



STORM WATER MANAGEMENT OPERATIONS & MAINTENANCE SOFTWARE (SWMSOFT)

- The figure consists of a site plan and four cross-sections (A-A, B-B, C-C, D-D) of a proposed detention pond.

Site Plan: The plan shows the pond's irregular shape with a blue boundary. Inside, there are black crosses representing trees or vegetation. The pond is surrounded by a green line, likely a fence or property boundary. Red triangles with the number '2' are placed around the pond, possibly indicating survey points or specific features. A north arrow is located at the top center of the plan.

Cross-Sections:
 - A-A:** A longitudinal section showing the pond's profile. The elevation ranges from 75.800 to 78.000. The pond is filled with water (blue) and has a red line indicating the proposed structure or embankment.
 - B-B:** A transverse section showing the pond's profile. The elevation ranges from 75.800 to 78.000. The pond is filled with water (blue) and has a red line indicating the proposed structure or embankment.
 - C-C:** A longitudinal section showing the pond's profile. The elevation ranges from 75.800 to 78.000. The pond is filled with water (blue) and has a red line indicating the proposed structure or embankment.
 - D-D:** A longitudinal section showing the pond's profile. The elevation ranges from 75.800 to 78.000. The pond is filled with water (blue) and has a red line indicating the proposed structure or embankment.

Maintenance Objectives

- A comprehensive inventory of all the SWM assets owned by municipality
- Develop plans to maintain all components within each asset to minimize liability and costs:
 - Capital expenditures
 - Operational costs

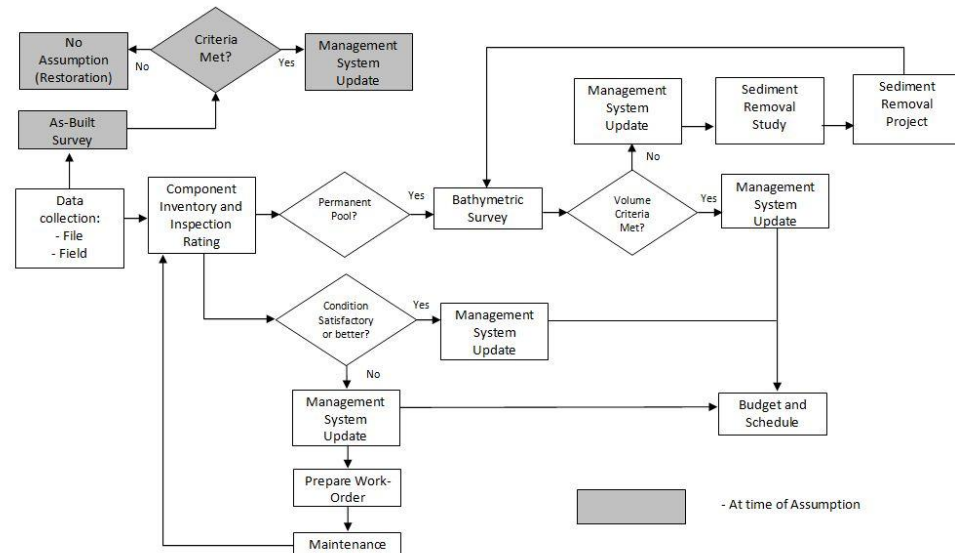
Methodology

1. Data Collection

- Field
- File



2. Organize and store all data in easily accessible GIS-Database (SWMSoft)



3. Create comprehensive Assumption and O&M Master Plan

Data Collection

Existing File Data Collection:

- Collect design and as-built drawings and reports
- Review files and data extraction
- Component
 - Identification
 - Information entry into O&M system
- Create field inspection forms



Comprehensive Field Inspections:

- Visit all facilities and supply all necessary equipment
- Identify and locate components
- Populate all inspection forms
- Photographic Records
- Bathymetric Survey

Additional Component Form
3/28/2012

Facility ID: _____

Component Name: _____

Component Type: (Circle One) Access Road Aerator Baffle Block Bank Berm Boardwalk Channel DIB Emerg. Eq. Fence Gate Gate Headwall Inlet Lock Lookout Manhole Manicured Grass Other Outfall Outlet Pipe Railing Retaining Wall Riser Pipe Sign Spillway Valve Vegetation Walkway Water Weir

Parent Component: (Circle One) Access Road Facility Fence Gate Inlet Manhole Outlet

General Description: _____

Location Description: _____

Site ID: _____

Condition: 1 2 3 4 5

Comments: _____

Notes: (Type, Spec Number, Number, Line, Elevation, Capacity, Restrictions, Material, Combination) _____

COLE ENGINEERING
 Sustainable. Smarter. Safer.

Condition: 1 - Excellent 3 - Attention Required 5 - Safety Hazard
2 - Satisfactory 4 - Non-Functional © 2010 Cole Engineering Group.

Past Inspection Report
2/24/2012

General Site Information

Facility Name: Cullen Estates Subdivision (southern)

Facility ID: PD 34-03

Nearest Major Intersection: Medland Avenue and Cochran Street

R.P. No.: Pond located behind row of houses, east of Cochran Street

TRCA/CVC No.: Storm outfall from Cochran Street to water quality pond

Inspector: Jordan Webb

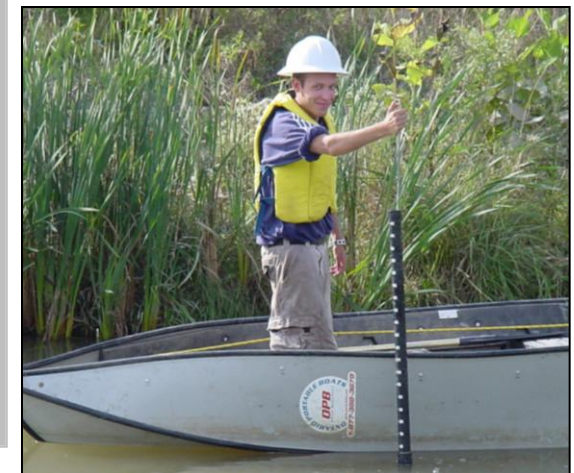
Inspection Date: 6/10/2011

Inspection Results

Name	Condition	Comments
Access Road	2 - Satisfactory	No vehicle turnaround. Good working order.
Facility	2 - Satisfactory	No garbage or erosion. Functioning properly with correct water levels. Inlet 2 needs some attention.
Fence	2 - Satisfactory	Good working order.
Inlet 1	2 - Satisfactory	Concrete baffle blocks present. Minimal constant flow. Rocks on outfall to direct water course channel. Surrounding vegetation and cattail is intense, may be limiting flow. Structural condition is ok.
Inlet 1: Baffle Blocks	2 - Satisfactory	Structural condition is ok.
Inlet 1: Fence	2 - Satisfactory	No rusted, bent or broken bars. Securely affixed to wall.
Inlet 1: Grate	2 - Satisfactory	Structural condition is ok.
Inlet 1: Headwall	2 - Satisfactory	No obstructions/debris, sediment accumulation, standing water or evidence of surcharge.
Inlet 1: Pipe	2 - Satisfactory	Debris blocking grate and channel. Cattail vegetation is extreme and needs maintenance.
Inlet 2	3 - Attention Required	Structural condition is ok. Vegetative overgrowth.
Inlet 2: Fence	2 - Satisfactory	No rusted, bent or broken bars. Securely affixed to wall. Cattails starting to surround it.
Inlet 2: Grate	2 - Satisfactory	Structural condition is ok. Vegetative cover needs to be clear away.
Inlet 2: Headwall	3 - Attention Required	No obstructions/debris, sediment accumulation, standing water or evidence of surcharge.
Inlet 2: Pipe	2 - Satisfactory	Good working order.
Manhole	2 - Satisfactory	Manhole is bolted down (slightly rusted). Vegetation grass is covering part of structure.
Wicken-bottom Manhole	2 - Satisfactory	

COLE ENGINEERING
 Sustainable. Smarter. Safer.

