

**City of Lino Lakes  
Environmental Board Meeting**

**January 27, 2016  
6:30 p.m.**

**AGENDA**

1. Call to Order
2. Approval of Agenda
3. Approval of Minutes
4. Open Mike
5. Action Items
  - A. Northeast Drainage Area Study
  - B. Mattamy Storm Water Reuse and Irrigation System
  - C. Environmental Board Goals 2016 and 20/20 Environmental Statements
6. Discussion Items
  - A. YouTube Use for Public Relations – Alex Schwartz
  - B. Rookery – Task Force Update/Camera Surveillance
  - C. Recycling Updates
  - D. EAB Update
7. Adjourn

**CITY OF LINO LAKES  
ENVIRONMENTAL BOARD MINUTES**

<b>DATE</b>	<b>: December 16, 2015</b>
<b>TIME STARTED</b>	<b>: 6:32 P.M.</b>
<b>TIME ENDED</b>	<b>: 8:00 P.M.</b>
<b>MEMBERS PRESENT</b>	<b>: Steve Heiskary, Barbra Bor, Paula Andrzejewski, Nancie Klebba, Alex Schwartz, John Sullivan</b>
<b>MEMBERS ABSENT</b>	<b>: None</b>
<b>STAFF PRESENT</b>	<b>: Marty Asleson, Aubrey Fonfara</b>

**1. CALL TO ORDER AND ROLL CALL:**

Mr. Heiskary called the Lino Lakes Environmental Board meeting to order at 6:32 p.m. on December 16, 2015.

**2. APPROVAL OF AGENDA**

Mr. Sullivan made a MOTION to approve the agenda. Motion was seconded by Ms. Klebba. Motion carried 7-0.

**3. APPROVAL OF MINUTES:**

November 18, 2015

Ms. Bor made a MOTION to approve the November 18, 2015 Meeting Minutes. Motion was seconded by Ms. Andrzejewski. Motion carried 7- 0.

**4. OPEN MIKE**

Mr.Heiskary declared Open Mike at 6:37 p.m. No one present, closed at 6:37pm

**5. ACTION ITEMS (there are no Action Items)**

**6. DISCUSSION ITEMS**

**A. Environmental Board Goals 2016**

The Environmental Board went through the goals and suggested changes to be made and the changes will be reviewed at the next meeting.

**B. Meeting Dates for 2016**

Ms. Bor made a MOTION to approve the meeting dates for 2016 and motion was seconded by Ms. Andrzejewski. Motion carried 7 – 0.

**C. Recycling Updates**

Ms. Fonfara stated that the next Recycling Saturday is December 19 from 10am – 2pm.

Mr. Heiskary has been to a few of the Recycling Saturdays and can't believe that the demand is still so strong, which is a good thing.

Ms. Bor asked if the Vietnam Veterans were going to be there on Saturday to take clothing and household items because sometimes they are and sometimes they are not.

Ms. Fonfara mentioned that the Vietnam Veterans were not going to be there but that Bridging will take household items and that there is a clothing drop off container at the business next to the park that residents can use.

Old and broken holiday lights are being collected from City staff and will be recycled by All Appliance Disposal for free.

Ms. Fonfara also brought up the locations and dates for drop-off Christmas tree recycling. The trees will be mulched and reused in City parks. This was also mentioned in the City newsletter.

Ms. Fonfara is looking for volunteer judges for the “America Recycles Day Art and Essay” contest which has the deadline of December 18. She will email out judging criteria.

**D. Other Updates**

No other updates

**7. ADJOURNMENT**

Ms. Andrzejewski made a MOTION to adjourn the meeting at 8:00 p.m. Motion was seconded by Ms. Kaufenberg. Motion carried 7 – 0.

Respectfully submitted,  
Mary Fogarty  
Office Tech

## **ENVIRONMENTAL BOARD AGENDA ITEM 5A**

**STAFF ORIGINATOR:** Katy Thompson, WSB & Associates

**MEETING DATE:** January 27, 2016

**TOPIC:** Northeast Drainage Area Study

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### **BACKGROUND**

The surface water in the Northeast area of Lino Lakes is landlocked inhibiting site improvements within this area. The area has been historically landlocked until the installation of agricultural field drains in the early 20<sup>th</sup> century. These drainages have limited capacity, and as such, cannot convey any additional runoff from development within the watershed. The field drains also do not provide any water quality benefits to Peltier Lake.

The NE Area Drainage feasibility study models the drainage for 1400 acres of land on the east and west sides of I-35E, and north of Main Street. The study evaluates water quality improvements and a new surface water outlet to Peltier Lake. Implementation of the plan will require approval from the Rice Creek Watershed District (RCWD). City staff submitted the draft NE Area Comprehensive Surface Water Management Plan (CSMP) to the RCWD in June of 2015 for review and comment. The RCWD has requested additional information as part of the approval process and which is being addressed in the study. The purpose of the feasibility study is to:

- Confirm modeling results and parameters.
- Examine design alternatives and develop a preferred alternative.
- Prepare preliminary plans and cost estimates.
- Develop and recommend proposed alignment.
- Identify effected property owners and stakeholders.
- Identify all necessary permits.
- Identify potential funding options.

Council authorized completion of the feasibility study in September 2015. The draft feasibility study has been completed and is currently under review by City staff.

The preferred alternative includes a new outlet to Peltier Lake, a new culvert crossing under I-35E, storm sewer along the proposed Otter Lake Trail extension and regional ponding facilities to detain peak storm flows to prevent increasing the flood levels on

Peltier Lake.

The following is a tentative schedule to finalize the feasibility:

January 27, 2016 – Present the final feasibility study to the Environmental Board for review and consistency with the AUAR.

February 2016 – Hold informational meeting with property owners and other stakeholders.

February 2016 – Formally present the final study to Council.

WSB & Associates staff will be in attendance at the work session to provide an update on the project.

#### **ENVIRONMENTAL DIRECTION**

None Required. Information Only.

#### **ATTACHMENTS**

1. Excerpts from Northeast Lino Lakes Drainage Improvement Project Feasibility Report

# **FEASIBILITY REPORT**

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## **NORTHEAST LINO LAKES DRAINAGE IMPROVEMENT PROJECT**

**FOR THE  
CITY OF LINO LAKES, MINNESOTA**

**January 18, 2016**

**Prepared By:**

**WSB & Associates, Inc.  
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## 1. EXECUTIVE SUMMARY

The surface water in the Northeast area of Lino Lakes is landlocked inhibiting site improvements within this area. The area has been historically landlocked until the installation of agricultural field drains in the early 20<sup>th</sup> century. These systems of agricultural drains have limited capacity, and as such, cannot convey any additional runoff from development within the watershed. The agricultural drains also do not provide any water quality benefits.

The Northeast area of Lino Lakes (*FIGURE 1*) is bound by Main Street to the south, the City of Hugo to the east, and Peltier Lake to the west and Rehbein Street to the north. It includes portions of Lino Lakes, Centerville, and Hugo. Land use in this area is predominantly agricultural. A majority of this watershed currently drains to the south via field drains to Clearwater Creek. Clearwater Creek is impaired for aquatic life and has had a history of significant bank erosion problems.

There were multiple alternatives considered to address the surface water runoff needs for this area as detailed further within this report. These options were coordinated with the Rice Creek Watershed District (RCWD) and a draft Comprehensive Surface Water Management Plan (CSMP) was created. The CSMP and the associated surface water modeling included water quality best management practices (BMPs), volume and rate control improvements, and a new outlet to Peltier Lake. Peltier Lake is impaired for nutrients and a new system would significantly reduce the agricultural loading to the lake.

The proposed project will result in a regional storm water conveyance system for 1,400 acres that will allow for development that includes:

- Regional storm water treatment
- Storm water quality and rate control

The project will be implemented using a phased approach based on preliminary development patterns. The phases and cost per phase are as follows:

<b>COST</b>	<b>TOTAL</b>
Phase 1 – Peltier Lake Outlet Pipe	\$2,114,944
Phase 2 – I-35E Crossing	\$689,030
Phase 3 – Otter Lake Trail Storm Sewer Extension	\$1,244,986
Phase 4 – Future Improvements	\$690,824
<b>TOTAL</b>	<b>\$4,739,784</b>

Funding for the project will be through surface water management fees, and potential grants from Rice Creek Watershed District (RCWD), Minnesota Board Water and Soil Resources (BWSR), and the Public Facilities Authority (PFA).

This project is feasible, necessary, and cost-effective from an engineering standpoint and should be constructed as proposed herein.

## **2. INTRODUCTION**

### **2.1. Authorization**

On September 14, 2015, the City of Lino Lakes City Council authorized the preparation of an engineering feasibility report for the Northeast Lino Lakes Drainage System Improvements.

### **2.2. Scope**

The Northeast Lino Lakes Drainage System Improvements Project consists of providing a new outlet to Peltier Lake, new storm sewer, and drainage improvements to existing field drains to facilitate development in the project area. The project area can be seen in **FIGURE 1** and encompasses the northeast section of Lino Lakes, north of Main Street and east of Peltier Lake, as well as portions of Centerville and Hugo that discharge water into the study area boundary.

The objective is to develop a regional storm water management plan to allow development of the property while protecting existing natural resources. This will be accomplished through storm water conveyance, water quality improvements and rate and volume control.

### **2.3. Data Available**

Information and materials used in the preparation of this report include the following:

- Rice Creek Watershed District (RCWD) record drawings
- RCWD topographic maps and GIS data
- RCWD hydrologic and hydraulic modeling files
- City of Lino Lakes 2030 Comprehensive Plan [September 12, 2011]
- City of Lino Lakes Parks, Natural Open Space/Greenways, and Trail System Plan [2004]
- City of Lino Lakes Surface Water Management Plan [2005]
- City of Lino Lakes I-35E Corridor Alternative Urban Areawide Review (AUAR) [2005]
- City of Lino Lakes record drawings and GIS data
- City of Hugo 2030 Comprehensive Plan [2010]
- Anoka County LIDAR contour information
- Field observations of the area
- Additional references detailed in Section 8

### **2.4. Project History**

A Comprehensive Stormwater Management Plan (CSMP) was completed in coordination with RCWD. This plan identified the existing conditions, and proposed a solution to provide surface water management within the study area.

The CSMP resulted in the establishment of performance standards to be used in developing the NE Drainage Area. The standards allow for phasing of development while limiting adverse impacts to neighboring properties and waterbodies. RCWD will use the CSMP performance standards to permit within the NE Drainage Area. The following is a brief summary of the CSMP performance standards:

- Development of regional storage facilities to limit discharges into Peltier Lake
- Gated operation of the regional storage facilities to be operated by the City
- Minimizes the risk of flood impact (downstream or upstream) to downstream structures, infrastructure and land currently within the floodplain
- Volume control through water reuse on within the drainage area

The entirety of the draft performance standards are in a RCWD letter dated October 1, 2015  
***APPENDIX D.***

### 3. EXISTING CONDITIONS

#### 3.1. Drainage Areas and Drain Tile

The Northeast Area is serviced by three Anoka County drainage systems, Anoka County Ditch (ACD) 72 and Judicial Ditch (JD) 2 in the north and ACD 55 in the south (**FIGURE 2**). ACD 72 and JD 2 discharge directly to Peltier Lake, while ACD 55 enters Clearwater Creek, or Judicial Ditch (JD) 3, to the south before discharging into Peltier Lake. The remainder of the study area surface flows directly to Peltier Lake.

The county ditches within the study area are all agricultural drain tile systems that serve an area of approximately 1,400 acres within the Cities of Lino Lakes, Centerville, and Hugo. These properties are entitled to the benefits of the drainage system and, in effect, own the drain tile system under Minnesota Statutes 103E (Minnesota Department of Natural Resources 1991). The drainage of the system must be maintained in perpetuity, until such time the assessed land owners choose to petition RCWD for the abandonment of the drain tile on their property.

The majority of the land in the study area is agricultural (**TABLE 1**) and drained to the ditch system via unbuffered surface inlets (**FIGURE 3**).

**Table 1. Existing land uses and areas**

LAND USE	AREA [acres]
Agricultural	1,059
Multifamily	2
Open Space/Conservation	116
Right of Way	43
Rural Residential	141
Single Family Detached	12
<b>TOTAL</b>	<b>1,373</b>

The low points in the study area remain inundated for weeks following the 100 year event due to the limited pipe capacity in the ditch system. Because the low lying areas take so long to drain back to their normal water levels, the next rain event may compound the flooding beyond the 100-year flood level. Without any drainage improvements, future developments in this area are required to design to retain the 100-year back-to-back events.

#### 3.2. Storm Sewer

There is storm sewer within the study area of Lino Lakes along Otter Lake Road and the McDonald's site. Due to the limited capacity of the existing drain tile system, McDonald's was required to install a temporary spray irrigation system to reduce the stormwater volume from their site; however this is not a feasible long-term solution. The City of Hugo has stormwater infrastructure and storage which serves the development along the Lino Lakes and Hugo border.

### 3.3. Receiving Waters

Peltier Lake has been listed as an impaired waterbody within the greater Anoka Chain of Lakes since 2002 for aquatic recreation, with the main pollutant identified as excess phosphorus from watershed runoff and internal loading (Minnesota Pollution Control Agency 2013). In addition, the Anoka Chain of Lakes has limited flood storage capacity. Any improvements to the drainage system will need to show no adverse impacts to receiving waters in terms of increased phosphorus loading or flooding potential.

### 3.4. Existing Site Limitations

Anoka County Ditch (ACD) 55 and ACD 72 drain tiles were designed to provide drainage for agricultural lands and are already at capacity, limited by the crossings under I-35E. ACD 55 and ACD 72 both cross under I-35E, as shown in **FIGURE 2**, with a total capacity of 1.5 cubic feet per second (cfs) and 0.52 cfs, respectively (RCWD 2014).

The City of Hugo contributes 210 acres of the 1,400 total acres and has an existing flow rate of 50.3 cfs into the City of Lino Lakes and the ACD 55 drain tile system. The City of Centerville contributes a minor amount of surface runoff to the study area, which under existing conditions contributes directly to Peltier Lake.

The existing agricultural drainage system has been subject to repeated blow-outs and tile ruptures in recent years. In 2014, the Rice Creek Watershed District reviewed the ACD 55 and 72 systems and determined the failures were recurring due to:

- Deterioration of the drain tile system, including sections of pipe that have pulled apart, as well as portions of the system have collapsed or are clogged with sediment.
- The drain tiles themselves are undersized and unable to convey the incoming flows, resulting in a surcharged system.

During the summer of 2015, RCWD maintained several sections of ACD 55 main trunk and the ACD 72 main trunk, as well as several lateral branches. The drain tile system does not provide any water quality benefits to Peltier Lake and field inlets to the system do not have adequate buffers to prevent sediments from entering the system and Peltier Lake.

The constraints of the drain tile system have limited landowners' ability to develop their land consistent with the City of Lino Lakes' Comprehensive Plan. Development must meet RCWD Rule C for Stormwater Management Plans, which includes water quality and rate control. Because the existing drainage system is already at capacity, any new development must treat their stormwater onsite to meet the water quality, rate control and volume reduction requirements of Rule C. Unfortunately the soils underlying the majority of the study area are poorly suited for infiltration and cannot meet the volume reduction requirements. This has resulted in temporary infrastructure being built because there was not a feasible way to meet the RCWD rules for surface water quality and storage.

In addition to poor underlying soils, the study area also has a significant amount of wetlands (**FIGURE 5**), which limit stormwater management opportunities. A detailed wetland analysis is included in **APPENDIX B**.

## 4. PROPOSED IMPROVEMENTS

### 4.1. Alternatives Considered

In consideration of the City’s Comprehensive Plan where this area is guided for urban and mixed uses (**FIGURE 5**) it was determined that the existing drainage system would need to be addressed. Through the CSMP multiple alternatives were considered based on the needs of the area (**TABLE 2**).

**Table 2. Full Build-Out Proposed Land Uses**

<b>LAND USE</b>	<b>AREA [acres]</b>
Commercial	82
Industrial	350
Mixed Use	345
Open Space/Conservation	238
Right of Way	43
Rural Residential	6
Single Family Detached	82
Single Family Attached	117
Medium-Density Residential	90
High-Density Residential	19
<b>TOTAL</b>	<b>1,373</b>

As the existing county drain system is not sufficient to handle the increased runoff from a developed watershed. Options were considered to provide capacity for development, with the goal of limiting adverse impacts to downstream landowners and natural resources.

#### Option 1: Existing System to Remain

The existing system is in need of maintenance, and RCWD completed study in 2014 outlining system improvements. The capacity of the existing system is not sufficient to develop the area as established in the City of Lino Lakes Comprehensive Plan. For property owners to make improvements in this drainage area, per RCWD rules, they may need to dedicate up to 40% of their developable land for stormwater management, including ponding of back-to-back 100-year flood events and infiltration requirements. This area has tight soils and infiltration options are costly and limited. Spray irrigation is temporarily being used to meet the requirements at the McDonald’s site until a regional BMP is constructed.

The existing system does not provide treatment upstream of Peltier Lake which is classified as an impaired waterbody. Any proposed project must not impair water quality or flood storage within or downstream of Peltier Lake.

#### Option 2: Outlet to Clearwater Creek

This option considered the lands drained by ACD 55 to the east of I-35E and proposed to reroute the drainage to the south, via storm pipe, to Clearwater Creek (**FIGURE 6**). This option benefits 710 acres, of which 495 acres are in Lino Lakes. This option was not recommended due to adverse impacts to Clearwater Creek including increased discharge and potential bank erosion.

### Option 3: New Outlet to Peltier Lake and Crossing Under I-35E

When considering this option various alignments between 20<sup>th</sup> Avenue and Peltier Lake were considered. The objective in recommending an alignment was to minimize impacts to undeveloped parcels and reduce associated easement acquisitions.

#### Alternative A – Open Channel Conveyance

This option includes open-channel flow through a 10 foot deep ditch system (**FIGURE 6**). While feasible and consistent with the City of Lino Lakes' *I-35 Final Corridor Alternative Urban Areawide Review*, it requires double the land acquisitions in a northern alignment resulting in the cost being 20 to 25 percent higher than Alternate B; and thus is not recommended. In addition, RCWD staff noted they would not permit it in a southern alignment due to potential wetland impacts.

#### Alternative B - Storm Sewer Pipe Outlet

This option is the preferred alternative and includes a new outlet at Peltier Lake via a 72-inch storm drain, or equivalent design, from Peltier Lake to I-35E to capture the ACD 55 and ACD 72 drainage systems upstream of I-35E and collect runoff from the study area (**FIGURE 6**).

There is a proposed mixed-use development between 20<sup>th</sup> Avenue and I-35E. The development would provide surface drainage via a series of connected ponds from I-35E to the 20<sup>th</sup> Avenue. If this development proceeds, the surface drainage system would replace the proposed pipeline between 20<sup>th</sup> Avenue and I-35E.

The area above the pipe could be used for public greenspace, as well as storm water ponding as this area develops in the future.

#### Alternative C – Combination Open Channel and Storm Sewer Outlet

We also considered a hybrid solution that would include a combined ditch and pipe system in lieu of a 72-inch storm drain between 20<sup>th</sup> Avenue and Peltier Lake. A smaller pipe was considered that would surcharge to an open-channel greenway above the pipe. Due to pipe depth and the pressure required to surcharge, this concept would require double the land acquisition than Alternative B.

Alternative B is recommended as it provides surface water treatment, water quality improvements and rate control through draining storage systems effectively and efficiently, thereby minimizing the bounce in ponds from successive storm events. It also provides a known normal water elevation in the low areas, around which the designers may build future development to be safe from flooding.



Option 3 also includes a crossing under I-35E near the existing ACD 55 crossing (**FIGURE 6**). Final design and coordination with RCWD and MnDOT will determine if this crossing is a single crossing or two smaller crossings under I-35E.

#### **4.2. Proposed Drainage Improvements**

The new outlet to Peltier Lake and crossing under I-35E via a storm sewer pipe system is recommended as the most cost-effective alternative. The proposed project (**FIGURE 7**) includes:

- A. New outfall to Peltier Lake
- B. New 72-inch storm drain from 20<sup>th</sup> Avenue to Peltier Lake Drive
- C. New 60-inch storm drain crossing under I-35E to regional storage facility
- D. New storm sewer to collect developed runoff from the east side of I-35E
- E. As feasible incorporate a public greenway corridor with additional water quality best management practice (BMP) features that could treat surface runoff before entering the storm main.
- F. Outlet control structures with gates on selected regional storage facilities to minimize the risk of storm water runoff from adversely impacting flood levels on Peltier Lake
- G. Preserve the agricultural drain tile system to maintain upstream drainage rights until all land within the study area develops. Drain tile may be abandoned or realigned as development progresses, at the benefitted landowners' expense and discretion.

The conceptual layout and system details are provided in **APPENDIX C**. Additional design requirements for land development within the study area are summarized in **APPENDIX D**.

#### **4.3. Storm Sewer and Stormwater Management**

The City's proposed storm sewer system and drainage design requirements will be in conformance with the City's performance standards, and as permitted by RCWD.

Construction of a stormwater collection and conveyance system will be necessary to direct stormwater to the new pipeline and ultimately to Peltier Lake. This system will reduce flooding within the study area and improve drainage conditions throughout the Northeast Lino Lakes Area.

There are multiple ponding locations proposed with the Northeast Lino Lakes Comprehensive Stormwater Management Plan. At this time it is proposed to utilize existing wetland complexes for flood storage by providing an outlet control structure with operable gate at the normal water level. In the event of a 1-percent chance design storm, the gates can be closed to minimize the risk of increasing the flood stage on Peltier Lake, and the wetlands would store the water until

the gates are opened after the flood threat on Peltier Lake has passed. The exact location and design of these regional BMPs will be determined as the design progresses. It will be expected that the storage area will experience a significant bounce in elevation during 100-year storm event and will need to be planted with a suitable planting palette that can tolerate periodic inundation to maintain vegetation.

#### **4.4. Storm Water Quality**

The study area will include a variety of measures to provide treatment and improve water quality in Peltier Lake and the Anoka Chain of Lakes to minimize impacts related to this project. All individual developments will be required to manage stormwater on site to the current and applicable Rice Creek Watershed District rules. It is anticipated the study area will include a water quality treatment train with sedimentation BMPs located in upland areas, designed to remove solids and particulate matter, combined with surface and media filtration to remove dissolved particulates, nitrogen and phosphorus, prior to entering the new storm sewer. Refer to *APPENDIX D* for details and design requirements for the study area.

#### **4.5. Permits and Approvals**

Construction of the pipe and outlet will disturb more than one acre of land and will require a National Pollution Discharge Elimination Systems (NPDES) General Stormwater Permit [MNR 100001] that must be obtained by Lino Lakes from the Minnesota Pollution Control Agency (MPCA).

The project includes a new outlet to Peltier Lake, as such the City will need to obtain a DNR Public Waters Work permit (GP2004-0001) from the MnDNR, as well as obtain a Rice Creek Watershed District [RCWD] permit to demonstrate no adverse impacts will be created as result of this project.

The project also includes a culvert crossing under I-35E; as such the City will need to obtain a Utility Accommodation on Trunk Highway Right of Way Permit (Form 2525) and a Miscellaneous Work on a Trunk Highway Right of Way permit (Form 1723) from MnDOT.

The project includes a storm drain crossing under 20<sup>th</sup> Avenue (CSAH 54), a Right of Way Permit from Anoka County may be required.

The storm water conveyance alignment has been chosen to avoid or minimize wetland impacts; however any modifications to existing wetlands would require approval by the Technical Evaluation Panel (TEP).

Given the complexity of the project it is anticipated that the City and staff will need to meet with the above agencies individually in order to facilitate permit approvals.

#### **4.6. Right-of-Way / Easements**

Right-of-way needs will be evaluated during final design. It is anticipated that some temporary construction easements will be required. Easement acquisition for the pipeline is anticipated: the

easements related to the regional storage basins will be acquired as part of the platting process for individual developments.

#### **4.7. Project Phasing**

The project will be constructed in several phases (*FIGURE 8*), as funding and land development allows. The project will be constructed from downstream to upstream, starting with the new Peltier Lake outfall and finishing with upstream regional storage facilities.

Phase 1 will include construction of the new outlet at Peltier Lake and the installation of the 72-inch storm sewer from Peltier Lake Drive to 20<sup>th</sup> Avenue. Once this outlet pipe is installed, the immediate neighboring properties can develop and discharge treated stormwater to the outlet pipe. Development of the regional stormwater facility between Peltier Lake Drive and 20<sup>th</sup> Avenue would need to be constructed concurrently with any development. The new 72-inch storm sewer will also provide an outlet for the proposed ponding facility being constructed between 20<sup>th</sup> Avenue and I-35E, also part of Phase 1.

Phase 2 will include the installation of a new 60-inch crossing under I-35E and an extension of the storm sewer beyond the MnDOT right-of-way to allow for future extension of the sewer along Otter Lake Trail.

Phase 3 would be constructed concurrently with the Otter Lake Trail extension and includes expanding the storm sewer system east of I-35E to the Otter Lake Trail extension and within the proposed right-of-way.

Future phases include construction of additional regional storage facilities, water quality features, recreational enhancements, and additional storm sewer infrastructure as needed for development. The timing of these features will depend on individual landowners and development interests.

At all times during project construction and phasing, upstream drainage will be maintained by realigning the county ditches, at the developers expense, or leaving them in place for future abandonment when the study area is fully built out.

#### **4.8. Private Utilities**

The Koch Pipeline Company has three crude oil pipelines that run through the study area, roughly from 20<sup>th</sup> Avenue and 80<sup>th</sup> Street in the northwest to Main Street at the Hugo border. The proposed 60-inch crossing under I-35E avoids the Koch pipeline, but final design of the storm sewer infrastructure east of I-35E will need to ensure there are no conflicts with the pipelines. It is anticipated that coordination with the Koch Pipeline Company will be required in order to construct the project as proposed.

#### **4.9. Wetlands**

All practical measures will be taken to prevent any inadvertent temporary drainage of wetlands from the construction and placement of the new pipeline and outfall to Peltier Lake. These

practices include using bentonite plugs and/or steel casing for the areas where the pipeline runs through wetlands, and prohibiting the use of gravel bedding under the pipeline in these areas.

## 5. FINANCING

### 5.1. Opinion of Probable Construction Cost

A detailed opinion of probable cost is included in *APPENDIX E* of this report. The opinion of probable cost is based on projected construction costs for 2016 and includes a 15% construction contingency and 25% indirect costs. The indirect costs include engineering, legal, and administrative costs associated with the project.

Project costs have been separated into assumed construction phases. The first phase will consist of the outlet pipe to Peltier Lake from 20<sup>th</sup> Avenue. This phase will also include volume and water quality BMP features to be constructed before any development may tie into the new outlet pipe.

It is anticipated that after the outlet pipe is constructed, the new crossing under I-35E will be constructed as the second phase. The third phase would consist of constructing storm sewer connections from the new I-35E crossing upstream, and along, the future Otter Lake Trail extension. Future phases will include additional volume control and water quality BMPs, outlet control structures, and storm sewer connections, as development in the study area progresses. The total project costs, by construction phase, are summarized below.

**Table 3. Northeast Lino Lakes Drainage Improvement Summary of Cost**

<b>COST</b>	<b>TOTAL</b>
Phase 1 – Peltier Lake Outlet Pipe	\$2,114,944
Phase 2 – I-35E Crossing	\$689,030
Phase 3 – Otter Lake Trail Storm Sewer Extension	\$1,244,986
Phase 4 – Future Improvements	\$690,824
<b>TOTAL</b>	<b>\$4,739,784</b>

### 5.2. Funding Sources

Funding for the project will be through surface water management fees collected through development, and potential grants from Rice Creek Watershed District (RCWD), Minnesota Board Water and Soil Resources (BWSR), and the Public Facilities Authority (PFA).

The surface water management fees per the City's current rates and proposed land use are estimated to be \$2 to \$2.5 million for this area. The City could consider developing a specific fee related to this area to ensure costs are covered.

If the City is eligible, a RCWD grant could be up to \$50,000, and a PFA grant could be 25% principal forgiveness on Phases 1 and 2. The BWSR has various grant programs, and an estimated grant amount is unknown at this time.

## 6. PROJECT SCHEDULE

The proposed schedule for this improvement project is as follows for construction to occur in 2017:

### **Phase 1 – Feasibility Report**

City Council Authorizes Feasibility Study.....September 14, 2015  
Public Informational Meeting..... February 2016  
City Council Accepts Feasibility Report and Sets Public Hearing Date.....March 2016  
Hold Public Hearing / Authorize Preparation of Final Plans and Specifications..... March 2016

### **Phase 2 – Final Design**

Final Design..... March - May 2016  
City Council Approves Plans..... May 2016  
Apply for Grant Funding..... Throughout 2016  
Obtain RCWD, MnDNR, MnDOT Permits.....Summer 2016  
City Council Authorizes Ad for Bids.....March 2017  
Receive Contractor Bids.....April 2017  
Award Contract.....May 2017

### **Phase 3 - Construction**

Begin Construction.....May 2017  
Final Completion of Construction.....Fall 2017

Note: The schedule assumes all permitting work will be complete prior to the start of construction.

## **7. FEASIBILITY AND RECOMMENDATION**

The Northeast Lino Lakes Drainage System Improvement Project includes a new stormwater outlet at Peltier Lake, drainage improvements, water quality and volume control BMPs, and appurtenant work. The total cost of the project is estimated at \$4,739,784.

Based on our analysis and data presented, the proposed project is feasible, necessary, and cost effective from an engineering standpoint. We recommend construction of the proposed improvements as detailed in this report and as determined financially feasible by the City Council.

