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www.pennoni.com

JULY 12, 2024

#### DNREC23002

Department of Natural Resources and Environmental Control Wetlands and Subaqueous Lands Section 89 Kings Highway Dover, Delaware 19901

#### RE: Milton Memorial Park Shoreline Restoration Project

To whom it may concern:

The Memorial Park Shoreline Restoration project aims to address the ongoing deterioration of the shoreline under a Resilient Community Partnership (RCP) with Delaware Natural Resources and Environmental Control (DNREC). The project is located along approximately 1,500 linear feet of shoreline of the Broadkill River at Milton Memorial Park in the town of Milton, Sussex County, Delaware. The shoreline was previously stabilized around 2007 using geotextile fabric and riprap aggregate. The previous design used R-5 riprap (50lb to 150lb armor stone) to construct stone sills and revetment along the shoreline. The sills were constructed at locations to create wetlands and marsh immediately behind the sills. Since then, the constructed sills and revetments have deteriorated, and signs of erosion can be seen along the shoreline. This project aims to re-stabilize the shoreline and create additional marsh and wetland areas.

The project design includes approximately 800 linear feet (LF) of stone revetment along the northern shoreline, approximately 315 LF of Vented Stone Sill along the North Shoreline, rehabilitate and plant approximately 1,880 SF of marsh area, and protect the three previously designed wetland areas along the northern shoreline, approximately 270 LF of tree log barrier along the southern shoreline, approximately 3,325 SF of created marsh wetland located between the upland and tree log barrier on the South Shoreline.

Please accept the enclosed DNREC Wetlands and Subaqueous Lands Permit Application along with the required attachments:

- 1. DNREC Subaqueous Lands Permit Basic Application Form and Signature Page
- 2. DNREC Subaqueous Lands Permit Applicable Appendices
  - F. Intake or Outfall Structures
  - H. Fill
  - I. Rip-Rap Sills Revetment
  - J. Vegetative Stabilization
- 3. Project Location Map
- 4. Site Survey and Design Plan
- 5. Site Photographs
- 6. Wetland and Watercourse Investigation Report
- 7. Agency Coordination

In addition to the information listed above, a Nationwide Permit 3- Maintenance and Nationwide Permit 54- Living Shoreline are being submitted to U.S. Army Corps of Engineers - Philadelphia Region. If you have questions during your review, please contact Michael Marra at (717) 620-5991 or mmarra@pennoni.com.

Sincerely,

PENNONI

Michael A. Maria

Michael Marra, PWS Staff Environmental Scientist

# ATTACHMENT 1

# DNREC Subaqueous Lands Basic Application Form and Signature Page

# WETLANDS AND SUBAQUEOUS LANDS SECTION PERMIT APPLICATION FORM

# For Subaqueous Lands, Wetlands, Marina and 401 Water Quality Certification Projects

State of Delaware Department of Natural Resources and Environmental Control Division of Water

Wetlands and Subaqueous Lands Section



APPLICATION FOR APPROVAL OF SUBAQUEOUS LANDS, WETLANDS, MARINA AND WATER QUALITY CERTIFICATION PROJECTS

#### PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

#### **Application Instructions:**

- 1. Complete each section of this basic application and appropriate appendices as thoroughly and accurately as possible. Incomplete or inaccurate applications will be returned.
- 2. All applications must be accompanied by a scaled plan view and cross-section view plans that show the location and design details for the proposed project. Full construction plans must be submitted for major projects.
- 3. All applications must have an original signature page and proof of ownership or permitted land use agreement.
- 4. Submit an original and two (2) additional copies of the application (total of 3) with the appropriate application fee and public notice fee\* (prepared in separate checks) to:

#### Department of Natural Resources and Environmental Control Wetlands and Subaqueous Lands Section 89 Kings Highway Dover, Delaware 19901

\*Application and public notice fees are non-refundable regardless of the Permit decision or application status.

5. No construction may begin at the project site before written approval has been received from this office.

#### **Helpful Information:**

1.	Tax Parcel Information:	New Castle County	(302) 395-5400
		Kent County	(302) 736-2010
		Sussex County	(302) 855-7878
2.	Recorder of Deeds:	New Castle County	(302) 571-7550
		Kent County	(302) 744-2314
		Sussex County	(302) 855-7785

- 3. A separate application and/or approval may be required through the Army Corps of Engineers. Applicants are strongly encouraged to contact the Corps for a determination of their permitting requirements. For more information, contact the Philadelphia District Regulator of the Day at (215) 656-6728 or visit their website at: <u>http://www.nap.usace.army.mil/Missions/Regulatory.aspx.</u>
- 4. For questions about this application or the Wetlands and Subaqueous Lands Section, contact us at (302) 739-9943 or visit our website at: <a href="http://www.dnrec.delaware.gov/wr/Services/Pages/WetlandsAndSubaqueousLands.aspx">http://www.dnrec.delaware.gov/wr/Services/Pages/WetlandsAndSubaqueousLands.aspx</a>. Office hours are Monday through Friday 8:00 AM to 4:30 PM, except on State Holidays.

# **APPLICANT'S REVIEW BEFORE MAILING**

#### **DID YOU COMPLETE THE FOLLOWING?**

X	Yes	BASIC APPLICATION
	Yes	SIGNATURE PAGE (Page 3)
X	Yes	APPLICABLE APPENDICES
X	Yes	SCALED PLAN VIEW
X	Yes	SCALED CROSS-SECTION OR ELEVATION VIEW PLANS
X	Yes	VICINITY MAP
	Yes	COPY OF THE PROPERTY DEED & SURVEY
Χ	Yes	THREE (3) COMPLETE COPIES OF THE APPLICATION PACKET
X	Yes	APPROPRIATE APPLICATION FEE & PUBLIC NOTICE FEE (Separate checks made payable to the State of Delaware)

#### Submit 3 complete copies of the application packet to:

#### Department of Natural Resources and Environmental Control Wetlands and Subaqueous Lands Section 89 Kings Highway Dover, Delaware 19901

#### Before signing and mailing your application packet, please read the following:

The Department requests that the contractor or party who will perform the construction of your proposed project, if other than the applicant, sign the application signature page along with the applicant in the spaces provided. When the application is signed by the contractor as well as the applicant, the Department will issue the Permit to both parties. For Leases, the contractor will receive a separate construction authorization that will make them subject to all of the terms and conditions of the Lease relating to the construction

#### **Section 1: Applicant Identification**

 1. Applicant's Name:
 Kristen Thornton
 Telephone #

 Mailing Address:
 100 West Water Street, Suite 10B
 Fax #:

 Dover, DE 19968
 E-mail:
 kr

2. Consultant's Name: <u>\_\_\_\_Brian Miller</u> Mailing Address: <u>\_\_121 Continental Drive, Suite 207</u> \_\_\_\_\_Newark, DE 19713

3. Contractor's Name: \_\_\_\_\_TBD by bid \_\_\_\_\_\_ Mailing Address: \_\_\_\_\_\_

Telephone #:	302-739-9173
Fax #:	
E-mail: krister	h.thornton@delaware.gov
	<b>_</b>
Company Name	:Pennoni
Telephone #:	302-351-5266
Fax #:	
E-mail: bm	iller@pennoni.com
· · · · · · · · · · · · · · · · · · ·	
Company Name	:
Telephone #:	
Fax #:	
E-mail:	

#### **Section 2: Project Description**

4. Check those that apply:XNew Project/addition to existing project?

X Repair/Replace existing structure? (If checked, must answer #16)

5. Project Purpose (attach additional sheets as necessary): See additional sheet below.

#### 6. Check each Appendix that is enclosed with this application:

	A. Boat Docking Facilities		G. Bulkheads	N. Preliminary Marina Checklist
	B. Boat Ramps	Х	H. Fill	O. Marinas
	C. Road Crossings	Х	I. Rip-Rap Sills and Revetments	P. Stormwater Management
	D. Channel Modifications/Dams	Х	J. Vegetative Stabilization	Q. Ponds and Impoundments
	E. Utility Crossings		K. Jetties, Groins, Breakwaters	R. Maintenance Dredging
Х	F. Intake or Outfall Structures		M. Activities in State Wetlands	S. New Dredging

#### Section 3: Project Location

7.	Project Site Address: _	Milton Memorial Park	County: N.C. Kent X Sussex Site owner name (if different from applicant): Town of Milton, D
	-	113 Union Street	Address of site owner: 115 Federal Street
		Milton, DE 19968	Milton, DE 19968

8. Driving Directions: From DE-1 take DE 5 S/Union Street, travel approximately 11 miles into the Town of Milton, turn left (east) on the Chandler Street, travel approximately 500 feet to entrance of Milton Memorial Park. (Attach a vicinity map identifying road names and the project location) See below.

