

COMPREHENSIVE STUDY OF WISCONSIN'S FISH PROPAGATION SYSTEM



Final Submittal – December 19, 2011

TABLE OF CONTENTS

VOLUME I - EXECUTIVE SUMMARY

About This Document..... 1

Background 1

Authority/Mandate 2

Need 4

 What Do Fish Hatcheries Do?..... 4

 Why Do We Need to Act Now?..... 4

Measureable Outcomes 6

 Who Benefits?..... 6

 What is Fishing Worth?..... 6

 What is Facility Renovation Worth? 7

 How Will Facilities Benefit? 7

Fish Production Gap Analysis 8

Improvement Groupings..... 9

Short-Term Construction Program..... 11

Long-Term Construction Program..... 13

Funding Options..... 15

Outsourcing Options..... 18

Projected Operational & Maintenance Costs 19

Hatchery Staff Recommendations 20

 Current Staffing 20

 Future Staffing..... 20

 Other Staffing Considerations 21

Action Needed by WDNR 22

Final Recommendations..... 23

Acknowledgments 24

Appendix A – Improvement Drawings 25



TABLE OF CONTENTS

VOLUME I - EXECUTIVE SUMMARY

List of Figures

- A. Location Map
- B. Fish Production Gaps
- C. Funding Sources Used by Various States
- D. Funding Information for Surrounding States

List of Tables

- A. Projected Costs for Improvements at all Facilities
- B. System Construction Program Recommendations

Appendix A - Index of Drawings

Existing Facilities

- AAO-3 Art A. Oehmcke State Fish Hatchery Proposed Improvements
- BAF-3 CD Basadny Anadromous Fish Facility Improvements
- BAP-1 CD Basadny Outlying Pond
- BRF-1 Albion Ponds (ALB) – Proposed Improvements
- BRF-2 Outlying Ponds (Trump Lake – TRU, Northfield Lake – NOR, Bill's Pond – BIL) – Proposed Improvements
- BRF-3 Winding Creek (WIN) – Proposed Improvements
- BRR-3 Brule River Rearing Station Proposed Improvements
- GTT-3 Gov. Tommy G. Thompson State Fish Hatchery Proposed Improvements
- KMS-3 Kettle Moraine Springs State Fish Hatchery Proposed Improvements
- KMA-2 Kettle Moraine Springs Annex Proposed Improvements
- LAK-3 Lakewood Rearing Station Proposed Improvements
- LAN-3 Langlade Rearing Station Proposed Improvements
- LKM-3 Lake Mills State Fish Hatchery Proposed Improvements
- LSV-3 Les Voigt State Fish Hatchery Proposed Improvements
- NEV-3 Nevin State Fish Hatchery Proposed Improvements
- OSC-3 Osceola State Fish Hatchery Proposed Improvements
- RRS-3 Root River Steelhead Facility Proposed Improvements
- SCF-3 St. Croix Falls State Fish Hatchery Proposed Improvements
- SCS-3 Strawberry Creek Spawning Facility Proposed Improvements
- THR-3 Thunder River Rearing Station Proposed Improvements
- WRO-1 Wild Rose Existing Conditions / Future Projects

Conceptual New Facilities

- N-1 Conceptual New Coldwater Hatchery Plan – Raceways
- N-2 Conceptual New Coldwater Hatchery Plan – Circular Units
- N-3 Conceptual New Coolwater Hatchery Plan
- ISO-1 Conceptual New Quarantine/Isolation Facility Plan (Option 1)
- ISO-2 Conceptual New Quarantine/Isolation Facility Plan (Option 2)



ABOUT THIS DOCUMENT

In April of 2009, the Wisconsin Department of Natural Resources (WDNR) contracted with HDR Engineering, Inc. , to complete a comprehensive statewide fish facility evaluation. This *Executive Summary* provides a brief overview of the study, and summary of findings and recommendations contained within the **Comprehensive Study of Wisconsin's Fish Propagation System** (hereafter termed Study). This *Executive Summary* is intended to highlight the findings contained within the Study; however, the reader is strongly encouraged to review the main document for clarification of details.

The purpose of the Study was to develop a planning document that will provide support and guidance to WDNR in defining the current condition of the infrastructure of the statewide fish propagation system. The audience for this report will include WDNR administration, legislative representatives and staff, and the general public. It is recommended that WDNR use this document and its supporting information as a framework and guide to direct the capital improvements to the statewide fish propagation system. Implementation of improvements will be phased over multiple year time frames to be consistent with available annual funding and to minimize impacts to ongoing fish production.



EXECUTIVE SUMMARY

BACKGROUND

The overall objective of the Study was to ensure that the statewide propagation system can continue to meet the current and projected future statewide fish stocking goals. Therefore, the Study consisted of a brief review and analysis of the current facilities and presented a series of conceptual improvements for each facility and the entire system.

The Study provided a detailed and systematic review of the seventeen existing WDNR fish production facilities. The areas of critical review included: water source(s), water distribution, supplemental oxygenation of water supplies, water treatment systems, buildings, fish rearing units, effluent management, general facility infrastructure and visitor facilities.

The study documented the Department's fish propagation system facilities with respect to needs associated with:

- Human Health and Safety;
- Environmental Compliance;
- Fish Health and Biosecurity;
- Minor and Major Maintenance needs; and
- Improvements Needed to Meet Fish Stocking Goals

Opinions of probable construction cost for all recommendations were provided. The recommended list of improvements was prioritized and a system-wide implementation plan was developed. In addition to the existing facilities, the option of adding new rearing and biosecurity/quarantine facilities was evaluated. The report also addressed the schedule and sequencing requirements related to the recommendations.



AUTHORITY / MANDATE

The Wisconsin Legislature created the Department of Natural Resources in 1967 to bring together the conservation functions of fish, parks, wildlife, and forest management and combined them with environmental protection responsibilities. The Department is comprised of seven Divisions and five Regions to cover the entire state. The Bureau of Fisheries Management is housed within the Division of Water. The overall Department's Mission follows:

The Department of Natural Resources is dedicated to the preservation, protection, effective management, and maintenance of Wisconsin's natural resources. It is responsible for implementing the laws of the state and, where applicable, the laws of the federal government that protect and enhance the natural resources of our state. It is the one agency charged with full responsibility for coordinating the many disciplines and programs necessary to provide a clean environment and a full range of outdoor recreational opportunities for Wisconsin citizens and visitors.



State statutes generally authorize the WDNR to operate state fish hatcheries and stock fish (Wis. Stats. ss. 29.709), and specifically require stocking of Great Lakes trout and salmon using receipts from Great Lakes trout and salmon stamp sales (Wis. Stats. ss. 29.2285 (2)). These statutory obligations are integrated as Department policy in state administrative code (Chapter NR 1.02(4)):

The department shall rear fish for stocking in waters lacking adequate natural reproduction and where reasonable returns are demonstrated by surveys. Stocking priorities will be based on use opportunities, hatchery production capabilities, cost and habitat potential. Stocking of exotic species shall be thoroughly evaluated.

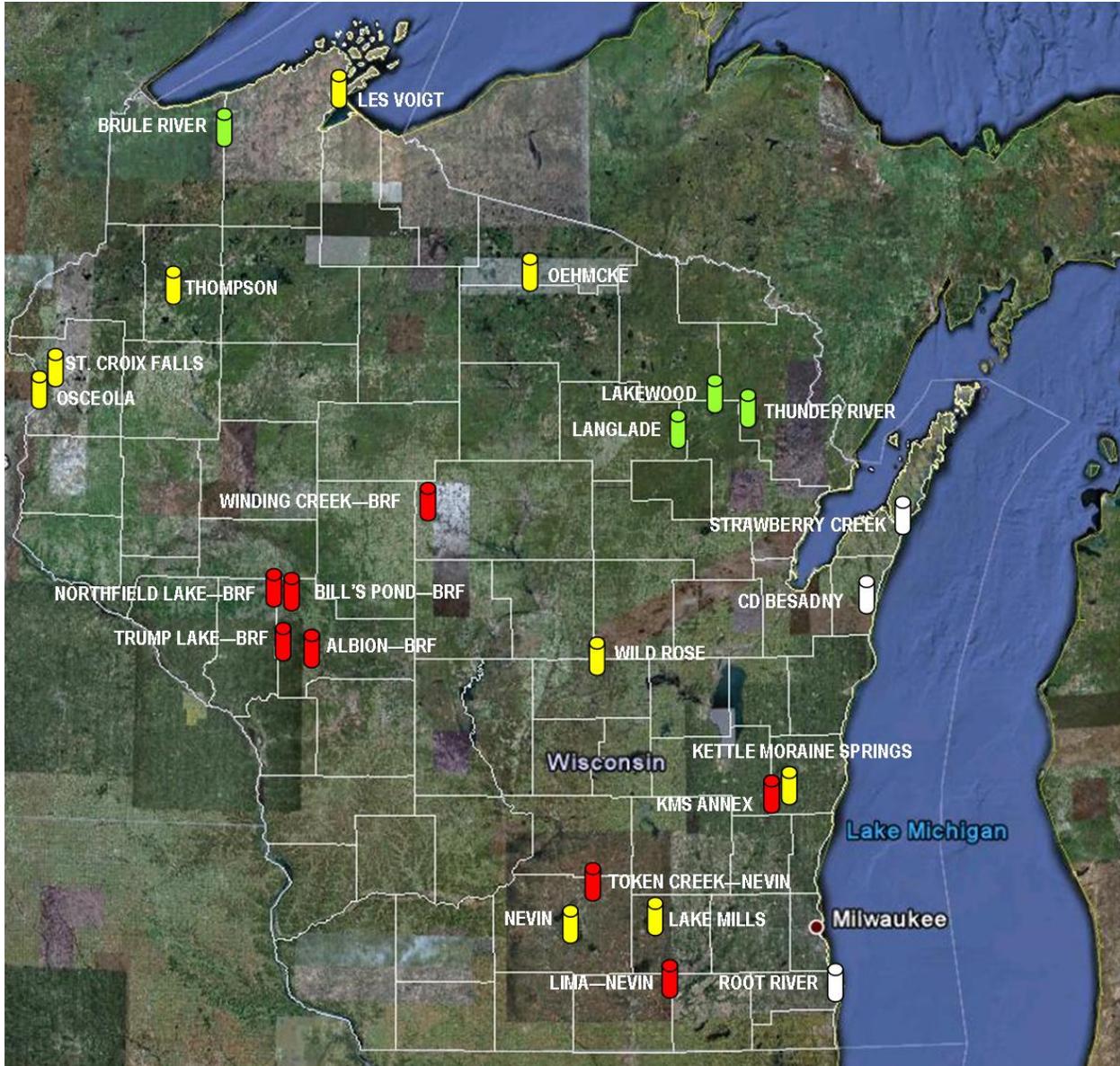
To meet these obligations, today's Bureau of Fisheries Management operates a total of seventeen (17) hatcheries, rearing stations and spawning stations throughout the state (See **Figure A** for map on page 3).

The major objectives of these facilities are to produce the requested amount of coldwater (Inland Trout, Great Lakes Trout and Salmon) and coolwater species to support fisheries management activities involving stocking throughout the state.

The Fish Propagation System Action Plan for Meeting Wisconsin's Fish Stocking Needs (WDNR, May 2002) identifies renovation of all the facilities is needed to meet compliance issues and continue to meet fish production goals. Investment in these renovation projects will allow for continued production fish for use by fisheries biologists for stocking in inland and Great Lakes waters of Wisconsin. These renovation projects will ensure that fish stocking goals are met efficiently and that the strategic goals for 2001 to 2007 (*A Fisheries, Wildlife and Habitat Management Plan for Wisconsin 2001 to 2007*, WDNR 2000) are addressed. These goals include:

- Species of concern (lake sturgeon, Great Lakes spotted muskellunge and lake trout)
- Meeting stated outdoor recreation fisheries goals
- Implementing muskellunge, lake sturgeon and walleye management plans (WDNR, 1998)
- Implementing fish health goals in partnership with DATCP
- Implementing wetlands goals
- Implementing Lake Michigan and Lake Superior fisheries management plans.

The WDNR program has historically produced and stocked the following coldwater species – brook trout, brown trout, rainbow trout, steelhead trout, Chinook salmon, Coho salmon, lake trout, splake; and coolwater species – walleye, muskellunge, northern pike, lake sturgeon, large- and smallmouth bass, and sauger.



