

# **CEDAR LAKE AQUATIC ECOSYSTEM RESTORATION FEASIBILITY STUDY**

## **CEDAR LAKE, INDIANA**

### **APPENDIX M LOCAL EXISTING CONDITIONS REPORT**

Town of Cedar Lake, Indiana



July 2016

# CEDAR LAKE WATERSHED ECOSYSTEM RESTORATION LOCAL EXISTING CONDITIONS REPORT



**Existing Conditions Report: July 2016**  
**Draft – Not for Distribution**

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  - Cedar Lake Development Standards Manual

## Introduction

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Cedar Lake is a 781 acre glacially formed lake in the Town of Cedar Lake (Town) in Lake County, Indiana. The Lake is currently in a highly eutrophic state. Historically, it has supported a biologically diverse ecosystem characteristic of glacial lakes. Over the years, watershed activities have adversely impacted the Lake's wetland habitat, lake-bottom substrate water quality and the overall ecosystem. The Town, with local support through the Cedar Lake Enhancement Association (CLEA), is taking steps to reverse the direction in aquatic ecosystem quality. Local Town and CLEA programs and projects currently implemented to improve aquatic ecosystem are described in this report. Local efforts have proved insufficient; therefore, the Federal government has been requested to assist due to their broader and unique expertise.

In March 2005, the U.S. Army Corps of Engineers, Chicago District (Corps), the Town, and CLEA began developing an ecosystem restoration project under the Corp's Continuing Authorities Program (CAP) Section 206 – Aquatic Ecosystem Restoration.

The overall project goals are:

- Restore Littoral Currents & Nutrient Cycling: This objective seeks to naturalize the littoral currents and nutrient cycling feedback components. It is well documented that these two parameters are adversely affecting how the littoral currents and nutrient cycling influence the habitat structure of Cedar Lake. One is the absence of aquatic macrophyte beds, both emergent and submergent, which would attenuate wave and current action indicative of a healthy glacial lake. The second is the presence of vast amounts of silts and clays that are unnatural to the system and are continually resuspended by littoral currents, natural wave action, recreational boating and non-native benthivorous fishes.
- Increase Spatial Coverage of Viable In-Lake Habitat: This objective seeks to increase the area of viable fringe, littoral zone and bathypelagic habitat within Cedar Lake. It is documented that little to no submergent and emergent aquatic macrophyte beds currently exist in Cedar Lake. It is also well documented that substrates within the deep littoral and bathypelagic zone are not physically or chemically suitable for aquatic macrophytes, macroinvertebrates and subsequently native fishes. Based on the existing percentages of cover for these habitat types, this objective targets an increase of about 25- acres of emergent fringe wetland, 50-acres of aquatic macrophyte bed, and about 400- acres of deep littoral and bathypelagic zone.
- Eradicate/Control Non-Native Species: This objective seeks to remove or ease the adverse impacts of non-native and invasive species, particularly common carp and white perch. Typically, invasive species gain a foot hold and eventually dominate a site due to previous impairments placed on the site, particularly to hydrology, hydraulics or geophysical properties of soils and substrates. Once a site's physical parameters are repaired, then invasive plant and animal species may be addressed quite effectively, especially if recolonization routes are not available. It is not uncommon to keep invasive plant and animal species to a minimum or less than 1% of the site's spatial coverage or relative abundance. Based on the existing dominance of non-

native fishes and the absence of a glacial lake fish assemblage, this objective targets to control animal species to less than 5% of the total relative abundance. Although non-native aquatic plant species are absent or at a minimum, it is because of the same problems keep native aquatic macrophyte bed from establishing; once conditions for plants are restored, non-native/invasive plant species should be controlled to less than 1% of spatial coverage.

- Re-establish Fish Passage / Recolonization: This objective seeks to allow the recolonization of fish species from former source populations that are now impeded. It is well documented that habitat fragmentation leads to many ecological and biological problems, such as inbreeding, sink populations, food chain collapse, road kill, etc. This phenomenon is quite apparent in Cedar Lake. Past intentional and unintentional manipulations of the native fish assemblage has caused native species richness to be reduced by 54% and relative abundance by 90%. The major recolonization portal was Cedar Creek which formerly flowed unimpeded to the Kankakee River, but was dammed off as previously discussed. Cedar Creek is also fragmented again by Lake Delacaria and is quite degraded in terms of habitat; thusly the former recolonization portal may never be restored. Also, glacial relict species can no longer recolonize since flowages between the lakes vanished shortly after the glaciers retreated thousands of years ago. The Cedar Lake outlet structure; however, currently prevents additional common carp from entering the lake that inhabit Lake Delacaria. Based on the existing dominance of non-native fishes, the absence of a glacial lake fish assemblage, and the absence of a natural recolonization portal, this objective targets to increase native glacial lake fish species richness to at least 25 and overall abundance of native fishes to at least 2,000 (gizzard shad abundance should be decreased even though it's a native species).
- Increase Cedar Lake's Biodiversity: This objective seeks to increase biodiversity, or the total native species richness, abundance and population(s) health of the Cedar Lake ecosystem. Currently, the number of native species alone within Cedar Lake is diminutive of what naturally once occurred. To compound the matter, the abundance and health of these species/populations that still exist are dramatically impaired. Once physical and biological resource problems are repaired, the lake would have the potential to provide life requisites for thousands of native fungi, plant, insect, fish, amphibian, reptile, bird and mammal species. Biodiversity change would be apparent and easily measured through species richness and abundance. It is expected, based on previous restoration projects that have been implemented, that once minimal physical repairs are made (i.e. hydrologic, hydraulic and invasive species removal), species start to colonize the site as soon as the impairments are disabled; immediate recolonization of birds and crayfish have resulted through the disablement of drain tiles under several completed restoration projects. This objective would be measured by comparing past data sets of Cedar Lake floral and faunal inventories with new inventory data during the monitoring phase of this project. This would be a good opportunity for a before and after bioblitz.

The Town will serve as the signatory Non-Federal sponsor of the project, providing a cash contribution, easements and right-of-way for project needs. The USACE

requested that the Town identify a suitable site for evaluation through a feasibility study. The Town has identified and secured a site, and will continue to work toward additional land rights needs for the discharge pipeline, staging area and related lands. The total cost for acquisition is estimated at \$1-2 million.

## **Background on Cedar Lake**

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Cedar Lake, one of the largest inland natural lakes in Indiana, is the focal point of the community and a rare natural feature in this part of the country. The large marsh south of the Lake, Cedar Lake Marsh, was part of the lake at one time and is one of the largest contiguous wetlands in Indiana.

By the 1870's, the pioneers had established small settlements around the Lake. The Monon Railroad arrived at the Lake's western shore in 1882. The 2.5-mile section of railroad that passed by the Lake was considered one of the most scenic sections along the railroad. With the railroad came new residents, as well as entrepreneurs who recognized the value of the Lake as a tourist destination. Cedar Lake became a popular destination for Chicagoans and tourists seeking a lakeside retreat. By the early 1900's, Cedar Lake had over 50 hotels, several steamboat tour lines and numerous lakeside cottages.

The resort days brought prosperity and growth, particularly cottage subdivisions. By the 1940's, greater mobility afforded tourists access to further destinations. As a result, Cedar Lake's popularity as a resort area began to decline. The hotels closed and were demolished. By 1990 the lakefront no longer hosted a wide variety of lodging, dining and entertainment. Cottages that were built as seasonal dwellings were converted to year-round dwellings, and the lakefront was lined mostly with homes and a few marina businesses.

The 1990's saw the south Chicago suburbs and Lake County, Indiana prospering. New subdivisions began to spring up in outlying areas, and in the mid 1990's, developments began a wave of single family subdivisions within the Town boundary. Additional land was annexed to the Town to accommodate sewer extensions and new developments. Over the past decade there have been over 3,000 dwelling units constructed, approved, awaiting construction, or in the planning approval stage of development.

In addition to development within the Town, two major statewide changes could significantly impact the watershed and underline the need for restoration and protection. The States of Illinois and Indiana have begun design and public meetings for a new expressway that will connect Interstate 57 to Interstate 65. The "Illiana Expressway" corridor is planned just south of Cedar Lake and could have a potentially major impact on land use and development in the Town. An extension of the South Shore Transit rail line that connects Northwest Indiana to Chicago is also planned to extend through the central part of the county. This extension is in the planning stages, with strong support from the Northwestern Indiana Regional Planning Commission and local area municipalities. It would follow the existing CSX railroad through the Town, where a station would be built.

The Town Council recognized the need to plan for the future of Cedar Lake. It was hoped that growth would help fuel redevelopment of existing portions of the Town, while not increasing impacts to the Lake. Town leaders realized that quality development needed to be guided by Town policies that set a higher environmental standard. A new Comprehensive Plan was born from the desire of the Town to take control of land development. Throughout the creation of the 2012 Town Comprehensive Plan, residents repeatedly expressed concern about the Lake and its condition. Continued restoration and maintenance of the Lake are major recommendations of the Comprehensive Plan. The Comprehensive Plan and the accompanying updates to Town ordinances are strong evidence of the Town's interest in protecting and restoring the lake's ecosystem.

The Town is joined in the restoration effort by the CLEA. CLEA is a local non-profit organization of neighbors and friends who value and work to protect the Lake. Since its formation over 15 years ago, CLEA has prepared a number of grant applications, hosted fundraising activities and garnered hundreds of hours of donated labor to invest in ecosystem protection within the Cedar Lake watershed. Exhibit 1 shows the Cedar Lake watershed and indicates the location and type of the CLEA's 17 recent projects.

Cedar Lake is highly valued and the need for ecosystem restoration is understood by the local residents. Their support for fundraising activities, revised planning and regulations shows a high level of local enthusiasm and support, demonstrated through the broad range of plans, programs, and projects.

Lakeside residents use their private boats and docks to spend time on the lake. Non-lakeside and regional residents use the public launching facilities to enjoy the opportunities for boating and fishing. In interesting contrast, however, there is a pervasive understanding of and regard for the environmental values of the lake and its ecosystem. The Town, Lake County, Lake County Soil & Water Conservation District, and the Cedar Lake Enhancement Association (CLEA) stress the ecosystem values in educational materials such as newsletters and workshops. This understanding helps the residents balance the recreational demand with environmental protection. The Town, as the non-federal sponsor of the ecosystem restoration project, understands that restoration project elements may require additional protection and long term management. The Town welcomes such a role.

## **Cedar Lake Ecosystem**

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In 1986, the Indiana Department of Environmental Management's (IDEM) review of conditions indicated a Trophic State Index of 70, indicating that the lake received an excess of nutrients that were not used in ecosystem processes. Investigations and analyses have been conducted to compile data about the condition of the lake ecosystem and to evaluate restoration measures. The Chicago District USACE is currently developing a feasibility analysis for ecosystem restoration measures based on previous studies, new data, and hydrodynamic modeling. As part of this analysis, a computer model was developed by Sandia National Laboratories to evaluate restoration measures and determine how to effectively combine them. A combination of sediment transport, hydrodynamics, and ecosystem parameters were modeled.



