Schoharie Creek Embankment Repair At Schoharie Street

Project Implementation Report

Village of Hunter, Greene County, New York

Update: December 2009

Project Partners and Contacts

New York City Department of Environmental Protection-Stream Management Program
71 Smith Avenue, Kingston, New York 12401
845.340.7628
Contact: Dave Burns
mailto:dburns@dep.nyc.gov

Greene County Soil and Water Conservation District
907 County Office Building, Cairo, New York 12413
518.622.3620
Contact: Joel DuBois
mailto:joel@gcswcd.com
www.gcswcd.com

Delaware Engineering, P.C.
28 Madison Avenue Extension, Albany, New York 12203
518.452.1290
Contact: Fred Grober, PE
www.delawareengineering.com

DELAWARE ENGINEERING, P.C.

FEMA

Village of Hunter
William Maley – Mayor
Michael Tancredi – Trustee
Alan Higgins – Trustee
Paula Boland – Clerk

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1.0 Project Background

The New York City Department of Environmental Protection (NYCDEP) initiated a regional study of water quality in the spring of 1993. The study focused on sub-basins in the West of Hudson (WOH) watershed and included identifying areas of concern and developing a comprehensive understanding of the sources and fate of materials contributing to turbidity and total suspended solids (TSS). In 2006, a watershed management project was initiated between the NYCDEP and the Greene County Soil and Water Conservation District (GCSWCD) in the Schoharie watershed. The Schoharie Stream Management Project focused on using fluvial geomorphic-based stream classification, assessment and restoration principles in an attempt to reduce turbidity and TSS loading in the watershed.

Figure 1 - Bank Failure at Schoharie Street Project Site

A primary goal of the Stream Management Project was to demonstrate the effectiveness of using fluvial geomorphic restoration techniques for reducing turbidity & TSS loading from in-stream sources. Goals of the project were further developed and refined throughout the progression of the project, and are summarized below:

- Evaluate and improve the effectiveness of natural channel design techniques in the Catskills, based on assessments of the physical and biological characteristics of the restoration sites paired with water quality monitoring.

- Evaluate and improve the effectiveness of geomorphic assessment indices and techniques for the identification of stability problems for use in multi objective restoration and planning.

- Evaluate the effectiveness of using stable reference reaches and regional relationships

in the development of restoration designs.

- Conduct performance evaluations of the restoration projects, through monitoring and inspection, to document the status and stability of the demonstration projects. The results of performance evaluations can then be used to improve the future use of the design techniques.

- Develop design standards, typical details, construction specifications, and construction sequencing procedures, and operation and maintenance protocols for geomorphic-based restoration projects.

A stream feature inventory conducted in 2006 identified sections of the project reach experiencing large-scale erosion and bank failure suspected to negatively impacting water quality. The position of a village water distribution line located under Schoharie Street, the close proximity of a residential structure to the failure and evidence of continued bank failure eliminated natural recovery of the failure from the possible approaches to the problem.

The project site had been targeted for repair following a flood event in 2005 that led to a FEMA disaster declaration. However, FEMA's underestimation of the cost of the repairs to the embankment resulted in project delays due to funding shortfall.

Completion of the Schoharie Creek Embankment Repair at Schoharie Street represents an effective collaboration between agency and municipal partners including the Federal Emergency Management Agency, New York State Emergency Management Office, New York City Department of Environmental Protection, Greene County Soil & water Conservation District, and the Village of Hunter. Integration of the applicable programs offered by the project partners resulted in implementation of a design that minimized impacts to upstream and downstream reaches, while incorporating vegetation into the final treatment.

2.0 Project Reach Setting

The Schoharie Creek watershed is located in the southeastern region of New York State. Approximately 80% of the 93 mi^2 (59,519 acres) main stem watershed above the Schoharie Reservoir lies within the Greene County towns of Hunter, Jewett, Lexington, Prattsville and Ashland. The remainder of the watershed lies within Gilboa, Roxbury, and Conesville.

The Schoharie Creek begins in a large wetland complex at Prediger Road in the Town of Hunter. The surrounding landscape is mountainous including the high peaks of Indian Head, Twin, Kaaterskill High Peak, Sugarloaf, Plateau, Hunter, and Rusk Mountains. The Schoharie Creeks meets up with County Route 23A flowing parallel to the roadway through the Village of Hunter, the most urban setting along the creek, and continuing through the Towns of Jewett, Lexington, and finally into Prattsville and its confluence with the Schoharie Reservoir.

The Schoharie Creek watershed contains approximately 216 miles of stream including, traveling from east to west, Roaring Kill, Cook Brook, Gooseberry Creek, Red Kill, Shanty Hollow Brook, and John Chase Brook along with numerous other unnamed tributaries. Elevations in the watershed vary from a high of approximately 4,040 feet above sea level in the Town of Hunter to a low point of 1,140 feet above sea level at the Schoharie Reservoir.

Figure 2 - 2006 aerial photograph of bank failure at Schoharie Street Stabilization Project

In 1885, the Catskill and Adirondack Forest Preserve was established by the NY State Assembly. An 1894 amendment to the New York State Constitution (now Article 14) directs: "the lands of the State now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed."

In 1904, the Catskill Park was designated, establishing a boundary or 'blue line' around the Forest Preserve and private land as well. Over the years the Forest Preserve and the Catskill Park grew, with the Catskill Park now comprising approximately 700,000 acres, about half of which is public Forest Preserve. The Catskill and Adirondack Parks are nationally unique because they are a checkerboard of public and private land; a grand experiment in how nature, even wilderness, and human society can coexist in a landscape.

A dominant characteristic of the Schoharie Creek Watershed's regional setting is its location within the 2,000 square-mile New York City Water Supply Watershed. The NYC Watershed is the largest unfiltered water supply in the U.S., providing 1.4 billion gallons of clean drinking water each day to over nine million residents in New York City and some smaller municipalities (nearly half the population of New York State). The Schoharie Creek empties into the Schoharie Reservoir, which in turn supplies water through an aqueduct into the Esopus Creek, which then flows into the Ashokan Reservoir. The Ashokan provides approximately ten percent of NYC's drinking water.

The NYC Department of Environmental Protection (DEP) operates this drinking water supply under a Filtration Avoidance Determination (FAD) issued by the Environmental Protection Agency (EPA) and the New York State Department of Health. Central to the maintenance of the FAD are a series of partnership programs between NYC and the upstate communities, as well as a set of rules and

regulations administered by the DEP. Due to its location within the NYC Watershed, land use in the Schoharie watershed is subject to the NYCDEP rules and regulations written to protect water quality. DEP offers a variety of watershed protection programs to encourage proper management practices within the watershed.

The project reach is located in the upper reaches of the Schoharie Creek mainstem in the Village of Hunter, NY. The project reach is located within a moderately confined valley containing steep side slopes with a moderate valley slope of approximately 0.6%. This morphology is confined by transportation infrastructure, residential encroachment and valley form.

2.1 Historic Aerial Photo Assessment and Channel Monitoring

Historic aerials from 1959, 1980 and 2001 were assessed to observe physical conditions of the reach including response and patterns in planform adjustment and trends in stream morphology. As seen from the historical stream alignments (below), the planform of the channel has remained fairly stable since 1959.

Figure 3 - Historic channel alignments for Schoharie Creek in the Village of Hunter

A stream corridor inventory performed in 2006 identified this site as a top priority for restoration. Recommendations for the reach in the Schoharie Creek Management Plan call for full restoration of the bank failure site. The complete Schoharie Creek Management Plan can be found on the internet at www.catskillsteams.org.

2.2 Bank Stability

The type of material and stratigraphy in a channel bank affects its erosion potential. Bank statigraphy is identified and measured in the field. Many channels are comprised of composite channel banks with bedrock, clay, alluvium and soils.

Bank failure can occur in various modes depending on the bank soil properties and the morphology of the stream. Bank failure modes include shallow, planar, rotational and

cantilever type failures. The most common type of bank failure results from removal of soil from the bank toe (undermining) and subsequent slope failure.

External stability refers to the acting and resisting forces adjacent to stream that influence stability of the slope. External stability analysis evaluates forces related to bearing capacity, base sliding, and overturning moments. Internal stability refers to forces within the channel bank that affect the stability of reinforcements (internal sliding, tensile overstress, and pullout). Local stability is related to the surficial facing of a channel bank. This also relates to the connection strength between the facing and internal reinforcements in a constructed slope. Global Stability relates to deep-seated rotational failures that are generally outside the limits of a constructed slope.

A Bank Erosion Monitoring Site (BEMS) was established to study erosion along this reach. A cross section and longitudinal profile survey was conducted to collect baseline data.

While the channel bed and lower banks were comprised of various types of bedrock, the upper slope contained much finer grained materials that were much more prone to failure.

Figure 4 - Fractured bed rock at the toe of the bank failure

Stream erosion at this site had fractured the lower shale bedrock bank and triggered a 9,432ft^2 shallow failure on the upper hillslope. At the top of the slope, the Village had been forced to close the end of Schoharie Street due to safety concerns. Erosion along the right streambank had scoured an area of 2,179ft2.

Geotechnical evaluation of the slope failure resulted in recommendations to stabilize the failure through the establishment of stable bank geometry and construction of a stacked rock wall. The bank geometry necessary to achieve stability was determined to be 1:1.

3.0 Proposed Design

The proposed design of this project included establishment of stable bank geometry, and construction of a stacked rock retaining wall. The stacked rock wall was designed to achieve the recommended overall bank slope of 1:1 while enabling plantings to be installed on the wall to enhance aesthetics and reduce thermal impacts to the water body.

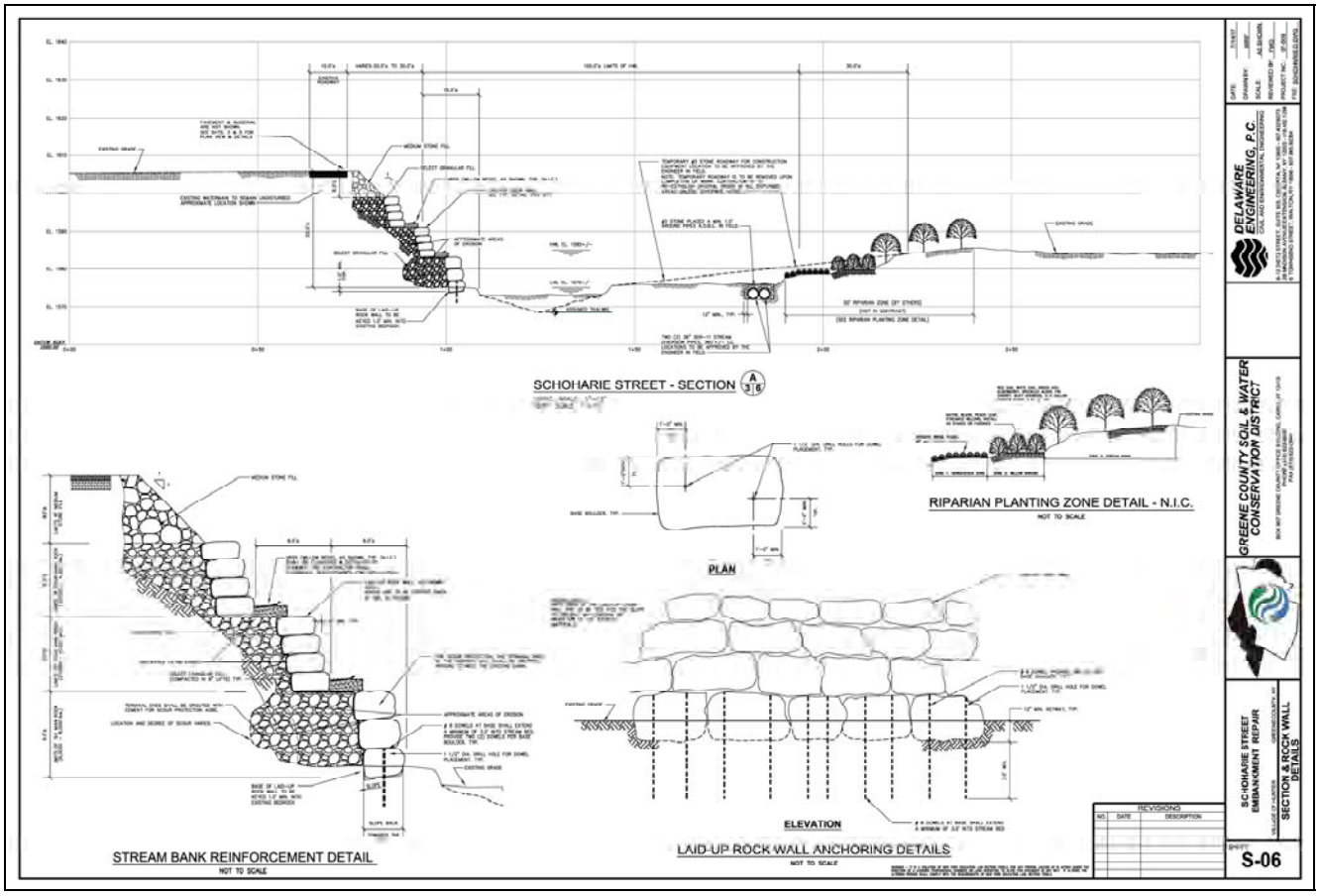


Figure 5 - Proposed Design Drawing

The final design of the wall included three terraces and prescribed geo-grid reinforced planting beds at the top of the lower two terraces.

