Item #10:

Village President Underwood

Report Of Annual Lake County SMC Board Meeting

(Three Lakes Drive Grant)

FISCAL YEAR 2017
WMAG/WMB APPLICATION SUMMARY RECOMMENDATIONS

Project	Applicant	Score	Total Project Cost	Funding Requested	Funding Available	SMC Staff Recommended	WMB Board Recommended
WATERSHED MANAGEMENT ASSISTANCE ($12,000 available)						**WMAG**	
Loch Lomond Lake Management Plan	Loch Lomond POA	420	$ 12,000	$ 12,000		$ 12,000	
Flint Creek Watershed Plan Update	Flint Creek Watershed Partnershi	290	$ 18,000	$ 10,000		$ -	
		WMAG TOTAL	$ 30,000	**$ 22,000**	*$ 12,000*	$ 12,000	
DES PLAINES RIVER ($67,620 available)						**Des Plaines**	
Grandwood Park Northern Berm	Lake County SMC	320	$ 25,000	$ 15,000		$ 15,000	
Greenbay Terrace & Maplewood Manor Stormsewer Project	Village of Beach Park	310	$ 501,536	$ 100,000		Potential SIRF	
Diamond Lake Cooperative Preservation Strategy	Mundelein Park District	305	$ 88,800	$ 30,000		$ 30,000	
Dady and Decker HOA Shoreline Protection	Warren Township	285	$ 21,445	$ 9,045		$ 9,045	
Three Lakes Drive Drainage Improvements	Village of Long Grove	285	$ 78,719	$ 39,359		$ 39,359	
Diamond Lake Drain Streambank Stabilization Project	Ravenna East HOA	210	$ 71,000	$ 20,000			
Cedar Crossings I Detention Basin Restoration Project	Cedar Crossings I-HOA	165	$ 26,500	$ 13,250			
			$ 813,000	$ 226,654	*$ 67,620*	$ 93,404	
		ADDITIONAL FUNDS FROM UNALLOCATED LAKE MICHIGAN WATERSHED			*$ 15,000*		
		ADDITIONAL FUNDS FROM UNALLOCATED NORTH BRANCH WATERSHED			*$ 10,784*	$ -	
		DES PLAINES RIVER WATERSHED WMB TOTAL			*$ 93,404*	$ 93,404	
NORTH BRANCH CHICAGO RIVER ($33,800 available)						**North Branch**	
Rondout Woods Restoration Project	Rondout School	215	$ 13,350	$ 6,500		$ 6,500	
1810 O'Plaine/1930 Cranbrook Drainage Improvements	Village of Green Oaks	155	$ 48,600	$ 24,300			
			$ 61,950	$ 30,800	*$ 33,800*	$ 6,500	
		UNALLOCATED FUNDS TO FOX RIVER WATERSHED			*$ (16,516)*		
		UNALLOCATED FUNDS TO DES PLAINES RIVER WATERSHED			*$ (10,784)*		
		NORTH BRANCH WATERSHED WMB TOTAL			*$ 6,500*	$ 6,500	
FOX RIVER ($33,800 available)						**Fox**	
Columbia Bay Drive Drainage Improvements	Lake Villa Township	310	$ 875,000	$ 50,000		Potential SIRF	
Dunn's Lake Shoreline Estates Phase II	Village of Fox Lake	295	$ 57,276	$ 24,868		$ 24,868	
Orchard Hills Natural Areas Management Plan	Orchard Hills HOA	280	$ 9,855	$ 4,855		$ 4,855	
Fish Lake Drain Dredging & Shoreline Improvements	Grant Township	275	$ 55,000	$ 15,000		$ 15,000	
Grand Dominion Rain Garden	Village of Mundelein	270	$ 12,736	$ 5,500		$ 5,500	
Woodhill's Bay Colony I-Stormwater Control Project	Woodhill's Bay Colony HOA	260	$ 40,000	$ 5,000		$ 5,000	
Round Lake Shoreline Restoration & BMP Project	Village of Round Lake Beach	255	$ 31,450	$ 15,725		$ 9,873	
Fox Waterway Agency Parking Lot Bioswale & Buffer Zon	Fox Waterway Agency	225	$ 20,000	$ 10,000		$ -	
Flint Creek Stream Gage Installation	Flint Creek Watershed Partnershi	220	$ 12,200	$ 6,100		$ -	
			$ 1,113,517	$ 137,048	*$ 33,800*	$ 65,096	
		ADDITIONAL FUNDS FROM UNALLOCATED LAKE MICHIGAN WATERSHED			*$ 10,780*		
		ADDITIONAL FUNDS FROM UNALLOCATED NORTH BRANCH WATERSHED			*$ 16,516*		
		ADDITIONAL FUNDS FROM UNALLOCATED CONTINGENCY			*$ 4,000*		
		FOX RIVER WATERSHED WMB TOTAL			***$ 65,096***	**$ 65,096**	
LAKE MICHIGAN ($25,780 available)						**Lake Michigan**	
DeWoody Road Culvert Replacement	Beach Park Drainage District	295	$ 86,655	$ 43,000			
Moraine Park Slope Stabilization & Public Access Project	Park District of Highland Park	290	$ 33,000	$ 15,000		*Withdrawn*	
			$ 119,655	$ 58,000	*$ 25,780*	$ -	
		UNALLOCATED FUNDS TRANSFER TO FOX WATERSHED			*$ (10,780)*		
		UNALLOCATED FUNDS TRANSFER TO DES PLAINES RIVER WATERSHED			*$ (15,000)*		
		LAKE MICHIGAN WATERSHED WMB TOTAL			*$ -*	$ -	
FY17 TOTAL WMB FUNDING ($177,000 AVAILABLE)		***2017 WMAG/WMB GRAND TOTAL***	$ 2,138,121	$ 474,502	*$ 177,000*	$ 177,000	

