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APPENDICES

Contact Information / Responsible Parties:

Permittee(s):
BNE Energy
29 South Main Street
Town Center, Suite 200
West Hartford, CT 06107
(800) 450-0503

Contractor Co-Permittee:
To be determined

Contractor Operator(s):
To be determined

Stormwater Manager and SWPPP Contact(s):
BNE Energy
29 South Main Street
Town Center Suite 200
West Hartford, CT 06107
(800) 450-0503

This SWPPP was prepared by:
Curtis Jones, P.E., LEED AP
CIVIL 1
43 Sherman Hill Road
Suite D-101
Woodbury, CT 06798

Section 1.0

PROJECT INTRODUCTION

1.0 PROJECT INTRODUCTION

Project/Site Information:

Project/Site Name: Wind Colebrook North

Location: Winsted- Norfolk Road
Colebrook, Connecticut

Latitude/Longitude:	Latitude:	Longitude:
	41º 58' 30" N	73º 08' 28" W

Method for determining latitude/longitude: Google Earth

1.1 SITE SUMMARY

1.1.1 Existing Conditions

Located along the Winsted- Norfolk Road and Rock Hall Road, the project site consists of approximately 125 acres of primarily undeveloped property. Development on the property is limited to a seasonal use building in the southwest corner of the property which services a golf driving range. The Property is located approximately 1,050 feet east of the Norfolk town line town line and is located in Drainage Basin 4302 Mad River which is part of the larger Farmington Regional Basin as indentified in the Atlas of the Public Water Supply Sources and Drainage Basins of Connecticut . The surrounding land is predominately low density residential. The site will be accessed via Rock Hall Road. This access point will be maintained throughout the construction process. Currently, there are no structural stormwater discharge points. All stormwater flows over land to discharge points off site.

1.1.2 Project Description

The Project consists of three GE 1.6MW wind turbines, associated ground equipment, the installation of an access driveway and an electrical connection. The installation of the turbines will require the construction of temporary equipment lay-down areas for the turbines, crane assembly area, access road and associated ground equipment including an electrical collector yard and associated utility infrastructure so that the turbines can be interconnected to the electrical grid. Following completion of the project, all temporary structures will be removed and the site returned to pre-construction conditions as far as practicable.

1.2 PROJECT OWNER AND OPERATOR

The project owner and operator, BNE Energy, will be the responsible entity for completing the project. The address and telephone is:
BNE Energy
29 South Main Street
Town Center Suite 200
West Hartford, CT 06107
(800) 450-0503

1.3 PERMIT COVERAGE AND ELIGIBILITY

The U.S. Environmental Protection Agency (EPA) requires a National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharges from construction sites that disturb more than one acre of land or from smaller sites that are part of a larger, common plan of development. For the purposes of the NPDES program, construction activities are defined as clearing, excavating, grading, or other land disturbing activities.

The General Permit for the Discharge of Stormwater and Dewatering Wastewaters associated with Construction Activities (CGP) authorizes stormwater discharges from construction activities which result in the disturbance of one or more acres of land area on a site regardless of project phasing. In the case of a larger plan of development, the estimate of total acres of site disturbance shall include, but is not limited to, road and utility construction, individual lot construction, and all other construction associated with the overall plan, regardless of the individual parties responsible for the construction of these various elements. These conditions are subject to the conditions outlined in DEP-PED-GP-015. The effective dates of this CGP are April 9, 2010 thru October 1, 2011, and cover all areas of Connecticut. This CGP includes provisions for the development of this Stormwater Pollution Prevention Plan (SWPPP) to maximize the potential benefits of pollution prevention and sediment and erosion control measures at a construction site.

CGP eligibility is limited to discharges from "large" and "small" construction activity as defined in Section 3 of 2010 Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters. A copy of DEP-PED-GP-015 is included in Appendix J of this document. The permittee has requested coverage under this CGP by submission of a complete and accurate General Permit Registration Form and Transmittal. Copies of these are included in Appendix A. A map detailing the limits of disturbance, for the disturbed area indicated on the registration form, and covered under this CGP, is included in Appendix D. The permittee is granted coverage under this CGP when they have received a Letter of Coverage (LOC) from DEP. A copy of the LOC is to be included in Appendix A.

1.4 CERTIFICATION REQUIREMENTS

All permittees and operators are required to sign a SWPPP certification as a condition of the CGP. The signed certifications confirm that the contractor has been informed that a SWPPP has been prepared for the project and they will be required to perform necessary actions tat have been identified to comply with both the SWPPP and the CGP. No permittee or operator shall commence work on this project site until they have familiarized themselves with this plan and signed the appropriate SWPPP certification. It may be necessary for the contractor to implement additional erosion control and pollution prevention measures not previously identified to maintain compliance with the CGP. The following signed SWPPP certifications are included in Appendix B:

- Preparer
- Permittee and Co-Permittee
- Operator
- Inspector

1.5 COASTAL CONSISTENCY REVIEW

After review of the applicable policies and standards in Connecticut's Coastal Management Act (CCMA), codified in Sections 22a-90 through 22a-112 of the Connecticut General Statutes (CGS), as amended, it has been determined that this project does not require a coastal consistency review.

1.6 ENDANGERED OR THREATENED SPECIES

The existence and/or mitigation for endangered or threatened species is discussed within the comprehensive assessment of all potential environmental impacts associated with Wind Colebrook North.

1.7 SOILS, SLOPES, VEGETATION, AND CURRENT DRAINAGE PATTERNS

1.7.1 Soil type(s)

Based upon a review of typical geologic conditions and the National Soil Cooperative Survey, the soils have been classified as (1) Bice- Millsite complex 3-15% slopes, very rocky, (2) Bice-Millsite complex 15-45% slopes, very rocky, (3) Bice fine sandy loam 3-8% slopes, very stony, (4) Bice fine sandy loam 8-15% slopes, very stony, (5) Bice fine sandy loam 15-25% slopes, very stony, (6) Schroon fine sandy loam 2-15% slopes, very stony, (7) Shelburne fine sandy loam 3- 8% slopes, (8) Shelburne fine sandy loam 8-15% slopes, (9) Shelburne fine sandy loam 8-15% slopes, very stony and (10) Brayton- Loonmeadow complex extremely stony.

1.7.2 Slopes

The project site consists of varying slope conditions ranging from relatively flat conditions in the central portion of the site and moderately steeper slopes in the extreme easterly and westerly portion of the site. The proposed towers are to be located on gentle slopes.

1.7.3 Drainage Patterns

Existing site topography is such that runoff migrates, typically via overland sheet flow from the easterly and westerly upland portions of the site towards the wetlands in the center portion of the site. The flow through the wetlands is generally from the north to the south and southeast through the Mill Brook which is a perennial watercourse.

1.7.4 Vegetation

Six major habitat types have been identified in the Terrestrial Wildlife Habitat & Wetland Impact Analysis prepared by VHB, Inc. These types include (1) second growth Northern Hardwood forest, (2) second growth Northern Hardwoods- Hemlock- White Pine forest, (3) early successional Northern Hardwood forest, (4) Palustrine forested wetlands (which include Mill Brook, a pereenial watercourse), (5) Palustrinescrub- shrub- emergent wetlands and (6) maintained lawn (golf driving range).

1.8 SITE FEATURES AND SENSITIVE AREAS TO BE PROTECTED

1.8.1 Receiving Waters and TMDL Applicability

Mill Brook runs through the property and ultimately receives the storm water runoff from the site.. This water body is not considered impaired and is not listed on the most current 303(d) listing of impaired waterways.

1.8.2 Wetlands

Within to the property boundary a wetland has been identified and delineated. Mitigation and impacts are discussed in the environmental assessment completed by VHB, Inc.

1.9 FINAL STABILIZATION AND TERMINATION OF COVERAGE

At the completion of a construction project registered pursuant to Section 4 of the general permit, a Notice of Termination must be filed with the commissioner. A project shall be considered complete after the site has been stabilized for at least three months following the cessation of construction activities. A site is not considered stabilized until there is no active erosion or sedimentation present and no disturbed areas remain exposed.

The termination notice shall be filed on forms prescribed and provided by the commissioner and shall include the following: (1) The permit number as provided to the permittee on the permit certificate; (2) The name of the registrant as reported on the general permit registration form DEP-PED-REG-015; (3) The address of the completed construction site; (4) The date all storm drainage structures were cleaned of construction debris pursuant to Section 6(b)(6)(C)(iv) of the general permit, the date of completion of construction, and the date of the final inspections pursuant to Section 6(b)(6)(D) of this general permit; (5) A description of the post-construction activities at the site; and (6) Signature of the permittee. The termination form should be filed with the commissioner at the following address:

Water Permitting & Enforcement Division
Bureau of Materials Management & Compliance Assurance
Department of Environmental Protection
79 Elm Street
Hartford, Ct 06106-5127

1.10 RETENTION OF RECORDS

The SWPPP document will be maintained by the contractor in the appropriate construction office or location from the date the construction is initiated until the project is concluded. Records will be maintained during grading operations, construction activities either temporarily or permanently cease, stabilization measures are initiated and final stabilization is achieved. The project owner will maintain the SWPPP for a period of three years following termination of coverage. Records to be maintained include but are not limited to:

- SWPPP and any amendments
- Copy of permit and/or certification of coverage
- General Permit Registration Form
- All reports and actions required
- Site inspection records
- Contractor certifications
- Notice of Termination

Section 2.0

CONSTRUCTION ACTIVITIES

2.0 CONSTRUCTION ACTIVITIES

2.1 DESCRIPTION OF CONSTRUCTION ACTIVITY

Prior to construction BNE will complete all pre-construction planning activities. BNE will continue to consult with municipalities, state agencies and federal agencies, as applicable, and will conduct site surveys to determine construction methodologies and procedures to minimize adverse effects to the environment and public.

Construction will typically consist of activities such as:

- Surveys to stake access roads and structural locations
- Wetland delineation
- Geotechnical investigations
- Establishment of construction staging area
- Installation of sediment and erosion control devices
- Excavation and installation of access roads
- Excavation and installation of lay-down and equipment assembly areas
- Excavation and installation of foundations and erection of new structures
- Installation of conductors
- Restoration of site, including re-establishment of vegetative areas

2.2 CONSTRUCTION SITE ESTIMATES

The following are estimates of the construction site:

Property Area: 125 acres
Area to be disturbed: 7.86 acres
Percentage impervious area before construction: 0%
Runoff coefficient number (RCN) before construction: 58
Percentage impervious area after construction: 0.98%
Runoff coefficient number (RCN) after construction: 60
Summary of peak flows: See 2.3.3
Summary of groundwater recharge: 0.015 AC-FT

2.3 PROPOSED STORMWATER MANAGEMENT PRACTICES

2.3.1 Stormwater Treatment Practices

Following construction of the tower units, the site will be returned to pre-construction conditions as far as practicable. The constructed access driveway will remain in place to provide access to the wind turbines. The temporary diversion swales with be regraded to pre-construction conditions and vegetation will be established. The permanent riprap swales constructed as part of the Erosion and Sediment Control Plan will remain in place and will convey runoff from the access drive to Stormwater Ponds for treatment and detention. Stone infiltration trenches will be constructed along the access drive in areas that do not drain to the Stormwater Ponds in order to promote infiltration of additional stormwater runoff.

2.3.2 Flood Control and Peak Runoff Attenuation Management Practices

The temporary and permanent stormwater runoff control measures have been designed in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and the 2004 Connecticut Stormwater Quality Manual. Temporary measures include temporary diversion swales, stone check dams, silt fencing, hay bales, temporary sediment traps, erosion control blankets and temporary seeding. Permanent measures include rip rap lined swales, catch basins with sumps, stormwater quality ponds/ detention basins, rip rap outlet protection, stone infiltration trenches, and level spreaders. These measures ensure that there will be no increase in post-development stormwater runoff flows for the 2, 10, 25, 50 and 100 year storms. Further information can be found in Appendix D and Appendix K.

2.3.3 Stormwater Runoff Flows

Storm Recurrence (Yrs)	**Pre-Construction Flow (cfs)**	**Post Construction Flow (cfs)**
2	13.9	13.6
10	58.6	56.7
25	91.0	88.0
50	122.2	117.9
100	160.4	154.0

Section 3.0

BEST MANAGEMENT PRACTICES

3.0 BEST MANAGEMENT PRACTICES

Soil erosion and sediment controls are measures that are used to reduce the amount of soil particles that are carried from a land area and deposited in receiving waters. This section provides a general description of the most appropriate control measures proposed for the Project. The permittee's construction contractor(s) and their subcontractors will be responsible for amending the erosion and sediment controls in the SWPPP for their portion(s) of the project as needed. Based on field conditions at the time of construction, the contractors or subcontractors may adjust the locations and types of BMPs so that erosion and sedimentation are controlled to the maximum extent practicable. However, in no case will modifications to the SWPPP result in any less stringent erosion and sedimentation control measures than specified herein.

Any revision to the SWPPP will be recorded on the Record of Revisions form. The application of the techniques in the field will be determined by the professional judgment of the permittee's field construction personnel and will depend on site-specific conditions. All applicable soil erosion and sediment control measures will be implemented in accordance with this SWPPP and the Permit prior to commencement of field construction activities. Measures will be maintained during and after the construction activity, until final stabilization of the soil is accomplished. Upon final stabilization of disturbed areas, all temporary soil erosion and sediment control measures will be removed.

3.1 STRUCTURAL CONTROL PRACTICES

Structural control practices divert flows from exposed soils, store water flow, or otherwise limit runoff from exposed areas of the site. Such practices may include silt fences, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, rock outlet protection (rip-rap), reinforced soil retaining systems, and temporary or permanent sediment basins. Some of these practices may be used as both temporary and permanent control measures. Structural control practices should be placed in upland areas to the degree practicable to prevent erosion and reduce sedimentation in lower elevation areas. See Appendix D for additional information.

3.2 TEMPORARY EROSION CONTROL PRACTICES

Erosion and sediment control measures will be in place prior to the initiation of soil disturbing activities and will be maintained throughout construction. The contractor may need erosion control measures in other locations of the project as work progresses to keep sediment from leaving the construction site. These measures will be determined by the contractor in the field; if measures are changed in the field, the SWPPP must be modified accordingly. All temporary erosion controls will be removed after the protected area is finally stabilized. The minimum temporary erosion and sediment control practices that will be used for the Project are discussed in the following sections. See Appendix D for additional information.

3.2.1 Sediment Fence (GSF)

Will retain sediment from small disturbed areas. Sediment fence will be placed along slopes as shown on construction details. The contractor will use his best judgment to install additional sediment fence as necessary to prevent loss of sediment. Refer to section 5-11 of 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

Maintenance: Inspect the silt fence at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. When used for dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits, or if room allows, install a second silt fence up slope from the existing fence when deposits reach approximately one half the height of the existing fence. Replace or repair within 24 hours of an observed failure. Refer to Connecticut Guidelines for Soil Erosion and Sediment Control figure GF-5 for troubleshooting failures. Maintain silt fence until the contributing area is stabilized.

3.2.2 Hay Bale Barrier (HB)

Will retain sediment from small disturbed areas. Hay bales will be placed along slopes as shown on construction details. The contractor will use his best judgment to install additional hay bales as necessary to prevent loss of sediment. Refer to section 5-11 of 2002 Connecticut Guidelines for Soil and Sediment Control.

Maintenance: Inspect the hay bale barrier at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. When used for dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits, or if room allows, install a secondary barrier up slope from the existing barrier when deposits reach approximately one half the height of the barrier. Replace or repair within 24 hours of an observed failure. Refer to Connecticut Guidelines for Soil Erosion and Sediment Control figure HB-5 for troubleshooting failures. Maintain hay bale barrier until the contributing area is stabilized.

3.2.3 Stone Check Dam (SCD)

Will be used to reduce velocity of concentrated flows, thus reducing erosion of the drainage way.

Maintenance: Inspect the stone check dam at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Remove the sediment deposits when deposits reach approximately one half the height of the Check dam. Replace or repair within 24 hours of an observed failure. Maintain until the contributing area is stabilized.

3.2.4 Temporary Pipe Slope Drain (TSD)

Will be used to carry water over excessive changes in grade. TSD's will convey concentrated stormwater runoff flows without causing erosion problems either on or at the toe of the slope.

Maintenance: Inspect the temporary pipe slope drain at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Repair damage as necessary. Avoid the placement of any material on the top of the pipe and prevent vehicular traffic from crossing the slope drain.

3.2.5 Temporary Diversion (TD)

Will be used to divert sediment laden runoff from a disturbed area to a sediment trapping facility.

Maintenance: When the temporary diversion is located within close proximity to on going construction activities, inspect the diversion at the end of each work day and immediately repair damage caused by construction equipment. Otherwise, inspect the temporary diversion and associated measures at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Repair within 24 hours of an observed failure.

3.2.6 Temporary Fill Berm (TFB)

Will be used to divert runoff from unprotected fill slopes during construction to a stabilized outlet or sediment trapping facility.

Maintenance: Inspect the temporary fill berm and associated controls at the end of each work day to ensure the criteria for installing the measures have been met. Determine if repair or modification is needed. This measure is temporary and under most situations will be covered the next work day. Maintenance requirements should be minimal. The contractor should avoid placing other material over the berm and construction traffic should not be allowed to cross.

3.2.7 Temporary Sediment Trap (TST)

Will be used to detain sediment laden runoff from small disturbed areas long enough to allow the majority of sediment to settle out.

Maintenance: Inspect the temporary sediment trap and associated controls at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Check the outlet to verify that it is structurally sound and has not been damaged by erosion or construction equipment. The height of the stone outlet should be maintained at least 1 foot below the crest of the embankment. When sediment has accumulated more than one quarter of the minimum wet storage volume, dewater and remove sediment as necessary to restore the trap to its original dimensions.

3.2.8 Construction Entrance (CE)

Will be used to reduce tracking of sediment off site to paved areas.

Maintenance: Maintain the entrance in a condition which will prevent tracking and washing of sediment onto paved surfaces. Provide periodic top dressing with additional stone or additional length as required. Immediately remove all sediment spilled, dropped, washed or tracked onto paved surfaces.

3.2.9 Tree Protection (TP)

Will be used to ensure the survival of existing desirable trees for their effectiveness in soil erosion and sediment control during construction.

Maintenance: Inspect tree protection zones weekly during site construction for damage to the tree crown, trunk and root system. When trees have been damaged or the protection zone has been compromised, consult an arborist licensed in CT to determine how damage should be addressed.

3.2.10 Temporary Erosion Control Blankets (ECB)

Will be used to provide temporary surface protection to disturbed soils to absorb raindrop impact and to reduce sheet and rill erosion until vegetation is established.

Maintenance: Inspect temporary erosion control blankets at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Repair any dislodged or failed blankets immediately.

3.3 SOIL STABILIZATION PRACTICES

Soil stabilization involves covering disturbed soils with grass, mulch, straw, geotextiles, trees, vines, or shrubs. Stabilization practices for exposed disturbed soils are extremely important while conducting construction activities. Vegetative cover serves to reduce the erosion potential by absorbing the energy of raindrops, promoting infiltration in lieu of runoff, and reducing the velocity of runoff. Stabilization measures shall be initiated as soon as practicable, but no more than 14 days after construction activities have temporarily or permanently ceased on any portion of the site.

3.4 MAINTENANCE AND INSPECTIONS

All erosion and sediment control devices shall be installed pursuant to the specifications in the construction details and in accordance with the Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities . They will be maintained so that they remain effective at all times.

Erosion and sediment control devices will be inspected by qualified personnel at least once every seven calendar days or at least once every 14 calendar days and within 24 hours of each 0.5-inch or greater rainfall event. During each inspection, the construction inspector will complete the Inspection and Maintenance Report Form located in the appendix. This form will be copied and used as necessary. Ineffective temporary erosion control measures will be repaired or replaced before the next storm event or as soon as practicable. The permittee will immediately install additional temporary erosion control devices in any area deemed in need of protection.

Following temporary or final stabilization, inspections must be conducted at least once a month. If construction has been halted due to frozen conditions, regular inspections are not mandatory until one month before the expected thaw. If vegetation establishment is not satisfactory, special steps to correct the problem will be implemented such as over seeding, mulching, sodding, or the use of erosion control blankets. Once a definable area of the construction site has been finally stabilized, no further inspection requirements apply to that area.

3.5 FINAL STABILIZATION

3.5.1 Seeding

The contractor will be responsible for labor, materials, tools, equipment, and other related items required for preparing ground, providing for sowing of seeds, fertilizing, mulching and top dressing, and other management practices required for erosion control and to achieve final stabilization. It will be the contractor's responsibility to make sure that the soil seedbed is not

blown, washed, or otherwise removed from the site. The contractor will make repairs (including replacement of lost topsoil and mulch) to the seedbed preparation site in the event of heavy rain, wind, or other natural events that cause damage. When practicable, native plant species should be used for landscaping.

3.5.2 Fertilizer

Soil in areas of disturbance may need supplementation from fertilizer. Soil tests may be necessary to determine the most appropriate fertilizer for each location. Once applied, the fertilizer will be worked into the soil to limit exposure to stormwater. Fertilizer spills will be cleaned up immediately and will not be applied along or in a waterway.

3.5.3 Mulching

Mulching will be used in conjunction with both temporary and permanent seeding practices to enhance success by providing erosion protection prior to the onset of vegetative growth. Mulches enhance plant establishment by moderating soil temperatures and conserving moisture. After seeding, straw or hay mulch will be applied at a rate of two to three tons per acre on the disturbed areas. Other forms of mulch will be applied at a rate designated by the Project Engineer. Mulch will not be applied in wetlands, on lawns, and areas where hydro-mulch is used. Mulch will be anchored immediately after placement on steep slopes and stream banks. Mulch will be held in place by a very thin covering of topsoil, small brush, pins, stakes, wire mesh, asphalt binder, or other adhesive material approved by the project engineer.

3.5.4 Topsoiling

Topsoil should be applied in areas where the subsoil or existing surface soil does not provide an adequate growth medium for the desired vegetation, where soil is too shallow to provide adequate rooting depth, or where the soil contains substances toxic to the desired vegetation. Topsoil shall be reasonably free from subsoil and stumps, roots, brush, stones, and clay lumps or similar objects.

3.5.5 Temporary Control Removal

Temporary erosion controls will be left in place until the Project site is stabilized with a uniform vegetative cover of 70 percent density of the native background vegetative cover on all unpaved areas. Following re-vegetation, the permittee will conduct periodic site visits to make sure that vegetation establishment is satisfactory. If sufficient vegetative cover has not been achieved, additional restoration measures will be implemented. Inspection results will be documented using the Inspection and Maintenance Report Form found in the appendix. All temporary soil erosion and sediment control measures will be removed and disposed of after final site stabilization is achieved and before submitting the Notice of Termination (NOT) to the CT DEP.

Section 4.0

GOOD HOUSEKEEPING BMP'S

4.0 GOOD HOUSKEEPING BMP'S

4.1 POTENTIAL SOURCES OF POLLUTION

Potential exists for construction sediment to be contained in any runoff that occurs on the project site. This sediment is a result of clearing and grading activities.

4.2 CONTROLS TO REDUCE POLLUTION FROM THE CONSTRUCTION SITE

Minimize Disturbed Area, Protect Natural Features, and Soil:
This project will not be mass graded. Only areas required for construction activities will be graded. This practice will reduce sediment transport into receiving bodies.

4.2.1 Material Handling and Waste Management

The contractor will establish control measures to prevent discharge or disposal of construction and sanitary waste on site.

4.2.2 Establish Proper Building Material Staging Areas

The contractor will establish a permanent staging area within the project site for materials and equipment storage.

4.2.3 Allowable Non-Stormwater Discharge Management

Non-stormwater discharges are allowable provided the non-stormwater component of the discharge is in compliance applicable state regulation. Prior to any non storm discharge, the appropriate BMP will be installed and inspected.

4.2.4 Maintenance of Controls

All erosion and sediment control practices will be checked for stability and operation following every runoff-producing rainfall, but in no case less than once every week. Any needed repairs will be made immediately to maintain all practices as designed.

All sediment control features shall be maintained until final stabilization has been obtained.

Contractor will maintain appropriate recording keepings as required by DEP-PED-GP-015. Maintenance records shall describe repair, replacement, and maintenance of BMPs undertaken based on the inspections and maintenance procedures described above and the individual requirements of the BMPs. Actions related to the findings of inspections should reference the specific inspection report. Records should describe actions taken, dates completed, and note the party that completed the work.

During construction the contractor will be responsible for maintaining integrity of all permanent and temporary structures. Prior to submittal of NOT, the contractor and owner will inspect permanent structures to remain in place and correct all noted deficiencies. Upon acceptance from contractor, the owner will maintain responsibility for inspection of the structure semi-annually.

Section 5.0

HAZARDOUS SUBSTANCE OR OIL SPILL REPORTING

5.0 HAZARDOUS SUBSTANCE OR OIL SPILL REPORTING

The Spill Prevention Control and Countermeasure Plan (SPCC), describes measures to prevent, control, and minimize impacts from a spill of a hazardous, toxic, or petroleum substance during construction of the proposed project. This plan identifies the potentially hazardous materials to be used during this project, describes the transport, storage, and disposal procedures for these substances, and outlines the procedures to be followed in the event of a spill of a contaminating or toxic substance.

As per 40 CFR 112, a Spill Prevention Control and Countermeasures Plan (SPCC) must be prepared if the construction site will have 1,320 gallons of above ground storage capacity (or 42,000 gallons in underground storage not regulated by UST rules) or more in 55-gallon-sized (or larger) containers. This would include any temporary tanks or fueling trucks used to "store" petroleum on-site. The truck would be subject to the SPCC Plan rules when parked on the construction site and used for "storage." If, at any time, a subcontractor's cumulative above ground storage capacity on-site exceeds 1,320 gallons, the subcontractor shall maintain a certified SPCC Plan (40 CFR 112).

5.1 MATERIAL MANAGEMENT PRACTICES

Properly managing materials on the construction site will greatly reduce the potential for stormwater pollution of materials. Good housekeeping, along with proper use and storage of construction materials, form the basis for proper management of potentially hazardous materials.

5.2 NON-PETROLEUM PRODUCTS

Due to the chemical makeup of specific products, certain handling and storage procedures are required to promote the safety of handlers and prevent the possibility of pollution. Care shall be taken to follow all directions and warnings for products used on the site. All pertinent information can be found on the MSDS for each product. The MSDS will be kept on-site.

5.3 PETROLEUM PRODUCTS

On-site vehicles will be monitored for leaks and receive regular maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Preferably, the containers will be stored in a covered truck or trailer that provides secondary containment for the products. Bulk storage tanks having a capacity of greater than 55 gallons will be provided with secondary containment. Containment can be provided by a temporary earthen berm or other means. After each rainfall event, the contractor shall inspect the contents of the secondary containment area for excess water. If no sheen is visible, the collected water can be pumped to the ground in a manner that does not cause scouring. If any sheen is present, it must be treated prior to discharging the water. Otherwise, the contaminated water must be transported and disposed off-site in accordance with local, state, and federal requirements. Bulk fuel or lubricating oil dispensers shall not have a self-locking mechanism that allows for unsupervised fueling. Fueling operations shall be observed to immediately detect and contain spills. No waste oil or other petroleum-based products will be disposed of on-site (e.g. buried, poured, etc.), but shall be taken off-site for proper disposal.

5.4 SPILL CONTROL AND CLEAN UP

In addition to the material management practices discussed previously, the following spill control and cleanup practices will be adhered to prevent stormwater pollution in the event of a spill:

- Personnel on-site will be made aware of cleanup procedures and the location of spill cleanup.
- Equipment spills will be contained and cleaned up immediately after discovery.
- Manufacturer methods for spill cleanup of a material will be followed as described on the material's MSDS.
- Materials and equipment needed for cleanup procedures will be kept readily available on the site, either at an equipment storage area or on contractor's trucks; equipment to be kept on the site will include, but not be limited to, brooms, dust pans, shovels, granular absorbents, sand, saw dust, absorbent pads and booms, plastic and metal trash containers, gloves, and goggles.
- Toxic, hazardous or petroleum product spills required to be reported by regulation will be documented to the appropriate federal, state, and local agencies.
- Spills will be documented and a record of the spills will be kept with this SWPPP.

The federal reportable spill quantity for petroleum products is defined in 40 CFR 110 as any oil spill that:

- violates applicable water quality standards;
- causes a film or sheen upon or discoloration of the water surface or adjoining shoreline; or
- causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.

Section 6.0

SWPPP APPENDICES

6.0 SWPPP APPENDICES

Attach the following documentation to the SWPPP in the following appendices.

Appendix A – Permit Coverage

- Submitted General Permit Registration Form and Transmittal
- Issued CT Letter of Coverage
- Other applicable permits

Appendix B – Certifications

- Preparer
- Permittee or Co-Permittee
- Operator
- Inspector

Appendix C – Pre-Construction Meeting – Items to be added upon completion of meeting includes:

- Agenda
- Attendees
- Minutes

Appendix D – Maps and Drawings

- Site Maps
- Site Plan

Appendix E – Construction Records

- Construction Activities and Control Installation Log

Appendix F – Inspection and Maintenance Records

- Inspection & Maintenance Log
- Inspection Report
- Maintenance Report

Appendix G – Hazardous Material or Oil Spill Records

- Spill Report

Appendix H – Update Records

- Plan Update Description
- Plan Update Log

Appendix I – Copy of CT DEP Notice of Termination (Form DHEC 2610, 04/1998)

Appendix J – Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities (DEP-PED-GP-015)

Appendix K – Supporting Calculations

Appendix A

PERMIT COVERAGE

General Permit Registration Form for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Please complete this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your registration. Print or type unless otherwise noted. You must submit the *Permit Application Transmittal Form* (DEP-APP-001) and the registration fee along with this form.

DEP USE ONLY
Application No. _____
Permit No. _____
Facility I.D. _____

Part I: Registration Type

Enter a check mark in the appropriate box identifying the registration type.

This registration is for (check one):	Please identify any existing permit number in the space provided:
☐ A *new* general permit registration	Existing permit number:
☐ A *modification* of an existing general permit	***GSN***

Part II: Fee Information

☐ ***Registration only***	A registration fee of $625.00 is to be submitted with *each* registration that you are submitting at least 30 days before the initiation of construction activities.
☐ ***Registration and Plan Review***	All construction projects that result in the disturbance of ten or more acres require the submittal of a Stormwater Pollution Control Plan and a $625.00 plan review fee. The plan and the fee must be submitted 30 days prior to initiation of the construction activity. $625.00 registration fee + $625.00 review fee = $1,250.00 total fee

For municipalities, a 50% discount applies. The registration will not be processed without the fee. The fee shall be non-refundable and shall be paid by certified check or money order payable to the Department of Environmental Protection.

Part III: Registrant Information

1. Fill in the name of the registrant(s) as indicated on the *Permit Application Transmittal Form* (DEP-APP-001):

   Registrant:

   Phone: ext. Fax:

   ☐ Check here if there are co-registrants. If so, label and attach additional sheet(s) with the required information as supplied above.

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Part III: Registrant Information (cont.)

2. List primary contact for departmental correspondence and inquiries, if different than the registrant.

   Name:
   Mailing Address:
   City/Town: State: Zip Code:
   Business Phone: ext. Fax:
   Site Phone: Emergency Phone:
   Contact Person: Title:
   Association (e.g. developer, general or site contractor, etc.):

3. List owner of the property on which the activity will take place, if different from registrant:

   Name:
   Mailing Address:
   City/Town: State: Zip Code:
   Business Phone: ext. Fax:
   Contact Person: Title:

4. List developer, if different from registrant or primary contact:

   Name:
   Mailing Address:
   City/Town: State: Zip Code:
   Business Phone: ext. Fax:
   Contact Person: Title:

5. Name and address of general contractor:

   Name:
   Mailing Address:
   City/Town: State: Zip Code:
   Business Phone: ext. Fax:
   Site Phone: Off-hours Phone:
   Contact Person: Title:

6. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the registration and Stormwater Pollution Plan.

   ☐ Check here if additional sheets are necessary, and label and attach them to this sheet.

   Name:
   Mailing Address:
   City/Town: State: Zip Code:
   Business Phone: ext. Fax:
   Contact Person: Title:
   Service Provided:

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Part IV: Site Information

1. Site or Project Name (if any):
   Street Address or Description of Location:
   City/Town: State: Zip Code:
2. Brief description of construction activity:
3. Start Date: Anticipated Completion Date:
4. Estimated total number of acres to be disturbed:

Part V: Stormwater Discharge Information

1. Where does stormwater discharge to:
   ☐ Municipal Separate Storm System? ☐ Yes ☐ No (Name):
   ☐ Surface water body or wetlands? ☐ Yes ☐ No (Name):
2. Is the discharge located less than 500 feet from a tidal wetland, which is not a fresh-tidal wetland?
   ☐ Yes ☐ No
3. Name of the watershed where the site is located OR nearest waterbody to which it discharges:
4. Is construction in accordance with the Guidelines established under Section 22a-329 of the Soil Erosion and Sedimentation Act? ☐ Yes ☐ No
5. Is construction in accordance with local soil erosion and sediment ordinances? ☐ Yes ☐ No
   Note: A copy of this registration and the Stormwater Pollution Control Plan must be available to the town wetlands enforcement officials, wetlands commission, or their equivalent.
6. Will the construction project disturb over ten acres? ☐ Yes ☐ No
   If yes, enclose a copy of the Stormwater Pollution Control Plan and plan review fee.
7. Has the construction project been reviewed for compliance with the following DEP programs?
   a. Coastal Management Act (Section 22a-92 of the Connecticut General Statutes) ☐ Yes ☐ No
   b. Endangered and Threatened Species (Section 26-306 of the Connecticut General Statutes) ☐ Yes ☐ No
   c. State and Federal Historic Preservation statutes? ☐ Yes ☐ No

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Part VI: Supporting Documents

Check the box by the attachments being submitted as verification that *all* applicable attachments have been submitted with this registration form. When submitting any supporting documents, please label the documents as indicated in this part (e.g., Attachment A, etc.) and be sure to include the registrant's name as indicated on the *Permit Application Transmittal Form*.

☐	Attachment A:	An 8 1/2" x 11" copy of the relevant portion or a full-sized original of a USGS Quadrangle Map indicating the exact location of the facility or site. Indicate the quadrangle name on the map. (To obtain a copy of the relevant USGS Quadrangle Map, call your town hall or DEP Maps and Publications Sales at 860-424-3555.)
☐	Attachment B:	A copy of the Stormwater Pollution Control Plan and plan review fee of $500.00, if the construction project disturbs over 10 acres

Part VII: Environmental Professional Certification

The following certification must be signed by a professional engineer, licensed to practice in Connecticut.

"I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements."

Signature of Professional Engineer	Date
Name of Professional Engineer (print or type)	P. E. Number (if applicable)

Affix P. E. Stamp Here

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Part VIII: Registrant Certification

The registrant *and* the individual(s) responsible for actually preparing the registration must sign this part. A registration will be considered incomplete unless all required signatures are provided.

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I certify that this general permit registration is on complete and accurate forms as prescribed by the commissioner without alteration of the text. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with section 22a-6 of the Connecticut General Statutes, pursuant to section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute.

I also certify under penalty of law that I have read and understand all conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, that all conditions for eligibility for authorization under the general permit are met, all terms and conditions of the general permit are being met for all discharges which have been initiated and are the subject of this registration, and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowingly making false statements."

Signature of Registrant	Date
Name of Registrant (print or type)	Title (if applicable)
Signature of Preparer (if different than above)	Date
Name of Preparer (print or type)	Title (if applicable)

☐ Check here if additional signatures are necessary.
If so, please reproduce this sheet and attach signed copies to this sheet.

Note: Please submit the *Permit Application Transmittal Form*, the Registration Form, Fee(s), and all Supporting Documents to:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Note: If discharging to municipal separate storm sewer, send a copy of this completed registration form to the owner or operator of that system.

If discharging to a public drinking water supply watershed or aquifer area, send a copy of this completed registration form to the appropriate water company.

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Central Permit Processing Unit
79 Elm Street
Hartford, CT 06106-5127

CPPU USE ONLY
App #:
Doc #:
Check #:

Permit Application Transmittal Form

Please complete this transmittal form in accordance with the instructions in order to ensure the proper handling of your application(s) and the associated fee(s). Print legibly or type.

Part I: Applicant Information:

- **If an applicant is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, applicant's name shall be stated **exactly** as it is registered with the Secretary of State.*
- *If an applicant is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).*

Applicant:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.: Fax:
Contact Person: Phone: ext.
E-Mail:
Applicant (check one): ☐ individual ☐ *company ☐ federal gov't ☐ state agency ☐ municipality
*If a company, list company type (e.g., corporation, limited partnership, etc.):
☐ Check if any co-applicants. If so, attach additional sheet(s) with the required information as supplied above.

Please provide the following information to be used for *billing purposes only*, if different:
Company/Individual Name:
Mailing Address:
City/Town: State: Zip Code:
Contact Person: Phone: ext.