3.1 Project Goals and Objectives

As project partners reviewed the condition of the reach and its potential for restoration, a number of goals and objectives were identified. Water quality is negatively affected by failure of the upper slope. The repair of the embankment presents the opportunity to minimize erosion, while providing a number of environmental and public safety benefits. The primary goal of the project can be summarized as follows:

To mitigate the public safety hazard posed by the failure of the Schoharie Street embankment while enhancing the riparian condition of the reach.

To accomplish the project goals it was determined that the design needed to address the existing slope failure, and enhance the riparian vegetation condition. The failure had increased in length from 120 ft to 180 ft in time between the initial disaster declaration and project implementation. The scope of the project included stabilization of the full 180 ft of the failure. The slope failure would be addressed through installation of the stacked rock retaining wall, while the riparian condition would be enhanced through plantings located on both the retaining wall and on the stream bank opposite the wall. The scope of the

3.2 Project Constraints

A number of potential constraints for the project were identified during the design process including physical site constraints, landowner approval and access, project permitting and data needs and limitations. The project design addressed bank stability and processes while working within the existing physical site constraints. The design needed to modify bank geometry and cross sectional parameters in order to achieve the goals and objectives of the project which include long-term bank stability.

The most significant challenge to design development was to identify a set of bank dimensions providing appropriate bank stability conditions and channel morphology guidelines in light of the physical site constraints. The bank treatment was constrained most notably by encroachment of Schoharie Street on the riparian corridor.

Landowner approval of the project was prerequisite to project construction. Implementation of the project required formal approval to be obtained in the form of Landowner Project Agreements. These agreements contain a ten year easement where attainable for protection of the project and to facilitate project maintenance when necessary. Education of the multiple primary and secondary landowners within the project area included information about stream instability, need for action, project benefits and long term maintenance and management. Initial planning and design for this project incorporated landowner knowledge of the site and addressed owner concerns where appropriate. The provisions of landowner approval were set forth via the Landowner Project Agreement, which is a temporary license between the landowner and the GCSWCD. Long term operation and maintenance agreement is discussed in ensuing sections.

Construction of the project required ACOE, NYSDEC and NYCDEP permits and approvals. Project design and construction required close coordination with these agencies. The NYSDEC has authorized similar projects under Article 15 of ECL, while the ACOE utilizes Nationwide 27 permits.

3.3 Major Design Components

The proposed design included stabilization of 180 linear feet of the failed stream embankment and riparian vegetation enhancements to both the failed steam embankment and the stream bank opposite the failure. The selected stabilization strategy was one of three alternatives that were evaluated during project development. A near vertical retaining wall alternative was evaluated but rejected because of the soil stability constraints of the site and the shallow depth to bed rock that would limit footer depth. Bank stabilization included modification of the bank geometry through installation of a series of three stacked rock walls. Small terrace were created

at the top of the lower two walls. This alternative was chosen over a dumped rock slope because of the habitat and aesthetic enhancements that could be achieved using the small terraces. Those enhancements included installation of live willow cuttings in the geo-grid reinforced planting beds at the top of each terrace of the wall. The project also included planting of ecologically appropriate tree and shrub species on the bank and floodplain terrace on the opposite side of the stream from the bank failure.

3.3.1 Embankment Repair

The overall retaining structure that was designed to stabilize the embankment met several design guidelines. First, the geometry of the wall needed to result in an overall bank slope of 1:1 or flatter. Second, the wall needed to be designed with terraces so vegetation could be incorporated into the wall. Third, the wall needed to allow reconstruction of Schoharie Street in its original location. Fourth, the wall needed to tie into the bank toe in a location that would minimize its impact on the channel morphology of the Schoharie Creek. And Finally, the individual stone walls that formed each terrace needed to have a slope that did not exceed 1 horizontal : 6 vertical.

Figure 6 - Completed Embankment Repair

The wall was constructed on a footer that was keyed 1 foot into the bedrock toe of the slope to prevent movement of the base course of the wall. A minimum of two rebar pins were installed through each base rock to further ensure that the base course of rock would not move under stress. Embankment repair elements of the project were funded by a combination of FEMA and NYCDEP funding. A summary of the project expenditures classified by funding source is presented in Table 1.

3.3.2 Schoharie Street Repair

Upon stabilization of the Schoharie Creek embankment, the proposal called for rehabilitation of the Schoharie Street roadway. The rehabilitation of the roadway included

asphalt paving and installation of guiderail. Roadway repair elements of the project were funded by a combination of FEMA and Village of Hunter Funding. A summary of the project expenditures classified by funding source is presented in Table 1.

3.3.3 Project Site Re Vegetation

Establishment of an effective riparian buffer zone is critical to the success of a stream stabilization design. A combination of dormant plant materials, conservation seed mixtures, and plantings of live trees and shrubs were applied to initiate the development of a functioning riparian community. Native willow, dogwood and other appropriate streamside species were planted on the streambanks. Live willow stakes were applied to the reinforced planting beds on the terraces of the rock wall, as well as near the toe of the opposite bank. Various species of woody trees, appropriate for the riparian zone, were planted on the floodplain terrace opposite the rock wall to promote enhanced canopy cover over the water surface. All other areas of disturbance were treated with a riparian seed mixture and mulched to minimize soil losses. A summary of the components of the seed mixture is presented in Table 1. In addition to the species contained in the seed mix, Virginia Creeper (*Parthenocissus quinquefolia*) seed of local origin was collected and distributed along the soil beds. All of the expenses associated with the revegetation of the site were funded solely by NYCDEP. A summary of the project expenditures classified by funding source is presented in Table 2.

Common Name	Scientific Name
Big Bluestem (Turkey Foot Bluestem)	*Andropogon gerardii (A. furcatus)*
Common Milkweed	*Asclepias syriaca*
Blue False Indigo	*Baptisia australis*
Fox Sedge	*Carex vulpinoidea*
Partridge Pea	*Chamaecrista fasciculata (Cassia f.)*
(Silky Dogwood)	*Cornus amomum*
Showy Tick Trefoil	*Desmodium canadense*
Riverbank Wild Rye	*Elymus riparius*
Virginia Wild Rye	*Elymus virginicus*
Joe Pye Weed	*Eupatorium fistulosum*
Spotted Joe Pye Weed	*Eupatorium maculatum*
Boneset	*Eupatorium perfoliatum*
Grass Leaved Goldenrod	*Euthamia graminifolia (Solidago g.)*
Ox Eye Sunflower	*Heliopsis helianthoides*
Soft Rush	*Juncus effusus*
Wild Bergamot	*Monarda fistulosa*
Deer Tongue	*Panicum clandestinum (Dichanthelium c.)*
Switchgrass	*Panicum virgatum*
Tall White Beard tongue	*Penstemon digitalis*
Staghorn Sumac	*Rhus typhina (R. hirta)*
Black Eyed Susan	*Rudbeckia hirta*
Little Bluestem	*Schizachyrium scoparium (Andropogon scoparius)*
Indiangrass	*Sorghastrum nutans*
Blue Vervain	*Verbena hastata*
Giant Ironweed	*Vernonia gigantea (V. altissima)*
Arrow Wood	*Viburnum dentatum*

Table 1 – Riparian Seed Mixture Components

BASE BID - 120 LF					COST		COST SHARES		
	BID ITEM	SIZE	QUANTITY	UNITS	UNIT PRICE	REQUEST AMOUNT	FEMA	NYCDEP	Hunter
1. 1	Mobilization and General Construction (4% max of total)		1.00	LS	$ 9,000.00	$ 9,000.00	$ 7,875,000	$ 1,125,000	$ -
1. 2A	Dewatering Pumping & General Sediment and Erosion Control	-	1.00	LS	$ 72,000.00	$ 72,000.00	$ 63,000,000	$ 9,000,000	$ -
1. 2B	Sediment and Erosion Control- Silt Fence	-	145.00	LF	$ 7.00	$ 1,015.00	$ 888,125	$ 126,875	$ -
1. 2C	Sediment and Erosion Control- Standby Time	-	0.00	DAYS	$ -	$ -	$ -	$ -	$ -
1. 3	Clearing and Grubbing	-	800.00	SY	$ 5.00	$ 4,000.00	$ 3,500,000	$ 500,000	$ -
1. 4	Temporary Access Road	-	140.00	SY	$ 15.00	$ 2,100.00	$ 1,837,500	$ 262,500	$ -
1. 5	Rock Excavation	-	17.00	CY	$ 200.00	$ 3,400.00	$ 2,975,000	$ 425,000	$ -
1. 6A	Medium Stone Fill	-	152.76	CY	$ 40.00	$ 6,110.40	$ 5,346,600	$ 763,800	$ -
1. 6B	Select Granular Fill	-	261.00	CY	$ 25.00	$ 6,525.00	$ 5,709,375	$ 815,625	$ -
1. 6C	Unclassified Backfill	-	20.00	CY	$ 50.00	$ 1,000.00	$ 875,000	$ 125,000	$ -
1. 6D	Road Subbase	-	74.88	CY	$ 50.00	$ 3,744.00	$ 3,276,000	$ 468,000	$ -
1. 6E	#3 Stone	-	31.29	CY	$ 50.00	$ 1,564.50	$ 1,368,938	$ 195,563	$ -
1. 7A	Rockery Wall	4 Man	298.92	CY	$ 200.00	$ 59,784.00	$ 52,311,000	$ 7,473,000	$ -
1. 7B	Rockery Wall	6 Man	190.93	CY	$ 275.00	$ 52,505.75	$ 45,942,531	$ 6,563,219	$ -
1. 8	Trench Stabilization Filter Fabric	-	550.00	SY	$ 4.00	$ 2,200.00	$ 1,925,000	$ 275,000	$ -
1. 9	Site Restoration	-	2400.00	SY	$ 4.00	$ 9,600.00	$ 8,400,000	$ 1,200,000	$ -
1. 10	Cementitous Material for Grouting	-	0.00	CY	$ 400.00	$ -	$ -	$ -	$ -
1. 11A	Asphalt Binder Course Type 3	-	22.23	TON	$ 175.00	$ 3,890.25	$ 3,403,969	$ -	$ 486,281
1. 11B	Asphalt Top Course Type 6	-	21.96	TON	$ 200.00	$ 4,392.00	$ 3,843,000	$ -	$ 549,000
1. 12	Setting Water Valve Box Covers to Grade	-	0.00	EA	$ 823.00	$ -	$ -	$ -	$ -
1. 13A	Guide Rail	-	138.00	LF	$ 50.00	$ 6,900.00	$ 6,037,500	$ -	$ 862,500
1. 13B	Guide Rail - End Section	-	15.00	LF	$ 75.00	$ 1,125.00	$ 984,375	$ -	$ 140,625
	BASE BID SUB-TOTAL					$250,055.90	$ 219,498,913	$ 29,318,581	$ 2,038,406

