

# PROACTIVE APPROACH TO FLOODING IN DELAWARE COUNTY, NY

PROVIDING FLOOD IMPACT INFORMATION AND MITIGATION  
OPPORTUNITIES BEFORE THE NEXT DISASTER



Village of Walton, NY High Water on Water Street Floodplain Reclamation Project: December 2020



**Delaware County Soil and Water Conservation District  
Walton, NY**





This application will serve to outline the locally driven efforts for a proactive approach to reduce flood risks as well as address water quality issues through the following programs:

1. Training: Post-Flood Emergency Stream Intervention
2. Local Flood Hazard Mitigation Analysis
3. Implementation of Local Flood Hazard Mitigation Projects

The Stream Program of the Delaware County Soil and Water Conservation District strives to **Empower** and **Inspire** our stakeholders to create and enhance programs that are proactive to protect our valuable water resources and communities. The requirements for the programs listed above are to be locally led driven by sound science. Our partnerships with Town and Village local officials, Delaware County Planning Department, the Flood Commissions, New York City Department of Environmental Protection, Delaware County Planning Department, Department of Public works, Emergency Services, Watershed affairs, Cornell Cooperative Extension, Natural Resource Conservation Services, Watershed Agricultural Council, Catskill Watershed Corporation, residents, business, and all State & Federal agencies are what makes these programs so successful and sustainable.

### **Benefits:**

Delaware County Soil and Water Conservation District' Stream Program saw a need for training municipalities and heavy equipment operators to response to flood events after the 2004 flood within the Village of Walton, NY. Good intention contractors carved parabolic stream channels for miles along the tributaries. These actions created unstable stream channels that resulted in 6 feet of streambed erosion and unstable high streambanks which then lead to a million dollar stream restoration projects (see Figure 2). The development of the Post-Flood Emergency Stream Intervention Training became a New York State-wide protocol to assist in stream repairs after a major storm. The Delaware County Soil and Water Conservation District partnered with NYS Department of Environmental Conservation (NYS DEC) to create a training and manual to assist municipal officials, contractors and machine operators responding to flood damage. The training is based on sound stream science and processes. Following the guidelines to size the stream channel appropriately by the recommended procedures reduces the impacts to water quality. This eliminates the need for communities to go back to the site for repairing mistakes which save the municipality's time and resources. For more information on the Post-Flood Emergency Stream Intervention Training visit the NYS DEC website: <https://www.dec.ny.gov/lands/86450.html>



Figure 2: The photos show the stream channel evolution for inappropriate sized stream. Large amounts of sediment are easily moved during small events impacting water quality.

The Local Flood Hazard Mitigation Analysis Program was developed to be a proactive approach to flooding rather than reactive. This locally led program, analyzes flood conditions through local flood analysis plans that identify flood mitigation projects. This program was necessary following multiple high-water events in the New York City watersheds.

The Local Flood Hazard Mitigation Analysis Program was written to function in two stages:

- 1) Local Flood Analysis Plans: An engineering analysis of flood conditions using FEMA floodplain maps and identification of potential flood mitigation projects articulated in a plan
- 2) Local Flood Hazard Mitigation Projects: Project design and implementation

All of the Local Flood Analysis plans are unique to their community's specific flood hazard reduction and projects. The plans completed within the NYC watersheds can be found on [www.catskillstreams.org/lfa](http://www.catskillstreams.org/lfa).

Local Flood Hazard Mitigation Projects are community ready projects that have been identified in the recommendations of Local Flood Analysis Plans. All municipalities in the region have adopted Local Flood Analysis Plan, and are in the process of actively implementing the recommendations as part of the Local Flood Hazard Mitigation Projects. Each community's readiness to move forward with implementing their plan's recommendations has direct



environmental benefits as well as the social benefit of achieving improved community confidence.

**Economic Impact:**

Under the development of the Local Flood Analysis Plan, each new flood mitigation plan is structured in a similar manner, according to the following outline.

- The Flood Commission is an organized body appointed by each municipality to represent their interests in Flood Hazard Mitigation. Their mission is to be engaged in the Local Flood Analysis process to coordinate municipal decisions and to implement any project recommendations that result in multi-objective benefits. Town and Village boards (jointly in some communities) choose to serve as the Flood Commission members and define the role of the meetings specifically for the community needs.
- Engineer-consultants are hired to identify projects that reduce flood risk within the impacted communities by using hydraulic modeling. The primary focus of the hydraulic modeling is to identify the potential for reducing flood elevations through construction projects such as channel and floodplain restoration as the first alternative to other hazard mitigation solutions. Each plan also discusses potential flood proofing, building elevations, bridge/culvert expansions, tank anchoring, and property buyouts.
- Upon finalization of a working plan, each municipality holds a public meeting to adopt the Local Flood Analysis Plan.
- Local municipalities then can utilize their adopted Local Flood Analysis Plan to scientifically assess flood hazard risks. They can further use this knowledge to prioritize work that best appropriates funding in the interest of protecting the community as well as water quality and aquatic resources.

