STREMBANK STABILIZATION PROJECT

GLEN OAKES
LUZERNE COUNTY

51 East Nescopeck Creek Lane
WHITE HAVEN, PA. 18861

DESIGN PACKAGE
(RIPRAPH INSTALLATION & GRAVEL BAR REMOVAL ONLY)

By: Bob Deecki
OCTOBER 2018
Erosion and Sediment Control Guidelines

The guidelines presented below, which address erosion and sediment control, will be included as a condition of all emergency permits. These guidelines must also be followed when work is conducted under an existing permit or when work is undertaken that does not require a permit.

1. Maps and plans should show the location of the project with respect to municipalities, access roads, existing structures or other landmarks. The maps and plans should show a detailed drawing of the specific work site(s) including limits of disturbance, stream width, depth, extent of debris and deposition removal, and placement details for bank stabilization materials. Construction entrances should also be shown on the maps and plans.

2. Staging areas and construction entrances, including those used for equipment maintenance and servicing should be located away from flowing streams, and shall be stabilized with AASHTO No. 1 rock.

3. All work should be done as quickly as possible, with bank stabilization to occur as segments of debris and deposition removal are completed.

4. Work should be performed from stream banks, as opposed to equipment operating in flowing streams, whenever possible.

5. Rock riprap used to stabilize stream banks or other areas shall be clean, dense, angular, blocky material. Minimum rock size shall be R-6, as rated by the National Stone Association.

6. All disturbed areas not stabilized with rock riprap, other materials, or seeded and mulched, shall be graded to avoid ponding water or concentrated flow. Standard seed mixtures and their specifications should be used. Hay and straw mulch shall be applied to such disturbed areas at a rate of approximately 3 tons to the acre (a loose layer 3/4 to 1 inch thick). Compost may be applied at a rate of 270-540 cubic yards per acre (2 to 4 inch thick uniform layer). Erosion control blankets should be installed/applied according to the manufacturer’s specifications.

7. Only clean, non-polluting materials shall be used as fill. Exposed fill surfaces are to be stabilized.

8. Any sediment, trees, brush, or similar material excavated during debris removal shall be deposited in a suitable site away from the areas affected by flooding or wetlands, and stabilized with permanent vegetative cover. Other debris containing harmful or potentially hazardous materials should be disposed of in approved landfills.

These guidelines and the maps and plans mentioned in item 1, along with any required contract specifications undertaken in cooperation with the Department of Environmental Protection (DEP) and the Natural Resources Conservation Service (NRCS), are considered to be the Erosion and Sedimentation Control Plan for Watershed Restoration project.
OPERATION AND MAINTENANCE
The Operation and Maintenance of the installed streambank stabilization practices are the responsibility of the landowners involved.

1. This streambank stabilization project utilizes rock riprap armor to protect susceptible areas against erosion. It also utilizes vegetation on the areas above the riprap.

2. Inspect streambank after storms and observe any displacement of rock or vegetation that has become unstable or eroded. Repair damages to the riprap and replant vegetation if necessary.

3. Be aware of obstructions in the stream, which high water can deposit. Often this form of material is beneficial as aquatic habitat but located inappropriately it can deflect flows into an unprotected streambank-causing scour. Allow for aquatic habitat, but in situations, which are causing damage rearrange or remove the obstruction.

4. If needed, recommendations for repair can be obtained from the Natural Resources Conservation Service or the Conservation District.
QUALITY ASSURANCE PLAN
For
GLEN OAKES STREAMBANK STABILIZATION PROJECT
LUZERNE COUNTY, PENNSYLVANIA

Quality Assurance person Assigned: John Levitsky

A. Major items of work to be inspected and timing of inspections are:

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>WORK OR MATERIAL</th>
<th>WORK DAYS</th>
<th>INSPECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Riprap installation</td>
<td>4</td>
<td>X</td>
</tr>
<tr>
<td>2.</td>
<td>Stabilization Above Riprap</td>
<td>3</td>
<td>X</td>
</tr>
<tr>
<td>3.</td>
<td>Seeding</td>
<td>1</td>
<td>X</td>
</tr>
</tbody>
</table>

B. Timing of inspections needed:
1. 8 Work Days: (Part Time)

C. Specific Item to be inspected:
1. Check that bedding stone is placed on the correct slope and to the required layer thickness.
2. Check that the R6 Riprap is of the required size and is durable.
3. Check that the R6 Riprap is placed on the correct slope and to the required layer thickness.
4. Check that the stabilization above the riprap is placed as designed and that the correct plantings are installed.
5. Check that all disturbed areas are seeded and mulched upon completion of the project.

D. Signatures

CONCUR: ___________________________ Date: ____________
Quality Assurance Inspector

CONCUR: ___________________________ Date: ____________
Immediate Supervisor

GLEN OAKES PROJECT QAP LUZERNE COUNTY, PA
PRE-CONSTRUCTION CONFERENCE CHECKLIST

A meeting between the landowner, contractor, inspector, and NRCS representative (if needed) is required to review the following checklist before construction begins. The contractor must be represented at the meeting by the foreman who will have authority to make decisions for the contractor on the job site, or by the foreman's immediate supervisor. Both individuals must be identified below and those in attendance must sign.