State Fish Hatcheries	Rearing Stations	Outlying Ponds/Facilities
Art A. Oehmcke Gov. Tommy G. Thompson Kettle Moraine Springs Lake Mills Les Voigt Nevin Osceola St. Croix Falls Wild Rose	Brule River Lakewood Langlade Thunder River	Black River Falls (BRF): Winding Creek Northfield Lake Bill's Pond Trump Lake Albion Nevin: Token Creek Lima Kettle Moraine Springs: Annex
	Spawning Stations	
	CD Besadny Root River Strawberry Creek	

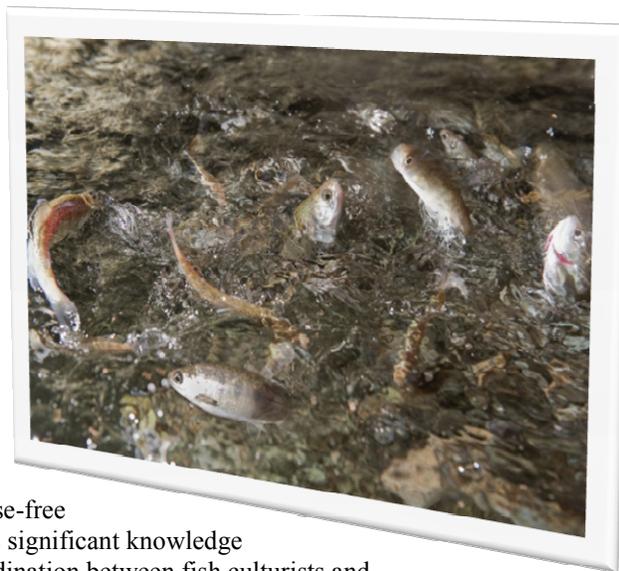
Figure A. Location Map.

NEED

What do Fish Hatcheries Do?

Fisheries Management programs use fish stocked from WDNR hatcheries as one of many essential tools to manage Wisconsin's fisheries statewide. Angler expenditures are central to Wisconsin's economic health and growth. A recent study shows that Wisconsin's over 1.4 million licensed anglers have an economic impact of over \$2.75 billion. Communities of all sizes benefit from fishing, especially stocked fisheries. The major objectives of stocked fish include:

- Restoration of various fish populations where man-influenced factors caused declines in fish abundance
- Restoration of populations following fish kills
- Supplementation of existing fish populations in public waters where natural recruitment is low
- Production of selected predatory species in order to control over-abundant forage species and provide additional recreational opportunities
- Production of fingerling fish for stocking new waters open to public fishing



Stocked fish must meet very specific requirements including species, numbers, size, genetic integrity, disease-free status, and proper timing for stocking. Stocking requires significant knowledge of statewide aquatic resources and a high degree of coordination between fish culturists and fisheries management biologists to successfully raise, transport and stock high-quality, healthy fish.

Why Do We Need to Act Now?

If the WDNR state fish hatcheries, rearing stations, and spawning facilities are not renovated, continued aging, and component failure will continue to degrade the system. Without renovation, it is unlikely that some of the aging infrastructure of these state facilities will last another ten to twenty years, resulting in a reduction of fish available for stocking.



Most of the facilities within the WDNR system are aging and require continual maintenance and improvements to continue to produce fish. Continuous deterioration of infrastructure requires many man hours, which would be better suited for fish rearing. Every facility contains areas that require renovation or replacement to the fish rearing

DATE	FACILITY
1870s	Nevin SFH*
1900s	none
1910s	St. Croix Falls SFH*
1920s	Brule River RS*, Osceola SFH*
1930s	Lakewood RS*, Langlade RS*, Lake Mills SFH*, Thunder River RS*
1940s	none
1950s	Kettle Moraine Springs SFH
1960s	none
1970s	Les Voigt SFH**, Black River Falls OP, Strawberry Creek SS
1980s	CD Besadny SS
1990s	Art A. Oehmcke SFH**, Gov. Tommy G. Thompson SFH**, Root River SS
2000s	Wild Rose SFH**



infrastructure. The following is a time range of initial construction of the WDNR facilities ranging from the early 1870s to the late 2000s.

Various small to medium scale and larger scale renovation projects have been completed at most of the sites, although all of the smaller scale renovations are more than 70 years old. With the exception of Wild Rose, Gov. Thompson and Art Oehmcke, no facilities have undergone a complete infrastructure renovation. Many of the features at the facilities have deteriorated over time or do not meet current codes. Minor to major infrastructure, aging and operational improvement needs were apparent at all facilities.

It is recommended that WDNR undertake a long-term funding and capital development program to complete renovation and modernization projects at **16** of the facilities that were evaluated within the report.

*Small to medium-scale renovation

**Large-scale renovation

SFH—State Fish Hatchery RS—Rearing Station

SS—Spawning Station OP—Outlying Ponds

The Wild Rose State Fish Hatchery has been recently renovated so no further improvements are recommended at this time. This renovated facility has won several awards including:

2010 and 2012 - National Finalist - American Council of Engineering Companies

2010 and 2012 - Honor Award - American Council of Engineering Companies – Illinois

2009 - Award of Excellence - Association of Conservation Engineers

2009 Build Wisconsin Award – The Associated General Contractors of Wisconsin



MEASURABLE OUTCOMES

Who Benefits?

Fishing is a favorite activity of both residents and visitors throughout the state. Wisconsin ranks second only to Florida in number of non-resident anglers. In 2009 Wisconsin residents purchased 1,091,026 licenses and non-residents bought 358,155 (D. Schenborn, WDNR). Over 20.8 million days were spent fishing in Wisconsin. Of those, over 3.7 million days were spent fishing the Great Lakes. The following groups benefit from fish stocking and, if stocking needs are not met, may suffer:



What is Fishing Worth?

Fishing is more than just a traditional American pastime; it is a powerful economic force. The state of Wisconsin ranks seventh in the nation for annual angler expenditures. According to the American Sportfishing Association (ASA, 2006 data), the economic impact of Fishing in Wisconsin can be summarized as:

	Great Lakes Fishing	Freshwater Fishing	WI Total
Retail Sales	\$252 million	\$1.41 billion	\$1.66 billion
Total Multiplier Effect	\$419 million	\$2.33 billion	\$2.75 billion
Salaries, Wages & Business Earnings	\$127 million	\$653 million	\$780 million
Jobs	5,011	25,153	30,164
Federal Tax Revenues	\$29 million	\$155 million	\$184 million
State and Local Taxes	\$28 million	\$168 million	\$196 million

In Wisconsin alone, anglers spent approximately \$1.75 billion on fishing related items that included trip related expenditures, equipment, and other expenses such as property, licenses, magazines, club memberships, and tours. Each angler spent \$1,180 on average per year. Between 2001 and 2006, the angler associated expenditures increased in Wisconsin by over \$0.5 million.

What is Facility Renovation Worth?

When the facilities undergo renovation, local engineering, construction and related services benefit. When Wild Rose SFH underwent a complete phased renovation, 287 people were employed to provide construction services alone. This translates to about 195,000 man hours worked for this one project and provided a boost to the local economy.

How Will Facilities Benefit?

The Wisconsin statewide hatchery system will benefit from the proposed renovation and modernization program in the following ways:



Biosecurity Compliance

Biosecurity and fish health concerns have become heightened over the past few years. Many improvements outlined in this report attempt to minimize concerns related to both biosecurity and Aquatic Nuisance Species (ANS) issues. Sometimes, best management practices (BMPs) alone can address the issues. In other cases, significant facility changes will need to be initiated. In all cases, WDNR will need to make changes to meet state and federal guidelines with respect to these issues. The study also outlines the specific requirements and costs associated with a new Isolation / Quarantine facility, which will enhance the system's overall biosecurity.

Long-Term Operation

Facility repair and renovation ensures long-term, reliable operation of the WDNR Hatchery System (i.e., infrastructure reliability). The existing infrastructure must either be renovated or replaced to simply maintain the current fish production rates and avoid losing capacity due to lost functionality at aging facilities. The proposed improvements to the WDNR Fish Hatchery System will assure that fish production will remain stable and allow for the potential to significantly increase production.

Additional Fish Production Capability

The 2010-19 Projected Stocking Goals represent a 78 percent increase (pounds of fish) over the current levels for coldwater production and 27 percent increases (number of fish) for coolwater production. Installation of relatively simple dissolved oxygen management systems at the existing facilities can increase coldwater production by about 10 percent at low capital costs. To increase coldwater production by about 25 percent over existing levels, selected facilities can add or enhance rearing units, if new water sources or recirculation and treatment are installed. Reaching the full 2010-19 **coldwater** goals will require construction of two new facilities. Achieving the full 2010-19 **coolwater** stocking goals will entail the construction of another new facility. Long-term WDNR production needs cannot be met by expansion of existing facilities alone. Construction of new hatchery facilities will be required to meet long-term goals. The study provides conceptual plans for new coldwater and coolwater facilities.



Facility Maintenance

Facility infrastructure improvements will reduce the amount of staff time and annual operating dollars associated with major and minor maintenance work needed to repair and operate antiquated and degraded infrastructure. However, periodic annual preventative maintenance will always be required, even at new or renovated systems. These improvements will also address human health and safety issues and meet environmental compliance at each facility.

Efficient Use of Manpower

The improvements to the WDNR Fish Hatchery System outlined in the study will result in more efficient use of manpower by providing higher fish production efficiency, less system maintenance time requirements, and reduced labor for some fish cultural tasks, as well as allowing facilities to be more productive 365 days a year.

Better Product and Cost Efficiency

Repair and renovation of the WDNR Statewide Fish Hatchery System infrastructure will result in consistent, high quality fishes produced cost effectively. Improvements outlined in this Study will enable the continuation and expansion of the coolwater inland, coldwater inland, Great Lakes coolwater, and Great Lakes coldwater production programs.

FISH PRODUCTION GAP ANALYSIS

When comparing the future 2010-19 stocking goals to the current average 2004-08 stockings, several deficits at the species and size-class level were apparent. These include:

COLDWATER SPECIES	SIZE-CLASS DEFICITS	COOLWATER SPECIES	SIZE-CLASS DEFICITS
● Brook Trout	Small fingerlings, Yearlings	● Walleye	Small and Large fingerlings
● Brown Trout	Small fingerlings, Yearlings	● Muskellunge	Large fingerlings and Yearlings
● Rainbow Trout	Small fingerlings, Yearlings	● Northern Pike	Large fingerlings and Yearlings
● Lake Trout	Yearlings	● Largemouth Bass	Large fingerlings
● Splake (Brook x Lake Trout)	Yearlings	● Smallmouth Bass	Large fingerlings
● Coho Salmon	Yearlings	● Sturgeon	Yearlings

The general trend of the 2010-19 WDNR stocking goals is to stock larger coolwater fish (i.e., more large fingerlings for large- and smallmouth bass, walleye, muskellunge, and northern pike) that should translate to a better return on the fish stocked. The same trend holds for coldwater species, where larger coldwater fish (i.e., rainbow, brook, brown, Coho salmon, Splake, and lake trout yearlings) are preferred.

To determine the rearing spaces requirements (at the species, size-class, and strain level) to make-up these shortages, detailed bio-programming at the species level are required and should be completed during design phase for any future project. At the conceptual study level, it was not practical to evaluate the entire WDNR system at the species-specific or size-class level. Therefore, the study evaluated stockings at the facility level. **Figure B** compares the existing 2004-08 average stocking values (pounds) to the overall future coldwater 2010-19 stocking goals for both coldwater and warmwater facilities.

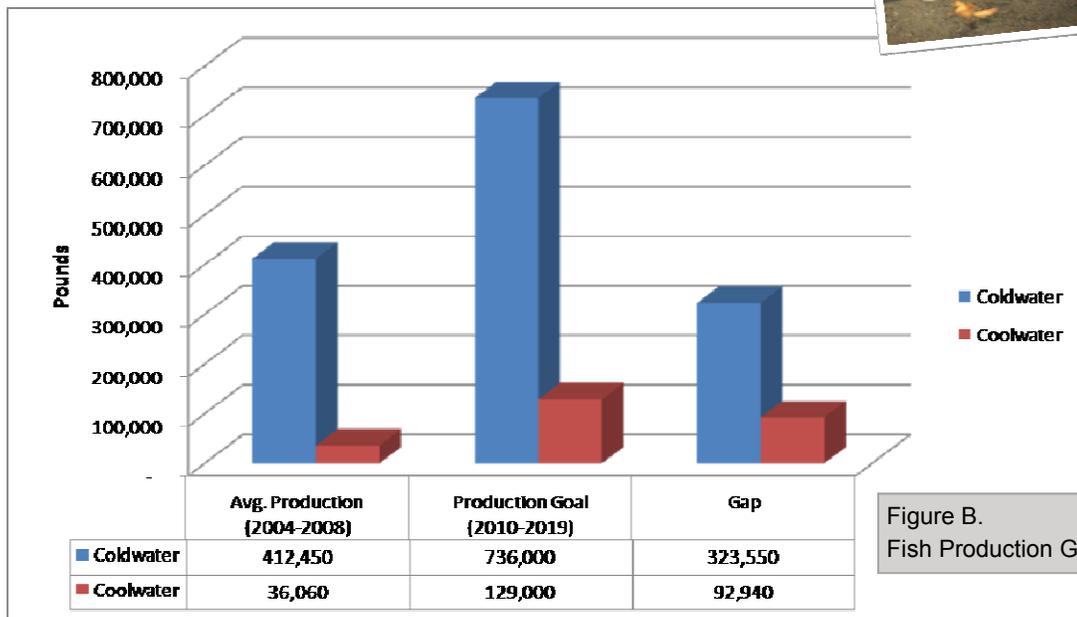


Figure B.
Fish Production Gaps

Please note that all fish production analysis assumptions and sources are provided in the main report.

