



*Burl W. Haar*

Burl W. Haar, Executive Secretary

STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

**NOTICE OF PUBLIC HEARINGS**

Issued: December 8, 2014

DEC 11 2014

**In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota**

**Public Utilities Commission (PUC) Docket Number:** PL-6668/CN-13-473

**Office of Administrative Hearings (OAH) Docket Number:** 8-2500-31260

DATE	TIME	LOCATION
Monday, January 5, 2015	2:00pm	Saint Paul RiverCentre – Ballrooms A and B 75 West Kellogg Boulevard St. Paul MN 55102 RiverCentre Information: <a href="http://www.rivercentre.org">www.rivercentre.org</a>
Tuesday, January 6, 2015	2:00pm	Downtown Holiday Inn - Ballroom 200 West 1 <sup>st</sup> Street Duluth MN 55802 Parking is free for public hearing guests
Wednesday, January 7, 2015	2:00pm	Bemidji State University Hobson Union - Ballroom 1500 Birchmont Drive Northeast Bemidji MN 56601 University Campus Map: <a href="http://www.bemidjistate.edu/campus_life/map.pdf">www.bemidjistate.edu/campus_life/map.pdf</a>
Thursday, January 8, 2015	2:00pm	Crookston Inn & Convention Center Ballrooms 1 and 2 2200 University Avenue Crookston MN 56716
Friday, January 9, 2015	2:00pm	St. Cloud River's Edge Convention Center Herberger Suite 10 4 <sup>th</sup> Avenue South St. Cloud MN 56301 Convention Center Information: <a href="http://www.stcloudriversedgeconventioncenter.com">www.stcloudriversedgeconventioncenter.com</a>

**Bad weather?** Find out if a meeting is canceled. Call (toll-free) 1-855-731-6208 or 651-201-2213 or visit [mn.gov/puc](http://mn.gov/puc)

## Project Description

North Dakota Pipeline Company LLC (NDPC) proposes to build a crude oil pipeline:

- Approximately 616 miles long, from Tioga, North Dakota to Superior, Wisconsin
- Approximately 302 miles of the new pipeline would be located in Minnesota
- With a 24 inch diameter and a 225,000 barrels per day (bpd) capacity from North Dakota to Clearbrook, Minnesota
- With a 30 inch diameter and a 375,000 barrels per day (bpd) capacity from Clearbrook, Minnesota to Superior, Wisconsin
- With approximately 25 to 50 feet of new right-of-way and 40 to 70 feet of temporary right-of-way

The proposed project includes a new terminal facility near the existing terminal in Clearbrook, Minnesota.

The proposed project would be located in Aitkin, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Polk, Red Lake, and Wadena counties.

## Public Hearing Information

- Public hearings start on time.
- Please arrive a few minutes early so you have time to sign the hearing roster, pick up materials, and find a seat.
- Administrative Law Judge Eric L. Lipman will preside over the public hearings.
- Public Utilities Commission, Department of Commerce, and North Dakota Pipeline Company (NDPC) staff will be available to answer questions about the permitting process and the project.
- Citizens will be able to add oral comments, written comments, or both into the record.
- Citizens who wish to speak will be called from two lists: a list of those who support granting the Certificate of Need and another list for those who oppose granting the Certificate of Need.
- The Judge will alternate between the two lists.
- Because a large number of citizens are expected to request an opportunity to speak at these hearings, the Judge will direct each speaker to be brief.
- The best public hearings are those that have the most number of short, factual presentations from a wide range of citizens.
- Learn more about participating at a public hearing at [mn.gov/puc/aboutus/index.html](http://mn.gov/puc/aboutus/index.html)

## Submit Comments

### Topics for Public Comment

- Is the proposed project needed and in the public interest?
- What are the costs and benefits of the proposed project?
- What are the environmental and human impacts of the proposed project and how can these impacts be addressed?
- Do any of the factors listed in Minnesota Rule 7853.0130 have particular importance in this case? <https://www.revisor.mn.gov/rules/?id=7853.0130>
- Are there other project-related issues or concerns?

**Comment Period** December 8, 2014 through January 23, 2015 at 4:30pm.

*Comments must be received by 4:30pm on the close date*

*Comments received after comment period closes will not be accepted*

**Online** Visit [mn.gov/puc](http://mn.gov/puc), select *Comment on an Issue*, find this docket (13-473), and add your comments to the discussion.

**U.S. Mail** Persons without internet access may send comments by U.S. mail to the Minnesota Public Utilities Commission, 121 7<sup>th</sup> Place East, Suite 350, St. Paul MN 55101.

Please include the Commission's docket number in all communications.

**Important** - Comments will be made available to the public via the Public Utilities Commission's website, except in limited circumstances consistent with the Minnesota Government Data Practices Act. The Commission does not edit or delete personal identifying information from submissions.

## Process Information

Before the project can be built, the Public Utilities Commission (Commission) must approve a certificate of need and a pipeline route permit. The certificate of need process determines the size, type and timing of the proposed pipeline and whether there is a better alternative for meeting North Dakota Pipeline Company LLC's stated need. The Commission accepted NDPC's certificate of need application as substantially complete on March 19, 2014.

NDPC's pipeline route permit application for this project is being handled separately, in PUC Docket Number PL-6668/PPL-13-474.

The Department of Commerce is preparing an environmental analysis for this project. The environmental analysis will be a broad review of the potential human and environmental impacts of the proposed project and alternatives. The environmental analysis will be issued in December 2014.

Judge Lipman will use all the information in the record, including written comments and comments received at the public hearings, to write a report for the Commission. The report will include findings, conclusions, and recommendations about the certificate of need for this project. After receiving the Judge's report, the Commission will schedule a meeting to make a final decision on the certificate of need, expected by June 2015.

## How to Learn More

**Project Mailing List:** Sign up to receive notices about project milestones and opportunities to participate (meetings, comment periods, etc.).

Contact [docketing.puc@state.mn.us](mailto:docketing.puc@state.mn.us) or 651-201-2234 with the docket number (13-473), your name, mailing address and email address.

**Subscribe to the Docket:** Subscribe to receive email notifications when new documents are filed.

Note - subscribing may result in a large number of emails.

1. [mn.gov/puc](http://mn.gov/puc)
2. Select green box *Subscribe to a Docket*
3. Type your e-mail address
4. For *Type of Subscription*, select *Docket Number*
5. For *Docket Number*, select 13 in the first box, type 473 in the second box
6. Select *Add to List*
7. Select *Save*

**Full Case Record:** All documents filed in this docket are available at [mn.gov/puc](http://mn.gov/puc), select *Search eDockets*, enter the year (13) and the docket number (473), select *Search*.

**Public Libraries:** The certificate of need application and the environmental analysis will be available at the following public libraries:

- Aitkin Public Library, 110 1st Avenue NE, Aitkin
- Bagley Public Library, 21 Main Avenue N, Bagley
- Bemidji Public Library, 509 America Ave NW, Bemidji
- Brainerd Public Library, 416 S 5th Street, Brainerd
- Carlton Public Library, 310 Chestnut Avenue, Carlton
- Cloquet Public Library, 320 14th Street, Cloquet
- Crookston Public Library, 110 N Ash Street, Crookston
- Duluth Public Library, 520 W Superior Street, Duluth
- East Grand Forks Campbell Library, 422 4th Street NW, East Grand Forks
- Fertile Public Library, 101 S Mill Street, Fertile
- Fosston Public Library, 403 N Foss Avenue, Fosston
- George Latimer Central Library, 90 W 4<sup>th</sup> Street, St. Paul

- Gonvick Lake Agassiz Regional Library, 170 Main Street, Gonvick
- Great River Regional Library, 1300 W St. Germain Street, St. Cloud
- McIntosh Public Library, 115 Broadway NW, McIntosh
- McGregor Public Library, 111 E Center Avenue, McGregor
- Outing Volunteer Library, 6300 Woods Bay Drive NE, Outing
- Park Rapids Area Library, 210 W 1st Street, Park Rapids
- Pine River Public Library, 212 Park Avenue, Pine River
- Red Lake Falls Public Libraries, 105 Champagne Avenue SW, Red Lake Falls
- Walker Public Library, 207 4th Street, Walker

**Available on CD:** You may contact North Dakota Pipeline Company LLC to request the certificate of need application on CD (see below).

**North Dakota Pipeline Company LLC Project Information**  
[www.enbridge.com/SandpiperProject](http://www.enbridge.com/SandpiperProject) or 1-855-788-7805

**Minnesota Statutes and Rules:** The certificate of need application is being reviewed under Minnesota Statute 216B.243 and Minnesota Rules Chapter 7853. Minnesota Statutes and Rules are available at [www.revisor.mn.gov](http://www.revisor.mn.gov).

## Project Contacts

### **Public Utilities Commission Public Advisor**

Tracy Smetana at [consumer.puc@state.mn.us](mailto:consumer.puc@state.mn.us), 651-296-0406 or 1-800-657-3782

### **Public Utilities Commission Energy Facilities Planner**

Scott Ek at [scott.ek@state.mn.us](mailto:scott.ek@state.mn.us) or 651-201-2255

### **Department of Commerce Environmental Review Manager**

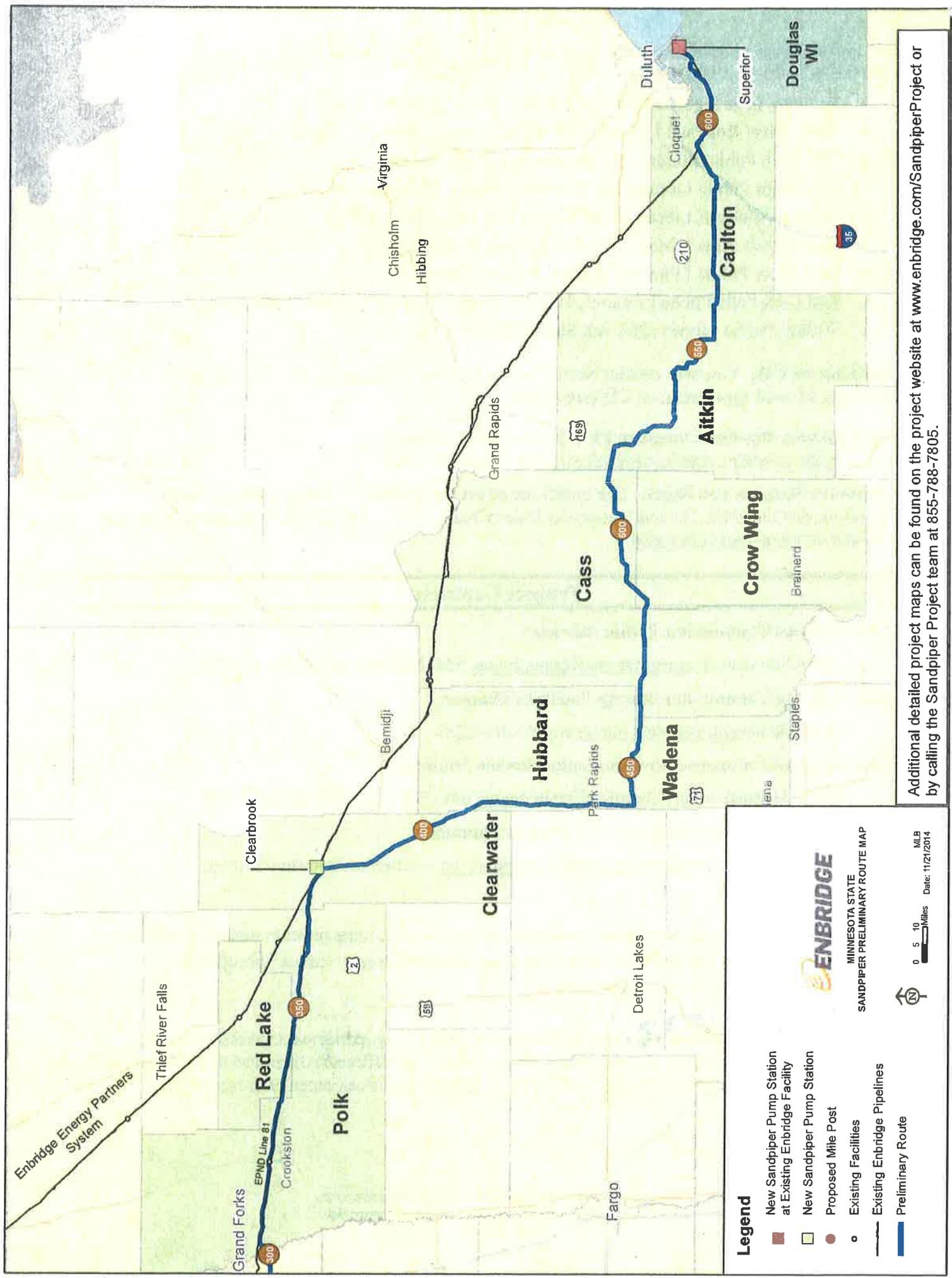
Larry Hartman at [larry.hartman@state.mn.us](mailto:larry.hartman@state.mn.us), 651-539-1839 or 1-800-657-3794

### **North Dakota Pipeline Company LLC Project Contact**

Lorraine Little at [sandpiperproject@enbridge.com](mailto:sandpiperproject@enbridge.com) – Attention Lorraine Little or 1-855-788-7805

This document can be made available in alternative formats (e.g., large print or audio) by calling 651-296-0406 (voice). Persons with hearing or speech disabilities may call us through their preferred Telecommunications Relay Service.

If any reasonable accommodation is needed to enable you to fully participate in these meetings (e.g., sign language or large print materials), please contact the Office of Administrative Hearings at 651-361-7000 (voice) or 651-361-7878 (TTY) at least one week in advance of the meeting.



**Legend**

- New Sandpiper Pump Station at Existing Enbridge Facility
- New Sandpiper Pump Station
- Proposed Mile Post
- Existing Facilities
- Existing Enbridge Pipelines
- Preliminary Route

**ENBRIDGE**  
MINNESOTA STATE  
SANDPIPER PRELIMINARY ROUTE MAP

MLB  
Date: 11/21/2014

0 5 10 Miles

↑ N

Additional detailed project maps can be found on the project website at [www.enbridge.com/SandpiperProject](http://www.enbridge.com/SandpiperProject) or by calling the Sandpiper Project team at 855-788-7805.

## Lake Minnewawa Lake Improvement District (LMLID)

Annual Meeting

August 23, 2014

McGregor Community Center

The meeting was called to order at 10:04 a.m. by LMLID Board Chairman, Pat Rath. Board members Mike Zell, Bob Bass, and David Warner were also present. The absence of Lee Carlson was excused. Recording secretary, Dora Potts, was present, as well. The owners of 19 Lake Minnewawa properties were also in attendance.

Rath welcomed the membership in attendance and directed all to seek further communication through the LMLID website.

### First Year in Review

Explaining that this has been an organizational year, Pat Rath gave a summary of the LMLID activities, assisted by a power point presentation. Accomplishments covered were:

- Administrative set-up
- Development of a funding request form
- Meeting procedure and organizational document
- Establishment of meeting etiquette guidelines
- Establishment of policy to update the membership list twice yearly for communication and tax purposes, once each in July and December.

### Financial Report

Attendees were presented with a financial summary for the year 2014, including receipts and expenditures through 8/23/14. Receipts totaled \$17,583.07 (tax money from the county) plus \$1.27 (interest), for a total of \$17,585.14. Expenditures were \$12,054.85 and included administrative start-up and maintenance expenses (checking account, post office, web site, and mailing). The remainder, which was the bulk of the LID's 2014 expenses, was money applied to weed harvesting on the lake. A further breakdown of the report can be found on the LMLID website.

The LMLID current balance is \$5,530.29. There is an expected bill from LMA for \$2,470 (AIS survey), which has been approved, but not paid. Additional Funding requests of approximately \$10,000 from LMA are expected for 2014. The LMLID expects to receive about \$16,000 from the county around the first of December 2014.

The expectation is that the LID will have about \$11,500 in unspent funds after these receipts and all currently approved disbursements.

Rath explained that taxes are paid by property owners on May 15 and October 15 of each year.

Recipients of these funds (like the LID) can expect their payments about six weeks after taxes are due.

### LMA Partnership

Rath said that it is the LID's pleasure to work with the LMA and encouraged attendees to reach out to the LMA through their website [www.minnewawa.org](http://www.minnewawa.org) and/or their Facebook page. He also praised the LMA for being the "action" group for improving the lake. Rath spoke of the funding request form for LID funding for any proposed activity that improves the health of the total lake. Bob Bass added that the LMA is the only organization currently working on lake improvement.

### Aquatic Invasive Species (AIS) Boat Inspection Program

Rath then introduced Sue Westberg, president of the LMA. Westberg spoke on what she considers the biggest accomplishment of the LMA during the past year: the establishment of the AIS inspection program.

Volunteers have been trained and were on hand for the Growlers' fishing tournament the weekend of August 16. Westberg thanked Bob and Barb Bass and David Warwick for organizing this effort. Although

it is called a volunteer effort, inspectors are paid \$9.00 per hour by the LMA with funds channeled to them by the LMLID. Westberg will continue to apply for grants to help with this expense. She emphasized that DNR funding (grants) can only be used at the 2 DNR landings on the lake and that these are the only two landings currently manned due to insurance concerns. Barb Bass told of continuing efforts to find alternate insurance coverage so that other lake accesses could be manned in the future. Westberg encouraged all interested people to contact Barb Bass for information about training and to volunteer for this program. She said that many area lakes are infested with invasive species and that inspecting watercraft for AIS is the best way to keep them out of Minnewawa.

### **Aquatic Invasive Species (AIS) Lake Survey**

Greg Pfeifer spoke about the recent hiring of Freshwater Scientific Services to perform an on-site lake survey. FSS is a private company and was chosen because it is strictly involved in lake assessment and does not sell any other services or products to improve lake health.

FSS spent 8-9 hours on the lake, covering 32 miles by boat. They conducted a variety of tests on Lake Minnewawa, including taking shoreline samples, using sonar to assess weed densities, and a one-acre intense study around many of the current boat landings.

At this time no established colonies of AIS were found. Pfeifer added that the study gives the LMA and LMLID a baseline with which to work. A second survey is planned for next year in order to further establish the baseline by performing additional inspection tests. After that, reinspection will probably be scheduled for alternate years for maintenance purposes.

Other points of discussion about this item included:

- Pfeifer expects to receive the final report from FSS in September.
- Mike Zell emphasized that early detection is key in keeping out AIS.
- A question concerning the health of Horseshoe Lake was raised. This concern was acknowledged as a possible part of expansion of current efforts.
- Residents and visitors to the lake are encouraged to be alert for AIS, as well. The various stages of AIS can be found on the DNR website and everyone should be on the lookout for them.
- The study is important in that it reassures us that there are no established colonies here. It enables us to be proactive. The other three area lakes studied the same week DID show evidence of invasive species, so Minnewawa results are especially reassuring. Those lakes were in the Brainerd, Minnetonka, and Mille Lacs areas.
- The LMLID is focused on two initiatives: reactive (such as harvesting) and proactive (lake survey and boat inspection). Mike Zell reminded the audience that the reactive portion is often much more expensive. Pat Rath believes that the LID has energized these efforts.

### **Approval of 2015 LMLID Budget**

According to LID bylaws, the board is required to solicit a membership vote on any expenditure over \$5,000. Therefore, the proposed budget for 2015 was presented to the meeting attendees.

Expected income in 2015 is \$34,060 (524 property owners @ \$65 each)

Priorities for 2015 are:

- Liability insurance
- LMLID administration
- Subcontracting documentation of Lake Management Plan
- Vegetation management (current expenses of harvesting and starting a harvester purchase fund)
- Boat inspection for AIS
- Lake survey (to address additional details of lake health and establish benchmarks for the LID's five year report)
- Contingency fund to cover overruns and unbudgeted items.

Unused 2014 funds can be directed to LMA for capital equipment (harvester).

Unused 2015 funds will be used to improve the health of the lake.

Mike Zell presented the results of his own investigation on harvester life. According to his sources, the typical harvester life span is about 15 years. The one in use on Lake Minnewawa was new in 1987 and was purchased, used, by LMA in 1994. Zell said that the typical harvester is replaced in 10 to 15 years. The board commended the efforts of harvester workers in keeping the current one in working order, but acknowledged the probability of an upcoming harvester purchase.

A suggestion was made from the floor concerning further itemization of expenditures on future budgets. Board chair, Pat Rath, said that this could certainly be done and emphasized that the board is learning a lot during their first year in operation and that suggestions are welcomed.

More budget details are available on the LMLID website.

A motion was made to approve the 2015 budget by Chuck Munson. The motion was seconded by Jerry Bass.

The budget was approved overwhelmingly by show of hands.

### **Voting and Election Concerns**

Two concerns were raised concerning the LMLID voting process. One member suggested that all members should be able to vote, not just the members in attendance at the annual meeting. Chairman Rath stated that all members were invited to the meeting by mail and, thus, were given the opportunity to have their voices heard; and that our by-laws and state statute were being followed. Another member mentioned the need for an unbiased election judge. Rath said that the board was not aware of the requirement for such a judge, but that he would investigate the matter before the next meeting.

### **Board of Directors Elections**

According to state regulations, LID boards of directors can have 5 to 9 members. The current board consists of 5 and has made a decision to try to expand to 7 at this time. The membership can vote on expanding to 9 members in the future. Two volunteers have come forward, James Bradley and Catherine Larson. No other nominations were made at the meeting.

Jerry Bass made a motion to accept the nominations of Bradley and Larson. The motion was seconded by Robbie Danko and Nancy Karjalahti. The motion carried by voice vote.

A motion was made by John Montour to elect Bradley and Larson to the LMLID Board of Directors. The motion was seconded by Emil Borg. There was no discussion. The motion carried by voice vote.

### **A Healthy Lake Requires All of Us (presentation by Greg VanEeckhout, MCPA Limnologist)**

VanEeckhout spoke about what it takes to have healthy lakes. He said that there are many new electronic methods and devices available to do more detailed, accurate surveys for less money. He said that it seems that Lake Minnewawa is on the cutting edge of monitoring what is going on in the lake. He was

told of additional initiatives that have been started here, such as rain gardens, the encouragement of establishing no-mow zones, and promoting run-off control.

VanEeckhout also spoke of AIS, like Curly Pond Weed, a very invasive plant, which is bad for water quality, since it decays early and contributes to algae blooms. He said that rooted plants might not be desirable to some people, but that some good plants are needed for fish and a healthy lake. Thus, there is the need to encourage the growth of native aquatic plants.

There are so many lakes in Minnesota that the state deals with them in groups concerning water quality, according to the watershed in which they are located. Lake Minnewawa falls in the Mississippi River Grand Rapids Watershed. VanEeckhout also said that state funding often comes to larger, more vocal groups.

### **Open Discussion**

Chairman Rath opened the floor for discussion and these items were brought forward:

- Suggestion that budget should be subdivided next year. This was noted by Rath.
- Rath invited any members with suggestions for activities to please come forward.
- The goal of the LMLID is to keep the lake healthy for fishing and other recreational use.
- The approach of the boat inspection program is non-confrontational, but educational. Inspectors can report violations to the proper DNR authorities.
- Members were encouraged to invite other property owners to attend and to otherwise promote increased attendance at LMLID meetings.

A motion was made to adjourn the meeting by Bob Bass.

The motion was seconded by Jerry Bass.

Meeting was adjourned at 11:24 a.m.

Submitted by Dora Potts as recording secretary  
August 25, 2014

Approved by Robert Bass, LMLID Secretary  
August 26, 2014

## LMLID 2015 Budget

800	Liability Insurance	
1,350	LMLID administration (mailings; annual meeting; stenographer, web site...)	1
500	Subcontract documentation of Lake Management Plan	2
22,000	Vegetation management	3
2,000	Boat inspection for AIS	4
6,000	Lake Survey	5
1,410	Contingency - cover overruns; unbudgetted items	
34,060	524 property owners @ \$65 =	\$34,060

Unused 2014 funds can be directed to LMA for Capital Equipment - up to \$12,000

Unused 2015 funds will be used to improve the Health of Lake Minnewawa

- 1 Left high to cover additional mailing if needed
- 2 Small amount to cover an initial review if needed (long term expect grant)
- 3 Cover expected harvesting program expenses and start Capital Equipment fund
- 4 If needed. (expect State funds to cover)
- 5 Comprehensive vegetation mapping - benchmark to support State DNR, PCA and County report



# Lakes and Pines Board Meetings

## 2015

January 26: 10am Full Board; 9am Finance Committee

February 23: 10 am Executive Committee

March 16: 10am Full Board

April 20: 10am Executive Committee

May 18: 10am Full Board (Luncheon to follow)

June 15: 10am Executive Committee; Nomination Committee; Personnel Committee

July 20: 10am Full Board

August 17: 1:30pm Executive Committee; Personnel Committee

September 21: 10am Full Board

October 1: 5pm Annual Board Meeting (Full Board)

October 19: 10am Executive Committee if needed

November 16: 10am Full Board

December 21: 10am Executive Committee

DEC 15 2014



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7699 Anagram Drive  
Eden Prairie, MN 55344

PHONE 952-937-5150  
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TOLL FREE 888-937-5150

[www.westwoodps.com](http://www.westwoodps.com)

December 17, 2014

Mr. Nathan Burkett  
Aitkin County Administrator  
217 Second Street NW  
Aitkin, MN 56431

**Re: EverStar Wetland Banking Project  
Project Engineer's Summary Letter for Partial Abandonment of County Ditch 24  
File 20047566**

Dear Mr. Burkett:

This letter is part of the additional materials being submitted to the Aitkin County Board in support of a petition for Partial Abandonment of County Ditch 24. Numerous materials have been submitted to the record and presented to the board. This letter helps summarize key issues regarding the project. I am the engineer of record for this project and have helped guide the technical aspects of the project over the years. The primary outcome of the project is that hydrology will be restored to facilitate wetland restoration and the partial abandonment of County Ditch 24 on the EverStar property will not negatively affect upstream users.

**Opinion 1: Flow capacity across the site is increased with no increase in stage or duration of stormwater to upstream users.**

The flow capacity of the existing narrow County Ditch is replaced and improved with a new, engineered broad swale that provides continuous flow across the site. The swale design is shown in the Construction Plans and new graphics in the Technical Response to Concerns materials. The performance of the swale versus the existing County Ditch is analyzed in two separate surface water flow models. These engineering studies support the opinion.

In all cases, the swale offers greater flow capacity and results in less backup for the upstream users. This becomes more pronounced during critical high flow events that currently flood the area. The wide swale is much larger than the existing ditch and simply has more capability to convey water during large storm events than the narrow existing County Ditch. Intuitively, the larger the flow, the deeper the flow area becomes. As the water flow deepens, it rises above the vegetation and begins to flow unimpeded. This is the reason the new design with its broad cross section improves drainage across the site.

From a maintenance standpoint, the wider feature is less prone to clogging over time. The County Ditch is currently overgrown and clogged with woody debris in sections. The wide swale will allow more water to flow and will be much less prone to clogging from woody debris than the existing County Ditch and will be maintained by the owner.



December 17, 2014

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**Opinion 2: Partial ditch abandonment will not impact the airport property.**

Airport drainage for the northern end of the runway flows overland off the airport property onto EverStar property. This flow is not in a channel, but is overland, sheet flow in nature. There will be no impacts to this drainage for two reasons. First, no surface grading is proposed in the area that carries the overland flow. All existing routes will be maintained for water movement away from the airport. The ultimate flow path will end in the broad swale slightly west of the current ditch location. Second, groundwater/subsurface influence of County Ditch 24 extends between 30 to 100 feet from the ditch. County Engineer John Welle has cited a 30 ft. lateral influence is typical for Aitkin County. This indicates that the ditch will have no adverse effect on the airport property, which is located well in excess of 30 feet from the ditch. The additional saturation of EverStar soils will be achieved on a limited basis to meet wetland criteria, but will not be of a magnitude to impact the airport property soils, which are already saturated to the point of being wetland.

Overall, the engineering plans return the project site to a more natural drainage pattern dominated by sheet flow. Water is retained on Site longer, reducing peak flow volumes to the remaining County Ditch system and Sissabagama Creek. This will provide a secondary benefit of allowing more flow from the airport property in the portion of the ditch downstream of the EverStar property.

The project design is supported by two independent surface water flow models and solid engineering practice. While Mr. Welle has expressed doubts that the proposed system will work as efficiently as the existing ditch, he has not provided technical data beyond his opinion to support this concern. The two models support the opinion of the project engineering team. The site design has also received approval of BWSR engineer Tom Wenzel and the TEP. I believe the plans as presented meet the requirements of the wetland project and support partial abandonment of County Ditch 24 in accordance with state rules. I am seeking your support and approval for this project. I encourage you to contact me if you have any questions.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Eric J. Hansen, PE, PG  
Director Environmental Services

**Comments and Concerns raised by Community and Local Government Staff in Meetings and Comment Letters with Responses to Comments and Concerns:**

**Venue Where Comment or Concern was noted: Partial Abandonment Petition Discussion from Technical Evaluation Panel Meeting, July 24, 2014,**

**Comment or Concern:**

County Engineer expressed concerns that County Ditch 24 is an outlet for 2 miles of County Road 54 and that evaluation of the flow must consider runoff and the regional 100 year flood.

**Response to Comment or Concern:**

The flow models created do accommodate for runoff from County Road 54, which has a drainage area of approximately 1 mile contributing to the ditch in the largest runoff events.

The 100 year regional flood covers nearly the entire site with water resulting in overland flow. This condition is unchanged by the proposed partial ditch abandonment and site grading.

**Venue Where Comment or Concern was noted: September 5, 2014 email from John Welle Aitkin County Engineer, regarding a meeting with the project team**

**Comment or Concern:**

John Welle, the Aitkin County Engineer stated that no meeting was necessary because there are not any outstanding issues that can be resolved in two days before the County Commission hearing. He also stated that the highway department staff does have concerns about negative drainage impacts to County Road 54.

These concerns were also presented orally at the County Ditch Petition Hearing

**Response to Comment or Concern:**

The proposed site design will continue to provide an outlet for this water. The culvert system leading from the roadside ditches into the County Ditch 24 system will remain unchanged. The two models completed both arrive at this conclusion. Downhill, positive drainage is maintained from these culverts to the return to the existing County Ditch 24 south of the property. This flow path along the engineered swale is shown on the attached Exhibit.

Maintenance of County Ditch 24 is allowable as part of the public drainage system to ensure it will operate as designed in the future. The upper reaches of County Ditch 24 will be cleaned

and restored as part of the site grading. The broad swale design offers a more robust design that requires less maintenance.

The property owner is legally responsible under Minnesota law to not cause flooding on adjacent properties. He is obligated to maintain the broad swale in working order.

Two independent surface water flow models for the project show that such impacts will not occur. The Wenck HydroCad model of September 25, 2013 determines that flow conditions will not be diminished under the proposed conditions. The Westwood XP-SWMM model of December 16, 2014 establishes water stage and duration will not increase in the road ditch system for flows any modeled flow event. The Westwood XP-SWMMM model shows that drainage from the County Road 54 road ditch system will improve significantly under critical high-flow runoff events.

The existing 18 inch culvert system that drains the County Road 54 ditch system is a limiting factor in the drainage system. Backup that occurs in the roadside ditches is due to this flow restriction and is independent of the function of County Ditch 24. The relative drainage areas of the culvert, the existing County Ditch and the broad swale are shown on the attached Exhibit. Intuitively, the flow capacity of the 18 inch (1.8 square feet) culvert can be handled in the new swale, which has a cross section of over 60 square feet, is lower than the roadside ditch culverts and provides a continuous down-slope path for surface water flow across the site.

**Venue Where Comment or Concern was noted: Meeting with County Engineer and Staff, September 8, 2014**

**Comment or Concern:**

County Engineer feels the plan means losing the drop in County Ditch system that is needed to provide drainage

**Response to Comment or Concern:**

The engineering principal of channel flow dynamics being proportional to both cross sectional area and drop contradicts this assertion. Surface water flow modeling with two independent models demonstrates that off-site flow is fully accommodated by the new swale system and no reduction in service to the upstream users is evident. Flow capacity in the newly constructed swale is greater for the critical large flow events. The ultimate drop across the site is unchanged as the water enters and exits the site at the same elevation as current conditions.

**Venue Where Comment or Concern was noted: Aitkin City Council Resolution 09-08-14 B, dated September 8, 2014, requesting denial of petition for partial ditch abandonment.**

**Comment or Concern:**

At the September 8, 2014 Aitkin City Council meeting, Mayor Tibbitts informed the council that the Airport Commission is requesting the council send a resolution to the public hearing to request that the County Commissioners deny the Everstar, LLC petition due to the property damage that the flooding would cause to the airport property and the airport runway. Discussion as to the direct endangerment to pilots entering and exiting the airport due to higher volumes of waterfowl attracted to the flooded areas, and the impact this will have at the airport in the future was of concern to the council. Resolution 09-08-14 B was introduced upon a motion by Miller and was seconded by Welshons for the council to request the County Commissioners deny the petition from Everstar, LLC for partial ditch abandonment of ditch 24. All in favor, opposed none, motion carried.