FARMER AND CONTRACTOR EACH HAVE A COPY OF:

_____ Design Drawings
_____ Construction Specifications
_____ Construction Sequence
_____ reviewed above items with contractor and landowners
_____ Went over site and any known problem areas with contractor and landowners

The contractor and the farmer agree with the above checklist.

Construction will start on _______________.

(Date)

Landowner #1 Signature________________________ Date________________

Landowner #2 Signature________________________ Date________________

Landowner #3 Signature________________________ Date________________

Contractor ______________________________ Phone __________

Foreman’s Signature ________________________

Supervisor’s Signature ______________________

Inspector’s Signature ________________________ Phone __________
From: John Levitsky <john@luzcd.org>
Date: Tuesday, October 2, 2018 2:18 PM
To: Deecki, Robert - FPAC-NRCS, Bloomsburg, PA
Subject: Fwd: Ticket Confirm POCS 10/02/18 13:56:10 20182752779-000 New Excavation Final Design

John Levitsky, Watershed Specialist
Luzerne Conservation District
325 Smiths Pond Road • Shavertown, PA 18708
570.674.7991 x 5 (phone) • 570.674.7989 (fax)

---------- Forwarded message ----------
From: POCS Ticket Confirmation <Delivery@pa1call.net>
Date: Tue, Oct 2, 2018 at 1:56 PM
Subject: Ticket Confirm POCS 10/02/18 13:56:10 20182752779-000 New Excavation Final Design
To: <JOHN@luzcd.org>

```
KTCFM 00000 POCS 10/02/18 13:56:10 20182752779-000 NEW XCAV DSGN

========== PENNSYLVANIA UNDERGROUND UTILITY LINE PROTECTION REQUEST ===========
Serial Number--[20182752779]-[000] Channel#: --[1344A032][0683][2018-07]
Message Type--[NEW][EXCAVATION][FINAL DESIGN]
County--[LUZERNE] Municipality--[DENNISON TWP]
Work Site--[NESCOPECK CREEK LN]
 Nearest Intersection--[SR 0437]
 Second Intersection--[SUE ANN LN]
 At Intersection--[N] Between Intersections--[Y]
 Subdivision--[GLEN OAKS]
Location Information--
[WHITE HAVEN PA 18861. WORKING AT THE CREEK OFF OF THE N SIDE OF NESCOPECK CREEK LN. WORKING FROM HOUSE 49 TO HOUSE 75 IN THE REAR OF THE PROPERTIES AT THE CREEK IN THE STREAM BED.]
Caller Lat/Lon--[]
Mapped Type--[P] Mapped Lat/Lon--
[41.099065/-75.843928,41.100783/-75.845194,41.104894/-75.846643, 41.107464/-75.838039,41.106624/-75.836580]
Attachments--[http://www.pa811.org/attachments/20182752779]
Type of Work--[REMOVE GRAVEL SHOAL AND INSTL RIP RAP] Depth--[3FT]
Extent of Excavation--[] Method of Excavation--[POWER EQUIP]
quip Type--[EXCAVATOR ON TRACKS]
Private Front--[ ] Rear--[X] Left--[ ] Right--[ ]
```

1
Project Dates--[____] thru [____] Response Due Date--[17-Oct-18]
Scheduled Excavation Date--[DESIGN]

Caller--[JOHN LEVITSKY]
Caller Phone--[570-674-7991] Caller Ext--[5]
Excavator--[LUZERNE CONSERVATION DISTRICT]
Address--[325 SMITHS POND ROAD]
City--[SHAVERSTOWN] State--[PA] Zip--[18708]
FAX--[] Caller Type--[B]
Email--[john@luzcd.org]
Work For--[LUZERNE CONSERVATION DISTRICT AND PA DEP]
Project Contact--[JOHN LEVITSKY]
Project Contact Phone--[570-239-1013] Contact Ext--[]
Best Time to Call--[ANYTIME]
Project Contact Email--[john@luzcd.org]

Prepared--[02-Oct-18] at [1355] by [MINDI BOCIANOSKI]
Remarks--
[ALSO STABILIZING THE EMBANKMENT WHICH WILL BE 350FT. SHOAL REMOVAL WILL BE
200FT. TOTAL EXTENT IS 700FT.]

AHGO AHG=AMERIGAS PROPAN AS10 AS1=ATLANTIC BBAND DNT0 DNT=DENNISON TWP
PWDO PWD=PPL ELEC DESIGN TC 0 TC =TRANSCO GAS PL UJ 0 UJ =UGI LEHIGH

Serial Number--[20182752779]-[000]

======Copyright (c) 2018 by Pennsylvania One Call System, Inc. =======
Deecki, Robert - FPAC-NRCS, Bloomsburg, PA

From: John Levitsky <john@luzcd.org>
Ant: Tuesday, October 9, 2018 2:51 PM
To: Deecki, Robert - FPAC-NRCS, Bloomsburg, PA
Subject: Fwd: Ticket 20182752779 for TC - Status Change

This is the only utility I received a response on for Glen Oakes, Dennison Twp., PA.

