

Outdoor Heritage Fund Grant Application



The purpose of the North Dakota Outdoor Heritage Fund is to provide funding to state agencies, tribal governments, political subdivisions, and nonprofit organizations to:

Directive A. Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

Directive B. Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

Directive C. Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

Directive D. Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Exemptions

Outdoor Heritage Fund grants may not be used to finance the following:

- A. Litigation;
- B. Lobbying activities;
- C. Any activity that would interfere, disrupt, or prevent activities associated with surface coal mining operations; sand, gravel, or scoria extraction activities; oil and gas operations; or other energy facility or infrastructure development;
- D. The acquisition of land or to encumber any land for a term longer than twenty years; or
- E. Projects outside this state or projects that are beyond the scope of defined activities that fulfill the purposes of Chapter 54-17.8 of the North Dakota Century Code

NO CONSIDERATION:

In addition to those specific items in law that are ineligible for funding, in the absence of exceptional circumstances, the following projects will NOT receive consideration for funding:

- Projects that are already completed;
- Projects that are on-going (Phased projects would be considered);
- Staffing;
- Feasibility studies;
- Annual maintenance;
- Paving projects for roads and parking lots;
- Swimming pools;
- Non-permanent equipment (such as tractors, snowmobiles);
- Research;
- Projects where the applicant is not directly involved in the project.

Application Deadline

Applications for the second grant round cycle are due on **August 1, 2014 at 5:00 p.m. CT.** All information, including attachments, must be submitted by that date. See instructions below for submission information.

Instructions

Please download this Word document (available on the Industrial Commission/Outdoor Heritage Fund Program website at <http://www.nd.gov/ndic/outdoor-infopage.htm>) to your computer and provide the information as requested. You are not limited to the spacing provided except in those instances where there is a limit on the number of words. After completing the application, save it and attach it to an e-mail and send it to outdoorheritage@nd.gov or print it and mail it to the address noted in the next paragraph.

Attachments in support of your application may be sent by mail to North Dakota Industrial Commission, ATTN: Outdoor Heritage Fund Program, State Capitol – Fourteenth Floor, 600 East Boulevard Ave. Dept. 405, Bismarck, ND 58505 or by e-mail to outdoorheritage@nd.gov. The application and all attachments must be received or postmarked by the application deadline. You will be sent a confirmation by e-mail of receipt of your application.

You may submit your application at any time prior to the application deadline. Early submission is appreciated and encouraged to allow adequate time to review your application and ensure that all required information has been included. Incomplete applications may not be considered for funding. Any item noted with an * is required.

Oral Presentation. Please note that you will be given an opportunity to make a ten-minute Oral Presentation at a meeting of the Outdoor Heritage Fund Advisory Board. These presentations are strongly encouraged.

Open Record. Please note that your application and any attachments will be open records as defined by law and will be posted on the Industrial Commission/Outdoor Heritage Fund website.

Name of Organization * The Minot Retriever Club

Federal Tax ID# * 45-0306839

Contact Person/Title * Ed Sehn, Club President

Address * 30-62nd St SW

City * Minot

State * ND

Zip Code * 58701

E-mail Address * sehn@srt.com

Web Site Address (Optional)

Phone * 701-833-7826

Fax # (if available)

List names of co-applicants if this is a joint proposal

MAJOR Directive: (select the Directive that best describes your grant request)*

Choose only one response

☐ **Directive A.** Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

☐ **Directive B.** Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

☐ **Directive C.** Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

☒ **Directive D.** Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Additional Directive: (select the directives that also apply to the grant application purpose)*

Choose all that apply

☒ **Directive A.** Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

☐ **Directive B.** Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

☒ **Directive C.** Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

☒ **Directive D.** Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Type of organization: (select the category that describes your organization)*

- ☐ State Agency
- ☐ Political Subdivision
- ☐ Tribal Entity
- ☒ Tax-exempt, nonprofit corporation, as described in United States Internal Revenue Code (26 U.S.C. § 501 (c))

Project Name* Saving The Minot Retriever Club for Future Generations

Abstract/Executive Summary. An Executive Summary of the project stating its objectives, expected results, duration, total project costs and participants.* (no more than 500 words)

Background

The Minot Retriever Club has been dedicated since 1957 to offering sportsmen the opportunity of training their retrievers on some of the finest retriever training grounds in the Midwest.

The Minot Retriever Club has spent the last three decades developing ponds designed for retriever training. The Club's ponds have received a majority of its water supply from Burlington Dam #1 located on the Des Lacs River. This dam was created in the 1930's as a CCC back-to-work project. The dam created backwater that would allow farmers to draw from the water source that was created by the Des Lacs River and provide irrigation for farmers. Following the Mouse River Flood of 2011, the dam was damaged and the Ward County Water Resource Board had the dam removed in October 2014. This has resulted in the club ponds being drained leaving a mud flat where the ponds had once been.

Objective

The objective of this project would be to construct two dikes after the dam is breached that would separate the current ponds from the Des Lacs River and allow the ponds to maintain their water levels. The club is fortunate that the current ponds were developed, so that if the water source from the river ended, we would easily be able to dike the current ponds and would have adequate watershed to maintain the majority of our training area.

Expected Results

This project would restore and maintain this sportsman's resource. There has been an increased interest in retriever training the last several years as more and more people have moved into the area from either oil development or from military people looking for this type of outdoor recreation opportunity. This project would continue to offer opportunities and ensure that the tradition of training retrievers at the Minot Retriever Grounds would be preserved for future generations.

Project Duration:* It is the goal of this project to have the dike systems in place by the fall of 2015.

Amount of Grant request \$ * \$177,000

Total Project Costs \$* 195,000

(Note that in-kind and indirect costs can be used for matching funds)

A minimum of 25% Match Funding is strongly encouraged. Amount of Matching Funds \$* \$18,000

Please indicate if the matching funds will be in-kind, indirect or cash.

Cash \$18,000

Source(s) of Matching Funds*

Please provide verification that these matching funds are available for your project.

Certifications *

X I certify that this application has been made with the support of the governing body and chief executive of my organization.

X I certify that if awarded grant funding none of the funding will be used for any of the exemptions noted on Page 1 of this application.