Page 1 of 1
© 2010 Cole Engineering Group.



Component Categories

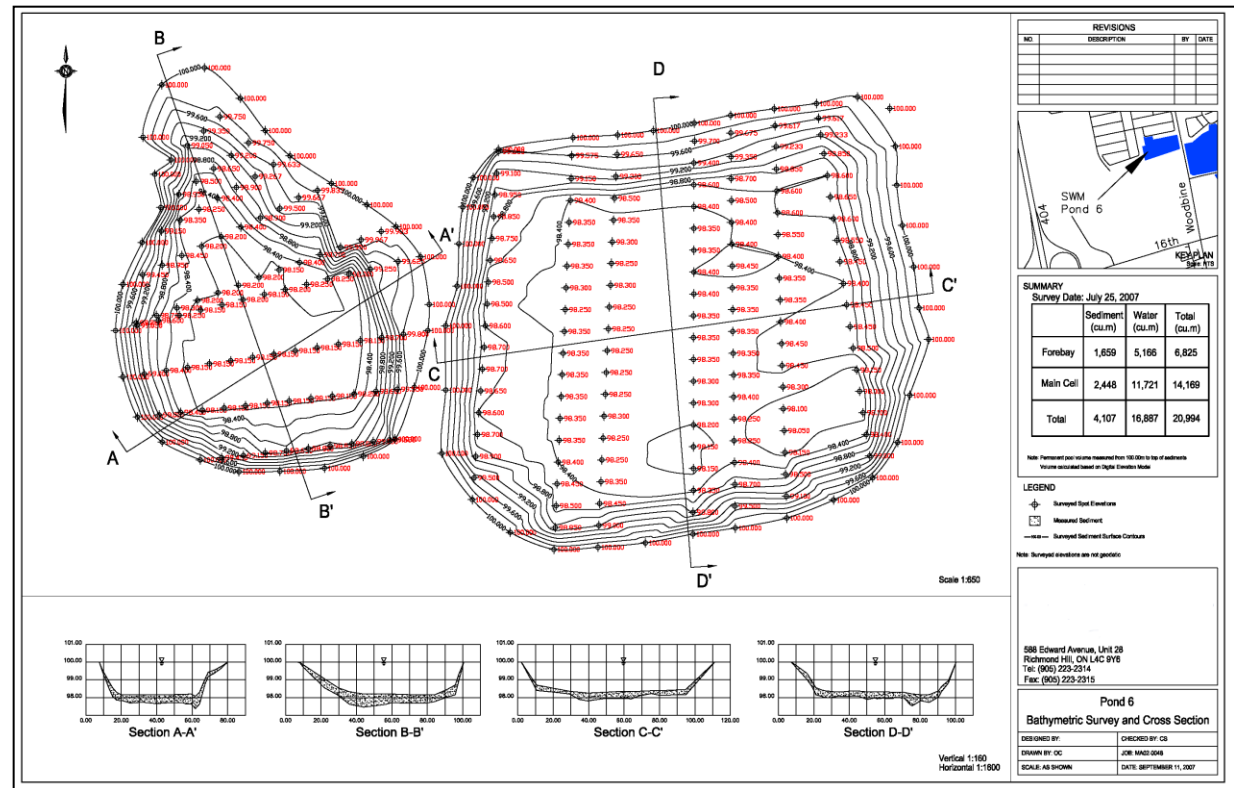
Name	Description
Access Road	Check for surface integrity, vegetation cover, erosion.
Aerator	Ensure visible bubbling, lack of algae in pond.
Baffle Block	Check for structural condition (cracking, flaking, broken, separating, leaning).
Bank	Check for evidence of animal burrows, unstable slopes, and erosion.
Bench Mark	Make sure to record any offset from the actual bench mark
Berm	Check slope stability, vegetation cover condition, erosion reels.
Boardwalk	Check for surface integrity, moss (slippery), weeds.
Channel	Check for standing water, structural integrity and in-stream erosion.
DICB	Check for obstructions/debris built-up around structure, sediment accumulation at the bottom, standing water, slope stability, water quality at the surface (colour, smell), vegetation cover.
Emergency Equip.	Check for presence and functionality of necessary equipment
Facility	Check for garbage, erosion, proper functioning and correct water levels
Fence	Check for structural condition (broken, leaning).
Gate	Check for structural condition (broken, leaning), lock, hinges, grease.
Grate	Check grate bars for rust, bent, broken, open/closed, lock.
Headwall	Check for structural condition (cracking, flaking, broken, separating, leaning).
Inlet	Check for obstructions/debris built-up around structure, sediment accumulation at the bottom, aesthetic conditions (graffiti, etc.), slope stability, water quality at the surface (colour, smell), vegetation cover.
Lock	Check for structural condition (broken, rust), grease.