John Levitsky, Watershed Specialist
Luzerne Conservation District
325 Smiths Pond Road • Shavertown, PA 18708
570.674.7991 x 5 (phone) • 570.674.7989 (fax)

---------- Forwarded message ----------
From: <williamsprsr@kroweb.com>
Date: Tue, Oct 2, 2018 at 3:35 PM
Subject: Ticket 20182752779 for TC - Status Change
To: <JOHN@luzcd.org>

Ticket 20182752779 for TC - Status Change

================================================================================
Company: LUZERNE CONSERVATION DISTRICT  Email: JOHN@Luzcd.ORG
================================================================================
Ticket Number: 20182752779
Work to Begin Date/Time: 10/17/2018 11:59:00 pm
County: LUZERNE
City: DENNISON TWP
Address: NESCOPECK CREEK LN
Contact: 
Phone: 

Member Code Facility Last Completion Date/Time
-----------------------------------------------
TC CUSTOM2 10/02/2018 02:15:31 pm
** GAS: Excavation Site Clear,
Response: 001-CLEAR **

================================================================================
Notes:
If your activity might affect or impact Williams Pipeline assets, or the info
ted changes, is incorrect or incomplete, you cannot proceed with your
ivity. Please refer to ticket remarks for additional contact info.
John Levitsky, Watershed Specialist
Luzerne Conservation District
Office: 570-674-7991 x5

-------- Forwarded message --------
From: POCs KARL Responses <Delivery@pa1call.net>
Date: Thu, Oct 18, 2018, 2:01 AM
Subject: POCs 10/18/18 02:01:37 20182752779-000 KARL Automated Response Service
To: <JOHN@luzcd.org>

PENNSYLVANIA ONE CALL SYSTEM, INC.
KARL AUTOMATED RESPONSE SERVICE

Excavator: LUZERNE CONSERVATION DISTRICT
Telephone #: 570-674-7991 x5
Caller: JOHN LEVITSKY
Fax Number:
E-Mail: john@luzcd.org

Serial Number 20182752779 at the following location:

County: LUZERNE
Municipality: DENNISON TWP
Address: NESCOPECK CREEK LN
Nearest Intersection: SR 0437
Second Intersection: SUE ANN LN
Location Information: WHITE HAVEN PA 18861. WORKING AT THE CREEK OFF OF THE N SIDE OF NESCOPECK CREEK LN. WORKING FROM HOUSE 49 TO HOUSE 75 IN THE REAR OF THE PROPERTIES AT THE CREEK IN THE STREAM BED.

has been responded to through Pennsylvania One Call System by these facility operators in the following manner:

UTILITY
RESPONSE

AMERIGAS PROpane LP (AHG)
CLEAR - NO FACILITIES.
ATLANTIC BROADBAND LLC (AS1)
CLEAR - NO FACILITIES.
DENNISON TOWNSHIP (DNT) DID NOT RESPOND THROUGH PA ONE CALL.
PPL ELECTRIC UTILITIES CORPORATION (PWD) CLEAR - NO FACILITIES.
TRANSCONTINENTAL GAS/WILLIAMS GAS (TC) CLEAR - NO FACILITIES.
UGI UTILITIES INC-LEHIGH HAZLETON (UJ) CLEAR - NO FACILITIES.

Please call 1-800-222-6470 to hear any Voice Message
Construction Specification
580. STREAMBANK AND SHORELINE PROTECTION

1. SCOPE

The work shall consist of furnishing materials and installing all components of
the streambank and/or shoreline protection, as outlined in this specification and the
drawings.

2. MATERIALS

Unless otherwise set forth in Section 7, the following materials are to be used:

a. ROCK shall be durable and obtained from sources listed in PennDOT Bulletin 14
or as otherwise approved by the designer. Size and gradation, where required, shall be
as specified in Section 7 or as shown on the drawings. The nominal size of a rock is that
dimension (middle) which passes through a square opening with the same size
dimension; i.e. it is not the greatest
dimension. The rock shall be free from soil
and trash. Rocks shall be angular or
subangular in shape. However, the least
dimension of any individual rock shall be not
less than one-third the greatest dimension.

b. GEOSYNTHETICS shall meet the
requirements set forth in Section 7 and/or
on the drawings. In addition, geotextiles
shall meet the requirements of PennDOT
Specifications, Section 735, for the
appropriate class defined in Section 212.
Certification from the manufacturer shall be
provided by the Contractor that the
geosynthetics meets these requirements.

c. BIOTEXTILES, BIOMATS and other
manufactured natural materials shall
conform to the requirements in Section 7,
and be installed according to the
manufacturer's recommendations for
flowing water applications.

d. AGGREGATE for bedding, drainfill, and
concrete shall be durable and obtained from
sources listed in PennDOT Bulletin 14. The
gradation shall be as set forth in Section 7
or on the drawings.