It appears the existing WDNR system carrying capacity cannot accommodate these future stocking requests, as there is a deficit of nearly 324,000 pounds for coldwater and 93,000 pounds for coolwater fish. Two new coldwater facilities, and one or more coolwater facilities, along with various improvements (i.e., dissolved oxygen management and potentially recirculation technology) at other existing facilities, would likely be required to make up these deficits. New conceptual level coldwater and coolwater facility requirements and recommendations were outlined in the study.

IMPROVEMENT GROUPINGS

First, each facility was individually analyzed with respect to the current infrastructure. A description of individual facility infrastructure problems and a discussion of possible solutions to address these identified problems was presented in the Study. The list of facility problems and needs for each facility was developed after the site inspection/meeting, and consultation with WDNR staff. The majority of the problems at the Wisconsin hatchery facilities are related to aging infrastructure, limited water availability and/or poor water quality, and lack of biosecure features. Conceptual drawings of the possible renovation alternatives is shown for each facility in **Appendix A**. Conceptual plans for new coldwater, coolwater and isolation/quarantine facilities are also included.

At the request of WDNR to comply with potential funding designations, the recommended improvements for each facility were divided into implementation groups in order to provide optimal funding and construction sequencing flexibility for the entire statewide system. WDNR can use these groupings to assist in obtaining appropriate construction funding. These groupings may need to undergo revision as system wide scheduling and State funding allocations change. The Improvement Groups were developed by the Consultant along with input from the WDNR staff. **Table A** outlines projected costs for each facility summarized by the following Improvement Groups:

	<p>Group 1</p> <p>Human Health and Safety</p>	<p>Considered critical to comply with the State's Human Health and Safety laws and codes such as Commerce DILHR rules:</p> <ul style="list-style-type: none"> • All visitor safety improvements and worker safety improvements such as guard rails, chemical storage/ventilation, lead paint and facility/electrical code upgrades to meet worker safety rules. • Staff restrooms and fire alarm systems.
	<p>Group 2</p> <p>Environmental Compliance</p>	<p>To comply with environmental State laws / WDNR rules:</p> <ul style="list-style-type: none"> • Recommended effluent treatment systems to assist in meeting current WPDES permit limits. • Water supply measurement systems to meet upcoming regulations. • Any site drainage and erosion control items.
	<p>Group 3</p> <p>Fish Health & Biosecurity</p>	<p>Improvement items intended as a set of preventive measures to:</p> <ul style="list-style-type: none"> • Reduce the risk of transmission of infectious diseases and pathogens, quarantined organisms, and/or aquatic nuisance species (invasive or exotic alien species) from being passed within the state fish hatchery system or into the state waters. • Items related to fish health, biosecurity and medical separation, i.e. water treatment, dissolved oxygen management, groundwater investigations. • Other fish health features include emergency generation to meet current life support functions and low flow/oxygen alarms.
	<p>Group 4</p> <p>Major Building Maintenance</p>	<p>Each facility contains numerous buildings which are used to support rearing efforts.</p> <ul style="list-style-type: none"> • Many buildings are antiquated and require extensive (i.e., > \$5,000) renovations to allow continued usage. • Improvements include restroom renovations, foundation work, wall/flooring replacement, and exterior siding/painting. • Many buildings also required extensive HVAC upgrading or replacement.
	<p>Group 5</p> <p>Minor Building Maintenance</p>	<p>Minor (< \$5,000) support building renovation projects to allow continued support functions.</p> <ul style="list-style-type: none"> • Minor repairs to building electrical switches and outlets • Painting to protect from weather; patching concrete cracks and spalling; keeping water collection system clean
	<p>Group 6</p> <p>Improvements Needed to Meet Stocking Goals</p>	<p>Remaining improvement items to meet stocking goals:</p> <ul style="list-style-type: none"> • Construction considered essential to meet current and future fish production goals. • Renovation required to repair deteriorated infrastructure and restore operational performance. • Enhanced water supply, treatment and recirculation items. • Future enhanced new wastewater treatment systems to meet requirements for proposed increased production. • General site work items, all new support buildings and visitor restrooms.

Table A. Projected Costs for Improvements at all Facilities

Facility	     						Rounded Total Cost
	Group 1 Human Health and Safety	Group 2 Environ. Compliance	Group 3 Fish Health & Biosecurity	Group 4 Major Building Maintenance	Group 5 Minor Building Maintenance	Group 6 Improvements Needed to Meet Stocking Goals	
Art. A. Oehmcke	\$505,000	\$312,000	\$2,438,000	\$274,000	\$0	\$8,160,000	\$11,689,000
CD Besadny	\$197,000	\$0	\$836,000	\$495,000	\$4,000	\$1,473,000	\$3,005,000
CD Besadny Pond	\$66,000	\$131,000	\$681,000	\$451,000	\$0	\$1,528,000	\$2,857,000
Albion Pond - BRF Outlying Ponds	\$8,000	\$0	\$288,000	\$145,000	\$4,000	\$1,014,000	\$1,459,000
Bill's Pond - BRF Outlying Ponds	\$0	\$0	\$0	\$44,000	\$0	\$278,000	\$322,000
Northfield Lake - BRF Outlying Ponds	\$0	\$159,000	\$0	\$231,000	\$0	\$161,000	\$551,000
Trump Lake - BRF Outlying Ponds	\$0	\$0	\$0	\$0	\$0	\$284,000	\$284,000
Winding Creek - BRF Outlying Ponds	\$0	\$0	\$29,000	\$84,000	\$0	\$584,000	\$697,000
Brule River	\$217,000	\$22,000	\$1,668,000	\$165,000	\$0	\$8,385,000	\$10,457,000
Gov. Tommy G. Thompson	\$114,000	\$281,000	\$2,478,000	\$356,000	\$0	\$7,465,000	\$10,694,000
Kettle Moraine Springs	\$350,000	\$986,000	\$3,580,000	\$721,000	\$0	\$10,383,000	\$16,020,000
Kettle Moraine Springs Annex	\$198,000	\$226,000	\$978,000	\$16,000	\$0	\$2,149,000	\$3,567,000
Lakewood	\$260,000	\$177,000	\$877,000	\$93,000	\$0	\$4,203,000	\$5,610,000
Langlade	\$236,000	\$88,000	\$1,570,000	\$179,000	\$0	\$5,352,000	\$7,425,000
Lake Mills	\$368,000	\$353,000	\$2,874,000	\$539,000	\$0	\$12,604,000	\$16,738,000
Les Voigt	\$408,000	\$1,214,000	\$4,199,000	\$1,134,000	\$0	\$2,765,000	\$9,720,000
Nevin	\$290,000	\$1,081,000	\$1,518,000	\$461,000	\$1,000	\$11,374,000	\$14,725,000
Nevin - Lima Pond	\$72,000	\$166,000	\$509,000	\$338,000	\$0	\$1,460,000	\$2,545,000
Osceola	\$268,000	\$288,000	\$939,000	\$262,000	\$0	\$6,394,000	\$8,151,000
Root River	\$507,000	\$130,000	\$1,955,000	\$44,000	\$0	\$3,414,000	\$6,050,000
St. Croix Falls	\$170,000	\$979,000	\$1,512,000	\$361,000	\$0	\$7,646,000	\$10,668,000
Strawberry Creek	\$179,000	\$102,000	\$786,000	\$15,000	\$0	\$3,204,000	\$4,286,000
Thunder River	\$178,000	\$94,000	\$2,472,000	\$331,000	\$0	\$4,586,000	\$7,661,000
Total^a	\$4,591,000	\$6,789,000	\$32,187,000	\$6,739,000	\$9,000	\$104,866,000	\$155,181,000
						Avg. per Site	\$6,747,000

New Hatchery Coldwater (Rwys) ^a	\$20,558,000
New Hatchery Coldwater (Circ) ^a	\$23,236,000
New Hatchery Coolwater ^a	\$24,057,000
New Isolation/Quar. (Opt. 1 - with Holding)	\$5,197,000
New Isolation/Quar. (Opt. 2 - w/o Holding)	\$3,470,000

Note: This summary table contains all possible recommendations contained within the Study. At any given facility, the Fisheries Program may choose a subset of this work, as appropriate.

^a A new hatchery will not meet current or future fish production goals alone. Existing facilities will still require renovation.

SHORT-TERM CONSTRUCTION PROGRAM

After grouping the recommendations for each facility, the next step for the system planning effort was to prioritize the system-wide recommendations into short- and long-term construction programs. **Table B** details the short- and long-term construction program. The following summarizes the consultant team's recommended actions required to implement the major short-term enhancements to Wisconsin's fish propagation system.

Great Lakes Projects:

- A. Renovate Existing Facilities
- B. New Coldwater Facility
- C. New Isolation/Quarantine Facility

Immediate priority should be given to the Great Lakes coldwater hatchery projects due to WDNR's specific statutory obligations to stock Great Lakes species using receipts from Great Lakes trout and Salmon stamp sales. In addition, the Great Lakes Management program is at the greatest risk due to poor overall facility condition and WDNR cannot meet current or future stocking goals.

- A. Renovate Existing Facilities. The first step in providing Great Lakes fish is to determine whether secure groundwater supplies are viable at Kettle Moraine SFH and Les Voigt SFH so groundwater studies should be implemented. If groundwater results are favorable, implement plans to design and construct the recommended improvements at each facility as recommended in the study. Costs for complete renovation will vary depending on the level of renovation selected.
- B. New Great Lakes Coldwater Facility. Due to the poor infrastructure and deficient production capacity for Great Lakes species, a new facility should be constructed.
- C. New Great Lakes Isolation/Quarantine Facility. Due to statewide biosecurity requirements, an isolation/quarantine facility will be required to handle Great Lakes species. Plan and construct one or more Isolation/Quarantine Facilities to support and protect the existing WDNR fish production programs.

New Inland and Coolwater Projects:

- A. New Coldwater Facility
- B. New Coolwater Facility

The next short-term priority should be given to securing funding, and initiating planning, design and construction of a second new coldwater facility dedicated to Inland Trout and a new Coolwater facility. Fish production can be moved to these new facilities while the long-term system needs are addressed by renovating the remaining existing facilities.

- A. New Inland Coldwater Facility. Due to the new biosecurity requirements, medically separated domestic and feral rearing will occur at the proposed new facility.
- B. New Coolwater Facility. Since the co-operative rearing is not successful every year, a new dedicated coolwater facility should be constructed to better meet stocking needs.



Group 3

Fish Health and Biosecurity

The third short-term construction priority is to plan and execute the Fish Health & Biosecurity (Group 3) improvements at existing facilities. Biosecurity issues are part of the short-term plan because this issue became prominent with new regulations becoming eminent during the course of the study. These selected improvements will

address detrimental fish health and biosecurity issues at existing facilities that have a negative impact on the quality and quantity of fish produced. Fish health will also improve with the installation of modern aeration and dissolved oxygen management systems.

