

Bear Lake SAW Grant

Stormwater Asset Management Plan

June 14, 2017

Scope of Work

Spicer Group's scope of professional services, including subconsultant work, for this project follows. Our services are organized to reflect the structure of the SAW Grant application and to ensure orderly and reasonable progress of the project. This scope of work details our approach to completing a Stormwater Asset Management Plan and a Stormwater Management Plan in accordance with MDEQ guidelines.

We will meet with the Village and Bear Lake Watershed Alliance (BLWA) to kick-off the project and obtain background information to assist us in understanding the Village's infrastructure systems. This will help us confirm what the Village owns and where the assets are located.

Establish a Stormwater Asset Management Plan

To ensure the needs of the Village of Bear Lake are met in an efficient and cost effective manner, we propose the following scope of services to evaluate the current state of the community's assets and assist the Village in crafting a long-term asset management and funding strategy.

The tools developed as part of the Stormwater Asset Management Plans (AMPs) will allow the Village to move from reactive system repair to predictive rehabilitation and maintenance, thus minimizing the risk of failure of critical infrastructure components.

The AMPs developed for stormwater will provide valuable information for short-term and long-term capital improvement planning and ensuring successful and cost-efficient ongoing operation of the Village's stormwater collection system. This will be in line with the Watershed planning and implementation also proposed for SAW funding.

Based on our knowledge of the Village's infrastructure and the SAW Grant requirements, we anticipate the following scope of work will meet the Village's needs for stormwater Asset Management.

Asset Management Organizational Structure

Assist the Village in the creation of an asset management organizational structure and the development of an asset management policy.

The Asset management organizational structure will include roles and responsibilities of staff, elected officials, citizen representatives, consultants, etc. Developing an asset management plan that can be utilized by the Village to provide the data necessary to maintain its existing assets and plan for future needs requires a commitment from all parties from Village administrators to the operations personnel responsible for day to day maintenance and repairs of the Village's infrastructure. It also requires policies be established that are workable in the field and allow access to data that is easily accessible to those responsible for planning and finances. As part of this process, we expect to:

- Establish organizational structure for asset management implementation, including roles and responsibilities for all levels.

- Develop an implementation schedule that is workable within the time frame of the grant conditions.
- Outline policies that will define the desired final management plan that include data management, risk management, desired levels of service, life cycle management, and implementation.

The SAW grant asset management plan is required to include the following:

- *Inventory and Condition Assessment*
- *Level of Service*
- *Criticality (Risk)*
- *Revenue Structure/Operation and maintenance (O&M) strategies*
- *Capital Improvement Plan/Long term funding*

Asset Inventory and Condition Assessment

The goal of the Asset Inventory portion of this task will be to identify data gaps and other information needed regarding the Village's storm water infrastructure. This will also include determining the extent of storm structure Global Positioning Survey (GPS) required for Geographic Information System (GIS) mapping. We expect to field locate and inspect storm sewer manholes and catch basins, with high accuracy to determine rim elevations, invert elevations, type, size, etc. We will investigate sewer routes for manholes not located on existing maps. The crews will obtain survey grade horizontal and vertical locations of all manholes and other collection system facilities. Our physical assessment will seek to determine as many of the GIS attributes as possible, such as pipe size, inverts, material, etc.

Condition assessment information, along with historic asset performance and theoretical performance expectations will form the basis for infrastructure deterioration forecasting. Other tasks that will be completed include:

- Existing record drawings will be used to label the storm sewer pipe including diameter, age, size, approximate invert elevation, and material in the GIS System. We will review accuracy and completeness of existing system data.
- Scan existing plan documents/As built drawings and develop a plan indexing system. Incorporate into the GIS system to allow Village personnel to review the plans directly from the GIS system.
- Identify areas of known collection system problems, such as basement flooding or property flooding. (based on Village staff feedback).
- Compile key findings and recommendations from previous drainage studies, including the identification of areas of known concern.
- Develop an Asset Inventory listing the various components of the system.
- Create a base map of the existing system using the survey information.
- Develop, update, or utilize existing manhole and pipe numbering/identification systems.

Data Management

Manistee County already maintains a GIS system. As a part of the Asset Management Plan (AMP), the stormwater systems around Bear Lake will be inventoried. Manistee County's existing Geographical Information System (GIS) will be updated, a condition assessment of the stormwater system will be performed, a risk analysis of component failure within the stormwater system will be performed, a review of the long-term operation and maintenance costs will be performed, and a long-term capital improvement plan will be developed.