**Response to Comment or Concern:**

Surface drainage from the airport property will not be changed. No grading is proposed in the area of the Site that is part of the overland drainage from the airport property. There is no groundwater effect from the ditch on the airport property because the lateral influence of the ditch is limited to approximately 30 feet based on typical Aitkin County soil conditions, based on statements from County Engineer.

Additional saturation of the Site soils needed to establish wetland conditions is a small change to the current conditions. Airport property soils are already saturated to meet the definition of wetland conditions.

The Cleary Avian Hazard report compared wildlife hazard indices on the EverStar property under pre-restoration conditions with off-site reference locations and locations around Aitkin Airport. Based on that analysis, observation points involving a combination of wet meadow and scrub-carr wetland (the wetland types targeted in the Wetland Bank Plan) exhibited lower wildlife hazard indices than observation points on the EverStar property under existing conditions. Accordingly, the successful achievement of the hydrology and vegetation objectives described in the Wetland Bank Plan and the Adaptive Management Plan attached to the Wetland Bank Plan should result in wildlife hazard indices that meet the objectives of the project and reduce the avian risk for the site.

In addition, the conversion from open hayland/cropland to a Shrub-carr wetland will add a dense shrub layer which discourages use by waterfowl in the area even under flood events.

**Venue Where Comment or Concern was noted: September 9, 2014 County Ditch Petition Hearing**

**Comment or Concern:**

County Engineer stated 1 to 1.25 miles of Aitkin County Road 54 use this ditch for drainage

**Response to Comment or Concern:**

This is generally correct. The extremely flat gradient in the roadside ditches makes it difficult to determine the exact break in flow. The loss of over 2 feet of drop in elevation at the ditch plug will not be offset by the wider flow area in the swale.

The two models for the site flow conditions refute this assertion and actually show an increased flow capacity in the proposed swale compared to the existing ditch under higher flow conditions that cause local flooding.

The broad swale by design carries more water more efficiently as the flow rates increase.

**Comment or Concern:**

The current ditch is performing well now

**Response to Comment or Concern:**

The county maintains the ability to maintain or improve the ditch if needed in the future. The ditch has not been maintained for approximately 30 years. The owner is responsible to maintain the site under the easements placed as part of the wetland creation process.

The model represents flow rates of runoff for rainfall events including the one inch event, two year event and the 100 year event. These are typical for engineering analysis. Large regional flooding events inundate the entire site, so these events are outside the scope of ditch performance. In the case of a receding regional flood, the swale performance will return in the same manner as the County Ditch Performance because both drain to the same point.

**Comments or Concerns:**

The County Engineer believes that the private ditch draining to the Mississippi River may be a remnant of a natural water course.

**Response to Comment or Concern:** Review of historic air photos, USGS topographic maps and county plat maps by Westwood indicates that no such natural drainage swale has existed on the site back to 1914. (Attached **Exhibits 1-9** include historical aerial photographs and topography dating back to 1914).

**Venue Where Comment or Concern was noted: September 9, 2014 County Ditch Petition Hearing**

**Comments or Concerns:** Concerns raised by Doug Green, CEO of American Peat

The abandonment will increase the frequency of maintenance for County Ditch 24. This is based on the graded stream theory that streams flow in equilibrium and reducing the flow from our site will create additional siltation.

There is no backup plan in the event that Sissabagama experiences additional siltation following project completion.

**Response to Comment or Concern:** The amount of siltation in the creek will not be materially altered and will result in a decrease in siltation. The on-site grading and vegetation restoration will reduce flow volumes and turbidity, therefore siltation rates to the creek will be reduced.

Any alteration to the siltation rate is insignificant relative to the overall County Ditch 24 watershed, so no contingency plan is necessary

Follow up discussions with Mr. Green on October 2, 2014 allowed discussion of peak flow timing for the site compared to the total County Ditch 24 system. The peak flow from the project site reaches Sissabagama Creek well before peak flows from the overall system. It is these peak flows that contribute to the scouring that Mr. Green believes is important to the self-cleaning of the creek bed. Because the site flow peak reaches the creek ahead of the overall peak, it does not make a significant contribution to the scouring effect.

At the conclusion of these follow up conversations on October 2, 2014, Mr. Green indicated he no longer held concerns over the project.

**Venue Where Comment or Concern was noted: Airport Commission at October 2, 2014 meeting**

**Comments or Concerns:**

John Welle raised concern that filling County Ditch 24 will cause an increase of water on the airport property.

**Response to Comment or Concern:**

Surface drainage from the airport property will not be changed. No grading is proposed in the area of the Site that is part of the overland drainage from the airport property.

There is no groundwater effect from the ditch on the airport property because the lateral influence of the ditch is limited to approximately 30 feet based on typical Aitkin County soil conditions, based on statements from County Engineer.

Additional saturation frequency and duration to within 12 inches below the surface of the Site soils needed to establish wetland conditions is a small change to the current conditions. Airport property soils are already saturated to meet the definition of wetland conditions.

**Comments or Concerns:**

Tammy Pfaff questioned if the 2011 avian study was going to be updated and questioned if a three year old report is still valid.

**Response to Comment or Concern:** No changes have occurred at the airport or Site that would cause a change to wildlife use patterns. Accordingly the 2011 avian study is still valid and the findings of that study still relevant and applicable to the project.

**Comments or Concerns:**

Concern was raised that wetland creation will increase the population density of birds and that the risk of bird-aircraft collisions will increase.

**Response to Comment or Concern:**

Avian studies were conducted under two FAA qualified airport wildlife biologists to assess the site for bird hazards. It was determined that bird hazards would be reduced over current conditions if shrub wetlands were created on the project area. In addition, the conversion from open hayland/cropland to a Shrub-carr wetland will provide additional shrubcover and reduce the amount of open water available for waterfowl use in the area during historical flood events, such as the flood in the summer of 2012.

The Cleary Avian Hazard report compared wildlife hazard indices on the EverStar property under pre-restoration conditions with off-site reference locations and locations around Aitkin Airport. Based on that analysis, observation points involving a combination of wet meadow and scrub-carr wetland (the wetland types targeted in the Wetland Bank Plan) exhibited lower wildlife hazard indices than observation points on the EverStar property under pre-restoration conditions. Accordingly, the successful achievement of the hydrology and vegetation objectives described in the Wetland Bank Plan and the Adaptive Management Plan attached to the Wetland Bank Plan should result in wildlife hazard indices that meet the objectives of the project and reduce the avian risk for the site.

**Venue Where Comment or Concern was noted: Meeting with County Engineer and Staff, October 7, 2014**

**Comments or Concerns:**

No issues raised with the modeling, but fundamental disagreement by the county engineer that flow rates can be maintained without the drop present in the current ditch.

**Response to Comment or Concern:** The drop in the existing County Ditch is in fact maintained across the site as the flow enters and ultimately exits the site at the same elevation under the proposed design. The flow rates across the site are maintained and actually improved for larger storm events because a significantly wider flow path is offered by the swale. The attached Exhibit shows the relative cross sectional area available for water flow. Water flow is proportional to head (drop) and flow area. The proposed plans use flow areas a hundred times greater than the existing ditch to maintain flow rates for upstream users.

**Venue Where Comment or Concern was noted: County Engineer Letter to Mr. Kirk Peysar opposing this partial abandonment, November 3, 2014 following request for specific comment at October 28, 2014 Public Hearing.**

**Comments or Concerns:**

County Ditch 24 is the primary outlet for approximately 1 mile of CR 54 roadside ditch. These ditches carry water from adjacent private properties and the road surface. Abandonment will cause negative affect because these ditches use County Ditch as their primary outlet.

**Response to Comment or Concern:**

The proposed site design will continue to provide an outlet for this water. The culvert system leading from the roadside ditches into the County Ditch 24 system will remain unchanged. All the modeling completed shows that positive drainage is maintained from these culverts to the return of flow to the existing County Ditch 24 south of the property. In addition, maintenance of the remaining County Ditch 24 is allowable as part of the public drainage system to ensure it will provide benefits in the future. Flow capacity in the engineered swale is greater than the ditch, so future improvements can be accommodated with the existing design.

The upper reaches of County Ditch 24, currently containing a large amount of woody debris and silt. This will be removed as part of the site grading. The broad swale design offers more capacity and requires less maintenance than the current narrow County Ditch. The property owner is legally responsible under Minnesota law to not cause flooding on adjacent properties so will be obligated to maintain the broad swale in working order independent of any county board requirements.

**Comments or Concerns:**

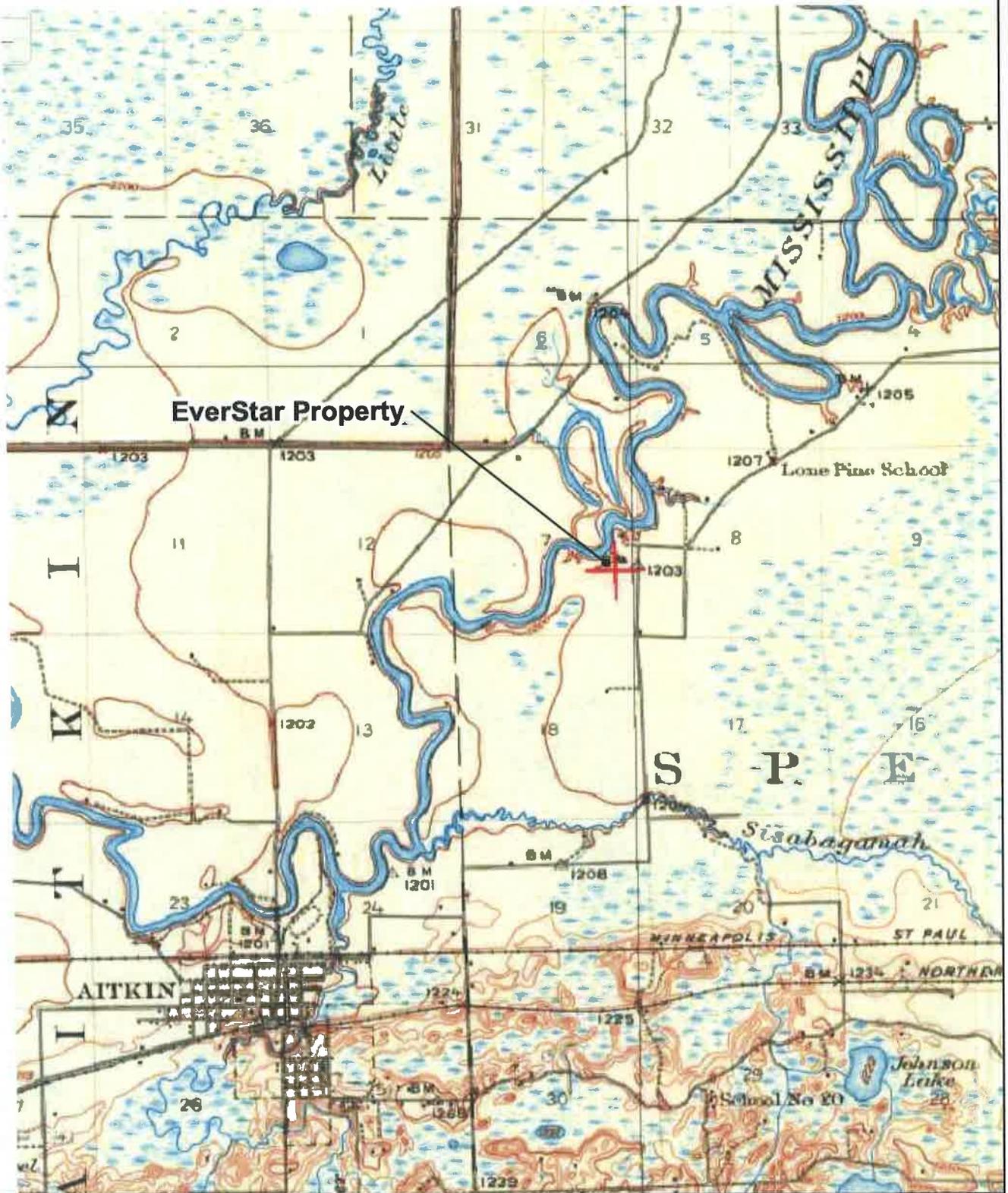
Increases in stage and duration of water at the county road ditch are likely to occur during runoff and flood events, causing water to be backed up onto County Road 54 and adjacent properties at a higher elevation and for greater periods of time than under current drainage conditions.

**Response to Comment or Concern:**

Two independent surface water flow models for the project show that such impacts will not occur. The Wenck HydroCad model of September 25, 2013 determines that flow conditions will not be changed under the proposed conditions. These findings were confirmed in the Westwood XP-SWMM model of December 16, 2014. This model also verifies water stage and duration will not change in the road ditch system for flows any modeled flow event.

The Westwood XP-SWMMM model shows that drainage from the County Road 54 road ditch system will improve under critical high-flow runoff events.

The existing 18 inch culvert system that drains the County Road 54 ditch system is a limiting factor in the drainage system. Backup that occurs in the roadside ditches is due to this flow restriction and is independent of the function of County Ditch 24. Intuitively, the flow capacity of the 18 inch (1.8 square feet) culvert can be handled in the new swale, which has a cross section of over 60 square feet, is lower than the roadside ditch culverts and provides a continuous down-slope path for surface water flow across the site.



Data Source(s): USGS Historical Topography (USGS Accessed 2014)

# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1914 Aitkin

1:62,500 Topography

EXHIBIT 1

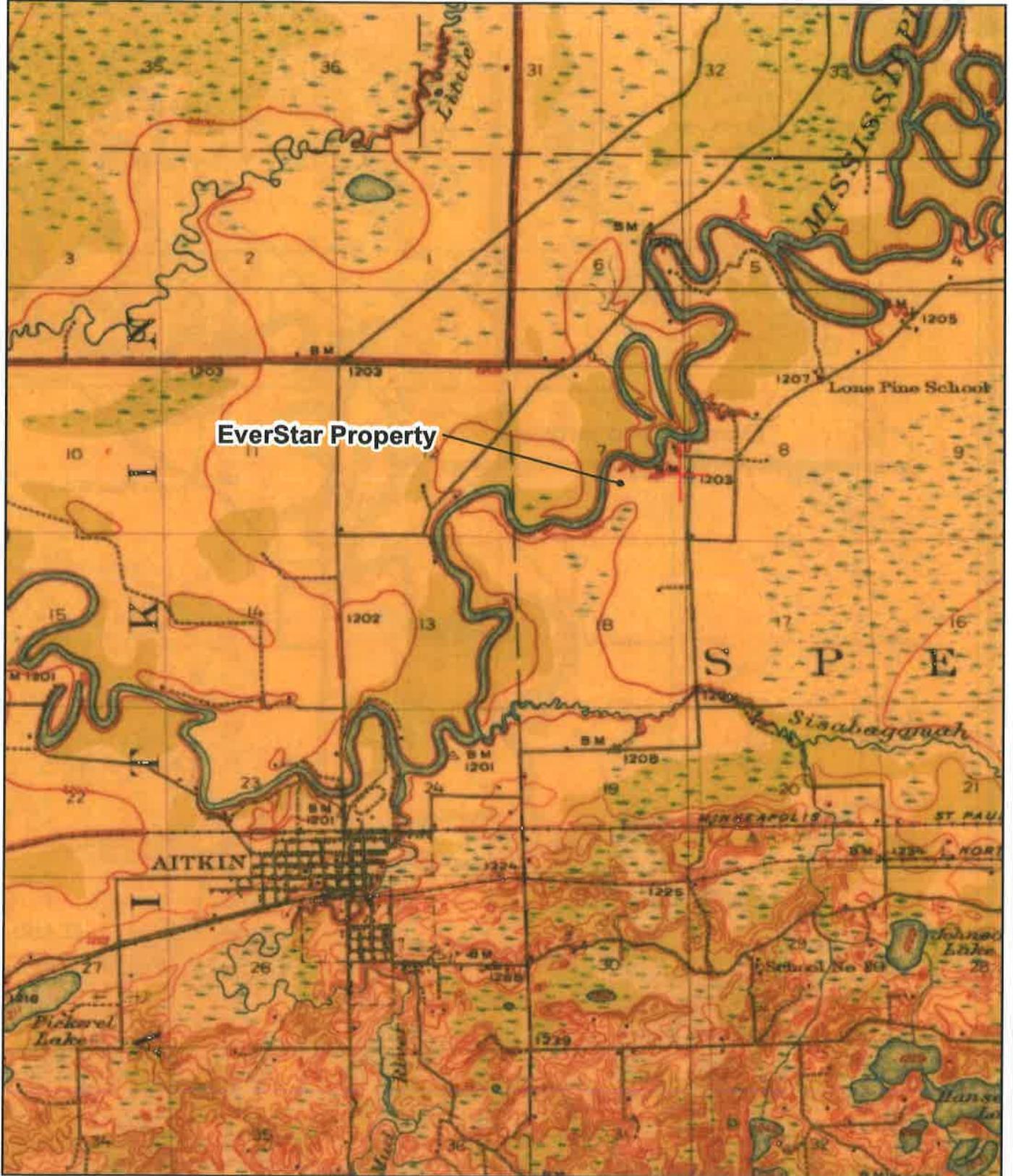


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www.westwoodps.com





EverStar Property

Data Source(s): USGS Historical Topography (USGS Accessed 2014)

# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1915 Aitkin

1:62,500 Topography

EXHIBIT 2



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Data Source(s): USGS Historical Topography (USGS Accessed 2014)

# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1953 Duluth

1:250,000 Topography

EXHIBIT 3

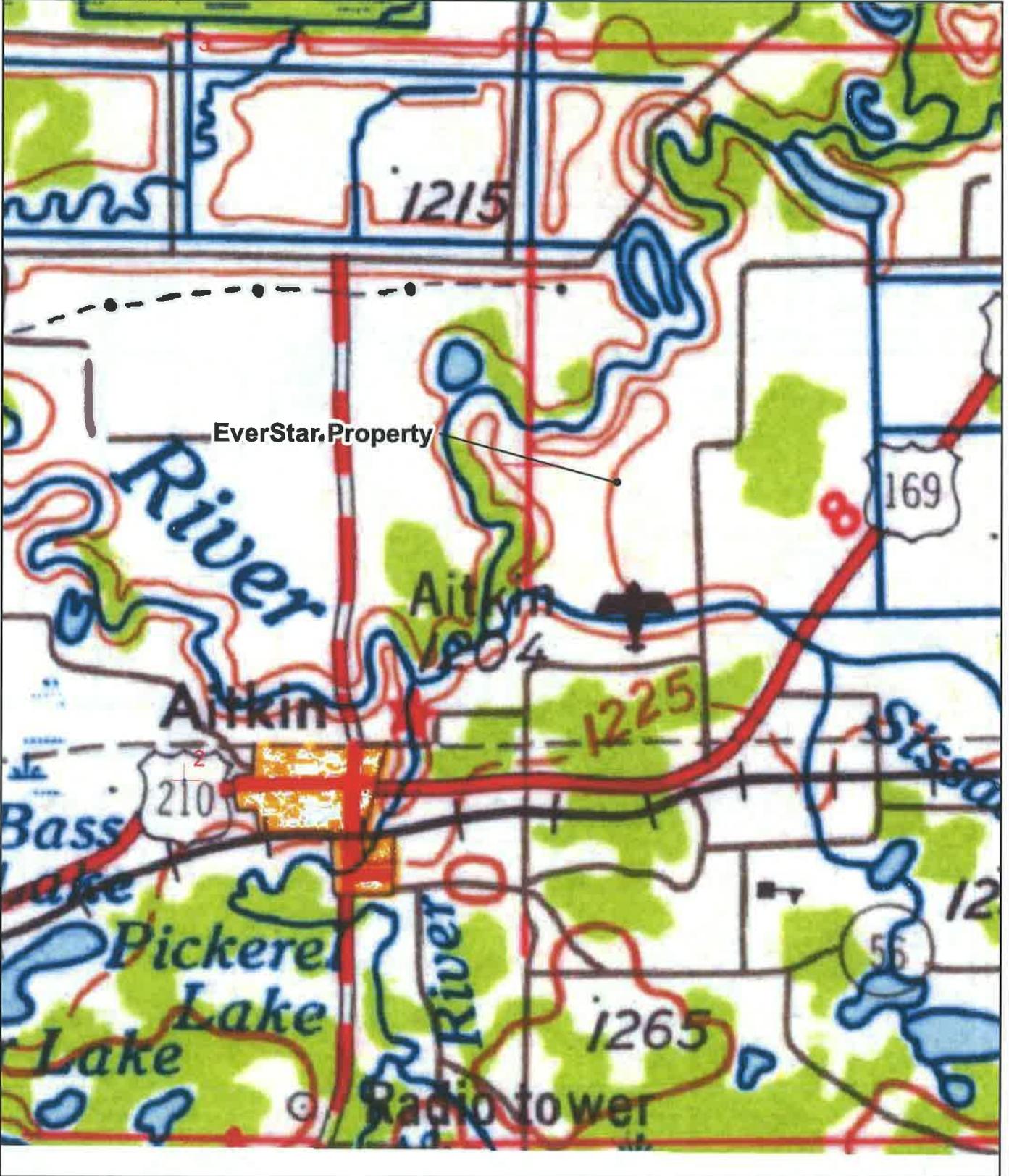


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Data Source(s): USGS Historical Topography (USGS Accessed 2014)

# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1958 Duluth

1:250,000 Topography

EXHIBIT 4



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Data Source(s): USGS Historical Topography (USGS Accessed 2014)

# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1973 Aitkin

1:24,000 Topography

EXHIBIT 5

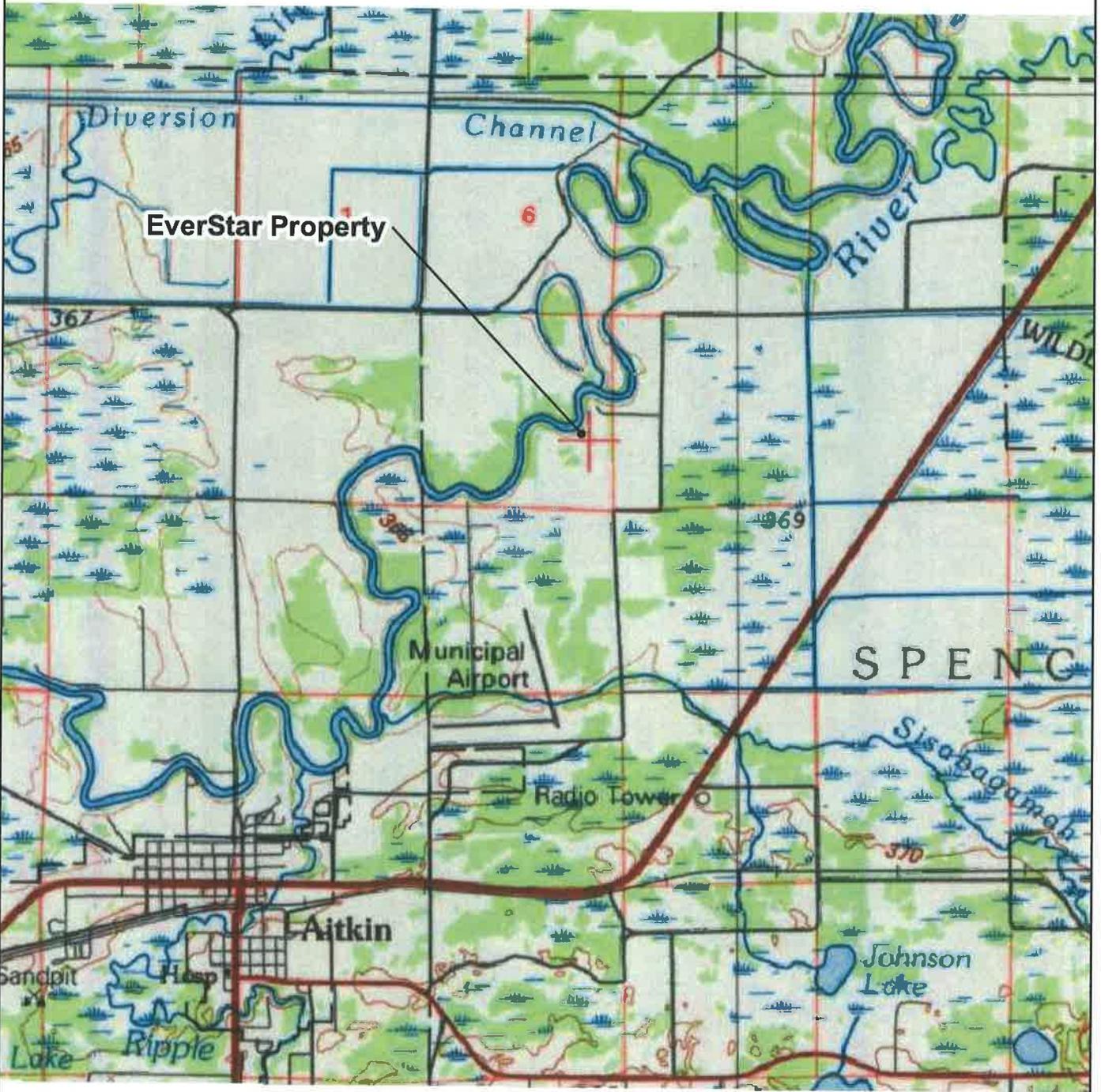


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Data Source(s): USGS Historical Topography (USGS Accessed 2014)

# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1994 Aitkin

1:100,000 Topography

EXHIBIT 6



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Data Source(s): Historical Imagery (Mn DNR Accessed 2014)

# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1939

Aerial Photograph

EXHIBIT 7



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**EverStar Property**

6-12-40

Date Source(s): Historical Imagery (Mn DNR Accessed 2014)

# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1940

Aerial Photograph

EXHIBIT 8



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**EverStar Property**

Data Source(s): Historical Imagery (Mn DNR Accessed 2014)

Map Document: Q:\20047566\GIS\Doc2014AES\_DOQ\_1975\_01A.mxd 12/16/2014 8:59:06 AM



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# EverStar Wetland Bank

Aitkin County, Minnesota

USGS 1975

Aerial Photograph

EXHIBIT 9



18" Diameter Culvert (1.8 square feet)

Existing Ditch (28 square feet)

Proposed Channel (139 square feet)



Date: 12/17/14 Sheet: 1 of 1  
Ditch\_comparison.dwg

Prepared for:

**EverStar, LLC**

Lake Shore, MN 56469

**EverStar Wetland Bank Project**  
Aitkin County, MN

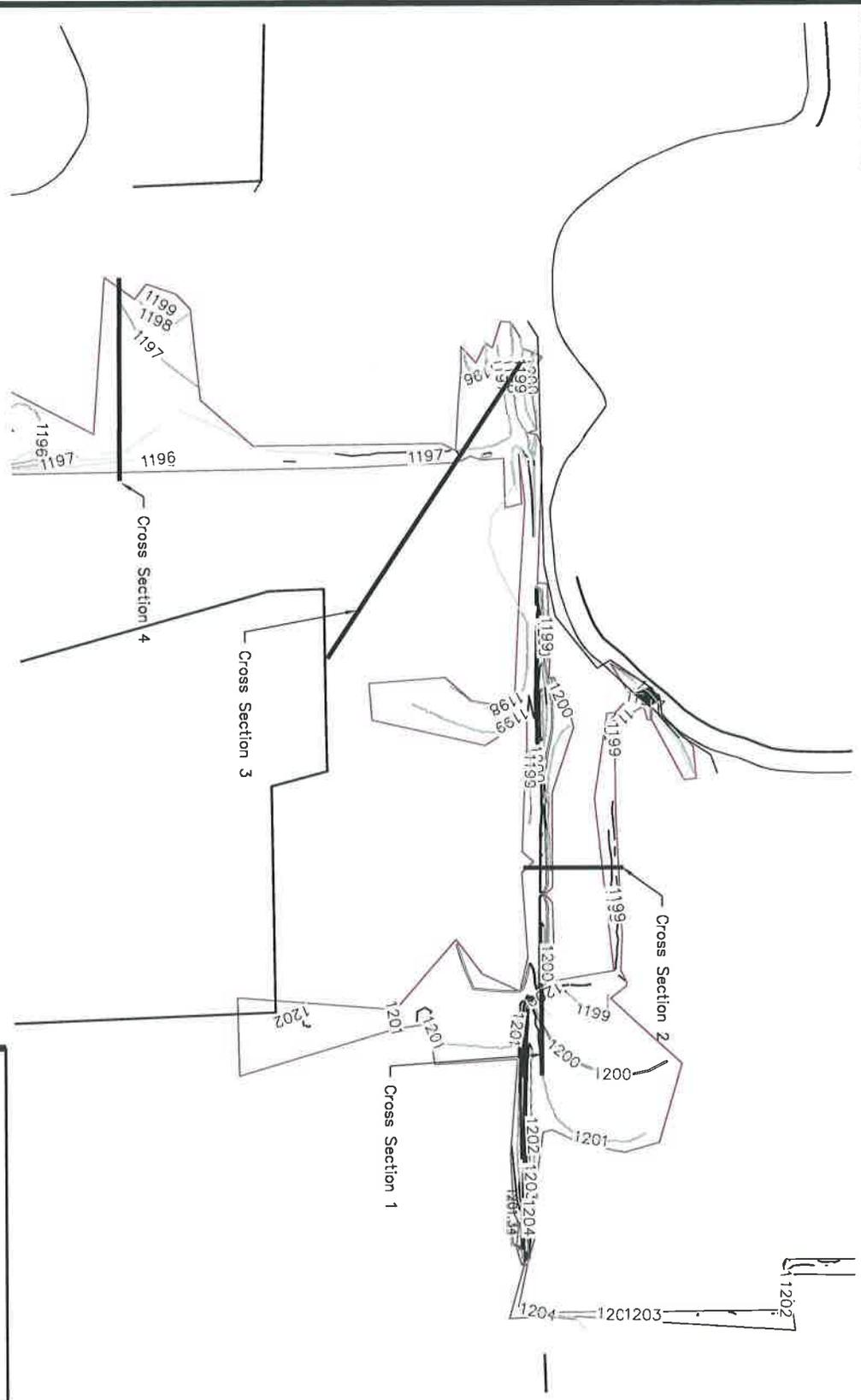
**Ditch - Channel Comparison**



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Contract:	_____
Drawn:	_____
Revised Drawing Number:	_____





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Prepared by:	JWF
Checked:	TJM
Drawn:	JWF
Vertical Datum:	NAVD83

Prepared for:  
**EverStar, LLC.**  
 Lake Shore, MN 56468

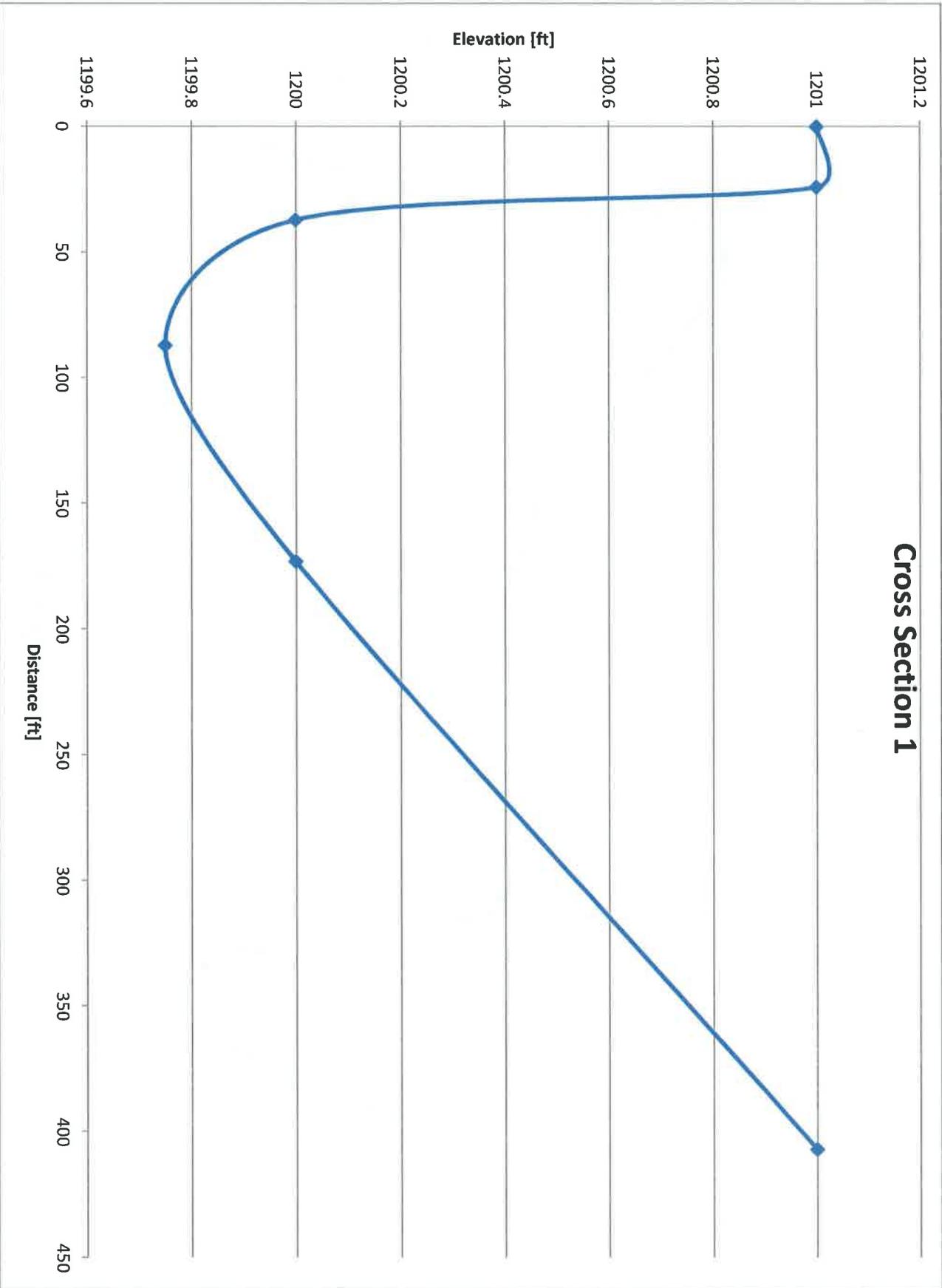
**EverStar Wetland  
 Bank Project**  
 Aitken County, MN

