DAMAGE SURVEY REPORT (DSR)
Emergency Watershed Protection Program – Recovery

Section 1A

NRCS Entry Only
Eligible: YES _____   NO _____
Approved: YES _____   NO _____
Funding Priority Number (from Section 4) _____
Limited Resource Area: YES ____   NO _____

Date of Report: _____

DSR Number: _____   Project Number: _____

Section 1B Sponsor Information

Sponsor Name: _____

Address: _____

City/State/Zip: _____

Telephone Number: _____   Fax: _____

Section 1C Site Location Information

County: _____   State: _____   Congressional District: _____

Latitude: _____   Longitude: _____   Section: _____ Township: _____ Range: _____

UTM Coordinates: _____

Drainage Name: _____   Reach: _____

Damage Description: _____

Section 1D Site Evaluation

All answers in this Section must be YES in order to be eligible for EWP assistance.

Site Eligibility	YES	NO	Remarks
Damage was a result of a natural disaster?*			
Recovery measures would be for runoff retardation or soil erosion prevention?*			
Threat to life and/or property?*			
Event caused a sudden impairment in the watershed?*			
Imminent threat was created by this event?**			
For structural repairs, not repaired twice within ten years?**			
Site Defensibility			
Economic, environmental, and social documentation adequate to warrant action (Go to pages 3, 4, 5 and 6 ***)			
Proposed action technically viable? (Go to Page 9 ***)			

Have all the appropriate steps been taken to ensure that all segments of the affected population have been informed of the EWP program and its possible effects?   YES _____   NO _____

Comments: _____

* Statutory
** Regulation
*** DSR Pages 3 through 5 are required to support the decisions recorded on this summary page. If additional space is needed on this or any other page in this form, add appropriate pages.

Section 1E Proposed Action

Describe the preferred alternative from Findings: Section 5 A:

Total installation cost identified in this DSR: Section 3: $_____

Section 1F NRCS State Office Review and Approval

Reviewed By: _____   Date Reviewed: _____
                           State EWP Program Manager

Approved By: _____   Date Approved: _____
                           State Conservationist

PRIVACY ACT AND PUBLIC BURDEN STATEMENT

NOTE: The following statement is made in accordance with the Privacy Act of 1974, (5 U.S.C. 552a) and the Paperwork Reduction Act of 1995, as amended. The authority for requesting the following information is 7 CFR 624 (EWP) and Section 216 of the Flood Control Act of 1950, Public Law 81-516, 33 U.S.C. 701b-1; and Section 403 of the Agricultural Credit Act of 1978, Public Law 95334, as amended by Section 382, of the Federal Agriculture Improvement and Reform Act of 1996, Public Law 104-127, 16 U.S.C. 2203. EWP, through local sponsors, provides emergency measures for runoff retardation and erosion control to areas where a sudden impairment of a watershed threatens life or property. The Secretary of Agriculture has delegated the administration of EWP to the Chief or NRCS on state, tribal and private lands.

Signing this form indicates the sponsor concurs and agrees to provide the regional cost-share to implement the EWP recovery measure(s) determined eligible by NRCS under the terms and conditions of the program authority. Failure to provide a signature will result in the applicant being unable to apply for or receive a grant the applicable program authorities. Once signed by the sponsor, this information may not be provided to other agencies. IRS, Department of Justice, or other State or Federal Law Enforcement agencies, and in response to a court or administrative tribunal.

The provisions of criminal and civil fraud statutes, including 18 U.S.C. 286, 287, 371, 641, 651, 1001; 15 U.S.C. 714m; and 31 U.S.C. 3729 may also be applicable to the information provided. According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0578-0030. The time required to complete this information collection is estimated to average 117/1.96 minutes/hours per response, including the time for reviewing instructions, searching existing data sources, field reviews, gathering, designing, and maintaining the data needed, and completing and reviewing the collection information.

USDA NONDISCRIMINATION STATEMENT

"The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, martial status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programms.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202)720-2600 (vocie and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW., Washington, DC 20250-9410, or call (800)795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Civil Rights Statement of Assurance

The program or activities conducted under this agreement will be in compliance with the nondiscrimination provisions contained in the Titles VI and VII of the Civil Rights Act of 1964, as amended; the Civil Rights Restoration Act of 1987 (Public Law 100-259); and other nondiscrimination statutes: namely, Section 504 of the Rehabilitation Act of 1973, Title IX of the Amendments of 1972, the Age Discrimination Act of 1975, and the Americans with Disabilities Act of 1990. They will also be in accordance with regulations of the Secretary of Agriculture (7 CFR 15, 15a, and 15b), which provide that no person in the United States shall on the grounds of race, color, national origin, gender, religion, age or disability, be excluded from participation in, be denied the benefits of, or otherwise subjected to discrimination under any program or activity receiving Federal financial assistance from the U.S. Department of Agriculture or any agency thereof.

Section 2 Environmental Evaluation

2A Resource Concerns	2B Existing Condition	2C Alternative Designation		
		Proposed Action	No Action	Alternative
		2D Effects of Alternatives		
Soil				
Water				
Air				
Plant				
Animal				
Other				

Section 2E Special Environmental Concerns

Resource Consideration	Existing Condition	Alternatives and Effects		
		Proposed Action	No Action	Alternative
Clean Water Act Waters of the U.S.				
Coastal Zone Management Areas				
Coral Reefs				
Cultural Resources				
Endangered and Threatened Species				
Environmental Justice				
Essential Fish Habitat				
Fish and Wildlife Coordination				
Floodplain Management				
Invasive Species				
Migratory Birds				
Natural Areas				
Prime and Unique Farmlands				
Riparian Areas				
Scenic Beauty				
Wetlands				
Wild and Scenic Rivers				

Completed By: _____   Date: _____

DSR NO: _____

Section 2F Economic

This section must be completed by each alternative considered (attach additional sheets as necessary).

	Future Damages ($)	Damage Factor (%)	Near Term Damage Reduction
Properties Protected (Private)			
Properties Protected (Public)			
Business Losses			
Other			
Total Near Term Damage Reduction $			
Net Benefit (Total Near Term Damage Reduction minus Cost from Section 3)			

Completed By: _____   Date: _____

Section 2G Social Consideration This section must be completed by each alternative considered

(attach additional sheets as necessary).

	YES	NO	Remarks
Has there been a loss of life as a result of the watershed impairment?			
Is there the potential for loss of life due to damages from the watershed impairment?			
Has access to a hospital or medical facility been impaired by watershed impairment?			
Has the community as a whole been adversely impacted by the watershed impairment (life and property ceases to operate in a normal capacity)			
Is there a lack or has there been a reduction of public safety due to watershed impairment?			