## 8. REFERENCES

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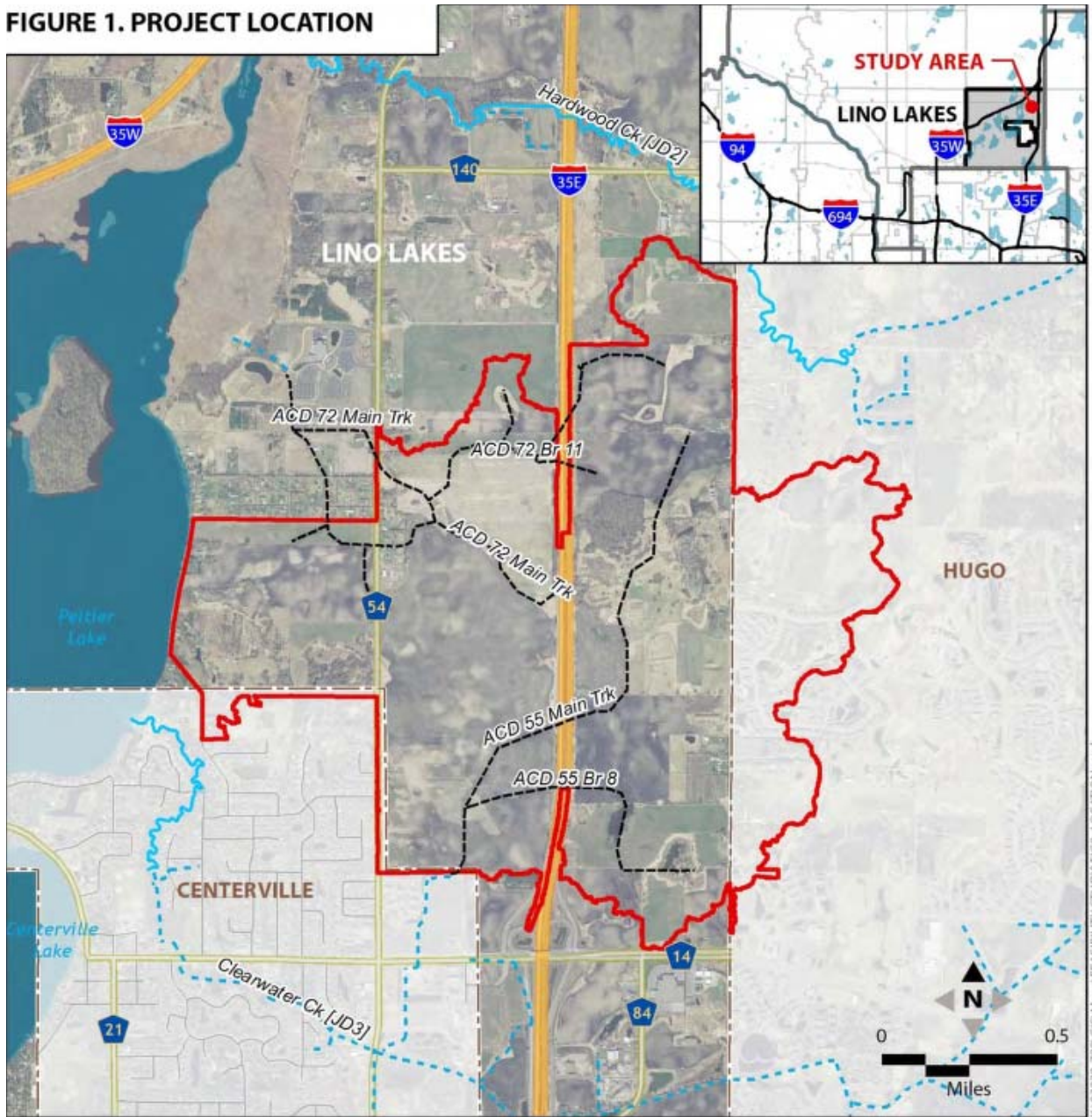


## **APPENDIX A**

### Figures

1. Project Location
2. Existing Drainages
3. Existing Land Use
4. Existing Wetlands
5. Proposed Land Use
6. Alternatives Considered
7. Proposed Improvements
8. Proposed Construction Phasing

**FIGURE 1. PROJECT LOCATION**

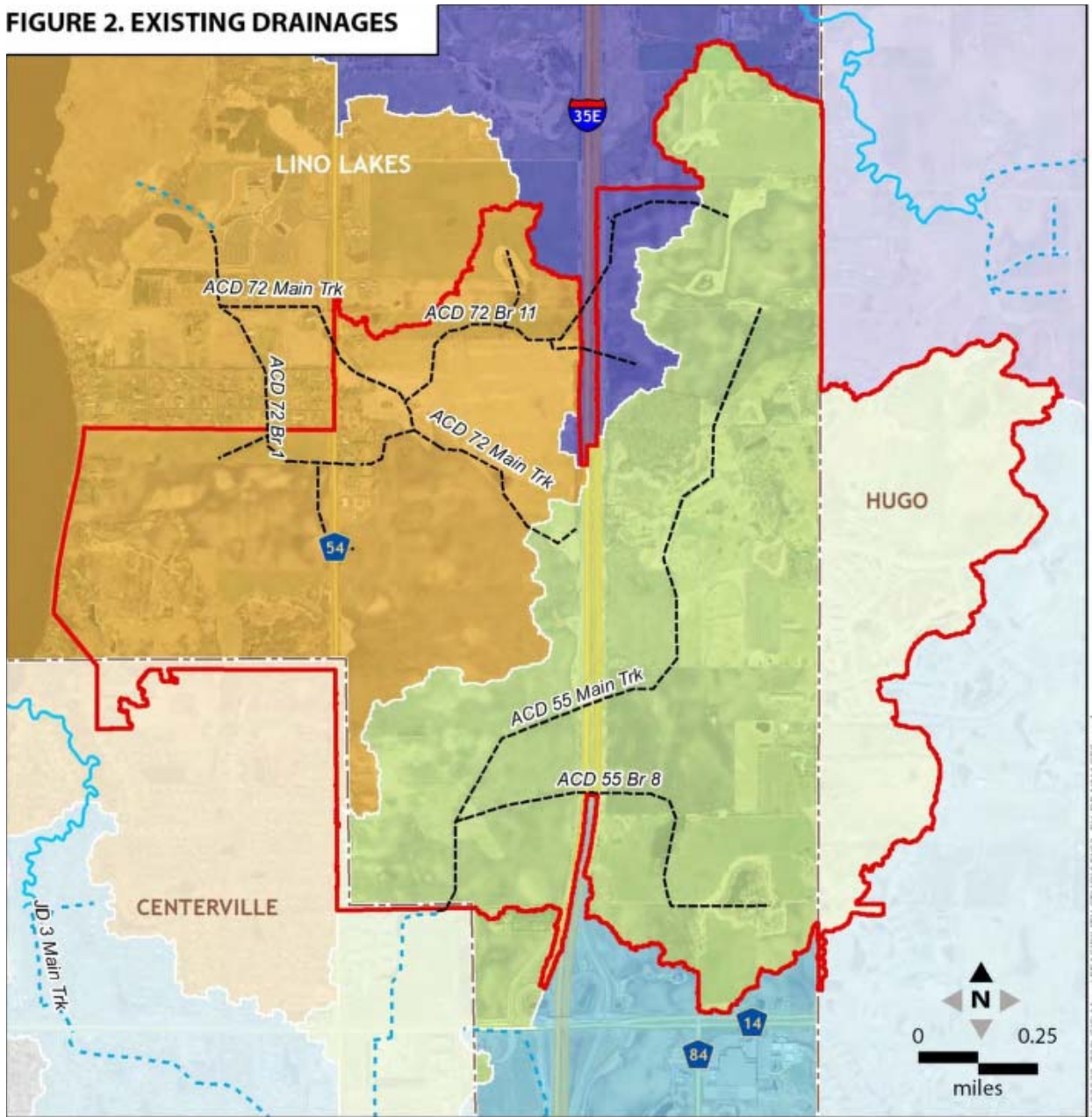


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**LEGEND**

- Study Area
- City Boundaries
- Drain Tile
- Open Ditch
- Stream

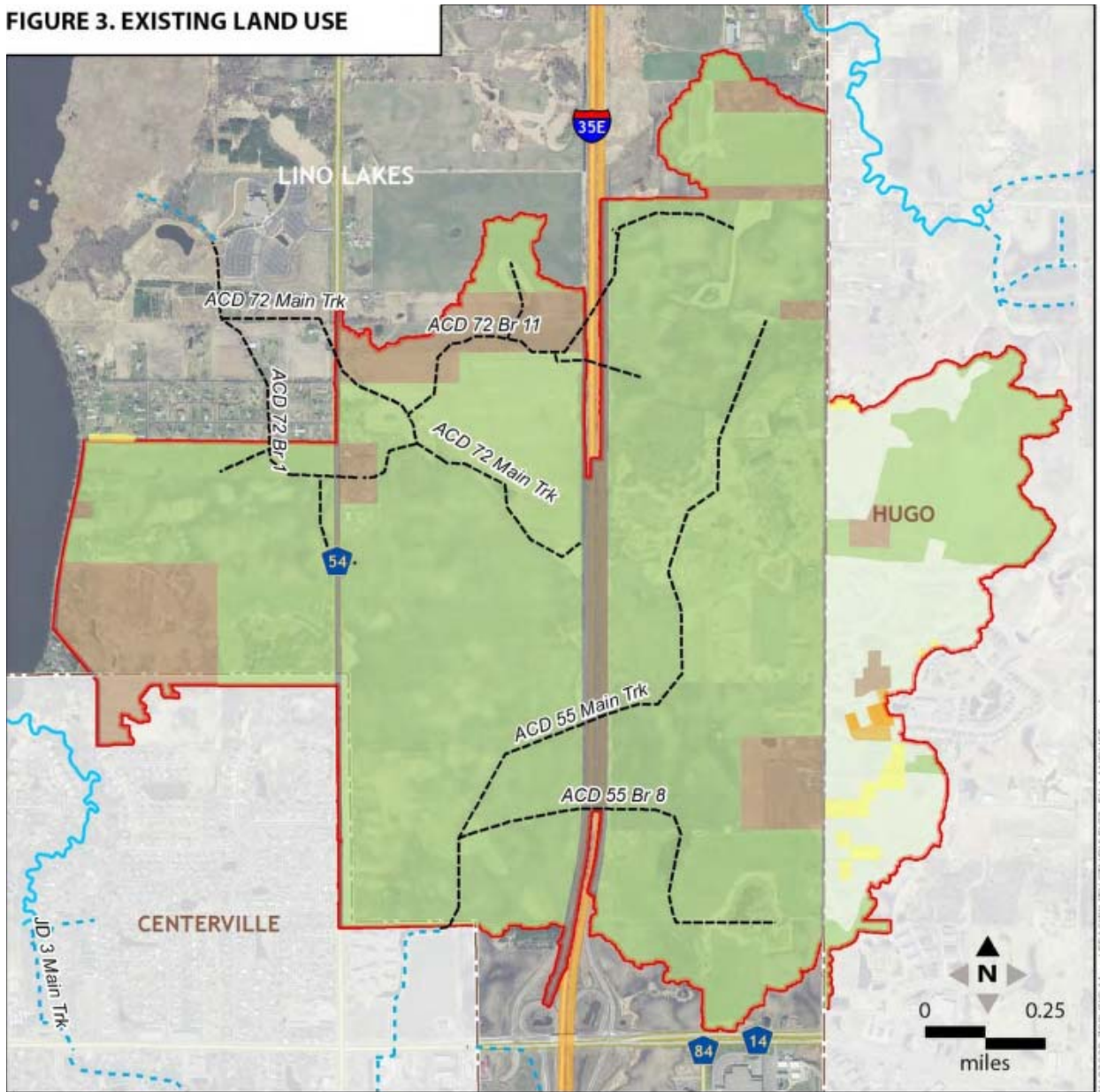
**FIGURE 2. EXISTING DRAINAGES**



**LEGEND**

- |            |                     |                              |            |
|------------|---------------------|------------------------------|------------|
| Study Area | JD2 [Hardwood Ck]   | Peltier Lake Direct Drainage | Open Ditch |
| ACD55      | JD3 [Clearwater Ck] | Drain Tile                   | Stream     |

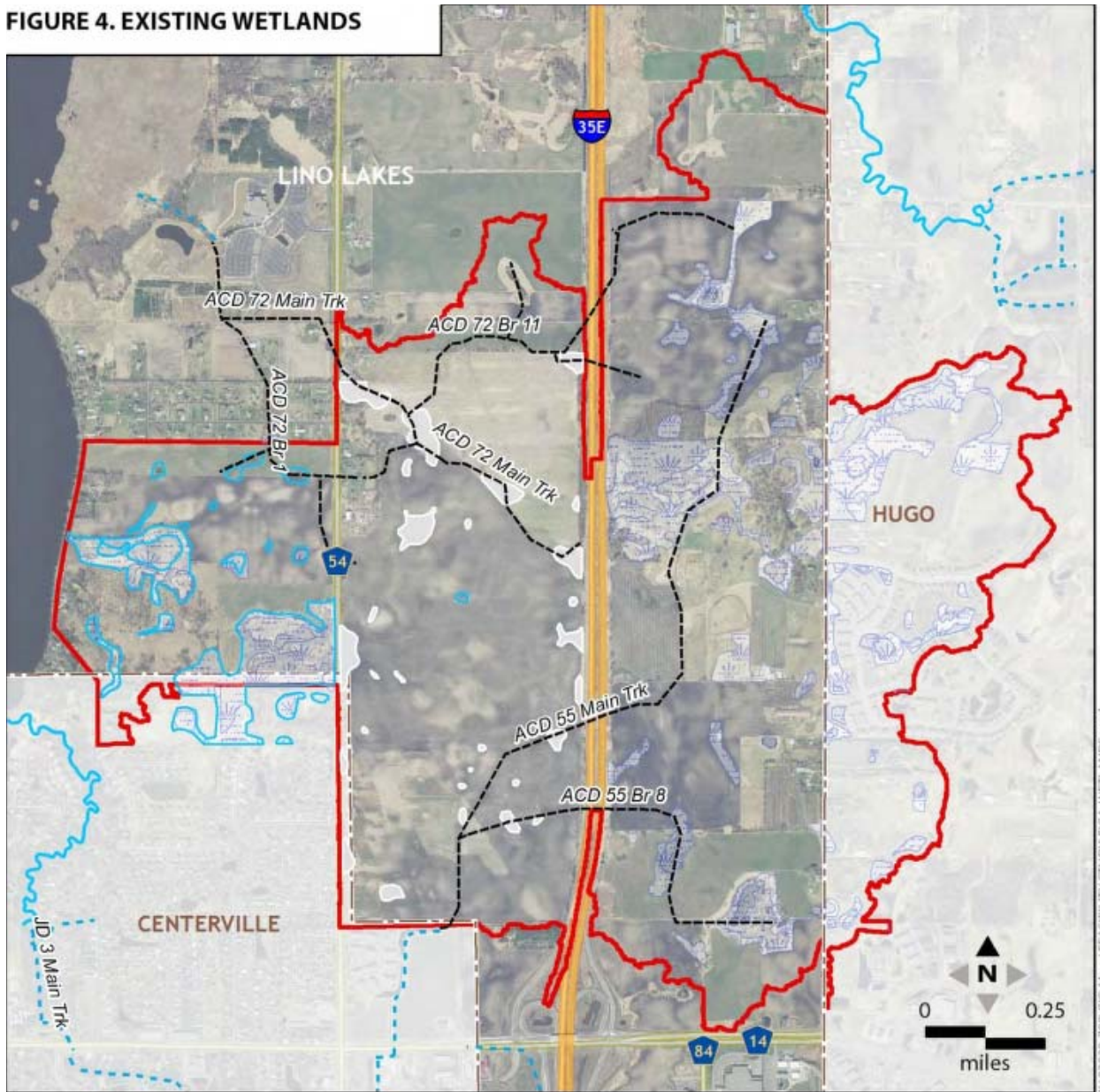
**FIGURE 3. EXISTING LAND USE**



**LEGEND**

Rural Residential	Multifamily	Open Space/Conservation	Drain Tile
Single Family Detached	Right-of-Way	Study Area	Open Ditch
Single Family Attached	Agricultural		Stream

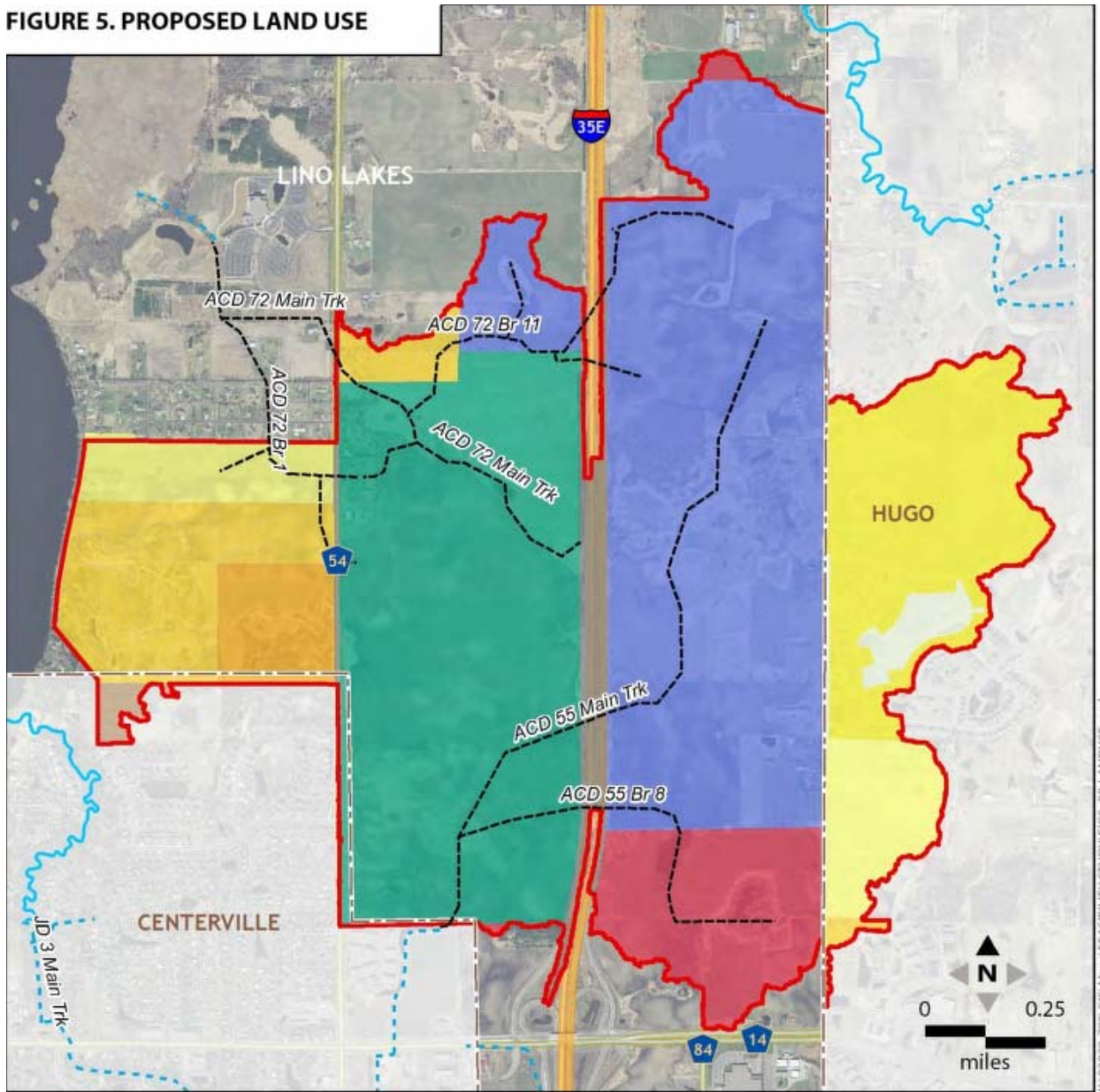
**FIGURE 4. EXISTING WETLANDS**



**LEGEND**

- |   |                            |   |            |   |            |
|---|----------------------------|---|------------|---|------------|
|  | Level 2 Delineation        |  | Study Area |  | Drain Tile |
|  | Level 1 Delineation        |  | Open Ditch |  | Stream     |
|  | National Wetland Inventory |   |            |   |            |

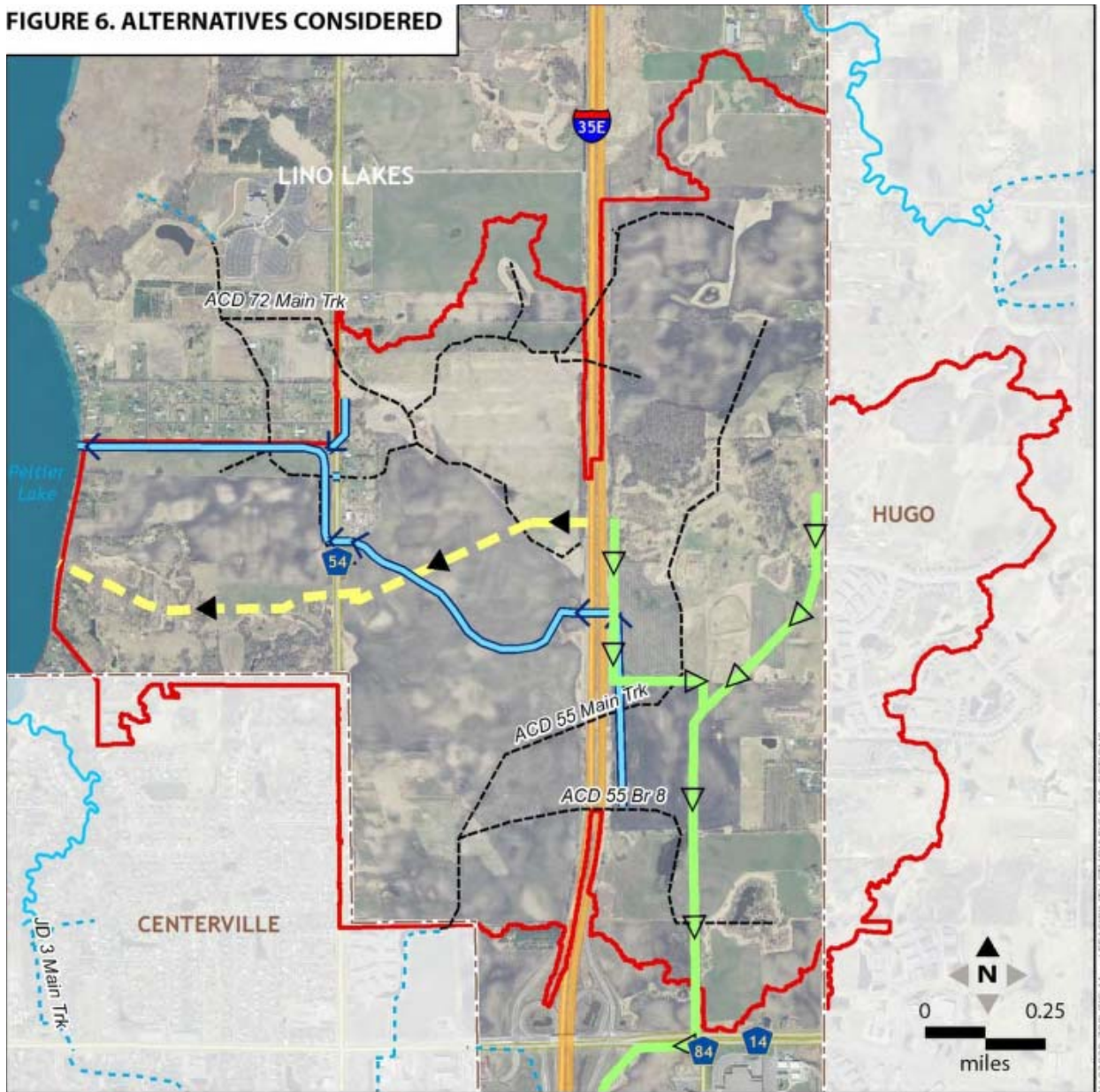
**FIGURE 5. PROPOSED LAND USE**



**LEGEND**

- |                        |                            |            |
|------------------------|----------------------------|------------|
| Rural Residential      | Single Family Attached     | Study Area |
| Industrial             | Medium Density Residential | Drain Tile |
| Commercial             | High-Density Residential   | Open Ditch |
| Mixed Use              | R/W                        | Stream     |
| Single Family Detached | Open Space/Conservation    |            |

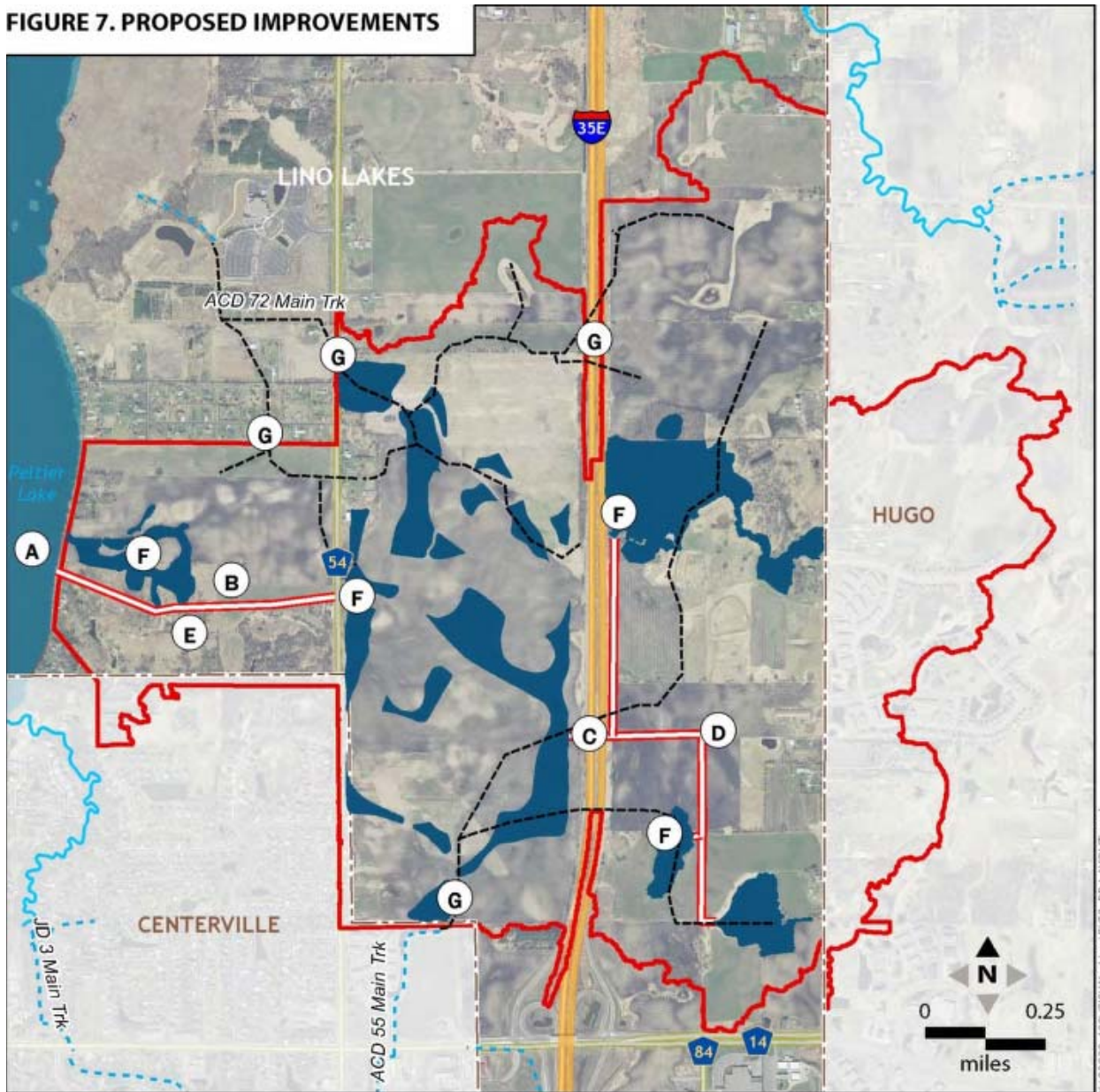
**FIGURE 6. ALTERNATIVES CONSIDERED**



**LEGEND**

- ▶ Option 1
- ▶ Options 2 & 3
- -▶ Option 4
- Study Area
- Drain Tile
- Open Ditch
- Stream

**FIGURE 7. PROPOSED IMPROVEMENTS**

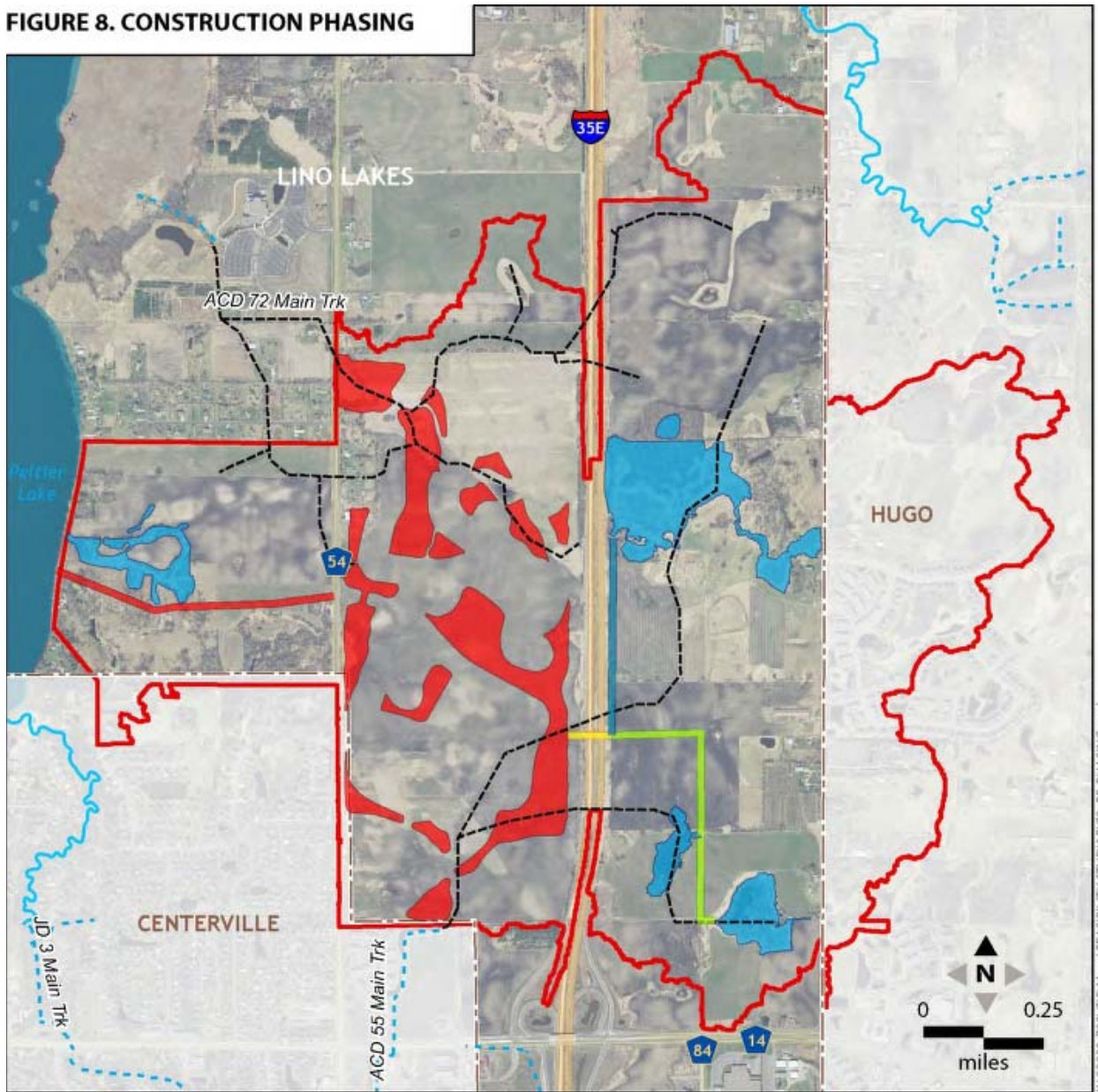


**LEGEND**

- |                             |            |            |                           |
|-----------------------------|------------|------------|---------------------------|
| Regional Storage Facilities | Study Area | Open Ditch | Design Feature [see text] |
| Proposed Storm Drain        | Drain Tile | Stream     |                           |



**FIGURE 8. CONSTRUCTION PHASING**



**LEGEND**

- |  |   |  |
|--|---|--|
| <span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span> 1st Phase [Peltier Lake Outlet and Regional BMPs]         | <span style="display:inline-block; width:15px; height:15px; border:2px solid red;"></span> Study Area | <span style="display:inline-block; width:15px; border-bottom:2px dashed blue;"></span> Open Ditch                              |
| <span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> 2nd Phase [I-35E Replacement Culvert]                  | <span style="display:inline-block; width:15px; border-bottom:2px dashed black;"></span> Drain Tile    | <span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid blue;"></span> Stream |
| <span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span> 3rd Phase [Otter Lake Trail Extension Storm Sewer] |   |  |
| <span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid blue;"></span> Future Phases [Timing depends on development]        |   |  |

## **ENVIRONMENTAL BOARD AGENDA ITEM 5B**

**STAFF ORIGINATOR:** Erin Heydinger, WSB & Associates

**MEETING DATE:** January 27, 2016

**TOPIC:** Mattamy Storm Water Reuse and Irrigation System

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### **BACKGROUND**

Over the past three years, management of both surface water and groundwater resources have received increased awareness both locally and regionally. Lino Lakes is included in the North and East Metro Groundwater Management District established by the Department of Natural Resources. The City is currently completing the NE Lino Lakes Drainage study covering a 1,400 acre area.

