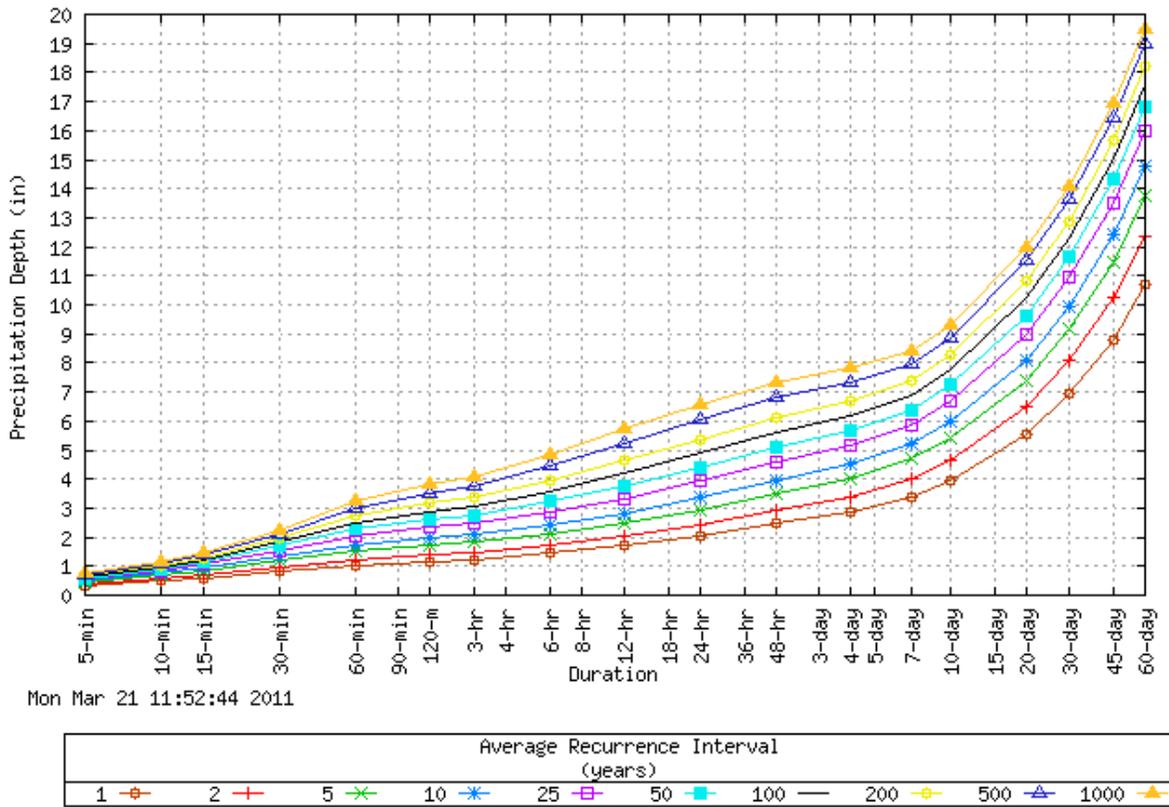
Partial duration based Point Precipitation Frequency Estimates - Version: 3
37.764 N 81.193 W 2345 ft



Mon Mar 21 11:52:45 2011

Duration					
5-min —	30-min *	3-hr ○	24-hr ▲	7-day +	30-day □
10-min +	60-min □	6-hr ●	48-hr ▼	10-day ×	45-day ■
15-min ×	120-m ■	12-hr ▲	4-day ▼	20-day *	60-day ○

Partial duration based Point Precipitation Frequency Estimates - Version: 3
 37.764 N 81.193 W 2345 ft



Related Information

Maps & Aerials

[Click here](#) to see topographic maps and aerial photographs available for this location from [Microsoft Research Maps](#)

Watershed/Streamflow Information

[Click here](#) to see watershed and streamflow information available for this location from the U.S. Environmental Protection Agency's site

Climate Data Sources

National Climatic Data Center (NCDC) database

Locate NCDC climate stations within:

or

of this location. Digital ASCII data can be obtained directly from [NCDC](#).

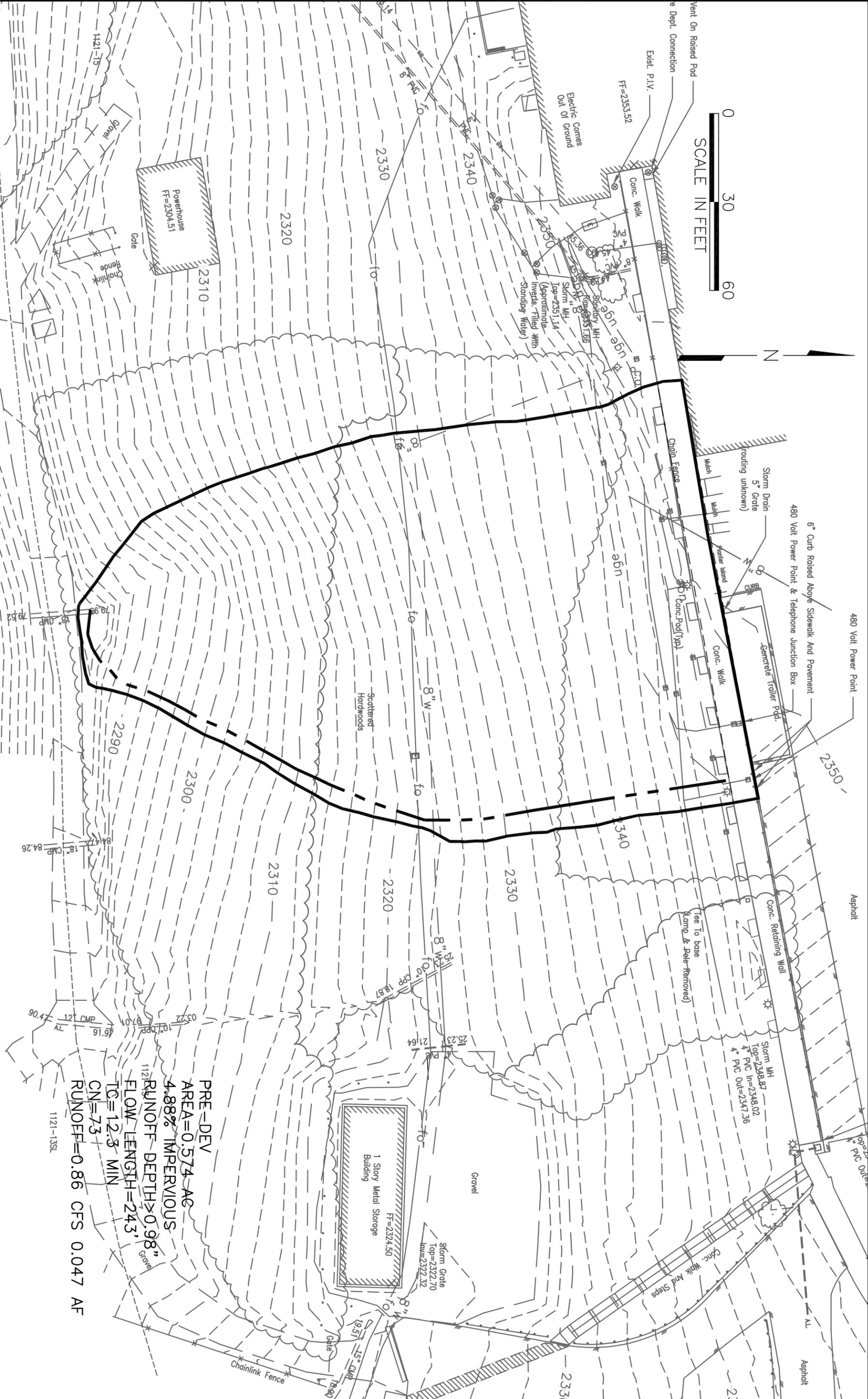
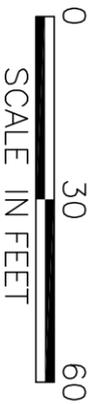
Note: Precipitation frequency results are based on analysis of precipitation data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to the matching documentation available at the [PF Document](#) page

[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[Office of Hydrologic Development](#)
 1325 East West Highway

Silver Spring, MD 20910

Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)