Narrative

Organization Information – Briefly summarize your organization's history, mission, current programs and activities. *

Include an overview of your organizational structure, including board, staff and volunteer involvement. (no more than 300 words)

In 1956 a small group of avid hunters met to help each other train their hunting dogs. In 1957 the group formed the Minot Retriever Club and affiliated the club with the American Kennel Club (AKC).

The members of the new club soon found that they needed access to both land and water to properly train their retrievers. Through fund raising the club was able to purchase land that would meet their needs. Throughout the last 30 years the retriever club has conducted several projects to improve the sculpted ponds that are especially designed for retriever training. The last improvement project took place in 2012 following the Mouse River Flood. That's projects goal was to repair and improve ponds and roads into our camping area that were effected by the flooding. The Minot Retriever Club's training grounds are located on approximately 39 acres, two and one half miles west of Burlington, North Dakota. The club has 25 members and has added five additional members this spring.

The club held its first AKC Licensed Field Trial in 1959, and has held at least one trial every year since then. In 2001 the club held its first (AKC) Licensed Retriever Hunt Test. These events draw people and dogs from as far away as Florida, Texas, and California giving the restaurants and gas stations in the town of Burlington and restaurants and hotels in Minot economic positive activity. The

club has regularly scheduled training sessions for members, with a focus on handler skills for new members.

The Minot Retriever Club is the only club of its kind in North Dakota that has been specifically designed for training retrievers. The mission of the club is to promote hunting conservation through the use of trained retrievers and to promote education and training of dog handlers and their retrievers. The Club holds their regularly scheduled business meetings the third Monday of every month at 7:00 p.m.

The Minot Retriever Club ponds and upland grasslands provide habitat for breeding and migrating waterfowl, pheasants, white tail deer, numerous species of shorebirds, wading birds and marsh birds and resident furbearers such as muskrats, mink and raccoons.

Purpose of Grant – Describe the proposed project identifying how the project will meet the specific directive(s) of the Outdoor Heritage Fund Program *

Identify project goals, strategies and benefits and your timetable for implementation. Include information about the need for the project and whether there is urgency for funding. Please indicate if this is a new project or if it is replacing funding that is no longer available to your organization. Identify any innovative features or processes of your project.

This is a new project that is being proposed because the dam that provides water to the Minot Retriever Club grounds was removed in October 2014. The goal of this grant is to preserve the ponds by constructing two dikes that will hold water in the ponds and allow for the activity of training retrievers to continue on these grounds.

The project timetable would be for the construction of the dikes to be completed by the fall of 2015. The ponds would include a clay liner that would aid in the retention of water in the ponds.

We have contracted with KLJ Engineering and their Engineering report has been attached to this document. The permit process was initiated on October 20, 2014 with the Army Corps of Engineers and we are awaiting approval.

This is a new project that has not been previously been funded, there is an urgency for the funding of this project.

The retriever club receives income from membership fees as well as the two AKC retriever events that are held each summer and are hosted by the Minot Retriever Club. At the end of the 2011 flood, much of the club's savings were used to repair damage that had occurred as a result of the flood. The revenue that the club has is enough to maintain the activities of the club, however it is not enough to fund this project.

Management of Project – Provide a description of how you will manage and oversee the project to ensure it is carried out on schedule and in a manner that best ensures its objectives will be met.*

Include a brief background and work experience for those managing the project.

We have been working with a Civil Engineer from KLJ Engineering who will design this project. Professional contractors will be used to do the dirt work that is needed for this project. These

individuals as well as the Board of Directors of the Minot Retriever Club will oversee this project to ensure that it is carried out in a manner the will meet the objectives of this project.

Evaluation – Describe your plan to document progress and results. *

How will you tell if the project is successful? Please be specific on the methods you will utilize to measure success. Note that regular reporting, final evaluation and expenditure reports will be required for every grant awarded.

Success of the project will be measured when the water levels are maintained to a level that will allow for retriever training to continue at the level that it had been in the past. Also by again being one of the premier destinations for AKC Hunt Test and AKC Field Trial participants from across the United States and Canada.

Financial Information

ATTACHMENT: Project Budget – Using the standard project budget format that is available on the website at <http://www.nd.gov/ndic/outdoor-infopage.htm> , please include a detailed total project budget that specifically outlines all the funds you are requesting. Note that a minimum of 25% match funding is strongly encouraged.*

The project budget should identify all matching funds, funding sources and indicate whether the matching funds are in the form of cash or in-kind services. As noted on the standard project budget format, certain values have been identified for in-kind services. Please utilize these values in identifying your matching funds. **NOTE: No indirect costs will be funded.**

X I certify that a project budget will be sent to the Commission*

Sustainability – Indicate how the project will be funded or sustained in future years. *

Include information on the sustainability of this project after all the funding from the Outdoor Heritage Fund has been expended and whether the sustainability will be in the form of ongoing management or additional funding from a different source.

Once the project is completed, it will be the responsibility of the Minot Retriever Club to maintain and manage the grounds including the ponds and the constructed dikes. The retriever club has been maintaining, improving and managing these grounds since 1957.

Partial Funding – Indicate how the project will be affected if less funding is available than that requested. *

If less funding is available than the amount requested, the Board of Directors will continue to pursue funding through other grant sources that may be available.

Scoring of Grants

All applications will be scored by the Outdoor Heritage Fund Advisory Board after your ten-minute oral presentation. The ranking sheet(s) that will be used by the Board is available on the website at <http://www.nd.gov/ndic/outdoor-infopage.htm> .

Budget Standard Form

Please use the table below to provide a detailed total project budget that specifically outlines all the funds you are requesting and the matching funds being utilized to fund this project. Please note if the matching funds are in the form of cash, indirect costs or in-kind services. The budget should identify all other committed funding sources and the amount of funding from each source. Match can come from any source (i.e. private sources, State and Federal funding, Tribal funding, etc.) Note a minimum of 25% match funding is strongly encouraged. An application will be scored higher the greater the amount of match funding provided. (See Scoring Form.)

Please feel free to add columns and rows as needed. Please include narrative to fully explain the proposed budget.

Note that NO INDIRECT COSTS will be funded from the Outdoor Heritage Fund. Also by law several items are ineligible for funding -- see Exemptions in the Application Form. Effective January 29, 2014 the following guidelines were approved by the Industrial Commission:

NO CONSIDERATION:

In addition to those specific items in law that are ineligible for funding, in the absence of exceptional circumstances, the following projects will NOT receive consideration for funding:

- Projects that are already completed;
- Projects that are on-going (Phased projects would be considered);
- Staffing;
- Feasibility studies;
- Annual maintenance;
- Paving projects for roads and parking lots;
- Swimming pools;
- Non-permanent equipment (such as snowmobiles, tractors);
- Research;
- Projects where the applicant is not directly involved in the project.