9	Tax Parcel ID Number	235-14 19-179 00	
1.	Tax Tarcer ID Rumber.	200 11110 110100	

Subdivision Name: \_\_\_\_\_

WSLS Us	e Only:	Permi	t #s:						_
Туре	SP 🗆	SL 🗆	SU 🗆	WE 🗆	$WQ \square$	LA 🗆	SA 🗆	$\mathbf{MP} \ \Box$	WA 🗆
Corps Per Received	rmit: SPGP 1 Date:	8 🗆 20	□ Nationwide Pro	e Permit #:		Indi	vidual Perm	uit #	
Fee Recei	ved? Yes 🗆	No 🗆	Amt: \$	Jeet Sciencis	Receipt #:				
Public No	tice #:		Public Notice	e Dates: ON		OFF			

Section 3: Project Loca	tion (Continued)				
10. Name of waterbody	at Project Location: Broadkill Rive	r waterbody is a tri	butary to: _	Delawa	re Bay
11. Is the waterbody:	X Tidal 🗆 Non-tidal Wat	terbody width at mean lov	w or ordina	ry high w	ater <u>130 ft (main c</u> hanne
12. Is the project:	X On public subaqueous lands? □ In State-regulated wetlands?	<ul> <li>□ On private subaquec</li> <li>□ In Federally-regulate</li> </ul>	ous lands?* ed wetlands	s?	
*If the project is on priva	te subaqueous lands, provide the na	me of the subaqueous lar	nds owner:		
(Written permission from	the private subaqueous lands owne	r must be included with t	his applica	tion)	
13. Present Zoning:	□ Agricultural □ Residential		ndustrial	X Othe	r
Section 4: Miscellaneou	S				
235-14.00-131.00 235-14.19-182 Sus 235- 20.08-6.00 Mi B. For wetlands and foot radius of the project See additional she	Preserve on the Broadkill Homeo sex County (Milton Public Librar Iton Fire Department Inc , 116 Fr marina projects, list the names and (attach additional sheets as necessar ets below.	wners, 211 Chandler S y) PO Box 589, George ont Street, Milton , DE d complete mailing addre	Street, Milt etown, DE	on, DE	ners within a 1,000
<ol> <li>Provide the names of Kristen Thornton, DN Rebecca Bobola, DN</li> </ol>	DNREC and/or Army Corps of Engin REC Mike Snyder, D REC Mike Yost, USA	eers representatives whon NREC ACE, Philadelphia Disti	n you have c	liscussed t	he project with:
A. Have you had a S B. Has the project be *If yes, what wa	tate Jurisdictional Determination pe een reviewed in a monthly Joint Pern as the date of the meeting? <u>4/1</u>	rformed on the property? mit Processing Meeting? 8/2024		□ Yes X Yes	X No
16. Are there existing st *If yes, provide	ructures or fill at the project site in s the permit and/or lease number(s):	ubaqueous lands?	🗙 Yes	🗆 No	
*If no, were stru	uctures and/or fill in place prior to 19	969?	es 🗆 No		
17. Have you applied fo □ No X Pene	r or obtained a Federal permit from the ding Issued Den	the Army Corps of Engin	eers?		
Type of Permit: Nation	vide Permit 3 -Maintenance; vide Permit 54- Living Shoreline	Federal Permit or ID #	:		
18. Have you applied fo XNo □ Pene	r permits from other Sections within ling	DNREC? ied Date:	Pern	nit or ID #	t:
Type of permit (circle al	l that apply): Septic Well	NPDES Storm Wate	er		

Other: \_\_\_\_\_

#### **Section 5: Signature Page**

19. Agent Authorization:

If you choose to complete this section, all future correspondence to the Department may be signed by the duly authorized agent. In addition, the agent will become the primary point of contact for all correspondence from the Department.

I do not wish to authorize an agent to act on my behalf  $\Box$ 

I wish to authorize an agent as indicated below  $\checkmark$ 

I, <u>Kristy Rogers, Town Manager</u>, hereby designate and authorize <u>Brian Miller, PE & Pennoni</u> (Name of Applicant) (Name of Agent)

to act on my behalf in the processing of this application and to furnish any additional information requested by the Department.

Authorized Agent's Name:	Brian Miller & Pennoni	_	Telephone #: _	302-351-5266
Mailing Address:	121 Continental Drive		Fax #:	
	Suite 207		E-mail:	BMiller@pennoni.com
	Newark, DE 19711			

20. Agent's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application.

Agent's Signature

Date

7/17/2024

Date

21. Applicant's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge and that I am required to inform the Department of any changes or updates to the information provided in this application. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application. I grant permission to authorized Department representatives to enter upon the premises <u>for</u> inspection purposes during working hours.

own, Town Manager RA Applicand's Signature

Kristy Rogers, Town Manager Print Name

22. Contractor's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge, and that I am required to inform the Department of any changes or updates to the information provided in this application. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application.

Contractor's Name

Date

Print Name

#### **Milton Memorial Park Shoreline Restoration Project**

#### Section 2: Project Description 5. Project Purpose

The Memorial Park Shoreline Restoration project aims to address the ongoing deterioration of the shoreline under a Resilient Community Partnership (RCP) with Delaware Natural Resources and Environmental Control (DNREC). The project is located along approximately 1,500 linear feet of shoreline of the Broadkill River at Milton Memorial Park in the town of Milton, Sussex County, Delaware. The shoreline was previously stabilized around 2007 using geotextile fabric and riprap aggregate. The previous design used R-5 riprap (50lb to 150lb armor stone) to construct stone sills and revetment along the shoreline. The sills were constructed at locations to create wetlands and marsh immediately behind the sills. Since then, the constructed sills and revetments have deteriorated, and signs of erosion can be seen along the shoreline. This project aims to re-stabilize the shoreline and create additional marsh and wetland areas.

The project design includes 800 linear feet (LF) of stone revetment along the northern shoreline, approximately 315 LF of vented stone sill along the northern shoreline, rehabilitate and plant approximately 1,880 SF of marsh area, and protect the three previously designed wetland areas along the northern shoreline, approximately 270 LF of tree log barrier along the southern shoreline, approximately 3,325 SF of created marsh wetland located between the upland and tree log barrier on the southern shoreline.

Section 3: Project Location 14.B. Property Owners within a 1,000 foot radius of the project.

PIN	ACRES	COUNTY
235-14 19-207 00	0 29652491	Sussex
235-14 00-592 00	0 15368437	Sussex
235-14 19-177 00	0.59505528	Sussex
235-14 19-99 00	0 17265081	Sussex
235-20 07-69 00	0.06208975	Sussex
235-20 08-56 01	0 18053109	Sussex
235-20.07-100.00	0 15987268	Sussex
235-20 08-38 01	0 24445709	Sussex
235-20 07-72 00	0.62337511	Sussex
235-14 19-150 00	0 23135503	Sussex
235-20 07-61 00	0 22820459	Sussex
235-14 19-105 00	0 1697161	Sussex
235-14 00-591 00	0 1261635	Sussex
235-20 08-15 00	0 27574054	Sussex
235-14 19-182 00	0 27041222	Sussex
235-14 00-583 00	0.36559637	Sussex
235-14 00-580 00	0 22728343	Sussex
235-14 19-141 00	0.36698732	Sussex
235-20 07-92 00	0 17279369	Sussex
235-20.07-60.00	0 16110539	Sussex
235-14 19-155 00	0 22004911	Sussex
235-20 08-55 00	0 40279225	Sussex
235-14 19-70 01	0.40273220	Sussex
235-14 19-13 00	0 1859477	Sussex
235-20 08-42 00	0 12476872	Sussex
235-14 19-153 00	0.23437762	Sussex
235-14 19-68 00	0.24669048	Sussex
235-14 00-587 00	0.24000040	Sussex
235-14 20-3 00	0 19761652	Sussex
235-14 19-71 01	0.32687417	Sussex
235-20 08-28 00	0.21156916	Sussex
235-14 00-574 00	0 19508486	Sussex
235-20 08-22 00	0.98554796	Sussex
235-20.08-30.00	0 14700428	Sussex
235-14.19-79.00	0.12246448	Sussex
235-14 19-16 00	0 16668436	Sussex
235-14 19-202 00	0 21294063	Sussex
235-20.07-68.00	0.48592558	Sussex
235-14 00-579 00	0 22728458	Sussex
235-14 19-72 00	0 10844306	Sussex
235-14.19-102.01	0.5021762	Sussex
235-20.07-67.00	0.50084473	Sussex
235-20.08-10.00	10.51979678	Sussex
235-14.19-154.00	0.26706118	Sussex
235-14.19-203.00	0.21212986	Sussex
235-14.00-578.00	0.22728476	Sussex
235-20.08-49.00	0.29398016	Sussex
235-14.00-577.00	0.22728456	Sussex
235-14 19-193 00	0 16031454	Sussex
235-20 08-24 00	0 28632851	Sussex
235-20.08-36.00	0.21885465	Sussex
235-20.07-89.00	0.07816658	Sussex
235-14.19-97.00	0.14620835	Sussex
235-14.19-184.00	0.2571446	Sussex
235-14.00-572.00	0.21106646	Sussex
235-20.07-77.00	0.07867755	Sussex
235-14.19-152.00	0.28532141	Sussex