Asset Management tools will be utilized. These tools may vary from simple spreadsheets, GIS applications, free government software, to proprietary software packages.

We will work with the Village to implement storm sewers GIS system that can be maintained by the County but readily available and utilized by the Village.

Determine County's software and hardware needs for:

- ArcGIS (software, workstations). A workstation at the Village will also assist in entering and retrieving data.
- Work with County staff to determine appropriate hardware and software needs for the County, including any necessary staff training. Based on the Village's population, the total amount eligible for this investment is \$60,000. We are assuming that a total of \$10,000 should be sufficient for hardware, software, and training.
- Identify additional sewer mapping/digitization needs, including:
 - Unmapped sewers, manholes, and catch basins. Pull structure lids to determine downs for calculating invert elevations and verify pipe sizes. This field work will be completed on structures in which invert and pipe size data is not available from the manhole inspection data.
 - Detention ponds and outlet structures
 - Culverts/bridges
 - Open channels / drains

Asset Evaluation- Stormwater Collection System

Sewer cleaning and CCTV

- Confirm which sections should be televised and use GIS to calculate total pipe length.
- The televising effort will focus on those areas with known problems, such as frequent repair/maintenance needs, flooding problems and age. Since the Village has little knowledge of the current condition of the storm sewer system it is expected that the CCTV work will incorporate all 7,000 feet of storm sewer.
- Subcontract with a company specializing in televising to have the pipes in the system cleaned and televised. This inspection will be completed using Pipe Assessment Certification Program (PACP) industry standards developed by the National Association of Sewer Service Companies (NASSCO). A pipe condition rating will be provided as part of this televising.
- Review the video and reports provided by our Subcontractor and include additional notes and comments.
- Subcontract storm structure cleaning.
- Inspect an estimated 65 manholes/catch basins.
 - This inspection will be completed using Manhole Assessment & Certification Program (MACP) industry standards developed by the National Association of Sewer Service Companies (NASSCO). A manhole and catch basin rating will be provided.
 - 360° camera video will be taken on every structure for future reference.
- Inspect culverts as deemed necessary within the drainage system

- Additional field survey to enhance GIS storm sewer data. This is expected to include all the Village's manholes. Field testing for the presence of E. coli at the storm sewer outlets into surface waters will also be included.
- Perform physical inspections of storm sewer manholes within the storm sewer televising areas.

System Modeling- Stormwater

- Organize a public meeting to receive feedback from residents on flooding problem areas. These meetings will also be used to discuss appropriate Level of Service (i.e. flood protection) for the Village's stormwater collection system.
- Develop a hydrologic/hydraulic model of key system components, including trunk storm sewers, based on public feedback received and information gathered from metering the system.
- Evaluate the need for regional improvements, such as stormwater detention, sewer enlargement, or other controls to manage peak flow rates and reduce flood pollutants.
- Evaluate the need for stormwater quality enhancements to reduce pollution in the Bear Lake and Bear Creek. This may include the identification of Best Management Practices (BMPs) to target urban runoff and reduce sedimentation and other urban pollutants.

Level of Service (LOS)

The goal of this task will be to determine the level of service warranted by the Village to deliver reliable services at a reasonable cost which is also consistent with applicable regulations. This will include determining the Village's risk tolerance and conveyance capability.

- Meet with your Council to discuss various Levels of Service available.
- Prepare a "Level of Service Agreement" that describes the system's performance targets.
- Attend a public meeting, if determined necessary, to present the capacity study and communicate the "Level of Service Agreement".
- List the State and Federal minimum requirements that need to be met for your system.
- Assist the Village in developing a baseline for the existing LOS for the storm sewer system based on minimum Operation and Maintenance Plan (O&M) activities and corrective action for critical failures in the system.
- Develop additional LOS criteria to represent increasing levels of annual spending requirements for O&M and capital/system renewal projects.
- Identify LOS components for inspection, preventative maintenance, corrective maintenance, and system renewal of each asset group (such as manholes, pipes, lift stations, etc.) and LOS level identified.
- Prepare a brief report summarizing our findings.

Criticality of Assets (Risk)

This includes a determination of how to prioritize projects identified in the asset management program(s). The goal of this task is to identify areas of the system that have the highest risk and consequence of failure in the community, and analyze the cause of asset failure for critical components and develop a specific response plan. We will have a discussion with the Village to determine potential critical facilities and additional analysis required to determine the critical facilities.