Project Expense	OHF Request	Applicant's Match Share (Cash)	Applicant's Match Share (In-Kind)	Applicant's Match Share (Indirect)	Other Project Sponsor's Share	Total Each Project Expense
Dike Construction *	\$177,000	\$18,000	\$ 0	\$ 0	\$ 0	\$ 195,000
	\$	\$	\$	\$	\$	\$
	\$	\$	\$	\$	\$	\$
	\$	\$	\$	\$	\$	\$
	\$	\$	\$	\$	\$	\$
	\$	\$	\$	\$	\$	\$
Total Costs	\$ 177,000	\$ 18,000	\$ 0	\$	\$	\$ 195,000

- Please see detailed breakdown on cost in the KLJ report.

PRELIMINARY ENGINEERING REPORT

Minot Retriever Club
MINOT, ND

Prepared for:
Minot Retriever Club
Minot, ND

November 2014

This document was originally issued and sealed by John Wirries, Registration Number 4449 on November 3, 2014 and the original documents are stored at KLJ at Moorhead, MN

Project #7614175



NATIONAL PERSPECTIVE
REGIONAL EXPERTISE
TRUSTED ADVISOR

CONTENTS

Introduction	1
Project Background and Description.....	1
Location	1
Design Criteria	1
Regulations	1
Analysis Methods	1
Hydrologic Criteria	1
Soils	2
Preliminary engineering	2
Hydrological Analysis.....	2
Hydraulic Analysis and Dam Design	2
Water Supply and Quality	3
Cost Estimate	3

EXHIBITS

Exhibit 1: Location Map	4
Exhibit 2: NRCS Soils Map.....	5
Exhibit 3: Watershed Map	6
Exhibit 4: Dam Design	7

TABLES

Table 1: Rainfall Depths	2
Table 2: Runoff Rate Summary	2
Table 3: Cost Estimate	3

LIST OF APPENDICES

Appendix A: Regresion Equations-Hydrology

Appendix B: Dam Hydraulic Weir Design

INTRODUCTION

Project Background and Description

The Minot Retriever Club requires a body of water for training and competition of their dogs. Multiple oxbows on the Des Lacs River on their property have supplied this need. However with the removal of a downstream dam, the water in the oxbows has receded leaving no water for the Minot Retriever Club's needs. The Minot Retriever Club wishes to build a dam at the mouth of one of the oxbows to maintain water in the oxbow. This preliminary engineering report will review the feasibility of different options, the permitting requirements and the design and construction costs.

Location

The Minot Retriever Club's property is in Ward County, North Dakota, north-west of Burlington off of US Highway 2 NW. A map of the location can be seen in Exhibit 1.

DESIGN CRITERIA

Regulations

This report was prepared in accordance with the "North Dakota Dam Design Handbook" and follows the guidelines set forth in the "North Dakota Hydrology Manual". "Techniques for Estimating Peak-Flow Frequency Relations for North Dakota Streams" by the US Geological Survey was also used for hydrological design.

Analysis Methods

"Techniques for Estimating Peak-Flow Frequency Relations for North Dakota Streams" was used for the hydrological analysis. The site is in Region C of North Dakota and therefore Region C regression equations were used to determine the peak flows at the dam site. Regression equations are based on historical data from streams and rivers in North Dakota. Estimates of peak flows are determined by fitting a probability distribution function to a series of annual peak flows for gauged rivers. Peak flow relationships, and basin characteristics were used to create the generalized skew coefficients for the different regions. This method requires a drainage area and slope both of which were determined using GIS Arc-Hydro and ARC-HMS tools. GIS Arc-Hydro and Arc-HMS use lidar data to determine the watershed boundary and stream delineation.

Hydrologic Criteria

Due to the rural location with some homes in the area and the height of the dam it was determined that the proposed dam will have a dam classification of Type II. Table 5-1 in the North Dakota Dam Design Handbook has no requirement for a principal spillway and suggests a 25 year storm for the emergency spillway and 50 year storm for the freeboard requirements.

The "North Dakota Hydrology Manual" Figures 1-4 through 1-8 and 1-15 were used to determine the rainfall depths seen in Table 1: Rainfall Depths.

TABLE 1: RAINFALL DEPTHS

Rainfall Duration	2-Year	10-Year	25-Year	50-Year	100-Year
24-Hour	1.92	3.16	3.62	4.12	4.65

Soils

According to the Natural Resource Conservation Service (NRCS), the proposed project area consists of loams. NRCS provides this information through its website to allow people to predict the soil characteristics expected to be encountered during construction activity. While sufficient for planning purposes, the soil surveys should not take the place of project-specific soil borings, which will provide the engineer and the contractor with soil and water depth information that can be critical to the success of the project. KLJ recommends consultation with a qualified geotechnical engineer to determine additional measures to be pursued. See Exhibit 2 for the NRCS Soil Survey.

PRELIMINARY ENGINEERING

Hydrological Analysis

The total area for the watershed is 0.65 mile² at a slope of 99 feet per mile. Table 2, provided below, summarizes the runoff that will reach the dam for the modeled storm events.

TABLE 2: RUNOFF RATE SUMMARY

Storm	Runoff (cfs)
2	30.35
10	103.95
25	154.53
50	198.07
100	244.70

The runoff rates for the 25 and 50 year storm events were used for the spillway design discussed in the next section.

Hydraulic Analysis and Dam Design

There are two dam locations on the site. The oxbow to the east has a large watershed and the oxbow to the west has an insignificant watershed. The watershed draining to the eastern oxbow can be seen in Exhibit 3. Therefore design was done on the east oxbow since the flows will be much larger. The design can be used for both dam sites. Pumping may be required to fill the

western oxbow. The design includes an earthen dam with a weir protected with rip rap. The weir acts as both the primary and emergency spillway. The locations of the dams can be seen in Exhibit 1. A sketch of the design can be seen in Exhibit 4. A clay pond liner may be necessary to maintain water in the oxbows but cannot be determined until a geotechnical evaluation is done.