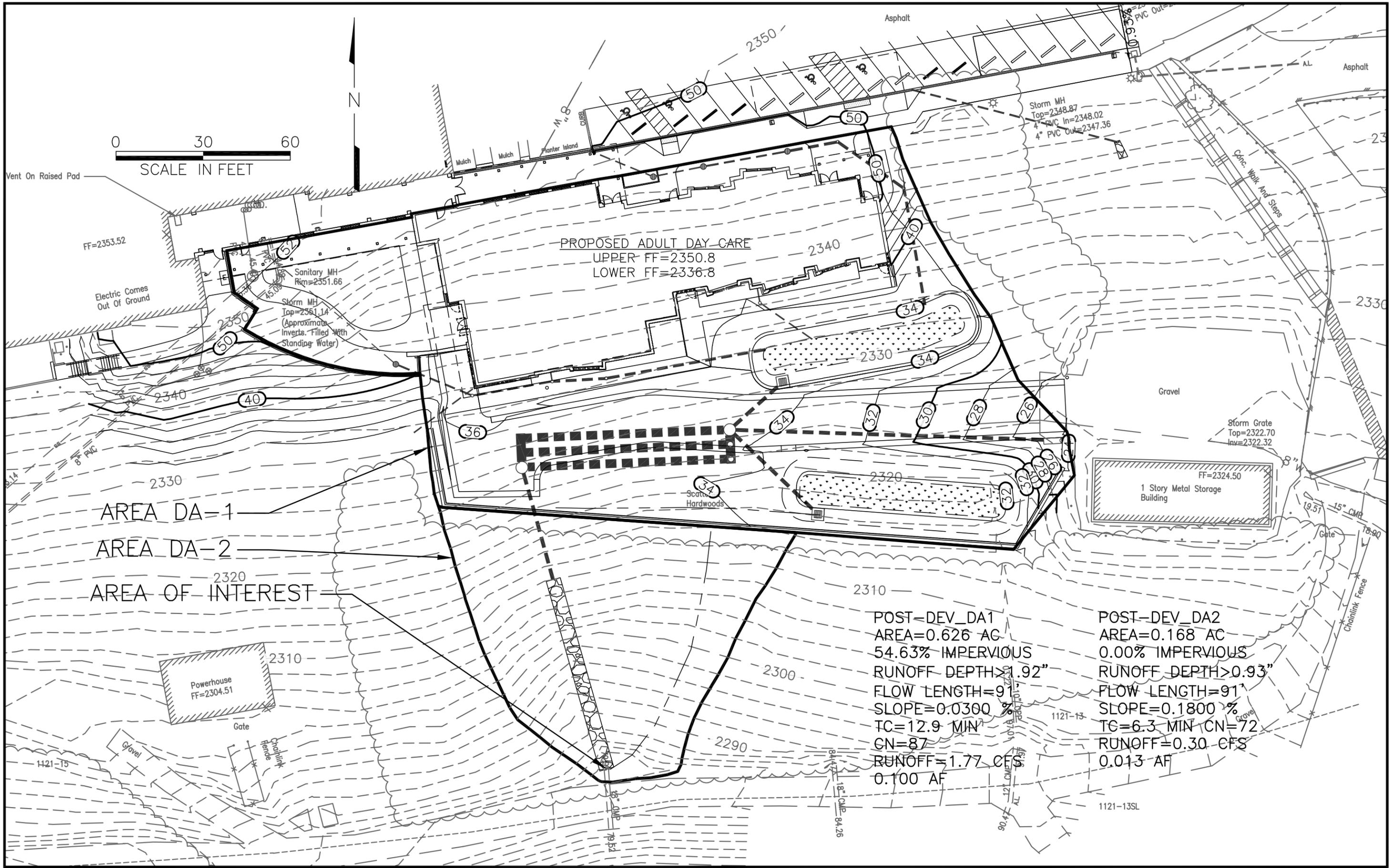
PRE-DEV
 AREA=0.574 AC
 4.88% IMPERVIOUS
 RUNOFF DEPTH>0.98"
 FLOW LENGTH=24.3'
 TC=12.3 MIN
 CN=73
 RUNOFF=0.86 CFS 0.047 AF
 1121-13SL

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DATE	REV.#	COMMENTS	DATE
07 JUL 11			

Adult Day Care Building
 VA Medical Building
 Beckley, West Virginia

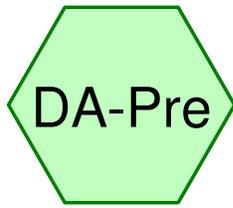
PRE DEVELOPMENT DRAINAGE MAP
 DOCUMENT NO. 28463-100
 SHEET 1 OF 2



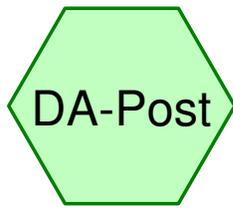
AREA DA-1
 AREA DA-2
 AREA OF INTEREST

POST-DEV_DA1 AREA=0.626 AC 54.63% IMPERVIOUS RUNOFF DEPTH>1.92" FLOW LENGTH=91' SLOPE=0.0300 % TC=12.9 MIN CN=87 RUNOFF=1.77 CFS 0.100 AF	POST-DEV_DA2 AREA=0.168 AC 0.00% IMPERVIOUS RUNOFF DEPTH>0.93" FLOW LENGTH=91' SLOPE=0.1800 % TC=6.3 MIN CN=72 RUNOFF=0.30 CFS 0.013 AF
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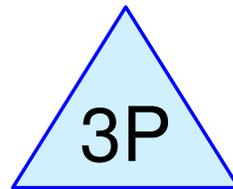
Cooper, Billy / 7/1/2011 12:22 AM / \\caprojects\projects\28\28463\engineering\design\plans\design_site_b\28463_design_site_b_da.dwg



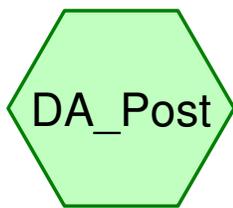
Pre-Dev



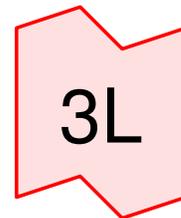
Post-Dev_DA1



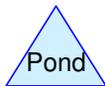
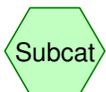
10-year
↓



Post-Dev_DA2



Post-Dev



28463_HydroCAD_Site_B

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.714	72	Woods/grass comb., Good, HSG C (DA-Pre,DA_Post)
0.284	74	>75% Grass cover, Good, HSG C (DA-Post)
0.370	98	Paved parking, HSG C (DA-Post,DA-Pre)
1.368		TOTAL AREA

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.368	HSG C	DA-Post, DA-Pre, DA_Post
0.000	HSG D	
0.000	Other	
1.368		TOTAL AREA

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Type II 24-hr 10-yr Rainfall=3.37"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-Post: Post-Dev_DA1 Runoff Area=0.626 ac 54.63% Impervious Runoff Depth>1.92"
Flow Length=91' Slope=0.0300 '/' Tc=12.9 min CN=87 Runoff=1.77 cfs 0.100 af

Subcatchment DA-Pre: Pre-Dev Runoff Area=0.574 ac 4.88% Impervious Runoff Depth>0.98"
Flow Length=243' Tc=12.3 min CN=73 Runoff=0.86 cfs 0.047 af

Subcatchment DA_Post: Post-Dev_DA2 Runoff Area=0.168 ac 0.00% Impervious Runoff Depth>0.93"
Flow Length=91' Slope=0.1800 '/' Tc=6.3 min CN=72 Runoff=0.30 cfs 0.013 af

Pond 3P: 10-year Peak Elev=1,002.89' Storage=0.036 af Inflow=1.77 cfs 0.100 af
Outflow=0.74 cfs 0.089 af

Link 3L: Post-Dev Inflow=0.79 cfs 0.102 af
Primary=0.79 cfs 0.102 af

Total Runoff Area = 1.368 ac Runoff Volume = 0.160 af Average Runoff Depth = 1.40"
72.95% Pervious = 0.998 ac 27.05% Impervious = 0.370 ac

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Type II 24-hr 10-yr Rainfall=3.37"

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Summary for Subcatchment DA-Post: Post-Dev_DA1

Runoff = 1.77 cfs @ 12.05 hrs, Volume= 0.100 af, Depth> 1.92"

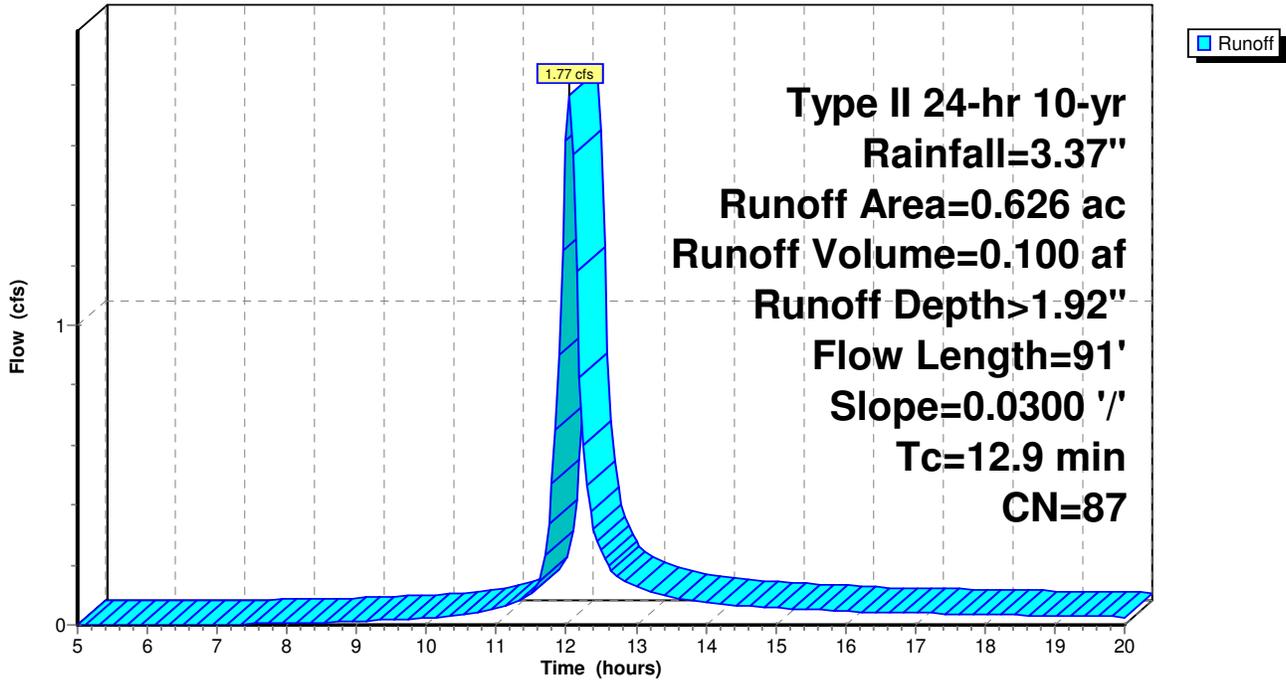
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.37"