Internally, staff discussed with WSB, city engineer, opportunities for improving the efficient use of both surface water and groundwater resources. As a result, the Environmental Board recommended to Council the authorization of a feasibility study for a stormwater reuse and irrigation system at the Mattamy Homes development. At this time, staff is requesting council acceptance of the study submitted by WSB.

The feasibility study provided an overview of three options for stormwater reuse in the proposed development:

1. Reusing stormwater to irrigate public places;
2. Reusing stormwater to irrigate public places and the townhomes; and
3. Reusing stormwater to irrigate the entire development.

A water balance was conducted to determine if there was sufficient water quantity available for each of the three options. The balance evaluated runoff, precipitation, evaporation, and irrigation. The proposed stormwater pond will receive enough runoff to implement Options 1 or 2, but a potable water connection will be required to implement Option 3.

In addition, the cost of each of the three options was estimated. After considering water supply and cost, WSB recommended that the City implement Option 2: reusing stormwater to irrigate public places and the townhomes for an estimated cost of \$463,000. Funding for the project is proposed through development fees generated from surface water management fees, and City trunk water system funds.

WSB & Associates staff will be in attendance at the work session to provide an update on the project.

**ENVIRONMENTAL DIRECTION**

None Required. Information Only.

**ATTACHMENTS**

1. Feasibility Study for Mattamy Homes Storm Water Reuse and Irrigation System



City of Lino Lakes, MN  
600 Town Center Parkway • Lino Lakes, MN 55014

# FEASIBILITY Report

June 8, 2015

## Mattamy Homes Water Reuse

*City of Lino Lakes  
Hennepin, MN*

*WSB Project No. 2988-01*



477 Temperance Street  
St. Paul, MN 55101  
Tel: (651) 286-8450 • Fax: (651) 286-8488  
wsbeng.com

# FEASIBILITY REPORT

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## MATTAMY HOMES WATER REUSE

FOR THE  
CITY OF LINO LAKES, MINNESOTA

June 8, 2015

Prepared By:

WSB & Associates, Inc.  
477 Temperance Street  
St. Paul, MN 55101  
651-286-8450  
651-286-8488 (Fax)

## CERTIFICATION

---

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

DRAFT

---

Greg F. Johnson, PE

Date: January 22, 2016

Lic. No. 26430

Prepared By:

DRAFT

---

Erin J. Heydinger

Date: January 22, 2016

## TABLE OF CONTENTS

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1.	EXECUTIVE SUMMARY.....	4
2.	MATTAMY HOMES WATER REUSE.....	5
2.1	INTRODUCTION.....	5
2.2	GENERAL BACKGROUND.....	5
2.3	PROPOSED IMPROVEMENTS.....	6
3.	FINANCING.....	7
3.1	OPINION OF COST.....	7
3.2	FUNDING.....	8
5.	RECOMMENDATION.....	9

### Appendix A

Figure 1 – Project Location

Figure 2 – Option 1: Irrigating Public Spaces

Figure 3 – Option 2: Irrigating Public Spaces and Townhomes

Figure 4 – Option 3: Irrigating Entire Development

### Appendix B

Table 1 – Estimated Annual Irrigation

### Appendix C

Table 1 - Water Balance Summary

Table 2 – Option 1 Cost Summary

Table 3 – Option 2 Cost Summary

Table 4 – Option 3 Cost Summary

### Appendix D

Water Balance Tech Memo

## 1. EXECUTIVE SUMMARY

The proposed Mattamy Homes Development is a 400 acre residential development located east of Interstate 35E and north of Main Street in the City of Lino Lakes. Surface water management for the project would include storm water quality, storage and rate control. The storm water storage area will hold a significant amount of water that can be used to provide irrigation verses conventional groundwater use for irrigation.

Over the past three years, management of both surface water and groundwater resources have received increased awareness both locally and regionally. Lino Lakes is included in the North and East Metro Groundwater Management District established by the Department of Natural Resources (DNR). The goal is to protect of water resources through sustainable water use solutions such as the one being proposed.

The water reuse project was evaluated through a water balance analysis and multiple options for an irrigation reuse system. The options for an irrigation reuse system are:

1. Irrigate the park and public spaces
2. Irrigate the townhomes, park, and public spaces
3. Irrigate the entire development, including single-family residences

The options were evaluated based on the estimated costs, ownership, storm water requirements, and maintenance. Option 2 is recommended: it includes irrigation of the townhomes, park and public spaces.

The estimated project cost for Option 2 is \$463,000 which includes 10% construction contingency and 20% indirect costs. Funding for the project is proposed through development fees generated from surface water management fees, and City trunk water system funds.

This project is feasible and cost-effective from an engineering standpoint, and should be constructed as proposed herein.



## 2. MATTAMY HOMES WATER REUSE

### 2.1 INTRODUCTION

#### 2.1.1 Authorization

On June 8, 2015, the City of Lino Lakes City Council authorized the preparation of a feasibility report for the Mattamy Homes Water Reuse project.

#### 2.1.2 Scope

The Mattamy Homes Development includes a large storm water storage area that can be used as an irrigation source. The proposed project includes storm water used for irrigating the development. This report evaluates several options for water reuse and considers water resources, cost, regulatory requirements, and value of the reuse irrigation system.

#### 2.1.3 Data Available

Information and materials used in the preparation of this report include the following:

- City of Lino Lakes Comprehensive Plan
- City of Lino Lakes Base Map and/or Topography Maps
- Minnesota Department of Natural Resources Water Usage Reports
- Grading plans and plat for the Mattamy Homes development

### 2.2 GENERAL BACKGROUND

#### 2.2.1 Project Location

The Mattamy Homes Development is located in the City of Lino Lakes, west of Interstate 35E, east of 20<sup>th</sup> Avenue North, north of Main Street, and south of the bounds extended by 77<sup>th</sup> Street East. A map showing the project area can be found in **Figure 1, Appendix A** of this report.

#### 2.2.2 Existing Conditions

The existing land use at Mattamy Homes is agricultural, with stormwater currently running through the site via Anoka County Ditch 55 (ACD-55) and Anoka County Ditch 72 (ACD-72). These ditch systems receive storm water runoff from watersheds located in the cities of Hugo and Lino Lakes and discharge to Peltier Lake. A study is being completed to address the surface water in the NE area of Lino Lakes. This report assumes that ditch water is not available as a source for irrigation and will be addressed through the NE Drainage Study.

#### 2.2.3 Current Irrigation Practices

The City currently regulates irrigation within the community to promote water conservation. It is estimated that irrigation accounts for 43% of the potable water used in the City each year (**Appendix B, Table 1**). The large proportion of water allocated towards irrigation presents an opportunity for the City to reduce its summer demand on the potable water system through water reuse.

## 2.3 PROPOSED IMPROVEMENTS

There were three options identified to coincide with the Mattamy development

### Option 1: Irrigating Public Spaces with Storm Water

Option 1 includes a water reuse irrigation system for public open spaces within the Mattamy Homes Development. This system includes the park in the center of the development as well as the berm on the east side of the development. In total, the irrigated area for Option 1 is 11 acres. A figure depicting Option 1 is shown as **Appendix A, Figure 2**.

### Option 2: Irrigating Public Spaces and Townhomes with Storm Water

Option 2 includes a water reuse irrigation system for public open spaces and multi-family residential (townhome) area in the southeastern portion of the development. The townhome area includes 12 acres of green space that will require irrigation, in addition to the 11 acres irrigated in the public space. A figure depicting Option 2 is shown as **Appendix A, Figure 3**.

### Option 3: Irrigating all of the Mattamy Development with Storm Water

Option 3 includes a water reuse irrigation system for public open spaces, multi-family residential townhomes, and single-family residences. A fourth municipal utility would be installed throughout the development. The third option requires homeowner education and interaction for system management and coordination with City maintenance staff. The total irrigated area for Option 3 is 144 acres. A figure depicting Option 3 is shown as **Appendix A, Figure 4**.

A water balance analysis was completed and can be found in **Appendix D**. The water balance summary for each option:

### Option 1: Irrigating Public Spaces with Storm Water

The water balance model indicates that the storm water stored can sufficiently supply water for irrigation of the public spaces with minimal pond level fluctuations.

### Option 2: Irrigating Public Spaces and Townhomes with Storm Water

The water balance model indicates that the storm water stored can sufficiently supply water for irrigation of the public spaces and townhomes with minimal pond level fluctuations.

### Option 3: Irrigating all of the Mattamy Development with Storm Water

The water balance model indicates that the storage area cannot supply enough irrigation water to support this option. The model showed that storage levels will reach significantly low levels and that the reuse system would require supplementation from the municipal water system. The cost to supplement the water reuse system with the municipal supply is not a cost that required with Option 1 or 2. In addition there will be vegetation issues if the storage area is

drawn down this low, along with it is anticipated that residents will not desire to have the storage area this low.

Option 2 is recommended because it provides the most surface water reuse without a fourth municipal utility system and individual service lines. Option 2 can be implemented without supplementation/connection to the municipal water system.

### **2.3.1 Pump and Pipe Materials**

Appendix C includes pump and forcemain layouts for each option, as well as suggested meter locations. The pump size should be determined by the irrigation designer, and they should be controlled by soil-moisture sensors, to ensure that watering is dictated by weather and soil conditions. The proposed forcemain is 2 to 4" diameter, high density polyethylene (HDPE).

### **2.3.2 Water Quality**

Prior to each irrigation season, it is recommended that the storage area be tested for water quality. The Minnesota Pollution Control Agency has recommended water quality parameters as outlined in **Appendix D**. If the parameters are not met, additional treatment should be considered to ensure the storage water remains of high enough quality to use for irrigation.

### **2.3.3 Ownership Recommendation**

It is recommended that the City own and operate the system, and within the townhome area, the City should have a maintenance agreement with the HOA where they are responsible for maintaining the system in the townhome area.

### **2.3.4 Metering, Usage, and Billing**

It is recommended that the park and berm irrigation systems be operated with independent meters so that the townhome maybe invoiced for their water usage to support maintenance of the system. Watering restrictions should remain in place for consistency and promote water conservation.

### **2.3.5 Permitting**

A Rice Creek Watershed District (RCWD) permit will be required. The project will meet volume reduction, treatment and rate control per RCWD rules. A Minnesota Department of Natural Resources (DNR) appropriations permit will also be required for the project.

### **2.3.6 Right of Way**

The proposed reuse system with Option 2 would be constructed within public right of ways and public land or land owned by the Home Owner Association for the townhomes. Option 3 may require additional easement or right of way dedicated through platting for the distribution system.

## **3. FINANCING**

### **3.1 OPINION OF COST**

The detailed opinion of probably cost for each of the three options can be found in **Appendix C** of this report. The opinions of cost incorporate estimated construction costs and include a 10%

construction contingency and 20% for indirect costs (legal, administrative, engineering, and financing items).

**Table 4** below provides a summary of the estimated cost for each of the three options considered:

<b>Option</b>	<b>Construction with Contingency</b>	<b>Indirect (20%)</b>	<b>Total</b>
Option 1: Public Areas Irrigated	\$296,000	\$60,000	\$356,000
<b>Option 2: Public Areas and Townhomes Irrigated</b>	<b>\$386,000</b>	<b>\$77,000</b>	<b>\$463,000</b>
Option 3: Public Areas, Townhomes, and Single-Family Homes Irrigated	\$2,151,000	\$431,000	\$2,582,000

### 3.2 FUNDING

Funding for the project is proposed through development fees generated from surface water management fees, and City trunk water system funds. The proposed funding for Option 2 is outlined as follows:

<b>Funding Source</b>	<b>Amount</b>
Surface Water Management	\$197,000
Trunk Water	\$266,000
<b>Total</b>	<b>\$463,000</b>

The trunk fee is calculated based on 40% of the \$4,069 trunk water fee for each townhome unit, based on the estimated water savings. It was assumed that each townhome is one Residential Equivalency Unit (REU).

The project may be eligible for grants from the Metropolitan Council of Environmental Services for Targeted Storm Water. Grant funding opportunities will be evaluated during the design of the project.

#### 4. RECOMMENDATION

The project is feasible, necessary, and cost-effective from an engineering perspective. WSB & Associates, Inc. recommends construction of the proposed improvements as detailed in this report. The economic feasibility of this project will be determined by the City Council.

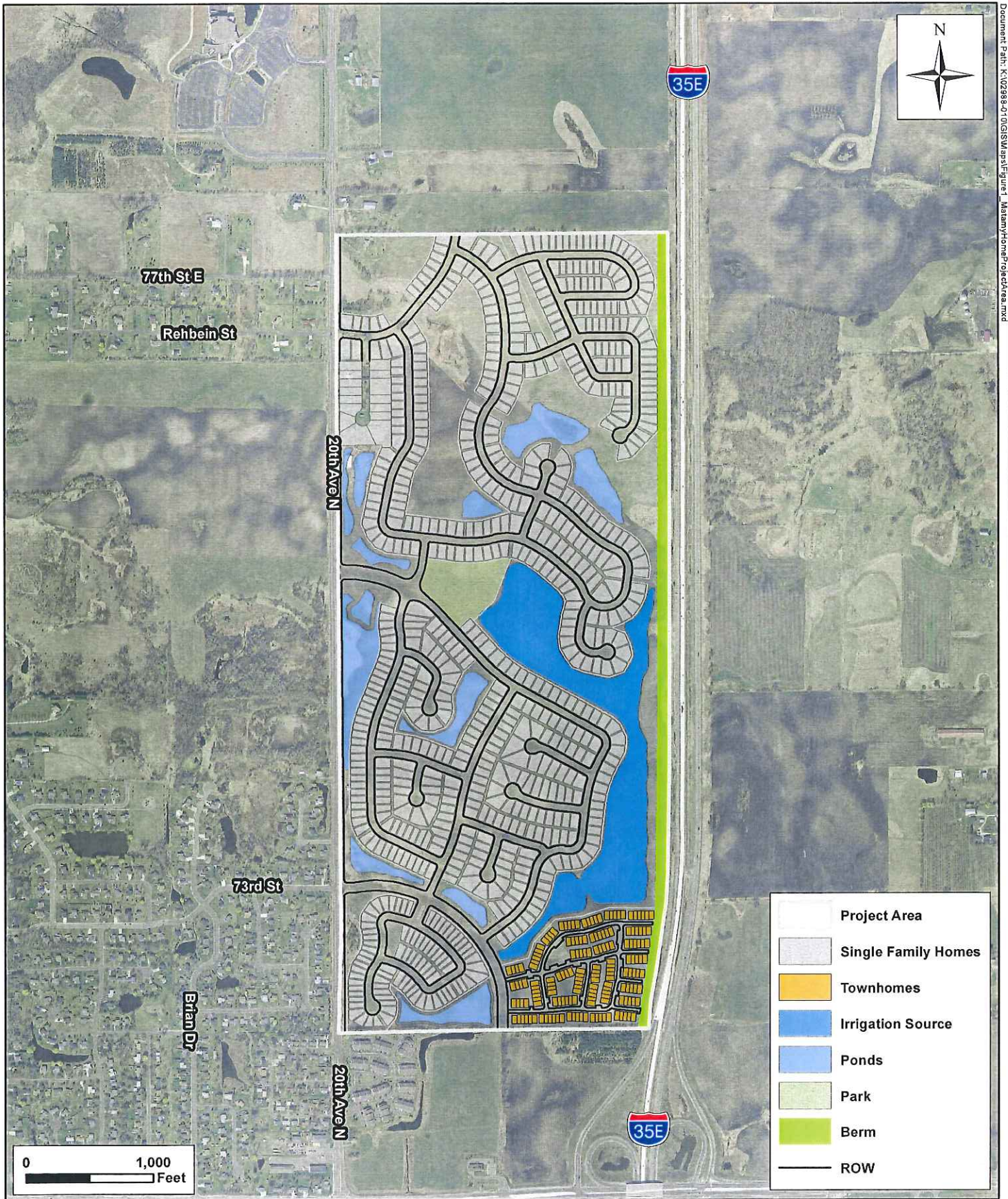
## APPENDIX A

**Figure 1: Project Location**

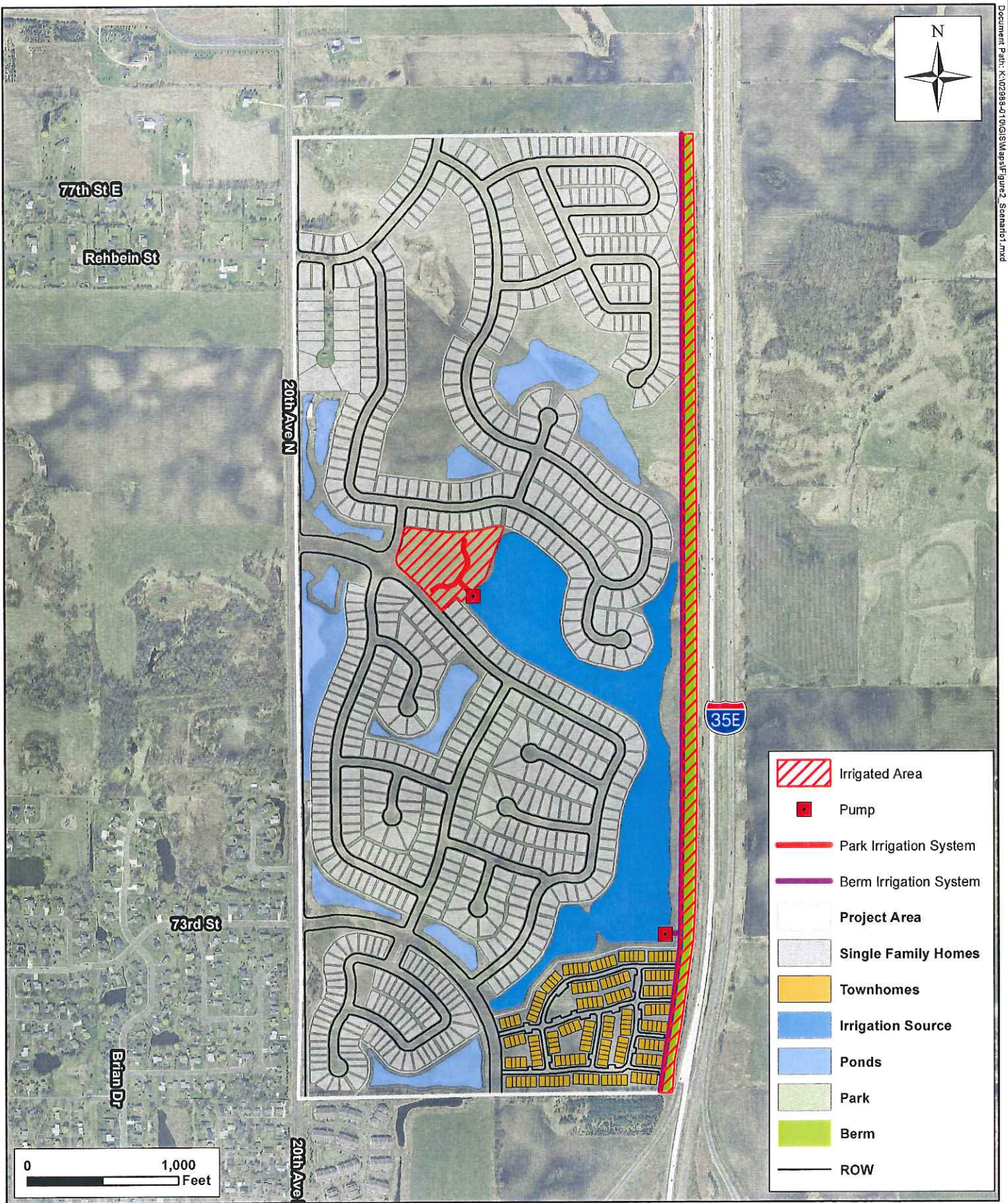
**Figure 2: Option 1: Irrigating Public Spaces**

**Figure 3: Option 2: Irrigating Public Spaces and Townhomes**

**Figure 4: Option 3: Irrigating Entire Development**

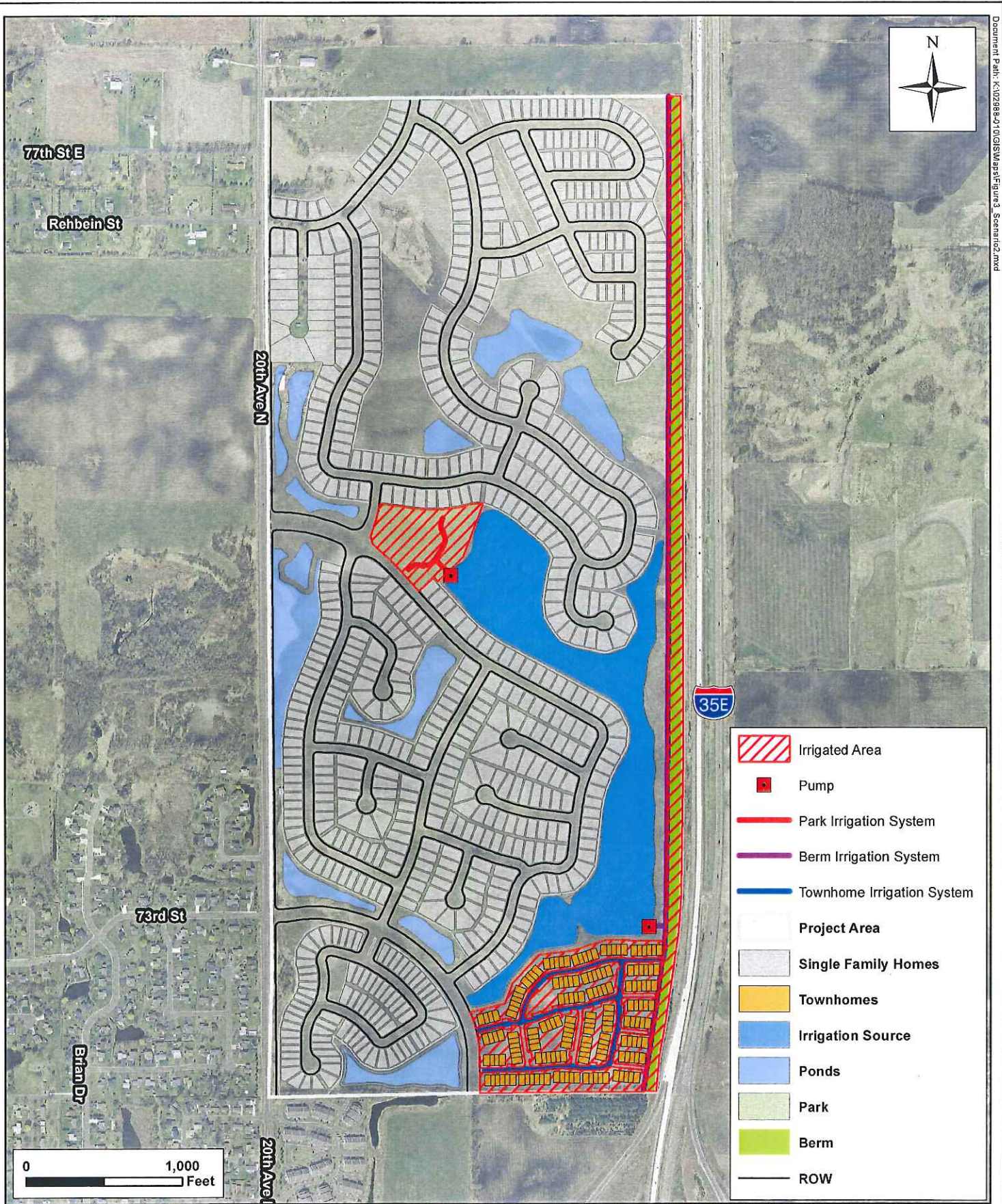















**Figure 1**  
**Mattamy Homes Project Area**



**Figure 2**  
**Option 1 - Parks and Berm**





-  Irrigated Area
-  Pump
-  Park Irrigation System
-  Berm Irrigation System
-  Townhome Irrigation System
-  Project Area
-  Single Family Homes
-  Townhomes
-  Irrigation Source
-  Ponds
-  Park
-  Berm
-  ROW

**Figure 3**  
**Option 2 - Parks, Berm, and Townhomes**



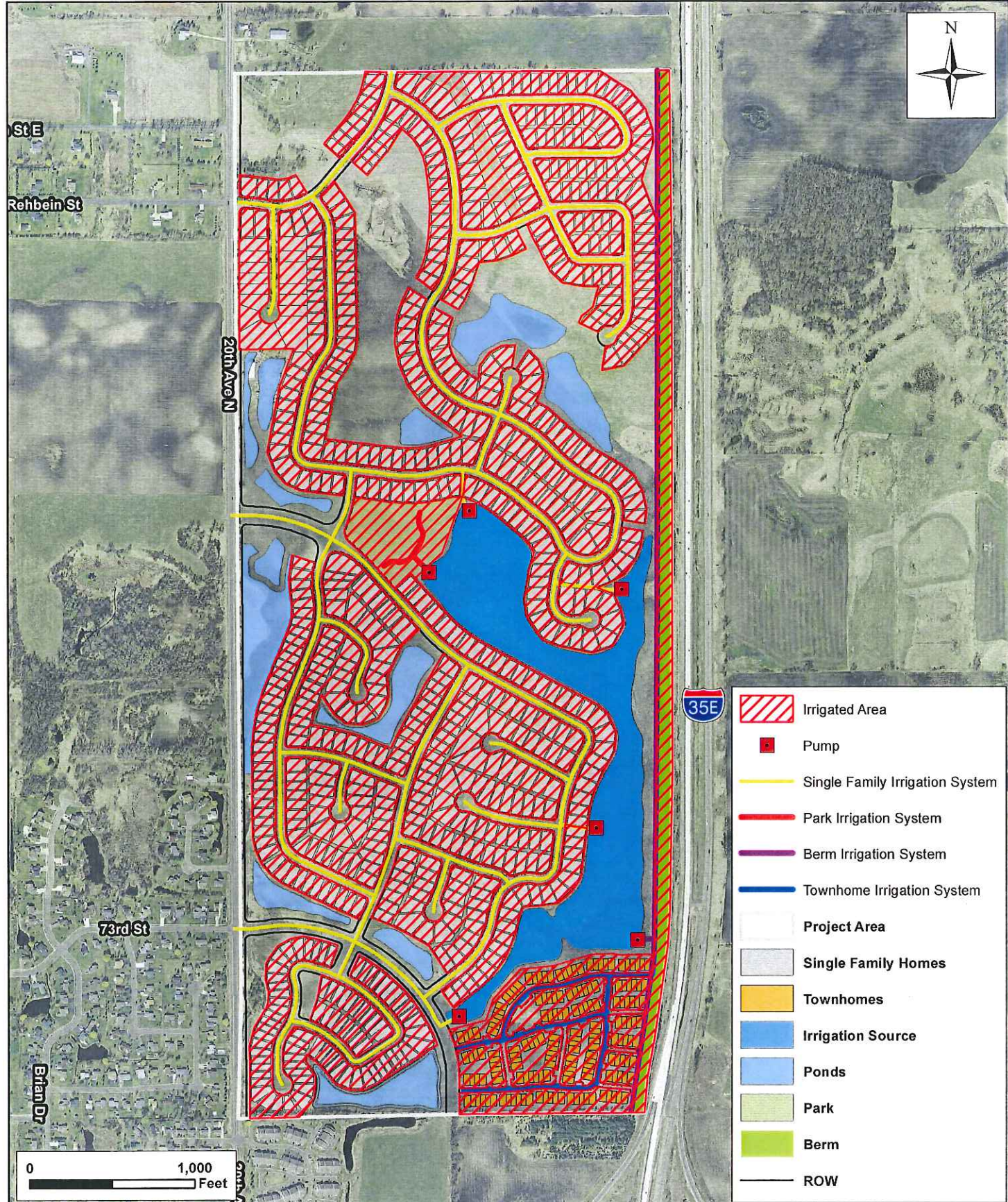


Figure 4

Option 3 - Entire Development Irrigated



## APPENDIX B

### Table 1 - Estimated Annual Irrigation

Pumping Data

	2011	2012	2013	2014	Average
January	25,888,000	25,071,000	27,807,000	25,983,000	26,187,250
February	23,596,000	22,437,000	23,407,000	22,194,000	22,908,500
March	23,542,000	24,787,000	23,681,000	24,295,000	24,076,250
April	26,549,000	35,803,000	27,568,000	25,505,000	28,856,250
May	32,688,000	48,084,000	35,966,000	36,576,000	38,328,500
June	61,591,000	66,619,000	38,388,000	42,654,000	52,313,000
July	66,370,000	95,916,000	83,252,000	64,403,000	77,485,250
August	59,137,000	93,978,000	101,316,000	73,428,000	81,964,750
September	69,350,000	90,784,000	89,821,000	47,160,000	74,278,750
October	51,635,000	56,177,000	34,861,000	33,170,000	43,960,750
November	25,097,000	24,722,000	24,858,000	24,064,000	24,685,250
December	26,704,000	25,046,000	24,703,000	25,310,000	25,440,750
<b>Total</b>	<b>492,147,000</b>	<b>609,424,000</b>	<b>535,628,000</b>	<b>444,742,000</b>	<b>520,485,250</b>
<b>Summer Usage:</b>	<b>367,320,000</b>	<b>487,361,000</b>	<b>411,172,000</b>	<b>322,896,000</b>	<b>397,187,250</b>
<b>Winter Usage:</b>	<b>124,827,000</b>	<b>122,063,000</b>	<b>124,456,000</b>	<b>121,846,000</b>	<b>123,298,000</b>