e. PORTLAND CEMENT shall be Type I,
with air-entrainment agent, or Type IA,
unless otherwise required in Section 7. All
cement shall conform to ASTM-C150.

f. MASONRY shall meet the requirements
of ASTM-C90 & C270.

g. PRECAST concrete units shall meet the
requirements of ACI-525 & 533, unless
otherwise specified in Section 7.

h. LUMBER shall be the dimensions and
species specified in Section 7 or shown on
the drawings. Wood shall be graded and
stamped by an agency accredited by the
American Lumber Standards Committee as
meeting the required species, grade, and
moisture content. Pressure treated wood
products shall be Douglas Fir, Southern
Yellow Pine, or as otherwise specified on
the drawings or in Section 7. They shall be
treated with preservatives in accordance
with the American Wood Preservers
Association (AWPA) Standard C16, "Wood
Used on Farms, Pressure Treatment",
except that only non-CCA preservatives,
suitable for use in aquatic habitats, can be
used. Each piece shall bear the AWPA
stamp of quality. In the absence of grade
and treatment stamps, the Contractor or
material supplier shall provide written
certification that the wood meets the
designated quality criteria.

i. PLANT MATERIALS, including seed,
shall be true to the type, name and size
required on the drawings or in Section 7. Plants and seeds shall be viable and free from disease, injurious insects, mechanical injury, decay, or other defect that will decrease survivability. All bare rootstock shall have a root:stem ratio of at least 1:1 by volume. Bulbs and tubers shall be firm and rhizomes resilient. Balled and burlapped, multi-stem stock shall be pruned to one-half height prior to planting. Transport and storage of all stock shall be done in a manner that prevents windburn and drying. All local, state, and Federal regulations regarding plant shipments shall be complied with.

3. SITE ACCESS AND CLEARING

Only those areas, shown on the drawings, to be protected or actually required for access shall be cleared. Tree and brush removal shall be done in such a manner to prevent damage to other trees and property. Unless otherwise specified in Section 7, all cleared materials, including trash, shall be burned or removed from the site. Burning shall comply with all state and local applicable regulations.

4. GRADING

Soil surfaces shall be graded to the lines or sections shown on the drawings and/or staked in the field. Surfaces which have been over-excavated shall be brought to the planned grade by replacement with soils similar to, and at a density equal to, that of the adjacent soils. Unless otherwise set forth in Section 7, fill that is required to be imported to the site shall be similar to, and placed at a density equal to, that of the adjacent soils, except that areas to be vegetated shall receive topsoil approved by the Engineer. Excess soil material shall be disposed of as set forth in Section 7 or shown on the drawings.

5. STRUCTURAL INSTALLATION

Structures shall be installed as set forth in Section 7, as shown on the drawings, and in such a manner as to minimize erosion and sedimentation.

Rock shall be placed by equipment on the surface and to the depths specified, and in such a manner as to avoid displacement or damage to the underlying materials or adjacent structures. Graded rock shall be delivered and placed in such a manner that will ensure that the in-place material is homogeneous with no one size dominating an area. Some hand placing may be necessary to provide a neat and uniform surface on grade.

Commercially manufactured structures, including but not limited to gabions, precast units, etc., shall be installed as required by the manufacturer for flowing water applications.

6. VEGETATION

Vegetation shall be established at the locations shown on the drawings and/or staked in the field, and as set forth herein, in Section 7, and/or as shown on the drawings. Unless otherwise set forth in Section 7, all woody vegetation shall be planted between October 1 and April 15. Bare rootstock and cuttings shall be discarded, and replaced, if leaf sprouting has begun.

Plant stock shall be planted within two days of harvesting or removal from commercial storage. Plants that can not be planted the
day of arrival onsite, shall be stored under a tarp to protect them from wind, direct sunlight, drying, or other damage. Cuttings or bare root stock that are not planted within two days of arrival onsite shall be discarded unless refrigerated below 50°F. Rooted stock that is not planted within five days of arrival onsite shall be discarded unless refrigerated at 40°F to 50°F. Discarded materials shall be replaced at the Contractor's expense.

Plant stock shall be planted in holes of sufficient size to prevent bending of the roots. Manually compact topsoil around the stock and add enough water to remove trapped air. Unless otherwise shown on the drawings, container and balled shrubs shall be planted so that the root ball is at or just above the final ground surface. Plant tubers and bulbs deep enough to prevent them from floating, but not less than two inches. Rhizomes shall be angled upward in shallow slits, with the upper end of the rhizome at the soil surface.

Live stakes, with a diagonal-cut stem end, may be driven into the soil to the depth required; however this shall be done in such a manner to prevent damage to the cutting. If the tcp of the cutting is damaged, it shall be discarded or the damaged length pruned off.

Rootwads and logs shall be from fresh hardwood trees that are free of decay and disease. Other bioengineering plant material shall be installed as shown in the drawings. Damaged materials shall be discarded and replaced at the Contractor's expense.