The dimensions of the dam were determined by using the max water depth in the oxbow of 5 feet, once muck is removed, and a permanent water depth of 3 feet by the Minot Retriever's Club. The required rip rap needed is 0.5 feet deep leaving 1.5 feet of depth for the weir. With this depth the weir is required to be 45 feet in length as seen in Appendix B. The depth of the water over the weir for a 25 year event will be 1.2 feet and 1.5 feet for a 50 year event.

Water Supply and Quality

Closing the oxbows to the river requires a means to fill or drain the oxbows. Although the east oxbow does have watershed that could supply some water, the watershed for the west oxbow is very small. It is understood that the Minot Retriever Club plans to pump water from or to the river to fill or drain the oxbow. Further with dredging the depth of the oxbow may be below the river itself. These factors introduce an operating cost to maintain water levels. This cost is not estimated. It also raises potential water quality issues. As the oxbows will not have a continual water refreshing capability, water quality may become a significant issue. This issue is not analyzed in this report.

COST ESTIMATE

An approximate cost for design, permitting and construction of this project is \$205,000. With soils data and additional survey this number can be refined.

TABLE 3: COST ESTIMATE

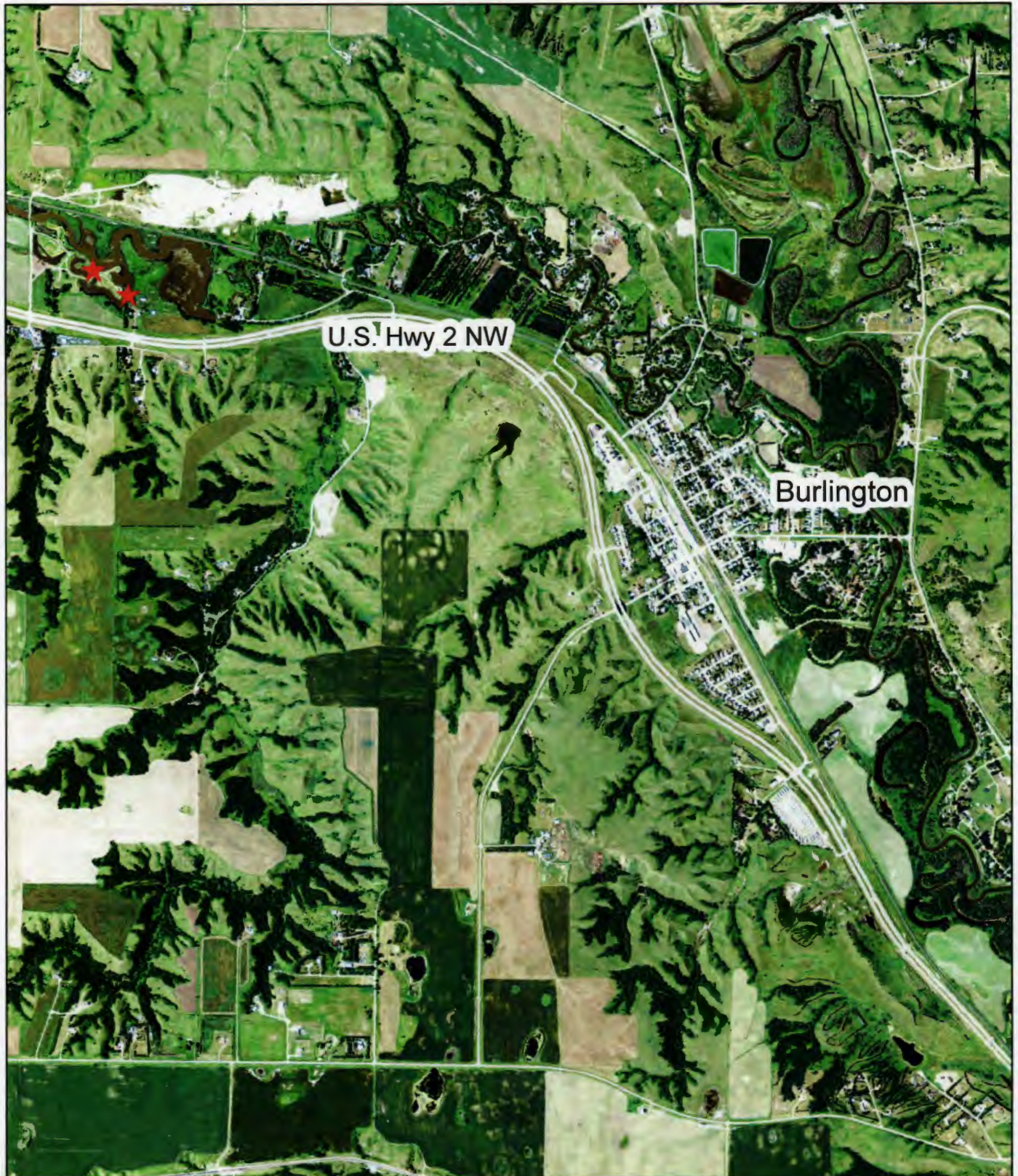
Item Description	Cost
North Dakota Permitting*	\$10,000
Design	\$30,000
Geotechnical Evaluation	\$10,000
Clay Pond Liner**	\$85,000
Dredging and Disposal	\$40,000
Earthen Levy & Erosion Protection	\$30,000
Total	\$205,000

*Assumes that the Minot Retriever Club is responsible for all wetland permits.

**A geotechnical evaluation will be required to determine if a clay pond liner will be needed to keep water in the oxbows. For the purpose of this report it is assumed that the liner will be needed due to similar sites.