235-14 19-185 02
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225 14 10 102 00
235-14.19-192.00
235-14.19-104.00
235-14 00-576 00
233-14.00-370.00
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235-14 19-140 00
235-20.08-37.00
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225 14 10 62 00
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235-20 08-34 00
200 20.00 04.00
235-20.08-33.00
235-14.19-83.00
225 14 10 60 00
235-14.19-69.00
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200 14.10 100.00
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235-14.19-171.00
235-20 08-64 00
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235-20 08-6 00
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235-20.08-2.00
225 14 10 106 01
233-14.19-100.01
235-14.00-584.00
235-14 19-198 00
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235-14.19-111.00
225 14 10 75 00
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235-20.08-8.00
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235-20.08-37.01 235-14.19-154.03 235-20.07-110.00 235-14.19-164.00 235-14.00-596.00 235-14.00-590.00 235-14.19-109.00 235-14.19-204.00 235-20.07-101.00 235-20.08-14.00 235-14.19-181.00 235-14.19-73.00
235-20.08-37.01 235-14.19-154.03 235-20.07-110.00 235-14.19-164.00 235-14.00-596.00 235-14.00-590.00 235-14.19-109.00 235-20.07-101.00 235-20.08-14.00 235-20.08-14.00 235-14.19-73.00 235-20.07-99.00
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235-20.08-37.01 235-14.19-154.03 235-20.07-110.00 235-14.19-164.00 235-14.00-596.00 235-14.00-590.00 235-14.19-109.00 235-20.07-101.00 235-20.07-101.00 235-20.08-14.00 235-14.19-181.00 235-20.07-99.00 235-14.19-159.00 235-20.07-76.00
235-20.08-37.01 235-14.19-154.03 235-20.07-110.00 235-14.19-164.00 235-14.00-596.00 235-14.00-590.00 235-14.19-109.00 235-20.07-101.00 235-20.07-101.00 235-20.08-14.00 235-14.19-181.00 235-14.19-73.00 235-20.07-99.00 235-20.07-99.00 235-20.07-76.00 235-20.07-80.00
235-20.08-37.01 235-14.19-154.03 235-20.07-110.00 235-14.19-164.00 235-14.00-596.00 235-14.00-590.00 235-14.19-109.00 235-20.07-101.00 235-20.07-101.00 235-20.08-14.00 235-14.19-181.00 235-14.19-73.00 235-20.07-99.00 235-20.07-99.00 235-20.07-80.00 235-20.07-80.00

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0.02223200	Sussex
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0 1000 1006	Succes
0.19004900	Sussex
0.16689081	Sussex
0 1925928	Sussex
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0.2116/503	Sussex
0.41504057	Sussex
1 25637455	Sussex
0.40040000	Oussex
0.42013602	Sussex
0.32125956	Sussex
0 57868184	SUSSAV
0.07000104	Ousser
0.33386461	Sussex
0.12641436	Sussex
0 22706467	Succov
0.22790407	Sussex
0.21/32568	Sussex
0.25255179	Sussex
0 125/01	Succov
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0.75961015	Sussex
0.15460271	Sussex
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0.93935648	Sussex
1.44443601	Sussex
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0.05725414	Succov
0.03723414	Sussex
0.16611558	Sussex
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	Sussex
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0.207/726	Succov
0.219/4/30	Sussex
0.0958456	SUSSEX
0.3163946	Sussex
0.42716561	Sussex
0.23918525	Sussex
0.12616484	Sussex

Parcels\_1000ft.xls

### ATTACHMENT 2

# **DNREC Subaqueous Lands Permit Applicable Appendices**

Appendix F. Intake and Outfall Structures

Appendix H. Fill

Appendix I. Rip-Rap Sills and Revetments

Appendix J. Vegetative Stabilization

#### INTAKE OR OUTFALL STRUCTURES

Please make sure answers to all of the questions in this appendix correspond to information on the application drawings.

1. How many feet will the intake or outfall structure(s) be placed channelward of the:

Tidal waters:mean high water line?5-10 ft.mean low water line?0ft.

Non-tidal waters: ordinary high water line? \_\_\_\_\_ ft.

- What type of material(s) will be used to construct the intake or outfall structure(s)?
   CMP pipe replacement/extension and HDPE pipe, concrete headwall, and R-4 stone riprap
- 3. What is the appropriate median stream flow rate at the:

intake site \_\_\_\_\_\_ cfs outfall site \_\_\_\_\_\_ cfs unknown \_X

4. What will be the daily rate of withdrawal at the intake site? \_\_\_\_\_ gpd

- 5. What will be the intake velocity? No Change fps
- What will be the mesh size of the screen used on the intake structure?
   \_\_\_\_\_\_ inches \_\_\_\_X \_\_\_\_ other (explain)
- 2 out of three inlets are not being modified. The third is being changed from an open pipe to yard inlet 7. What will be the daily rate of return at the outfall site? \_\_\_\_\_ gpd
- 8. Have you applied for the National Pollutant Discharge Elimination System (NPDES) permit for this project?
   Yes X No If your answer is "No", contact the Surface Water Discharges Section, DNREC.
   Rehabbing existing pipe and outfalls
- 9. Will a splash apron be employed at the outfall site? X Yes No If your answer is "Yes" complete Appendix I.

If your answer is "No", explain your proposed method of preventing erosion.

10. How far will any associated structures for support or erosion control (e.g. wing walls, pile, bents, splash aprons, etc.) extend channelward of the:

Tidal waters:	mean high water line?	10	ft.mean low water line?	0	ft.
Non-tidal waters:	ordinary high water line?		ft.		

- 11. How many square feet of any associated structures for support or erosion control will be located: Channelward of mean high water? <u>140</u> sq. ft. In vegetated wetlands? <u>0</u> sq. ft.
- 12. Is there any dredging or fill associated with this project? X Yes No If yes, please complete the appropriate appendix.

Page 1 of 1

#### FILL

Please make sure answers to all of the questions in this appendix correspond to information on the application drawings.

- How many linear feet will the fill extend channelward of the: a. Tidal waters: mean high water line? \_\_\_\_\_ft. mean low water line? \_\_\_\_\_ft.
  - b. Non-tidal waters: ordinary high water line? \_\_\_\_\_ ft.
- 2. What is the area of fill that will be located:
  - a. on subaqueous land (channelward of mean high water) \_\_\_\_\_\_ sq. ft.
  - b. on vegetated wetlands? \_\_\_\_\_ sq. ft.
- 3. What is the source of the fill?

X Hauled in from upland sources: What is the source company/location/parcel number?

\_\_\_\_\_ Obtained from dredged material: Complete Dredging Appendix.

- 4. What is the total volume of fill? <u>120</u> cubic yards
  a. What is the total fill per running foot of shoreline? <u>0.2</u> cubic yards
- 5. What method will be used to place the fill?

The fill material will be placed using standard construction equipment such as a wheel front loader or backhoe.

- 6. State the type and composition percentage of the fill material (e.g. sand 80%, silt 5%, clay 15%, etc.) SAND BACKFILL- The specific source will be identified during the submittal stage following award.
- 7. How will the fill be retained? Complete appropriate appendix.