Unless otherwise approved by the Engineer, the application of seed, soil supplements, and mulch shall be done by mechanical methods that ensure uniform coverage.
7. ADDITIONAL CONDITIONS WHICH APPLY TO 580
(STREAMBANK PROTECTION):

Excavation/Fill & Backfill

1. This item shall include all excavation and/or fill material necessary for the installation of the R6 Riprap and bedding stone. This shall also include the removal of a gravel bar located at a residence downstream of where the Riprap will be placed; this material shall be used as the “bedding stone” behind the R6 Riprap.
   A. During excavation of a channel, keep erosion and interference with the flow of the stream to a minimum; all work shall be done from the top of the streambank when possible.

Riprap and Bedding Stone and Fill Material

2 - Riprap - Place stones for riprap in such manner as to produce a reasonably well-graded and uniform surface providing the full thickness shown on the Drawings. Place stones to the full course thickness in one operation and without displacing the underlying material. Do not place stones in layers. The finished work shall be free from objectionable pockets of small stones and clusters of larger stones, and the entire mass of stones shall be roughly graded to conform to the gradation specified. Smaller stones shall be well distributed in order to chink the voids between larger stones, insofar as practicable. Do not place riprap by dumping stones into chutes or by similar methods, likely to cause segregation of the various sizes. Do not use a tractor equipped with bulldozer blade, stone rake, or any similar equipment. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry, by controlled dumping of successive loads during final placing, or by other approved methods. Rearrange individual stones by hand or mechanical means only to the extent necessary to break down bridging and to obtain a reasonably well-graded mass.

Provide cut-offs at the ends of riprap as shown on the Drawings, and do not allow any equipment to pass over the finished riprap surface.

Riprap shall be R-6 gradation, conforming to the table in the drawings. The riprap shall be certified as to size and gradation and the Inspector shall accept the onsite riprap based on a visual inspection. Riprap shall consist of sound durable rock. The inspector shall reject rock that is “marginal” or is weathered or is otherwise unsatisfactory for the intended use. The materials shall be free of objectionable amounts of earth, quarry dust, or other materials; however, washing will not be required. Stone for riprap shall be block shaped. Smooth rounded stone or boulders, flat, thin, elongated, and slab-shaped stone shall not be acceptable.
3 – Bedding Stone – The bedding stone shall be the material that is removed from the downstream gravel bar. Place stones to the full course thickness in one operation and without displacing the underlying material. Do not place stones in layers. Excess material from the gravel bar, not used as bedding stone, shall be hauled away and disposed of at a location determined by the excavating contractor.

4 – Fill Material – Excavated material from the site, or material from the removal of the downstream gravel bar shall be used to fill any voids in the streambank and to establish the required 1.5:1 slope before the bedding stone and final R-6 Riprap is placed. The areas above the riprap shall not be filled with the gravel bar material. This area shall be graded and top-dressed with topsoil or soil material suitable for growing the vegetation specified.

Access to the project

5 – Site Access – The access to this project will be as shown on the drawings. This area shall be stabilized with stone, as needed. The driveway and yard shall be replaced to equal or better than original conditions and repaired to the satisfaction of the inspector and owner.
STREAMBANK STABILIZATION PROJECT

GLEN OAKES
LUZERNE COUNTY, PA

SITE LOCATION

51 EAST NESCOPECK CREEK LANE
WHITE HAVEN, PA. 18861

ACT 187:
Data concerning the utilities at this site has been obtained from Pennsylvania One-Call System. Accuracy of this data is not guaranteed. The Contractor must contact the PA One-Call System (1-800-242-1776) at least 3, but not more than 10, working days prior to the commencement of construction for utility information.

SERIAL NUMBER:
20182752779

DATE:
10/02/2018

DRAWING INDEX
1. Cover Sheet
2. Plan View (Existing)
3. Plan View (Proposed)
4. Riprap Details
5. Cutoff Detail
6. Rock Construction
   Entrance Detail

Project Agreement Description:
The site is located along Nescopeck Creek, Dennison Township; Route 437 to East Nescopeck Creek Lane (White Haven). The repair will consist of placing R6 riprap along the streambank, at the locations shown on the planview. The length of streambank stabilization is approximately 300', with another 20' of riprap required for tying into the streambanks (cutoffs). The riprap height is an average of 7'. All work shall be done as shown in the drawings and described in the Additional Conditions to Construction Specification PA 580 (Streambank Stabilization).

Bid opening location:

Contacts:

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

DRAWINGS COVER SHEET
GLEN OAKES PROJECT
LUZERNE COUNTY, PENNSYLVANIA

Designated: RCD
Drawn: RCD
Checked: 
Approved: 

File Name
Drawing Name
Sheet: 1 of
ADDRESS: 75 EAST NESCOPECK CREEK LANE
WHITE HAVEN, PA 18661

GRAVEL BAR REMOVAL SITE

26' AVG. DEPTH
(REMOVE TO 6" ABOVE LOW WATER LEVEL)
SLOPE BACK OVERHANG

EXCAVATED SOIL MATERIAL (NOT RUBBLE) TO BE PLACED ABOVE RIPRAP TO PLANT INTO

LIME, FERTILIZE, SEED, AND MULCH ACCORDING TO SPECIFICATION IN DESIGN PACKAGE

3.6'

R6 RIPRAP

1.5

1

3.6'

GRAVEL DEPOSITION & EXCAVATED MATERIAL FROM SITE.