Date: 12/16/14 Sheet 1 OF 1  
 20047566PCON\_1section  
**Cross Section  
 Sites**

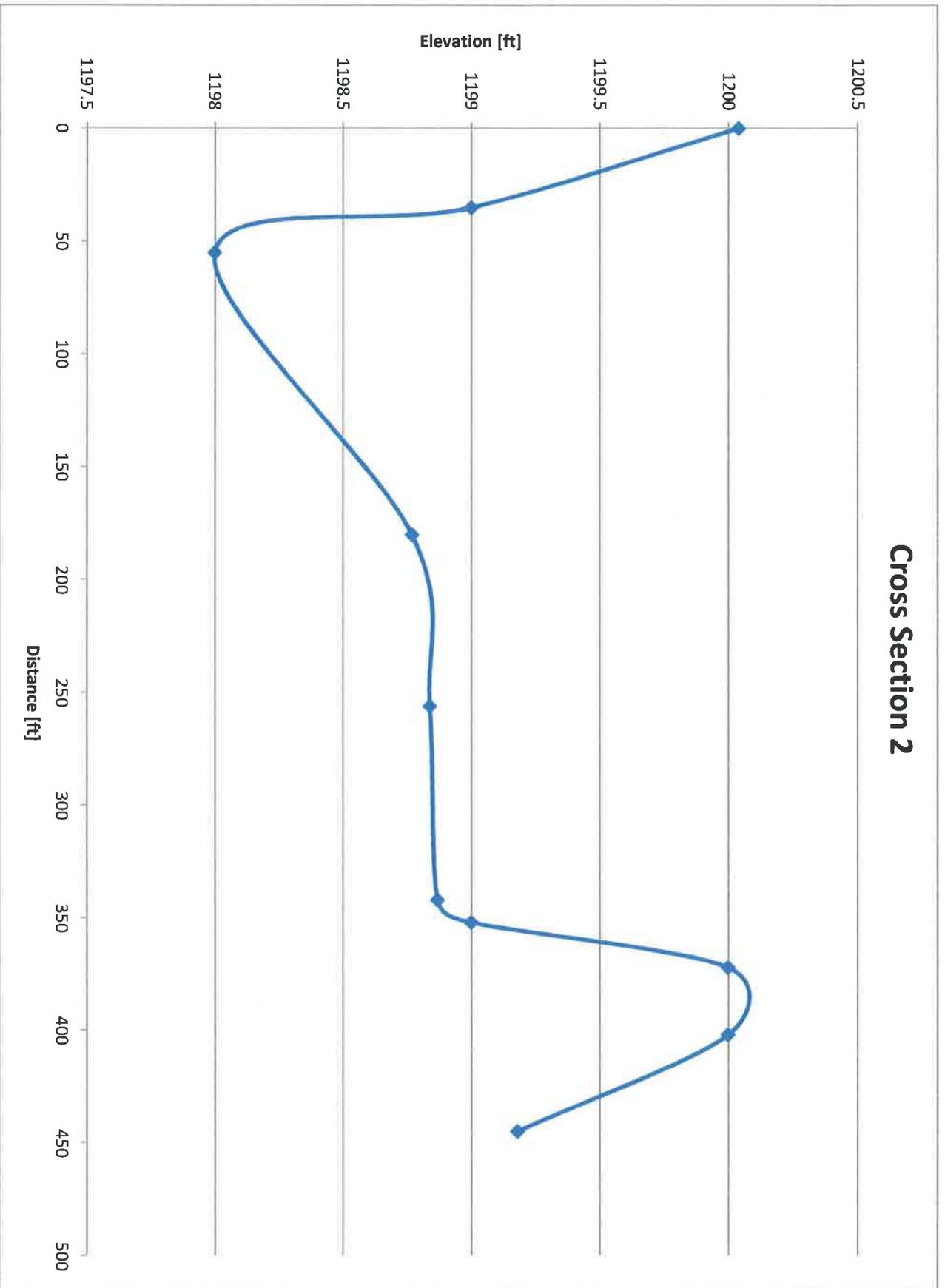




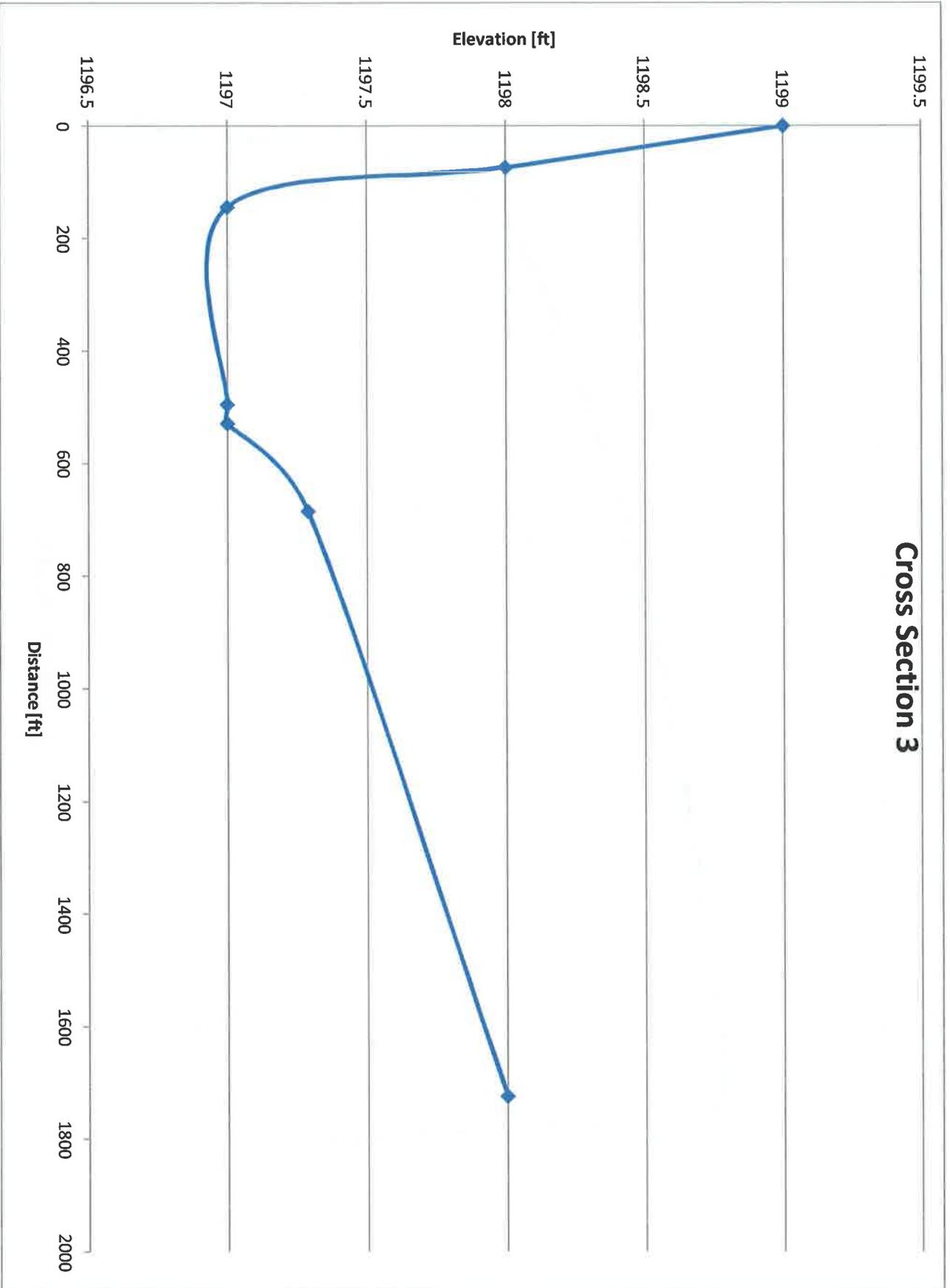
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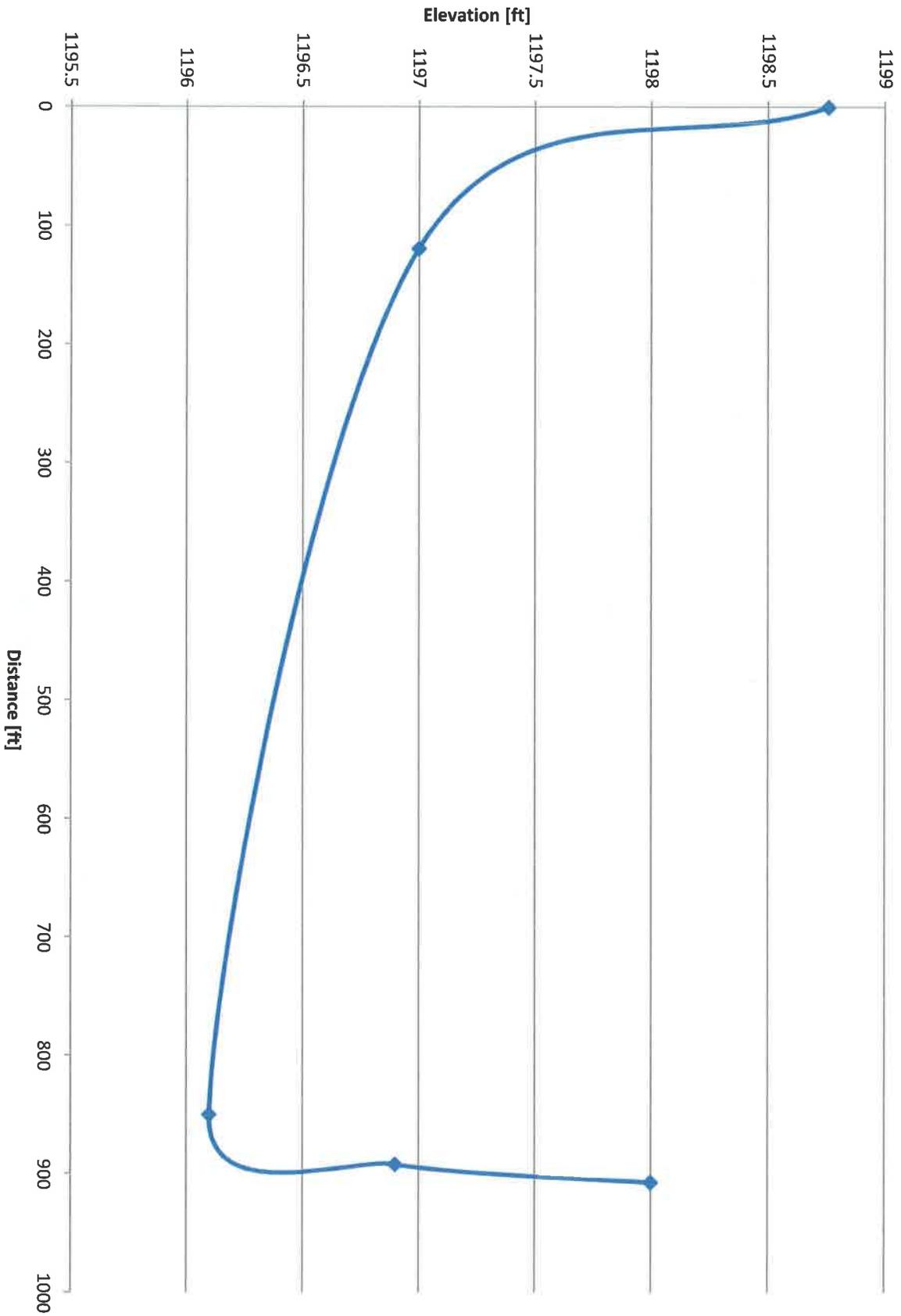
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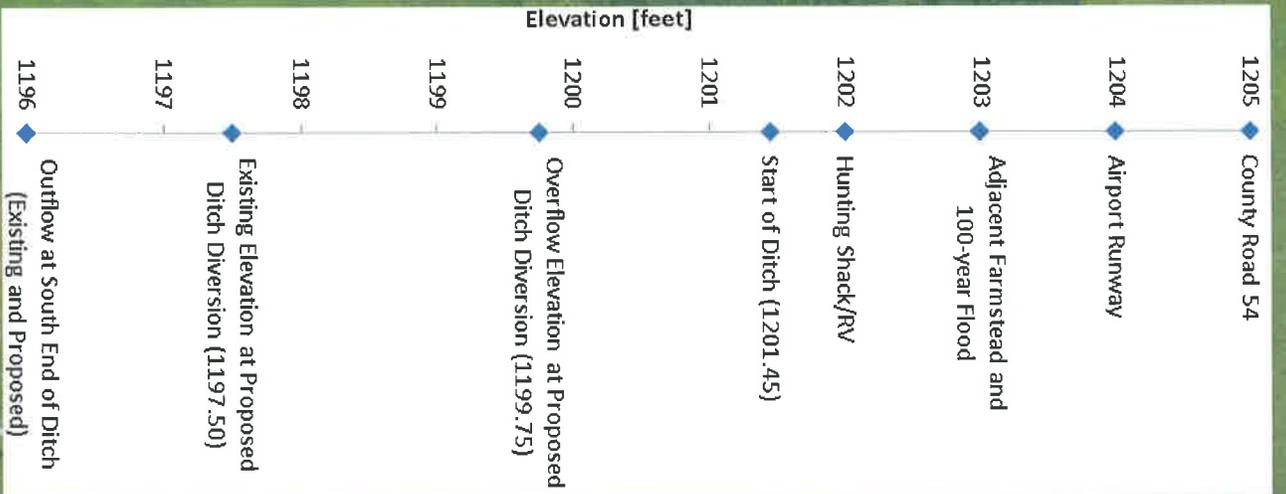
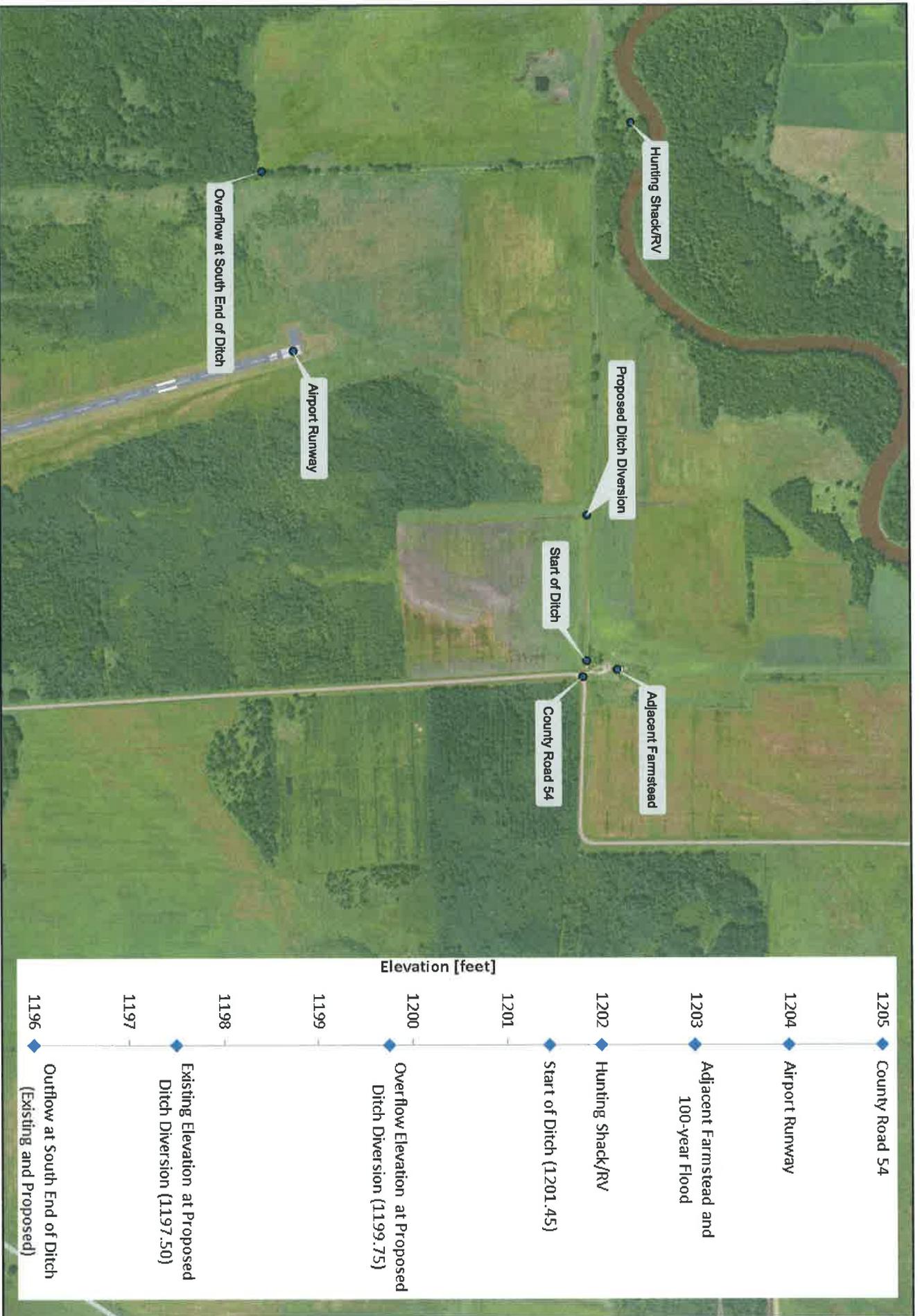


### Cross Section 3



### Cross Section 4





## EverStar Wetland Bank Project Key Elevations

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## MEMORANDUM

Date: December 16, 2014

Re: **Everstar Wetland Bank – Aitkin County – Supplemental Stormwater Analysis Inputs and Results**  
File 20047566

To: File

From: Tom Miller, PE, Water Resources Manager

This memo serves to summarize supplemental computer modeling completed for the Everstar Wetland Bank and is issued as additional information to support the memo provided to the county on 11/6/2014. This analysis was conducted for verification purposes to provide another check of the original hydrologic modeling summarized in the September 25, 2013 memo by Wenck Associates. The conclusions of this analysis verify the conclusion reached in the Wenck memo that “offsite drainage will not be affected by the proposed wetland bank”.

XP-SWMM modeling software was used for this modeling effort. The primary benefit of this software is that it uses physically measurable inputs to generate results, limiting the amount of engineering judgment needed to perform the analysis. XP-SWMM is a hydrologic and hydraulic (H&H) model, capable of analyzing ditches, culverts, ponds, wetlands and all types of hydraulic features. Additionally, it has the ability to model complex flow situations such as backwater flows, reverse flows, road overtopping and multiple flow paths.

This analysis followed the typical water resources practice of creating two models; one for the existing conditions and one for the proposed conditions. Identical rainfall data is input into each model and the differences in flows and water elevations due to a project are examined.

This supplemental modeling purposely used conservative input parameters from standard literature sources to alleviate any concerns that input parameters were not sufficiently “worst case”.

### Data Sources

Modeling inputs can be divided into two categories; hydrology and hydraulics. Hydrology relates to the conversion of rainfall to runoff. Hydraulics describes the movement of water through ditches, pipes and ponds after the runoff is generated.



### Hydrology

The four main hydrology parameters are; drainage area, curve number, TOC (time of concentration) and rainfall.

The drainage area was measured based on high resolution elevation data (LiDAR) available from the State of Minnesota. A total of 584 acres of drainage area are located upstream of the project extents and were analyzed (446 acres owned by Everstar, 138 acres offsite). The offsite acreage includes a portion of the airport property and the areas southeast of County Road 54.

The curve number defines the amount of water that becomes runoff when it rains and is dependent on land cover and soil type. A valid range of curve numbers is from 30 to 98; with a 30 creating very little runoff (a forest on very sandy soils) and 98 creating almost complete runoff (a parking lot). The Aitkin County soil survey indicates that loam and sandy loam soils dominate the area. To maintain a conservative (higher) curve number, it was assumed that the soils were a clay loam and curve numbers were set to 74. A curve number of 74 is a reasonable value for meadow/brush/woods on a clay loam soil. For comparison, the previous Wenck modeling assumed a more loamy soil and had curve numbers that ranged from 57 to 69.

TOC describes the timing between when it rains and how fast the water runs off and enters the ditches. It is based primarily on the distance runoff needs to travel to reach a ditch and the slope of the land. The slope was derived from the State of Minnesota elevation data, the length was measured from contour maps and the Lag Method from Part 630 of the National Engineering Handbook was used to convert to TOC.

The software allows any rainfall depth and distribution to be input. For purposes of comparing the impact the project will have on flows and water elevations, a full range of "design storms" were used. By using a variety of storms, 1-inch to 6.3 inches in 24-hours, the project can assess and impacts under all reasonably foreseeable circumstances. Rainfall was entered explicitly into the model based on rainfall depths available from the National Weather Service. (<http://hdsc.nws.noaa.gov/hdsc/pfds/index.html>).

### Hydraulics

Hydraulics input parameters define the movement of water once it has run off the land. The primary inputs are channel and culvert dimensions and the 'n' value (Mannings Coefficient) One of the primary strengths of XP-SWMM is that all physical dimensions of the existing and proposed channels and pipes can be explicitly input based on existing dimensions and proposed changes in configuration. The existing channel slope, cross sections and culverts were input in the model based on ground

survey on the site. Proposed dimensions (slope and cross sections) of channels were input based on the proposed plan set approved by the TEP.

The 'n' value defines the velocity at which water is conveyed, a lower 'n' value translates into faster flow. For example; a straight, smooth concrete channel ('n' of 0.013) conveys flow much more quickly than an earth channel with long, dense weeds ('n' of 0.080). For the existing condition of the ditch an 'n' value was set at 0.035, typical of a straight channel with vegetation. To account for the brushy conditions through the site under proposed conditions; the 'n' value was set at 0.14, a condition of extreme obstruction caused by floodplain vegetation (Aldridge and Garrett, 1973).

### Results

High water levels and flow rates were calculated for both existing and post-restoration conditions on this site and indicated that there will be no rise in the stage or duration of inundation in the county road ditch upstream of the EverStar property due to the Everstar Wetland Bank project. (Table 1 and Figures 1 and 2) The modeling also shows that flows, elevation and inundation near the downstream extent of the project adjacent to the airport will not be increased under proposed conditions. (Figures 3-6) This supplemental modeling corroborates Wenck Associates previous findings.

Table 1. Maximum water elevation in channel at downstream end of 18" CR 54 Culvert (upstream project boundary)

	Rain depth [in]	Existing [ft]	Post- Restoration [ft]	Reduction in max water elevation
1-inch	1.00	1200.45	1200.25	0.20
1-year	2.35	1201.67	1201.52	0.16
2-year	2.73	1201.96	1201.75	0.21
10-year	3.97	1203.11	1202.56	0.55
100-year	6.33	1204.31	1203.58	0.73

Figure 1. Water elevations and duration at County Road 54 outlet culvert (existing)  
Node - Node31

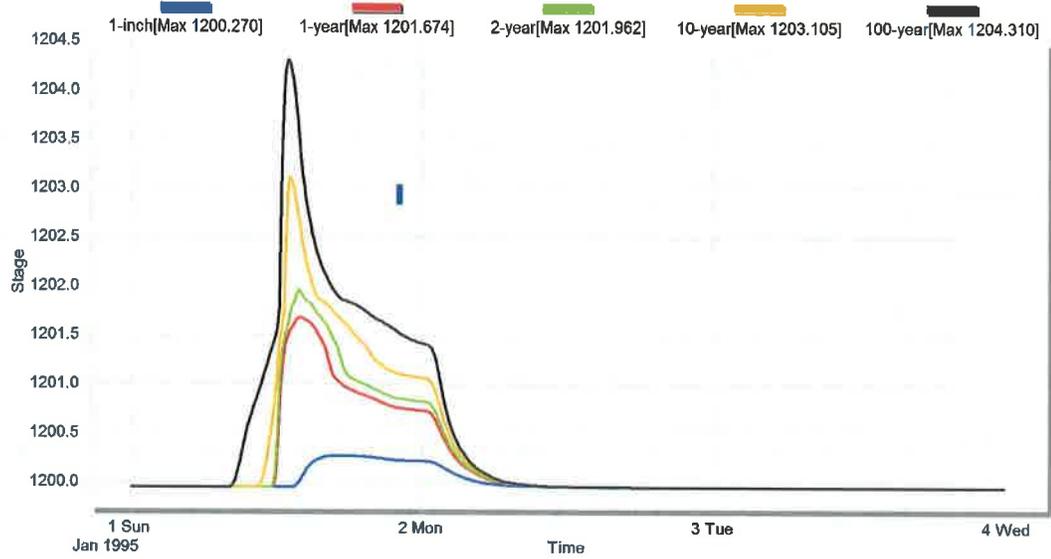


Figure 2. Water elevations and duration at County Road 54 outlet culvert (post-restoration)  
Node - Node31

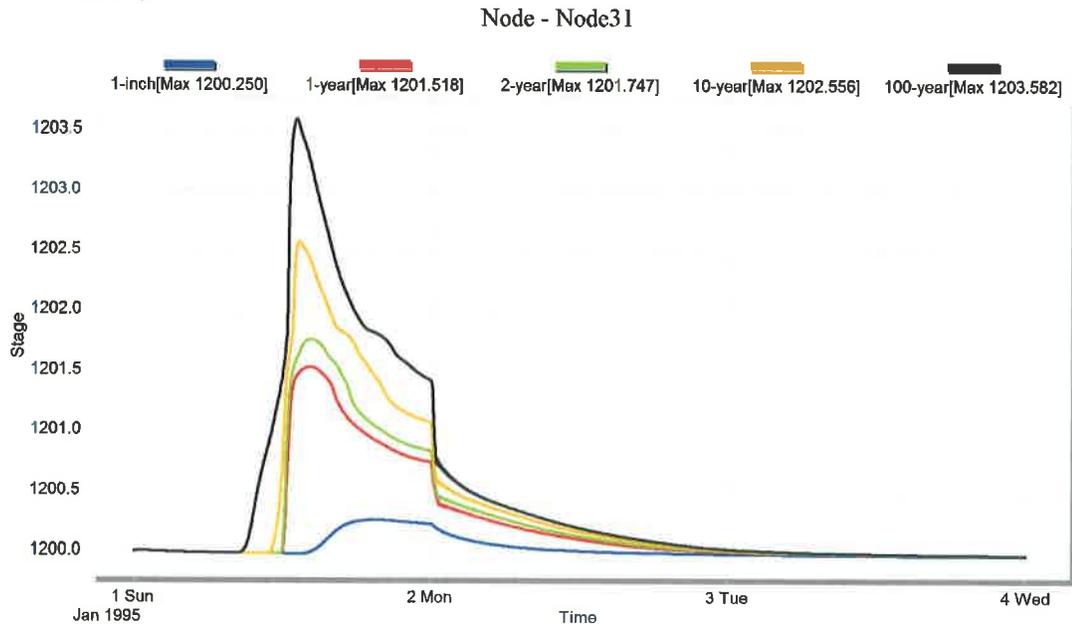


Figure 3. Peak flows in channel downstream of project site (existing)  
Conduit Link50 from SW\_6 to Outfall

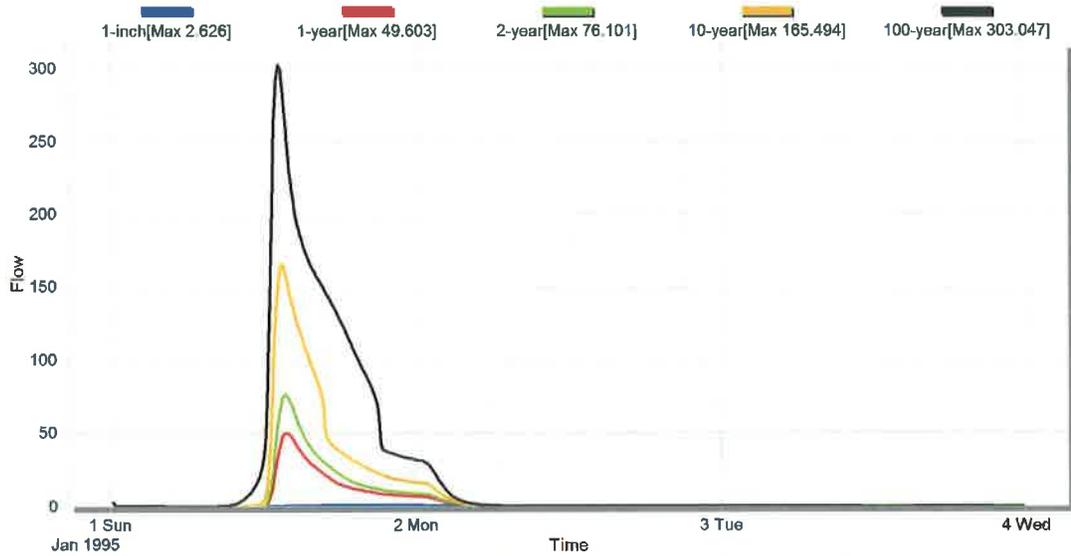


Figure 4. Peak flows in channel downstream of project site (proposed)  
Conduit Link50 from SW\_6 to Outfall

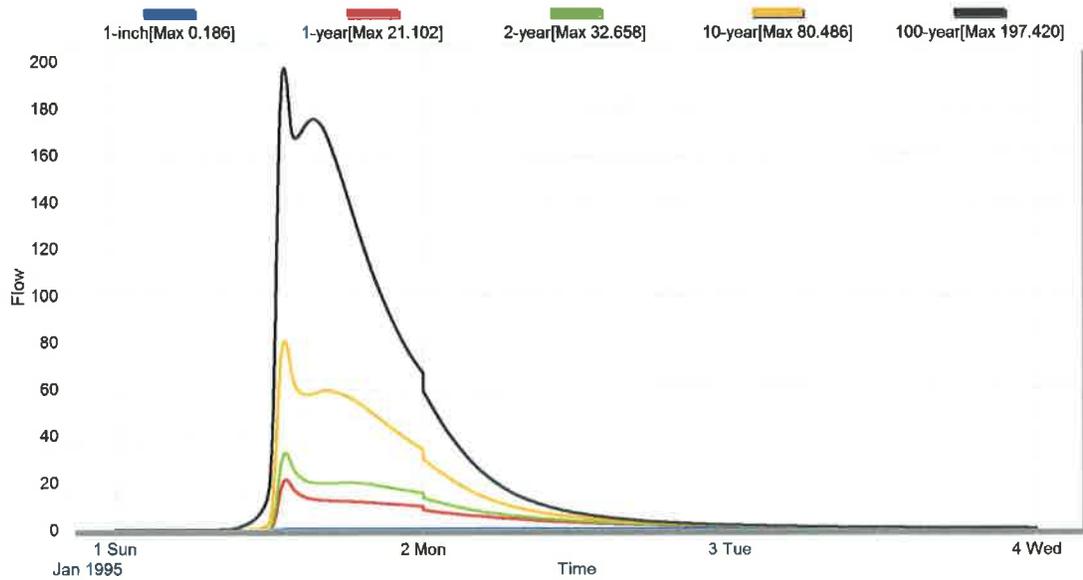


Figure 5. Water elevations and duration near airport at downstream project boundary (existing)

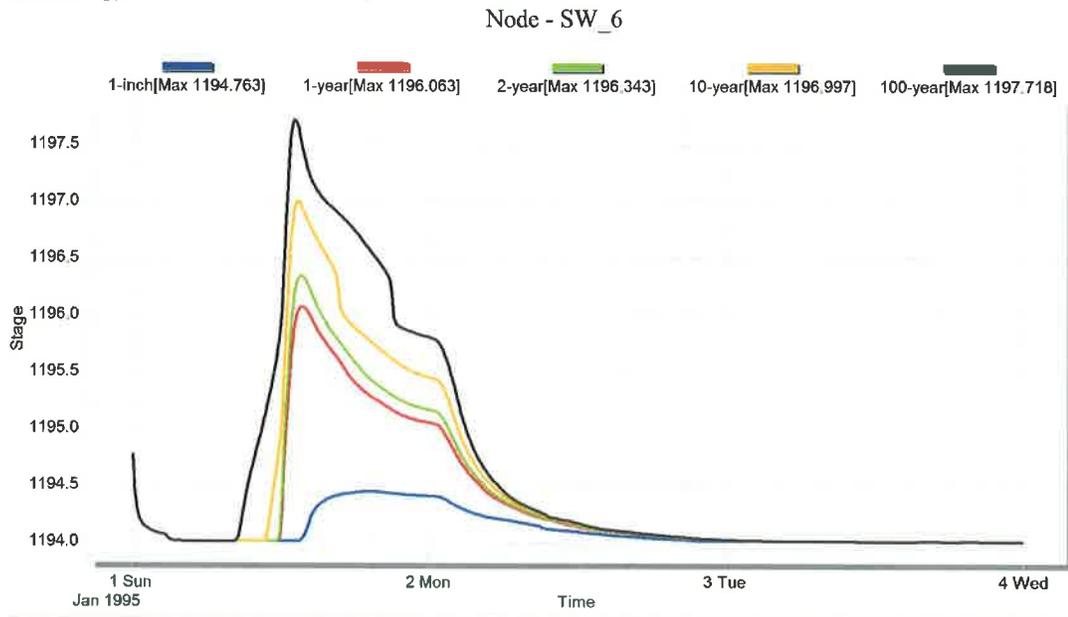
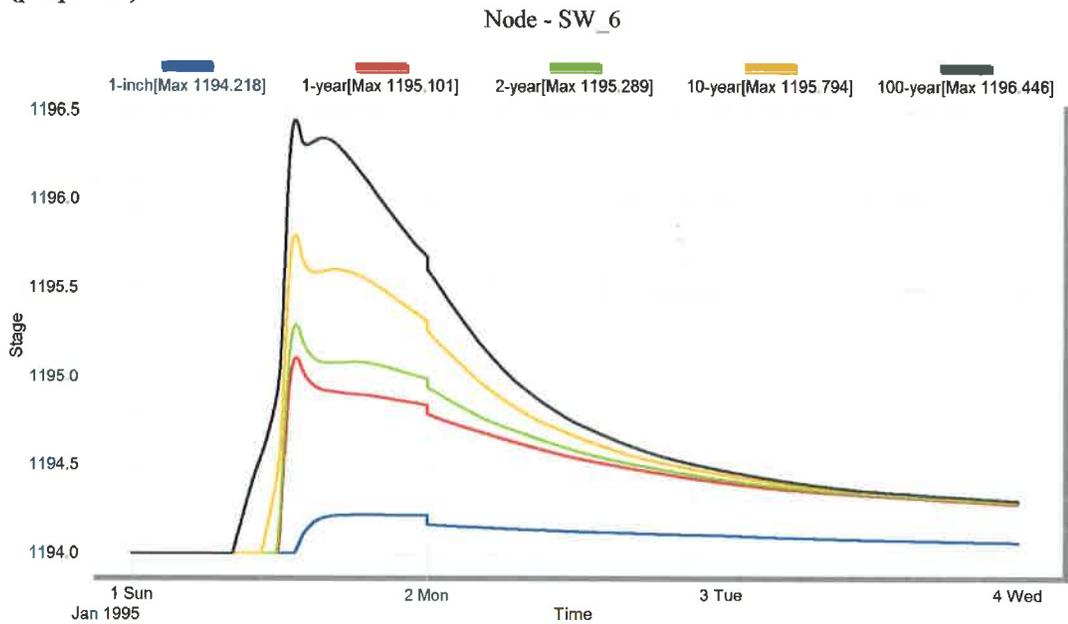


Figure 6. Water elevations and duration near airport at downstream project boundary (proposed)



**ANALYSIS OF DAMAGE HAZARD VALUES AND NEGATIVE EFFECT-ON-FLIGHT  
HAZARD VALUES FOR EXISTING AND PROJECTED HABITAT CONDITIONS AT  
AITKIN AIRPORT, STEVE KURTZ FIELD (AIT) AND THE EVERSTAR WETLAND  
BANK SITE, AITKIN COUNTY, MN.**

**Prepared by  
Edward C. Cleary (resume attached)  
WASHMan LLC**

## Introduction

A proposal is being considered to develop a wetland mitigation bank near Aitkin Airport (AIT) in Aitkin County, MN. The wetland restoration being proposed would convert drained and partially drained, farmed former wetlands to wet meadow and scrub shrub wetland types. These wetland types are common in the area surrounding AIT and represent pre-drainage conditions on much of the EverStar property. Concerns have been raised that restoring wetlands near AIT would create or exacerbate bird-strike hazards at that facility. Conversely, it has been suggested by the project proponent and their wildlife consultant that the existing combination of cropland, wetland and forest land on the EverStar property represents a greater bird strike hazard than the projected post-restoration wetland types.