Completed By: _____   Date: _____

DSR NO: _____

Section 2H Group Representation and Disability Information

This section is completed only for the preferred alternative selected.

Group Representation	Number
American Indian/Alaska Native Female Hispanic	
American Indian/Alaska Native Female Non-Hispanic	
American Indian/Alaska Native Male Hispanic	
American Indian/Alaska Native Male Non-Hispanic	
Asian Female Hispanic	
Asian Female Non-Hispanic	
Asian Male Hispanic	
Asian Male Non-Hispanic	
Black or African American Female Hispanic	
Black or African American Female Non-Hispanic	
Black or African American Male Hispanic	
Black or African American Male Non-Hispanic	
Hawaiian Native/Pacific Islander Female Hispanic	
Hawaiian Native/Pacific Islander Female Non-Hispanic	
Hawaiian Native/Pacific Islander Male Hispanic	
Hawaiian Native/Pacific Islander Male Non-Hispanic	
White Female Hispanic	
White Female Non-Hispanic	
White Male Hispanic	
White Male Non-Hispanic	
Total Group	

Census tract(s)_____

Completed By: _____   Date: _____

Section 2I. Required consultation or coordination between the lead agency and/or the RFO and another governmental unit including tribes:

Easements, permissions, or permits:

Mitigation Description:

Agencies, persons, and references consulted, or to be consulted:

<u>Section 3 - ENGINEERING SITE EVALUATION</u>

DSR No:

Completed by: Date:
                        Name

<u>Section 3A</u>

Locate and mark the beginning and end of the project reach at stable banks.

Length of project reach:

How will the bank stabilization be keyed back into the stable bank sections?   *Include this length in the total.*

Locate a benchmark and grade control. Determine the average slope of the reach.

Determine the typical cross section upstream and down.

Determine the height of the low bank and the height of structural protection needed.

Look for opportunities to use vegetation rather than structural measures.

Identify if a sill/weir is required in the channel to stabilize the channel bottom.

How many sills/weirs are required?   What spacing?

What depth of key is required in the toe of the slope?   3'   2'

Determine if a plunge pool is required. Size the plunge pool.   W: L: D:

Determine the slope of the bank needed in the protected area.

Determine if geotextile fabric is needed behind the structure.

Determine estimated quantities of excavation, fill, clearing, and debris removal for section B.

Determine the needed pollution control and dewatering practices.

Determine the need for traffic control or road closure.

Make a plan view sketch that includes the following:
        The alignment of the streambank to be repaired and the protected structure.
        The existing stream thalweg, north, the bench mark, and apparent landowners.
        Identify items not to be disturbed during construction (e.g., trees, mailboxes, etc.).
        Identify debris to be removed.
        Locate all utilities.
        Identify spoil/staging area.
        Identify construction limits and access.

Take and label photographs.

DSR NO: _____

Section 3 Engineering Cost Estimate

Completed By: _____   Date: _____

This section must be completed by each alternative considered (attach additional sheets as necessary).

Proposed Recovery Measure (including mitigation)	Quantity	Units	Unit Cost ($)	Amount ($)
Total Installation Cost (Enter in Section 1F)$				

Unit Abbreviations:

AC	Acre	LS	Lump Sum
CY	Cubic Yard	SF	Square Feet
EA	Each	SY	Square Yard
HR	Hour	TN	Ton
LF	Linear Feet	Other (Specifiy)	

DSR NO: _____

Section 4 NRCS EWP Funding Priority

Complete the following section to compute the funding priority for the recovery measures in this application
(see instructions on page 10).

Priority Ranking Criteria	Yes	No		Ranking Number Plus Modifer
1. Is this an exigency situation?				
2. Is this a site where there is serious, but not immediate threat to human life?				
3. Is this a site where buildings, utilities, or other important infrastructure components are threatened?				
4. Is this site a funding priority established by the NRCS Chief?				
The following are modifiers for the above criteria			**Modifier**	
a. Will the proposed action or alternatives protect or conserve federally-listed threatened and endangered species or critical habitat?				
b. Will the proposed action or alternatives protect or conserve cultural sites listed on the National Register of Historic Places?				
c. Will the proposed action or alternatives protect or conserve prime or important farmland?				
d. Will the proposed action or alternatives protect or conserve existing wetlands?				
e. Will the proposed action or alternatives maintain or improve current water quality conditions?				
f. Will the proposed action or alternatives protect or conserve unique habitat, including but not limited to, areas inhabited by State-listed species, fish and wildlife management area, or State identified sensitive habitats?				

Enter priority computation in Section 1A, NRCS Entry, Funding priority number.

Remarks:

DSR NO: _____

Section 5A Findings

Finding: Indicate the preferred alternative from Section 2 (Enter to Section 1E):

I have considered the effects of the action and the alternatives on the Environmental Economic, Social; the Special Environmental Concerns; and the extraordinary circumstances (40 CFR 1508.27). I find for the reasons stated below, that the preferred alternative:

_____ Has been sufficiently analyzed in the EWP PEIS (reference all that apply)
Chapter _____
Chapter _____
Chapter _____
Chapter _____
Chapter _____

_____ May require the preparation of an environmental assessment or environmental impact statement.
The action will be referred to the NRCS State Office on this date:

NRCS representative of the DSR team:

Name/Title: _____   Date: _____

Section 5B Comments:

Section 5C   Sponsor Concurrence:

Sponsor Representative

Title: _____   Date: _____

Section 6 Attachments:
A. Location Map
B. Site Plan or Sketches
C. Other (explain)

INSTRUCTIONS FOR COMPLETING THE NRCS-PDM-20, DSR

	Explanation of Requested Item	Who Completes
Section 1	Enter Site Sponsor, Location, Evaluation, Selected Alternative, and Reviewed and Approval Signatures.	NRCS completes with voluntary assistance from Sponsor except for NRCS only portion of Section 1A.
1A	Enter the Date, DSR Number, Project Number. For NRCS only enter Eligible Yes/No, Approved Yes/No, Funding Priority Number, and Limited Resource Area Yes/No.	
1B	Enter Sponsor Name, Address, Telephone, Fax	
1C	Enter site location County, State, Congressional District, Latitude, Longitude, Section, Township, Range, UTM Coordinates, Drainage Name, Reach within drainage, and Damage Description.	
1D	Enter Yes/No and any Remarks for the Site Evaluation information. Any No response means the site is not eligible for EWP assistance and no further information is necessary to complete the DSR. (See NEWPPM 390-502.03 and 390-502-04) Enter Yes/No regarding whether the affected public has been informed of the EWP program.	
1E	Enter the proposed treatment and the cost of installation.	NRCS only.
1F	NRCS Review and Approval.	