In the northern portion of the project, the sand backfill will be placed behind (landward) of the new stone revetment. In the southern portion of the project, the sand backfill will be placed behind (landward) of the tree log barrier.

8. What type of vegetation or ground cover will be provided for the filled area(s) to prevent soil erosion and help keep sediment from reaching State waters?

High marsh (Scirpus Atrovirens) and low marsh (Pontederia Cordata and Peltandra Virginica) will be planted in order to create new tidal wetlands (southern portion of the project and improve the three existing tidal wetlands (northern portion of the project.

9. Describe the type(s) of structure(s) to be erected on the filled area (if any). Complete appropriate appendix.

No structures will be erected in the fill area.

#### **Rip-Rap Sills and Revetments**

Please respond to each question. Questions left blank may result in the application being returned as incomplete. In addition, the answers to all of the questions in this Appendix must correspond accurately to the information on the plan and section view drawings for the project.

1. Will the project be:

\_\_\_ New Construction (un-stabilized shoreline)

X Repair or Replacement of an Existing Rip-Rap Structure or Rubble

\_ Repair or Replacement of an Existing Bulkhead

(If repair or replacement, submit photographs of the entire existing structure).

- 2. How many linear feet of shoreline are proposed to be stabilized? 1,225
- 3. Is the project a: X Standard rip-rap revetment X Free-standing sill
- 4. Describe the existing shoreline:

The existing northern shoreline (approximately 1,225 LF shoreline) was previously stabilize in 2007 using geotextile fabric and R-5 riprap aggregate (50 lbs to 150 lbs stone) to construct stone sills and revetment along the shoreline. The sills were constructed at three locations to create wetlands and marsh areas immediately behind the sills. Since then, the constructed sills and revetments have deteriorated, and signs of significant erosion can be seen along the shoreline.

- What is the total number of cubic yards of rip-rap that will be used?
   430 (R-4 20 CY for outfall, R-5 410 for sill/revetment) Existing stone may be reused
   380 Armor Stone
- 380 Armor Stone 6. What is the number of cubic yards of rip-rap per running foot of shoreline? 0.66

(See page 4 for a guide to calculating total cubic yards and cubic yards per running foot).

7. What will be the average weight of the stone used for the:

Armor stone: 200-250 lbs Core stone: 50-150 lbs

[If material other than stone, such as prefab geo-grid or other similar product is proposed, please describe here and include photographs or a brochure. The Department strongly discourages the use of broken concrete, cinderblocks or other materials that are less dense than stone, more apt to move off site due to currents or wave action, and/or are not aesthetically pleasing or in keeping with the natural environment.]

Describe:

8.	For Sta A. Me Or	andard Revetments answer A–F, below: (for Sill projects, skip to Question #9) How many linear feet will the structure extend channelward of: ean High Water:Mean Low Water:0 dinary High Water: (for non-tidal waters)
	B. Ch Ch On	How many square feet of the structure will be located: annelward of Mean High Water: <u>8,155</u> Channelward of Mean Low Water: <u>0</u> annelward of Ordinary High Water: (for non-tidal waters) vegetated wetlands: <u>0</u>
	C. If y	Will the revetment be backfilled? Yes $\underline{X}$ Noves, complete Appendix H and include it in your application.
	D.	Will filter cloth be used behind the rip-rap structure? X Yes No
	E.	What is the average slope of the existing bank?3.5:1
	F.	What is the proposed slope of the rip-rap revetment? <u>1.5:1 and 2:1</u> (See page 3 for a guide to calculating slopes).
9	Sill Pro	vierts.
5.	Δ	What is the base width of the proposed structure. 14 ft
	В.	What is the top width of the proposed structure: 2.0 ft
	C.	How many square feet of the structure will be located:
	_	Channelward of Mean High Water: $3,455$ Channelward of Mean Low Water:0
		Channelward of Ordinary High Water: (for non-tidal waters)
		On vegetated wetlands:0
	D.	What will be the average height of the structure: 4 ft
	E.	How much of the structure (in inches) will extend vertically above:
	Me	ean High Water: O Ordinary High Water: (for non-tidal waters)
	F.	Are breaks or notches proposed in the sill to allow for greater flushing? $X$ Yes No
	G.	Will fill material be placed behind the sill? $X$ Yes No If yes, complete appropriate appendix.
		X

H. Will wetland vegetation be planted behind the sill? <u>A</u> Yes \_\_\_\_ No If yes, complete Appendix H and include it in your application.

10. Construction Techniques (Complete for both Revetment and Sill Projects):

A. Will any dredging be required? \_\_\_\_ Yes X No

If yes, please include appropriate dredging Appendix with your application).

B. Please describe the sequence of construction and any techniques that will be utilized to minimize adverse impacts on the aquatic environment, and to preserve existing vegetation (particularly woody vegetation) along the shoreline:

A turbidity curtain is proposed to be used to minimize adverse impacts on the surrounding waterway and aquatic environment. Sensitive area protection is proposed to be used to protect existing wetlands.

#### CALCULATIONS

RUN = Base width of the structure (in feet) RISE = Vertical height of the structure (in feet)

I. How to calculate total cubic yards:

0.5 \* RUN \* RISE \* Linear feet of shoreline stabilized/27 = Total Cubic Yards

II. How to calculate cubic yards per running foot of shoreline:

Total # Cubic Yards/ Linear feet of shoreline = Cubic yards per running foot

III. How to calculate slope: Slope = RUN/RISE

#### EXAMPLE:

If we propose to stabilize 100 linear feet of shoreline with a rip-rap revetment that has a basewidth of 6 feet and a height of 3 feet:

0.5 \* 6 \* 3 \* 100/27 = 33.33 Total Cubic Yards

- II. 33.33/ 100= 0.333 Cubic Yards per running foot
- III. 6/3= Slope of 2

#### Vegetative Stabilization

• Please make sure that all answers in this appendix correspond to information on the application drawing

#### 1. Submit a brief description of the proposed activity

The project design includes 800 linear feet (LF) of Stone Revetment along the North Shoreline, approximately 315 LF of Vented Stone Sill along the North Shoreline, rehabilitate and plant approximately 1,880 SF of marsh area, and protect the three previously designed wetland areas along the North Shoreline, approximately 270 LF of Tree Log Barrier along the South Shoreline, approximately 3,325 SF of created marsh wetland located between the upland and Tree Log Barrier on the South Shoreline.

- 2. Is grading of bank and/or placement of fill part of this project? Yes No If yes complete Appendix H
- 3. Indicate the area of proposed planting that is channelward of the:
  - a. Tidal Waters: mean high water line?  $5,070 \text{ ft}^2$ mean low water line?  $0 \text{ ft}^2$
  - b. Non-tidal waters: ordinary high water line? \_\_\_\_\_ ft<sup>2</sup>
- 4. What will the water depth of the plantings be relative to the: (provide the range if it varies)
  - a. Tidal Waters: mean high water line? <u>-1 to +1</u> f mean low water line? +3 to +5 ft
  - b. Non-tidal waters: ordinary high water line? ft
- 5. Provide the list of plant species that will be utilized.

Arrow Arum (Peltandra virginica) Pickerelweed (Pontederia cordata) Green Bullrush (Scirpus atrovirens)

6. Describe the sequence of construction and planting.

After the sills and tree log barrier are installed and backfill is placed, 2" plugs can be planted with 18" spacing during the planting season of March to June 15.

7. Describe the maintenance and monitoring plan for the vegetation.

Marsh areas are proposed to be inspected quarterly for the first two years then yearly after the first two years.

Sick and/or dead vegetation is proposed to be replaced, invasive species removed, trash/debris removed, and trees trimmed to help increase sunlight.