<b>Average Monthly Winter Use:</b>	24,659,600
<b>Average Monthly Summer Use:</b>	56,741,036
<b>Average Estimated Irrigation:</b>	224,570,050
<b>Percent of Total:</b>	43.1%

## APPENDIX C

- Table 1 - Water Balance Summary**
- Table 2 – Option 1 Cost Summary**
- Table 3 – Option 2 Cost Summary**
- Table 4 – Option 3 Cost Summary**

	Irrigated Area (ac)	Volume Required to Irrigate Area (gal)	Average Days Irrigating from Lake Yearly	Average Daily Irrigation Demand (gal)	Annual Lake Water Used (MG)	Annual Lake Water Used (ac-ft)	Annual Potable Water Used (MG)
Option 1: Irrigate Park and Berm	10.79	42,000	156	35,336	6.54	20.06	0
Option 2: Irrigate Park, Berm, and Townhome	23.04	88,000	156	74,038	13.69	42.02	0
Option 3: Irrigate Entire Development*	143.7	547,000	134	460,215	73.09	224.3	12.05

\*Numbers assume an 11' protective depth

## Opinion of Probable Cost

Item No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost
<b>A. Irrigating Public Spaces (Park and Berms)</b>					
1	MOBILIZATION	LUMP SUM	1	\$8,000.00	\$8,000.00
2	CLEARING AND GRUBBING	LUMP SUM	1	\$500.00	\$500.00
3	DEWATERING	LUMP SUM	1	\$5,000.00	\$5,000.00
4	2" FORCE MAIN HDPE	LIN FT	6,991	\$18.00	\$125,832.87
5	ELECTRICAL SERVICE	LUMP SUM	1	\$12,000.00	\$12,000.00
6	IRRIGATION METER AND CONTROLS	EACH	2	\$3,000.00	\$6,000.00
7	LIFT STATION, FILTER, CONTROLS, AND APPURTENANCES*	LUMP SUM	2	\$55,000.00	\$110,000.00
8	SILT FENCE, TYPE HEAVY DUTY	LIN FT	250	\$3.50	\$875.00
9	CONCRETE PUMP PAD	EACH	2	\$1,000.00	\$1,000.00
SUBTOTAL					<b>\$269,207.87</b>
+ 10% CONTINGENCY					<b>\$26,920.79</b>
CONSTRUCTION SUBTOTAL					<b>\$296,128.66</b>
+ 20% INDIRECT					<b>\$59,225.73</b>
TOTAL					<b>\$356,000.00</b>

## Opinion of Probable Cost

Item No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost
<b>B. Irrigating Public Spaces and Townhomes</b>					
1	MOBILIZATION	LUMP SUM	1	\$16,700.00	\$16,700.00
2	CLEARING AND GRUBBING	LUMP SUM	1	\$500.00	\$500.00
3	DEWATERING	LUMP SUM	1	\$5,000.00	\$5,000.00
4	2" FORCE MAIN HDPE	LIN FT	6,991	\$18.00	\$125,838.00
5	ELECTRICAL SERVICE	LUMP SUM	1	\$12,000.00	\$12,000.00
6	IRRIGATION METER AND CONTROLS	EACH	3	\$3,000.00	\$9,000.00
7	LIFT STATION, FILTER, CONTROLS, AND APPURTENANCES*	LUMP SUM	2	\$55,000.00	\$110,000.00
8	SILT FENCE, TYPE HEAVY DUTY	LIN FT	250	\$3.50	\$875.00
9	CONCRETE PUMP PAD	EACH	2	\$1,000.00	\$2,000.00
11	4" FORCE MAIN HDPE	LIN FT	3,807	\$18.00	\$68,531.73
SUBTOTAL					<b>\$350,444.73</b>
+ 10% CONTINGENCY					<b>\$35,044.47</b>
CONSTRUCTION SUBTOTAL					<b>\$385,489.21</b>
+ 20% INDIRECT					<b>\$77,097.84</b>
TOTAL					<b>\$463,000.00</b>



## Opinion of Probable Cost

Item No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost
<b>C. Irrigating Entire Development</b>					
1	MOBILIZATION	LUMP SUM	1	\$93,100.00	\$93,100.00
2	CLEARING AND GRUBBING	LUMP SUM	1	\$500.00	\$500.00
3	DEWATERING	LUMP SUM	1	\$5,000.00	\$5,000.00
4	2" FORCE MAIN HDPE	LIN FT	6,991	\$18.00	\$125,838.00
5	ELECTRICAL SERVICE	LUMP SUM	1	\$12,000.00	\$12,000.00
6	IRRIGATION METER AND CONTROLS	EACH	8	\$3,000.00	\$24,000.00
7	LIFT STATION, FILTER, CONTROLS, AND APPURTENANCES*	LUMP SUM	6	\$55,000.00	\$330,000.00
8	SILT FENCE, TYPE HEAVY DUTY	LIN FT	250	\$3.50	\$875.00
9	CONCRETE PUMP PAD	EACH	6	\$1,000.00	\$1,000.00
10	CONNECT TO POTABLE WATER	EACH	6	\$8,000.00	\$48,000.00
11	4" FORCE MAIN HDPE	LIN FT	36,944	\$18.00	\$664,992.00
12	POTABLE WATER SYSTEM OVERSIZING	LUMP SUM	1	\$650,000.00	\$650,000.00
SUBTOTAL					<b>\$1,955,305.00</b>
+ 10% CONTINGENCY					<b>\$195,530.50</b>
CONSTRUCTION SUBTOTAL					<b>\$2,150,835.50</b>
+ 20% INDIRECT					<b>\$430,167.10</b>
TOTAL					<b>\$2,582,000.00</b>

## APPENDIX D

### Water Balance Technical Memo



January 21, 2016

Mr. Mike Grochala, AICP  
Community Development Director  
City of Lino Lakes  
600 Town Center Pkwy  
Lino Lakes, MN 55015

Re: Mattamy Homes Water Reuse – Water Balance Technical Memorandum  
WSB Project Number 02988-01

Dear Mr. Grochala:

We are providing you this technical memorandum to summarize the results of the water balance model for the water reuse feasibility study in the Mattamy Homes development. This document describes the methodology used to calculate the quantity of stormwater available and the amount used for irrigation purposes.

### **Project Background**

The City of Lino Lakes wishes to implement a water reuse program using water from the lake in the Mattamy Homes development to irrigate portions of the development. There are three potential scales with respect to water reuse that were evaluated. The first is using water in the lake to irrigate the development's park and the berms on the eastern edge of the development. The second is to irrigate the park and the berms as well as the townhomes in the southeastern corner of the development. Finally, the water balance modeled the feasibility of irrigating the entire development, including single-family homes, with water from the lake.

### **Water Balance Theory**

The water balance presented in this document evaluates the amount of water provided to the pond via stormwater runoff, the amount that will be withdrawn for irrigation, and the resulting lake levels. The estimate takes into consideration precipitation, runoff, evaporation, irrigation demand, and pond overflow. While water balances rely on historic data and do not predict future climate patterns, they are a helpful tool when determining if stormwater irrigation is feasible, and if so, whether or not potable water augmentation will be required.

### **Calculating Drainage Area**

To determine the amount of water available for irrigation, the drainage area to the lake was taken from the current Lino Lakes Northeast Study being conducted by WSB & Associates for the City. In addition, drainage information was obtained from the the developer to estimate the area in the future development that will drain to the lake.

The purpose of the water balance is to determine if the lake holds enough water for irrigation purposes throughout the irrigation season. Therefore, a conservative approach was taken when estimating the drainage area; only the immediate drainage within the development was considered for the water balance.

### Calculating Precipitation

Rainfall data was obtained from the Minnesota Climatology Working Group. Data was available beginning on May 1, 1959, and extending to June 30, 2015. Days in which rainfall data was missing were assumed to have received no precipitation.

### Calculating Runoff

The water balance uses the United States Department of Agriculture (USDA) Natural Resources Conservation Service method for determining runoff. This method, commonly known as the SCS Runoff Curve Number method, has widespread use in hydrologic modeling. The curve number for the drainage area was calculated as part of the Lino Lakes Northeast Study. The curve numbers for the drainage area within the development was estimated using soil type and single- and multi-family residential published curve numbers. Using the calculated curve numbers, an S-value (the amount of maximum soil moisture retention after runoff begins) was determined using the following equation:

$$S = \frac{1000}{Curve\ Number} - 10$$

From the S-value, the initial abstraction ( $I_a$ ) was calculated as  $0.2*S$ , per the USDA. To predict the amount of runoff ( $Q$ ) from a particular rain event, the USDA gives the equation:

$$Q = \begin{cases} 0 & \text{for } P \leq I_a \\ \frac{(P-I_a)^2}{P-I_a+S} & \text{for } P > I_a \end{cases}$$

The equation dictates that there is no runoff from a storm where the amount that falls (in inches) is less than the initial abstraction. In the single-family residential area, a storm of 0.47 inches is required, and in the multi-family residential (townhome) area, a storm of 0.26 inches is required. In the model, runoff from the three areas was considered independently to ensure the most accurate estimate of total runoff volume possible. Using the equation above, the runoff entering the lake was evaluated for each rain event from the historical rainfall data.

### Calculating Pond Volume

Pond volume was determined using contour data from the grading plan for the lake. First, a stage to surface area relationship was developed using surface area from the grading plan. Once the surface area was evaluated at several elevations, the trapezoidal method was used to estimate overall pond volume as well as the volume at several elevations. The storage capacity of the pond is approximately 122 million gallons, with a volume of 86 million gallons at the normal water elevation. The total possible volume was assumed to be the volume at the overflow

elevation. The grading plans assume a normal water level of 900 feet, which was set as the initial lake volume for modeling purposes.

### Calculating Evaporation

Based on the estimated volume contained in the lake, the surface area was calculated in Excel using the Forecast function. The Forecast function gives a predicted value of a variable using a linear regression analysis. In this case, the function uses the elevation-surface area data calculated in the pond volume analysis to predict what the surface area would be for any volume of water. This is a necessary component for the model because the volume analysis as outlined in the previous section gives volume at one foot increments only. Once the surface area is estimated, the amount of evaporation is predicted using the pan evaporation method with a pan coefficient, as outlined by the University of Minnesota. The guiding document recommends a pan coefficient of 0.75 for Minnesota. The equation used is below:

$$\text{Evaporation} = \text{Water Surface Area (ft}^2\text{)} \times 0.75 \times \frac{36.98 \text{ inches}}{12 \text{ inches/ft}}$$

The value of 36.98 inches is the average pan evaporation for the State of Minnesota between 1974 and 2004. The equation above provides annual evaporation. Therefore, in the water balance, the value was divided by 180, or the approximate number of days in which evaporation occurs annually.

### Calculating Irrigation Requirements

Using aerials and plans provided by the developer, the irrigated area was estimated for the berms, park, townhomes, and single-family homes. It is estimated that to maintain a lawn, one inch of water is required per week (including precipitation). 1-inch of irrigation weekly results in an average of 1/7, or 0.14, inches per day. Therefore, if the rainfall is greater than 0.14 inches in a given day, it was assumed in the water balance that irrigation did not occur that day.

Rice Creek Watershed District rules dictate that stormwater irrigation occurs, at maximum, from April 15 to October 15 for the generation of volume reduction credits. The water balance calculates irrigation between these dates.

Phase	Irrigation Volume per Day (gal)
1. Park and berms only	42,000
2. Park, berms, and townhome area	88,000
3. Park, berms, townhome area, single family area	546,150

### Water Balance: Final Calculation and Results

Once all of the above parameters were calculated, the balance was conducted to determine lake levels throughout the irrigation season. The overall water balance equation is as follows:

$$\text{Pond Volume} = \text{Initial Pond Volume} + \text{Stormwater Runoff} + \text{Ditch Inflow} - \text{Discharge} - \text{Evaporation} - \text{Irrigation}$$

The average annual precipitation, including snowmelt, was 33.5 inches. The model predicted that on average, irrigation will occur 156 days each year, out of 184 possible irrigation days. This

Mr. Mike Grochala  
January 21, 2016  
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leads to a weekly irrigation depth of 0.84 inches, resulting in a total water depth of 1.6 inches applied to the turf on a weekly basis, including precipitation. Studies conducted by the University of Minnesota indicate that this irrigation rate is likely slightly more than necessary given the soils and precipitation. A small overestimation of the irrigation rate is desired so that the model is conservative.

Option 1: Irrigating Public Spaces with Storm Water

Option 1 resulted in a daily irrigation rate of 42,000 gallons on days in which irrigation occurred (days in which precipitation was less than 1/7-inch). The water balance model indicates that the storage can sufficiently supply water for irrigation of the public spaces with minimal effect on storage levels. Evaporation and irrigation combined resulted in maximum storage level fluctuation of 36.8 million gallons (MG), or 4 feet in elevation change. Option 1 is feasible in terms of water supply.

Option 2: Irrigating Public Spaces and Townhomes with Storm Water

Option 2 resulted in a daily irrigation rate of 88,000 gallons on days in which irrigation occurred. The water balance model indicates that the storage can sufficiently supply water for irrigation of the public spaces and townhome properties with minimal effect on storage levels. Evaporation and irrigation combined resulted in maximum storage level fluctuation of 37.0 MG, or 4 feet in elevation change. Option 2 is feasible in terms of water supply.

Option 3: Irrigating all of the Mattamy Development with Storm Water

Option 3 resulted in a daily irrigation rate of 547,000 gallons. The storage cannot supply enough irrigation water to support this option. The model showed that storage levels will reach approximately two feet in depth during the summer if irrigating at this rate. A protective elevation can be set, such that at a certain storage depth the irrigation system does not run. Depending on the elevation chosen, the system will turn off for different time ranges. If, for example, the protective elevation is 896 feet (corresponding to an eleven foot depth), the system would run off of potable water an average of 22 days per summer. Given the system and operating cost, Option 3 is not feasible in terms of water supply.

Please contact me at (763) 287-8319 with any questions.

Sincerely,

*WSB & Associates, Inc.*



Erin Heydinger

Mr. Mike Grochala  
January 21, 2016  
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**Sources:**

Gulliver, J.S., A.J. Erickson, and P.T. Weiss (editors). 2010. Stormwater treatment: Assessment and Maintenance. University of Minnesota, St. Anthony Falls Laboratory. Minneapolis, MN.  
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## **ENVIRONMENTAL BOARD AGENDA ITEM 5C**

**STAFF ORIGINATOR:** Marty Asleson, Environmental Coordinator

**MEETING DATE:** January 27, 2016

**TOPIC:** Environmental Board Goals 2016

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### **BACKGROUND**

2016 Environmental Board Goals were discussed at the December 16, 2015 meeting. Based on the discussion at that meeting, the following proposed goals for 2016 are:

1. Promoting Environmental Stewardship with the citizens of Lino Lakes, and conservation opportunities by communicating environmental initiatives in the city using various means of communication such as:
  - Mailings.
  - Multi-media including social media.
  - School “enviro- shows”, promotion in schools.
  - Partnerships with our two watershed districts.
2. Participate in Earth Day (April 23rd, 2016)
3. Participate in Blue Heron Days (August 19, 2016)
4. Recycling/Partner with Anoka County Recycling Resource Solutions to:
  - Utilize County Select Committee on Recycling (SCORE) and Local Recycling Development Grant (LRDG) Funds to the maximum extent possible to increase our recycling totals.
  - Work with local participating businesses on mandated business recycling through Anoka County and “Waste-Wise” staff.
  - Partner with our neighborhood groups to educate and start pilot projects to recycle organics.
  - Increase our volunteer base.
  - Increase services available to residents at the monthly Recycling Day event including additional paper shredding, events, hard drive destruction and the Bridging program and or other charity organizations.



- To meet or exceed our City recycling goal of 50 (1836 tons) percent or greater of our municipal solid waste. Find innovative ways to promote and encourage recycling as a city. Continue to look into ways for school facilities to reduce waste and increase recycling, and continue to enhance recycling efforts through grants from Anoka County Integrated Waste.
- 5. Cooperate with Rice Creek watershed and Vadnais Lakes Area Water Management Organization, and city staff to promote development that renews, preserves, and restores surface water, lakes, stream and wetlands through project review processes and public education.
- 6. Monitor any activity in the AUAR as well as other proposed development areas, focusing on the values that citizens of Lino Lakes have expressed in the 20/30 vision for our city and the unique ecological aspects of our wetlands, lakes and streams and subsurface waters, vegetation and wildlife populations.
- 7. Perform evaluation of past Environmental Board recommendations for development projects. Review a sampling of a variety of projects by on-site visits, discussion with city staff, and landowners, neighbors, on the outcomes of the board's recommendations. If necessary, submit a summary of significant findings resulting from the review in writing to the Community Development Director.
- 8. Support Conservation Development within the city through site review processes by incorporating The Resources Management System Plan components of the City Comprehensive Plan. The use of the planning documents within the Comprehensive Plan that enable Conservation Development include:
  - The Lino Lakes Handbook For Environmental Planning and Conservation Development,
  - The Minnesota Land Cover Classification System and Natural Resource Inventory for Lino Lakes
  - The Minnesota County Biologic Survey
  - The Lino Lakes Assessment of Existing Ecological Conditions and Management Opportunities
  - The Lino Lakes Handbook For Environmental Planning and Conservation Development
  - The Minnesota DNR Regionally Significant Ecological Areas Assessment, Rare Wildlife and Plant Models built by the City
  - The Lino Lakes Parks, Natural Open Space/Greenways, and Trails System Plan,
  - The I-35E Corridor Alternative Urban Area-wide Review (AUAR) assessment
  - The Rice Creek Watershed District/Lino Lakes Resources Management Plan

- The Assessment of Development, Suitability and Natural Resources Conservation Opportunities study,
  - The City of Lino Lakes Local Surface Water Management Plan
9. Support the Community Garden site and continue the partnership with Park Department to manage the Community Garden site.
  10. Do an annual review/update in regards to the Lino Lakes EAB Implementation Plan. Offer residents opportunities for tree purchasing and possibly tree treatment.
  11. Continue to work on Wollan's Park Wetland bank to achieve wetland bank credits by the end of the year 2019 and investigate new banking opportunities.
  12. Continue to monitor the Heron rookery and water quality in the northern one third of Peltier Lake and to support the protection of resources in that area. Update Council on these matters. Recruit new volunteers to help with rookery maintenance and monitoring.

### **RECOMMENDATION**

Request comment on the above revised Goals from the Environmental Board to be sent on to the City Council for consideration.

### **ATTACHMENTS**

1. Resource Management System Plan

## Chapter 2: Resource Management System Plan

### Introduction

The Lino Lakes Comprehensive Plan embraces the concept of sustainability. Sustainability is not a set of concrete ideas; rather it is a decision making process. The goal of this decision making process is to link ecological integrity, social equity, and economic prosperity. The Resource Management System Plan presented in this Chapter provides the conservation design framework for the Comprehensive Plan and sustainable decisions regarding growth and development. This system plan includes the following major components:

- The *Rice Creek Watershed District/Lino Lakes Resource Management Plan (RMP)* - a watershed-based approach to aquatic resource management that uniquely addresses resource management in the context of wetland functions, Lino Lakes' citizen's public values regarding wetlands, and the effects of anticipated future land use.
- The city's *Local Surface Water Management Plan* – this plan assures compliance with applicable Minnesota state statutes and rules. The city's overall goal for the LSWMP is “improvement of the quality of surface waters” by “delivering good quality stormwater runoff to lakes and wetlands at acceptable rates and volumes while reducing pollutant and sediment loadings”.
- The city's *Parks, Natural Open Space/Greenways, and Trail System Plan* – the vision embraced in this plan is:
  - Fostering a high quality living environment within the context of ecological protection, responsible land stewardship, long-term sustainability, and economic viability.
  - Perpetuating an interconnected latticework of natural landscapes, greenways, parks, and trails throughout the city.
  - Fostering the “city as a park” concept, whereby preserved natural areas and parks serve as a primary factor in shaping the character of the community.

The Resource Management System Plan pulls together these components to provide a unified “system approach” to natural resource management and providing natural resource based amenities, which are highly-valued and enjoyed by the community.

This Chapter of the Comprehensive Plan will describe the Resource Management System Plan and each of its components. The vision, goals and policies for resource management are presented first. These statements of desired future conditions and the policies needed to realize the vision are the foundation of the Resource Management System Plan.

## Resource Management Vision, Goals and Policies

The Citizen Comprehensive Plan Advisory Panel refined the goals and policies prepared by the Citizen Visioning Committee to guide the Comprehensive Plan. Additional policies related to the RCWD/Lino Lakes Resource Management Plan (RMP) were also added. The city's Resource Management System Plan is based on the vision statement and revised goals and strategies from the Community Amenities and Natural Resources portion of the Vision document. Goals and strategies from other sections of the visioning document, such as Transportation or Commercial and Economic Development, are presented in the corresponding comprehensive plan chapter, but were also used as a basis for development of this Resource Management System Plan chapter when appropriate.

The following vision, goals and policies were developed from the goals and strategies identified by the Citizen Visioning Committee and the Comprehensive Plan Advisory Panel to achieve the vision for community amenities and natural resources, which is included in four categories: 1) parks, trails, open space and recreation, 2) natural resources and amenities, 3) land use policies and practices, and 4) other ecological challenges and threats.

### 2030 Vision for Parks, Trails, Open Space and Recreation

*The city has provided Lino Lakes residents with a comprehensive array of well-maintained parks, interconnected trails, natural open spaces and greenways, and recreational opportunities for their enjoyment and recreation. It also has preserved and enhanced the community's natural environment and special character.*

**Goal 1:** Continue development and maintenance of recreational activities that serve the identified needs of the community and people of all ages, including, where possible, neighborhood parks, larger multi-use area parks and the regional park.

**Rationale:** The city's parks and recreational facilities are important community assets enjoyed by residents. The demand for and use of these assets will grow as the city's population expands over the next 25 years.

**Policies:**

1. Continue to pursue the development of a multi-sports complex either on the city-owned property at Birch and Centerville Roads or another suitable site.
2. Foster and maintain cooperation between the city and school districts to facilitate joint use of indoor and outdoor facilities for organized and recreational activities.
3. Utilize the Rice Creek Regional Park as an aesthetic and recreational community amenity with continued sensitivity to the preservation of biosystems and ecosystems within the park.
4. Acquire, reserve and develop sufficient park and open space land to fulfill the identified and projected needs of the present and future population.
5. Continue collaboration with the YMCA and similar organizations to provide recreational facilities for the entire community.
6. Continue, whenever possible, inclusion of neighborhood parks in future developments and planned redevelopments.
7. Direct and manage activities in an appropriate manner by balancing the use of programming activities in the neighborhood parks.

**Goal 2:** Collaborate with Anoka County to guarantee and improve public access of Rice Creek Regional Park waterways for recreational use and enjoyment of the community.

**Rationale:** Rice Creek Regional Park is a unique and extensive community asset. Citizens want this asset preserved and they desire more access points into the park.

**Policies:**

1. Identify, develop and maintain new public access points to area lakes so that residents can enjoy these unique recreational opportunities.
2. Ensure the new access points are designed to minimize adverse impacts on lakeshore quality, water quality and adjacent environmental features: i.e. uplands, etc.

**Goal 3:** Develop, maintain, and connect the current and proposed trails in the City of Lino Lakes and Rice Creek Regional Park in a manner that preserves and sustains the natural environment.

**Rationale:** Connectivity among trail systems and between the trail system and Rice Creek Regional Park is desired by the city's residents.

**Policies:**

1. Continue to work with adjacent jurisdictions to achieve interconnectivity among local and regional trails.
2. As development occurs, require an interconnected trail system.
3. Locate trails within or adjacent to greenway corridors, where appropriate.

## 2030 Vision for Natural Resources and Amenities

*The unique and extensive natural resources and amenities which are highly-valued and enjoyed by the community including wildlife, wildlife habitats, and other ecologically significant assets have been restored to the fullest extent possible and preserved. This has been accomplished in part through the on-going partnership between Lino Lakes and the Rice Creek Watershed District which provides a conservation-based framework for the city's upland and aquatic resource management.*

**Goal 1:** Identify, protect and preserve the desirable natural areas and ecological and aquatic resources of the community.

**Rationale:** The preservation of Lino Lakes' natural resources and amenities is high priority to the community's citizens.

**Policies:**

1. Pursue a well-defined natural resource restoration and management plan consistent with the RCWD/Lino Lakes Resource Management Plan (RMP).
2. Continue to provide natural resource staff and advisory board.
3. Maintain the partnership of Lino Lakes and Rice Creek Watershed District and other groups such as Anoka County to maintain, restore, and manage the aquatic and upland areas of the city.

4. Establish and fund programs to maintain or improve current green spaces owned by the city.
5. Where possible, restore damaged or misused natural and ecologically significant areas to their original state.
6. Require natural space buffers, where appropriate, around wetlands to preserve their function and value.

**Goal 2:** Initiate and continue vigorous collaborations and programs to address, restore, and preserve the water quality of the region's lakes, wetlands and other aquatic assets.

**Rationale:** The region's lakes, wetlands, and protected uplands occupy nearly 46% of the city's total area and provide Lino Lakes with a character and ambience unequalled within the region. The deterioration of these vital assets would diminish the city aesthetically and emotionally. As the city inevitably grows and progresses to 2030, the preservation of these aquatic and upland assets is vitally important to maintaining a distinctive feature of the city its citizens cherish.

**Policies:**

1. Establish a surface water management system consistent with the RMP.
2. Apply the Resource Management Unit recommendations from the RMP to meet RMP goals for aquatic resource protection and management.
3. Incorporate TMDL (Total Maximum Daily Load) limits, when determined, into the City's Surface Water Management requirements to reduce degradation and improve the quality of the city's and region's lakes, waterways and other aquatic resources.
4. Collaborate with adjacent jurisdictions and agencies to achieve TMDLs.

## 2030 Vision for Land Use Policies and Practices

*Lino Lakes has enhanced and preserved the quality of its natural resources and amenities and achieved a well-planned community through anticipating, planning for, and balancing the needs for natural resource protection with the need to accommodate growth.*

**Goal 1:** Ensure that well-planned, quality residential, commercial, industrial and institutional development to accommodate the city's projected growth needs occurs in a manner that also conserves and enhances the city's natural resources and amenities.

**Rationale:** The types of uses that occur on the city's available and developable land are vital factors affecting the ability to restore, preserve and enhance these resources and amenities.

**Policies:**

1. Encourage developers, where appropriate, to use Open Space Design/Conservation Development Model to implement the Resource Management System Plan.
2. Provide clearly defined incentives to achieve conservation development principles and apply low impact development techniques, to the extent feasible, to all development.
3. Ensure the development of the land within the community is done in a way that consciously preserves its natural resources and amenities.
4. Require wetland functional assessments, based on accepted methodology, on new development projects to ensure wetland function and values are preserved to the extent possible.

5. Promote business and commercial development that is conservation conscious, aesthetically interesting, and recognizes that each individual land use activity contributes to the total effect on the community's natural resources.
6. Recognize there are unique lands that the city/residents may not want to be developed:
  - a. Promote techniques that encourage developers to preserve the unique lands within their development.
  - b. Partner with the Rice Creek Watershed District and/or other groups to purchase unique ecological properties if they become threatened.
  - c. Develop innovative practices, when appropriate, to acquire unique lands to prevent development.
  - d. Promote partnerships with established conservancy groups in order to "save" these unique lands. Examples: Nature Conservancy.
7. Promote the use of quality and environmentally sound buffer areas between areas with differing land uses.
8. Continue to use the Alternative Urban Areawide Review (AUAR) process to assess the impact of development on the city's natural resources and infrastructure.

## 2030 Vision for Other Ecological Challenges and Threats

*Lino Lakes, in anticipation of potentially devastating ecological threats and challenges that are imported to the community, has initiated cooperative partnerships with the state and other local government entities and programs for dealing with these threats.*

**Goal 1:** Identify and work cooperatively with the state and other local government entities to develop approaches for addressing potential ecological challenges and threats that could adversely affect Lino Lakes.

**Rationale:** Efforts to address ecological threats such as ash tree borers, buckthorn, climate change, etc. have to be done in cooperation with other entities and could require residents to take specific steps on their own property to deal with these threats.

**Policies:**

1. Identify and alert residents of potential ecological challenges and threats that can affect Lino Lakes and the property of residents.
2. Plan and initiate cooperative efforts with the state and other local government entities for programs that address and may manage these threats effectively.
3. Proactively educate the community and its residents of all ages about the specific actions they can or may be asked to take in addressing these threats.
4. Continue to encourage and support programs that measure the effectiveness of Best Management Practices.

# Resource Management System Background

## *Natural History and Landscape*

The City of Lino Lakes is located within the Anoka Sandplain ecological subsection of central Minnesota. The Anoka Sandplain is a 1,875 square mile glacial outwash plain that includes portions of 13 Minnesota counties, and is centered on most of Anoka, Isanti, and Sherburne counties. The Anoka Sandplain was created and shaped by the last major glacial episode in Minnesota – the Wisconsin glaciation – between 35,000 and 10,000 years ago.

The City of Lino Lakes is located within the historic lake bottom of Glacial Lake Fridley which formed from glacial ice-melt water circa 12,000 years ago. The release of glacial melt water from Glacial Lake Fridley created deep, broad, irregular troughs within the glacial lake bottom. These troughs formed the Rice Creek Chain of Lakes and associated wetland complexes of present day, as well as numerous other lake chains to the northwest and southeast of Lino Lakes.