Component Categories

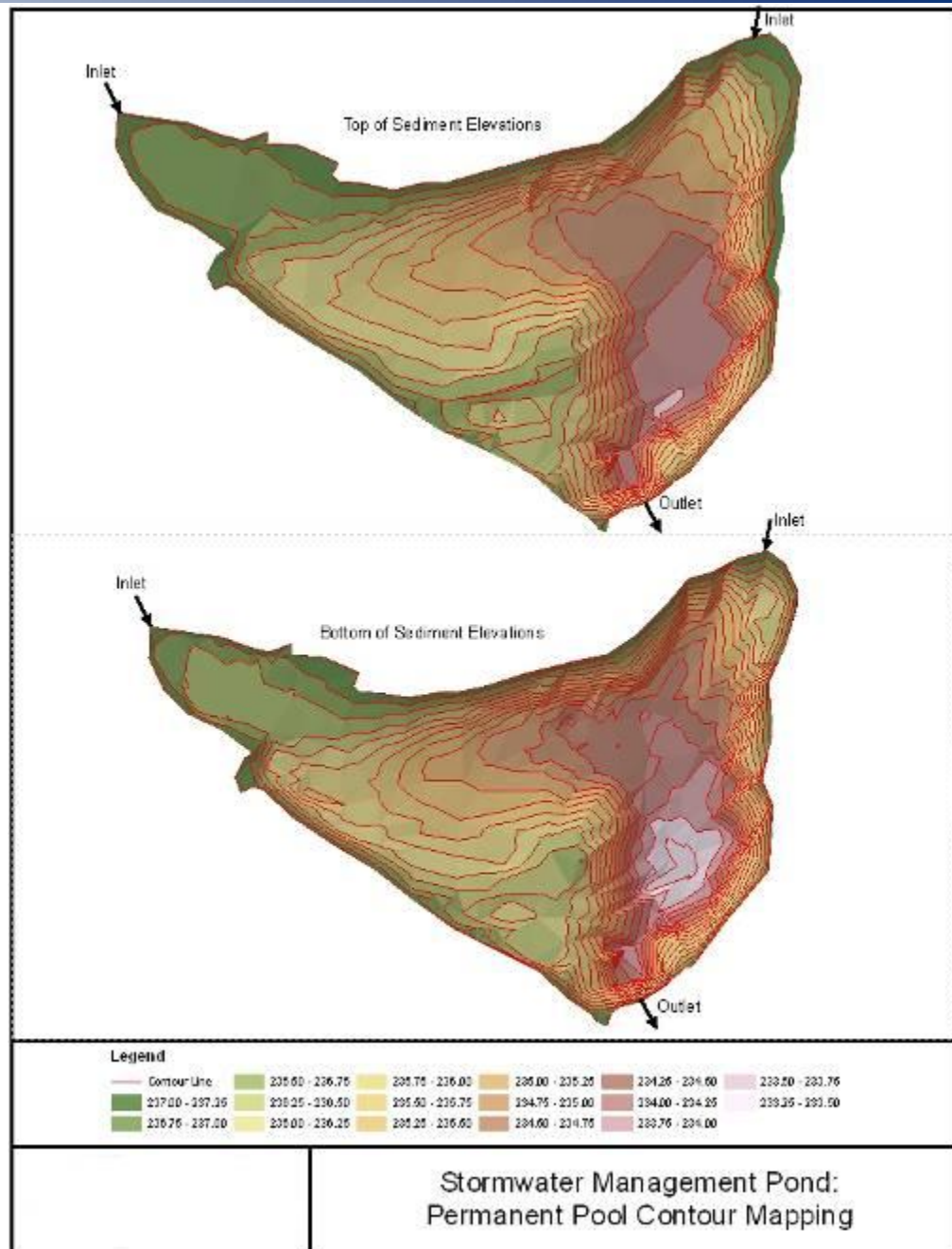
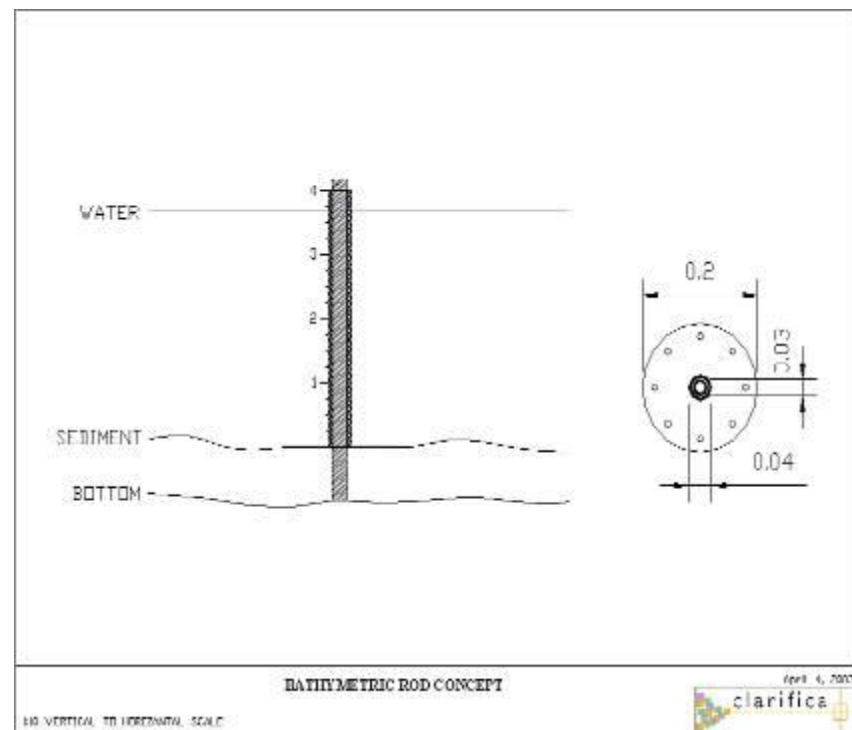
Name	Description
Lookout	Check interpretation signs.
Manhole	Check integrity of cover (rust, bent, broken, open/closed, lock-bolts), settling around, erosion.
Manicured Grass	Approximate manicured area
Other	Check structural condition and function
Outfall	Check for obstructions/debris built-up around structure, sediment accumulation at the bottom, aesthetic conditions (graffiti, etc.), slope stability, water quality at the surface (colour, smell), vegetation cover.
Outlet	Check for obstructions/debris built-up around structure, sediment accumulation at the bottom, aesthetic conditions (graffiti, etc.), slope stability, water quality at the surface (colour, smell), vegetation cover.
Pipe	Check for obstructions/debris built-up, sediment accumulation at the bottom, standing water, evidence of surcharge, vegetation cover.
Railing	Check for structural condition (broken, leaning).
Retaining Wall	Check for structural condition (cracking, flaking, broken, separating, leaning).
Riser Pipe	Check for structural condition (cracking, flaking, broken, separating, leaning), clogging.
Signage	Check for legibility, integrity and accuracy of signs
Spillway	Check for structural condition (cracking, flaking, broken, separating, leaning), obstructions.
Valve	Check functionality, rust, grease, leaks.
Vegetation	Check for general cover condition (eg. grass height), sick trees, noxious weeds.
Walkway	Check for surface integrity, vegetation cover, erosion.
Water	Check water level (not higher or lower than design permanent pool level), oily sheen, algae growth or abnormal colour or odour.
Weir	Check for structural condition (cracking, flaking, broken, separating, leaning), obstructions.