Area (ac)	CN	Description
0.342	98	Paved parking, HSG C
0.284	74	>75% Grass cover, Good, HSG C
0.626	87	Weighted Average
0.284		Pervious Area
0.342		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	91	0.0300	0.12		Sheet Flow, Sheet n= 0.240 P2= 2.45"

Subcatchment DA-Post: Post-Dev_DA1

Hydrograph



Summary for Subcatchment DA-Pre: Pre-Dev

Runoff = 0.86 cfs @ 12.05 hrs, Volume= 0.047 af, Depth> 0.98"

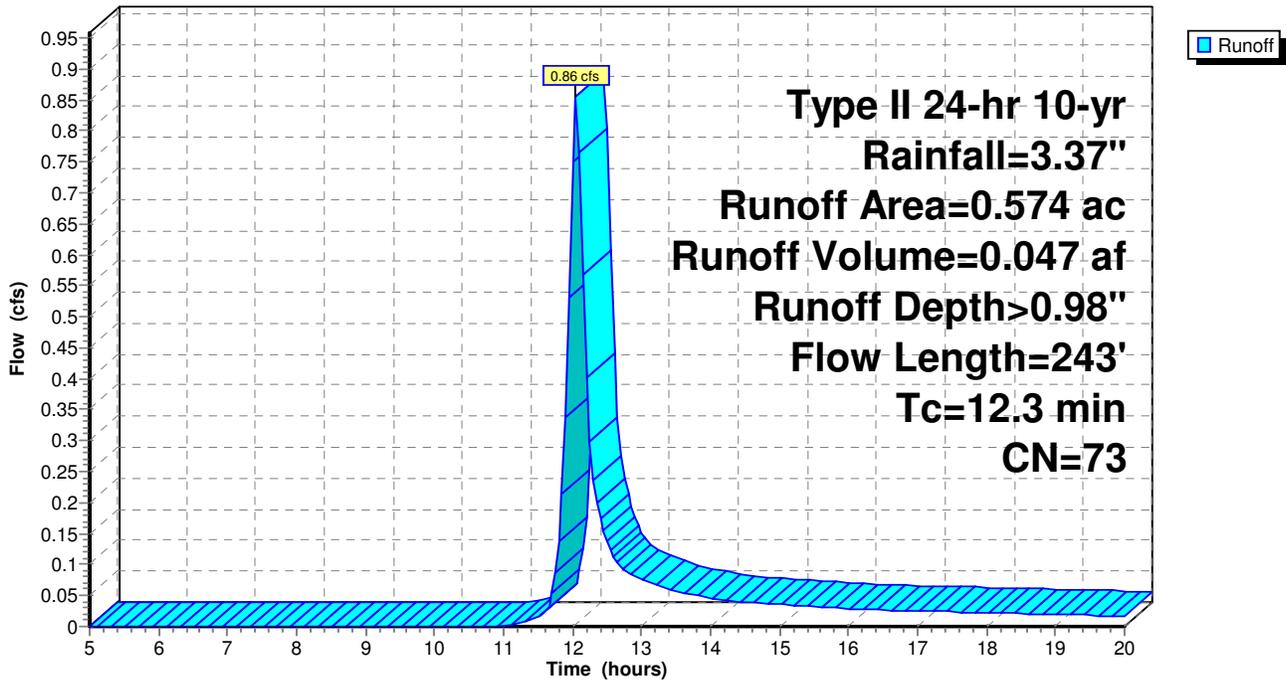
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10-yr Rainfall=3.37"

Area (ac)	CN	Description
0.546	72	Woods/grass comb., Good, HSG C
0.028	98	Paved parking, HSG C
0.574	73	Weighted Average
0.546		Pervious Area
0.028		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	57	0.2790	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 2.45"
8.1	92	0.2710	0.19		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.45"
0.6	94	0.2978	2.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.3	243	Total			

Subcatchment DA-Pre: Pre-Dev

Hydrograph



Summary for Subcatchment DA_Post: Post-Dev_DA2

Runoff = 0.30 cfs @ 11.98 hrs, Volume= 0.013 af, Depth> 0.93"

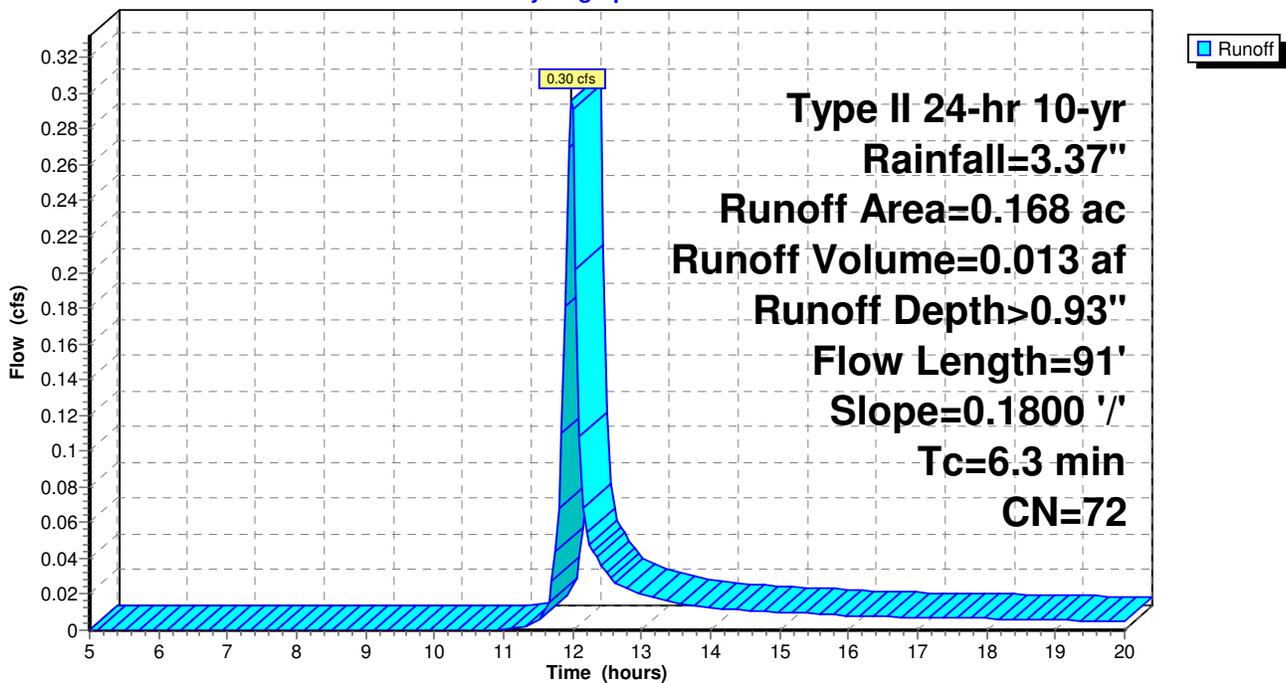
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10-yr Rainfall=3.37"

Area (ac)	CN	Description
0.168	72	Woods/grass comb., Good, HSG C
0.168		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	91	0.1800	0.24		Sheet Flow, Sheet n= 0.240 P2= 2.45"

Subcatchment DA_Post: Post-Dev_DA2

Hydrograph



Summary for Pond 3P: 10-year

Inflow Area = 0.626 ac, 54.63% Impervious, Inflow Depth > 1.92" for 10-yr event
 Inflow = 1.77 cfs @ 12.05 hrs, Volume= 0.100 af
 Outflow = 0.74 cfs @ 12.22 hrs, Volume= 0.089 af, Atten= 58%, Lag= 10.5 min
 Primary = 0.74 cfs @ 12.22 hrs, Volume= 0.089 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,002.89' @ 12.22 hrs Surf.Area= 0.006 ac Storage= 0.036 af

Plug-Flow detention time= 66.5 min calculated for 0.089 af (89% of inflow)
 Center-of-Mass det. time= 30.6 min (811.0 - 780.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	0.037 af	36.0"D x 75.00'L Horizontal Cylinder S= 0.0005 ' /' x 3

Device	Routing	Invert	Outlet Devices
#1	Primary	1,000.00'	1.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,001.00'	4.5" Vert. Orifice/Grate C= 0.600

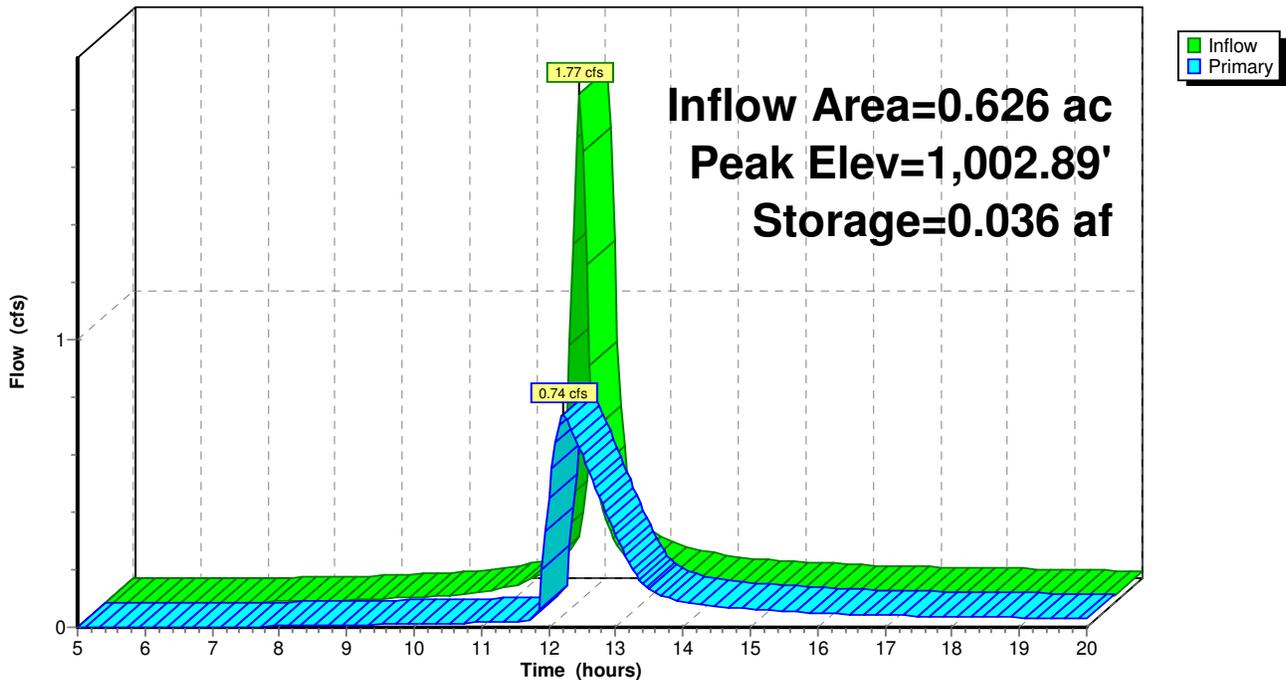
Primary OutFlow Max=0.73 cfs @ 12.22 hrs HW=1,002.87' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.04 cfs @ 8.09 fps)

