# Green Infrastructure Planning for Improved Stormwater Management in Central New York

## *Final Report*

February 2011

Prepared by the Central New York Regional Planning and Development Board

For the New York State Department of Environmental Conservation

# American Recovery and Reinvestment Act (ARRA)
# Clean Water Act Section 604(b)

## Final Report

Prepared for the New York State Department of Environmental Conservation

# Project/Organization Information

## Project Information

| | | | |
|---|---|---|---|
| Project Name | Green Infrastructure Planning for Improved Stormwater Management in Central New York | | |
| Primary Project Type | Green Infrastructure Planning | | |
| State Contract Number | C304265 | | |
| Project Start Date | February 1, 2010 | Project End Date | February 15, 2012 |
| ARRA Award Amount | $237,500.00 | Total Project Cost | $237,500.00 |

## Organization Information

| | | | | | |
|---|---|---|---|---|---|
| Name | Central New York Regional Planning and Development Board | | | | |
| Address 1 | 126 N. Salina Street, Suite 200 | | | | |
| Address 2 | | | | | |
| City | Syracuse | State | New York | Zip Code + 4 | 13202-1065 |
| Telephone | 315-422-8276 | Fax | 315-422-9051 | | |
| E-mail | bertuch@cnyrpdb.org | Website | cnyrpdb.org | | |

## Report Preparer

| | | | |
|---|---|---|---|
| Name | Kathleen Bertuch | | |
| Job Title | Program Manager | | |
| Telephone | 315-422-8276 Ext. 208 | E-mail | bertuch@cnyrpdb.org |

# Introduction

## Project Introduction & Description

The primary purpose of the project should be described, along with a general overview of major project goals and outcomes. Affected bodies of water and project locations should also be noted.

The purpose of this project was to identify appropriate green infrastructure practices capable of minimizing stormwater impacts within the Oswego-Seneca-Oneida Rivers drainage basin including the Oneida Lake, Seneca River and Oneida River Watersheds (all category 1 watersheds in need of restoration) and the Onondaga Lake watershed (which contains section 303(d) impaired waters caused by stormwater/ urban runoff). By reducing the volume of urban runoff and the amount of sediment, phosphorus and other stormwater related pollutants from urban runoff, this project was designed to ultimately improve and protect the long-term ecological and recreational value of local waterbodies while reducing property damage resulting from unattenuated stormwater peak flow.

The Central New York Regional Planning & Development Board's primary project goals were:

1). Identify whole communities or sewersheds within the Syracuse Urbanized Area (SUA) where the volume and quality of stormwater runoff contributes to water quality issues and repeated flooding and drainage concerns;

2). Develop a GIS based inventory of current stormwater control practices, known areas of high erosion potential, high pollutant loading, frequent flooding, and water quality issues;

3). Identify specific sites in regulated MS4 communities and potential opportunities for watershed based project areas to implement new or to retrofit existing stormwater control practices in order to address stormwater runoff related problems using green infrastructure;

4). Develop a database of appropriate green infrastructure practices to address peak flow attenuation and stormwater quality at the site specific and/or sewershed and/or watershed levels;

5). Identify one project location within watersheds having documented water quality impairments related to stormwater runoff and non-point source pollution in each of the five-Central New York counties and develop green infrastructure stormwater control design plans.

As a result of completing this project, an initial list of 104 Level 1 sites identified by local officials as being in need of improved stormwater management and/or flooding and drainage improvements was reduced to 33 Level 2 priority sites through the use of GIS desktop analysis and field investigations. Following additional field investigations and a detailed GIS based suitability analysis, concept design sketches were developed for green infrastructure practices on the ten Level 3 sites that showed the greatest potential to benefit from runoff reduction and pollution prevention. A complete project description, an inventory of Level 2 and Level 3 priority sites, and Level 3 concept sketches is provided in the final Technical Report at www.cnyrpdb.org/reports.asp. In addition, five sites (one each in Cayuga, Madison, and Oswego Counties; two sites in Onondaga County) were identified as in need of detailed engineered design plans to address stormwater and flooding related shoreline and water quality issues. Stamped construction plans including planting and materials lists, and cost breakdowns were prepared and presented to the governing boards of the jurisdictional municipalities. These sites were selected in part because they are high public use areas that provide excellent opportunities for public education. The sites are: Owasco Lake Shoreline in Emerson Park, Cayuga County; Oneida Lake Shoreline, Chapman Park, Madison County; Jamesville Train Station, Butternut Creek, Onondaga County; Limestone Creek, Canal Landing Park, Onondaga County; and Lake Neatahwanta, Bullhead Point, Oswego County.