Bathymetric Survey

- Survey completed by taking 50 -100 points of both sediment and bottom layer of pond
- Sediment and water volumes calculated using CAD or GIS and compared with minimum active volume requirements



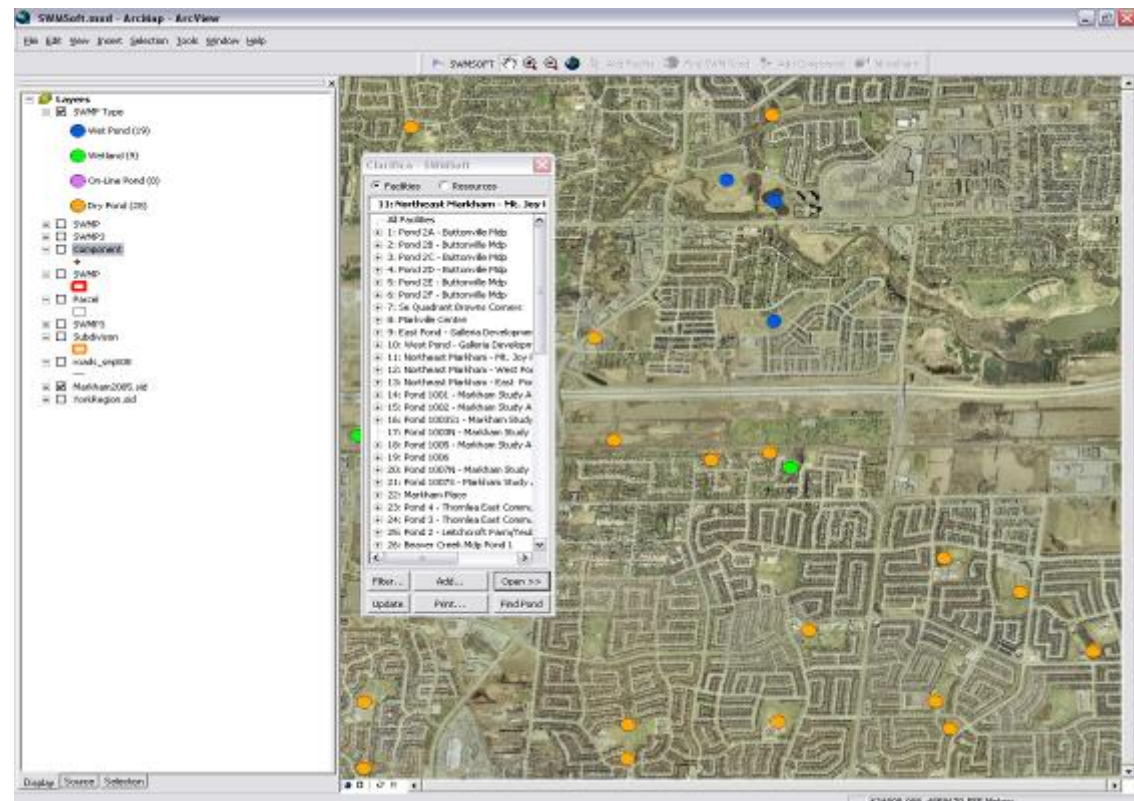
Dual Measurement Bathymetric Survey



SWMSoft

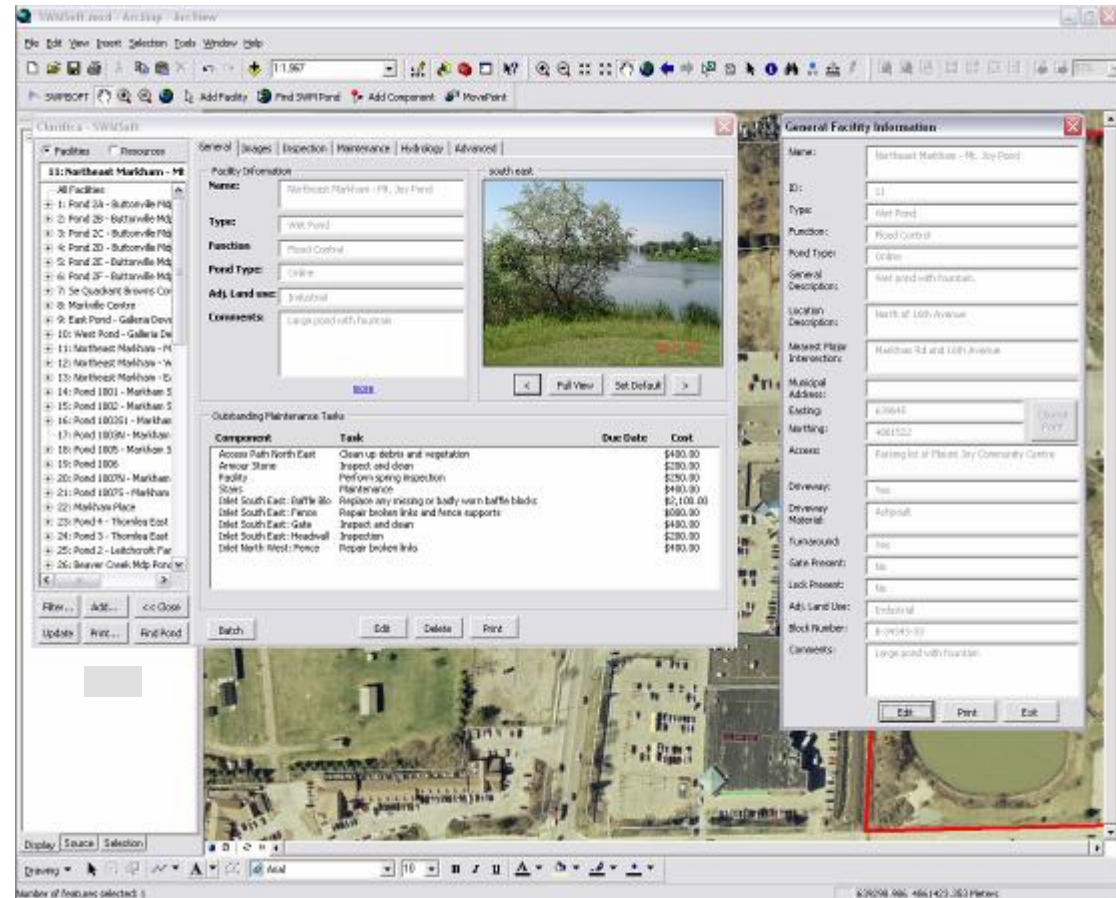
SWMSoft = Centralized Repository of all SWM Information

- SWM Reports
- Drawings
- Inspection results
- Maintenance (completed and recommended)
- Photographs
- Sediment accumulation and forecasting