Watershed Management Board Grant Application

Three Lakes Drive Drainage Improvements

Village of Long Grove

GHA GEWALT HAMILTON ASSOCIATES, INC.

GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS
625 Forest Edge Drive, Vernon Hills, IL 60061
TEL 847.478.9700 ■ FAX 847.478.9701
www.gha-engineers.com

October 7, 2016

Mr. Mike Warner, Executive Director
Lake County Stormwater Management Commission
500 W. Winchester Road, Suite 201
Libertyville, IL 60048

Re: WMB Projects FY2017
Three Lakes Drive Drainage
Village of Long Grove

Dear Mr. Warner:

On behalf of The Village of Long Grove, we are pleased to submit the enclosed project proposal for consideration of grant funding from the Lake County Watershed Management Board. The project is located within the Des Plaines River Watershed. The following items are included for your review:

- Completed & Signed Watershed Resource Request Form
- Statement of Compliance
- Location Map
- Preliminary Engineer's Opinion of Probable Cost
- Three Lakes Drive Drainage Schematic Exhibit

Project Description

In the Three Lakes Subdivision, located north of Robert Parker Coffin Road and west of Illinois Route 83 in the Village of Long Grove, runoff is collected in a series of detention basins. The two large basins (referred to herein as "East Basin" and "West Basin"), approximately 400-feet north of Robert Parker Coffin Road are interconnected by a 36" diameter equalizer pipe that crosses under Three Lakes Drive. During the recent flooding of April 2013, flood waters had risen high enough to reach the homes surrounding these basins, causing property damage. The damage was limited to yard flooding and flooding of outdoor gazebos, patios, pools, etc. This was not the first time of flooding in the area. Three Lakes Drive has occasionally overtopped, resulting in road closures and safety concerns.

In June 2016, the Village (through Ela Township) pumped water from the West Basin to the East Basin via a 6" pump for three days. This effort was completed due to a high water in the West Basin that could not drain due to the condition of the equalizer pipe; see below for more information. As a result of the pumping, the water level in the West Basin was lowered 1.5,' while the water level in the East Basin remained the same. The East Basin is at capacity and is draining over the berm at the northeast corner of the basin; see below for more information. The Village had to complete a similar operation eight years ago.

