



# Crystal Lake Watershed Stormwater Management Program Implementation Plan

Prepared by:

*Hey and Associates, Inc. &  
Crystal Lake Engineering Division*

Prepared for:

City of Crystal Lake

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## **EXECUTIVE SUMMARY**

The Crystal Lake Watershed Stormwater Management Plan was adopted to protect Crystal Lake by regulating the stormwater management practices of properties that develop in the Watershed. As the plan was being finalized by the City Council, the Council requested that a companion document be developed that would provide more detail on how the watershed regulations would be executed by the City. The final product was the Crystal Lake Watershed Stormwater Implementation Plan. The plan gives specific details on what the responsibilities of developers, property owners, and the City are in the watershed.

### **Regulation**

The Crystal Lake Stormwater Management Design manual and the Crystal Lake Stormwater Ordinance provides guidance for the design and construction of stormwater management best management practices (BMPs). The implementation plan presents a system where those facilities are working as intended in perpetuity.

### **Education**

- The City will prepare an educational brochure and distribute it to stakeholders in the Watershed. It will address the importance of the Watershed, the adverse impacts of sodium chloride, fertilizers, pesticides, etc. and describe BMPs and their benefit.
- The City will provide this brochure on the City webpage and at other civic locations.

### **Monitoring**

- The City will continue its current monitoring program in the Watershed and expand it with 6 new locations.
- Monitoring will address the quality of the stormwater and quantity of flow.
- New developments will be required to install monitoring ports at the infiltration basins, drain tiles entering and leaving the site, and up gradient and down gradient.

### **Tracking**

The City will track all aspects of the storm water management system in the watershed, such as BMPs, infiltration basins, monitoring results, and enforcement efforts. The City will develop a system to automate inspections and data reporting.

### **Inspections**

- The City-hired consultant will perform inspections during construction and after construction at the owner's expense. Primary duties after construction are to inspect BMPs, determine if maintenance is being performed and preparing and submitting to the City the annual inspection report.

### **Maintenance**

- A City-hired consultant will perform the maintenance activities required for the stormwater management facilities at the owner's expense for non-residential and residential developments. Primary tasks are cleaning and removing debris, eradicating nuisance vegetation, repairing control structures, mowing or burns depending on the maintenance requirement, watering, and replacing vegetation.

### **Enforcement**

- The primary means of enforcement of these regulations during construction will be through the permit process. A performance surety supplied by the developer and held by the City will also be required. This performance surety can be used to correct any violations that could occur if the City cannot obtain compliance by other means.
- Enforcement by the City will also be performed after construction is complete.

### **Funding**

- The City Administered Comprehensive Program will be funded primarily by the City initially. Permit fees will be assessed also. When the Watershed is built out, the City will consider a Stormwater Utility Fee to fund an outsourced program.
- Fees as defined by the implementation plan will be collected to offset the cost of reviewing and inspecting the stormwater management facilities during the approval and construction of development.
- Residential development maintenance of their facilities will be funded through special service areas.
- Non-residential developments will enter into a participation agreement with the City, as part of the approval process or condition of a PUD defining maintenance responsibilities and costs. Additionally, a SSA may be established and a covenant running with the land.

## **INTRODUCTION**

This Stormwater Management Program Implementation Plan defines the program elements, roles and responsibilities of the parties that will implement and sustain stormwater management in the Crystal Lake Watershed. The City, developers, and the new property owners will all have responsibilities for program implementation. Ultimately, the costs of the program will be borne by developers and new property owners in the watershed. The Stormwater Management Implementation Program will consist of the following major components:

- Regulation
- Education
- Monitoring
- Tracking
- Inspections
- Maintenance
- Enforcement
- Funding

## **REGULATION**

The Crystal Lake Watershed Stormwater Management Design Manual (Manual) and the Crystal Lake Stormwater Ordinance provide regulations for the design and construction of stormwater management systems within the Crystal Lake Watershed (Exhibit 1). The overall goal of these regulations is to protect the quantity and quality of water reaching Crystal Lake. However, to ensure that this goal is achieved, a stormwater management implementation program is also needed for the Crystal Lake Watershed. This program would cover monitoring, tracking, inspections, enforcement, maintenance, and funding to ensure that the stormwater management designs continue to function in perpetuity.