When completed, the feasibility analysis will be published as a DRAFT Feasibility Report and Integrated Environmental Assessment.

### **Key Study Findings**

- Phosphorus was determined to be the limiting nutrient, having the most adverse effects to ecosystem health and the primary nutrient responsible for algal blooms in the summer.
- Nine inlets potentially contribute flow and sediment/nutrient loading to Cedar Lake.
- There is a deep and persistent phosphorus source in the sediment bed primarily due to historical agricultural runoff in the watershed.
- The primary source of phosphorous loading to Cedar Lake water is through bed sediment flux.
- Field data was used to map the sediment bed baseline initial condition. Mapping indicates pollutant concentration in the center of the Lake.
- Removing and safely disposing of phosphorous-laden sediments would be an ideal restoration measure to remove the source of loading.
- Removal of the source phosphorous must be combined with additional restoration measures because tributary loading and atmospheric deposition will perpetuate the problem.

In addition to the Sandia National Laboratories research, the Clean Water Act 303(d) and 305(b) reports provide an environmental profile of the lake, showing recent signs of improvement. In the 2006 Integrated Water Monitoring and Assessment Report (sections 303(d) and 305(b)), Indiana Lakes are classified into five trophic states utilizing the Indiana Trophic State Index (TSI). The TSI is a classification systems used to indicate the amount of nutrient enrichment present in a lake. The five classifications of the TSI, listed in order of nutrient enrichment, are oligotrophic, mesotrophic, eutrophic, hypereutrophic, and dysotrophic. Cedar Lake is considered to be mesotrophic, as are 46% of assessed Indiana Lakes. The report also indicates that Cedar Lake is showing signs of aquatic ecosystem improvement, as nutrient levels and their associated effects are decreasing in the lake. Only 11% of sampled Indiana Lakes showed similar signs of aquatic ecosystem improvement.

## **History of Water Resource Problems**

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### **Surcharge Events and Septic Fields**

There are approximately 290 acres of existing reported septic fields tributary to the Lake, most of which are located west and south of the Lake. There have been concerns that there are more septic fields and tanks that are unreported and lay within the Lake's watershed. Additionally, large areas west of Cedar Lake, near Parish Avenue are being developed. All of these areas are directly tributary to the Lake and all septic surcharging or tank failures drain directly into the Lake. These septic fields have been an aquatic ecosystem concern for the Lake because some failures and surcharges have been unreported. The Town has been working to reduce the amount of septic fields in the area; while almost all septic fields within Town boundary are gone there are still several within the watershed and outside the Town limits.

In addition to contamination concerns from local septic fields, sanitary sewer surcharging has been a problem. In recent years (2003-2008 and 2011-2016), extended surcharging was reported multiple times with records provided between 2008 and 2011. There were concerns that only a fraction of these events were being reported or went unnoticed. All reported surcharging locations were within the Lake's watershed; therefore, all sewage surcharged drained directly into the Lake. The West Side Sanitary Sewer (WSSS) has been designed to alleviate many of these events and an expansion of the Lowell water treatment plant capacity is being pursued to provide adequate capacity to treat the areas served by the WSSS and those with septic fields once they are connected. The locations of all historically surcharging manholes and known septic fields can be seen on Exhibit 2. A summary of reported surcharges in the past five years within the Cedar Lake watershed is provided below in Table 1.

**Table 1 – Reported SurchARGE Events**

Year	Letter Date	Number of Surcharges	Date of Surcharges	Locations of Surcharges
<b>2016</b>	3-Mar-16	1	3-Mar-16	14229 Lauerman
<b>2015</b>	22-Jun-15	8	--	MH# 395; 6700 block of 145th Avenue
	16-Jun-15		15-Jun-15	MH# 1033; 7927 Lake Shore Drive
	15-Jun-15		15-Jun-15	MH# 395; 6700 block of 145th Avenue
	17-Jun-15		15-Jun-15	MH# 395; 6700 block of 145th Avenue
	21-Jul-15		19-Jul-15	MH# 395; 6700 block of 145th Avenue
	2-Jul-15		18-Jul-15	MH# 395; 6700 block of 145th Avenue
	22-Jun-15		4-Jun-15; 5-Jun-15	MH# 395; 6700 block of 145th Avenue
	21-May-15		--	MH# 598; 14301 Lauerman
<b>2013</b>	16-Dec-13	1	--	MH# 395; 6700 block of 145th Avenue
<b>2012</b>	29-May-12	6	27-May-12	14517 Parrish; force main
	9-May-12		7-May-12	MH# 941A; Pine crest
	7-May-12		7-May-12	13853 Binyon; lift station 5
	7-May-12		7-May-12	MH# 1033; 7927 Lake Shore Drive
	7-May-12		7-May-12	MH# 395; 145th and Morse
	6-Jan-12		5-Jan-12	12545 Parrish Avenue; force main
<b>2011</b>	15-Dec-11	14	14-Dec-11	MH# 941; Pine Crest; lift station 1
	15-Dec-11		14-Dec-11	MH# 395; 6700 block of 145th Avenue; lift station 3
	15-Dec-11		14-Dec-11	MH# 984; 140th Avenue and 141st Avenue; lift station 3
	20-Jun-11		20-Jun-11	MH# 395; 6700 block of 145th Avenue; lift station 3
	17-Jun-11		17-Jun-11	MH# 395; 6700 block of 145th Avenue; lift station 3
	10-Jun-11		9-Jun-11	MH# 1033; lift station 2
	10-Jun-11		9-Jun-11	MH# 598; lift station 10
	10-Jun-11		9-Jun-11	MH# 941; lift station 1
	10-Jun-11		9-Jun-11	MH# 983; lift station 3
	10-Jun-11		9-Jun-11	lift station 5

Year	Letter Date	Number of Surcharges	Date of Surcharges	Locations of Surcharges
	10-Jun-11		9-Jun-11	lift station 20
	26-May-11		26-May-11	MH# 598; 14301 Lauerman; lift station 10
	18-Feb-11		17-Feb-11	11535 West 134th Court; lift station 18
	15-Feb-11		12-Feb-11	8715 Lauerman
<b>2008</b>	28-Jan-08	1	24-Jan-08	8715 W 143rd, 1:00 pm - 12:30 pm of 28th
<b>2007</b>	24-Aug-07	2	23-Aug-07	145th Ave, #108A, 9pm - 11:30am (24th)
				Lauerman by Pine Crest Marina #941, 9pm - 7:50 am (24th)
	26-Apr-07	4	25-Apr-07	145th #108A, 5:30am - 1:30 pm
			--	Lauerman by Pine Crest Marina, #041, 6am - 2pm
			--	Cedar Lake Chamber Building #1032, 6am - 8:30am
			--	W 142nd Ave & Lauerman #648, 9:45 - 2pm
<b>2006</b>	12-Jul-06	3	11-Jul-06	Blaine St & 147th Crt (Lift #1)
			--	14415 Lauerman
			--	147th Crt & Lee St.
<b>2005</b>	13-Jan-05	3	--	#654, #656, #37
	12-Jan-05	2	--	Pinecrest Marina, #941, #37
	14-Feb-05	5	--	#655, #656A
<b>2004</b>	16-Jan-04	1	--	--
	18-Feb-04	1	--	forcemain
	5-Mar-04	1	--	#941
	9-Mar-04	1	--	#293
	30-May-04	1	--	#660
	15-Jun-04	7	--	#941, #395, #655, #924, #940, #654, #656A
	25-Aug-04	2	--	#654, #655
	26-Aug-04	2	--	#654, #655
	8-Nov-04	1	--	Lift Station #3
	7-Dec-04	3	--	#941, #654, #655
<b>2003</b>	4-Apr-03	1	--	Lift Station #1
	4-May-03	3	--	#941 #655 #654
	12-May-03	13	--	#395 #940 #939 #934 #944C #931B #937A #1026 #653 #654 #656A #806 #986
	30-May-03	1	--	forcemain
	3-Jul-03	6	--	#939, #934, #931B, #653, #654, #656A
	17-Jul-03 - 18-Jul-03	6	--	#939, #934, #931B, #653, #654, #656A
	21-Jul-03 - 22-Jul-03	9	--	
	3-Aug-03	4	--	
	24-Nov-03	1	--	forcemain

## Sewer Improvements

The sanitary sewer system in the Town of Cedar Lake was initially installed in 1972 and went online in 1975. Since that time, upgrades to the system have been completed in response to pressing sewer concerns, especially sewer limits associated with community growth within the last five years. The Cedar Lake Public Works Department conducts ongoing maintenance on sanitary lift stations to prevent sanitary surcharges. Exhibit 3 shows the locations of all lift stations within or near the Cedar Lake watershed. A summary of lift station maintenance since 2002 is provided below in Table 2.

**Table 2 – Reported Sewer System Maintenance and Enhancements**

Lift Station #	Total Rehab	Controls Update	Replace Force Main	Replace Generator	Replace Pumps	Notes <sup>1</sup>
1			X	X	X	stilling well and bypass, cleaned wet well
2	X				X	stilling well and bypass
3	X		X	X	X	stilling well and bypass, cleaned wet well, new gate valves, discharge shutoff gate valve,
4	X		X		X	pump 2 rebuild
5		X				check and gate valves, ABB VFD drives
6	X		X		X	mercoid, MPC controller
7	-	-	-	-	-	mercoid, MPC controller
8	X		X			both pumps rebuilt, mercoid, MPC controller, backup float controller
9		X				regular maintenance, floats, thermal overload, harness, new elbow
10		X			X	waiting for council approval of complete rehab
11	X	X	X	X	X	pump 2 rebuild
12		X				power flow pump, control panel, ABB VFD controls
13		X				ABB VFD controls
14	X				X	D152 controller
15	X					both pumps rebuilt, ABB VFD controls
16	X					ABB VFD controls
17		X				regular maintenance
18		X				raised wet well with concrete ring, new lid, panel rehab, ABB VFD

Lift Station #	Total Rehab	Controls Update	Replace Force Main	Replace Generator	Replace Pumps	Notes <sup>1</sup>
						controls
19		X				regular maintenance
20	X					regular maintenance
21		X			X	ABB VFD controls, 2 power flow grinder pumps with bases
22	-	-	-	-	-	regular maintenance
23		X			X	regular maintenance
24						regular maintenance
25						regular maintenance

<sup>1</sup> All lift stations have been equipped with OmniSite remote monitoring systems.

Several lift stations are scheduled for maintenance to prevent surcharges. There are five locations that have been vulnerable to sanitary surcharge during significant rain events. All known surcharges are reported to IDEM. An example letter has been provided in Appendix 1. The Cedar Lake Public Works Department has made approximately eighteen point repairs to sanitary lines in the past few years.