The Village contracted Integrated Lakes Management (ILM) to conduct a sediment probing study of the basin in April 2014 to better understand the cause of the flooding. These basins flow west to east and outlet at the northeast corner of the subdivision. From there, discharge is carried under Illinois Route 83. ILM found that sediment has accumulated throughout the basins and was prohibiting flow in the equalizer pipe. In addition, the current water level was determined to be approximately 4.5 feet higher than the designed normal water level. The sediment in the basins and equalizer pipe explained the poor drainage under Three Lakes Drive; however, additional analysis was sought to explain the higher water level in both basins.

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In efforts to identify the cause of the elevated water levels, ILM inspected the outlet of the East Basin. ILM found that sediment had blocked the outlet pipes and the berm at the outlet to be in very poor condition. Due to the outlet blockage, seepage was observed through the base of the berm, erosion is also occuring at the outlet as a result overtopping. Further downstream, the drainage outlet across Illinois Route 83 was found to be in poor condition, due to debris blockages and a significant amount of erosion.

These basins are privately owned, so the repairs to the outlet are not included in this grant application. Likewise, the drainage under Illinois Route 83 is in the state right-of-way and not included in this application. The Village is responsible for Three Lakes Drive and is seeking improvements to maintain safe passage of this roadway during and after storm events.

In order to alleviate flooding of Three Lakes Drive, the Village of Long Grove is proposing to expose and clean the existing 36" equalizer pipe under Three Lakes Drive to promote flows. The Village is also proposing to install risers on the ends of the equalizer pipe to prevent sediment from entering the culvert pipe.

Project Benefits

Below is a summary of the project benefits based on the project prioritization criteria included in the WMB Project Proposal packet.

1. **Interjurisdictional Benefits** – Through implementation of the proposed Three Lakes Drive drainage improvements, the following jurisdictions will benefit:
    a. The Village of Long Grove, by re-establishing flows from the West Basin to the East Basin to alleviate road overtopping.
    b. Owners of properties surrounding the west basin in The Three Lakes Subdivision by controlling the water levels.
2. **Flood Hazard Reduction Benefits** – The drainage improvements will alleviate chronic flooding of Three Lakes Drive and properties surrounding the West Basin. The chronic flooding of Three Lakes Drive results in a road closure, which is a safety concern if emergency response vehicles cannot access the area; this subdivision has one access.
3. **Structural Damage Reduction** – Owners surrounding the West Basin have reported occurrences of flooded basements and property damage over the years. By restoring flows from the West Basin to the East Basin, water levels will not raise to damage levels. The roadway overtopping will be alleviated by this project. Although not evident at this time, the flooding of roadways has a negative impact on the structural integrity of the entire pavement section (asphalt, stone base and subgrade) resulting in premature failure.
4. **Water Quality Benefits** – The current situation results in stagnant water on properties for several days after a larger rainfall events. The proposed project will alleviate stagnant water in the area.
5. **Natural Resources Benefits** – This project will maintain a water level in the West Basin, which will allow the shoreline to be revegetated and stabilized. The revegetation and stabilization will need to be completed by the residents. The reduction in water level of the West Basin will also restore the flood capacity of this basin.
6. **Nuisance Flood Reduction** – Nuisance flooding will also be reduced by this project, not only in the private property but also in the Three Lakes Drive right-of-way. There is also a health, welfare and safety benefit to this project. Stagnant water can lead to nuisance pests and unusable areas of land.
7. **Multiple Use Benefits** – The proposed storm sewer pipe will benefit the Three Lakes subdivision and also the Village of Long Grove.
8. **Outside Funding Utilization** –The Village of Long Grove will be funding 50% of the overall cost.
9. **Public Education Component** – As part of regular outreach efforts with various Homeowner's Associations and Village-wide newsletters, the Village regularly discusses the importance of maintaining

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existing drain tiles, storm sewer lines, shorelines, refraining from planting trees over storm sewers and asking homeowners to assist in clean-up of leaves and debris that can clog storm sewer structures and ditches.

If you have any questions regarding this application, please call me at 847-478-9700 or email me at: gperry@gha-engineers.com.