	Explanation of Requested Item	Who Completes
Section 2	Use available natural resource, economic, and social, information, including the EWP Programmatic Environmental Impact Statement (PEIS), to briefly describe the effects of the alternatives to the proposed action including the "no action" alternative. Typically, the proposed action and no action are the alternatives considered for EWP recovery measures due to the focus on repairing or preventing damages within a watershed. However, in cases where additional alternatives are considered, include all pertinent information to adequately address the additional alternatives (e.g., proposed action would be bio-engineering for bank stabilization, no action alternative, and an additional alternative may be riprap for bank stabilization). Do not leave blanks where a consideration is not applicable, use NA to indicate the factor was considered but not applicable for the alternative.	NRCS completes with voluntary assistance from Sponsor.
2A	List all resource concerns which are relevant to the area of the proposed action and alternatives. Refer to National Bulletin 450-5-8 TCH-COMPLETING AND FILING MEASUREMENT UNITS FOR RESOURCE CONCERNS IN THE FIELD OFFICE TECHNICAL GUIDE (FOTG). Note: the affected area may extend beyond the construction foot print (ex. where water quality or water rights are affected downstream of the site).	
2B	Provide a brief description of the present condition of each resource concern listed in 2A. Quantify conditions where possible. Reference accompanying photo documentation.	
2C	Briefly summarize the practice/system of practices being proposed, as well as the "no action" alternative, and any other alternatives being considered. The "no action" alternative is the predicted future condition if no action is taken.	
2D	Document the efforts of the proposed action and alternatives for the considerations listed in 2A. Reference applicable quality criteria, information in the CPPE, and quantify effects whenever possible. Consider both long-term and short-term effects. Consider any effects which may be individually minor but cumulatively significant at a larger scale or over an extended time period. Clearly define the differences between proposed action, no action, and the other alternatives.	

2E	Enter Special Environmental Concerns for Clean Water Act Waters of the U.S., Coastal Zone Management Areas, Coral Reefs, Cultural Resources, Endangered and Threatened Species, Environmental Justice, Essential Fish Habitat, Fish and Wildlife Coordination, Floodplain Management, Invasive Species, Migratory Birds, Natural Areas, Prime and Unique Farmlands, Riparian Areas, Scenic Beauty, Wetlands, and Wild and Scenic Rivers for each alternative considered. In the case where the selected alternative from Section 5A impacts a Special Environmental Concern, additional information, coordination, permitting or mitigation may be required and adequate documentation should be prepared and attached to the DSR to identify how NRCS or the Sponsor addressed the concern	
2F	Identify Property Protected both private and public, business losses and other economic impacts considered for each alternative. Enter the dollar value of the potential future damages if no action is taken in the Future Damage (5) column. This would be the estimate of the value lost if the EWP recovery measure is not installed. Use the repair cost or damage dollar method to determine the estimate of future damages. The repair cost method uses the costs to return the impaired property, good, or services based on their original pre-event condition or value. The damage dollar method uses an estimate of the future damage to value (e.g. if the structure is condemned, then enter the value of the structure). Enter the estimated amount based upon existing information or information furnished by the sponsor, contractors or others with specific knowledge for recovery from natural disasters for each alternative considered. Often market values for properties or services can be obtained from personnel at the local county/parish tax assessment office. The DSI team needs to determine the Damage Factor (%) which is a coefficient that indicates the degree of damage reduction to a property that is attributed to the effect of the proposed EWP recovery measures. Use an appropriate estimate of how much of the damage the EWP recovery measure will avoid for the alternative being considered. If the recovery measures from a single site will prevent 100 percent of the damage use 100 percent. The Near Term Damage Reduction is the Future Damage ($) times the Damage Factor (%). Sum the Near Term Damage Reduction values to calculate the Total Near Term Damage Reduction. Enter the Net Benefit which is computed by subtracting the Cost from section 3 from the total near term damage reduction. The economic section must be completed for each alternative considered. Attach additional sheets as necessary.	
2G	Enter information to describe the potential social impacts and considerations for each alternative. Answer Yes or No and any remarks necessary to adequately address each question. The information may be obtained through interviews with community leaders, government officials or sponsors. Factors such as road closures, loss of water, electricity, access to emergency services are used when answering whether the community as a whole has been impaired. This information is part of the environmental evaluation portion of the DSR but may be pertinent in Section 4 regarding priorities. The Social Considerations Section must be completed for each alternative considered. Attach additional sheets as necessary.	
2H	Enter the Group Representation Information for the preferred alternative. Use the most recent census tract information based upon where the EWP recovery measures are located.	Sponsor completes.

2I	Enter whether easement, permissions, or permits, and mitigation will require consultation or coordination for the selected alternative (e.g., Clean Water Act section 404 permit, Endangered Species Act section 10 permits, and any State or county permits or requirements). Describe mitigation to be applied that will offset any adverse impacts and attach any documentation from other agencies regarding mitigation requirements.	NRCS completes with voluntary assistance from Sponsor.

	Explanation of Requested Item	**Who Completes**
Section 3	Enter Proposed Recovery Measure(s) including Quantity, Units, Unit Cost, and Total Amount Cost. Enter sum of all Proposed Recovery Measure Costs to calculate Total Costs. Enter Total Installation Costs in Section 1F. The Engineering Cost Estimate must be completed for each alternative considered. Attach additional sheets as necessary.	NRCS completes with voluntary assistance from Sponsor.

	Explanation of Requested Item	**Who Completes**
Section 4	This section is used to determine the Funding Priority for the preferred alternative and sequence for initiating recovery measures. Enter Yes/No for questions 1 through 4 and enter the number (exigency 1, serious threat to human life 2, etc.) in the right column, Ranking Number Plus Modifier. Complete the Modifier portion by placing the alphabetic indicator a. through f. in the Modifier column. Complete the Ranking Number Plus Modifier column by entering the alphabetic indictor(s) that exists within the site. The number of the site designates the priority (e.g., a site with a designation of 2 is a higher priority that a site with a designation of 3). The modifiers increase the priority for the same numeric site (e.g., a site with a designation of 1a, would be a higher priority than a site with a designation of 1, a site with a designation of 2bc would be a higher priority than a site designated as 2b). Enter the Funding Priority in Section 1A.	NRCS completes with voluntary assistance from Sponsor.

	Explanation of Requested Item	**Who Completes**
Section 5	Enter the Findings, Rationale Supporting Findings, NRCS Representative signature and Comments, and Concurrence signature by the Sponsor(s).	NRCS completes.
5A	Indicate the preferred alternative and check the applicable finding being made. The NRCS Representative signs indicating the Finding selected. If the proposed action was adequately addressed in the PEIS, check all appropriate chapter paragraphs.	
5B	Enter any additional Comments.	
5C	Sponsor(s) review and concurrence.	Sponsor(s) signature.