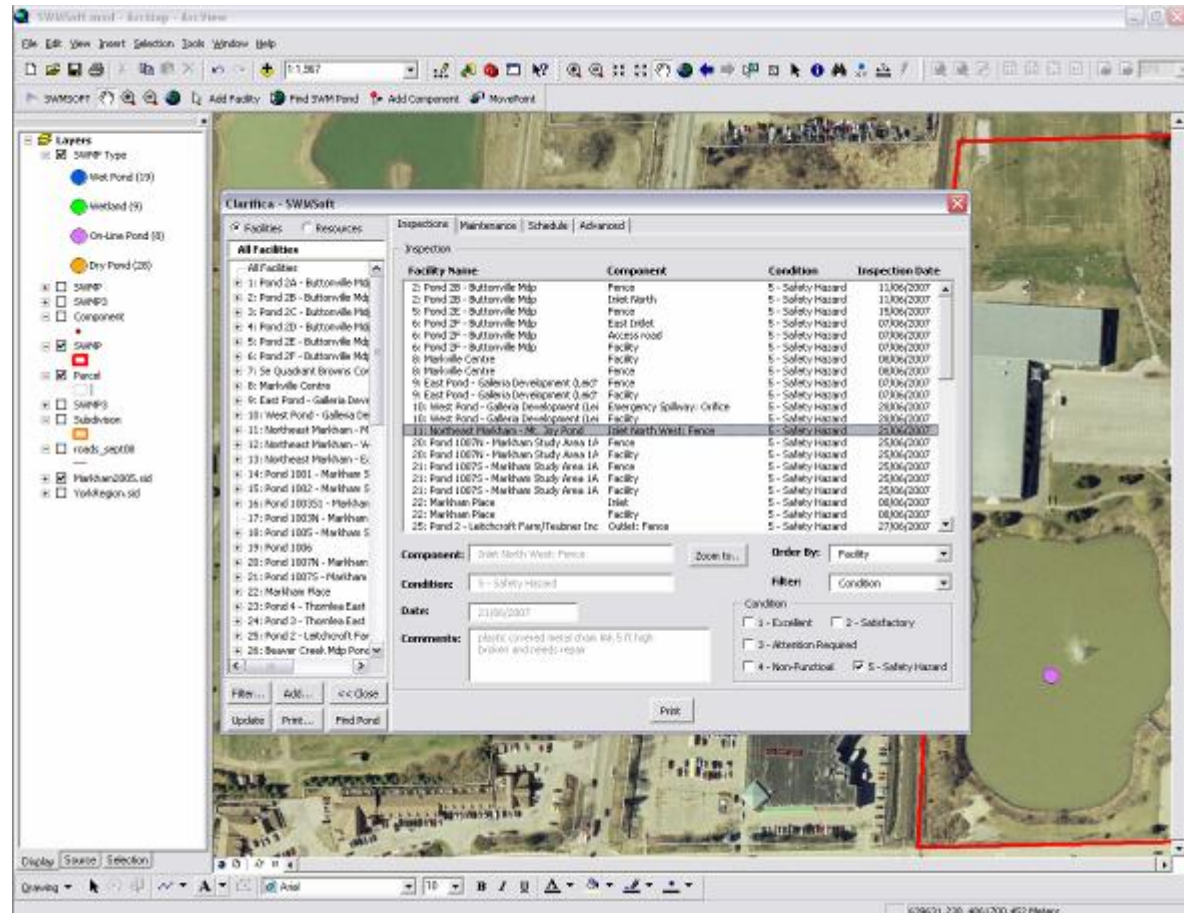
Facility Information

- Provides general information about facilities including:
 - Name and ID
 - Type
 - Location
 - Access
 - Maintenance tasks
 - Comments
- Facility status and general inspection forms can be printed directly from this screen



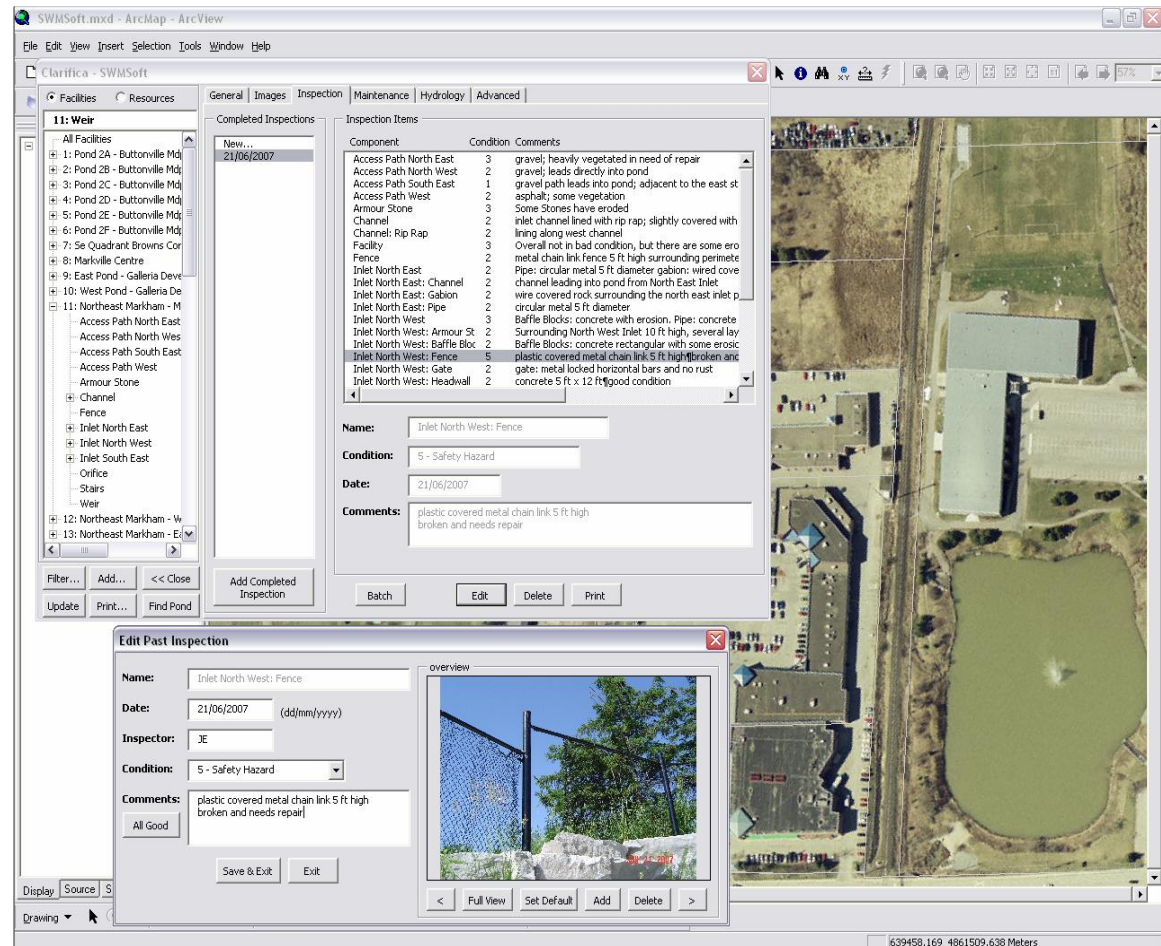
Inspection Summary

- Lists all components and their current condition
- Filters:
 - Condition
 - Type (wet ponds)
- Sorting:
 - Facility
 - Component
 - Condition
 - Inspection date



Inspections Details

- Provides access to:
 - Inspection results
 - New inspection forms
- Lists all components associated with a facility including:
 - Inlet and outlet structures and pipes
 - Fences
 - Access roads
 - Weirs and other controls
 - Structural elements
- Reports condition and comments by:
 - Overall facility
 - Component
 - Inspection date



Maintenance Summary

- Detailed breakdown of cost for each maintenance task

The screenshot displays the SWISoft software interface, specifically the 'Clarifica - SWISoft' window. The interface includes a 'Layers' panel on the left, a 'Facilities' list in the center, and a 'Maintenance' tab on the right. The 'Maintenance' tab shows a table of 'Outstanding Maintenance Tasks' with columns for 'Facility', 'Task', and 'Cost'.