## **EDUCATION**

The City will prepare an educational brochure and distribute to stakeholders in the Watershed as well as developers or potential land purchasers. The brochure will include:

- 1.) A general explanation of the importance and function of the Watershed and its relationship with Crystal Lake,
- 2.) A map of the area defined as the Watershed,
- 3.) A discussion on the adverse impact of fertilizers, pesticides, herbicides, phosphorus, and sodium chloride use in the watershed,
- 4.) An overview of the types of Best Management Practices that can be utilized to treat stormwater discharge and provide infiltration.

The City will post this brochure on the City website and make it available at public locations, such as the Crystal Lake Public Library, the Crystal Lake Chamber of Commerce, and McHenry County College.

At the direction of the City Council, the City will host an annual workshop to educate watershed stakeholders as to their responsibilities.

## **MONITORING**

Monitoring refers to the quantity and quality of stormwater runoff, effluent from BMPs and infiltration basins, tile lines and groundwater. It does not refer to inspection, which is discussed in another section.

The monitoring program has been developed to assess the water quality and quantity performance of new development BMPs in the watershed. The recommended program addresses the following issues.

- Monitoring of the watershed as a whole
- Facilitation of individual site and BMP monitoring
- Monitoring responsibility
- Monitoring frequency
- Constituents to be monitored
- Assurance of sample collection quality and analysis

### **City Administered Comprehensive Watershed Program**

The monitoring program will be primarily implemented and expanded by the City. A City-operated monitoring program can assure the quality of sample collection and analyses. Likewise the City will be able to coordinate sampling frequency and locations to provide the most useful and relevant data such as during spring agricultural fertilizer applications and during major rainfall events. The City also will be able to decide which constituents should be analyzed and when based on experience. This flexibility is critical to providing the most useful information for management decisions.

The City's current monitoring and sampling program has been ongoing for nearly thirty years. Sampling typically has been conducted at four locations: Honeysuckle, Lippold, Cove Pond, and the Lake outlet. Water quality has been assessed for total suspended solids, total volatile solids, dissolved oxygen, fecal coliform, fecal strep, total coliform, temperature, pH, CBOD, ammonia, nitrate, chloride, and phosphorus. There is an extensive database managed by the City regarding this program.

The City will undertake the following efforts.

1. Expand the monitoring program to include routine groundwater levels at six sites throughout the watershed as shown in Exhibit 1. Sample quarterly or additionally if determined necessary by the City Engineer.
2. Expand its current monitoring program to include groundwater quality four times each year at ten sites (six new and four existing).

3. Expand the current monitoring program to include tile flow and quality at three locations as shown on Exhibit 1, and future monitoring locations that may be established
4. Collect samples at current locations (Honeysuckle, Lippold, Cove Pond, and the lake outflow) and new tile locations at least twice monthly.
5. Expand the current constituent analytical list to include nitrate, chloride, zinc, and fecal coliform in addition to existing constituents (suspended solids, phosphorus, etc.).
6. Analyze a composite sample of tile flow for priority pollutants once a year, preferably in the spring. If any results indicate priority pollutants are a concern, then a forensic investigation to determine sources may be conducted.
7. Conduct detailed forensic investigations using the monitoring ports constructed as part of new developments if watershed-wide data indicate concerns with water quality or groundwater elevations.

The City will expand its current program to include the sampling as indicated above. These costs will be absorbed, initially as part of the operation and maintenance costs. The installation of the six additional groundwater-monitoring wells is estimated to cost about \$9,000. Additional flow meters and testing equipment is approximately \$5,000. The City will pursue partnerships, similar to the Fox River Watershed Partnership, with the Crystal Lake Park District or other qualified organizations to assist in the monitoring and the upfront well and equipment costs. A minimum fee of \$1500 per development will be assessed upon applications for rezoning, PUD, and annexation to offset these costs. The fee will be assessed at \$30 per acre but no less than \$1500 per development.

In the future, upon substantial percentage of development completion of the Watershed, the City may consider outsourcing the entire program to a consultant for collection and a laboratory for analysis. Estimated costs for such a program are as shown in Table 1 and would then need to be assessed to benefited, developed properties, probably through a stormwater utility fee as there would be defined costs to distribute to the defined developments:

The City will analyze the data annually to determine if adjustments to the monitoring program are in order.

### **Estimated Cost – Long Range Watershed Build-out, Outsourced Program**

A future, out-sourced City-operated monitoring program for the watershed would require the following approximate level of effort and cost. These estimates are based on current market rates and are summarized in Table 1. The total estimated annual cost for the watershed-monitoring program is \$46,000 with additional automated equipment costs of \$30,000. This does not include the potential for additional detailed site investigations, if they become necessary.