2=Orifice/Grate (Orifice Controls 0.69 cfs @ 6.24 fps)

Pond 3P: 10-year

Hydrograph



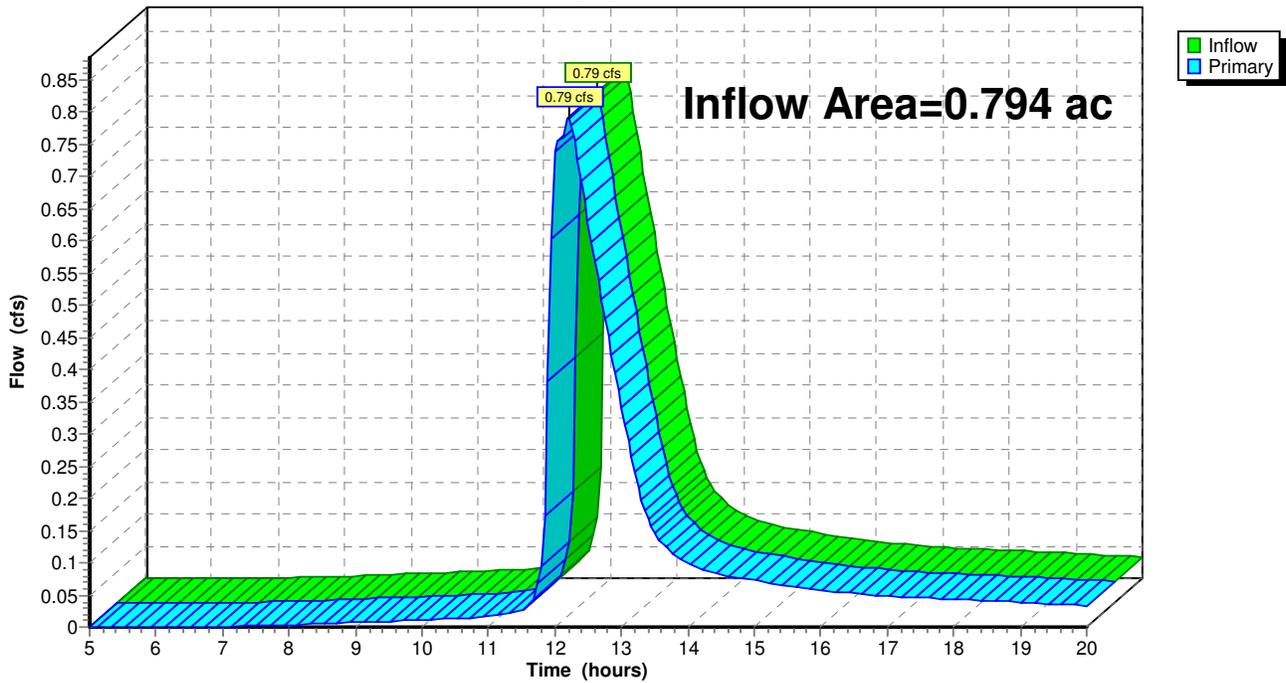
Summary for Link 3L: Post-Dev

Inflow Area = 0.794 ac, 43.07% Impervious, Inflow Depth > 1.54" for 10-yr event
Inflow = 0.79 cfs @ 12.21 hrs, Volume= 0.102 af
Primary = 0.79 cfs @ 12.21 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Post-Dev

Hydrograph



28463_HydroCAD_Site_B

Prepared by Anderson & Associates, INC

HydroCAD® 8.50 s/n 003244 © 2007 HydroCAD Software Solutions LLC

Type II 24-hr 95th Rainfall=1.20"

Printed 6/30/2011

Page 10

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-Post: Post-Dev_DA1 Runoff Area=0.626 ac 54.63% Impervious Runoff Depth>0.30"
Flow Length=91' Slope=0.0300 '/' Tc=12.9 min CN=87 Runoff=0.28 cfs 0.016 af

Subcatchment DA-Pre: Pre-Dev Runoff Area=0.574 ac 4.88% Impervious Runoff Depth>0.04"
Flow Length=243' Tc=12.3 min CN=73 Runoff=0.01 cfs 0.002 af

Subcatchment DA_Post: Post-Dev_DA2 Runoff Area=0.168 ac 0.00% Impervious Runoff Depth>0.03"
Flow Length=91' Slope=0.1800 '/' Tc=6.3 min CN=72 Runoff=0.00 cfs 0.000 af

Pond 3P: 10-year Peak Elev=1,000.78' Storage=0.007 af Inflow=0.28 cfs 0.016 af
Outflow=0.02 cfs 0.013 af

Link 3L: Post-Dev Inflow=0.02 cfs 0.014 af
Primary=0.02 cfs 0.014 af

Total Runoff Area = 1.368 ac Runoff Volume = 0.018 af Average Runoff Depth = 0.16"
72.95% Pervious = 0.998 ac 27.05% Impervious = 0.370 ac

Summary for Subcatchment DA-Post: Post-Dev_DA1

Runoff = 0.28 cfs @ 12.06 hrs, Volume= 0.016 af, Depth> 0.30"

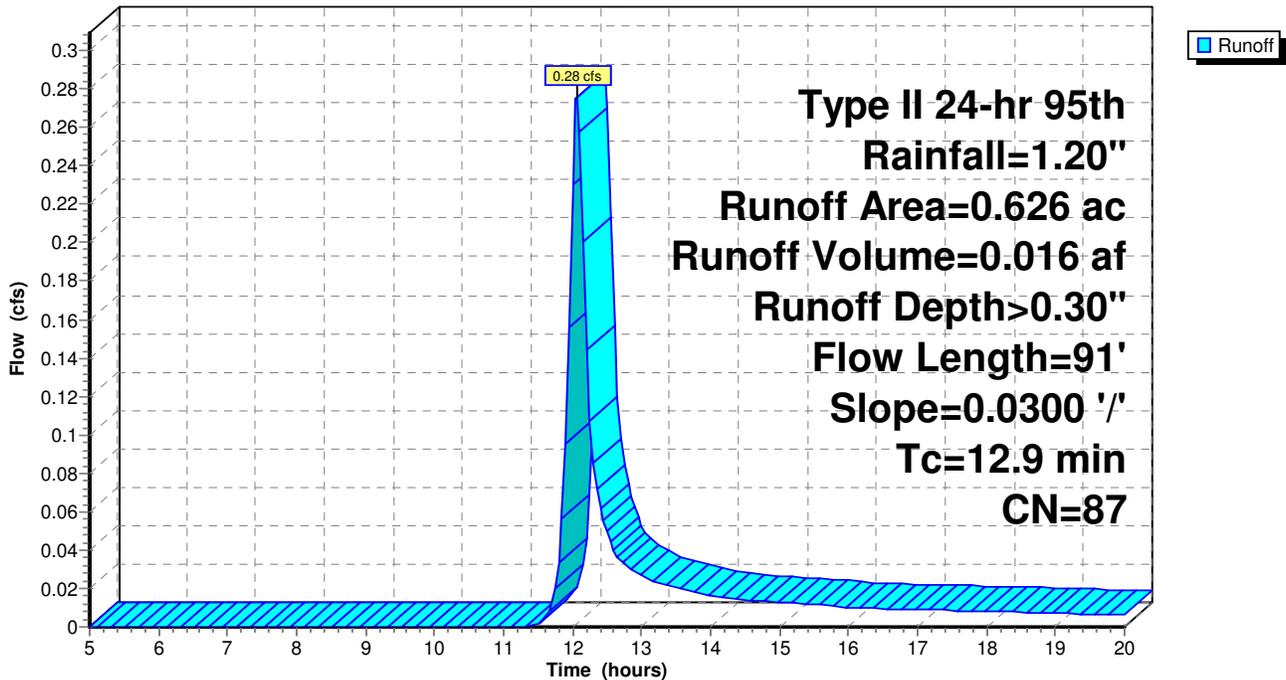
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 95th Rainfall=1.20"

Area (ac)	CN	Description
0.342	98	Paved parking, HSG C
0.284	74	>75% Grass cover, Good, HSG C
0.626	87	Weighted Average
0.284		Pervious Area
0.342		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	91	0.0300	0.12		Sheet Flow, Sheet n= 0.240 P2= 2.45"