To facilitate resolution of these issues, the project proponent's wildlife consultant Westwood Professional Services carried out one year of avian point count surveys at AIT, the EverStar property and a series of existing wetland complexes similar to projected post-restoration conditions on the EverStar property ("Reference sites"). Since habitat types vary considerably around AIT and the EverStar property, avian surveys were conducted at a number of representative observation points (OPs) on and around these properties. Fifteen OPs were surveyed<sup>1</sup> with five OPs each being associated with AIT (OPs 1, 2, 3, 4, & 15), the EverStar property (OPs 5, 6, 7, 8, & 9), and the Reference sites (OPs 11, 12, 13 14, & 16). The Reference sites also varied but all contained wet meadow and scrub shrub wetland types similar to the projected post-restoration condition on the EverStar property. A report prepared by Westwood describes the survey methodology and OP characteristics (Appendix A).

The study this report is based on was undertaken to develop quantitative strike hazard values associated with the three habitat conditions referenced above: (1) existing conditions on and around AIT, (2) existing conditions on and around the EverStar

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<sup>1</sup> A sixteenth OP (OP10) was surveyed on the Mississippi River but was not used in this analysis because: (1) the analysis calls for an equal number of OPs for AIT, EverStar and Reference sites; (2) of the Reference sites, OP10 bore the least similarity to post-restoration conditions on the EverStar property; OP10 had the smallest percentage of wet meadow and scrub shrub type wetlands of any Reference site (11%). The next lowest was OP13 with 36%., OP10 is the Reference site that is least representative of post-restoration conditions on the EverStar property. If it had been included, the conclusions in this report would remain the same.

property and (3) existing conditions at a series of Reference sites containing wetlands similar to projected post-restoration conditions on the EverStar property. In their report, Westwood provides land cover descriptions for the OPs associated with these three habitat conditions (see Appendix A).

## **Methods**

Using a method developed by Dolbeer<sup>2</sup> (2010, personal communication) designed to provide quantitative values for the risks to aviation safety posed by different wildlife species and the habitat attracting them, relative risk values were developed for the three above-described habitat conditions.

A wildlife species' strike risk value is defined as the hazard level of a species (defined as the fraction of strikes involving that species that result in either aircraft damage or a negative effect on the flight of the aircraft) multiplied by the likelihood that the species will be struck by an aircraft using the airport. The likelihood that the species will be struck is an inverse function of the number of birds counted in the habitat of concern times the distance of the habitat from the airport's Air Operating Area (AOA) (i.e., the closer the habitat is to the AOA the greater the probability of aircraft striking birds using that habitat). Because the distance from the airport to the existing agricultural land proposed for wetland restoration is constant, distance is not a factor and can be left out of considerations for this study.

Thus, the risk associated with each combination of habitat types is the sum of the hazard value for each species recorded (0.0 to 1.0) multiplied by the mean number of birds of that species counted per unit area in each habitat combination. When comparing existing versus post-restoration conditions, the habitat combination posing the lowest risk to aviation safety is that with the lowest total summed risk value.

Counts of birds seen using habitat within 0.25 miles of OPs were kept separate from those counted more than 0.25 miles or just flying over the OP. By counting only birds seen using habitat within 0.25 miles of the OP and using the same number of observation points in each habitat condition, the total areas surveyed are equal and the

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<sup>2</sup> Dr. Richard A. Dolbeer, PhD, Science Advisor, U.S. Department of Agriculture, Wildlife Services, 1228 Laguna Drive, Huron, OH 44839, USA

number of birds counted in each habitat type can be validly compared.

Some consideration also needs to be given to the threat to aircraft posed by birds merely flying over the survey area. Birds can be attracted to an area because they see other birds in the area or when moving between habitats. Regardless of the reason for the attraction, their presence in the area can pose a threat to aircraft safety. For this reason, the strike risk values for birds seen more than 0.25 miles from the OP or just flying over the OP was also calculated.

As described in Appendix A, avian point count surveys were conducted at 15 OPs 1 to 6 times per month, from August 2010 to July 2011. Survey methods were based on those used in past Wildlife Hazard Assessments (WHAs) prepared by the Grand Rapids, Minnesota office of the USDA Animal and Plant Health Inspection Service (APHIS), Wildlife Services. As done in past USDA WHAs, these surveys were weighted to provide more survey events per month during migration periods. In order to focus the comparison on birds actually using the habitats associated with each OP, observations were placed into two categories: (1) birds observed using habitat (e.g., feeding, loafing, etc.) within 0.25 miles of an OP and (2) birds observed more than 0.25 miles from an OP or flying over the OP but not using its associated habitat. In the analysis presented below, more weight is placed on the observations associated with habitat use within 0.25 miles of an OP. The exact number of surveys conducted each month is presented in Table 1.

The current version of the FAA's National Wildlife Aircraft Strike Database (2011-7, covering 1 January 1990 to 31 July 2011, N=114,388 was searched for reports of strikes involving all species seen using habitat within 0.25 miles of the observation points or flying over the OP but not using the associated habitat for reported strikes that resulted in aircraft damage or negative effect-on-flight<sup>3</sup>. The database was also searched for reported strikes occurring at AIT. No records of reported strikes occurring at AIT were found.

Point count surveys were performed by Debbie Waters (26 survey trips) and Erik

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<sup>3</sup> A negative effect-on-flight occurs when a strike results in an aborted takeoff, a precautionary landing, aircraft engine(s) shutdown, or other deviations from normal/planned flight.

Bruhneke (2 survey trips) from Hawk Ridge Bird Observatory in Duluth, Minnesota. Both individuals possess substantial experience in conducting avian point counts and have conducted such surveys for government agencies in the past. Resumes for the surveyors are provided in Appendix A and their respective biographies can be viewed at:

<http://www.hawkridge.org/about/staff.html>.

## **Results**

A total of 145 species of birds (7,951 individuals) were seen and identified to species within 0.25 miles of all OPs; 3,649 birds were seen and identified to species more than 0.25 miles from or flying over the OPs. An additional 1,629 birds were seen but identified only to group (i.e., gull, woodpecker, flycatcher) not to species and were excluded from the analysis. No strike reports were found for 14 species of birds observed. Table 2 presents a list of those species seen and identified to species, the number of reported strikes, the number and percentage of reported damaging strikes and the number and percentage of strikes that resulted in a negative effect-on-flight of the aircraft.

During the year long study: 1,552 birds of 82 species were seen using habitat within 0.25 miles of AIT OPs and 949 birds of 52 species were seen more than 0.25 miles from or flying over the AIT OPs; 4,497 birds of 104 species were seen using habitat within 0.25 miles of EverStar OPs and 1,664 birds of 55 species were seen more than 0.25 miles from or flying over the EverStar OPs; and 1,902 birds of 101 species were seen using habitat within 0.25 miles of Reference site OPs and 1,036 birds of 59 species were seen more than 0.25 miles from or flying over the Reference site OPs. Table 3 presents a breakdown of this data.

Tables 4, 5, and 6 present the strike risk values for damage and negative effect-on-flight for each species seen using habitat within 0.25 miles of the OPs at AIT (Table 4), the EverStar property (Table 5), and Reference sites (Table 6). The strike risk value was calculated by multiplying the hazard value (percentage of reported strikes that resulted in aircraft damage or had a negative effect-on-flight) by the number of birds seen using habitat within 0.25 miles of each OP.

For the entire year, the total risk value for damage for OPs associated with AIT was 55.5 for birds seen using habitat within 0.25 miles of the OPs and 98.0 for birds seen more than 0.25 miles from the OPs or flying overhead. For the EverStar property, the total risk value for damage was 496.2 for birds seen using habitat within 0.25 miles of the OPs and 240.9 for birds seen more than 0.25 miles from the OPs or flying overhead. For the Reference sites, the total risk value for damage was 66.3 for birds seen using habitat within 0.25 miles of the OPs and 128.6 for birds seen more than 0.25 miles from the OPs or flying overhead (Table 7).

For the entire year, the total risk value for negative effect-on-flight for AIT was 71.6 for birds seen using habitat within 0.25 miles of an OP and 81.6 for birds seen more than 0.25 miles from an OP or flying overhead. For the EverStar property the risk value for negative effect-on-flight hazard value was 371.9 for birds seen using habitat within 0.25 miles of an OP and 213.1 from birds seen more than 0.25 miles from an OP or flying overhead. For Reference sites, the total risk value for negative effect-on-flight was 88.2 for birds seen using habitat within 0.25 miles of an OP and 104.5 for birds seen more than 0.25 miles from an OP or flying overhead (Table 7).

For the entire year, for birds seen using habitat within 0.25 miles of an OP, the total risk value for damage of the EverStar property is 9 times greater than AIT and 7 times greater than the Reference sites. For birds seen using habitat within 0.25 miles of the OP, the total risk value for negative effect-on-flight of the EverStar property is 5 times greater than AIT and 4 times greater than the Reference sites (Table 7).

For the entire year, for birds seen more than 0.25 mile from an OP or flying overhead, the total risk value for damage of the EverStar property is 2.5 times greater than AIT and 1.9 times greater than the Reference sites. For birds seen more than 0.25 miles from an OP or flying overhead, the total risk value for negative effect-on-flight of the EverStar property is 2.6 times greater than AIT and 2 times greater than the Reference sites (Table 7).

Table 8 presents the combined strike risk values for damage by month, based on the average number of birds seen each month, for birds seen using habitat within 0.25 miles of, and those more than 0.25 miles from or flying over the OPs associated with

AIT, the EverStar property, and the Reference sites.

Table 9 presents the combined strike risk values for negative effect-on-flight by month, based on the average number of birds seen each month, for birds seen using habitat within 0.25 miles of, and those more than 0.25 miles from or flying over the OPs associated with AIT, the EverStar property, and the Reference sites.

Table 10 presents the combined strike risk values for damage and negative effect-on-flight of aircraft by month, based on the average number of birds seen each month, for birds seen using habitat within 0.25 miles of, and those more than 0.25 miles from or flying over the OPs associated with AIT, the EverStar property, and the Reference sites.

The total strike risk values for damage and negative effect-on-flight was higher for the EverStar property in all cases, whether considered singularly or in combination, for damage or negative effect-on-flight for birds seen using the habitat within 0.25 miles of the OP and for birds seen more than 0.25 miles from or flying over the OP.

With the exception of December, January, February, and March the damage strike risk values for birds seen within 0.25 miles of the OP, were highest for the EverStar property in its existing condition. The OPs within the EverStar property that most influenced these high damage strike risk values (i.e., OPs 6 and 7) were associated with partially drained, farmed wetland that would have crop residue and temporary sheet water in the spring. In the three winter months the OPs associated with the EverStar property had the lowest damage strike risk values. This is not surprising because of the almost total lack of cover and food to be found on EverStar's agricultural land during the winter. The low risk levels observed at the EverStar OPs over the winter months were far outweighed by the much higher risk levels observed during the spring migration season (see the seasonal variation in risk levels presented in Tables 8, 9, and 10).

With the exception of January, February and March, the negative effect-on-flight strike risk values for birds seen within 0.25 miles of the OP were again highest for OPs associated with the EverStar property in its existing condition. Again OPs 6 and 7 within the EverStar property most influenced these high damage strike risk values. In

the three winter months they were again the lowest. Again, this is not surprising because of the total lack of cover and food to be found on EverStar's agricultural land during the winter.

Observation Point 7 (located on EverStar property) has the highest total number of birds seen within 0.25 miles (2,830) of the OP. Six species (blue-winged teal – 158, snow buntings – 177, red-winged blackbirds – 177, ring-billed gulls – 512, mallards – 582, and crows – 650) account for 2,256 of the 2,830 birds seen there. Excepting the snow buntings, the majority of these birds were seen in the late spring to early summer (April through June). The snow buntings were seen in November. Observation Point 7 also has the highest number of birds seen (464) more than 0.25 miles from or flying over the OP – 343 American robins were counted on 8 April 2011. OP 2 (AIT) has the lowest total number of birds seen (196) within 0.25 miles of the OP. The lowest total number of birds counted more than 0.25 miles from the OP or just flying overhead were seen from OP 15 (117), OP 13 (124), OP 11 (140), and OP 2 (146) (See Table 11).

The observation points having the largest areas of wet meadow and scrub shrub wetland (the types being proposed by EverStar as the post-restoration condition) within 0.25 miles are ranked as follows:

AIT OP 3 – 88%

Reference OP 16 – 86%

Reference OP 12 – 65%

Reference OP 11 – 45%

Reference OP 14 – 40%

Reference OP 13 – 36%

AIT OP 2 – 32%

OP 3 (which lies immediately off the south end of the AIT primary runway) overlooks the largest amount of wet meadow and scrub shrub type wetlands of all the OPs; and, for the OPs available, is most representative of the post-restoration condition on the EverStar property. Yet, in terms of strike risk value for damage and strike risk value for negative effect-on-flight, OP 3 ranks second and third to last, respectively, as compared to the other OPs. The strike risk damage value of birds using habitat within 0.25 miles

of EverStar OP 7 is 63 times higher than that at OP 3. The strike risk value for negative effect-on-flight value for birds seen using habitat within 0.25 miles of EverStar OP 7 is 31 times higher than at OP 3. Accordingly, the proposed conversion of EverStar's existing crop fields to wet meadow and scrub shrub wetlands similar to those around OP 3 would reduce strike risk values dramatically.

## **Discussion and Conclusions**

For the 12-month period, the strike hazard risk is highest for the OPs associated with the EverStar property in its existing condition (which includes a significant proportion of agriculture cropland) for both damage and negative effect-on-flight. The average damage strike hazard risk for EverStar OPs is 7 times higher than the average for Reference site OPs and nine times higher than OPs associated with AIT. The average negative effect-on-flight strike hazard risk at OPs associated with the EverStar property is 4 times higher than the average for Reference site OPs and 5 times higher than OPs associated with AIT.

From the analysis presented in this report, based upon data competently gathered by individuals experienced in conducting avian point counts utilizing survey methods employed by APHIS and an analysis performed under a standard developed by Dr. Dolbeer, Science Advisor, U.S. Department of Agriculture, Wildlife Services and an expert in the field, it is my conclusion that converting drained and partially drained agricultural land on the EverStar property to wet meadow and scrub shrub wetlands similar to those found around AIT OP 3 and Reference site OPs would reduce rather than increase the risk of adverse effect strikes at Aitkin Airport. Retention of the current agricultural use on the EverStar property will perpetuate the existing risk of bird-strikes when this risk could readily be mitigated by converting drained and partially drained agricultural land to wet meadow and scrub shrub wetlands.

## Tables

Table 1. Number of avian point count survey trips<sup>1</sup> conducted each month during the study.

Aug-2010	Sep-2010	Oct-2010	Nov-2010	Dec-2010	Jan-2011	Feb-2011	Mar-2011	Apr-2011	May-2011	Jun-2011	Jul-2011
2	2	6	2	1	1	1	1	4	4	2	2

<sup>1</sup>Each survey trip entailed two visits to each OP, with the survey route run opposite directions on each trip.

Table 2. Birds seen and identified to species during the wildlife surveys around Aitkin Airport, the number of reported strikes, the number and percentage of reported damaging strikes and the number and percentage of reported strikes that resulted in a negative effect on the flight of the aircraft. Strike data taken from the FAA's National Wildlife Aircraft Strike Database, 1 January 1990 to 31 July 2011. Page 1 of 5.

Species	No. Repts	Repts Damage	% Damage	Repts N EoF	% N EoF
Common loon	24	15	62.50	10	41.67
American white pelican	12	9	75.00	10	83.33
Canada goose	1,326	667	50.30	363	27.38
Trumpeter swan	2	2	100.00	2	100.00
Tundra swan	8	7	87.50	4	50.00
Wood duck	31	11	35.48	5	16.13
Gadwall	32	10	31.25	5	15.63
Mallard	616	148	24.03	77	12.50
Blue-winged teal	17	9	52.94	3	17.65
Northern pintail	96	54	56.25	32	33.33
Common goldeneye <sup>1</sup>	5	2	40.00	1	20.00
Hooded merganser <sup>1</sup>	5	2	40.00	0	0.00
American bittern	6	3	50.00	2	33.33
Great blue heron	267	56	20.97	45	16.85
Turkey vulture	428	215	50.23	148	34.58
Osprey	204	47	23.04	30	14.71
Bald eagle	143	60	41.96	41	28.67
Northern harrier	89	2	2.25	2	2.25
Sharp-shinned hawk	13	1	7.69	0	0.00
Cooper's hawk	47	2	4.26	2	4.26
Broad-winged hawk	12	2	16.67	1	8.33
Red-tailed hawk	1,380	215	15.58	151	10.94
Rough-legged hawk	56	4	7.14	2	3.57
American goldfinch	32	0	0.00	1	3.13
Merlin	49	0	0.00	2	4.08
Peregrine falcon	185	14	7.57	9	4.86
Ruffed Grouse <sup>2</sup>					
Wild turkey	53	16	30.19	14	26.42
Sora	14	0	0.00	1	7.14
Sandhill crane	97	41	42.27	26	26.80
Killdeer	2,395	39	1.63	47	1.96
Spotted sandpiper <sup>1</sup>	15	2	13.33	1	6.67

Table 2. Cont. Page 2 of 5

Species	No. Repts	Repts Damage	% Damage	Repts N EoF	% N EoF
Greater yellowlegs	3	1	33.33	0	0.00
Willet	6	0	0.00	0	0.00
Lesser yellowlegs	4	0	0.00	0	0.00
Upland sandpiper	139	4	2.88	6	4.32
Short-billed dowitcher	5	1	20.00	0	0.00
Wilson's snipe	39	3	7.69	3	7.69
Wilson's phalarope	2	0	0.00	0	0.00
Bonaparte's gull	28	2	7.14	3	10.71
Ring-billed gull	1,072	94	8.77	85	7.93
Rock pigeon	2,003	211	10.53	197	9.84
Mourning dove	4,306	135	3.14	181	4.20
Black-billed cuckoo	1	0	0.00	0	0.00
Barred owl	15	1	6.67	1	6.67
Common nighthawk	241	1	0.41	1	0.41
Chestnut-collared Swift <sup>2</sup>					
Belted kingfisher	8	0	0.00	0	0.00
Red-bellied Woodpecker <sup>2</sup>					
Yellow-bellied sapsucker	12	0	0.00	2	16.67
Downy woodpecker	2	0	0.00	1	50.00
Hairy woodpecker	3	0	0.00	0	0.00
Northern flicker	51	3	5.88	0	0.00
Pileated Woodpecker <sup>2</sup>					
Eastern wood-pewee	3	0	0.00	0	0.00
Yellow-bellied flycatcher	1	0	0.00	0	0.00
Acadian flycatcher	1	0	0.00	0	0.00
Least flycatcher	2	0	0.00	0	0.00
Eastern phoebe	3	0	0.00	0	0.00
Great crested flycatcher	2	0	0.00	0	0.00
Eastern kingbird	15	1	6.67	1	6.67
Northern Shrike <sup>2</sup>					
Yellow-throated vireo	1	0	0.00	0	0.00
Warbling vireo	8	1	12.50	0	0.00
Red-eyed Vireo <sup>2</sup>					
Blue jay	12	0	0.00	0	0.00

Table 2. Cont. Page 3 of 5

Species	No. Repts	Repts Damage	% Damage	Repts N EoF	% N EoF
Black-billed magpie	9	2	22.22	2	22.22
American crow	333	29	8.71	30	9.01
Common raven	31	8	25.81	5	16.13
Horned lark	1,571	15	0.95	27	1.72
Tree swallow	284	0	0.00	3	1.06
Bank swallow	148	2	1.35	4	2.70
Cliff swallow	559	3	0.54	7	1.25
Barn swallow	1,684	10	0.59	21	1.25
Black-capped chickadee	18	0	0.00	0	0.00
Red-breasted Nuthatch <sup>2</sup>					
White-breasted nuthatch	1	0	0.00	0	0.00
Brown Creeper <sup>2</sup>					
House wren	9	0	0.00	0	0.00
Winter wren	1	0	0.00	0	0.00
Sedge Wren <sup>2</sup>					
Marsh wren	5	0	0.00	1	20.00
Golden-crowned kinglet	3	0	0.00	0	0.00
Ruby-crowned kinglet	12	0	0.00	0	0.00
Eastern bluebird	4	0	0.00	0	0.00
Veery	4	0	0.00	2	50.00
Swainson's thrush	44	5	11.36	1	2.27
Hermit thrush	29	1	3.45	0	0.00
Wood thrush	7	0	0.00	1	14.29
American robin	455	31	6.81	20	4.40
Gray catbird	34	0	0.00	0	0.00
Brown thrasher	9	0	0.00	0	0.00
European starling	2,692	104	3.86	147	5.46
American kestrel	2,556	22	0.86	43	1.68
Bohemian waxwing	1	0	0.00	0	0.00
Cedar waxwing	47	1	2.13	2	4.26
Golden-crowned kinglet	3	0	0.00	0	0.00
Nashville Warbler <sup>2</sup>					
Northern parula	3	0	0.00	0	0.00
Yellow warbler	9	1	11.11	0	0.00
Chestnut-sided warbler	1	0	0.00	0	0.00

Table 2. Cont. Page 4 of 5

Species	No. Repts	Repts Damage	% Damage	Repts N EoF	% N EoF
Magnolia warbler	10	0	0.00	1	10.00
Yellow-rumped warbler	25	0	0.00	0	0.00
Palm warbler	5	0	0.00	0	0.00
Black-and-white warbler	8	0	0.00	0	0.00
American pipit	31	0	0.00	0	0.00
Ovenbird	17	1	5.88	2	11.76
Northern waterthrush	4	0	0.00	0	0.00
Connecticut Warbler <sup>2</sup>					
Mourning warbler	2	0	0.00	0	0.00
Common yellowthroat	14	0	0.00	1	7.14
Wilson's warbler	16	0	0.00	0	0.00
Scarlet tanager	3	1	33.33	0	0.00
American tree sparrow	8	0	0.00	1	12.50
Chipping sparrow	18	0	0.00	0	0.00
Clay-colored Sparrow <sup>2</sup>					
Field sparrow	16	0	0.00	0	0.00
Savannah sparrow	172	2	1.16	1	0.58
Le Conte's Sparrow <sup>2</sup>					
Fox sparrow	18	1	5.56	0	0.00
Song sparrow	46	0	0.00	0	0.00
Swamp sparrow	13	0	0.00	0	0.00
White-throated sparrow	50	1	2.00	1	2.00
Harris's sparrow	1	0	0.00	0	0.00
White-crowned sparrow	18	0	0.00	1	5.56
Dark-eyed junco	41	3	7.32	2	4.88
Snow bunting	167	2	1.20	17	10.18
Northern cardinal	6	0	0.00	0	0.00
Rose-breasted grosbeak	3	0	0.00	0	0.00
Indigo bunting	4	0	0.00	0	0.00
Bobolink	12	0	0.00	1	8.33
Red-winged blackbird	149	4	2.68	8	5.37
Eastern meadowlark	663	5	0.75	10	1.51
Rusty blackbird	1	0	0.00	0	0.00
Brewer's blackbird	35	0	0.00	0	0.00
Common grackle	97	5	5.15	9	9.28

Table 2. cont. Page 5 of 5

Species	No. Repts	Repts Damage	% Damage	Repts N EoF	% N EoF
Brown-headed cowbird	114	2	1.75	3	2.63
Baltimore oriole	9	0	0.00	1	11.11
Pine Grosbeak <sup>2</sup>					
Purple finch	3	0	0.00	0	0.00
House finch	46	0	0.00	1	2.17
White-winged crossbill	1	0	0.00	0	0.00
Pine siskin	3	0	0.00	0	0.00
American golden-plover	74	3	4.05	4	5.41
House sparrow	105	3	2.86	2	1.90

<sup>1</sup>These species were seen only from OP10 and are included only for completeness. They did not affect any of the calculations.

<sup>2</sup> No strike records for these species were found in the FAA's National Wildlife Aircraft Strike Database.

Table 3. The number of birds seen using habitat within 0.25 miles of the observation points and the number of birds seen >0.25 miles from or flying over the observation points. Page 1 of 4.

Species	AIT observation points		EverStar, LLC observation points		Reference observation points	
	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP
Common loon						3
American white pelican		4		97		
Canada goose		20	55	41	5	32
Trumpeter swan						2
Tundra swan				11		21
Wood duck		3	2			
Gadwall			1			
Mallard	3	10	583	13	15	41
Blue-winged teal			158			
Northern pintail			60			
Common goldeneye <sup>1</sup>						
Hooded merganser <sup>1</sup>						
American bittern					2	
Great blue heron						1
Turkey vulture		13	6	20	6	8
Osprey				1	28	
Bald eagle	3	28	2	39	6	22
Northern harrier	1	2	18	6	14	5
Sharp-shinned hawk		3	3	3	1	2
Cooper's hawk		1				
Broad-winged hawk	2	2			1	3
Red-tailed hawk	3	10	5	6	1	4
Rough-legged hawk		4	10	25	8	9
American goldfinch	4	1	2	3	2	5
Merlin		1		1	1	1
Peregrine falcon				1		
Ruffed Grouse	7		3	1	3	1
Wild turkey			6			
Sora					1	
Sandhill crane		12	13	32	7	28
Killdeer	15	1	3	1	6	11
Spotted sandpiper <sup>1</sup>						
Greater yellowlegs			8			
Willet			1			
Lesser yellowlegs			25			
Upland sandpiper		1		1		
Short-billed dowitcher			8			
Wilson's snipe	15	5	10	2	18	2
Wilson's phalarope			2			

Table 3. Cont. Page 2 of 4

Species	AIT observation points		EverStar, LLC observation points		Reference observation points	
	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP
Bonaparte's gull			2			
Ring-billed gull			512	2	5	2
Rock pigeon	22	56		54	29	13
Mourning dove	7	8	1		6	2
Black-billed cuckoo			1			
Barred owl					1	
Common nighthawk				42		
Chestnut-collared Swift			1			
Belted kingfisher	2		1			1
Red-bellied Woodpecker			1		1	
Yellow-bellied sapsucker	1		3	1	8	1
Downy woodpecker	8		14		20	1
Hairy woodpecker	3		3		8	
Northern flicker	18		10	6	22	8
Pileated Woodpecker	4	3	4	1	2	1
Eastern wood-pewee			1		1	
Yellow-bellied flycatcher			6		1	
Acadian flycatcher	14	1	3		15	
Least flycatcher			5		5	
Eastern phoebe	5	1	8	1	7	
Great crested flycatcher	2	6	18	3	12	
Eastern kingbird			14		2	
Northern Shrike	2		5		6	
Yellow-throated vireo			5		1	
Warbling vireo	3		10		1	
Red-eyed Vireo	13		7	4	10	2
Blue jay	18	35	20	9	19	43
Black-billed magpie	14	2	4	2	3	2
American crow	110	334	1,027	469	150	434
Common raven	2	24	12	15	2	15
Horned lark			47	2	97	6
Tree swallow	22		48	9	5	
Bank swallow			43	1		
Cliff swallow		3			55	3
Barn swallow	35		7		17	
Black-capped chickadee	119		31	1	106	5
Red-breasted Nuthatch			1		1	
White-breasted nuthatch	3		10		16	1

Table 3. Cont. Page 3 of 4

Species	AIT observation points		EverStar, LLC observation points		Reference observation points	
	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP
Brown Creeper			1		2	
House wren	13	4	1	2	1	1
Winter wren	1					
Sedge Wren	49	1	55		90	
Marsh wren	1	1	2		3	
Golden-crowned kinglet	1					
Ruby-crowned kinglet	1		2			
Eastern bluebird	5	7	10	10	20	5
Veery	15		6		8	1
Swainson's thrush			3			
Hermit thrush					1	1
Wood thrush	6	1				
American robin	159	134	288	483	68	36
Gray catbird	12		2	1	12	
Brown thrasher	2				1	
European starling	108	28	5		57	1
American kestrel					128	
Bohemian waxwing					5	6
Cedar waxwing	7	4	5		5	13
Golden-crowned kinglet	1		1		3	
Nashville Warbler	11		5	1	4	
Northern parula					1	
Yellow warbler	3		18		19	
Chestnut-sided warbler			3		18	
Magnolia warbler	1					
Yellow-rumped warbler	8		3		6	
Palm warbler	2					
Black-and-white warbler	8		1		6	
American pipit	6		2		3	
Ovenbird	12		11	2	2	
Northern waterthrush					2	
Connecticut Warbler	2					
Mourning warbler					2	
Common yellowthroat	46	6	45	3	105	1
Wilson's warbler			1			
Scarlet tanager	1		1			
American tree sparrow	3		47		17	
Chipping sparrow	17		3		3	
Clay-colored Sparrow	23		35		18	

Table 3. Cont. Page 4 of 4

Species	AIT observation points		EverStar, LLC observation points		Reference observation points	
	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP	No. birds using habitat within 0.25 miles of OP	No. birds seen >0.25 miles from or flying over OP
Field sparrow			1			
Savannah sparrow	49	2	67	3	7	1
Le Conte's Sparrow			8		5	
Fox sparrow	1					
Song sparrow	90	9	152	14	135	8
Swamp sparrow	15		4	1	51	
White-throated sparrow	18	2	47	1	20	
Harris's sparrow	1					
White-crowned sparrow	2				1	
Dark-eyed junco	116	2	164		61	
Snow bunting	2		204	3	40	7
Northern cardinal	1	1				
Rose-breasted grosbeak	16	2	7	5	12	1
Indigo bunting	1		2		4	
Bobolink			34	1	8	2
Red-winged blackbird	58	28	258	142	96	123
Eastern meadowlark			4	1	1	
Rusty blackbird		3				8
Brewer's blackbird	1	53	1		2	12
Common grackle	76	11	6	22	4	26
Brown-headed cowbird	17	4	68		13	
Baltimore oriole	2		3		2	2
Pine Grosbeak	1	4				
Purple finch	6	14	3		7	2
House finch	21		1		4	
White-winged crossbill				3		12
Pine siskin			1		13	2
American golden-plover	51	34	37	40	46	24
House sparrow	3				1	
<b>Total birds counted</b>	<b>1,552</b>	<b>949</b>	<b>4,497</b>	<b>1,664</b>	<b>1,902</b>	<b>1,036</b>
<b>Number of species seen</b>	<b>82</b>	<b>52</b>	<b>104</b>	<b>55</b>	<b>101</b>	<b>59</b>

<sup>1</sup>These species were seen only from OP10 and are included only for completeness. They did not affect any of the calculations.