EXTENDED BID - ADDITIONAL 60 LF					COST		COST SHARES		
	BID ITEM	SIZE	QUANTITY	UNITS	UNIT PRICE	REQUEST AMOUNT	FEMA	NYCDEP	Hunter
2. 1	Mobilization and General Construction (4% max of total)	-	1.00	LS	$ -	$ -	$ -	$ -	$ -
2. 2A	Dewatering Pumping & General Sediment and Erosion Control	-	1.00	LS	$ 12,000.00	$ 12,000.00	$ -	$ 12,000.00	$ -
2. 2B	Sediment and Erosion Control- Silt Fence	-	25.00	LF	$ 7.00	$ 175.00	$ -	$ 175.00	$ -
2. 2C	Sediment and Erosion Control- Standby Time	-	0.00	DAYS	$ -	$ -	$ -	$ -	$ -
2. 3	Clearing and Grubbing	-	400.00	SY	$ 5.00	$ 2,000.00	$ -	$ 2,000.00	$ -
2. 4	Temporary Access Road	-	0.00	SY	$ 15.00	$ -	$ -	$ -	$ -
2 5	Rock Excavation	-	107.40	CY	$ 200.00	$ 21,480.00	$ -	$ 21,480.00	$ -
2. 6A	Medium Stone Fill	-	513.85	CY	$ 40.00	$ 20,554.00	$ -	$ 20,554.00	$ -
2. 6B	Select Granular Fill	-	0.00	CY	$ 25.00	$ -	$ -	$ -	$ -
2. 7A	Rockery Wall	4 Man	150.65	CY	$ 150.00	$ 22,597.50	$ -	$ 22,597.50	$ -
2. 7B	Rockery Wall	6 Man	128.02	CY	$ 200.00	$ 25,604.00	$ -	$ 25,604.00	$ -
2. 8	Trench Stabilization Filter Fabric	-	1550.00	SY	$ 4.00	$ 6,200.00	$ -	$ 6,200.00	$ -
2. 9	Site Restoration	-	1200.00	SY	$ 4.00	$ 4,800.00	$ -	$ 4,800.00	$ -
2. 10	Cementitous Material for Grouting	-	0.00	CY	$ 400.00	$ -	$ -	$ -	$ -
2. 11	Willow Soil Beds	-	54.67	SY	$ 120.00	$ 6,560.40	$ -	$ 6,560.40	$ -
	EXTENDED BID SUB-TOTAL					$121,970.90	$ -	$ 121,970.900	$ -

TIME & MATERIALS				COST		COST SHARES		
	DESCRIPTION	TICKET#	UNITS	UNIT PRICE	REQUEST AMOUNT	FEMA	NYCDEP	Hunter
T& M	PIPE REPAIR	383573	LS	$2,235.00	$2,235.00	$0.00	$2,235.00	$0.00
	T&M SUB-TOTAL				$2,235.00	$0.00	$2,235.00	$ -
	CONSTRUCTION COST SUB-TOTAL				$375,061.80	$219,498.91	$153,524.48	$ 2,038,406

PROFESSIONAL SERVICES			COST		COST SHARES	
	TYPE	TASK	APPROVED AMOUNT	FEMA	NYCDEP	Hunter
	Design Costs	Design	$ 32,185.34	$ 23,045.00	$ 9,140.34	$ -
	Bidding Costs	Bidding Process	$ 5,000.00	$ -	$ 5,000.00	$ -
	Permitting Costs	Joint Permit App	$ 5,000.00	$ 5,000.00	$ -	$ -
	Project Financing	Bond Anticipation Note	$ 10,000.00	$ -	$ -	$ 10,000.00
	Construction Management	Construction Oversight	$ 30,600.00	$ 7,434.00	$ 23,166.00	$ -
		Field Survey/Stake Out	$ 1,400.00	$ 1,400.00	$ -	$ -
	PROFESSIONAL SERVICES SUB-TOTAL		$ 84,185.34	$36,879.00	$37,306.34	$ 10,000.000
	GRAND TOTAL		$459,247.14	$256,377.91	$190,830.82	$ 12,038.406

Table 2 – Project Implementation Cost Summary

4.0 Project Construction Summary

4.1 Construction Schedule

Project construction began July 22, 2008 with equipment mobilization, installation of dewatering equipment and stormwater controls, and delivery of rock materials. A rain event on July 23, 2008 resulted in stream flows that exceeded the projects dewatering capacity and work was stopped until flows receded to levels that were with in the capacity of the dewatering equipment. Work resumed on the project on August 7, 2008 and continued uninterrupted through substantial completion of the project achieved on August 26, 2008. The only item that remained for final completion of the project was guiderail installation, an item which was the financial responsibility of FEMA and the Village of Hunter. Outstanding work was completed and the final application for payment was submitted by the contractor on December 16, 2008. Additional plantings outside the scope of the construction contract were installed in the spring of 2009 by GCSWCD staff.

4.2 Project Access

Project access was attained using existing access routes through private property. Access roads were improved with aggregate materials where necessary, and were restored to preconstruction conditions upon completion of the construction activities.

4.3 Dewatering and Erosion and Sediment Control

Stream channel construction was required to be completed in a dry condition in order to meet the requirements of various regulatory agencies. During all construction in the stream channel, the contractor was required to divert the entire stream flow around the work area. Dewatering was maintained 24 hours per day, 7 days per week during the construction period and was accomplished by a pump and pipeline scenario. The approximate capacity of the dewatering system was 50 ft^3/sec. Stream flow exceeded pumping capacity following a rain event on July 23, 2008, stopping work until flows fell back into the capacity range of the dewatering equipment on August 7, 2008.

Figure 7 - Dewatering equipment Installed on Site

Sediment control during construction was accomplished through collection of all turbid water within the work area, and pumping the sediment-laden water to designated filter areas. The Contractor was also required to develop open sediment basins constructed of hay bales lined with filter fabric to achieve acceptable sediment control. The constructed basins were placed near the locations of the existing filter areas and pre-treated the discharge before it was released to the stream channel. All disturbed areas were stabilized as soon as possible to minimize soil erosion.

All construction infrastructure including roads, staging areas, borrow and storage sites, construction entrances and other infrastructure as deemed necessary were restored to preconstruction conditions.

4.4 Clearing and Grubbing

Clearing and grubbing consisted of the clearing, grubbing, and disposal of trees, snags, logs, brush, stumps, shrubs, and rubbish from the designated areas. These areas were identified in order to minimize any impacts to adjacent vegetation. These areas were re vegetated as component of the project.

The project site had a few small stands of knotweed (*Polygonum Cuspidatum*). This species is an invasive plant, not native to the region. It is extremely prolific, and can grow from small cuttings of either the rhizome or vegetative growth. This species is detrimental to stream bank stability, and must be handled and disposed of carefully. Areas of Knotweed on the project site were treated by a licensed applicator with an herbicide application that was completed outside of the scope of the construction contract.

4.5 Construction Sequence

Construction sequencing would consist of first excavating a footing for the rockery wall into the underlying bedrock. The excavation of the footer was completed with the use of a hydraulic hammer mounted on an excavator. Upon the completion of the footer excavation, rockery wall construction began. The first course of rock in the wall was placed in the footing trench, and

pinned to the bedrock using rebar rods inserted into holes drilled into the rockery and the bedrock. The wall design called for terraces to be installed that would be fitted with textile reinforced willow beds to improve the stability and aesthetics of the wall while reducing the thermal impacts that the exposed rockery could have on the stream flow. The rockery was blended into the existing grades using medium and heavy stone fill.

The acquisition of plant material for the willow bed component of the project was conducted at Greene County Soil & Water's Plant material center.

5.0 Post Construction Monitoring

Project inspections will include photographic documentation of the project reach and a visual inspection of the rockery and willow beds. The inspections will be conducted annually during the project site observations as well as during and after significant flow events. The willow cuttings installed in the willow beds will be inspected to determine whether their performance meets the performance standards outlined in the project specifications on or before October 15, 2009. Long term monitoring of water quality is being performed by NYCDEP, which includes measurements of total suspended solids (TSS) and turbidity.

6.0 Operation and Maintenance

During the initial years after project completion, as the site experiences a range of flows and the channel sediment becomes naturalized, projects usually require modifications and design enhancements. Project sponsors must be prepared to undertake adjustments in channel form and/or rock structures as indicated by the project monitoring.

The project's Landowner Agreements are temporary easements between the landowner and GCSWCD, and are for a term of 10 years. The agreement stipulates that the GCSWCD is responsible for maintenance and repairs of the project for a period of three years and monitoring of the project for a period of 10 years if funding is available. The agreement also stipulates that the Landowner must not (within the next 10 years): disturb vegetation within the project area, disturb rock structures, disturb the soil, construct any permanent structures within the project area, or commence any work within the project area without notifying the GCSWCD. These measures are intended to ensure the stability of the project, and to protect the investment made by the project partners.

6.1 In Stream Maintenance

The rockery wall may require some modification and enhancement. The monitoring and inspections performed by project partners will assist in prescribing the modification of rocks to ensure structural integrity, as well as any debris and sediment maintenance measures. The annual project status reports will document these needs and modifications and will require notification and approval by ACOE and NYSDEC and NYCDEP.

6.2 Riparian Vegetation

Vegetative establishment in the project area is a critical component to the project's long-term success. General site constraints and excessively drained soil conditions may limit the success and establishment of the designated vegetative elements of the project. Careful planning,

monitoring, and maintenance are required for all of the installed vegetation. Increased browsing pressure from mammals, potential for disease, and extreme weather conditions can reduce the success of the plant materials. Inspection and monitoring of the plant materials throughout the initial stage of development will assist in ensuring plant viability. Supplemental installation of plant material, as needed, in the form of bioengineering and riparian planting will ensure effective riparian vegetation establishment. Plantings may require maintenance to ensure proper moisture at critical times.

6.2.1 Vegetation Update - 2009

Monitoring of vegetative treatments conducted in 2009 revealed that less than the required 80% of the willow stakes installed by the contractor in the willow beds had survived at the specified inspection date. In order to remedy the survival short fall, the contractor was directed to install 16 Common Juniper (*Juniperus communis*) shrubs. The contractor installed those plants into the planting beds on the rockery wall in December 2009. Junipers have lower water requirements than the willows initially planted on the rockery, and are expected to have a superior survival rate in the well drained conditions on the rockery.

Additionally, monitoring revealed that some buffer plantings installed by GCSWCD in 2008, on the bank and floodplain opposite from the rockery, had not survived. The buffer planting was augmented through planting of 5 balled and burlapped River Birch (*Betula nigra*) trees measuring approximately 7 feet in height. Those additional trees were planted by GCSWWCD staff in December, 2009.

Monitoring of the vegetative treatments on the site will continue, and will be used to inform future replanting and other project maintenance decisions.

Appendix A – Landowner Agreements

Schoharie Creek Embankment Repair at Schoharie Avenue
LANDOWNER LICENSE AGREEMENT

This agreement, made this 4 day of June 2008, by and between **James and Dorothy Manalio (Landowners)** residing at 36 Schoharie St, Hunter, NY, **owner(s) of that certain parcel of land** identified as **SBL 164.09-2-12** on the Real Property Tax Maps for the town of Hunter in Greene County (the Property) and the Greene County Soil & Water Conservation District **(GCSWCD)**, with its principal office at 907 County Office Building, Cairo NY 12413, sets forth certain responsibilities of the parties hereto in connection with a creek embankment repair project for a portion of the Schoharie Creek referred to as the Schoharie Creek Embankment Repair At Schoharie Avenue.