Table B. System Construction Program Recommendations

Goals	SHORT TERM Capital Construction				LONG TERM Capital Construction				
Program	Great Lakes Program		Inland Program	Coolwater Program	Great Lakes, Inland, and Coolwater Programs				
Project	Secure Viable Groundwater Supplies at Kettle Moraine Springs and Les Voigt and Renovate Facilities	New Great Lakes Coldwater Facility and New Isolation/Quarantine Facility	New Inland Coldwater Facility	New Coolwater Facility	Fish Health & Biosecurity improvements	Human Health Safety & Code Compliance and Environmental Compliance	Improvements Needed to Meet Fish Stocking Goals	Major Building and Minor Building	Facility Closure Recommendations
Improvement Groupings	Groups 1-6	New	New	New	Group 3	Groups 1 and 2	Group 6	Groups 4 and 5	Closure
	All new facilities will require groundwater investigations (drives ultimate location), siting studies and permitting initiation to determine optimal and feasible locations for further design and development. The capacity of the proposed new facilities will be addressed during the planning and design phase.								
Details	<ul style="list-style-type: none"> Groundwater studies should be implemented at Kettle Moraine Springs and Les Voigt. If groundwater results are favorable, implement plans to design and construct the recommended improvements at each facility. 	<p>New Great Lakes Coldwater facility:</p> <ul style="list-style-type: none"> In conjunction with the new Inland facility, these facilities could allow the phase-out of operation existing facilities Staff can be relocated to the new facilities. Use a pathogen-free constant temperature groundwater source Recirculation and zero-discharge treatment technologies should be given design consideration Utilize physical separation and other biosecurity design features. The preferred location is in northern to central eastern Wisconsin <p>New Isolation/Quarantine Facility:</p> <ul style="list-style-type: none"> Support and protect the existing Great Lakes WDNR fish production programs. Provide short-term holding completely separated from production facilities until fish health testing can be confirmed, reducing the risk of transmitting diseases to production hatcheries. The facilities will also simplify the present DATCP mandated fish health reporting. 	<ul style="list-style-type: none"> A biosecurity-separated facility for domestic and feral inland trout. Utilize physical separation and other biosecurity design features. In conjunction with the new Great Lakes facility, these facilities could allow the phase-out of operation of existing facilities Staff can be relocated to the new facilities. Use a pathogen-free constant temperature groundwater source Recirculation and zero-discharge treatment technologies should be given design consideration The preferred location is in northern to central eastern Wisconsin 	<ul style="list-style-type: none"> Approximately 40-acres of lined production ponds An intensive coolwater module capable of producing small and large fingerling fish species on zooplankton, artificial diets and minnow finishing prior to stocking. The preferred location is in northwestern Wisconsin The facility could operate a portion of the west central region (WCR or Black River Falls) rearing ponds for selected support of the new coolwater hatchery complex. Or some components of the WCR (Black River Falls) ponds may be phased out of operation Obtain water supply from pathogen-free groundwater Design priorities: recirculation, zero discharge and biosecurity 	<ul style="list-style-type: none"> Install modern aeration systems for the coolwater hatcheries Install liquid oxygen based dissolved oxygen management systems at coldwater hatcheries Install truck and equipment disinfection stations Increase production 10% or greater within the existing installed infrastructure Installation of improvements is relatively simple Can be completed without long capital construction timeframes. 	<ul style="list-style-type: none"> Improvements not directly related to fish production With the exception of electrical code upgrade requirements, no major environmental non-compliance issues have been identified as critical needs that require immediate attention as a result of this study. Discharge permits and effluent treatment will require WDNR staff labor and expertise to continue compliance. If fish production is significantly increased or if WPDES permit limits change in the future, funds may be required to provide effluent treatment upgrades or enhancements. 	<p>To allow additional fish production that will assist in meeting fish production goals improvements include a wide variety of infrastructure improvements or replacement alternatives for each facility.</p> <ul style="list-style-type: none"> Fix and/or replace existing rearing infrastructure Add support space and functions Add new rearing infrastructure <p>Determine improvements according to recommendations of this study and evaluation of need by the Fish Propagation System Review Advisory Task Group</p>	<ul style="list-style-type: none"> Address critical needs as a part of a normal maintenance These categories are for the most part non-production items. 	<p>If new facilities are constructed and/or enhancements are completed at existing facilities as recommended in this report, two phases of eventual facility closures are recommended.</p> <p>These phased closures are long-term recommendations and will require many years to complete.</p> <ul style="list-style-type: none"> The first phase includes Langlade, Thunder River and Kettle Moraine Springs (assuming new groundwater sources are not found). Primary decision factors include water source (quality and quantity) and biosecurity issues. The second phase of facility closures includes Brule River and Lakewood. Both facilities have open water supplies, which present biosecurity issues.
Projected Costs:	~ \$1 million for gw study, varies for improvements	~\$3.5 to \$5.2 million per Isolation ~\$20.5 to \$23 million per facility	~\$20.5 to \$23 million per facility	~\$24 million	~\$32 million	~\$4.5 million (Group 1) & ~\$6.8 million (Group 2)	~\$105 million	~\$6.7 million (Group 4 & Group 5)	

LONG-TERM CONSTRUCTION PROGRAM

The following recommendations outline the consultant team's recommended actions to implement the major long-term improvements and enhancements to Wisconsin's fish propagation system as outlined in the Study.

	<p>Group 1 Human Health Safety & Code Compliance</p>	<p>These categories (Group 1 and Group 2) include improvement items that area largely not directly related to fish production. It is suggested that only critical safety and code compliance issues be addressed and that WDNR request funding that is not game and fish based from outside agencies to complete the work required.</p>
	<p>Group 2 Environmental Compliance</p>	
	<p>Group 6 Improvements Needed to Meet Fish Stocking Goals</p>	<p>Improvements in this category (Group 6) include a wide variety of infrastructure improvements or replacement alternatives for each facility. Some of these improvements are related to fixing existing rearing infrastructure or adding support space and functions to the facility. Other recommendations relate to replacing existing or adding new rearing infrastructure to allow additional fish production that will assist in meeting fish production goals. It is recommended that execution of this class of improvements be completed facility by facility using recommendations of this study and evaluation of need by the Fish Propagation System Review Advisory Task Group assigned to long-term improvements. The Task Group should work to provide a relatively continuous execution process for hatchery infrastructure improvements each biennium budget cycle.</p>
	<p>Group 4 Major Building Maintenance</p>	<p>These categories (Group 4 and Group 5) are for the most part non-production items. Completion of these needs is largely a State of Wisconsin policy issue. It is suggested that critical needs be addressed as a part of a normal maintenance funding through the normal biannual budget process.</p>
	<p>Group 5 Minor Building Maintenance</p>	
<p>Facility Closure Recommendations</p>		<p>If new facilities are constructed and/or enhancements are completed at existing facilities as recommended in this report, two phases of eventual facility closures are recommended. These phased closures are long-term recommendations and will require many years to complete.</p> <ul style="list-style-type: none">A. The first phase includes the facilities of Langlede, Thunder River and Kettle Moraine (assuming new groundwater sources are not found). There are various factors that have resulted in this recommendation with the primary factor being characteristics of the water source, including quality, quantity and biosecurity issues.B. The second phase of facility closures includes Brule River and Lakewood. Both facilities have open water supplies, which present biosecurity issues.

Execution of the Short-Term and Long-Term Construction Program requires dedicated continuous funding and bold commitment of WDNR and the State of Wisconsin to complete these major capital improvements. Similar to the Wild Rose SFH improvements project, this program can be completed if steps are taken now to create funding sources and a plan to complete the program over a reasonable time frame.

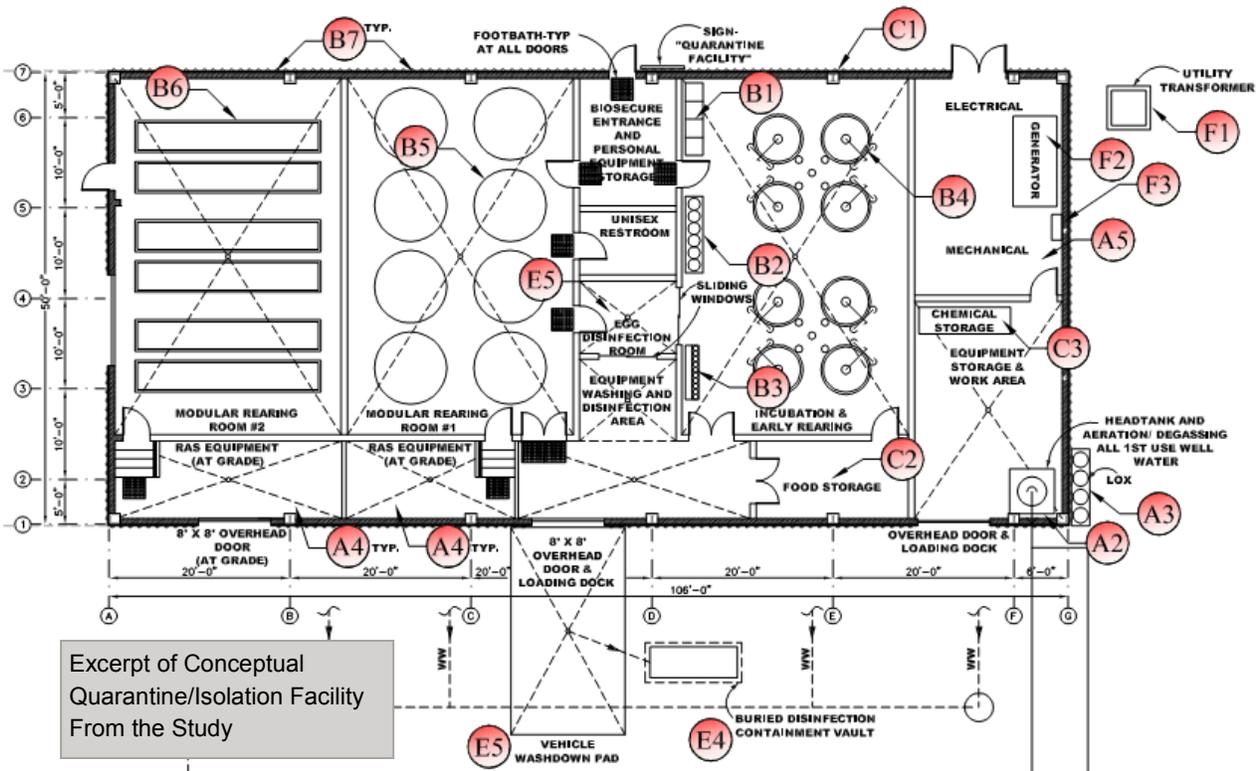
Time requirements are significant for planning and construction of each new facility. At least six years is required and more likely eight to ten years can be anticipated given the significant capital funding and execution requirements imposed by WDNR, WDOA, and the legislature. **That is why these new facility projects have been included in the short-term program since work must be initiated now in order for these projects to move forward.**

A bold and direct approach to complete the short- and long-term construction program is strongly recommended which could include an angler supported hatchery capital construction fund. Concurrent planning and funding is suggested to provide completion in a reasonable time frame. The Department should be given the authority to execute the improvements program as recommended in this Study.

Many other Implementation Plan options are available and are mostly dependant upon funding allocations and WDNR long-term propagation and biosecurity decisions. It should be stressed that the projects can be combined or staged in any way to meet final decisions and funding allocations.

Please note that it is required to operate the present system at the current level of fish production with all proposed renovation plans. WDNR must be prepared to provide normal levels of operation and maintenance funding to the existing system while the capital improvements programs are executed.

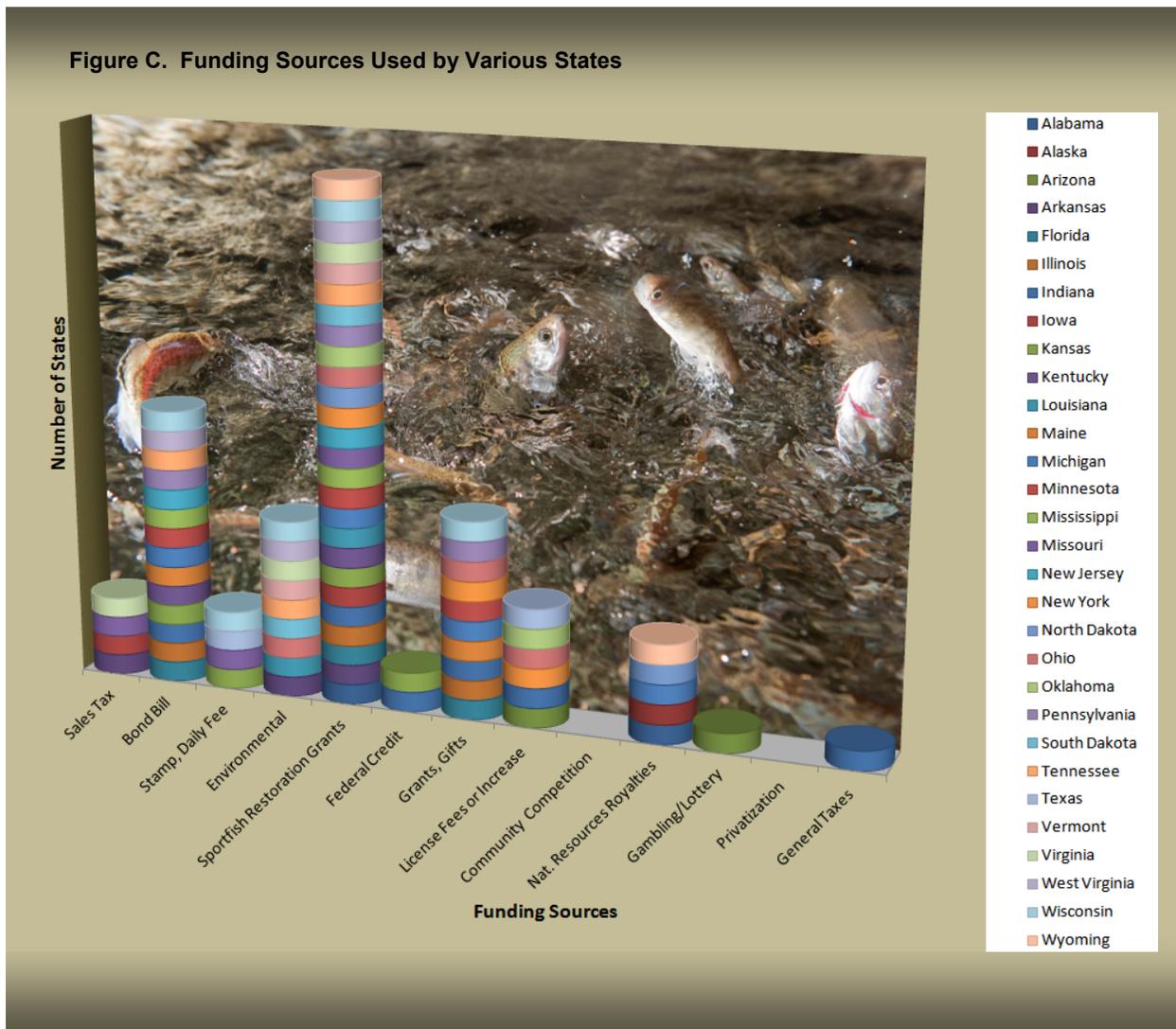
Immediate priority should be given to the Great Lakes coldwater hatchery projects recognizing WDNR's specific statutory obligations to stock Great Lakes trout and salmon.