Sincerely,
Village of Long Grove

Geoffrey L. Perry, P.E.
Assistant Village Engineer

cc: Mr. Neil Schindelar – Lake County Stormwater Management Commission
Ms. Angie Underwood, Village President – Village of Long Grove
Mr. David Lothspeich, Village Manager – Village of Long Grove
Mr. Michael Shrake, P.E., Village Engineer – GHA

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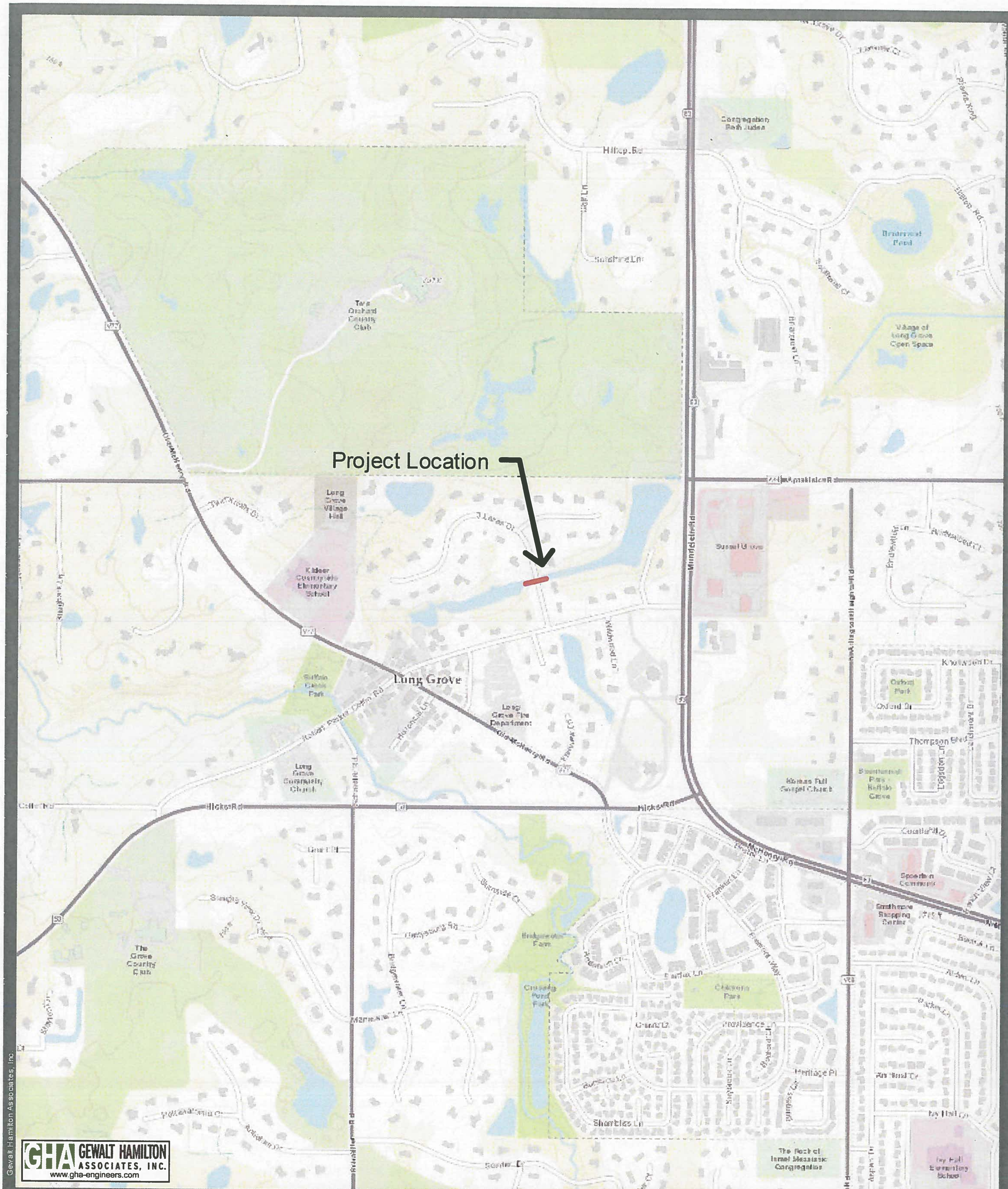
Statement of Compliance with SMC Policies, Local Plans and Ordinance

The Village of Long Grove, as Project Sponsor, will comply with all policies of the Lake County Stormwater Management Commission, local plans, and applicable ordinances in the development and execution of this project.