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STORMWATER MANAGEMENT PROGRAM  
IMPLEMENTATION PLAN

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**Table 1. City Annual Watershed Monitoring Program (Outsourced)**

Monitoring Task	Annual Frequency	Staffing Collection	Analyses	Method	Routine Samples	Priority Pollutants	Labor	Equipment	Analytical Rate	Total Cost
Groundwater Level (automatic equipment)	6	24	24	Automatic	Daily		\$5,000	\$5,000*	0	\$10,000*
Groundwater Quality (Manual Collection)	4	4	4	Manual	24	1	\$5,000	\$1,000	\$7,000	\$13,000
Tile Quantity (automatic equipment)	3	12	12	Automatic	Hourly		\$5,000	\$25,000*	0	\$30,000*
Tile Quality (Manual Collection)	24	72	72	Manual	72	1	\$5,000	\$2,000	\$22,000	\$29,000

\*First year only. Annual costs = \$2,000 each

### Development Monitoring

Developers will have the following responsibilities as defined in the Design Manual:

1. Provide monitoring ports on tile lines entering and leaving their properties.
2. Provide monitoring wells at the upgradient and downgradient points on their property. The wells will penetrate to at least ten feet below current groundwater levels.
3. Provide a monitoring port in their infiltration basins.

A City hired consultant, will collect samples at each of the monitoring ports listed above on a quarterly basis for the first two years to establish baseline data. This cost will be borne by the developer or subsequent owner. Frequency of sampling will be adjusted accordingly based on sampling results. Regardless, of any change in frequency, the owner or other responsible party will be responsible for the monitoring costs in perpetuity.

### TRACKING SYSTEM

The City will continue to use the current extensive tracking system already in place. The City may expand the system for tracking all aspects of the stormwater management system that is constructed in the Crystal Lake watershed. Such a system would give the City a readily available current inventory of the status of all BMPs, infiltration basins, and all inspection, enforcement and monitoring results for the watershed.

A developments stormwater management system drawings should be submitted on a GIS-ready electronic file. This will allow the City to automate its inspection and monitoring schedules. The City could also automatically send notices to property owner’s associations. Reporting also could be automated as data is collected.



**Estimated Cost**

The cost to develop an expanded system and to enter data and maintain it is estimated at about \$15,000 with annual costs at \$10,000. As part of development approval, a permit fee will be assessed on a prorated basis to offset these costs.

**INSPECTIONS**

Many state and local programs stress the need for frequent inspections of BMPs and infiltration facilities. Frequent and thorough inspections are needed both during construction and post-construction to ensure that BMPs and infiltration basins operate as designed. At least nine different key points during the construction process have been identified in the Design Manual and inspections or observations should accompany each of these steps. Table 2 presents a list of these steps and the roles and responsibilities of the City, and/or its designee and the developer.

**Table 2. Watershed Construction Inspection Schedule During Construction**

	<b>Inspection Item</b>	<b>Developer Responsibility</b>	<b>City Responsibility</b>
1.	Site soil borings and infiltration testing.	Conduct required tests.	Observe tests and review/approve test results.
2.	Soil erosion and sediment control measures.	Install and maintain SE/SC measures.	Conduct construction site inspections.
3.	Routine soil erosion and sediment control inspections (weekly and after 0.5" rain).	Conduct inspections in Accordance with SWPPP.	Review inspection reports.
4.	Final grading and infiltration testing of infiltration basin.	Conduct infiltration tests.	Observe test and review/approve test results.
5.	Infiltration testing after placement of engineered soil and inspection of observation port.	Conduct infiltration tests.	Observe test and review/approve test results.
6.	Replace tile and install inspection ports.	Construct new tile and inspection ports as required. As-built survey.	Construction observation.
7.	BMP construction.	Construct BMPs. As-built survey.	Construction observation.
8.	Vegetation placement.	Install vegetation.	Construction observation.
9.	First post-construction operational inspection during significant rainfall.	Perform inspection.	Review and confirm inspection results.

The City, through a consultant selected by the City, will administer inspections during construction and the fees for these services will be paid for as part of the permit by the developer.

**Post-Construction Watershed Inspections**

In addition to these construction inspections administered by the City, there is the need for perpetual routine maintenance inspections. The City’s consultant will perform these inspections using standard forms that follow Chapter 6 of the Design Manual and prepare an annual report for the City.