FUNDING OPTIONS

Funding is required to complete all the capital construction recommendations outlined in the report. WDNR and agencies around the country have encountered this same challenge and have handled it in many creative ways. In order to fund the Wild Rose SFH project, WDNR utilized funding from many sources including: License and Stamp sales, Federal Sportfish Restoration Funds (SFR), and Environmental Damage Funds.

The country’s economic situation has impacted all facets of growth and development. State and federal funding resources are limited. Many historical funding sources are no longer available or can only be used for yearly operational expenses. In order to fund the improvements projects outlined in this report, it is informative to review what methods other nearby stage agencies are employing. While this information was informally gathered for purposes of the report, it is recommended that further research be undertaken by an impartial party to collate this information for all state agencies to use as a tool for evaluating potential new funding sources. Using data obtained from 30 states, **Figure C** quantifies the number of states that are using specific funding vehicles to support new capital construction projects.



In this example, Sportfish Restoration (SFR) Grants have been the most popular funding option. Unfortunately, these funds have been used more frequently for operational funding and are not generally large enough to fund large-scale capital improvements projects. Next, bond bills have been used frequently by many states. Bond bills generally require either legislative appropriation or voter approval. The next highest funding category is related to

Grants or Gifts. These funding resources are generally the most lucrative since they may not need to be repaid. However, these types of funding sources cannot generally be relied upon for long-term funding. The next highest category is related to Environmental Damage or Natural Disaster situations which utilize Natural Resource Damage Assessment (NRDA) programs, mitigation/Brownfield redevelopment programs, and Federal Emergency Management Agency (FEMA) resources. License funds / fee increases are the next most employed funding alternatives.

Next, a map of the United States, **Figure D** (on the following page), specifically illustrates how other nearby agencies are funding capital improvement projects. States in shades of tan are the 30 states that were tabulated for this exercise. Some agencies, similar to WDNR, employ a multitude of funding sources. Using this comparison, it is suggested that WDNR employ the following techniques to generate funding for the suggested improvements and new hatchery projects outlined in this report.

No. 1 — Establish a WDNR Fish Hatchery or Fisheries Stamp.

The stamp funds would be ear-marked money that could only be used for fish hatchery/propagation infrastructure construction, improvements and system operation including stocking and all related fish propagation operations. Stamp cost could be similar to Texas Parks and Wildlife Department's \$5 annual fee which would generate about \$7 million dollars annually using current angler license numbers. Ideally, WDNR should be in total control of stamp fund expenditures. However, most likely the funds would be controlled by the legislature and/or Governor but WDNR would be given authority to spend money from the account. WDNR will probably still have to go to the Building Commission for approval. The current WDNR Salmon Stamp could continue and be used to pay for the rearing and stocking of fish as well as management surveys. The new Fisheries or Fish Hatchery Stamp would be used for capital projects and operations of renovated hatcheries only. Essentially, the stamp is another User Pays / User Benefits fee structure that guarantees that the money goes for what it was intended to fund and it a consistent, reliable fund to use for the long term enhancement program.

No. 2—Create Sustainable Conservation Sales Tax Fund

To those who benefit from statewide fishing and all other Wisconsin Outdoor Recreation, create a new Sustainable Conservation Sales Tax Fund for Wisconsin so that all the other statewide fishing related / tourism benefits associated with fishing are included. This will provide new revenue providing funding of statewide Conservation Programs outside of the traditional fishing and hunting license revenue. This is a broad new revenue program that funds a lot of the conservation programs in Arkansas, Virginia, and Missouri. This option will require legislative and WDNR support for establishment and may require statewide voter approval via referendum. The new money would be used for many programs, one of which could be the hatchery propagation system enhancement program. Iowa is now ready to accumulate money that has been voted on by the public but it won't start until the governor and legislature approve a sales tax increase.

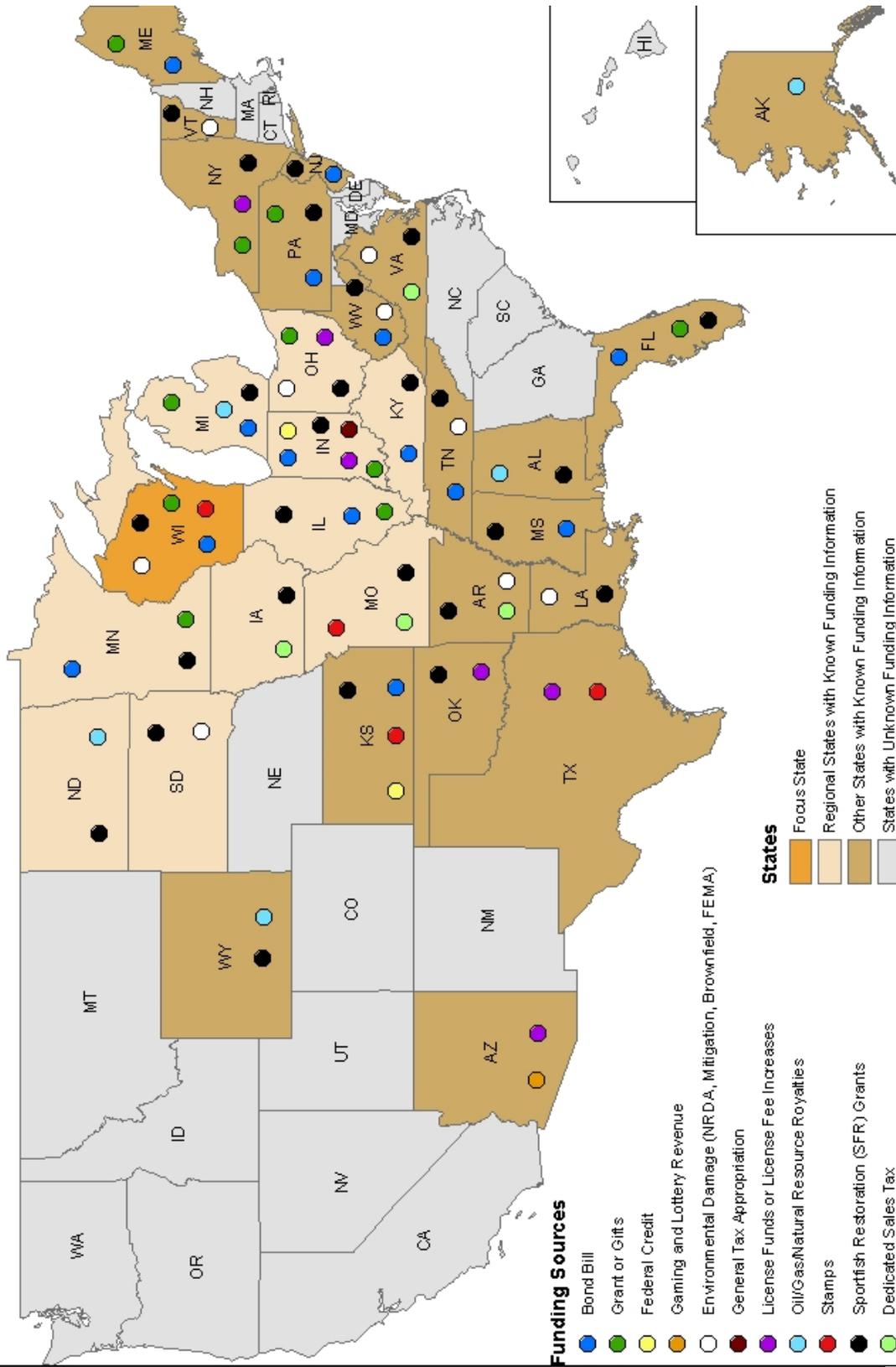
No. 3—Foundation Grants, Donations or Land Transfer Gifts

Foundation grants, large monetary donations or land transfer gifts have been used in some states to fund or partially fund new hatchery projects. However, this alternative is not typically consistent enough to fund the large-scale improvements projects proposed for WNDNR. Louisiana Department of Wildlife and Fisheries is going to get a fully supported 314 acre hatchery site in Lake Charles, La for a new marine hatchery as a gift from a significant member of the Louisiana Coastal Conservation Association (CCA). Several Texas hatcheries have completed significant major improvements using private donation. Donor request and recognition is a viable method but not always predictable.

No. 4—License Fee Increases

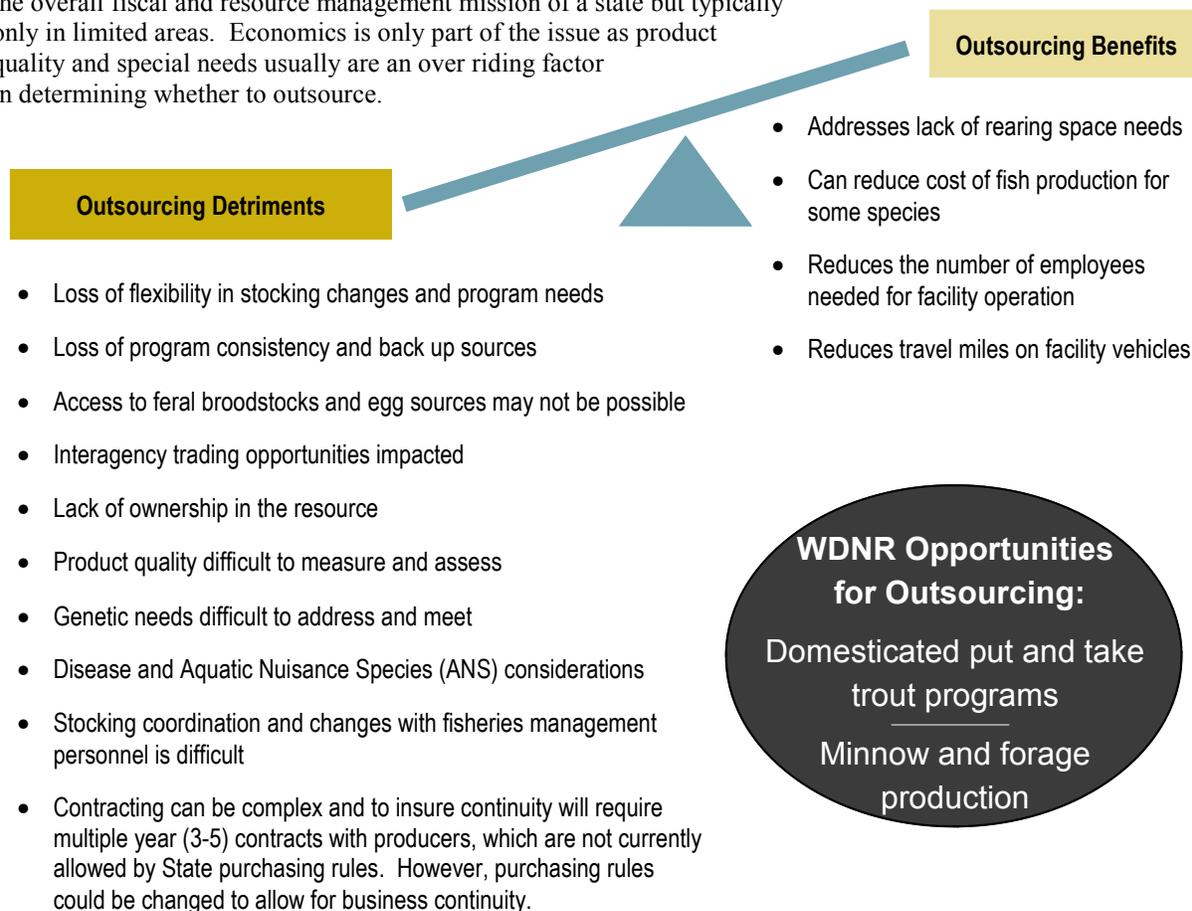
Another funding option is to give WDNR the authority to annually increase license fees based on the annual cost of living increase and operational cost increases. Many states are using this method to cover increased operating costs. However, given the current economy, this option should be carefully balanced with current user support. If a portion of license fee increases can be used to retire long-term capital construction bond debt, this option may be a viable method to fund hatchery improvements.