# **ATTACHMENT 3**

# **Project Location Map**



Sources: Base map layer provided by ESRI Online: Pennoni job number DNREC23002

# **ATTACHMENT 4**

Site Survey and Design Plan

# **PREPARED FOR: DNREC DIVISION OF CLIMATE, COASTAL & ENERGY**



SOILS MAP Scale: 1" = 1000'

WATER UTILITY TOWN OF MILTON (302) 462-1775

SANITARY SEWER UTILITY ARTESIAN WASTEWATER MANAGEMENT (302) 453-6971

ELECTRIC UTILITY DELMARVA POWER CONTACT: CENTURY ENGINEERING (302) 423-2586

COMMUNICATIONS UTILITY COMCAST CONTACT: CABLE PROTECTION SERVICE (804) 562-3409

CALL BEFORE YOU DIG **Call Miss Utility of Delmarva** 800-282-8555 Ticket Number(s): 241200603

# **MEMORIAL PARK SHORELINE STABILIZATION**

# **PERMITTING PLANS**

**BROADKILL HUNDREDS SUSSEX COUNTY, DELAWARE** 

**100 WEST WATER STREET, SUITE 10B DOVER, DE 19904** 



Sheet List Table						
Sheet Number	Sheet Description	Sheet Title				
1	CM0001	COVER				
2	CM0501	EXISTING CONDITIONS				
3	CM1001	PROPOSED SHORELINE STABILIZATION				
4	CM1002	PROPOSED SHORELINE STABILIZATION				
5	CM6001	CONSTRUCTION DETAILS & CROSS SECTIONS				
6	CM8501	EROSION & SEDIMENT CONTROL DETAILS				
7	CM8502	EROSION & SEDIMENT CONTROL DETAILS				





Christiana Executive Campus 121 Continental Drive, Suite 207 Newark, DE 19713-4310 **T** 302.655.4451 **F** 302.654.2895

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NOT FOR CONSTRUCTION SHEET 1 OF 7



ABBREVIATIONS:	4.0' HTL
HTL - HIGH TIDE LINE MHHW - MEAN HIGHEST HIGH WATER	2.0' MHHW
NAVD'88 - NORTH AMERICAN VERTICAL DATUM MTL - MEAN TIDE LEVEL MLW - MEAN LOW WATER	0.0' NAVD'880.5' MTL
MLLW - MEAN LOWEST LOW WATER	-2.8' MLLW
NOTE: 1 HTL OBSERVED AND VERIFIED AT NOAA TIDA	AL STATION 8557380   EWES DE THE HT

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# **EXISTING CONDITION NOTES:**

- 1. EXISTING CONDITIONS AND BATHYMETRIC SURVEYS PERFORMED NOVEMBER 15-17, 2023 AND NOVEMBER 22, 2023 BY PENNONI ASSOCIATES INC.
- 2. HORIZONTAL AND VERTICAL DATUMS FOR THIS PROJECT ARE BASED ON RTK-GPS OBSERVATIONS OF TWO SURVEY CONTROL POINTS.
- 3. VERTICAL COORDINATES ARE IN MLW. ELEVATIONS WERE CONVERTED FROM NAVD'88, TO MLW BASED ON NOAA'S VDATUM: VERTICAL DATUM TRANSFORMATION VERSION 4.6.1. WITH A CONVERSION FACTOR OF +2.6'.
- 4. HORIZONTAL COORDINATES ARE IN DE STATE PLANE COORDINATE SYSTEM NAD'83.
- 5. THERE WAS NO BOUNDARY OR TITLE SEARCH PERFORMED FOR THIS PROJECT. THIS PLAN SHOULD NOT BE USED AS A BOUNDARY SURVEY.
- 6. A WETLAND AND WATERCOURSE INVESTIGATION WAS PERFORMED ON NOVEMBER 15, 2023 BY PENNONI TO DELINIATE EXISTING WETLANDS THAT ARE FOUND ON-SITE.
- 7. UNLESS SPECIFICALLY STATED OR SHOWN HEREON TO THE CONTRARY, THIS SURVEY IS MADE SUBJECT TO AND DOES NOT LOCATE OR DELINEATE:
- 7.1. RIGHTS OR INTEREST OF THE UNITED STATES OF AMERICA OR STATE OF DELAWARE OVER LANDS NOW OR FORMERLY FLOWN BY TIDEWATER, BUT NO LONGER VISIBLE OR PHYSICALLY EVIDENT, OR LANDS CONTAINING ANY ANIMAL, MARINE OR BOTANICAL SPECIES REGULATED BY OR UNDER THE JURISDICTION OR ANY FEDERAL, STATE, OR LOCAL AGENCY.
- 7.2. BUILDING SETBACK LINES, ZONING REGULATIONS OR LINES ESTABLISHED BY ANY FEDERAL, STATE OR LOCAL AGENCY WHICH MAY AFFECT THE BUILDING OR DEVELOPMENT POTENTIAL OF THE SUBJECT PROPERTY.
- 7.3. ANY SUBSURFACE OR SUBTERRANEAN CONDITION, EASEMENTS OR RIGHTS, INCLUDING, BUT NOT LIMITED TO MINERAL OR MINING RIGHTS, OR THE LOCATION OF OR RIGHTS TO ANY SUBSURFACE STRUCTURES, CONTAINERS OR FACILITIES OR ANY OTHER NATURAL OR MAN-MADE SUBSURFACE CONDITION WHICH MAY OR MAY NOT AFFECT THE USE OR DEVELOPMENT POTENTIAL OF THE SUBJECT PROPERTY.
- 8. UTILITY NOTES:
- 8.1. EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE BASED UPON THE BEST AVAILABLE INFORMATION AND ARE SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. NO GUARANTEE IS MADE OR IMPLIED REGARDING THE ACCURACY OR COMPLETENESS THEREOF.
- 8.2. CONTRACTOR IS RESPONSIBLE FOR THE VERIFICATION OF THE LOCATION, DEPTH, SIZE AND MATERIAL OF ALL UNDERGROUND UTILITIES TO HIS OWN SATISFACTION BEFORE BEGINNING ANY EXCAVATION OR PIPE LAYING. THE ENGINEER AND SURVEYOR DISCLAIM ANY RESPONSIBILITY FOR THE ACCURACY AND COMPLETENESS OF SAID INFORMATION. IF THE CONTRACTOR RELIES ON SAID INFORMATION, HE DOES SO AT HIS OWN RISK. THE GIVING OF THE INFORMATION ON THE PLANS WILL NOT RELIEVE THE CONTRACTOR OF HIS OBLIGATIONS TO SUPPORT AND PROTECT ALL SHOWN OR NOT SHOWN EXISTING UTILITIES AND APPURTENANCES.
- 8.3. SHOULD ANY EXISTING UTILITIES BE DAMAGED BY THE CONTRACTOR, THEN THE CONTRACTOR SHALL REPAIR THE DAMAGE CAUSED TO THE UTILITY AT THE PROVIDERS SATISFACTION, AND AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL MAKE HIS OWN INVESTIGATION AND TEST PIT EXISTING UTILITIES AS REQUIRED.
- 8.4. MISS UTILITY SHALL BE NOTIFIED NOT LESS THAN TWO (2) FULL WORKING DAYS, BUT NO MORE THAN 10 WORKING DAYS PRIOR TO EXCAVATION. THE DAY OF THE NOTIFICATION DOES NOT COUNT AS ONE OF THESE DAYS.
- 8.5. IF CONFLICTS ARE FOUND THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND DESIGN ENGINEER FOR INSTRUCTION BEFORE PROCEEDING WITH WORK.
- 9. PROTECT BENCH MARKS AND EXISTING STRUCTURES, ROADS, SIDEWALKS, PAVING AND CURBS AGAINST DAMAGE FROM VEHICULAR OR FOOT TRAFFIC.
- 10. MAINTAIN UTILITY, ELECTRICAL, AND MECHANICAL SERVICES/SYSTEMS INDICATED TO REMAIN AND PROTECT THEM AGAINST DAMAGE.

# FLOOD ZONE INFORMATION:

1. BASED UPON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) NUMBER 10005C01, EFFECTIVE DATE MARCH 16, 2015, THE PROPERTY IS LOCATED IN AREA DESIGNATED AS FLOOD ZONE "AE", WHICH IS AN AREA THAT HAS BEEN DETERMINED TO BE INSIDE THE 100-YEAR FLOODPLAIN, AND ALSO WITHIN THE FLOODWAY AREA OF ZONE AE, WHICH IS DEFINED AS THE CHANNEL OF A STREAM PLUS ANY ADJACENT FLOODPLAIN AREAS THAT MUST BE KEPT FREE OF ENCROACHMENT SO THAT THE 1% ANNUAL CHANCE FLOOD CAN BE CARRIED WITHOUT SUBSTANTIAL INCREASES IN FLOOD HEIGHTS.