The perpetual inspection program will consist of the following.

1. Frequent inspections of BMPs and infiltration basins will be performed by the City's consultant using the schedules and tasks already presented in Chapter 6 of the Manual.
2. A standardized maintenance agreement containing the tasks and schedules in the Manual must be signed by the owner or other responsible party before permit approval.
3. City will review annual inspection reports submitted by property owner or consultant for the City and perform annual City inspections to confirm findings.

### **Estimated Cost**

The cost to implement the above inspection program will be subject to the size of the project and specific BMPs being used. However, typical estimated costs are as follows:

- Construction phase inspections other than soil erosion and sediment control - 80 man-hours or \$5,000. This will be included as part of the permit fee.
- Construction soil erosion and sediment control inspections - \$5,000 per site assuming an average of 80 man-hours. This will be included as part of the permit fee.
- Post-construction annual inspection - 8 man-hours per site average and 8 hours for report preparation and processing into the tracking system or \$1,000 per site annually. This is addressed in the funding portion of the implementation plan.

### **MAINTENANCE POST-CONSTRUCTION**

Maintenance refers to the actions undertaken to prevent or repair malfunctions in BMPs and infiltration basins. There are two primary categories of development as it relates to ownership and maintenance of stormwater facilities: residential and non-residential.

#### **Residential Developments**

Maintenance refers to actions undertaken to prevent or repair malfunctions in BMPs and infiltration basins. Maintenance tasks are outlined in Table 3.

The stormwater facilities in residential areas will become the ownership and maintenance responsibility of the City. The City through a consultant and contractor will ensure the appropriate maintenance is performed, in perpetuity, and the costs assessed to the homeowners via a Special Service Area (SSA) tax.

#### **Non-Residential Developments (Amended June 18, 2013 by Ordinance Number 6939)**

For non-residential developments, routine maintenance tasks such as debris removal, vegetation management, erosion control, animal control, and minor structural repairs will be the responsibility of the owner or other responsible party. However, those tasks will be performed by a City-hired contractor under a maintenance agreement between the City and the owner.

For non-residential developments, as part of the maintenance agreements, the City will have the inspection and enforcement responsibility to perform proper maintenance of the facilities as necessary. If a major repair or replacement is needed *and it is not an emergency repair*, the City will *immediately contact the property owner of the necessary repair or replacement by providing the scope of work established by the City-hired consultant. The property owner shall have the option to:*

- 1. Independently obtain a contract for the necessary repair or replacement. Prior to any work commencing, the property owner is required to submit and receive approval of the proposed contractor's qualification to perform the proposed repair or replacement; or*
- 2. Direct the City to make the repair or replacement.*

*Should the owner direct the City to make the repair or replacement, the City will assess a fee under the terms of the maintenance agreement to allow the City to make the repair or utilize funds from performance escrows or an established SSA, or other financial commitment relating to that development.*

### **Estimated Cost**

While costs to perform maintenance activities will vary from site to site depending on the types of BMP's utilized and other elements of the stormwater management, Table 3 contains examples of the typical annual inspection and maintenance costs for 50-acre commercial and residential developments.

**Table 3. Estimated Post Construction Maintenance Costs**

Management Practice	Annual Routine Maintenance Cost for a "Typical" Application	Routine Maintenance Activity											Typical Annual Cost
		Monthly	Annual	Annual	Annual	Annual	Quarterly	Unknown	Annual	Twice per Year	Annual	Quarterly	
		Cleaning and removal of debris after major storm events	Eradicate nuisance vegetation	Repair of embankment and side slopes	Repair of control structures	Sediment removal	Mowing or burns	Repair or replacing filter media	Maintenance of inlets and outlets	Berms and piping maintenance	repair or replace vegetation	watering of plant material	
Inspection Report to Meet Chapter 6 of the Watershed Manual	\$1,000												\$1,000
Wet Ponds	\$2,000 - \$4,000	x	x	x	x	x		x	x	x			\$3,000
Wetlands	\$1,000 - \$3,000	x	x	x	x	x		x	x	x	x		
Bioretention	\$2,000 - \$4,000	x	x	x				x	x	x	x	x	
Infiltration Drywell or Trench	\$500 - \$1,000	x				x	x	x	x				\$500
Infiltration Basin	\$2,000 - \$3,000	x	x			x	x		x	x	x	x	\$3,000
Grassed Swale	\$500 - \$1,000	x	x	x		x	x				x	x	\$1,000
Filter Strips/Rain Gardens	\$500 - \$1,000	x	x			x	x		x		x	x	\$500
Bioretention Islands	\$500 - \$1,000	x	x					x	x		x	x	
Tiles	\$500	x				x			x		x	x	
													\$9,000