.

Whereas, the Federal Emergency Management Agency (FEMA) declared Disaster #1589 after which the Property was identified as a site eligible for FEMA funding; and

Whereas, the GCSWCD, pursuant to said declaration by FEMA, retained Delaware Engineering, P.C. to develop an embankment repair design for the project; and

Whereas, the New York City Department of Environmental Protection has agreed to provide funding to complete the project; and

Whereas, such repair design will require access to an area of stream located on the Property; and

Whereas, in connection with repair work, GCSWCD needs to undertake construction activities on certain parcels of privately-owned real property of which the Property is one such parcel; now

Therefore, in consideration of the premises and the respective representations hereinafter contained, the parties hereto agree as follows:

1. Landowner hereby grants a temporary license to enter the Property to GCSWCD, its heirs and assigns, to provide access to the Project Area, which area includes certain portions of the Property, by its employees, agents, subcontractors and contractors, certain employees of the New York City Department of Environmental Protection and other government entities that have an interest in the Project, for the purpose of constructing, observing, maintaining, repairing and monitoring the Project.

2. GCSWCD shall meet with the Landowner and review the Project design and proposed construction activities prior to the commencement of any Project-related work ("Project work") on the Property. No Project work shall be commenced without the prior review of Landowner.

4. GCSWCD shall administer and coordinate all phases of the Project including, among other things: selecting a contractor; obtaining all required regulatory permits, preparing project updates for Landowner, requiring subcontractors to have adequate insurance coverage, overseeing construction activities, monitoring the progress and quality of the work and certifying completion.

5. GCSWCD shall be responsible for maintaining and/or repairing the Project for a minimum of one year from the date of completion and shall monitor the Project for a minimum of five years provided funding continues to be available.

6. The Landowner shall identify the location of any subsurface treatment systems, utilities and/or such other subsurface facilities or conditions located on the Property which should be taken into consideration in the final design.

7. GCSWCD shall consult with the Landowner to determine access points, staging areas and other items required to perform Project work.

9. GCSWCD shall use best efforts to restore all disturbed areas of the Property to pre-project conditions.

10. GCSWCD shall not be liable to the Landowner for any personal injury or property damage that results from flooding on the

Property or from the work performed in connection with the Project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the GCSWCD, its employees or agents.

11. GCSWCD shall indemnify and hold the Landowner harmless from any claims, judgments, and causes of action resulting from damage, including sickness or death, to third parties or damage to property resulting from the negligence or willful misconduct of its employees, agents, contractors and/or subcontractors in connection with the Project.

12. Neither the City of New York nor the NYCDEP shall be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from work performed in connection with this project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the acts of the City, NYCDEP, their employees or agents. Both the City and NYCDEP shall be entitled to rely upon the foregoing language and enforce this provision as if either were a signatory hereto.

13. This Agreement may be recorded in the office of the Greene County Clerk.

14. This Agreement may only be amended in writing and by mutual consent of the parties hereto.

Landowner: James Manalio

Jeff Flack, Acting Director GCSWCD

6/4/08

Date

6/4/08

Date

Deceased

Landowner: Dorothy Manalio

Date

Schoharie Creek Embankment Repair at Schoharie Avenue
LANDOWNER LICENSE AGREEMENT

This agreement, made this 4 day of June, by and between **Alan W. Higgins (Landowner)** residing at 7897 Main St, **owner(s) of that certain parcel of land** identified as **SBL 164.10-2-3 and 164.10-2-9.2 and 164.10-2-9.1** on the Real Property Tax Maps for the town of Hunter in Greene County (the Property) and the Greene County Soil & Water Conservation District **(GCSWCD)**, with its principal office at 907 County Office Building, Cairo NY 12413, sets forth certain responsibilities of the parties hereto in connection with a creek embankment repair project for a portion of the Schoharie Creek referred to as the Schoharie Creek Embankment Repair At Schoharie Avenue.

.

Whereas, the Federal Emergency Management Agency (FEMA) declared Disaster #1589 after which the Property was identified as a site eligible for FEMA funding; and

Whereas, the GCSWCD, pursuant to said declaration by FEMA, retained Delaware Engineering, P.C. to develop an embankment repair design for the project; and

Whereas, the New York City Department of Environmental Protection has agreed to provide funding to complete the project; and

Whereas, such repair design will require access to an area of stream located on the Property; and

Whereas, in connection with repair work, GCSWCD needs to undertake construction activities on certain parcels of privately-owned real property of which the Property is one such parcel; now

Therefore, in consideration of the premises and the respective representations hereinafter contained, the parties hereto agree as follows:

1. Landowner hereby grants a temporary license to enter the Property to GCSWCD, its heirs and assigns, to provide access to the Project Area, which area includes certain portions of the Property, by its employees, agents, subcontractors and contractors, certain employees of the New York City Department of Environmental Protection and other government entities that have an interest in the Project, for the purpose of constructing, observing, maintaining, repairing and monitoring the Project.

2. GCSWCD shall meet with the Landowner and review the Project design and proposed construction activities prior to the commencement of any Project-related work ("Project work") on the Property. No Project work shall be commenced without the prior review of Landowner.

4. GCSWCD shall administer and coordinate all phases of the Project including, among other things: selecting a contractor; obtaining all required regulatory permits, preparing project updates for Landowner, requiring subcontractors to have adequate insurance coverage, overseeing construction activities, monitoring the progress and quality of the work and certifying completion.

5. GCSWCD shall be responsible for maintaining and/or repairing the Project for a minimum of one year from the date of completion and shall monitor the Project for a minimum of five years provided funding continues to be available.

6. The Landowner shall identify the location of any subsurface treatment systems, utilities and/or such other subsurface facilities or conditions located on the Property which should be taken into consideration in the final design.

7. GCSWCD shall consult with the Landowner to determine access points, staging areas and other items required to perform Project work.

9. GCSWCD shall use best efforts to restore all disturbed areas of the Property to pre-project conditions.

10. GCSWCD shall not be liable to the Landowner for any personal injury or property damage that results from flooding on the

Property or from the work performed in connection with the Project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the GCSWCD, its employees or agents.

11. GCSWCD shall indemnify and hold the Landowner harmless from any claims, judgments, and causes of action resulting from damage, including sickness or death, to third parties or damage to property resulting from the negligence or willful misconduct of its employees, agents, contractors and/or subcontractors in connection with the Project.

12. Neither the City of New York nor the NYCDEP shall be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from work performed in connection with this project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the acts of the City, NYCDEP, their employees or agents. Both the City and NYCDEP shall be entitled to rely upon the foregoing language and enforce this provision as if either were a signatory hereto.

13. This Agreement may be recorded in the office of the Greene County Clerk.

14. This Agreement may only be amended in writing and by mutual consent of the parties hereto.

Landowner: Alan W. Higgins

6-4-08
Date

Jeff Flack, Acting Director GCSWCD

4/4/08
Date

Schoharie Creek Embankment Repair at Schoharie Avenue
LANDOWNER LICENSE AGREEMENT

This agreement, made this 4th day of June, 2008, by and between **John Laveglia (Landowner)** residing at PO Box 458, Hunter, NY 12442, **owner(s) of that certain parcel of land** identified as **SBL 164.09-2-13** on the Real Property Tax Maps for the town of Hunter in Greene County (the Property) and the Greene County Soil & Water Conservation District **(GCSWCD)**, with its principal office at 907 County Office Building, Cairo NY 12413, sets forth certain responsibilities of the parties hereto in connection with a creek embankment repair project for a portion of the Schoharie Creek referred to as the Schoharie Creek Embankment Repair At Schoharie Avenue.

.

Whereas, the Federal Emergency Management Agency (FEMA) declared Disaster #1589 after which the Property was identified as a site eligible for FEMA funding; and

Whereas, the GCSWCD, pursuant to said declaration by FEMA, retained Delaware Engineering, P.C. to develop an embankment repair design for the project; and

Whereas, the New York City Department of Environmental Protection has agreed to provide funding to complete the project; and

Whereas, such repair design will require access to an area of stream located on the Property; and

Whereas, in connection with repair work, GCSWCD needs to undertake construction activities on certain parcels of privately-owned real property of which the Property is one such parcel; now

Therefore, in consideration of the premises and the respective representations hereinafter contained, the parties hereto agree as follows:

1. Landowner hereby grants a temporary easement for a period of ten years from the date of this Agreement, to GCSWCD, its heirs and assigns, to provide access to the Project Area (described in greater detail in the drawing annexed hereto as Attachment A and by this reference made a part hereof), which area includes certain portions of the Property, by its employees, agents, subcontractors and contractors, certain employees of the New York City Department of Environmental Protection and other government entities that have an interest in the Project, for the purpose of constructing, observing, maintaining, repairing and monitoring the Project.

2. The area of the Property subject to the easement (Easement Area) is more specifically described in Attachment A.

3. GCSWCD shall meet with the Landowner and review the Project design (Attachment B) and proposed construction activities prior to the commencement of any Project-related work ("Project work") on the Property. No Project work shall be commenced without the prior review of Landowner.

4. GCSWCD shall administer and coordinate all phases of the Project including, among other things: selecting a contractor; obtaining all required regulatory permits, preparing project updates for Landowner, requiring subcontractors to have adequate insurance coverage, overseeing construction activities, monitoring the progress and quality of the work and certifying completion.

5. GCSWCD shall be responsible for maintaining and/or repairing the Project for a minimum of one year from the date of completion and shall monitor the Project for a minimum of five years provided funding continues to be available.

6. The Landowner shall identify the location of any subsurface treatment systems, utilities and/or such other subsurface facilities or conditions located on the Property which should be taken into consideration in the final design.

7. GCSWCD shall consult with the Landowner to determine access points, staging areas and other items required to perform Project work.

8. The Landowner shall maintain the Project in accordance with the Operation and Maintenance Plan (Schoharie Avenue Embankment Repair Landowner Guide) annexed hereto as Attachment C and by this reference made a part hereof. In connection with this maintenance obligation, Landowner shall not:

(a) cut, remove, mow or otherwise disturb the vegetation, including but not limited to trees and shrubs, planted or naturally growing in the Project Area;
(b) alter, undermine or remove rock structures constructed within the Project Area;
(c) otherwise excavate, grade or remove soil from the Project area;
(d) construct roads, bridges or permanent structures of any nature within the Project Area;
(e) commence any work within the Project Area without providing notice to GCSWCD

9. GCSWCD shall use best efforts to restore all disturbed areas of the Property to pre-project conditions.

10. GCSWCD shall not be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from the work performed in connection with the Project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the GCSWCD, its employees or agents.

11. GCSWCD shall indemnify and hold the Landowner harmless from any claims, judgments, and causes of action resulting from damage, including sickness or death, to third parties or damage to property resulting from the negligence or willful misconduct of its employees, agents, contractors and/or subcontractors in connection with the Project.

12. Neither the City of New York nor the NYCDEP shall be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from work performed in connection with this project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the acts of the City, NYCDEP, their employees or agents. Both the City and NYCDEP shall be entitled to rely upon the foregoing language and enforce this provision as if either were a signatory hereto.

13. This Agreement may be recorded in the office of the Greene County Clerk.

14. This Agreement may only be amended in writing and by mutual consent of the parties hereto.

15. Landowner shall, upon receipt of written notice from GCSWCD, immediately undertake to cure any breach of its obligations under this Declaration of Temporary Easement, Covenants and Restrictions, including any obligations set forth in the Operations and Maintenance Agreement.