EXHIBIT 1: LOCATION MAP

Minot Retriever Club Location Map



Legend

★ Dam Locations

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet



Minot Retriever Club Location Map



0 125 250 500 Feet

1 inch = 250 feet





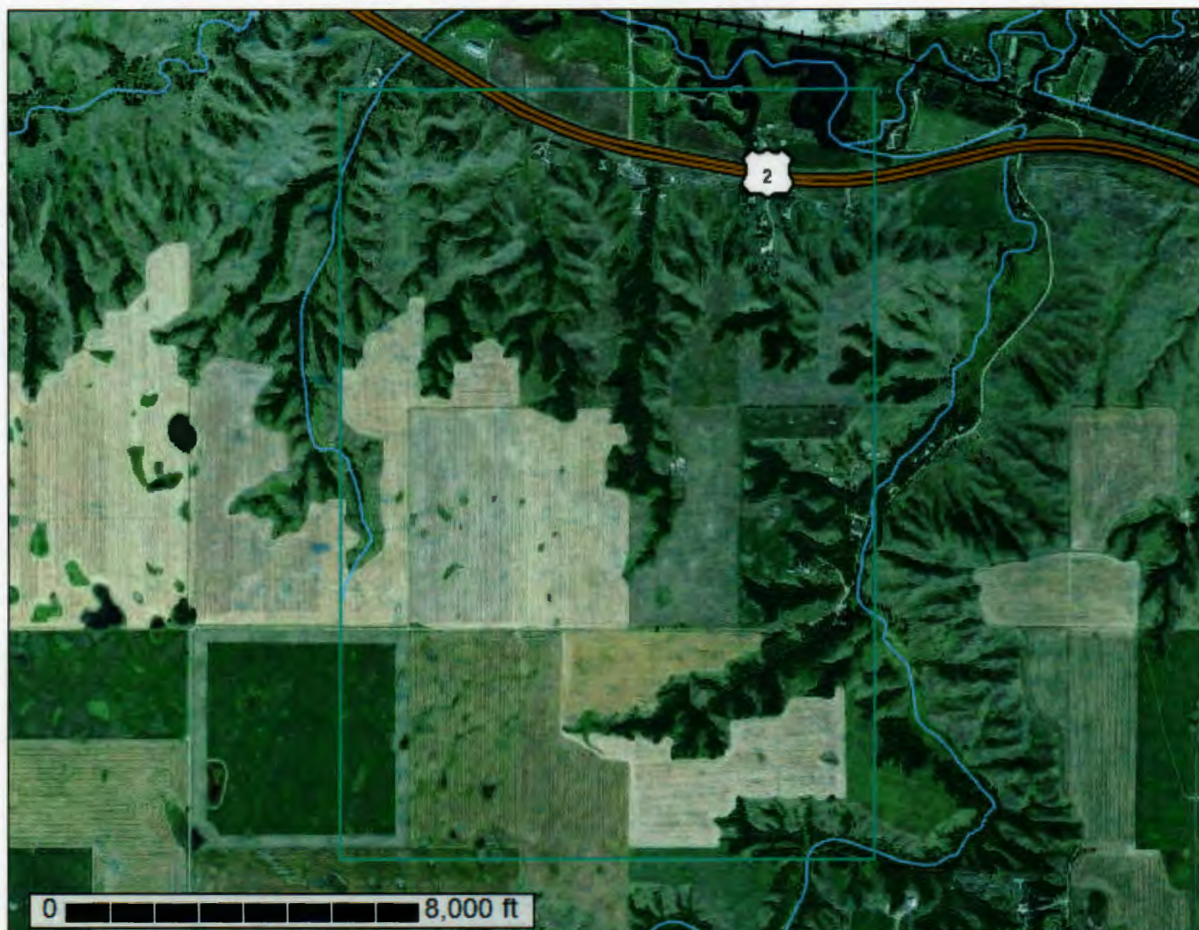
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Ward County, North Dakota**



October 29, 2014

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
Soil Map	5
Soil Map.....	6
Legend.....	7
Map Unit Legend.....	8
Soil Information for All Uses	10
Soil Properties and Qualities.....	10
Soil Qualities and Features.....	10
Hydrologic Soil Group.....	10
References	16

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Map

This map displays soil distribution across a landscape, with labels indicating different soil types such as F596B, F147F, F562A, F272E, F996, F577A, F576A, F147F, F639F, F596B, F560A, F147F, F149F, F657B, F178F, F177F, F657B, F657A, F147F, F680D, F661B, F147C, F560A, F147F, F562A, F149F, F655A, F657B, F658A, F655A, F657B, F658B, F659A, F658A, F661B-F658A, F143C, F177F, F147F, F560A, F562A, F149F, F658A, F657B, F661B, F177F, F657B, F147F, F560A, F562A, F149F.

Map Scale: 1:16,400 if printed on A portrait (8.5" x 11") sheet.

Meters

N 0 200 400 800 1200

Map Scale: 1:10,000 printed on A portrait (8.5" x 11") sheet


The graphic scale bar consists of two horizontal lines. The top line is labeled 'Meters' at its right end and has major tick marks at 0, 200, 400, 800, and 1200. The bottom line is labeled 'Feet' at its right end and has major tick marks at 0, 200, 400, 800, and 1200. The two lines are parallel and share the same set of tick marks, indicating a direct conversion between the two units.

6

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ward County, North Dakota
Survey Area Data: Version 14, Sep 23, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 17, 2010—Jun 23, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Map Unit Legend

Ward County, North Dakota (ND101)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
F2A	Tonka silt loam, 0 to 1 percent slopes	5.5	0.4%
F143C	Barnes-Buse-Langhei loams, 6 to 9 percent slopes	6.7	0.5%
F147C	Buse-Barnes-Darnen loams, 3 to 9 percent slopes	12.8	0.9%
F147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	205.0	15.1%
F149F	Buse-Barnes-La Prairie, wooded, occasionally flooded loams, 6 to 35 percent slopes	201.8	14.9%
F177F	Buse-Barnes-Darnen loams, wooded, 9 to 35 percent slopes	18.2	1.3%
F178F	Buse-Barnes-La Prairie, occasionally flooded loams, wooded, 6 to 35 percent slopes	14.8	1.1%
F272E	Sioux-Arvilla-Renshaw complex, 9 to 25 percent slopes	1.4	0.1%
F560A	La Prairie, wooded-Fluvaquents, channeled complex, 0 to 2 percent slopes, frequently flooded	24.0	1.8%
F562A	La Prairie-Fluvaquents, channeled complex, 0 to 2 percent slopes, frequently flooded	34.2	2.5%
F576A	Velva loam, moist, 0 to 2 percent slopes, occasionally flooded	0.5	0.0%
F577A	Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded	16.7	1.2%
F596B	Darnen loam, 2 to 6 percent slopes	62.4	4.6%
F639F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	28.5	2.1%
F655A	Aastad-Tonka complex, west, 0 to 3 percent slopes	50.9	3.7%
F657A	Forman loam, west, 0 to 3 percent slopes	21.1	1.6%
F657B	Forman loam, west, 3 to 6 percent slopes	128.6	9.5%
F658A	Forman-Aastad loams, west, 0 to 3 percent slopes	330.6	24.3%