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- 1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL AMENDMENTS THERETO. THESE DRAWINGS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFFTY
- 2. THE CONTRACTOR SHALL PROTECT ALL ADJOINING AND NEARBY BUILDINGS, EQUIPMENT, ALL UTILITIES, STRUCTURES, FENCES, TREES, SHRUBBERY, ETC., FROM DAMAGE DUE TO EXCAVATION, DEMOLITION, AND CONSTRUCTION, DURING THE ENTIRE CONSTRUCTION PERIOD. ANY DAMAGE CAUSED DIRECTLY OR INDIRECTLY WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
- 3. CONTRACTOR TO DISPOSE OF ALL HAZARDOUS WASTE ENCOUNTERED DURING EXCAVATION IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. THE DISPOSAL SITE MUST BE A PERMITTED SITE.
- 4. THE CONTRACTOR SHALL MAINTAIN ALL CONSTRUCTION ACTIVITIES WITHIN THE DESIGNATED LIMITS OF WORK/DISTURBANCE. 5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DISPOSE OF ALL
- EXCAVATED/DREDGED MATERIAL NOT USED IN THE PROJECT CONSTRUCTION AT AN APPROVED UPLAND DISPOSAL SITE HAVING AN APPROVED EROSION AND SEDIMENT CONTROL PLAN.
- 6. CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY BYPASS PUMPING, TO PERFORM THE PROPOSED WORK.
- 7. CONTRACTOR IS SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES, SAFETY PRECAUTIONS AND PROGRAMS. 8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ACTUAL SITE
- CONDITIONS PRIOR TO THE START OF ANY WORK. THERE IS NO WARRANTY OR GUARANTEE ON THE COMPLETENESS OR CORRECTNESS OF EXISTING CONDITION INFORMATION. ANY DISCREPANCIES FOUND SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE INSPECTOR AND/OR THE ENGINEER PRIOR TO THE START OF ANY CONSTRUCTION WORK.
- 9. CONTRACTOR SHALL MAINTAIN INGRESS/EGRESS TO ALL PROPERTIES DURING CONSTRUCTION. 10. CONTRACTOR SHALL NOTIFY ALL AFFECTED PROPERTY OWNERS/RESIDENTS
- ABOUT CONSTRUCTION ACTIVITIES. 11. ALL EXISTING UTILITIES AND FEATURES ON THE SITE WHICH SHALL INCLUDE BUT NOT BE LIMITED TO, YARD HYDRANTS, TREES, SHRUBS, ETC. SHALL BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR. SHOULD ANY DAMAGE OCCUR BY THE CONTRACTOR, THEY SHALL BE REPLACED IN KIND AT THE CONTRACTOR'S EXPENSE.
- 12. PROTECT BENCH MARKS AND EXISTING STRUCTURES, ROADS, SIDEWALKS, PAVING AND CURBS AGAINST DAMAGE FROM VEHICULAR OR FOOT TRAFFIC.
- 13. MAINTAIN DESIGNATED TEMPORARY ROADWAYS, WALKWAYS AND DETOURS, FOR VEHICULAR AND PEDESTRIAN TRAFFIC.

# TIME OF YEAR RESTRICTIONS:

BASED UPON THE DELAWARE DEPARTMENT OF NATURAL RESOURCES AND 1 ENVIRONMENTAL CONTROL DIVISION OF FISH AND WILDLIFE REVIEW, NO IN-WATER WORK MAY BE PERFORMED BETWEEN DECEMBER 15, AND JUNE 30.

# SEQUENCE OF CONSTRUCTION:

- 1. A PRE-CONSTRUCTION MEETING MUST BE SCHEDULED AND CONDUCTED WITH THE AGENCY CONSTRUCTION SITE REVIEWER, THE OWNER/DEVELOPER, CONTRACTOR, AND CERTIFIED CONSTRUCTION REVIEWER; THE DESIGNER IS RECOMMENDED TO ATTEND.
- 2. NOTIFY MISS UTILITY NOT LESS THAN TWO (2) FULL WORKING DAYS, BUT NO MORE THAN 10 WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. THE DAY OF THE NOTIFICATION DOES NOT COUNT AS ONE OF THESE DAYS.
- 3. ESTABLISH PERIMETER CONTROL. ALL PERIMETER CONTROLS ARE TO BE REVIEWED BY THE AGENCY CONSTRUCTION SITE REVIEWER AND APPROVED PRIOR TO PROCEEDING WITH FURTHER SITE DISTURBANCE OR CONSTRUCTION.
- 4. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF, OR WIND, FROM LEAVING THE SITE. PERIMETER CONTROLS SHOULD BE CHECKED DAILY AND ADJUSTED AND/OR REPLACED TO FULLY COVER THE DISTURBED AREA. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR REPAIR MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER. TURBIDITY CURTAIN SHALL BE USED TO ENCOMPASS ALL IN-WATER WORK BEING PERFORMED AT ANY GIVEN TIME
- 5. REHABILITATE EXISTING STORMWATER PIPES
- 6. CONSTRUCT PROPOSED STONE REVETMENT AND STONE SILL AS INDICATED ON PLANS.
- 7. CONSTRUCT TREE LOG BARRIER AS INDICATED ON PLANS.
- 8. FILL AND GRADE LANDWARD OF STONE SILLS AND TREE LOG BARRIER STRUCTURES.
- 9. PLANT MARSH PLANTINGS AS INDICATED ON PLANS.
- 10. PERMANENTLY SEED ALL DISTURBED AREAS PER THE SEEDING NOTES PROVIDED ON THE EROSION AND SEDIMENT CONTROL DETAILS.
- 11. UPON COMPLETION OF THE PROJECT, AND APPROVAL FROM AGENCIES, REMOVE ANY REMAINING EROSION CONTROL MEASURES.



NOT FOR CONSTRUCTION

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OF 7





PURPOSE	PLANTING METHOD	APPROXIMATE TOTAL AREA	QUANTITY	PLANTING SEASON		
ABLISHMENT OF	ALTERNATING SPECIES	1,370 S.F.	609			
LOW MARSH 2" PLUGS 18" SPACING		1,370 S.F.	609	MARCH - JUNE 13		
ABLISHMENT OF HIGH MARSH	2" PLUGS 18" SPACING	2,740 S.F.	1,218	MARCH - JUNE 15		

IS AND MAINTENANCE SCHEDULE					
CHEDULE	MAINTENANCE				
CE EVERY SIX WO YEARS. ARS, INSPECT THE R.	FILL AND COMPACT ANY AREAS WHERE SOIL HAS SETTLED OR ERODED. REPLACE ANY ARMOR STONE THAT HAS SHIFTED OR BEEN REMOVED.				
CE EVERY SIX WO YEARS. ARS, INSPECT THE R.	REPLACE ANY ARMOR STONE THAT HAS SHIFTED OR BEEN REMOVED.				
UARTERLY FOR THE ARS, INSPECT THE AR.	REPLACE AND/OR REPLANT ANY SICK OR DEAD MARSH PLANTS. IDENTIFY AND REMOVE ANY PRESENT INVASIVE SPECIES. REMOVE ANY TRASH OR DEBRIS FROM THE MARSH AREA. TRIM ANY OVERSHADOWING TREES THAT MAY BE INHIBITING SUNLIGHT ONTO THE MARSH PLANTS.				

	Pennoni		PENNONI ASSOCIATES INC.	Christiana Executive Campus	121 Continental Drive, Suite 207 Newark. DE 19713-4310	T 302.655.4451 F 302.654.2895
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	MEMORIAL PARK SHORELINE STABILIZATION	MILTON, DE 19968	CONSTRUCTION DETAILS & CROSS SECTIONS		DININEO DIVIDION OF CLIMATE, COADTAE & LIVENOT 100 WEST WATER STREET, SUITE 10B	DOVER, DE 19904
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# Standard Detail & Specifications **Vegetative Stabilization**

TEMPORARY SEEDING BY RATES, DEPTHS AND DATES											
Mix #	Species <sup>5</sup>	Seedir	Optimum Seeding Dates <sup>1</sup> O = Optimum Planting Period; A = Acceptable Planting Period					Planting Depth <sup>3</sup>			
				Co	astal P	lain	Р	iedmo	nt	All	
	Certified Seed	lb/Ac.4	lb/1000 sq.ft.	2/1- 4/30	² 5/1- 8/14	8/15- 10/31	3/1- 4/30	² 5/1- 7/31	8/1- 10/31	10/31- 2/1	
1	Barley	125	4	0	A	0	0	A	0		1-2 inches 2-3" sandy soils
2	Oats	125	4	0	A	А	0	A	A		1-2 inches 2-3" sandy soils
3	Rye	125	4	0	A	0	0	A	0	A	1-2 inches 2-3" sandy soils
4	Perennial Ryegrass	125	4	0	A	0	0	Α	0		0.5 inches 1-2" sandy soils
5	Annual Ryegrass	125	4	0	A	0	0	A	0	A	0.5 inches 1-2" sandy soils
6	Winter Wheat	125	4	0	A	0	0	A	0	A	1-2 inches 2-3" sandy soils
7	Foxtail Millet	30 PLS	0.7		0			0			0.5 inches 1-2" sandy soils
8	Pearl Millet	20 PLS	0.5		0			0			0.5 inches 1-2" sandy soils

I. Winter seeding requires 3 tons per acre of straw mulch for proper stabilization. 2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.