# Summary of Activity

## Objectives, Tasks, & Outcomes

Work plan objectives should be clearly linked to final project outcomes. For each objective listed on the work plan, a brief summary of the tasks and activities should demonstrate how project deliverables and outcomes have accomplished that objective.

Objective

**Identify communities, watersheds or sewersheds within the Syracuse Urbanized Area where the volume and quality of stormwater runoff is contributing to water quality concerns and repeated flooding/ drainage problems**

Task Summary & Project Outcomes

CNY RPDB identified individuals, organizations and local governments with an interest or stake in the project including municipal engineers, DPW and Highway department staff, code enforcement officers, and planning and development directors from 31 regulated MS4s in the Syracuse Urbanized Area (SUA), as well as representatives from NYS DOT, NYSDEC Reg. 7 and three county SWCD offices. CNY RPDB held an initial stakeholder meeting to provide an overview of the project and to request and explain supporting informational and GIS data needs to representatives from interested stakeholders in the SUA. Following the meeting, CNY RPDB met with municipal representatives from 23 individual MS4s to further discuss local needs and to compile additional data, including sewershed mapping and GIS inventories of post construction stormwater management practices. CNY RPDB conducted site visits as needed to review, clarify and or/verify information and data collected. CNY RPDB developed an organizational structure for growing GIS database which included information on water quality/drainage issues, potential benefits, initial practices for consideration, potential site restrictions and impediments to implementation. From this database, a list of 74 sites/areas where water quality and/or drainage issues could potentially be addressed through the implementation of Green Infrastructure practices was developed for further consideration.

Objective

**Develop GIS based inventory of current stormwater control practices, known areas of high erosion potential, high pollutant loading, frequent flooding or drainage concerns and water quality issues**

Task Summary & Project Outcomes

CNY RPDB located all identified sites in GIS using tax parcel data where possible and/or general spatial data where appropriate. Storm sewershed mapping, system mapping, and inventories of post-construction stormwater management practices provided by the municipalities were incorporated into the existing regional stormwater GIS database.

Objective

**Identify specific sites in regulated MS4 communities and potential opportunities for watershed based project areas to implement new or to retrofit existing stormwater control practices for the purpose of addressing stormwater runoff related problems using green infrastructure**

Task Summary & Project Outcomes

General site characteristics (i.e., soil series and Hydrologic Soil Groups present at each site, existing water resources, wetlands, floodplains, and areas of steep slopes) were assembled, and relevant design points were located using outfall mapping and other data and information provided by the municipalities. The drainage area to each design point was delineated in GIS using Digital Elevation Mapping, existing sewershed mapping, and descriptions provided by the municipalities. Estimation of runoff volumes and analysis of phosphorus and Total Suspended Solids loads were completed for the drainage subcatchments affecting each of the sites on both a cumulative and per-acre basis. Soil types and impervious area were assessed in drainage areas to demonstrate sources of drainage problems. CNY RPDB conducted a second round of follow-up meetings with 17 of the 23 MS4s to discuss the results of the GIS analysis and initial findings. Current site conditions, factors contributing to identified problems, and options for possible solutions for each of the sites were further discussed. As a result, CNY RPDB narrowed down the universe of potential sites to a list of "Level 2" sites where implementation of mitigation practices appeared

potentially feasible and worthy of more detailed investigation.

Objective

**Develop a database of appropriate green infrastructure practices to address peak flow attenuation and stormwater quality at the site specific, sewereshed and/or watershed levels**

Task Summary & Project Outcomes

CNY RPDB conducted a series of site visits based on municipal interest in pursuing feasible project. Additional data was collected regarding access, drainage patterns, utilities and other potential use conflicts, and existing structural improvements at the sites. This information was incorporated into the GIS database. Appropriate practices were determined for each site based on drainage area size; site conditions including land use, soil type, and topography or landscape position; and retrofit goal (e.g. runoff reduction, peak flow control, water quality improvement, demonstration project, etc.). This information was added to the SUA database by cross-referencing the suggested practices to specific site locations. CNYRPDB sent letters to the participating municipalities documenting findings relative to the sites noted above. The letters identified applicable NYSDEC-approved stormwater control and green infrastructure practices to address problems or opportunities. The letters also included an accounting of additional information necessary to further refine whether the practices could be utilized, and where the practices might be located. The letters requested additional follow-up information and site visits from municipalities interested in pursuing concept development for identified practices. CNYRPDB conducted a suitability analysis in GIS to further evaluate and display the factors affecting the feasibility and site limitations or advantages relative to using specific practices at specific sites. A matrix was created rating the suitability of 18 possible practices for a total of six different criteria. The various criteria were then weighted in accordance with their importance, producing a raster output that was displayed for the entire Syracuse Urbanized Area. CNYRPDB met for a third time with six municipalities to develop preliminary feasibility studies and conceptual sketches for proposed practices in ten sites ("Level 3"). The meetings included site visits to verify drainage areas and/or structures, identify limitations such as space, access, utilities, etc., and denote other relevant field conditions. This information was used along with aerial photography and other mapping received from municipal contacts to develop concept sketches of the projects being conceived. The sketches detailed locations and site features relative to proposed green infrastructure and stormwater management practices.