Angela K. Underwood

Signature of WMB Member



N

1 inch = 1,000 Feet

Location Map

Three Lakes Drive Drainage Improvements

Date: October 7, 2016

SMC USE ONLY

RECEIVED:_____

REVIEWED:_____

WATERSHED RESOURCE REQUEST FORM

To: Des Plaines River Watershed Management Board
(Name of watershed, e.g., Fox River, Des Plaines River, Chicago River, or Lake Michigan)

Applicant Jurisdiction(s): Village of Long Grove
(e.g., name of Village, Township, Homeowners Association, etc.)

Brief Project Title: Three Lakes Drive Drainage Improvements

General Location: Three Lakes Drive, north of Robert Parker Coffin Road, between East and West lakes

North end of East lake near Route 83

Contact Person: David Lothspeich, Village Manager (Name) dlothspeich@longgrove.net (Email)

Address: Village of Long Grove, 3110 Old McHenry Road, Long Grove, IL 60047

Phone: 847-478-9440

Grant Project Manager: Geoffrey Perry (Name) 847-478-9700 (Phone) gperry@gha-engineers.com (E-mail)

Project Type: (check all that apply)
___ Planning ___ Design _X_ Issue Resolution
_X_ Capital Improvement ___ Other

Is this a request for a Watershed Management Assistance Grant? Y/N _N_
(This is a specific type of planning grant described on page 5 of this request for proposals packet)

Resource Request: (check one)
_X_ Watershed Account Funds ___ SMC Staff Assistance
___ Combination Funds and Staff

Project Description (use additional sheets if necessary): See attached.

Cost Estimate: $78,718.86 Applicant Share $39,359.43 WMB Share $39,359.43

In-Kind Service Person-Hours: Applicant N/A SMC N/A

In-Kind Service Description (Applicant/SMC Service Scope): N/A

Project Timing: Start Date June 2017 Completion Date August 2017

Summary of Project Benefits (relating to flood damage reduction, water quality improvement, and natural resource enhancement): See attached.

Statement of Local Commitment (assurance that applicant has sufficient matching funds and staff capacity):
The Village of Long Grove is budgeting sufficient funds for their share of the construction costs associated with the Three Lakes Drive Drainage Improvement Project as outlined in this application. The project is to be completed in 2017 to alleviate existing chronic flooding (roadway and structural) and standing water.

Angela K. Underwood
Signature of WMB member
(This must be a WMB member who supports the project. It is not necessarily the applicant.) See Page 1 for WMB member guidelines.

Village President
Title

Requested Attachments:

1. Location map & project site photos
2. Detailed project description
3. Detailed (per criteria) statement on benefits, including quantifiable benefits
4. Statement of compliance with SMC policies, local plans and ordinance
5. Other comments or supporting documents

N

1 inch = 200 Feet

Proposed Improvements

Three Lakes Drive Drainage Improvements

Date: October 7, 2016

PRELIMINARY ENGINEER'S OPINION OF PROBABLE COST

Three Lakes Drive Drainage Improvements
4111 Three Lakes Drive
Long Grove, Illinois
GHA #5000.023

Date: October 5, 2016
Prepared by: Geoffrey Perry, P.E.