### **West Side Sanitary Sewer**

The Town has experienced steady population growth from new developments over the past five years. This rapid increase in development has increased sanitary sewer loadings significantly, at a rate at which potential conveyance must also be increased. The Town's proposed solution to this need for increased sanitary sewer conveyance is the creation of a new sanitary line, referred to as the WSSS.

The WSSS will be located along Morse Street, 159<sup>th</sup> Avenue, Cline Avenue, 155<sup>th</sup> Avenue, Parrish Avenue and 151<sup>st</sup> Avenue, connecting south and east to the Equalization Basin and ultimately continuing to the Lowell Wastewater Treatment Plant. At full build-out, it will service approximately 3,000 acres of both existing development and future developable areas. This current and potential future development has an estimated capacity of 10,500 ERUs that could be serviced by the WSSS.

The WSSS sanitary sewer collection mains will range in size between 18-inch and 36-inch in diameter for a total length of 5.8 miles. The entire length will be served by gravity with the option for some of the future areas west and south to connect by lift station as dictated by specific development and topography.

## **Local Solutions for Aquatic Ecosystem Improvements**

### **Local Plans, Programs and Projects**

In order for enhancements to occur, the Town needed a structured foundation to be set in place. Enforcement of policies, ensured compliance with Ordinances and controlled development were a huge portion of the Town's goals to evolve into a prosperous and thriving community.

The recent rapid development in Cedar Lake can be viewed as a benefit for the Town as long as development is controlled and planned correctly. To manage the large amounts of new development the Town uses two major tools. First, all new development must be deemed appropriate with reference to the Cedar Lake Comprehensive Plan. Second, the Town has Zoning and Development Ordinances to restrict all development types to planned areas.

In addition to the Town's inspection programs, development is regulated through Town codes, and ordinances, including the Development Standards, Storm Water Management Ordinance, Storm Water Technical Standards Manual, and the Subdivision Ordinance. The Town can enforce regulations and programs by issuing fines and/or stop work orders for sites or developments that do not comply. Several such punishments have been issued since the Ordinance went into effect.

#### Comprehensive Plan, Town of Cedar Lake, Indiana, 2012:

The Comprehensive Plan outlines and protects the Lake's value for citizens of the Town. Public participation was key in developing the Plan. The Comprehensive Plan invited public participation to let the community give input on how to improve the perception of the Town, and help embrace change. The Plan itself shows that the Town has enormous potential to evolve into a successful and flourishing community. In the Public workshops, members focused on five key issues: 1) Road/Infrastructure improvements 2) Cleanliness/Lake improvements 3) More commercial development 4) Aesthetic improvements and 5) More recreational opportunities. These issues were then incorporated into the Comprehensive Plan.

Among the many initiatives put forward within the Comprehensive Plan, the Town focuses strongly on acquiring land for park and lake access, preservation of open lands and natural features through funding and financing, and providing pedestrian connections between neighborhoods and parks through the use of sidewalks and trails. The plan also pushes for the distinction of low, medium, and high density residential through zoning changes and will include open space requirements. This will allow for more controlled development within the Lake's watershed. For this to work, the Town needed to demonstrate how the implementation of the Plan will achieve the changes. The Plan breaks down what steps need immediate action, medium term, and long term actions. Included in the priority items are actions to rewrite the Zoning Ordinance and Subdivision Regulations, create a Capital improvements plan, prioritize lands with natural features and seek funding for acquisition and/or protection, and review the Plan after one year to ensure that action plans are being implemented and the Future Land Use Plan remains consistent. Medium and long term actions include additions of multi-use trails, sidewalk and other pedestrian improvements, the continuation to seek additional funding sources, acquire high-priority land for parks and lake access and review the Plan on an annual basis. The Town already sees great progress with the action plans within these initial years of the Plan's implementation. A copy of the Comprehensive Plan can be found on a CD attached in Appendix 6.

#### Town of Cedar Lake Stormwater User Fee:

To provide a means of compliance with NPDES permit coverage for the Town, an MS4 community, a stormwater fee was established. Property owners are required to pay a fee based on the level of imperviousness of their property, referred to as the

Equivalent Runoff Unit (ERU). The revenue generated from this fee allows for the repair, replacement, planning, operation, regulation and maintenance of the existing and future stormwater infrastructure and supports programs that protect and improve the aquatic ecosystem and habitat of Cedar Lake. The Town regularly updates fees due to changes in existing sites and new construction.

Cedar Lake Stormwater Management Ordinance No. 1218, April 2015:

This recent Town ordinance demonstrates the Town's desire for appropriate stormwater management principles. The purpose of the Ordinance was to provide for the health, safety, and general welfare of the citizens of Cedar Lake through the regulation of stormwater and non-stormwater discharges to the storm drainage system and to protect, conserve and promote the orderly development of land and water resources within Cedar Lake. The Ordinance establishes methods for managing the quantity and quality of stormwater entering into the drainage system in order to comply with all State and Federal requirements. The objectives of the Ordinance are:

- A. To reduce the hazard to public health and safety caused by excessive storm water runoff.
- B. To regulate the contribution of pollutants to the stormwater drainage system from runoff from new development and re-development.
- C. To prohibit illicit discharges into the stormwater drainage system.
- D. To establish legal authority to carry out inspection, monitoring, enforcement and any other applicable procedures necessary to ensure compliance with this Ordinance.

The Ordinance details steps in the land development process to achieve local goals consistent with ecosystem restoration. A copy of the Stormwater Management, Stormwater Technical Manual and Subdivision Ordinances can be found on a CD attached in Appendix 6.

Chapter Two of the Ordinance deals with prohibited discharges and connections. The chapter applies to all discharges entering the stormwater drainage system under the control of Cedar Lake, regardless of whether the discharge originates from developed or undeveloped lands, and regardless of whether the discharge is generated from an active construction site or a stabilized site. These discharges include flows from direct connections to the stormwater drainage system, illegal dumping, and contaminated runoff. Also included is information on the storage of hazardous materials, private property maintenance duties, and spill reporting. In addition, the chapter summarizes the Town's authority for inspection and monitoring to portions of the stormwater system, private properties where suspected illicit discharges are occurring and new development sites to verify all on-site stormwater conveyances and connections to the storm drainage system are in compliance with the Ordinance.

Chapter Three involves six main policies on stormwater quantity management. The first is detention, dealt with in Section 2, topics such as release rates, depressional storage, off-site runoff, downstream restrictions and direct release provisions are discussed. The second part of Section 2, explains grading and building pad elevation requirements, acceptable outlet and adjoining property impacts, and no net loss floodplain storage policies. Section 3 addresses calculations and design

standards and specifications that are located in the Cedar Lake Stormwater Technical Standards Manual. Section 4 deals with drainage easement requirements for subdivisions, non-subdivisions and municipalities and schools. Section 5 discusses the placement of utilities with consent from the Cedar Lake Town Engineer and the Cedar Lake Public Works Department and without consent the results of penalties that are described in Chapter 8. Section 6 deals with the inspection, maintenance, record keeping, and reporting of all work within Cedar Lake.

Chapter Four includes a progressive Stormwater Pollution Prevention Plan (SWPPP) regulation section for construction sites. It contains topics such as applicability and exemptions, policies on stormwater pollution prevention, calculations and design standards and specifications, and inspection, maintenance, record keeping, and reporting. This section details how all site owners are responsible for implementing all measures necessary to adequately prevent polluted stormwater runoff, establish their own self-monitoring inspection program, and prepare their own SWPPP.

Chapter Five deals with stormwater quality management for post-construction sites. The chapter emphasizes topics such as applicability and exemptions, policies on stormwater pollution prevention, calculations and design standards and specifications, and inspection, maintenance, record keeping, and reporting. It deals with long-term responsibilities of the site owner, and long-term post construction inspections of all public or privately owned stormwater quality facilities.

In Chapter Six of the Ordinance, the developments in wetlands regulations are addressed. This chapter includes information on applicability and exemptions, wetland identification and wetland disturbance prevention. It is the public policy of Cedar Lake to preserve, protect, and conserve freshwater wetlands, and the benefits derived wherefrom, to prevent the despoliation and destruction of freshwater wetlands, and to regulate use and development of such wetlands to secure the natural benefits, consistent with the general welfare and beneficial to economic, social, and agricultural development of Cedar Lake.

Chapter Seven explains permit requirements and procedures enforced in the Ordinance. It talks about information requirements that include an initial Notice of Intent, construction plans, stormwater drainage technical report, SWPPP, and a post-construction SWPPP. The chapter also deals with reviews of individual lots within a permitted project, changes to plans, fee structures, required assurances, the terms and conditions of permits, and certification of as-builts.

The Ordinance, within Chapter Eight, addresses code enforcement and compliance. The Ordinance details penalties for violations and the ability to issue stop work orders. Additionally, it addresses failure to comply issues and suspensions of access to the storm drainage system; all to achieve the goals of a safe and environmentally friendly stormwater management system.

#### NPDES and MS4 Program:

The Town understands that all watershed activities have the potential for negative impact on the watershed and Lake ecosystem and therefore has made protection of the watershed and the aquatic ecosystem a priority. Development in Cedar Lake watershed has increased at a rapid rate and illicit connections of stormwater



systems to sanitary sewers has been a concern. To ensure compliance, the Town has recently implemented a testing program to check both newly created or suspect developments and subdivisions to confirm they are not illegally connecting their storm water or sump pumps to the sanitary sewer system. Town representatives have performed door to door tests, using both dye testing and smoke testing methods for sump pumps and storm pipes to make sure that no storm water is ending up in the sanitary sewers.

As part of the 2014-2015 Annual Report, the Town developed and implemented a wide range of programs, regulations and plans. Some of the major topics addressed were Public Education/Outreach, Public Involvement/Participation, Illicit Discharge Detection and Elimination, Construction Site Stormwater Run-off Control, Post-construction Stormwater Management, and others. The MS4 General Permit Program summary can be seen below.

#### MS4 General Permit Program Annual Report Summary

Listed below are many, but not all, of the programs, regulations, and plans set forth and implemented by the Town as part of the MS4 General Permit Program Annual Report.

#### **Public Education and Outreach:**

- Contracted PE & O: Developed and implemented minimum measures for Public Education and Outreach. Public education and outreach was partly achieved by distributing newsletters, contacting residents over the phone, putting up displays, and posting information on utility bills and the Town's website. Displays of brochures and materials could be found at Town Hall, the Parks Department, the Public Works Department, the Chamber of Commerce, and the Public Library.
- Training for Construction Professionals: Training sessions for Phase II, inspection process and SWPPP's have all taken place in the Town. The Town and local construction professionals and engineers attend an annual workshop hosted by the Lake County Surveyor's Office regarding erosion and sediment control measures for construction sites. The Town also periodically provides erosion and sediment control brochures to construction site managers and staff.
- Newsletter Articles: The Town of Cedar Lake has a local newsletter that circulates to local residents that routinely include articles on storm water to help with local public outreach efforts. An example of a newsletter is located in Appendix 2.
- Website: The Town of Cedar Lake has a Stormwater Management webpage; information on it includes MS4 related documents, information on permitting, flooding and watersheds, and links to related webpage's such as the NIRPC MS4 website. Additionally, shown on the webpage are public complaint forms along with "report a polluter" information to help involve the public and give them an opportunity to voice their concerns.