Figure D. Funding Information for Surrounding States



OUTSOURCING OPTIONS

The issue of outsourcing (or privatization) the production of sport fish for the stocking of public waters has been an issue that periodically comes up across the country as a potential means of reducing costs and meeting budgets. In some cases, purchase of private or commercially raised fish may be advantageous to the overall fiscal and resource management mission of a state but typically only in limited areas. Economics is only part of the issue as product quality and special needs usually are an over riding factor in determining whether to outsource.



Biosecurity and prevention of the spread of diseases and aquatic nuisance species has become an ever increasing issue with the fisheries resources of states. When fish are produced and stocked from state run facilities, better control can be maintained over what leaves a facility and what is stocked into public waters, as these fish are always under the direct control and purview of the state. The WDNR is better suited to control where fish or eggs are collected, determine health status of produced fish, and allowing for changes in stocking priorities on short notice.

With the WDNR's practice of rearing feral strains of fish that require modified loading and density rates that are usually lower than what domestic strains may be reared at, the private producer will most likely not want to undertake the responsibility of rearing these fish, unless he can receive extra compensation for the effort. Feral fish rearing requires more rearing space and less fish density to produce the same number of fish as the domestic strains. This practice is more suited to natural resource agency programs.

Special management stocking programs, such as those that may require specific genetic strain stockings for research needs and improved stocking survival are best managed by the state resource agencies. Adjustments to research programs that require specific stocking scenarios can usually only be addressed by that agency as changes in stocking needs may occur at any time. Agency stocking programs typically involve multiple locations and involved placement in proper habitat.

It is not recommended that sport fish production that is currently under WDNR purview be outsourced, particularly with feral strain trout, salmon, walleye, muskellunge, northern pike and sturgeon species. However, two areas could be evaluated further to determine viability. First, domesticated put and take trout programs could be looked at for efficiency and cost comparison. The Fisheries Program will have to balance issues related to cost, fish health, distribution costs, and private fish farm capacity and potential to expand when deciding whether to invest in the infrastructure needed to produce domestic put-and-take trout or to contract. Secondly, minnow and forage production should be provided by the private sector, as it is next to impossible to provide forage for coolwater production at the level that WDNR requires. There is not enough rearing or regional pond space to provide the amount of forage needed for rearing of large fingerling walleye, muskellunge and northern pike at the current or anticipated production level.

PROJECTED FUTURE OPERATIONAL & MAINTENANCE COSTS

The capital costs associated with the proposed facility improvements are outlined within the individual sections of the Study. Increases in operation and maintenance costs should be expected with the corresponding hatchery capital improvements. Identified operational cost increases may include, but are not limited to, the following: feed/forage costs; electrical costs associated with pumping of new wells and/or treating, disinfecting and pumping with recirculating aquaculture systems (RAS); dissolved oxygen management systems; wastewater treatment enhancements; and stocking costs (travel and vehicles). These operational costs will likely be proportional to the level of production/stocking increases across the individual facilities.

Depending on the level of future **coldwater** production, increases of operational and maintenance costs could vary from 30 to 75 percent. Potential feed costs will increase proportionally as production increases. Dissolved oxygen management via bulk liquid oxygen (LOX) can be expected to increase overall operational costs from 10 to 15 percent. Increased electrical costs associated with pumping additional wells and/or RAS pumping, screening and disinfection could increase in excess of 50 percent. Production reassignment and increased production would increase travel and vehicle costs.

Proposed operational cost increases for **coolwater** production include increases for artificial feed and minnow and sucker forage (200 to 300 percent). As larger coolwater fish are preferred impacts to feed must be realized. Professional experience at other conservation hatcheries has shown that artificial feeds are typically about one-third the cost of forage. That said, it is recommended that manufactured diets be used (initially) to reduce overall feed costs. If manufactured diets are not successful then forage would have to be used. Other increases include electrical (25 to 50 percent) for low pressure pond aeration systems and travel and vehicles for stockings.

More accurate determination of operation cost changes would be made during design, as specific facility improvement alternatives are selected and subsequent production changes are made. For comparison purposes, future salary, feed, and operational costs at updated facilities and the new proposed facilities could be similar to Wild Rose SFH, but they would be proportional to the level of production. It should be noted that the operational costs at Wild Rose after the renovation process was completed are higher than the other gravity flow facilities due to pumping of well water and water and effluent treatment. However, this facility meets strict biosecurity and WPDES requirements that many of the other facilities cannot provide due to open water sources and less treatment. As WDNR works to achieve the higher future stocking goals outlined in the report, higher operational and personnel costs are anticipated throughout the system. The extent of operation and personnel cost increases will depend and will vary with the level of complexity of the facility upgrades. Funding resources will need to be provided to cover these costs.

It should be noted that as WDNR attempts to achieve the higher future stocking goals outlined in the report, higher operational and personnel costs are anticipated throughout the system.

HATCHERY STAFF RECOMMENDATIONS

Current Staffing

Organization charts for each facility were provided by WDNR. Each chart identifies staff, total hours worked per year, titles and typical duties. Due to the variety of hours worked per year for many similar positions, the positions were converted into full time staff equivalents. For example, if there were two technicians that worked 2,080 and 1,040 hours per year respectively, the staff would be converted to 1.5 staff equivalents. In addition to full-time equivalents, limited-time or seasonal employees (technicians or laborers) are hired each year at most of the facilities during high work load periods.

Current facility operation includes 77.87 staff equivalents (61.6 full-time and 16.27 seasonal) to support the current level of fish production and stocking. For the most part, staffing levels at WDNR hatcheries appear to be similar to other state operated facilities of comparable size and complexity.



Future Staffing

Future staffing was evaluated first with respect to current production levels and then the proposed production and stocking increases and proposed infrastructure improvements outlined in this Study. Increased production and stocking requires higher fish densities, increased feeding, increased fish husbandry and will include operation of recirculation treatment systems that are likely beyond the capabilities of current staffing levels. Future facility operation includes 116.62 staff equivalents (94.35 full-time and 22.27 seasonal) to support the proposed future level of production and stocking. LTE staffing was not added for the future but this may need to be adjusted depending on future fish production goals and stocking windows. These future staffing recommendations are as follows:

1. All staff vacancies should be filled.
2. Supervisors should be added to all hatchery facilities (i.e., facilities with broodstock and egg incubation).
3. DNR should consider either creating a new classification for hatchery foremen at rearing stations and what are essentially assistant hatchery managers at all hatcheries, or provide a commensurate pay rate premium to adequately compensate staff at these positions for their added responsibility.
4. Facility production and stocking increases at or beyond 25% should be matched with the addition of one or more staff member(s).
5. Facilities where recirculation aquaculture systems are proposed (screening, disinfection, pumping, back-up power supplies, etc.) should have dedicated maintenance mechanics, which could also serve as part-time technicians as site conditions warrant.
6. If new coldwater and coolwater facilities are constructed, they should be provided with additional full-time and limited-time staff. If the new facility(s) replaces one or more of the existing facilities, those existing staff could be moved to the new facility. If the new



facility(s) do not replace existing facilities then new staff would be required. Isolation facilities could be staffed by existing personnel at nearby facilities.

7. Wisconsin hatcheries are among the few state hatchery programs that do not utilize at least part-time office program assistants. These program assistants typically handle phone calls, clerical and routine report processing functions, and handle hatchery visitor contacts and tours which frees up supervisor time for administrative planning, project management, staff training and supervision, and important fish cultural activities. DNR should consider adding these positions when the economic climate allows.

Other Staffing Considerations

One difference in the WNDNR organizational make up from other states is the absence of a centralized Hatchery Section composed of a Fish Culture Section Chief and support staff to oversee the planning and operation of all hatchery facilities. The present organizational structure whereby hatcheries fall under regional supervision can potentially create stocking priority changes within the region without prior knowledge of the central office staff. It is recommended that all hatchery planning, reporting, operations and administration be conducted through a central office administrator to whom all hatchery managers would report. A centralized budget should be included that would be allocated and managed by the centralized administrator and support staff. This centralized office should direct the development of system-wide annual reports that document goals, quotas, production, transfers, and stocking which are instrumental in the tracking of statewide hatchery operations and can be used in future system wide needs.

The Wisconsin Fish Culture Section does not currently use all of the fish culture specialist classifications utilized by some states including Fish Culture Facilities Engineer and Fish Genetics Specialist. Coordination for major development projects was assigned as an additional job duty for the Fish Propagation Specialist, which displaced several other important, normal job duties assigned to that position. Genetics services are contracted with the Molecular Conservation Genetics Lab at the Wisconsin Cooperative Fisheries Research Unit at UW Stevens Point.

When the long-term capital improvements program recommended in this report is initiated by WNDNR, the position of Fish Culture facilities Engineer could be especially useful to coordinate the long-term capital improvements program. This position could be used to coordinate the improvements program with the WNDNR Commission, WNDNR fisheries administrators, hatchery managers, internal WNDNR Engineering personnel, and hatchery design consultants. The benefit of this hatchery system engineer position would be the consistency of supervision and coordination during implementation of the long-term hatchery improvements master plan and general long-term knowledge of each of the hatchery's systems. This would avoid problems created by requesting hatchery managers to become directly involved with concurrent capital construction planning and day-to-day fish hatchery production operations and supervision of hatchery personnel.



ACTION NEEDED BY WDNR

In order to implement the Hatchery System Modernization Plan as outlined in this report, the Wisconsin Department of Natural Resources needs to perform the following generalized tasks:

● **Generate Annual Hatchery System Report** containing annual fish production reports by facility. Use this information for tracking existing trends, including individual facility and system-wide production costs, production techniques, overall production success or failure, and recommendations for future rearing adjustments techniques and facility assignments, for determining where gaps exist between actual production and goals, and for setting goals that match existing infrastructure capacity.

● **Manage and Operate as a Statewide Program** working cooperatively to best meet the fish stocking requirements for all Wisconsin waters.

● **Seek New Funding Sources** for short-term and long-term construction programs for facility repair, renovation, and expansion along with the construction of new facilities.

● **Develop an Implementation Schedule** that reflects annual funding and internal facility requirement priorities. Address known infrastructure problems or immediate fish production needs that are likely to fail and potentially cause adverse production impacts.

● **Implement Multiple-Years A/E Contracts.** Continue Planning and Engineering Phase of each project (average of two to four years or longer for design through construction per facility). Work with the WDOA/DSF to implement multiple years A/E Contract for design and construction administration services, if possible.

● **Improve Dissolved Oxygen Management** at all existing facilities even if not able to construct new production facilities (2 coldwater and 1 coolwater). This will be necessary to be able to achieve 2010-2019 stocking goals. In such an event, WDNR is encouraged to rectify the agency's stocking goals with the hatchery system's production capacity established in the hatchery system annual reports.

● **Coordinate and Communicate** with reviewing agencies, user groups, legislative staff and the general public concerning a Statewide Propagation Renovation and Expansion Plan.

● **Finalize Biosecurity Guidelines.** Determine infrastructure alterations necessary for existing facilities, as well as requirements for any new facility construction. Guidelines should help determine whether use of any open water supplies can continue or what level of water treatment will be acceptable.

● **Authorize** the Propagation Coordinator and the Fish Propagation System Review Advisory Task Group to work with WDOA/DSF to execute the WDNR new facility and renovation program.

● **Budget for Improvements and Technology.** As facilities become more technically sophisticated to meet biosecurity requirements and reduced water demand, there will be increased operational and overhead costs associated with these changes. WDNR will need to budget for these increased operational costs as suggested in the study.