Subcatchment DA-Post: Post-Dev_DA1

Hydrograph



Summary for Subcatchment DA-Pre: Pre-Dev

Runoff = 0.01 cfs @ 12.43 hrs, Volume= 0.002 af, Depth> 0.04"

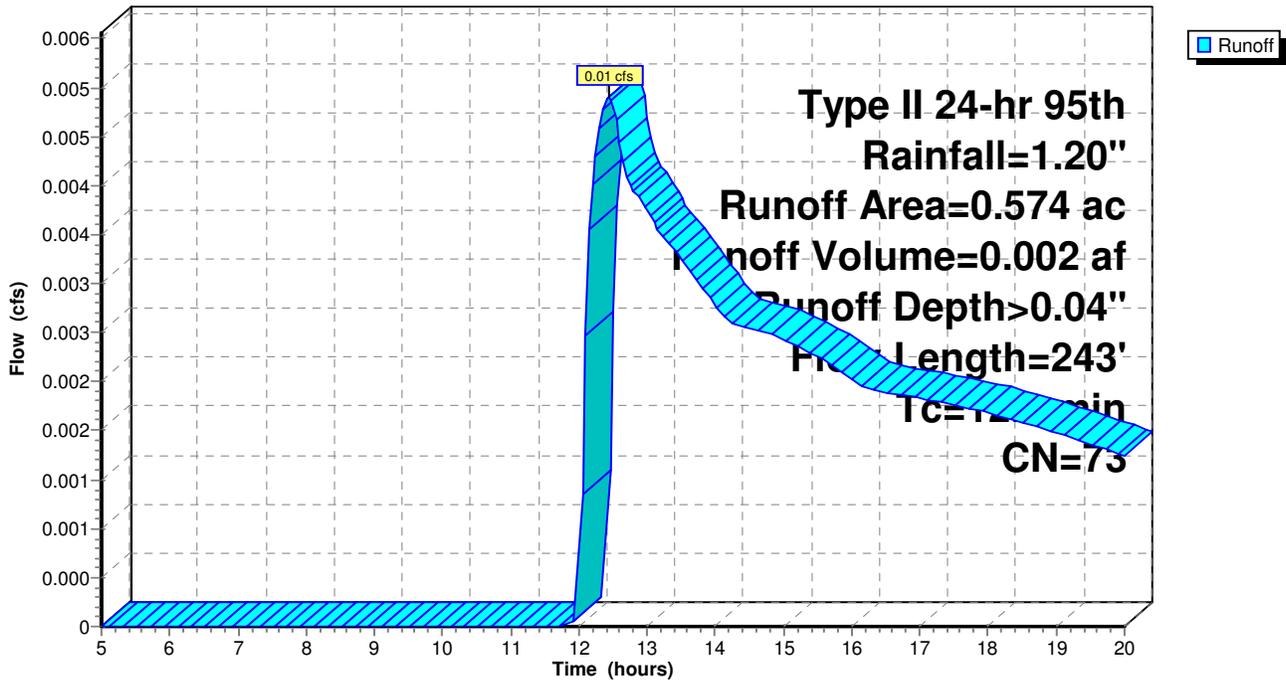
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 95th Rainfall=1.20"

Area (ac)	CN	Description
0.546	72	Woods/grass comb., Good, HSG C
0.028	98	Paved parking, HSG C
0.574	73	Weighted Average
0.546		Pervious Area
0.028		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	57	0.2790	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 2.45"
8.1	92	0.2710	0.19		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.45"
0.6	94	0.2978	2.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.3	243	Total			

Subcatchment DA-Pre: Pre-Dev

Hydrograph



Summary for Subcatchment DA_Post: Post-Dev_DA2

Runoff = 0.00 cfs @ 12.43 hrs, Volume= 0.000 af, Depth> 0.03"

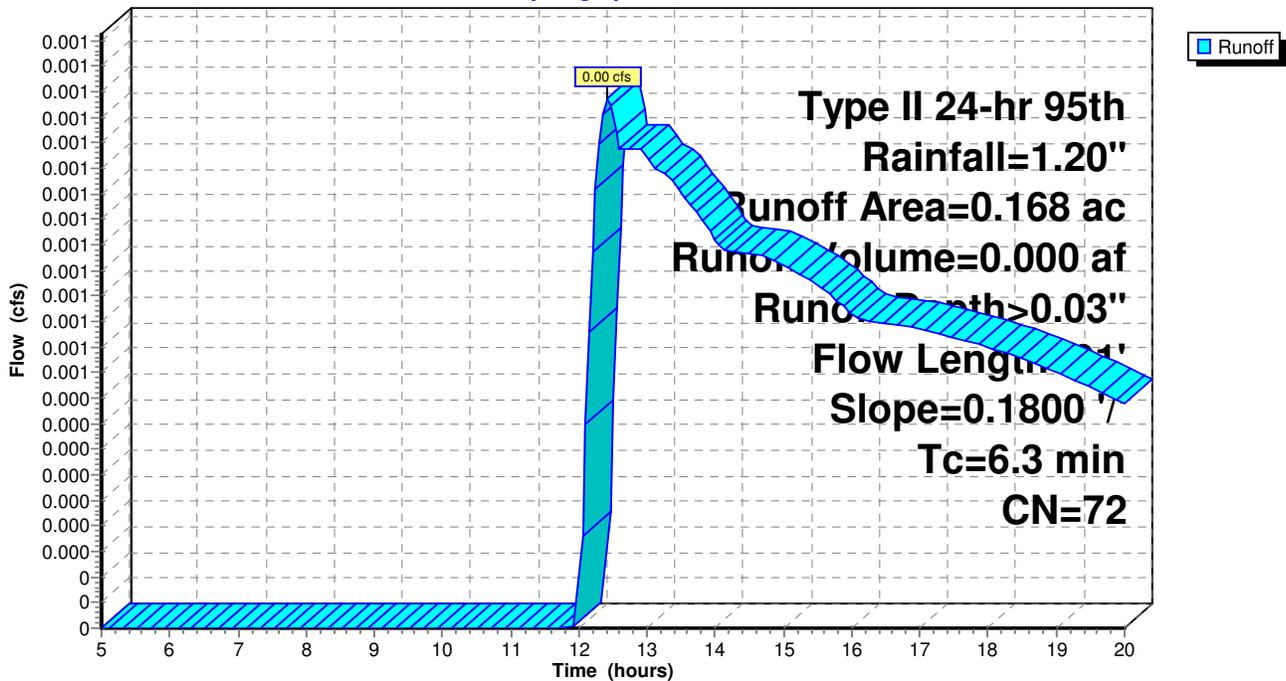
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 95th Rainfall=1.20"

Area (ac)	CN	Description
0.168	72	Woods/grass comb., Good, HSG C
0.168		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	91	0.1800	0.24		Sheet Flow, Sheet n= 0.240 P2= 2.45"

Subcatchment DA_Post: Post-Dev_DA2

Hydrograph



Summary for Pond 3P: 10-year

Inflow Area = 0.626 ac, 54.63% Impervious, Inflow Depth > 0.30" for 95th event
 Inflow = 0.28 cfs @ 12.06 hrs, Volume= 0.016 af
 Outflow = 0.02 cfs @ 13.28 hrs, Volume= 0.013 af, Atten= 92%, Lag= 73.3 min
 Primary = 0.02 cfs @ 13.28 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,000.78' @ 13.28 hrs Surf.Area= 0.014 ac Storage= 0.007 af

Plug-Flow detention time= 170.4 min calculated for 0.013 af (85% of inflow)
 Center-of-Mass det. time= 123.5 min (943.2 - 819.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	0.037 af	36.0"D x 75.00'L Horizontal Cylinder S= 0.0005 ' /' x 3

Device	Routing	Invert	Outlet Devices
#1	Primary	1,000.00'	1.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,001.00'	4.5" Vert. Orifice/Grate C= 0.600

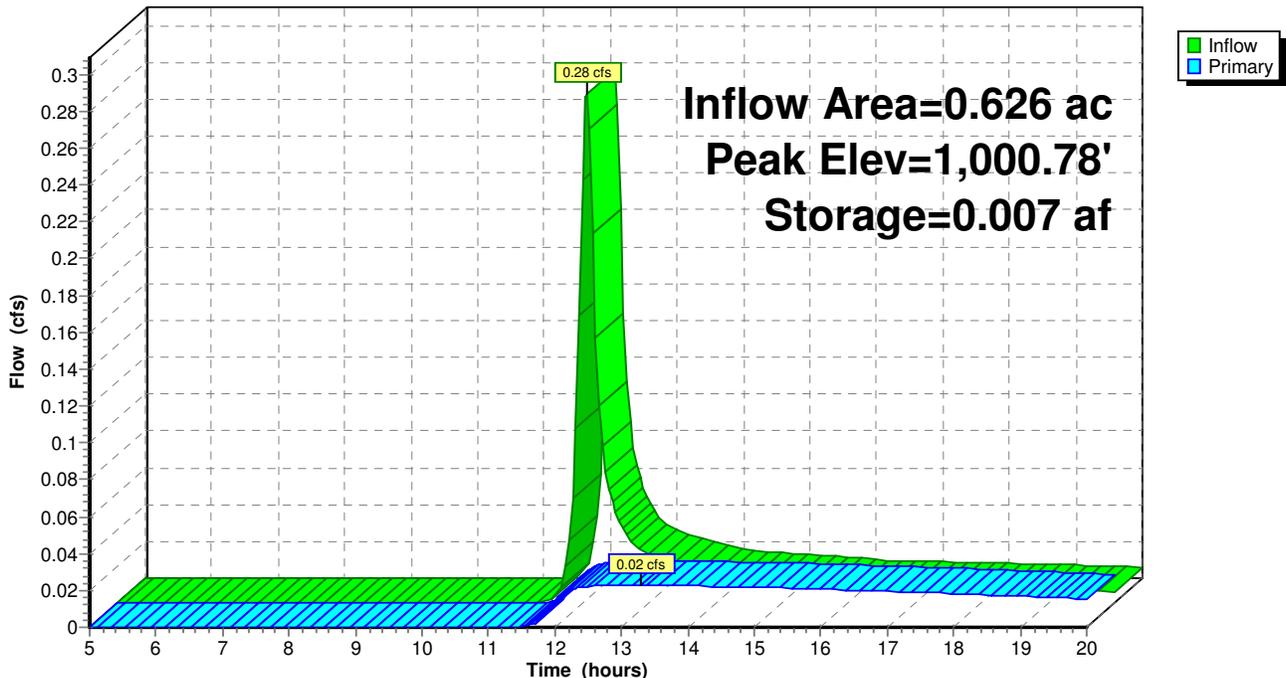
Primary OutFlow Max=0.02 cfs @ 13.28 hrs HW=1,000.78' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.02 cfs @ 4.15 fps)