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EQUALIZER PIPE IMPROVEMENTS

Pay Item	Description	Quantity	Unit	Unit Price	Value
20100110	Tree Removal (6 to 15 Units Diameter)	12.0	UNIT	$50.00	$600.00
21101600	Topsoil Furnish and Place, Variable Depth	150.0	SY	$10.00	$1,500.00
25000110	Seeding, Class 1A	0.03	AC	$6,500.00	$201.45
25000400	Nitrogen Fertilizer Nutrient	2.8	LB	$2.00	$5.58
25000600	Potassium Fertilizer Nutrient	2.8	LB	$2.00	$5.58
25100127	Mulch, Method 3A	150.0	SY	$5.00	$750.00
28000400	Perimeter Erosion Barrier	100.0	FT	$4.00	$400.00
50201101	Non-Erodible Cofferdam	2.0	EA	$20,000.00	$40,000.00
542C1081	Pipe Culverts, Class C, Type 1 36"	20.0	FT	$75.00	$1,500.00
X0426200	Dewatering	1.0	LS	$3,000.00	$3,000.00
X1200068	Bypass Pumping	5.0	DAY	$300.00	$1,500.00
X2010510	Clearing & Grubbing	1.0	LS	$1,000.00	$1,000.00
	Culvert Risers with Frame & Grate	2.0	EA	$3,000.00	$6,000.00
	Replacement Trees, 3" cal.	4.0	EA	$650.00	$2,600.00
	Cleaning and Sediment Removal of 36" Culvert	100.0	LF	$50.00	$5,000.00
	Traffic Control & Protection	1.0	LS	$2,500.00	$2,500.00

Sub-Total Construction Costs:	$66,562.60
Contingency (10%):	$6,656.26
Total Construction Costs:	**$73,218.86**
Topographic Survey:	$750.00
Phase II Engineering:	$1,500.00
Phase III Engineering:	$2,500.00
Record Drawings:	$750.00
Total Soft Costs:	**$5,500.00**
Grand Total Project Costs:	**$78,718.86**

Detailed Description:
This is a preliminary Engineer's Opinion of Probable Cost for submission with the Lake County Watershed Management Board Grant Application (2016). The scope of work is generally depicted on the aerial exhibit, prepared by Gewalt Hamilton Associates, Inc. dated October 7, 2016 and more fully described in the grant application.

*Since Gewalt-Hamilton Associates Inc. Has No Control Over the Cost of Labor, Materials, or Equipment, or Over the Contractor's Methods of Determining Prices, or Over Competitive Bidding of Market Conditions, Opinions of Probable Costs, as Provided for Herein, Are to be Made on the Basis of Experience and Qualifications and Represent the Best Judgment as a Design Professional Familiar with the Construction Industry. Gewalt-Hamilton Associates, Inc., Cannot and Does Not Guarantee That Proposals, Bids, or The Construction Costs Will Not Vary From Opinions of Probable Cost Prepared for the Owner.

Integrated Lakes Management, Inc.
Lake and Pond Management
Restoration ▪ Consulting

April 1, 2014

Prabir Sen-Gupta
The Lakes of Long Grove
4148 Three Lakes Court
Long Grove, IL 60047

Re: The Lakes of Long Grove Outlet Structure Investigation

Dear Mr. Sen-Gupta,

Thank you for meeting with me and our partner, Biedyboys Construction and Excavating (BCE) on March 31, 2013. A brief summary of the project to date, and the findings of our site visit are described below, along with recommended next steps.

During the flooding of April, 2013, residents living along the South Basin indicated that flood waters from the lake backed up into their homes, causing property damage. Integrated Lakes Management (ILM) was asked to conduct a sediment probing study of the lakes to determine if sediment accumulation had caused the flooding. ILM presented the findings to the residents of The Lakes of Long Grove, indicating that sediment had accumulated throughout the lakes, and was potentially restricting flow in the culvert beneath Three Lakes Drive.

It was initially presented to ILM that the current water level in the lakes was the designed normal water level (NWL). Conversations with the Village of Long Grove, and property owners indicated that the culvert beneath Three Lakes Drive has been submerged below the water surface as long as all residents and Village personnel can recall.

The residents asked ILM to present cost estimates to remove sediment and clean out this culvert to improve flow through this culvert, with the goal of reducing future flooding. Cost estimates were developed and presented on July 24, 2013, September 24, 2013, and March 4, 2014 that included varying degrees of sediment removal, and installation of a concrete drop structure at the NWL at the "up-stream" end of the culvert to reduce further sedimentation within the culvert.