Section 6	Include attachments for location map, site sketch or plan and other information as needed.	NRCS completes with voluntary assistance from Sponsor.

Computation Sheet

U.S. Department of Agriculture
Natural Resources Conservation Service

State NY		Project EWP– Little Schoharie Creek– Reach A		
By WAV	Date 2/21/12	Checked by	Date	Job No. DSR#: S-TM-07
Subject Conceptual Design Analysis & Quantities for Cost Estimating				Sheet __1__ of __12__

GIVEN: Reach A of Little Schoharie Creek from Outlet into Schoharie Creek to NY's Rte 145 bridge.
(copy attached)

① Reach A Existing Conditions (per "Little Schoharie Creek Reach Summary" spreadsheet)

Reach Length = 8,478 LF   Left Bank Raw Bank Area = 88,226 sq. ft.
"   Slope = 1.4%   Right "   "   "   "   = 87,851 " "
"   US Elev. = 740' AMSL   Total "   "   "   "   = 176,077 sq. ft
"   DS " = 620' "
"   Fall = 120'
Valley Length = 8,000 LF

② Reach A Conceptual Design Geometry (per "Estimated Stream Channel Geometry – Little Schoharie Creek 2011 EWP Cost Estimating" spreadsheet, attached):

Bankfull Flow est., Q_{BF} = 800 cfs

"   Area ", A_{BF} = 160 sq. ft → V_{BF} = 5 ft/sec

"   Width ", W_{BF} = 55 ft

"   Depth ", D_{BF} = 2.9 ft

Max. BF Depth ", D_{max} = 4.4 ft

③ Channel Length, Slope & Grade Control Conceptual Design:

For B & C Stream Types, Sinuosity should be at least 1.2

∴ Required Minimum Stream Length = Valley Length × Sinuosity

= 8,000 LF × 1.2

$$\boxed{\text{Conceptual Design Stream Length} = 9,600 \text{ LF}}$$

Gross Stream Slope = $\dfrac{\text{Fall}}{\text{Stream L}}$ = $\dfrac{120 \text{ ft}}{9,600 \text{ ft}}$ = $0.0125 \dfrac{\text{ft}}{\text{ft}}$ = 1.25% slope

However, such a steep slope will result in much too high flow velocities and shear stresses (Vel. on the order of 8-9 ft/sec, $\tau \approx 2.25$ lb/ft²)

→ (See NY-Hydraulics2_WAV.xlsx, Channel flow – unaltered slope tab)

Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State	Project				
NY	EWP-Little Schoharie Creek - Reach A				

By	Date	Checked by	Date	Job No.
WAV	2/21/12			DSR#: S-TM-07

Subject		
Conceptual Design Analysis & Quantities for Cost Estimating	Sheet __2__ of __12__

③ <u>Channel Length, Slope & Grade Control Conceptual Design cont.:</u>

From NY-Hydraulics2-WAV.xlsx, Channel flow-proposed tab, stream slope needs to be approx. 0.005 ft/ft to produce target flow conditions as follows:

@ Stream Slope = 0.005 ft/ft and Parabolic channel w/ Max. Depth = 4.4 ft:

$$A = 161 \text{ sq. ft} \approx 160 \text{ sq. ft. target}$$
$$T = W = 55 \text{ ft} = 55 \text{ ft target}$$
$$Q = 861 \text{ cfs} \approx 800 \text{ cfs target}$$
$$V = 5.3 \text{ ft/sec} \approx 5 \text{ ft/sec target}$$

} OK

Then, 9600 LF stream × 0.005 ft/ft = 48 ft of fall due to slope.

The remainder of the existing fall (120 ft - 48 ft = 72 ft) to be accomplished with rock cross vanes for energy dissipation, sediment transport, and grade control.

Assuming 1-foot of net drop across each cross vane, this will require approx. 72 cross vanes over the 9,600 LF reach.

∴ Assume 72 rock cross vanes req'd.

Cross Vane Geometry as indicated on NY-Hydraulics2-WAV.xlsx, rock vane design-WAV tab:
(attached)—

<u>Channel Top Width</u>	=	55 ft
Bank Angle	=	25 degrees
Vane Height (Avg.)	=	5 ft
Vane Width	=	3 ft
Overall Vane Length	=	105 ft
Total Keyway Length	=	20 ft
Total Vane Face Area	=	625 sq. ft

$$72 \text{ cross vanes} \times 625 \frac{\text{sq. ft}}{\text{Vane}} = 45,000 \text{ sq. ft. Total Face Area of Cross Vanes.}$$

Computation Sheet

NRCS--ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State		Project		
NY		EWP – Little Schoharie Creek – Reach A		

By	Date	Checked by	Date	Job No.
WAV	2/21/12			DER #: S-TM-07

Subject: Conceptual Design Analysis & Quantities for Cost Estimating

Sheet __3__ of __12__

④ <u>Temporary Bank Stabilization (Bioengineering) at Cross Vanes:</u>

Assume willow wattles/fascines used at each cross vane for temporary bank stabilization.

At each vane, assume 2 rows, each 40 ft long on each side of stream

$\quad$ 2 rows × 40 ft each × 2 sides = 160 LF at each cross vane

$\quad$ @ 72 cross vanes $\quad$ = 11,520 LF Total

$\boxed{\text{Use: 11,500 LF willow wattles/fascines}}$

$\boxed{\text{Assume 100 LF/hr can be installed by unskilled labor & 1 backhoe}}$

⑤ <u>Gravel Removal/Relocation:</u>

The existing trapezoidal channel in this reach is, for the most part, larger and wider than that suggested by regional curves. Also, trapezoidal berms of gravel/cobbles exist along both sides of the channel in this reach. For the purposes of this conceptual-level cost estimate, it is assumed that the berm material can be removed and relocated nearby to restore desired channel geometry. Excess berm material, if any will be transported to nearby channel or floodplain areas within the reach as needed. It is further assumed that, on average over the reach, the gravel/cobble berm to be removed/relocated is as follows:

$A = \dfrac{1}{2}(8ft + 24ft)(4ft) = 64$ sq.ft.
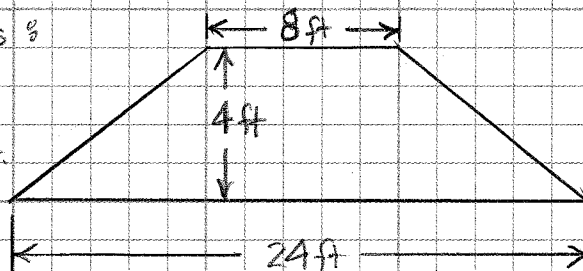
Then, for the existing Reach Length = 8,478 ft and a berm on each side of the channel:

$\quad$ Berm Volume = 64 sq.ft × 8500 LF × 2 sides = 1,088,000 cu.ft

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad = 40,300$ cu.yd.