- Stormwater Survey: Partnership has determined to invest in a statistically significant survey to encourage public participation. The regional stormwater quality survey was conducted in September of 2007 with a follow-up survey conducted in October of 2010. The initial survey provided a benchmark to gauge regional public outreach effectiveness, which a total of 755 surveys were completed, and the 2010 survey included 607 phone interviews.
- Distribute Storm Water Educational Brochures: 1500 brochures were printed and distributed as of 2006. Along with brochures, distribution materials included posters, CD's, calendars, and specialized handouts such as rain gauges, stress balls, pens and umbrellas. A slide showing sample brochures and materials can be found in Appendix 3.
- Soil and Water Conservation District Activities: The SWCD provide a variety of educational activities for local students as well as public outreach events.
- Mass Media Opportunities Placemats were provided to local restaurants that contained stormwater quality information as well as informative games for kids. Other local non-profit fundraising events for residents have taken place to provide additional opportunities to discuss stormwater quality. Organizations that Cedar Lake has paired with to help public education include the Lake County Solid Waste Management District, NIRPC (Northern Indiana Regional Planning Commission, the Lake County Health Department, the Indiana Department of Natural Resources, and the LCSWCD (Lake County Soil and Water Conservation District).
- Arbor Day Event: The Parks Department organizes volunteers and applies for grants for the Town's annual Arbor Day event in which volunteers plant trees and shrubs in public parks.
- Earth Day Event: To celebrate Earth Day the community, Town staff, and Consultants are invited to participate in a roadside cleanup event, in which volunteers collect trash alongside roads and ditches throughout Town.
- Recycling: Cedar Lake has a municipal recycling program which includes recycling material dumpsters at the Public Works Department and the placement of paper recycling bins at all public facilities.
- Household Hazardous Waste Collection: The collection is held annually at the Cedar Lake Town Hall for residents and gives the Northern Indiana Regional Planning Commission (NIRPC) another opportunity to distribute MS4 and stormwater quality literature.
- School Programs: The Lake County Soil and Water Conservation District conducts a variety of storm water related programs in the Cedar Lake School system. At the Cedar Lake Hometown Festival, Kids Key Club members distributed MS4 brochures and other storm water information.

### **Public Involvement and Participation:**

- Contracted PI &P: The Town developed and implemented minimum control measures for Public Involvement and Participation. Opportunities for the public include clean-up events, storm drain marking, open public meetings, household hazardous waste events and public complaint opportunities.
- Cedar Lake Clean Water Program Steering Committee: This Committee includes department heads from Parks, Public Works, Enforcement, Fire, Police, Building, Planning/Zoning, Town Management and the MS4 consultant.
- Develop Rule 13 Participation: Public awareness includes storm drain stenciling which involves the voluntary public and a Science camp in the winter, spring and summer to show the importance of rain/storm water and the lake by providing stormwater quality exercises for the kids. Also, during the summer, the Parks Department hosts a day camp for kids 5 to 18. This interactive camp has kids participate in learning activities, in which some involve storm water information. The Town is also encouraging farmers to voluntarily enroll in NRCS pest/nutrient management programs.
- Public Meetings: The local Stormwater Management Board meets on a monthly basis as well as the MS4 Advisory Committee and MCM leaders.
- Clean-up Events: Events include annual roadside clean-up, neighborhood waterway clean-up organized by the Parks Department, household hazardous waste collection days, and the Lake County Solid Waste Management District promotions.
- Pollution Prevention Program: The Town developed a form to handle public complaints on illegal dumping, illicit discharges, inadequate erosion control, and other activities. Local law enforcement attends meetings to coordinate enforcement procedures regarding illicit discharges.

### **Illicit Discharge Detection and Elimination:**

- Storm Water System Conveyance Map (enclosed pipe): The Town is in the process of mapping all of the underground storm water system conveyance. This will ensure correct record keeping and easy detection locations for areas in question.
- Storm Water System Conveyance Map (open channel): As of 2006, approximately 11,600 feet ( $\approx 35\%$ ) of the total open channel conveyances with a  $\geq 2'$  bottom width is mapped in ArcGIS.
- Storm Water System Conveyance Outfall Map: All known outfalls to Cedar Lake have been mapped for records. The maps will be able to show changes over time for the outfalls and surrounding locations.
- IDDE Plan: A formal Illicit Discharge Detection and Elimination (IDDE) Plan, accepted by the Town, uses mapping, screening, industrial inspections and water testing activities. The plan includes information on well testing, dry weather screening, illicit discharge detection and elimination forms and good

housekeeping & pollution prevention staff training. The plan spells out illicit discharge detection response procedures and the goals of completely eliminating illicit connections. Dry weather screening of all known outfalls has been completed.

- Good Housekeeping: Items included proper handling, storage, labeling and disposal. Spill kits, secondary containment units and available MSDS have also been implemented as part of the overall IDDE plan.
- Illicit Discharge Detection and Elimination Regulations: The Town contracted with Christopher B. Burke Engineering Ltd. to develop an Illicit Discharge Detection and Elimination section within the Storm Water Ordinance to serve as a regulatory mechanism for point source pollutants.
- Illicit Discharge Detection Investigation Drill: The drill has already collected samples at 5 outfall locations discharging to Cedar Lake to field test the IDDE Investigation process.
- Hazmat Response: The plan for hazmat response has already been integrated, having the Cedar Lake Fire Department respond to 4 hazardous material calls involving gasoline/oil/combustible liquid spills contained and or treated with bio-remediation.
- Routine Water Quality Testing: With this plan in place the Town tests 11 sites weekly to ensure water meets EPA standards

#### **Construction Site Storm Water Run-off Control**

- Erosion and Sediment Control Ordinance: This comprehensive ordinance meets the minimum requirements of 327 IAC 15-5 (Rule 5). The ordinance details out information on inspection and enforcement documentation, procedures for prioritizing review and inspection of construction activities and the training for construction professionals.
- Plan Review: The Town has incorporated a formal permitting procedure to ensure repeatability of the review process for storm water discharge permitting after adoption of the Storm Water Ordinance.
- Site Inspection: A part-time Building Inspector is employed within the Building Department that has been delegated responsibility for conducting on-site inspections for compliance with storm water pollution prevention on active construction sites.
- Staff Training: The Town has begun training to ensure all reviewing and inspection staff members are following the same guidelines.
- Enforcement: An enforcement penalty matrix was established to enforce the Ordinance in a fair and consistent manor. Already implemented, enforcements included habitat mitigation and rehabilitation for non-compliant sites.

- Erosion and Sediment Control and Post Construction BMP Tracking Database: The database was established not only to keep better records of existing BMPs, but to keep better records of the maintenance of the structures.
- Quality Assurance/Quality Control (QA/QC) of Overall Program: This section was incorporated to help track the progress of the program and its effectiveness.

### **Post-construction Storm Water Management in New Development and Redevelopment**

- Post-Construction Control Ordinance: This ordinance includes post-construction site run-off control measures, information on staff training, plan review, site inspections, and enforcement.
- Post-Construction BMP Operation and Maintenance Plan: These are essential to keep the BMP's efficiently working and a plan to continually track each one.
- Erosion and Sediment Control and Post Construction BMP Tracking: A database tracks construction projects, erosion and sediment control activities, and post-construction BMP's.

### Town of Cedar Lake Indiana Zoning Ordinance No. 496:

The current Zoning Ordinance continues the theme of watershed, lake and ecosystem restoration through the inclusion of general provisions regulating land clearing, excavations, setbacks and site development. The Ordinance not only created the zoning district boundaries but also established organized zoning districts. Zoning districts include residential, planned unit developments, agricultural, business, industrial and protective wetland and floodway. This Ordinance is currently undergoing a substantial revision due to be completed sometime in 2016. A few of the watershed themed districts are described below.

- Title IV Wetland and Watercourse (WW) Zoning District  
The main purposes of this zoning district are to: 1. Provide for the protection, preservation, proper maintenance and use of watercourses and wetlands in order to minimize disturbance to them and to prevent damage from erosion, turbidity, or siltation, a loss of fish life or other beneficial aquatic organisms, a loss of wildlife and vegetation and/or from the destruction of the natural habitat thereof. 2. Provide for the protection of the Town's potable fresh water supplies from the dangers of drought, overdraft, pollution, or mismanagement; and 3. Provide maximum protection for the residents of the Town of Cedar Lake and their property in areas affected by high water tables, periodic flooding and unstable soil conditions caused by marshy or swamp like terrain.
- Title V Floodplain (FP) District, Floodway (FW) District and Floodway Fringe (FF) District  
These zoning districts were established as overlay districts which create additional controls on property determined to be subject to inundation by the One Hundred Year Flood. The purpose of the Floodplain (FP) zoning district

is to guide development in areas where a potential for damage from floodwaters exists but for which no detailed flood data has been provided. The purpose of the Floodway (FW) district zoning is to guide development in areas identified as floodway. The purpose of the Floodway Fringe (FF) zoning district is to guide development in areas subject to potential flood damage, but outside and identified floodway.

In summary, the Zoning Ordinance was drafted to ensure a direct relationship between the regulations and the goals and objectives of the Comprehensive Plan. The Town of Cedar Lake is creating an updated Zoning Ordinance and is going through their final edits and hope to be completed with it in late 2010.

#### Utopia Subdivision Storm Water Improvements Project:

Although not required by federal flood protection project guidelines, the Town and CLEA insisted on the inclusion of a detention/sedimentation basin as an element of the project. The Utopia Subdivision was constructed within the limits of a historical overflow flow path that conveyed stormwater to Sleepy Hollow Ditch. The primary purpose of the Utopia improvements was to provide 10-year protection to the subdivision which experiences frequent shallow depth flooding. A channel was excavated along the southwest property boundary of the subdivision to convey storm water runoff to the headwaters of Sleepy Hollow Ditch just upstream of Parrish Avenue. The basin was constructed near the downstream limits of the project and collects sediment and attenuates peak velocities prior to the release into the downstream reaches of Sleepy Hollow Ditch. The velocity attenuation reduces streambank erosion and thereby reduces sediment flowing to the Lake.

#### Founders Creek Storm Water Improvements:

With assistance from the Lake County Surveyor, Drainage Board and the property owner a site development plan has been developed to be in compliance with the Ecosystem Restoration project. Construction of these improvements is pending. A copy of the Lake County Drainage Board meeting minutes can be found in Appendix 4.