During a meeting with Village of Long Grove personnel and interested residents on March 17, 2014, ILM received the Record Drawings of the Lakes of Long Grove development from the Village of Long Grove. Upon review of the Record Drawings, it was observed that installation of a concrete drop structure on the west side of Three Lakes Drive would not be feasible, as the original designed NWL was at the invert (base) of the culvert beneath Three Lakes Drive, rather than above the culvert as had been indicated to ILM. The Record Drawing is attached as Exhibit A.

Discovering that the current water level in the lakes was above the designed NWL, ILM looked to the outlet of the East Basin to determine what was causing the current water level to be approximately 4.5-feet higher than NWL.

On March 31, the outlet on the north end of the East Basin was inspected. It should be noted that ILM and BCE are not Professional Engineers that can certify the integrity of structures such as levees and dams. However, we offer the following assessments based on our professional experience and understanding. Plan and profile drawings of the observed conditions are included with this letter.

Levee/Berm Condition – The levee, or berm on the north end of the East Basin is in poor to very poor condition. Seepage was evident along the entire base of the berm. Woody vegetation and trees were observed to be growing on top of and on the embankments. Numerous animal burrows were observed in the berm. Approximately halfway along the top of the berm, an eroded spillway was observed. The spillway did not appear to be a designed structure; rather, it appeared to have formed over time as a result of erosion along the top of the berm. A photo of the eroded spillway is included as Exhibit B. The water level on March 31, 2014 was very near the top of the berm. The eroded spillway was serving as the primary water control structure.

High Water Level Drainage – The Record Drawings show a concrete weir detail as the proposed high water overflow structure. During our site visit, a weir structure was not observed. Instead, an approximately 12-inch reinforced concrete pipe at the estimated high water level was identified. The inlet of the pipe was not protected with a grate, and was plugged with woody debris and leaves. A photograph of the high water level drainage inlet is included as Exhibit C. The outlet of the high water level drainage pipe did not have an outfall apron. While inspecting the outlet of the pipe it was observed that water was seeping around the outside of the pipe, and was not flowing through the inside of the pipe. When debris was manually cleared from the pipe inlet, water began draining freely through the high water level drainage pipe, indicating that this pipe is not plugged internally.

Normal Water Level Drainage – A second, approximately 12-inch reinforced concrete pipe that appeared to the primary NWL outlet structure was observed approximately 50-feet east of the high water level drainage pipe. There was no drainage present inside, or along the outside of this pipe. The spillway apron at the base of the pipe had been pulled away from the rest of the pipe by approximately 3-inches. A photograph of the outlet of the NWL pipe is included as Exhibit D. Based on the notes on the Record Drawing, the inlet of the NWL outlet pipe is approximately 4.5-feet below the current water surface.

State Route 83 Drainage - The drainage inlet beneath St. Rt. 83 was observed to be in poor to very poor condition. Woody debris from fallen trees was scattered around the inlet. A significant area of erosion, potentially caused by a broken drainage culvert was observed in the St. Rt. 83 embankment. This erosion may affect the integrity of the roadway if not addressed soon. The woody debris and poor condition of the inlet structure appeared to be backing up water at the base of the East Basin berm, and had created a wetland with standing water at the time of our visit. Wetland delineation flags were observed around the area at the base of the berm. Photographs of the St. Rt. 83 inlet pipe are included in Exhibit E.

Conclusions

The berm on the north end of the East Basin was not designed to retain water at the current water level for extended periods of time. Based on discussions with residents, it is thought that the water has been at the current level for over 10-years. The current water level is approximately 4.5-feet above the NWL.

The berm is showing signs of failure, evidenced by the seepage at the base, animal burrows, woody vegetation growth, and eroded spillway. If this berm is compromised, either during a high flow flood event, or by loss of structural integrity of the berm, all water currently in the lakes will be lost, and a costly repair will be necessary to restore the berm and lake level.

Flooding in the South Basin during April 2013 was likely due to the lack of flood retention capacity within the drainage system, and the submerged, and likely restricted flow beneath Three Lakes Drive.

Recommended Next Steps

Residents need to mobilize to address the high water level situation as soon as possible. The high water level has caused the lakes to lose their flood retention capacity, and is compromising the integrity of the retention berm. If the berm is compromised, the cost to repair and replace the berm will greatly exceed any maintenance or drainage pipe repair costs.