State		Project			
NY		EWP – Little Schoharie Creek - Reach A			
By	Date	Checked by	Date	Job No.	
WAV	2/21/12			DSR# : S-TM-07	

Subject			
Conceptual Design Analysis & Quantities for Cost Estimating		Sheet __4__ of __12__	

5.) <u>Gravel Removal/Relocation cont.:</u>

Assume that an equipment group of 1 excavator (mid-size), 1 bulldozer (mid-size), and 1 dump truck can remove/relocate approx. 100 CY of material per hour and place this material in its final location.

Then, $\frac{40,000 \text{ cy}}{100 \text{ cy/hr}} =$ 400 hours req'd for 1 Excavator, 1 Dozer & 1 Dump Truck each.

* Also add 400 hours of Skilled Labor for Foreman/Supt./Surveyor.

6.) <u>Dewatering</u>

Assume that some level of dewatering will be required. Assume that approx. 100 LF channel can be reconstructed per day.

Then,

$\frac{9,600 \text{ LF channel (new alignment)}}{100 \text{ LF/day}} =$ 96 days (Major Construction)

Use: 100 days of Major Channel reconstruction (for Dewatering)

7.) <u>Seeding & Mulching:</u>

Assume a 100 ft wide swath on each side of new channel to be seeded/mulched.

Then, $9,600 \text{ LF} \times \frac{100 \text{ ft}}{\text{side}} \times 2 \text{ sides} = 1,920,000 \text{ sq. ft.}$

$= 44 \text{ acres}$
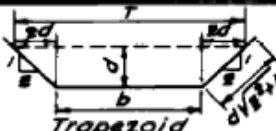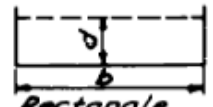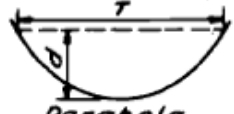
Use: 45 acres Seeding/Mulching

8.) <u>Conceptual-Level Cost Estimate:</u>

See attached "Engineers Construction Cost Estimate" dated 2/21/12 for Reach A ⇒ $2,786,000

Reach	Description	Stream Length		Valley Length	Stream Sinuosity		Approx. Elevation Data			Stream Slope		Raw Bank Area		
		Pre-Flood	Post-Flood	Length	Pre-Flood	Post-Flood	US Elev.	DS Elev.	Fall	Pre-Flood	Post-Flood	Left Bank	Right Bank	Total
		(ft)	(ft)	(ft)			(ft)	(ft)	(ft)	(%)	(%)	(sq.ft.)	(sq.ft.)	(sq.ft.)
A	Schoharie Creek to NYS Rte. 145	8,478	8,478	8,000	1.1	1.1	740	620	120	1.4	1.4	88,226	87,851	176,077
B	NYS Rte. 145 to Chichester property	8,274	7,626	6,800	1.2	1.1	860	740	120	1.5	1.6	198,082	106,290	304,372
C	Chichester property to near Lawton Hollow Rd.	6,036	5,170	4,850	1.2	1.1	960	860	100	1.7	1.9	87,650	64,603	152,253
D	Lawton Hollow Rd. to Gridley Rd.	6,653	6,669	5,750	1.2	1.2	1,150	960	190	2.9	2.8	123,489	129,484	252,973
	Total, 4 Reaches	29,441	27,943	25,400	1.2	1.1			530			497,447	388,228	885,675

Little Schoharie Creek Reach Summary - Existing Conditions as of January 2012

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Estimated Stream Channel Geometry - Little Schoharie Creek 2011 EWP Cost Estimating

Parameter	Little Schoharie at Gridley Rd	Little Scho. just below Brooky Hollow	Little Schoharie at NYS Rte. 145	Little Schoharie at VanAller Farm	Notes/Comments
		Locations on the Little Schoharie Creek analyzed for EWP Cost Estimating			
Drainage Area, DA (sq.mi.)	10.2 (sq.mi.)	15.1 (sq.mi.)	18.1 (sq.mi.)	24.3 (sq.mi.)	
Flow, Q (cfs)					
Del. Cty. SWCD 2005 Regional Curve Q_{BF} (= $28.65*DA^{1.01}$)	299 (cfs)	445 (cfs)	534 (cfs)	719 (cfs)	
USGS StreamStats Q1.5	273 "	397 "	472 "	628 "	
USGS StreamStats Q2	369 "	538 "	638 "	849 "	
USGS StreamStats Q5	666 "	971 "	1150 "	1530 "	
USGS StreamStats Q_{BF}	717 "	974 "	1120 "	1410 "	
Average Q_{BF}	508 "	709 "	827 "	1064 "	
Selected Q_{BF} (cfs)	350 (cfs)	500 (cfs)	600 (cfs)	800 (cfs)	
Bankfull Area, A_{BF} (sq.ft.) and Bankfull Velocity, V_{BF} (ft/sec)					
Del. Cty. SWCD 2005 Regional Curve A_{BF} (= $7.01*DA^{0.93}$)	61 (sq.ft.) 5 (ft/sec)	88 (sq.ft.) 5 (ft/sec)	104 (sq.ft.) 5 (ft/sec)	136 (sq.ft.) 5 (ft/sec)	
USGS StreamStats A_{BF}	109 " 7 "	148 " 7 "	170 " 7 "	214 " 7 "	
Average A_{BF}	85 " 6 "	118 " 6 "	137 " 6 "	175 " 6 "	
Selected A_{BF} (sq.ft.)	70 (sq.ft.) 5 (ft/sec)	100 (sq.ft.) 5 (ft/sec)	120 (sq.ft.) 5 (ft/sec)	160 (sq.ft.) 5 (ft/sec)	
DCSWCD Post-Flood curve for East Branch Del. Basin (for comparison)	61	88	104	137	
Bankfull Width, W_{BF} (ft)					
DCSWCD 2005 Reg. Curve A_{BF} and W/D=16 for upper reaches (B-Type), W/D=18 for lower reaches (C-Type)	31 (ft)	37 (ft)	43 (ft)	50 (ft)	
USGS StreamStats W_{BF}	50 "	60 "	65 "	74 "	
Average W_{BF}	40 "	49 "	54 "	62 "	
Selected W_{BF} (ft)	35 (ft)	40 (ft)	45 (ft)	55 (ft)	
DCSWCD Post-Flood curve for East Branch Del. Basin (for comparison)	33	41	46	55	
Bankfull Depth, D_{BF} (ft)					
DCSWCD 2005 Reg. Curve A_{BF}/W_{BF}	1.9 (ft)	2.3 (ft)	2.4 (ft)	2.8 (ft)	
USGS StreamStats D_{BF}	2.2 "	2.5 "	2.7 "	2.9 "	
Average D_{BF}	2.1 "	2.4 "	2.5 "	2.8 "	
Selected D_{BF} (ft)	2.0 (ft)	2.5 (ft)	2.7 (ft)	2.9 (ft)	
DCSWCD Post-Flood curve for East Branch Del. Basin (for comparison)	1.9	2.1	2.3	2.5	
Resulting W/D ratio (dimensionless)	18	16	17	19	
Resulting D_{max} (cross vane sizing)	3.0	3.8	4.0	4.4	