16. If Landowner fails, within 90 days of receiving such notice of breach from GCSWCD, to cure such breach, GCSWCD may undertake and complete those activities that are reasonably calculated to cure the conditions constituting the breach and, upon receipt in writing from GCSWCD that such activities were undertaken and completed, Landowner shall be liable to GCSWCD for the full cost to cure such condition, including reasonable court costs and legal fees, if any.

John Laveglia: Landowner

6-4-08
Date

Jeff Flack, Acting Director GCSWCD

6/4/08
Date

Schoharie Creek Embankment Repair at Schoharie Avenue
LANDOWNER LICENSE AGREEMENT

I & O.A. Slutzky, ~~Jr.~~ C/O: CB

This agreement, made this 4th day of June, 2008, by and between **Charles B. Slutzky (Landowner)** residing at 2272 Route 296, Hunter, NY 12442, **owner(s) of that certain parcel of land** identified as **SBL 164.10-2-15** on the Real Property Tax Maps for the town of Hunter in Greene County (the Property) and the Greene County Soil & Water Conservation District **(GCSWCD)**, with its principal office at 907 County Office Building, Cairo NY 12413, sets forth certain responsibilities of the parties hereto in connection with a creek embankment repair project for a portion of the Schoharie Creek referred to as the Schoharie Creek Embankment Repair At Schoharie Avenue.

.

Whereas, the Federal Emergency Management Agency (FEMA) declared Disaster #1589 after which the Property was identified as a site eligible for FEMA funding; and

Whereas, the GCSWCD, pursuant to said declaration by FEMA, retained Delaware Engineering, P.C. to develop an embankment repair design for the project; and

Whereas, the New York City Department of Environmental Protection has agreed to provide funding to complete the project; and

Whereas, such repair design will require access to an area of stream located on the Property; and

Whereas, in connection with repair work, GCSWCD needs to undertake construction activities on certain parcels of privately-owned real property of which the Property is one such parcel; now

Therefore, in consideration of the premises and the respective representations hereinafter contained, the parties hereto agree as follows:

1. Landowner hereby grants a temporary easement for a period of ten years from the date of this Agreement, to GCSWCD, its heirs and assigns, to provide access to the Project Area (described in greater detail in the drawing annexed hereto as Attachment A and by this reference made a part hereof), which area includes certain portions of the Property, by its employees, agents, subcontractors and contractors, certain employees of the New York City Department of Environmental Protection and other government entities that have an interest in the Project, for the purpose of constructing, observing, maintaining, repairing and monitoring the Project.

2. The area of the Property subject to the easement (Easement Area) is more specifically described in Attachment A.

3. GCSWCD shall meet with the Landowner and review the Project design (Attachment B) and proposed construction activities prior to the commencement of any Project-related work ("Project work") on the Property. No Project work shall be commenced without the prior review of Landowner.

4. GCSWCD shall administer and coordinate all phases of the Project including, among other things: selecting a contractor; obtaining all required regulatory permits, preparing project updates for Landowner, requiring subcontractors to have adequate insurance coverage, overseeing construction activities, monitoring the progress and quality of the work and certifying completion.

5. GCSWCD shall be responsible for maintaining and/or repairing the Project for a minimum of one year from the date of completion and shall monitor the Project for a minimum of five years provided funding continues to be available.

6. The Landowner shall identify the location of any subsurface treatment systems, utilities and/or such other subsurface facilities or conditions located on the Property which should be taken into consideration in the final design.

7. GCSWCD shall consult with the Landowner to determine access points, staging areas and other items required to perform Project work.

8. The Landowner shall maintain the Project in accordance with the Operation and Maintenance Plan (Schoharie Avenue Embankment Repair Landowner Guide) annexed hereto as Attachment C and by this reference made a part hereof. In connection with this maintenance obligation, Landowner shall not:

(a) cut, remove, mow or otherwise disturb the vegetation, including but not limited to trees and shrubs, planted or naturally growing in the Project Area;
(b) alter, undermine or remove rock structures constructed within the Project Area;
(c) otherwise excavate, grade or remove soil from the Project area;
(d) construct roads, bridges or permanent structures of any nature within the Project Area;
(e) commence any work within the Project Area without providing notice to GCSWCD

9. GCSWCD shall use best efforts to restore all disturbed areas of the Property to pre-project conditions.

10. GCSWCD shall not be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from the work performed in connection with the Project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the GCSWCD, its employees or agents.

11. GCSWCD shall indemnify and hold the Landowner harmless from any claims, judgments, and causes of action resulting from damage, including sickness or death, to third parties or damage to property resulting from the negligence or willful misconduct of its employees, agents, contractors and/or subcontractors in connection with the Project.

12. Neither the City of New York nor the NYCDEP shall be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from work performed in connection with this project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the acts of the City, NYCDEP, their employees or agents. Both the City and NYCDEP shall be entitled to rely upon the foregoing language and enforce this provision as if either were a signatory hereto.

13. This Agreement may be recorded in the office of the Greene County Clerk.

14. This Agreement may only be amended in writing and by mutual consent of the parties hereto.

15. Landowner shall, upon receipt of written notice from GCSWCD, immediately undertake to cure any breach of its obligations under this Declaration of Temporary Easement, Covenants and Restrictions, including any obligations set forth in the Operations and Maintenance Agreement.

16. If Landowner fails, within 90 days of receiving such notice of breach from GCSWCD, to cure such breach, GCSWCD may undertake and complete those activities that are reasonably calculated to cure the conditions constituting the breach and, upon receipt in writing from GCSWCD that such activities were undertaken and completed, Landowner shall be liable to GCSWCD for the full cost to cure such condition, including reasonable court costs and legal fees, if any.

Charles B. Slutzky: Landowner

6/4/08
Date

Jeff Flack, Acting Director GCSWCD

4/4/08
Date

Schoharie Creek Embankment Repair at Schoharie Avenue
LANDOWNER LICENSE AGREEMENT

This agreement, made this 4 day of June, 2008, by and between **Walter E. Higgins (Landowner)** residing at 7925 Main St. Hunter, **owner(s) of that certain parcel of land** identified as **SBL 164.10-2-2.1** on the Real Property Tax Maps for the town of Hunter in Greene County (the Property) and the Greene County Soil & Water Conservation District **(GCSWCD)**, with its principal office at 907 County Office Building, Cairo NY 12413, sets forth certain responsibilities of the parties hereto in connection with a creek embankment repair project for a portion of the Schoharie Creek referred to as the Schoharie Creek Embankment Repair At Schoharie Avenue.

.

Whereas, the Federal Emergency Management Agency (FEMA) declared Disaster #1589 after which the Property was identified as a site eligible for FEMA funding; and

Whereas, the GCSWCD, pursuant to said declaration by FEMA, retained Delaware Engineering, P.C. to develop an embankment repair design for the project; and

Whereas, the New York City Department of Environmental Protection has agreed to provide funding to complete the project; and

Whereas, such repair design will require access to an area of stream located on the Property; and

Whereas, in connection with repair work, GCSWCD needs to undertake construction activities on certain parcels of privately-owned real property of which the Property is one such parcel; now

Therefore, in consideration of the premises and the respective representations hereinafter contained, the parties hereto agree as follows:

1. Landowner hereby grants a temporary license to enter the Property to GCSWCD, its heirs and assigns, to provide access to the Project Area, which area includes certain portions of the Property, by its employees, agents, subcontractors and contractors, certain employees of the New York City Department of Environmental Protection and other government entities that have an interest in the Project, for the purpose of constructing, observing, maintaining, repairing and monitoring the Project.

2. GCSWCD shall meet with the Landowner and review the Project design and proposed construction activities prior to the commencement of any Project-related work ("Project work") on the Property. No Project work shall be commenced without the prior review of Landowner.

4. GCSWCD shall administer and coordinate all phases of the Project including, among other things: selecting a contractor; obtaining all required regulatory permits, preparing project updates for Landowner, requiring subcontractors to have adequate insurance coverage, overseeing construction activities, monitoring the progress and quality of the work and certifying completion.

5. GCSWCD shall be responsible for maintaining and/or repairing the Project for a minimum of one year from the date of completion and shall monitor the Project for a minimum of five years provided funding continues to be available.

6. The Landowner shall identify the location of any subsurface treatment systems, utilities and/or such other subsurface facilities or conditions located on the Property which should be taken into consideration in the final design.

7. GCSWCD shall consult with the Landowner to determine access points, staging areas and other items required to perform Project work.

9. GCSWCD shall use best efforts to restore all disturbed areas of the Property to pre-project conditions.

10. GCSWCD shall not be liable to the Landowner for any personal injury or property damage that results from flooding on the

Property or from the work performed in connection with the Project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the GCSWCD, its employees or agents.

11. GCSWCD shall indemnify and hold the Landowner harmless from any claims, judgments, and causes of action resulting from damage, including sickness or death, to third parties or damage to property resulting from the negligence or willful misconduct of its employees, agents, contractors and/or subcontractors in connection with the Project.

12. Neither the City of New York nor the NYCDEP shall be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from work performed in connection with this project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the acts of the City, NYCDEP, their employees or agents. Both the City and NYCDEP shall be entitled to rely upon the foregoing language and enforce this provision as if either were a signatory hereto.

13. This Agreement may be recorded in the office of the Greene County Clerk.

14. This Agreement may only be amended in writing and by mutual consent of the parties hereto.

Landowner: Walter E. Higgins

6-4-08
Date

Jeff Flack, Acting Director GCSWCD

6/4/08
Date

Schoharie Creek Embankment Repair at Schoharie Avenue
LANDOWNER LICENSE AGREEMENT

This agreement, made this 2 day of JUNE, by and between **Neal Harris (Landowner)** residing at 7917 ET 23rd, **owner(s) of that certain parcel of land** identified as **SBL 164.10-2-4** on the Real Property Tax Maps for the town of Hunter in Greene County (the Property) and the Greene County Soil & Water Conservation District **(GCSWCD)**, with its principal office at 907 County Office Building, Cairo NY 12413, sets forth certain responsibilities of the parties hereto in connection with a creek embankment repair project for a portion of the Schoharie Creek referred to as the Schoharie Creek Embankment Repair At Schoharie Avenue.

Whereas, the Federal Emergency Management Agency (FEMA) declared Disaster #1589 after which the Property was identified as a site eligible for FEMA funding; and

Whereas, the GCSWCD, pursuant to said declaration by FEMA, retained Delaware Engineering, P.C. to develop an embankment repair design for the project; and

Whereas, the New York City Department of Environmental Protection has agreed to provide funding to complete the project; and

Whereas, such repair design will require access to an area of stream located on the Property; and

Whereas, in connection with repair work, GCSWCD needs to undertake construction activities on certain parcels of privately-owned real property of which the Property is one such parcel; now

Therefore, in consideration of the premises and the respective representations hereinafter contained, the parties hereto agree as follows:

1. Landowner hereby grants a temporary license to enter the Property to GCSWCD, its heirs and assigns, to provide access to the Project Area, which area includes certain portions of the Property, by its employees, agents, subcontractors and contractors, certain employees of the New York City Department of Environmental Protection and other government entities that have an interest in the Project, for the purpose of constructing, observing, maintaining, repairing and monitoring the Project.

2. GCSWCD shall meet with the Landowner and review the Project design and proposed construction activities prior to the commencement of any Project-related work ("Project work") on the Property. No Project work shall be commenced without the prior review of Landowner.

4. GCSWCD shall administer and coordinate all phases of the Project including, among other things: selecting a contractor; obtaining all required regulatory permits, preparing project updates for Landowner, requiring subcontractors to have adequate insurance coverage, overseeing construction activities, monitoring the progress and quality of the work and certifying completion.

5. GCSWCD shall be responsible for maintaining and/or repairing the Project for a minimum of one year from the date of completion and shall monitor the Project for a minimum of five years provided funding continues to be available.