FINAL RECOMMENDATIONS

WDNR needs to invest in the fish propagation infrastructure if fish stocking goals are going to be met. Angler pressure within the state is high and stocking is required to meet those needs. WDNR has been authorized by state statutes to provide stocking in waters lacking adequate natural reproduction. In order to provide this service, each facility in the system requires renovation. In addition, if future fish stocking goals are to be met, new fish production facilities must be constructed. Biosecurity has become a major concern for the entire propagation system. Facilities must meet biosecurity requirements if stocking is to continue.

Wisconsin has a fish propagation program admired by many state agencies throughout the U.S. due to the complexity of stocking feral and domestic species, along with Great Lakes strains, and the many conflicting needs of waters throughout the state. The current staff is devoted to fish rearing and has a vast knowledge base that cannot be replicated. A dedicated funding source is needed, along with adequate planning, to address the entire statewide system before it is too late.



ACKNOWLEDGMENTS

The following individuals have been involved in the development and review of this report entitled, **Wisconsin Comprehensive Study of Wisconsin's Fish Propagation System**. Their cooperation and assistance is gratefully acknowledged.

Wisconsin Department of Natural Resources, Bureau of Fisheries Management

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Steve Avelallemant Regional Fisheries Coordinator; Acting NOR Operations Supervisor
Bob Fahey SCR Operations Supervisor
John Komassa..... SER Operations Supervisor
John Nelson..... NER Operations Supervisor
Peter Segerson..... WCR Operations Supervisor
Neal Rosenberg..... Fisheries Team Supervisor
Bruce Underwood..... Art A. Oehmke Fisheries Team Supervisor
Michael Baumgartner CD Basadny On-Site Foreman
Darren Miller..... Brule River/Les Voigt Fisheries Team Supervisor
William Gobin Brule River On-Site Foreman
Gary Lindenberger Gov. Tommy G. Thompson Fisheries Team Supervisor
Andrew Hron..... Kettle Moraine Springs Team Supervisor
Joseph Golbach Lakewood On-Site Foreman
Heather Hermes..... Langlade On-Site Foreman
Steve Merson..... Lake Mills Fisheries Team Supervisor
Mike Aquino..... Nevin Team Supervisor
Peter Jensen..... Osceola/St.Croix Falls Fisheries Team Supervisor
Amy Gardon Thunder River On-Site Foreman
Steve Fajfer Wild Rose Fisheries Team Supervisor
Angela Zar DOA Project Manager/Architect

Plus all the dedicated hatchery staff at all the facilities that assisted the project team by answering questions, filling out questionnaires and reviewing submittals.

(Note: titles were current at time of the study.)

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Terra McParland, P.E. Environmental/Civil Engineer
Troy Talsma, P.E. Mechanical Engineer
Garry Roscetti, P.E. Electrical Engineer
D. Ryan Keith..... Environmental Scientist
Doug McQueen Senior CAD Technician
Lynda Cliburn Senior Marketing Coordinator

Appendix A Improvement Drawings

Existing Facilities

- AAO-3 Art A. Oehmcke State Fish Hatchery Proposed Improvements
- BAF-3 CD Basadny Anadromous Fish Facility Improvements
- BAP-1 CD Basadny Outlying Pond
- BRF-1 Albion Ponds (ALB) – Proposed Improvements
- BRF-2 Outlying Ponds (Trump Lake – TRU, Northfield Lake – NOR, Bill's Pond – BIL) – Proposed Improvements
- BRF-3 Winding Creek (WIN) – Proposed Improvements
- BRR-3 Brule River Rearing Station Proposed Improvements
- GTT-3 Gov. Tommy G. Thompson State Fish Hatchery Proposed Improvements
- KMS-3 Kettle Moraine Springs State Fish Hatchery Proposed Improvements
- KMA-2 Kettle Moraine Springs Annex Proposed Improvements
- LAK-3 Lakewood Rearing Station Proposed Improvements
- LAN-3 Langlade Rearing Station Proposed Improvements
- LKM-3 Lake Mills State Fish Hatchery Proposed Improvements
- LSV-3 Les Voigt State Fish Hatchery Proposed Improvements
- NEV-3 Nevin State Fish Hatchery Proposed Improvements
- OSC-3 Osceola State Fish Hatchery Proposed Improvements
- RRS-3 Root River Steelhead Facility Proposed Improvements
- SCR-3 St. Croix Falls State Fish Hatchery Proposed Improvements
- SCS-3 Strawberry Creek Spawning Facility Proposed Improvements
- THR-3 Thunder River Rearing Station Proposed Improvements
- WRO-1 Wild Rose Existing Conditions / Future Projects

Conceptual New Facilities

- N-1 Conceptual New Coldwater Hatchery Plan – Raceways
- N-2 Conceptual New Coldwater Hatchery Plan – Circular Units
- N-3 Conceptual New Coolwater Hatchery Plan
- ISO-1 Conceptual New Quarantine/Isolation Facility Plan (Option 1)
- ISO-2 Conceptual New Quarantine/Isolation Facility Plan (Option 2)

**Art A. Oehmcke State Fish Hatchery
Improvements Legend**

A Water Supply

- A1** Disinfect Madeline Lake water supply to buildings and ponds
- A2** Modifications to Clear Lake pump station
- A3** Disinfect Clear Lake water supply to buildings
- A4** Microscreen Clear Lake water supply to buildings and ponds
- A5** Treat domestic well water for iron and hydrogen sulfide
- A6** Renovate Madeline Lake intake box and intake screen
- A7** Renovate or replace microscreen filtration system
- A8** Add emergency spillway at Madeline dam
- A9** Replace manual air release valves with automatic
- A10** Install water supply measurement
- A11** Install recirculation treatment system (UV, filtration, pump)
- A12** Perform a groundwater study to determine availability / quality of additional water
- A13** Install a new well

B Fish Rearing Units

- B1** Add coolwater early rearing space
- B2** Add coldwater rearing space
- B3** Add egg disinfection room or building
- B4** Replace all wooden screens/weir boards for biosecurity
- B5** Line or replace remaining earthen rearing ponds (8-11)
- B6** Replace existing pond liners
- B7** Provide shade/netting over selected ponds
- B8** Underdrains for pond liners in Ponds 12-16
- B9** Repair cracked and broken kettle concrete
- B10** Coating for concrete rearing units A-H
- B11** Replace egg incubation jars
- B12** Replace selected harvest kettles with larger harvest kettles
- B13** Replace pond aeration system

C Buildings

- C1** Remove lead paint and repaint support buildings
- C2** Add biosecure visitor center
- C3** Hatchery Building Renovation
- C4** Add laboratory and staff restroom
- C5** Add temperature control to feed storage
- C6** Add employee gear lockers and storage space
- C7** Add general storage
- C8** Replace HVAC duct in hatchery building

**Art A. Oehmcke State Fish Hatchery
Improvements Legend**

- C9** Office building renovations
- C10** Net Room/Shop Renovation
- C11** Renovate pond building
- C12** Repair/replace concrete approach into shop area
- C13** Add building features to allow biosecure isolation of individual lots

D Site

- D1** Add truck/equipment disinfection area
- D2** Enclose entire facility with fence and automatic gates
- D3** Abandon unused domestic well per code
- D4** Replace Net Room/Shop domestic water conditioning system
- D5** Separate other agencies/management storage from hatchery storage
- D6** Install better stormwater runoff management system
- D7** Create a video showing fish rearing and egg take
- D8** Add a visitor's ADA accessible restroom

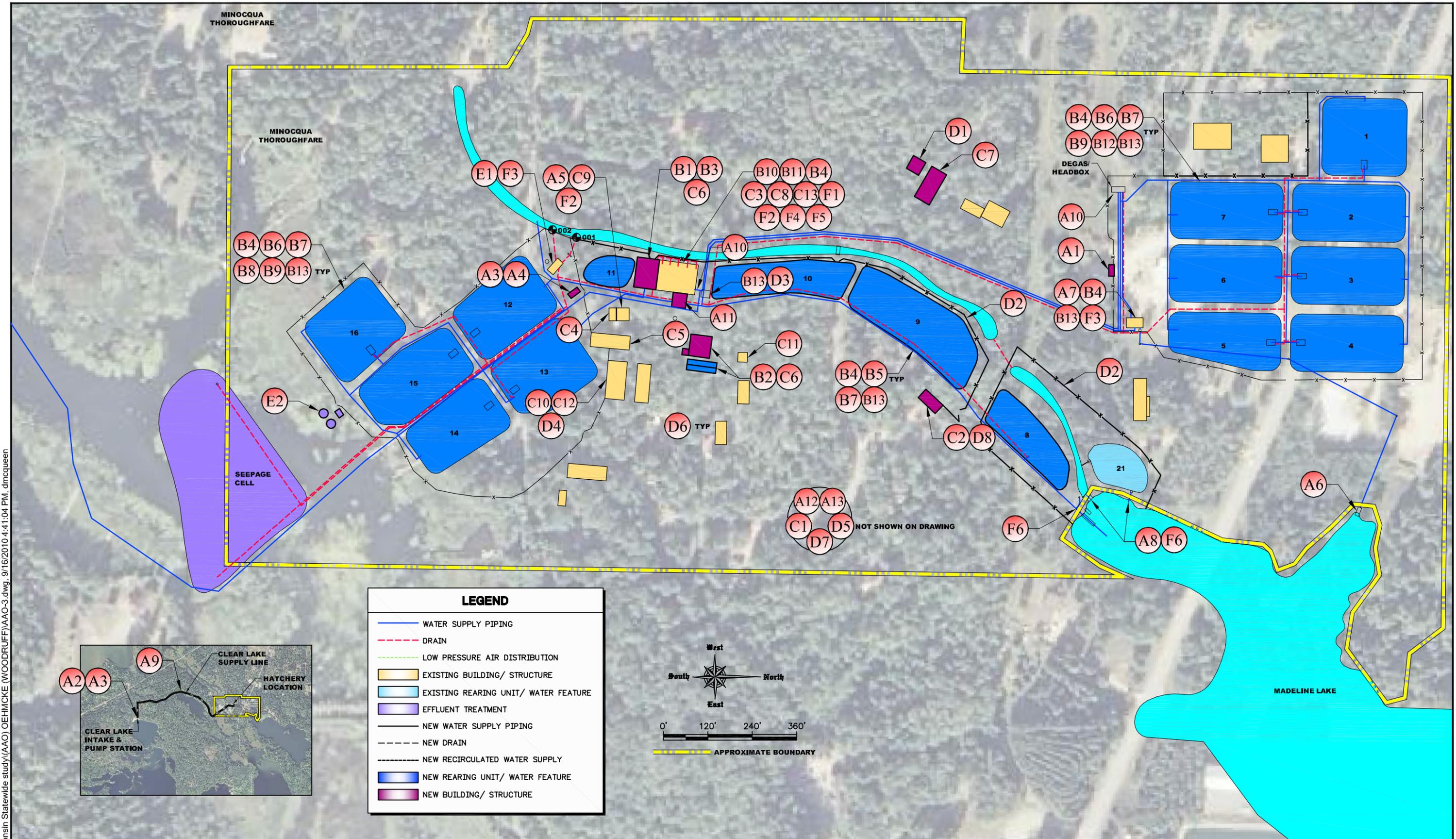
E Aquaculture Wastewater

- E1** Provide effluent treatment in the winter for building wastewater
- E2** Install effluent treatment for future coldwater production

F Utility Systems

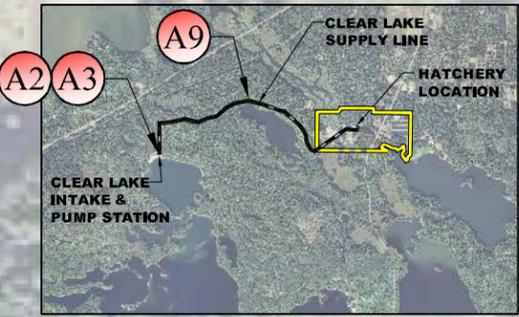
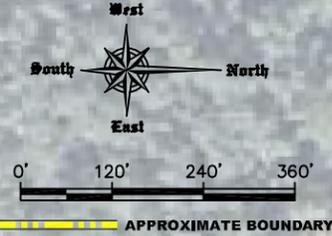
- F1** Relocate and add more electrical outlets in the hatchery building
- F2** Replace/upgrade instrumentation system hardware and software
- F3** Emergency backup for the intake pump stations and effluent lift station
- F4** Replace temperature probes in the hatchery building
- F5** Upgrade main electrical panel
- F6** Add microturbine at Madeline Lake intake for potential energy savings

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LEGEND

- WATER SUPPLY PIPING
- - - DRAIN
- - - LOW PRESSURE AIR DISTRIBUTION
- EXISTING BUILDING/ STRUCTURE
- EXISTING REARING UNIT/ WATER FEATURE
- EFFLUENT TREATMENT
- NEW WATER SUPPLY PIPING
- - - NEW DRAIN
- - - NEW RECIRCULATED WATER SUPPLY
- NEW REARING UNIT/ WATER FEATURE
- NEW BUILDING/ STRUCTURE