Custom Soil Resource Report

Ward County, North Dakota (ND101)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
F658B	Forman-Aastad loams, west, 3 to 6 percent slopes	42.5	3.1%
F659A	Forman-Aastad-Tonka complex, west, 0 to 3 percent slopes	26.7	2.0%
F661B	Forman-Buse loams, west, 3 to 6 percent slopes	101.6	7.5%
F680D	Barnes-Sioux complex, 6 to 15 percent slopes	13.6	1.0%
F996	Water	10.8	0.8%
Totals for Area of Interest		1,359.1	100.0%

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

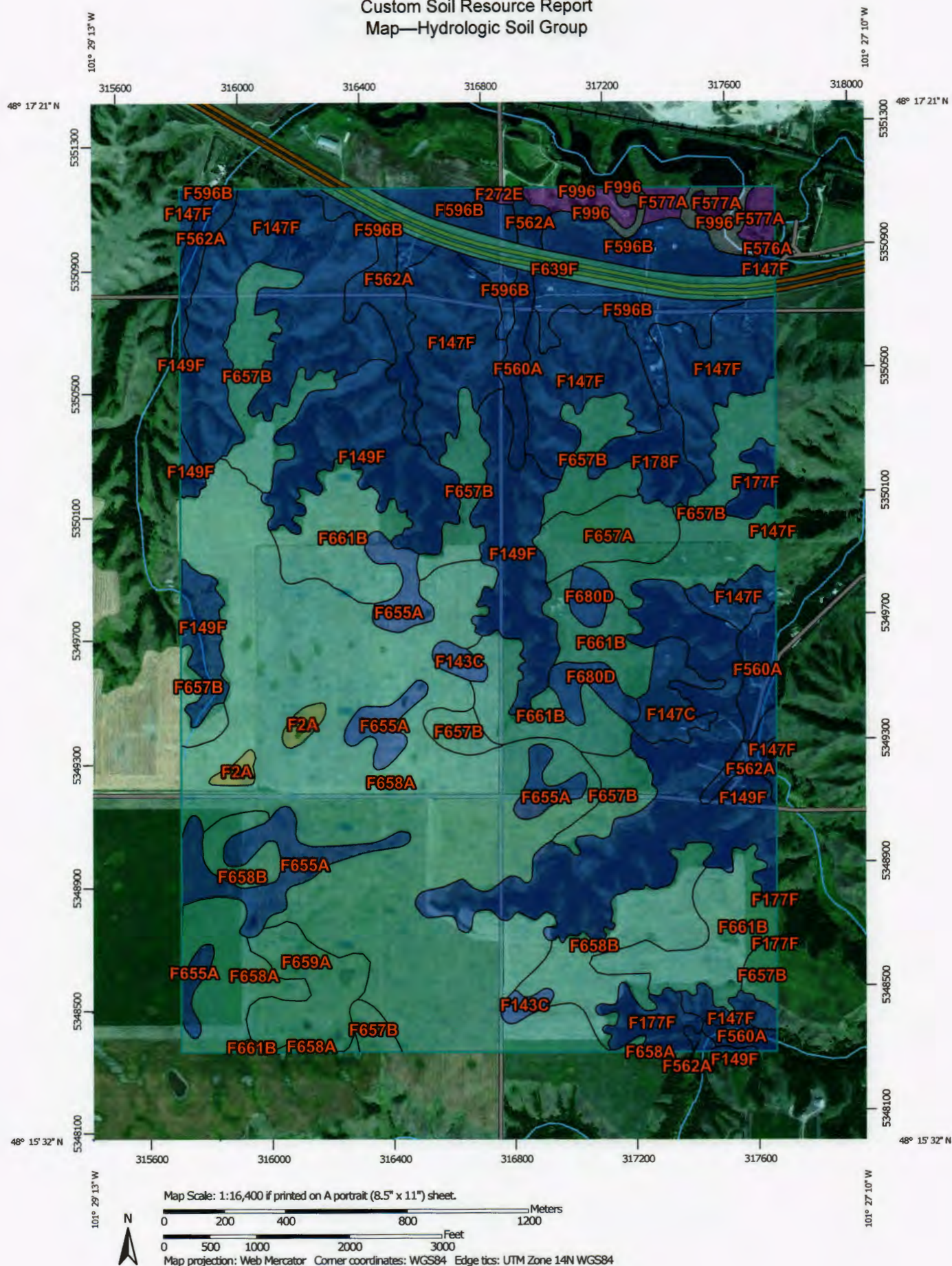
Custom Soil Resource Report

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Custom Soil Resource Report









MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils





Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ward County, North Dakota
 Survey Area Data: Version 14, Sep 23, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 17, 2010—Jun 23, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
F2A	Tonka silt loam, 0 to 1 percent slopes	C/D	5.5	0.4%
F143C	Barnes-Buse-Langhei loams, 6 to 9 percent slopes	B	6.7	0.5%
F147C	Buse-Barnes-Darnen loams, 3 to 9 percent slopes	B	12.8	0.9%
F147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	B	205.0	15.1%
F149F	Buse-Barnes-La Prairie, wooded, occasionally flooded loams, 6 to 35 percent slopes	B	201.8	14.9%
F177F	Buse-Barnes-Darnen loams, wooded, 9 to 35 percent slopes	B	18.2	1.3%
F178F	Buse-Barnes-La Prairie, occasionally flooded loams, wooded, 6 to 35 percent slopes	B	14.8	1.1%
F272E	Sioux-Arvilla-Renshaw complex, 9 to 25 percent slopes	A	1.4	0.1%
F560A	La Prairie, wooded-Fluvaquents, channeled complex, 0 to 2 percent slopes, frequently flooded	B	24.0	1.8%
F562A	La Prairie-Fluvaquents, channeled complex, 0 to 2 percent slopes, frequently flooded	B	34.2	2.5%
F576A	Velva loam, moist, 0 to 2 percent slopes, occasionally flooded	B	0.5	0.0%
F577A	Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded	A	16.7	1.2%
F596B	Darnen loam, 2 to 6 percent slopes	B	62.4	4.6%
F639F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	C	28.5	2.1%