2=Orifice/Grate (Controls 0.00 cfs)

Pond 3P: 10-year

Hydrograph



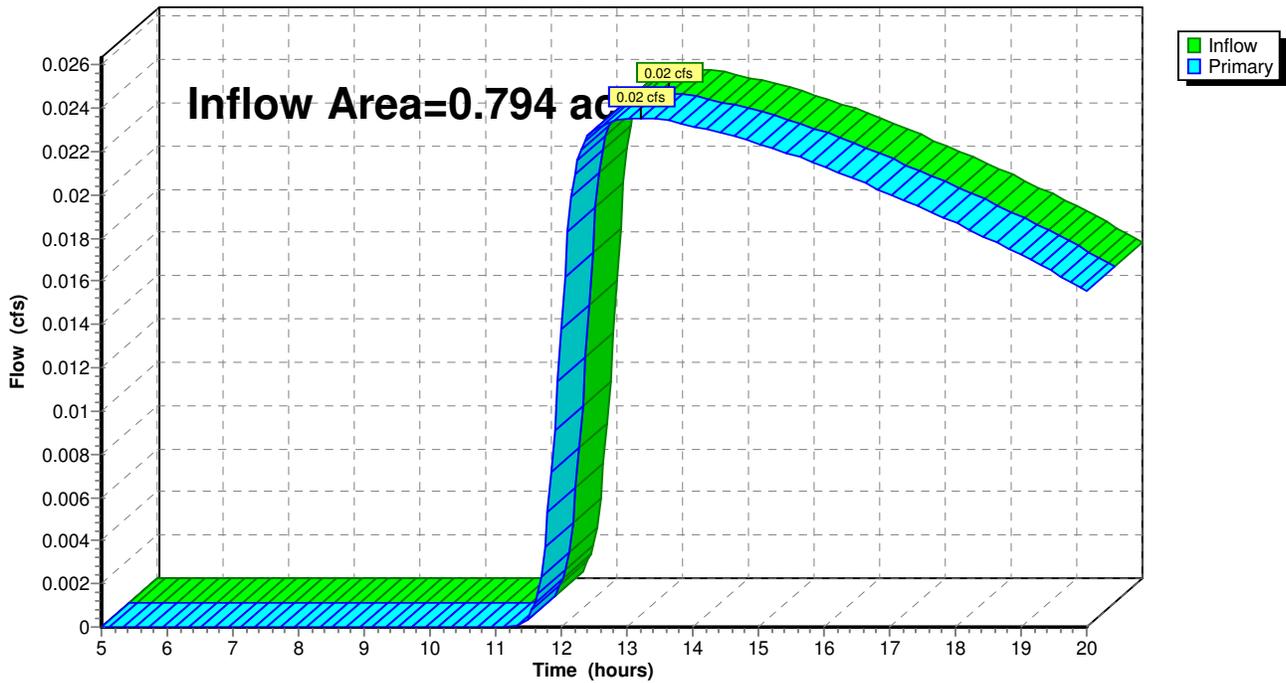
Summary for Link 3L: Post-Dev

Inflow Area = 0.794 ac, 43.07% Impervious, Inflow Depth > 0.21" for 95th event
Inflow = 0.02 cfs @ 13.22 hrs, Volume= 0.014 af
Primary = 0.02 cfs @ 13.22 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Post-Dev

Hydrograph





APPENDIX C

WATER QUALITY CALCULATIONS

Post-development Drainage Areas within Applicable Area (A)

BMP	DA No.	DA (Ac)	Area-perv (Ac)	Area-imp (Ac)	% Imp
Bioretention 1	1	0.265	0.076	0.188	71.15%
Bioretention 2	2	0.277	0.155	0.122	43.94%
None	3	0.000	0.000	0.000	#DIV/0!
	4	0.000	0.000	0.000	#DIV/0!
	5	0.000	0.000	0.000	#DIV/0!
Total		0.542	0.231	0.310	57.25%

Impervious (post-pre)	0.282	ac
	12,284	ft ²
V _{wq} (1/2 inch)	0.0118	Ac-ft
	512	ft ³

Performance-based Water Quality Calculations from VSMH (Blue Book)

Step 1 - Determine Applicable Area (A) and post development impervious cover (I-post)

Applicable Area (A) = 0.54 acre

Post Development Impervious Cover:

structures	
parking lot	
roadway	
other - sum	0.31 acre

Total 0.31 acre

$I\text{-post} = (\text{total post-development impervious cover}/A) \times 100$

I-post 57.25 %

Step 2 - Determine average land cover condition (I-watershed) or the existing impervious cover (I-existing).

I-watershed (locality)	None
or	
I-watershed (CB default = 16%)	16.00

or
Determine I-existing - pre-development impervious cover

structures	
parking lot	
roadway	
other - sum	0.03 acre

Total 0.03 acre

I-existing 5.17 %

Step 3 - determine which development scenario is proposed to determine the appropriate performance criteria

See Blue Book Appendix 5D pages 5D-6 and 5D-7

Situation 1	0
Situation 2	2
Situation 3	0
Situation 4	0

Worksheet 2 for Situation 2

From Worksheet 1

Area 0.54 acres

I_{post} 57.25 %

$I_{\text{watershed}}$ 16.00 %

I_{exist} 5.17 %

5.17 ≤ 16.00 and
57.25 > 16.00

Step 4 - Determine relative pre-development pollutant load (L_{pre}).

1. Pre-development pollutant load based on the existing impervious cover:

$$L_{\text{pre(watershed)}} = [0.05 + (0.009 \times I_{\text{watershed}})] \times A \times 2.28 \quad \text{Eq 5-16}$$

$L_{\text{pre(watershed)}}$ 0.24 lbs/yr

Step 5 - Determine the relative post development pollutant load (L_{post}).

$$L_{\text{post}} = [0.05 + (0.009 \times I_{\text{post}})] \times A \times 2.28 \quad \text{Eq 5-21}$$

L_{post} 0.70 lbs/yr

Step 6 - Determine the relative pollutant removal requirement

$$RR = L_{\text{post}} - L_{\text{pre(watershed)}}$$

RR 0.46 lbs/yr

Step 7 - Identify best management practice (BMP) for this site.

1. Determine the required pollutant removal efficiency for the site:

$$EFF = (RR / L_{\text{post}}) \times 100 \quad \text{Eq 5-22}$$

EFF 65.68 %

Performance-based Water Quality Calculations from VSMH (Blue Book)

2. Select BMP(s) from Table 5-15 and locate on the site:

BMP 1	Bioretention 1
A_{BMP1}	0.26 acres
I_{BMP1}	71.15 %
Eff_{BMP1}	65 %
BMP 2	Bioretention 2
A_{BMP2}	0.28 acres
I_{BMP2}	43.94 %
Eff_{BMP2}	65 %
BMP 3	None
A_{BMP3}	0.00 acres
I_{BMP3}	#DIV/0! %
Eff_{BMP3}	0 %
BMP 4	0
A_{BMP4}	0.00 acres
I_{BMP4}	#DIV/0! %
Eff_{BMP4}	0 %
BMP 5	0
A_{BMP5}	0.00 acres
I_{BMP5}	#DIV/0! %
Eff_{BMP5}	%

3. Determine the pollutant load entering the proposed BMP(s):

$$L_{BMP} = [0.05 + (0.009 \times I_{BMP})] \times A \times 2.28 \quad \text{Eq 5-23}$$

Where: I_{BMP} = % Impervious in BMP drainage area (% expressed in whole numbers)
 A = drainage area of proposed BMP (acres)

L_{BMP1}	0.4170 lbs/yr
L_{BMP2}	0.2809 lbs/yr
L_{BMP3}	#DIV/0! lbs/yr
L_{BMP4}	#DIV/0! lbs/yr
L_{BMP5}	#DIV/0! lbs/yr

4. Determine the pollutant load removed by the proposed BMP(s):

$$L_{removed} = Eff_{BMP} \times L_{BMP} \quad \text{Eq 5-24}$$

$L_{removed/BMP1}$	0.2711 lbs/yr
$L_{removed/BMP2}$	0.1826 lbs/yr
$L_{removed/BMP3}$	#DIV/0! lbs/yr
$L_{removed/BMP4}$	#DIV/0! lbs/yr

Performance-based Water Quality Calculations from VSMH (Blue Book)

$L_{\text{removed/BMP5}}$ #DIV/0! lbs/yr

5. Calculate total pollutant load removed by the BMP(s):

$$L_{\text{removed/total}} = L_{\text{removed/BMP1}} + L_{\text{removed/BMP2}} + \dots \quad \text{Eq 5-25}$$