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Section	Area a	Wetted Perimeter P	Hydraulic Radius r	Top Width T
Trapezoid	$bd + z d^2$	$b + 2d\sqrt{z^2+1}$	$\dfrac{bd + z d^2}{b + 2d\sqrt{z^2+1}}$	$b + 2zd$
Rectangle	bd	$b + 2d$	$\dfrac{bd}{b+2d}$	b
Triangle	$z d^2$	$2d\sqrt{z^2+1}$	$\dfrac{zd}{2\sqrt{z^2+1}}$	$2zd$
Parabola	$\dfrac{2}{3}dT$	$T + \dfrac{8d^2}{3T}$	$\dfrac{2dT^2}{3T^2+8d^2}$	$\dfrac{3a}{2d}$

Little Schoharie Creek Reach A - Existing Conditions (Jan. 2012) - Trapezoidal Channel

Given			Compute								
	Slope (s) =	0.014									
	Manning's n =	0.04								Shear	Average
	Bottom Width	Flow Depth	Side Slope	Top Width	Wetted Perimeter	Hydraulic Radius	Area	Velocity	Discharge	Stress	Rock
	b	d	z	T	p	r	a	V	Q	τ	feet
Trapezoid	40	6	2	64	66.83	4.67	312.00	12.31	3841.09	4.08	3.77410995
Rectangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Triangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Parabola					#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Specific Weight of Water = 62.4 lbs/ft^3

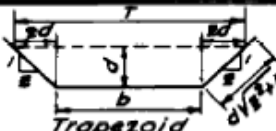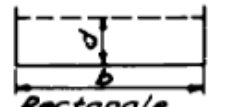Shield's Equation

τ = Shear Stress (lbs/ft^2)

$\tau = \gamma R S$

γ = specific weight of water (lbs/ft^3)

R = hydraulic radius (ft)

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$ Q=VA

Section	Area a	Wetted Perimeter P	Hydraulic Radius r	Top Width T
Trapezoid	$bd + zd^2$	$b + 2d\sqrt{z^2+1}$	$\dfrac{bd + zd^2}{b + 2d\sqrt{z^2+1}}$	$b + 2zd$
Rectangle	bd	$b + 2d$	$\dfrac{bd}{b+2d}$	b
Triangle	zd^2	$2d\sqrt{z^2+1}$	$\dfrac{zd}{2\sqrt{z^2+1}}$	$2zd$
Parabola	$\dfrac{2}{3}dT$	$T + \dfrac{8d^2}{3T}$	$\dfrac{2dT^2}{3T^2+8d^2}$	$\dfrac{3a}{2d}$

Little Schoharie Creek Reach A - Stream Length increased to 9600 LF to achieve minimum sinuosity of 1.2. Resulting slope unaltered.

Given			Compute								
Slope (s) =	0.0125										
Manning's n =	0.04									Shear	Average
Bottom Width	Flow Depth	Side Slope	Top Width	Wetted Perimeter	Hydraulic Radius	Area	Velocity	Discharge		Stress	Rock
b	d	z	T	p	r	a	V	Q		τ	feet
Trapazoid				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Rectangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Triangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Parabola		4.4		55	55.94	2.88	161.33	8.44	1361.38	2.25	3.43768218

Specific Weight of Water = 62.4 lbs/ft^3

Shield's Equation

τ = Shear Stress (lbs/ft^2)
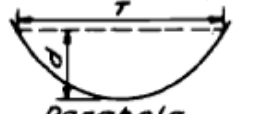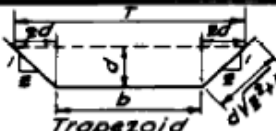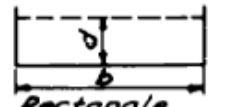
γ = specific weight of water (lbs/ft^3)

R = hydraulic radius (ft)

$$\tau = \gamma RS$$

$$V = \frac{1.49}{n} R^{2/3} S^{1/2} \qquad Q = VA$$

Section	Area a	Wetted Perimeter P	Hydraulic Radius r	Top Width T
Trapezoid	$bd + zd^2$	$b + 2d\sqrt{z^2+1}$	$\dfrac{bd + zd^2}{b + 2d\sqrt{z^2+1}}$	$b + 2zd$
Rectangle	bd	$b + 2d$	$\dfrac{bd}{b+2d}$	b
Triangle	zd^2	$2d\sqrt{z^2+1}$	$\dfrac{zd}{2\sqrt{z^2+1}}$	$2zd$
Parabola	$\dfrac{2}{3}dT$	$T + \dfrac{8d^2}{3T}$	$\dfrac{2dT^2}{3T^2+8d^2}$	$\dfrac{3a}{2d}$

Little Schoharie Creek Reach A - proposed conditions to model selected bankfull parameters. Stream Length increased to 9600 LF to achieve minimum sinuosity of 1.2. Required slope of 0.005 ft/ft to be achieved with cross-vanes.

Given											
Slope (s) =	0.005		Compute								
Manning's n =	0.04										

	Bottom Width b	Flow Depth d	Side Slope z	Top Width T	Wetted Perimeter p	Hydraulic Radius r	Area a	Velocity V	Discharge Q	Shear Stress τ	Average Rock feet
Trapazoid				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Rectangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Triangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Parabola		4.4		55	55.94	2.88	161.33	5.34	861.01	0.90	2.91951977

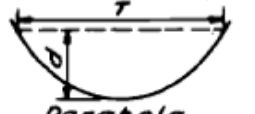Specific Weight of Water = 62.4 lbs/ft^3

Shield's Equation

τ = Shear Stress (lbs/ft^2)

γ = specific weight of water (lbs/ft^3)