Stream Bed

GRAVEL BAR MATERIAL 6" THICKNESS

Cross Section

<table>
<thead>
<tr>
<th>Riprap Gradations</th>
<th>Bedding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gradation Name</td>
<td>Size - Inches</td>
</tr>
<tr>
<td></td>
<td>$D_{10}$</td>
</tr>
<tr>
<td>R-3</td>
<td>6</td>
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<tr>
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<td>12</td>
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<td>24</td>
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<tr>
<td>R-7</td>
<td>30</td>
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</tbody>
</table>

$^1$ The subscript number is the maximum percent, by weight, which may be smaller than the respective size.

$^2$ The nominal size of a rock is that dimension (middle or composite average) which passes through a square opening with the same side dimension; i.e., it is not the longest dimension.

$^3$ At least 15%, by weight of the gradation, must be smaller than the $D_{90}$ size.
NOTES:
INSTALL THE CUTOFF ON THE UPSTREAM & DOWNSTREAM ENDS OF THE RIPRAP AS SHOWN ON THE DRAWINGS.

INSTALL THE CUTOFFS AS CLOSE TO EXISTING TREES AS POSSIBLE WITHOUT DISTURBING THE TREE ROOT SYSTEMS.
CONSTRUCTION NOTES:

1. A ROCK CONSTRUCTION ENTRANCE SHALL BE INSTALLED AT BOTH LOCATIONS; SITE WHERE THE RIPRAP WILL BE INSTALLED AND ALSO THE SITE WHERE THE GRAVEL BAR WILL BE REMOVED. EQUIPMENT OR ROCK TRUCKS ARE NOT PERMITTED ON THE BLACKTOP DRIVEWAY AT THE GRAVEL BAR REMOVEAL SITE.

2. INSTALL ROCK CONSTRUCTION ENTRANCE AT THE JUNCTION OF THE SITE ACCESS WITH THE PUBLIC ROAD. EFFORT SHALL BE MADE TO MINIMIZE THE AMOUNT OF SEDIMENT TRACKED ONTO THE ROADWAY BY MAINTAINING THE ROCK CONSTRUCTION ENTRANCE REASONABLY CLEAN OF MUD AND DEBRIS. TOP DRESSING WITH CLEAN STONE OR MANUALLY REMOVING MUD CLODS MAY BE REQUIRED.

3. GEOTEXTILE SHALL BE PENN–DOT CLASS IV, TYPE A, NON–WOVEN.
Cross-Section A-A

HI = 105.25

Slope = \frac{5.45 - 5.25}{25'} = 0.8\%

Cross-Section BB

At USE 1% SLOPE OF STREAM CHANNEL

Top of Stream Center of Stream Riprap (Top of Key Rock)
<table>
<thead>
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<th>THICKNESS</th>
<th>1.5:1</th>
<th>2.0:1</th>
<th>2.5:1</th>
<th>3.0:1</th>
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<td>* Angle</td>
<td>33.69</td>
<td>26.57</td>
<td>21.80</td>
<td>18.43</td>
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</table>

\[ L = \frac{y}{\sin(\theta)} \]

Use: R-7 Riprap @ 12.5' Height or 1.5:1.0 Side Slope
### AREA of 1.5 : 1 SIDE SLOPES (SQ FT)

<table>
<thead>
<tr>
<th>&quot;h&quot; (Feet)</th>
<th>1.00</th>
<th>1.50</th>
<th>2.00</th>
<th>2.50</th>
<th>3.00</th>
<th>3.50</th>
<th>4.00</th>
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<tbody>
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<td>19.23</td>
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### AREA of 2 : 1 SIDE SLOPES (SQ FT)

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<td>144.94</td>
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**L (FT)**
- 1.8
- 2.7
- 3.6
- 4.5
- 5.4
- 6.3
- 7.2

**D (ft)**
- 0.5
- 1.0
- 1.5
- 2.0
- 2.5
- 4.0

**NCSA**
- R-3
- R-4
- R-5
- R-6
- R-7
- R-8
StreamStats Report

Region ID: PA
Workspace ID: PA20180418135315325000
Clicked Point (Latitude, Longitude): 41.10451, -75.84171
Time: 2018-04-18 09:53:31 -0400