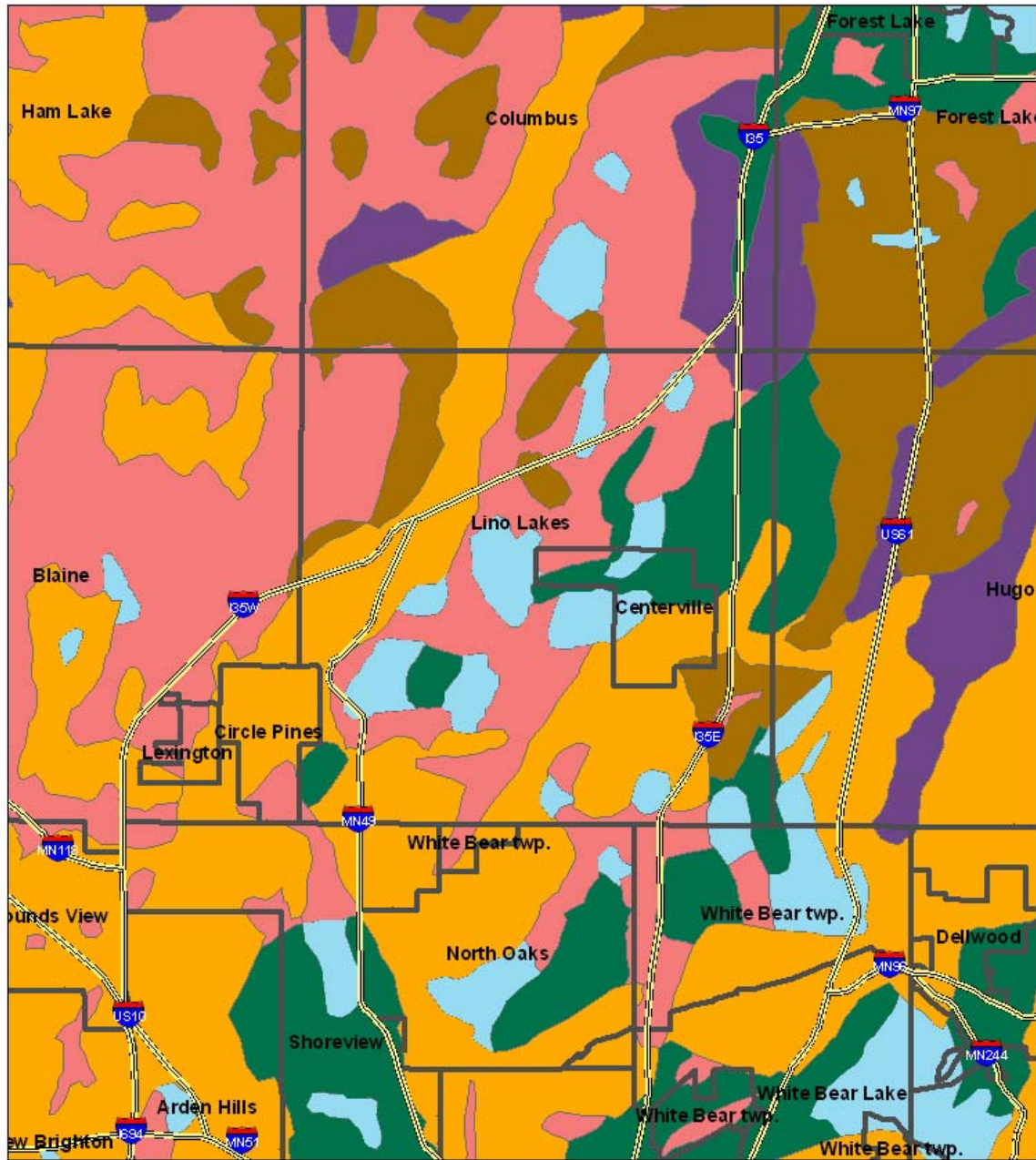
The glacial history of Lino Lakes resulted in complex patterns of surficial geology, hydrology, and soil associations that remain as important influences on development, agricultural patterns, and natural resources conservation opportunities within the city. The upland soils of Lino Lakes are typically sandy, moderately to well drained, and nutrient poor. Wetland soils are typically shallow to deep organic peat deposits over sand or saturated sands, which occur within complex networks of braided depressions throughout the city's landscape. The southeastern most edge of the city includes a small portion of a glacial till. The upland and wetland soils of this landscape inclusion are comprised of fine-textured silt loams, loams, and clays that are poorly drained. Topography throughout the city is generally flat to slightly undulating, and the regional groundwater table is typically shallow below the soil surface.

## **Presettlement Vegetation (circa 1850)**

Native vegetation patterns of Lino Lakes were described at the time of Minnesota's Original Land Survey (circa 1850), and prior to European settlement of Minnesota. Native vegetation communities within the City prior to European settlement were primarily comprised of oak barrens and savannas, aspen/oak forests and woodlands, dry, mesic, and wet prairies, rich fens, poor fens, bogs, tamarack swamps, a network of shallow lakes and associated marshes, and inclusions of mesic hardwood forest (Figure 2-1). Large-scale natural processes dramatically influenced the formation, establishment, and succession of natural vegetation patterns and natural communities within the landscape over thousands of years prior to European settlement. These natural processes include: surface and sub-surface hydrology, flooding, drought, herbivory, wildlife migration, plant dispersal, plant community succession, and occasional to frequent wildfires. Over the past 150 years, the natural landscape and associated landscape processes have been widely altered to accommodate agricultural land uses, development, and other anthropocentric uses of the landscape.



Figure 2-1. Presettlement Vegetation



March 12, 2007

**Presettlement Vegetation**

City of Lino Lakes, Minnesota  
and Surrounding Areas



**Presettlement Vegetation Types**

- Aspen-Oak Land
- Oak Openings and Barrens
- Conifer Bogs and Swamps
- Wet Prairie
- Big Woods
- Lakes (open water)



## ***Natural Resources Inventories, Assessments, Plans & Products***

Over the last 30 years, Lino Lakes has seen considerable population growth. In the late 1990s and early 2000s additional development occurred that put more pressure on natural resources. In response, the city has actively attempted to manage growth through various means with varying levels of success. The visual and environmental impact of development has become more obvious and of concern to residents. Managing development in a manner that is consistent with community values is of paramount importance to citizens.

The natural resources and the natural environment of Lino Lakes represent valuable amenities within the City. In response to mounting development pressure, significant efforts have been made to inventory and assess the extent and quality of the City's remaining natural resources and to evaluate opportunities for natural resources conservation, restoration, and stewardship.

Several important studies, models, plans, and City documents have emerged as a result of the natural resources inventory and assessment that has occurred within Lino Lakes. These products have been based on analyses of existing extent and quality of natural resources within the City, compliance with local, State, and Federal environmental regulatory requirements, and the City's desire to incorporate natural resources enhancement and stewardship into future development plans to achieve a sustainable and contiguous parks, trails, and open space network throughout the City.

### **Minnesota County Biological Survey**

In 1988, the Minnesota Department of Natural Resources' County Biological Survey conducted a broad-scale assessment and biological inventory of Anoka County's most significant remaining natural communities and rare plant and animal populations. Potential high quality areas were remotely identified and prioritized for further field assessment on a county-wide scale. Within Lino Lakes, the County Biological Survey identified twenty-three natural community remnants, twelve rare animal populations or rare animal nesting sites, and one rare plant population. However, many natural community remnants were too small or assumed to be too degraded to warrant further (on the ground) field assessment. Furthermore, the field assessment of natural areas was often limited to public lands, as relatively few private lands were granted permission for DNR to access. As a result, many areas of the City were not field checked by DNR biologists, and a majority of the remaining natural community remnants and rare species populations within the City remained undocumented. Despite these limitations, for more than a decade following the completion of the DNR's Anoka County biological survey, the County Biological Survey was the best available and highest quality natural resources information for Lino Lakes and surrounding communities.

### **Assessment of Existing Ecological Conditions and Restoration and Management Opportunities**

In 1998, the City conducted a city wide assessment of existing ecological conditions and restoration and management opportunities within Lino Lakes. Data collection and interpretation was based primarily on remote-sensing of available low-altitude aerial photography with only limited field checking. This inventory, assessment, and analysis process resulted in the identification of numerous contiguous natural and semi-natural potential habitat corridors within the City. The results of the inventory were published in 1999 and served as the foundation for the City's Handbook for Environmental Planning and Conservation Development.

## **Lino Lakes Handbook for Environmental Planning and Conservation Development**

In 1998 and 1999, the City developed the Lino Lakes Handbook for Environmental Planning and Conservation Development (Handbook). The final Handbook (published in December 1999) provided detailed guidance to enable the City to establish a viable conservation development program, and included: a natural resources based planning model and framework, an overview of Lino Lakes existing ecological resources, priority areas for ecological protection within the City, action steps for protection of ecological systems, potential open space and greenway corridors, a framework for ecological restoration and management, and principles of and guidelines for conservation development.

## **Minnesota Land Cover Classification System (MLCCS) and Natural Resources Inventory**

From 2000 to 2001, the City participated in a detailed land cover classification and natural resources inventory of the City, using the newly established Minnesota Land Cover Classification System (MLCCS). The MLCCS survey of Lino Lakes documented all existing developed, agricultural, semi-natural, and natural land cover types within the City (Figure 2-2). While all public lands and many private lands were assessed in the field as part of this survey, some private lands were unable to be field checked due to lack of access. The MLCCS assessment and resulting natural resources inventory identified and mapped 1,978 natural community remnants and semi-natural landscapes of various ecological quality throughout the City. Furthermore, the MLCCS inventory identified eleven additional rare plant populations that had not previously been documented within Lino Lakes, as well as dozens of potential natural rare species habitats that were flagged for future field checking. Figure 2-3 identifies the location of natural and semi-natural areas, the ecological quality of natural areas, and locations of regionally significant ecological areas mapped by the DNR and Metropolitan Council.

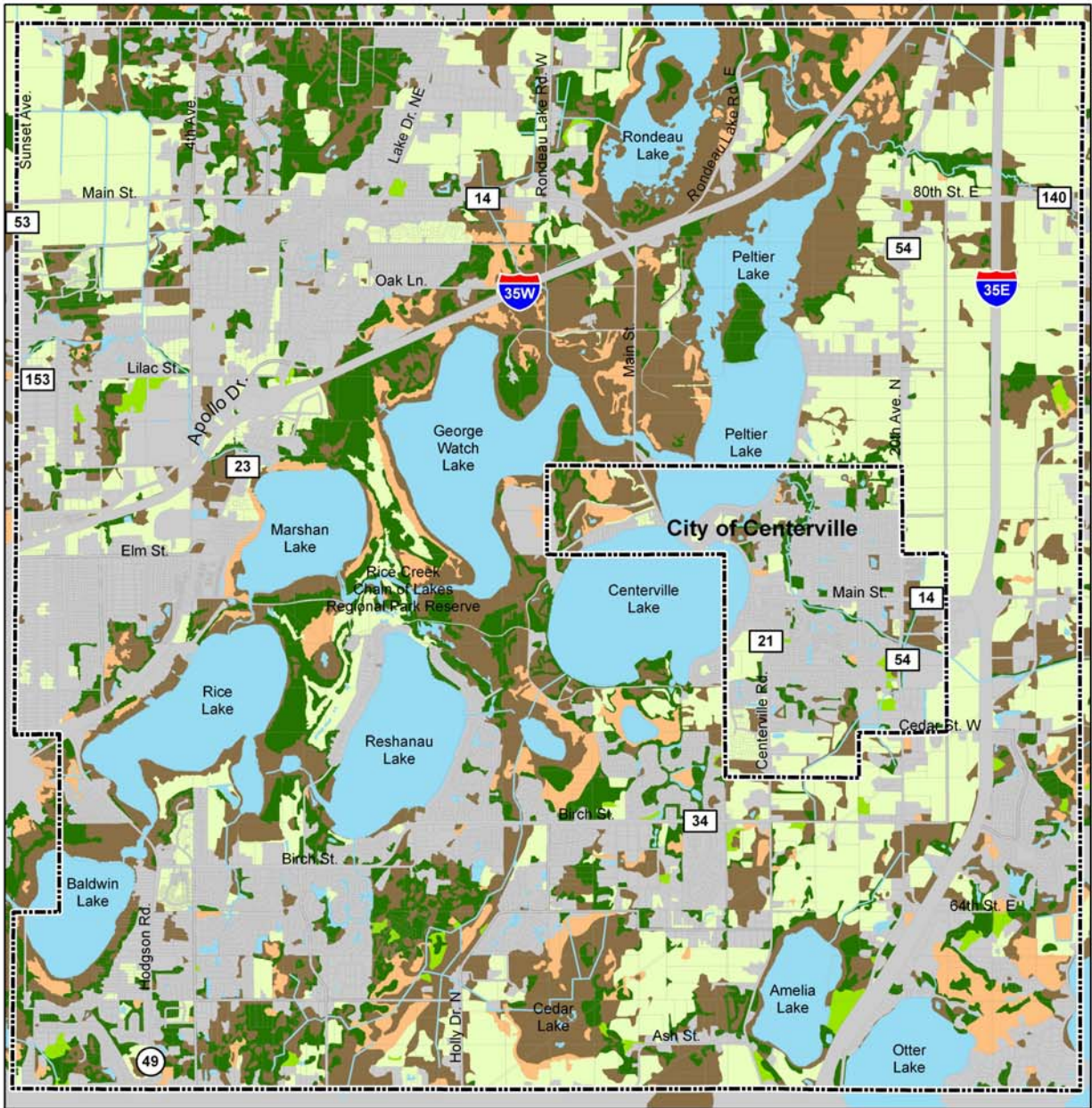
As defined by MLCCS, *semi-natural areas* are unmaintained or infrequently maintained areas of perennial vegetation with more than 50% of the cover comprised of nonnative plants. In contrast, *natural areas* are comprised of more than 50% native plants. The MLCCS assessment determined the ecological quality of remnant natural areas and classified each natural area as one of the following three categories:

1. **High Quality Natural Areas** – represents areas with little to no human disturbances and the natural processes are intact.
2. **Moderate Quality Natural Areas** – represents areas with natural processes somewhat intact, but shows signs of obvious human disturbances and low levels of exotic species.
3. **Low Quality Natural Areas** – represents areas that include native species, but the native species are widely dispersed and altered.

## **Regionally Significant Ecological Areas (RSEAs)**

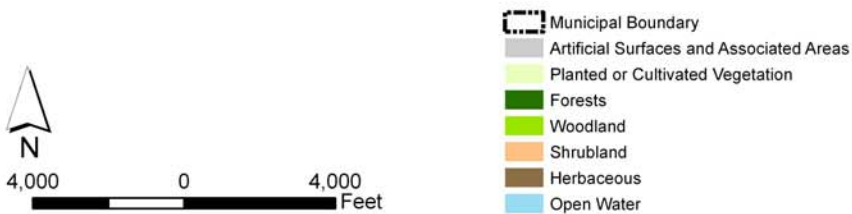
RSEAs represent regionally significant terrestrial and wetland ecological areas in the seven-county metropolitan area. This inventory and assessment was completed by the MnDNR and are based on a hybrid land cover data layer created from LandSat images, national wetland inventory data, and locations of grasslands. The data is intended to help make regional scale land use decisions especially as it relates to balancing development and natural resource conservation.

Figure 2-2. Minnesota Land Cover Classification System (MLCCS)



**Minnesota Land Cover Classification System (MLCCS)**

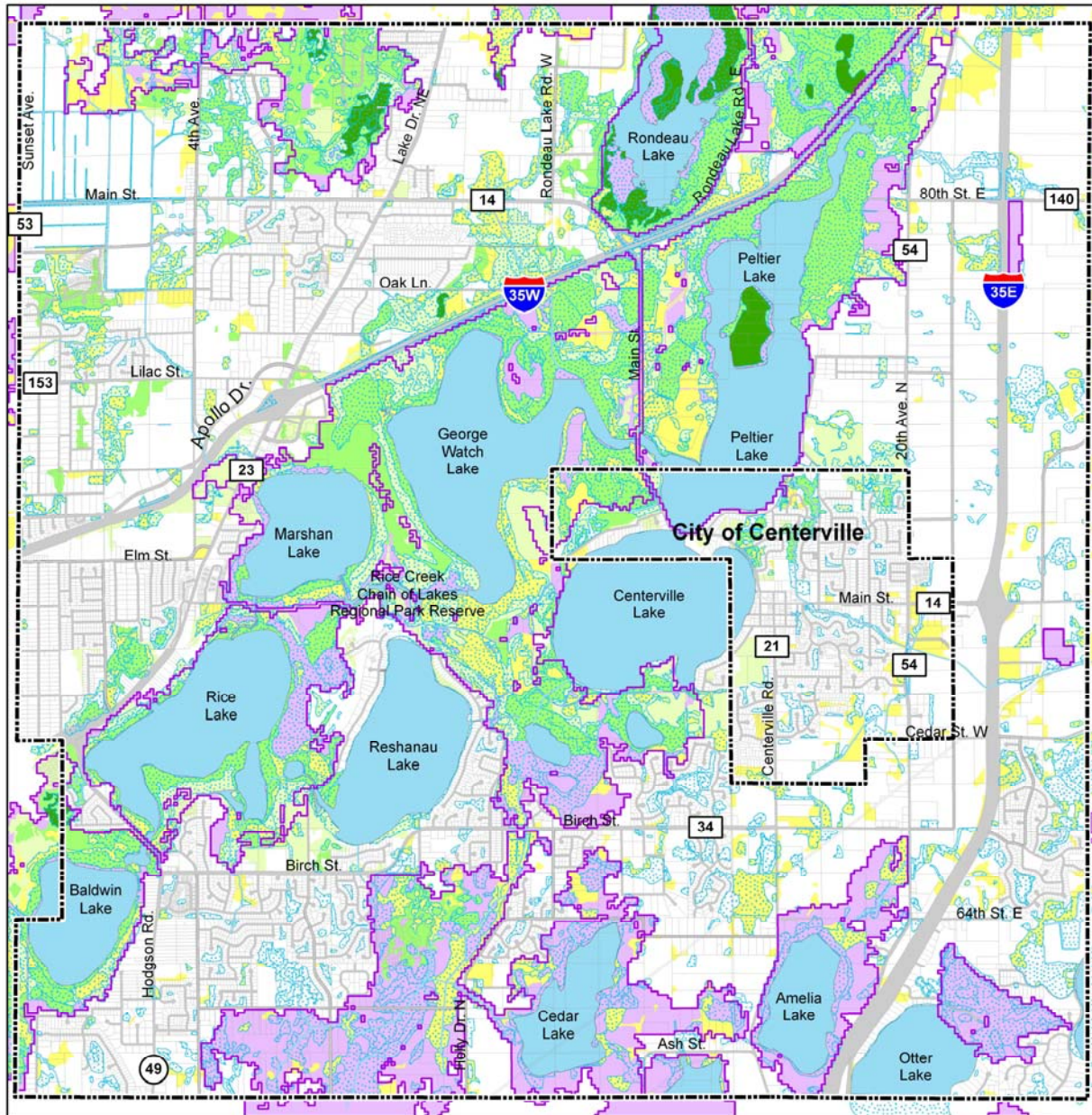
City of Lino Lakes 2030 Comprehensive Plan



July 23, 2008

Prepared by Bonestroo  
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Figure 2-3. Natural and Semi-Natural Areas



### Natural and Semi-Natural Areas

City of Lino Lakes 2030 Comprehensive Plan



## **Rare Wildlife and Plant Habitat Models**

Using available natural resources inventory data and land cover information, and known habitat affinities of rare animals, city staff developed a GIS based wildlife model to assess potential habitats for rare animal populations known to occur within the City. This predictive model identifies potential habitats for a state threatened reptile, the Blanding's Turtle (*Emydoidea blandingii*). Potential habitats are field checked for the presence of rare animals during the development review process. Furthermore, the model identifies opportunities for the restoration and management of natural habitats and for reestablishing habitat corridors that may support rare wildlife populations in the future.

The City assisted with the development of a predictive model to assess potential habitats that could support rare plant populations within the City. The model parameters were based on environmental data collected with historic and recent records of rare plant population records documented within Lino Lakes and adjacent communities on the Anoka Sandplain (e.g. Blaine, Ham Lake, and Columbus). The model analyzes available MLCCS land cover and natural resources inventory data, as well as soils, wetlands, hydrology data, and recent aerial photographs to determine natural and semi-natural habitats with a high likelihood of supporting undocumented rare plant species populations. The results of this model are used to review proposed development plans and conservation projects, and to identify areas within the City that may require additional field survey and assessment for the presence of rare plant populations.

## **Lino Lakes Parks, Natural Open Space/Greenways, and Trails System Plan**

In 2004, the City updated its Comprehensive Parks, Natural Open Space/Greenways, and Trail System Plan. The planning process incorporated updated and detailed natural resources information and environmental analysis to develop a parks, open space, greenway, and trail system plan that incorporated important natural resources into a contiguous network of recreational and habitat corridors throughout the City. The Plan led to the development, and refinement of a Conservation Development approach to development that was adopted by the City. This program has resulted in the design and implementation of residential conservation developments within the City that achieve ecological restoration, open space preservation, recreational, and economic development goals of the City (Figure 2-4: Open Space Design/Conservation Development Model, Brauer & Associates).

## **I-35E Corridor Alternative Urban Areawide Review (AUAR)**

The I-35E Corridor Alternative Urban Areawide Review (AUAR) was a proactive, citizen driven environmental review process that comprehensively assessed the environmental impacts of development in a 4,600-acre growth area in the City. The AUAR was completed in 2005 and the AUAR area is shown in Figure 2-5. The overarching goal of the whole project was to balance development with natural resource conservation. The result of the AUAR process was a Mitigation Plan that documents the actions the City will take to mitigate environmental impacts. The foundation of the Mitigation Plan is the Conservation Design Framework (CDF). The goals of the CDF are to: 1) Conserve the most ecologically significant natural resources within the AUAR area; 2) Protect ecologically sensitive natural resources from adjacent land uses by through buffering; and 3) Connect ecologically significant resources via multifunctional greenway corridors - corridors for wildlife, trails, and surface water management features.

Figure 2-4. Open Space Design/Conservation Development Model

## OPEN SPACE DESIGN/CONSERVATION DEVELOPMENT MODEL

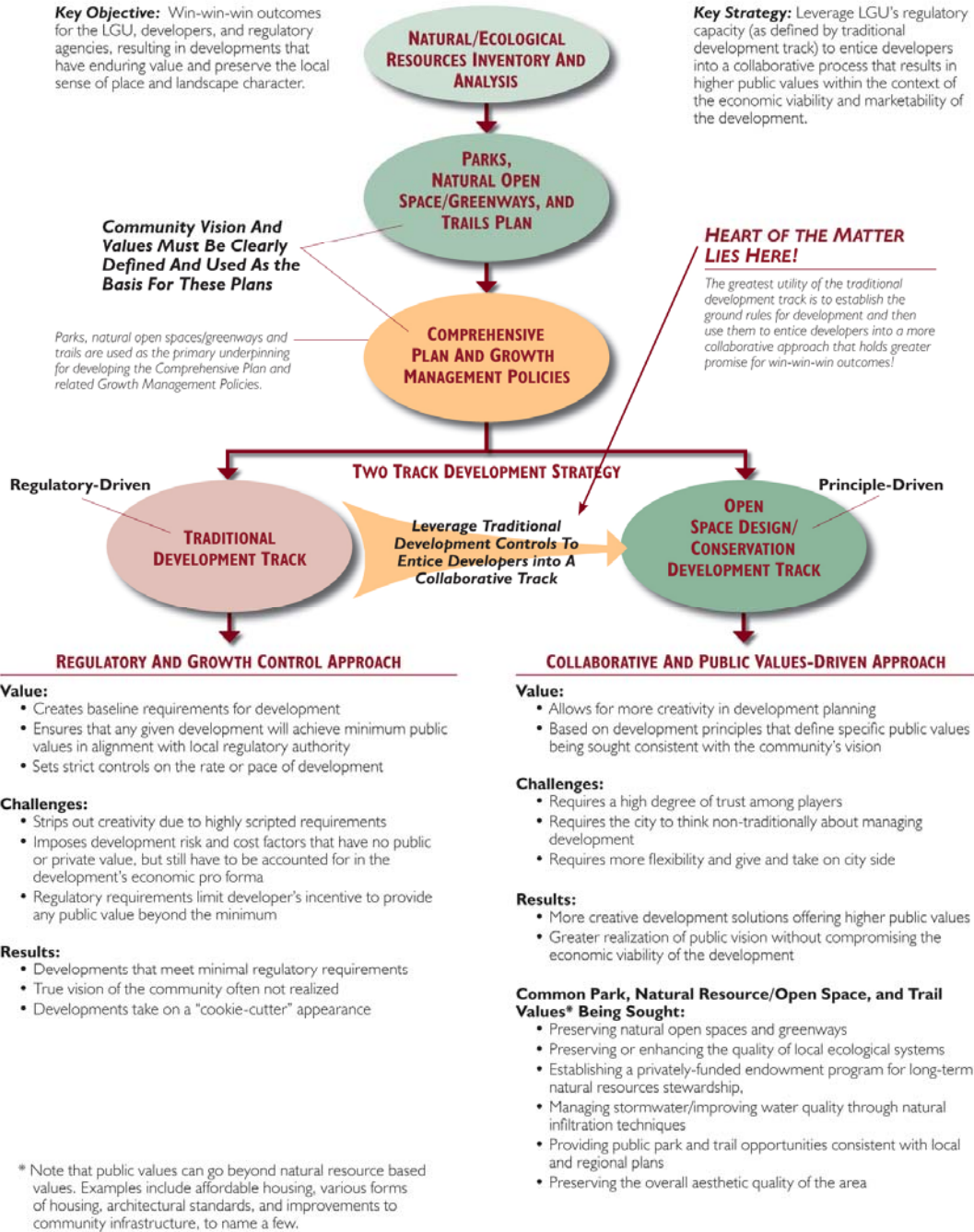
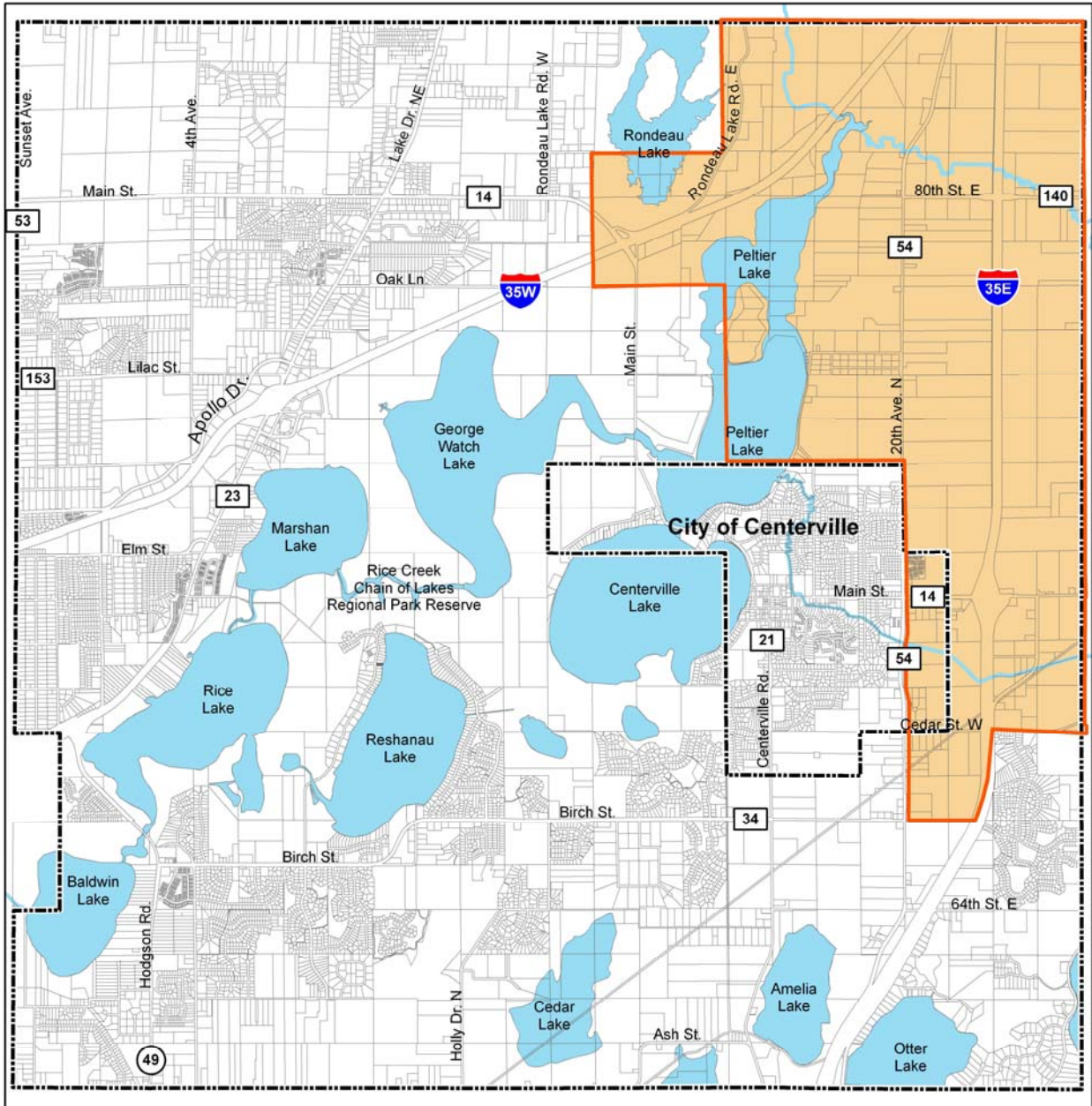
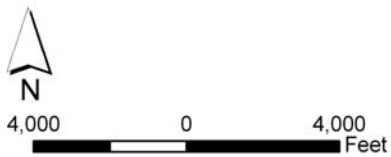


Figure 2-5. I-35E Corridor AUAR Area



**I-35E Corridor AUAR Area**  
City of Lino Lakes 2030 Comprehensive Plan



- Municipal Boundary
- AUAR Area
- Open Water



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## **Environmental Site Review**

With each additional subdivision review in the City, additional natural resources and rare features data are being documented, refined, and collected as part of local, state, and federal environmental review requirements and environmental regulatory programs. Environmental review of proposed subdivisions has resulted in the discovery and documentation of additional high quality natural community remnants and additional rare feature records (rare plant communities, state-listed plant and animal populations) that were not able to be accessed or documented during previous county-wide or city-wide surveys and inventories. Many of these new discoveries are a direct result of the City's Conservation Development policies and processes. Significant natural resources data that result from environmental reviews of proposed subdivisions and developments are incorporated into local and state databases and plans, and are used to help guide land development to help avoid, preserve, and enhance rare, sensitive, or otherwise important natural features within the City and to incorporate natural areas into contiguous city-wide greenway corridor systems.

## **Additional Data and Future Opportunities**

Additional natural resources data layers and information have been collected by local, regional State, and Federal government agencies for areas that include the City of Lino Lakes. Such data sources include: The National Wetlands Inventory (NWI), the digital Soil Survey of Anoka County Minnesota, and historic, recent, and current aerial photographs. These and many other data layers are often referenced to perform natural resources assessments and update existing natural resources data within the City.