**ENFORCEMENT**

Enforcement falls into two categories similar to inspections:

- The construction phase,
- The post-construction phase

In both instances, the City’s authority and regulatory powers are provided in the existing Codes to provide enforcement to remedy any circumstances of non-compliance. The City will hire a consultant, at the developer’s expense, to perform the required inspections.

**During Construction**

There are two primary areas of concern during construction:

- 1.) Compliance with soil erosion and sedimentation control
- 2.) Proper construction of the BMP’s, detention facility, and infiltration basin

A performance bond will be required to be posted with the City prior to the issuance of a permit that would be used for any default during the construction phase. In the event there is a violation of the soil erosion and sedimentation control provisions, the City would issue a field correction notice and

require the developer/contractor to file a notice of non-compliance with those conditions. Failure to remedy the situation in a timely manner will result in a “stop work notice”, potential legal proceedings and/or utilization of the performance bond to correct the violation.

In the event the stormwater management facilities are not constructed properly, the work would be stopped until corrected and no occupancy would be allowed until such stormwater facilities are built in compliance with the approved plans.

### **Post-Construction**

There are two primary areas of enforcement application:

- Residential development
- Non-residential development

There are three points of concern regarding post-construction enforcement:

- 1.) Failure to properly maintain the BMPs and infiltration basin
- 2.) Failure to submit an annual monitoring report to the City documenting maintenance
- 3.) Failure of the BMPs or the infiltration basin

### **Residential**

In the case of residential developments, the City, through its consultant and contractor, will assume the responsibility for post-construction maintenance, monitoring, and repairs. These costs will be covered by the SSA for the PUD or subdivision.

### **Non-residential**

The City, through a City-hired contractor, will perform the proper maintenance, repair or replace a failed BMP, as well as prepare and keep on file the proper annual report. If necessary, the City will follow the following procedure or take alternative corrective action as deemed appropriate by the City Attorney:

- Send a notice of non-compliance via a Field Correction notice
- File a mandatory injunction or appropriate legal action
- Assess a fine, initiate remediation, levy to recoup costs incurred

## **FUNDING**

There are a number of ways to fund the elements of the implementation plan. The primary activities which require funding are:

- City Administered Comprehensive Watershed Program
- Inspection during construction and post-construction
- Post-construction monitoring, maintenance, and repair of BMPs, if necessary

### **City Administered Comprehensive Watershed Program (described previously)**

Since the Implementation Plan provides elevated sampling and monitoring whether development takes place or not, those costs would be absorbed by the City initially and included in future budgets to address the sampling, flow analysis, and laboratory testing. An application fee of \$1500 minimum per development will be collected upon application for a project approval. The fee will be assessed at \$30 per acre but no less than \$1500 per development.

If upon ultimate development of the watershed, the City determines an outsourced program of collection, monitoring and lab analysis is required; a stormwater utility fee would be established to assess those costs equitably.

### **Construction Inspection**

Inspection fees will be collected as part of the permit process to address soil erosion and sediment control inspection and construction of BMPs in accordance with the approved plans.

### **Post-Construction Inspection and Monitoring**

#### **Residential**

As part of the approval process for any proposed development subject to the Watershed Management Plan and the provisions of this Implementation Plan and the Design Manual, the petitioner shall, in cooperation with the City, create a SSA. Funds generated by the SSA shall be used to underwrite any costs associated with the City's retention of consultants and contractors to inspect, maintain, and monitor.

**Non-residential**

The City will require as part of the approval process, the owner or other responsible party to do the following:

- Upon development approval, enter into a participation agreement that describes the areas of responsibility related to the stormwater management facilities.
- Record a “Covenant running with the land” to insure perpetuity responsibility.
- Create a SSA to address the costs related to inspection, maintenance, repair of BMPs if necessary, monitoring, and reporting requirements that the City will be performing.

# CRYSTAL LAKE WATERSHED STORMWATER MANAGEMENT PROGRAM IMPLEMENTATION PLAN

## EXHIBIT 1: WATERSHED MONITORING LOCATIONS