3. Applicable on slopes 3:1 or less.

4. Use varieties currently recommended for Delaware. Contact a County Extension Office for information. 5. Warm season grasses such as Millet may be used between 5/1 and 9/1 if desired. Seed at 3-5 lbs.

per acre. Good on low fertility and acid areas. Seed after frost through summer at a depth of 0.5".

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Detail No

DE-ESC-3.4.3

Sheet 1 of 4

Effective July 2023

Symbo Source: Delaware ESC Handbook



				Standard Deta	il & Specifications		
			Sei	nsitive Area	<b>Protection</b>		
С	onst	ruction Note	es:				
Fe ins mu are silf mi	Fencing shall be installed at the extents of all sensitive areas. For trees, the fencing shall be installed outside the dripline (mature canopy) and at no time within 5 feet of the trunk. Personnel nust be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained. If fence is to be used for demarcation purposes, appropriate signage shall be provided a ninimum of every 20 feet denoting the area as a sensitive area protection zone.						
M	later	ials:					
1.	Snow consti	Fence - Standard 4 ruction on standard	40-inch hi steel pos	gh snow fence shall be pla ts set 6 feet apart.	aced at the limits of clearing or		
2.	Board protru minim a fenc still be	Fence - Board fence ding at least 4 feet um of two horizontal e at the drip line, co located at the drip li	ing consis above th I boards bo nstruct a f ine, since	sting of 4-inch square posts e ground shall be placed etween posts. For tree prote riangular fence nearer the the root zone within the drip	set securely in the ground and at the limits of clearing with a ection, if it is not practical to erect trunk. The limits of clearing will b line will still require protection.		
3.	3. Plastic Fencing - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foc minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:						
	a.	Tensile yield:		Average 2,000 lbs. per 4-	foot width (ASTM D638)		
	b. Ultimate tensile yield: Average 2,900 lbs. per 4-foot width (ASTM D638)						
	C.	Elongation at brea	ak (%):	Greater than 1000% (AS	TM D638)		
	d.	Chemical resistan	ce:	Inert to most chemicals a	nd acids		
ou	rce:		Symbol	:	Detail No.		
Adapted from			SAD	DE-ESC-3.7.2			

-SAP-

VA ESC Handbook





- Maintenance The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
- 8. Washing Vehicle wheels shall be cleaned to remove sediment prior to entrance onto public rightsof-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.





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fencing on 6-foot ollowing

DE-ESC-3.7.2 Sheet 2 of 3 Effective July 2023



Standard Detail & Specifications

**Sensitive Area Protection** 

4. Cord Fence - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely

in the ground and protruding at least 4 feet above the ground shall be placed at the limits of

clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts

with strips of colored surveyor's flagging tied securely to the string at intervals no greater than



NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Detail No

DE-ESC-3.4.3

Sheet 3 of 4

Effective July 2023

Source: Delaware ESC Handbook







- 1. Site Preparation a. Prior to seeding, install needed erosion and sediment control practices such as diversions,
- grade stabilization structures, berms, dikes, grassed waterways, and sediment basins. b. Final grading and shaping is not necessary for temporary seedings.

2. Seedbed Preparation

- It is important to prepare a good seedbed to ensure the success of establishing vegetation. The seedbed should be well prepared, loose, uniform, and free of large clods, rocks, and other objectionable material. The soil surface should not be compacted or crusted.
- 3. Soil Amendments
- a. Lime Apply liming materials based on the recommendations of a soil test in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil.
- b. Fertilizer Apply fertilizer based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply a formulation of 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soils.

4. Seeding

- a. For temporary stabilization, select a mixture from Sheet 1. For a permanent stabilization, select a mixture from Sheet 2 or Sheet 3 depending on the conditions. Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.
- b. Apply seed uniformly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. All seed will be applied at the recommended rate and planting depth.
- c. Seed that has been broadcast should be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption

5. Mulching

All mulching shall be done in accordance with detail **DE-ESC-3.4.5**.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		DE-ESC-3.4.3
		Sheet 4 of 4
		Effective July 2023

# Standard Detail & Specifications **Geotextile Dewatering Bag**

**Construction Notes:** 

- . The dewatering bag should be placed so the incoming water flows into and through the bag, and then flow off the site without creating more erosion. The neck should be tied off tightly to stop the water from flowing out of the bag without going through the walls. The dewatering bag should be placed on a gravel bed to allow water to flow in all directions.
- 2. The dewatering bag is considered full and should be disposed when it is impractical for the bag to filter the sediment out at a reasonable flow rate. At this point, it should be replaced with a new
- Disposal may be accomplished as directed by the construction reviewer. If the site allows, the bag may be buried on site and seeded, visible fabric removed and seeded or removed from site to a proper disposal area.

Materials:

1. The geotextile fabric shall be a Type GD-IV.

Heavy duty

2. The dewatering bag shall be sewn with a double needle machine using high strength thread. All structural seams will be sewn with high strength, double stitched "J" type. Seam strength test will have the following minimum average roll values:

•	
EST METHOD	TEST RESULT
STM D-4884	100 lb / in

3. The dewatering bag shall have an opening large enough to accommodate a four (4) inch discharge hose with attached strap to tie off the hose to prevent the pumped water from escaping from the bag without being filtered.

Source:	Symbol:	Detail No.
Adapted from		DE-ESC-3.2.1.2
ACF Products, Inc.		Sheet 2 of 2
		Effective July 2023

# Standard Detail & Specifications **Concrete Washout**

### **Construction Notes:**

- . Locate washout area a minimum of 50 feet from open channels, stormdrain inlets, wetlands or waterbodies.
- 2. Locate washout area so that it is accessible to concrete equipment (service with a minimum 10 foot wide gravel accessway), but so it is not in a highly active construction area causing accidental damage.
- B. Minimum dimensions for prefabricated units are 4 feet by 4 feet by 1 foot deep with a minimum 4mil polyethylene plastic liner. Minimum dimensions for constructed concrete washout areas are 6 feet by 6 feet by 3 feet deep, with a minimum 10mil polyethylene liner, 2:1 side slopes, and a 1 foot high by 1 foot wide compacted fill berm.
- The liner must be free of tears or holes and placed over smooth surfaces to prevent puncturing. For excavated washouts, anchor the liner underneath the berm or overtop with sandbags or concrete blocks to hold in place.
- 5. Provide a sign designating the washout area, and for large construction sites, provide signs throughout directing traffic to its location.
- 6. Allow washed out concrete mixture to harden through evaporation of the wastewater. Once the facility has reached 75 percent of its capacity, remove the hardened concrete by reusing the broken aggregate onsite, recycling, or disposing of offsite. The hardened material can be buried on site with minimum of 1 foot of clean, compacted fill.
- Apply a new liner before reusing the station for additional washouts after maintenance has occurred.

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Source:	Syn
Adapted from	
Colorado Urban Storm Drain-	
age Criteria Manual, Vol 3	

DE-ESC-3.6.2 Sheet 2 of 2 Effective July 2023

Detail No.