Part II: Project Information

Brief Description of Project: *(Example: Development of a 50 slip marina on Long Island Sound)*

Location (City/Town):

Other Project Related Permits (*not* included with this form):

Permit Description	Issuing Authority	Submittal Date	Issuance Date	Denial Date	Permit #

Part III: Individual Permit Application and Fee Information

New, Mod. or Renew	Individual Permit Applications	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
	AIR EMISSIONS				
	New Source Review	$940.00			1 + 0
	Title V Operating Permits	none			1 + 0
	Title IV	none			1 + 0
	Clean Air Interstate Rule (CAIR)	none			1 + 0
	WATER DISCHARGES				
	To Groundwater	$1300.00			1 + 1
	To Sanitary Sewer (POTW)	$1300.00			1 + 1
	To Surface Water (NPDES)	$1300.00			1 + 2
	INLAND WATER RESOURCES-multiple permits 1 + 6 total copies				
	Dam Construction	none			1 + 2
	Flood Management Certification	none			1 + 1
	Inland 401 Water Quality Certification	none			1 + 5
	Inland Wetlands and Watercourses	none			
	Stream Channel Encroachment Lines	★			
	Water Diversion	★			1 + 5
	OFFICE OF LONG ISLAND SOUND PROGRAMS				
	Certificate of Permission	$375.00			1 + 3
	Coastal 401 Water Quality Certification	none			1 + 3
	Structures and Dredging/Tidal Wetlands	$660.00			1 + 3
	WASTE MANAGEMENT				
	Aerial Pesticide Application	★			1 + 2
	Aquatic Pesticide Application	$200.00			1 + 0
	CGS Section 22a-454 Waste Facilities	★			1 + 1
	Hazardous Waste Treatment, Storage and Disposal Facilities	★			1 + 1
	Marine Terminal License	$125.00			1 + 0
	Stewardship	$4000.00			1 + 1
	Solid Waste Facilities	★			1 + 1
	Waste Transportation	★			1 + 0
		Subtotal ➡			
	GENERAL PERMITS and AUTHORIZATIONS	Subtotals Page 3 ➡			
	Enter subtotals from Part IV, pages 3 & 4 & 5 of this form	Subtotals Page 4 ➡			
		Subtotals Page 5 ➡			
		TOTAL ➡			
	☐ Indicate whether municipal discount or state waiver applies.	Less Applicable Discount ➡			
		AMOUNT REMITTED ➡			
	Check # ➡	Check or money order should be made payable to: "Department of Environmental Protection"			

★ **See fee schedule on individual application.**

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Part IV: General Permit Registrations and Requests for Other Authorizations Application and Fee Information

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
	AIR EMISSIONS				
☐	Limit Potential to Emit from Major Stationary Sources of Air Pollution	$5000.00			1 + 0
☐	Ionizing Radiation Registration	$200.00			1 + 0
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	WATER DISCHARGES				
☐	Domestic Sewage	$500.00			1 + 0
☐	Food Processing Wastewater	$500.00			1 + 0
☐	Groundwater Remediation Wastewater to a Sanitary Sewer	$500.00			1 + 0
☐ ☐	Groundwater Remediation Wastewater to a Surface Water Registration Only Approval of Registration by DEP	 $625.00 $1250.00			1 + 0
☐ ☐	Hydrostatic Pressure Testing Wastewater Registration Only Approval of Registration by DEP (natural gas pipelines)	 $625.00 $1250.00			1 + 0
☐ ☐	Miscellaneous Discharges of Sewer Compatible Wastewater Flow < 5,000 gpd and fire sprinkler system testwater Flow > 5,000 gpd	 $500.00 $1000.00			1 + 1
☐	Non-Contact Cooling and Heat Pump Water (Minor)	$625.00			1 + 1
☐	Photographic Processing Wastewater (Minor)	$100.00			1 + 0
☐	Printing & Publishing Wastewater (Minor) Flow < 40 gpd	$500.00 $100.00			1 + 0
☐	Stormwater Associated with Commercial Activities	$500.00			1 + 0
☐	Stormwater Associated with Industrial Activities	$500.00			1 + 0
☐ ☐	Stormwater & Dewatering Wastewaters-Construction Activities 5 – 10 acres > 10 acres	 $625.00 $1250.00			1 + 0
☐	Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)	$250.00			1 + 0
☐	Swimming Pool Wastewater - Public Pools and Contractors	$500.00			1 + 0
☐	Tumbling or Cleaning of Parts Wastewater (Minor)	$1000.00			1 + 1
☐ ☐	Vehicle Maintenance Wastewater Registration Only Approval of Registration by DEP	 $500.00 $1000.00			1 + 0
☐	Water Treatment Wastewater	$625.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to POTW	$1500.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to Surface Water	$1500.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to Groundwater	$1500.00			1 + 0
☐	Other, (please specify):				
	Note: Carry subtotals over to Part III, page 2 of this form.	Subtotal ➡			

★★ **Contact the specific permit program for this information (Contact numbers are provided in the instructions).**

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Part IV: General Permit Registrations and Requests for Other Authorizations (continued)

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
	AQUIFER PROTECTION PROGRAM				
☐	Registration for Regulated Activities	$625.00			1 + 0
☐	Permit Application to Add a Regulated Activity	$1250.00			1 + 0
☐	Exemption Application from Registration	$1250.00			1 + 0
	INLAND WATER RESOURCES				
☐	Dam Safety Repair and Alteration	$1000.00			1 + 2
☐	Diversion of Water for Consumptive Use: Reauthorization Categories	$1000.00			1 + 2
☐	Diversion of Water for Consumptive Use: Authorization Required	$2500.00			1 + 5
☐	Diversion of Water for Consumptive Use: Filing Only	$1500.00			1 + 4
☐	Habitat Conservation	$1000.00			1 + 2
☐	Lake, Pond and Basin Dredging	$1000.00			1 + 2
☐	Minor Grading	$1000.00			1 + 2
☐	Minor Structures	$1000.00			1 + 2
☐	Utilities and Drainage	$1000.00			1 + 2
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	OFFICE OF LONG ISLAND SOUND PROGRAMS				
☐	4/40 Docks	$700.00			1 + 1
☐	Beach Grading	$100.00			1 + 1
☐	Coastal Remedial Activities Required by Order	$700.00			1 + 1
☐	Marina and Mooring Field Reconfiguration	$700.00			1 + 1
☐	Non-harbor Moorings	$100.00			1 + 1
☐	Osprey Platforms and Perch Poles	none			1 + 1
☐	Pump-out Facilities (no fee for Clean Vessel Act grant recipients)	$100.00			1 + 1
☐	Removal of Derelict Structures	$100.00			1 + 1
☐	Residential Flood Hazard Mitigation	$100.00			1 + 1
☐	Swim Floats	$100.00			1 + 1
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	Note: Carry subtotals over to Part III, page 2 of this form.	Subtotal ➡			

★ See fee schedule on registration/application. ★★ Contact the specific permit program for this information.

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Part IV: General Permit Registrations and Requests for Other Authorizations (continued)

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
	WASTE MANAGEMENT				
☐	Addition of Grass Clippings at Registered Leaf Composting Facilities	$500.00			1 + 0
☐	Asbestos Disposal Authorization	$300.00			1 + 0
	Certain Recycling Facilities				
☐	Drop-site Recycling Facility	$200.00			1 + 0
☐	Limited Processing Recycling Facility	$500.00			1 + 0
☐	Recyclables Transfer Facility	$500.00			1 + 0
☐	Single Item Recycling Facility	$500.00			1 + 0
	Contaminated Soil and/or Staging Management (Staging/Transfer)				
☐	Registration Only	$250.00			1 + 0
☐	Approval of Registration by DEP	$1500.00			1 + 0
☐	Connecticut Solid Waste Demonstration Project	$1000.00			1 + 0
☐	Disassembling Used Electronics	$400.00			1 + 0
☐	Leaf Composting Facility	none			1 + 1
☐	Municipal Transfer Station	$800.00			1 + 1
☐	One Day Collection of Certain Wastes and Household Hazardous Waste	$1000.00			1 + 0
☐	Special Waste Authorization	$660.00			1 + 0
☐	Storage and Distribution of Two (2) Inch Nominal Tire Chip Aggregate	$500.00			1 + 0
☐	Storage and Processing of Asphalt Roofing Shingle Waste and/or Storage and Distribution of Ground Asphalt Aggregate	★			1 + 0
☐	Storage and Processing of Scrap Tires for Beneficial Use	$1000.00			1 + 0
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	REMEDIATION				
☐	In Situ Groundwater Remediation: Enhance Aerobic Biodegradation	★			1 + 2
	Note: Carry subtotals over to Part III, page 2 of this form.	Subtotal ➡			

★See fee schedule on registration/application. ★★Contact the specific permit program for this information.

In conformance with the ADA, individuals with disabilities who need information in an alternative format to allow them to benefit and/or participate in the agency's programs and services, should call 860-424-3051 or 860-418-5937, or e-mail Marcia Z. Bonitto, ADA Coordinator at Marcia.Bonitto@ct.gov.

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Applicant Compliance Information

DEP ONLY
App. No. _____
Co./Ind. No. _____

Applicant Name:
(as indicated on the *Permit Application Transmittal Form*)

If you answer *yes* to any of the questions below, you must complete the Table of Enforcement Actions on the reverse side of this sheet as directed in the instructions for your permit application.

A. During the five years immediately preceding submission of this application, has the applicant been convicted in any jurisdiction of a criminal violation of any environmental law?

☐ Yes ☐ No

B. During the five years immediately preceding submission of this application, has a civil penalty been imposed upon the applicant in any state, including Connecticut, or federal judicial proceeding for any violation of an environmental law?

☐ Yes ☐ No

C. During the five years immediately preceding submission of this application, has a civil penalty exceeding five thousand dollars been imposed on the applicant in any state, including Connecticut, or federal administrative proceeding for any violation of an environmental law?

☐ Yes ☐ No

D. During the five years immediately preceding submission of this application, has any state, including Connecticut, or federal court issued any order or entered any judgement to the applicant concerning a violation of any environmental law?

☐ Yes ☐ No

E. During the five years immediately preceding submission of this application, has any state, including Connecticut, or federal administrative agency issued any order to the applicant concerning a violation of any environmental law?

☐ Yes ☐ No

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Table of Enforcement Actions

(1) Type of Action	(2a) Date Commenced	(2b) Date Terminated	(3) Jurisdiction	(4) Case/Docket/ Order No.	(5) Description of Violation

☐ Check the box if additional sheets are attached. Copies of this form may be duplicated for additional space.

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Applicant Background Information

Please enter a check mark by the entity which best describes the applicant and complete the requested information. **You must choose one of the following.**

☐ **Corporation**

1. Parent Corporation
   Name:
   Mailing Address:
   City/Town: State: Zip Code: -
   Business Phone: - - ext. Fax: - -
   Contact Person: Title:
2. Subsidiary Corporation:
   Name:
   Mailing Address:
   City/Town: State: Zip Code: -
   Business Phone: - - ext. Fax: - -
   Contact Person: Title:
3. Directors:
   Name:
   Mailing Address:
   City/Town: State: Zip Code: -
   Business Phone: - - ext. Fax: - -

   Name:
   Mailing Address:
   City/Town: State: Zip Code: -
   Business Phone: - - ext. Fax: - -

   ☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.
4. Officers:
   Name:
   Mailing Address:
   City/Town: State: Zip Code: -
   Business Phone: - - ext. Fax: - -

   ☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

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Applicant Background Information (continued)

☐ **Limited Liability Company**

1. List each member.

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

2. List any manager(s) who, through the articles of organization, are vested the management of the business, property and affairs of the limited liability company.

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

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Applicant Background Information (continued)

☐ **Limited Partnership**

1. General Partners:

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

2. Limited Partners:

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

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Applicant Background Information (continued)

☐ **General Partnership**

1. General Partners:

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

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Applicant Background Information (continued)

☐ **Voluntary Association**

1. List authorized persons of association or list all members of association.

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

☐ **Individual or Other Business Type**

1. Name:
Mailing Address:
City/Town: State: Zip Code: -
Business Phone: - - ext. Fax: - -

2. State other names by which the applicant is known, including business names.
Name:

☐ Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

DEP-APP-008 5 of 5 Rev. 07/11/01

Appendix B

CERTIFICATIONS

PREPARER'S CERTIFICATION

Project:	Wind Colebrook North
Project Location:	Winsted- Norfolk Road Colebrook, Connecticut
Permittee:	BNE Energy
	29 South Main Street Town Center Suite 200 West Hartford, CT 06107 (800) 450-0503
Contractor:	To Be Determined
Preparer:	Curtis Jones, PE, LEED AP
	Civil 1 43 Sherman Hill Road Suite D-101 Woodbury, CT 06798
Phone:	203-266-0778
Fax:	203-266-4759
Email:	curt@civil1.com

Certification Statement:
I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

Name:	Curtis Jones, PE, LEED AP
Company:	Civil 1
Title:	President
Signature:	
Date:	

CONTRACTOR / CO-PERMITTEE CERTIFICATION

Project:	Wind Colebrook North
Project Location:	Winsted- Norfolk Road Colebrook, Connecticut
Contractor:	To Be Determined
Address:	
Phone:	
Fax:	

Certification Statement:
I certify by my signature below that I participated in a pre-construction conference with the individual who is responsible for the operational control of this Stormwater Pollution Prevention Plan (SWPPP). I accept the terms and conditions of this SWPPP as required by the general National Pollutant Discharge Elimination System issued to the Owner/Operator of the construction activity for which I have been contracted to perform construction related professional services. Further, by my signature below, I understand that I am becoming a Co-permittee with the Owner/Operator and other contractors that have become Co-permittees to the general NPDES permit issued to the Owner/Operator of the facility for which I have been contracted to perform professional construction services. As a Co-permittee, I understand that I, and my company, as the case may be, am legally accountable to the Connecticut Department Environmental Protection to ensure compliance with the terms and conditions of this SWPPP. I also understand that DEP enforcement actions may be taken against any specific Co-permittee or combination of Co-permittees if the terms and conditions of this SWPPP are not met. Therefore, having understood the above information, I am signing this certification and am receiving Co-permittee status to the aforementioned general NPDES permit.

Company Official's Signature:

Name: _____ Title: _____
(Please print) (Please print)

Signature: _____ Date: _____

CONTRACTOR / OPERATOR CERTIFICATION

Project:	Wind Colebrook North
Project Location:	Winsted- Norfolk Road Colebrook, CT
Contractor:	
Address:	
Phone:	
Fax:	

Certification Statement:
I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I certify that this permit registration is on complete and accurate forms as prescribed by the commissioner without alteration of the text. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Bureau of Materials Management & Compliance Assurance DEP-PED-GP-015 10 of 24 Connecticut General Statutes, and in accordance with any other applicable statute. I also certify under penalty of law that I have read and understand all conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), that all conditions for eligibility for authorization under the general permit are met, all terms and conditions of the general permit are being met for all discharges which have been initiated and are the subject of this registration, and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowingly making false statements.

Corporate Official's Signature:

Name: _____ Title: _____
(Please print) (Please print)

Signature: _____ Date: _____

INSPECTOR CERTIFICATION

Project:	Wind Colebrook North
Project Location:	Winsted- Norfolk Road Colebrook, Connecticut
Contractor:	
Address:	
Phone:	
Fax:	

Certification Statement:
I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

Inspector's Signature:

Name: _____ Title: _____
(Please print) (Please print)

Signature: _____ Date: _____

Appendix C

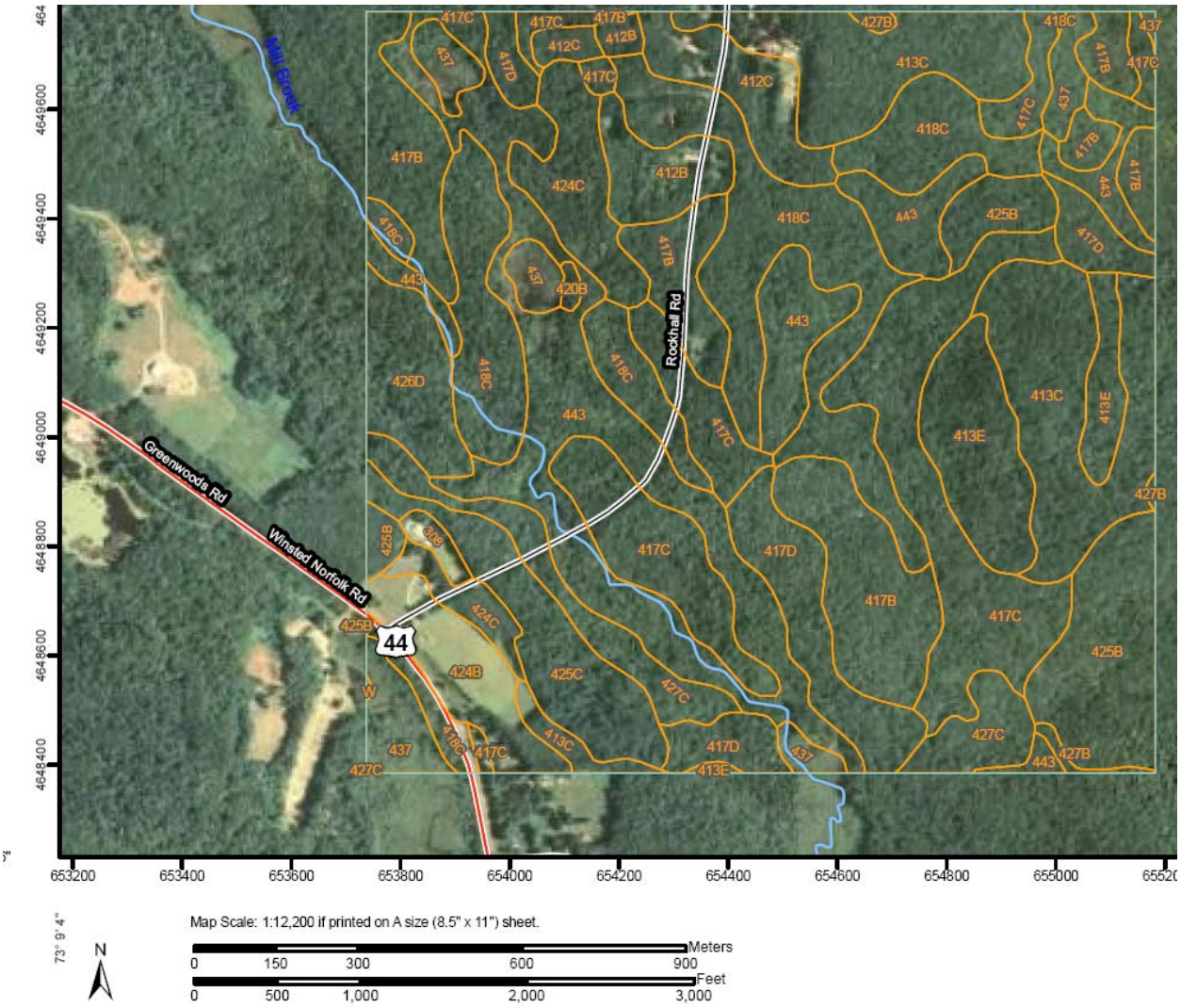
PRE-CONSTRUCTION MEETING

Although a pre-construction meeting is not a requirement for this CGP, a meeting will be conducted. A copy of this documentation should be kept in this appendix.

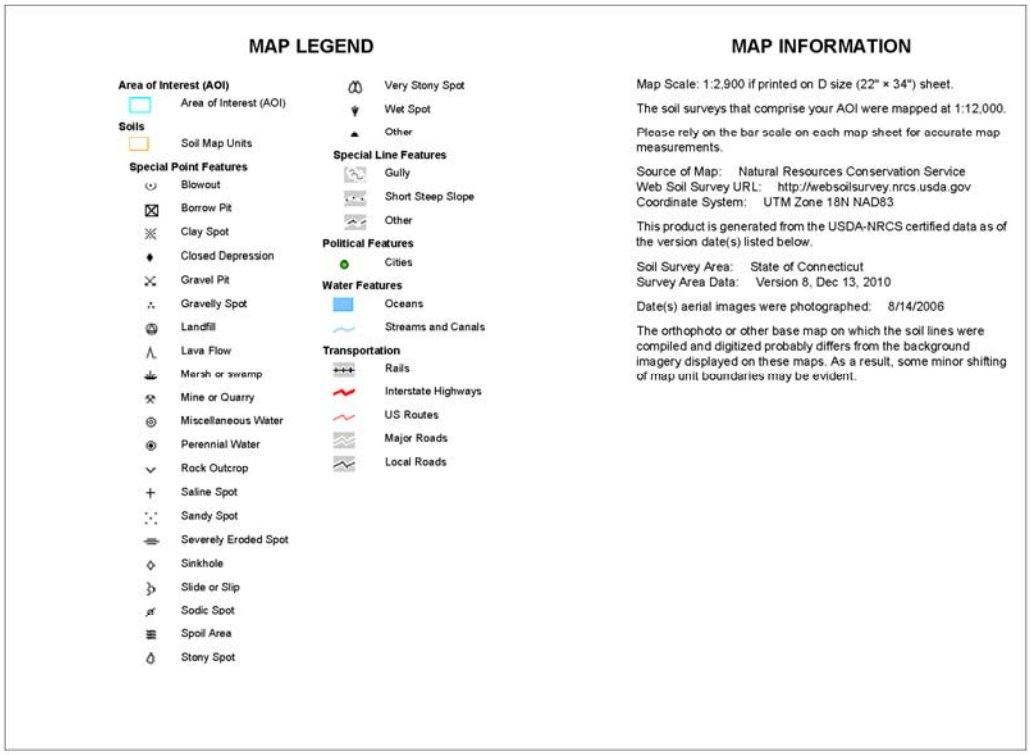
Appendix D

MAPS AND DRAWINGS


TOPO! map printed on 03/21/11 from "Untitled.tpo"
73°12'00" W
73°10'00" W
73°08'00" W
73°06'00" W
73°04'00" W
WGS84 73°02'00" W
42°02'00" N
42°01'00" N
42°00'00" N
41°59'00" N
41°58'00" N
41°57'00" N
41°56'00" N
41°55'00" N
SITE
NORFOLK
COLEBROOK
WINCHESTER
Winsted
Norfolk
Colebrook
Robertsville
North Colebrook
Mc Claveville
Lake Waramaug
Lake Pleiade
Benedict Pond
Spaulding Pond
Rowley Pond
Nelson Corner
Granville
Mill Brook
Colebrook River
Reservoir
ALGONQUIN STATE FOREST
MOHAWK MOUNTAIN STATE PARK
DENNIS HILL STATE PARK
AMERICAN LEGION STATE FOREST
Lake Winchester
Crystal Lake
Highland Lake
Map created with TOPO! © 2006 National Geographic, © 2005 Tele Atlas, Rel. 8/2005
NATIONAL GEOGRAPHIC
0.0 0.5 1.0 1.5 2.0 2.5 3.0 miles
0 1 2 3 4 5 km
MN TN
14°
03/21/11


Mill Brook
Rockhall Rd
Greenwoods Rd
Winsted Norfolk Rd
44
417C
417B
412C
412B
427B
418C
413C
437
417D
424C
420B
443
426D
425B
424B
425C
427C
413E
413B
653200
653400
653600
653800
654000
654200
654400
654600
654800
655000
4649600
4649400
4649200
4649000
4648800
4648600
4648400
73° 9' 4"
N
Map Scale: 1:12,200 if printed on A size (8.5" x 11") sheet.
Meters
0 150 300 600 900
Feet
0 500 1,000 2,000 3,000

Soil Map–State of Connecticut



Natural Resources Conservation Service | Web Soil Survey, National Cooperative Soil Survey | 3/13/2011 Page 2 of 3

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
61C	Canton and Charlton soils, 8 to 15 percent slopes, very stony	0.3	0.1%
62D	Canton and Charlton soils, 15 to 35 percent slopes, extremely stony	0.4	0.1%
412B	Bice fine sandy loam, 3 to 8 percent slopes	15.4	3.0%
412C	Bice fine sandy loam, 8 to 15 percent slopes	15.3	3.0%
413C	Bice-Millsite complex, 3 to 15 percent slopes, very rocky	64.9	12.8%
413E	Bice-Millsite complex, 15 to 45 percent slopes, very rocky	23.5	4.6%
417B	Bice fine sandy loam, 3 to 8 percent slopes, very stony	58.1	11.5%
417C	Bice fine sandy loam, 8 to 15 percent slopes, very stony	93.1	18.4%
417D	Bice fine sandy loam, 15 to 25 percent slopes, very stony	18.3	3.6%
418C	Schroon fine sandy loam, 2 to 15 percent slopes, very stony	57.5	11.3%
420B	Schroon fine sandy loam, 3 to 8 percent slopes	0.6	0.1%
424C	Shelburne fine sandy loam, 8 to 15 percent slopes	9.1	1.8%
425B	Shelburne fine sandy loam, 3 to 8 percent slopes, very stony	21.1	4.2%
425C	Shelburne fine sandy loam, 8 to 15 percent slopes, very stony	4.9	1.0%
426D	Shelburne fine sandy loam, 15 to 35 percent slopes, extremely stony	2.8	0.6%
427B	Ashfield fine sandy loam, 2 to 8 percent slopes, very stony	17.3	3.4%
427C	Ashfield fine sandy loam, 8 to 15 percent slopes, very stony	12.3	2.4%
428A	Ashfield fine sandy loam, 0 to 3 percent slopes	2.9	0.6%
437	Wonsqueak mucky peat	22.6	4.5%
443	Brayton-Loonmeadow complex, extremely stony	65.9	13.0%
Totals for Area of Interest		**506.5**	**100.0%**

Appendix E

CONSTRUCTION RECORDS

During the construction of the project, a log should be kept that documents the specific activities, relative to this plan, that happen on the site. This should include when BMPs (controls) are installed and when construction of facilities is initiated.

INSPECTOR CERTIFICATION

Project:	Wind Colebrook North
Project Location:	Winsted- Norfolk Road Colebrook, Connecticut
Contractor:	
Address:	
Phone:	
Fax:	

CONSTRUCTION ACTIVITIES / EROSION & SEDIMENT CONTROLS INSTALLATION LOG

Start Date	Completion Date	Construction Activity or E&SC Controls Installed	Operator

Appendix F

INSPECTION AND MAINTENANCE RECORDS

INSPECTOR CERTIFICATION

Project:	Wind Colebrook North
Project Location:	Winsted- Norfolk Road Colebrook North
Contractor:	
Address:	
Phone:	
Fax:	

CONSTRUCTION INSPECTION & MAINTENANCE LOG

Date	Activity	Description	(1) Report No.
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	
	❑ Inspection ❑ Maintenance	By: ______________________	

CONSTRUCTION SITE INSPECTION REPORT

General Information				
Project Name:	Wind Colebrook North			
Location:	Winsted- Norfolk Road Colebrook, Connecticut			
CT DEP Tracking No.		(1) Report No.		
Date of Inspection:		Start / End Time:		
Inspector's Name(s):				
Inspector's Title(s):				
Inspector's Contact Information:				
Describe present phase of construction:				
Type of Inspection: ❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event				
Weather Information				
Has it rained since the last inspection? ❑Yes ❑No If yes, provide: Storm Start Date & Time: Storm Duration (hrs): Approximate Rainfall (in):				
Weather at time of this inspection?				
Discharge Information (A)				
Do you suspect that discharges may have occurred since the last inspection? ❑Yes ❑No				
Are there any discharges at the time of inspection? ❑Yes ❑No				
Describe location of any discharges from the site:				

SITE-SPECIFIC BMPs

(B)	BMP Description	BMP Installed and Operating Properly?	Corrective Action Needed	Date for corrective action / responsible party
1		❑Yes ❑No		
2		❑Yes ❑No		
3		❑Yes ❑No		
4		❑Yes ❑No		
5		❑Yes ❑No		
6		❑Yes ❑No		
7		❑Yes ❑No		
8		❑Yes ❑No		
9		❑Yes ❑No		
10		❑Yes ❑No		
11		❑Yes ❑No		
12		❑Yes ❑No		
13		❑Yes ❑No		
14		❑Yes ❑No		
15		❑Yes ❑No		
16		❑Yes ❑No		
17		❑Yes ❑No		
18		❑Yes ❑No		
19		❑Yes ❑No		

OVERALL SITE ISSUES

(C)	BMP/activity	Implemented?	Maintained?	Corrective Action	Date for corrective action/responsible person
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No		
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No		
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No		
4	Are discharge points and receiving waters free of sediment deposits?	❑Yes ❑No	❑Yes ❑No		
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No		
6	Is there evidence of sediment being tracked into the street?	❑Yes ❑No	❑Yes ❑No		
7	Is trash/litter from work areas collected and placed in covered	❑Yes ❑No	❑Yes ❑No		

(C)	BMP/activity	Implemented?	Maintained?	Corrective Action	Date for corrective action/responsible person
	dumpsters?				
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No		
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No		
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No		
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No		
12	(Other)	❑Yes ❑No	❑Yes ❑No		

(C)	BMP/activity	Implemented?	Maintained?	Corrective Action	Date for corrective action/responsible person
13	(Other)	❑Yes ❑No	❑Yes ❑No		

GENERAL INSPECTION COMMENTS AND EXPLANATION

General Inspection Comments (D)
Is other descriptive information attached to this inspection report? ❑Yes ❑No

Plan Information (E)
Were all current plan BMP's in place at the time of inspection? ❑Yes ❑No
Are additional BMP's required? ❑Yes ❑No
Does the plan need to be updated? ❑Yes ❑No
Explanation of additional BMP and Plan update requirements:

Certification statement:
I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

Name: _____
(Please print)
Signature: _____

Title: _____ Date: _____

.

CONSTRUCTION SITE MAINTENANCE REPORT

General Information				
Project Name:	Wind Colebrook North			
Location:	Winsted- Norfolk Road Colebrook, Connecticut			
CT DEP Tracking No.:		(1) Report No.		
Date of Maintenance:		Start / End Time:		
Describe present phase of construction:				
Type of Maintenance: ❑ Regular ❑ Pre-storm event ❑ Post-storm event ❑ Plan Update				
Maintenance Information				
Inspection Report Reference (No., Item)	Maintenance performed:			
Performed by:				
Inspection Report Reference (No., Item)	Maintenance performed:			
Performed by:				
Inspection Report Reference (No., Item)	Maintenance performed:			
Performed by:				
Inspection Report Reference (No., Item)	Maintenance performed:			
Performed by:				
Inspection Report Reference (No., Item)	Maintenance performed:			
Performed by:				

Inspection Report Reference (No., Item)	Maintenance performed:
Performed by:	
Inspection Report Reference (No., Item)	Maintenance performed:
Performed by:	
Inspection Report Reference (No., Item)	Maintenance performed:
Performed by:	
Inspection Report Reference (No., Item)	Maintenance performed:
Performed by:	
Inspection Report Reference (No., Item)	Maintenance performed:
Performed by:	
Inspection Report Reference (No., Item)	Maintenance performed:
Performed by:	
Inspection Report Reference (No., Item)	Maintenance performed:
Performed by:	
Inspection Report Reference (No., Item)	Maintenance performed:
Performed by:	

Certification statement:
I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

Name: _____

Signature: _____

Title: _____ Date: _____

Appendix G

HAZARDOUS MATERIAL OR OIL SPILL RECORDS

HAZARDOUS SUBSTANCE/OIL SPILL DISCHARGE EVENT

General Information			
Project Name:	Wind Colebrook North		
Location:	Winsted- Norfolk Road Colebrook, Connecticut		
CT DEP Tracking No.:		(2) Discharge Report No.	
Date of Event:		Time of Event:	
Responsible Party:			
Substance Discharged:			
Description of Event			
Is other descriptive information attached to this inspection report? ❑Yes ❑No			
Control and Containment Measures Implemented			

Counter Measures Proposed
Does the SWPPP need to be updated? ❑Yes ❑No
Explanation of additional BMP and SWPPP update requirements:

Certification statement:
I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

Name: _____

Signature: _____

Company: _____

Title: _____ Date: _____

Appendix H

UPDATE RECORDS

PLAN UPDATE DESCRIPTION

General Information			
Project Name:	Wind Colebrook North		
Location:	Winsted- Norfolk Road Colebrook, Connecticut		
CT DEP Tracking No.		Revision No.	
Section:		Date:	
Description of Revision			
Reason for Revision			
Revision Requested By: ❑ Inspection ❑ Maintenance ❑ Agency Inspection ❑ Other: _____			

PLAN UPDATE LOG

Revision No.	Description -	
Section:	Date of Revision :	
By:		
Revision No.	Description -	
Section:	Date of Revision :	
By:		

Revision No.	Description -	
Section:	Date of Revision :	
By:		
Revision No.	Description -	
Section:	Date of Revision :	
By:		
Revision No.	Description -	
Section:	Date of Revision :	
By:		

Certification statement:
I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

Name: _____

Signature: _____

Company: _____

Title: _____ Date: _____

Appendix I

CT DEP NOTICE OF TERMINATION (NOT)

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Notice of Termination Form

Please complete and submit this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your termination. Print or type unless otherwise noted.

Note: Ensure that for commercial and industrial facilities, registrations under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (DEP-PED-GP-014) or the *General Permit for the Discharge of Stormwater from Commercial Activities* (DEP-PED-GP-004) have been filed where applicable. For questions about the applicability of these general permits, please call the Department at 860-424-3018.

Part I: Registrant Information

1. Permit number: ***GSN***
2. Fill in the name of the registrant(s) as indicated on the registration certificate:

   Registrant:
3. Site Address:

   City/Town: State: Zip Code:
4. Date all storm drainage structures were cleaned of construction sediment:

   Date of Completion of Construction:

   Date of Last Inspection (must be at least three months after final stabilization pursuant to Section 6(b)(6)(D) of the general permit):
5. Check the post-construction activities at the site (check all that apply):

   ☐ Industrial ☐ Residential ☐ Commercial ☐ Capped Landfill

   ☐ Other (describe):

Part II: Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Signature of Permittee	Date
Name of Permittee (print or type)	Title (if applicable)

Note: Please submit this Notice of Termination Form to:

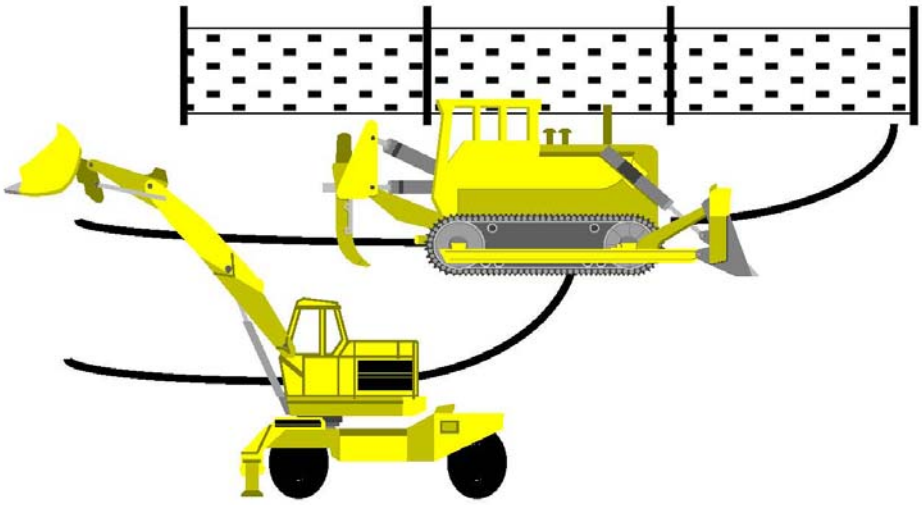
STORMWATER PERMIT COORDINATOR
BUREAU OF WATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Appendix J

CONNECTICUT GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATERS ASSOCIATED WITH CONSTRUCTION ACTIVITIES (DEP-PED-GP-015)

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF MATERIALS MANAGEMENT & COMPLIANCE ASSURANCE
WATER PERMITTING & ENFORCEMENT DIVISION
860-424-3018

General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities



Issuance Date: April 9, 2010
Expiration Date: October 1, 2011

Printed on recycled paper

General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Table of Contents

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Section 1. Authority

This general permit is issued under the authority of Section 22a-430b of Connecticut General Statutes.

Section 2. Definitions

The definitions of terms used in this general permit shall be the same as the definitions contained in Section 22a-423 of the Connecticut General Statutes and Section 22a-430-3(a) of the Regulations of Connecticut State Agencies. As used in this general permit, the following definitions shall apply:

"*Authorized activity*" means any activity authorized under this general permit.

"*Coastal area*" means coastal area as defined in Section 22a-93(5) of the Connecticut General Statutes.

"*Coastal waters*" means coastal waters as defined in Section 22a-29 of the Connecticut General Statutes.

"*Commissioner*" means commissioner as defined in Section 22a-2(b) of the Connecticut General Statutes.

"*Construction activities*" means activities including but not limited to clearing and grubbing, grading, excavation, and dewatering.

"*Department*" means the department of environmental protection.

"*Developer*" means a person who or municipality which is responsible, either solely or through contract, for the design and construction of a project site.

"*Dewatering wastewater*" means wastewater generated from the lowering of the groundwater table, the pumping of accumulated stormwater from an excavation, or the pumping of surface water from a cofferdam, or pumping of other surface water that has been diverted into a construction site.

"*Disturbance*" means the execution of any of the construction activities defined above.

"*Erosion*" means the detachment and movement of soil or rock fragments by water, wind, ice and gravity.

"*Fresh-tidal wetland*" means a tidal wetland with an average salinity level of less than 0.5 parts per thousand.

"*Guidelines*" means the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, or as may be amended, established pursuant to Section 22a-328 of the Connecticut General Statutes.

"*High tide line*" means high tide line as defined in Section 22a-359(c) of the Connecticut General Statutes.

"*Individual permit*" means a permit issued to a named permittee under Section 22a-430 of the Connecticut General Statutes.