Table 4. Strike risk values, for damage and negative effect-on-flight for species seen from the observation points around AIT, August 2010 to July 2011. Page 1 of 5

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Common loon	0.00	0.00	0.00	0.00
American white pelican	0.00	3.00	0.00	3.33
Canada goose	0.00	10.06	0.00	5.48
Trumpeter swan	0.00	0.00	0.00	0.00
Tundra swan	0.00	0.00	0.00	0.00
Wood duck	0.00	1.06	0.00	0.48
Gadwall	0.00	0.00	0.00	0.00
Mallard	0.72	2.40	0.38	1.25
Blue-winged teal	0.00	0.00	0.00	0.00
Northern pintail	0.00	0.00	0.00	0.00
Common goldeneye	0.00	0.00	0.00	0.00
Hooded merganser	0.00	0.00	0.00	0.00
American bittern	0.00	0.00	0.00	0.00
Great blue heron	0.00	0.00	0.00	0.00
Turkey vulture	0.00	6.53	0.00	4.50
Osprey	0.00	0.00	0.00	0.00
Bald eagle	1.26	11.75	0.86	8.03
Northern harrier	0.02	0.04	0.02	0.04
Sharp-shinned hawk	0.00	0.23	0.00	0.00
Cooper's hawk	0.00	0.04	0.00	0.04
Broad-winged hawk	0.33	0.33	0.17	0.17
Red-tailed hawk	0.47	1.56	0.33	1.09
Rough-legged hawk	0.00	0.29	0.00	0.14
American goldfinch	0.00	0.00	0.13	0.03
Merlin	0.00	0.00	0.00	0.04
Peregrine falcon	0.00	0.00	0.00	0.00
Ruffed Grouse	0.00	0.00	0.00	0.00
Wild turkey	0.00	0.00	0.00	0.00
Sora	0.00	0.00	0.00	0.00
Sandhill crane	0.00	5.07	0.00	3.22
Killdeer	0.24	0.02	0.29	0.02
Spotted sandpiper	0.00	0.00	0.00	0.00

Table 4. Cont. Page 2 of 5

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Greater yellowlegs	0.00	0.00	0.00	0.00
Willet	0.00	0.00	0.00	0.00
Lesser yellowlegs	0.00	0.00	0.00	0.00
Upland sandpiper	0.00	0.03	0.00	0.04
Short-billed dowitcher	0.00	0.00	0.00	0.00
Wilson's snipe	1.15	0.38	1.15	0.38
Wilson's phalarope	0.00	0.00	0.00	0.00
Bonaparte's gull	0.00	0.00	0.00	0.00
Ring-billed gull	0.00	0.00	0.00	0.00
Rock pigeon	2.32	5.90	2.16	5.51
Mourning dove	0.22	0.25	0.29	0.34
Black-billed cuckoo	0.00	0.00	0.00	0.00
Barred owl	0.00	0.00	0.00	0.00
Common nighthawk	0.00	0.00	0.00	0.00
Chestnut-collared Swift	0.00	0.00	0.00	0.00
Belted kingfisher	0.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00
Yellow-bellied sapsucker	0.00	0.00	0.17	0.00
Downy woodpecker	0.00	0.00	4.00	0.00
Hairy woodpecker	0.00	0.00	0.00	0.00
Northern flicker	1.06	0.00	0.00	0.00
Pileated Woodpecker	0.00	0.00	0.00	0.00
Eastern wood-pewee	0.00	0.00	0.00	0.00
Yellow-bellied flycatcher	0.00	0.00	0.00	0.00
Acadian flycatcher	0.00	0.00	0.00	0.00
Least flycatcher	0.00	0.00	0.00	0.00
Eastern phoebe	0.00	0.00	0.00	0.00
Great crested flycatcher	0.00	0.00	0.00	0.00
Eastern kingbird	0.00	0.00	0.00	0.00
Northern Shrike	0.00	0.00	0.00	0.00
Yellow-throated vireo	0.00	0.00	0.00	0.00
Warbling vireo	0.38	0.00	0.00	0.00

Table 4. Cont. Page 3 of 5.

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Red-eyed Vireo	0.00	0.00	0.00	0.00
Blue jay	0.00	0.00	0.00	0.00
Black-billed magpie	3.11	0.44	3.11	0.44
American crow	9.58	29.09	9.91	30.09
Common raven	0.52	6.19	0.32	3.87
Horned lark	0.00	0.00	0.00	0.00
Tree swallow	0.00	0.00	0.23	0.00
Bank swallow	0.00	0.00	0.00	0.00
Cliff swallow	0.00	0.02	0.00	0.04
Barn swallow	0.21	0.00	0.44	0.00
Black-capped chickadee	0.00	0.00	0.00	0.00
Red-breasted Nuthatch	0.00	0.00	0.00	0.00
White-breasted nuthatch	0.00	0.00	0.00	0.00
Brown Creeper	0.00	0.00	0.00	0.00
House wren	0.00	0.00	0.00	0.00
Winter wren	0.00	0.00	0.00	0.00
Sedge Wren	0.00	0.00	0.00	0.00
Marsh wren	0.00	0.00	0.20	0.20
Golden-crowned kinglet	0.00	0.00	0.00	0.00
Ruby-crowned kinglet	0.00	0.00	0.00	0.00
Eastern bluebird	0.00	0.00	0.00	0.00
Veery	0.00	0.00	7.50	0.00
Swainson's thrush	0.00	0.00	0.00	0.00
Hermit thrush	0.00	0.00	0.00	0.00
Wood thrush	0.00	0.00	0.86	0.14
American robin	10.83	9.13	6.99	5.89
Gray catbird	0.00	0.00	0.00	0.00
Brown thrasher	0.00	0.00	0.00	0.00
European starling	4.17	1.08	5.90	1.53
American kestrel	0.00	0.00	0.00	0.00
Bohemian waxwing	0.00	0.00	0.00	0.00
Cedar waxwing	0.15	0.09	0.30	0.17
Golden-crowned kinglet	0.00	0.00	0.00	0.00

Table 4. Cont. Page 4 of 5.

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Nashville Warbler	0.00	0.00	0.00	0.00
Northern parula	0.00	0.00	0.00	0.00
Yellow warbler	0.33	0.00	0.00	0.00
Chestnut-sided warbler	0.00	0.00	0.00	0.00
Magnolia warbler	0.00	0.00	0.10	0.00
Yellow-rumped warbler	0.00	0.00	0.00	0.00
Palm warbler	0.00	0.00	0.00	0.00
Black-and-white warbler	0.00	0.00	0.00	0.00
American pipit	0.00	0.00	0.00	0.00
Ovenbird	0.71	0.00	1.41	0.00
Northern waterthrush	0.00	0.00	0.00	0.00
Connecticut Warbler	0.00	0.00	0.00	0.00
Mourning warbler	0.00	0.00	0.00	0.00
Common yellowthroat	0.00	0.00	3.29	0.43
Wilson's warbler	0.00	0.00	0.00	0.00
Scarlet tanager	0.33	0.00	0.00	0.00
American tree sparrow	0.00	0.00	0.38	0.00
Chipping sparrow	0.00	0.00	0.00	0.00
Clay-colored Sparrow	0.00	0.00	0.00	0.00
Field sparrow	0.00	0.00	0.00	0.00
Savannah sparrow	0.57	0.02	0.28	0.01
Le Conte's Sparrow	0.00	0.00	0.00	0.00
Fox sparrow	0.06	0.00	0.00	0.00
Song sparrow	0.00	0.00	0.00	0.00
Swamp sparrow	0.00	0.00	0.00	0.00
White-throated sparrow	0.36	0.04	0.36	0.04
Harris's sparrow	0.00	0.00	0.00	0.00
White-crowned sparrow	0.00	0.00	0.11	0.00
Dark-eyed junco	8.49	0.15	5.66	0.10
Snow bunting	0.02	0.00	0.20	0.00
Northern cardinal	0.00	0.00	0.00	0.00
Rose-breasted grosbeak	0.00	0.00	0.00	0.00
Indigo bunting	0.00	0.00	0.00	0.00

Table 4. Cont. Page 5 of 5.

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Bobolink	0.00	0.00	0.00	0.00
Red-winged blackbird	1.56	0.75	3.11	1.50
Eastern meadowlark	0.00	0.00	0.00	0.00
Rusty blackbird	0.00	0.00	0.00	0.00
Brewer's blackbird	0.00	0.00	0.00	0.00
Common grackle	3.92	0.57	7.05	1.02
Brown-headed cowbird	0.30	0.07	0.45	0.11
Baltimore oriole	0.00	0.00	0.22	0.00
Pine Grosbeak	0.00	0.00	0.00	0.00
Purple finch	0.00	0.00	0.00	0.00
House finch	0.00	0.00	0.46	0.00
White-winged crossbill	0.00	0.00	0.00	0.00
Pine siskin	0.00	0.00	0.00	0.00
American golden-plover	2.07	1.38	2.76	1.84
House sparrow	0.09	0.00	0.06	0.00
<b>Total Strike Risk values for habitat</b>	<b>55.54</b>	<b>97.97</b>	<b>71.60</b>	<b>81.56</b>

Table 5. Strike risk values, for damage and negative effect-on-flight for species seen from the observation points around the EverStar property, proposed for development of mitigation bank. August 2010 to July 2011. Page 1 of 5.

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Common loon	0.00	0.00	0.00	0.00
American white pelican	0.00	72.75	0.00	80.83
Canada goose	27.67	20.62	15.06	11.22
Trumpeter swan	0.00	0.00	0.00	0.00
Tundra swan	0.00	9.63	0.00	5.50
Wood duck	0.71	0.00	0.32	0.00
Gadwall	0.31	0.00	0.16	0.00
Mallard	140.07	3.12	72.88	1.63
Blue-winged teal	83.65	0.00	27.88	0.00
Northern pintail	33.75	0.00	20.00	0.00
Common goldeneye	0.00	0.00	0.00	0.00
Hooded merganser	0.00	0.00	0.00	0.00
American bittern	0.00	0.00	0.00	0.00
Great blue heron	0.00	0.00	0.00	0.00
Turkey vulture	3.01	10.05	2.07	6.92
Osprey	0.00	0.23	0.00	0.15
Bald eagle	0.84	16.36	0.57	11.18
Northern harrier	0.40	0.13	0.40	0.13
Sharp-shinned hawk	0.23	0.23	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
Broad-winged hawk	0.00	0.00	0.00	0.00
Red-tailed hawk	0.78	0.93	0.55	0.66
Rough-legged hawk	0.71	1.79	0.36	0.89
American goldfinch	0.00	0.00	0.06	0.09
Merlin	0.00	0.00	0.00	0.04
Peregrine falcon	0.00	0.08	0.00	0.05
Ruffed Grouse	0.00	0.00	0.00	0.00
Wild turkey	1.81	0.00	1.58	0.00
Sora	0.00	0.00	0.00	0.00
Sandhill crane	5.49	13.53	3.48	8.58
Killdeer	0.05	0.02	0.06	0.02

Table 5. Cont. Page 2 of 5.

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Spotted sandpiper	0.00	0.00	0.00	0.00
Greater yellowlegs	2.67	0.00	0.00	0.00
Willet	0.00	0.00	0.00	0.00
Lesser yellowlegs	0.00	0.00	0.00	0.00
Upland sandpiper	0.00	0.03	0.00	0.04
Short-billed dowitcher	1.60	0.00	0.00	0.00
Wilson's snipe	0.77	0.15	0.77	0.15
Wilson's phalarope	0.00	0.00	0.00	0.00
Bonaparte's gull	0.14	0.00	0.21	0.00
Ring-billed gull	44.90	0.18	40.60	0.16
Rock pigeon	0.00	5.69	0.00	5.31
Mourning dove	0.03	0.00	0.04	0.00
Black-billed cuckoo	0.00	0.00	0.00	0.00
Barred owl	0.00	0.00	0.00	0.00
Common nighthawk	0.00	0.17	0.00	0.17
Chestnut-collared Swift	0.00	0.00	0.00	0.00
Belted kingfisher	0.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00
Yellow-bellied sapsucker	0.00	0.00	0.50	0.17
Downy woodpecker	0.00	0.00	7.00	0.00
Hairy woodpecker	0.00	0.00	0.00	0.00
Northern flicker	0.59	0.35	0.00	0.00
Pileated Woodpecker	0.00	0.00	0.00	0.00
Eastern wood-pewee	0.00	0.00	0.00	0.00
Yellow-bellied flycatcher	0.00	0.00	0.00	0.00
Acadian flycatcher	0.00	0.00	0.00	0.00
Least flycatcher	0.00	0.00	0.00	0.00
Eastern phoebe	0.00	0.00	0.00	0.00
Great crested flycatcher	0.00	0.00	0.00	0.00
Eastern kingbird	0.93	0.00	0.93	0.00

Table 5. Cont. Page 3 of 5.

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Northern Shrike	0.00	0.00	0.00	0.00
Yellow-throated vireo	0.00	0.00	0.00	0.00
Warbling vireo	1.25	0.00	0.00	0.00
Red-eyed Vireo	0.00	0.00	0.00	0.00
Blue jay	0.00	0.00	0.00	0.00
Black-billed magpie	0.89	0.44	0.89	0.44
American crow	89.44	40.84	92.52	42.25
Common raven	3.10	3.87	1.94	2.42
Horned lark	0.45	0.02	0.81	0.03
Tree swallow	0.00	0.00	0.51	0.10
Bank swallow	0.58	0.01	1.16	0.03
Cliff swallow	0.00	0.00	0.00	0.00
Barn swallow	0.04	0.00	0.09	0.00
Black-capped chickadee	0.00	0.00	0.00	0.00
Red-breasted Nuthatch	0.00	0.00	0.00	0.00
White-breasted nuthatch	0.00	0.00	0.00	0.00
Brown Creeper	0.00	0.00	0.00	0.00
House wren	0.00	0.00	0.00	0.00
Winter wren	0.00	0.00	0.00	0.00
Sedge Wren	0.00	0.00	0.00	0.00
Marsh wren	0.00	0.00	0.40	0.00
Golden-crowned kinglet	0.00	0.00	0.00	0.00
Ruby-crowned kinglet	0.00	0.00	0.00	0.00
Eastern bluebird	0.00	0.00	0.00	0.00
Veery	0.00	0.00	3.00	0.00
Swainson's thrush	0.34	0.00	0.07	0.00
Hermit thrush	0.00	0.00	0.00	0.00
Wood thrush	0.00	0.00	0.00	0.00
American robin	19.62	32.91	12.66	21.23
Gray catbird	0.00	0.00	0.00	0.00
Brown thrasher	0.00	0.00	0.00	0.00
European starling	0.19	0.00	0.27	0.00

Table 5. Cont. Page 4 of 5.

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
American kestrel	0.00	0.00	0.00	0.00
Bohemian waxwing	0.00	0.00	0.00	0.00
Cedar waxwing	0.11	0.00	0.21	0.00
Golden-crowned kinglet	0.00	0.00	0.00	0.00
Nashville Warbler	0.00	0.00	0.00	0.00
Northern parula	0.00	0.00	0.00	0.00
Yellow warbler	2.00	0.00	0.00	0.00
Chestnut-sided warbler	0.00	0.00	0.00	0.00
Magnolia warbler	0.00	0.00	0.00	0.00
Yellow-rumped warbler	0.00	0.00	0.00	0.00
Palm warbler	0.00	0.00	0.00	0.00
Black-and-white warbler	0.00	0.00	0.00	0.00
American pipit	0.00	0.00	0.00	0.00
Ovenbird	0.65	0.12	1.29	0.24
Northern waterthrush	0.00	0.00	0.00	0.00
Connecticut Warbler	0.00	0.00	0.00	0.00
Mourning warbler	0.00	0.00	0.00	0.00
Common yellowthroat	0.00	0.00	3.21	0.21
Wilson's warbler	0.00	0.00	0.00	0.00
Scarlet tanager	0.33	0.00	0.00	0.00
American tree sparrow	0.00	0.00	5.88	0.00
Chipping sparrow	0.00	0.00	0.00	0.00
Clay-colored Sparrow	0.00	0.00	0.00	0.00
Field sparrow	0.00	0.00	0.00	0.00
Savannah sparrow	0.78	0.03	0.39	0.02
Le Conte's Sparrow	0.00	0.00	0.00	0.00
Fox sparrow	0.00	0.00	0.00	0.00
Song sparrow	0.00	0.00	0.00	0.00
Swamp sparrow	0.00	0.00	0.00	0.00
White-throated sparrow	0.94	0.02	0.94	0.02
Harris's sparrow	0.00	0.00	0.00	0.00
White-crowned sparrow	0.00	0.00	0.00	0.00

Table 5. Cont. Page 5 of 5.

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Dark-eyed junco	12.00	0.00	8.00	0.00
Snow bunting	2.44	0.04	20.77	0.31
Northern cardinal	0.00	0.00	0.00	0.00
Rose-breasted grosbeak	0.00	0.00	0.00	0.00
Indigo bunting	0.00	0.00	0.00	0.00
Bobolink	0.00	0.00	2.83	0.08
Red-winged blackbird	6.93	3.81	13.85	7.62
Eastern meadowlark	0.03	0.01	0.06	0.02
Rusty blackbird	0.00	0.00	0.00	0.00
Brewer's blackbird	0.00	0.00	0.00	0.00
Common grackle	0.31	1.13	0.56	2.04
Brown-headed cowbird	1.19	0.00	1.79	0.00
Baltimore oriole	0.00	0.00	0.33	0.00
Pine Grosbeak	0.00	0.00	0.00	0.00
Purple finch	0.00	0.00	0.00	0.00
House finch	0.00	0.00	0.02	0.00
White-winged crossbill	0.00	0.00	0.00	0.00
Pine siskin	0.00	0.00	0.00	0.00
American golden-plover	1.50	1.62	2.00	2.16
House sparrow	0.00	0.00	0.00	0.00
<b>Total Strike Risk values for habitat type</b>	<b>496.23</b>	<b>240.92</b>	<b>371.95</b>	<b>213.12</b>

Table 6. Strike risk values, for damage and negative effect-on-flight, for species seen from the observation points around the Reference Sites. August 2010 to July 2011. Page 1 of 4

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Common loon	0.00	1.88	0.00	1.25
American white pelican	0.00	0.00	0.00	0.00
Canada goose	2.52	16.10	1.37	8.76
Trumpeter swan	0.00	2.00	0.00	2.00
Tundra swan	0.00	18.38	0.00	10.50
Wood duck	0.00	0.00	0.00	0.00
Gadwall	0.00	0.00	0.00	0.00
Mallard	3.60	9.85	1.88	5.13
Blue-winged teal	0.00	0.00	0.00	0.00
Northern pintail	0.00	0.00	0.00	0.00
Common goldeneye	0.00	0.00	0.00	0.00
Hooded merganser	0.00	0.00	0.00	0.00
American bittern	1.00	0.00	0.67	0.00
Great blue heron	0.00	0.21	0.00	0.17
Turkey vulture	3.01	4.02	2.07	2.77
Osprey	6.45	0.00	4.12	0.00
Bald eagle	2.52	9.23	1.72	6.31
Northern harrier	0.31	0.11	0.31	0.11
Sharp-shinned hawk	0.08	0.15	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
Broad-winged hawk	0.17	0.50	0.08	0.25
Red-tailed hawk	0.16	0.62	0.11	0.44
Rough-legged hawk	0.57	0.64	0.29	0.32
American goldfinch	0.00	0.00	0.06	0.16
Merlin	0.00	0.00	0.04	0.04
Peregrine falcon	0.00	0.00	0.00	0.00
Ruffed Grouse	0.00	0.00	0.00	0.00
Wild turkey	0.00	0.00	0.00	0.00
Sora	0.00	0.00	0.07	0.00
Sandhill crane	2.96	11.84	1.88	7.51
Killdeer	0.10	0.18	0.12	0.22
Spotted sandpiper	0.00	0.00	0.00	0.00
Greater yellowlegs	0.00	0.00	0.00	0.00
Willet	0.00	0.00	0.00	0.00
Lesser yellowlegs	0.00	0.00	0.00	0.00
Upland sandpiper	0.00	0.00	0.00	0.00
Short-billed dowitcher	0.00	0.00	0.00	0.00

Table 6. Cont. Page 2 of 4

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Wilson's snipe	1.38	0.15	1.38	0.15
Wilson's phalarope	0.00	0.00	0.00	0.00
Bonaparte's gull	0.00	0.00	0.00	0.00
Ring-billed gull	0.44	0.18	0.40	0.16
Rock pigeon	3.05	1.37	2.85	1.28
Mourning dove	0.19	0.06	0.25	0.08
Black-billed cuckoo	0.00	0.00	0.00	0.00
Barred owl	0.07	0.00	0.07	0.00
Common nighthawk	0.00	0.00	0.00	0.00
Chestnut-collared Swift	0.00	0.00	0.00	0.00
Belted kingfisher	0.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00
Yellow-bellied sapsucker	0.00	0.00	1.33	0.17
Downy woodpecker	0.00	0.00	10.00	0.50
Hairy woodpecker	0.00	0.00	0.00	0.00
Northern flicker	1.29	0.47	0.00	0.00
Pileated Woodpecker	0.00	0.00	0.00	0.00
Eastern wood-pewee	0.00	0.00	0.00	0.00
Yellow-bellied flycatcher	0.00	0.00	0.00	0.00
Acadian flycatcher	0.00	0.00	0.00	0.00
Least flycatcher	0.00	0.00	0.00	0.00
Eastern phoebe	0.00	0.00	0.00	0.00
Great crested flycatcher	0.00	0.00	0.00	0.00
Eastern kingbird	0.13	0.00	0.13	0.00
Northern Shrike	0.00	0.00	0.00	0.00
Yellow-throated vireo	0.00	0.00	0.00	0.00
Warbling vireo	0.13	0.00	0.00	0.00
Red-eyed Vireo	0.00	0.00	0.00	0.00
Blue jay	0.00	0.00	0.00	0.00
Black-billed magpie	0.67	0.44	0.67	0.44
American crow	13.06	37.80	13.51	39.10
Common raven	0.52	3.87	0.32	2.42
Horned lark	0.93	0.06	1.67	0.10
Tree swallow	0.00	0.00	0.05	0.00
Bank swallow	0.00	0.00	0.00	0.00
Cliff swallow	0.30	0.02	0.69	0.04
Barn swallow	0.10	0.00	0.21	0.00
Black-capped chickadee	0.00	0.00	0.00	0.00

Table 6. Cont. Page 3 of 4

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Red-breasted Nuthatch	0.00	0.00	0.00	0.00
White-breasted nuthatch	0.00	0.00	0.00	0.00
Brown Creeper	0.00	0.00	0.00	0.00
House wren	0.00	0.00	0.00	0.00
Winter wren	0.00	0.00	0.00	0.00
Sedge Wren	0.00	0.00	0.00	0.00
Marsh wren	0.00	0.00	0.60	0.00
Golden-crowned kinglet	0.00	0.00	0.00	0.00
Ruby-crowned kinglet	0.00	0.00	0.00	0.00
Eastern bluebird	0.00	0.00	0.00	0.00
Veery	0.00	0.00	4.00	0.50
Swainson's thrush	0.00	0.00	0.00	0.00
Hermit thrush	0.03	0.03	0.00	0.00
Wood thrush	0.00	0.00	0.00	0.00
American robin	4.63	2.45	2.99	1.58
Gray catbird	0.00	0.00	0.00	0.00
Brown thrasher	0.00	0.00	0.00	0.00
European starling	2.20	0.04	3.11	0.05
American kestrel	1.10	0.00	2.15	0.00
Bohemian waxwing	0.00	0.00	0.00	0.00
Cedar waxwing	0.11	0.28	0.21	0.55
Golden-crowned kinglet	0.00	0.00	0.00	0.00
Nashville Warbler	0.00	0.00	0.00	0.00
Northern parula	0.00	0.00	0.00	0.00
Yellow warbler	2.11	0.00	0.00	0.00
Chestnut-sided warbler	0.00	0.00	0.00	0.00
Magnolia warbler	0.00	0.00	0.00	0.00
Yellow-rumped warbler	0.00	0.00	0.00	0.00
Palm warbler	0.00	0.00	0.00	0.00
Black-and-white warbler	0.00	0.00	0.00	0.00
American pipit	0.00	0.00	0.00	0.00
Ovenbird	0.12	0.00	0.24	0.00
Northern waterthrush	0.00	0.00	0.00	0.00
Connecticut Warbler	0.00	0.00	0.00	0.00
Mourning warbler	0.00	0.00	0.00	0.00
Common yellowthroat	0.00	0.00	7.50	0.07
Wilson's warbler	0.00	0.00	0.00	0.00
Scarlet tanager	0.00	0.00	0.00	0.00
American tree sparrow	0.00	0.00	2.13	0.00

Table 6. Cont. Page 4 of 4

Species	Damage Strike Risk Values for birds:		Neg. EoF Strike Risk Values for birds:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP
Chipping sparrow	0.00	0.00	0.00	0.00
Clay-colored Sparrow	0.00	0.00	0.00	0.00
Field sparrow	0.00	0.00	0.00	0.00
Savannah sparrow	0.08	0.01	0.04	0.01
Le Conte's Sparrow	0.00	0.00	0.00	0.00
Fox sparrow	0.00	0.00	0.00	0.00
Song sparrow	0.00	0.00	0.00	0.00
Swamp sparrow	0.00	0.00	0.00	0.00
White-throated sparrow	0.40	0.00	0.40	0.00
Harris's sparrow	0.00	0.00	0.00	0.00
White-crowned sparrow	0.00	0.00	0.06	0.00
Dark-eyed junco	4.46	0.00	2.98	0.00
Snow bunting	0.48	0.08	4.07	0.71
Northern cardinal	0.00	0.00	0.00	0.00
Rose-breasted grosbeak	0.00	0.00	0.00	0.00
Indigo bunting	0.00	0.00	0.00	0.00
Bobolink	0.00	0.00	0.67	0.17
Red-winged blackbird	2.58	3.30	5.15	6.60
Eastern meadowlark	0.01	0.00	0.02	0.00
Rusty blackbird	0.00	0.00	0.00	0.00
Brewer's blackbird	0.00	0.00	0.00	0.00
Common grackle	0.21	1.34	0.37	2.41
Brown-headed cowbird	0.23	0.00	0.34	0.00
Baltimore oriole	0.00	0.00	0.22	0.22
Pine Grosbeak	0.00	0.00	0.00	0.00
Purple finch	0.00	0.00	0.00	0.00
House finch	0.00	0.00	0.09	0.00
White-winged crossbill	0.00	0.00	0.00	0.00
Pine siskin	0.00	0.00	0.00	0.00
American golden-plover	1.86	0.97	2.49	1.30
House sparrow	0.03	0.00	0.02	0.00
<b>Total Strike Risk Values</b>	<b>66.34</b>	<b>128.63</b>	<b>88.16</b>	<b>104.55</b>

Table 7. Total strike risk values for each habitat type for damage and negative effect-on-flight for all birds seen using habitat within 0.25 miles of (red) or more than 0.25 miles from or flying over (black) OPs associated with Aitkin Airport (AIT), the EverStar property, or the Reference sites, Aitkin County, MN, August 2010 to July 2011 (EverStar data dated 7/12/11)

	Total risk for damaging strikes from birds:			Total risk for negative effect-on-flight strikes from birds:	
	Total birds seen using habitat within 0.25 miles of the OPs	Total birds seen >0.25 miles from or flying over OPs	Total birds seen using habitat within 0.25 miles of the OPs	Total birds seen using habitat within 0.25 miles of the OPs	Total birds seen >0.25 miles from or flying over OPs
<b>Aitkin Airport (AIT) OPs</b>					
	1,552	949	55.5	71.6	81.6
<b>EverStar property OPs</b>					
	4,497	1,664	496.2	371.9	213.1
<b>Reference sites OPs</b>					
	1,902	1,036	66.3	88.2	104.5
<b>Totals 7,951</b>		<b>3,649</b>			

Table 8. Strike risk values for damage by month, based on the average number of birds seen each month, for birds seen using habitat within 0.25 miles of and those > 0.25 miles from or flying over OPs associated with Aitkin Airport (AIT), the EverStar property and Reference points, Aitkin County, MN August 2010 to July 2011.

	Aug 10	Sep 10	Oct 10	Nov 10	Dec 10	Jan 11	Feb 11	Mar 11	Apr 11	May 11	Jun 11	Jul 11	Total
Aitkin Airport (AIT) OPs													
<0.25 miles	3.2	3.4	4.1	1.0	1.3	0.0	1.1	1.0	1.7	1.8	1.6	0.7	20.9
> 0.25 miles	2.1	4.7	4.1	5.2	1.2	0.2	1.2	2.4	5.4	4.5	1.0	0.3	32.4
Total	5.3	8.1	8.2	6.2	2.5	0.2	2.3	3.4	7.1	6.3	2.6	1	53.2
EverStar property OPs													
<0.25 miles	6.0	4.2	20.8	1.8	0.6	0.0	0.3	0.8	40.9	36.0	36.9	1.1	149.3
> 0.25 miles	1.5	6.1	9.1	7.6	0.8	0.6	0.0	4.5	14.8	22.1	2.5	0.3	69.8
Total	7.5	10.2	29.9	9.4	1.3	0.6	0.3	5.3	55.7	58.1	39.4	1.4	219.1
Reference sites OPs													
<0.25 miles	1.0	5.9	1.0	2.3	1.7	0.0	0.1	0.7	3.3	3.8	2.6	1.7	24.0
> 0.25 miles	3.4	3.0	4.8	3.3	0.2	11.4	1.7	1.6	9.9	6.4	0.9	0.8	47.5
Total	4.4	8.9	5.8	5.6	1.9	11.4	1.8	2.3	13.2	10.2	3.5	2.5	71.5

Table 9. Strike risk values for negative effect-on-flight of aircraft, by month, based on the average number of birds seen each month, for birds seen using habitat within 0.25 miles of and those >0.25 miles from or flying over OPs associated with Aitkin Airport (AIT), the EverStar property and Reference sites, Aitkin County, MN August 2010 to July 2011

	Aug 10	Sep 10	Oct 10	Nov 10	Dec 10	Jan 11	Feb 11	Mar 11	Apr 11	May 11	Jun 11	Jul 11	Total
Aitkin Airport (AIT) OPs													
<0.25 miles	4.7	3.9	3.3	1.2	1.0	0.0	1.0	1.0	1.6	3.0	5.0	2.6	28.2
> 0.25 miles	2.0	4.0	3.0	4.7	1.1	0.2	0.8	2.3	4.1	3.6	1.2	0.4	27.4
Total	6.7	7.9	6.3	5.9	2.1	0.2	1.8	3.3	5.7	6.6	6.1	3.0	55.6
EverStar property OPs													
<0.25 miles	6.2	3.6	21.5	6.0	3.5	0.5	0.7	0.5	23.2	23.4	23.1	2.3	114.5
> 0.25 miles	1.1	5.9	7.9	6.0	0.6	0.6	0.1	3.2	9.5	24.0	2.0	0.4	61.3
Total	7.3	9.5	29.4	12.0	4.1	1.1	0.8	3.7	32.7	47.4	25.1	2.7	175.8
Reference sites OPs													
<0.25 miles	1.6	6.2	1.6	3.7	5.4	0.5	0.0	1.1	2.5	4.4	4.8	3.6	35.4
> 0.25 miles	3.1	2.1	4.4	2.6	0.3	11.4	1.2	1.5	6.6	5.2	1.1	1.3	40.7
Total	4.7	8.3	6.0	6.3	5.7	11.9	1.2	2.5	9.1	9.6	5.9	4.9	76.1

Table 10. Combined strike risk values for damage and negative effect-on-flight of aircraft, by month based on the average number of birds seen each month, for birds seen using habitat within 0.25 miles of and those >0.25 miles from or flying over OPs associated with Aitkin Airport (AIT), the EverStar property, and Reference sites, Aitkin County, MN, August 2010 to July 2011.