R = hydraulic radius (ft)

$$\tau = \gamma R S$$

$$V = \frac{1.49}{n} R^{2/3} S^{1/2} \qquad Q = VA$$

2011 Schoharie County EWP By: W. VanDeValk

DSR No.: S-TM-07 Date: 2/17/2012

Site Description: Little Schoharie Reach A

Given

(Vane Height assumed to vary from 6 ft in center of channel to 4 ft at keyways)

					left bank	
CW =	55	ft	(channel top width)	Keyway into bank	10	ft
BA =	25	°	(stream bank to structure angle)		right bank	
Vane Height =	5.0	ft	(Top Rock to Bottom of Footer)	Keyway into bank	10	ft
Vane Width =	3.0	ft	(perpendicular to flow)			
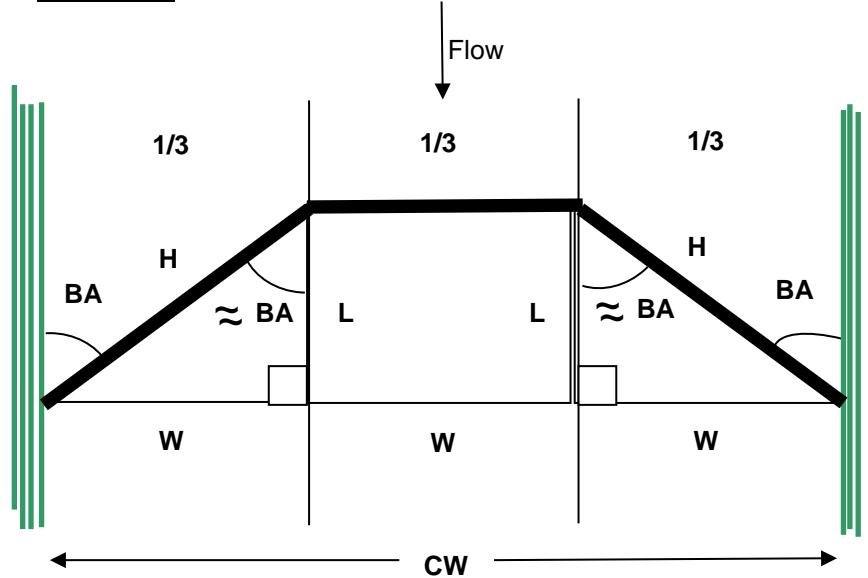
Find

1) Determine weir length, ft.

$Tan(BA) = W/L$
$Sin(BA) = W/H$

Solution

W =	18	ft	(CW/3)
L =	39	ft	(W/TAN(BA))
H =	43	ft	(W/SIN(BA))

Assume thalweg bed elev. = 100, vane elev. @ thalweg = 101, BF elev. = 104.4 (Dmax = 4.4 ft), top of rock elev. = 104.5

Overall Weir Length

105

ft ((H*2)+W)

Left Arms				
Arm Length	TW Elev.	BKF Elev.	Slope (%)	Keyway Length
43	101.0	104.5	8.07%	10

Invert Sill
Sill Length
18

Right Arms				
Arm Length	TW Elev.	BKF Elev.	Slope (%)	Keyway Length
43	101.0	104.5	8.07%	10

Center 1/3

Drop in vane elevation   3.5 ft   left
                          3.5 ft   right

	Length (ft)	Face Area (ft^2)	Vol (ft^3)	Vol (yds^3)	Tons
Vane Arm Totals =	87	434	1301	48	96
Invert Sill Totals =	18	92	275	10	20
Keyway Totals =	20	100	300	11	22
Totals:	125	625	1876	69	139

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2011 Schoharie County EWP
Engineer's Construction Cost Estimate

| | | | | **By:** | W. VanDeValk | |
| | | | | **Date:** | 2/21/2012 | |

| **DSR No.:** | S-TM-07 | | | **Sponsor:** | | |
| **Site Description:** | Little Schoharie Creek, Reach A | | | | | |

Item	Description	Unit cost	Unit	Quantity	Item cost	
Mobilization/Demobilization		$5,000.00	job	2	$10,000	
Rip rap	Heavy stone (in place)	$67.00	ton	0	$0	
		$100.00	cy	0	$0	
	Medium stone (in place)	$60.00	ton	0	$0	
		$90.00	cy	0	$0	
	Dumped rock (in place)	$53.00	ton	0	$0	
		$80.00	cy	0	$0	
	Pinning	$10.00	ft wall/# rock layers	0	$0	
Gravel	2" minus screened (in place)	$14.00	cy	0	$0	
	#2 Stone (in place)	$22.00	cy	0	$0	
	Cobbles (in place)	$15.00	cy	0	$0	
	Bankrun (in place)	$12.00	cy	0	$0	
Geotextile		$0.15	sq ft	0	$0	
Geo-grid		$0.30	sq ft	0	$0	
Trucking		$85.00	hr	400	$34,000	
Excavator	large	$170.00	hr	0	$0	
	mid-size	$140.00	hr	400	$56,000	
Backhoe		$120.00	hr	115	$13,800	
Dozer	large	$150.00	hr	0	$0	
	mid-size	$130.00	hr	400	$52,000	
Labor	skilled	$50.00	hr	200	$10,000	
	unskilled	$35.00	hr	115	$4,025	
Willow stakes	w/o labor	$2.00	stake	0	$0	
Wattles & Fascines	w/o labor	$9.00	lin ft	11500	$103,500	
Brush layering	w/o labor	$18.00	bundle	0	$0	
Brush mattress	w/o labor	$3.00	sq ft	0	$0	
Silt fence	installed & maintained	$5.00	lin ft	0	$0	
Straw blanket	100 sq yard/roll	$175.00	roll	0	$0	
Geo-jute	65 sq yard/roll	$120.00	roll	0	$0	
Dewatering	small pump (<4"), incl. setup	$3,000.00	day	0	$0	
	mid-size (6") incl. setup	$5,000.00	day	100	$500,000	
	large (8-12") incl. setup	$8,000.00	day	0	$0	
Seeding & Mulching		$2,000.00	acre	45	$90,000	
		$0.05	sq ft	0	$0	
Overhead and Profit, %	20			Overhead and Profit	$174,665	
				Subtotal, excluding Wall Systems	$1,047,990	
Wall System costs (in place; wall system only; includes OH&P)						
Sheet Piling	Under 1000 sq ft	$35.00	sq ft	0	$0	
	Over 1000 sq ft	$30.00	sq ft	0	$0	
Rip rap	6' wall stacked/pinned	$33.00	sq ft	45000	$1,485,000	625 x 72 =
	8' wall stacked/pinned	$31.00	sq ft	0	$0	
	10' wall stacked/pinned	$30.00	sq ft	0	$0	
	12' wall stacked/pinned	$29.00	sq ft	0	$0	
Precast concrete	T-wall system	$35.00	sq ft	0	$0	
	Recon wall system	$35.00	sq ft	0	$0	
Reinforced earth	w/geogrid & fill (15' depth)	$22.00	sq ft	0	$0	
				Subtotal	$2,532,990	
Contingency %	10			Contingency	$253,299	
Additional %	0			Additional	$0	
				Total Estimate	**$2,786,289**	