$L_{\text{removed/total}}$ 0.4536 lbs/yr

6. Verify compliance:

$L_{\text{removed/total}}$ greater than or equal to RR

$L_{\text{removed/total}}$ 0.4536 lbs/yr

RR \geq 0.4584 lbs/yr



APPENDIX D

**WVDEP NOI AND GENERAL PERMIT
INFORMATION**



**NOTICE OF INTENT (NOI)
CONSTRUCTION STORMWATER WV/NPDES GENERAL PERMIT**

GENERAL PERMIT REGISTRATION NO. WVR _____ (office use only)

1. Project name _____

2. Applicant's name _____
Federal Employer Identification Number (FEIN) _____
Required for Application Processing
Address _____

Telephone () _____
E-mail Address _____

3. Operator or contractor _____
Address _____

Telephone () _____

4. Acres disturbed _____ (Must be less than 3 acres to use NOI Form)

5. Latitude DEGREES MINUTES SECONDS
Longitude DEGREES MINUTES SECONDS

6. Nearest Town _____
County _____
County Route _____

7. Receiving Stream*(s) _____
**(If the receiving stream tier is 2.5 or 3.0, the NOI Form cannot be used)*
Basin _____
Municipal System Operator (if applicable) _____

8. Brief Description of Project (Use additional pages if necessary and label as Attachment 8)

9. Proposed Construction Schedule

10. Topographic map with site located. (Label as "Attachment 11")
11. Groundwater Protection Plan (Do Not Attach. Maintain on Site)
12. Storm Water Pollution Prevention Plan – (Do Not Attach. Maintain on site.)

Preparer's Name _____

13. Public Notice Sign (see instructions)

BY COMPLETING AND SUBMITTING THIS APPLICATION, I HAVE REVIEWED AND UNDERSTAND AND AGREE TO THE TERMS AND CONDITIONS OF THE GENERAL PERMIT ISSUED ON NOVEMBER 4, 2007. I UNDERSTAND THAT PROVISIONS OF THE PERMIT ARE ENFORCEABLE BY LAW. VIOLATION OF ANY TERM AND CONDITION OF THE GENERAL PERMIT AND/OR OTHER APPLICABLE LAW OR REGULATIONS CAN LEAD TO ENFORCEMENT ACTION.

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED ON THIS FORM AND THAT IT IS, TO THE BEST OF MY KNOWLEDGE, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT.

APPLICANT SIGNATURE _____ DATE _____

PRINT NAME _____

The application fee for construction projects disturbing between 1 to less than 3 acres in size is \$300.00. Prior to filing this application, you may wish to obtain a copy of the legislative rules of the Department of Environmental Protection, Title 47, Series 26, Water Pollution Control permit fee schedule. You may obtain a copy of the referenced rules from the Secretary of State's Office, State Capitol Building, Charleston, WV 25305.

Your check or money order for the application fee must be made payable to the West Virginia Department of Environmental Protection and mailed to:

Division of Water and Waste Management
Construction NPDES
601 57th Street, SE
Charleston, WV 25304

We will process your personal information (email address, mailing address and/or telephone number) in accordance with the State of West Virginia's Privacy Policy for appropriate and customary business purposes. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. The Division of Water and Waste Management will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact the DEP's Chief Privacy officer at depprivacyofficer@wv.gov.

ALL SPILLS OR ACCIDENTAL DISCHARGES ARE REQUIRED TO BE REPORTED IMMEDIATELY TO THE EMERGENCY RESPONSE SPILL ALERT SYSTEM TOLL FREE TELEPHONE NUMBER 1-800-642-3074. CALLS FROM OUT OF STATE SHOULD BE MADE TO 304-348-8899.



CONSTRUCTION STORMWATER GENERAL PERMIT INSTRUCTIONS TO COMPLETE A NOTICE OF INTENT (NOI) FORM

A. GENERAL INSTRUCTIONS

The Division of Water and Waste Management developed and issued a General WV/NPDES Water Pollution Control permit to regulate sediment containing stormwater flowing into the waters of the State from discharges associated with construction activity. This General Permit was issued on November 5, 2007, became effective on December 5, 2007, and will expire on December 4, 2012.

Certain establishments which discharge sediment laden stormwater and fall under the definition of "Stormwater Associated with Industrial Activity" can elect to be regulated under the General Permit. Those establishments must file a Site Registration Application Form with the Division of Water and Waste Management. Sites disturbing one but less than 3 acres of land that do not discharge to a Tier 2.5 or Tier 3.0 water may register through use of the Notice of Intent Form (NOI). Individuals will be regulated under the General Permit only if they agree to do so, and if they satisfy the registration requirements. The Division of Water and Waste Management reserves the right to require any individual to obtain a facility-specific WV/NPDES Permit. Establishments not wishing to be regulated by the General Permit are required to apply for and obtain an individual permit.

After development of a Draft General Permit, the Division of Water and Waste Management advertised the intent to issue the General Permit and have fulfilled the public notice requirements. Applicants need not perform any public notice activities except as noted in Section 14 of these instructions, unless the site will discharge to a Tier 2.5 or Tier 3.0 stream. **As of the date of permit issuance, a final list of Tier 2.5 waters has not been established and approved. Instructions will be provided when a final list of Tier 2.5 waters has been established and approved.**

All permittees are required to develop a Stormwater Pollution Prevention Plan (SWPPP) for the project to be covered by the permit. Persons with questions regarding the General Permit or application procedures should contact the Division of Water and Waste Management, Permitting Section at (304) 926-0495.

B. WHO MUST APPLY

Any establishment, pursuant to Chapter 22, Article 11, where, stormwater associated with construction activity is or may be discharged into the waters of the State or, where designated by the Director, is a contributor to a violation of the Water Quality Standards or that results in a significant

pollutant loading to the receiving waters must apply. Any person proposing a construction activity, one (1) acre or greater of land disturbance in size, shall submit a site registration application form and receive approval from the Division of Water and Waste Management prior to commencing construction. Sites with land disturbance of 1 to less than 3 acres and that do not discharge to a Tier 2.5 or Tier 3.0 stream may register for the General Permit through use of the Notice of Intent (NOI) Form. A project that disturbs one to less than three acres but will have construction activities lasting one year or longer must file a site registration application form. NOI forms shall be submitted at least 10 days prior to the anticipated construction start date.

Construction of single family residences by the homeowner or homeowner's contractor requiring land disturbances less than three acres in size are provided coverage under the General WV/NPDES Water Pollution Control Permit and do not require application for registration. However, all other terms and conditions of the General Permit still apply except for the Notice of Termination requirement. When the construction activity is owned by one person but operated by another, it is the responsibility of the owner to obtain the permit. A separate registration application form is to be submitted for each construction activity.

C. WHERE TO FILE

1. Two (2) copies of the NOI Form and **one copy** of any attached information and **fee** shall be mailed to the following office:

Division of Water and Waste Management
Construction/NPDES
601 57th Street, SE
Charleston, WV 25304

The application fee for construction projects disturbing between 1 to less than 3 acres in size is \$300.00. Prior to filing this application, you may wish to obtain a copy of the legislative rules of the Department of Environmental Protection, Title 47, Series 26, Water Pollution Control permit fee schedule. You may obtain a copy of the referenced rules from the Secretary of State's Office, State Capitol Building, Charleston, WV 25305.

Your check or money order for the application fee must be made payable to the West Virginia Department of Environmental Protection.

**LINE BY LINE INSTRUCTIONS FOR COMPLETING
THE NOTICE OF INTENT FORM**

1. PROJECT NAME

The project name is the official name such as "River City Parking Garage Site Preparation Project".

2. APPLICANT'S NAME

The individual, corporation, company or governmental entity (owner) with day-to-day oversight of the project and who is supplying the capital to finance the project. The owner is responsible for obtaining and complying with the permit.

FEDERAL EMPLOYER IDENTIFICATION NUMBER (FEIN) – If you have a FEIN enter it on this line. All partnerships, corporations, sole owners or companies with employees must have a FEIN.

ADDRESS -- The address of the APPLICANT AND COMPANY TITLE (if applicable).

TELEPHONE -- The number where the APPLICANT can be reached. This person should be familiar with the project, if not, provide name of a knowledgeable person.

E-MAIL ADDRESS -- The email address of the developer. DWWM now sends out all approval letters electronically.

3. OPERATOR OR CONTRACTOR

The operator/contractor is the person/firm that will be doing the earthmoving and also has day-to-day control over operations. The operator can be the same as the applicant, but often the contractor is a different entity. If the contractor is unknown at time of application, the applicant is required to provide this information after awarding the contract.

4. TOTAL ACREAGE TO BE DISTURBED

Include ALL areas (offsite borrow areas, offsite waste sites, access roads, house sites, utility installation and all other earth disturbances related to the central project) that will be disturbed during the life of the project.

5. LATITUDE -- LONGITUDE

Locate accurately the center of the construction site on a United States Geologic Survey 7.5 minute topographic map. For precision, latitude and longitude should be given to the nearest seconds. (Example: latitude 38 57' 30", longitude 78 48' 45"). The local Natural Resources Conservation Service office may help if needed. Topographic maps can be obtained online

<http://gis.wvdep.org/imap/index.html> and several other sources can be found at <http://nationalmap.gov/gio/viewonline.html>.

6. **NEAREST TOWN** self explanatory

COUNTY self explanatory

COUNTY ROUTE The official Division of Highways (DOH) designation may be found on a road sign at the nearest intersection, on the DOH county road map, or check with county maintenance garage.

