INFRASTRUCTURE and FLOOD MITIGATION

Emergency Power Program
Flood Proof Main Sewage Pump Station
Waterbury Village Flood Study
Dac Rowe Flood-Proofing and Recreation Enhancement
Natural disasters result in the widespread interruption of basic utilities such as electric services and water, often causing damage to critical infrastructure. As a disaster unfolds the reestablishment of electric power and access to clean water become priorities in affected communities. The Thatcher Brook Primary School and Crossett Brook Middle School have been identified as emergency shelter locations and will require continuous functionality during disaster events. Similarly critical infrastructure, including the wastewater treatment plant, requires continuous operation during disaster events. This project identifies five locations for emergency generators and identifies the electrical demands and size requirements for each location. Each unit will be placed outside the flood plain and will include automatic start functions. Proposed installation locations include:

- Thatcher Brook Primary School
- Crossett Brook Middle School
- Sweet Water Road Well-Field
- Wastewater Treatment Plant
- Proposed new Municipal Complex

Implementation of this project will provide the community with access to critical electrical services during future disaster events. The project will also decrease emergency spending which occurs when needed resources are unavailable within the community.

**ACTION STEPS**
- Determine installation requirements
- Determine necessary size of supplemental generators to include allowance for growth
- Prioritize installations and available funding
- Install system(s)

**DISASTER RESILIENCE**
Disaster impacted communities may anticipate a quicker return to normalcy due to greater public administrative capacities and improved health and safety standards at public shelters. This project will provide ongoing access to essential needs and help mitigate the increased burden of loss associated with slow response rates.

**COST ESTIMATE**
Cost per installation: $65,000-$160,000
Total project cost: $465,000

**PROJECT CHAMPIONS**
Don Schneider and Alec Tuscany

**PROJECT SPONSORS**
Town and Village of Waterbury
The main sewage pump station supports village residents, major commercial and industrial properties, and the State Office Complex, which encompass a service base of an estimated 5,373 individuals. During flood events, the wastewater station has lost power resulting in a loss of service and requiring the implementation of a bypass system. This bypass system requires raw wastewater to be removed and disposed of off-site at an estimated cost of $20,000 per day. The Village/Town has relied upon this bypass service during past flood events. The excessive costs of executing the bypass option create a highly impractical short-term solution for local authorities who are forced to finance interim sewer services until the main sewage pump station is restored.

The main sewage pump station has flooded four times in the past ten years. The two existing pumps located at the lowest level of the facility have been damaged during each flood event. Resources that otherwise could have been used to fund critical long-term system updates and improvements have been spent on emergency pumping and removal services. The steel gasket flood doors and exterior wall openings leak during flood events and present additional health and safety hazards. The main sewage pump station has been placed back in service following each flood event. Mitigation of this recurring problem would prevent costly avoidable operational expenses associated with future repairs. This project has three components:

1. Existing flood doors: reinforced gaskets replaced, closing mechanisms rehabilitated
2. Existing wall penetrations: resealed with grout, hardened with additional steel cover
3. Existing sewage pumps: replaced with two dry-pit submersible solid handling pumps

Dependable, cost-effective municipal services are critical to the health of a community and are essential for attracting new business opportunities. Annual operational and maintenance costs for the MPS are funded through quarterly sewer rent revenues. Current costs are likely to be reduced if the mitigation of the MPS system is implemented. The technical components of this project, as well as the projected financial estimates must receive the approval of the Village of Waterbury Water & Sewer Commissioners. Upon approval, the information can be forwarded to the Village of Waterbury Board of Trustees for final approval and initiation of the project.

**ACTION STEPS**
- Obtain approval to conduct pump sizing exercise and develop requirements
- Disseminate Request for Proposals/Apply for FEMA Hazard Mitigation Grant
- Award contract and approve funding
- Execute mitigation activities


**DISASTER RESILIENCE**
Mitigation measures to ensure continued functionality of the main sewage pump station during disaster events will allow funds allocated for the emergency bypass system to be utilized for other emergency needs in a disaster event.

**COST ESTIMATE**
Capital Equipment and installation: $149,500

**PROJECT CHAMPION**
Alec Tuscany

**PROJECT SPONSOR**
Village of Waterbury
A flood inundation study and the creation of a flood risk model will enhance local capacities for flood response and mitigation. Flood inundation maps illustrate the extent of flooding anticipated in a specific area and indicate where roadways, streets, buildings, and residential neighborhoods are likely to be impacted by floodwaters.

Flood risk models are planning and mitigation tools for municipal and state officials, including emergency managers, floodplain managers, and regional/urban planners. Flood risk models will provide decision-makers in Waterbury with the information to better mitigate the impacts of flooding and build a more resilient community by enhancing awareness of flood hazards. Flood risk modeling will provide Waterbury officials with the ability to view inundation levels in minor, moderate, and major flood categories; display 100-year and 500-year flood projections and floodway zones, and show the extent of flooding expected in a specific area.

The projected study area for mapping and modeling begins south of Waterbury Village at the confluence of the Mad and Winooski Rivers. The study area would extend seven miles north to the Bolton Dam and 1,000 meters on either side of the centerline of the Winooski River. The flood study documentation will help with adjustments to control the flow of flood waters.