Facility	Task	Cost
5: Pond 2F - Butternut Mts		\$1,250.00
11: Northwest Park - M. Jay Pond		\$5,100.00

Below the table, the 'Facility' dropdown is set to '11: Northwest Park - M. Jay Pond'. The 'Component' dropdown is set to 'Access Path North East'. The 'Task' dropdown is set to 'Clean up debris and vegetation'. The 'Cost' dropdown is set to '\$400.00'.

The 'Maintenance' tab also includes a 'Schedule' sub-tab and a 'Print' button. The background of the software shows an aerial view of a pond and surrounding area.

Maintenance Details

For each facility, identifies recommended maintenance tasks including:

- Component to be maintained
- Description of task
- Work order status
- Request date and due date
- Resources required (staff, time, and equipment)

The screenshot shows the SWMSoft software interface. The main window displays a map of a facility with a red outline. A 'Clarifica - SWMSoft' window is open, showing a table of maintenance tasks. The table has columns for Component, Task, Status, Request Date, and Due Date. The tasks listed are:

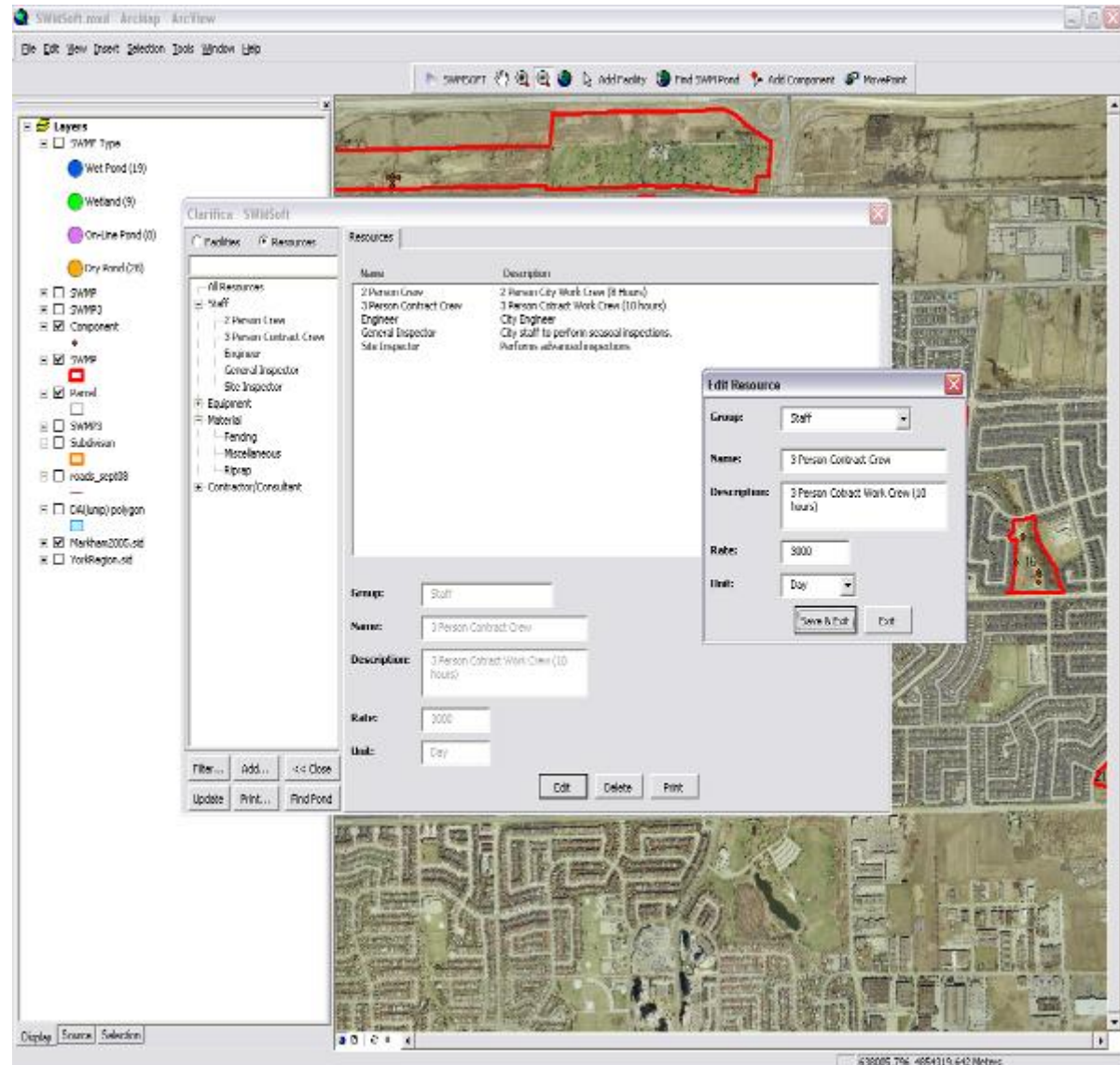
Component	Task	Status	Request Date	Due Date
Access Path North East	Clean up debris and vegetation	Open	28/09/2007	
Islet South East: Delta B	Replace any missing or badly worn battis blocks	Open	28/09/2007	
Amour Stone	Inspect and clean	Open	28/09/2007	
Islet South East: Delta	Replace missing battis and remove supports	Open	28/09/2007	
Islet South East: Delta	Inspect and clean	Open	28/09/2007	
Facility	Perform opening inspection	Open	28/09/2007	
Islets	Monitor law	Open	28/09/2007	

The window also includes fields for Name, Task, Description, Type, Status, Request Date, Due Date, Request By, Reminders, and Cost. A small image of a facility component is shown on the right side of the window.

-
- The screenshot displays the SWISeft software interface, which is used for water management and mapping. The main window shows an aerial map of North East Marlham, with a red boundary outlining a specific area and a purple dot marking a location. The interface includes a menu bar (File, Edit, View, Insert, Selection, Tools, Window, Help) and a toolbar with various icons for map manipulation. On the left, there is a 'Clarification - SWISeft' panel with tabs for 'Facilities', 'Resources', 'General', 'Inspection', 'Maintenance', 'Hydrology', and 'Advanced'. The 'Facilities' tab is active, showing a list of facilities and a thumbnail gallery. The 'Resources' tab is also visible, showing a list of resources. The 'General' tab is selected, displaying a map view of the selected facility. The 'Inspection' tab is also visible, showing a list of inspection points. The 'Maintenance' tab is also visible, showing a list of maintenance tasks. The 'Hydrology' tab is also visible, showing a list of hydrology data. The 'Advanced' tab is also visible, showing a list of advanced settings. The bottom of the interface features a 'Display' panel with 'Source' and 'Selection' tabs, and a 'Drawing' panel with various drawing tools. The status bar at the bottom shows the coordinates '029419.170, 4301773.179' and the text 'Marham'.