"*Inland wetland*" means wetlands as defined in Section 22a-38 of the Connecticut General Statutes.

"*Municipal separate storm sewer*" means conveyances for stormwater (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) owned or operated by any municipality and discharging directly to surface waters of the state.

"*Municipality*" means a city, town or borough of the state.

"*Permittee*" means any person who or municipality which initiates, creates or maintains a discharge in accordance with Section 3 of this general permit.

"*Person*" means person as defined in Section 22a-423 of the Connecticut General Statutes.

"*Point Source*" means any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged.

"*Registrant*" means a person who or municipality which files a registration.

"*Registration*" means a registration form filed with the commissioner pursuant to Section 4 of this general permit.

"*Retain*" means to permanently hold on-site with no subsequent point-source release as in a detention system where there is a temporary holding or delaying of the delivery of stormwater downstream.

"*Sediment*" means solid material, either mineral or organic, that is in suspension, is transported, or has been moved from its site of origin by erosion.

"*Site*" means geographically contiguous land or water on which a authorized activity takes place or on which an activity for which authorization is sought under this general permit is proposed to take place. Non-contiguous land or water owned by the same person and connected by a right-of-way, which such person controls, and to which the public does not have access shall be deemed the same site.

"*Soil*" means any unconsolidated mineral and organic material of any origin.

"*Stabilize*" means the use of pavement, establishment of vegetation, use of geotextile materials, use or organic of inorganic mulching materials, or retention of existing vegetation to prevent erosion.

"*Stormwater*" means waters consisting of precipitation runoff.

"*Tidal wetland*" means a wetland as that term is defined in Section 22a-29(2) of the Connecticut General Statutes.

"*Total disturbance*" means the total area on a site that will be exposed or susceptible to erosion during the course of a project.

"*Total sediment load*" means the total amount of sediment carried by stormwater runoff on an annualized basis.

"*Upland soils*" means soils which are not designated as poorly drained, very poorly drained, alluvial, or flood plain by the National Cooperative Soils Survey, as may be amended from time to time, of the Soil Conservation Service of the United States Department of Agriculture and/or the Inland Wetlands Commission of the community in which the project will take place.

"*Water company*" means water company as defined in Section 25-32a of the Connecticut General Statutes.

Section 3. Authorization Under This General Permit

(a) Eligible Activities

The following activity is authorized by this general permit, provided the requirements of subsection (b) of this section are satisfied:

The discharge of stormwater and dewatering wastewater from construction activities which result in the disturbance of one or more total acres of land area on a site regardless of project phasing. In the case of a larger plan of development (such as a subdivision), the estimate of total acres of site disturbance shall include, but is not limited to, road and utility construction, individual lot construction (i.e. house, driveway, septic system, etc.), and all other construction associated with the overall plan, regardless of the individual parties responsible for construction of these various elements.

(b) Requirements for Authorization

This general permit authorizes the activity listed in subsection (a) of this section provided:

(1) Coastal Management Act

Such activity must be consistent with all applicable goals and policies in Section 22a-92 of the Connecticut General Statutes, and must not cause adverse impacts to coastal resources as defined in Section 22a-93(15) of the Connecticut General Statutes.

(2) Endangered and Threatened Species

Such activity must not threaten the continued existence of any species listed pursuant to Section 26-306 of the Connecticut General Statutes as endangered or threatened and must not result in the destruction or adverse modification of habitat designated as essential to such species.

(3) Historic Places

Such activity must at all times be in compliance with State and Federal Historic Preservation statutes, regulations and policies including identification of any potential impacts on property listed or eligible for listing on the State and/or National Registers of Historic Places and a description of measures necessary to avoid or minimize those impacts.

(4) The stormwater is *not* discharged to a Publicly Owned Treatment Works or to ground water;

(5) The discharge shall *not* cause pollution due to acute or chronic toxicity to aquatic and marine life, impair the biological integrity of aquatic or marine ecosystems, or result in an unacceptable risk to human health.

(6) Any construction site that is registered under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, issued October 1, 1997, is authorized by this general permit provided that the site continues to meet the conditions listed in Section 6 of this general permit.

(c) Registration

Pursuant to Section 4 of this general permit, a completed registration with respect to the construction activity shall be filed with the commissioner 30 days prior to the commencement of the activity unless exempted by Section 3(d) of this general permit.

(d) Small Construction

For construction projects with a total disturbed area (regardless of phasing) of between one and five acres, the permittee shall agree to adhere to the erosion and sediment control land use regulations of the town in which the construction activity is conducted. No registration pursuant to Section 4 of this general permit shall be required for such construction activity as long as it receives town review and written approval of its erosion and sediment control measures and follows the Guidelines. If no review is conducted by the town, the permittee must register and comply with Section 6.

(e) Geographic Area

This general permit applies throughout the State of Connecticut.

(f) Effective Date and Expiration Date of this General Permit

The modification of this general permit is **effective on April 9, 2010**, and **expires on October 1, 2011**.

(g) Effective Date of Authorization

Any activity is authorized by this general permit on the date the general permit becomes effective or on the date the activity is initiated, whichever is later.

(h) Revocation of an Individual Permit

If an activity is eligible for authorization under this general permit and such activity is presently authorized by an individual permit, the existing individual permit may be revoked by the commissioner upon a written request by the permittee. If the commissioner revokes such individual permit in writing, such revocation shall take effect on the effective date of authorization of such activity under this general permit.

(i) Issuance of an Individual Permit

If the commissioner issues an individual permit under Section 22a-430 of the Connecticut General Statutes, authorizing an activity authorized by this general permit, this general permit shall cease to authorize that activity beginning on the date such individual permit is issued.

Section 4. Registration Requirements

(a) Who Must File a Registration

With the exception noted below or in Section 3(d) of this general permit, any person who or municipality which initiates, creates, originates or maintains a discharge described in Section 3(a) of this general permit shall file with the commissioner a registration form that meets the requirements of Section 4 of this general permit along with the applicable fee at least thirty (30) days before the initiation of construction activities.

If a site has been previously registered under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued October 1, 1997 or October 1, 2002 and modified April 8, 2004, the permittee does *not* need to submit a new registration under this general permit, unless the ownership of the site has been transferred.

If the site for which a registration is submitted under this permit is owned by one person or municipality but is leased or, in some other way, the legal responsibility of another person or municipality (the developer), the developer is responsible for submitting the registration required by this permit. The registrant is responsible for compliance with all conditions of this permit.

(b) Scope of Registration

A registrant shall register on one registration form only those discharges that are operated by such permittee on one site.

(c) Contents of Registration

(1) Fees

(A) The registration fee of $625.00 shall be submitted with a registration form, provided that the registration fee for a municipality shall be $312.50. A registration shall not be deemed complete and no activity shall be authorized by this general permit (with the exception of activities previously registered under the general permit issued October 1, 1997 or October 1, 2002 and modified April 8, 2004), unless the registration fee has been paid in full.

(B) Registrants required to submit a stormwater pollution control plan (Plan) in accordance with Section 6(b)(3)(C) of this permit shall pay an additional plan review fee of $625.00 with the submittal of the Plan, the registration form and registration fee, provided that the plan review fee for a municipality shall be $312.50.

(C) The registration fee and plan review fee shall be paid by check or money order payable to the **Department of Environmental Protection**.

(D) The registration fee and plan review fee are non-refundable.

(2) Registration Form

A registration shall be filed on forms prescribed and provided by the commissioner and shall include the following:

(A) Legal name, address, and telephone number of the registrant. If the registrant is a person (as defined in Section 2) transacting business in Connecticut and is registered with the Connecticut Secretary of the State, provide the exact name as registered with the Connecticut Secretary of the State.

(B) Legal name, address and telephone number of the owner of the property on which the activity will take place.

(C) Legal name, address and telephone number of the primary contact for departmental correspondence and inquiries, if different from the registrant.

(D) Legal name, address and telephone number of the developer of the property on which the subject activity is to take place.

(E) Legal name, address and daytime and off-hours telephone numbers of the general contractor or other representative, if different from the developer.

(F) Legal name, address and telephone number of any consultant(s) or engineer(s) retained by the permittee to prepare the registration and Stormwater Pollution Control Plan.

(G) Location address or description of the site with respect to which the registration is submitted.

(H) The estimated duration of the construction activity.

(I) A brief description of the construction activity, including, but not limited to:

(i) Number of acres disturbed.

(ii) Assurance that construction is in accordance with the Guidelines and local erosion and sediment control ordinances.

(iii) A determination of whether or not a coastal consistency review is necessary for the activity.

(iv) Assurance that there are no endangered or threatened species suspected or known to be impacted by the activity.

(J) A brief description of the stormwater discharge, including:

(i) The name of the municipal separate storm sewer system or immediate surface water body or wetland to which the stormwater runoff discharges, and whether or not the site discharges within 500 feet of a tidal wetland.

(ii) The name of the watershed or nearest waterbody to which the site discharges.

(K) An 8 ½" by 11" copy of the relevant portion or a full-sized original of a United States Geological Survey (USGS) quadrangle map, with a scale of 1:24,000, showing the exact location of the site and the area within a one mile radius of the site. Identify the quadrangle name on such copy.

(L) For all sites that will disturb 10 acres or more (regardless of phasing), a copy of the Stormwater Pollution Control Plan shall be submitted (with the $625.00 plan review fee) in accordance with Section 6(b)(3)(C) of this general permit.

(M) The signature of the registrant and of the individual or individuals responsible for actually preparing the registration, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I certify that this permit registration is on complete and accurate forms as prescribed by the commissioner without alteration of the text. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the

Connecticut General Statutes, and in accordance with any other applicable statute.

I also certify under penalty of law that I have read and understand all conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), that all conditions for eligibility for authorization under the general permit are met, all terms and conditions of the general permit are being met for all discharges which have been initiated and are the subject of this registration, and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowingly making false statements."

(N) The following certification must be signed by a professional engineer, licensed to practice in Connecticut:

"I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and on my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements."

(d) Where to File a Registration

A registration shall be filed with the commissioner at the following address:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

(e) Additional Information

The commissioner may require a registrant to submit additional information that the commissioner reasonably deems necessary to evaluate the consistency of the subject activity with the requirements for authorization under this general permit.

(f) Additional Notification

For discharges through a municipal separate storm sewer system authorized by this general permit, a copy of the registration shall also be submitted to the owner and operator of that system.

For discharges within a public drinking water supply watershed or aquifer area, a copy of the registration and the Plan described in Section 6(b) of this general permit shall be submitted to the water company.

In addition, a copy of this registration and the Plan shall be available upon request to the local wetlands agency or its equivalent, or its duly authorized agent.

(g) Action by Commissioner

(1) The commissioner may reject without prejudice a registration if he determines that it does not satisfy the requirements of Section 4(c) of this general permit or more than 30 days have elapsed since the commissioner requested that the registrant submit additional information or the required fee and the registrant has not submitted such information or fee. Any registration refiled after such a rejection shall be accompanied by the fee specified in Section 4(c)(1) of this general permit.

(2) The commissioner may disapprove a registration if he finds that the subject activity is inconsistent with the requirements for authorization under Section 3(b) of this general permit, or for any other reason provided by law.

(3) Disapproval of a registration under this subsection shall constitute notice to the registrant that the subject activity must be authorized under an individual permit.

(4) Rejection or disapproval of a registration shall be in writing.

Section 5. Termination Requirements

(a) Notice of Termination

At the completion of a construction project registered pursuant to Section 4 of this general permit, a Notice of Termination must be filed with the commissioner. A project shall be considered complete after the site has been stabilized for at least three months following the cessation of construction activities. A site is not considered stabilized until there is no active erosion or sedimentation present and no disturbed areas remain exposed.

(b) Termination Form

A termination notice shall be filed on forms prescribed and provided by the commissioner and shall include the following:

(1) The permit number as provided to the permittee on the permit certificate.

(2) The name of the registrant as reported on the general permit registration form (DEP-PED-REG-015).

(3) The address of the completed construction site.

(4) The date all storm drainage structures were cleaned of construction debris pursuant to Section 6(b)(6)(C)(iv) of this general permit, the date of completion of construction, and the date of the final inspections pursuant to Section 6(b)(6)(D) of this general permit.

(5) A description of the post-construction activities at the site.

(6) Signature of the permittee.

(c) Where to File a Termination Form

A termination form shall be filed with the commissioner at the following address:

WATER PERMITTING & ENFORCEMENT DIVISION
BUREAU OF MATERIALS MANAGEMENT & COMPLIANCE ASSURANCE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Section 6. Conditions of this General Permit

The permittee shall at all times continue to meet the requirements for authorization set forth in Section 3 of this general permit. In addition, a permittee shall assure that authorized activities are conducted in accordance with the following conditions:

(a) Conditions Applicable to Certain Discharges

(1) Any person who or municipality that discharges stormwater into coastal tidal waters for which a permit is required under either the Structures and Dredging Act in accordance with Section 22a-361 of the Connecticut General Statutes or the Tidal Wetlands Act in accordance with Section 22a-32 of the Connecticut General Statutes, shall obtain such permit(s) from the commissioner. A tidal wetland permit is required for the placement of any sediment upon tidal wetland, whether it is deposited directly or indirectly.

(2) Any site which has a post-construction stormwater discharge that is located less than 500 feet from a tidal wetlands which is not a fresh-tidal wetland, shall discharge such stormwater through a system designed to retain the volume of stormwater runoff generated by 1 inch of rainfall on the site.

(b) Stormwater Pollution Control Plan

A registrant shall develop a Stormwater Pollution Control Plan ("Plan") for each site authorized by this general permit. Once the construction activity begins, the permittee shall perform all actions required by such Plan and shall maintain compliance with the Plan thereafter. The Plan shall be designed to address two components of stormwater pollution: (1) pollution caused by soil erosion and sedimentation during and after construction; and (2) stormwater pollution caused by use of the site after construction is completed, including, but not limited to, parking lots, roadways and the maintenance of grassed areas.

(1) Development of Plan

(A) The registrant shall develop a Plan for the site. Plans shall be prepared in accordance with sound engineering practices. The Plan shall ensure and demonstrate compliance with the Guidelines.

(B) For any stormwater discharges that were permitted under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued October 1, 1997 or October 1, 2002 and modified April 8, 2004, the existing Plan shall be updated in accordance with subsection (b)(6) of this section. The permittee shall maintain compliance with such Plan thereafter.

(2) Deadlines for Plan Preparation and Compliance

For construction activities authorized by this general permit that are initiated after the date of issuance of this general permit, the registrant shall prepare the Plan no later than thirty days before the date of initiation of the construction activity.

(3) Signature and Plan Review

(A) The Plan shall be signed by the registrant in accordance with Section 6(h) of this general permit. The Plan shall be certified by all contractors and subcontractors in accordance with subsection (b)6(E) of this section.

(B) The registrant shall provide a copy of the Plan, and the registration form required in Section 4 of this general permit to the following persons immediately upon request:

(i) the commissioner;

(ii) the local agency approving sediment and erosion plans, grading plans, or stormwater management plans, and the local official responsible for enforcement of such plans;

(iii) in the case of a stormwater discharge through a municipal separate storm sewer system, the municipal operator of the system;

(iv) in the case of a stormwater discharge located within a public drinking water supply watershed or aquifer area, the water company.

The registrant shall also provide a copy of the Plan to all contractors or developers conducting construction activities on individual lots or buildings within the overall plan of development, regardless of ownership. These additional contractors or developers shall sign the certification in Section 6(b)(6)(E)(ii).

For all registrants or permittees submitting a Plan in accordance with subsection (b)(3)(B)(i) of this section, a plan review fee of $625.00 shall be submitted with the Plan.

(C) For construction activities that result in the disturbance of ten or more total acres of land area on a site (regardless of phasing), the Plan shall be submitted to the commissioner no later than thirty days before the initiation of construction activities. Plans shall be submitted in conjunction with the registration submitted in compliance with Section 4 of this general permit.

(D) The commissioner may notify the registrant at any time that the Plan and/or the site do not meet one or more of the minimum requirements of this permit. Within 7 days of such notice, or such other time as the commissioner may allow, the permittee shall make the required changes to the Plan and perform all actions required by such revised Plan. Within 15 days of such notice, or such other time as the commissioner may allow, the permittee shall submit to the commissioner a written certification that the requested changes have been made and implemented and such other information as the commissioner requires, in accordance with Sections 6(g) and 6(h) of this general permit.

(4) Keeping Plans Current

The permittee shall amend the Plan whenever there is a change in contractors or subcontractors at the site, or a change in design, construction, operation, or maintenance at the site which has the potential for the discharge of pollutants to the waters of the state and which has not otherwise been addressed in the Plan or if the actions required by the Plan fail to prevent pollution.

(5) Failure to Prepare, Maintain or Amend Plan

In no event shall failure to complete, maintain or update a Plan in accordance with subsections (b)(1) and (b)(4) of this section relieve a permittee of responsibility to implement any actions required to protect the waters of the state and to comply with all conditions of the permit, including but not limited to installation and maintenance of all controls and management measures described in subsection (b)(6)(C) of this section and in the Guidelines.

(6) Contents of the Plan

The Plan shall include, at a minimum the following items:

(A) Site Description

(i) A description of the nature of the construction activity;

(ii) Estimates of the total area of the site and the total area of the site that is expected to be disturbed by construction activities;

(iii) An estimate, including calculations if any, of the average runoff coefficient of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site;

(iv) A site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, the location of major structural and non-structural controls identified in the Plan, the location of areas where stabilization practices are expected to occur, areas which will be vegetated following construction, surface waters (including inland wetlands, tidal wetlands, and fresh-tidal wetlands), and locations where stormwater is discharged to a surface water (both during and post-construction); and

(v) The name of the immediate receiving water(s) and the ultimate receiving water(s) of the discharges authorized by this general permit and areal extent of wetland acreage on the site.

(B) Construction Sequencing

Each Plan shall clearly identify the expected sequence of major construction activities on the site, including but not limited to installation of erosion and sediment control measures, clearing, grubbing, grading, cut and fill operations, drainage and utility installation, and paving and stabilization operations. This section shall include an estimated timetable for all activities, which shall be revised in accordance with subsection (4) above as necessary. Wherever possible, the site shall be phased to avoid the disturbance of over five acres at one time. The Plan shall clearly show the limits of disturbance for the entire activity and for each phase. Any Plan that shows a site disturbance of over ten acres total (regardless of phasing) requires submittal of the Plan to the commissioner, in accordance with subsection (b)(3)(C) of this section.

(C) Controls

Each Plan shall include a description of appropriate controls and measures that will be performed at the site to prevent pollution of the waters of the state. The Plan shall clearly describe for each major activity identified in subsection (b)(6)(B) of this section, the appropriate control measures and the timing during the construction process that the measures would be implemented. (For example, perimeter controls for one portion of the site will be installed after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site. Perimeter controls will be actively maintained until final stabilization of those portions of the site upgradient of the perimeter control. Temporary perimeter controls will be removed after final stabilization.) Controls shall be designed in accordance with the Guidelines. Use of controls to comply with subsection (b)(6)(C)(i) of this section that are not included in the Guidelines must be approved by the commissioner or his designated agent. The description of controls shall address the following minimum components:

(i) Erosion and Sediment Controls

1) Stabilization Practices

The Plan shall include a description of interim and permanent stabilization practices, including a schedule for implementing the practices. Site plans shall ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include but not be limited to: silt fences, temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other vegetative and non-structural measures as may be identified by the Guidelines. Where construction activities have permanently ceased or have temporarily been suspended for more than seven days, or when final grades are reached in any portion of the site, stabilization practices shall be implemented within three days. Areas that will remain disturbed but inactive for at least thirty days shall receive temporary seeding in accordance with the Guidelines. Areas that will remain disturbed beyond the planting season, shall receive long-term, non-vegetative stabilization sufficient to protect the site through the winter. In all cases, stabilization measures shall be implemented as soon as possible in accordance with the Guidelines. Areas to be graded with slopes steeper than 3:1 (horizontal:vertical) and higher than 15 feet shall be graded with appropriate slope benches in accordance with the Guidelines.

2) Structural Practices

The Plan shall include a description of structural practices to divert flows away from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from the site. Such practices include but may not be limited to earth dikes (diversions), drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, outlet protection, reinforced soil retained systems, gabions, and temporary or permanent sediment basins and chambers. Unless otherwise specifically approved in writing, structural measures shall be installed on upland soils.

At a minimum, for discharge points that serve an area with between 2 and 5 disturbed acres at one time, a sediment basin, sediment trap, or other control as may be defined in the Guidelines for such drainage area, designed in accordance with the Guidelines, shall be designed and installed. All sediment traps or basins shall provide a minimum of 134 cubic yards of water storage per acre drained and shall be maintained until final stabilization of the contributing area. This requirement shall not apply to flows from off-site areas and flows from the

site that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment trap or basin. Any exceptions must be approved in writing by the commissioner.

For discharge points that serve an area with more than five (5) disturbed acres at one time, a sediment basin designed in accordance with the Guidelines, shall be designed and installed, which basin shall provide a minimum of 134 cubic yards of water storage per acre drained and which basin shall be maintained until final stabilization of the contributing area. This requirement shall not apply to flows from off-site areas and flows from the site that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment basin. Outlet structures from sedimentation basins shall not encroach upon a wetland. Any exceptions must be approved in writing by the commissioner.

3) Maintenance

Maintenance shall be performed in accordance with the Guidelines, provided that, if additional maintenance is required to protect the waters of the state from pollution, the Plan shall include a description of the procedures to maintain in good and effective operating conditions all erosion and sediment control measures, including vegetation, and all other protective measures identified in the site plan.

(ii) Dewatering Wastewaters

Where feasible and appropriate, dewatering wastewaters shall be infiltrated into the ground. Dewatering wastewaters discharged to surface waters shall be discharged in a manner that minimizes the discoloration of the receiving waters. Each plan shall include a description of the operational and structural practices that will be used to ensure that all dewatering wastewaters will not cause scouring or erosion or contain suspended solids in amounts that could reasonably be expected to cause pollution of waters of the State.

(iii) Post Construction Stormwater Management

Each plan must include a description of measures that will be installed during the construction process to control pollutants in stormwater discharges that will occur after construction operations have been completed. Unless otherwise specifically provided by the commissioner in writing, structural measures shall be placed on upland soils. This general permit only addresses the installation of stormwater management measures, and not the ultimate operation and maintenance of such structures included in such measures after the construction activities have been completed and the site has

undergone final stabilization. The following measures must be implemented:

1) For construction activities initiated after October 1, 1992, the permittee shall install post-construction stormwater management measures designed to remove suspended solids and floatables (i.e. oil and grease, other floatable liquids, floatable solids, trash, etc.) from stormwater. A goal of 80 percent removal of total sediment load from the stormwater discharge shall be used in designing and installing stormwater management measures. Such measures may include but are not limited to: stormwater detention structures (including wet ponds); stormwater retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff on-site; vegetated buffer strips; sediment removal chambers or structures; and sequential systems (which combine several practices). Provisions shall be included to address the maintenance of any system installed.

2) Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., maintenance of hydrologic conditions, such as the hydrodynamics present prior to the initiation of construction activities).

3) Any site which has a post-construction stormwater discharge located less than 500 feet from a tidal wetlands which is not a fresh-tidal wetland, shall discharge such stormwater through a system designed to retain the volume of stormwater runoff generated by 1 inch of rainfall on the site.

(iv) Other Controls

A description of other controls used at the site. The following controls must be implemented:

1) Waste Disposal

A description of best management practices to be performed at the site, which practices shall ensure that no litter, debris, building materials, or similar materials are discharged to waters of the State.

2) Off-site vehicle tracking of sediments and the generation of dust shall be minimized.

3) All post-construction stormwater structures shall be cleaned of construction sediment and any remaining silt fence shall be removed prior to filing of a termination notice pursuant to Section 5 of this general permit.

(D) Inspection

A description of the inspection procedures that must be addressed and implemented in the following manner:

Qualified personnel (provided by the permittee) shall inspect disturbed areas of the construction activity that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.1 inches or greater. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months.

(i) 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. Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Where discharge locations or points are assessable, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking.

(ii) Based on the results of the inspection, the description of potential sources and pollution prevention measures identified in the Plan shall be revised as appropriate as soon as practicable after such inspection. Such modifications shall provide for timely implementation of any changes to the site within 24 hours and implementation of any changes to the Plan within 3 calendar days following the inspection. The Plan shall be revised and the site controls updated in accordance with sound engineering practices, the Guidelines, and subsections (4) and (6)(C)(i) 3) of this section.

(iii) A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Plan, and actions taken shall be made and retained as part of the Plan for at least three years after the date of inspection. The report shall be signed by the permittee or his/her authorized representative in accordance with the requirements of Section 6(h) of this general permit.

(E) Contractors

(i) The Plan shall clearly identify each contractor and subcontractor that will perform actions on the site which may reasonably be expected

to cause or have the potential to cause pollution of the waters of the State, and shall include a copy of the certification statement shown below signed by each such contractor and subcontractor. All certifications shall be included in the Plan.

(ii) Subdivisions

Where individual lots in a subdivision or other common plan of development are conveyed or otherwise the responsibility of another contractor, those individual lot contractors shall be required to comply with the provisions of this general permit and shall sign the certification statement below regardless of lot size or disturbed area. The permittee shall provide a copy of the Plan to each of these contractors.

(iii) Certification Statement

The Plan shall include the following certification signed by each contractor and subcontractor identified in the Plan as described above:

"I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this permit, including but not limited to the requirements of the Stormwater Pollution Control Plan prepared for the site."

The certification shall include the name and title of the person providing the signature; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

(c) Reporting and Record Keeping Requirements

(1) The permittee shall retain copies of the Plan and all reports required by this general permit, and records of all data used to complete the registration to be authorized by this general permit, for a period of at least three years from the date that construction at the site is completed unless the commissioner specifies another time period in writing.

(2) The permittee shall retain an updated copy of the Plan required by this general permit at the construction site from the date construction is initiated at the site until the date construction at the site is completed.

(3) Upon completion of construction, for sites authorized by the General Permit for the Discharge of Stormwater Associated with Commercial Activity or the General Permit for the Discharge of Stormwater Associated with Industrial Activity, the Plan shall be kept as an appendix to the Stormwater Management

Plan or Stormwater Pollution Prevention Plan (as applicable) for a period of at least three years from the date of completion of construction.

(d) Regulations of Connecticut State Agencies Incorporated into this General Permit

The permittee shall comply with the following Regulations of Connecticut State Agencies which are hereby incorporated into this general permit, as if fully set forth herein:

(1) Section 22a-430-3:

Subsection (b) General - subparagraph (1)(D) and subdivisions (2),(3),(4) and (5)
Subsection (c) Inspection and Entry
Subsection (d) Effect of a Permit - subdivisions (1) and (4)
Subsection (e) Duty to Comply
Subsection (f) Proper Operation and Maintenance
Subsection (g) Sludge Disposal
Subsection (h) Duty to Mitigate
Subsection (I) Facility Modifications, Notification - subdivisions (1) and (4)
Subsection (j) Monitoring, Records and Report Requirements - subdivisions (1), (6), (7), (8), (9) and (11) (except subparagraphs (9) (A) (2) and (9) (c)
Subsection (k) Bypass
Subsection (m) Effluent Limitation Violations
Subsection (n) Enforcement
Subsection (p) Spill Prevention and Control
Subsection (q) Instrumentation, Alarms, Flow Recorders
Subsection (r) Equalization

(2) Section 22a-430-4

Subsection (t) Prohibitions
Subsection (p) Revocation, Denial, Modification
Appendices

(e) Reliance on Registration

In evaluating the registrant's registration, the commissioner has relied on information provided by the registrant. If such information proves to be false or incomplete, the registrant's authorization may be suspended or revoked in accordance with law, and the commissioner may take any other legal action provided by law.

(f) Duty to Correct and Report Violations

Upon learning of a violation of a condition of this general permit, a permittee shall immediately take all reasonable action to determine the cause of such violation, correct and mitigate the results of such violation, prevent further such violation, and report in writing such violation and such corrective action to the commissioner within five (5) days of the permittee's learning of such violation. Such information shall be filed in accordance with the certification requirements prescribed in Section 6(h) of this general permit.

(g) Duty to Provide Information

If the commissioner requests any information pertinent to the authorized activity or to compliance with this general permit or with the permittee's authorization under this general permit, the permittee shall provide such information within fifteen (15) days of such request. Such information shall be filed in accordance with the certification requirements prescribed in Section 6(h) of this general permit.

(h) Certification of Documents

Any document, including but not limited to any notice, information or report, which is submitted to the commissioner under this general permit shall be signed by the permittee, or a duly authorized representative of the permittee, and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

(i) Date of Filing

For purposes of this general permit, the date of filing with the commissioner of any document is the date such document is received by the commissioner. The word "day" as used in this general permit means the calendar day; if any date specified in the general permit falls on a Saturday, Sunday, or legal holiday, such deadline shall be the next business day thereafter.

(j) False Statements

Any false statement in any information submitted pursuant to this general permit may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes.

(k) Correction of Inaccuracies

Within fifteen (15) days after the date a permittee becomes aware of a change in any information in any material submitted pursuant to this general permit, or becomes aware that any such information is inaccurate or misleading or that any relevant information has been omitted, such permittee shall correct the inaccurate or misleading information or supply the omitted information in writing to the commissioner. Such information shall be filed in accordance with the certification requirements prescribed in Section 6(h) of this general permit.

(l) Transfer of Authorization

Authorizations under this general permit are non-transferable. However, any person or municipality registering a discharge that has previously been registered under this permit may adopt by reference the Plan developed by the previous permittee. The new permittee shall amend the Plan as required by Section 6(b)(4) prior to submitting a new registration.

(m) Other Applicable Law

Nothing in this general permit shall relieve the permittee of the obligation to comply with any other applicable federal, state and local law, including but not limited to the obligation to obtain any other authorizations required by such law.

(n) Other Rights

This general permit is subject to and does not derogate any present or future rights or powers of the State of Connecticut and conveys no rights in real or personal property nor any exclusive privileges, and is subject to all public and private rights and to any federal, state, and local laws pertinent to the property or activity affected by such general permit. In conducting any activity authorized hereunder, the permittee may not cause pollution, impairment, or destruction of the air, water, or other natural resources of this state. The issuance of this general permit shall not create any presumption that this general permit should or will be renewed.

Section 7. Commissioner's Powers

(a) Abatement of Violations

The commissioner may take any action provided by law to abate a violation of this general permit, including but not limited to penalties of up to $25,000 per violation per day under Chapter 446k of the Connecticut General Statutes, for such violation. The commissioner may, by summary proceedings or otherwise and for any reason provided by law, including violation of this general permit, revoke a permittee's authorization hereunder in accordance with Sections 22a-3a-2 through 22a-3a-6, inclusive, of the Regulations of Connecticut State Agencies. Nothing herein shall be construed to affect any remedy available to the commissioner by law.

(b) General Permit Revocation, Suspension, or Modification

The commissioner may, for any reason provided by law, by summary proceedings or otherwise, revoke or suspend this general permit or modify to establish any appropriate conditions, schedules of compliance, or other provisions which may be necessary to protect human health or the environment.

(c) Filing of an Individual Application

If the commissioner notifies a permittee in writing that such permittee must obtain an individual permit if he wishes to continue lawfully conducting the authorized activity, the permittee must file an application for an individual permit within thirty (30) days of receiving the commissioner's notice. While such application is pending before the commissioner, the permittee shall comply with the terms and conditions of this general permit and the subject approval of registration. Nothing herein shall affect the commissioner's power to revoke a permittee's authorization under this general permit at any time.

Issued Date: April 9, 2010

AMEY W. MARRELLA
Commissioner

This is a true and accurate copy of the general permit executed on April 9, 2010 by the Commissioner of the Department of Environmental Protection.

Appendix K

SUPPORTING CALCULATIONS

CALCULATIONS FOR CULVERTS, SWALES, RIP RAP,STORMWATER PONDS, LEVEL SPREADERS TEMPORARY SEDIMENT TRAPS AND WATER QUALITY VOLUME

DRAINAGE CALCULATIONS FOR SIZING CULVERT CROSSING – DP-1 MAIN ACCESS DRIVE STATION 7+45

25-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Design Point #1 – Wetlands Crossing near WL flag 1-301, Station 7+45:
Total area contributing to driveway crossing: 21.60 ac.
Proposed Land Cover
Impervious = 0.48 ac.
Grass = 0.12 ac.
Wooded = 21.00 ac.

C = [(.9*.48)+(.3*.12)+(.2*21.00)]/21.60 = 0.22
Time of Concentration = 30.6 minutes ∴ I = 3.3 in/hr

Q = C*I*A = .22 * 3.3 * 21.60 = 15.7 cfs

Openness Ratio Calculation:
(Per ACOE PGP Criteria openness ratio should be at least 0.25 meters

Length of culvert = 38’ = 11.58 m
Openness Ratio = (Height x Width)/Length (measured in meters)

For 3’h x 12’w bottomless culvert
Openness Ratio = (.91 m x 3.66 m)/11.58 m = .288 meters

Depth of flow for 15.7 cfs through 3’h x 12’w bottomless culvert set at 4.3% (natural gradient of watercourse) = 0.35’ = 4.2 inches.

Worksheet
Worksheet for Rectangular Channel

Project Description	
Worksheet	Wetland Cross Culver – DP1 - STA. 7+45
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.040	
Channel Slope	043000	ft/ft
Bottom Width	12.00	ft
Discharge	15.70	cfs

Results		
Depth	0.35	ft
Flow Area	4.2	ft²
Wetted Perim	12.71	ft
Top Width	12.00	ft
Critical Depth	0.38	ft
Critical Slope	0.035027	ft/ft
Velocity	3.70	ft/s
Velocity Head	0.21	ft
Specific Ener	0.57	ft
Froude Numb	1.10	
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR SIZING CULVERT CROSSING – DP-2 MAIN ACCESS DRIVE STATION 8+75

25-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Design Point #2 – Wetlands Crossing near WL flag 1-257, Station 8+75:
Total area contributing to driveway crossing: 71.00 ac.
Proposed Land Cover
Impervious = 0.45 ac.
Grass = 2.80 ac.
Wooded = 67.75 ac.

C = [(.9*.45)+(.3*2.8)+(.2*67.75)]/71.00 = 0.21
Time of Concentration = 41.7 minutes ∴ I = 2.8 in/hr

Q = C*I*A = .21 * 2.8 * 71.00 = 41.7 cfs

Openness Ratio Calculation:
(Per ACOE PGP Criteria openness ratio should be at least 0.25 meters

Length of culvert = 38’ = 11.58 m
Openness Ratio = (Height x Width)/Length (measured in meters)

For 3’h x 12’w bottomless culvert
Openness Ratio = (.91 m x 3.66 m)/11.58 m = .288 meters

Depth of flow for 41.7 cfs through 3’h x 12’w bottomless culvert set at 9.5% (natural gradient of watercourse) = 0.50’ = 6.0 inches.

Worksheet
Worksheet for Rectangular Channel

Project Description	
Worksheet	Wetland Cross Culver – DP2 – STA 8+75
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.040	
Channel Slope	095000	ft/ft
Bottom Width	12.00	ft
Discharge	41.70	cfs

Results		
Depth	0.50	ft
Flow Area	6.1	ft²
Wetted Perim	13.01	ft
Top Width	12.00	ft
Critical Depth	0.72	ft
Critical Slope	0.030246	ft/ft
Velocity	6.88	ft/s
Velocity Head	0.74	ft
Specific Energ	1.24	ft
Froude Numb	1.71	
Flow Type	Supercritical	

WATER QUALITY VOLUME CALCULATIONS FOR STORMWATER POND #1 (PER DEP 2004 STORMWATER QUALITY MANUAL)

3-18-11

Water Quality Volume (WQV) = 1" x R x A/ 12

Where R = Volumetric Runoff Coefficient = 0.05 + 0.009 x I
I = Percent impervious cover
A = Site area in acres

A = 4.70 acres
I = 0.68 ac = 14.5%
R = 0.05 + 0.009 x 14.5 = 0.180
WQV (Drainage Area) = 1" x 0.180 x 4.70 / 12 = .071 ac-ft = 3,071 CF

Total WQV Required = 3,071 CF

Volume provided in forebay area = 2,097 CF

Volume provided in micropool area = 5,115 CF

Total Water Quality Volume provided = 7,212 CF

WATER QUALITY VOLUME CALCULATIONS FOR STORMWATER POND #2 (PER DEP 2004 STORMWATER QUALITY MANUAL)

3-18-11

Water Quality Volume (WQV) = 1" x R x A/ 12

Where R = Volumetric Runoff Coefficient = 0.05 + 0.009 x I
I = Percent impervious cover
A = Site area in acres

A = 2.46 acres
I = 0.26 ac = 10.6%
R = 0.05 + 0.009 x 10.6 = 0.145
WQV (Drainage Area) = 1" x 0.145 x 2.46 / 12 = .030 ac-ft = 1,298 CF

Total WQV Required = 1,298 CF

Volume provided in forebay area = 825 CF

Volume provided in micropool area = 2,358 CF

Total Water Quality Volume provided = 3,183 CF

WATER QUALITY VOLUME CALCULATIONS FOR ROADSIDE INFILTRATION TRENCH (PER DEP 2004 STORMWATER QUALITY MANUAL)

12-6-10

Water Quality Volume (WQV) = 1" x R x A/ 12

Where R = Volumetric Runoff Coefficient = 0.05 + 0.009 x I
I = Percent impervious cover
A = Site area in acres

TYPICAL SIZING FOR 150 LF ROAD TO 150 LF OF INFILTRATION TRENCH AT TOE OF SLOPE (STATION 0+50 TO STATION 2+00 MAIN ACCESS ROAD)

A = 0.12 acres
I = 0.04 ac = 33.3%
R = 0.05 + 0.009 x 33.3 = 0.350
WQV (Drainage Area) = 1" x 0.350 x 0.12 / 12 = .0035 ac-ft = 152 CF
WQV Required = 655 CF

Total Volume provided in 150 LF of 2' x 2' stone trench = 180 CF (assumes 30% void ratio in stone trench comprised of 2" crushed stone.
Total Volume provided by Infiltration Trench = 180 CF

Specify 2'w x 2'd stone infiltration trench at toe of slope below roadway where appropriate on Site Plans.