A topographical flood risk model will serve as an additional source of information for planning future town projects and will:

- Determine if changes should be made at bridge locations to reduce flooding potentials
- Provide community planners with data to determine whether or not flood plain areas should be restored
- Support infrastructure planning for existing repairs and future construction
- Develop plans for flood relief features, bridge, or road construction which can alleviate flood risk
- Increase understanding and anticipate flood characteristics and movement
- Provide accurate mapping for future planning and development purposes

**ACTION STEPS**

- Identify existing flood studies, models, and data
- Determine deficiencies and gaps in pre-existing studies
- Design a study to address the deficiencies in current flood models and provide mitigation alternatives
- Work with Consultant/Agency to develop timeline for deliverables.
- Gather topographic information from Aerial Survey
- Gather site information with survey equipment if needed
- Reduce data and use in maps and existing Hydrologic Engineering Centers-River Analysis Systems (HEC-RAS) model
- Alter model to determine impact on bridges, flood relief features and structures
- Identify and model flood inundation and mitigation scenarios to reduce flood vulnerability
- Present findings to municipal leaders and the public with recommendations that promote flood resiliency
- Produce large scale map for municipal use
DISASTER RESILIENCE
Best practices for construction of infrastructure can be implemented if flood patterns within the river corridor are better understood. A Village flood study will help municipal officials better implement available funding so that preventative maintenance prior to a disaster event and replacement costs afterwards are reduced.

COST ESTIMATE
Topographic information from Aerial Survey: $20,000-$40,000
Data processing and flood inundation simulation: $50,000-$100,000
Public and municipal resources based on the modeling results: $10,000
Total Project Cost: $80,000 - $150,000

PROJECT CHAMPIONS
John Grenier and Dan Currier

PROJECT SPONSORS
Town and Village of Waterbury
The Dascombe Rowe Recreation Fields “Dac Rowe” is a recreation area that hosts four baseball fields and four youth soccer fields in the heart of the Village of Waterbury. Approximately 22 acres, Dac Rowe, is located near the confluence of the Thatcher Brook and the Winooski River. It acts as a natural floodplain buffer during annual flooding events, absorbing and containing rising floodwaters and preventing damage elsewhere in the community.

Tropical Storm Irene caused severe damage to the Dac Rowe recreational infrastructure. The intent of this project is to replace the infrastructure in a sustainable manner by identifying and implementing flood-resistant alternatives including development of a new site plan for the recreation fields, parking lots, facilities and infrastructure.

Project Objectives:
1. Flood-proofing existing infrastructure to avoid damage during future flooding events
2. Expanding and enhancing the recreational opportunities available at Dac Rowe to sustain existing sport and recreation resources, while also developing new ones

The project will commence with the Dac Rowe Flood Mitigation and Expanded Recreational Activity Feasibility Study to determine the most sustainable and cost-effective manner to achieve both objectives. The implementation of the Dac Rowe flood-proofing project will help reduce the costs associated with future flooding events and enhancing whole community assets.

In support of the objectives, the Dac Rowe flood-proofing project will explore:
- A variety of site plans to facilitate efficient land use in the floodplain
- Improvements that will enhance existing recreational opportunities and accommodate new winter sporting activities
- Redesign of park facilities and infrastructure to improve vehicular access and pedestrian circulation
- Expanding the connections to recreational trails in the area
- Providing an access point to the Winooski River for kayakers and river activities

ACTION STEPS
- Investigate flood-resistant alternatives to the existing chain-link fencing that defines the outfield, the backstops, and the dugouts
- Design a site plan that repositions the infrastructure away from the floodway while facilitating better pedestrian and vehicular circulation
- Add access for additional recreational activities such as cross country skiing and kayaking, and install concessions or similar amenities
- Construct improved infrastructure that incorporate innovative flood-mitigation and landscape-design principles
DISASTER RESILIENCE
The objective of this project is to reduce the likelihood of loss in the future. This project will identify and implement flood-resistant alternatives to the existing chain-link fencing and electrical boxes, which suffered damages from Tropical Storm Irene. Repositioning the existing fields and associated infrastructure using best practices for floodplain design will provide complementary benefits to these flood-proofing solutions.

COST ESTIMATE
Study: $5,000 - $10,000
Existing infrastructure repair (without incorporation of flood-resistant enhancements or design improvements): $78,535

PROJECT CHAMPIONS
Kane Smart and Peg O’Neill

PROJECT SPONSOR
Town of Waterbury
PARKS and RECREATION

Recreation Director for Waterbury
Parks and Recreation Master Plan
Little River-Village Connector Trail
Tropical Storm Irene severely impacted many of Waterbury’s recreational facilities, including Dac Rowe Field and waterfront property along the Winooski River, which is littered with debris. Recreational offerings in Waterbury have been managed in the past by volunteers and town officials, who have higher priority projects to supervise. A 2010 Waterbury Summer Recreation Study identified a need for a full-time recreation director to develop Waterbury’s recreational resources and to actively promote Waterbury as a recreation destination. A recreation director will facilitate recreation planning efforts as well as marking outreach to help attract increased recreational tourism, which will help enhance Waterbury’s continued economic recovery. This project will help the Town continue to provide recreational opportunities for residents as well as explore more income generating recreational programs for both locals and visitors alike.