Basin Characteristics

<table>
<thead>
<tr>
<th>Parameter Code</th>
<th>Parameter Description</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRNAREA</td>
<td>Area that drains to a point on a stream</td>
<td>7.36</td>
<td>square miles</td>
</tr>
<tr>
<td>STORAGE</td>
<td>Percentage of area of storage (lakes ponds reservoirs wetlands)</td>
<td>4</td>
<td>percent</td>
</tr>
<tr>
<td>PRECIP</td>
<td>Mean Annual Precipitation</td>
<td>45</td>
<td>inches</td>
</tr>
<tr>
<td>CARBON</td>
<td>Percentage of area of carbonate rock</td>
<td>0</td>
<td>percent</td>
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</table>

https://streamstats.usgs.gov/ss/  4/18/2018
### Parameter Code
<table>
<thead>
<tr>
<th>Parameter Code</th>
<th>Parameter Description</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOREST</td>
<td>Percentage of area covered by forest</td>
<td>95</td>
<td>percent</td>
</tr>
<tr>
<td>URBAN</td>
<td>Percentage of basin with urban development</td>
<td>0</td>
<td>percent</td>
</tr>
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### Peak-Flow Statistics Parameters [Peak Flow Region 1]

<table>
<thead>
<tr>
<th>Parameter Code</th>
<th>Parameter Name</th>
<th>Value</th>
<th>Units</th>
<th>Min Limit</th>
<th>Max Limit</th>
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</thead>
<tbody>
<tr>
<td>DRNAREA</td>
<td>Drainage Area</td>
<td>7.36</td>
<td>square miles</td>
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<td>Percent Storage</td>
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### Peak-Flow Statistics Flow Report [Peak Flow Region 1]


<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>Unit</th>
<th>SE</th>
<th>SEp</th>
<th>Equiv. Yrs.</th>
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</thead>
<tbody>
<tr>
<td>2 Year Peak Flood</td>
<td>331</td>
<td>ft^3/s</td>
<td>33</td>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>5 Year Peak Flood</td>
<td>581</td>
<td>ft^3/s</td>
<td>31</td>
<td>31</td>
<td>6</td>
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<tr>
<td>10 Year Peak Flood</td>
<td>785</td>
<td>ft^3/s</td>
<td>31</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>50 Year Peak Flood</td>
<td>1340</td>
<td>ft^3/s</td>
<td>36</td>
<td>36</td>
<td>13</td>
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<td>100 Year Peak Flood</td>
<td>1620</td>
<td>ft^3/s</td>
<td>38</td>
<td>38</td>
<td>13</td>
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<td>500 Year Peak Flood</td>
<td>2390</td>
<td>ft^3/s</td>
<td>46</td>
<td>46</td>
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### Peak-Flow Statistics Citations


### General Flow Statistics Parameters [Statewide Mean and Base Flow]

<table>
<thead>
<tr>
<th>Parameter Code</th>
<th>Parameter Name</th>
<th>Value</th>
<th>Units</th>
<th>Min Limit</th>
<th>Max Limit</th>
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</table>

https://streamstats.usgs.gov/ss/
<table>
<thead>
<tr>
<th>Parameter Code</th>
<th>Parameter Name</th>
<th>Value</th>
<th>Units</th>
<th>Min Limit</th>
<th>Max Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRNAREA</td>
<td>Drainage Area</td>
<td>7.36</td>
<td>square miles</td>
<td>2.26</td>
<td>1720</td>
</tr>
<tr>
<td>PRECIP</td>
<td>Mean Annual Precipitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARBON</td>
<td>Percent Carbonate</td>
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<td>percent</td>
<td>0</td>
<td>99</td>
</tr>
<tr>
<td>FOREST</td>
<td>Percent Forest</td>
<td>95</td>
<td>percent</td>
<td>5.1</td>
<td>100</td>
</tr>
<tr>
<td>URBAN</td>
<td>Percent Urban</td>
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<td>percent</td>
<td>0</td>
<td>89</td>
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General Flow Statistics Flow Report [Statewide Mean and Base Flow]


<table>
<thead>
<tr>
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<th>Value</th>
<th>Unit</th>
<th>SE</th>
<th>SEp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmonic Mean Streamflow</td>
<td>3.28</td>
<td>ft$^3$/s</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

General Flow Statistics Citations


https://streamstats.usgs.gov/ss/
### Channel Cross Section

#### Section Survey notes
- **Height of Instrument (ft):** 105.25

<table>
<thead>
<tr>
<th>Pnt no.</th>
<th>Distance (ft)</th>
<th>FS (ft)</th>
<th>Elevation (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-37</td>
<td>2.65</td>
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<tr>
<td>2</td>
<td>-25</td>
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<td>99.95</td>
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<td>3</td>
<td>-11</td>
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<td>4</td>
<td>-8</td>
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<td>5</td>
<td>0</td>
<td>6.4</td>
<td>98.85</td>
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<td>11</td>
<td>6.4</td>
<td>98.85</td>
</tr>
<tr>
<td>7</td>
<td>18.5</td>
<td>1.4</td>
<td>103.85</td>
</tr>
</tbody>
</table>

#### Calculated Discharge
- **Peak Discharge:** 1143.5 cfs
- **Calculated Discharge:** 1143.5 cfs
- **Exterior Frame Stone size:** OK

#### Dimensions
- **x-section area (ft²):** 142.6
- **Width (ft):** 53.3
- **d mean:** 2.7
- **d max (in):** 3.7
- **d mean:** 2.60
- **wet P:** 54.9