DRAINAGE CALCULATIONS FOR TEMPORARY DIVERSION #1 (TD1)

10-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 2.13 ac.
Proposed Land Cover
Grass = 0.15 ac.
Wooded = 1.98 ac.

C = [(.3*.15)+(.2*1.98)]/2.13 = 0.21
Time of Concentration = 20 minutes ∴ I = 3.6 in/hr

Q = C*I*A = .21 * 3.6 * 2.13 = 1.62 cfs

Velocity in grass-lined swale at 5% slope = 3.34 fps.

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	TD1
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Channel Slope	.050000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	1.60	cfs

Results		
Depth	0.20	ft
Flow Area	0.5	ft²
Wetted Perim	2.89	ft
Top Width	2.80	ft
Critical Depth	0.25	ft
Critical Slope	0.023407	ft/ft
Velocity	3.34	ft/s ← GRASS LINED SWALE
Velocity Head	0.17	ft
Specific Energ	0.37	ft
Froude Numb	1.42	
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR TEMPORARY DIVERSION #2 (TD2)

10-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 0.73 ac.
Proposed Land Cover
Grass = 0.05 ac.
Wooded = 0.68 ac.

C = [(.3*.05)+(.2*0.68)]/.73 = 0.21
Time of Concentration = 12 minutes ∴ I = 4.5 in/hr

Q = C*I*A = .21 * 4.5 * 0.73 = 0.70 cfs

Velocity in grass-lined swale at max 14% slope = 3.51 fps.

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	TD2
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Channel Slope	140000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	0.70	cfs

Results		
Depth	0.09	ft
Flow Area	0.2	ft²
Wetted Perim	2.41	ft
Top Width	2.37	ft
Critical Depth	0.15	ft
Critical Slope	0.026813	ft/ft
Velocity	3.51	ft/s ← GRASS LINED SWALE
Velocity Head	0.19	ft
Specific Energ	0.28	ft
Froude Numb	2.13	
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR TEMPORARY DIVERSION #3 (TD3)

10-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 0.62 ac.
Proposed Land Cover
Grass = 0.06 ac.
Wooded = 0.56 ac.

C = [(.3*.06)+(.2*0.56)]/0.62 = 0.21
Time of Concentration = 25 minutes ∴ I = 3.2 in/hr

Q = C*I*A = .21 * 3.2 * 0.62 = 0.42 cfs

Velocity in grass-lined swale at 12% slope = 2.78 fps.

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	TD3
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Channel Slope	120000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	0.42	cfs

Results		
Depth	0.07	ft
Flow Area	0.2	ft²
Wetted Perim	2.32	ft
Top Width	2.28	ft
Critical Depth	0.11	ft
Critical Slope	0.029456	ft/ft
Velocity	2.78	ft/s ← GRASS LINED SWALE
Velocity Head	0.12	ft
Specific Energ	0.19	ft
Froude Numb	1.91	
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR PERMANENT DIVERSION SWALE #1(PDS1)

25-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 2.78 ac.
Proposed Land Cover
Grass = 0.22 ac.
Wooded = 2.56 ac.

C = [(.3*.22)+(.2*2.56)]/2.78= 0.21
Time of Concentration = 18 minutes ∴ I = 4.4 in/hr

Q = C*I*A = .21 * 4.4 * 2.78 = 2.54 cfs

Velocity in riprap-lined swale at 9.9% slope = 2.78 fps.

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PDS1
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.040	
Channel Slope	099000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	2.78	cfs

Results		
Depth	0.27	ft
Flow Area	0.7	ft²
Wetted Perim	3.19	ft
Top Width	3.06	ft
Critical Depth	0.35	ft
Critical Slope	0.038164	ft/ft
Velocity	4.14	ft/s ← MOD. RIPRAP CHANNEL
Velocity Head	0.27	ft
Specific Energ	0.53	ft
Froude Numb	1.56	
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR PERMANENT DIVERSION SWALE #2(PDS2)

25-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 5.35 ac.
Proposed Land Cover
Grass = .08 ac.
Wooded = 5.27 ac.

C = [(.3*.08)+(.2*5.27)]/5.35= 0.20
Time of Concentration = 21 minutes ∴ I = 4.1 in/hr

Q = C*I*A = .20 * 4.1 * 5.35 = 4.39 cfs

Velocity in riprap-lined swale at 4.5% slope = 2.78 fps.

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PDS2
Flow Element	Trapezoidal Cha
Method	Manning's Formı
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.040	
Channel Slope	045000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	4.39	cfs

Results		
Depth	0.43	ft
Flow Area	1.2	ft²
Wetted Perim	3.90	ft
Top Width	3.70	ft
Critical Depth	0.45	ft
Critical Slope	0.035723	ft/ft
Velocity	3.61	ft/s ← MOD. RIPRAP CHANNEL
Velocity Head	0.20	ft
Specific Energ	0.63	ft
Froude Numb	1.11	
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR CROSS CULVERT TO LEVEL SPREADER TURBINE 2 ACCESS ROAD STATION 0+55

25-YEAR DESIGN STORM
3-18-11

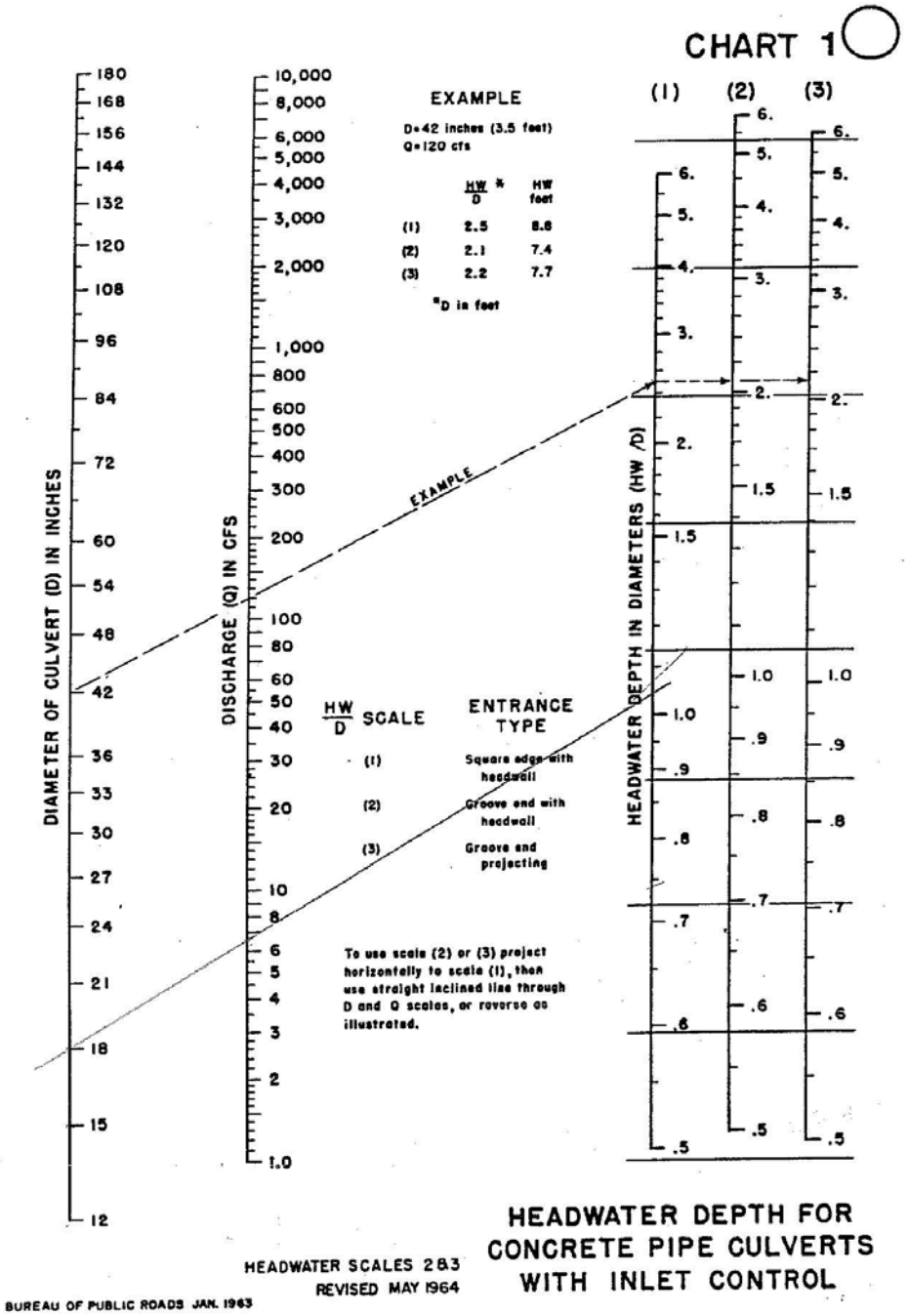
Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 8.13 ac.
Proposed Land Cover
Grass = 0.30 ac.
Wooded = 7.83 ac.

C = [(.3*.30)+(.2*7.83)]/8.13= 0.20
Time of Concentration = 21 minutes ∴ I = 4.1 in/hr

Q = C*I*A = .20 * 4.1 * 8.13 = 6.67 cfs

For 18" culvert - HW/D = 1.05



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CROSS CULVERT, TURBINE 2 ACCESS ROAD
STATION 0+55

CROSS CULVERT
TURBINE 2 ACCESS ROAD

OUTLET PROTECTION - OUTLET VELOCITY ≤ 14 feet/sec

	OUTLET PIPE DIAMETER OR SPAN (in)									
DISCHARGE (cfs)	12	15	18	24	30	36	42	48	54	60
0-5	***10***	***10***		***USE***						
6	12	11								
7		13	***12***							
8		14	13	***12***		***MINIMUM***				
9			14	13						
10			15	13						
11			16	14				***LENGTH***		
12				14						
14				16	***14***					
16				17	15	***14***			***OUTLINED***	
18				18	16	15				
20					17	15	***14***			
22		***USE***			18	16	15			
24						17	15	***14***		
26						17	16	15		
28						18	16	15		
30						19	17	16		
35						20	18	17	***16***	
40			***PREFORMED***				20	18	17	***16***
45							21	19	18	16
50							22	20	18	17
55								21	19	18
60								22	20	19
65								24	21	20
70					***SCOUR***			25	22	20
75								26	23	21
80									24	22
90									26	24
100									28	25
110										27
125							***HOLE***			29
130										30

Table 8-6.1 - Length - L_a (feet)
Type A Riprap Apron

Notes: 1. Bold face outlined boxes indicate minimum L_a to be used for a given pipe diameter or span.
2. Rounding and interpolating are acceptable.

$W_a = 3(s_p) + 0.4(L_a)$

$W_a = 3(1.5) + 0.4(12) = 9.3'$, use 10'W

10'W x 12'L M00 RIPRAP PAD

Cross culvert - Turbine 2 Access Road
Worksheet for Circular Channel

Project Description	
Worksheet	Circular Channel
Flow Element	Circular Channel
Method	Manning's Formu
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.013	
Channel Slope	010000	ft/ft
Diameter	18.0	in
Discharge	6.67	cfs

Results		
Depth	0.87	ft
Flow Area	1.1	ft²
Wetted Perime	2.59	ft
Top Width	0.00	ft
Critical Depth	1.00	ft
Percent Full	57.9	%
Critical Slope	0.006577	ft/ft
Velocity	6.29	ft/s ← USE MOD. RIPRAP PAD
Velocity Head	0.62	ft
Specific Energ	1.48	ft
Froude Numbe	1.31	
Maximum Disc	11.30	cfs
Discharge Full	10.50	cfs
Slope Full	0.004032	ft/ft
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR PERMANENT DIVERSION SWALE #3(PDS3) 25-YEAR DESIGN STORM

3-18-11

Rational Method:

Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 8.35 ac.
Proposed Land Cover
Grass = 0.52 ac.
Wooded = 7.83 ac.

C = [(.3*.52)+(.2*7.83)]/8.35= 0.21
Time of Concentration = 22 minutes ∴ I = 4.0 in/hr

Q = C*I*A = .21 * 4.0 * 8.35 = 7.01 cfs

Velocity in riprap-lined swale at max 20.0% slope = 7.02 fps.

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PDS3
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.040	
Channel Slope	200000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	7.01	cfs

Results		
Depth	0.37	ft
Flow Area	1.0	ft²
Wetted Perim	3.64	ft
Top Width	3.46	ft
Critical Depth	0.59	ft
Critical Slope	0.033524	ft/ft
Velocity	7.02	ft/s ← MOD. RIPRAP CHANNEL
Velocity Head	0.77	ft
Specific Ener	1.13	ft
Froude Numb	2.30	
Flow Type	Supercritical	

STORMWATER POND 1 OUTLET

Worksheet

Worksheet for Circular Channel

Project Description	
Worksheet	Pond 1 outlet
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.013	
Channel Slope	050000	ft/ft
Diameter	15.0	in
Discharge	2.30	cfs

Results		
Depth	0.34	ft
Flow Area	0.3	ft²
Wetted Perime	1.37	ft
Top Width	0.00	ft
Critical Depth	0.61	ft
Percent Full	27.0	%
Critical Slope	0.005630	ft/ft
Velocity	8.61	ft/s ← USE INT. RIPRAP PAD
Velocity Head	1.15	ft
Specific Energ	1.49	ft
Froude Numbe	3.09	
Maximum Disc	15.54	cfs
Discharge Full	14.44	cfs
Slope Full	0.001268	ft/ft
Flow Type	Supercritical	

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STORMWATER POND 1 OUTLET

Culverts 8.7-7

OUTLET PROTECTION - OUTLET VELOCITY ≤ 14 feet/sec

	OUTLET PIPE DIAMETER OR SPAN (in)									
DISCHARGE (cfs)	12	15	18	24	30	36	42	48	54	60
0-5	***10***	***10***		***USE***						
6	12	11								
7		13	***12***							
8		14	13	***12***		***MINIMUM***				
9			14	13						
10			15	13						
11			16	14				***LENGTH***		
12				14						
14				16	***14***					
16				17	15	***14***			***OUTLINED***	
18				18	16	15				
20					17	15	***14***			
22		***USE***			18	16	15			
24						17	15	***14***		
26						17	16	15		
28						18	16	15		
30						19	17	16		
35						20	18	17	***16***	
40			***PREFORMED***				20	18	17	***16***
45							21	19	18	16
50							22	20	18	17
55								21	19	18
60								22	20	19
65								24	21	20
70					***SCOUR***			25	22	20
75								26	23	21
80									24	22
90									26	24
100									28	25
110										27
125						***HOLE***				29
130										30

Table 8-6.1 - Length - L_a (feet)
Type A Riprap Apron

Notes: 1. Bold face outlined boxes indicate minimum L_a to be used for a given pipe diameter or span.
2. Rounding and interpolating are acceptable.

$W = 3(S_p) + 0.4(L_a)$
$= 3(1.25) + 0.4(10) = 7.75'$, USE 8'

8'W × 10'L INT. RIPRAP PAD

October 2000 ConnDOT Drainage Manual

8.0

DRAINAGE CALCULATIONS FOR CROSS CULVERT UNDER MAIN ACCESS DRIVE STATION 19+85

25-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

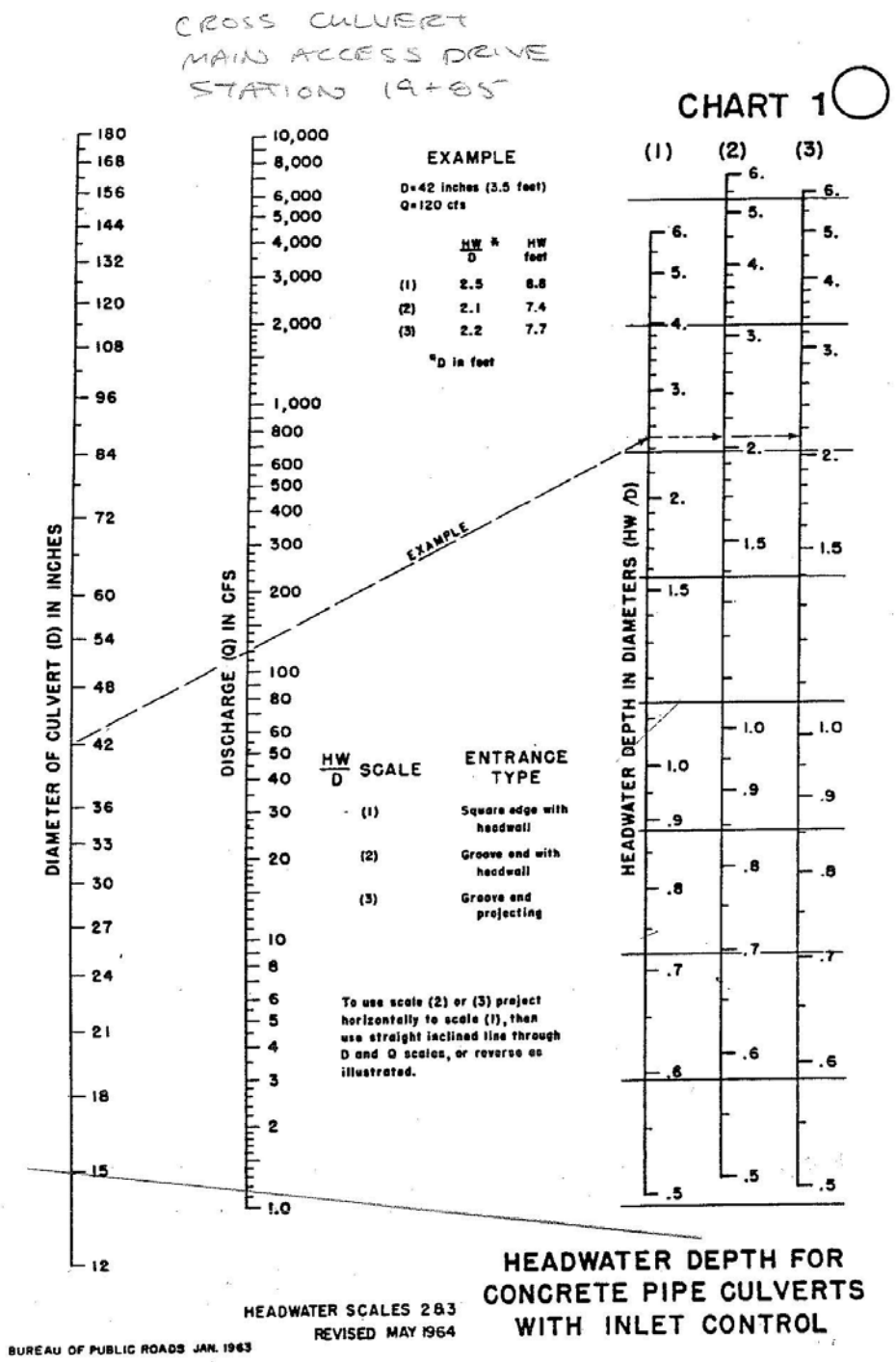
Total area contributing to swale: 1.24 ac.
Proposed Land Cover
Impervious = 0.05
Grass = 0.33 ac.
Wooded = 0.86 ac.

C = [(.9*.05)+(.3*.33)+(.2*.86)]/1.24 = 0.24
Time of Concentration = 20 minutes ∴ I = 3.6 in/hr

Q = C*I*A = .25 * 3.6 * 1.24 = 1.14 cfs

For 15” culvert - HW/D = <0.5

Use 5’ X 5’ modified riprap pad at outlet into swale


CROSS CULVERT
MAIN ACCESS DRIVE
STATION 19+85
CHART 1
EXAMPLE
D=42 inches (3.5 feet)
Q=120 cfs
HW/D * HW feet
(1) 2.5 8.8
(2) 2.1 7.4
(3) 2.2 7.7
*D in feet
DIAMETER OF CULVERT (D) IN INCHES
DISCHARGE (Q) IN CFS
HEADWATER DEPTH IN DIAMETERS (HW /D)
(1) (2) (3)
EXAMPLE
HW/D SCALE
ENTRANCE TYPE
(1) Square edge with headwall
(2) Groove end with headwall
(3) Groove end projecting
To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through D and Q scales, or reverse as illustrated.
HEADWATER SCALES 283
REVISED MAY 1964
BUREAU OF PUBLIC ROADS JAN. 1963
HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

181

DRAINAGE CALCULATIONS FOR PERMANENT CONVEYANCE SWALE #1 (PCS1) AND CROSS CULVERT UNDER MAIN ACCESS DRIVE AT STATION 15+25

25-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 0.30 ac.
Proposed Land Cover
Grass = 0.06 ac.
Impervious = 0.24 ac.

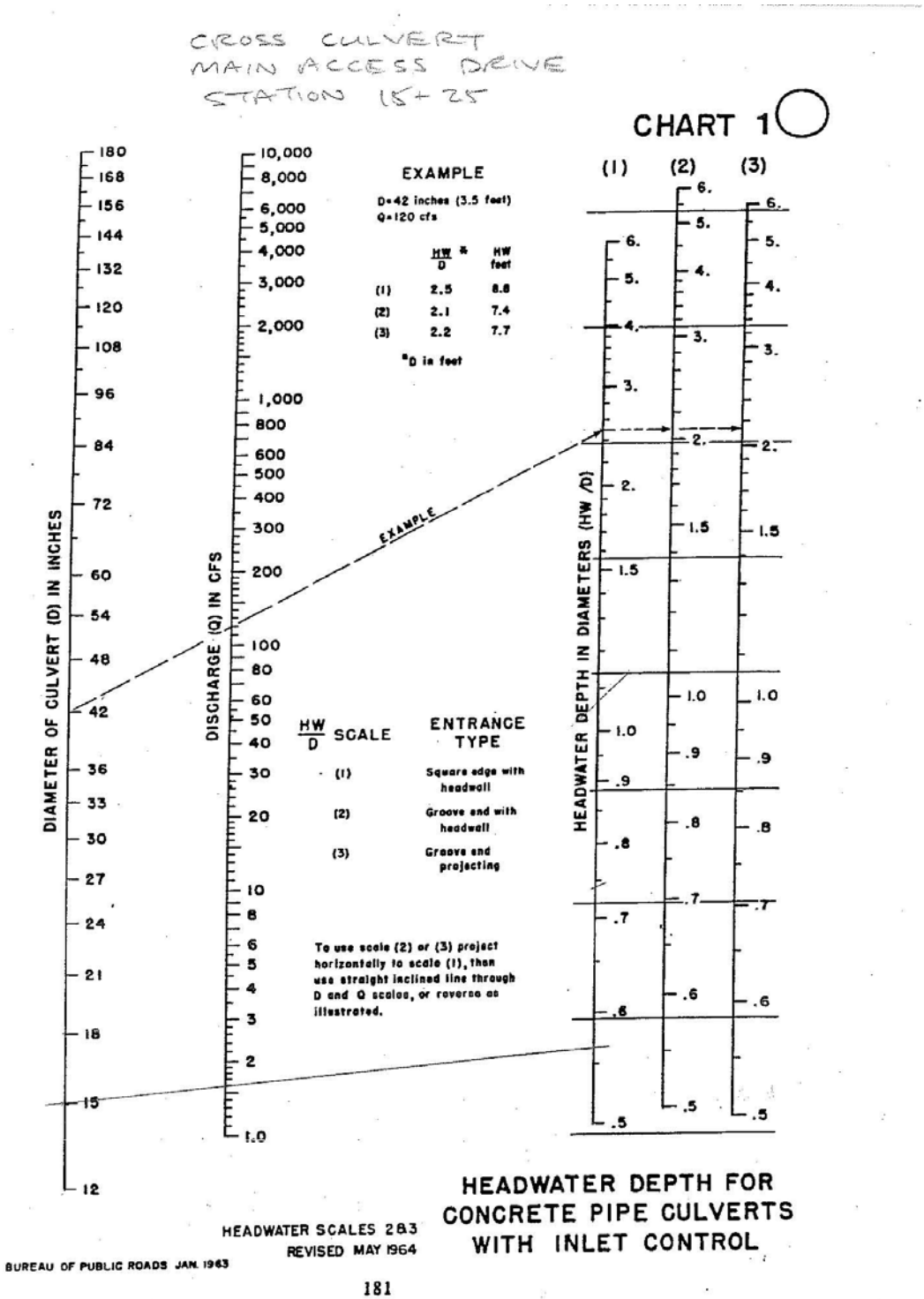
C = [(.3*.06)+(.9*.24)]/.30= 0.78
Time of Concentration = 5 minutes ∴ I = 6.7 in/hr

Q = C*I*A = .78 * 6.7 * 0.30 = 1.57 cfs

Velocity in riprap swale at max 5% slope = 2.73 fps

For 15” culvert - HW/D = 0.55

Use 5’ X 5’ modified riprap pad at outlet into swale


CROSS CULVERT
MAIN ACCESS DRIVE
STATION 15+25
CHART 1
EXAMPLE
D=42 inches (3.5 feet)
Q=120 cfs
HW/D * HW feet
(1) 2.5 8.8
(2) 2.1 7.4
(3) 2.2 7.7
*D in feet
DIAMETER OF CULVERT (D) IN INCHES
DISCHARGE (Q) IN CFS
HEADWATER DEPTH IN DIAMETERS (HW/D)
(1) (2) (3)
EXAMPLE
HW/D SCALE
ENTRANCE TYPE
(1) Square edge with headwall
(2) Groove end with headwall
(3) Groove end projecting
To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through D and Q scales, or reverse as illustrated.
HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL
HEADWATER SCALES 2&3
REVISED MAY 1964
BUREAU OF PUBLIC ROADS JAN. 1963
181

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PCS1
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.040	
Channel Slope	050000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	1.57	cfs

Results		
Depth	0.23	ft
Flow Area	0.6	ft²
Wetted Perim	3.04	ft
Top Width	2.93	ft
Critical Depth	0.25	ft
Critical Slope	0.041716	ft/ft
Velocity	2.73	ft/s ← MOD RIPRAP SWALE
Velocity Head	0.12	ft
Specific Energ	0.35	ft
Froude Numb	1.09	
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR PERMANENT CONVEYANCE SWALE #2 (PCS2)

25-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 4.53 ac.
Proposed Land Cover
Impervious = 0.68 ac.
Grass = 0.30 ac.
Wooded = 3.55 ac.

C = [(.9*.68)+(.3*.30)+(.2*3.55)]/4.53 = 0.31
Time of Concentration = 21 minutes ∴ I = 4.1 in/hr

Q = C*I*A = .31 * 4.1 * 4.53 = 5.76 cfs

Velocity in riprap-lined swale at max 15% slope = 5.98 fps

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PCS2
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.040	
Channel Slope	150000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	5.76	cfs

Results		
Depth	0.36	ft
Flow Area	1.0	ft²
Wetted Perim	3.59	ft
Top Width	3.42	ft
Critical Depth	0.53	ft
Critical Slope	0.034409	ft/ft
Velocity	5.98	ft/s ← USE MOD. RIPRAP
Velocity Head	0.56	ft
Specific Energ	0.91	ft
Froude Numb	1.99	
Flow Type	Supercritical	

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DRAINAGE CALCULATIONS FOR PERMANENT CONVEYANCE SWALE #3 (PCS3)

25-YEAR DESIGN STORM
3-18-11

Rational Method:
Q = CIA
Where:
Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = area (ac.)

Total area contributing to swale: 2.02 ac.
Proposed Land Cover
Impervious = 0.25 ac.
Grass = 1.21 ac.
Wooded = 0.56 ac.

C = [(.9*.25)+(.3*1.21)+(.2*.56)]/2.02 = 0.70
Time of Concentration = 25 minutes ∴ I = 3.2 in/hr

Q = C*I*A = .70 * 3.2 * 2.02 = 4.52 cfs

Velocity in riprap-lined swale at max 5.5% slope = 3.91 fps

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PCS3
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.040	
Channel Slope	055000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	2.00	ft
Discharge	4.52	cfs

Results		
Depth	0.41	ft
Flow Area	1.2	ft²
Wetted Perim	3.83	ft
Top Width	3.64	ft
Critical Depth	0.46	ft
Critical Slope	0.035635	ft/ft
Velocity	3.91	ft/s ← USE MOD. RIPRAP SWALE
Velocity Head	0.24	ft
Specific Energ	0.65	ft
Froude Numb	1.22	
Flow Type	Supercritical	

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STORMWATER POND 2 OUTLET PROTECTION

Worksheet
Worksheet for Circular Channel

Project Description	
Worksheet	Pond 2 outlet
Flow Element	Circular Chann
Method	Manning's For
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.013	
Channel Slope	066700	ft/ft
Diameter	15.0	in
Discharge	1.13	cfs

Results		
Depth	0.22	ft
Flow Area	0.1	ft²
Wetted Perime	1.08	ft
Top Width	0.00	ft
Critical Depth	0.42	ft
Percent Full	17.6	%
Critical Slope	0.005230	ft/ft
Velocity	7.75	ft/s ← USE MOD. RIPRAP PAD
Velocity Head	0.93	ft
Specific Energ	1.15	ft
Froude Numbe	3.49	
Maximum Disc	17.95	cfs
Discharge Full	16.68	cfs
Slope Full	0.000306	ft/ft
Flow Type	Supercritical	

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STORMWATER POND 2
OUTLET

Culverts 8.7-7

OUTLET PROTECTION - OUTLET VELOCITY ≤ 14 feet/sec

DISCHARGE (cfs)	OUTLET PIPE DIAMETER OR SPAN (in)									
	12	15	18	24	30	36	42	48	54	60
0-5	***10***	***10***		***USE***						
6	12	11								
7		13	***12***							
8		14	13	***12***		***MINIMUM***				
9			14	13						
10			15	13						
11			16	14				***LENGTH***		
12				14						
14				16	***14***					
16				17	15	***14***			***OUTLINED***	
18				18	16	15				
20					17	15	***14***			
22		***USE***			18	16	15			
24						17	15	***14***		
26						17	16	15		
28						18	16	15		
30						19	17	16		
35						20	18	17	***16***	
40			***PREFORMED***				20	18	17	***16***
45							21	19	18	16
50							22	20	18	17
55								21	19	18
60								22	20	19
65								24	21	20
70					***SCOUR***			25	22	20
75								26	23	21
80									24	22
90									26	24
100									28	25
110										27
125							***HOLE***			29
130										30

Table 8-6.1 - Length - L_a (feet)
Type A Riprap Apron

Notes: 1. Bold face outlined boxes indicate minimum L_a to be used for a given pipe diameter or span.
2. Rounding and interpolating are acceptable.

$W_a = 3(S_o) + 0.4\,L_a$
$= 3(1.25) + 0.4\,(10) = 7.75'$, USE 8'

8'W × 10'L MOD. RIPRAP PAD

October 2000 ConnDOT Drainage Manual

TEMPORARY SEDIMENT TRAP SIZING
PER 2002 CT DEP E&S MANUAL
3-18-11

8.1.1.1

TST 1 (MAIN ACCESS DRIVE - STATION 20+00 – TURBINE 3 LOCATION):

Initial Storage Volume = 134 cubic yards per acre of drainage area
V = 134 cubic yards x 0.85 acres = 114 cubic yards
Half of Storage Volume will be wet and half dry = 114 / 2 = 57 cubic yards = 1,539 cubic feet

Vwet = 0.85 x Awet x Dwet
If trap is 2.0' deep: 1,539 cubic feet = 0.85 x Awet x 2.0'
Awet required = 905 square feet
Use dimension of 20' x 46' for Wet Surface Area = Awet = 920 square feet

Vdry = (Awet + Adry)/2 x Ddry
If dry area is 1.5' high, Adry = 26' x 52' = 1,352 sf
Vdry = (920 + 1,352)/2 x 1.5' = 1,704 cubic feet
Use dimension of 26' x 52' for Dry Surface Area

TST 2 (TURBINE 2 LOCATION):

Initial Storage Volume = 134 cubic yards per acre of drainage area
V = 134 cubic yards x 0.89 acres = 119 cubic yards
Half of Storage Volume will be wet and half dry = 119 / 2 = 59.5 cubic yards = 1,606 cubic feet

Vwet = 0.85 x Awet x Dwet
If trap is 2.0' deep: 1,606 cubic feet = 0.85 x Awet x 2.0'
Awet required = 945 square feet
Use dimension of 20' x 50' for Wet Surface Area = Awet = 1,000 square feet

Vdry = (Awet + Adry)/2 x Ddry
If dry area is 1.5' high, Adry = 26' x 56' = 1,456 sf
Vdry = (1,000 + 1,456)/2 x 1.5' = 1,842 cubic feet
Use dimension of 26' x 56' for Dry Surface Area

TST 3 (MAIN ACCESS DRIVE - STATION 10+50 – STORNWATER POND 1 LOCATION):

Initial Storage Volume = 134 cubic yards per acre of drainage area
V = 134 cubic yards x 3.60 acres = 482 cubic yards
Half of Storage Volume will be wet and half dry = 482/2 = 241 cubic yards = 6,507 cubic feet

Vwet = 0.85 x Awet x Dwet
If trap is 3.0' deep: 6,507 cubic feet = 0.85 x Awet x 3.0'
Awet required = 2,552 square feet
Use dimension of 38' x 98' for Wet Surface Area = Awet = 3,724 square feet

Vdry = (Awet + Adry)/2 x Ddry
If dry area is 3.0' high, Adry = 56' x 116' = 6,496 sf
Vdry = (3,724 + 6,496)/2 x 3.0' = 15,330 cubic feet
Use dimension of 56' x 116' for Dry Surface Area

*Note – TST3 is significantly oversized because area will be rough graded to be used as Stormwater Pond post-construction.

TST 4 (MAIN ACCESS DRIVE - STATION 6+50 – STORNWATER POND 2 LOCATION):

Initial Storage Volume = 134 cubic yards per acre of drainage area
V = 134 cubic yards x 1.62 acres = 217 cubic yards
Half of Storage Volume will be wet and half dry = 217/2 = 108.5 cubic yards = 2,930 cubic feet

Vwet = 0.85 x Awet x Dwet
If trap is 3.0' deep: 2,930 cubic feet = 0.85 x Awet x 3.0'
Awet required = 1,149 square feet
Use dimension of 24' x 86' for Wet Surface Area = Awet = 2,064 square feet

Vdry = (Awet + Adry)/2 x Ddry
If dry area is 2.5' high, Adry = 39' x 101' = 3,939 sf
Vdry = (2,064 + 3,939)/2 x 2.5' = 7,504 cubic feet
Use dimension of 39' x 101' for Dry Surface Area

*Note – TST4 is significantly oversized because area will be rough graded to be used as Stormwater Pond post-construction.