Conversions for estimating quantities

Assume for each 100' wall, will need to dewater for 3 days

Estimating sloped rip rap protection

Depth of key/toe (2 or 3')	3	ft	Quantity in key/toe	12	(based on trapezoidal key)
Thickness of rip rap	2.5	ft			

Elevation difference	length of slope for 1.5:1 (ft)	quantitiy/ft @ 1.5:1		lin footage	total rock	
4	7.21	1.11	cy/ft	0	0	cy
5	9.01	1.28	cy/ft	0	0	cy
6	10.82	1.45	cy/ft	0	0	cy
7	12.62	1.61	cy/ft	0	0	cy
8	14.42	1.78	cy/ft	0	0	cy
9	16.22	1.95	cy/ft	0	0	cy
10	18.03	2.11	cy/ft	0	0	cy
11	19.83	2.28	cy/ft	0	0	cy
12	21.63	2.45	cy/ft	0	0	cy

Elevation difference	length of slope for 2:1	quantitiy/ft @ 2:1				
4	8.94	1.27	cy/ft	0	0	cy
5	11.18	1.48	cy/ft	0	0	cy
6	13.42	1.69	cy/ft	0	0	cy
7	15.65	1.89	cy/ft	0	0	cy
8	17.89	2.10	cy/ft	0	0	cy
9	20.12	2.31	cy/ft	0	0	cy
10	22.36	2.51	cy/ft	0	0	cy
11	24.60	2.72	cy/ft	0	0	cy
12	26.83	2.93	cy/ft	0	0	cy

2011 EWP- Middleburgh (T) Little Schoharie - Reach A

Elev. ~ 620' AMSL at Schoharie Creek

8478ft @ 1.4%

Elev. ~ 740' AMSL at NYS Rte. 145

Raw Bank Heights - Jan. 2012

Right_Bank_Ht_Reach_A
BankHeight
- 0
- 1 - 5
- 6 - 10
- 11 - 14
- 15

Left_Bank_Ht_Reach_A
BankHeight
- 0
- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 45
- VanAller_to_Rte145

Feet
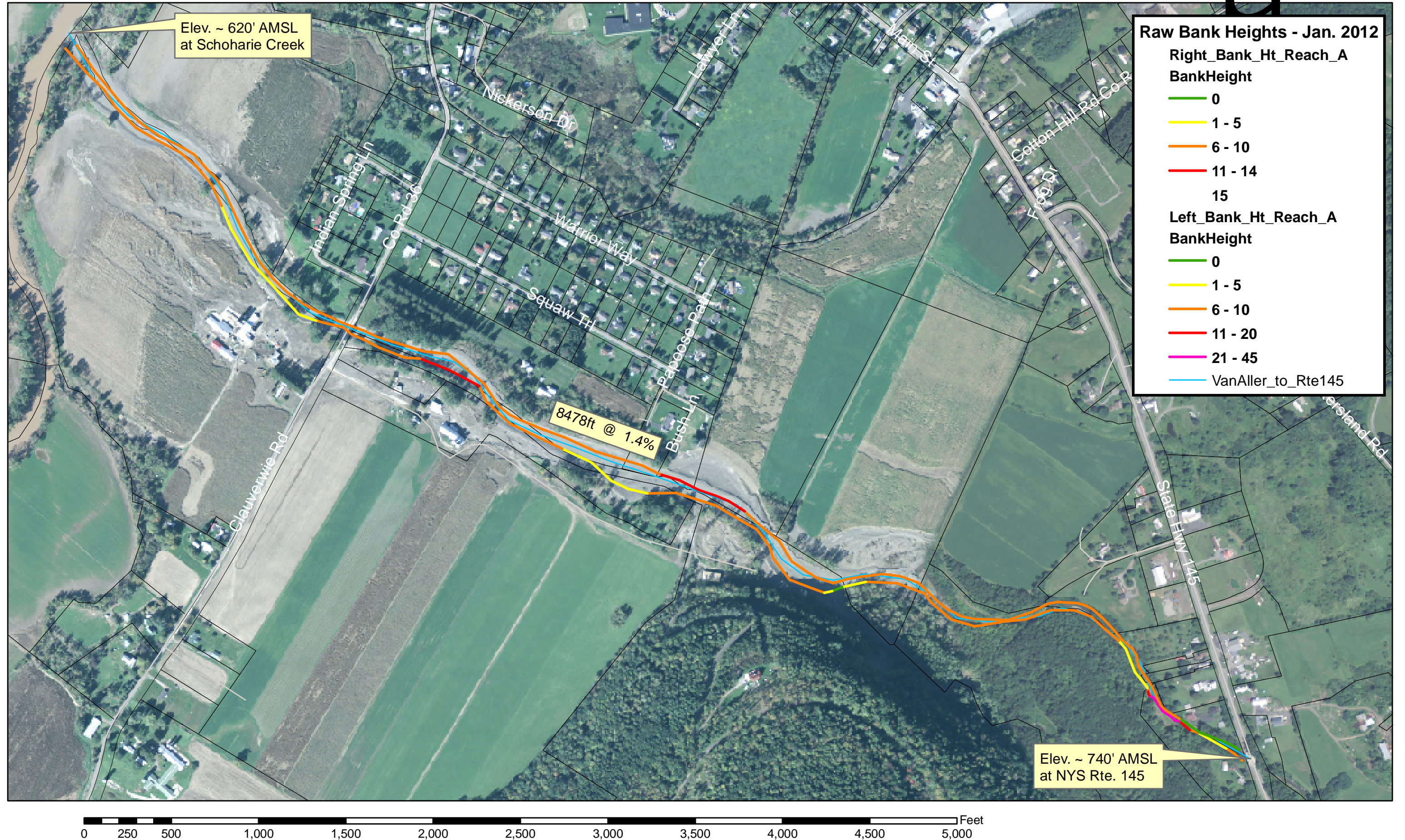0 250 500 1,000 1,500 2,000 2,500 3,000 3,500 4,000 4,500 5,000

Photo 8: 30-40 ft high raw left bank with significant seepage near upstream end of reach

Photo 15: close-up of white pine on failed left bank with failure plane crack visible

Photo 25: looking upstream at overwidened channel with loose gravel berms on both banks

Photo 46: looking downstream at overwidened channel with high gravel berm on left bank

Photo 50: looking downstream at overwidened channel with high gravel berms on both banks

Photo 60: looking downstream at overwidened channel with center bars forming

Photo 76: looking downstream at gravel berm along left bank

Photo 83: Looking across channel at ~ 8-9 foot high loose gravel berm on right bank

Photo 85: looking upstream at channel just above confluence with Schoharie Creek

Photo 94: looking upstream at gravel berm along left bank of channel & floodplain