The first step for in addressing the drainage pipe repairs is to identify the source and location of the blockage in the NWL drainage pipe which drains toward St. Rt. 83. The source of the blockage can be determined by sending a camera up the drainage pipe. The camera will allow us to determine the condition of the pipe, the location of the lower end of the blockage in the pipe, and potentially the cause of the blockage. Having this information will allow us to determine if the blockage is located within the berm, or beyond the berm, beneath the water. The cost to send a camera up the pipe is $550.

Once the location of the NWL drain blockage is known, repair work can begin. If the blockage is determined to be beneath the water, and the pipe is in good condition, ILM proposes that an excavator be brought in to try breaking off the plugged area of the pipe in the water, allowing water to gain entry into the pipe. The excavator would work to clear debris from the pipe until the water level reaches the NWL. Once the NWL is achieved, the broken pipe would be repaired, and a grated inlet structure would be installed. The existing eroded spillway would be repaired with gravel, clay, and geotextile, to prevent further erosion.

If the camera investigation indicates that the pipe is in poor condition, or the plug is within the berm, the effort to repair the drainage outlet is significantly increased. Pumps will be necessary to drain the lake down to, or below the NWL. Once the water level is at or below the NWL, the existing drain pipe can be excavated out of the berm, and a new drain pipe, inlet, and outfall apron can be installed. The existing eroded spillway would be repaired with gravel, clay, and geotextile, to prevent further erosion. The cost of this repair work is not known at this time due to the potential permitting, design, and construction uncertainties.

All woody vegetation that is currently growing on the berm should be cut and removed, to reduce the risk of berm failure. The roots of woody vegetation create flow pathways for water to pass through the berm, causing seepage and loss of structural integrity.

The storm water inlet under St. Rt. 83 should be repaired as soon as possible. BCE has contacts with the Lake County Department of Transportation (DOT), and will notify them of the

conditions we observed. ILM encourages the Village of Long Grove to also make the Lake County DOT aware of this condition so that repair work can begin as soon as possible, so the St. Rt. 83 road embankment is not compromised, and water can flow away from the base of the berm when discharged.

The recommendations above may only reduce the risk of the berm being compromised, not eliminate the risk. If the landowners wish to engage an engineer who is certified to certify the integrity of these types of structures, ILM can reach out to our Engineering partners to expedite the project.

Once the water level is returned to the NWL, the lake is likely to look very different than it currently does, and it is likely to be smaller in surface area, and shallower. The elevated water level has caused significant erosion along the banks, as areas that were graded and designed to be above water during normal conditions have been submerged for more than 10 years. These areas and the current lake shoreline have eroded, leading to the heavy sediment deposits noted by ILM. The exposed banks should be stabilized with vegetation to reduce further erosion and sedimentation into the lake.

Based on the Record Drawings, the invert (base) of the culvert beneath Three Lakes Drive is at the NWL, as described above. When the water level returns to the NWL, The culvert should be self-cleaning when water flows through it, and should not accumulate additional sediment that would restrict flows between the South Basin and the East Basin.

The changes in the lake appearance and repair costs must be weighed against the risk of additional flooding damages, and the potential cost associated with repairing the berm should it experience a total failure, draining the entire lake system. If the berm were to fail, the landowners would be responsible for any downstream property damages, as well as repair of the structure to restore the area to approved storm water discharge volumes.

At this time, our role has changed from that of a contractor providing pricing for proposed work to serving as a technical advisor/consultant. ILM is providing the information included in this letter to the residents of the Lakes of Long Grove as a courtesy based on our prior relationship. Any future technical advisor or consultant work will need to be billed to the client on a time and materials basis at our standard hourly rate of $120.

If you have any questions, please contact me at 847-244-6662. We look forward to continuing to work with you to resolve the issues related to your lakes and their maintenance.

Sincerely,

Bill Santelik, PWS
Integrated Lakes Management

cc: Bill Biedermann, Biedyboys Construction and Excavation
David Lothspeich, Village of Long Grove