The following map shows the location and status of the Local Flood Analysis Plans throughout the New York City Watersheds just in Delaware County, NY (Not shown are other counties in NYC Watersheds include Greene, Ulster, and Sullivan):





## **Outreach Efforts:**

Below is the outreach timeline that summarizes the proactive efforts and the community's patience to see a completed project results:

- 2006 Flood Event impacting the Village of Walton, NY
- 2009 Grant received to develop the Post-Flood Emergency Stream Intervention Training
- 2010 The first series of the Post-Flood Emergency Stream Intervention Training
  - 2010-2022: Over 2,000 individuals have been trained in the State-wide Protocols
- 2010 Walton Flood Commission Formed
- 2011 Hurricane Irene and Tropical Storm Lee impacting all of Delaware County, NY
- 2011 Village of Walton received a grant to conduct a Local Flood Analysis plan
- 2012 Emergency Water Protection federal funding to repair 32 sites
  - East Brook Floodplain Reclamation Project selected
- 2013 Completion of the East Brook Floodplain Reclamation Project
- 2014 Engineer Consultant hired to implement a Local Flood Analysis Plan
- 2014 Public outreach to residence and business
- 2015 Local Flood Analysis Plan was completed on the West Branch Delaware River
- 2018 Local Flood Analysis Plan was completed on the tributaries
- 2017-2020 formation of additional flood commission throughout Delaware County
- 2018-2019 Water Street Floodplain Reclamation Project
- 2019 Engineer Consultant hired to determine the impacts of the floodplain project completed in 2013 and other mitigation projects along East Brook stream
- 2020 Applied for Letter of Map Revision (LOMR) to update FIRM maps along East Brook
- 2021 FIRM map updated for East Brook stream

The Local Flood Hazard Mitigation Program is community-driven, and begins with several public meetings. The first meeting begins with the presentation “Introduction to Stream Mechanics” to help the audience learn the technical terms that would be used throughout the process. The workshop concludes with an information gathering session to draw on public knowledge of historic flooding issues. The final public meeting is conducted by an engineering-consultant showing the results of their hydraulic study, as well as their recommendations.



*Figure 3: Public outreach to the residence from the Village & Town of Delhi, NY*

The Delaware County Soil and Water Conservation District's staff continue their education and outreach efforts for the Post-Flood Emergency Stream Intervention training, public presentations, press release, fair booth displays, website and social media. These proactive efforts for trained municipal officials and heavy equipment operators have proven successful resulting in quicker coordinated responses during flood events as well as protecting water resources and communities.

### **Results:**

Using Federal Emergency Management Agency (FEMA) floodplain maps, engineer-consultants duplicate each area using a hydraulic modeling program. The "Hydrologic Engineering Center River Analysis System" (HEC-RAS) is software written by the United States Army Corps of Engineers and is considered to be the industry standard for riverine flood analysis. The model uses water surface profiles to compute one-dimensional, steady-state, or time-varied water flows. A range of hazard mitigation alternatives, such as sediment removal, bridge modification/replacement, and floodplain reclamation projects can be evaluated to determine the reduction of flood surface levels within the community. In some communities there may have not been a "silver bullet" that solved all flood issues, but the reduction of water depth is still important.

The Village of Walton, NY have completed three Flood Hazard Mitigation projects that are located in the red hatch marks in Figure 4. Unfortunately, the three floodplain reclamation projects were not able to reduce the water depths throughout the village limits, but the projects are able to provide a localized impact to the nearby businesses and residences.



*Figure 4: Local Flood Hazard Mitigation Projects within the Village of Walton, NY.*

For example, the East Brook Floodplain Reclamation project completed a Letter of Map Revision in 2021 to update the FEMA maps. The project reduced the flood insurance on 42 properties with 22 of those properties removed from the Special Flood Hazard Area. The maps will be updated as more floodplain mitigation projects are completed throughout the village and when a large number of properties will benefit from the revisions.