Objective

**Identify one project location within watersheds having documented water quality impairments related to stormwater runoff and non-point source pollution in each of the five-Central New York counties and develop green infrastructure stormwater control design plans.**

Task Summary & Project Outcomes

CNY RPDB initially contacted county planning agencies and Soil and Water Conservation District offices in Cayuga, Cortland, Madison, Onondaga and Oswego Counties to identify water quality and drainage concerns relative to priority water bodies, and to solicit recommendations regarding planned construction projects that would benefit from the inclusion of a green infrastructure design component. Outreach letters were sent to every mayor and supervisor in the five-county region to ensure that no worthwile projects were overlooked. Following site visits to assess preliminary recommendations, CNY RPDB conducted additional direct outreach with the Finger Lakes Land Trust, elected municipal officials in the towns of DeWitt, Sullivan, Brutus, Owasco, Nelson, Georgetown, the cities of Fulton, Oneida and Cortland, the Owasco Lakefront Supervisors working group, Cayuga County Parks and Recreation, the governing Board of the Agricultural Museum in Cayuga County, and the village of Fayetteville to explain the project and to discuss potential sites. Focus was placed on identifying municipally owned sites and projects where the jurisdictional municipality recognized the need for and utility of implementing on-site green infrastructure practices to address water quality and or drainage problems. Efforts were also made to locate projects in areas of high public visibility where the jurisdictional municipality expressed an interest in incorporating educational signage into the final installation. Of the nine most promising sites preliminarily identified in five counties, four were rejected due to the size and complexity of the drainage area, limiting site conditions at the available treatment area, and/or insufficient municipal commitment to the project. Selected sites and projects were: Jamesville Train Station Infiltration and Downspout Disconnection (Butternut Creek, Onondaga County); Bullhead Point Parking Area Bioinfiltration Swale (Lake Neatahwanta, Oswego County); Emerson Park Shoreline Stabilization and Buffer (Owasco Lake, Cayuga County); Chapman Park Runoff Reduction and Infiltration (Oneida Lake, Madison County); Canal Landing Park Bank Stabilization and Bioinfiltration (Limestone Creek, Onondaga County). CNY RPDB issued a Request for Proposals and selected two project consultants from the ten proposals received. Following initial meetings between CNY RPDB, the selected consultants and the individual municipal sponsors, site data and planning information was compiled, and a series of site visits was conducted by the

consultant. In all cases, the municipal sponsors were asked to review and comment on preliminary draft, draft final, and final design plans developed by the design consultants. All final designs reflect changes made in response to CNY RPDB and municipal sponsor review. Following preliminary approval by CNY RPDB and the primary municipal project contact(s), the final design packages were presented to the governing boards of each municipal sponsor for approval and implementation.

## Problems Encountered/How Solved

A comprehensive summary of any problems encountered during the life of the project and how those problems were resolved should be listed. The list should include any information reported in the "Problems Encountered/How Solved" box on the Quarterly Report Cover Pages throughout the project.

It proved quite difficult to identify design project opportunities. Several of the sites and projects recommended by individual municipalities were experiencing problems beyond the scope of what could be addressed within the level of planning assistance available, or that required a more traditionally engineered, structural solution. Several projects that initially appeared feasible and met the municipal ownership criteria were withdrawn because we were not able to provide implementation funding. On more than one occasion, municipal contacts expressed a sense of frustration over what was perceived to be a "money looking for a project" approach to funding at a time when funding for "real" construction and implementation projects is fading and becoming more difficult to obtain. Several municipalities expressed the belief that the available design assistance would ultimately cost more in construction and long term maintenance than what they would recognize in the design cost savings.

It was not always possible to overcome these issues; however, it was observed that by providing information on the function of natural systems and pointing out the relationship between "shovel ready" projects and fundable projects, we were able to overcome some initial reservations.

## Changes to Project Work Plan

Any changes that were made to the project work plan during the life of the project should be noted, including a brief description of why the changes were necessary.

Following several months of discussions with various planning partners and municipal representatives in Cortland County, CNY RPDB was unable to identify a design project of an appropriate scope and scale for this initiative. As a result, we requested a work plan change that would allow us to fund two design projects in one of the other CNY counties. Upon recommendation of NYS DEC, a last attempt was made to identify a project in Cortland County, and our primary planning partners were alerted to the situation and provided an opportunity to respond. A second design project was ultimately identified and completed in Onondaga County.