Considerable City resources have been allocated to the documentation and assessment of remaining natural resources within Lino Lakes. Additional inventory and assessment will likely result in improved documentation of remaining resources, additional rare species and sensitive natural features, and an increased understanding of how to best manage and steward high-priority natural resources within the City in the future.

## **Achieving a Natural Resource Based Comprehensive Plan Update**

A goal of the 2030 Lino Lakes comprehensive plan update is to incorporate all available and pertinent natural resources information, analyses, and plans in the comprehensive planning process. These data, analysis, and plans will serve as a guide for assessing future development opportunities and constraints within remaining developable lands within the City and to capitalize on natural resources preservation opportunities associated with development and redevelopment. To support this effort the City initiated the following three additional natural resource studies to support the comprehensive plan update.

## **Rice Creek Watershed District / Lino Lakes Resources Management Plan**

The City collaborated with Rice Creek Watershed District to develop a unique and unprecedented city-wide watershed based Resource Management Plan (RMP) that identifies opportunities for wetland restoration and management within watersheds (and sub-watersheds) in Lino Lakes. This RMP is fully discussed later in this Chapter. While the RMP is primarily focused on guiding future management and potential restoration and enhancement of wetland and water resources, the plan also identifies selected upland natural resources areas that are important to the preservation of the functions and values of adjacent wetlands. In addition, the RMP includes a watershed based stormwater and hydraulic model, a watershed-scale wetlands functions and

values assessment (using the Minnesota Routine Assessment Method) and a Total Maximum Daily Load (TMDL) water quality model for the Rice Creek Chain of Lakes and associated water resources.

## **Assessment of Development Suitability and Natural Resources Conservation Opportunities**

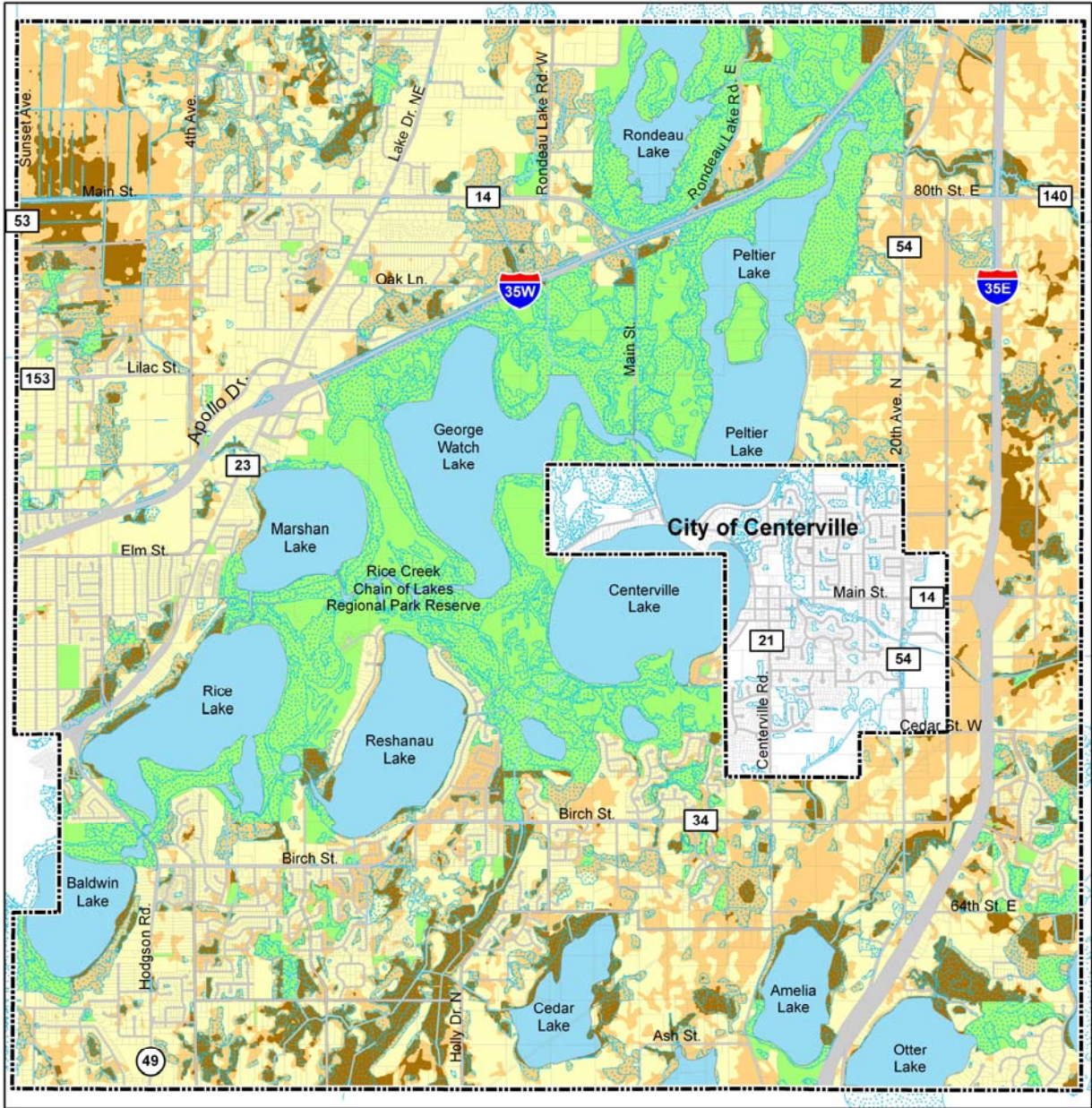
As a first step in determining development suitability and opportunities for natural resources restoration and management, remaining undeveloped uplands (and uplands identified for redevelopment) were assessed for their relative proximity and potential to impact and/or incorporate priority natural areas, greenway corridors, and sensitive natural resources areas. Upland areas were classified as to their suitability for development. Environmental impediments and opportunities for development were considered and assessed. The analysis identified opportunities for future open space and natural resources protection and enhancement projects.

Generally, lands within the city are classified into one of four development suitability categories, which area displayed on Figure 2-6:

1. **Not Suitable** – These areas encompass existing parks, open space, conservation areas, and open water.
2. **Marginally Suitable** – These areas encompass lands that include two (2) or more sensitive natural resources areas. Sensitive natural resource areas include: high priority wetlands, hydric soils and lower quality wetlands, unique habitat, and the predicted 100-year rainfall event extent.
3. **Moderately Suitable** – These areas encompass lands that include one (1) sensitive natural resource area (see description above).
4. **Highly Suitable** – The areas encompass lands that do not include any sensitive natural resource areas (see description above).

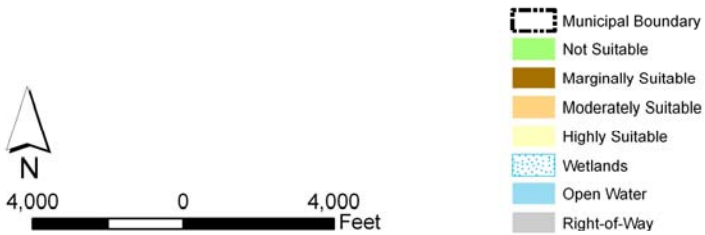
The suitability analysis was used to inform the comprehensive plan update process and will help guide future development within the City. The suitability analysis was refined throughout the process as new information was made available. The initial suitability analysis was used to fully incorporate natural resource information into the land use alternatives analysis that resulted in the proposed land use plan map presented in Chapter 3. Likewise, the refined suitability analysis was used to update important elements of the 2004 Parks, Natural Open Space/Greenways, and Trail System Plan. These updates are presented in this chapter. Lastly, the suitability analysis will be referred to as the city reviews future development applications within or adjacent to environmentally sensitive areas (see Figure 2-6).

Figure 2-6. Natural Resources Based Development Suitability Analysis



### Natural Resources Based Development Suitability Analysis

City of Lino Lakes 2030 Comprehensive Plan



  
 July 23, 2008  
 Prepared by Bonestroo  
 Source: Critical Connections Ecological Services, Inc. 07/08  
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## **Wetland Alternatives Analysis**

The City is in cooperation with the Rice Creek Watershed District in conducting a planning level wetland alternatives analysis in collaboration with the Army Corps of Engineers. The identification, protection and preservation of aquatic resources is one of the goals of the RMP and comprehensive plan. The goal of aligning the RMP with federal wetland regulations is to achieve effective and consistent regulation of aquatic resources under federal, state and local requirements, while reducing the public and private costs of compliance with those regulatory requirements. This is intended to streamline the Section 404 permitting process for applicants within the City. Aligning the RMP and comprehensive plan with federal requirements will be done in collaboration with the Corps through the City's planning level alternatives analysis for wetland impacts.

Under current practice, the Metropolitan Council requires that all wetlands are not considered as buildable area when communities prepare their comprehensive plan updates (i.e., all wetland acres are subtracted – netted out - from each communities calculation of developable land available to accommodate forecasted growth). However, this does not mean that those wetlands are not impacted as communities accommodate growth. As a result, the small wetland impacts tend to be replaced with small wetland mitigation. The RMP and the wetland alternatives analysis broadens the scale of potential wetland impacts to the entire city through the comprehensive plan. Wetlands are viewed in their broader watershed and mitigation and preservation is also viewed using this broader scale. This follows the Corps' rule in using a watershed approach in evaluating and replacing wetland function and values.

## **The Resource Management System**

This Comprehensive Plan provides a unified systems approach to natural resource management, commonly referred to as “green infrastructure”. This system plan provides a conservation design framework for the Comprehensive Plan that knits together the following major components:

- The city’s Local Surface Water Management Plan
- The Rice Creek Watershed District/Lino Lakes Resource Management Plan (RMP)
- The city’s Parks, Natural Open Space/Greenways, and Trail System Plan

Each of these major components is discussed in detail later in this Chapter following presentation of the Resource Management System Plan. These three elements, which make up the Resource Management System Plan, are discussed below, and are presented in Figure 2-7.

### ***Greenways***

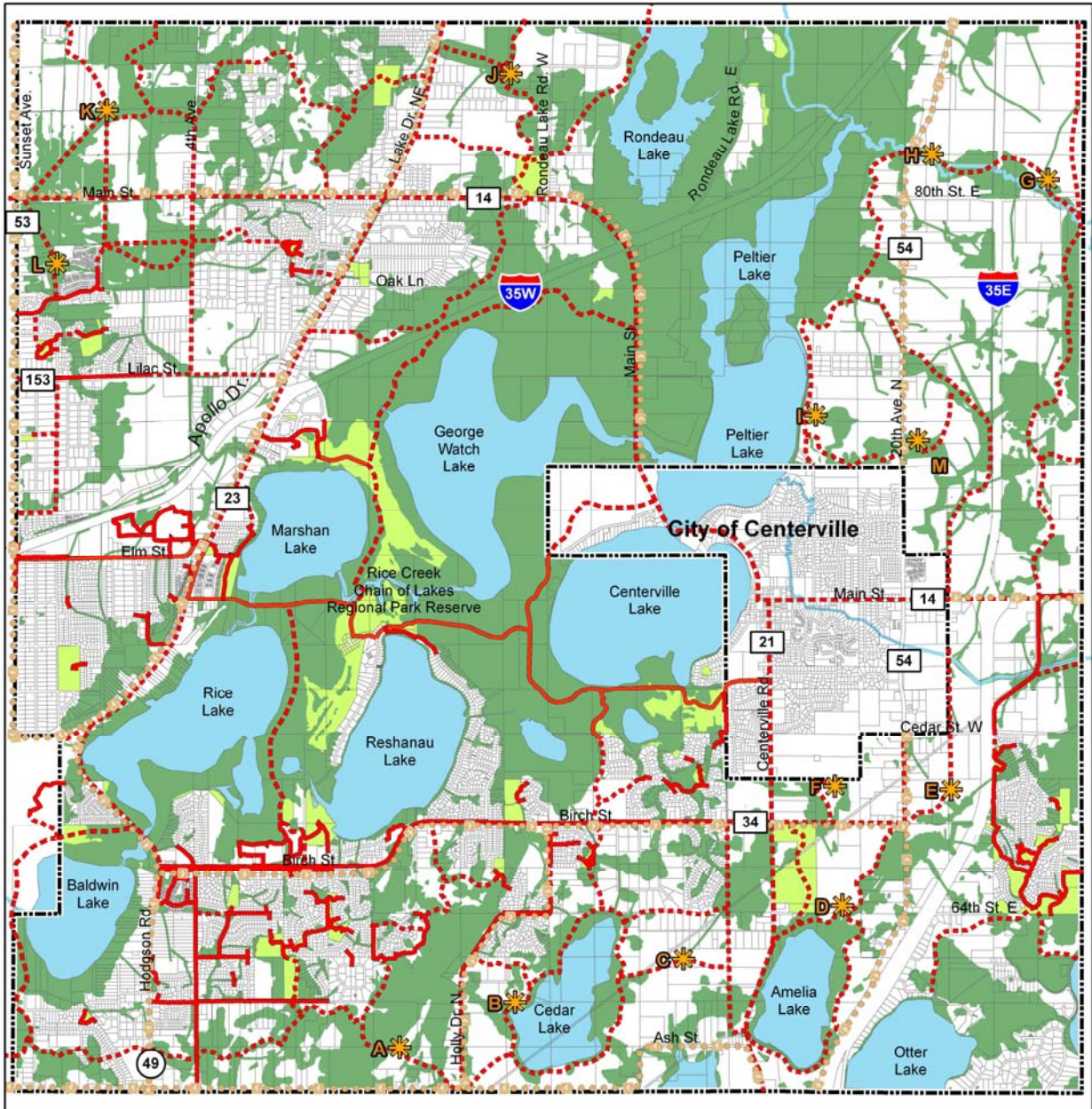
Given the natural history of the city and the current extent of wetlands, lakes, streams, and ditches, aquatic resources are the most prevalent natural system in Lino Lakes. The culmination of extensive scientific inquiry regarding the location, quality and function of upland and aquatic resources has resulted in the greenways identified in the Resource Management System Plan (see Figure 2-7). This is a “working” multi-functional greenway corridor intended to provide areas for stormwater management, upland buffer areas for wetlands protection, conservation of natural and semi-natural areas, as well as open space and trails for people. The greenway corridor includes the following attributes:

- Major and minor drainage routes that are the spine of the regional and local surface water management system providing areas for the natural movement of water.
- The Wetland Preservation Corridor (WPC) – The WPC is a key outcome of the RMP. The WPC includes high priority wetlands with variable width buffer areas, selected marginally suitable development areas, and the 100-year floodplain.
- Connections between parks, open space, and the WPC for the movement of people and wildlife (often combined with a trail).
- Areas with low development suitability located outside the WPC. These areas contain a combination of rare species, natural and semi-natural habitat areas, and hydric soils.

### ***Parks and Trails***

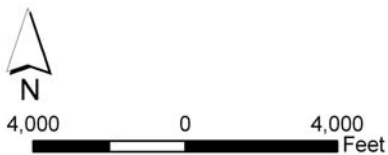
The Resource Management System builds upon the city’s Parks, Greenways and Trail System Plan. This plan was updated as part of the comprehensive planning process to reflect the additional demand for parks and recreation facilities that will occur from the growth that the city is anticipating and to incorporate the wealth of natural resource information gathered through the development suitability analysis and RMP. This additional information was used to modify the location of future parks, trails, and open space to maximize the ability of the city to create multi-functional greenway corridors for wildlife, trails, natural resource conservation and surface water management features. The location of existing and proposed parks and trails are depicted on the Resource Management System Plan map (see Figure 2-7).

Figure 2-7. Resource Management System Plan



## Resource Management System Plan

City of Lino Lakes 2030 Comprehensive Plan



- Future Neighborhood Park (Center of Service Area)
- Proposed Designated Bike Route
- Existing Trails
- Proposed Trails
- Open Water
- Parks
- Greenway System



August 15, 2008

Prepared by Bonestroo

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## ***Local Surface Water Management Plan***

The City of Lino Lakes completed its Local Surface Water Management Plan (LSWMP) in December 2005. The LSWMP was developed to:

- Meet the requirements of Minnesota Statutes 103B and Minnesota Rules 8410,
- Be consistent with the goals and policies of the Metropolitan's Council's Water Resources Management Policy Plan, and
- Meet the goals, policies, and program requirements of the Rice Creek Watershed District (RCWD) and the Vadnais Lake Area Water Management Organization (VLAWMO) in effect at the time of LSWMP development.

Since the LSWMP was created, there have been several significant developments which affect the City's stormwater management efforts. These include the following:

- The State of Minnesota Stormwater Manual, developed by MPCA and intended to provide detailed guidance on the application, design, and performance of stormwater BMP's, was released in November 2005 and has been updated since. This Manual is frequently referenced as a source for accepted design standards for various stormwater management BMP's.
- The RCWD has adopted district-wide revised rules. The revised rules address stormwater management, erosion control, wetland alterations and other water management-related areas. They were adopted by the RCWD on February 13, 2008.
- The Lino Lakes Resource Management Plan (RMP) was developed. A draft of this plan was completed in June 2008 as a joint effort between the City and the RCWD. The RMP provides a unique and unprecedented watershed based approach to wetland management within the context of wetland functions and the city's future land use plan presented in this overall Comprehensive Plan. The RMP, as amended, is incorporated in this Comprehensive Plan and is provided in Appendix A. A summary of the RMP is provided in the next section of this chapter.
- The RCWD has approved the Lino Lakes RMP on October 8, 2008. RCWD's Rule RMP-3, implementing the Lino Lakes RMP, was adopted on January 28, 2009 and became effective on February 4, 2009.

The LSWMP and the RMP are two major components of the city's Resource Management System Plan that strengthen and streamline wetland and stormwater management programs and provide a development framework for accommodating growth. An overview of the adopted LSWMP and the RMP are provided as these two documents provide the information required for the LSWMP component of the Comprehensive Plan.

The RCWD is beginning the process of preparing its "next generation" district-wide watershed management plan, which is expected to be completed within the next two years. Consistent with the City's current LSWMP, the City expects to update its local plan around 2010 or shortly thereafter in order to comply with any new watershed authority requirements that arise out of their updated plan as well as other regional, state, and federal mandates. The RMP, RMP rule, and the RCWD rules are expected to provide an important foundation for the RCWD's next plan update. Therefore, the city intends to wait to fully update its LSWMP until the RCWD and VLAWMO complete their updates. A discussion of the city's future LSWMP update is included. In the interim, the city will continue to work with the RCWD to implement the RMP and associated RCWD rules to manage aquatic resources.

## Overview of Lino Lakes Adopted LSWMP (2005)

The content of the city's 2005 LSWMP provides some of the information the Metropolitan Council requires for a local surface water management component of a Comprehensive Plan. Following is an overview of the Lino Lakes LSWMP and the status of several "action items" identified in the 2005 LSWMP.

*Chapter 1 – Introduction.* This chapter presents the purpose of the LSWMP, which includes assuring compliance with applicable Minnesota state statutes and rules as well as compliance with the RCWD rules in effect at the time of plan development. The overall goal stated for the LSWMP is "improvement of the quality of [its] surface waters" by "delivering good quality stormwater runoff to lakes and wetlands at acceptable rates and volumes while reducing pollutant and sediment loadings".

*Chapter 2 – Existing Programs and Policies.* Chapter 2 lays out the applicable programs and roles of various local government programs, the Metropolitan Council, state agencies, and federal agencies as well as provides an overview of the role of private organizations pertaining to water management. Water resource management-related agreements are referenced, such as those for managing water across city jurisdictional boundaries. This section:

- Outlines the role that the VLAWMO and RCWD play in administration of the Wetland Conservation Act within Lino Lakes and in the development and administration of a comprehensive wetland management plan for major portions of Lino Lakes.
- Discusses the Metro region-wide objectives for water management adopted by the Metropolitan Council and their local water management plan review responsibility under Minnesota Statutes Chapter 103B.
- Describes the City's obligation and intent to comply with the provisions of the Total Maximum Daily Load (TMDL) program and NPDES Phase 2 requirements.

*Chapter 3- Setting.* This chapter contains the land and water resources inventory. It includes an overview of the major soil associations in Lino Lakes and their drainage characteristics as it pertains to runoff volume. The majority of the soils in Lino Lakes fall into Hydrologic A and B categories, though high water tables can limit their use for stormwater infiltration and there are large pockets of HSG C and D associated with several extensive wetland complexes within the City. Characteristics of the drainage system within the City are also presented, including the locations and physical characteristics of major ditches as well as subwatershed outlet structures and storm trunk pipes. All lakes within the City's jurisdictional boundaries are identified and characterized with regard to area, depth, management classification, public access status, etc. Lakes identified as impaired on MPCA's 303d Impaired Waters list at the time of development of the plan are identified. Available data for lake water quality is also summarized, focusing on phosphorus and water clarity. Stream water quality data for major water courses is also presented, focusing on total phosphorus and total suspended solids.

*Chapter 4 – Identification of Water-Related Problems.* Chapter 4 identifies the high priority water resources management problems identified by the City. They include:

- Water quantity management/flood protection
- Water quality management
- Erosion control
- Preservation of key natural resources
- Wetlands management and protection
- Monitoring/inspection and maintenance of stormwater infrastructure



*Chapter 5 – Goals, Policies, and Action Items.* This chapter establishes the goals, policies, and objectives that will guide City water management actions for the time period that the City's LSWMP is in effect. Action items that address Metropolitan Council priorities are listed below, along with comments on the status of the City's efforts to execute those actions.

A. Water Quantity

- Establish standards for stormwater runoff quantity from new and re-development consistent with the RCWD, VLAWMO and NPDES Phase 2 requirements, including peak runoff controls. This has been completed by the City.
- Implement and enforce program to detect and eliminate illicit discharges consistent with NPDES Phase 2 requirements. The program has been established and implementation is underway.

B. Water Quality

- Adopt standards for stormwater runoff quality from new and re-developments that are consistent with RCWD requirements. The City follows NURP criteria as well as NPDES Phase 2 permit requirements for its runoff treatment standards. This action has been completed by the City.
- In cooperation with RCWD and VLAWMO, establish target maximums for key pollutants adversely affecting streams and lakes. TMDL studies are currently underway for Centerville/Peltier Lakes and the Lower Chain of Lakes as well as Hardwood Creek. A TMDL for Clearwater Creek is planned for 2009.

C. Wetlands

- Have the RCWD and the VLAWMO implement the Wetland Conservation Act within the City. Agreements have been reached with both watershed authorities to perform this function.
- Assist the appropriate watershed organizations in the development of a comprehensive wetland management plan. In cooperation with the RCWD, the Lino Lakes Resource Management Plan (RMP) was completed in June 2008 and was approved by the RCWD on October 8, 2008.

D. Erosion and Sediment Control

- Comply with provisions of the NPDES Phase 2 permit for construction site runoff control, including updating ordinances as necessary. This item has been completed.

E. Public Participation, Information, and Education

- Implement multiple projects (specified in LSWMP) that fulfill the public education and outreach intent and requirements of the City's NPDES Phase 2 MS4 permit. The City has completed the identified projects and thereby fulfilled the requirements.

F. Maintenance and Inspection

- Develop and implement a plan for regular inspection and maintenance of public water resources infrastructure. The plan has been completed and is being implemented.
- Develop and implement a training program to prevent and reduce pollutant runoff from City operations. The program has been completed and is being implemented.
- Develop and implement a record keep system. The system has been developed and is being implemented.

*Chapter 6 – Implementation and Amendments.* Table 6.1 in Chapter 6 lays out city project expenditures by year starting in 2006 for new and existing City activities to execute the LSWMP. These activities include development of the City's Stormwater Pollution Prevention Plan (SWPPP) to comply with NPDES Phase 2 MS4 permit requirements, monitoring, system construction, street sweeping and maintenance/repair activities. The chapter identifies as a high priority identification and development of funding sources to support these expenditures. Finally, the chapter provides guidance on the process through which amendments to the plan can be made.

As previously noted, the RCWD is beginning the process of preparing its "next generation" watershed management plan, which is expected to be completed within the next two years. VLAWMO has completed its next generation plan. The City expects to update its local plan within two years of both watershed district's completing their respective watershed management plan, in order to comply with any new watershed authority requirements that arise out of their updated plan as well as other regional, state, and federal mandates. The RMP, RMP rule, and the RCWD rules are expected to provide an important foundation for the RCWD's next plan update. The RCWD Rule RMP-3, RCWD Rules- and the City's Erosion Control Ordinance area located in Appendix A.

## ***Lino Lakes/Rice Creek Watershed District Resource Management Plan (2008)***

The Lino Lakes Resource Management Plan (RMP) came about through a partnership between the RCWD and the City of Lino Lakes. This collaboration was initiated in 2006 and included extensive coordination between the City, the RCWD and other regulatory agencies.

The RMP provides a watershed-based approach to wetland management that is consistent with RCWD and city goals. The approach uniquely addresses management in the context of wetland functions and the effects of anticipated future land use. The RMP and this Comprehensive Plan were prepared in concert with one another as the RMP modeled the potential effects of the city's proposed land use plan on water resources. The proposed land use plan was assessed under two scenarios – one *without* the implementation of the watershed-based approach to wetland management provided for in the RMP and one *with* the RMP. The modeling assessment indicated that an RMP-based scenario would be necessary to maintain and protect priority resources within the city. This modeling effort resulted in an iterative process of adjusting the future land use plan and the RMP to achieve the resource management goals of RCWD and the city.

The RMP was developed in close coordination with state and federal permitting authorities and has been prepared to be consistent with both state and federal wetland regulations. It is intended that components of the plan be incorporated into Clean Water Act Section 404 permit evaluations. The approach is unique as a means to develop a comprehensive wetland management plan according to the State of Minnesota Wetland Conservation Act because it not only includes the required assessment of existing wetland functions and values, but it also forecasts future wetland functions in light of the city's proposed land use plan and watershed-based approaches for no net loss of wetland function.

This iterative collaboration between RCWD and Lino Lakes is intended to meet the following objectives:

- Provide maximum consistency with the Minnesota Wetland Conservation Act (WCA) requirements for a Comprehensive Wetland Management Plan and no net loss in acreage and function of wetland resources
- Be consistent with the Federal Clean Water Act requirements for Section 404
- Provide an implementation strategy for multiple Total Maximum Daily Load projects
- Provide watershed-based context to the public Ditch Repair process proceeding on a parallel track
- Through an iterative process, provide guidance to the City for ecological-based land use decisions during the Comprehensive Plan Update process
- Provide stormwater management guidance to the City for the Comprehensive Plan Update requirements and municipal stormwater permitting

The following contains a summary of the four major sections of the RMP: existing conditions assessment, future conditions assessment, wetland alternatives analysis, and implementation. The full RMP, including all figures, is located in Appendix A.

## Existing Conditions

The RMP existing conditions element is a watershed-based natural resource plan that was used by the city to prepare this Comprehensive Plan. This section of the RMP contains an existing conditions, watershed-based analysis of wetlands, lakes, ditches, and the quality and quantity of water they depend on. The culmination of this work is graphically presented in Appendix A - Figure 10, which shows the location of high priority wetlands and associated high quality upland resources. The assessment of existing resource condition establishes the baseline for which the city's future land use alternatives were tested.

The Existing Conditions section of the LL RMP presents watershed condition and resource assessments today to be used to inform recommendations for protection and restoration tomorrow. The following watershed components and processes have been examined.

- Public Ditch System
- Watershed Runoff
- Nutrient Load
- Wetlands and Associated Habitat
- High Priority Resources

### Public Ditch System

The RCWD Board is authorized to manage the public ditch system. The majority of the drainage system was constructed during the late 1800's and early 1900's. Over the decades, much of the system was minimally maintained by different ditch authorities. Today, many ditches function as straightened creeks within a partially or marginally drained wetland slough or riparian corridor.

The major public ditch systems in Lino Lakes are:

- Anoka County Ditch (ACD) 10-22-32
- ACD 25
- ACD 55
- ACD 72

The public ditch systems are an integral part of the RMP, and the RMP serves as the ditch repair alternative for each system. Updated ditch maps and system data were developed based on field surveys and historic records (see Appendix A, RMP, Figure 3). Profile and repair reports have been completed for all of these ditch systems, and the Resource Management Unit (RMU) recommendations integrate ditch repair implementation projects.

### Watershed Runoff

Today, upland runoff from Lino Lakes and upstream communities moves through a series of ponds, ditches, wetlands, and pipes collectively called the conveyance system. Hydrologic modeling has been used to examine how these components are expected to respond under a range of storm events. Modeling and analysis has been performed at the catchment level, which are much smaller drainage areas within each subwatershed. Subwatersheds are in the 640 to 6,400 acre size range. Catchments are in the 32 to 320 acre range. The City will utilize these models for the existing conditions assessment for its LSWMP update.

Hydrologic boundaries do not stop at the municipal border and orderly coordination between related municipalities is addressed in the RMP. Hydrologic boundary based, Resource Management Units (RMU) identified in the RMP are the basis for neighbor community coordination of shared water resources. The hydrologic modeling encompasses true watershed catchments even where the boundaries are outside the municipal boundaries. The modeling covers small portions of land area within North Oaks, Hugo, and Blaine, as well as all of Centerville. The contributing areas of Upper Rice Creek, Hardwood Creek, and Clearwater Creek

were also factored in. The city and the RCWD will work with adjacent municipalities to implement shared resource management goals.

### **Nutrient Load**

Total Maximum Daily Load (TMDL) studies are being coordinated with the RMP to understand the source of excess phosphorus in several of the lakes. The Peltier/Centerville TMDL study is being funded by the MPCA. The second TMDL study, being funded by the RCWD, includes the Chain of Lakes downstream of Peltier. To identify phosphorus sources and loads, subwatershed catchment areas were broken out and modeled. The TMDL studies will discuss the relevance of the loading to lake impairment. In this document, loading is discussed with respect to wetlands and the implications for wetland management

### **Wetlands and Associated Habitat**

Habitats are formed from lakes, wetlands, drainage systems, streams, grasslands and woodlands all working together. Except when endangered species come into play, the upland portions of habitat are not afforded direct regulatory protection like wetlands and lakes and streams (aquatic resources). Assessing the health of existing wetlands and associated habitat is important for the purposes of preparing a Comprehensive Wetland Management Plan and studying two biologically impaired streams.

- *Upland*

Upland vegetation mapping is based on current land use and includes all natural and non-natural land cover types as well as a vegetative quality indicator. In Lino Lakes, certain rare plant species are found along the marginal area between wetlands and uplands. Protection of these species is a local priority for the City and this habitat is accounted for in the RMP. The Peltier Lake heron rookery has also been a notable habitat component in the area.