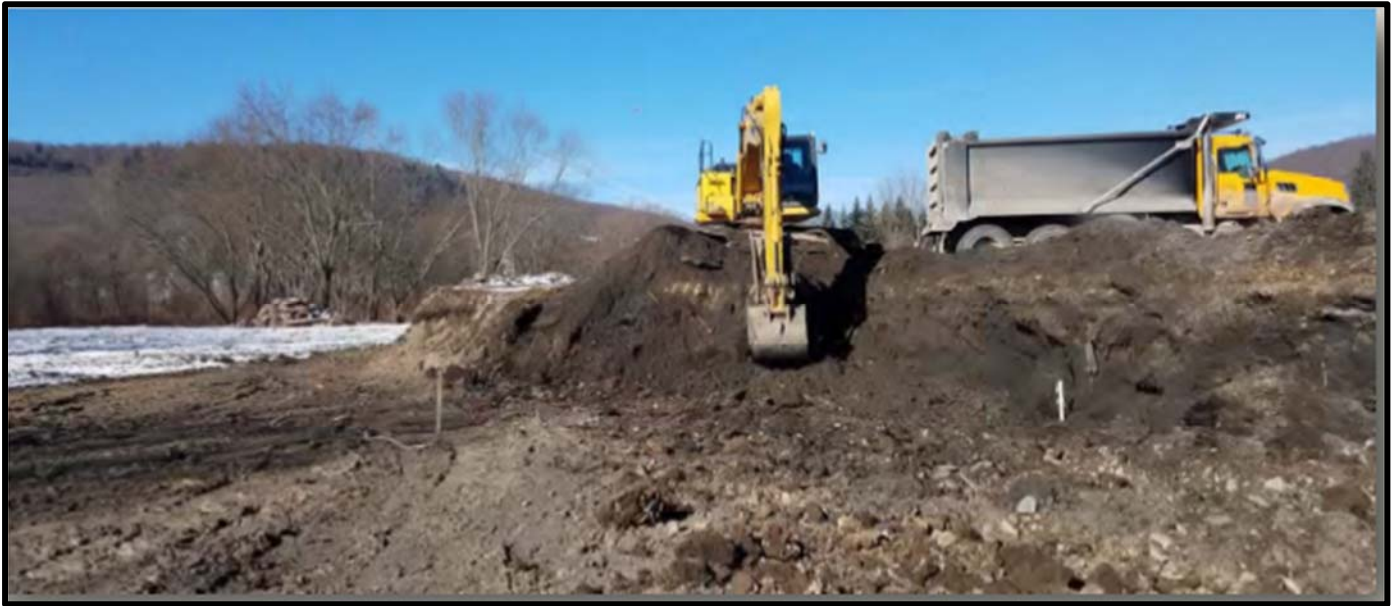


*Figure 5: The photo on the left was taken after the 2004 flood event. The photo on the right was taken during the December 2020 high water event. The water can be seen on the 100-year designed floodplain.*





Another great example of a completed project as a direct result of local flood analysis planning was the Water Street Floodplain Reclamation, within the heart of the Village of Walton, NY. The \$1.2 million project on the nearly 13-acres of Walton Village and Town properties removed approximately 52,000 cubic yards of soil and garbage that was dumped for decades in the floodplain to an off-site location. Additionally, a culvert installed beneath Water Street allowed water from Veteran's park to drain into a swale channel that will convey the park's 2.8 acres of stormwater runoff from building roof tops and parking lots through a vegetated filter area before it enters the West Branch Delaware River.



*Figure 6: Village of Walton, NY High Water on Water Street Floodplain Reclamation Project*

In Figure 6 above shows the depth of material excavated from the floodplain. The material was sorted prior to off-site trucking to remove debris and solid waste that was found throughout the project area. It was estimated that approximately 10% of the total volume of material to be removed consisted of solid waste which was disposed of at a traditional waste management facility. The cover page of this documents shows the high water event that occurred in December 2020 remained on the constructed floodplain saving the businesses and residence within the village from flood damages.

The West Branch Delaware River contributes water to the NYC's Cannonsville Reservoir. Both reclamation projects were implemented using Delaware County Soil and Water Conservation District funds from their NYC DEP contract and supplemented with federal grant funding (Water Resource Development Act and Emergency Watershed Protection funds).



## **Maintenance:**

Commitment and Leadership in Pursuit of Environmental Excellence – The maintenance of these proactive efforts are very low because the Local Flood Hazard Mitigation Program/Projects is designed to operate from the bottom up, by local individuals and organizations, in their own communities, commitment and pursuit of excellence go hand in hand. All communities strive to maintain economic viability while exercising reasonable control over any preventable events which might lead to property loss and/or water contamination.

The success shown through the proactive efforts of Post-flood Emergency Stream Intervention Training and the Local Flood Hazard Mitigation Program/Projects since 2010 demonstrates its viability to be utilized. Using industry standard of stream mechanics and FEMA floodplain maps as an informational base, the underlying process of the Program will lend itself well in transferability to any community experiencing flooding issues.

Any projects completed through the Delaware County Soil and Water Conservation District (DCSWCD) funding maintain a monitoring plan that is conducted annually and after every high water event. In the event a problem is noted by the local municipality, DCSWCD staff or landowner, the DCSWCD will schedule a detailed inspection to evaluate the observed changes. In the recent events, staff have conducted on the ground observations and drone flights over the Village of Walton to observe the water flow on the constructed floodplains as shown in the photo below.



*Figure 7: Water Street Floodplain Reclamation Project: December 2020*



**Conclusion:**

The Delaware County Soil and Water Conservation District's Stream Corridor Management Program strives to protect NYC Watersheds water quality, the natural water resources of streams and floodplains as well as the communities that live near the streams in Delaware County, NY. The efforts of our dedicated and professional staff in developing new programs and projects to promote healthy streams and floodplains deserve recognition. These programs can lend themselves well in transferability to any community experiencing similar flooding issues.

We would like to take this opportunity to thank the Towns, Villages, flood commissions, and partnering agencies for their support, patience, and dedication that have made the proactive approach to flooding so successful. Without their countless hours of the local dedication to protect their communities from threats flooding through sound science-based programs.