6. The Landowner shall identify the location of any subsurface treatment systems, utilities and/or such other subsurface facilities or conditions located on the Property which should be taken into consideration in the final design.

7. GCSWCD shall consult with the Landowner to determine access points, staging areas and other items required to perform Project work.

9. GCSWCD shall use best efforts to restore all disturbed areas of the Property to pre-project conditions.

10. GCSWCD shall not be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from the work performed in connection with the Project unless such injury or damage was caused by negligence or

willful misconduct directly attributable to the GCSWCD, its employees or agents.

11. GCSWCD shall indemnify and hold the Landowner harmless from any claims, judgments, and causes of action resulting from damage, including sickness or death, to third parties or damage to property resulting from the negligence or willful misconduct of its employees, agents, contractors and/or subcontractors in connection with the Project.

12. Neither the City of New York nor the NYCDEP shall be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from work performed in connection with this project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the acts of the City, NYCDEP, their employees or agents. Both the City and NYCDEP shall be entitled to rely upon the foregoing language and enforce this provision as if either were a signatory hereto.

13. This Agreement may be recorded in the office of the Greene County Clerk.

14. This Agreement may only be amended in writing and by mutual consent of the parties hereto.

Landowner: Neal Harris

4/2/08
Date

Jeff Flack, Acting Director GCSWCD

4/9/08
Date

Appendix B – Safe Work Plan

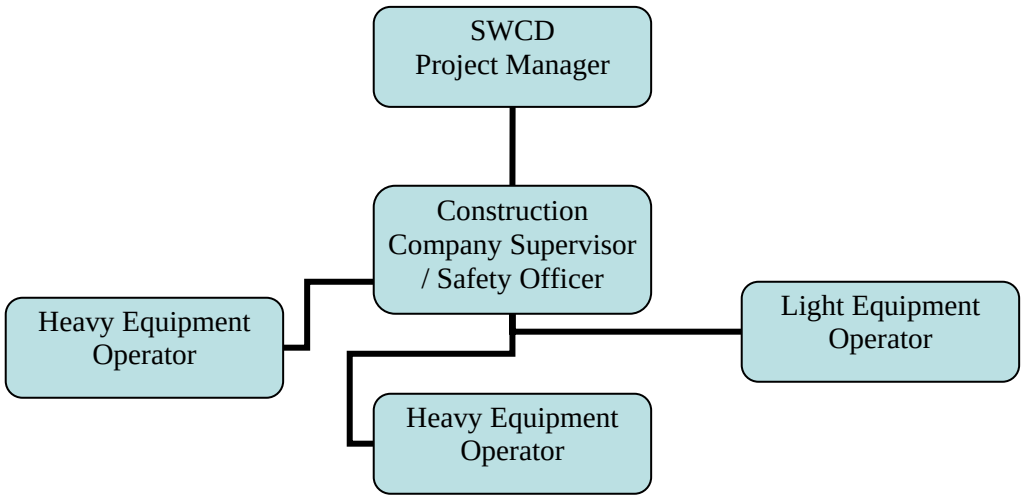
Safe Work Plan

Project name: Schoharie Creek Embankment Repair at Schoharie Street		
Project location: Village of Hunter, NY		
Expected date of construction activity: 2008	Begin: July 14	End: November 30
Entity constructing project:	Evergreen Mtn. Cont., Inc.	Contact: Michael Petosa
Designated safety officer:	Michael Petosa (Cell Phone: (518) 365-6132)	
Entity supervising construction:	Greene County SWCD	Contact: Joel DuBois (Cell Phone: (518) 225-0521)
Entity paying for construction:	FEMA, NYC DEP, V. Hunter	Contact: David Burns, DEP

Disclaimer: This document may not cover every condition or situation that a restoration project could present. The Safe Work Plan is the responsibility of the project contractor. The Plan is provided as a guide and should be tailored for site specific conditions.

Safety Officer responsibility: The Safety Officer will review the Safe Work Plan and modify it for site specific conditions. The Safety Officer will ensure that the project construction company adheres to this Safe Work Plan and will serve as a liaison to NYC DEP's Health and Safety Coordinator, Steve Coppey. Mr. Coppey can be reached at: 845-340-7815, scoppey@dep.nyc.gov. The Safety Officer will supply worker training record upon request and submit injury report forms, if applicable.

Please provide a command structure that details distinct roles of individuals on project site. See below for example.



Safe Work Plan

Environmental Protection

Spill Notification

In the event of a spill of any amount, Evergreen Mountain Contracting, Inc. will notify the Safety Officer immediately. The Safety Officer shall notify NYCDEP of any spills that occur by calling the DEP Project Manager at 845-340- 7850, DEP EH&S Coordinator, Steve Coppey at 845-340-7815, and Croton Command Center at 888-426-7453. Immediately is considered to be no later than 2 hours after a spill is discovered. This is true for any amount of material spilled. Evergreen Mountain Contracting, Inc. is equipped with a spill kit designed to contain and minimize a spill.

Oil Spill Cleanup Kit contents will include but not limited to:

- DOT-approved 20-Gallon OverPack
- 15" X 19" white Oil Spill SonicBonded pads
- 3" x 48" white Oil Spill sorbent socks
- 18" x 18" white Oil Spill pillows
- Pair nitrile gloves
- Pair goggles
- Clear disposal bags
- Bag ties
- Package cleans up approximately 15.7 gallons

All spills will be cleaned up immediately. All waste will be properly disposed at an Approved Waste Disposal site, and spill kit contents will be replaced as used by next work day. All cleanup materials will be placed into proper containers. All job related tools, equipment, and supplies will be kept in an approved on-site area or container. Container will be kept locked. A perimeter fence (when needed) will be erected to ensure safety for the public. When the job is complete, all tools, equipment, and supplies will be removed from the job site.

Refueling

Evergreen Mountain Contracting, Inc. will provide for safe fueling of all equipment within the work area. Evergreen Mountain Contracting, Inc. is aware that the work is being performed in the New York City Watershed area. Evergreen Mountain Contracting, Inc. understands that under no circumstances shall equipment be fueled within 15 feet of the water's edge. Further is preferable. Evergreen Mountain Contracting, Inc. will carefully fuel all equipment with special attention not to overflow the tank and create spillage. All fuel tanks shall have tight, leak proof caps. All equipment re-fueling must be completed under the observation of the person conducting the fueling operations. At no time will fueling be conducted without an observer present. Refueling equipment shall be outfitted with an automatic shut-off on the pump and spill pads beneath equipment.

Fuel Storage

All petroleum and other chemical containers stored on site shall be secured to

prevent unauthorized or accidental spillage. There will be no overnight storage of petroleum or chemical products. Evergreen Mountain Contracting, Inc. employees have been properly trained in all aspects of safety and health for the job that will be done. Evergreen Mountain Contracting, Inc. employees have been properly trained in protecting the environment in the project area.

Material Safety Data Sheets
Material Safety Data Sheets (MSDS) will be maintained on site for any hazardous materials on the work site. This includes but is not limited to gasoline, hydraulic oil, cleaning materials, and pesticides.

Signage
Evergreen Mountain Contracting, Inc. will be responsible for posting signage along the perimeter of the project area, as well as at the main entrance to the project, warning visitors of the potential for serious injury and requiring proper PPE (e.g. hardhat & high visibility attire) for entry into work area.

Orientation
Prior to commencing any work, Evergreen Mountain Contracting, Inc. will attend an orientation reviewing the DEP polices that will pertain to the specific services they have been hired to provide.
This orientation will inform Evergreen Mountain Contracting, Inc. of the NYCDEP policies that pertain to this project. Evergreen Mountain Contracting, Inc. will then train any employees who will be working on any DEP activities during the length of this contract. If Evergreen Mountain Contracting, Inc. needs to add additional or replacement workers to its crews, the new workers must be trained on this information as well.

Reporting Injuries or Illnesses associated with the project
Evergreen Mountain Contracting, Inc. or a representative will report all injuries and illnesses associated with this project to the Safety Officer immediately. The Safety Officer shall forward any reports to NYCDEP within 24 hours of the incident.

Workers will read all safety rules and sign off

Safety Rules

Personal Protection Equipment
Use the correct PPE within project limits. If you do not know what to wear, ask the Safety Officer. PPE must be maintained in good condition and cleaned regularly. PPE must be stored properly when not in use to protect it from damage. Damaged or broken PPE must be returned to your foreman for replacement. Hard hats must be worn when told to by Michael Petosa. Safety glasses or goggles must be worn when work creates an eye injury hazard. High visibility overgarments (e.g. vest or

Safe Work Plan

shirt) will be worn. Hearing protection (ear plugs or muffs) will be worn while equipment is in operation or when noise levels reach 85 decibels. Employees must wear steel toed work boots on the job site. The boots should have complete leather uppers and skid resistant soles and be in good condition. Athletic style shoes, tennis shoes, open toe shoes, plastic or vinyl shoes or shoes with decorative accessories are not allowed. Wear hand protection (gloves) when needed. Long pants will be worn. Do not wear loose, torn or frayed clothing, finger rings, and jewelry items that could cause injury.

First Aid/Emergency Procedures

Keep a fully stocked and up-to-date first aid kit on site. Used items shall be replaced by the next work day. Proper equipment for the prompt transportation of the injured or ill person to a physician or hospital where emergency care is provided, or an effective communication system for contacting hospitals or other emergency medical facilities, physicians, ambulance and fire services, must be provided.

Prior to the commencement of work at any site, the Safety Officer must locate the nearest preferred medical facility and establish that transportation or communication methods are available in the event of an employee injury.
Each employee must be informed of the procedures to follow in case of injury or illness through our new employee orientation program, safety rules, and safety meetings. Where the eyes or body of any person may be exposed to injurious or corrosive materials, suitable facilities for drenching the body or flushing the eyes with clean water must be conspicuously and readily accessible.

Accident Procedures

These procedures are to be followed in the event of an employee injury in the course of employment. For severe accidents call 911 and request the Paramedics. Employees must report all work related injuries to their Safety Officer immediately. Even if they do not feel that it requires medical attention. Failure to do so may result in a delay of Workers' Compensation benefits and disciplinary action.
The Safety Officer and employee should determine whether or not outside medical attention is needed. When uncertainty exists on the part of any individual, the employee should be sent for professional medical care. If medical attention is not desired or the employee refuses treatment, you must still fill out an Accident Report in case complications arise later. In all cases, if the employee cannot transport himself or herself for any reason, transportation should be provided.

Phone #/Nearest Location	Phone#/ Nearest Location
Hospital: (518) 828-7601	Ambulance: 911 Hunter, NY
Columbia Memorial Hospital, Hudson, NY	
Fire Department: 911, Hunter, NY	Doctor: (518) 589-6843

Safe Work Plan

	Dr. Schneider

Heavy Moving Equipment

Operators are trained in the proper operations and maintenance of the excavation equipment to be used on site. A walk around inspection of all moving parts will be performed each day before operations begin. Operators will look for cracks, defects, and damage. Parts will be repaired or replaced immediately. Inspections will be done on the hydraulic lines. Checks will be made for leaks. Operator will use paper or cardboard to check. Repairs or replacements of leaking or damaged fittings and hoses will be done before operating the machine. Hydraulic hoses enclosed in nylon sheaths are for burst protection and abrasion resistance. Operator will inspect the bucket, hammer, swivel, shear, crusher, or thumb depending on which attachment is being used. Fasteners, bolts, pins, etc. will be checked for wear and damage. Any part needing repair or replacement will be performed immediately. Inspections will be made of the tracks for wear and damage. Repairs or replacements will be done before beginning operations. Transmission oil temperature will be monitored regularly to ensure there is no overheating.