- *Wetlands*

Wetland vegetation mapping is based on current land use data and includes the size and types of wetlands. High priority wetlands will establish the critical nodes and linkages for what have become the Wetland Preservation Corridors. Wetland quality was assessed by looking at the functioning of the wetland habitat, characteristic wetland hydrology and water quality, wetland role in downstream flooding, as well as plant species and community diversity.

The city contains numerous fully and partially drained wetlands that provide the greatest opportunity for wetland restoration activities. Wetland restoration projects function to retain and treat stormwater and at the same time enhance natural resources, all of which were determined to be of highest priority for the citizens of Lino Lakes according to a wetland values survey. As specified by the Minnesota Routine Assessment Methodology (MNRAM), the factors evaluated when considering a wetland for restoration include the number of nearby wetlands, hydrologic restoration potential without flooding structures, number of landowners involved, size, potential for a naturalized buffer, and restoration design complexity. Wetlands ranked high and medium are considered high priority for restoration (see Appendix A, RMP, Figure 9 – Partially Drained or Impaired Wetlands). Local wetland values such as Lino Lakes' interest in Tamarack Swamp restoration was also used in the evaluation.

- *Streams*

Aside from the small segments of Rice Creek that connect the Chain of Lakes, Lino Lakes contains two other creeks, Hardwood and Clearwater. Both creeks are TMDL-listed for biotic impairment, meaning the fish and insect life living in the stream is unhealthy. Biotic stressors can include in-stream habitat structure, stormwater volume, sediment, temperature, nutrients and other pollutants. The Hardwood Creek TMDL is nearly complete and the Clearwater Creek TMDL is planned to start in the future.

### **High Priority Resources**

State and federal wetland protection laws apply to wetlands in Lino Lakes. Both regulatory programs can be adapted to provide additional protection to these high quality resources. Additional protection can be afforded to those wetlands that exhibit high vegetative quality, high potential for restoration, create habitat connections, or harbor rare species. The high priority wetlands and associated high quality upland resources in Lino Lakes are shown in Appendix A, RMP, Figure 10. These upland resource preservation areas are higher quality oak woodlands and forests.

The high priority resources were selected based upon a landscape-scale wetland functional assessment recently completed by the watershed district and numerous past studies by the City that incorporate the following information:

- High Restoration Potential
- Floodzones
- High Vegetative Integrity
- Trunk Drainageways
- Groundwater Dependant Natural Communities
- Rare Species
- Orchid Monitoring
- City Conservation Easements
- Tamarack Basins
- Cedar Lake Floodplain
- Rare Plant Community Sites

The RMP Rule for Lino Lakes provides additional protection measures for the high priority wetlands, and low quality, low priority wetlands will be afforded lower mitigation ratios and sequencing flexibility. Additionally, the City has recently completed a development suitability analysis for upland areas that was used to inform the preparation of the city's Land Use Plan and updated Parks, Opens Space/Greenway and Trail System Plan.

### **Future Conditions**

City land use and watershed management policy affects watershed runoff volume, nutrient load, locations of open space and connected greenways and in turn affects the future quality and functioning of lakes, wetlands, and ditches. Two future conditions scenarios were evaluated in the RMP. Each scenario was created by dovetailing the city's proposed "full build out" land use plan and official controls with strategies for protecting water resources and watershed policy information from RCWD. A description of the two scenarios and the results of the analysis are summarized in the following section.

### **Scenario 1 - Full Build Out (FBO)**

This scenario models the following effects on resources:

- The city's preliminary full build out land use plan prepared as part of this Comprehensive Plan update,
- The impervious surface percentages allowed in the city's adopted zoning ordinance,
- Protection of high priority wetlands identified through the existing conditions assessment in the RMP, and
- 2007 RCWD rules.

The results of modeling the FBO scenario indicate the location of sensitive water level points, or flood prone areas, throughout the city (see Appendix A, RMP, Figure 20 - Land Use Alternatives Analysis: FBO *without* RMP conditions). These points include locations of predicted road overtops, less than 1" freeboard on a road, and pond overtops under a 100-year flood event.

During the process of developing the RMP, results of the existing conditions assessment and modeling the first scenario identified potential environmental impacts. Through an iterative process, this information guided the creation of the RMP goals and strategies, the Wetland Preservation Corridor, the city's land use plan presented in Chapter 3, and proposed revisions to impervious surface allowances in the city's zoning ordinance.

### **Scenario 2 – Resource Management Plan-Based Full Build Out (RMP-FBO)**

This scenario was formed through an iterative process between the city and the RCWD that took into account the following effects on resources:

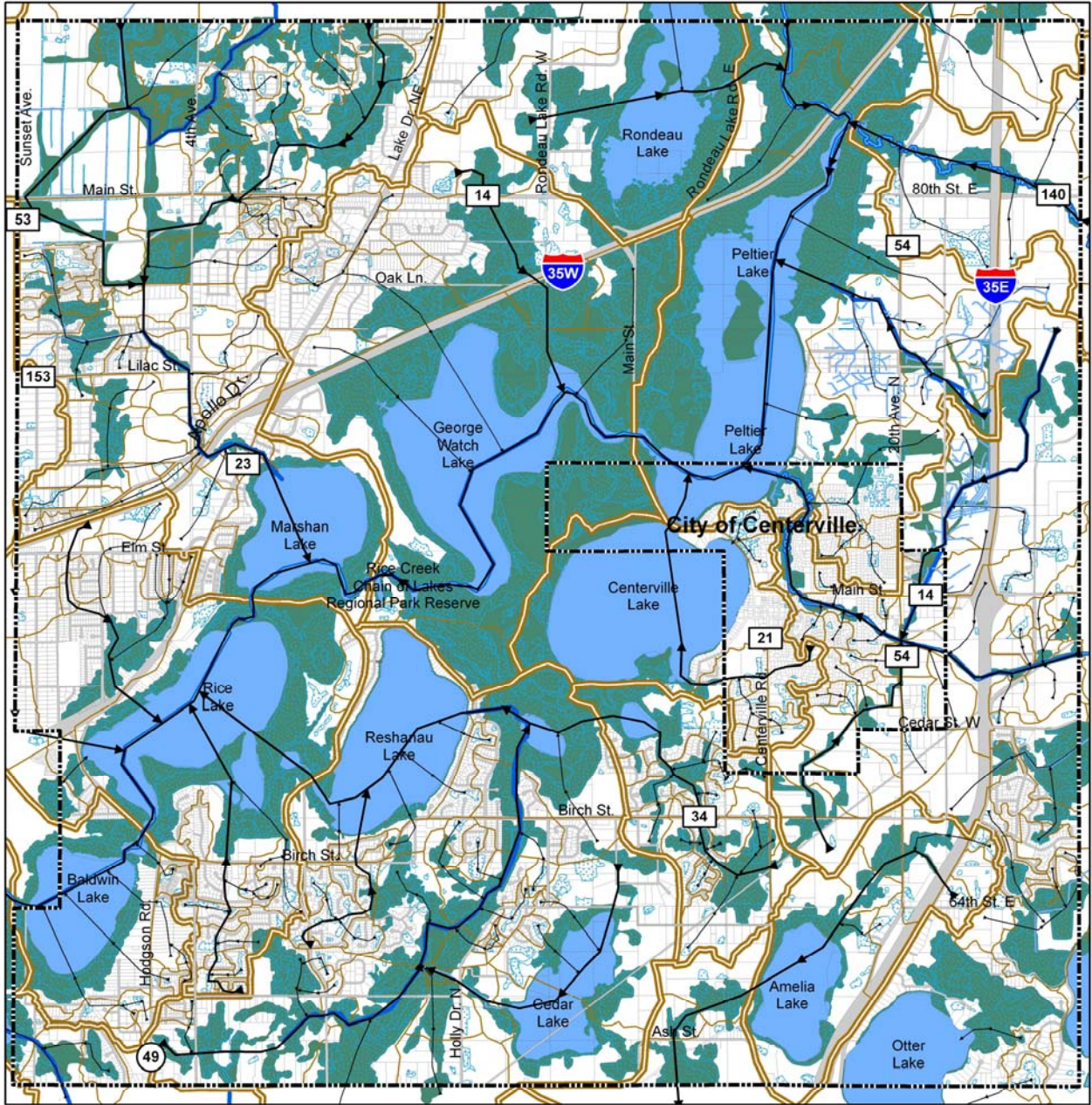
- The revised proposed full build out land use plan presented in Chapter 3 – Land Use Plan
- Proposed revisions to allow impervious surface coverage in the city's adopted zoning ordinance
- The Wetland Preservation Corridor prepared in the RMP
- Proposed updates to the city's Parks, Natural Open Space/Greenways & Trail System Plan presented later in this Resource Management System Chapter of the Comprehensive Plan
- 2008 Watershed District Rules

This scenario results in eliminating several of the sensitive water level points, or floodprone areas, that resulted from the FBO scenario (see Appendix A, RMP, Figure 21 - Land Use Alternatives Analysis: FBO *with* RMP conditions). The final RMP-FBO scenario provides for land use conditions needed to maintain and protect priority resources in the city. These conditions are thread throughout this Comprehensive Plan, most notably in this Resource Management System Plan and in the Land Use Plan, which represent the fundamental framework for future decisions regarding growth and development.

- *Wetland Preservation Corridor (WPC)*

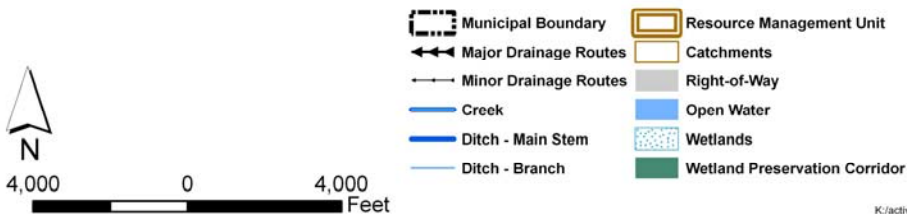
The first outcome of high priority wetland designation was to create the WPC (Figure 2-8). The buffer width standard for high functioning wetlands according to the Wetland Conservation Act (WCA) is 300 feet to maintain habitat and 50 feet to maintain water quality (MNRAM buffer width metric). A customized variable width buffer area is incorporated into the WPC, giving each wetland complex individual attention, rather than using a one size fits all approach. The combination of high priority wetlands and variable width buffer area with the City's defined low development suitability areas produces nodes, and the 100-year floodplain area produces the diffuse corridor linkage areas. The diffuse corridor linkage areas tie together corridor nodes.

Figure 2-8. Drainage Map



## Drainage Map

City of Lino Lakes 2030 Comprehensive Plan



June 26, 2008

Prepared by Bonestroo  
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## **RMP Implementation Overview**

The primary issues for Lino Lakes to address through implementing the RMP are restoring groundwater hydrology to groundwater-dependent wetlands, restoring naturally fluctuating hydrology to wetland open space systems, maintaining ditch systems being used for agricultural benefit, establishing habitat complexes and connected greenways, mitigating flood-prone areas, and reducing phosphorus loading to impaired lakes. Urban land use most notably affects these resources through stormwater volume. As such, a strategy of broad-based source reduction in volume is needed.

The creation of a "Resource Management System" is the unifying strategy to address volume effects. Stormwater is considered an asset to 'retain for recharge' instead of a waste to 'collect and dispose'. In this strategy, retained stormwater at its source eliminates downstream flooding and recharges shallow aquifers to sustain wetlands and lakes during drought. This RMP provides recommendations for management strategies based upon volume reduction, not capacity expansion, and the protection of existing drainage divides as shown on Figure 2-8. All drainage routes are natural gravity-fed pathways with no reliance on manufactured materials such as pumps to move water from one area to another. The major and minor drainage routes in conjunction with the Wetland Preservation Corridor form the core greenway system included in the overall Resource Management System Plan presented in this Chapter.

A long-term monitoring program to accompany RMP implementation will evaluate quantitatively the strategy's long-term environmental and cost benefits. To implement the RMP a partnership is needed between the City, RCWD, VLAWMO, and private property owners for shared water retention. Natural resource management within this context means linking and integrating resources and compatible land uses. The overall Resource Management System Plan presented in this Chapter intends to accomplish this by integrating wetland/upland habitat, stormwater management, parks, trails, and greenway features to sustain ecological processes.

This Comprehensive Plan Update supports the RMP by designation of the Wetland Preservation Corridors (WPCs) referred to in the rule and by general definition of certain areas within the City to provide habitat and/or RMP-based stormwater conveyance connections. These features are shown in Figure 2-8.

The City has worked with the RCWD to develop a watershed district rule that helps implement the RMP within the City's jurisdictional limits. The Implementation Section of this overall Resource Management System Plan provides additional information regarding RMP implementation including the RCWD Rule.

## ***Parks, Open Space, Greenways & Trails System Plan***

The City of Lino Lakes adopted an extensive comprehensive parks, natural open space/greenways, and trail system plan in 2004. The following three statements provide the key underpinnings of the plan's vision.

- *Fostering a high quality living environment within the context of ecological protection, responsible land stewardship, long-term sustainability, and economic viability.*
- *Perpetuating an interconnected latticework of natural landscapes, greenways, parks, and trails throughout the city.*
- *Fostering the "city as a park" concept, whereby preserved natural areas and parks serve as a primary factor in shaping the character of the community.*

The mission statement was an outgrowth of the vision and reflects the city's commitment to preserving natural open space and providing a balanced overall park and trail system. The mission statement is to:

*Promote a high quality of life in Lino Lakes by providing a comprehensive, balanced, and sustainable system of parks, natural open spaces, greenways, and trails in as fair and cost effective manner as possible.*

A number of guiding principles support the park vision and mission statements. These include:

- Implement a balanced system plan that offers multiple community values.
- Allow for some flexibility in implementing the plan to adjust to realistic financial limitations and unforeseen events.
- Maintain a high and consistent standard of quality throughout the system.
- Plan and design parks for their entire lifecycle (i.e., 15 to 20 years).
- Adhere to a standardized planning and design process for individual parks to ensure consistency in public involvement and outcomes.

The system plan describes the various components of the parks, natural open space, greenways, and trails and the plan provides a framework for implementing the system plan (see Figure 2-4). The plan also includes a natural resources stewardship and water resource plan that provides a framework for restoring and managing the city's natural areas and protecting water resources.

The plan notes that achieving the common vision requires the use of conventional and non-conventional approaches to planning, development, and funding. Successful implementation of the plan also requires a steadfast commitment to collaborating with the development community for a couple of key reasons:

- The nuances of integrating greenways, parks, and trails into a development require a high level of collaboration and flexibility to achieve the highest public values.
- The cost of implementing the parks, greenways, and trail system plan to its fullest potential is likely to be well beyond the city's means using conventional funding mechanisms, park dedication policies, and approaches to acquisition and development.

By combining standard regulatory controls with alternative approaches to the development process (such as conservation development), achieving the vision and goals set forth in this and other city plans becomes more realistic. Lacking that, realizing the full potential of the system plan becomes significantly more of a challenge, and perhaps even unlikely.

## **Parks, Open Space, Greenways & Trails System Plan Update**

This plan was updated as part of the comprehensive planning process to reflect the additional demand for parks and recreation facilities that will occur from the growth that the city is anticipating and to incorporate the wealth of natural resource information gathered through the development suitability analysis and RCWD's RMP. This additional information was used to modify the location of future parks, trails, and open space to maximize the ability of the city to create multifunctional greenway corridors for wildlife, trails, natural resource conservation and surface water management features. The revised Parks, Open Space, Greenways, and Trail System Plan map is shown on Figure 2-9. The following are excerpts from the 2004 plan that have been updated to describe the updated plan and map. It is noted that the 2004 plan is incorporated into this Comprehensive Plan (see Appendix A) and only the definitions presented below and the map have been updated. Page numbers from the 2004 plan are provided to reference the original text that has been amended.

### **Greenway System**

Considering this mosaic of natural systems in a collective way created the basic conceptual structure of the greenway system. The following considers each of these areas in greater detail. As the Park, Greenway, and Trail System Map illustrates, three specific areas are defined within the greenway system. The following considers each of these (see Figure 2-9).

#### *Natural Resource Protected Area*

Generally consists of water bodies and land areas that have some level of protection under current regulatory ordinances and controls. Specific areas included in this zone, as amended from page 14 of the 2004 plan:

- Lakes, streams, and county ditches
- Parkland (regional and local parks)
- Wetland Preservation Corridor (WPC) identified in the Lino Lakes RMP and protected through an associated RCWD Rule
- Wetland systems that are not included within the WPC, but are protected through the Federal Clean Water Act and/or Minnesota's Wetland Conservation Act

Under protected status, development is largely controlled and, where feasible, prohibited. Under established regulatory rules, any encroachment into these areas typically requires special permitting and mitigation.

#### *Natural Resource Conservation Area*

Consists largely of upland areas defined under various natural vegetative cover or soil types. Specific areas included in this zone, as amended from page 14 of the 2004 plan:

- Unique banded soils areas that support rare species, many of which have been identified on the vegetative mapping
- Oak forest, aspen, maple-basswood, tamarack swamp, lowland forest, and other areas that are significant natural resource areas, especially those that are adjacent to other protected resource areas
- Blanding turtle breeding site and corridor
- Floodplain areas
- Previously restored natural areas

- Marginally suitable development areas identified through the natural resource based development suitability analysis

The areas encompassed by the conservation area are those where preservation opportunities are very high and where protection of these ecological systems is a foremost consideration as land is developed. Development in the conservation area is allowed in accordance with city zoning codes and development ordinances. Beyond these requirements, the natural values of these lands are not inherently protected. In addition, land ownership rights preclude arbitrarily omitting or severely limiting development within this zone. Given this, the city will have to use a variety of strategies if the key ecological values in the conservation areas are to be preserved as development occurs. The RCWD RMP and associated Rule and the city's local surface water management plan provide new strategies for conserving these upland areas to achieve water resource goals.

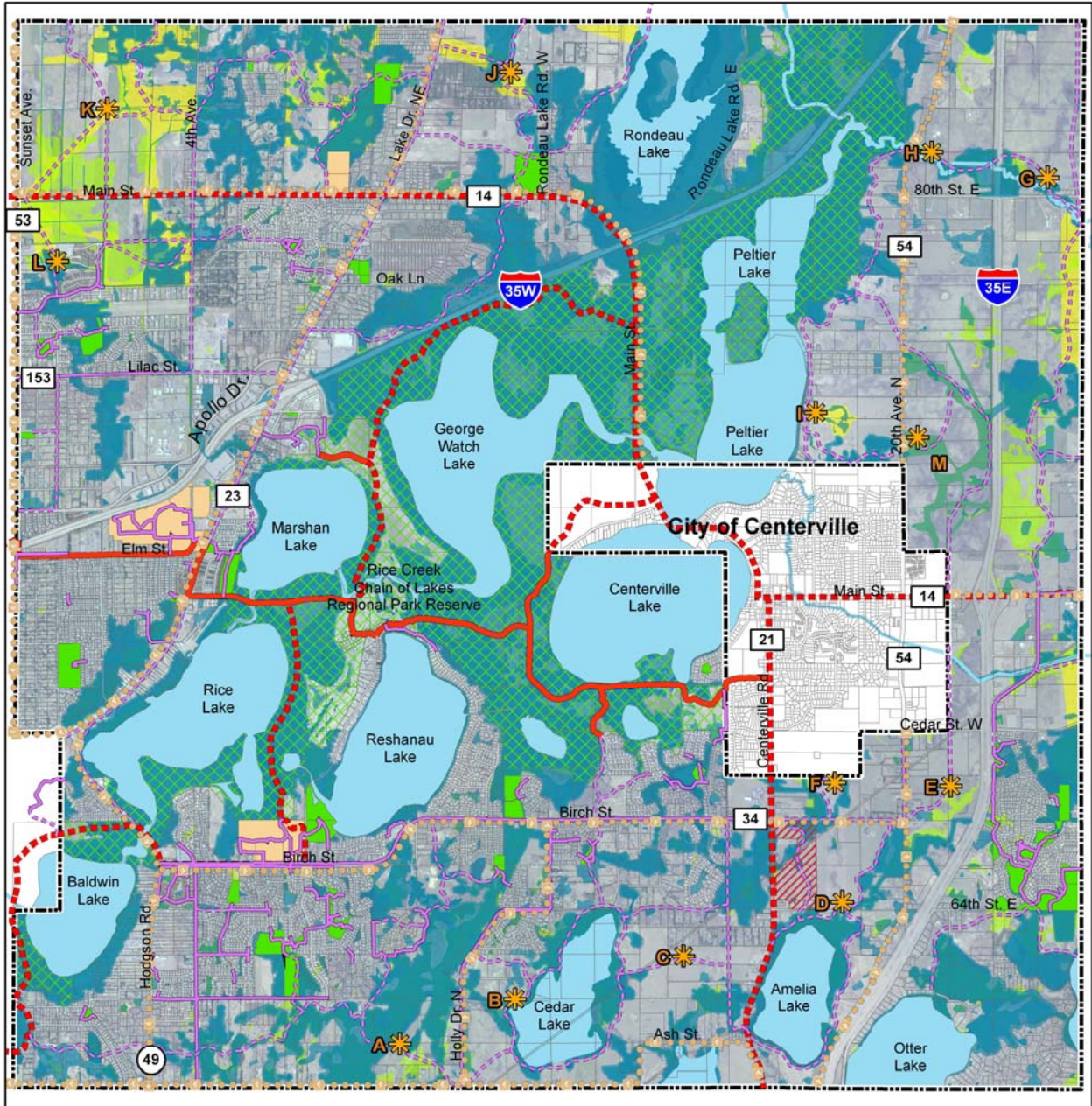
*Natural Resource Enhancement Corridors*

Consists of areas that will convey surface water runoff and/or fill gaps in the greenway system and/or provide a corridor for the greenway-based trail system. Generally, these areas are currently being used for agriculture. In conjunction with the natural resource protected and conservation areas, these areas help establish a more contiguous and complete natural open space system. In application, the natural resource enhancement corridors should be considered in the same context as natural resources conservation areas, with the objectives (as amended from page 15 of the 2004 plan) being to:

- Provide multi-functional greenways where there is convergence of multiple features such as existing or proposed ditch and drainage systems, existing and proposed trail corridors, existing high quality upland natural resource areas, etc.
- Integrate them into future developments consistent with natural resource conservation areas
- Restore and manage them as functioning, high quality greenways that are seamless with other aspects of the greenway system. An example of this is transitioning farm fields into prairie communities that expand the greenway system

The Parks, Greenway, and Trail System Map only highlights natural resource enhancement corridors that are larger in scale and/or serve a defined purpose, such as connecting two greenway areas together or providing space for a trail corridor. In application, there will be other opportunities to expand the greenway system as development proposals are considered by the city. The main point to be made is that all lands offer some potential to be part of the greenway system. The extent to which these lands can be set aside as greenways will be determined through a collaborative development planning process between the city and the development community.

Figure 2-9. Park, Greenway & Trail System Plan



### Park, Greenway & Trail System Plan

City of Lino Lakes 2030 Comprehensive Plan



## **Park System**

Although the greenway and park system functions as a cohesive whole, individual parks will continue to have a significant and defined purpose consistent with their classifications. The Parks, Greenways, and Trail System Map illustrates the location and name of each park within the system, and the general areas where new parks will be needed as development occurs.

Neighborhood parks serve the recreational needs of individual neighborhoods within the city. These parks bring people together to recreate and socialize close to home. Providing a balanced set of amenities that appeal to a broad range of individuals is important to meeting contemporary park needs – although active, non-programmed recreation remains the mainstay of neighborhood parks.

A number of key criteria will continue to be the basis for determining the location of new neighborhood parks, as amended from page 19 of the 2004 plan, including:

- A service area radius of between ¼ to ½ mile
- Property characteristics suitable for park purposes
- Connection to neighborhoods via the trail system
- Connection to the emerging Resource Management System (to expand perception of open space at the neighborhood level)
- Location of major roads and other physical barriers, such as extensive wetland or lake systems. Trails need to work in concert with the greenway system to provide trails in locations that minimize potential environmental impacts

These criteria were generally used for determining the location of the more recently acquired parks, albeit not always uniformly weighted due to site-specific circumstances. Parks acquired prior to the city's *1992 Park and Open Space System Plan* were often based on less stringent criteria and often pose more of a challenge to integrate into the system plan.

In spite of any limitations associated with the location of some parks, the overall system plan is reasonably balanced at the neighborhood park level and will serve the community well. Any imbalances that may remain have been or can be largely mitigated through good park design and interconnections with other parks through the emerging greenway system.

### *Interconnection of Neighborhood Parks to Greenway System*

The interconnection of parks through the greenway-based trail system is of particular importance to the success of the park system. This is especially the case with neighborhood parks, where safe and appealing access to them is critical to their use levels. Lacking these trail connections, any inequity in park distribution will become more apparent to the user because the parks will be harder to get to from within a given residential neighborhood. The less convenient the access, the less use parks are likely to receive. In addition, most of the neighborhood parks are on the smaller side, with only limited green space outside the active use areas. Because of this, the greenway system becomes an important open space component that significantly enhances the neighborhood park system.

### *Areas Where New Neighborhood Parks will be Required as Development Occurs*

As illustrated on the Park, Greenway, and Trail System Map, there are several areas within the city where new neighborhood parks will be required to service local needs as development occurs. Desirable property characteristics include:

- An appropriate location that is central to the surrounding service area and linked to the greenway system.
- Exhibiting the physical characteristics appropriate for active and passive uses. This includes adequate developable upland to accommodate typical neighborhood park amenities, ranging from active open space to play areas and trails.
- Exhibiting an aesthetic characteristic befitting a park, which is defined as:
  - open space for active use; a natural landscape with mature trees and quality natural vegetation for its aesthetic and passive use qualities; and interesting (but not excessive) topography for relief and park character.

Although natural amenities are desirable, designated wetlands or non-upland protected areas that cannot be developed for active or passive (i.e., trails, overlooks, sitting areas) park purposes should not be included in the acreage calculation for a neighborhood park. (Note: Protected areas should be integrated into the larger greenway system to create complementary open space. Where feasible, the greenway system should directly abut the neighborhood park to create a contiguous park setting).

The distribution of future neighborhood parks is intrinsically linked to the greenway-based trail system, which provides the conduit for pedestrians to get to the park in a safe and appealing manner. The greenways also expand the park experience itself, whereby the neighborhood park becomes less of a defined space and more of a contiguous, linear park experience. The effect of tying neighborhood parks with the greenway system is that the spacing between individual parks can often be greater than traditional standards suggest. The system plan is based on this principle, with the greenway system playing a significant role in determining the number and location of future neighborhood parks necessary to meet community demands. Should the greenway system substantially change or not materialize the distribution of the accompanying neighborhood parks would need to be reconsidered.

As illustrated on the Parks, Greenways, and Trail System Map, there are a number of areas where new neighborhood parks will be needed as future development occurs. Note that the locations for these parks are general and do not represent a specific parcel of land. Their actual location will be based on the specific developments that the park serves and how the park ties into the greenway and trail system. The adopted plan identified 12 future neighborhood parks (labeled A – L on the map – See Figure 2-9) to provide a comprehensive park system for existing and future residents.

The following discusses the one additional neighborhood park that has been added to the system as part of this comprehensive plan update, an amendment to page 23 of the 2004 Plan and the corresponding Park, Greenway and Trail System map (See Appendix A).

The park location criteria were used to review the location of proposed parks within the emerging Resource Management System. The results of this analysis were used to update the Park, Greenway and Trails System plan as shown on Figure 2-9 and summarized below:

- Center of the service area for **Neighborhood Park Areas C, I, K and L** was modified slightly to include proposed residential areas that were not covered by a 1/4 to 1/2 mile service area. The modified location also took into account the location of the Resource Management System to connect parks to this emerging system.
- **New Neighborhood Park Area M** – serves the Mixed Use area along the west side of I-35E in the eastern portion of the community. This area was previously guided for Industrial uses and no neighborhood park was contemplated. Since the

adoption of the park plan, the city has guided the area for Mixed Use, including residential neighborhoods. The linear trail system is important for linking this park to other parks in the northeast area of the city and to future residential neighborhoods.

### **Trail System**

This section focuses on the Lino Lakes trail system. The overarching goals of the trail system plan are to:

- Develop an interlinking system of trails throughout the city that interconnect with regional parks and trails
- Provide reasonable trail access to the natural resource amenities within the community without unduly compromising their integrity and natural qualities
- Provide a reasonable and appropriate degree of universal accessibility to trails throughout the system

The greenway-based trails that link individual neighborhoods with natural open spaces and the regional park system are the backbone of the Lino Lakes' trail system. Through this system of trails, the interconnected latticework of natural landscapes, greenways, and parks throughout the city will be accessible to the public for enjoyment of the outdoors, nature viewing, exercise, and transportation.

The trail system plan highlights existing and proposed trails that collectively create a complete and integrated trail system. The plan is based on three key principles:

- It purposefully focuses on establishing the *primary* greenway-based destination trail network that forms the core system of high value recreation trails
- It uses linking trails as a means to connect the destination trails together, as well as provide pedestrian-level transportation routes to schools, public parks, and other public facilities and commercial districts
- It is ambitious, yet realistic and achievable

The Park, Greenway, and Trail System Map (see Figure 2-9) illustrates each type of trail within the trail system plan. The location of the trails within the system plan have been updated from the 2004 plan system map to locate trails within future multi-functional greenway corridors, to provide connections between planned neighborhoods, and to provide connections between existing and future parks. Chapter 6, Transportation Plan, includes additional information regarding the future trail system for the city.

In addition to the existing and proposed trails shown on Figure 2-9, which are intended to accommodate pedestrian, bicycle, or other non-motorized trips, the City of Lino Lakes also contains a network of snowmobile trails that run primarily through the Rice Creek Regional Park Reserve. The Minnesota Department of Natural Resources (DNR) operates a program of grants to local organizations to help create and maintain snowmobile trails. Land for trails can be purchased by the local organization, but it is more common to acquire leases that allow trails through private property. The local snowmobile organization negotiates the trail leases with property owners, executes the lease agreements, and maintains the trail. The trail is not intended to be used for anything other than snowmobiling. A requirement for the DNR funding program is that these leases run for a one-season period, and allow snowmobile use only from December 1 to April 1.



The City of Lino Lakes recognizes snowmobiling as a recreational activity enjoyed by many members of the public. The City is aware of the trails program and of the efforts of the Rice Creek Snowmobile Trail Association to maintain trails through Lino Lakes.

## **Implementation**

The Resource Management System Plan presented in this Chapter provides the conservation design framework for the Comprehensive Plan and sustainable decisions regarding growth and development. It provides a unified “system approach” to natural resource management and providing natural resource based amenities, parks and trails which are highly-valued and enjoyed by the community. This “systems” approach allows the city the ability to leverage several regulations and funding sources to implement the Resource Management System plan.