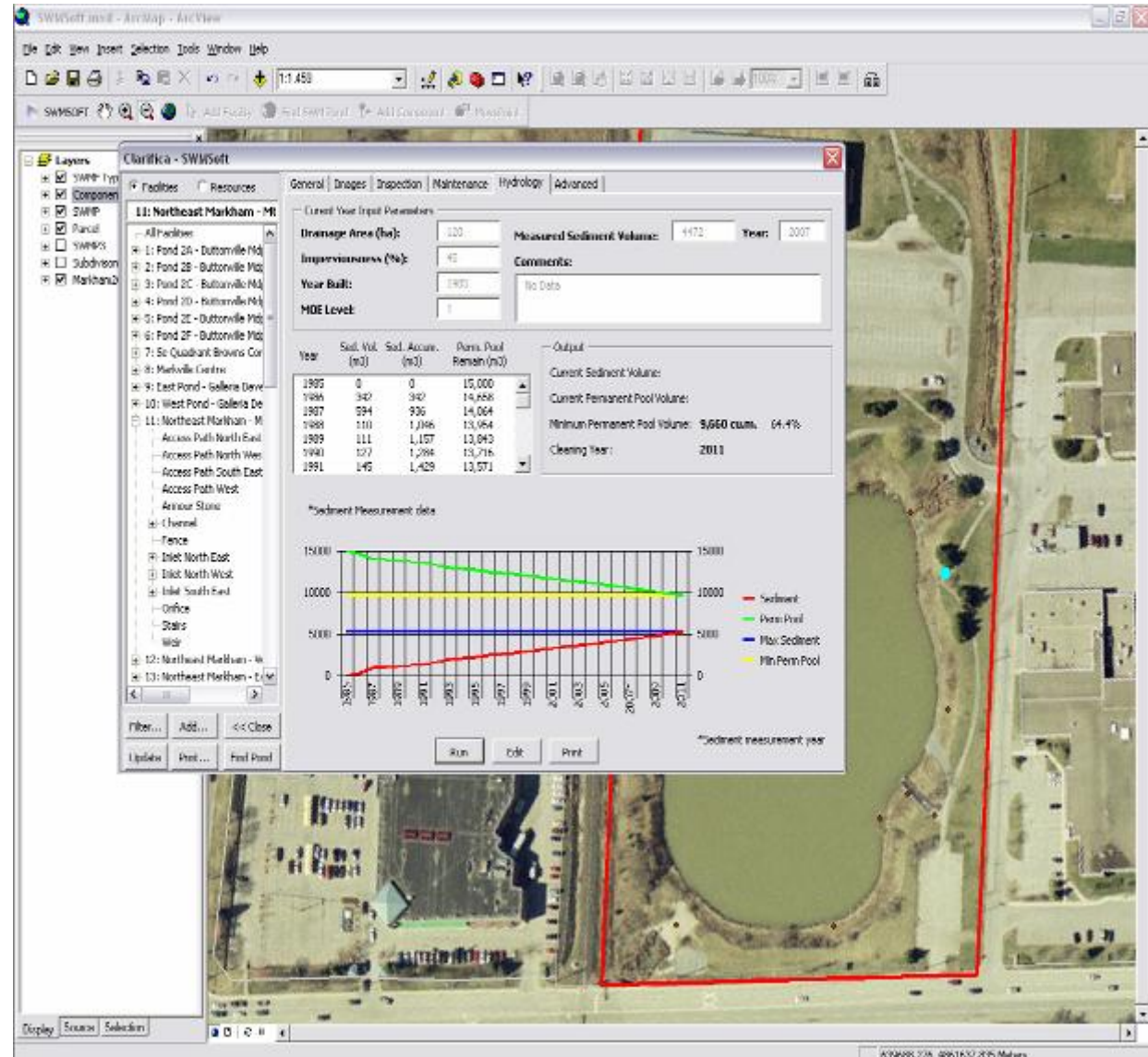
Resources & Costs

- Unit rates and staff times
- Equipment and material costs



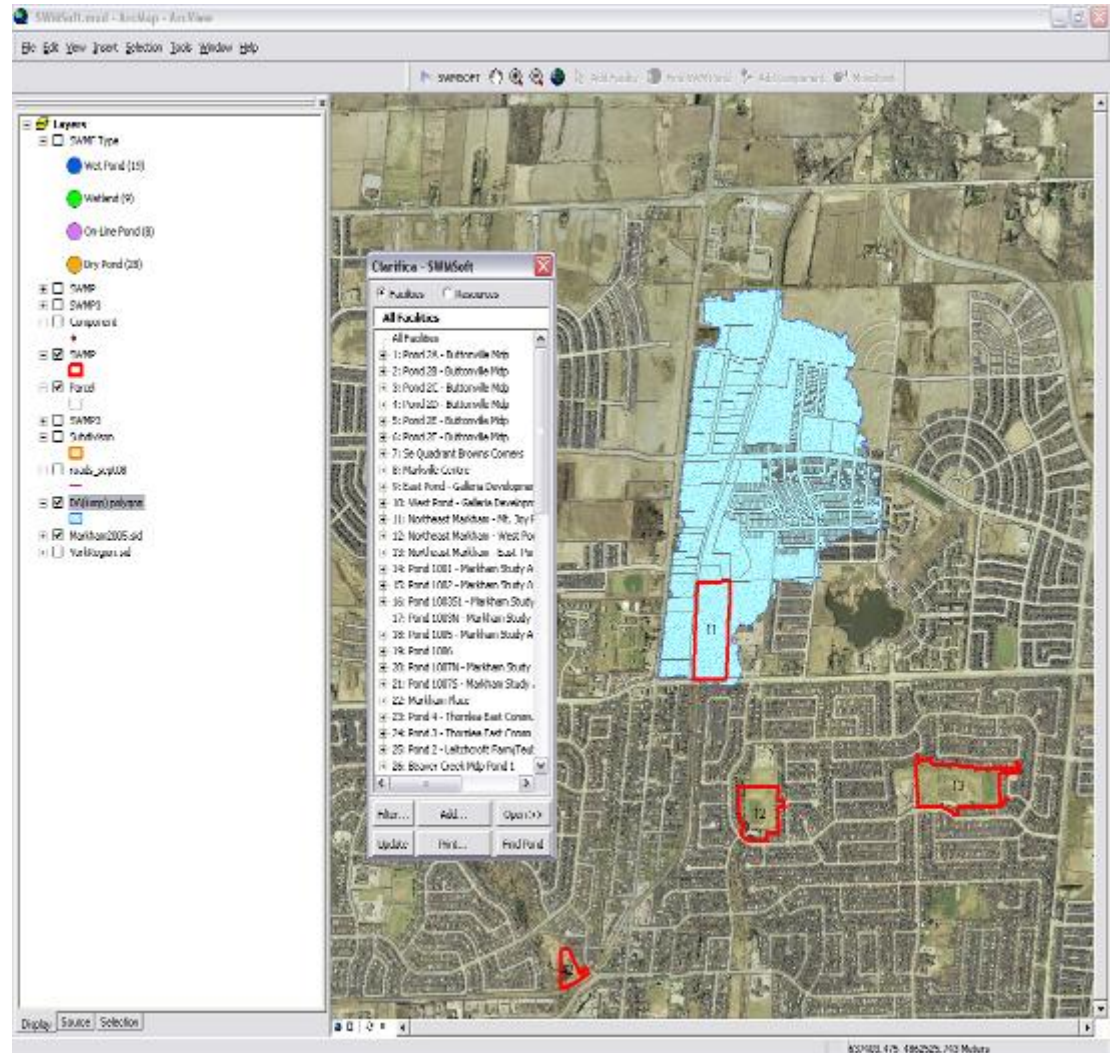
Hydrology, Water Quality, Environmental Management