TST 5 (STATION 60+80):

Initial Storage Volume = 134 cubic yards per acre of drainage area
V = 134 cubic yards x 0.25 acres = 34 cubic yards
Half of Storage Volume will be wet and half dry = 34 / 2 = 17 cubic yards = 459 cubic feet

Vwet = 0.85 x Awet x Dwet
If trap is 2.0' deep: 459 cubic feet = 0.85 x Awet x 2.0'
Awet required = 270square feet
Use dimension of 12' x 24' for Wet Surface Area = Awet = 288 square feet

Vdry = (Awet + Adry)/2 x Ddry
If dry area is 1.5' high, Adry = 18' x 30' = 540 sf
Vdry = (540 + 288)/2 x 1.5' = 621 cubic feet
Use dimension of 18' x 30' for Dry Surface Area

TST 6 (STATION 64+30):

Initial Storage Volume = 134 cubic yards per acre of drainage area
V = 134 cubic yards x 0.25 acres = 34 cubic yards
Half of Storage Volume will be wet and half dry = 34 / 2 = 17 cubic yards = 459 cubic feet

Vwet = 0.85 x Awet x Dwet
If trap is 2.0' deep: 459 cubic feet = 0.85 x Awet x 2.0'
Awet required = 270square feet
Use dimension of 12' x 24' for Wet Surface Area = Awet = 288 square feet

Vdry = (Awet + Adry)/2 x Ddry
If dry area is 1.5' high, Adry = 18' x 30' = 540 sf
Vdry = (540 + 288)/2 x 1.5' = 621 cubic feet
Use dimension of 18' x 30' for Dry Surface Area

TST 7 (STATION 77+00):

Initial Storage Volume = 134 cubic yards per acre of drainage area
V = 134 cubic yards x 1.85 acres = 248 cubic yards
Half of Storage Volume will be wet and half dry = 248 / 2 = 124 cubic yards = 3,346 cubic feet

Vwet = 0.85 x Awet x Dwet
If trap is 3.0' deep: 3,346 cubic feet = 0.85 x Awet x 3.0'
Awet required = 1,312 square feet
Use dimension of 20' x 66' for Wet Surface Area = Awet = 1,320 square feet

Vdry = (Awet + Adry)/2 x Ddry
If dry area is 2.25' high, Adry = 26' x 72' = 1,872 sf
Vdry = (1,872 + 1,320)/2 x 2.25' = 3,591 cubic feet
Use dimension of 26' x 72' for Dry Surface Area

TST 8 (STATION 28+40):

Initial Storage Volume = 134 cubic yards per acre of drainage area
V = 134 cubic yards x 1.75 acres = 235 cubic yards
Half of Storage Volume will be wet and half dry = 235 / 2 = 117.5 cubic yards = 3,165 cubic feet

Vwet = 0.85 x Awet x Dwet
If trap is 3.0' deep: 3,165 cubic feet = 0.85 x Awet x 3.0'
Awet required = 1,241 square feet
Use dimension of 20' x 64' for Wet Surface Area = Awet = 1,280 square feet

Vdry = (Awet + Adry)/2 x Ddry
If dry area is 2.25' high, Adry = 26' x 70' = 1,820 sf
Vdry = (1,820 + 1,280)/2 x 2.25' = 3,488 cubic feet
Use dimension of 26' x 70' for Dry Surface Area

PRE-DEVELOPMENT DRAINAGE CALCULATIONS

Table of Contents

********** MASTER SUMMARY **********

S/N: A215014070C4 Curtis Jones & Associates

PondPack Ver. 8.0068 Time: 1:39 PM Date: 3/21/2011

Table of Contents (continued)

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Litchfield Co.
2 YR 3.2000 Synthetic Curve TypeIII 24hr
10 YR 4.7000 Synthetic Curve TypeIII 24hr
25 YR 5.5000 Synthetic Curve TypeIII 24hr
50 YR 6.2000 Synthetic Curve TypeIII 24hr

100 YR 7.0000 Synthetic Curve TypeIII 24hr

MASTER NETWORK
SUMMARY
SCS Unit
Hydrograph
Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt;
LR=Left&Rt)
Max
Return HYG Vol Qpeak Qpeak Max WSEL Pond Storage
Node ID Type Event ac-ft Trun hrs cfs ft ac-ft
*DP 3 JCT 2 3.609 12.7500 13.90
*DP 3 JCT 10 10.659 12.6000 58.60
*DP 3 JCT 25 15.377 12.5500 91.00
*DP 3 JCT 50 19.915 12.5500 122.23
*DP 3 JCT 100 25.485 12.5500 160.36

EXDA 3 AREA 2 3.609 12.7500 13.90
EXDA 3 AREA 10 10.659 12.6000 58.60
EXDA 3 AREA 25 15.377 12.5500 91.00
EXDA 3 AREA 50 19.915 12.5500 122.23
EXDA 3 AREA 100 25.485 12.5500 160.36

NETWORK RUNOFF NODE SEQUENCE

==========
Runoff Data Apply to Node Receiving Link
==========
SCS UH EXDA 3 Subarea EXDA 3 Add Hyd EXDA 3

NETWORK ROUTING SEQUENCE

==========

```
=============
Link Operation UPstream Node DNstream Node
=============================================================
=============
Add Hyd TO DP 3 Subarea EXDA 3 Jct DP 3

     File.... C:\Program
     Files\Haestad\PPKW\PPW\
     Title... Project Date: 4/16/2009
     Project Engineer: Curtis Jones
     Project Title: Watershed
     Project Comments:


DESIGN STORMS SUMMARY


 Design Storm File,ID = Litchfield Co.



 Storm Tag Name = 2 YR
 Data Type, File, ID = Synthetic Storm TypeIII 24hr
 Storm Frequency = 2 yr
 Total Rainfall Depth= 3.2000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs



 Storm Tag Name = 10 YR
 Data Type, File, ID = Synthetic Storm TypeIII 24hr
 Storm Frequency = 10 yr
 Total Rainfall Depth= 4.7000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs



 Storm Tag Name = 25 YR
 Data Type, File, ID = Synthetic Storm TypeIII 24hr
 Storm Frequency = 25 yr
 Total Rainfall Depth= 5.5000 in
 Duration Multiplier = 1
 Resulting Duration = 24.0000 hrs
 Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs
```

```
Storm Tag Name = 50 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 6.2000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs


Storm Tag Name = 100 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.0000 in


Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs
```

Type.... Design Storms Name.... Litchfield Co. File.... C:\Program Files\Haestad\PPKW\PPW\ Storm... TypeIII 24hr Tag: 2 YR Page 3.02 Event: 2 yr

DESIGN STORMS SUMMARY

```
Design Storm File,ID = Litchfield Co.


Storm Tag Name = 2 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.2000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs


Storm Tag Name = 10 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.7000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs
```

```
Storm Tag Name = 25 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs


Storm Tag Name = 50 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 6.2000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs




Storm Tag Name = 100 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs


File.... C:\Program Files\Haestad\PPKW\PPW\3093 EXDA 3.BAK.PPW


 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
 ::::::::
 TIME OF CONCENTRATION CALCULATOR
 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
 ::::::::




 Segment #1: Tc: TR-55 Sheet


 Mannings n .4000
 Hydraulic Length 260.00 ft
 2yr, 24hr P 3.2000 in
```

Slope .060000 ft/ft

Avg.Velocity .15 ft/sec

Segment #1 Time: .4953 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length 1860.00 ft
Slope .065000 ft/ft
Unpaved

Avg.Velocity 4.11 ft/sec

Segment #2 Time: .1256 hrs

Segment #3: Tc: TR-55 Channel

Flow Area 2.5000 sq.ft
Wetted Perimeter 5.50 ft
Hydraulic Radius .45 ft
Slope .057000 ft/ft
Mannings n .0400
Hydraulic Length 1950.00 ft

Avg.Velocity 5.26 ft/sec

Segment #3 Time: .1030 hrs

==========
Total Tc: .7240 hrs
==========

File.... C:\Program Files\Haestad\PPKW\PPW\3093 EXDA 3.BAK.PPW

Tc Equations used...
==== SCS TR-55 Sheet Flow

```
 ============================================
 Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))
 Where:   Tc = Time of concentration, hrs
 n = Mannings n
 Lf = Flow length, ft
 P = 2yr, 24hr Rain depth, inches
 Sf = Slope, %



 ==== SCS TR-55 Shallow Concentrated Flow
 ================================


     Unpaved surface:
     V = 16.1345 * (Sf**0.5)


     Paved surface:
     V = 20.3282 * (Sf**0.5)


     Tc = (Lf / V) / (3600sec/hr)


     Where:     V = Velocity, ft/sec
           Sf = Slope, ft/ft
           Tc = Time of concentration, hrs
           Lf = Flow length, ft

Type.... Tc Calcs Page 4.03
Name.... EXDA 3
File.... C:\Program Files\Haestad\PPKW\PPW\3093
EXDA 3.BAK.PPW
==== SCS Channel Flow
========================================

R =Aq/Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n


Tc = (Lf / V) / (3600sec/hr)


Where: R = Hydraulic radius

       Aq = Flow area, sq.ft.
```

Wp = Wetted perimeter, ft

V = Velocity, ft/sec

Sf = Slope, ft/ft

n = Mannings n

Tc = Time of concentration, hrs

Lf = Flow length, ft

File.... C:\Program Files\Haestad\PPKW\PPW\3093 EXDA 3.BAK.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Adjusted %UC	CN
Soil Type B -Wooded	55	109.590	55.00		
Soil Type B -Grass/Meadow	58	.200	58.00		
Soil Type D -Wooded	77	16.910	77.00		
Impervious	98	.200	98.00		

COMPOSITE AREA & WEIGHTED CN ---> 126.900 58.00 (58)
::
::::::::::::

SCS UNIT HYDROGRAPH METHOD
(Computational Notes)

DEFINITION OF TERMS: ----------

At = Total area (acres): At = Ai+Ap
Ai = Impervious area (acres)
Ap = Pervious area (acres)

```
CNi = Runoff curve number for impervious area
CNp = Runoff curve number for pervious area
fLoss = f loss constant infiltration (depth/time)
gKs = Saturated Hydraulic Conductivity (depth/time)
Md = Volumetric Moisture Deficit
Psi = Capillary Suction (length)
hK = Horton Infiltration Decay Rate (time^-1)
fo = Initial Infiltration Rate (depth/time)
fc = Ultimate(capacity)Infiltration Rate (depth/time)
Ia = Initial Abstraction (length)
dt = Computational increment (duration of unit excess rainfall)

   Default dt is smallest value of 0.1333Tc, rtm,
   and th
   (Smallest dt is then adjusted to match up with
   Tp)
   UDdt = User specified override computational
   main time increment
   (only used if UDdt is => .1333Tc)
   D(t) = Point on distribution curve (fraction of
   P) for time step t


K   = 2 / (1 + (Tr/Tp)): default K = 0.75: (for Tr/Tp = 1.67)

Ks  = Hydrograph shape factor
    = Unit Conversions * K:
    = ((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K

      Default Ks = 645.333 * 0.75 = 484
```

Lag = Lag time from center of excess runoff (dt) to Tp: Lag = 0.6Tc
P = Total precipitation depth, inches
Pa(t) = Accumulated rainfall at time step t
Pi(t) = Incremental rainfall at time step t
qp = Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi.

= (Ks * A * Q) / Tp (where Q = 1in. runoff, A=sq.mi.)
Qu(t) = Unit hydrograph ordinate (cfs) at time step t
Q(t) = Final hydrograph ordinate (cfs) at time step t
Rai(t)= Accumulated runoff (inches) at time step t for impervious area
Rap(t)= Accumulated runoff (inches) at time step t for pervious area
Rii(t)= Incremental runoff (inches) at time step t for impervious area
Rip(t)= Incremental runoff (inches) at time step t for pervious area
R(t) = Incremental weighted total runoff (inches)

Rtm = Time increment for rainfall table
Si = S for impervious area: Si = (1000/CNi) -10
Sp = S for pervious area: Sp = (1000/CNp) -10
t = Time step (row) number
Tc = Time of concentration
Tb = Time (hrs) of entire unit hydrograph: Tb = Tp + Tr
Tp = Time (hrs) to peak of a unit hydrograph: Tp = (dt/2) + Lag
Tr = Time (hrs) of receding limb of unit hydrograph: Tr = ratio of Tp

SCS UNIT HYDROGRAPH METHOD
(Computational Notes)

PRECIPITATION: ----------
---------Column (1): Time for time step t
Column (2): D(t) = Point on distribution curve for time step t
Column (3): Pi(t) = Pa(t) -Pa(t-1): Col.(4) -Preceding Col.(4)
Column (4): Pa(t) = D(t) x P: Col.(2) x P

PERVIOUS AREA RUNOFF (using SCS Runoff CN Method) ----------

Column (5): Rap(t) = Accumulated pervious runoff for time step t

If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0

If (Pa(t) is > 0.2Sp) then use:

Rap(t) = (Col.(4)-0.2Sp)**2 / (Col.(4)+0.8Sp)

Column (6): Rip(t) = Incremental pervious runoff for time step t

Rip(t) = Rap(t) -Rap(t-1)

Rip(t) = Col.(5) for current row -Col.(5) for preceding row.

IMPERVIOUS AREA RUNOFF ----------
---------Column (7 & 8)... Did not specify to use impervious areas.

INCREMENTAL WEIGHTED RUNOFF: ----------

---------Column (9): R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t)

R(t) = (Ap/At) x Col.(6) + (Ai/At) x Col.(8)

SCS UNIT HYDROGRAPH METHOD: ----------
---------Column (10): Q(t) is computed with the SCS unit hydrograph method

using R() and Qu().

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 24.0000 hrs Rain Depth = 3.2000 in
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
Rain File -ID = -TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
HYGFile -ID = -EXDA32YR
Tc = .7240 hrs
Drainage Area = 126.900 acres Runoff CN= 58
==========

Computational Time Increment = .09653 hrs
Computed Peak Time = 12.7416 hrs
Computed Peak Flow = 13.94 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.7500 hrs
Peak Flow, Interpolated Output = 13.90 cfs
==========

DRAINAGE AREA

ID:EXDA 3
CN = 58
Area = 126.900 acres
S = 7.2414 in
0.2S = 1.4483 in

Cumulative Runoff= .3412 in

```
            3.608 ac-ft


HYG Volume... 3.609 ac-ft (area under HYG curve)


***** SCS UNIT HYDROGRAPH PARAMETERS *****


Time Concentration, Tc = .72395 hrs (ID: EXDA
3)
Computational Incr, Tm = .09653 hrs = 0.20000
Tp


Unit Hyd. Shape Factor = 483.432 (37.46% under rising
limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K =
.7491)


Unit peak, qp = 198.61 cfs
Unit peak time Tp = .48264 hrs
Unit receding limb, Tr = 1.93054 hrs
Total unit time, Tb = 2.41318 hrs

SCS UNIT HYDROGRAPH METHOD


STORM EVENT: 10 year storm
Duration = 24.0000 hrs Rain Depth = 4.7000 in
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
Rain File -ID = -TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
HYGFile -ID = -EXDA310YR
Tc = .7240 hrs
Drainage Area = 126.900 acres Runoff CN= 58
==================================

Computational Time Increment = .09653 hrs
Computed Peak Time = 12.6451 hrs
Computed Peak Flow = 58.72 cfs


Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.6000
```

```
hrs
Peak Flow, Interpolated Output = 58.60 cfs
==================================

                DRAINAGE AREA


           ID:EXDA 3
           CN = 58
           Area = 126.900 acres
           S = 7.2414 in
           0.2S = 1.4483 in


            Cumulative Runoff


                 1.0077 in

                 10.656 ac-ft


HYG Volume... 10.659 ac-ft (area under HYG curve)


***** SCS UNIT HYDROGRAPH PARAMETERS *****


Time Concentration, Tc = .72395 hrs (ID: EXDA
3)
Computational Incr, Tm = .09653 hrs = 0.20000
Tp


Unit Hyd. Shape Factor = 483.432 (37.46% under rising
limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K =
.7491)


Unit peak, qp = 198.61 cfs
Unit peak time Tp = .48264 hrs
Unit receding limb, Tr = 1.93054 hrs
Total unit time, Tb = 2.41318 hrs

SCS UNIT HYDROGRAPH METHOD
```

```
STORM EVENT: 25 year storm
Duration = 24.0000 hrs Rain Depth = 5.5000 in
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
Rain File -ID = -TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
HYGFile -ID = -EXDA325YR
Tc = .7240 hrs
Drainage Area = 126.900 acres Runoff CN= 58


==================================Computat
ional Time Increment = .09653 hrs
Computed Peak Time = 12.5485 hrs
Computed Peak Flow = 91.03 cfs


Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.5500
hrs
Peak Flow, Interpolated Output = 91.00 cfs
==================================

                DRAINAGE AREA


          ID:EXDA 3
          CN = 58
          Area = 126.900 acres
          S = 7.2414 in
          0.2S = 1.4483 in


           Cumulative Runoff


                1.4537 in

                15.373 ac-ft


HYG Volume... 15.377 ac-ft (area under HYG curve)


***** SCS UNIT HYDROGRAPH PARAMETERS *****


Time Concentration, Tc = .72395 hrs (ID: EXDA
```

```
3)
Computational Incr, Tm = .09653 hrs = 0.20000
Tp


Unit Hyd. Shape Factor = 483.432 (37.46% under rising
limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K =
.7491)


Unit peak, qp = 198.61 cfs
Unit peak time Tp = .48264 hrs
Unit receding limb, Tr = 1.93054 hrs
Total unit time, Tb = 2.41318 hrs

SCS UNIT HYDROGRAPH METHOD


STORM EVENT: 50 year storm
Duration = 24.0000 hrs Rain Depth = 6.2000 in
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
Rain File -ID = -TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
HYGFile -ID = -EXDA350YR
Tc = .7240 hrs
Drainage Area = 126.900 acres Runoff CN= 58


==================================Computat
ional Time Increment = .09653 hrs
Computed Peak Time = 12.5485 hrs
Computed Peak Flow = 122.29 cfs


Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.5500
hrs
Peak Flow, Interpolated Output = 122.23 cfs
==================================

                DRAINAGE AREA


          ID:EXDA 3
          CN = 58
```

```
Area = 126.900 acres
S = 7.2414 in
0.2S = 1.4483 in


 Cumulative Runoff


      1.8827 in

      19.909 ac-ft

HYG Volume... 19.915 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****


Time Concentration, Tc = .72395 hrs (ID: EXDA
3)
Computational Incr, Tm = .09653 hrs = 0.20000
Tp


Unit Hyd. Shape Factor = 483.432 (37.46% under rising
limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K =
.7491)


Unit peak, qp = 198.61 cfs
Unit peak time Tp = .48264 hrs
Unit receding limb, Tr = 1.93054 hrs
Total unit time, Tb = 2.41318 hrs

SCS UNIT HYDROGRAPH METHOD


STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 7.0000 in
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
Rain File -ID = -TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
HYGFile -ID = -EXDA3100YR
Tc = .7240 hrs
```

```
Drainage Area = 126.900 acres Runoff CN= 58


==================================Computat
ional Time Increment = .09653 hrs
Computed Peak Time = 12.5485 hrs
Computed Peak Flow = 160.45 cfs


Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.5500
hrs
Peak Flow, Interpolated Output = 160.36 cfs
==================================

                DRAINAGE AREA


          ID:EXDA 3
          CN = 58
          Area = 126.900 acres
          S = 7.2414 in
          0.2S = 1.4483 in


           Cumulative Runoff


                2.4092 in

                25.478 ac-ft


HYG Volume... 25.485 ac-ft (area under HYG curve)


***** SCS UNIT HYDROGRAPH PARAMETERS *****


Time Concentration, Tc = .72395 hrs (ID: EXDA
3)
Computational Incr, Tm = .09653 hrs = 0.20000
Tp


Unit Hyd. Shape Factor = 483.432 (37.46% under rising
limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K =
```

```
          .7491)


          Unit peak, qp = 198.61 cfs
          Unit peak time Tp = .48264 hrs
          Unit receding limb, Tr = 1.93054 hrs
          Total unit time, Tb = 2.41318 hrs

              SUMMARY FOR HYDROGRAPH ADDITION
              at Node: DP 3


HYG Directory: C:\Program Files\Haestad\PPKW\PPW\


============================================================Upstrea
m Link ID Upstream Node ID HYG file HYG ID HYG tag


TODP3 EXDA3 EXDA3 2YR
============================================================


INFLOWS TO: DP 3
---------------------------------------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs


          EXDA 3 2 YR 3.609 12.7500 13.90



TOTAL FLOW INTO: DP 3
---------------------------------------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs


          DP 3 2 YR 3.609 12.7500 13.90

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYGTag =2YR


Peak Discharge = 13.90 cfs
Time to Peak = 12.7500 hrs
```

HYG Volume = 3.609 ac-ft

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .0500 hrs

hrs | Time on left represents time for first value in each row.

11.8500	.00	.00	.01	.11	.26
12.1000	.66	1.17	2.11	3.19	4.66
12.3500	6.21	7.82	9.44	10.77	12.07
12.6000	12.86	13.60	13.79	13.90	13.62
12.8500	13.29	12.79	12.28	11.73	11.20
13.1000	10.68	10.19	9.74	9.33	8.96
13.3500	8.62	8.30	8.03	7.77	7.55
13.6000	7.34	7.16	6.99	6.85	6.71
13.8500	6.59	6.47	6.36	6.25	6.14
14.1000	6.04	5.95	5.85	5.76	5.67
14.3500	5.58	5.50	5.42	5.35	5.28
14.6000	5.22	5.16	5.11	5.05	5.00
14.8500	4.96	4.91	4.86	4.81	4.77
15.1000	4.72	4.68	4.63	4.58	4.54
15.3500	4.49	4.44	4.39	4.34	4.29
15.6000	4.24	4.19	4.14	4.09	4.03
15.8500	3.98	3.93	3.87	3.82	3.76
16.1000	3.70	3.65	3.59	3.54	3.49
16.3500	3.44	3.39	3.34	3.30	3.26
16.6000	3.22	3.18	3.15	3.11	3.08
16.8500	3.05	3.02	2.99	2.96	2.93
17.1000	2.90	2.88	2.85	2.82	2.79
17.3500	2.77	2.74	2.71	2.69	2.66
17.6000	2.63	2.60	2.58	2.55	2.52
17.8500	2.49	2.46	2.44	2.41	2.38
18.1000	2.35	2.32	2.30	2.27	2.24
18.3500	2.22	2.20	2.18	2.16	2.14
18.6000	2.12	2.11	2.09	2.08	2.07
18.8500	2.06	2.05	2.04	2.03	2.02
19.1000	2.01	2.00	1.99	1.98	1.97
19.3500	1.97	1.96	1.95	1.94	1.93

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .0500 hrs

hrs | Time on left represents time for first value in each row.

19.6000	1.92	1.92	1.91	1.90	1.89
19.8500	1.88	1.88	1.87	1.86	1.85
20.1000	1.84	1.83	1.83	1.82	1.81
20.3500	1.80	1.79	1.79	1.78	1.77
20.6000	1.77	1.76	1.75	1.75	1.74
20.8500	1.73	1.73	1.72	1.71	1.71
21.1000	1.70	1.69	1.69	1.68	1.68
21.3500	1.67	1.66	1.66	1.65	1.64

21.6000 |	1.64	1.63	1.62	1.62	1.61
21.8500 |	1.60	1.60	1.59	1.58	1.58
22.1000 |	1.57	1.57	1.56	1.55	1.55
22.3500 |	1.54	1.53	1.52	1.52	1.51
22.6000 |	1.50	1.50	1.49	1.48	1.48
22.8500 |	1.47	1.46	1.46	1.45	1.44
23.1000 |	1.44	1.43	1.42	1.41	1.41
23.3500 |	1.40	1.39	1.39	1.38	1.37
23.6000 |	1.37	1.36	1.35	1.34	1.34
23.8500 |	1.33	1.32	1.31	1.30	1.29
24.1000 |	1.26	1.23	1.18	1.12	1.04
24.3500 |	.96	.86	.76	.67	.58
24.6000 |	.49	.42	.35	.30	.25
24.8500 |	.21	.17	.15	.12	.11
25.1000 |	.09	.08	.06	.05	.04
25.3500 |	.04	.03	.03	.02	.02
25.6000 |	.02	.01	.01	.01	.01
25.8500 |	.01	.00	.00	.00	.00
26.1000 |	.00	.00			

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

==========Upstrea
m Link ID Upstream Node ID HYG file HYG ID HYG tag

TODP3 EXDA3 EXDA3 10YR
==========

INFLOWS TO: DP 3
----------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

EXDA 3 10 YR 10.659 12.6000 58.60

TOTAL FLOW INTO: DP 3
----------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

DP 3 10 YR 10.659 12.6000 58.60

TOTAL NODE INFLOW...

HYG file =
HYGID =DP3
HYGTag =10YR

Peak Discharge = 58.60 cfs
Time to Peak = 12.6000 hrs
HYG Volume = 10.659 ac-ft

HYDROGRAPH ORDINATES (cfs)
Time | Output Time increment = .0500 hrs
hrs | Time on left represents time for first value in each row.

11.5500	.00	.01	.03	.09	.21
11.8000	.47	.89	1.73	2.93	5.10
12.0500	7.88	12.08	16.96	23.11	29.69
12.3000	36.33	42.98	48.18	53.20	55.92
12.5500	58.47	58.60	58.53	56.61	54.53
12.8000	51.60	48.65	45.59	42.61	39.80
13.0500	37.14	34.72	32.50	30.51	28.73
13.3000	27.13	25.70	24.41	23.28	22.25
13.5500	21.37	20.55	19.85	19.20	18.64
13.8000	18.11	17.65	17.20	16.80	16.41
14.0500	16.05	15.70	15.37	15.04	14.73
14.3000	14.43	14.16	13.89	13.65	13.43
14.5500	13.22	13.03	12.85	12.68	12.52
14.8000	12.36	12.22	12.07	11.93	11.79
15.0500	11.66	11.52	11.39	11.25	11.12
15.3000	10.98	10.85	10.72	10.58	10.45
15.5500	10.31	10.17	10.04	9.90	9.76
15.8000	9.62	9.48	9.34	9.20	9.05
16.0500	8.91	8.77	8.63	8.49	8.35
16.3000	8.21	8.09	7.96	7.85	7.74
16.5500	7.63	7.53	7.44	7.35	7.27
16.8000	7.19	7.11	7.03	6.96	6.88
17.0500	6.81	6.74	6.67	6.60	6.53
17.3000	6.47	6.40	6.33	6.26	6.20
17.5500	6.13	6.06	5.99	5.93	5.86
17.8000	5.79	5.72	5.66	5.59	5.52
18.0500	5.45	5.38	5.32	5.25	5.19
18.3000	5.13	5.07	5.01	4.96	4.92
18.5500	4.87	4.83	4.80	4.76	4.73
18.8000	4.70	4.67	4.65	4.62	4.60
19.0500	4.57	4.55	4.53	4.51	4.48

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .0500 hrs

hrs | Time on left represents time for first value in each row.

19.3000	4.46	4.44	4.42	4.40	4.38

19.5500 |	4.36	4.34	4.32	4.30	4.28
19.8000 |	4.26	4.24	4.22	4.20	4.18
20.0500 |	4.16	4.14	4.12	4.10	4.08
20.3000 |	4.06	4.04	4.02	4.00	3.99
20.5500 |	3.97	3.95	3.94	3.92	3.90
20.8000 |	3.89	3.87	3.85	3.84	3.82
21.0500 |	3.81	3.79	3.78	3.76	3.75
21.3000 |	3.73	3.72	3.70	3.68	3.67
21.5500 |	3.65	3.64	3.62	3.61	3.59
21.8000 |	3.57	3.56	3.54	3.53	3.51
22.0500 |	3.50	3.48	3.47	3.45	3.44
22.3000 |	3.42	3.40	3.39	3.37	3.36
22.5500 |	3.34	3.32	3.31	3.29	3.28
22.8000 |	3.26	3.24	3.23	3.21	3.20
23.0500 |	3.18	3.16	3.15	3.13	3.11
23.3000 |	3.10	3.08	3.06	3.05	3.03
23.5500 |	3.02	3.00	2.98	2.97	2.95
23.8000 |	2.94	2.92	2.90	2.88	2.86
24.0500 |	2.83	2.77	2.70	2.59	2.46
24.3000 |	2.29	2.10	1.89	1.67	1.46
24.5500 |	1.27	1.08	.91	.76	.65
24.8000 |	.54	.46	.38	.33	.27
25.0500 |	.23	.19	.16	.14	.12
25.3000 |	.10	.08	.07	.06	.05
25.5500 |	.04	.03	.03	.02	.02
25.8000 |	.02	.01	.01	.01	.01
26.0500 |	.00	.00	.00	.00	.00

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

==========Upstrea
m Link ID Upstream Node ID HYG file HYG ID HYG tag

TODP3 EXDA3 EXDA3 25YR
==========

INFLOWS TO: DP 3
----------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

EXDA 3 25 YR 15.377 12.5500 91.00

TOTAL FLOW INTO: DP 3
----------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

DP 3 25 YR 15.377 12.5500 91.00

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYGTag =25YR

Peak Discharge = 91.00 cfs
Time to Peak = 12.5500 hrs
HYG Volume = 15.377 ac-ft

HYDROGRAPH ORDINATES (cfs)
Time | Output Time increment = .0500 hrs
hrs | Time on left represents time for first value in each row.

11.1500	.00	.00	.01	.02	.05
11.4000	.08	.16	.26	.43	.66
11.6500	1.01	1.50	2.18	3.17	4.48
11.9000	6.52	9.15	13.22	18.20	25.16
12.1500	33.04	42.50	52.47	62.06	71.56
12.4000	78.51	85.15	88.21	91.00	90.23
12.6500	89.17	85.55	81.72	76.85	71.99
12.9000	67.12	62.40	58.02	53.90	50.18
13.1500	46.77	43.75	41.03	38.61	36.46
13.4000	34.51	32.82	31.27	29.95	28.73
13.6500	27.69	26.71	25.89	25.09	24.42
13.9000	23.75	23.17	22.59	22.07	21.55
14.1500	21.07	20.60	20.15	19.72	19.32
14.4000	18.95	18.60	18.28	17.99	17.71
14.6500	17.46	17.22	16.99	16.77	16.57
14.9000	16.36	16.16	15.97	15.78	15.59
15.1500	15.40	15.21	15.02	14.83	14.65
15.4000	14.46	14.27	14.08	13.90	13.71
15.6500	13.52	13.33	13.13	12.94	12.75
15.9000	12.56	12.36	12.16	11.97	11.77
16.1500	11.58	11.39	11.20	11.02	10.85
16.4000	10.68	10.52	10.37	10.23	10.09
16.6500	9.96	9.84	9.73	9.62	9.51
16.9000	9.40	9.30	9.20	9.11	9.01
17.1500	8.91	8.82	8.73	8.63	8.54
17.4000	8.45	8.36	8.27	8.17	8.08
17.6500	7.99	7.90	7.81	7.72	7.63
17.9000	7.53	7.44	7.35	7.26	7.17
18.1500	7.08	6.99	6.90	6.82	6.74
18.4000	6.67	6.60	6.54	6.48	6.43
18.6500	6.38	6.33	6.29	6.25	6.21

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .0500 hrs

hrs | Time on left represents time for first value in each row.

18.9000	6.17	6.14	6.11	6.07	6.04
19.1500	6.01	5.98	5.95	5.92	5.90
19.4000	5.87	5.84	5.81	5.78	5.76
19.6500	5.73	5.70	5.67	5.65	5.62
19.9000	5.59	5.57	5.54	5.51	5.48
20.1500	5.46	5.43	5.40	5.38	5.35
20.4000	5.33	5.30	5.28	5.25	5.23
20.6500	5.21	5.19	5.16	5.14	5.12
20.9000	5.10	5.08	5.05	5.03	5.01
21.1500	4.99	4.97	4.95	4.93	4.91
21.4000	4.89	4.87	4.85	4.83	4.81
21.6500	4.78	4.76	4.74	4.72	4.70
21.9000	4.68	4.66	4.64	4.62	4.60
22.1500	4.58	4.56	4.53	4.51	4.49
22.4000	4.47	4.45	4.43	4.41	4.38
22.6500	4.36	4.34	4.32	4.30	4.28
22.9000	4.26	4.23	4.21	4.19	4.17
23.1500	4.15	4.13	4.10	4.08	4.06
23.4000	4.04	4.02	3.99	3.97	3.95
23.6500	3.93	3.91	3.89	3.87	3.84
23.9000	3.82	3.80	3.76	3.72	3.65
24.1500	3.56	3.41	3.24	3.01	2.76
24.4000	2.48	2.20	1.93	1.67	1.42
24.6500	1.20	1.00	.85	.71	.60
24.9000	.50	.43	.36	.31	.25
25.1500	.22	.18	.15	.13	.11
25.4000	.09	.08	.06	.05	.04
25.6500	.04	.03	.02	.02	.02
25.9000	.01	.01	.01	.01	.00
26.1500	.00	.00	.00		

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

==========Upstream Link ID Upstream Node ID HYG file HYG ID HYG tag

TODP3 EXDA3 EXDA3 50YR
==========

INFLOWS TO: DP 3
----------Volume Peak Time Peak Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

EXDA 3 50 YR 19.915 12.5500 122.23

TOTAL FLOW INTO: DP 3
----------Volume Peak Time Peak Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

DP 3 50 YR 19.915 12.5500 122.23

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYGTag =50YR

Peak Discharge = 122.23 cfs
Time to Peak = 12.5500 hrs
HYG Volume = 19.915 ac-ft

HYDROGRAPH ORDINATES (cfs)
Time | Output Time increment = .0500 hrs
hrs | Time on left represents time for first value in each row.

---------|----------

10.8000 |	.00	.01	.01	.03	.05
11.0500 |	.10	.16	.27	.38	.55
11.3000 |	.74	1.00	1.27	1.63	2.02
11.5500 |	2.51	3.08	3.81	4.74	5.96
11.8000 |	7.59	9.69	12.77	16.68	22.46
12.0500 |	29.42	38.91	49.57	62.06	75.16
12.3000 |	87.43	99.52	108.02	116.07	119.32
12.5500 |	122.23	120.50	118.40	113.10	107.54
12.8000 |	100.78	94.06	87.44	81.05	75.18
13.0500 |	69.65	64.69	60.15	56.13	52.53
13.3000 |	49.32	46.48	43.91	41.69	39.65
13.5500 |	37.92	36.30	34.95	33.66	32.59
13.8000 |	31.54	30.66	29.78	29.03	28.28
14.0500 |	27.60	26.93	26.31	25.70	25.13
14.3000 |	24.57	24.06	23.58	23.14	22.73
14.5500 |	22.36	22.01	21.68	21.38	21.09
14.8000 |	20.81	20.54	20.29	20.03	19.78
15.0500 |	19.54	19.30	19.06	18.82	18.58
15.3000 |	18.35	18.11	17.88	17.64	17.40
15.5500 |	17.17	16.93	16.69	16.45	16.21
15.8000 |	15.97	15.73	15.49	15.24	15.00
16.0500 |	14.75	14.51	14.27	14.03	13.80
16.3000 |	13.57	13.36	13.14	12.95	12.76
16.5500 |	12.58	12.41	12.26	12.10	11.96
16.8000 |	11.82	11.69	11.56	11.44	11.31
17.0500 |	11.19	11.07	10.95	10.83	10.72
17.3000 |	10.60	10.49	10.37	10.26	10.15

17.5500 |	10.03	9.92	9.81	9.69	9.58
17.8000 |	9.47	9.35	9.24	9.13	9.01
18.0500 |	8.90	8.79	8.68	8.57	8.46
18.3000 |	8.36	8.26	8.17	8.09	8.01

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .0500 hrs

hrs | Time on left represents time for first value in each row.

---------|----------

18.5500 |	7.94	7.87	7.81	7.75	7.70
18.8000 |	7.65	7.60	7.56	7.51	7.47
19.0500 |	7.43	7.39	7.36	7.32	7.28
19.3000 |	7.25	7.21	7.18	7.14	7.11
19.5500 |	7.07	7.04	7.01	6.97	6.94
19.8000 |	6.90	6.87	6.84	6.80	6.77
20.0500 |	6.73	6.70	6.67	6.63	6.60
20.3000 |	6.57	6.54	6.51	6.48	6.45
20.5500 |	6.42	6.39	6.36	6.33	6.31
20.8000 |	6.28	6.25	6.22	6.20	6.17
21.0500 |	6.14	6.12	6.09	6.07	6.04
21.3000 |	6.02	5.99	5.97	5.94	5.91
21.5500 |	5.89	5.86	5.84	5.81	5.78
21.8000 |	5.76	5.73	5.71	5.68	5.66
22.0500 |	5.63	5.60	5.58	5.55	5.53
22.3000 |	5.50	5.47	5.45	5.42	5.39
22.5500 |	5.37	5.34	5.32	5.29	5.26
22.8000 |	5.24	5.21	5.18	5.16	5.13
23.0500 |	5.11	5.08	5.05	5.03	5.00
23.3000 |	4.97	4.94	4.92	4.89	4.86
23.5500 |	4.84	4.81	4.78	4.76	4.73
23.8000 |	4.71	4.68	4.65	4.62	4.58
24.0500 |	4.53	4.44	4.33	4.16	3.94
24.3000 |	3.66	3.36	3.02	2.68	2.34
24.5500 |	2.03	1.72	1.46	1.22	1.04
24.8000 |	.86	.73	.61	.52	.44
25.0500 |	.37	.31	.26	.22	.19
25.3000 |	.15	.13	.11	.09	.08
25.5500 |	.06	.05	.04	.04	.03
25.8000 |	.02	.02	.02	.01	.01
26.0500 |	.01	.01	.00	.00	.00

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

==========Upstrea
m Link ID Upstream Node ID HYG file HYG ID HYG tag

TODP3 EXDA3 EXDA3 100YR
==========

INFLOWS TO: DP 3

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	EXDA	3 100 YR	25.485	12.5500	160.36

TOTAL FLOW INTO: DP 3

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	DP	3 100 YR	25.485	12.5500	160.36

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYG Tag = 100 YR

Peak Discharge = 160.36 cfs
Time to Peak = 12.5500 hrs
HYG Volume = 25.485 ac-ft

HYDROGRAPH ORDINATES (cfs)
Time | Output Time increment = .0500 hrs
hrs | Time on left represents time for first value in each row.

10.3500	.00	.00	.01	.02	.04
10.6000	.07	.13	.20	.30	.42
10.8500	.58	.75	.97	1.20	1.47
11.1000	1.75	2.08	2.42	2.82	3.23
11.3500	3.72	4.23	4.83	5.47	6.24
11.6000	7.12	8.23	9.61	11.40	13.78
11.8500	16.80	21.13	26.57	34.43	43.82
12.1000	56.37	70.40	86.55	103.41	118.88
12.3500	134.05	144.33	154.01	157.41	160.36
12.6000	157.38	153.95	146.53	138.83	129.74
12.8500	120.73	111.97	103.54	95.83	88.58
13.1000	82.11	76.20	70.98	66.30	62.14
13.3500	58.47	55.14	52.27	49.63	47.40
13.6000	45.32	43.58	41.92	40.54	39.20
13.8500	38.06	36.94	35.97	35.01	34.15
14.1000	33.30	32.51	31.73	31.01	30.30
14.3500	29.66	29.05	28.50	27.98	27.51
14.6000	27.07	26.66	26.28	25.91	25.57

14.8500 |	25.23	24.91	24.59	24.28	23.97
15.1000 |	23.67	23.37	23.07	22.78	22.48
15.3500 |	22.19	21.90	21.60	21.31	21.01
15.6000 |	20.72	20.42	20.13	19.83	19.53
15.8500 |	19.23	18.93	18.63	18.33	18.03
16.1000 |	17.73	17.43	17.13	16.85	16.57
16.3500 |	16.30	16.04	15.80	15.57	15.35
16.6000 |	15.14	14.95	14.76	14.59	14.41
16.8500 |	14.25	14.09	13.94	13.78	13.63
17.1000 |	13.48	13.34	13.19	13.05	12.91
17.3500 |	12.77	12.63	12.49	12.35	12.21
17.6000 |	12.07	11.93	11.79	11.65	11.52
17.8500 |	11.38	11.24	11.10	10.96	10.82

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .0500 hrs

hrs | Time on left represents time for first value in each row.