	Aug 10	Sep 10	Oct 10	Nov 10	Dec 10	Jan 11	Feb 11	Mar 11	Apr 11	May 11	Jun 11	Jul 11	Total
Aitkin Airport (AIT) OPs													
<0.25 miles	7.9	7.2	7.4	2.2	2.3	0.0	2.1	2.0	3.3	4.8	6.6	3.3	49.0
>0.25 miles	4.1	8.8	7.1	9.9	2.3	0.4	2.0	4.7	9.5	8.1	2.1	0.7	59.8
Total	12.0	16.0	14.5	12.1	4.6	0.4	4.1	6.7	12.8	12.9	8.7	4.0	108.8
EverStar property OPs													
<0.25 miles	12.2	7.8	42.3	7.9	4.0	0.5	0.9	1.4	64.1	59.4	59.9	3.4	263.8
>0.25 miles	2.6	11.9	17.0	13.6	1.4	1.2	0.2	7.6	24.3	46.1	4.6	0.7	131.1
Total	14.8	19.7	59.3	21.4	5.4	1.7	1.1	9.0	88.4	105.5	64.5	4.1	394.9
Reference sites OPs													
<0.25 miles	2.6	12.1	2.6	5.9	7.1	0.5	0.1	1.8	5.8	8.2	7.5	5.3	59.4
>0.25 miles	6.5	5.1	9.2	6.0	0.5	22.8	2.9	3.0	16.5	11.6	1.9	2.1	88.2
Total	9.1	17.2	11.8	11.9	7.6	23.3	3.0	4.8	22.3	19.8	9.4	7.4	147.6

Table 11. Strike risk values for each observation point for damage and negative effect-on-flight, for species seen using habitat within 0.25 miles of the OP or seen more than 0.25 miles from or flying over OP, for the various habitat types on or around Aitkin Airport (AIT), Aitkin County, MN, August 2010 to July 2011

	Number of birds:		Strike risk value for Damage for:		Strike risk value for Neg EoF for:	
	Seen using habitat within 0.25 miles of OP	Seen >0.25 miles from or flying over OP	Birds seen using habitat within 0.25 miles of OP	Birds seen >0.25 miles from or flying over OP	Birds seen using habitat within 0.25 miles of OP	Birds seen >0.25 miles from or flying over OP
OP 1 <sup>a</sup>	304	157	7.4	10.9	11.4	8.9
OP 2 <sup>a</sup>	196	146	7.2	19.7	8.5	15.5
OP 3 <sup>a</sup>	228	265	6.6	24.9	9.2	19.8
OP 4 <sup>a</sup>	396	264	15.3	33.1	18.2	29.2
OP 5 <sup>b</sup>	323	398	323.0	398.0	19.7	98.6
OP 6 <sup>b</sup>	762	220	43.0	28.0	42.5	21.7
OP 7 <sup>b</sup>	2,830	464	416.3	41.7	281.9	29.5
OP 8 <sup>b</sup>	203	282	4.5	37.3	5.9	29.5
OP 9 <sup>b</sup>	379	300	12.7	35.3	16.9	29.8
OP 11 <sup>c</sup>	442	140	15.8	15.1	15.8	13.5
OP 12 <sup>c</sup>	560	219	24.9	22.2	32.4	18.8
OP 13 <sup>c</sup>	331	124	7.6	8.3	13.7	6.6
OP 14 <sup>c</sup>	314	257	9.7	29.6	16.9	26.9
OP 15 <sup>a</sup>	428	117	19.0	9.3	24.4	8.1
OP 16 <sup>c</sup>	255	296	8.3	53.5	9.4	38.7

Total  
birds  
seen

7,951      3,649

<sup>a</sup> Observation points associated with AIT.

<sup>b</sup> Observation points associated with the EverStar property.

<sup>c</sup> Observation points associated with the Reference sites.

**EDWARD C. CLEARY**  
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**765-490-5998 (Cell)**  
**WASHManEd@aol.com**



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**Personal Details**

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**Profession** Wildlife Biologist. Specializing in wildlife aircraft strike prevention and wildlife hazard management at airports.

**Nationally** United States

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**Key Qualifications:** 32 years experience dealing with all aspects of human-wildlife conflicts.  
15 years experience dealing exclusively with wildlife aircraft strike hazard issues.

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**Professional Status** Certified Wildlife Biologist by The Wildlife Society  
FAA Qualified Airport Wildlife Biologist  
Steering Committee member Bird Strike Committee – USA  
Permanent Advisor to the Caribbean and South American Regional Wildlife Hazard Committee (CARSAMPAF)

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**Education** Associates Degree, Law Enforcement, Riverside City College, 1962  
Bachelor of Science. Wildlife Biology and Range Management (double major), Humboldt State University, Arcata, California, 1971  
Post graduate studies, Song Beach State College, Long Beach, California

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**Professional Experience**

Aug 2007 – Present	WASHMan, LLC.
Sept 1995 – Aug 2007	U.S. Department of Transportation, Federal Aviation Administration, Staff Wildlife Biologist
June 1986 – Sept 1995	US Dept Agriculture, Wildlife Services, Assistant State Director, Ohio.
Oct 1984 – June 1986	US Dept Agriculture, Wildlife Services, Acting State Supervisor/State Supervisor, North Dakota
June 1978 – Oct 1984	US Fish and Wildlife Service, Wildlife Biologist, Indiana.
Aug 1974 – June 1978	US Dept Agriculture, Agricultural Research Service, Crop and Soils Research Technician, Fort Benton, Montana.

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**Work Experience**

**WASHMan, LLC.**

I am the sole owner and proprietor of the business. I specialize in Wildlife Aircraft Strike Hazard Management – Wildlife Hazard Assessments, Wildlife Hazard Management Plans, and Airport personnel training.

A **Three Year Reference List** is included at the end of this document.

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**US Department of Transportation  
Federal Aviation Administration,  
Staff Wildlife Biologist  
Washington, DC, USA.**

Management, direct, and conduct the Federal Aviation Administration's wildlife aircraft strike hazard reduction program.

Provide Technical Assistance, nationally and internationally, for issues affecting wildlife threats to aviation safety:

Develop technical wildlife guidance to support regional Airport Certification Safety Inspectors in review of wildlife problems at airports; Monitor current research in the field to stay abreast of information that may be of assistance to the FAA Airports wildlife program; Develop guidance for FAA Orders, Advisory Circulars, and manuals on wildlife issues and wildlife management programs; Provide timely and accurate information to the public on questions concerning airport and wildlife issues; Assist the FAA's Community and Environmental Needs Division and regional offices on general wildlife issues affecting airport environmental assessments. Provide guidance and airport siting issues; Provide guidance and develop policy on municipal solid waste landfill siting issues.

Provide oversight and direction of FAA's National Wildlife Aircraft Strike Database:

Monitor the FAA's National wildlife Strike Database to help aviation community and pilots be aware of the reporting opportunity; Seek ways to improve and expand the database so that more data is provided and that the information is accurate and timely;

Seek opportunities to use the database for trend analysis and identification of problems that should be addressed; Work closely with Smithsonian Institution Feather Identification Lab on feather ID program and on DNA Barcode of Life to develop

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DNA database for all birds and other wildlife in North America; Work with Embry Riddle Aeronautical University's web master to insure that the FAA's National Wildlife Aircraft Strike Data Base is accessible to interested Federal, State and Local governmental agencies and public and private organizations in a user friendly manner; Work with International Civil Aviation Organization (ICAO) counter parts to ensure that United States' data is reported to the IBIS database in a timely and useful fashion.

Develop and publish FAA guidance on landfills and other land use practices that have the potential to attract hazardous wildlife near airports:

Develop, maintain, and monitor FAA guidance on airports, landfills and other hazardous wildlife attractants compatibility; Work closely with FAA Regional Offices to ensure they understand the requirements and are following generally considered application; Seek opportunities to educate the public on the potential hazards of locating landfills and other hazardous wildlife attractants near airports and provide technical review on specific hazardous wildlife attractants as requested.

Author FAA publications such as Advisory Circulars, annual reports, i.e. *Wildlife strikes to Civil Aircraft in the United States, 1990 to 2006*, and manuals *Wildlife Hazard Management at Airports*.

Act as agency expert in liaison with other government agencies and the aviation community:

Oversee FAA coordination with the Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Service on airport related wildlife issues, including all aspects of the Memorandum of Understanding between the FAA and Wildlife Services; Liaison with Department of Defence, U. S. Air Force to address mutual concerns and insure cooperation; Provide presentations and briefings materials to aviation organizations when seeking FAA input on airport wildlife matters; Work with State and/or local governmental agencies on

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specific bird or wildlife problems at airports.

Assist ICAO with updating and revising the Airport Services Manual (Doc 9137), Part 3, Bird Control and Reduction, and Amendment 5 to Annex 14, Volume 1, Chapter 9, § 9.4 Bird Hazard Reduction.

Act as FAA expert in liaison with foreign governments and provide assistance in dealing with wildlife aircraft strike hazard issues.

Working with and through the FAA's Office of International Aviation, the Safe Skies For Africa program, and International Civil Aviation Organization (ICAO) provide expert advice/assistance to airports managers on wildlife issues:

Conducted Wildlife Hazard Assessments at airports in Rwanda (Kigali), Uganda (Entebbe), Kenya (Nairobi, Mombasa), Tanzania (Dar es Salon, Kilimanjaro, Zanzibar), Costa Rica (Liberia), Mexico (Mexico City international Airport, Los Mochas, Guadalajara, Chetumal, Villahermosa), Dominican Republic (La Isabela), and Chile (Santiago, Concepcion, Temuco, Punta Arenas).

As part of the wildlife hazard assessment, presented training programs for airport personnel dealing with wildlife aircraft strike hazard management:

1 Day training programs: Uganda (Entebbe), Kenya (Nairobi, Mombasa), Tanzania (Dar es Salon, Kilimanjaro, Zanzibar), Costa Rica (Liberia).

3 day training programs: Bangkok Thailand, Beijing China

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## **US Dept Agriculture**

### **Wildlife Services**

#### **Assistant State Direction, Ohio**

I had two main areas of responsibility.

First, provide technical information and assistance, upon request, for reducing or preventing damage to agricultural crops and products, private property, or other interest, or threats to human health and safety caused by birds and other wild vertebrate animals in

Ohio. Disseminate information to all requesting individuals or organizations, both public and private, concerning the methods, tools and techniques available to protect agricultural crops and products, private property, or other interest from damage caused by birds or other wild vertebrate animals. Some of the organizations worked with or through include the Ohio State University, Ohio cooperative Extension Service, Ohio Agricultural Research and Development Center, Ohio Department of Natural Resources, Ohio Department of Health, Ohio Department Agriculture, Ohio Department of Transportation, County and local Sanitarians, U.S. Fish and Wildlife Service, Federal Aviation Administration, local TV and radio stations, and newspapers.

Second, manage the wildlife on the National Aeronautics and Space Administration's (NASA) 5,000-acre Plum Brook Station, located in Sandusky, Ohio. The primary emphasis of this wildlife management program was deer management:

Monitor the station's deer population level using an annual winter aerial census. Using the winter census figures, project the deer population levels for the coming year. Make browse utilization observations to determine station carrying capacity. Set up and conducting public deer hunts to maintain the station's deer population at a level consistent with the ecological carrying capacity and human safety needs of the station.

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## **US Dept Agriculture**

### **Wildlife Services**

#### **Acting State Supervisor/State Supervisor**

##### **North Dakota**

Provided line supervision, administration, and overview of all U.S. Fish and Wildlife Service, Animal Damage Control, activities in North Dakota. Additional duties included establishing and maintaining liaison with the agricultural community and other landowners and managers for the purpose of assisting and encouraging them to manage their

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lands in a manner that benefit the wildlife dependent thereon.

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**US Fish and Wildlife Service,  
District Supervisor Wildlife Biologist, Indiana.**

Conduct the field Animal Damage Control program in Indiana. This was primarily an extension type program that provides, upon request, the technical information, and assistance necessary to alleviate man/wildlife conflicts while maintaining the diverse wildlife populations and wildlife habitats of Indiana and the United States. Disseminating animal damage control information through and to the Purdue Cooperative Extension Service, Purdue Agricultural Information Service, State Department of Natural Resources, State, County and local Sanitarians, local TV and radio stations, newspapers, leaf lets, phone calls, letters and personal visits. Conducting on-site training for individuals and organizations, both public and private, in the correct use and application of animal damage control tools, techniques, and methodology. Examples of such training include coyote control, small predator control, bird depredation control in agricultural crops, commensal rodent control, commensal bird control, field rodent control, and wildlife hazard control at airports.

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**Attendance at Courses and Conferences**

Pesticide Applicators Certification Training, sponsored by the Montana Department of Agriculture. Certified to use: Rodenticide, Piscicide, Insecticides, Herbicides, and Fungicides. 1978

Bird Hazard to Aircraft, Terre Haute, IN., sponsored by USFWS, June 27-28, 1978.

Pesticide Applicators Certification Training, sponsored by Indiana State Chemist Office and Purdue University. Certified in category 7a1 - vertebrate pest control, 1978.

Administrative Workshop, sponsored by USFWS, Lansing, MI, March 12-15, 1979.

Eight Bird Control Seminar, Bowling Green State University, Bowling Green, OH, October 3-November 1, 1979.

Great Plains Agricultural Council, Wildlife Damage Control Workshop, Kansas State University,

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Manhattan, KS, December 4-6, 1979.

Pest Control Operators Short Course, University of Lexington, Lexington, KY, October 26-29, 1980.

Introduction to Supervision, (40 hrs.) sponsored by USFWS and OPM, Great Lakes Region, April 27-May 1, 1981.

Defense Small Purchase: Correspondence Course/sub-course AIM3817H. This course met USFWS requirements for \$5,000 level one procurement warrant, Completed May, 1982.

First Eastern Wildlife Damage Control Conference, Cornell University, Ithaca, NY, September 27-30, 1983.

Purdue Pest Control Conference, Purdue University, West Lafayette, IN, January, 1979, 1980, 1981, 1982, 1983, 1984.

Supervision and Group Performance (40 hrs.) sponsored by USFWS and DRTC. August 26-30, 1985.

Pesticide Applicators Certification Training, sponsored by North Dakota Cooperative Extension Service. Certified in Agricultural Pest Control. January, 1985.

Effective Interaction Skills (30 hrs.), sponsored by USDA FS and DRTC, March 11-13, 1986.

Pesticide Applicators Certification Training, sponsored by North Dakota Cooperative Extension Service and USDA APHIS ADC. Certified in Vertebrate Pest Control, March, 1986.

Twenty-seventh, Twenty-eighth, Twenty-ninth, thirtieth, Thirty-second, Thirty-third Ohio Fish and Wildlife Conference, (1987, 1988, 1989, 1990, 1992, 1993).

U.S. Army Corps of Engineers, Workshop: Management of Bird Pest April 27-29, 1988, New Orleans, LA.

Fourth Eastern Wildlife Damage Control Conference, Madison WI, Sept. 26-28, 1989.

International Canada Goose Symposium, Milwaukee, WI, April 23-25, 1991

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Chemical Immobilization of Animals, April 27 to 29, 1992. Sponsored by Safe-Capture International, Inc.

Sixth Eastern Wildlife Damage Control Conference, Asheville, Oct. 4-6, 1993

First Annual Wildlife Control Instructional Seminar Sponsored by Wildlife Control Technology Magazine, and National Animal Damage Control Association, Itasca, IL. Feb. 10-12, 1995.

FAA Aircraft Accident Investigation, May 1998.

Bird strike Committee – USA, meetings in 1995, 1996, 1997, 1998.

Bird strike Committee – USA/Bird strike Committee – Canada, joint meetings, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007

Bird Strike Committee International, 2000, 2005

Caribbean and South American Regional Wildlife Hazard Committee (CARSAMPAF) meetings, 2003, 2004, 2006.

ICAO/COSCAP, Regional Seminar on Wildlife Hazard Reduction At Airports, Bangkok, Thailand, 9 - 11 January 2006.

ICAO/COSCAP Wildlife Hazard Reduction Workshop Beijing, China 16 - 19 January 2006

East Africa Workshop on Bird Hazards at Airports, 22, 23 February 2007, Arusha, Tanzania.

West Africa Workshop on Wildlife Hazards at Airports, Lagos, Nigeria, May 2007

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## **Publications**

Brown, P. L., E. C. Cleary, and M. R. Miller. 1975. Water Use and Rooting Depths of Crops for Saline Seep Control, Proceedings Regional Saline Seep Symposium, Montana State University, December 9-11, Bozeman, Montana, pages 125-136.

Brown, P. L. and E. C. Cleary. 1978. Water Use and Rooting Depths of Crops for Saline Seep Control, Proceedings Sub-commission on Salt Affected Soils, 11th International Soil Science Society Congress, June, Edmonton, Canada, pages 7/1-7/7.

Cleary, E. C. 1973a. Selective Exclusion Fencing for use in Desert Bighorn Sheep and Wild Burro Management. Desert Bighorn Council Transactions,

April 3-6, Hawthorn, Nevada. 17:106-109.

Cleary, E. C. 1973b. Key to the Genera of the Grasses of Southern California. Basic Plant Taxonomy Class, California State University, Long Beach, California. 8 pages.

Cleary, E. C. 1980. Birds - Can they be Managed or Controlled, 44th Purdue University Pest Control Conference, Purdue University, January 3-7, Lafayette, Indiana. 10 pages.

Cleary, E. C. 1982. Vertebrate Pest in Urban Situations, 46th Purdue University Pest Control Conference, Purdue University, January 2-6, Lafayette, Indiana. 11 pages.

Cleary, E. C. 1984. Animal Damage Control - Coyotes. Purdue University Cooperative Extension Service, leaflet ADC-14. 4 pages.

Cleary, E. C. 1988a. Animal Damage Control: An Overview, 28th Ohio Fish and Wildlife Conference, February 19. Columbus Ohio.

Cleary, E. C. 1988b. Animal Damage Control - Snakes, USDA/APHIS/ADC Ohio, leaflet ADC/OH-6. 6 pages

Cleary, E. C. 1989a. Bird Control Methodologies, in Krzysik, A. J. Ed., Management of Bird Pest, U.S. Army Corps of Engineers. New Orleans, LA., April 27-29, 1988, REMR Report, June 1989, pages13-17

Cleary, E. C. 1989b. Animal Damage Control Voles, USDA/APHIS/ADC, Ohio, leaflet ADC/OH-15. 5 pages

Cleary, E. C. 1989c. Animal Damage Control Moles, USDA/APHIS/ADC, Ohio, leaflet ADC/OH-11. 3 pages.

Cleary, E. C. 1989d. Animal Damage Control - Deer, USDA/APHIS/ADC, Ohio, leaflet ADC/OH-20. 4 pages.

Cleary, E. C. 1990a. Animal Damage Control - Canada Goose, USDA/APHIS/ADC, Ohio, leaflet ADC/OH-32. 4 pages.

Cleary, E. C. 1990b. Animal Damage Control - Gulls, USDA/APHIS/ADC, Ohio, leaflet ADC/OH-33. 5 pages.

Cleary, E. C. 1994. Waterfowl. In S. E. Hylgnstrom, R. M Timm, & G. E. Larson, Eds. *Prevention and Control of Wildlife Damage*, University of Nebraska, Cooperative Extension Division, Lincoln, NE. Pages E139-E155.

Cleary, E. C. and S. C. Craven. 1994. Thirteen-lined ground squirrel. In S. E. Hylgnstrom, R. M Timm, and G. E. Larson, Eds., *Prevention and Control of Wildlife Damage*, University of Nebraska, Cooperative Extension Division, Lincoln, NE. Pages B165-B170.

Cleary, E. C. 2002a. Preliminary Wildlife Hazard Assessment Kilgali International Airport Kilgali, Rwanda. December, 2001. 15 pages.

Cleary, E. C. 2002b. Preliminary Review of the Wildlife Hazard Management Program Entebbe International Airport Entebbe, Uganda. December, 2001. 18 pages.

Cleary, E. C. and R. A. Dolbeer, 1999, *Wildlife hazard management at airports, a manual for airport operators*. US Dept of Transportation, Federal Aviation Administration, Office of Airport Safety and Standards, Washington, D.C. USA. 276 pages.

Cleary, E. C. and R. A. Dolbeer. 2003. Preliminary Wildlife Hazard Assessment of Aeropuerto La Isabela, Santo Domingo, Dominican Republic. January 2003. 21 pages.

Cleary, E. C. and R. A. Dolbeer. 2005. *Wildlife hazard management at airports, a manual for airport operators*. Second edition. Federal Aviation Administration, Office of Airport Safety and Standards, Washington, D.C. USA. 348 pages. (<http://wildlife-mitigation.tc.faa.gov/>).

Cleary, E. C. and R. A. Dolbeer. 2005. Multi-engine bird strikes to turban powered aircraft. IBSC27/WP VI-2, Athens, Greece, 23-27 May 2005. 15 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 1996. The Mexico City International Airport Project: Conclusions and recommendations regarding bird/aircraft issues in Ex-Vaso de Texcoco. Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. November 1996. 15 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 1998.

The Mexico City International Airport Project: Conclusions and recommendations regarding bird/aircraft issues in Ex-Vaso de Texcoco. Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. January 1998. 24 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 1999a. The Mexico City International Airport Project: Bird and mammal concerns at the existing airport and proposed site (Ex-Vaso de Texcoco). Supplemental Report, Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. March 1999. 33 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 1999b. The Mexico City International Airport Project: Bird and mammal concerns at the existing airport and proposed site (Ex-Vaso de Texcoco). Supplemental Report Number 2, Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. December 1999. 16 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 2001. The Mexico City International Airport Project: Bird and mammal concerns at the existing airport and proposed site (Ex-Vaso de Texcoco). Supplemental Report Number 3, Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. February 2001. 27 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 2002. The Mexico City International Airport Project: Bird and mammal concerns at the existing airport and selected site (Ex-Vaso de Texcoco) for the new airport. Supplemental Report Number 4, Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. March 2002. 46 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 2003. The Mexico City International Airport Project: Bird and mammal concerns at the existing airport and selected site (Ex-Vaso de Texcoco) for the new airport. Supplemental Report Number 5, Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. February 2003. 34 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 2004a. Preliminary Wildlife Hazard Assessment of a Proposed Landfill near Villahermosa International Airport, Villahermosa, Tabasco, Mexico. January

2004. 23 pages

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 2004b. The Mexico City International Airport Project: Bird and mammal concerns at the existing airport and selected site (Ex-Vaso de Texcoco) for the new airport. Supplemental Report Number 6, Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. January 2004. 37 pages.

Cleary, E. C., R. A. Dolbeer, and P. Ramirez. 2005. The Mexico City International Airport Project: Bird and mammal concerns at the existing airport and selected site (Ex-Vaso de Texcoco) for the new airport. Supplemental Report Number 7, Aeropuertos y Servicios Auxiliares, Mexico City, D. F., Mexico. March 2005. 56 pages.

Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2002b. Wildlife strikes to civil aircraft in the United States, 1990–2001. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 8, DOT/FAA/AS/00-6(AAS-310). Washington D.C. USA. 50 pages.

Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2003. Wildlife strikes to civil aircraft in the United States, 1990–2002. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 9 DOT/FAA/AS/00-6(AAS-310). Washington D.C. USA. 51 pages.

Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2004. Wildlife strikes to civil aircraft in the United States, 1990–2003. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 10 DOT/FAA/AS/00-6(AAS-310). Washington D.C. USA. 54 pages.

Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2005. Wildlife strikes to civil aircraft in the United States, 1990–2004. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 11 DOT/FAA/AS/00-6(AAS-310). Washington D.C. USA. 53 pages.

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DOT/FAA/AS/00-6(AAS-310). Washington D.C. USA. 64 pages.

Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2007. Wildlife strikes to civil aircraft in the United States, 1990–2006. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 13 DOT/FAA/AS/00-6(AAS-310). Washington D.C. USA. 58 pages.

Cleary, E. C. and A. L. Gosser. 2004. Preliminary Wildlife Hazard Assessment Of Tanzanian International Airports At Dar Es Salaam, Kilimanjaro, And Zanzibar. April 2004. 62 pages.

Cleary, E. C. and A. L. Gosser. 2005a. Preliminary Wildlife Hazard Assessment Kenya International Airports: Jomo Kenyatta International Airport, Nairobi Moi International Airport, Mombasa. September 2004. 58 Pages.

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Cleary, E. C. and A. L. Gosser. 2007b. Direccion General de Aeronautica Civil Chile Wildlife Hazard Management Program Evaluation and Preliminary Wildlife Hazard Assessments at Aeropuerto Carriel Sur, Concepcion; Aeródromo Maquehue, Temuco; Aeropuerto Presidente Carlos Ibañez del Campo, Punta Arenas; and Aeropuerto Comodoro Arturo Merino Benitez, Santiago. June 2007. 86 pages.

Cleary, E. C. and T. A. Messmer. 1986a. Animal Damage Control Skunks. North Dakota State University Cooperative Extension Service, leaflet ADC-1. 4 pages.

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Cleary, E. C. and T. A. Messmer. 1986c. Animal Damage Control - Woodpeckers, North Dakota State University Cooperative Extension Service. leaflet ADC3. 4 pages.

Cleary, E. C. and T. A. Messmer. 1986d. Animal Damage Control - Bats, North Dakota State University Cooperative Extension Service. leaflet ADC-4. 4 pages-

Cleary, E. C. and K. Reynolds. 1983. Canada Goose Numbers and Goose Damage in Northeastern Indiana. Proceedings First Eastern Wildlife Damage Control Conference. Cornell University, Ithaca New York. September 27-30. pages 237-238.

Cleary, E. C., S. E. Wright, and R. A. Dolbeer. 1996. Wildlife strikes to civilian aircraft in the United States, 1993–1995. Serial Report Number 2. DOT/FAA/AAS/97-1. Federal Aviation Administration, Office of Airport Safety and Standards, Washington, D.C. USA. 33 pages.

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Federal Aviation Administration, Office of Airport Safety and Standards, Washington, D.C. USA. 37 pages.

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Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2003. Wildlife strikes to civil aircraft in the United States, 1990–2002. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 9. DOT/FAA/AS/00-6(AAS-310). Washington, DC, USA. 51 pages.

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### Three Year Reference List

#### **Wildlife Hazard Program Evaluation**

Orlando International Airport, Orlando FL, June 2009

POC:

Johnny Metcalf

Wildlife Hazard Management Program Manager

[JMetcalf@goaa.org](mailto:JMetcalf@goaa.org)

#### **Wildlife Hazard Assessments**

Easton/Newman Field, Easton MD, March 2009

POC:

Mike Henry

Airport Manager

Easton/Newman Field

Easton, MD 21601

[mhenry@talbgov.org](mailto:mhenry@talbgov.org)

Tijuana International Airport, Tijuana Mexico, July 2008

Calexico International Airport, Calexico, Mexico, June 2008

POC:

Fernando Domínguez Guzman,

Supervisión y Control de Fauna. S. A. de V. C.

[SUCOFA@hotmail.com](mailto:SUCOFA@hotmail.com)

Daniel Oduber Queras International Airport, Liberia, Costa Rica, January 2007

POC:

Sra. Hilda Valvede Avalos,

Costa Rica, Direccion General de Aviation Civil, Airport Inspections

Aeropuerto Comodoro Arturo Merino Benitez, Santiago, Chile, June 2007

Aeropuerto Carriel Sur, Concepcion, Chile, June 2007

Aeródromo Maquehue, Temuco Chile, June 2007

Aeropuerto Presidente Carlos Ibañez del Campo, Punta Arenas, Chile, June 2007

POC:

Sr. Ramiro Castro Cuadra,

Manager Emergency Response, LAN,

Santiago de Chile

[Ramiro.CastroC@lan.com](mailto:Ramiro.CastroC@lan.com)

#### **Wildlife Hazard Management Plan**

Al Maktoum International Airport,

Dubai World Central, Dubai, United Arab Emirates. November 2007

POC:

Phil Archer

[archerpw@yahoo.com.au](mailto:archerpw@yahoo.com.au)

**Wildlife Surveys**

**Conducted wildlife surveys through the Valley of Mexico, as part of preparation for construction of the New Mexico City International Airport, December 2008.**

POC:

Biol. Magdalena Colunga,  
Aeropuertos y Servicios Auxiliares (ASA),  
[magdalena.colunga@asa.gob.mx](mailto:magdalenacolunga@asa.gob.mx)

**Airport Personnel Training programs**

**Mr. Cleary is conducting 8 hour training programs for Port Authority of New York and New Jersey airport personnel to meet requirements of FAA Advisory Circular 150/5200-36.**

**Training is conducted as part of contract between AAEE and PANYNJ.**

POC:

Will James  
AAEE  
703-824-0500X149  
[wjames@aaee.org](mailto:wjames@aaee.org)





AITKIN AIRPORT & EVERSTAR WETLAND BANK

## **APPENDIX A:**

# **AVIAN SURVEY METHODS AND RESULTS**

Aitkin County, Minnesota

November 3, 2011



**Prepared For:**

EverStar, LLC  
9302 Interlachen Road  
Lake Shore, MN 56468

**Prepared By:**



**Westwood**

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# **APPENDIX A**

## **Avian Survey Methods and Results Aitkin Airport and EverStar Wetland Bank Aitkin County, Minnesota**

Prepared for:

EverStar, LLC  
9302 Interlachen Road  
Lake Shore, MN 56468

Prepared by:

Ronald P. Peterson, JD  
FAA Qualified Wildlife Biologist  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344  
(952) 937-5150

Project Number: 20047566.00

November 3, 2011

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## Introduction

EverStar, LLC has proposed a wetland bank project that will restore a large area of drained and partially drained riparian wetland along an approximately two mile stretch of the Mississippi River in Aitkin County, Minnesota (**Exhibit 1**). The wetland area to be restored is currently in agricultural use and has primarily been planted to soybeans and oats in recent years. Upon completion and acceptance, the wetland mitigation credits generated by the project will be deposited into the State Wetland Bank and sold for use in offsetting unavoidable impacts of future projects where on-site wetland replacement is not feasible. The proposed EverStar project will result in the restoration of approximately 419 acres of riparian wetland and the restoration or preservation of 103 acres of upland buffer. Wetlands to be restored are drained and partially drained by surface ditches and are currently used for small grain agriculture. Restoration will be accomplished by the blockage or elimination of shallow surface swales and the placement of ditch blocks on deeper ditches. One relatively deep ditch through the center of the project site is a county ditch and, accordingly, cannot be blocked.

To avoid attracting waterfowl, the restoration plan calls for the conversion of existing agricultural fields to saturated palustrine scrub shrub wetland (PSS1B)<sup>1</sup>(hereafter referred to as “scrub shrub wetlands”). However, members of the Wetland Conservation Act (WCA) technical evaluation panel (TEP) rejected this wetland type on the basis that it would encourage infestation by common buckthorn (*Rhamnus cathartica*). To satisfy the TEP, the proposed wetland type has been changed to saturated palustrine emergent wetland (PEMB)(hereafter referred to as “wet meadows”). A Wildlife Hazard Evaluation report dated May 23, 2010 was prepared by Airport Wildlife Consultants, LLC (AWC) and Westwood Professional Services to describe existing wildlife hazards at Aitkin Airport (AIT) and evaluate whether hazards would increase or decrease with the completion of the wetland restoration project. The AWC report was based on existing and projected land cover types and a review of the habitat preferences of the top 25 hazardous wildlife species or guilds, as identified in FAA Advisory Circular 150/5200-33B (dated 8/28/2007). The AWC report concluded that the proposed wetland restoration would result in a net reduction in wildlife hazards as compared to the existing agricultural land use. The AWC report was reviewed by the Federal Aviation Administration (FAA), USDA Animal and Plant Health Inspection Service (APHIS) and the U. S. Army Corps of Engineers (USACE) and a conclusion was reached that field survey data was needed to determine whether this conclusion was correct.

In August of 2010, one year of avian point count surveys were initiated to obtain objective, scientific data upon which appropriate conclusions on existing and projected wildlife hazards could be based. This report summarizes the avian survey methods employed and the survey results obtained in the area of Aitkin Airport (AIT), the proposed EverStar wetland bank project and several reference locations containing the wetland types to be restored on the EverStar property. We have formatted the survey results in a manner to facilitate their use by Mr. Ed

---

<sup>1</sup> Wetland types are according to the classification system set forth in *Wetlands and Deepwater Habitats of the United States* (Cowardin, L. M. et al. 1979; FWS/OBS Publication 79/31).

Cleary of WASHMan, LLC in his quantitative analysis of damage hazard and negative effect-on-flight values.