- Integrated SWMM model to forecast sediment accumulation
- Estimates based on drainage area, past surveys, and age
- Pollutant build-up and wash-off function included for estimates



Drainage Area

- Drainage area delineation:
 - Spill response
 - New or infill development SWM criteria
 - Development charges
- Major and minor system drainage area



Other Useful Functions

- Facility Index Map
- Detailed SWM Facility information binders
- Maintenance priority listing and detailed costing

General Information Report
30/09/2003

All Facility Maintenance Task Report
30/09/2003

All Maintenance Tasks	
Component Name	Budget
Facility Name: 1: Thornhill/Maughan Neighbourhood (A4) - Pond 4	Facility Budget:
Facility Name: 5: Lakeview Estates Ltd	Facility Budget:
Facility Name: 14: Pond 1 - Woodland Acres	Facility Budget:
Facility Name: 15: Thornhill/Maughan Community - Pond D (Maryla Payne Park)	Facility Budget:
Facility Name: 16: Keele #407	Facility Budget:

Component List	Description
Standard Inlet	
sided concrete headwall	
Concrete Blocks	
locks that demarcate the forebay from the main pond	
wide path concrete/ground to treyay	
erm. between D on River and facility	
utlet that exits to Don River	
sided concrete headwall with pipes	

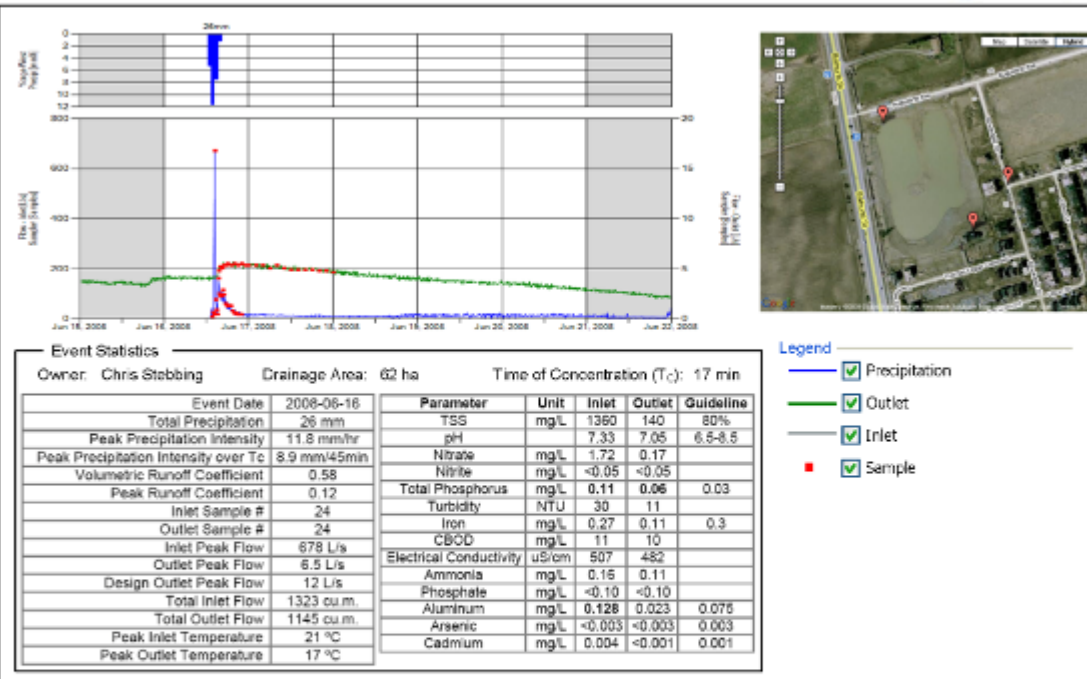
© Clarifica Inc. 2003.

SWM Monitoring Records

Pond Monitoring and Sample Analysis

Clarifica Automated Data Analysis System

Project: Yonge West Environmental Monitoring
Site: Pond A



Setup

Project:

Site:

Flow Sensor:

Rain Gauge:

T_c :

Drainage Area:

Event Date:

Start: 2008-05-15 00:00:00

End: 2008-05-22 23:59:59

Inter-event dry period: 48 hours

Pond Assumption Protocols

- Developers provide information and consistent QA/QC surveys prior to assumption
- New facilities added via standard forms

The screenshot displays a software interface for adding a facility. It features a map of a residential area with a pond. Overlaid on the map is a form titled "Add Facility". The form contains the following fields:

- Name: Test
- ID: 65
- Type: [Dropdown menu]
- Function: [Dropdown menu]
- Pond Type: [Dropdown menu]
- General Description: [Text area]
- Location Description: [Text area]
- Nearest Major Intersection: [Text area]
- Municipal Address: 6135 Water Street
- Easting: [Text area]

Below the form are two technical drawings:

- FOUNDATION PLAN - INLET CONTROL STRUCTURE
- FOUNDATION PLAN - ENDWALL

At the bottom of the form is a "Comments:" section with a text area. To the right of the form is a "Choose Point" button. At the bottom right are "Save", "Clear", and "Quit" buttons.

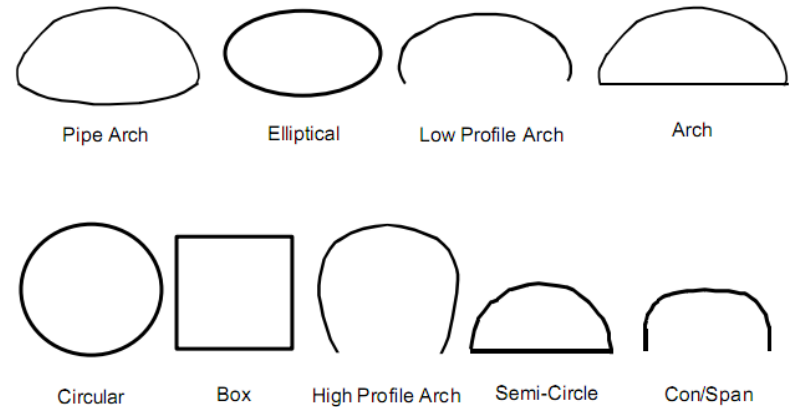
Crossings (Culvert, Bridges...)

- Similar to ponds, location, type, inspection, maintenance requirements, etc. available through system
- Specialized cross-related components included
- All HEC-RAS information stored



Crossings (Culvert, Bridges...)

- Crossings types:
 - Single Pipe
 - Multi-Pipe
 - Box
 - Bridges
- Specialized components include:
 - Piers including drag coefficient and size
 - Wing walls
 - Slope
 - Size and shape of openings
 - Material



Questions?