# **GENERAL NOTES:**

- 1. THE DNREC, SEDIMENT AND STORMWATER PROGRAM (OR DELEGATED AGENCY) MUST BE NOTIFIED IN WRITING FIVE (5) DAYS PRIOR TO COMMENCING WITH CONSTRUCTION.
- 2. REVIEW AND OR APPROVAL OF THE SEDIMENT AND STORMWATER MANAGEMENT PLAN SHALL NOT RELIEVE THE CONTRACTOR FROM HIS OR HER RESPONSIBILITIES FOR COMPLIANCE WITH THE REQUIREMENTS OF THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS, NOR SHALL IT RELIEVE THE CONTRACTOR FROM ERRORS OR OMISSIONS IN THE APPROVED PLAN.
- 3. IF THE APPROVED PLAN NEEDS TO BE MODIFIED, ADDITIONAL SEDIMENT AND STORMWATER CONTROL MEASURES MAY BE REQUIRED AS DEEMED NECESSARY BY DNREC OR THE DELEGATED AGENCY.
- FOLLOWING SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED FOR ALL PERIMETER SEDIMENT CONTROLS, SOIL STOCKPILES AND ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE WITHIN 14 CALENDAR DAYS UNLESS MORE RESTRICTIVE FEDERAL REQUIREMENTS APPLY.
- ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL COMPLY WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
- 6. AT ANYTIME A DEWATERING OPERATION IS USED, IT SHALL BE PREVIOUSLY APPROVED BY THE AGENCY CONSTRUCTION SITE REVIEWER FOR A NON-EROSIVE POINT OF DISCHARGE, AND A DEWATERING PERMIT SHALL BE APPROVED BY THE DNREC WELL PERMITTING BRANCH .
- APPROVAL OF A SEDIMENT AND STORMWATER MANAGEMENT PLAN DOES NOT GRANT OR IMPLY A RIGHT TO DISCHARGE STORMWATER RUNOFF. THE OWNER/DEVELOPER IS RESPONSIBLE FOR ACQUIRING ANY AND ALL AGREEMENTS. ETC., NECESSARY TO COMPLY WITH STATE DRAINAGE AND OTHER APPLICABLE
- 8. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS SHALL BE CHECKED DAILY AND ADJUSTED AND/OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENT FROM LEAVING THE SITE. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR ALTER MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER.
- BEST AVAILABLE TECHNOLOGY (BAT) SHALL BE EMPLOYED TO MANAGE TURBID 9 DISCHARGE IN ACCORDANCE WITH REQUIREMENTS OF 7. DelC. Ch 60, REGULATIONS GOVERNING THE CONTROL OF WATER POLLUTION, SECTION 9.1.02, KNOWN AS SPECIAL CONDITIONS FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES, AND DEPARTMENT POLICIES, PROCEDURES, AND GUIDANCE.

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Effective July 2023





# **Standard Detail & Specifications Riprap Outlet Protection - 1**

#### **Construction Notes:**

CHAIN

- The subgrade for the riprap shall be prepared to the required lines and grades as shown on the plan. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.
- 2. The riprap shall conform to the grading limits as shown on the plan.

Symbol:

- 3. Filter cloth shall be protected from punching, cutting or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged area. All connecting joints should overlap a minimum of 1 ft. If the damage is extensive, replace the entire filter cloth.
- . Stone for the riprap or gabion outlets may be placed by equipment. Riprap shall be placed in a manner to prevent damage to the filter cloth. Hand placement will be required to the extent necessary to prevent damage to the conduits, structures, etc.



Source: Adapted from MD Stds. & Specs. for ESC

Effective July 2023



# **Standard Detail & Specifications Turbidity Curtain**

### **Construction Notes:**

- . Materials a. Barriers should be a bright color (yellow or "international" orange are recommended) that will attract the attention of nearby boaters.
- b. The curtain fabric shall meet manufacturer's recommendations for the application. c. Seams in the fabric shall be either vulcanized welded or sewn and shall develop the full
- strength of the fabric. d. Floatation devices shall be flexible, buoyant units contained in an individual floatation sleeve or collar attached to the curtain. Buoyancy provided by the floatation units shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 3
- inches above the water surface level. e. Load lines must be fabricated into the bottom of all floating turbidity curtains. Type II and Type III must have load lines also fabricated into the top of the fabric. The top load line shall consist of woven webbing or vinyl-sheathed steel cable and shall have a break strength in excess of 10,000 pounds. The supplemental (bottom) load line shall consist of a chain incorporated into the bottom hem of the curtain of sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided as necessary. The load lines shall have suitable connecting devices which develop the full breaking strength for connection to load lines in adjacent sections as shown in the detail
- f. External anchors may consist of wooden or metal stakes (2- x 4-inch or 2-1/2-inch minimum diameter wood or 1.33 lbs/linear foot steel) when Type I installation is used; when Type II or Type III installations are used, bottom anchors should be used.
- g. Bottom anchors must be sufficient to hold the curtain in the same position relative to the bottom of the watercourse without interfering with the action of the curtain. The anchor may dig into the bottom (grappling hook, plow or fluke-type) or may be weighted (mushroom type) and should be attached to a floating anchor buoy via an anchor line. The anchor line should then run from the buoy to the to load line of the curtain. When used with Type III installations, these lines must contain enough slack to allow the buoy and curtain to float freely with tidal changes without pulling the buoy or curtain down and must be checked regularly to make sure they do not become entangled with debris. As previously noted, anchor spacing will vary with current velocity and potential wind and wave action; manufacturer's recommendations should be followed. See detail for orientation of external anchors and anchor buoys for tidal installations.

Source:	Symbol:	Detail No.
Adapt. from Amer. Boom and Barrier Corp.	TC-(1/2/3) (Std/Alt)	DE-ESC-3.5.3 Sheet 6 of 8 Effective July 2023

# Standard Detail & Specifications **Turbidity Curtain**

# **Construction Notes (cont.)**

- 2. Installation
- a. In the calm water of lakes or ponds (Type I installation) it is usually sufficient to set the curtain end stakes or anchor points (using anchor buoys if bottom anchors are employed), then tow the curtain in the furled condition out and attach it to the stakes or anchor points. Following this, any additional stakes or buoyed anchors required to maintain the desired location of the curtain may be set and these anchor points made fast to the curtain. Only then shall the furling lines be cut to allow the curtain skirt to drop.
- b. In rivers or in other moving waters (Type II and Type III installations) it is important to set all curtain anchor points. Care must be taken to ensure that anchor points are of sufficient holding power to retain the curtain under the existing current conditions, prior to putting the furled curtain into the water. Anchor buoys should be employed on all anchors to prevent the current from submerging the flotation at the anchor points. If the curtain is being installed into tidal areas which would be subject to currents in both directions, anchors should be provided on both sides of the curtain. This will minimize curtain movement and prevent the curtain from overrunning the anchors during tide reversals. After the anchors have been secured, the furled curtain should be secured to the upstream anchor point and then sequentially attached to each next downstream anchor point until the entire curtain is in position. Before unfurling, the "lay" of the curtain should be assessed and any necessary adjustments made to the anchors. Once the location has been deemed adequate, the furling lines may be cut to allow the skirt to drop.
- c. Anchor lines should be attached to the flotation device, not to the bottom of the curtain. The anchoring line attached to the flotation device on the downstream side will provide support for the curtain. Attaching the anchors to the bottom of the curtain could cause premature failure of the curtain due to the stresses imparted on the middle section of the curtain.
- d. Turbidity curtain shall not be installed across channel flows unless there is a danger of causing sediment deposition to occur in the middle of a watercourse, thereby blocking access or creating a sand bar. In such situations, the curtain may be installed so as to form a long-sided, sharp "V" to deflect clean water around a work site, confining most of the silt-laden water to the work area inside the "V" and directing it to the shoreline. In no case shall the curtain be installed perpendicular to the channel flow.

Source:	Symbol:	Detail No.
Adapt. from Amer. Boom and Barrier Corp.	TC-(1/2/3) (Std/Alt)	DE-ESC-3.5.3 Sheet 7 of 8 Effective July 2023

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ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK								
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ALL DOCUMENTS PREPARED BY PENNONI ASSOCIAT ARE INSTRUMENTS OF SERVICE IN RESPECT OF TH PROJECT. THEY ARE NOT INTENDED OR REPRESENT TO BE SUITABLE FOR REUSE BY OWNER OR OTHERS THE EXTENSIONS OF THE PROJECT OR ON ANY OTH PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICAT OR ADAPTATION BY PENNONI ASSOCIATES FOR TH SPECIFIC PURPOSE INTENDED WILL BE AT OWNER SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO PENNONI ASSOCIATES; AND OWNEI SHALL INDEMNIFY AND HOLD HARMLESS PENNON ASSOCIATES FROM ALL CLAIMS, DAMAGES, LOSSES, EXPENSES ARISING OUT OF OR RESULTING THEREFR								
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