## Avian Survey Methods

The avian survey summarized in this report characterizes bird use throughout a one year period for sixteen observation points (OPs) associated with AIT (OPs 1, 2 3, 4 and 15), the EverStar property (OPs 5, 6, 7, 8 and 9) and reference sites containing existing wetlands of the types to be restored on the EverStar property (OPs 11, 12, 13, 14 and 16). OPs 11, 13, 14 and 16 were located near existing wet meadow and scrub shrub wetlands similar to what is expected on the EverStar property after wetland restoration is complete. OP 12 was located adjacent to the established Willow Springs Wetland Bank site, which is about 2 miles southeast of AIT and is predominantly wet meadow similar to what is projected for the EverStar property. OP 10 along the Mississippi River north of the EverStar property was not considered comparable to projected post-restoration conditions on the EverStar property and was surveyed primarily to characterize bird movements along the river corridor. OPs for AIT and the EverStar property were sited to provide adequate coverage of the habitat combinations characteristic of these properties. The locations and habitat characteristics of the surveyed OPs are depicted in **Exhibits 2 and 3** and summarized in **Table 1**. Photographs taken at each OP are presented in **Attachment A**.

Because they are adjacent to large acreages of saturated palustrine emergent and scrub shrub wetlands (PEMB and PSS1B), OPs 11, 12, 13, 14 and 16 are all reference sites that are representative of conditions on the EverStar property after completion of wetland restoration activities. Respectively, 45, 65, 36, 40 and 86 percent of the land within 0.25 mile of OPs 11, 12, 13, 14 and 16 consisted of these wetland types. OPs 2 and 3 adjacent to AIT are also associated with large areas of these wetland types and are also representative of post-restoration conditions on the EverStar property. Respectively, 32 and 88 percent of the land within 0.25 mile of OPs 2 and 3 consisted of these wetland types.

Avian survey methods were based on methods described in recent Wildlife Hazard Assessments (WHAs) prepared by USDA Animal and Plant Health Inspection Service (APHIS) Wildlife Services office in Grand Rapids, Minnesota. WHAs for the Albert Lea, Brainerd, Duluth, Grand Rapids, Rochester and St. Cloud airports were reviewed. Based on those reports, the survey protocol developed for the EverStar project and approved by FAA included the following elements:

1. 16 OPs were surveyed.
2. During surveys, each OP was observed for 3 minutes. Each OP was surveyed two times during each survey trip, with the survey route reversed on the second run. Times of observations were varied so as not to always be at the same time of day at any given OP.
3. All birds seen or heard using habitat (i.e. feeding, loafing, etc.) within 0.25 mile of the OP were documented.
4. Birds observed more than 0.25 mile from or flying over an OP were also documented.
5. Data was recorded on revised USDA forms (**Attachment B**).
6. Any other anecdotal observations on wildlife activities or attractants while traveling between observation points were noted.

7. 28 survey visits, weighted seasonally to emphasize migration periods were performed as follows: 4 visits per month in April and May; 2 visits per month in June, July, August, September and November; 6 trips in October; and 1 trip per month December through March.
8. No mammal surveys were done at AIT due to the presence of the existing deer fence.

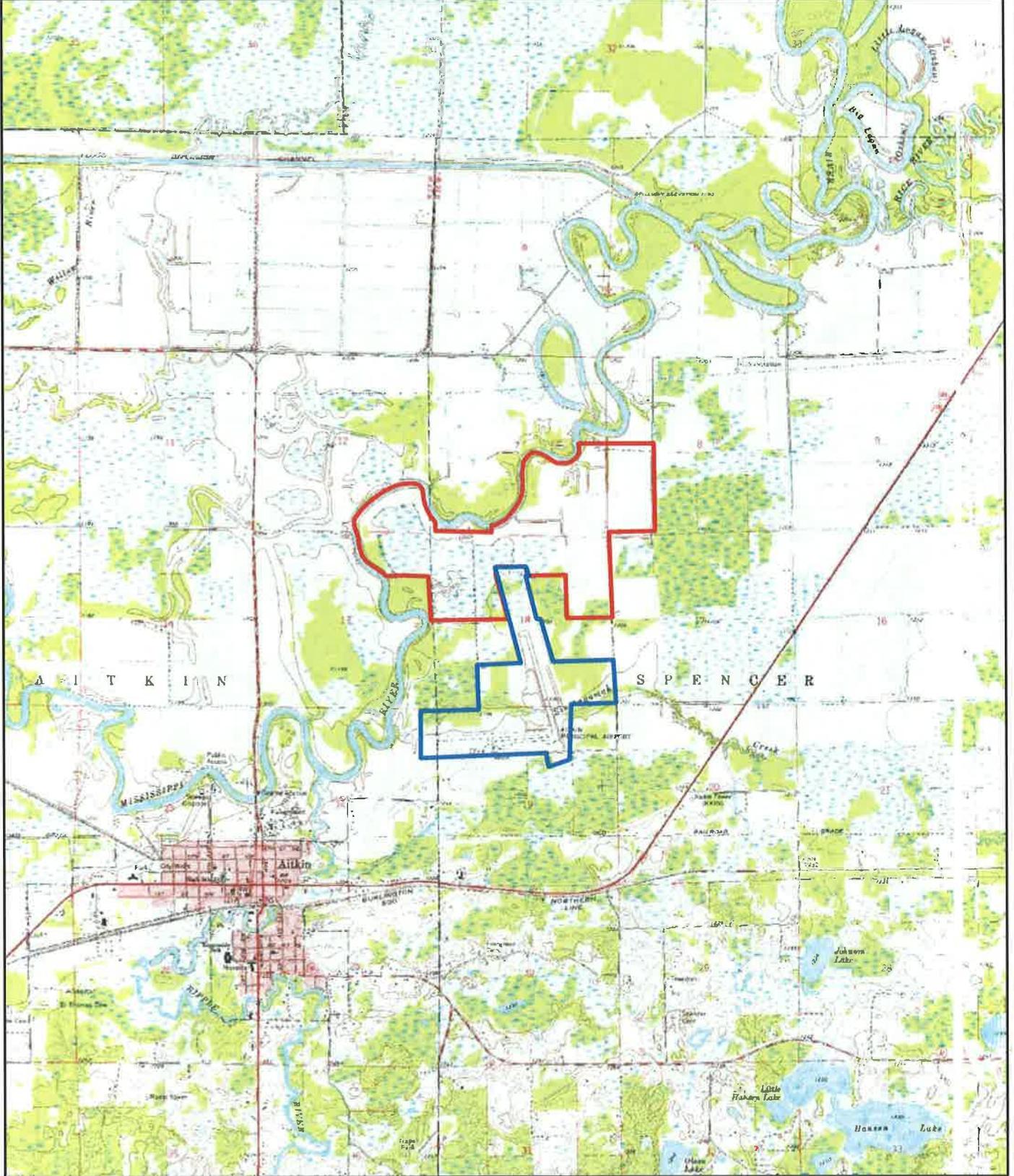
The survey protocol and information on the selected OPs was transmitted to John Weller, National Wildlife Biologist for the FAA on November 5, 2010. This information was accompanied by a request that Mr. Weller confirm that the survey methods and observation points selected were acceptable to the FAA and would meet the requirements for avian surveys set forth in 14 CFR 139.(c)(2). On January 5, 2011, Mr. Weller concurred with the survey methodology by voicemail, stating the observation points and the survey protocol “looked good” and authorizing the survey work to proceed.

Twenty-six of the 28 point count survey trips were performed by Debbie Waters, Education Director at Hawk Ridge Bird Observatory in Duluth. The remaining two survey trips were performed by Erik Bruhnke, Count Interpreter at Hawk Ridge. Both individuals are very experienced in performing avian point count surveys. Resumes for the avian surveyors and the author of this report are provided in **Attachment C**.

## **Survey Results**

Avian point count survey results for all OPs are summarized in **Table 2**. Survey results for individual OPs are supplied in Tables D-1 through D-16 in **Attachment D**.

## **EXHIBITS**



Data Source(s): Westwood (2011); USGS 24k DRG Topo, Quads 2329 and 2330 (various dates).

# EverStar Wetland Bank Project

Aitkin County, Minnesota

## Project Location Map



**Westwood**

Westwood Professional Services, Inc.  
 7699 Anagram Drive  
 Eden Prairie, MN 55344

PHONE 952-937-6150  
 FAX 952-937-5822  
 TOLL FREE 1-888-937-9150

[www.westwoodps.com](http://www.westwoodps.com)

### Legend

- EverStar Project Boundary
- Airport Boundary

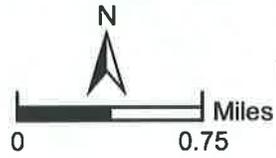
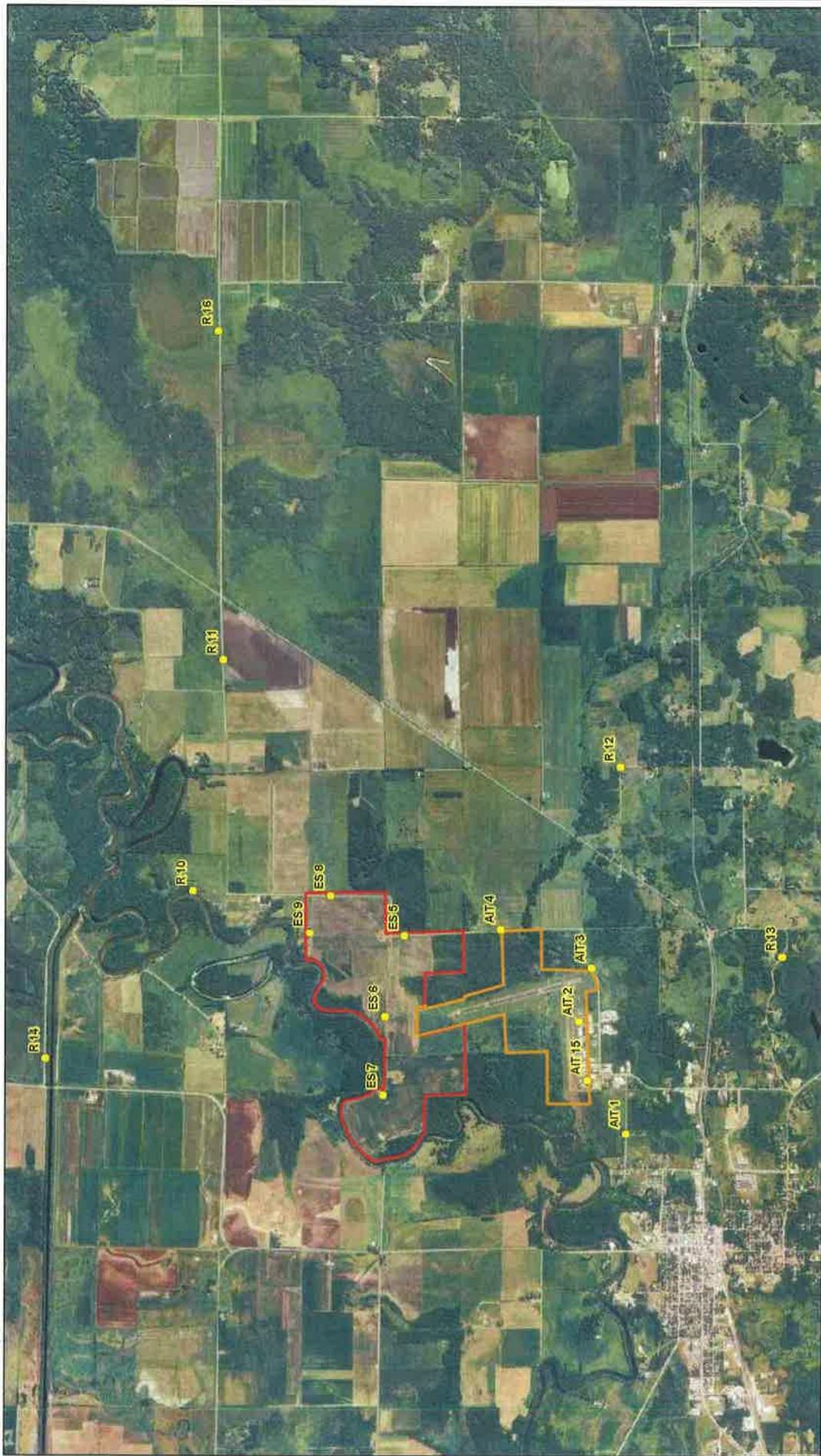


EXHIBIT 1

©2021 Wetland Professional Services, Inc.



Map Download: (7/20/2014 10:26 AM)  
 11/20/2014 10:26 AM

**Wetland Professional Services, Inc.**  
 EverStar Project  
 10000 EverStar Blvd  
 Aitkin, MN 56401  
 Phone: (218) 837-5130  
 Fax: (218) 837-5822  
 Email: info@wps.com  
 www.wps.com

**Legend**

- Observation Points
- EverStar Project Boundary
- Airport Boundary

N   
 0 3,000 Feet

# EverStar Wetland Bank Project

Aitkin County, Minnesota

## Avian Point Count Observation Points

EXHIBIT 2



**ATTACHMENT A**  
**Photographs taken at Observation Points**



Observation Point AIT 1  
View to North



Observation Point AIT 1  
View to South



Observation Point AIT 1  
View to East



Observation Point AIT 1  
View to West



Observation Point AIT 2  
View to North



Observation Point AIT 2  
View to South



Observation Point AIT 2  
View to East



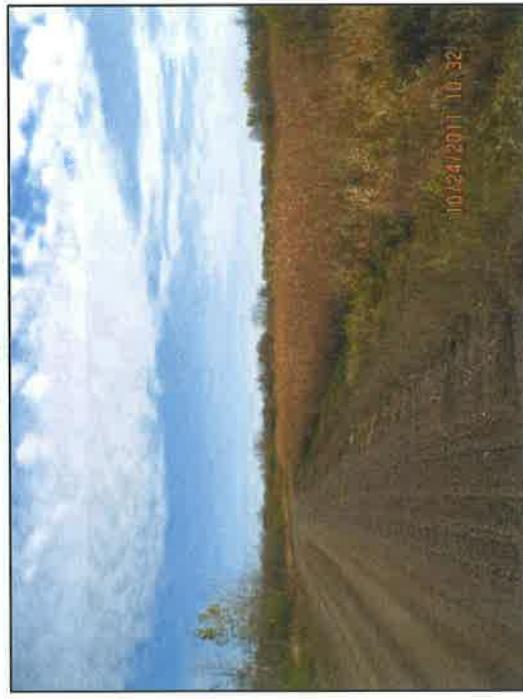
Observation Point AIT 2  
View to West



Observation Point AIT 3  
View to North



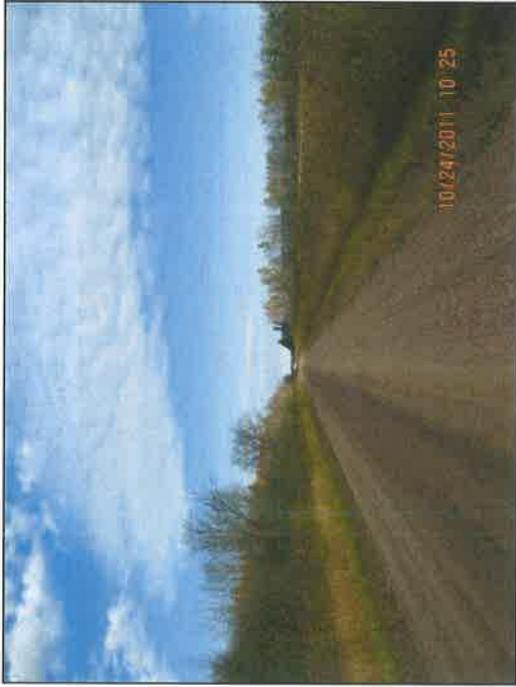
Observation Point AIT 3  
View to Southeast



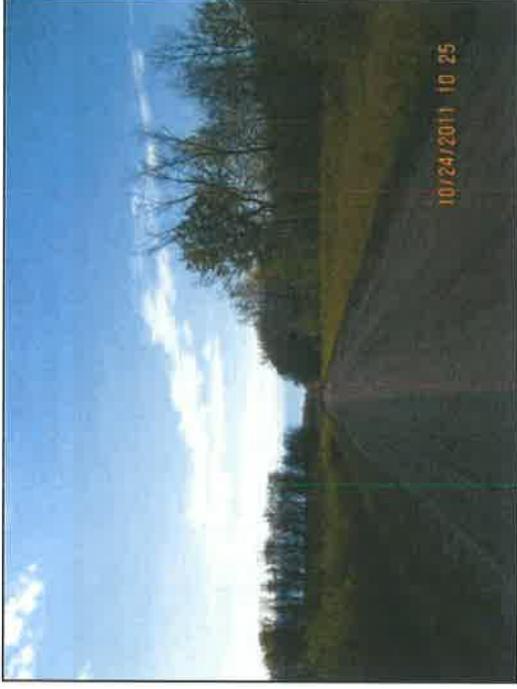
Observation Point AIT 3  
View to East



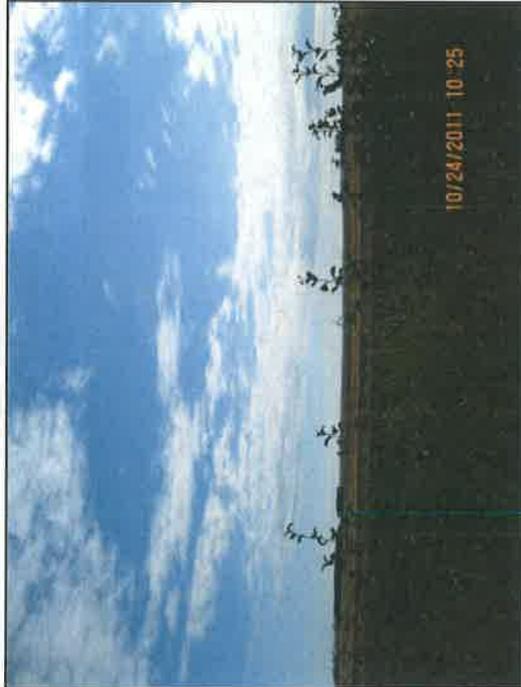
Observation Point AIT 3  
View to West



Observation Point AIT 4  
View to North



Observation Point AIT 4  
View to South



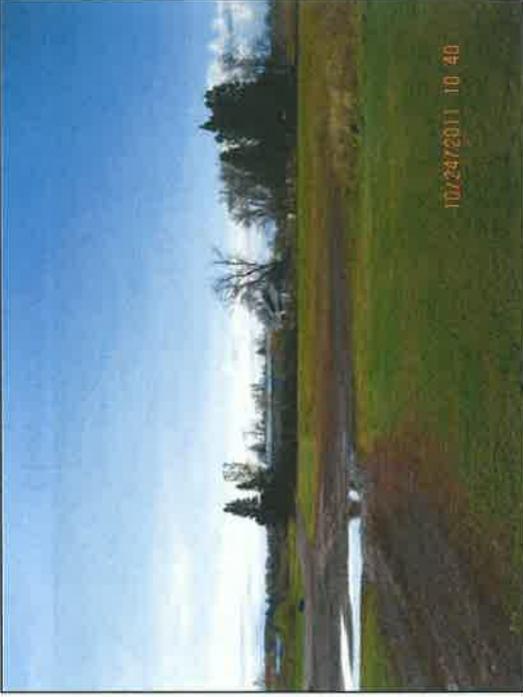
Observation Point AIT 4  
View to East



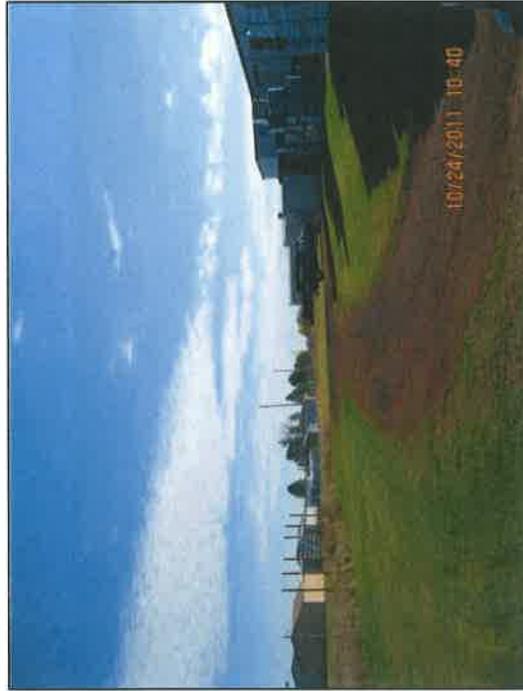
Observation Point AIT 4  
View to West



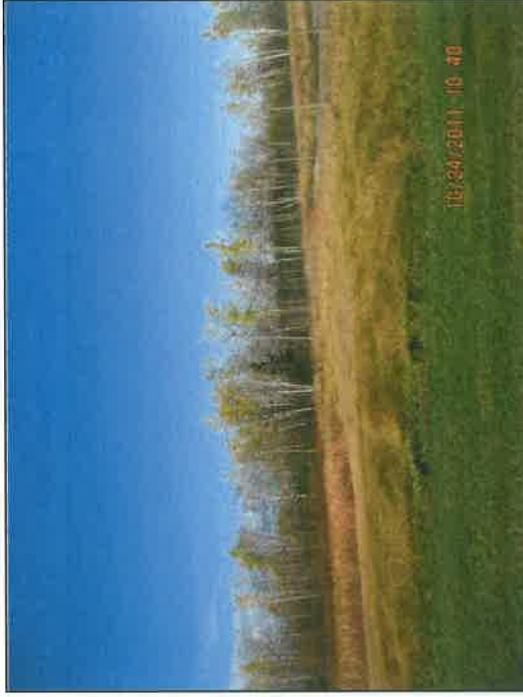
Observation Point AIT 15  
View to North



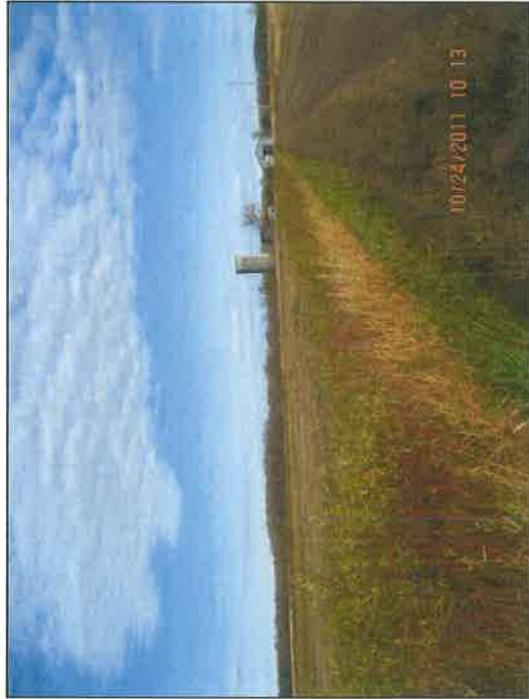
Observation Point AIT 15  
View to South



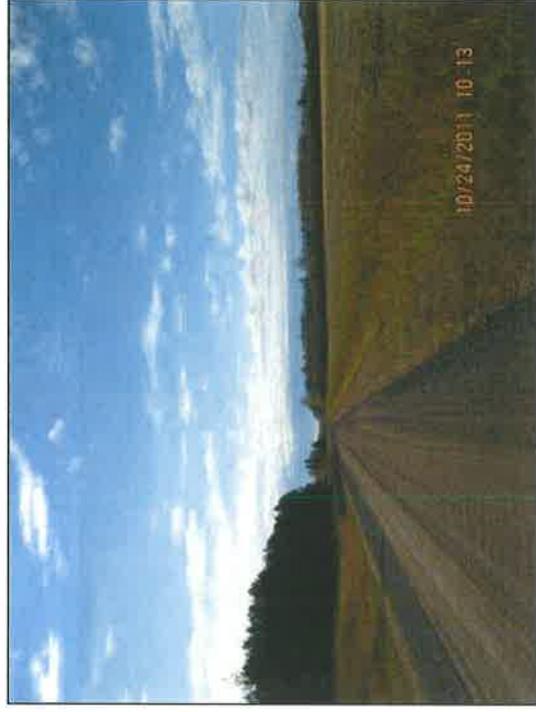
Observation Point AIT 15  
View to East



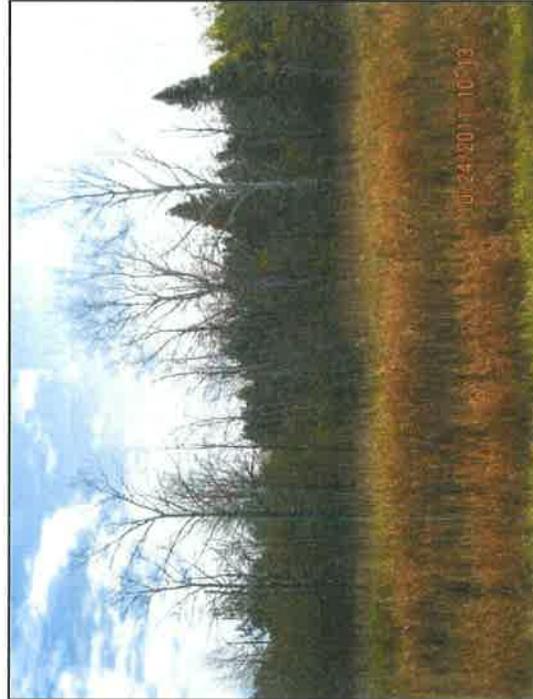
Observation Point AIT 15  
View to West



Observation Point ES 5  
View to North



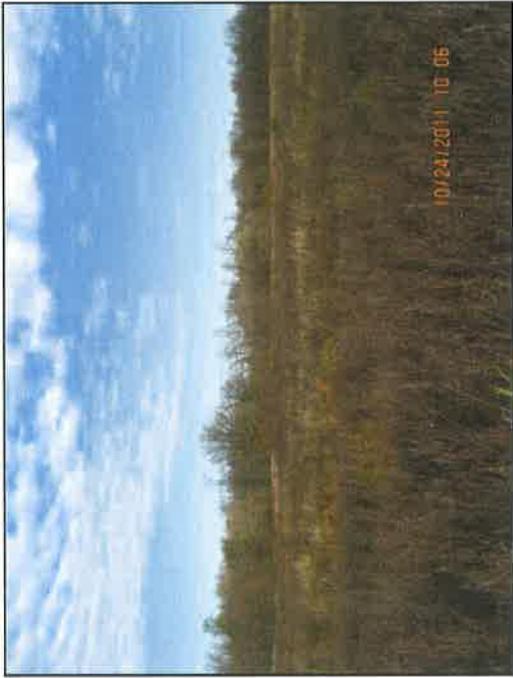
Observation Point ES 5  
View to South



Observation Point ES 5  
View to East



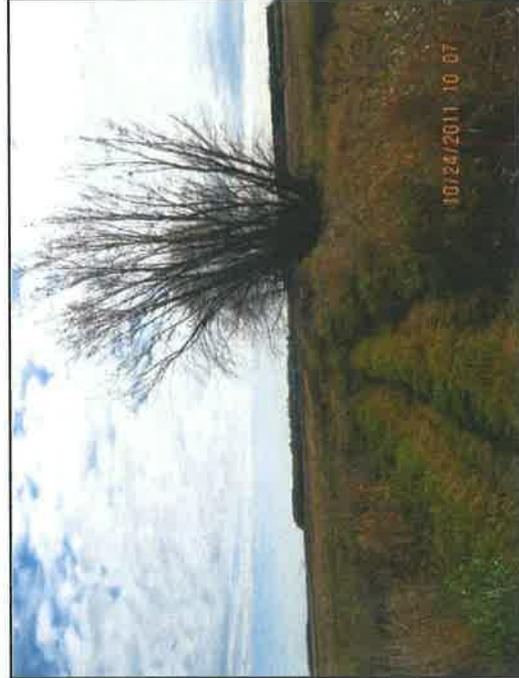
Observation Point ES 5  
View to West



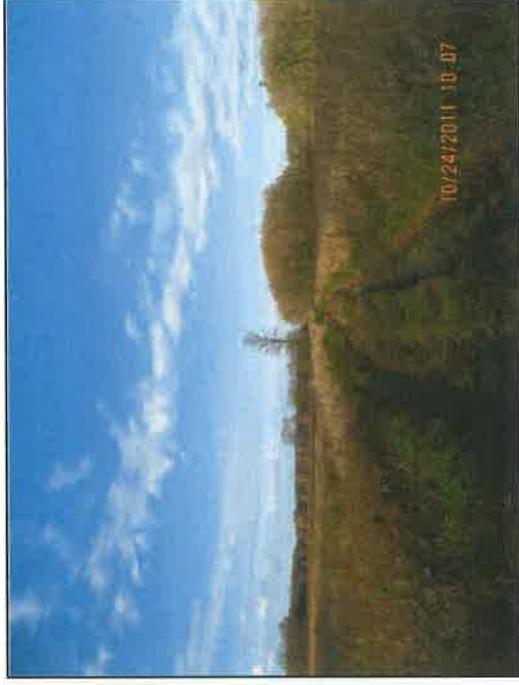
Observation Point ES 6  
View to North



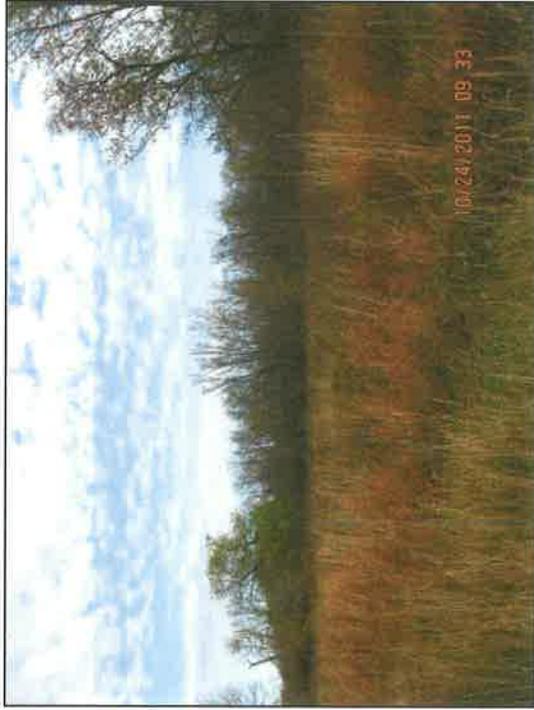
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View to South



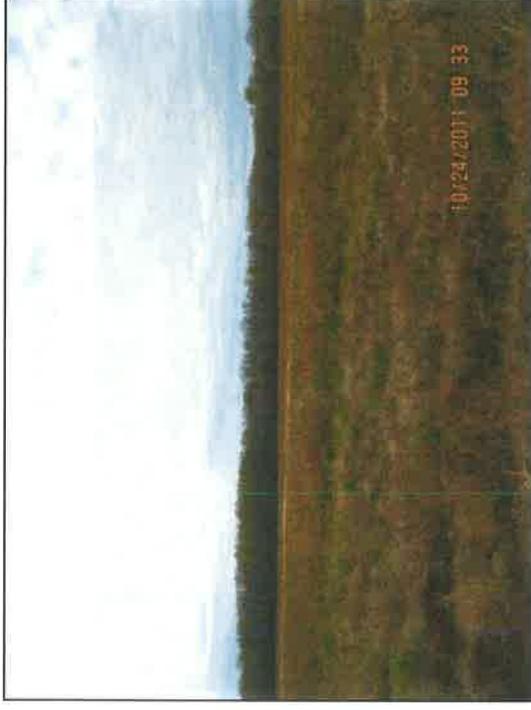
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View to East