7. **RECEIVING STREAM**

Provide the official name from a USGS topographic map of all streams that will receive a stormwater discharge. If the discharge is not into a named stream, report the stream as an unnamed tributary of the first named stream that it flows into. (Example: Unnamed tributary (UT) of Laurel Run or UT of Laurel Run of the New River). Determine the Tier designation of the receiving stream. As of the date of General Permit issuance, the Tier 2.5 stream listing had not been finalized pending response to public comments and legislative approval. When the list is finalized, a copy of it will be provided with the application materials. If the stream is listed as a Tier 2.5 or Tier 3.0 stream, the NOI form registration application may not be used. **If the stream is listed as a Tier 2.5 or Tier 3.0 stream, the Stormwater Pollution Prevention Plan (SWPPP) must be submitted for review and public notice is required prior to approval of the registration. In order to ensure that the required information is provided, the applicant in this circumstance must submit the registration request on the "Site Registration Application Form for Three Acres or Greater" instead of using the NOI Form. The application fee does not change.**

In urban areas the discharge may be to a municipal storm sewer. Identify the operator of the storm sewer system, such as "River City" and the ultimate receiving water, i.e. the New River.

8. **BRIEF DESCRIPTION OF THE PROJECT**

Provide a description of the nature of the construction activity. Furnish an estimate of the cubic yards of material to be excavated if applicable. Include an estimate of excess excavation, if any, and the amount of any possible borrow. Off-site waste and borrow sites are considered part of the permitted site.

9. **PROPOSED CONSTRUCTION SCHEDULE**

Provide an estimated startup date, completion date (or contract duration) and a relative time line of the primary construction activities. These major activities include clearing, grubbing, rough site grade, final grade, temporary and permanent sediment control practices, seeding and mulching, building footers, etc.

10. USGS TOPOGRAPHIC MAP

A copy of the part of the topographic map where the site is located must accompany the permit application. The minimum information required on each map will be the name of the map, the boundary of the site, a north arrow and the location of the storm water discharge point(s). Assistance in locating sites on a topographic map may be obtained from the local Conservation District.

11. GROUNDWATER PROTECTION PLAN

All establishments holding an NPDES permit are required to have and implement a Groundwater Protection Plan (GPP). See the enclosed Generic Groundwater Protection Plan for Construction. The contractor can fill out these forms. Assistance with GPP's is available from the DWWM Groundwater Section at (304) 926-0495.

12. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

The applicant is required to develop a SWPPP plan specific for the project. A SWPPP is a Sediment and Erosion Control Plan. See the Sections 13, 14 and 17 in the Instructions for filling out the Site Registration Application Form available on the web or as part of the packet you received for help in the information needed to complete a SWPPP. A copy of the SWPPP must be maintained on site and be made available for DEP personnel at the construction site. Additional assistance in best management practices development or implementation may also be obtained from the local Conservation Districts.

13. PUBLIC NOTICE SIGN

The Environmental Quality Board ruled in 2003 that the public notice procedures in the General Permit were inadequate and required the DWWM to modify the Permit to allow for better public notice and participation. The General Permit was modified by adding section G.4.b.6.. It states that "Within twenty-four (24) hours of filing an NOI (1 to less than 3 acres) or a Site Registration Application (3 acres or more) with DWWM, all projects shall display a sign for the duration of the construction project near the entrance of the project or, for linear projects, at a location near an active part of the project that is accessible by the public, which contains the following information: 1) The registrants name or the name of a contact person along with a telephone number; 2) A brief description of the project; 3) A statement indicating that the NOI or SWPPP, as applicable, has been filed with the DWWM; 4) The address and telephone number where the NOI or SWPPP is maintained; and 5) That any person may obtain a copy of the NOI or SWPPP by contacting the DWWM at (304) 926-0495. The sign shall be a minimum of two (2) feet by two (2) feet and at least three (3) feet above ground level. If it is not feasible to display a sign at or near the project, the registrant with prior approval from the DWWM may post a notice containing the foregoing information at a local public building, including, but not limited to, a town hall or public library."

A template for the sign is as follows:

The top half of the sign, down to the words "Application Date" shall be worded and formatted as shown. Remaining text shall be filled in by the applicant (Date, Name of Registrant or Contact, Project Description, and Phone) in the size and format shown. High contrast colors must be used.

<p>For Info on NPDES Stormwater Permit</p> <p>To comment on Sediment Control Plan: Call: 800-654-5227</p> <p>or DEP.Plan@wv.gov</p> <p>DEP 601 57th Street SE, Charleston WV 25304</p> <p>Application date: XX/XX/XX</p> <p><i>Name of Project, Project Description</i></p> <p><i>(area code) Tele. No.</i></p>

The sign will be at least 24" x 24" with 1.6" and .8" letters.

OTHER CONSIDERATIONS PRIOR TO BEGINNING CONSTRUCTION:

1. Are any local permits needed, i.e. subdivision, flood plain, storm water, etc. Several counties and municipalities in the state have subdivision and stormwater management laws or regulations that must be followed in order to be in compliance with this general permit. The application for this permit does not relieve the applicant from his or her duty to obtain the proper permits required by the local or other state jurisdictions. See the attached list of Municipal Separate Storm Sewer Systems (MS4) located in the state. Every county or municipality in the state has flood plain regulations. It is up to the applicant to check with the local authorities (county commission, planning commission, etc.) to see if the planned construction is within the 100-year flood plain.
2. Minimize in-stream work.
3. Will there be any stream work that would require a Public Lands Corporation Right-of-Entry from the Real Estate Management Section of the Division of Natural Resources or a U.S. Army Corps of Engineers 404 permit?
4. Are there any wetlands? Wetland fills require a 404 permit from the Corps and 401 Water Quality Certification from the Division of Water and Waste Management.
5. Proper disposal of solid wastes.
6. Proper handling of hazardous waste.
7. Proper methods for disposal of excess cement.
8. Dust control.
9. Burning permit.
10. Permit for cement batch plants.

State of West Virginia MS4 Communities Contact Info

Village of Barboursville
Stephen J. Parsons, Public Works Director
P.O. Box 266
Barboursville, WV 25504-0266
khayden@barboursville.org
304-736-8995
cell: 304-633-8995

Beckley Sanitary Board
Jeremiah Johnson
P.O. Box 2494
Beckley, WV 25802 – 2492
Jojohnson9@earthlink.net
304-256-1760

Berkeley County Commission
William Teach, County Engineer
119 West King Street
Martinsburg, WV 25401
wteach@berkeleycountycomm.org
304-264-1966

Village of Bethlehem
P.O. Box 6339
Wheeling, WV 26003
304-233-9527

City of Bluefield
Bluefield Sanitary Board
Ronald Dodson, Asst. Director
P.O. Box 998
Bluefield, WV 24701
rdodson@bluefieldsanitary.org
304-325-3681

City of Ceredo
Charles Bash, Councilman
P.O. Box 691
Ceredo, WV 25507
304-453-1164
City of Charleston

Tom Elkins, Stormwater Manager
P.O. Box 2749
Charleston, WV 25330-2749
Tom.elkins@cityofcharleston.org
304-348-8106 x331

City of Clarksburg
Frank Scarcelli, Director of Public Works
222 West Main Street
Clarksburg, WV 26301
304-624-1611

City of Dunbar
Mayor Roger Wolfe
P.O. Box 483
Dunbar, WV 25064
rbernie@charter.net
Mayor's office: 304-766-0220

City of Fairmont
Mike DeMary, Storm Water Coordinator
200 Jackson Street
Fairmont, WV 26555-1428
mdemary@cityoffairmontwv.com
304-366-6231

City of Huntington
Charles Cornett, Director of Public Works
P.O. Box 1694
Huntington, WV 257
Cornettcw2004@aol.com
304-696-5903

City of Hurricane
Ronnie Woodall, Utilities Superintendent
Hurricane Storm Water Board
P.O. Box 1086
Hurricane, WV 25526
rwoodall@hurricanewv.com
304-562-5814

City of Kenova
P.O. Box 268
Kenova, WV 25530
304-453-1571

City of Martinsburg
Steve Knipe, Utilities Director
P.O. Box 828
Martinsburg, WV 25401
sknmtbgwater@adelphia.net
304-264-2116

Town of Milton
Kreth Sink, Public Works Director
1139 Smith Street
Milton, WV 25541
sinkkreth@aol.com
miltonwater@charter.net
304-360-3579

Morgantown Utility Board
Scott Copen, P.E. Staff Engineer
P.O. Box 852
Morgantown, WV 28507-0852
scopen@mub.org
304-292-8443

City of Moundsville
Larry Bonar, Assistant Superintendent
Moundsville Sanitary Board
P.O. Box 480
Moundsville, WV 26041
lbonar@moundsvillewwtp.com
Larry Bonar: 304-845-8973
Jim Richmond: 304-845-3511

City of Nitro
A.J. Hill, Director of Public Works
20th Street & 2nd Avenue
Nitro, WV 25143
pwlman@aol.com
304-755-0705

City of Parkersburg
Ron Stadler, PE, City Engineer
Pete Moran
One Government Square
Parkersburg, WV 26102
pmoran@netassoc.net
304-424-8568

City of St. Albans
Dick Callaway, Mayor
1499 MacCorkle Avenue
St. Albans, WV 25177
Mayor's office: 304-722-3391
Contact: Bill Keaton
bkeaton@chaptech.com
Chapman Technical: 304-727-5501

City of South Charleston
Frank Mullens, Mayor
4th Avenue & D Street
South Charleston, WV 25303
Steve DeBarr: 304-768-4140
Gerald Burgy: 304-744-5532
gburgy@suddenlinkmail.com



APPENDIX E

WVDEP EROSION AND SEDIMENT CONTROL STANDARDS

As an attempt to save paper, the pages of measures (as listed in this narrative under section I) from the West Virginia Department of Environmental Protection best management practice standards are not included. These sheets will be included in the approved documents provided to the review agencies, the Owner, and the Contractor.