#### Hydraulics
- **Velocity (ft/sec):** 8.0
- **Discharge rate, Q (cfs):** 1143.5
- **Shear stress (lbs/ft²):** 1.62
- **Shear velocity (ft/sec):** 0.91
- **Froude number:** 0.75

---

**Use R6**

**Stabilize to 5' NT**

---

Page 2
## Channel Cross Section

### Section Survey Notes

- **Height of Instrument (ft):** 105.25

<table>
<thead>
<tr>
<th>Pnt no.</th>
<th>Distance (ft)</th>
<th>FS (ft)</th>
<th>Elevation (ft)</th>
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<tr>
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<td>99.65</td>
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<tr>
<td>7</td>
<td>14.5</td>
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<td>100.65</td>
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### Channel Slope (%)

<table>
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<th>Channel slope (%)</th>
<th>Manning's &quot;n&quot;</th>
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<tbody>
<tr>
<td>1</td>
<td>0.035</td>
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</tbody>
</table>

### Depth and Elev

- **Depth:** 3.9 ft
- **Elev:** 99.6 ft

### Peak Discharge and Calculated Discharge

- Peak Discharge: 566.6 cfs
- Calculated Discharge: 566.6 cfs

### Exterior Frame Stone size

- 5 yr stream: OK

### Dimensions

- **x-section area (ft²):** 75.3 ft²
- **width (ft):** 30.1 ft
- **d max (in):** 3.9 in

### Hydraulics

- **velocity (ft/sec):** 7.5 ft/sec
- **discharge rate, Q (cfs):** 566.6 cfs
- **shear stress (lbs/ft²):** 1.47 lbs/ft²
- **shear velocity (ft/sec):** 0.87 ft/sec
- **Fröude number:** 0.70

**Notes:**

- $R_4 \text{ max } = 7.6 \text{ ft/sec}$
- $R_5 \text{ max } = 9.8 \text{ ft/sec}$
- $R_6 \text{ max } = 11.2 \text{ ft/sec}$

**Stabilize to 5' HT**
<table>
<thead>
<tr>
<th>NCSA No.</th>
<th>$D_{50}$</th>
<th>$D_{100}$</th>
<th>Max. Vel.</th>
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<tbody>
<tr>
<td>R-3</td>
<td>3&quot;</td>
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<td>5.0 ft/s</td>
</tr>
<tr>
<td>R-4</td>
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<td>12&quot;</td>
<td>7.8 ft/s</td>
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<tr>
<td>R-5</td>
<td>9&quot;</td>
<td>18&quot;</td>
<td>9.8 ft/s</td>
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<tr>
<td>R-6</td>
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<td>11.2 ft/s</td>
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<tr>
<td>R-7</td>
<td>15&quot;</td>
<td>30&quot;</td>
<td>12.8 ft/s</td>
</tr>
</tbody>
</table>

* As per Bloomsburg Technical Office
GRavel BAR
ACCESS TO GRAVEL BAR
SITE ADDRESS: 51 EAST NESCOPECK CREEK LANE
WHITE HAVEN, PA 18861

ESCOPECK CREEK

ESTIMATED QUANTITIES

R6 @ 7' HT: \( (28.24^{3} \times 300') \div 97 \times 1.4 = 440 \text{ ton} \) 455 ton

R6 CURTICE: \( (80' \times 7' \times 21) \div 97 \times 1.4 = 15 \text{ ton} \)

GRAVEL BAR REMOVAL: \( (100' \times 25' \text{ width} \times 2.5' \text{ thick}) \div 27 = 231.5 \text{ yd}^3 \)

DRAWFILL REQUIRED: \( \left( \frac{10.5}{1.6} \times \frac{7}{3.6} \times (21.6 + 3.6) \times 1.5 \times 300' \right) \div 27 = 90 \text{ yd}^3 \)

USE AS REMAINING MATERIAL \( (231.5 - 90) = 141.5 \text{ yd}^3 \) BEHIND RIPRAP & HAUL AWAY EXCESS

ACCESS ROAD @ GRAVEL BAR SITE = 185'7" 280' TOTAL
ACCESS ROAD @ RIPRAP SITE = 75'3"

GEOTEXTILE FOR ACCESS = \( (14' \times 280) \div 9 = 436 \text{ yd}^2 \)

AASHTO #1: \( (3920^{3} \times 1.5) \div 27 \times 1.5 = 109 \text{ ton} \) 174 ton

2A MOD: \( (3920 \times 1.25) \div 37 \times 1.8 = 65 \text{ ton} \)

ACCESS ROAD REMOVAL (AFTER PROJECT COMPLETION): \( (3920^{3} \times 75) \div 27 = 109 \text{ yd}^3 \)

REPLACE TOP OF EXIST. ACCESS/DRIVEWAY @ RIPRAP SITE = 55'
2A MOD: \( (55 \times 4 \times 0.33) \div 27 \times 1.8 = 17 \text{ ton} \)

REPAIR YARDS @ GRAVEL BAR SITE + RIPRAP SITE = 1 Job

SEEDING = 1 Job

TREE/ROOT REMOVAL = 1 Job

MOB: 15% OF CONSTRUCTION COSTS