### **Parks, Open Space, Greenways and Trail System Plan**

The City will implement the updated Parks, Greenways and Trail System Plan through:

- Acquisition of parks, greenways, open space and trail corridors
- Continuing to develop an interlinking system of parks and trails throughout the city that connect to regional parks and trails
- Establishing multi-functional greenway corridors (corridors for wildlife, trails, and surface water management features)

Review and update park dedication requirements to ensure consistency with the updated Parks, Greenways and Trail System Plan.

## **Rice Creek Watershed District/Lino Lakes Resource Management Plan (RMP)**

### **Municipal Ordinance and Watershed Rule Coordination**

The RMP proposes a plan to address municipal and Watershed District rules at the same time. This requires updating of local ordinances and Watershed rules that effectively implement the plan. The Resource Management System Plan (commonly referred to as “green infrastructure”) or traditional conveyance infrastructure (referred to as “gray infrastructure”) are the two overarching surface water system alternatives, with the former focused on runoff volume reduction and the latter on runoff volume conveyance to downstream endpoints. Capital investments ought to principally focus on one or the other alternative on an overall city and related subwatersheds basis. Blending the two is not feasible, because subwatersheds are interrelated, with one feeding another. The RMP-based FBO modeling scenario was performed on a volume reduction basis and demonstrates the feasibility of implementing the green infrastructure alternative on a city-wide basis. Implementing green infrastructure ought to consider the particular modeling results on a subwatershed (RMU) basis, and also the feasibility of various green infrastructure strategies as they relate to various land uses. Green infrastructure strategies are more and more grouped according to whether the land area under consideration is:

1. Developing Areas – Low Impact Development (LID) Planning Assistance
2. Existing Urban Areas – Green Infrastructure Program
3. Proposed Greenway System

These three situations can be the basis of green infrastructure implementation and are recommended to be incorporated into the city plan review process, public works organization, and capital improvement funding. As part of the RMP, green infrastructure implementation will be pursued in the city, with the following three initiatives refined to be incorporated into programs and ordinances.

1. *Developing Areas - Low Impact Development (LID) Planning Assistance*  
 As agricultural and rural land uses convert to urban-scale development (e.g. commercial, industrial, and residential), the parties involved in reviewing and approving plans, such as staff, City Boards, and City Council, need tools for evaluating plans for whether all green infrastructure design parameters were utilized. For example, a project design with onsite pipes and holding ponds would presume an offsite stormwater conveyance system for the ponds to overflow to. Project-level design needs to be consistent with an overall city-level green infrastructure alternative to managing surface water. Green infrastructure as defined by the USEPA utilizes numerous features (see Appendix A, RMP, References, USEPA Green Infrastructure) that collectively operate to retain and recharge water where it falls. A green infrastructure system does not include a stormwater conveyance system (i.e., large regional ponds, pumps, and pipes) that is constructed in advance of and in anticipation of numerous individual projects' conveyance systems that can be linked together. Green infrastructure in practice will at first require more upfront plan review and project-level design, but reap savings from significantly reducing capital costs of constructing conveyance systems and the costly maintenance of ponds and associated devices.
  1. Provide guidance for staff, City Boards, and City Council regarding low impact development.
  2. Use of site planning and stormwater management features described for low impact development (see Appendix A, RMP, page 27).
  3. Application of the city-wide conservation design framework presented in the Resource Management System to future development and redevelopment.
  4. Ordinance revisions to implement the Resource Management System goals, policies, and programs.
  5. Revising the maximum allowable impervious surface coverages for each land use category as a primary strategy to reducing the volume of water from new development. The adopted maximum allowable impervious surface coverages for all Zoning Districts range from 65-85%. The proposed revisions to the requirements, which were modeled in the RMP-FBO scenario, are presented in the following table:

**Table 2-1. Revised Maximum Impervious Percentage by Land Use Category**

<b>Land Use Category</b>	<b>Maximum Impervious Percentage Allowed</b>
Permanent Rural	10%
Low Density Residential	40%
Medium Density Residential	50%
High Density Residential	65%
Commercial	75%

Industrial	75%
Public Semi Public	65%
Right-of-Way	75%
Mixed Use	75%

2. *Existing Urban Areas - Green Infrastructure Program*

Developed areas shall be approached with an infrastructure redevelopment strategy that is coupled with particular water bodies which may be currently affected in negative ways by stormwater pipe discharge. In addition, the green infrastructure strategies for existing transportation network maintenance can be geared towards eliminating existing outfall structures into nearby water bodies. Elements of a Green Infrastructure Program may include:

1. Addressing joint responsibility areas between the county highway department and the City.
2. Restructuring of the City street program: Shift the stormwater component of street reconstruction to a separate stormwater management program that relies primarily on less capital and energy intensive post-construction BMPs. Neighborhood stormwater planning should precede the street project design in order to develop the agreements with residents for the residential components (disconnected downspouts, driveway runoff) and street side infiltration and biofiltration areas.
3. Establishing a clean lakes fund (similar to a stormwater utility) through a City fee that is used to pay for local stormwater plans. The City designs, installs and maintains the stormwater features included in the neighborhood plan. To those willing to agree to maintenance agreements, a fee reduction would serve as an incentive.
4. Establishing the green infrastructure program with City staff that conduct design, inspection, and maintenance.
5. Establishing a Clean Water Act Nondegradation compliance program to include the established goals for each aquatic resource, the timetable for eliminating stormwater discharges, a resource monitoring schedule, and reporting program.
6. Establishing a volume reduction overlay. Volume reduction will lead to nutrient load reduction which will contribute to meeting TMDL load reduction goals. Some areas of the volume reduction overlay will serve to reduce volume effects on sensitive wetlands under existing conditions. In other areas, the overlay will reduce existing or potential future flooding and capacity exceedance of the agricultural ditches and other conveyance systems.

3. *Proposed Greenway System*

In open space and park land areas of the City, the green infrastructure program will protect high priority wetlands, their biological condition, and will balance their function as high quality habitat, natural flood reduction and water quality improvement components in the landscape. Further refinement of corridor linkage areas, shape, and size shall occur with green infrastructure implementation, through a combination of City Board's review of plats and City initiatives for setting aside multi-functional greenway corridors (volume reduction stormwater features, passive trails and open space, wetland and volume banking sites). Where rare and endangered animal species movement patterns (e.g.

Blanding's turtle) need to be considered, corridor linkages will be established in consultation with wildlife habitat specialists.

### **MnDOT and County Transportation Coordination**

The Minnesota Department of Transportation (MnDOT) is the WCA LGU for wetland impacts within its right-of-way (ROW). MnDOT and County projects that propose to disturb wetlands within their ROW will continue to apply the wetland mitigation standards found in WCA, not the wetland mitigation standards specified by the watershed rules, unless it elects to apply the RMP Rule. All other Rules adopted by RCWD will continue to apply for MnDOT and County projects within the District boundary.

### **Land Owner Coordination**

The RMP provides expanded benefit opportunities to landowners, in addition to the traditional benefit of wetland drainage. As the watershed land uses affecting these ditches continue to lose agricultural use to urban use, each parcel can derive benefits differently depending on the specific land characteristics of the parcel. Benefits are available for landowners who may need opportunity areas for volume control and also landowners who have volume control opportunities to offer. The RMP provides the wetland and open space corridors sought by potential buyers of new, suburban lots which benefits landowners of both developable and preservation land. It also provides landowners who own extensive partially drained wetlands a framework to benefit from watershed-based volume control banking and wetland mitigation credit banking. The volume and wetland banks are eligible for use by landowners in other parts of the watershed and the state metro wetland bank program.

Additionally, the RMP provides the following tangible benefits to property owners within the RMP:

- Streamlined or consistent processing of local, state and federal permitting
- Clear stormwater management expectations
- Expanded range and flexibility of replacement options
- Expanded opportunity for wetland credits
- Increased land value for properties associated with preserved open space

### **Rice Creek Watershed District's RMP Rule 3**

The City has worked with the RCWD to develop a watershed district rule that helps implement the RMP within the City's jurisdictional limits. The major components of the rule include:

- *Designation of Wetland Preservation Corridors (WPC).* These corridors form a network of inter-connected natural communities that contain many of the highest priority lake, wetland, and upland resources in the City. They provide the critical foundation for efforts to both preserve and expand the quality and quantity of the wetland, wildlife habitat, and stormwater management functions in the City. An important link between the Comprehensive Plan, Local Surface Water Management Plan, and the RMP is the incorporation of the wetland preservation corridors into these plans.
- *Development of customized wetland impact/replacement ratios.* As part of a thorough and wide-ranging wetland management plan developed in cooperation with the RCWD, the rule requires replacement ratios of as high as 3:1 for wetlands within designated WPCs. To the extent allowed by the WCA, the rule also allows lower replacement ratios for certain types of wetlands outside the WPCs if the functions and values of those wetlands are replaced within the corridor. In general, the rule creates an incentive to avoid impacts to wetlands within the WPCs and

consolidate replacement wetlands within contiguous ecological units on which the WPCs are based, which will enhance their value for multiple purposes.

- *Setting up of a wetland bank.* This provision provides incentives for creating wetland banks within the same geographic area and management units that the impacts are anticipated to occur. By doing so, the benefits of replacing wetland functions and values will remain local.
- *Development of wetland buffer requirements.* This rule component requires designation and protection of upland buffers adjacent to wetlands within the WPCs. It lays out specific requirements for development of recordable instruments through which the buffer dimensions will be legally designated monumentation to delineate the buffer on the ground, and allowable uses and management of the buffer. The buffers will provide critical upland habitat components for the WPCs.
- *Supplemental runoff volume control requirements.* The rule requires certain development and grading activities creating impervious surfaces to retain the runoff from a one-year precipitation event (2.3 inches of rainfall over 24 hours) where feasible. The rule outlines where achieving the standards may not be feasible and outlines an alternative BMP sequencing process for those areas, including:
  - Re-establishment of effectively drained wetlands
  - Upland restoration/conservation
  - Restoration of degraded wetlands
  - Impervious dis-connection, and/or
  - Soil amendments and deep tilling
- *Creation of a runoff volume credit and banking system.* This provision of the rule allows parties to receive credit for stormwater volume reduction measures that provide more attenuation than required under the rule. The rule lays out the conditions for establishing volume control credits and sets up a system for tracking and transfer of those credits within the City.

A hypothetical example of the RMP permitting sequence for a development project is shown in Figure 2-10.

### **Future Local Water Management Plan Update**

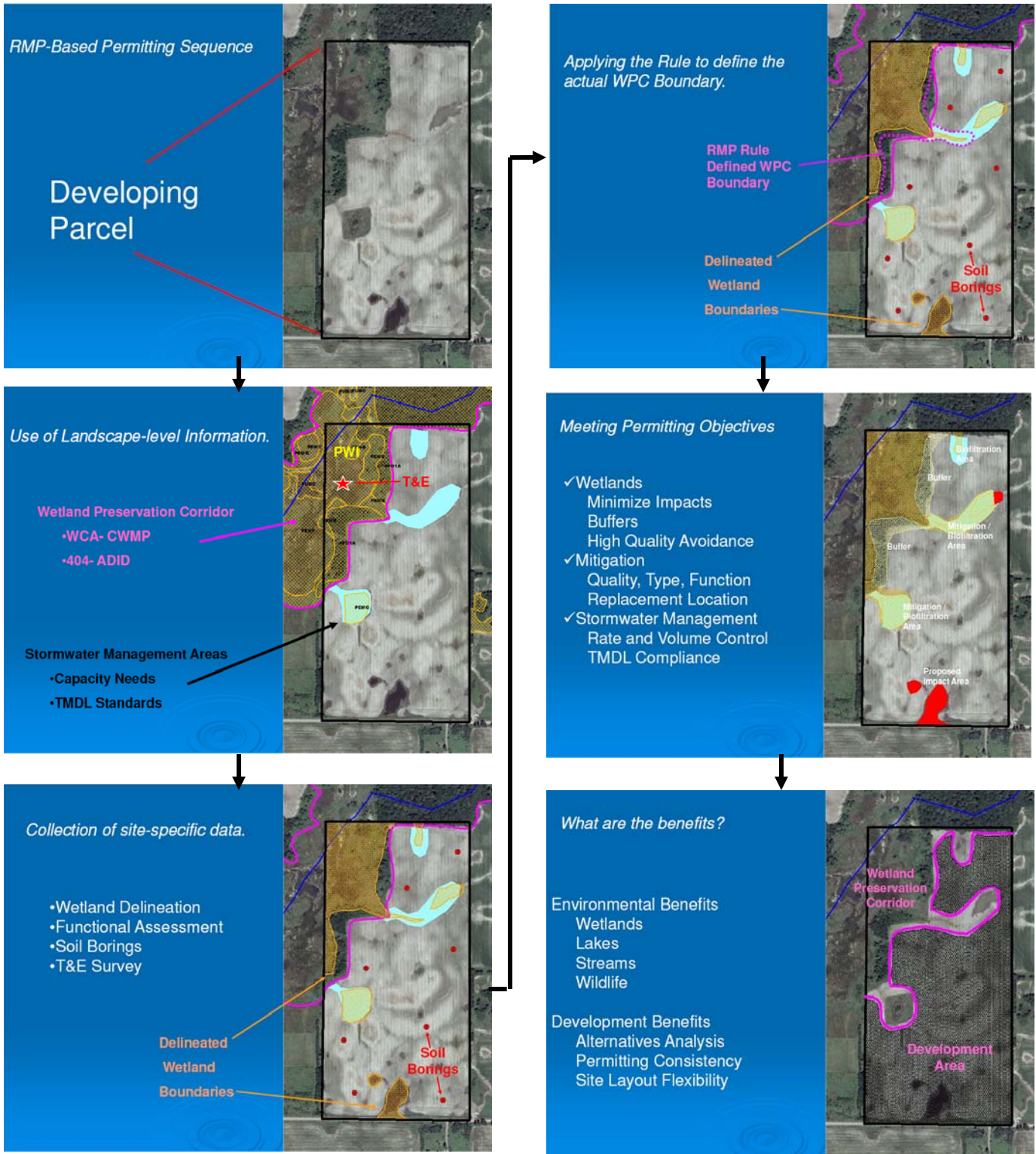
The City's future plans for local surface water management planning activities are as follows:

1. *Proceed with administration of Lino Lakes RMP Rule 3.* The Lino Lakes RMP was approved by the RCWD on October 8, 2008. RCWD's Rule RMP-3, implementing the Lino Lakes RMP was formally adopted on January 28, 2009 and became effective on February 4, 2009. The City will be working with the RCWD to implement the rule and determine what, if any, adjustments need to be made in it to facilitate its administration.
2. *Prepare an update to the City's local water management plan.* The City intends to wait until after the RCWD has developed and adopted their next generation watershed management plan, since the requirements in that plan will affect the content of the City's plan. The RMP, RMP Rule 3, and the RCWD rules are expected to provide an important foundation for the next update. The primary emphasis will be to write the City's next generation LSWMP to comply with the content and organizational requirements of Minnesota Statutes 103B and Minnesota Rule 8410, summarize, consolidate, and reference the pertinent information that has already been generated in the

aforementioned sources, and develop supplemental information where necessary to fill in the gaps. Areas where supplemental information will likely be needed include:

- Integration of MS4 SWPPP policies and goals
- Expansion of system improvements to include non-structural elements as well
- Preparation of cost estimates and timelines for improvements program
- Integration of nondegradation elements into plan (pending completion of MPCA rule)

Figure 2-10: Example RMP-Based Permitting Implementation



**ENVIRONMENTAL BOARD  
AGENDA ITEM 6B**

**STAFF ORIGINATOR:** Marty Asleson, Environmental Coordinator  
**MEETING DATE:** January 27, 2016  
**TOPIC:** Heron Rookery Surveillance

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**BACKGROUND**

The Collapse of the Peltier Lake Heron Rookery nest abandonment started occurring in the year 2000. Although many theories were established for this abandonment, research done by Andy VanDuyke discovered the main reason of nest abandonment was raccoon predation. Camera surveillance recorded the nest predation events.

Andy's long-term recommendation for nesting recovery was to place aluminum flashing around nesting trees to prevent raccoons from predating new chicks. Flashing the trees started shortly after Andy's study was completed. Since then the rookery has grown back up to about 250 nests in 2015.

Discussions of the need to continue with flashing nesting trees occurred in 2015. The Environmental Board discussed this at their December 2015 meeting, and the need to possibly re-survey the nesting trees. My personal observations and feelings are that the herons have been expanding their nesting area for the last few years but some of the nests have that abandonment appearance (un-kept, smaller nests).

Re-survey would involve the use of cameras again. Since 2003/2004 when Andy was carrying marine batteries back and forth to and from the island, technology has improved. It may be possible to solar power better cameras, and Wi-Fi to a nearby computer. I talked to a company that uses the Cloud for information storage that seemed very cost effective.

There is a State Wildlife Grant Program (SWG) that may fund this type of project. We have about \$1800 in our grant from the Blaine Jaycees that also could be used to fund new survey initiative.

**ENVIRONMENTAL DIRECTION**

Staff is requesting board direction.

**ATTACHMENTS**



1. Minnesota State Wildlife Grant Program

## MN Teaming With Wildlife Coalition Members:

Audubon MN

American Fisheries Society—MN Chapter

Fish & Wildlife Legislative Alliance

Izaak Walton League MN Division

MN Conservation Federation

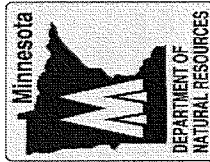
The Wildlife Society—MN Chapter

National Wild Turkey Federation

MN Prairie Chicken Society

Society for Conservation Biology

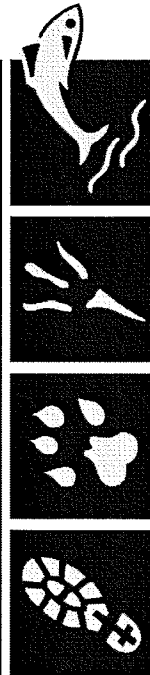
The Nature Conservancy



### For more information contact:

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INVESTING IN WILDLIFE SINCE 2000



STATE WILDLIFE GRANTS

February, 2014

## Minnesota's State Wildlife Grants Program

*Preventing species in greatest conservation need (SGCN) from becoming threatened or endangered and aiding in the recovery of those already listed.*



*Prairie monitoring to improve prairie and grassland conservation*

*Over the past thirteen years, Minnesota has received \$16.5 million in State Wildlife Grants (SWG) to support over 60 projects benefiting SGCN and their habitats. Many of these projects will inform the investment of other conservation funds, including funds from the Legacy Amendment and the Environmental and Natural Resources Trust Fund.*

This booklet highlights, by Congressional District, a few of Minnesota's 2010-2013 SWG projects.

For more information about Minnesota's SWG Program visit: [mndnr.gov/cwcs/swgj.html](http://mndnr.gov/cwcs/swgj.html)

## **ENVIRONMENTAL BOARD AGENDA ITEM 6C**

**STAFF ORIGINATOR:** Aubrey Fonfara, Recycling Intern  
**MEETING DATE:** January 27, 2015  
**TOPIC:** Recycling Updates

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### **BACKGROUND**

*A clarification has been requested for Item #6, Discussion Item A of the October 28, 2015 Environmental Board Meeting:* At our September Recycling Saturday, residents who brought furniture we believed was reusable were allowed to donate it for free and it was transported it to Bridging for donation. Bridging was unable to accept 3100 lbs. of this material due to its quality and space limitations. There was a cost of \$600 for All Appliance Disposal to transport this furniture to Great River Energy for disposal.

Recycling Saturday was January 16<sup>th</sup> at Lino Park. Our vender, All Appliance Disposal, is now working with Evergreen Recycling to recycle mattresses. In addition to Bridging, we are also working with St. Vincent De Paul in an effort to maximize our reuse of furniture in good condition.

Fees for Recycling Saturdays have increased for 2016. Recycling is strongly connected with global oil markets, and because oil prices are currently very low the collection and processing of recycled product costs more than using virgin material. Many end markets are not purchasing recyclables at this time, and recyclers sometimes have to pay to move the product. Attached is the January postcard reflecting theses change in Recycling Saturday fees.

Members of the Environmental Board judged submissions for the Art and Essay contest on January 11<sup>th</sup>. Winners were honored at an awards ceremony this evening before the Environmental Board meeting. The Quad Community Press will publish the winning entries throughout the month of February.

### **ENVIRONMENTAL DIRECTION**

None Required. Information Only.

### **ATTACHMENTS**

1. January Recycling Saturday postcard

# LINO LAKES RECYCLING SATURDAYS!

January 16, 2016  
10 AM – 2 PM

LINO PARK | 7850 LAKE DRIVE

Place all materials in appropriate containers. Small businesses welcome!

## ACCEPTED ITEMS:

### Aluminum Cans

(will be donated to city athletic complex)

Appliances containing Freon (\$15)

Appliances NOT containing Freon (\$10)

Batteries (automotive) - FREE!

Batteries - household (\$1 small box)

Batteries - rechargeable (\$1 small box)

Bicycles - FREE!

Computer Monitors (\$15)

Couches (\$30)

Couches: Sectional (\$20 per piece)

Fluorescent Bulbs (\$1)

Hide-a-beds (\$45)

Mattresses/Small Furniture (\$25)

### Miscellaneous Electronics:

- 1 small item (\$5)
- unlimited small items (\$10)
- 1 large item (\$10)
- unlimited large items (\$20)

Scrap Metal - FREE!

Small Engine Equipment - FREE!

Tires - light truck/auto (\$5)

Tires - semi-truck (\$10)

Tires - tractor (\$50)

TV - 19" & under (\$20)

TV - 20" - 29" (\$30)

TV - 30" & up (\$50)

TV Console & Projection:

- wood (\$60)
- plastic (\$50)



For more information, e-mail *aubrey.fonfara@ci.lino-lakes.mn.us* or call 651-982-2423.

Like us on Facebook at [www.facebook.com/LinoLakesRecycling](http://www.facebook.com/LinoLakesRecycling).

## **ENVIRONMENTAL BOARD AGENDA ITEM 6D**

**STAFF ORIGINATOR:** Marty Asleson, Environmental Coordinator  
**MEETING DATE:** January 27, 2016  
**TOPIC:** EAB Update

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### **BACKGROUND**

Emerald Ash Borer (EAB) was first discovered in Detroit Michigan in 2002. Since it took probably 5 or 6 years to realize something new was happening to the ash trees in Detroit, it is estimated that the insect was introduced around 1996 or 1997. There are now 11 counties in Minnesota that EAB has been identified in and these counties are under quarantine. Park point in Duluth is also under quarantine. Anoka County was placed in the quarantine area.

Lino Lakes approved an EAB Management Plan in 2011. The City has completed an ash inventory of most city ash trees. There is about 900 ash trees on city boulevards and 400 ash trees in public parks. The majority of the park trees (292) are in Country Lakes Park.

The city has removed and replaced ash trees in the Highland Meadows neighborhood boulevards, and as part of the Shenandoah neighborhood street reconstruction project we removed and replaced 22 rather large boulevard ash trees.

The City Council has directed staff to increase the effort for removing and replacing ash trees and subsequently allocated additional \$5000 to a removal and replacement budget of \$10000. Staff would like to increase the removal and replacement dollars in each new upcoming year.

This winter the city will be focusing on Country Lakes Park and removing at least the ash trees in wetlands and a third of the larger upland trees. We shall also like to select a neighborhood street to remove and replace.

The Minnesota Department of Agriculture continues to take the state lead in combating EAB. The Department of Agriculture has a predatory wasp release program that may have a 20% reduction in beetle population decrease. Anything to slow the tree losses down will be helpful. Agriculture staff select more rural and concentrated areas of known EAB to release and study the wasp program. They have, however, released them at the Shoreview site on County Road I.

The University of Minnesota has initiated a volunteer program to detect and map the locations of another native predatory wasp that hunts EAB. It is called the Smokey Winged Beetle Bandit. This wasp is a ground nesting beetle and prefers compacted sand areas for nesting. Volunteer groups (girl scouts, boy scouts, and other interested parties) can look for this beetle and report its location to the University. It is often found on the perimeter of ball field infields, but having the Anoka County sand plane in 2/3 of our city makes it a much larger search area. Finding this wasp can indicate the presence of EAB. The University of Minnesota will provide aerial nets to capture beetles/wasps returning to their nests with their prey and when startled the wasp will drop its prey and this captured insect can then be identified. So far the University has identified 25 confirmed sites, but many more are needed.

The City of Shoreview is now treating public and private trees. Property owners must pay for the chemical and are placed on a list of trees to be treated by licensed students/interns. I am recommending at this time that we look into the treatment of trees in 2017.

The City is offering trees at wholesale costs to proactively replace future ash losses. The city also advertises for Anoka Conservation District tree sale. These are small and less expensive trees.

## **ENVIRONMENTAL DIRECTION**

Update EAB Plan.

## **ATTACHMENTS**

1. Lino Lakes EAB Plan

## **City of Lino Lakes, MN Emerald Ash Borer Management Plan**

### **Purpose:**

The provisions of this management plan are intended to provide a cost effective and culturally acceptable method of management for the outbreak of Emerald Ash Borer. The death of all the ash trees in the City of Lino Lakes will have a detrimental effect on home values, quality of life and environmental benefit. The goal of this plan is to mitigate the impact of EAB as much as practical, to residents and City Ash trees.

### **Introduction:**

Emerald Ash Borer (EAB) is an invasive, non-native, introduced pest that came into the USA from ports in Detroit Michigan. The insect is indigenous to China and is suspected to come into this country in packing crates. EAB most likely existed in Michigan for at least 5 years before a plant pathologist noticed something wrong with their Ash Trees in 2002. All efforts in Michigan to stop this insect have failed. It is now estimated that EAB can travel up to 4 miles by its self, or an average of 10 miles with human help. Humans help this insect get around to new areas mainly by firewood transport. With only 6 or seven years of study and research, managers at this time are unable to stop this insect. Scientists do know that once established in a City, all of the City's Ash trees will be killed in five to 10 years. It will be perhaps 20 years minimum until effective controls may be available.

Minnesota has a tremendous amount of Ash trees (900 million). This number does not include the trees planted in Cities in parks and along street scapes. The City of Lino lakes has approximately 328 Ash trees in parks and 598 Ash trees on street boulevards. There are also 157 Ash trees on Peltier Island that have supported Great Blue Heron nests in the past. Preliminary remote sensing from the Minnesota Department of Natural Resources estimates 10000 Ash trees overall in the City of Lino Lakes.

There are three options (other than doing nothing), or combination of these options that cities can decide to follow. First, a city can remove all of their Ash trees. If the trees are not removed, unsightly and hazardous trees are left in the landscape. Secondly, a City can remove and replace the dead ash trees with another type of tree, thus mitigating the benefits of the lost trees. Third, a City can chemically treat the trees with an insecticide for an indefinite amount of time. A city can also do a combination of any of these options. The following highlights each option.

1. **Remove all City Ash Trees:** All Trees will die in 5 years so removal costs are associated with the city or a contractor removing all trees in 5 years. This plan has the lowest out of pocket expense. This plan also causes the greatest losses to aesthetic and ecological value that the Ash trees provided for Lino Lakes. The City will remove all public Ash trees using City Crews
2. **Remove/Replace all City Ash trees.** This option replaces every Ash tree with a new tree that won't get Emerald Ash borer. This plan is the least costly way to manage the Lino Lakes Ash forest and allow it to regain its former size. The City will utilize City crews to remove and replace all City Ash Trees.

The City will provide opportunities for residents to purchase trees at discounted prices to replace Ash trees. The City Goal is plant enough trees to replace anticipated losses in the City Tree Canopy.

The City will start in 2016 to remove and replace City Ash trees on city boulevards and appropriate \$5000 per year to replant these trees.

3. **Treat City Ash trees with insecticide.** This plan has the lowest annual out of pocket costs, but it has the greatest cost over time. It also produces the largest remaining forest over time. Research demonstrates that insecticides can protect small trees < 12" in diameter until they reach a 15 inch diameter. Effective treatment of larger trees would require either a more frequent application, or a higher dose of insecticide. Research as of 3.8.2010 shows one application of insecticide will treat a tree for at least 3 years. The City will utilize City personnel trained and licensed in treatment for EAB, to treat City trees chosen to be treated.
4. **Combination of the first 3 options.**

Treating at least the middle range of City tree size also gives the City time to spread our losses over a much greater time period, and possibly eliminate our losses for treated trees. Treated trees should be limited to trees in good vigor with good form. Poor formed trees or trees in declining condition should be removed as soon as possible. Natural controls with parasitic and predatory insects, genetic selection and manipulation, all take time. The estimated time to achieve success in one of these areas is 20 years minimum.

The use of soil drench pesticides for Emerald Ash Borer is discouraged do to the possibility of chemical movement off site.

## Administration



The City Forester shall coordinate efforts with the Public Works Department, the Minnesota Department of Agriculture and/or the Minnesota Department of Natural Resources, Anoka County, and St Paul District Energy to seek assistance for the removal, disposal, replacement, and treatment of City Plan Ash trees. Furthermore the City Forester shall enforce the City Shade Tree Disease Control Ordinance and assist and educate the public in private Ash tree disposal. The disease control ordinance shall be an integral part of this plan.

### **City Park and Boulevard Tree Management Recommendations**

Recommended procedure for City Ash Trees is removal of all poorly-formed and/or defective trees first. Chemically treat all trees in the 6 to 12 inch classification, remove and replace all ash trees < 6 inches and trees > 12 inches. Should future chemical labels allow for higher chemical injection rates, than the City may choose to treat the larger trees.

### **Peltier Island Nest Supported Trees**

It is recommended that Ash Trees supporting Heron nests on Peltier Island (County Property) be managed in such a way as to support the present and future heron Populations, and that a coordinated effort between Anoka County, and the City of Lino Lakes be arranged to this end. Coordinated efforts may be chemical treatment of existing trees and/or replacement of the Ash trees with Basswood, Hickory Trees., or other species that would afford good habitat for the herons.

### **Disposal**

Since all trees within an infected county will be severely transport limited by quarantine, It is recommended that two diseased tree stock pile sites be designated in the City. These sites would be open to the residents of Lino Lakes to dispose of their dead Ash trees. Trees would be allowed to stay on site until such a time that there would be sufficient volumes for tub grinding by St Paul District Energy, or other party interested in tub ground wood product.

Stock pile sites are the north western corner of the old city hall site, and the athletic complex land on Centerville Road and Birch. The City will maintain an open invitation to better-use utilization of Ash wood.

### **Public Information**

Connect to the public by newsletter articles, web page, kiosk information booth and PSA's on local cable TV.

### **Partnerships**

Share resources with other communities where possible. Investigate the use of marshaling of

September 28, 2011

materials on a common interest basis.

**553 street trees**

**425 park trees**