#### Recent Cedar Lake Roadway and Storm Water Improvements:

Many enhancements have taken place in the past few years to update and improve roadways and drainage throughout the Town. Improvements include replacement/addition of structures and pipe to minimize flooding/ponding in the roadways, installation of extra deep sumps in catch basins, roadside vegetated buffers, hydrodynamic separators, outfall stabilization, and vegetative filtrations.

#### 133<sup>rd</sup> Avenue Roadway Widening

In 2009, the Town finished their first federally funded INDOT roadway project on the west side of Town along 133<sup>rd</sup> Avenue. There was about 3,330 feet of reconstruction including the improvements of the 133<sup>rd</sup> Avenue and Parrish Avenue intersection. Work included a full widening and reconstruct of roadway, sidewalk, curb and gutter, street lighting, intersection and traffic control improvements and over 6,300 feet of storm sewer was installed. The second phase of the 133<sup>rd</sup> widening project was completed in the Spring of 2016. This included similar improvements that measured 2,400 ft. of roadway reconstruction, the construction of a wet detention basin, and 4,000 ft. of storm sewer.

### 133<sup>rd</sup> Avenue and Morse Street Corridor

Improvements were completed for the intersection of 133<sup>rd</sup> Avenue and Morse Street on the east side of Cedar Lake in 2008. The 133<sup>rd</sup> Avenue and Morse Street area was experiencing revitalization with new condominiums being built on the lakeshore. New retail construction was occurring at the southeast corner of the intersection for a longtime Town business, and the retail business at the northeast corner of the intersection was expanding and remodeling. Future commercial construction was also anticipated in the area. The intersection historically had flooding problems and was frequently closed during rain events as the roadway became impassible.

The 133<sup>rd</sup> and Morse project consisted of the installation of a new storm sewer trunk line and laterals to serve the intersection. The development of the condominiums on the lake shore provided the outlet to the lake that served the development and the intersection project. The roadway was widened to provide turn lanes on each leg of Morse Street and on 133<sup>rd</sup> Avenue itself. In addition to the widening, road improvements also included the construction of curb and gutter and the milling and overlay of the existing pavement to regrade the roadway. Streetscape improvements included sidewalks, benches, planters, decorative columns and fencing, landscaping, ornamental street lighting, and stamped asphalt in the crosswalks and the intersection.

This area experienced further revitalization in 2014 when 133<sup>rd</sup> Avenue was widened from Morse Street to east of Fairbanks Street and resurfaced to tie into a Lake County resurfacing project to at the Town Corporate Limit. New storm sewer, curb and gutter, storm sewers, decorative lighting, and a wetland mitigation project were completed as part of these improvements.

### Capital Improvement Projects (2007-2010):

The Town of Cedar Lake initiated projects with design, bidding and construction management for \$5.97 million in Capital Improvements. The improvements span over (6) six miles on 29 different roadways. The project started in the fall of 2007 with final completion in the spring of 2010. The project was constructed in five phases. As part of the project, a field assessment of the roadways was performed to determine the most suitable and cost effective measures to improve the roadway and corresponding drainage. The majority of the improvements consisted of the complete removal of the existing pavement and replacement with a full-depth asphalt section, curb and gutter, new storm sewer and final restoration. Drainage along the roadways was a major concern since most of the roadways discharge directly to Cedar Lake. Two stormwater protection structures were included and numerous other best management practices as part of the drainage improvements to decrease the pollutants that enter Cedar Lake. Erosion control items used were Catch-All inlet baskets, silt fence, sediment logs, erosion control blanket, rip rapped outfalls, sedimentation basins, rock check dams, stabilized construction entrances and specialized seeding. A Capital Improvement project locations map is provided in Appendix 5.

Phase 1 included 13 streets located throughout Cedar Lake including roads in Lemon Lake Estates and Surprise Park Subdivision. Improvements included

installation of new storm sewer, milling and full depth pavement on roads, and the addition of sidewalk and curb and gutter.

Phase 2 included improvements to Meyer Manor Estates which is located adjacent to the Lake. Major drainage and flooding concerns were investigated when designing the new storm sewer, where many outlet directly to the lake. Curb and gutter were installed on roads with very tight right-of-way to help direct water to the storm sewer systems. There was more than 2,700 feet of new storm sewer installed in the subdivision while removing almost 1,700 feet of existing failing sewer. Specialized plantings were used where culverts outletted to the lake to prevent erosion, to trap sediment and filter storm water.

Phase 3 included Reeder Road and 126<sup>th</sup> Avenue. On both roads, a combination of culverts/storm sewer (over 1,600 feet) and newly formed drainage ditches were constructed along each side of the roadway.

Phase 4 dealt with improvements to East Lake Shore Drive, West Lake Shore Drive and Huseman Street. Storm sewer was installed on all roads, with special attention to both Lake Shore Drives because of their proximity to the Lake. On East Lake Shore Drive there were two stormwater treatment system structures installed to clean water before outletting to lake. These 3 roads combined had over 7,900 feet of new storm sewer installed during the improvements while removing over 1,300 feet of existing undersized or failing storm sewer.

Phase 5 included work on Hilltop Avenue, West 129<sup>th</sup> Place, Fulton Street, West 133<sup>rd</sup> Place and Vermillion Avenue. Work entailed storm sewer improvement/replacement along with mill and resurfacing of the road and ditch regrading to increase its overall lifespan.

#### Capital Improvement Projects (2010-Present):

The second round of the Capital Improvement Program started in the summer of 2011. These improvements incorporated work on 27 different roads in the Oaks/Shades and the Cedar Point Park subdivisions. Flooding within the Cedar Point Park subdivision has been eliminated with the installation of 2-15 HP stormwater lift station that conveys storm runoff to Cedar Lake via a twin 6" force main. A stormwater treatment structure was installed to reduce sediment loading to the lake. Ditches were enhanced and storm sewer was constructed in the Oaks/Shades subdivision to eliminate overland flooding due to failing infrastructure and undersized pipes. Over 9,300 feet of storm sewer improvements were constructed as part of this phase.

The Town is currently seeking funding sources to complete two additional roadway/drainage improvements projects in the South Shore and Highgrove neighborhoods as part of the capital improvement program. The South Shore neighborhood runoff is primarily conveyed to the southern wetland complex adjacent to the lake. The Highgrove neighborhood runoff primarily conveyed to a wetland complex north of the lake.

#### 2015-2016 Street Program:

This program utilized CEDIT funds to resurface 34,000 ft. of deteriorating roadway throughout the Town. Failing roadways were either milled/resurfaced, patched, or



overlaid to increase their lifespan. Failing cross-culverts, damaged curb and gutter lines, and storm sewer inlets were also replaced as part of this project. The Town would like for this to be an annual effort to maintain a better and higher quality roadway inventory. Additionally, Parrish Avenue was completely reconstructed from 137<sup>th</sup> Avenue to 141<sup>st</sup> Avenue using all local funds.


Cedar Lake Enhancement Association:

CLEA has been a lake ecosystem advocate of long standing. CLEA funds projects through locally raised money and an aggressive and constant pursuit of restoration grants. CLEA projects serve as examples of environmental protection and enhancement benefits in the Cedar Lake watershed. Projects include bank erosion protection (wetland creation, enhancements and plantings), inlet channel stabilization, and lakeshore or stream bank stabilization. CLEA project information is located below.

**Table 3 – CLEA Ecosystem Enhancement Projects**

Ref #	Project Name	Location	Enhancement (BMP)	Activity	Goals	Status	Funding Source	Amt.
1	Condos Inlet Bank Stabilization Project	S. of Lakeshore Drive and Foster St.	Bank, Shoreline and Conveyance Stabilization	Installed terraced seawall, wetland plants, re-shape bank slopes, blanket/seed	Minimize Sediment Deposition, Stabilize Conveyance Slopes and Provide Vegetative Filtration	Completed 2006	LARE with local match by CLEA	\$43,000
2	Golf Course Inlet Project	N. of South Lakeshore Drive and 145th Ave.	Conveyance Stabilization	Re-shaping conveyance slopes, blanket/seedling	Minimize Sediment Deposition, Stabilize Conveyance Slopes and Provide Vegetative Filtration	Completed 2010/2011	LARE with match by CLEA and In-Kind by Cedar Lake	Est. \$25,000
3	Chamber of Commerce Shoreline Stabilization Project	S. of Lakeshore Drive, E. of Cline Ave.	Wetland Enhancement	Establish hydrology and hydrophytic vegetation to expand existing wetland as part of a mitigation	Improve Wetland for Wildlife Habitat and Bio-filtration	Completed 2009	NIPSCO, LARE and Build Indiana Funds	\$5,000
4	Sunset Harbor (Old Bank) Inlet Stabilization Project	E. of Morse St., N. of 133rd Ave.	Bank, Shoreline and Conveyance Stabilization	Re-shaping conveyance slopes, blanket/seedling, plant wetland vegetation, install check dams, grassed swales	Minimize Sediment Deposition, Stabilize Conveyance Slopes and Provide Vegetative Filtration	Completed 2009	LARE with local match by CLEA	Approx. \$8,000

Ref #	Project Name	Location	Enhancement (BMP)	Activity	Goals	Status	Funding Source	Amt.
5	Wilson Property Wetland Project	N. of Lakeshore Drive, W. of Foster St.	Wetland Enhancement	Install hydrophytic vegetation to enhance existing wetland	Improve Wetland for Wildlife Habitat and Bio-filtration	Completed 2010	LARE with match by CLEA and In-Kind by Cedar Lake	Approx. \$10,000
6	Cedar Lake Town Complex Enhancement Project	On East bank of Lake near Constitution Ave.	Shoreline Stabilization	Installation of riprap, seawall, glacial stone, wetland creation and tree planting	Minimize Sediment Deposition, Stabilize Shoreline and Provide Vegetative Filtration	Completed 1999	Build Indiana Funds	\$200,000
7	Sleepy Hollow Ditch Control Structure Enhancement Project	Sleepy Hollow Ditch West side of Lake	Stabilization Structure	Installation of Weir structure, riprap, stabilize conveyance to lake through slope re-shaping, blanket/seeding and grassed buffer strips.	Minimize Sediment Deposition, Stabilize Shoreline and Provide Stable Control Structure	Completed 2002	IDEM 319, Build Indiana Funds	Approx. \$200,000
8	Sleepy Hollow Ditch Bank Stabilization Project	Sleepy Hollow Ditch, just upstream of outlet to Cedar Lake	Bank Stabilization	Re-shaping conveyance slopes, blanket/seeding, gabion baskets, hydrotex, grassed buffer	Minimize Sediment Deposition, Stabilize Conveyance Slopes	Completed 2001	IDEM 319, Build Indiana Funds	\$85,000
9	Bible Conf. Grounds Project	On West Bank of Lake, near 137th and Forest Dr.	Cobblestone Shoreline Stabilization	Install seawall and cobblestone for shoreline stabilization	Minimize Sediment Deposition and Stabilize Shoreline	Pending/ Partially Complete and in progress	Bible Conf. Center	Approx. \$8,000
10	Potawatomi Park Enhancement Project	On SE bank of Lake, just West of Golf Course	Bank Stabilization and Detention Pond	Cleaned shoreline, hydroseeded, wetland plugs, bio-logs, offline bio-retention pond	Minimize Sediment Deposition	Completed 1999	Build Indiana Funds	--
11	The Dam Enhancement Project	N. of South Lakeshore Drive and 145th Ave.	Control Structure and Fish Barrier	Installation of control structure (dam), fish barrier and sheet piling	Minimize Sediment Deposition, Stabilize Shoreline and Provide Stable Control Structure	Completed 1998	Build Indiana Funds	\$70,000