- Develop a risk assessment method for your system.
- Rate each major component as to the consequence of failure to the overall system.
- Review the failure history of the system.

- Import and integrate CCTV and manhole inspection data, as well as field survey data, into the storm sewer GIS database. Use these ratings to determine the LOF variable to be assigned to each component.
- Estimate the probability of failure and list assets by their likely of failure (LOF).
- Work with Village staff to determine appropriate characteristics to use to establish a LOF variable. Characteristics may include: population served, roadway traffic impacted during system repair, depth, accessibility, environmental issues, groundwater depth, potential for flooding, etc.
- Analyze future risk and consequences.
- Utilize asset decay curves or another method to try to predict the life span of critical components.
- Develop a rating system to factor condition, criticality, probability of failure, and overall life span of the major components.
- Create a priority list of the most critical assets in the system.
- Perform Hydrologic and Hydraulic calculations or develop a model to determine the maximum capacities of the major components of the system.
- Establish a priority ranking ("Criticality Index") using the Risk/Consequence factors, to be used to develop a list of repair/replacement/rehab needs.
- Develop a Deterioration Forecasting Model based on current asset condition, depth, material, and age. This will be used to forecast system repair/rehab/replacement needs.
- Perform an analysis of the system to determine areas that need improvement to meet the level of service that is chosen by the Community.
- Prepare tables and maps of the system showing age, type, size, condition, risk assessment, and hydraulic capacity of storm sewer system.
- Provide recommendations for future (ongoing) system inspection needs, operation of maintenance including storm sewer cleaning, CCTV, culvert inspections. etc.

Revenue Structure-Financial Analysis/Operations and Maintenance Strategies

This task will include a review of current infrastructure budgets/operation and maintenance costs and how these costs can be balanced with a proactive program. The goal is to find the point in an asset's life cycle where the cost of replacement is balanced against the accelerating cost to maintain it and declining level of service. The goal of O&M Strategies is to improve system performance and preserve the asset's condition (i.e. maximize planned maintenance and minimize emergency maintenance). This task will include discussions with the Village to determine current O&M activities (cleaning activities, training programs, etc.) and determine potential future consultant and Village work efforts required to enhance the Village's O&M program to determine which strategies are the most feasible for your organization.

Revenue Structure

The Village currently does not have any dedicated storm water funds. Storm water is typically funded as part of street improvements or grant funds. We will work with the Village to summarize existing storm water funding sources. We will also work with the Village to identify other potential sources of funding and assist with allocation of existing funds.

Capital Improvement Plan/Long Term Funding

The goal of the Long-Term Funding/Capital Improvement Planning (CIP) will be to identify how much and when money will be needed, based on projects identified, to meet the level of service goals to maintain the system at or above the identified minimum condition. This task will include discussions with the Village and historical/projected infrastructure cost information to assure that adequate information will be available to perform the funding/CIP analysis. We will also consider alternative forms of revenue creation to assist with funding the work.

Once the current and future needs have been identified, the project team will begin structuring a funding and financing strategy for the identified needs. We will study multiple scenarios for 10- and 20-year durations to guide the Village well into the future.

Financial Recommendations

- Identify current funding gap based on CIP and AMP.
- Evaluate additional annual revenues necessary to maintain an adequate Level of Service.
- Identify revenue options for future funding.
- Review all existing capital and O&M costs related to the Village's storm sewer assets. This will result in a comprehensive set of system needs that the Village can use to determine total system revenues necessary to address its stormwater infrastructure.
- Determine the costs of a failure including environmental, rehab/replacement, reduction in the level of service to customers, collateral damage, social costs etc.
- Determine the costs of rehabilitation, repair and replacement for the critical assets.
- Review alternate strategies that exist for managing O&M, personnel, and capital budget accounts.
- Review the life cycle costs including O&M, active rehabilitation, and replacement of the critical assets.

Subconsultants

To expedite the process, we may use subconsultants for portions of the work. We have estimated the fees for this proposal assuming our staff and hourly rates, obtained preliminary quotes and/or have allotted time or budgetary costs for sub consultant work. We will coordinate with the Village regarding the use of sub consultants. All charges for subconsultants will be costs of the project covered by the Grant and paid for from Grant proceeds. Some potential services where subcontractors or suppliers may assist include:

- Cleaning and videotaping of storm and sanitary sewers, including rating of sewers
- Manhole inspections, including rating of sewers
- Geographical Information Services – data entry, training, equipment purchases, etc.
Asset management consulting, if needed or desired Grant proceeds.