---------|----------

18.1000 |	10.68	10.55	10.42	10.28	10.16
18.3500 |	10.04	9.93	9.83	9.73	9.64
18.6000 |	9.56	9.49	9.42	9.35	9.29
18.8500 |	9.23	9.18	9.12	9.07	9.02
19.1000 |	8.98	8.93	8.88	8.84	8.80
19.3500 |	8.75	8.71	8.67	8.62	8.58
19.6000 |	8.54	8.50	8.46	8.41	8.37
19.8500 |	8.33	8.29	8.25	8.21	8.17
20.1000 |	8.12	8.08	8.04	8.00	7.96
20.3500 |	7.92	7.89	7.85	7.81	7.78
20.6000 |	7.74	7.71	7.67	7.64	7.61
20.8500 |	7.57	7.54	7.51	7.47	7.44
21.1000 |	7.41	7.38	7.35	7.32	7.29
21.3500 |	7.25	7.22	7.19	7.16	7.13
21.6000 |	7.10	7.06	7.03	7.00	6.97
21.8500 |	6.94	6.91	6.87	6.84	6.81
22.1000 |	6.78	6.75	6.72	6.69	6.65
22.3500 |	6.62	6.59	6.56	6.52	6.49
22.6000 |	6.46	6.43	6.40	6.36	6.33
22.8500 |	6.30	6.27	6.24	6.20	6.17
23.1000 |	6.14	6.11	6.07	6.04	6.01
23.3500 |	5.98	5.94	5.91	5.88	5.85
23.6000 |	5.81	5.78	5.75	5.72	5.68
23.8500 |	5.65	5.62	5.58	5.54	5.47
24.1000 |	5.37	5.23	5.02	4.76	4.43
24.3500 |	4.06	3.65	3.24	2.83	2.45
24.6000 |	2.08	1.77	1.48	1.25	1.04
24.8500 |	.89	.74	.63	.53	.45
25.1000 |	.37	.32	.26	.22	.19
25.3500 |	.16	.13	.11	.09	.08
25.6000 |	.06	.05	.04	.04	.03
25.8500 |	.02	.02	.01	.01	.01
26.1000 |	.01	.00	.00	.00	.00

Index of Starting Page Numbers for ID Names

```
-----D ----DP 3 2 YR... 7.01, 7.04, 7.07, 7.10,

  7.13
  -----E ----

EXDA 3... 4.01, 5.01, 6.03, 6.04,
  6.05, 6.06, 6.07


-----L -----
Litchfield Co.... 3.01, 3.02
```

-----W ----Watershed... 1.01, 2.01

POST-DEVELOPMENT DRAINAGE CALCULATIONS

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POND 1

POND 1

POND 1

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MASTER DESIGN STORM SUMMARY

Network Storm Collection: Litchfield Co.

Total Depth Rainfall Return Event

in Type RNF
ID

2 YR 3.2000 Synthetic Curve TypeIII 24hr
10 YR 4.7000 Synthetic Curve TypeIII 24hr
25 YR 5.5000 Synthetic Curve TypeIII 24hr
50 YR 6.2000 Synthetic Curve TypeIII 24hr

100 YR 7.0000 Synthetic Curve TypeIII 24hr

MASTER NETWORK
SUMMARY
SCS Unit
Hydrograph
Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt;
LR=Left&Rt)

Node ID	Return Event	HYG Type	Vol ac-ft	Qpeak Trun	Qpeak hrs	Max WSEL cfs	Pond ft	Storage ac-ft
*DP 3	JCT	2	3.682	12.7000	13.60			
*DP 3	JCT	10	10.786	12.6000	56.75			
*DP 3	JCT	25	15.529	12.6000	88.03			
*DP 3	JCT	50	20.087	12.6000	117.89			
*DP 3	JCT	100	25.678	12.6000	154.00			
JUNCTION	JCT	2	3.682	12.7000	13.60			
JUNCTION	JCT	10	10.786	12.6000	56.75			
JUNCTION	JCT	25	15.529	12.6000	88.03			
JUNCTION	JCT	50	20.087	12.6000	117.89			
JUNCTION	JCT	100	25.678	12.6000	154.00			
POND 1	IN POND	2	.188	12.4000	1.19			
POND 1	IN POND	10	.492	12.3000	3.97			

```
POND 1 IN POND 25 .688 12.3000 5.78
POND 1 IN POND 50 .872 12.3000 7.48
POND 1 IN POND 100 1.097 12.3000 9.52

 Name....                                                    Watershed

 File....  C:\Program  Files\Haestad\PPKW\PPW\3093  PRDA  3.PPW
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Return Node	HYG ID	Vol Type	Qpeak Event	Qpeak ac-ft	Max WSEL Trun	Pond hrs	Storage cfs	Max ft	Storage ac-ft
POND	1	OUT	POND	2	.187	13.0000	.43	1266.64	.043
POND	1	OUT	POND	10	.491	13.0000	1.17	1267.85	.159
POND	1	OUT	POND	25	.687	12.8000	2.31	1268.29	.213
POND	1	OUT	POND	50	.872	12.8000	2.98	1268.71	.269
POND	1	OUT	POND	100	1.096	12.7000	4.03	1269.20	.341
POND	2	IN	POND	2	.091	12.5000	.46		
POND	2	IN	POND	10	.244	12.5000	1.61		
POND	2	IN	POND	25	.344	12.4000	2.36		
POND	2	IN	POND	50	.439	12.4000	3.09		
POND	2	IN	POND	100	.554	12.4000	3.98		
POND	2	OUT	POND	2	.090	13.0000	.26	1240.39	.017
POND	2	OUT	POND	10	.244	13.0000	.66	1241.22	.062
POND	2	OUT	POND	25	.344	13.0000	1.13	1241.66	.092
POND	2	OUT	POND	50	.438	12.9000	1.54	1241.99	.117
POND	2	OUT	POND	100	.553	12.9000	1.88	1242.41	.152

PR3	D2	AREA	2	.091	12.5000	.46
PR3	D2	AREA	10	.244	12.5000	1.61
PR3	D2	AREA	25	.344	12.4000	2.36
PR3	D2	AREA	50	.439	12.4000	3.09
PR3	D2	AREA	100	.554	12.4000	3.98
PRDA	3D1	AREA	2	.188	12.4000	1.19
PRDA	3D1	AREA	10	.492	12.3000	3.97
PRDA	3D1	AREA	25	.688	12.3000	5.78
PRDA	3D1	AREA	50	.872	12.3000	7.48
PRDA	3D1	AREA	100	1.097	12.3000	9.52
PRDA	3ND	AREA	2	3.404	12.7000	13.01
PRDA	3ND	AREA	10	10.051	12.6000	55.29
PRDA	3ND	AREA	25	14.499	12.6000	85.14
PRDA	3ND	AREA	50	18.777	12.6000	113.70
PRDA	3ND	AREA	100	24.028	12.5000	148.53

File.... C:\Program Files\Haestad\PPKW\PPW\
Title... Project Date: 4/16/2009
Project Engineer: Curtis Jones
Project Title: Watershed
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Litchfield Co.

Storm Tag Name = 2 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.2000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.7000 in

```
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs


Storm Tag Name = 25 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs


Storm Tag Name = 50 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 6.2000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs


Storm Tag Name = 100 YR
Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs



File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


:::::::::::::::::::::::::::::::::::::::::::::::::::::::::: TIME OF
CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::




Segment #1: Tc: TR-55 Sheet
Mannings n .4000
Hydraulic Length 230.00 ft
2yr, 24hr P 3.2000 in
Slope .035000 ft/ft
```

```
 Avg.Velocity .11 ft/sec

                                Segment #1 Time: .5571 hrs

 Segment #2: Tc: TR-55 Shallow
 Hydraulic Length 180.00 ft
 Slope .087000 ft/ft
 Unpaved


 Avg.Velocity 4.76 ft/sec

                                Segment #2 Time: .0105 hrs


                                     ======================
                                      Total Tc: .5676 hrs
                                     ======================

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


 Tc Equations used...



 ==== SCS TR-55 Sheet Flow
 =========================================


    Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))


    Where:     Tc = Time of concentration, hrs
          n = Mannings n
          Lf = Flow length, ft
          P = 2yr, 24hr Rain depth, inches
          Sf = Slope, %


 ==== SCS TR-55 Shallow Concentrated Flow
 ================================
```

```
    Unpaved surface:
    V = 16.1345 * (Sf**0.5)


    Paved surface:
    V = 20.3282 * (Sf**0.5)


    Tc = (Lf / V) / (3600sec/hr)


    Where:     V = Velocity, ft/sec
          Sf = Slope, ft/ft
          Tc = Time of concentration, hrs
          Lf = Flow length, ft

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


 :::::::::::::::::::::::::::::::::::::::::::::::::::::::: TIME OF
 CONCENTRATION CALCULATOR
 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::



 Segment #1: Tc: TR-55 Sheet
 Mannings n .4000
 Hydraulic Length 175.00 ft
 2yr, 24hr P 3.2000 in
 Slope .080000 ft/ft


 Avg.Velocity .15 ft/sec


                                Segment #1 Time: .3216 hrs

 Segment #2: Tc: TR-55 Shallow
 Hydraulic Length 500.00 ft
 Slope .180000 ft/ft
 Unpaved


 Avg.Velocity 6.85 ft/sec
```

```
                                  Segment #2 Time: .0203 hrs

 Segment #3: Tc: TR-55 Channel
 Flow Area 2.6000 sq.ft
 Wetted Perimeter 5.00 ft
 Hydraulic Radius .52 ft
 Slope .100000 ft/ft
 Mannings n .0300
 Hydraulic Length 810.00 ft


 Avg.Velocity 10.16 ft/sec

                                  Segment #3 Time: .0222 hrs


                                       ======================
                                        Total Tc: .3641 hrs
                                       ======================

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


 Tc Equations used...



 ==== SCS TR-55 Sheet Flow
 ============================================


    Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))


    Where:     Tc = Time of concentration, hrs
          n = Mannings n
          Lf = Flow length, ft
          P = 2yr, 24hr Rain depth, inches
          Sf = Slope, %


 ==== SCS TR-55 Shallow Concentrated Flow
 ==============================
```

```
     Unpaved surface:
     V = 16.1345 * (Sf**0.5)


     Paved surface:
     V = 20.3282 * (Sf**0.5)


     Tc = (Lf / V) / (3600sec/hr)


     Where:     V = Velocity, ft/sec
           Sf = Slope, ft/ft
           Tc = Time of concentration, hrs
           Lf = Flow length, ft

Type.... Tc Calcs Page 3.05
Name.... PRDA 3D1
File.... C:\Program Files\Haestad\PPKW\PPW\3093
PRDA 3.PPW
==== SCS Channel Flow
=====================================

R =Aq/Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n


Tc = (Lf / V) / (3600sec/hr)


Where: R = Hydraulic radius

      Aq = Flow area, sq.ft.

      Wp = Wetted perimeter, ft

      V = Velocity, ft/sec

      Sf = Slope, ft/ft

      n = Mannings n

      Tc = Time of concentration, hrs

      Lf = Flow length, ft

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
```

:: TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet
Mannings n .4000
Hydraulic Length 260.00 ft
2yr, 24hr P 3.2000 in
Slope .060000 ft/ft

Avg.Velocity .15 ft/sec

Segment #1 Time: .4953 hrs

Segment #2: Tc: TR-55 Shallow
Hydraulic Length 1860.00 ft
Slope .065000 ft/ft
Unpaved
Avg.Velocity 4.11 ft/sec

Segment #2 Time: .1256 hrs

Segment #3: Tc: TR-55 Channel
Flow Area 2.5000 sq.ft
Wetted Perimeter 5.50 ft
Hydraulic Radius .45 ft
Slope .057000 ft/ft
Mannings n .0400
Hydraulic Length 1950.00 ft

Avg.Velocity 5.26 ft/sec

Segment #3 Time: .1030 hrs

==========
Total Tc: .7240 hrs
==========

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

Tc Equations used...

SCS TR-55 Sheet Flow
==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

SCS TR-55 Shallow Concentrated Flow
==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs Page 3.08
Name.... PRDA 3ND
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

```
 SCS Channel Flow
=====================================

R =Aq/Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n


Tc = (Lf / V) / (3600sec/hr)


Where: R = Hydraulic radius

      Aq = Flow area, sq.ft.

      Wp = Wetted perimeter, ft

      V = Velocity, ft/sec

      Sf = Slope, ft/ft

      n = Mannings n

      Tc = Time of concentration, hrs

      Lf = Flow length, ft

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


RUNOFF CURVE NUMBER DATA
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


                      Impervious
                Area Adjustment Adjusted
                Soil/Surface Description CN acres %C %UC CN


Soil Type B -Grass/Meadow 58 1.330 58.00
Soil Type B -Woods 55 .870 55.00
Impervious 98 .260 98.00


COMPOSITE AREA & WEIGHTED CN ---> 2.460 61.17 (61)
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
```

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjusted %UC	Adjusted CN
Soil Type B -Grass/Meadow	58	.470			58.00
Soil Type B -Wooded	55	3.550			55.00
Impervious Area	98	.680			98.00

COMPOSITE AREA & WEIGHTED CN ---> 4.700 61.52 (62)
::
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjusted %UC	Adjusted CN
Soil Type B -Wooded	55	101.720			55.00
Soil Type B -Grass/Meadow	58	.770			58.00
Soil Type D -Wooded	77	16.690			77.00
Soil Type D -Grass/Meadow	78	.080			78.00
Impervious	98	.480			98.00

COMPOSITE AREA & WEIGHTED CN ---> 119.740 58.27 (58)
::
SCS UNIT HYDROGRAPH METHOD
(Computational Notes)

```
DEFINITION OF TERMS: ---------------------------------

At = Total area (acres): At = Ai+Ap
Ai = Impervious area (acres)
Ap = Pervious area (acres)
CNi = Runoff curve number for impervious area
CNp = Runoff curve number for pervious area
fLoss = f loss constant infiltration (depth/time)
gKs = Saturated Hydraulic Conductivity (depth/time)
Md = Volumetric Moisture Deficit
Psi = Capillary Suction (length)
hK = Horton Infiltration Decay Rate (time^-1)
fo = Initial Infiltration Rate (depth/time)
fc = Ultimate(capacity)Infiltration Rate (depth/time)
Ia = Initial Abstraction (length)
dt = Computational increment (duration of unit excess rainfall)

   Default dt is smallest value of 0.1333Tc, rtm,
   and th
   (Smallest dt is then adjusted to match up with
   Tp)
   UDdt = User specified override computational
   main time increment
   (only used if UDdt is => .1333Tc)
   D(t) = Point on distribution curve (fraction of
   P) for time step t


K   = 2 / (1 + (Tr/Tp)): default K = 0.75: (for Tr/Tp = 1.67)

Ks  = Hydrograph shape factor
    = Unit Conversions * K:
    = ((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K

      Default Ks = 645.333 * 0.75 = 484
```

Lag = Lag time from center of excess runoff (dt) to Tp: Lag = 0.6Tc
P = Total precipitation depth, inches
Pa(t) = Accumulated rainfall at time step t
Pi(t) = Incremental rainfall at time step t
qp = Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi.

= (Ks * A * Q) / Tp (where Q = 1in. runoff, A=sq.mi.)
Qu(t) = Unit hydrograph ordinate (cfs) at time step t
Q(t) = Final hydrograph ordinate (cfs) at time step t

Rai(t)= Accumulated runoff (inches) at time step t for impervious area
Rap(t)= Accumulated runoff (inches) at time step t for pervious area
Rii(t)= Incremental runoff (inches) at time step t for impervious area
Rip(t)= Incremental runoff (inches) at time step t for pervious area
R(t) = Incremental weighted total runoff (inches)
Rtm = Time increment for rainfall table
Si = S for impervious area: Si = (1000/CNi) -10
Sp = S for pervious area: Sp = (1000/CNp) -10
t = Time step (row) number
Tc = Time of concentration
Tb = Time (hrs) of entire unit hydrograph: Tb = Tp + Tr
Tp = Time (hrs) to peak of a unit hydrograph: Tp = (dt/2) + Lag
Tr = Time (hrs) of receding limb of unit hydrograph: Tr = ratio of Tp

SCS UNIT HYDROGRAPH METHOD
(Computational Notes)

PRECIPITATION: ----------
---------Column (1): Time for time step t
Column (2): D(t) = Point on distribution curve for time step t
Column (3): Pi(t) = Pa(t) -Pa(t-1): Col.(4) -Preceding Col.(4)
Column (4): Pa(t) = D(t) x P: Col.(2) x P

PERVIOUS AREA RUNOFF (using SCS Runoff CN Method) ----------

Column (5): Rap(t) = Accumulated pervious runoff for time step t

If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0

If (Pa(t) is > 0.2Sp) then use:

Rap(t) = (Col.(4)-0.2Sp)**2 / (Col.(4)+0.8Sp)

Column (6): Rip(t) = Incremental pervious runoff for time step t

Rip(t) = Rap(t) -Rap(t-1)

Rip(t) = Col.(5) for current row -Col.(5) for preceding row.

IMPERVIOUS AREA RUNOFF ----------

---------Column (7 & 8)... Did not specify to use impervious areas.

INCREMENTAL WEIGHTED RUNOFF: ----------
---------Column (9): R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t)

R(t) = (Ap/At) x Col.(6) + (Ai/At) x Col.(8)

SCS UNIT HYDROGRAPH METHOD: ----------
---------Column (10): Q(t) is computed with the SCS unit hydrograph method

using R() and Qu().

Type.... Unit Hyd. Summary Page 5.03
Name.... PR3 D2 Tag: 2 YR Event: 2 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 24.0000 hrs Rain Depth = 3.2000 in
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
Rain File -ID = -TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
HYGFile -ID = -PR3D22YR
Tc = .5676 hrs
Drainage Area = 2.460 acres Runoff CN= 61

==========Computational Time Increment = .07568 hrs
Computed Peak Time = 12.5628 hrs
Computed Peak Flow = .47 cfs

Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.6000 hrs
Peak Flow, Interpolated Output = .46 cfs
WARNING: The difference between calculated peak

```
flow
and interpolated peak flow is greater than 1.50%
========================================

                DRAINAGE AREA


          ID:PR3 D2
          CN = 61
          Area = 2.460 acres
          S = 6.3934 in
          0.2S = 1.2787 in


           Cumulative Runoff


                .4440 in
                 .091 ac-ft


        HYG Volume... .091 ac-ft (area under HYG curve)


        ***** SCS UNIT HYDROGRAPH PARAMETERS *****


        Time Concentration, Tc = .56760 hrs (ID: PR3
        D2)
        Computational Incr, Tm = .07568 hrs = 0.20000
        Tp


        Unit Hyd. Shape Factor = 483.432 (37.46% under rising
        limb)
        K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
        Receding/Rising, Tr/Tp = 1.6698 (solved from K =
        .7491)


        Unit peak, qp = 4.91 cfs
        Unit peak time Tp = .37840 hrs
        Unit receding limb, Tr = 1.51359 hrs
        Total unit time, Tb = 1.89199 hrs

Type.... Unit Hyd. Summary Page 5.04
Name.... PR3 D2 Tag: 10 YR Event: 10 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
```

```
Storm... TypeIII 24hr Tag: 10 YR


          SCS UNIT HYDROGRAPH METHOD


          STORM EVENT: 10 year storm
          Duration = 24.0000 hrs Rain Depth = 4.7000 in
          Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
          Rain File -ID = -TypeIII 24hr
          Unit Hyd Type = Default Curvilinear
          HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
          HYGFile -ID = -PR3D210YR
          Tc = .5676 hrs
          Drainage Area = 2.460 acres Runoff CN= 61


          ==========================================



          Computational Time Increment = .07568 hrs



          Computed Peak Time = 12.4871 hrs



          Computed Peak Flow = 1.62 cfs


          Time Increment for HYG File = .1000 hrs
          Peak Time, Interpolated Output = 12.5000
          hrs
          Peak Flow, Interpolated Output = 1.61 cfs
          ==================================

                         DRAINAGE AREA


                    ID:PR3 D2
                    CN = 61
                    Area = 2.460 acres
                    S = 6.3934 in
                    0.2S = 1.2787 in
```

Cumulative Runoff

```
                        1.1926 in
                          .244 ac-ft


          HYG Volume... .244 ac-ft (area under HYG curve)


          ***** SCS UNIT HYDROGRAPH PARAMETERS *****


          Time Concentration, Tc = .56760 hrs (ID: PR3
          D2)
          Computational Incr, Tm = .07568 hrs = 0.20000
          Tp


          Unit Hyd. Shape Factor = 483.432 (37.46% under rising
          limb)
          K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
          Receding/Rising, Tr/Tp = 1.6698 (solved from K =
          .7491)


          Unit peak, qp = 4.91 cfs
          Unit peak time Tp = .37840 hrs
          Unit receding limb, Tr = 1.51359 hrs
          Total unit time, Tb = 1.89199 hrs

Type.... Unit Hyd. Summary Page 5.05
Name.... PR3 D2 Tag: 25 YR Event: 25 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 25 YR


          SCS UNIT HYDROGRAPH METHOD


          STORM EVENT: 25 year storm
          Duration = 24.0000 hrs Rain Depth = 5.5000 in
          Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
          Rain File -ID = -TypeIII 24hr
          Unit Hyd Type = Default Curvilinear
          HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
          HYGFile -ID = -PR3D225YR
          Tc = .5676 hrs
          Drainage Area = 2.460 acres Runoff CN= 61
```

==========

Computational Time Increment = .07568 hrs

Computed Peak Time = 12.4115 hrs

Computed Peak Flow = 2.38 cfs

Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.4000 hrs
Peak Flow, Interpolated Output = 2.36 cfs
==========

DRAINAGE AREA

ID:PR3 D2
CN = 61
Area = 2.460 acres
S = 6.3934 in
0.2S = 1.2787 in

Cumulative Runoff

```
                                    1.6787 in
                                      .344 ac-ft


                HYG Volume... .344 ac-ft (area under HYG curve)


                ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                Time Concentration, Tc = .56760 hrs (ID: PR3 D2)
                Computational Incr, Tm = .07568 hrs = 0.20000 Tp


                Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                Unit peak, qp = 4.91 cfs
                Unit peak time Tp = .37840 hrs
                Unit receding limb, Tr = 1.51359 hrs
                Total unit time, Tb = 1.89199 hrs

Type.... Unit Hyd. Summary Page 5.06
Name.... PR3 D2 Tag: 50 YR Event: 50 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 50 YR


                SCS UNIT HYDROGRAPH METHOD


                STORM EVENT: 50 year storm
                Duration = 24.0000 hrs Rain Depth = 6.2000 in
                Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                Rain File -ID = -TypeIII 24hr
                Unit Hyd Type = Default Curvilinear
                HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                HYGFile -ID = -PR3D250YR
                Tc = .5676 hrs
                Drainage Area = 2.460 acres Runoff CN= 61


                ==========================================



                Computational Time Increment = .07568 hrs



                Computed Peak Time = 12.4115 hrs



                Computed Peak Flow = 3.12 cfs


                Time Increment for HYG File = .1000 hrs
                Peak Time, Interpolated Output = 12.4000 hrs
                Peak Flow, Interpolated Output = 3.09 cfs
                ==========================================
```

```
                                    DRAINAGE AREA


                              ID:PR3 D2
                              CN = 61
                              Area = 2.460 acres
                              S = 6.3934 in
                              0.2S = 1.2787 in


                               Cumulative Runoff


                                      2.1405 in
                                        .439 ac-ft


                    HYG Volume... .439 ac-ft (area under HYG curve)


                    ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                    Time Concentration, Tc = .56760 hrs (ID: PR3 D2)
                    Computational Incr, Tm = .07568 hrs = 0.20000 Tp


                    Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                    K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                    Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                    Unit peak, qp = 4.91 cfs
                    Unit peak time Tp = .37840 hrs
                    Unit receding limb, Tr = 1.51359 hrs
                    Total unit time, Tb = 1.89199 hrs

Type.... Unit Hyd. Summary Page 5.07
Name.... PR3 D2 Tag: 100 YR Event: 100 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 100 YR


                    SCS UNIT HYDROGRAPH METHOD


                    STORM EVENT: 100 year storm
                    Duration = 24.0000 hrs Rain Depth = 7.0000 in
                    Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                    Rain File -ID = -TypeIII 24hr
                    Unit Hyd Type = Default Curvilinear
                    HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                    HYGFile -ID = -PR3D2100YR
                    Tc = .5676 hrs
                    Drainage Area = 2.460 acres Runoff CN= 61


                    ==========================================




                    Computational Time Increment = .07568 hrs



                    Computed Peak Time = 12.4115 hrs
```

```
                Computed Peak Flow = 4.01 cfs


                Time Increment for HYG File = .1000 hrs
                Peak Time, Interpolated Output = 12.4000 hrs
                Peak Flow, Interpolated Output = 3.98 cfs
                ========================================


                                    DRAINAGE AREA


                             ID:PR3 D2
                             CN = 61
                             Area = 2.460 acres
                             S = 6.3934 in
                             0.2S = 1.2787 in


                              Cumulative Runoff


                                      2.7019 in
                                        .554 ac-ft


                HYG Volume... .554 ac-ft (area under HYG curve)


                ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                Time Concentration, Tc = .56760 hrs (ID: PR3 D2)
                Computational Incr, Tm = .07568 hrs = 0.20000 Tp


                Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                Unit peak, qp = 4.91 cfs
                Unit peak time Tp = .37840 hrs
                Unit receding limb, Tr = 1.51359 hrs
                Total unit time, Tb = 1.89199 hrs

Type.... Unit Hyd. Summary Page 5.08
Name.... PRDA 3D1 Tag: 2 YR Event: 2 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR


                SCS UNIT HYDROGRAPH METHOD


                STORM EVENT: 2 year storm
                Duration = 24.0000 hrs Rain Depth = 3.2000 in
                Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                Rain File -ID = -TypeIII 24hr
                Unit Hyd Type = Default Curvilinear
                HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                HYGFile -ID = -PRDA3D12YR
                Tc = .3641 hrs
                Drainage Area = 4.700 acres Runoff CN= 62
```

```
==========================================


Computational Time Increment = .04854 hrs


Computed Peak Time = 12.3787 hrs


Computed Peak Flow = 1.20 cfs


Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.4000 hrs
Peak Flow, Interpolated Output = 1.19 cfs
==========================================

                          DRAINAGE AREA


               ID:PRDA 3D1
               CN = 62
               Area = 4.700 acres
               S = 6.1290 in
               0.2S = 1.2258 in


                Cumulative Runoff


                        .4810 in
                         .188 ac-ft


HYG Volume... .188 ac-ft (area under HYG curve)


***** SCS UNIT HYDROGRAPH PARAMETERS *****


Time Concentration, Tc = .36408 hrs (ID: PRDA 3D1)
Computational Incr, Tm = .04854 hrs = 0.20000 Tp


Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


Unit peak, qp = 14.63 cfs
Unit peak time Tp = .24272 hrs
Unit receding limb, Tr = .97088 hrs
Total unit time, Tb = 1.21360 hrs

Type.... Unit Hyd. Summary Page 5.09
Name.... PRDA 3D1 Tag: 10 YR Event: 10 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 10 YR
```

```
SCS UNIT HYDROGRAPH METHOD


STORM EVENT: 10 year storm
Duration = 24.0000 hrs Rain Depth = 4.7000 in
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
Rain File -ID = -TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
HYGFile -ID = -PRDA3D110YR
Tc = .3641 hrs
Drainage Area = 4.700 acres Runoff CN= 62


==========================================



Computational Time Increment = .04854 hrs



Computed Peak Time = 12.2816 hrs



Computed Peak Flow = 3.98 cfs


Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.3000 hrs
Peak Flow, Interpolated Output = 3.97 cfs
==========================================


                          DRAINAGE AREA


               ID:PRDA 3D1
               CN = 62
               Area = 4.700 acres
               S = 6.1290 in
               0.2S = 1.2258 in


                Cumulative Runoff


                       1.2569 in
                         .492 ac-ft


HYG Volume... .492 ac-ft (area under HYG curve)


***** SCS UNIT HYDROGRAPH PARAMETERS *****


Time Concentration, Tc = .36408 hrs (ID: PRDA 3D1)
Computational Incr, Tm = .04854 hrs = 0.20000 Tp


Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)
```

```
               Unit peak, qp = 14.63 cfs
               Unit peak time Tp = .24272 hrs
               Unit receding limb, Tr = .97088 hrs
               Total unit time, Tb = 1.21360 hrs

Type.... Unit Hyd. Summary Page 5.10
Name.... PRDA 3D1 Tag: 25 YR Event: 25 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 25 YR


               SCS UNIT HYDROGRAPH METHOD


               STORM EVENT: 25 year storm
               Duration = 24.0000 hrs Rain Depth = 5.5000 in
               Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
               Rain File -ID = -TypeIII 24hr
               Unit Hyd Type = Default Curvilinear
               HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
               HYGFile -ID = -PRDA3D125YR
               Tc = .3641 hrs
               Drainage Area = 4.700 acres Runoff CN= 62


               ==========================================



               Computational Time Increment = .04854 hrs



               Computed Peak Time = 12.2816 hrs



               Computed Peak Flow = 5.82 cfs


               Time Increment for HYG File = .1000 hrs
               Peak Time, Interpolated Output = 12.3000 hrs
               Peak Flow, Interpolated Output = 5.78 cfs
               ==========================================


                                    DRAINAGE AREA


                           ID:PRDA 3D1
                           CN = 62
                           Area = 4.700 acres
                           S = 6.1290 in
                           0.2S = 1.2258 in


                            Cumulative Runoff


                                   1.7561 in
                                     .688 ac-ft
```

```
                HYG Volume... .688 ac-ft (area under HYG curve)


                ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                Time Concentration, Tc = .36408 hrs (ID: PRDA 3D1)
                Computational Incr, Tm = .04854 hrs = 0.20000 Tp


                Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                Unit peak, qp = 14.63 cfs
                Unit peak time Tp = .24272 hrs
                Unit receding limb, Tr = .97088 hrs
                Total unit time, Tb = 1.21360 hrs

Type.... Unit Hyd. Summary Page 5.11
Name.... PRDA 3D1 Tag: 50 YR Event: 50 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 50 YR


                SCS UNIT HYDROGRAPH METHOD


                STORM EVENT: 50 year storm
                Duration = 24.0000 hrs Rain Depth = 6.2000 in
                Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                Rain File -ID = -TypeIII 24hr
                Unit Hyd Type = Default Curvilinear
                HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                HYGFile -ID = -PRDA3D150YR
                Tc = .3641 hrs
                Drainage Area = 4.700 acres Runoff CN= 62


                ===========================================




                Computational Time Increment = .04854 hrs



                Computed Peak Time = 12.2816 hrs



                Computed Peak Flow = 7.55 cfs


                Time Increment for HYG File = .1000 hrs
                Peak Time, Interpolated Output = 12.3000 hrs
                Peak Flow, Interpolated Output = 7.48 cfs
                ===========================================


                                        DRAINAGE AREA


                                ID:PRDA 3D1
```

```
                                CN = 62
                                Area = 4.700 acres
                                S = 6.1290 in
                                0.2S = 1.2258 in


                                 Cumulative Runoff


                                        2.2284 in
                                          .873 ac-ft


                        HYG Volume... .872 ac-ft (area under HYG curve)


                        ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                        Time Concentration, Tc = .36408 hrs (ID: PRDA 3D1)
                        Computational Incr, Tm = .04854 hrs = 0.20000 Tp


                        Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                        K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                        Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                        Unit peak, qp = 14.63 cfs
                        Unit peak time Tp = .24272 hrs
                        Unit receding limb, Tr = .97088 hrs
                        Total unit time, Tb = 1.21360 hrs

Type.... Unit Hyd. Summary Page 5.12
Name.... PRDA 3D1 Tag: 100 YR Event: 100 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 100 YR


                        SCS UNIT HYDROGRAPH METHOD


                        STORM EVENT: 100 year storm
                        Duration = 24.0000 hrs Rain Depth = 7.0000 in
                        Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                        Rain File -ID = -TypeIII 24hr
                        Unit Hyd Type = Default Curvilinear
                        HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                        HYGFile -ID = -PRDA3D1100YR
                        Tc = .3641 hrs
                        Drainage Area = 4.700 acres Runoff CN= 62


                        ===========================================
                        Computational Time Increment = .04854 hrs
                        Computed Peak Time = 12.2816 hrs
                        Computed Peak Flow = 9.62 cfs


                        Time Increment for HYG File = .1000 hrs
                        Peak Time, Interpolated Output = 12.3000 hrs
                        Peak Flow, Interpolated Output = 9.52 cfs
                        ===========================================


                                             DRAINAGE AREA
```

```
                              ID:PRDA 3D1
                              CN = 62
                              Area = 4.700 acres
                              S = 6.1290 in
                              0.2S = 1.2258 in


                               Cumulative Runoff


                                      2.8010 in

                                       1.097 ac-ft


                    HYG Volume... 1.097 ac-ft (area under HYG curve)


                    ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                    Time Concentration, Tc = .36408 hrs (ID: PRDA 3D1)
                    Computational Incr, Tm = .04854 hrs = 0.20000 Tp


                    Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                    K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                    Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                    Unit peak, qp = 14.63 cfs
                    Unit peak time Tp = .24272 hrs
                    Unit receding limb, Tr = .97088 hrs
                    Total unit time, Tb = 1.21360 hrs

Type.... Unit Hyd. Summary Page 5.13
Name.... PRDA 3ND Tag: 2 YR Event: 2 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR


                    SCS UNIT HYDROGRAPH METHOD


                    STORM EVENT: 2 year storm
                    Duration = 24.0000 hrs Rain Depth = 3.2000 in
                    Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                    Rain File -ID = -TypeIII 24hr
                    Unit Hyd Type = Default Curvilinear
                    HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                    HYGFile -ID = -PRDA3ND2YR
                    Tc = .7240 hrs
                    Drainage Area = 119.740 acres Runoff CN= 58


                    ===========================================
                    Computational Time Increment = .09653 hrs
                    Computed Peak Time = 12.7416 hrs
                    Computed Peak Flow = 13.16 cfs


                    Time Increment for HYG File = .1000 hrs
                    Peak Time, Interpolated Output = 12.7000 hrs
                    Peak Flow, Interpolated Output = 13.01 cfs
                    ===========================================


                                          DRAINAGE AREA
```

```
                              ID:PRDA 3ND
                              CN = 58
                              Area = 119.740 acres
                              S = 7.2414 in
                              0.2S = 1.4483 in


                               Cumulative Runoff


                                        .3412 in

                                        3.405 ac-ft


                    HYG Volume... 3.404 ac-ft (area under HYG curve)


                    ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                    Time Concentration, Tc = .72395 hrs (ID: PRDA 3ND)
                    Computational Incr, Tm = .09653 hrs = 0.20000 Tp


                    Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                    K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                    Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                    Unit peak, qp = 187.40 cfs
                    Unit peak time Tp = .48264 hrs
                    Unit receding limb, Tr = 1.93054 hrs
                    Total unit time, Tb = 2.41318 hrs

Type.... Unit Hyd. Summary Page 5.14
Name.... PRDA 3ND Tag: 10 YR Event: 10 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 10 YR


                    SCS UNIT HYDROGRAPH METHOD


                    STORM EVENT: 10 year storm
                    Duration = 24.0000 hrs Rain Depth = 4.7000 in
                    Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                    Rain File -ID = -TypeIII 24hr
                    Unit Hyd Type = Default Curvilinear
                    HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                    HYGFile -ID = -PRDA3ND10YR
                    Tc = .7240 hrs
                    Drainage Area = 119.740 acres Runoff CN= 58


                    ==========================================
                    Computational Time Increment = .09653 hrs
                    Computed Peak Time = 12.6451 hrs
                    Computed Peak Flow = 55.40 cfs


                    Time Increment for HYG File = .1000 hrs
                    Peak Time, Interpolated Output = 12.6000 hrs
                    Peak Flow, Interpolated Output = 55.29 cfs
                    ==========================================
```

```
                                    DRAINAGE AREA


                              ID:PRDA 3ND
                              CN = 58
                              Area = 119.740 acres
                              S = 7.2414 in
                              0.2S = 1.4483 in


                               Cumulative Runoff


                                      1.0077 in

                                      10.055 ac-ft


                    HYG Volume... 10.051 ac-ft (area under HYG curve)


                    ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                    Time Concentration, Tc = .72395 hrs (ID: PRDA 3ND)
                    Computational Incr, Tm = .09653 hrs = 0.20000 Tp