Ref #	Project Name	Location	Enhancement (BMP)	Activity	Goals	Status	Funding Source	Amt.
12	Chamber Conveyance Improvement Project	N. of Lakeshore Drive, E. of Cline Ave.	Conveyance Enhancement from Wetland to Lake	Remove Accumulated Sediment and Establish High Quality Hydrophytic Vegetation along Banks	Improve Wetland Vegetation and Sediment Removal	Completed 2009	NIPSCO	\$4,000
13	Pickereel Creek Inlet Stabilization Project	Along 146th, W of Cline Ave.	Shoreline/Bank Stabilization, Vegetation Establishment and Channel Restoration	Channel Dredging, Seawall Installation and Establish Vegetative Buffer.	Improve Drainage and Reduce Sediment Deposition	Completed 1999	Build Indiana Funds and private funding by adjacent landowners	--
14	North Inlet & Legion Property Wetland Project	S. of 132nd Ave., E. of Grimm St.; N. of Lakeshore Dr., W. of Washington	Wetland Enhancement & Wetland Creation	Install/establish hydrophytic vegetation to enhance existing wet-land and construct new wetland; stabilize conveyance to lake through slope re-shaping, blanket/seeding and grassed buffer strips.	Improve and Create Wetland for wildlife habitat and bio-filtration; Provide Additional Storage for Storm Water	Scheduled for 2016	LARE with local cash match by CLEA and In-Kind services by the Ton of Cedar Lake	
15	Sleepy Hollow Ditch (143rd) Bank Stabilization Project #1	S. of 142nd Pl. to Lauerman	Bank Stabilization	Re-shaping conveyance slopes, blanket/seeding, construct and install bio-engineered toe-wall, plan native trees and shrubs	Minimize Sediment Deposition, Stabilize Conveyance Slopes	Completed 2015	LARE, with local match by CLEA and In-Kind services by the Ton of Cedar Lake	
16	Sleepy Hollow Ditch (143rd) Bank Stabilization Project #2	N. of 143rd Pl. and E. of Lauerman to outlet at Cedar Lake	Bank Stabilization	Re-shaping conveyance slopes, blanket/seeding, construct and install bio-engineered toe-wall, plan native trees and shrubs	Minimize Sediment Deposition, Stabilize Conveyance Slopes	Scheduled for 2016	LARE, with local match by CLEA and In-Kind services by the Ton of Cedar Lake	

Ref #	Project Name	Location	Enhancement (BMP)	Activity	Goals	Status	Funding Source	Amt.
17	Sleepy Hollow Ditch Wetland Project	S. of Birch Street and W. of Lauerman	Wetland Creation	Establish hydrology and hydrophytic vegetation to construct wetland; establish step-backed banks to facilitate flow into wetlands	Create Low Lying Forested Wetlands for Wildlife Habitat and Bio-filtration; Provide Additional Storage for Storm water	Pending	Pending	Pending

\* Projects are being or have been funded through a variety of programs, primarily through Build Indiana and Lake and River Enhancement (LARE) grants. Some of these projects have estimated funding sources as most grants were approved for larger applications, encompassing a number of restoration projects. Frequently projects include donated labor and materials which are not included in the total amounts. Summary tables of both the LARE and Build Indiana grants are provided after the enhancement projects fact sheets.

## Enhancement Project Fact Sheets

<b>Project ID Number:</b>	1
<b>Project Name:</b>	Condos Inlet Bank Stabilization Project
<b>Location:</b>	S. of Lakeshore Drive and Foster St.
<b>Enhancement BMP:</b>	Bank, Shoreline and Conveyance Stabilization
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Conveyance Slopes and Provide Vegetative Filtration
<b>Activities</b>	Installed terraced seawall, wetland plants, re-shape bank slopes, blanket/seed
<b>Funding Source</b>	LARE with local match by CLEA
<b>Status</b>	Completed 2006



<b>Project ID Number:</b>	2
<b>Project Name:</b>	Golf Course Inlet Project
<b>Location:</b>	N. of South Lakeshore Drive and 145th Ave.
<b>Enhancement BMP:</b>	Conveyance Stabilization
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Conveyance Slopes and Provide Vegetative Filtration
<b>Activities</b>	Re-shaping conveyance slopes, blanket/seeding
<b>Funding Source</b>	LARE with local cash match by CLEA and In-Kind services provided by the Town of Cedar Lake
<b>Status</b>	Completed 2010/2011



<b>Project ID Number:</b>	3
<b>Project Name:</b>	Chamber of Commerce Shoreline Stabilization Project
<b>Location:</b>	S. of Lakeshore Drive, E. of Cline Ave.
<b>Enhancement BMP:</b>	Wetland Enhancement
<b>Goals</b>	Improve Wetland for Wildlife Habitat and Bio-filtration
<b>Activities</b>	Establish hydrology and hydrophytic vegetation to expand existing wetland as part of a mitigation
<b>Funding Source</b>	NIPSCO, LARE and Build Indiana Funds
<b>Status</b>	Completed 2009



<b>Project ID Number:</b>	4
<b>Project Name:</b>	Sunset Harbor (Old Bank) Inlet Stabilization Project
<b>Location:</b>	E. of Morse St., N. of 133rd Ave.
<b>Enhancement BMP:</b>	Bank, Shoreline and Conveyance Stabilization
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Conveyance Slopes and Provide Vegetative Filtration
<b>Activities</b>	Re-shaping conveyance slopes, blanket/seeding, plant wetland vegetation, install check dams, grassed swales
<b>Funding Source</b>	LARE with local cash match by CLEA
<b>Status</b>	Completed 2009





<b>Project ID Number:</b>	5
<b>Project Name:</b>	Wilson Property Wetland Project
<b>Location:</b>	N. of Lakeshore Drive, W. of Foster St.
<b>Enhancement BMP:</b>	Wetland Enhancement
<b>Goals</b>	Improve Wetland for Wildlife Habitat and Bio-filtration
<b>Activities</b>	Install hydrophytic vegetation to enhance existing wetland
<b>Funding Source</b>	LARE with local cash match by CLEA and In-Kind services by the Town of Cedar Lake
<b>Status</b>	Completed spring 2010



<b>Project ID Number:</b>	6
<b>Project Name:</b>	Cedar Lake Town Complex Enhancement Project
<b>Location:</b>	On East bank of Lake near Constitution Ave.
<b>Enhancement BMP:</b>	Shoreline Stabilization
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Shoreline and Provide Vegetative Filtration
<b>Activities</b>	Installation of riprap, seawall, glacial stone, wetland creation and tree planting
<b>Funding Source</b>	Build Indiana Funds
<b>Status</b>	Completed 1999



<b>Project ID Number:</b>	7
<b>Project Name:</b>	Sleepy Hollow Control Structure Enhancement Project
<b>Location:</b>	Sleepy Hollow Ditch West Side of Lake
<b>Enhancement BMP:</b>	Stabilization Structure
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Shoreline and Provide Stable Control Structure
<b>Activities</b>	Installation of Weir structure, riprap, stabilize conveyance to lake through slope re-shaping, blanket/seeding and grassed buffer strips.
<b>Funding Source</b>	IDEM 319, Build Indiana Funds
<b>Status</b>	Completed 2002



<b>Project ID Number:</b>	8
<b>Project Name:</b>	Sleepy Hollow Ditch Bank Stabilization Project
<b>Location:</b>	Sleepy Hollow Ditch, just upstream of outlet to Cedar Lake
<b>Enhancement BMP:</b>	Bank Stabilization
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Conveyance Slopes
<b>Activities</b>	Re-shaping conveyance slopes, blanket/seeding, gabion baskets, hydrotex, grassed buffer
<b>Funding Source</b>	IDEM 319, Build Indiana Funds
<b>Status</b>	Completed 2001



<b>Project ID Number:</b>	9
<b>Project Name:</b>	Bible Conf. Grounds Shoreline Project
<b>Location:</b>	On West Bank of Lake, near 137th and Forest Dr.
<b>Enhancement BMP:</b>	Cobblestone Shoreline Stabilization
<b>Goals</b>	Minimize Sediment Deposition and Stabilize Shoreline
<b>Activities</b>	Install seawall and cobblestone for shoreline stabilization
<b>Funding Source</b>	Bible Conf. Center
<b>Status</b>	Partially Completed and additional stabilization is in progress



<b>Project ID Number:</b>	10
<b>Project Name:</b>	Potawatomi Park Enhancement Project
<b>Location:</b>	On SE bank of Lake, just West of Golf Course
<b>Enhancement BMP:</b>	Bank Stabilization and Detention Pond
<b>Goals</b>	Minimize Sediment Deposition
<b>Activities</b>	Cleaned shoreline, hydroseeded, wetland plugs, bio-logs, offline bio-retention pond
<b>Funding Source</b>	Build Indiana Funds
<b>Status</b>	Completed 1999



<b>Project ID Number:</b>	11
<b>Project Name:</b>	The Dam Enhancement Project
<b>Location:</b>	N. of South Lakeshore Drive and 145 <sup>th</sup> Ave.
<b>Enhancement BMP:</b>	Control Structure and Fish Barrier
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Shoreline and Provide Stable Control
<b>Activities</b>	Installation of control structure (dam), fish barrier and sheet piling
<b>Funding Source</b>	Build Indiana Funds
<b>Status</b>	Completed 1998



<b>Project ID Number:</b>	12
<b>Project Name:</b>	Chamber Conveyance Improvement Project
<b>Location:</b>	N. of Lakeshore Drive, E. of Cline Ave.
<b>Enhancement BMP:</b>	Conveyance Enhancement from Wetland to Lake
<b>Goals</b>	Improve Wetland Vegetation and Sediment Removal
<b>Activities</b>	Remove accumulated sediment and establish high quality hydrophytic vegetation along banks
<b>Funding Source</b>	NIPSCO
<b>Status</b>	Completed 2009