Operator will make sure the lockout system (that shuts the engine off when a worker is entering or exiting the machine) is working. Operator will wear a seat belt. All safety guards will be in place. Operator will make sure the back-up and/or travel alarm is working. If the alarm is not working there will be a signal person assigned. Barricades or tape will be placed around heavily trafficked areas. A fire extinguisher is on site. Operator will lower the digging arm (boom) before exiting and never leave the machine running when unattended. Operator will always wear a hard hat, ear plugs or ear muffs when necessary, safety glasses or goggles, high visibility vest, and steel-toed boots.

Material Handling/Lifting

Use the legs for lifting; not the back. Set objects to prevent inadvertent shifting of the load. Check the load or object for sharp edges, splinters, etc. Use gloves when appropriate. Watch footing when walking on uneven ground or when walking in crowded areas. Un-stack objects to ensure good visibility. Do not carry more than you can safely handle or see over. Slide loads into place rather than lift the load in an awkward position. Carry loads close to the body. Never pull loads towards you, push them away from you. Use proper lifting techniques for handling trees and shrubs. Ask for assistance when the load is heavier than you can handle alone.

Hand Tools

The proper use, care and storage of hand tools will increase the life of the tool and reduce potential for injury. Inspect before use; do not use tools that are in poor or unsafe condition. Do not place tools where they may fall on other employees. Select the proper tool for the job. When handing a tool to another person, direct sharp points and cutting edges down and away from you and the other person. Avoid

carrying tools in your hand when you are climbing. Carry tools in tool belts or hoist the tools to the work area using a hand line. Tools must be properly stored and not left in the work area. All shovels, rakes, picks, and steel bars are in good condition.

Ground Worker Safety

Make sure potable water is on site. Drink plenty of water during hot weather. Stay alert to all heavy equipment operations. Use safe lifting techniques. Watch your footing. Make sure you are trained in proper usage of all hand tools.

Lock-out / Tag-out

Machinery or equipment capable of movement must be stopped and the power source de-energized or disengaged, and locked out. If necessary, the moveable parts must be mechanically blocked or secured to prevent inadvertent movement during cleaning, servicing, or adjusting operations unless the machinery or equipment must be capable of movement during this period in order to perform the specific task. If so, the hazard of movement must be minimized. Equipment or power driven machines equipped with lockable controls, or readily adaptable to lockable controls, must be locked out or positively sealed in the "off" position during repair work and setting-up operations. In all cases, accident prevention signs and/or tags must be placed on the controls of the equipment or machines during repair work. Evergreen Mountain Contracting, Inc. will provide a sufficient number of accident prevention signs or tags and padlocks, seals or other similarly effective means that may be required by any reasonably foreseeable repair.

Sequence of Lockout Procedure

Notify all affected employees that a lockout is required and the reason therefore. If the equipment is operating, shut it down by the normal stopping procedure (such as: depress stop button, open toggle switch).

Operate the switch, valve, or other energy isolating devices so that the energy source(s) (electrical, mechanical, hydraulic, other) is disconnected or isolated from the equipment.

Stored energy, such as that in capacitors, springs, elevated machine members, rotating fly wheels, hydraulic systems, and air, gas, steam or water pressure, must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down.

Lockout energy isolating devices with an assigned individual lock. After ensuring that no personnel are exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate.

CAUTION: Return operating controls to neutral position after the test.

Fire Extinguishers

Fire extinguisher is on site.

Employees receive annual training on the use of fire extinguishers.

Safe Work Plan

Department: Indicate the name or designation where the extinguishers are located.
Person Conducting Review: Indicate the name of the person conducting the periodic review.
Date: Indicate the date the review was conducted. July 14, 2008
Related Operating Procedures Reviewed: Ensure that the location, type, size, and serviceability of the extinguisher is considered in relation to the actual needs of the department or specific job.
Extinguisher Map Developed/Current: Ensure that a facility map is developed to show the exact location, type, and size of extinguishers being used.
Circle Type Extinguisher: Indicate the type of extinguisher.
Extinguisher Designation: Indicate the numerical or other designation of the extinguisher.
Date of Last Annual Check: Indicate the date of the last annual serviceability check. July 14, 2008
Check to ensure that the serviceability tag has been annotated with the monthly inspection and annual service. Unserviceable extinguishers will be reported to the Safety Coordinator.

Class A, Fire Extinguishers:	Use on ordinary combustibles or fibrous material, such as wood, paper, cloth, rubber and some plastics. Travel distance for employees to any extinguisher is 75 feet (22.9 m) or less.
Class B, Fire Extinguishers:	Use on flammable or combustible liquids such as gasoline, kerosene, paint, paint thinners and propane. Travel distance from the Class B hazard area to any extinguisher is 50 feet (15.2 m) or less.
Class C, Fire Extinguishers:	Use on energized electrical equipment, such as appliances, switches, panel boxes and power tools. Travel distance from the Class C hazard area to any extinguishing agent is 50 feet (15.2 m) or less.
Class D, Fire Extinguishers:	Use on combustible metals, such as magnesium, titanium, potassium and sodium. Travel distance from the combustible metal working area to any extinguishing agent is 75 feet (22.9 m) or less.
H Type Fire Extinguishers:	Indicates hose system.

Safe Work Plan

Safety Rules Sign Off

This is to certify that I have read a copy of Evergreen Mountain Contracting, Inc. Safety Rules. I have read these instructions, understand them, and will comply with them while working for Evergreen Mountain Contracting, Inc. I understand that failure to abide by these rules may result in disciplinary action and possible termination of my employment with Evergreen Mountain Contracting, Inc. I also understand that I am to report any injury to my Safety Officer immediately and report all safety hazards.

I further understand that I have the following "Safety" rights:

I am not required to work in any area I feel is not safe. I am entitled to information on any hazardous material or chemical I am exposed to while working. I am entitled to see a copy of the Company Safety and Health Manual. I will not be discriminated or retaliated against for reporting safety concerns.

Employee Name	**Signature**	**Date**
Supervisor Name	**Signature**	**Date**

Safe Work Plan

Job Safety Analysis

Project:	Activity:
Contract:	
Location:	

#	Job Steps	Potential Hazards	Safe Procedures/Controls
1	Vehicle Inspection	Fluid leaks: oil, transmission, fuel, engine coolant	Check under the vehicle; open the hood, repair or replace parts immediately
		Brake lights, lights, turn signals not working	Turn on lights and signals, walk around the vehicle; repair immediately
		Unsecured tools/equipment	Secure before driving away
		Rear view mirror missing/ mirror cracked	Make sure all mirrors are in place and allow backing visibility
2	Fire extinguisher	Not in truck	Make sure fire extinguisher is in vehicle before driving away
		Not charged and ready for use	Inspect all fire extinguishers monthly; make sure they are charged and ready for use
		Not in proper place during work	Take out of truck and place on ground where it is safe and readily available
3	Heavy Moving Equipment	Hydraulic/fuel leaks	Inspect all equipment before operations begin
		Pinch points	Keep hands away from all pinch points
		Crushing injuries	Make sure boom/loader is touching the ground before leaving equipment
		Operator error	Operator must be trained for the equipment they will be operating
		Backup alarm not working	An assistant must be assigned to direct traffic when a backup alarm is not working
4	Hand tools Shovels, rakes, picks	Improper usage	Use tools for what they are intended to be used for
		Injuries from defective or broken tools	Remove any defective tools
			Handles free of cracks and splinters
5	Environmental Protection	Fuel leaks	Fuel tanks have tight, leak proof caps.
		Hydraulic leaks	Inspection of all hoses before operations begin
		Refueling overflow	Re-fueling must be completed under the observation of the person conducting the fueling operations.
		Unsecured containers	All petroleum and other chemical containers stored on site shall be secured to prevent unauthorized or accidental spillage.
		Oil spill cleanup kit not on	Operations will not begin until oil spill cleanup kit is

Safe Work Plan

		site	on site

Job Safety Analysis

#	Job Steps	Potential Hazards	Safe Procedures/Controls
6	Crushed stone	Ground worker injuries	Make sure all alarms and communications are working between equipment operators and ground crew
		Slips, trips, falls	Make sure PPE is in good condition
			Employees must be aware of all operations taking place
7	Geotextile	Slips, trips, falls	Make sure PPE is in good condition
			Employees must be aware of all operations taking place
8	Material handling/lifting	Back injuries	Ask for assistance when load is heavy
		Pinch points	Know where to place your hands at all times
		Crushing injuries	Keep feet and hands in safe place while lifting and placing down
9	Housekeeping	Slips, trips, falls	Keep work area clean; clean up as necessary
			Move materials around to avoid walking over
			Do not rush
			Report damaged tools immediately
10	Responding to an emergency/First Aid Kits	Delayed emergency response	Respond quickly in case of an accident
			Know where emergency numbers are Call 911 immediately
		First Aid Kit missing	Know where the first aid kit is
		Expired/missing contents	Inspect kit monthly & replace contents as used
11	Gather equipment and clean-up	Slips, trips, and falls	Make sure all equipment, tools, and supplies are accounted for and placed in proper containment area
			Dispose of at approved waste disposal site
	Equipment to be used	**Inspection requirements**	**Training requirements**
	PPE	All PPE in good condition	Employees know how to properly wear all PPE
	Mini excavator	Complete walk around inspection	Operator trained for equipment being used
	Skid steer loader	Complete walk around inspection	Operator trained for equipment being used
	Hand tools	Inspected for defects	Employees trained in proper usage
	Truck	Complete walk around inspection	Employees have a valid driver’s license

Safe Work Plan

Safe Work Plan

Worker Training Record

EMPLOYEE NAME	TRAINING DATES	TYPE OF TRAINING	TRAINER

Safe Work Plan

Employee's Report of Injury Form

Employees must use this form to report all work related injuries, illnesses, or "near miss" events (which could have caused an injury or illness) – no matter how minor. This helps us to identify and correct hazards before they cause serious injuries. This form must be completed by employees as soon as possible and given to the Safety Office for further action.

I am reporting a work related: ☐ Injury ☐ Illness ☐ Near miss	
Your Name:	
Job title:	
Supervisor:	
Have you told your supervisor about this injury/near miss? ☐ Yes ☐ No	
Date of injury/near miss:	Time of injury/near miss:
Names of witnesses (if any):	
Where, exactly, did it happen?	
What were you doing at the time?	
Describe step by step what led up to the injury/near miss. (continue on the back if necessary):	
What could have been done to prevent this injury/near miss?	
What parts of your body were injured? If a near miss, how could you have been hurt?	
Did you see a doctor about this injury/illness? ☐ Yes ☐ No	
If yes, whom did you see?	Doctor's phone number:
Date:	Time:
Has this part of your body been injured before? ☐ Yes ☐ No	
If yes, when?	Supervisor:
Your signature:	Date:

Safe Work Plan

Safety Officer's Accident Investigation Form

Name of Injured Person _____
Date of Birth _____ Telephone Number _____
Address _____

City _____ State _____ Zip Code _____

(Circle one) Male Female

What part of the body was injured? Describe in detail. _____

What was the nature of the injury? Describe in detail. _____

Describe fully how the accident happened? What was employee doing prior to the event? What equipment, tools being using? _____

Names of all witnesses: _____

Date of Event _____ Time of Event _____

Exact location of event: _____
What caused the event? _____

Were safety regulations in place and used? If not, what was wrong? _____

Employee went to doctor/hospital? Doctor's Name
_____ Hospital Name
_____
Recommended preventive action to take in the future to prevent reoccurrence:

Safety Officer Signature/Date

Send Employee Report of Injury & Safety Officer Accident Investigation Form to Steve Coppey at 71 Smith Ave, Kingston, NY, 12401.

Appendix C – Landowner Guide

Schoharie Creek Management Project

Schoharie Avenue Embankment Repair

Landowner Guide

Project Goals and Objectives

The Schoharie Creek Embankment Repair at Schoharie Avenue is intended to stabilize a section of the Schoharie Creek which has been severely disturbed by erosion. The site was identified as Project #771 under Federal Emergency Management Agency (FEMA) Disaster Declaration #1589 in 2005. Having overcome critical design and funding issues, the project is scheduled for completion in the summer of 2008.