                    Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                    K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                    Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                    Unit peak, qp = 187.40 cfs
                    Unit peak time Tp = .48264 hrs
                    Unit receding limb, Tr = 1.93054 hrs
                    Total unit time, Tb = 2.41318 hrs

Type.... Unit Hyd. Summary Page 5.15
Name.... PRDA 3ND Tag: 25 YR Event: 25 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 25 YR


                    SCS UNIT HYDROGRAPH METHOD


                    STORM EVENT: 25 year storm
                    Duration = 24.0000 hrs Rain Depth = 5.5000 in
                    Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                    Rain File -ID = -TypeIII 24hr
                    Unit Hyd Type = Default Curvilinear
                    HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                    HYGFile -ID = -PRDA3ND25YR
                    Tc = .7240 hrs
                    Drainage Area = 119.740 acres Runoff CN= 58


                    ===========================================
                    Computational Time Increment = .09653 hrs
                    Computed Peak Time = 12.5485 hrs
                    Computed Peak Flow = 85.89 cfs


                    Time Increment for HYG File = .1000 hrs
                    Peak Time, Interpolated Output = 12.6000 hrs
                    Peak Flow, Interpolated Output = 85.14 cfs
                    ===========================================
```

```
                                    DRAINAGE AREA


                                ID:PRDA 3ND
                                CN = 58
                                Area = 119.740 acres
                                S = 7.2414 in
                                0.2S = 1.4483 in


                                 Cumulative Runoff


                                        1.4537 in

                                        14.505 ac-ft


                        HYG Volume... 14.499 ac-ft (area under HYG curve)


                        ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                        Time Concentration, Tc = .72395 hrs (ID: PRDA 3ND)
                        Computational Incr, Tm = .09653 hrs = 0.20000 Tp


                        Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                        K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                        Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                        Unit peak, qp = 187.40 cfs
                        Unit peak time Tp = .48264 hrs
                        Unit receding limb, Tr = 1.93054 hrs
                        Total unit time, Tb = 2.41318 hrs

Type.... Unit Hyd. Summary Page 5.16
Name.... PRDA 3ND Tag: 50 YR Event: 50 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 50 YR


                        SCS UNIT HYDROGRAPH METHOD


                        STORM EVENT: 50 year storm
                        Duration = 24.0000 hrs Rain Depth = 6.2000 in
                        Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                        Rain File -ID = -TypeIII 24hr
                        Unit Hyd Type = Default Curvilinear
                        HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                        HYGFile -ID = -PRDA3ND50YR
                        Tc = .7240 hrs
                        Drainage Area = 119.740 acres Runoff CN= 58


                        ==========================================
                        Computational Time Increment = .09653 hrs
                        Computed Peak Time = 12.5485 hrs
                        Computed Peak Flow = 115.39 cfs


                        Time Increment for HYG File = .1000 hrs
                        Peak Time, Interpolated Output = 12.6000 hrs
```

```
                Peak Flow, Interpolated Output = 113.70 cfs
                ===========================================


                                    DRAINAGE AREA


                              ID:PRDA 3ND
                              CN = 58
                              Area = 119.740 acres
                              S = 7.2414 in
                              0.2S = 1.4483 in


                               Cumulative Runoff


                                      1.8827 in

                                      18.786 ac-ft


                HYG Volume... 18.777 ac-ft (area under HYG curve)


                ***** SCS UNIT HYDROGRAPH PARAMETERS *****


                Time Concentration, Tc = .72395 hrs (ID: PRDA 3ND)
                Computational Incr, Tm = .09653 hrs = 0.20000 Tp


                Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
                K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
                Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


                Unit peak, qp = 187.40 cfs
                Unit peak time Tp = .48264 hrs
                Unit receding limb, Tr = 1.93054 hrs
                Total unit time, Tb = 2.41318 hrs

Type.... Unit Hyd. Summary Page 5.17
Name.... PRDA 3ND Tag: 100 YR Event: 100 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 100 YR


                SCS UNIT HYDROGRAPH METHOD


                STORM EVENT: 100 year storm
                Duration = 24.0000 hrs Rain Depth = 7.0000 in
                Rain Dir = C:\Program Files\Haestad\PPKW\PPW\
                Rain File -ID = -TypeIII 24hr
                Unit Hyd Type = Default Curvilinear
                HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
                HYGFile -ID = -PRDA3ND100YR
                Tc = .7240 hrs
                Drainage Area = 119.740 acres Runoff CN= 58


                ===========================================
                Computational Time Increment = .09653 hrs
                Computed Peak Time = 12.5485 hrs
                Computed Peak Flow = 151.40 cfs
```

```
Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.5000 hrs
Peak Flow, Interpolated Output = 148.53 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%
==========================================


                              DRAINAGE AREA


                    ID:PRDA 3ND
                    CN = 58
                    Area = 119.740 acres
                    S = 7.2414 in
                    0.2S = 1.4483 in


                     Cumulative Runoff


                            2.4092 in

                            24.040 ac-ft


HYG Volume... 24.028 ac-ft (area under HYG curve)


***** SCS UNIT HYDROGRAPH PARAMETERS *****


Time Concentration, Tc = .72395 hrs (ID: PRDA 3ND)
Computational Incr, Tm = .09653 hrs = 0.20000 Tp


Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)


Unit peak, qp = 187.40 cfs
Unit peak time Tp = .48264 hrs
Unit receding limb, Tr = 1.93054 hrs
Total unit time, Tb = 2.41318 hrs

Type.... Node: Addition Summary Page 6.01
Name.... DP 3 Event: 2 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR


          SUMMARY FOR HYDROGRAPH ADDITION
          at Node: DP 3


HYG Directory: C:\Program Files\Haestad\PPKW\PPW\


================================================================================
Upstream Link ID Upstream Node ID HYG file HYG ID HYG tag


TO DP3 JUNCTION JUNCTION 2 YR
================================================================================
```

INFLOWS TO: DP 3
----------Volume Peak Time Peak Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

JUNCTION 2 YR 3.682 12.7000 13.60

TOTAL FLOW INTO: DP 3
----------Volume Peak Time Peak Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

DP 3 2 YR 3.682 12.7000 13.60

Type.... Node: Addition Summary Page 6.02
Name.... DP 3 Event: 2 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYGTag =2YR

Peak Discharge = 13.60 cfs
Time to Peak = 12.7000 hrs
HYG Volume = 3.682 ac-ft

HYDROGRAPH ORDINATES (cfs)
Time | Output Time increment = .1000 hrs
hrs | Time on left represents time for first value in each row.

11.8000	.00	.00	.10	.63	2.03
12.3000	4.52	7.65	10.56	12.65	13.60
12.8000	13.49	12.74	11.75	10.76	9.88
13.3000	9.12	8.49	7.97	7.55	7.21
13.8000	6.92	6.68	6.46	6.25	6.06
14.3000	5.87	5.70	5.55	5.41	5.29
14.8000	5.18	5.07	4.97	4.88	4.78
15.3000	4.68	4.58	4.47	4.37	4.26
15.8000	4.15	4.04	3.92	3.81	3.69
16.3000	3.58	3.48	3.39	3.30	3.23
16.8000	3.16	3.10	3.04	2.98	2.92
17.3000	2.86	2.81	2.75	2.70	2.64
17.8000	2.58	2.53	2.47	2.41	2.36
18.3000	2.30	2.25	2.21	2.18	2.14
18.8000	2.12	2.09	2.07	2.05	2.03
19.3000	2.02	2.00	1.98	1.96	1.95
19.8000	1.93	1.91	1.89	1.88	1.86
20.3000	1.84	1.83	1.81	1.80	1.78
20.8000	1.77	1.76	1.74	1.73	1.72
21.3000	1.70	1.69	1.68	1.66	1.65
21.8000	1.64	1.62	1.61	1.60	1.58
22.3000	1.57	1.56	1.54	1.53	1.52
22.8000	1.50	1.49	1.47	1.46	1.45
23.3000	1.43	1.42	1.40	1.39	1.38
23.8000	1.36	1.35	1.33	1.29	1.21
24.3000	1.08	.90	.71	.54	.40
24.8000	.30	.23	.17	.14	.11

25.3000 |	.09	.07	.06	.05	.05
25.8000 |	.04	.04	.03	.03	.03
26.3000 |	.03	.03	.03	.03	.03
26.8000 |	.02	.02	.02	.02	.02

Type.... Node: Addition Summary Page 6.03
Name.... DP 3 Event: 2 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .1000 hrs

hrs | Time on left represents time for first value in each row.

27.3000 |	.02	.02	.02	.02	.02
27.8000 |	.02	.02	.02	.02	.02
28.3000 |	.01	.01	.01	.01	.01
28.8000 |	.01	.01	.01	.01	.01
29.3000 |	.01	.01	.01	.01	.01
29.8000 |	.01	.01	.01	.01	.01
30.3000 |	.01	.01	.01	.01	.01
30.8000 |	.01	.00	.00	.00	.00
31.3000 |	.00	.00	.00	.00	.00
31.8000 |	.00	.00	.00	.00	.00
32.3000 |	.00	.00	.00	.00	

Type.... Node: Addition Summary Page 6.04
Name.... DP 3 Event: 10 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 10 YR

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

==========Upstream Link ID Upstream Node ID HYG file HYG ID HYG tag

TO DP3 JUNCTION JUNCTION 10 YR
==========

INFLOWS TO: DP 3
----------Volume Peak Time Peak Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

JUNCTION 10 YR 10.786 12.6000 56.75

TOTAL FLOW INTO: DP 3
----------Volume Peak Time Peak Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

DP 3 10 YR 10.786 12.6000 56.75

Type.... Node: Addition Summary Page 6.05
Name.... DP 3 Event: 10 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 10 YR

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYGTag =10YR

Peak Discharge = 56.75 cfs
Time to Peak = 12.6000 hrs
HYG Volume = 10.786 ac-ft

HYDROGRAPH ORDINATES (cfs)
Time | Output Time increment = .1000 hrs
hrs | Time on left represents time for first value in each row.

---------|-------

11.4000 |	.00	.00	.01	.09	.46
11.9000 |	1.67	4.92	11.72	22.40	35.17
12.4000 |	46.57	54.03	56.75	55.06	50.45
12.9000 |	44.83	39.38	34.58	30.57	27.33
13.4000 |	24.73	22.65	21.00	19.68	18.61
13.9000 |	17.72	16.94	16.23	15.58	14.97
14.4000 |	14.43	13.96	13.56	13.20	12.88
14.9000 |	12.58	12.30	12.02	11.75	11.47

15.4000 |	11.20	10.92	10.64	10.36	10.07
15.9000 |	9.78	9.49	9.20	8.90	8.62
16.4000 |	8.37	8.13	7.92	7.73	7.55
16.9000 |	7.39	7.23	7.08	6.94	6.79
17.4000 |	6.65	6.51	6.36	6.22	6.08
17.9000 |	5.94	5.79	5.65	5.51	5.38
18.4000 |	5.26	5.15	5.06	4.98	4.91
18.9000 |	4.84	4.77	4.72	4.66	4.61
19.4000 |	4.56	4.51	4.46	4.41	4.36
19.9000 |	4.31	4.27	4.22	4.18	4.13
20.4000 |	4.09	4.05	4.01	3.98	3.94
20.9000 |	3.91	3.87	3.84	3.81	3.78
21.4000 |	3.74	3.71	3.68	3.65	3.62
21.9000 |	3.58	3.55	3.52	3.49	3.46
22.4000 |	3.43	3.39	3.36	3.33	3.30
22.9000 |	3.26	3.23	3.20	3.17	3.13
23.4000 |	3.10	3.07	3.03	3.00	2.97
23.9000 |	2.94	2.89	2.81	2.64	2.34
24.4000 |	1.95	1.53	1.16	.85	.63
24.9000 |	.47	.36	.27	.21	.17
25.4000 |	.13	.11	.09	.08	.07
25.9000 |	.06	.05	.05	.04	.04
26.4000 |	.04	.03	.03	.03	.03

Type.... Node: Addition Summary Page 6.06
Name.... DP 3 Event: 10 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 10 YR

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .1000 hrs

hrs | Time on left represents time for first value in each row.

---------|---

26.9000 |	.03	.03	.03	.03	.03
27.4000 |	.03	.02	.02	.02	.02
27.9000 |	.02	.02	.02	.02	.02
28.4000 |	.02	.02	.02	.02	.02
28.9000 |	.02	.01	.01	.01	.01
29.4000 |	.01	.01	.01	.01	.01
29.9000 |	.01	.01	.01	.01	.01
30.4000 |	.01	.01	.01	.01	.01
30.9000 |	.01	.01	.01	.01	.01
31.4000 |	.01	.01	.00	.00	.00
31.9000 |	.00	.00	.00	.00	.00
32.4000 |	.00	.00	.00	.00	.00
32.9000 |	.00	.00	.00	.00	.00
33.4000 |	.00				

Type.... Node: Addition Summary Page 6.07
Name.... DP 3 Event: 25 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 25 YR

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

==========Upstream Link ID Upstream Node ID HYG file HYG ID HYG tag

TO DP3 JUNCTION JUNCTION 25 YR
==========

INFLOWS TO: DP 3
----------Volume Peak Time Peak Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

JUNCTION 25 YR 15.529 12.6000 88.03

TOTAL FLOW INTO: DP 3
----------Volume Peak Time Peak Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

DP 3 25 YR 15.529 12.6000 88.03

Type.... Node: Addition Summary Page 6.08
Name.... DP 3 Event: 25 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 25 YR

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYGTag =25YR

Peak Discharge = 88.03 cfs
Time to Peak = 12.6000 hrs
HYG Volume = 15.529 ac-ft

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .1000 hrs

hrs | Time on left represents time for first value in each row.

11.0000	.00	.00	.00	.02	.09
11.5000	.27	.65	1.46	3.08	6.34
12.0000	12.86	24.38	41.06	59.77	75.83
12.5000	85.62	88.03	83.96	75.89	66.70
13.0000	58.02	50.47	44.23	39.20	35.16
13.5000	31.95	29.41	27.39	25.75	24.39
14.0000	23.22	22.16	21.20	20.32	19.54
14.5000	18.87	18.29	17.78	17.33	16.91
15.0000	16.50	16.11	15.72	15.33	14.96
15.5000	14.58	14.20	13.81	13.43	13.04
16.0000	12.65	12.26	11.87	11.50	11.15
16.5000	10.84	10.55	10.29	10.05	9.83
17.0000	9.62	9.41	9.21	9.02	8.82
17.5000	8.63	8.44	8.25	8.06	7.87
18.0000	7.68	7.49	7.31	7.13	6.98
18.5000	6.84	6.72	6.61	6.52	6.44
19.0000	6.36	6.29	6.22	6.15	6.08
19.5000	6.02	5.96	5.89	5.83	5.77
20.0000	5.71	5.64	5.58	5.52	5.46
20.5000	5.40	5.35	5.30	5.25	5.20
21.0000	5.15	5.10	5.05	5.01	4.96
21.5000	4.92	4.87	4.82	4.78	4.74
22.0000	4.69	4.65	4.61	4.56	4.52
22.5000	4.47	4.43	4.38	4.34	4.30
23.0000	4.25	4.21	4.17	4.12	4.08
23.5000	4.03	3.99	3.95	3.90	3.86
24.0000	3.80	3.69	3.46	3.07	2.56
24.5000	2.01	1.52	1.11	.82	.61
25.0000	.46	.35	.27	.21	.17
25.5000	.14	.11	.09	.08	.07
26.0000	.06	.05	.05	.05	.04

Type.... Node: Addition Summary Page 6.09
Name.... DP 3 Event: 25 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 25 YR

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .1000 hrs

hrs | Time on left represents time for first value in each row.

26.5000	.04	.04	.03	.03	.03
27.0000	.03	.03	.03	.03	.03

27.5000 |	.03	.03	.02	.02	.02
28.0000 |	.02	.02	.02	.02	.02
28.5000 |	.02	.02	.02	.02	.02
29.0000 |	.02	.02	.01	.01	.01
29.5000 |	.01	.01	.01	.01	.01
30.0000 |	.01	.01	.01	.01	.01
30.5000 |	.01	.01	.01	.01	.01
31.0000 |	.01	.01	.01	.01	.01
31.5000 |	.01	.01	.01	.00	.00
32.0000 |	.00	.00	.00	.00	.00
32.5000 |	.00	.00	.00	.00	.00
33.0000 |	.00	.00	.00	.00	.00
33.5000 |	.00	.00			

Type.... Node: Addition Summary Page 6.10
Name.... DP 3 Event: 50 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 50 YR

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

==========Upstrea
m Link ID Upstream Node ID HYG file HYG ID HYG tag

TO DP3 JUNCTION JUNCTION 50 YR
==========

INFLOWS TO: DP 3
----------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

JUNCTION 50 YR 20.087 12.6000 117.89

TOTAL FLOW INTO: DP 3
----------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

DP 3 50 YR 20.087 12.6000 117.89

Type.... Node: Addition Summary Page 6.11
Name.... DP 3 Event: 50 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 50 YR

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYGTag =50YR

Peak Discharge = 117.89 cfs
Time to Peak = 12.6000 hrs
HYG Volume = 20.087 ac-ft

HYDROGRAPH ORDINATES (cfs)
Time | Output Time increment = .1000 hrs
hrs | Time on left represents time for first value in each row.

10.5000	.00	.00	.00	.01	.02
11.0000	.06	.17	.38	.73	1.26
11.5000	1.99	3.02	4.65	7.44	12.49
12.0000	21.83	37.63	59.75	84.41	104.89
12.5000	116.26	117.89	111.14	99.60	86.99
13.0000	75.33	65.31	57.09	50.48	45.19
13.5000	40.91	37.48	34.74	32.53	30.69
14.0000	29.11	27.71	26.43	25.26	24.23
14.5000	23.36	22.61	21.95	21.37	20.83
15.0000	20.32	19.82	19.33	18.85	18.37
15.5000	17.89	17.41	16.93	16.45	15.96
16.0000	15.47	14.98	14.51	14.05	13.62
16.5000	13.23	12.88	12.57	12.29	12.02
17.0000	11.76	11.51	11.27	11.02	10.78
17.5000	10.55	10.31	10.08	9.84	9.61
18.0000	9.38	9.14	8.92	8.70	8.51
18.5000	8.34	8.19	8.06	7.95	7.85
19.0000	7.76	7.67	7.59	7.51	7.43
19.5000	7.35	7.28	7.20	7.13	7.05
20.0000	6.98	6.90	6.83	6.76	6.69
20.5000	6.62	6.56	6.50	6.43	6.37
21.0000	6.32	6.26	6.20	6.14	6.08
21.5000	6.02	5.97	5.91	5.85	5.80
22.0000	5.74	5.69	5.63	5.58	5.52
22.5000	5.46	5.41	5.35	5.30	5.24
23.0000	5.19	5.13	5.08	5.02	4.97
23.5000	4.91	4.86	4.80	4.75	4.69
24.0000	4.63	4.49	4.21	3.73	3.10
24.5000	2.44	1.84	1.34	.99	.73
25.0000	.55	.42	.32	.25	.20
25.5000	.16	.13	.11	.09	.08

Type.... Node: Addition Summary Page 6.12

Name.... DP 3 Event: 50 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 50 YR

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .1000 hrs

hrs | Time on left represents time for first value in each row.

---------|---

26.0000 |	.07	.06	.05	.05	.05
26.5000 |	.04	.04	.04	.04	.03
27.0000 |	.03	.03	.03	.03	.03
27.5000 |	.03	.03	.03	.03	.02
28.0000 |	.02	.02	.02	.02	.02
28.5000 |	.02	.02	.02	.02	.02
29.0000 |	.02	.02	.02	.02	.01
29.5000 |	.01	.01	.01	.01	.01
30.0000 |	.01	.01	.01	.01	.01
30.5000 |	.01	.01	.01	.01	.01
31.0000 |	.01	.01	.01	.01	.01
31.5000 |	.01	.01	.01	.01	.01
32.0000 |	.00	.00	.00	.00	.00
32.5000 |	.00	.00	.00	.00	.00
33.0000 |	.00	.00	.00	.00	.00
33.5000 |	.00	.00	.00	.00	

Type.... Node: Addition Summary Page 6.13
Name.... DP 3 Event: 100 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 100 YR

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

==========Upstrea
m Link ID Upstream Node ID HYG file HYG ID HYG tag

TO DP3 JUNCTION JUNCTION 100 YR
==========

INFLOWS TO: DP 3
----------Volume Peak Time Peak

Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

JUNCTION 100 YR 25.678 12.6000 154.00

TOTAL FLOW INTO: DP 3
----------Volume Peak Time Peak
Flow
HYG file HYG ID HYG tag ac-ft hrs cfs

DP 3 100 YR 25.678 12.6000 154.00

Type.... Node: Addition Summary Page 6.14
Name.... DP 3 Event: 100 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 100 YR

TOTAL NODE INFLOW...
HYG file =
HYGID =DP3
HYG Tag = 100 YR

Peak Discharge = 154.00 cfs
Time to Peak = 12.6000 hrs
HYG Volume = 25.678 ac-ft

HYDROGRAPH ORDINATES (cfs)
Time | Output Time increment = .1000 hrs
hrs | Time on left represents time for first value in each row.

---------|----------

10.1000 |	.00	.00	.00	.01	.03
10.6000 |	.08	.20	.42	.74	1.18
11.1000 |	1.72	2.38	3.19	4.18	5.41
11.6000 |	7.04	9.48	13.53	20.63	33.38
12.1000 |	54.33	83.43	115.31	140.31	153.38
12.6000 |	154.00	144.09	128.25	111.32	95.86
13.1000 |	82.70	72.05	63.55	56.78	51.40
13.6000 |	47.14	43.74	40.97	38.63	36.55
14.1000 |	34.66	32.93	31.37	30.00	28.84
14.6000 |	27.86	27.00	26.23	25.52	24.86
15.1000 |	24.22	23.60	22.99	22.39	21.80
15.6000 |	21.20	20.61	20.01	19.40	18.80

16.1000 |	18.20	17.61	17.04	16.51	16.03
16.6000 |	15.60	15.22	14.87	14.54	14.22
17.1000 |	13.92	13.63	13.34	13.05	12.77
17.6000 |	12.49	12.21	11.93	11.64	11.36
18.1000 |	11.07	10.80	10.54	10.30	10.09
18.6000 |	9.91	9.76	9.62	9.50	9.38
19.1000 |	9.28	9.18	9.08	8.99	8.90
19.6000 |	8.81	8.72	8.63	8.54	8.45
20.1000 |	8.36	8.27	8.18	8.10	8.02
20.6000 |	7.95	7.87	7.80	7.73	7.65
21.1000 |	7.59	7.52	7.45	7.38	7.31
21.6000 |	7.25	7.18	7.11	7.04	6.97
22.1000 |	6.91	6.84	6.77	6.70	6.63
22.6000 |	6.56	6.49	6.42	6.36	6.29
23.1000 |	6.22	6.15	6.08	6.02	5.95
23.6000 |	5.88	5.81	5.75	5.68	5.59
24.1000 |	5.43	5.09	4.51	3.75	2.95
24.6000 |	2.21	1.62	1.19	.88	.66
25.1000 |	.50	.38	.30	.23	.19

Type.... Node: Addition Summary Page 6.15
Name.... DP 3 Event: 100 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 100 YR

HYDROGRAPH ORDINATES (cfs)

Time | Output Time increment = .1000 hrs

hrs | Time on left represents time for first value in each row.

---------|--

25.6000 |	.15	.13	.10	.09	.08
26.1000 |	.07	.06	.05	.05	.05
26.6000 |	.04	.04	.04	.04	.03
27.1000 |	.03	.03	.03	.03	.03
27.6000 |	.03	.03	.03	.03	.02
28.1000 |	.02	.02	.02	.02	.02
28.6000 |	.02	.02	.02	.02	.02
29.1000 |	.02	.02	.02	.02	.01
29.6000 |	.01	.01	.01	.01	.01
30.1000 |	.01	.01	.01	.01	.01
30.6000 |	.01	.01	.01	.01	.01
31.1000 |	.01	.01	.01	.01	.01
31.6000 |	.01	.01	.01	.01	.01
32.1000 |	.00	.00	.00	.00	.00
32.6000 |	.00	.00	.00	.00	.00
33.1000 |	.00	.00	.00	.00	.00
33.6000 |	.00	.00	.00	.00	

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)

```
 1266.00 -----.0600 .0000 .000 .000
 1268.00 -----.1200 .2649 .177 .177
 1270.00 -----.1800 .4470 .298 .475
```

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

Elevation (ft)	Planimeter (sq.in)	Area A1 (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1240.00	-----.0400	.0000	.000	.000	
1242.00	-----.0800	.1766	.118	.118	
1244.00	-----.1200	.2980	.199	.316	

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

```
   where: EL1, EL2 = Lower and upper elevations of the
          increment
          Area1,Area2 = Areas computed for EL1, EL2,
          respectively
          Volume = Incremental volume between EL1 and EL2

File....   C:\Program   Files\Haestad\PPKW\PPW\3093   PRDA   3.PPW


              REQUESTED        POND        WS        ELEVATIONS:


                Min.    Elev.=    1266.00    ft
                Increment     =      .10     ft
                Max.    Elev.=    1270.00    ft


             ****************************
                        OUTLET CONNECTIVITY
                        ******************

         ---> Forward Flow Only (UpStream to DnStream)

        <---Reverse  Flow  Only  (DnStream  to  UpStream)

        <--->     Forward     and     Reverse     Both     Allowed


              Structure No. Outfall E1, ft E2, ft


  Weir-Rectangular     4     --->     TW     1269.250     1270.000
  Weir-Rectangular     3     --->     TW     1269.000     1270.000
  Orifice-Circular     2     --->     TW     1267.500     1270.000
  Orifice-Circular     1     --->     TW     1266.000     1270.000
  TW               SETUP,                DS                Channel

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


          OUTLET STRUCTURE INPUT DATA



          Structure ID = 4
          Structure Type = Weir-Rectangular
```

```
          # of Openings = 1
          Crest Elev. = 1269.25 ft
          Weir Length = 15.00 ft
          Weir Coeff. = 1.000000


          Weir TW effects (Use adjustment equation)



          Structure ID = 3
          Structure Type = Weir-Rectangular


          # of Openings = 1
          Crest Elev. = 1269.00 ft
          Weir Length = 8.00 ft
          Weir Coeff. = .600000

          Weir TW effects (Use adjustment equation)



          Structure ID = 2
          Structure Type = Orifice-Circular


          # of Openings = 1
          Invert Elev. = 1267.50 ft
          Diameter = .7500 ft
          Orifice Coeff. = .600

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


          OUTLET STRUCTURE INPUT DATA



          Structure ID = 1
          Structure Type = Orifice-Circular
```

```
          # of Openings = 1
          Invert Elev. = 1266.00 ft
          Diameter = .4170 ft
          Orifice Coeff. = .600



          Structure ID = TW
          Structure Type = TW SETUP, DS Channel


          FREE OUTFALL CONDITIONS SPECIFIED


          CONVERGENCE TOLERANCES...
          Maximum Iterations= 30
          Min. TW tolerance = .01 ft
          Max. TW tolerance = .01 ft
          Min. HW tolerance = .01 ft
          Max. HW tolerance = .01 ft
          Min. Q tolerance = .10 cfs
          Max. Q tolerance = .10 cfs

File....  C:\Program  Files\Haestad\PPKW\PPW\3093  PRDA  3.PPW


           RATING    TABLE    FOR    ONE    OUTLET    TYPE


           Structure    ID    =    4    (Weir-Rectangular)


           Upstream  ID  =  (Pond  Water  Surface)
           DNstream   ID   =   TW   (Pond   Outfall)


WS       Elev,Device       Q       Tail       Water       Notes


WS Elev.  Q  TW Elev  Converge
  ft  cfs  ft  +/-ft  Computation Messages

1266.00   .00   Free   Outfall   HW   &   TW   below   Inv.El.=1269.250
1266.10   .00   Free   Outfall   HW   &   TW   below   Inv.El.=1269.250
1266.20   .00   Free   Outfall   HW   &   TW   below   Inv.El.=1269.250
1266.30   .00   Free   Outfall   HW   &   TW   below   Inv.El.=1269.250
```

1266.40	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1266.50	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1266.60	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1266.70	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1266.80	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1266.90	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.00	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.10	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.20	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.30	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.40	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.50	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.60	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.70	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.80	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1267.90	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.00	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.10	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.20	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.30	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.40	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.50	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.60	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.70	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.80	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1268.90	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1269.00	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1269.10	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1269.20	.00	Free	Outfall	HW	&	TW	below	Inv.El.=1269.250
1269.25	.00	Free	Outfall	H=.00;		Htw=.00;		Qfree=.00;

```
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

          RATING TABLE FOR ONE OUTLET TYPE
          Structure ID = 4 (Weir-Rectangular)
          Upstream ID = (Pond Water Surface)

          DNstream ID = TW (Pond Outfall)
```

WS Elev,Device Q Tail Water Notes

WS Elev. ft	Q cfs	ft +/-ft	TW Elev Converge Computation Messages
1269.30	.17	Free Outfall	H=.05; Htw=.00; Qfree=.17;
1269.40	.87	Free Outfall	H=.15; Htw=.00; Qfree=.87;
1269.50	1.88	Free Outfall	H=.25; Htw=.00; Qfree=1.88;
1269.60	3.11	Free Outfall	H=.35; Htw=.00; Qfree=3.11;
1269.70	4.53	Free Outfall	H=.45; Htw=.00; Qfree=4.53;
1269.80	6.12	Free Outfall	H=.55; Htw=.00; Qfree=6.12;
1269.90	7.86	Free Outfall	H=.65; Htw=.00; Qfree=7.86;
1270.00	9.74	Free Outfall	H=.75; Htw=.00; Qfree=9.74;

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 3 (Weir-Rectangular)

Upstream ID = (Pond Water Surface)
DNstream ID = TW (Pond Outfall)

WS Elev,Device Q Tail Water Notes

WS Elev. Q TW Elev Converge
ft cfs ft +/-ft Computation Messages

1266.00 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.10 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.20 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.30 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.40 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.50 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.60 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.70 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.80 .00 Free Outfall HW & TW below Inv.El.=1269.000
1266.90 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.00 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.10 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.20 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.30 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.40 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.50 .00 Free Outfall HW & TW below Inv.El.=1269.000

```
1267.60 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.70 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.80 .00 Free Outfall HW & TW below Inv.El.=1269.000
1267.90 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.00 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.10 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.20 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.30 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.40 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.50 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.60 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.70 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.80 .00 Free Outfall HW & TW below Inv.El.=1269.000
1268.90 .00 Free Outfall HW & TW below Inv.El.=1269.000
1269.00 .00 Free Outfall H=.00; Htw=.00; Qfree=.00;
1269.10 .15 Free Outfall H=.10; Htw=.00; Qfree=.15;
1269.20 .43 Free Outfall H=.20; Htw=.00; Qfree=.43;
1269.25 .60 Free Outfall H=.25; Htw=.00; Qfree=.60;

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

            RATING TABLE FOR ONE OUTLET TYPE
            Structure ID = 3 (Weir-Rectangular)
            Upstream ID = (Pond Water Surface)


            DNstream ID = TW (Pond Outfall)
```

WS Elev,Device Q		Tail Water	Notes
WS Elev.	Q		TW Elev Converge
ft	cfs	ft +/-ft	Computation Messages
1269.30	.79	Free Outfall	H=.30; Htw=.00; Qfree=.79;
1269.40	1.21	Free Outfall	H=.40; Htw=.00; Qfree=1.21;
1269.50	1.70	Free Outfall	H=.50; Htw=.00; Qfree=1.70;
1269.60	2.23	Free Outfall	H=.60; Htw=.00; Qfree=2.23;
1269.70	2.81	Free Outfall	H=.70; Htw=.00; Qfree=2.81;
1269.80	3.43	Free Outfall	H=.80; Htw=.00; Qfree=3.43;
1269.90	4.10	Free Outfall	H=.90; Htw=.00; Qfree=4.10;
1270.00	4.80	Free Outfall	H=1.00; Htw=.00; Qfree=4.80;

Type.... Individual Outlet Curves Page 8.08
Name.... Outlet 1

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
DNstream ID = TW (Pond Outfall)

WS Elev,Device Q Tail Water Notes

WS Elev. Q TW Elev Converge
ft cfs ft +/-ft Computation Messages

1266.00 .00 Free Outfall HW & TW below invert
1266.10 .00 Free Outfall HW & TW below invert
1266.20 .00 Free Outfall HW & TW below invert
1266.30 .00 Free Outfall HW & TW below invert
1266.40 .00 Free Outfall HW & TW below invert
1266.50 .00 Free Outfall HW & TW below invert
1266.60 .00 Free Outfall HW & TW below invert
1266.70 .00 Free Outfall HW & TW below invert
1266.80 .00 Free Outfall HW & TW below invert
1266.90 .00 Free Outfall HW & TW below invert
1267.00 .00 Free Outfall HW & TW below invert
1267.10 .00 Free Outfall HW & TW below invert
1267.20 .00 Free Outfall HW & TW below invert
1267.30 .00 Free Outfall HW & TW below invert
1267.40 .00 Free Outfall HW & TW below invert
1267.50 .00 Free Outfall Upstream HW & DNstream TW < Inv.El
1267.60 .03 Free Outfall CRIT.DEPTH CONTROL Vh= .024ft Dcr= .076ft CRIT.DEPTH
1267.70 .11 Free Outfall CRIT.DEPTH CONTROL Vh= .053ft Dcr= .146ft CRIT.DEPTH
1267.80 .24 Free Outfall CRIT.DEPTH CONTROL Vh= .080ft Dcr= .220ft CRIT.DEPTH
1267.90 .42 Free Outfall CRIT.DEPTH CONTROL Vh= .109ft Dcr= .291ft CRIT.DEPTH
1268.00 .63 Free Outfall CRIT.DEPTH CONTROL Vh= .140ft Dcr= .360ft CRIT.DEPTH
1268.10 .86 Free Outfall CRIT.DEPTH CONTROL Vh= .175ft Dcr= .425ft CRIT.DEPTH
1268.20 1.12 Free Outfall CRIT.DEPTH CONTROL Vh= .212ft Dcr= .488ft CRIT.DEPTH
1268.30 1.39 Free Outfall H =.43
1268.40 1.54 Free Outfall H =.53
1268.50 1.68 Free Outfall H =.63
1268.60 1.81 Free Outfall H =.72
1268.70 1.93 Free Outfall H =.82
1268.80 2.05 Free Outfall H =.93
1268.90 2.15 Free Outfall H =1.03
1269.00 2.26 Free Outfall H =1.13
1269.10 2.35 Free Outfall H =1.22
1269.20 2.45 Free Outfall H =1.32
1269.25 2.49 Free Outfall H =1.38

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS Elev,Device Q		Tail Water	Notes
WS Elev. ft	Q cfs	ft +/-ft	TW Elev Converge Computation Messages
1269.30	2.54	Free Outfall	H =1.43
1269.40	2.63	Free Outfall	H =1.53
1269.50	2.71	Free Outfall	H =1.63
1269.60	2.79	Free Outfall	H =1.72
1269.70	2.87	Free Outfall	H =1.82
1269.80	2.95	Free Outfall	H =1.93
1269.90	3.03	Free Outfall	H =2.03
1270.00	3.10	Free Outfall	H =2.13

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = 1 (Orifice-Circular)
Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS Elev,Device Q

WS Elev. ft	Q cfs
1266.00	.00
1266.10	.02
1266.20	.08
1266.30	.17
1266.40	.27
1266.50	.35
1266.60	.41
1266.70	.46
1266.80	.51

1266.90	.55
1267.00	.58
1267.10	.62
1267.20	.65
1267.30	.69
1267.40	.72
1267.50	.75
1267.60	.78
1267.70	.80
1267.80	.83
1267.90	.85
1268.00	.88
1268.10	.90
1268.20	.93
1268.30	.95
1268.40	.97
1268.50	1.00
1268.60	1.02
1268.70	1.04
1268.80	1.06
1268.90	1.08
1269.00	1.10
1269.10	1.12
1269.20	1.14
1269.25	1.15

Tail		Water
	TW Elev Converge ft +/-ft	
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
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Free	Outfall
Free	Outfall

Notes

Computation Messages

Upstream HW & DNstream TW < Inv.El

CRIT.DEPTH CONTROL	Vh= .022ft	Dcr= .078ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .054ft	Dcr= .146ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .085ft	Dcr= .215ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .124ft	Dcr= .277ft	CRIT.DEPTH

H =.29

H =.39

H =.49

H =.59

H =.69

H =.79

H =.89

H =.99

H =1.09

H =1.19

H =1.29

H =1.39

H =1.49

H =1.59
H =1.69
H =1.79
H =1.89
H =1.99
H =2.09
H =2.19
H =2.29
H =2.39
H =2.49
H =2.59
H =2.69
H =2.79
H =2.89
H =2.99
H =3.04

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = 1 (Orifice-Circular)
Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS Elev,Device Q		Tail Water	Notes
WS Elev.	Q	TW Elev Converge	
ft	cfs	ft +/-ft	Computation Messages
1269.30	1.16	Free Outfall	H =3.09
1269.40	1.17	Free Outfall	H =3.19
1269.50	1.19	Free Outfall	H =3.29
1269.60	1.21	Free Outfall	H =3.39
1269.70	1.23	Free Outfall	H =3.49
1269.80	1.25	Free Outfall	H =3.59
1269.90	1.26	Free Outfall	H =3.69
1270.00	1.28	Free Outfall	H =3.79

Type.... Composite Rating Curve Page 8.12
Name.... Outlet 1
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q			Notes
			Converge
Elev.	Q	TW Elev Error	
ft	cfs	ft +/-ft	Contributing Structures
1266.00	.00	Free Outfall	None contributing
1266.10	.02	Free Outfall	1
1266.20	.08	Free Outfall	1
1266.30	.17	Free Outfall	1
1266.40	.27	Free Outfall	1
1266.50	.35	Free Outfall	1
1266.60	.41	Free Outfall	1
1266.70	.46	Free Outfall	1
1266.80	.51	Free Outfall	1
1266.90	.55	Free Outfall	1
1267.00	.58	Free Outfall	1
1267.10	.62	Free Outfall	1
1267.20	.65	Free Outfall	1
1267.30	.69	Free Outfall	1
1267.40	.72	Free Outfall	1
1267.50	.75	Free Outfall	1
1267.60	.80	Free Outfall	2 +1
1267.70	.91	Free Outfall	2 +1
1267.80	1.07	Free Outfall	2 +1
1267.90	1.27	Free Outfall	2 +1
1268.00	1.51	Free Outfall	2 +1
1268.10	1.77	Free Outfall	2 +1
1268.20	2.05	Free Outfall	2 +1
1268.30	2.34	Free Outfall	2 +1
1268.40	2.51	Free Outfall	2 +1
1268.50	2.68	Free Outfall	2 +1
1268.60	2.83	Free Outfall	2 +1
1268.70	2.97	Free Outfall	2 +1
1268.80	3.10	Free Outfall	2 +1
1268.90	3.23	Free Outfall	2 +1
1269.00	3.35	Free Outfall	3 +2 +1
1269.10	3.62	Free Outfall	3 +2 +1
1269.20	4.01	Free Outfall	3 +2 +1
1269.25	4.24	Free Outfall	4 +3 +2 +1
1269.30	4.65	Free Outfall	4 +3 +2 +1
1269.40	5.89	Free Outfall	4 +3 +2 +1
1269.50	7.48	Free Outfall	4 +3 +2 +1
1269.60	9.34	Free Outfall	4 +3 +2 +1

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q Notes
----------Converge ----------

Elev. Q TW Elev Error
ft cfs ft +/-ft Contributing Structures