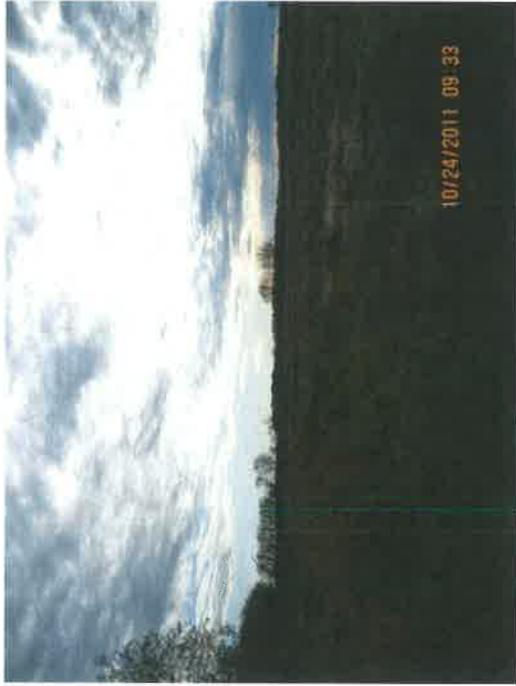
Observation Point ES 6  
View to West



Observation Point ES 7  
View to North



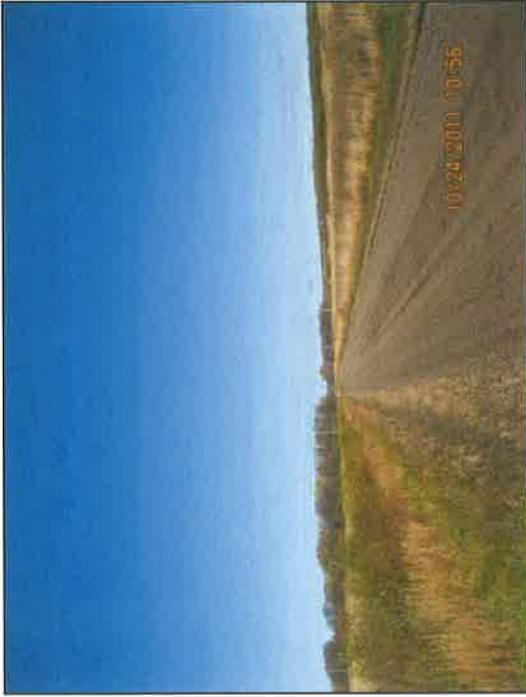
Observation Point ES 7  
View to South



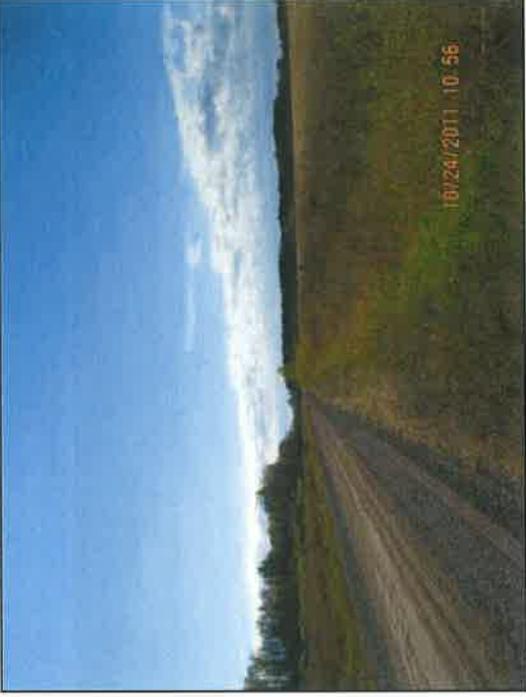
Observation Point ES 7  
View to East



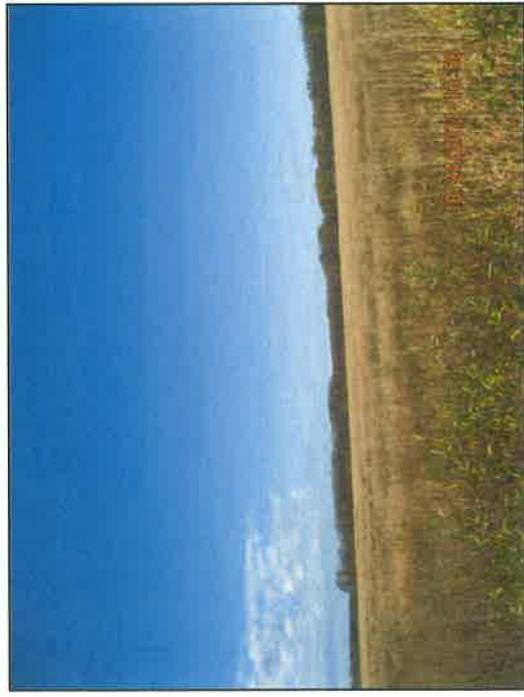
Observation Point ES 7  
View to West



Observation Point ES 8  
View to North



Observation Point ES 8  
View to South



Observation Point ES 8  
View to East



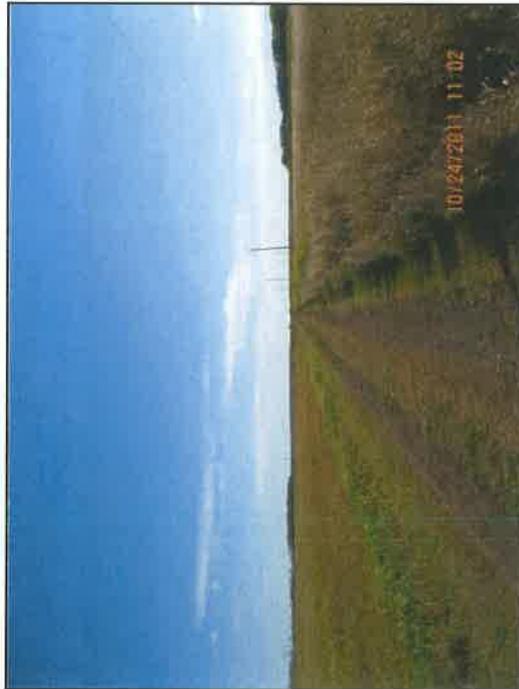
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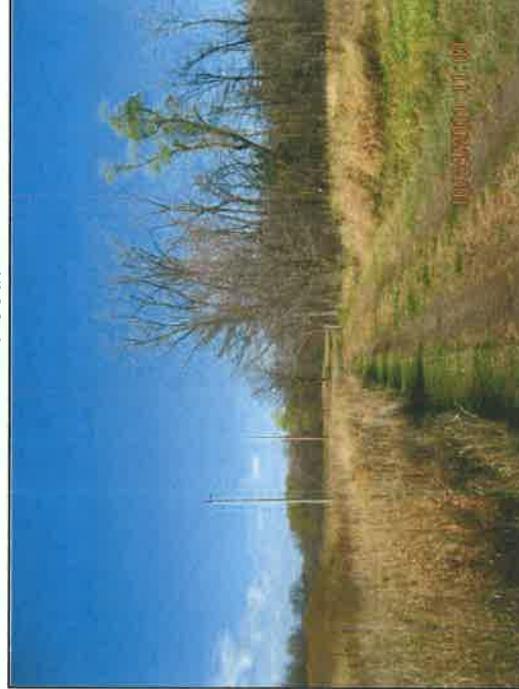
Observation Point ES 9  
View to North



Observation Point ES 9  
View to South



Observation Point ES 9  
View to East



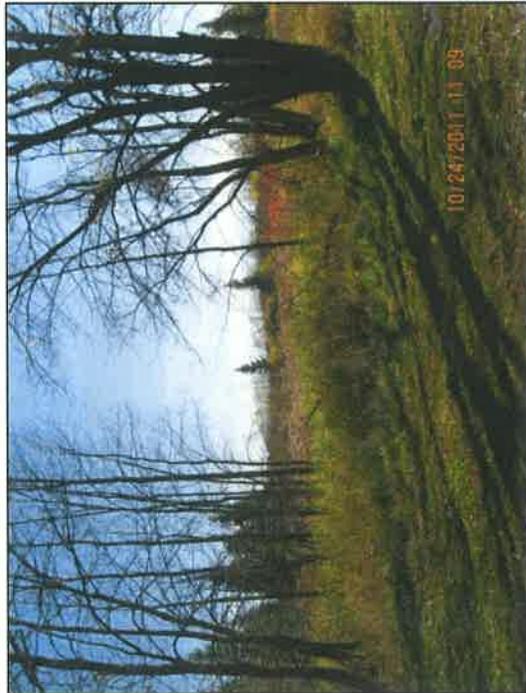
Observation Point ES 9  
View to West



Observation Point R10  
View to North



Observation Point R10  
View to South



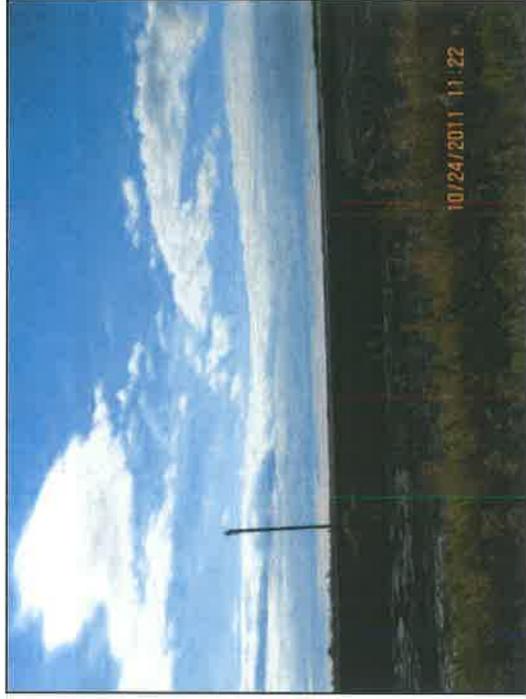
Observation Point R10  
View to East



Observation Point R10  
View to West



Observation Point R11  
View to North



Observation Point R11  
View to South



Observation Point R11  
View to East



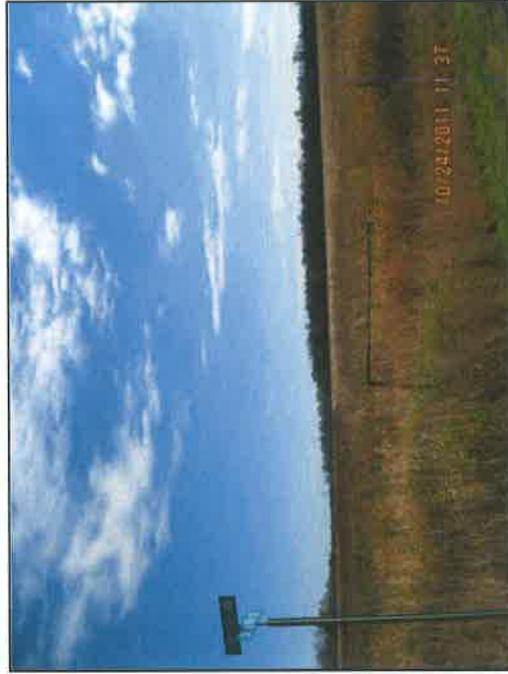
Observation Point R11  
View to West



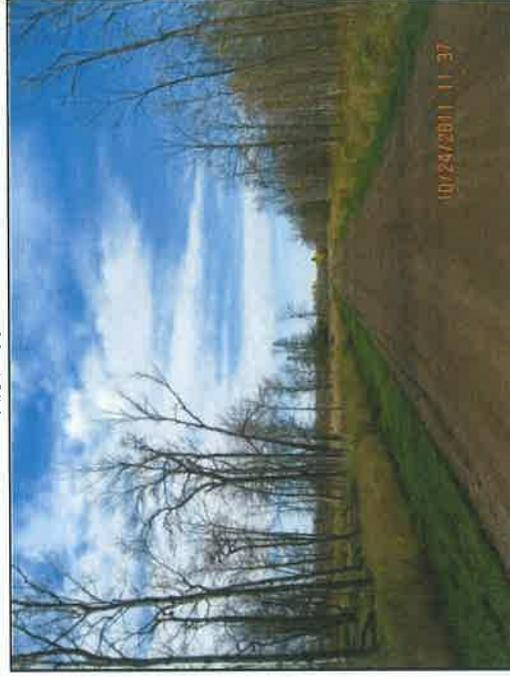
Observation Point R12  
View to North



Observation Point R12  
View to South



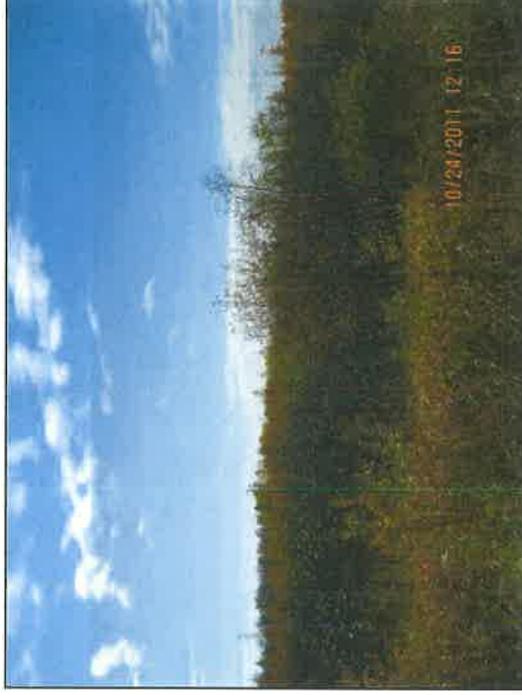
Observation Point R12  
View to East



Observation Point R12  
View to West



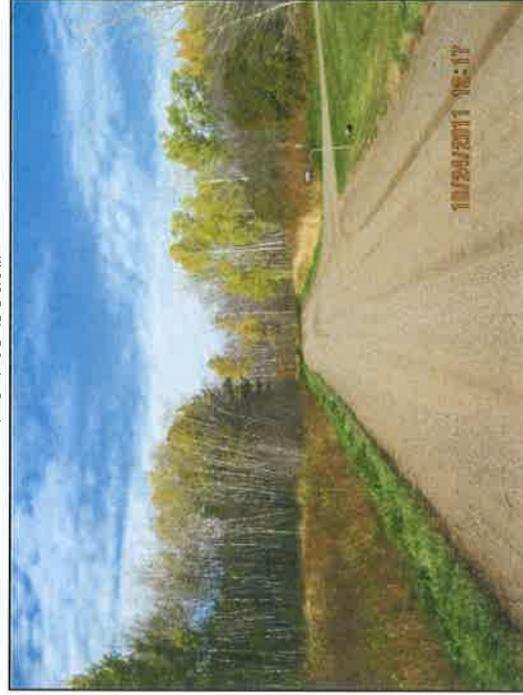
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View to North



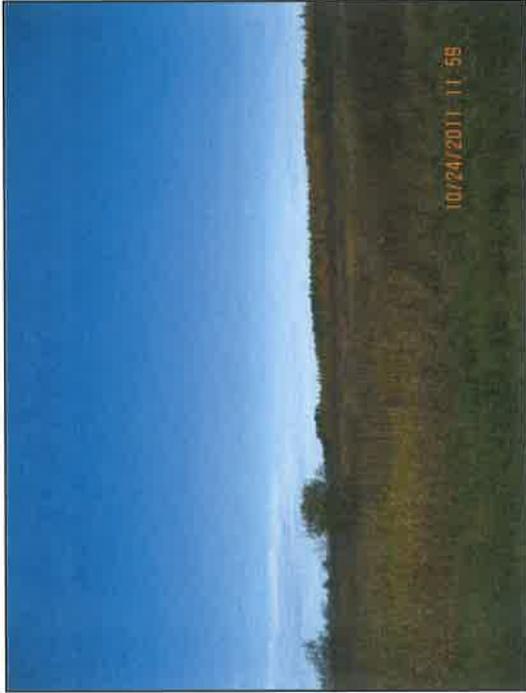
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View to South



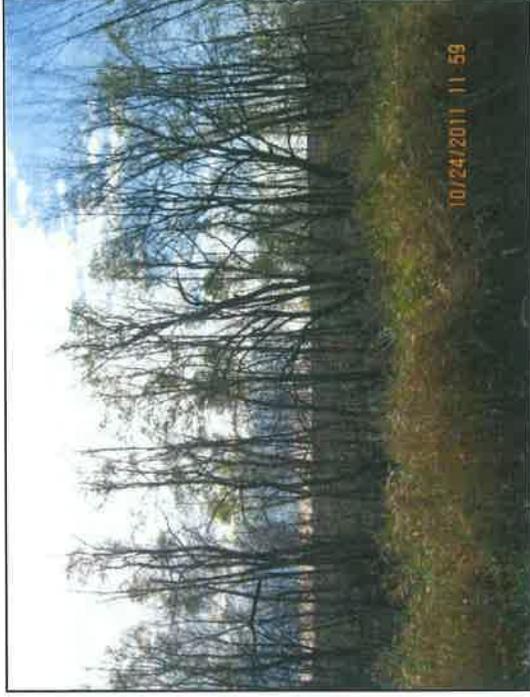
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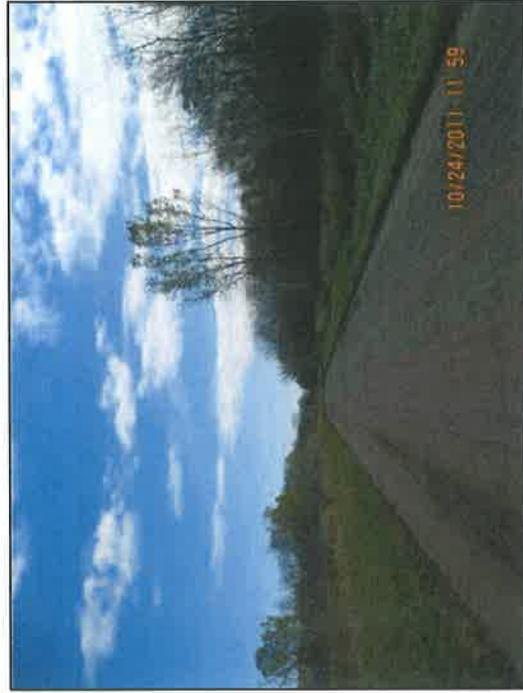
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View to West



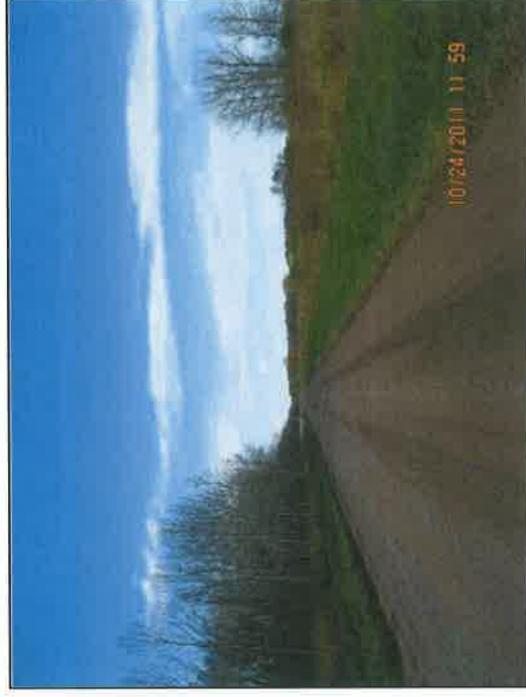
Observation Point R14  
View to North



Observation Point R14  
View to South



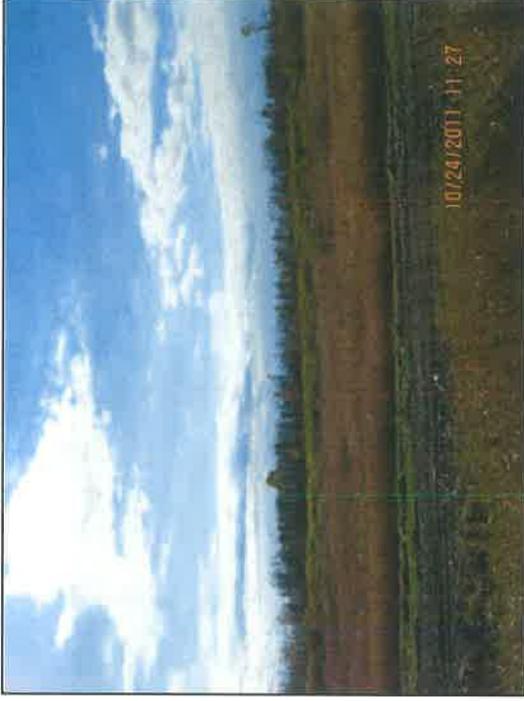
Observation Point R14  
View to East



Observation Point R14  
View to West



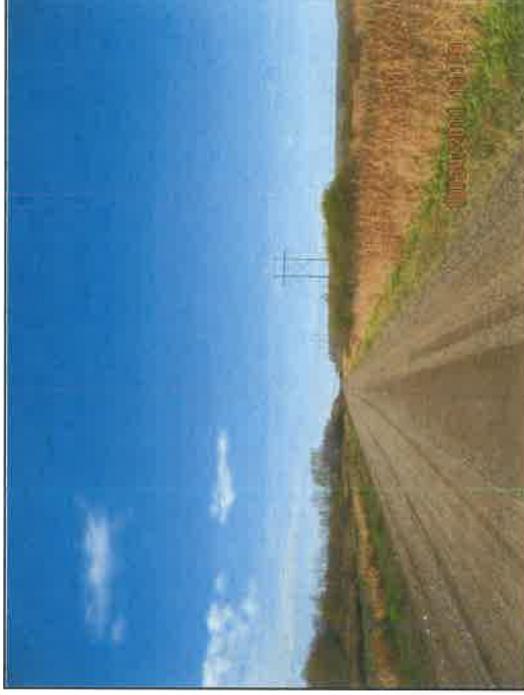
Observation Point R16  
View to North



Observation Point R16  
View to South



Observation Point R16  
View to East



Observation Point R16  
View to West

December 16, 2014

Aitkin County Board of Commissioners  
c/o Mr. Nathan Burkett  
Aitkin County Administrator  
217 2<sup>nd</sup> Street NW  
Room 130  
Aitkin, MN 56431

Dear Aitkin County Board of Commissioners:

My name is Alvin E. (Al) McQuinn, owner of approximately 640 acres of very flat low-land in Aitkin County. We refer to this property as the Everstar Farm. In four years of ownership I have only collected one year's rent and even then returned the rent to the renter because late planting and early frost reduced his crop to nearly nothing. The other three years the crop was either not planted or failed during the growing season. Thus, these lands produced little or no crops and no rent. In 2014 the Mississippi River flooded the land and crops were never planted. To farm this land, levies would be required plus a complete underground drain tile system with large pumps to pump water over the levies. The flat low-land is undependable when used as farmland. For these same reasons the land is unsuitable for the development of building sites of any kind. When I acquired the EverStar land it was to help an over-extended young friend escape financial disaster. From his representations, the property was well along the process of being converted into a wetland bank reserve. Time was short, so with few questions, I provided a financial rescue and became owner of the subject land.

Today, I come to the Aitkin County Board of Commissioners as a friend of Aitkin County and a tax paying property owner with a plea that I truly believe will improve the land I own as well as the drainage of the airport and all other land to the east that now drains over or through my property.

We have hired competent and accredited engineers to provide more rapid drainage than the existing ditch. With the approvals we have received we are prepared and must meet and maintain high state and federal standards before we can ever sell wetland credits. If, for any reason, what I state turns out to be incorrect or untrue,

Aitkin County Board of Commissioners

December 16, 2014

Page 2

we will voluntarily fix the problem. We will do this automatically without any action required other than a notice to us if we do not know of the problem. Following the directives of the state and federal agencies, the present drainage swale was designed to carry more water away than the current ditch.

The drainage swale was designed by professional engineers. The plan was accepted and approved by all other governmental agencies. In the most unlikely event this carefully engineered plan proves deficient, we will widen the swale to whatever it takes to solve the problem. To date, my investment in this property is almost \$1,500,000 and it increases every day.

Approval of this project will result in a large natural preserve. The planted wetlands will be a beautiful natural attraction in the summer for local visitors. The seeding requirement for the wetland areas requires a carefully selected mix of special grasses and other broadleaf plants, many of which will be flowering, that will survive on a thin layer of semi-dry soil and is very expensive but will become, as stated above, a beautiful community attraction. The wetlands will not accommodate bush or tree growth because of the high water table but will serve as a water source to replenish underground water reservoirs and provide clean oxygen into the air. Our plan does not include open water which eliminates the water bird attraction and is a meaningful improvement for the airport.

To the Commissioners of Aitkin County, I pledge to be a good and responsible land owner, sensitive to the community and its needs. Delay only weakens and limits my capacity to achieve the best for all of us. As I understand the current status, as long as we meet all other government and agency requirements, your votes of approval are all we need to move us forward together.

My sincere thanks for your careful consideration,



A.E.(Al) McQuinn  
5201 Eden Avenue, Suite 350  
Edina, MN 55436-2350



Co Board

# City of Aitkin

109 First Avenue NW • Aitkin, MN 56431  
218/927-2527 • Fax 218/927-1834  
[www.ci.aitkin.mn.us](http://www.ci.aitkin.mn.us)

December 16, 2014

DEC 22 2014

Township Officials:

Enclosed please find the 2016 Proposed Fire Department budget and the 2016 Allocation of Taxable Net Tax Capacity, along with a spreadsheet for your township showing 2012 – 2016. The Fire Department is using the previous three years of manhours in the calculation.

The City Council has set the annual meeting with the townships for:

***Tuesday, January 20, 2015, from 6:00 p.m. to 7:00 p.m.***

The Fire Chief will be present and he will provide a report on 2014, as well as addressing any questions you may have.

Please share this information with your township supervisors and with anyone else who may be interested in attending.

If you should have any questions, please don't hesitate to contact me.

Sincerely,



Tammy Lou Pfaff  
City Clerk

Enclosures

cc Aitkin City Council  
Brian Pisarek, Fire Chief



December 17, 2014

J. Mark Wedel - Chairperson, Aitkin County Board of Commissioners  
Commissioner - Minnesota Department of Natural Resources  
Minnesota PCA  
Brian Napstad - Chair, Minnesota Board of Water and Soil Resources  
Kirk Peyser - Auditor, Aitkin County  
Steve Hughes - Manager, Aitkin County Soil and Water Conservation District  
Jerry Pawlek - Chair, Shamrock Township

DEC 22 2014

## **Lake Minnewawa Lake Improvement District 2014 annual report.**

Please accept this report as meeting our requirements per Minnesota Statute 103B.571 subd.4.  
Copies of Annual Meeting Minutes and 2015 Budget attached.

The Lake Minnewawa Lake Improvement District (LMLID) was established with Aitkin County resolutions 100813-087 and 100813-088, on October 8, 2013.

2014 has been an Organization building year.

Accomplishments include:

- Administrative setup
- Development of a Funding Request form
- Organization and Meeting Guidelines document built
- Continued maintenance and enrichment of publicly available web site
- Committed to update member list with County twice per year
- Financial support to Lake Minnewawa Association (LMA) Weed Harvesting operation
- Financial support to LMA Aquatic Invasive Species projects. (see annual meeting minutes attached)
- 2 new people added as Board of Directors see annual meeting minutes attached)

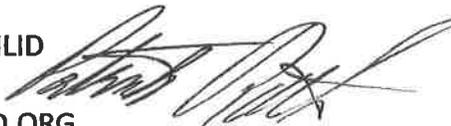
Full Fiscal Year 2014 financial activity included receipts of \$ 32,147 from County/LMLID assessments.  
Expenses included: \$ 640 - Administration, \$ 3039 - Aquatic Invasive Species projects,  
\$ 16,485 - LMA Weed Harvesting program, \$ 10,000 LMA capital fund.

2015 Plans include building on foundation set in 2014.

New activities will include:

- Lake Survey to be used as benchmark/status of Lake health
- Implementation of compliance needs as appropriate
- Financial support of LMA new Harvester purchase

Respectfully, Patrick Rath, President LMLID



WWW.LMLID.ORG

Our Vision is to be an organization dedicated to providing funds for service and research efforts which serve to improve the health of Lake Minnewawa. To provide control and management of District funds with transparency and ensure compliance per applicable state and county requirements. We see a healthy Lake Minnewawa as one which is navigable and clean for recreation, supportive of historical and appropriate vegetation (including wild rice), source of a good fishery and home to a variety of birds and animals, based on standards established with state aquatic authorities. We envision an engaged property owner membership in support of best practice land management.



Handout  
5A



RINKE NOONAN

*attorneys at law*

1015 W. St. Germain St., Ste. 300, P.O. Box 1497  
St. Cloud, Minnesota 56302-1497  
Telephone 320-251-6700, Fax 320-656-3500

To: Aitkin County Board of Commissioners, sitting as Drainage Authority for Aitkin County Ditch 24  
From: EverStar, LLC: John C. Kolb, Rinke Noonan  
Direct Dial: 320-656-3503  
Re: Petition for abandonment of a portion of County Ditch 24  
Our File: 21667.001  
Date: December 23, 2014

EverStar, LLC is asking the Board to make a decision on EverStar’s petition, under statutes section 103E.806, to abandon a portion of County Ditch (CD) 24 crossing EverStar’s property in Section 18 of Spenser Township. The portion of CD 24 petitioned to be abandoned is a branch of CD 24 that serves a limited drainage area and provides direct drainage impact to only EverStar’s property.

Your decision is controlled by the requirements of statutes section 103E.806. The statute requires the Drainage Authority to “make findings and direct, by order, that part of the drainage system be abandoned, if the drainage authority determines that part of the drainage system does not serve a substantial useful purpose as part of the drainage system to any property remaining in the system and is not of a substantial public benefit and utility.” EverStar has demonstrated, provided detailed modeling analysis showing that the portion of CD 24 proposed to be abandoned does not serve a substantial useful purpose as part of the drainage system to any property remaining in the system and that the portion of CD 24 proposed to be abandoned is not of a substantial public benefit and utility.

EverStar has invited and sought to address the concerns of neighboring property owners and the local community regarding the proposed partial abandonment. Only two entities have raised specific concerns: the County Highway Department and the City of Aitkin – speaking for the Airport Authority. The concerns of both entities have been expressed by the County Highway Engineer, Mr. Welle. Upon request of the County Board to provide specifics of his concern, Mr. Welle provided a letter dated November 3, 2014. In his letter he states, “the proposed ditch abandonment will negatively affect County Road (CR) 54 as the road ditches on approximately 1 mile of CR 54 currently use the ditch as it’s *[sic]* primary outlet.” He continues, “County Road 54 and the surrounding properties are currently benefitted by the drainage provided by this ditch. Maintenance of the ditch is allowable as part of a public drainage system

to ensure that this ditch will continue to provide drainage benefits for CR 54 and adjacent properties in the future.” Finally, he states, “increases in stage and duration of water at the county ditch outlet are likely to occur during future runoff and flooding events, causing water to back up onto County Road 54 and adjacent properties at a higher elevation and for greater periods of time than under current drainage conditions.”

None of Mr. Welle’s assertions are supported by evidence. The CR 54 road ditches flow to an 18” culvert which has been in place, unchanged, for decades. It is the culvert that controls drainage in the county road ditches. The culvert is set at an elevation higher than the EverStar property and will continue to allow the historic flow of water from the county road ditches. It is gravity – fall across EverStar’s property – that controls this flow, not the portion of CD 24 proposed for abandonment. Even if the branch of CD 24 were never constructed across the EverStar property, the controlling culvert would continue to flow by virtue of the contours of land providing gravity flow across EverStar’s property.

Similarly, no adjacent property will be impacted negatively by the partial abandonment. The portion of adjacent property in the immediate drainage area of the portion of CD 24 proposed to be abandoned is very small. These properties exist at significant distances, a thousand feet or more, from the ditch itself. None of these properties is directly connected to CD 24 by drainage improvements. Rather, these properties shed water by gravity to the EverStar property and will continue to do so after the portion of CD 24 is abandoned. Because of fall across the EverStar property, combined with the modification of the EverStar property as part of its wetland restoration, these properties will continue to drain as they always have – by gravity.

Finally, the modeling performed by EverStar’s engineering consultants demonstrates that the partial abandonment along with the modifications proposed as part of the wetland restoration actually reduces peak stages and duration of flood stages in large storm events. By providing a broad, shallow swale across its property, EverStar increases the efficiency of flow across the property and further benefits those adjacent properties discharging surface water to the EverStar property by gravity.

In his response on behalf of the Airport Authority, Mr. Welle states, “It is reasonable to expect that abandonment of the ditch will have the potential to result in soils being more saturated than currently, standing water that is deeper than it is currently, and the duration of saturation/standing water being longer than it is currently.” Again, no evidence supports Mr. Welle’s speculation about the impact of the partial abandonment. The portion of the Airport property within the drainage area of the portion of CD 24 proposed to be abandoned is already wetland and is saturated for a majority of the growing season. The ditch can only immediately impact, by lateral effect, an area 60 – 100 feet from the ditch and cannot physically impact the hydrology or saturation of soils on the airport property. Gravity flow across the EverStar property through the broad swale created as part of the wetland restoration will eliminate standing water. There is no impoundment of water proposed or included in the wetland restoration plan. Finally, the modeling shows reductions in both stage elevation and duration during large storms.

We have asked repeatedly for specific concerns so we could model them. To date, all we have received is general speculation of the impact of partial abandonment. This speculation is contrary to all of our modeling. Our modeling has included reasonable storm and run-off events and has accounted for specific property conditions.

We have met the statutory standard for partial abandonment. We respectfully ask that you grant our petition. As you know, EverStar's principal, Al McQuinn is passionate about this project and is committed to seeing its successful completion. He articulated his commitment to this Board in ensuring that the project is beneficial for the community and that legitimate issues are addressed. He has asked me to reiterate his commitment and intent regarding this project. He believes that his proposed use of the property is the highest and best use and intends that the property remain in private ownership, subject to property taxation as agricultural land. He also intends that the property be used for recreation, hunting and other uses consistent with the proposed wetland bank.

Finally, I want to address the recent article in the Minneapolis newspaper regarding wetland restorations in Aitkin County. Unlike the restorations described in the article, EverStar's proposal is to provide wetland credits for local economic development – including the credits needed for proposed airport expansion. Additionally, this project, since its inception, has been focused on the ecological benefits it will provide to the Mississippi River and the adjacent, high quality, wetland complex. As noted by the Mississippi Headwaters Board in its comments on our Conditional Use Application, "The Board wishes to express that the applicant's activities toward a proposed wetland restoration and upland buffer areas support the goals of improving the Mississippi River water quality by filtering sediments and removing nutrients and agricultural runoff from the surface water that affect the jurisdictional area of the MHB."