Custom Soil Resource Report

Hydrologic Soil Group— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
F655A	Aastad-Tonka complex, west, 0 to 3 percent slopes	B	50.9	3.7%
F657A	Forman loam, west, 0 to 3 percent slopes	C	21.1	1.6%
F657B	Forman loam, west, 3 to 6 percent slopes	C	128.6	9.5%
F658A	Forman-Aastad loams, west, 0 to 3 percent slopes	C	330.6	24.3%
F658B	Forman-Aastad loams, west, 3 to 6 percent slopes	C	42.5	3.1%
F659A	Forman-Aastad-Tonka complex, west, 0 to 3 percent slopes	C	26.7	2.0%
F661B	Forman-Buse loams, west, 3 to 6 percent slopes	C	101.6	7.5%
F680D	Barnes-Sioux complex, 6 to 15 percent slopes	B	13.6	1.0%
F996	Water		10.8	0.8%
Totals for Area of Interest			1,359.1	100.0%

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelpdb1043084>

Custom Soil Resource Report

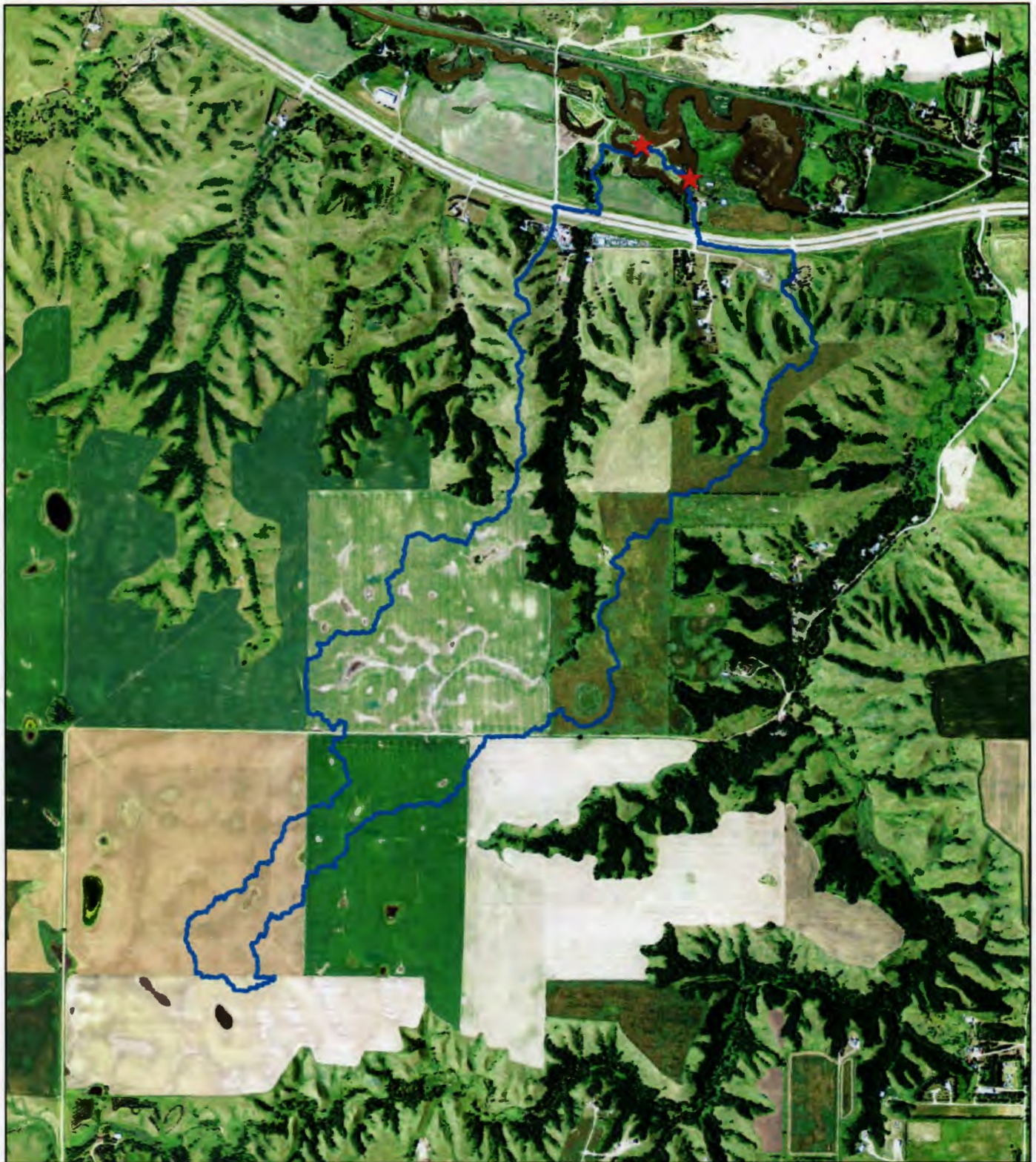
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