```
1269.70  11.44  Free  Outfall  4  +3  +2  +1
1269.80  13.75  Free  Outfall  4  +3  +2  +1
1269.90  16.25  Free  Outfall  4  +3  +2  +1
1270.00  18.92  Free  Outfall  4  +3  +2  +1

File....  C:\Program  Files\Haestad\PPKW\PPW\3093  PRDA  3.PPW

            REQUESTED        POND        WS        ELEVATIONS:

              Min.   Elev.=   1240.00   ft
              Increment    =     .10    ft
              Max.   Elev.=   1244.00   ft


           ************************************
                     **********
                     OUTLET CONNECTIVITY
                     *************************
                     *********************

         ---> Forward Flow Only (UpStream to DnStream)

        <---Reverse Flow Only (DnStream to UpStream)

        <--->    Forward    and    Reverse    Both    Allowed

              Structure No. Outfall E1, ft E2, ft

  Weir-Rectangular     4     --->     TW     1243.000     1244.000
  Weir-Rectangular     3     --->     TW     1242.500     1244.000
  Orifice-Circular     2     --->     TW     1241.250     1244.000
  Orifice-Circular     1     --->     TW     1240.000     1244.000
  TW              SETUP,              DS              Channel

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

          OUTLET STRUCTURE INPUT DATA
```

```
          Structure ID = 4
          Structure Type = Weir-Rectangular


          # of Openings = 1
          Crest Elev. = 1243.00 ft
          Weir Length = 15.00 ft
          Weir Coeff. = 1.000000


          Weir TW effects (Use adjustment equation)




          Structure ID = 3
          Structure Type = Weir-Rectangular


          # of Openings = 1
          Crest Elev. = 1242.50 ft
          Weir Length = 8.00 ft
          Weir Coeff. = .600000


          Weir TW effects (Use adjustment equation)




          Structure ID = 2
          Structure Type = Orifice-Circular


          # of Openings = 1
          Invert Elev. = 1241.25 ft
          Diameter = .5000 ft
          Orifice Coeff. = .600

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


          OUTLET STRUCTURE INPUT DATA



          Structure ID = 1
          Structure Type = Orifice-Circular
```

```
          # of Openings = 1
          Invert Elev. = 1240.00 ft
          Diameter = .4170 ft
          Orifice Coeff. = .600



          Structure ID = TW
          Structure Type = TW SETUP, DS Channel


          FREE OUTFALL CONDITIONS SPECIFIED


          CONVERGENCE TOLERANCES...
          Maximum Iterations= 30
          Min. TW tolerance = .01 ft
          Max. TW tolerance = .01 ft
          Min. HW tolerance = .01 ft
          Max. HW tolerance = .01 ft
          Min. Q tolerance = .10 cfs
          Max. Q tolerance = .10 cfs

 File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


            RATING TABLE FOR ONE OUTLET TYPE


            Structure ID = 4 (Weir-Rectangular)


            Upstream ID = (Pond Water Surface)
            DNstream ID = TW (Pond Outfall)


 WS Elev,Device Q Tail Water Notes


 WS Elev. Q TW Elev Converge
   ft cfs ft +/-ft Computation Messages


1240.00 .00 Free Outfall HW & TW below Inv.El.=1243.000
1240.10 .00 Free Outfall HW & TW below Inv.El.=1243.000
```

```
1240.20 .00 Free Outfall HW & TW below Inv.El.=1243.000
1240.30 .00 Free Outfall HW & TW below Inv.El.=1243.000
1240.40 .00 Free Outfall HW & TW below Inv.El.=1243.000
1240.50 .00 Free Outfall HW & TW below Inv.El.=1243.000
1240.60 .00 Free Outfall HW & TW below Inv.El.=1243.000
1240.70 .00 Free Outfall HW & TW below Inv.El.=1243.000
1240.80 .00 Free Outfall HW & TW below Inv.El.=1243.000
1240.90 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.00 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.10 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.20 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.25 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.30 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.40 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.50 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.60 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.70 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.80 .00 Free Outfall HW & TW below Inv.El.=1243.000
1241.90 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.00 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.10 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.20 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.30 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.40 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.50 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.60 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.70 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.80 .00 Free Outfall HW & TW below Inv.El.=1243.000
1242.90 .00 Free Outfall HW & TW below Inv.El.=1243.000
1243.00 .00 Free Outfall H=.00; Htw=.00; Qfree=.00;
1243.10 .47 Free Outfall H=.10; Htw=.00; Qfree=.47;
1243.20 1.34 Free Outfall H=.20; Htw=.00; Qfree=1.34;

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW


           RATING TABLE FOR ONE OUTLET TYPE
           Structure ID = 4 (Weir-Rectangular)
           Upstream ID = (Pond Water Surface)


           DNstream ID = TW (Pond Outfall)
```

WS Elev,Device Q Tail Water Notes

WS Elev. ft	Q cfs	Tail Water ft +/-ft	TW Elev Converge Computation Messages
1243.30	2.47	Free Outfall	H=.30; Htw=.00; Qfree=2.47;
1243.40	3.80	Free Outfall	H=.40; Htw=.00; Qfree=3.80;
1243.50	5.30	Free Outfall	H=.50; Htw=.00; Qfree=5.30;
1243.60	6.97	Free Outfall	H=.60; Htw=.00; Qfree=6.97;
1243.70	8.78	Free Outfall	H=.70; Htw=.00; Qfree=8.78;
1243.80	10.73	Free Outfall	H=.80; Htw=.00; Qfree=10.73;
1243.90	12.81	Free Outfall	H=.90; Htw=.00; Qfree=12.81;
1244.00	15.00	Free Outfall	H=1.00; Htw=.00; Qfree=15.00;

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 3 (Weir-Rectangular)

Upstream ID = (Pond Water Surface)
DNstream ID = TW (Pond Outfall)

WS Elev,Device Q Tail Water Notes

WS Elev. Q TW Elev Converge
ft cfs ft +/-ft Computation Messages

1240.00 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.10 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.20 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.30 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.40 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.50 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.60 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.70 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.80 .00 Free Outfall HW & TW below Inv.El.=1242.500
1240.90 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.00 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.10 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.20 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.25 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.30 .00 Free Outfall HW & TW below Inv.El.=1242.500

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1241.40 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.50 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.60 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.70 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.80 .00 Free Outfall HW & TW below Inv.El.=1242.500
1241.90 .00 Free Outfall HW & TW below Inv.El.=1242.500
1242.00 .00 Free Outfall HW & TW below Inv.El.=1242.500
1242.10 .00 Free Outfall HW & TW below Inv.El.=1242.500
1242.20 .00 Free Outfall HW & TW below Inv.El.=1242.500
1242.30 .00 Free Outfall HW & TW below Inv.El.=1242.500
1242.40 .00 Free Outfall HW & TW below Inv.El.=1242.500
1242.50 .00 Free Outfall H=.00; Htw=.00; Qfree=.00;
1242.60 .15 Free Outfall H=.10; Htw=.00; Qfree=.15;
1242.70 .43 Free Outfall H=.20; Htw=.00; Qfree=.43;
1242.80 .79 Free Outfall H=.30; Htw=.00; Qfree=.79;
1242.90 1.21 Free Outfall H=.40; Htw=.00; Qfree=1.21;
1243.00 1.70 Free Outfall H=.50; Htw=.00; Qfree=1.70;
1243.10 2.23 Free Outfall H=.60; Htw=.00; Qfree=2.23;
1243.20 2.81 Free Outfall H=.70; Htw=.00; Qfree=2.81;

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

            RATING TABLE FOR ONE OUTLET TYPE
            Structure ID = 3 (Weir-Rectangular)
            Upstream ID = (Pond Water Surface)

            DNstream ID = TW (Pond Outfall)
```

WS Elev,Device Q		Tail Water	Notes
WS Elev. ft	Q cfs	ft +/-ft	TW Elev Converge Computation Messages
1243.30	3.43	Free Outfall	H=.80; Htw=.00; Qfree=3.43;
1243.40	4.10	Free Outfall	H=.90; Htw=.00; Qfree=4.10;
1243.50	4.80	Free Outfall	H=1.00; Htw=.00; Qfree=4.80;
1243.60	5.54	Free Outfall	H=1.10; Htw=.00; Qfree=5.54;
1243.70	6.31	Free Outfall	H=1.20; Htw=.00; Qfree=6.31;
1243.80	7.12	Free Outfall	H=1.30; Htw=.00; Qfree=7.12;
1243.90	7.95	Free Outfall	H=1.40; Htw=.00; Qfree=7.95;
1244.00	8.82	Free Outfall	H=1.50; Htw=.00; Qfree=8.82;

```
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
```

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = 2 (Orifice-Circular)
Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS	Elev,Device	Q
WS Elev. ft	Q cfs	
1240.00		.00
1240.10		.00
1240.20		.00
1240.30		.00
1240.40		.00
1240.50		.00
1240.60		.00
1240.70		.00
1240.80		.00
1240.90		.00
1241.00		.00
1241.10		.00
1241.20		.00
1241.25		.00
1241.30		.01
1241.40		.05
1241.50		.13
1241.60		.25
1241.70		.38
1241.80		.52
1241.90		.60
1242.00		.67
1242.10		.73
1242.20		.79
1242.30		.85
1242.40		.90
1242.50		.95
1242.60		.99
1242.70		1.04

1242.80	1.08
1242.90	1.12
1243.00	1.16
1243.10	1.20
1243.20	1.23

Tail	Water

TW Elev ft	Converge +/-ft	
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
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Free Outfall

Notes

Computation Messages

HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
HW	&	TW	below	invert
Upstream	HW &	DNstream	TW <	Inv.El

CRIT.DEPTH CONTROL	Vh= .018ft	Dcr= .031ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .041ft	Dcr= .109ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .066ft	Dcr= .183ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .100ft	Dcr= .250ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .134ft	Dcr= .316ft	CRIT.DEPTH

H =.30

H =.40

H =.50

H =.60

H =.70

H =.80

H =.90

H =1.00

H =1.10

H =1.20

H =1.30

H =1.40

H =1.50

H =1.60

H =1.70

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = 2 (Orifice-Circular)
Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS Elev,Device Q		Tail Water	Notes
WS Elev.	Q		TW Elev Converge
ft	cfs	ft +/-ft	Computation Messages
1243.30	1.27	Free Outfall	H =1.80
1243.40	1.30	Free Outfall	H =1.90
1243.50	1.34	Free Outfall	H =2.00
1243.60	1.37	Free Outfall	H =2.10
1243.70	1.40	Free Outfall	H =2.20
1243.80	1.43	Free Outfall	H =2.30
1243.90	1.46	Free Outfall	H =2.40
1244.00	1.49	Free Outfall	H =2.50

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = 1 (Orifice-Circular)
Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS	Elev,Device	Q
WS Elev.	Q	
ft	cfs	
1240.00		.00
1240.10		.02
1240.20		.08
1240.30		.17
1240.40		.27
1240.50		.35

1240.60	.41
1240.70	.46
1240.80	.51
1240.90	.55
1241.00	.58
1241.10	.62
1241.20	.65
1241.25	.67
1241.30	.69
1241.40	.72
1241.50	.75
1241.60	.78
1241.70	.80
1241.80	.83
1241.90	.85
1242.00	.88
1242.10	.90
1242.20	.93
1242.30	.95
1242.40	.97
1242.50	1.00
1242.60	1.02
1242.70	1.04
1242.80	1.06
1242.90	1.08
1243.00	1.10
1243.10	1.12
1243.20	1.14

Tail		Water
	TW Elev Converge ft +/-ft	
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
Free		Outfall
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Free	Outfall

Notes

Computation Messages

Upstream HW & DNstream TW < Inv.El

CRIT.DEPTH CONTROL	Vh= .022ft	Dcr= .078ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .054ft	Dcr= .146ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .085ft	Dcr= .215ft	CRIT.DEPTH
CRIT.DEPTH CONTROL	Vh= .124ft	Dcr= .277ft	CRIT.DEPTH

H =.29

H =.39

H =.49

H =.59

H =.69

H =.79

H =.89

H =.99

H =1.04

H =1.09

H =1.19
H =1.29
H =1.39
H =1.49
H =1.59
H =1.69
H =1.79
H =1.89
H =1.99
H =2.09
H =2.19
H =2.29
H =2.39
H =2.49
H =2.59
H =2.69
H =2.79
H =2.89
H =2.99

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = 1 (Orifice-Circular)
Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS Elev,Device Q		Tail Water	Notes
WS Elev. ft	Q cfs	ft +/-ft	TW Elev Converge Computation Messages
1243.30	1.16	Free Outfall	H =3.09
1243.40	1.17	Free Outfall	H =3.19
1243.50	1.19	Free Outfall	H =3.29
1243.60	1.21	Free Outfall	H =3.39
1243.70	1.23	Free Outfall	H =3.49
1243.80	1.25	Free Outfall	H =3.59
1243.90	1.26	Free Outfall	H =3.69
1244.00	1.28	Free Outfall	H =3.79

Type.... Composite Rating Curve Page 8.25

Name.... Outlet 2
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q			Notes
			Converge
Elev.	Q	TW Elev Error	
ft	cfs	ft +/-ft	Contributing Structures
1240.00	.00	Free Outfall	None contributing
1240.10	.02	Free Outfall	1
1240.20	.08	Free Outfall	1
1240.30	.17	Free Outfall	1
1240.40	.27	Free Outfall	1
1240.50	.35	Free Outfall	1
1240.60	.41	Free Outfall	1
1240.70	.46	Free Outfall	1
1240.80	.51	Free Outfall	1
1240.90	.55	Free Outfall	1
1241.00	.58	Free Outfall	1
1241.10	.62	Free Outfall	1
1241.20	.65	Free Outfall	1
1241.25	.67	Free Outfall	1
1241.30	.69	Free Outfall	2 +1
1241.40	.77	Free Outfall	2 +1
1241.50	.88	Free Outfall	2 +1
1241.60	1.02	Free Outfall	2 +1
1241.70	1.19	Free Outfall	2 +1
1241.80	1.35	Free Outfall	2 +1
1241.90	1.45	Free Outfall	2 +1
1242.00	1.55	Free Outfall	2 +1
1242.10	1.64	Free Outfall	2 +1
1242.20	1.72	Free Outfall	2 +1
1242.30	1.80	Free Outfall	2 +1
1242.40	1.87	Free Outfall	2 +1
1242.50	1.94	Free Outfall	3 +2 +1
1242.60	2.16	Free Outfall	3 +2 +1
1242.70	2.50	Free Outfall	3 +2 +1
1242.80	2.92	Free Outfall	3 +2 +1
1242.90	3.41	Free Outfall	3 +2 +1
1243.00	3.95	Free Outfall	4 +3 +2 +1
1243.10	5.02	Free Outfall	4 +3 +2 +1
1243.20	6.52	Free Outfall	4 +3 +2 +1
1243.30	8.32	Free Outfall	4 +3 +2 +1
1243.40	10.37	Free Outfall	4 +3 +2 +1
1243.50	12.63	Free Outfall	4 +3 +2 +1
1243.60	15.09	Free Outfall	4 +3 +2 +1

File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q Notes

```
  ------------------------Converge ------------
  -------------
  Elev. Q TW Elev Error
  ft cfs ft +/-ft Contributing Structures


1243.70  17.72  Free  Outfall  4  +3  +2  +1
1243.80  20.53  Free  Outfall  4  +3  +2  +1
1243.90  23.49  Free  Outfall  4  +3  +2  +1
1244.00  26.59  Free  Outfall  4  +3  +2  +1

                  LEVEL POOL ROUTING DATA


    HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
    Inflow HYG file = NONE STORED -POND 1 IN 2 YR
    Outflow HYG file = NONE STORED -POND 1 OUT 2 YR


    Pond Node Data = POND 1
    Pond Volume Data = POND 1
    Pond Outlet Data = Outlet 1


    No Infiltration


    INITIAL CONDITIONS


    Starting WS Elev = 1266.00 ft
    Starting Volume = .000 ac-ft
    Starting Outflow = .00 cfs
    Starting Infiltr. = .00 cfs
    Starting Total Qout= .00 cfs
    Time Increment = .1000 hrs


Elevation Outflow Storage Area Infilt. Q Total 2S/t + O
    ft cfs ac-ft acres cfs cfs cfs


 1266.00 .00 .000 .0600 .00 .00 .00
 1266.10 .02 .006 .0625 .00 .02 1.50
 1266.20 .08 .013 .0651 .00 .08 3.10
 1266.30 .17 .019 .0677 .00 .17 4.80
 1266.40 .27 .026 .0704 .00 .27 6.57
 1266.50 .35 .033 .0731 .00 .35 8.39
```

```
1266.60 .41 .041 .0758 .00 .41 10.25
1266.70 .46 .048 .0787 .00 .46 12.17
1266.80 .51 .056 .0815 .00 .51 14.15
1266.90 .55 .065 .0845 .00 .55 16.20
1267.00 .58 .073 .0874 .00 .58 18.32
1267.10 .62 .082 .0905 .00 .62 20.51
1267.20 .65 .091 .0935 .00 .65 22.77
1267.30 .69 .101 .0967 .00 .69 25.10
1267.40 .72 .111 .0998 .00 .72 27.51
1267.50 .75 .121 .1031 .00 .75 29.99
1267.60 .80 .131 .1064 .00 .80 32.58
1267.70 .91 .142 .1097 .00 .91 35.31
1267.80 1.07 .153 .1131 .00 1.07 38.16
1267.90 1.27 .165 .1165 .00 1.27 41.14

                LEVEL POOL ROUTING DATA


   HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
   Inflow HYG file = NONE STORED -POND 1 IN 2 YR
   Outflow HYG file = NONE STORED -POND 1 OUT 2 YR


   Pond Node Data = POND 1
   Pond Volume Data = POND 1
   Pond Outlet Data = Outlet 1


   No Infiltration


   INITIAL CONDITIONS


   Starting WS Elev = 1266.00 ft
   Starting Volume = .000 ac-ft
   Starting Outflow = .00 cfs
   Starting Infiltr. = .00 cfs
   Starting Total Qout= .00 cfs
   Time Increment = .1000 hrs


Elevation Outflow Storage Area Infilt. Q Total 2S/t + O
   ft cfs ac-ft acres cfs cfs cfs


1268.00 1.51 .177 .1200 .00 1.51 44.24
1268.10 1.77 .189 .1227 .00 1.77 47.43
```

```
1268.20 2.05 .201 .1255 .00 2.05 50.72
1268.30 2.34 .214 .1282 .00 2.34 54.08
1268.40 2.51 .227 .1310 .00 2.51 57.39
1268.50 2.68 .240 .1339 .00 2.68 60.76
1268.60 2.83 .254 .1367 .00 2.83 64.18
1268.70 2.97 .267 .1396 .00 2.97 67.67
1268.80 3.10 .281 .1425 .00 3.10 71.22
1268.90 3.23 .296 .1455 .00 3.23 74.83
1269.00 3.35 .311 .1485 .00 3.35 78.51
1269.10 3.62 .326 .1515 .00 3.62 82.41
1269.20 4.01 .341 .1545 .00 4.01 86.50
1269.25 4.24 .349 .1561 .00 4.24 88.61
1269.30 4.65 .356 .1576 .00 4.65 90.92
1269.40 5.89 .372 .1607 .00 5.89 96.00
1269.50 7.48 .389 .1639 .00 7.48 101.52
1269.60 9.34 .405 .1670 .00 9.34 107.39
1269.70 11.44 .422 .1702 .00 11.44 113.57
1269.80 13.75 .439 .1735 .00 13.75 120.04

                  LEVEL POOL ROUTING DATA


   HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
   Inflow HYG file = NONE STORED -POND 1 IN 2 YR
   Outflow HYG file = NONE STORED -POND 1 OUT 2 YR


   Pond Node Data = POND 1
   Pond Volume Data = POND 1
   Pond Outlet Data = Outlet 1


   No Infiltration


   INITIAL CONDITIONS


   Starting WS Elev = 1266.00 ft
   Starting Volume = .000 ac-ft
   Starting Outflow = .00 cfs
   Starting Infiltr. = .00 cfs
   Starting Total Qout= .00 cfs
   Time Increment = .1000 hrs


Elevation Outflow Storage Area Infilt. Q Total 2S/t + O
```

```
  ft cfs ac-ft acres cfs cfs cfs


1269.90 16.25 .457 .1767 .00 16.25 126.77
1270.00 18.92 .475 .1800 .00 18.92 133.76

Type.... Pond Routing Summary Page 9.04
Name.... POND 1 OUT Tag: 2 YR Event: 2 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR


               LEVEL POOL ROUTING SUMMARY


 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
 Inflow HYG file = NONE STORED -POND 1 IN 2 YR
 Outflow HYG file = NONE STORED -POND 1 OUT 2 YR


 Pond Node Data = POND 1
 Pond Volume Data = POND 1
 Pond Outlet Data = Outlet 1


 No Infiltration


 INITIAL CONDITIONS


 Starting WS Elev = 1266.00 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout= .00 cfs
 Time Increment = .1000 hrs



 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 ================================================
 Peak Inflow = 1.19 cfs at 12.4000 hrs
 Peak Outflow = .43 cfs at 13.0000 hrs


 Peak Elevation = 1266.64 ft
 Peak Storage = .043 ac-ft
 ================================================
```

```
MASS BALANCE (ac-ft)

     + Initial Vol = .000

     + HYG Vol IN = .188
     -Infiltration = .000
     -HYG Vol OUT = .187
     -Retained Vol = .001


 Unrouted Vol = -.000 ac-ft (.010% of Inflow Volume)

Type.... Pond Routing Summary Page 9.05
Name.... POND 1 OUT Tag: 10 YR Event: 10 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 10 YR

               LEVEL POOL ROUTING SUMMARY


 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
 Inflow HYG file = NONE STORED -POND 1 IN 10 YR
 Outflow HYG file = NONE STORED -POND 1 OUT 10 YR


 Pond Node Data = POND 1
 Pond Volume Data = POND 1
 Pond Outlet Data = Outlet 1


 No Infiltration


 INITIAL CONDITIONS


 Starting WS Elev = 1266.00 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout= .00 cfs
 Time Increment = .1000 hrs
```

```
INFLOW/OUTFLOW HYDROGRAPH SUMMARY
================================================
Peak Inflow = 3.97 cfs at 12.3000 hrs
Peak Outflow = 1.17 cfs at 13.0000 hrs


Peak Elevation = 1267.85 ft
Peak Storage = .159 ac-ft
================================================


MASS BALANCE (ac-ft)


          + Initial Vol = .000

          + HYG Vol IN = .492
            -Infiltration = .000
            -HYG Vol OUT = .491
            -Retained Vol = .001


Unrouted Vol = -.000 ac-ft (.003% of Inflow Volume)

Type.... Pond Routing Summary Page 9.06
Name.... POND 1 OUT Tag: 25 YR Event: 25 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 25 YR


              LEVEL POOL ROUTING SUMMARY


HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
Inflow HYG file = NONE STORED -POND 1 IN 25 YR
Outflow HYG file = NONE STORED -POND 1 OUT 25 YR


Pond Node Data = POND 1
Pond Volume Data = POND 1
Pond Outlet Data = Outlet 1


No Infiltration


INITIAL CONDITIONS
```

```
 Starting WS Elev = 1266.00 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout= .00 cfs
 Time Increment = .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 ================================================
 Peak Inflow = 5.78 cfs at 12.3000 hrs
 Peak Outflow = 2.31 cfs at 12.8000 hrs


 Peak Elevation = 1268.29 ft
 Peak Storage = .213 ac-ft
 ================================================


 MASS BALANCE (ac-ft)


      + Initial Vol = .000

      + HYG Vol IN = .688
      -Infiltration = .000
      -HYG Vol OUT = .687
      -Retained Vol = .001


 Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

Type.... Pond Routing Summary Page 9.07
Name.... POND 1 OUT Tag: 50 YR Event: 50 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 50 YR


               LEVEL POOL ROUTING SUMMARY


 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
 Inflow HYG file = NONE STORED -POND 1 IN 50 YR
 Outflow HYG file = NONE STORED -POND 1 OUT 50 YR
```

```
Pond Node Data = POND 1
Pond Volume Data = POND 1
Pond Outlet Data = Outlet 1


No Infiltration


INITIAL CONDITIONS


Starting WS Elev = 1266.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=================================================
Peak Inflow = 7.48 cfs at 12.3000 hrs
Peak Outflow = 2.98 cfs at 12.8000 hrs


Peak Elevation = 1268.71 ft
Peak Storage = .269 ac-ft
=================================================


MASS BALANCE (ac-ft)


              + Initial Vol = .000

              + HYG Vol IN = .872
              -Infiltration = .000
              -HYG Vol OUT = .872
              -Retained Vol = .001


Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

Type.... Pond Routing Summary Page 9.08
Name.... POND 1 OUT Tag: 100 YR Event: 100 yr
```

```
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 100 YR


               LEVEL POOL ROUTING SUMMARY


 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
 Inflow HYG file = NONE STORED -POND 1 IN 100 YR
 Outflow HYG file = NONE STORED -POND 1 OUT 100 YR


 Pond Node Data = POND 1
 Pond Volume Data = POND 1
 Pond Outlet Data = Outlet 1


 No Infiltration


 INITIAL CONDITIONS


 Starting WS Elev = 1266.00 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout= .00 cfs
 Time Increment = .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 ================================================
 Peak Inflow = 9.52 cfs at 12.3000 hrs
 Peak Outflow = 4.03 cfs at 12.7000 hrs


 Peak Elevation = 1269.20 ft
 Peak Storage = .341 ac-ft
 ================================================


 MASS BALANCE (ac-ft)


      + Initial Vol = .000
```

+ HYG Vol IN = 1.097
-Infiltration = .000
-HYG Vol OUT = 1.096
-Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

LEVEL POOL ROUTING DATA

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
Inflow HYG file = NONE STORED -POND 2 IN 2 YR
Outflow HYG file = NONE STORED -POND 2 OUT 2 YR

Pond Node Data = POND 2
Pond Volume Data = POND 2
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 1240.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. Q cfs	Total Q cfs	2S/t + O cfs
1240.00	.00	.000	.0400	.00	.00	.00
1240.10	.02	.004	.0417	.00	.02	1.01
1240.20	.08	.008	.0434	.00	.08	2.10
1240.30	.17	.013	.0451	.00	.17	3.26
1240.40	.27	.017	.0469	.00	.27	4.47
1240.50	.35	.022	.0487	.00	.35	5.71
1240.60	.41	.027	.0506	.00	.41	6.97
1240.70	.46	.032	.0524	.00	.46	8.27
1240.80	.51	.038	.0544	.00	.51	9.60

```
1240.90 .55 .043 .0563 .00 .55 10.98
1241.00 .58 .049 .0583 .00 .58 12.41
1241.10 .62 .055 .0603 .00 .62 13.88
1241.20 .65 .061 .0624 .00 .65 15.40
1241.25 .67 .064 .0634 .00 .67 16.17
1241.30 .69 .067 .0644 .00 .69 16.97
1241.40 .77 .074 .0666 .00 .77 18.63
1241.50 .88 .081 .0687 .00 .88 20.38
1241.60 1.02 .088 .0709 .00 1.02 22.21
1241.70 1.19 .095 .0731 .00 1.19 24.12
1241.80 1.35 .102 .0754 .00 1.35 26.07

                LEVEL POOL ROUTING DATA


   HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
   Inflow HYG file = NONE STORED -POND 2 IN 2 YR
   Outflow HYG file = NONE STORED -POND 2 OUT 2 YR


   Pond Node Data = POND 2
   Pond Volume Data = POND 2
   Pond Outlet Data = Outlet 2


   No Infiltration


   INITIAL CONDITIONS


   Starting WS Elev = 1240.00 ft
   Starting Volume = .000 ac-ft
   Starting Outflow = .00 cfs
   Starting Infiltr. = .00 cfs
   Starting Total Qout= .00 cfs
   Time Increment = .1000 hrs


Elevation Outflow Storage Area Infilt. Q Total 2S/t + O
   ft cfs ac-ft acres cfs cfs cfs


1241.90 1.45 .110 .0777 .00 1.45 28.03
1242.00 1.55 .118 .0800 .00 1.55 30.03
1242.10 1.64 .126 .0818 .00 1.64 32.08
1242.20 1.72 .134 .0836 .00 1.72 34.16
1242.30 1.80 .143 .0855 .00 1.80 36.29
```

```
1242.40 1.87 .151 .0874 .00 1.87 38.45
1242.50 1.94 .160 .0892 .00 1.94 40.66
1242.60 2.16 .169 .0912 .00 2.16 43.06
1242.70 2.50 .178 .0931 .00 2.50 45.63
1242.80 2.92 .188 .0950 .00 2.92 48.33
1242.90 3.41 .197 .0970 .00 3.41 51.14
1243.00 3.95 .207 .0990 .00 3.95 54.06
1243.10 5.02 .217 .1010 .00 5.02 57.54
1243.20 6.52 .227 .1030 .00 6.52 61.51
1243.30 8.32 .238 .1051 .00 8.32 65.84
1243.40 10.37 .248 .1072 .00 10.37 70.45
1243.50 12.63 .259 .1092 .00 12.63 75.33
1243.60 15.09 .270 .1114 .00 15.09 80.45
1243.70 17.72 .281 .1135 .00 17.72 85.81
1243.80 20.53 .293 .1156 .00 20.53 91.39

                LEVEL POOL ROUTING DATA


   HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
   Inflow HYG file = NONE STORED -POND 2 IN 2 YR
   Outflow HYG file = NONE STORED -POND 2 OUT 2 YR


   Pond Node Data = POND 2
   Pond Volume Data = POND 2
   Pond Outlet Data = Outlet 2


   No Infiltration


   INITIAL CONDITIONS


   Starting WS Elev = 1240.00 ft
   Starting Volume = .000 ac-ft
   Starting Outflow = .00 cfs
   Starting Infiltr. = .00 cfs
   Starting Total Qout= .00 cfs
   Time Increment = .1000 hrs


Elevation Outflow Storage Area Infilt. Q Total 2S/t + O
   ft cfs ac-ft acres cfs cfs cfs


 1243.90 23.49 .304 .1178 .00 23.49 97.17
```

```
1244.00 26.59 .316 .1200 .00 26.59 103.15

Type.... Pond Routing Summary Page 9.12
Name.... POND 2 OUT Tag: 2 YR Event: 2 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR


               LEVEL POOL ROUTING SUMMARY


 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
 Inflow HYG file = NONE STORED -POND 2 IN 2 YR
 Outflow HYG file = NONE STORED -POND 2 OUT 2 YR


 Pond Node Data = POND 2
 Pond Volume Data = POND 2
 Pond Outlet Data = Outlet 2


 No Infiltration


 INITIAL CONDITIONS


 Starting WS Elev = 1240.00 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout= .00 cfs
 Time Increment = .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 ================================================
 Peak Inflow = .46 cfs at 12.5000 hrs
 Peak Outflow = .26 cfs at 13.0000 hrs


 Peak Elevation = 1240.39 ft
 Peak Storage = .017 ac-ft
 ================================================


 MASS BALANCE (ac-ft)
```

+ Initial Vol = .000

+ HYG Vol IN = .091
-Infiltration = .000
-HYG Vol OUT = .090
-Retained Vol = .001

```
 Unrouted Vol = -.000 ac-ft (.010% of Inflow Volume)

Type.... Pond Routing Summary Page 9.13
Name.... POND 2 OUT Tag: 10 YR Event: 10 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 10 YR


               LEVEL POOL ROUTING SUMMARY


 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
 Inflow HYG file = NONE STORED -POND 2 IN 10 YR
 Outflow HYG file = NONE STORED -POND 2 OUT 10 YR


 Pond Node Data = POND 2
 Pond Volume Data = POND 2
 Pond Outlet Data = Outlet 2


 No Infiltration


 INITIAL CONDITIONS


 Starting WS Elev = 1240.00 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout= .00 cfs
 Time Increment = .1000 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 ================================================
```

```
 Peak Inflow = 1.61 cfs at 12.5000 hrs
 Peak Outflow = .66 cfs at 13.0000 hrs


 Peak Elevation = 1241.22 ft
 Peak Storage = .062 ac-ft
 ================================================


 MASS BALANCE (ac-ft)


      + Initial Vol = .000

      + HYG Vol IN = .244
      -Infiltration = .000
      -HYG Vol OUT = .244
      -Retained Vol = .001


 Unrouted Vol = -.000 ac-ft (.004% of Inflow Volume)

Type.... Pond Routing Summary Page 9.14
Name.... POND 2 OUT Tag: 25 YR Event: 25 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 25 YR


               LEVEL POOL ROUTING SUMMARY


 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
 Inflow HYG file = NONE STORED -POND 2 IN 25 YR
 Outflow HYG file = NONE STORED -POND 2 OUT 25 YR


 Pond Node Data = POND 2
 Pond Volume Data = POND 2
 Pond Outlet Data = Outlet 2


 No Infiltration


 INITIAL CONDITIONS


 Starting WS Elev = 1240.00 ft
```

```
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=================================================
Peak Inflow = 2.36 cfs at 12.4000 hrs
Peak Outflow = 1.13 cfs at 13.0000 hrs


Peak Elevation = 1241.66 ft
Peak Storage = .092 ac-ft
=================================================


MASS BALANCE (ac-ft)


     + Initial Vol = .000

     + HYG Vol IN = .344
     -Infiltration = .000
     -HYG Vol OUT = .344
     -Retained Vol = .001


Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

Type.... Pond Routing Summary Page 9.15
Name.... POND 2 OUT Tag: 50 YR Event: 50 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 50 YR


               LEVEL POOL ROUTING SUMMARY


HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
Inflow HYG file = NONE STORED -POND 2 IN 50 YR
Outflow HYG file = NONE STORED -POND 2 OUT 50 YR


Pond Node Data = POND 2
```

```
Pond Volume Data = POND 2
Pond Outlet Data = Outlet 2


No Infiltration


INITIAL CONDITIONS


Starting WS Elev = 1240.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
==================================================
Peak Inflow = 3.09 cfs at 12.4000 hrs
Peak Outflow = 1.54 cfs at 12.9000 hrs


Peak Elevation = 1241.99 ft
Peak Storage = .117 ac-ft
==================================================


MASS BALANCE (ac-ft)


     + Initial Vol = .000

     + HYG Vol IN = .439
     -Infiltration = .000
     -HYG Vol OUT = .438
     -Retained Vol = .001


Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

Type.... Pond Routing Summary Page 9.16
Name.... POND 2 OUT Tag: 100 YR Event: 100 yr
File.... C:\Program Files\Haestad\PPKW\PPW\3093 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 100 YR
```

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\
Inflow HYG file = NONE STORED -POND 2 IN 100 YR
Outflow HYG file = NONE STORED -POND 2 OUT 100 YR

Pond Node Data = POND 2
Pond Volume Data = POND 2
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 1240.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .1000 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY
==========
Peak Inflow = 3.98 cfs at 12.4000 hrs
Peak Outflow = 1.88 cfs at 12.9000 hrs

Peak Elevation = 1242.41 ft
Peak Storage = .152 ac-ft
==========

MASS BALANCE (ac-ft)

+ Initial Vol = .000

+ HYG Vol IN = .554
-Infiltration = .000

-HYG Vol OUT = .553
-Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

Index of Starting Page Numbers for ID Names