<b>Project ID Number:</b>	13
<b>Project Name:</b>	Pickrel Creek Stabilization Project
<b>Location:</b>	Along 146th Ave, W. of Cline Ave.
<b>Enhancement BMP:</b>	Shoreline/Bank Stabilization, Vegetation Establishment and Channel Restoration
<b>Goals</b>	Improve Drainage and Reduce Sediment Deposition
<b>Activities</b>	Channel dredging, seawall installation and establish vegetative buffer.
<b>Funding Source</b>	Build Indiana Funds and private funding by adjacent landowners
<b>Status</b>	Completed 1999



<b>Project ID Number:</b>	14
<b>Project Name:</b>	North Point Inlet & Legion Property Wetland Project
<b>Location:</b>	S. of 132 <sup>nd</sup> Ave., E. of Grimm St. & N. of Lakeshore Drive, W. of Washington St.
<b>Enhancement BMP:</b>	Wetland Enhancement & Wetland Creation
<b>Goals</b>	Improve and Create Wetland for wildlife habitat and bio-filtration; Provide Additional Storage for Storm Water
<b>Activities</b>	Install/establish hydrophytic vegetation to enhance existing wetland and construct new wetland; stabilize conveyance to lake through slope re-shaping, blanket/seeding and grassed buffer strips.
<b>Funding Source</b>	LARE with local cash match by CLEA and In-Kind services by the Town of Cedar Lake
<b>Status</b>	Scheduled for 2016



<b>Project ID Number:</b>	15
<b>Project Name:</b>	Sleepy Hollow Ditch (143 <sup>rd</sup> ) Bank Stab. Project #1
<b>Location:</b>	Sleepy Hollow Ditch, from south of 142 <sup>nd</sup> Place to Lauerman
<b>Enhancement BMP:</b>	Bank Stabilization
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Conveyance Slopes
<b>Activities</b>	Re-shaping conveyance slopes, blanket/seeding, construct and install bio-engineered toe-wall, plant native trees and shrubs
<b>Funding Source</b>	LARE, with local match by CLEA and In-Kind services by the Town of Cedar Lake
<b>Status</b>	Completed in 2015



<b>Project ID Number:</b>	16
<b>Project Name:</b>	Sleepy Hollow Ditch (143 <sup>rd</sup> ) Bank Stab. Project #2
<b>Location:</b>	Sleepy Hollow Ditch, from Lauerman to outlet at Cedar Lake (north of 143 <sup>rd</sup> Place)
<b>Enhancement BMP:</b>	Bank Stabilization
<b>Goals</b>	Minimize Sediment Deposition, Stabilize Conveyance Slopes
<b>Activities</b>	Re-shaping conveyance slopes, blanket/seeding, construct and install bio-engineered toe-wall, plan native trees and shrubs
<b>Funding Source</b>	LARE, with local match by CLEA and In-Kind services by the Town of Cedar Lake
<b>Status</b>	Scheduled for Fall 2016



<b>Project ID Number:</b>	17
<b>Project Name:</b>	Sleepy Hollow Wetland Project
<b>Location:</b>	Southwest Corner of Birch St. (139 <sup>th</sup> Ave.) and Lauerman
<b>Enhancement BMP:</b>	Wetland Creation
<b>Goals</b>	Create Low Lying Forested Wetlands for Wildlife Habitat and Bio-filtration; Provide Additional Storage for Storm water
<b>Activities</b>	Establish hydrology and hydrophytic vegetation to construct wetland; establish step-backed banks to facilitate flow into wetlands
<b>Funding Source</b>	To be determined
<b>Status</b>	Pending



**Table 4 – LARE Grants for CLEA Projects Summary**

<b>Title</b>	<b>Year Awarded</b>	<b>Amount<sup>1</sup></b>	<b>Program</b>
Diagnostic Study, "T by 2000 Feasibility Study"	1989	\$8,541	Preliminary Lake/Watershed Diagnostic Study
Engineering Feasibility Study	1997	\$40,860	Evaluate Possible Sediment Traps, Wetlands, etc. for Sleepy Hollow Ditch and Cedar Lake Marsh
Design Study	1999	\$40,000	Sediment Trap/Nutrient Filter and Streambank on Sleepy Hollow Ditch
Engineering Feasibility Study	2002	\$36,000	Evaluate Streambank Stabilization of "Golf Course Inlet", Wetland Construction on Chamber of Commerce", "Condominium" and another unnamed inlet
Design Study and Construction	2004	\$98,350	Design/Build Sediment and Nutrient on up to Five Sites
Design Study and Construction	2007	\$56,250	Conveyance Stabilization
Construction	2013	\$60,000	Wetland Enhancement & Wetland Creation
Design/Build	2015	\$49,600	Conveyance Stabilization

<sup>1</sup> Information provided by IDNR Division of Fish and Wildlife website: <http://www.in.gov/dnr/fishwild/3304.htm>

**Table 5 – CLEA Projects funded through Build Indiana Funds**

<b>Project</b>	<b>Cost<sup>1</sup></b>
Cedar Lake Control Structure	\$22,300
Dredging of Control Structure Channel	\$23,000
Town Owned Shoreline Erosion Prevention	\$114,500
Provide No Wake Buoys Along Cedar Lake Shoreline to Prevent Excessive Shoreline and Bottom Erosion	\$17,000
Derelict Wood Piling Removal	\$27,000
Install Rip-Rap Along Sleepy Hollow Ditch	\$167,000
Rip-Rap Adams Ditch - Wetlands to Lake	\$25,000
Install Curbing Along Lake Shore Drive	\$75,000
<b>Total:</b>	<b>\$470,800</b>

<sup>1</sup> Proposed cost as of 12/01/96 according to CLEA

## **SUMMARY**

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The Town of Cedar Lake and its citizens, as well as the local advocacy group CLEA, have been highly proactive in working for improved aquatic ecosystem around and in the Lake. By funding local projects and passing progressive regulations, they have achieved some success, verified by recent studies, including the CWA 303(d) and 305(b) reports. However, to improve the Lake's ecosystem to the desired level, beyond its current eutrophic state, Federal funding is needed to further support local actions and bring the desired success in aquatic ecosystem improvements that the Town and its citizens have been working toward for years.

N:\CedarLake\1060015\Water\206\technical reports\Local Conditions Report\LocalConditionsRpt 2016\FINAL CL Local Conditions June 2016\FINAL 2016-Not for Dist-CL LocalConditions\_070516.doc

## **EXHIBITS**

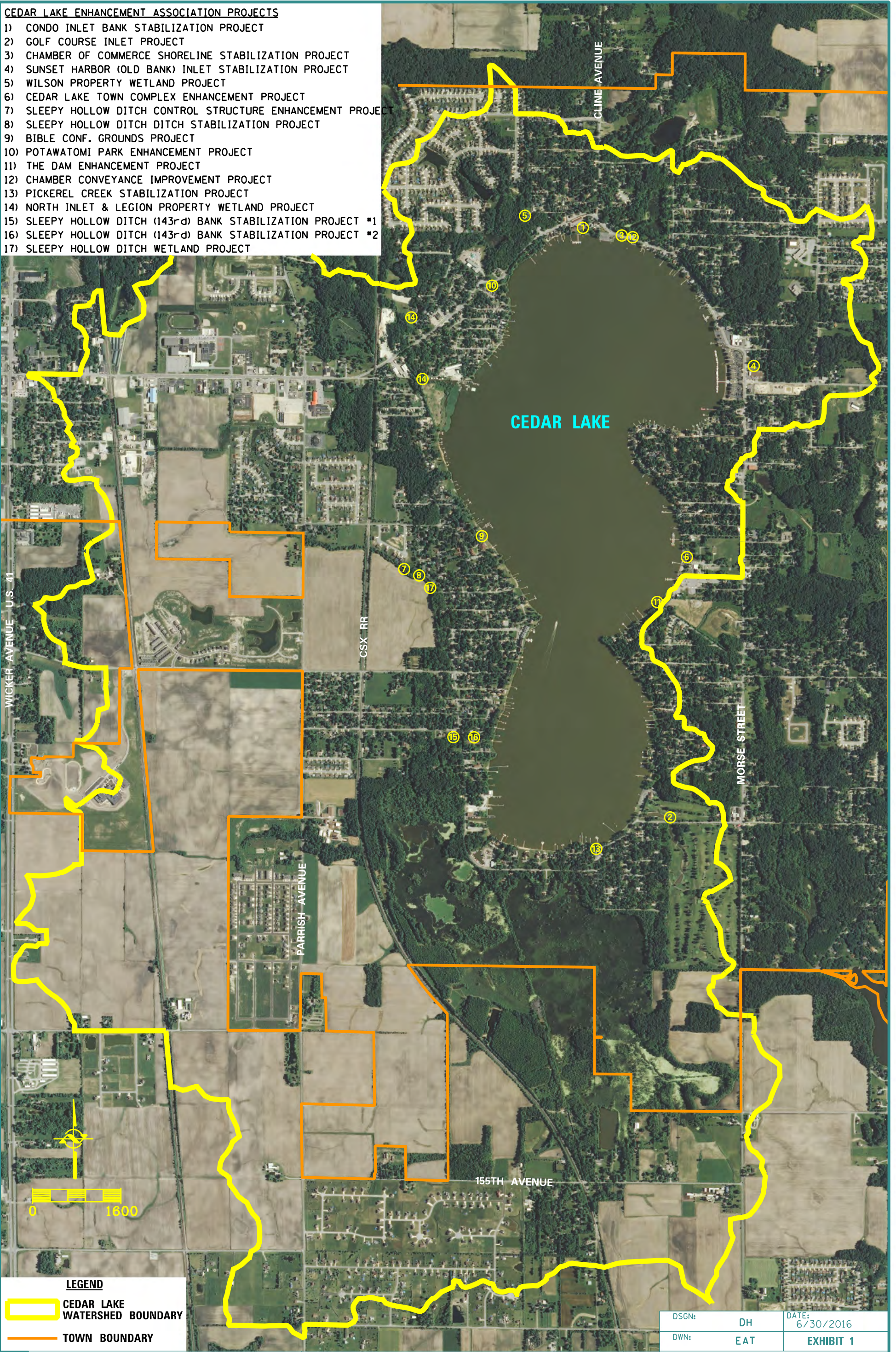
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1. CLEA Projects
2. Cedar Lake Septic Fields and Surcharging Locations
3. Cedar Lake Lift Station Improvements