EXHIBIT 3: WATERSHED MAP

Minot Retriever Club Watershed Map



Legend

- ★ Dam Locations
- ▭ Subbasin

0 750 1,500 3,000 Feet

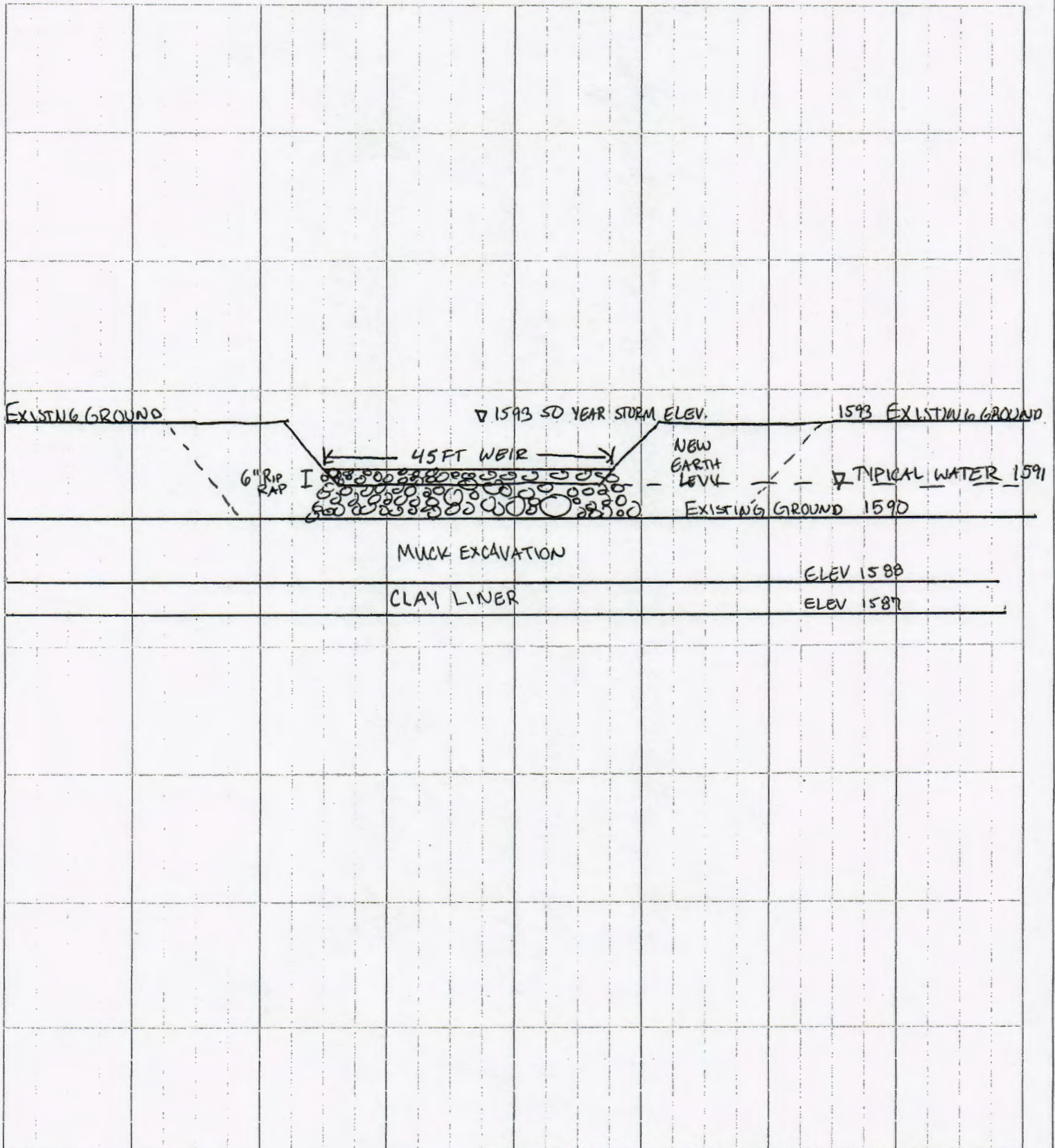
1 inch = 1,500 feet



EXHIBIT 4: DAM DESIGN



PROJECT 7614175
SHEET NO. 1 OF 1
CALCULATED BY AK DATE 10-31-14
CHECKED BY _____ DATE _____



APPENDIX A: REGRESION EQUATIONS-HYDROLOGY

Table 4.--Regional regression equations that relate peak flow for selected recurrence intervals to selected basin characteristics

[Q , peak flow, in cubic feet per second; CA , contributing drainage area, in square miles;
 S , main-channel slope, in feet per mile]

Recurrence interval (years)	Equation	Number of stations used in analysis	Standard error of estimate (percent)	Standard error of prediction (percent)	Equivalent years of record (years)
<u>Region A</u>					
2	$Q = 24.9 CA^{0.543} S^{0.094}$	41	60	64	3.1
10	$Q = 62.2 CA^{0.600} S^{0.168}$	41	55	60	5.0
15	$Q = 70.9 CA^{0.609} S^{0.181}$	41	56	60	5.6
25	$Q = 81.6 CA^{0.619} S^{0.197}$	41	57	61	6.3
50	$Q = 95.9 CA^{0.631} S^{0.217}$	41	58	64	7.1
100	$Q = 110 CA^{0.640} S^{0.234}$	41	60	66	7.8
500	$Q = 142 CA^{0.656} S^{0.268}$	41	67	73	
<u>Region B</u>					
2	$Q = 7.68 CA^{0.697} S^{0.299}$	88	83	88	2.3
10	$Q = 32.7 CA^{0.716} S^{0.294}$	88	60	64	5.9
15	$Q = 41.6 CA^{0.717} S^{0.286}$	88	60	67	6.7
25	$Q = 55.1 CA^{0.716} S^{0.276}$	88	61	66	7.5
50	$Q = 76.4 CA^{0.715} S^{0.262}$	88	65	70	8.2
100	$Q = 101 CA^{0.713} S^{0.249}$	88	70	76	8.5
500	$Q = 171 CA^{0.708} S^{0.229}$	88	84	91	8.6
<u>Region C</u>					
2	$Q = 4.08 CA^{0.638} S^{0.348}$	58	98	104	
10	$Q = 22.3 CA^{0.665} S^{0.275}$	58	66	71	5.2
15	$Q = 29.4 CA^{0.668} S^{0.263}$	58	64	77	6.3
25	$Q = 39.7 CA^{0.670} S^{0.249}$	58	62	68	7.5
50	$Q = 56.3 CA^{0.671} S^{0.232}$	58	62	68	9.0
100	$Q = 75.6 CA^{0.672} S^{0.219}$	58	63	69	10.2
500	$Q = 129 CA^{0.676} S^{0.196}$	58	67	75	12.0

APPENDIX B: DAM HYDRAULIC WEIR DESIGN

Rectangular Weir

Coeff	2.6	***
Length	45	feet

$$Q = CLH^{1.5}$$

Depth (ft)	Flow (cfs)	Depth (in)
0.00	0.00	0.00
0.10	3.70	1.20
0.20	10.46	2.40
0.30	19.23	3.60
0.40	29.60	4.80
0.50	41.37	6.00
0.60	54.38	7.20
0.70	68.52	8.40
0.80	83.72	9.60
0.90	99.90	10.80
1.00	117.00	12.00
1.10	134.98	13.20
1.20	153.80	14.40
1.30	173.42	15.60
1.40	193.81	16.80
1.50	214.94	18.00
1.60	236.79	19.20
1.70	259.33	20.40
1.80	282.55	21.60
1.90	306.42	22.80
2.00	330.93	24.00

25 Year Storm

50 Year Storm