In order to close a funding gap, left by FEMA, the project has been adopted by the New York City Department of Environmental Protection (NYCDEP) as part of the NYC Filtration Avoidance Determination (FAD) mandated by the Environmental Protection Agency (EPA). The NYCDEP is working in conjunction with Greene County Soil & Water Conservation District (GCSWCD) to improve water quality throughout NYC's watershed. By creating healthy stream reaches at critical locations we are creating clean drinking water through natural biological means.

The project is 180 feet long, and will address a 35 foot high bank failure that threatens private homes and public infrastructure in addition to water quality. The restoration strategy for the project will focus on the establishment of stable bank geometry for the site conditions. Working with Delaware Engineering, P.C., GCSWCD will implement a final design that will result in a stable embankment for the stream channel and Schoharie Avenue.

Existing Site Conditions

Construction is expected to begin in June of 2008 and persist for approximately 4 weeks. Construction of the newly shaped stream embankment will include installation of terraced rock walls to achieve stable bank geometry, and vegetative applications to improve the ecological value of the treatment.

Rockery Walls

Rockery walls were design in order to achieve the bank geometry necessary to assure stability of the embankment. The walls will be anchored into bedrock at the toe of the embankment. Three terraces will be constructed with each of the three walls having an appearance similar to that of the rock wall pictured to the right. An important difference from the wall pictured at the right is that each terrace will be fitted with soil beds which will be planted with native shrub species appropriate for the setting. The plantings will improve the ecological value of the project while significantly enhancing the aesthetic of the finished project.

Upon completion of the embankment stabilization, the damaged portion of Schoharie Avenue will be resurfaced and made available for use.

Rockery Wall on Gooseberry Creek.

Bioengineering

Willows being harvested at the PMC; to be used for willow fascines.

Vegetation plays a crucial role in restoration projects. The roots of grasses, trees, and shrubs protrude into the ground creating the intricate framework that binds soil throughout the project site and provides resistance against runoff and flowing water.

Use of vegetative materials to achieve structural stability goals is commonly referred to as bioengineering. Bioengineering uses dormant materials such as willows to quickly establish vegetation. Willow stakes are cut from living willow shrubs when they are dormant. The stakes, ranging from one to several feet long, are pushed or hammered into the soil. In the spring the cuttings will sprout from the exposed ends.

Grass Seed and Mulch

Grass is essential to a restoration project. Its roots form the quickest and provide necessary immediate erosion control. The hydro-seeding method will be used to spread grass seed immediately following construction. This method uses a large tank which mixes water, seed, and mulch and sprays it through a hose. This provides for fast and even spreading, while the mulch protects and binds the grass seed to the soil until it can germinate.

Contact:

Greene County Soil & Water Conservation District
907 County Office Building
Cairo, NY 12413
Phone (518) 622-3620
Fax (518) 622-0344
www.gcswcd.com/stream/schoharie-eastkill/

Project Contacts

Jeff Flack, Interim Executive Director
Jeff@gcswcd.com

Joel DuBois, Stream Program Leader
Joel@gcswcd.com

Abbe Martin, Project Coordinator
Abbe@gcswcd.com

Vegetation Maintenance

The landowner plays an extremely important role in the success of this project. As it has been noted, vegetation is critical to the long term stability of the restoration site. It is crucial that certain measures are taken by you, the landowner, in order to assure this stability. Below is a list of important guidelines to follow with regards to the project area. See the attached project map to view your property in relation to the project boundaries. To ensure the project's success, it is important that you observe the following guidelines unless otherwise instructed by Greene County Soil and Water. If you have any questions, or see any problems you wish to report, please contact GCSWCD at the number listed on the bottom of pg 2.

IMPORTANT RULES TO FOLLOW:

- **Never cut, remove, mow, or otherwise disturb the vegetation. This includes all trees, shrubs and any other vegetation, whether it has been planted or occurs naturally.**
- **Never alter the rock structures in any way.**
- **Never remove, excavate, or grade the soil.**
- **Never construct roads, bridges, or permanent structures of any kind without appropriate permits.**
- **Always check with GCSWCD before conducting any work within the project area.**

Surveyors and Field Crews

Throughout the next 3-15 years, you may notice GCSWCD and DEP survey crews entering the project site. This is part of an ongoing process to study and document the progress of the project. Survey crews will be surveying designated cross sections along the stream. Measurements such as the shape, depth, and width of the stream channel will be taken in order to track the natural changes which occur from year to year. Annual and high flows will be measured to ensure the stream is performing as desired.

Survey crew.

Vegetation monitoring crews will also be collecting data in order to follow the progress of the planted vegetation. Such factors as height, plant vigor, and survival will continually be documented in order to maintain the site and improve future plantings. Monitoring of the invasive species Japanese Knotweed will also take place. This will include observations as well as removal at various locations. Crews may also enter the project site to replant in the future if it is deemed necessary. In the spring, small plugs may also be planted throughout the project site.

You may see crews with GPS (Global Positioning System) units as well. A GPS is a device which uses satellites in space to determine and record the user's position on the ground. They are often used to collect the location of various features along with information on the condition of the particular feature. These groups will collect a wide array of information about various attributes to the stream. The location and condition of such structures as culverts, bridges and utility lines are collected as GPS points. These points can then be placed on maps using GIS (Geographic Information System) software and displayed along with features like roads, soils, and vegetation. The maps and the information collected are used to assess existing or potential problems. The use of GPS data along with GIS software provides an intuitive, convenient way of comparing various data with respects to many different management concerns, such as minimizing threats to private and public property and protection of water quality and fish habitat.

Invasive Species: Japanese Knotweed

Invasive species can threaten the ecology of a native plant community. This impact may extend to an alteration of landscape or bank stabilization. Japanese Knotweed is an exotic, invasive species and in recent years has been a serious issue along the reach of the project site as well as neighboring areas. As the name implies it comes from Asia and was originally brought here as an ornamental plant. In an attempt to beautify their homes, residents unknowingly introduced a threatening element to the environment. Knotweed is very good at out-competing native plants. Eventually, it can take over entire stretches of stream banks. It grows much faster than most native species, thereby towering over them and cutting off their light supply. This is especially dangerous, because knotweed does not hold stream banks together as well as native species. Furthermore, it is a very resilient plant. Simply cutting it down without the proper knowledge can potentially make the problem worse.

IDENTIFICATION

As a landowner you can help stop the spread of this invasive. The first step is identification. Japanese Knotweed is fairly easy to identify; it has bamboo stalks and large heart-shaped leaves. In late summer, the tree sprouts long lacy white flowers. It generally grows anywhere from a tiny sprout up to around 10ft tall. It is often seen in large patches where the tall stalks droop outward around the edges. Identification can be difficult in early spring. Often, what gives it away at this time of year are the young sprouts amongst last years dead stalks, which appear as clusters of brown, jointed, hollow wooden poles. See pg 6-7 for more information on the control of Japanese Knotweed.

Japanese Knotweed.

Japanese Knotweed Management

When dealing with knotweed the most important thing to understand is its ability to spread by vegetative means. This means that it spreads through its root system, as opposed to by seed (which it also does, but not as prominently). One of the best things a landowner can do is monitor the spread of knotweed on his or her section of the project. Never alter the environment in any way that would destabilize the stream banks or disrupt the natural riparian vegetation and allow the spread of knotweed. Any fill material introduced to the area should be tested for the presence of knotweed as it is notorious for spreading through contaminated fill.

MOWING

Depending on the characteristics of your landscape, it may be beneficial to employ a regular lawn mowing schedule at a minimum frequency of every other week. This would help to suppress knotweed colonies by continually oppressing them before they have the ability to grow. This is much more time efficient than manual removal. Keep in mind that mowing too close to the stream and removing native grasses can decrease bank stability and cause erosion problems. Also **be careful to avoid mowing over planted trees as well as native trees that occur naturally.**

It is important when removing knotweed from areas that will be naturally revegetated to make sure you collect all the root and stalk pieces. The knotweed must then be disposed of in a manner where it will not have the potential to spread and root anywhere else. Even a small piece, if left behind or dumped somewhere, has the potential to root and start a new colony. Be especially careful not to allow debris to fall in the stream, as this will only spread the problem further downstream.

Japanese Knotweed sprouting

REMOVAL

The application of herbicide is governed by NYS Department of Environmental Conservation (DEC) and must be administered by a licensed professional. Therefore, cutting and removal may be the only means by which to eradicate Japanese Knotweed. In small patches it may even be beneficial to pull each plant up by the roots. It is important to note that no matter how you remove it, Japanese Knotweed will most likely return due to the fact that any part of the root left underground can re-sprout. Therefore, an effective removal strategy will most likely involve several cuttings per season, perhaps over the course of several years. One method that is suggested for small patches is to employ a combination of cutting and covering. This method involves cutting the knotweed as close to the ground as possible, then covering the area with a tarp or old rug in the winter. This way, when spring comes and the knotweed tries to sprout, it is covered and has no light supply.

The following website, although discussing knotweed in the northwest, contains information useful to the landowner pertaining to the removal of knotweed throughout the U.S.: http://www.skamaniacounty.org/Noxious_Weeds/TNCreport.htm. It has a wealth of information and links for those who wish to learn more about this troubling invasive species. NYC DEP and GCSWCD are working with Hudsonia, Inc. to review the state of the knowledge on Japanese Knotweed and conduct basic research into its growth habits as part of an effort to develop management recommendations for its future control. As mentioned, you may see knotweed monitoring crews entering the project site in the future to monitor this problem.

GCSWCD will be the main caretakers of this project for the years to come. As a landowner, you may have the unique ability to observe your particular stretch of the project on a regular basis. **We appreciate and welcome calls to report potential problems seen on the project site.** Problems could include things like flood issues, structure damage, or anything that seems threatening to the success of the project. If you have any questions regarding your own use of the land, what trees you should plant, to what extent you may mow lawn which borders the project , or anything else call GCSWCD at the number listed below.

Want to do More?

If you would like to do more to help the success of this project, there are several things you can do.
Mulch can be placed around the trees that have been planted to help them grow. This helps keep weeds from suffocating the tree and helps hold moisture in the soil. Mulch should be spread around the tree, making sure to leave a space of an inch or two around the base of the trunk. If the mulch is piled against the trunk it could damage the tree. **If the plants seem to be in drought conditions, you may also choose to water them.**

The addition of supplemental native vegetation could help to keep invasive species away from areas where they might otherwise take over. **If you see an area that lacks vegetation, you may wish to plant something.** In the case that you should plant anything on or near the job site, it is important that you don't introduce any invasive species. What you plant should be healthy for and native to the habitat and free of any unknown materials. Pg 8-9 shows a list of the sapling tree species that have been planted on the job site and can therefore be used as a general guide of what trees are best to plant. In the case of grasses, a conservation or native reclamation mix would work well. Check with your local seed supplier and make sure what you are buying is native to and suited for local wetland or watershed habitats.

GCSWCD holds an annual plant sale in the spring. Items for sale include bare-root trees and shrubs, wildflower seed mixes, ground cover seed mixes, fertilizer tablets, and bird boxes/feeders. More information as well as order forms can be found on their website, http://www.gcswcd.com/conservation/,
or you can call the Cairo office at 518-622-3620 to have an order form mailed to you.

Seedlings can also be purchased through the NYS Department of Environmental Conservation (DEC). DEC operates the State Tree Nursery in Saratoga Springs which produces tree and shrub seedlings for conservation on private and public lands. Orders for seedlings can be placed from January 2 through mid-May by calling 518-587-1120. For all other inquiries the nursery office can be reached Monday through Friday, 8 a.m to 4 p.m. at 518-581-1439. More information can also be obtained at the GCSWCD office in Cairo.