**CEDAR LAKE ENHANCEMENT ASSOCIATION PROJECTS**

- 1) CONDO INLET BANK STABILIZATION PROJECT
- 2) GOLF COURSE INLET PROJECT
- 3) CHAMBER OF COMMERCE SHORELINE STABILIZATION PROJECT
- 4) SUNSET HARBOR (OLD BANK) INLET STABILIZATION PROJECT
- 5) WILSON PROPERTY WETLAND PROJECT
- 6) CEDAR LAKE TOWN COMPLEX ENHANCEMENT PROJECT
- 7) SLEEPY HOLLOW DITCH CONTROL STRUCTURE ENHANCEMENT PROJECT
- 8) SLEEPY HOLLOW DITCH DITCH STABILIZATION PROJECT
- 9) BIBLE CONF. GROUNDS PROJECT
- 10) POTAWATOMI PARK ENHANCEMENT PROJECT
- 11) THE DAM ENHANCEMENT PROJECT
- 12) CHAMBER CONVEYANCE IMPROVEMENT PROJECT
- 13) PICKEREL CREEK STABILIZATION PROJECT
- 14) NORTH INLET & LEGION PROPERTY WETLAND PROJECT
- 15) SLEEPY HOLLOW DITCH (143rd) BANK STABILIZATION PROJECT #1
- 16) SLEEPY HOLLOW DITCH (143rd) BANK STABILIZATION PROJECT #2
- 17) SLEEPY HOLLOW DITCH WETLAND PROJECT

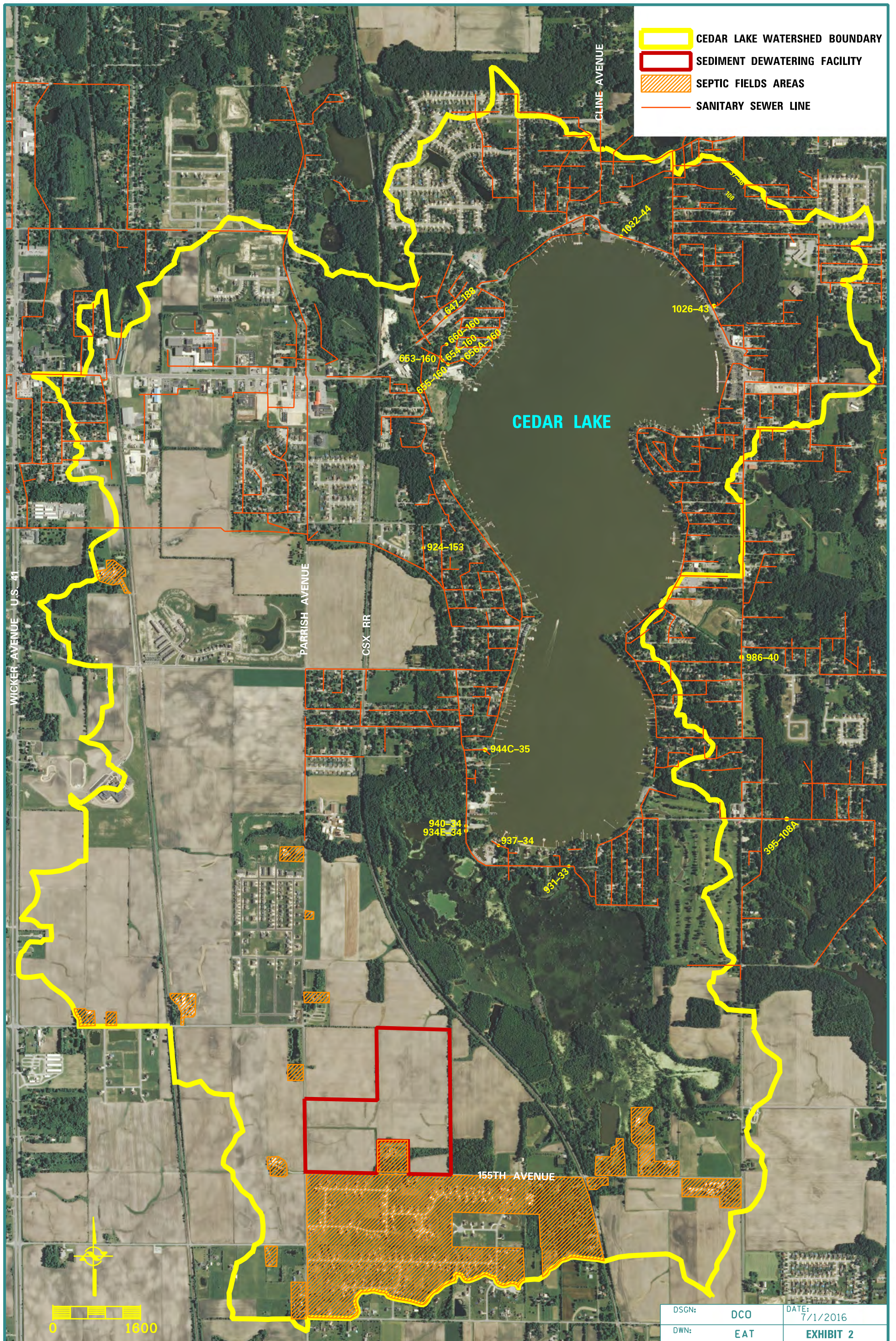


**LEGEND**

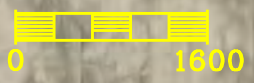
- CEDAR LAKE WATERSHED BOUNDARY
- TOWN BOUNDARY

DSGN:	DH	DATE:	6/30/2016
DWN:	EAT	<b>EXHIBIT 1</b>	

 <b>CHRISTOPHER B. BURKE ENGINEERING LTD.</b> One Point Center, Suite 314 Crown Point, IN 46307 (219)663-3410	CLIENT: <b>TOWN OF CEDAR LAKE</b>		TITLE: <b>CEDAR LAKE ENHANCEMENT ASSOCIATION PROJECT</b>
	PROJECT NO. <b>106-0015</b>	SCALE: <b>1"=1600'</b>	



- CEDAR LAKE WATERSHED BOUNDARY
- SEDIMENT DEWATERING FACILITY
- SEPTIC FIELDS AREAS
- SANITARY SEWER LINE

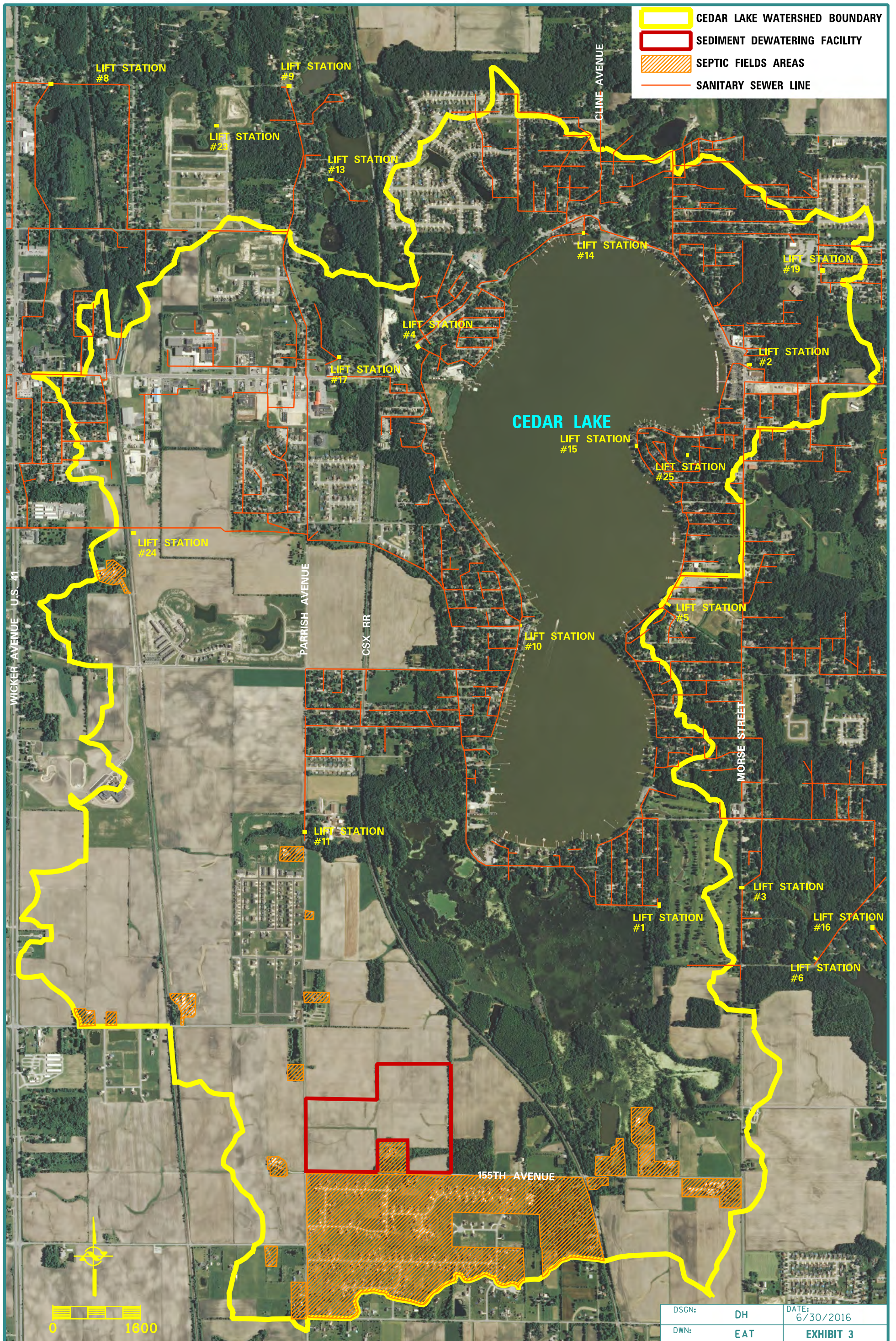


**CB** CHRISTOPHER B. BURKE ENGINEERING LTD.  
 One Point Center, Suite 314  
 Crown Point, IN 46307 (219)663-3410

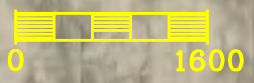
CLIENT: TOWN OF CEDAR LAKE  
 PROJECT NO. 06-0015 SCALE: 1"=1600'

DSGN:	DCO	DATE:	7/1/2016
DWN:	EAT	EXHIBIT 2	

TITLE: CEDAR LAKE WATERSHED SEPTIC FIELDS AND SURCHARGE LOCATIONS



- CEDAR LAKE WATERSHED BOUNDARY
- SEDIMENT DEWATERING FACILITY
- SEPTIC FIELDS AREAS
- SANITARY SEWER LINE



**CB** CHRISTOPHER B. BURKE ENGINEERING LTD.  
 One Point Center, Suite 314  
 Crown Point, IN 46307 (219)663-3410

CLIENT: TOWN OF CEDAR LAKE  
 PROJECT NO. 06-0015 SCALE: 1"=1600'

DSGN: DH DATE: 6/30/2016  
 DWN: EAT EXHIBIT 3

TITLE: CEDAR LAKE LIFT STATION IMPROVEMENTS

## **APPENDICES**