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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

ART OEHMCKE STATE FISH HATCHERY PROPOSED IMPROVEMENTS

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
AAO-3

**CD Besadny Anadromous Fish Facility
Improvements Legend**

A Water Supply

- A1** Perform a groundwater study to determine availability / quality of additional water
- A2** Install mechanical intake screen cleaning system and/or leaf deflector
- A3** Install river water supply filtration
- A4** Upgrade aeration system
- A5** Install screen lifting device at lamprey eel screen
- A6** Drill a new well or increase river water supply for Coho
- A7** River intake improvements

B Fish Rearing Units

- B1** Improve safety and function of white sucker and Chinook passage system
- B2** Add isolated egg incubation system
- B3** Concrete holding tanks repairs
- B4** Replace all wooden screens/weir boards for biosecurity

C Buildings

- C1** Roof replacement: storage bldg, residence, garage & outbuilding
- C2** Replace/Add insulation in residence
- C3** Addition to building for crew room and heated storage area
- C4** Expand visitor facility with additional area and more displays
- C5** Renovate leaks in fish viewing area; reroute groundwater
- C6** Cold Storage Building Renovation
- C7** Replace outbuilding at the residence
- C8** Residence renovations
- C9** Replace cracked viewing window

D Site

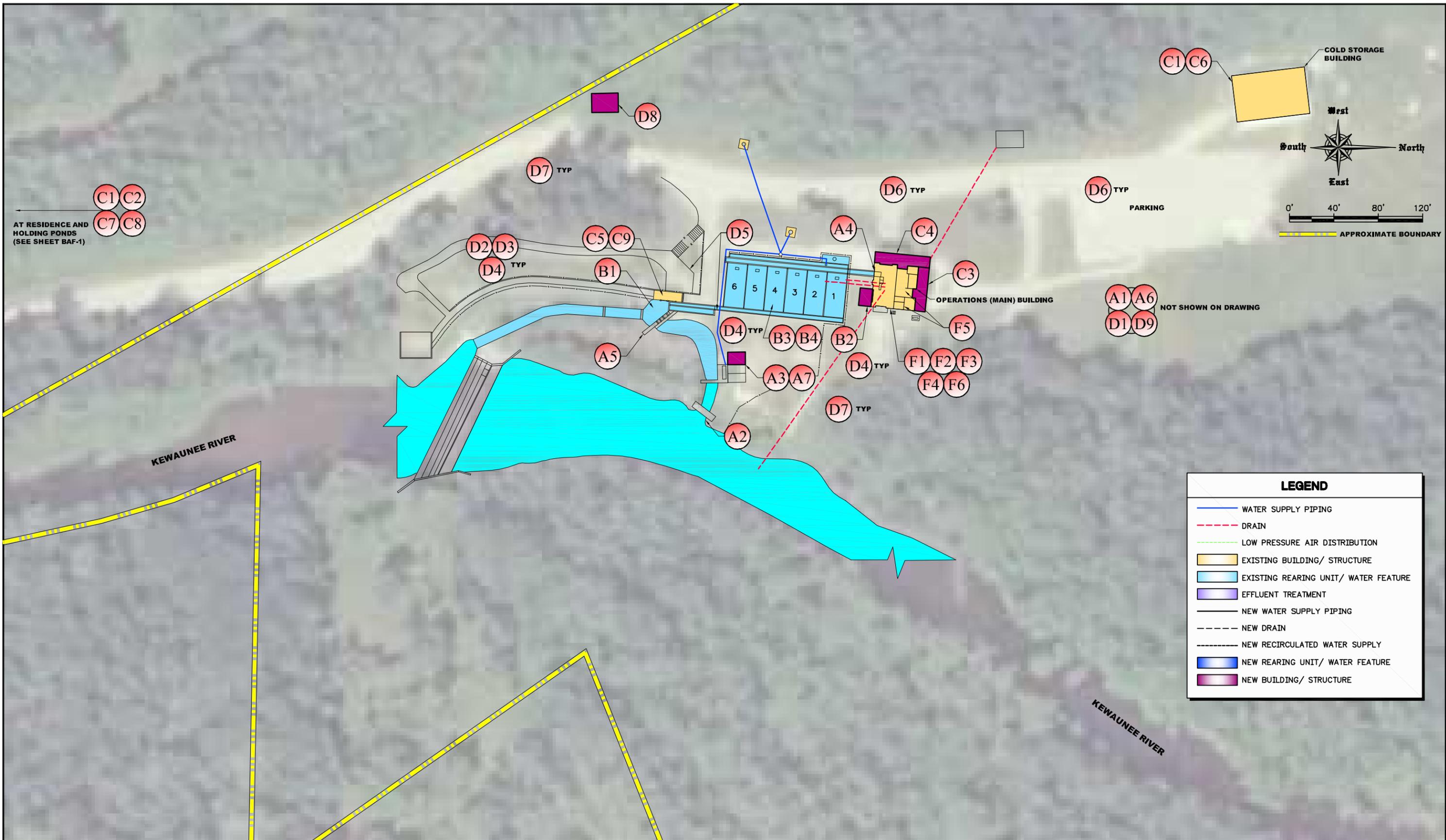
- D1** Drill new domestic supply well
- D2** Safety railings and wider walkways renovations
- D3** Level and/or renovate sidewalks for visitor safety
- D4** Relandscape areas that are visitor safety hazards or difficult to mow
- D5** Renovate retaining walls
- D6** Resurface and relevel entrance road and parking lot
- D7** Replace site fencing
- D8** Add truck/equipment disinfection area
- D9** Create a video showing egg take

E Aquaculture Wastewater

- E1** None

F Utility Systems

- F1** Replace domestic water heater in main building
- F2** Enhance security system
- F3** Replace work room heating system with infrared
- F4** Upgrade electrical system
- F5** Install air-conditioning in the visitor room and office area
- F6** Install fire alarm system for the facility



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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

BESADNY ANADROMOUS FISH FACILITY PROPOSED IMPROVEMENTS
 COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
 9/15/10
 SHEET:
BAF-3

CD Besadny Anadromous Fish Facility - Besadny Pond
Improvements Legend

A Water Supply

A1 Install new well and aeration/degassing system

A2 Install iron removal system

A3 Install recirculation treatment system (UV, filtration, pump)

B Fish Rearing Units

B1 Replace raceways

B2 Install fish crowding system in raceways

C Buildings

C1 Replace well building

C2 Install rearing unit pavilion/building

C3 New feed and equipment storage building

D Site

D1 Install walkway for outlet screen cleaning

D2 Install permanent access/egress from raceway

D3 Pave area near harvest location

D4 Install stormwater management system

E Aquaculture Wastewater

E1 Install settling basin for solids management

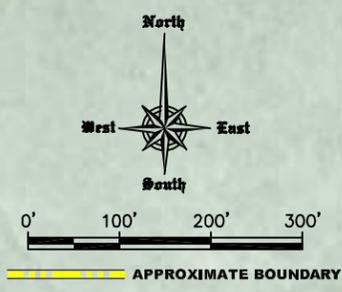
F Utility Systems

F1 Upgrade electrical system

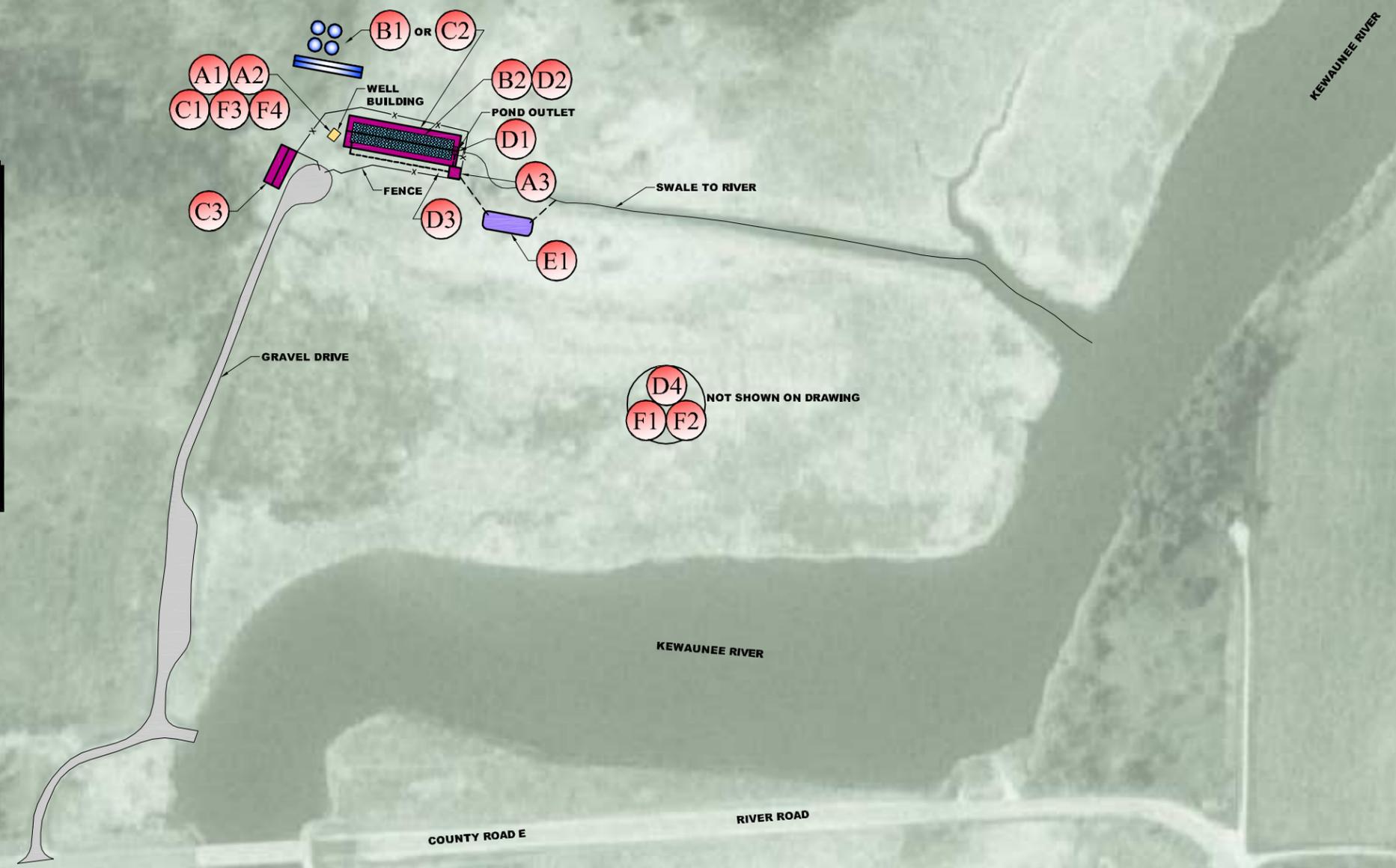
F2 Install remote cameras for security monitoring

F3 Provide emergency power for the pump

F4 Replace pump electrical system



LEGEND	
	WATER SUPPLY PIPING
	DRAIN
	LOW PRESSURE AIR DISTRIBUTION
	EXISTING BUILDING/ STRUCTURE
	EXISTING REARING UNIT/ WATER FEATURE
	EFFLUENT TREATMENT
	NEW WATER SUPPLY PIPING
	NEW DRAIN
	NEW RECIRCULATED WATER SUPPLY
	NEW REARING UNIT/ WATER FEATURE
	NEW BUILDING/ STRUCTURE



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BESADNY POND FISH FACILITY PROPOSED IMPROVEMENTS
 COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
 9/15/10
 SHEET:
BAP-1

**Black River Falls Outlying Facilities - Albion Ponds
Improvements Legend**

A Water Supply

- A1** Adjust water supply alkalinity
- A2** Install alternate water supply for ponds during drought conditions
- A3** Add filtration to the water supply to the building
- A4** New truck fill water supply or treat the water pumped from the ponds
- A5** Install additional water supply for building during incubation
- A6** Install hatchery building water supply to frost depth
- A7** Conduct groundwater investigation

B Fish Rearing Units

- B1** Regrade A-Series pond side slopes
- B2** Stabilize pond bottoms
- B3** Install settling basin upstream of Pond A-2
- B4** Install a bypass channel for the C-Series ponds
- B5** Remove silt from Pond C-1 upper end
- B6** Install better pond fish harvest system
- B7** Line ponds with synthetic liner

C Buildings

- C1** Install concrete floor in building
- C2** Increase building height and rafters

D Site

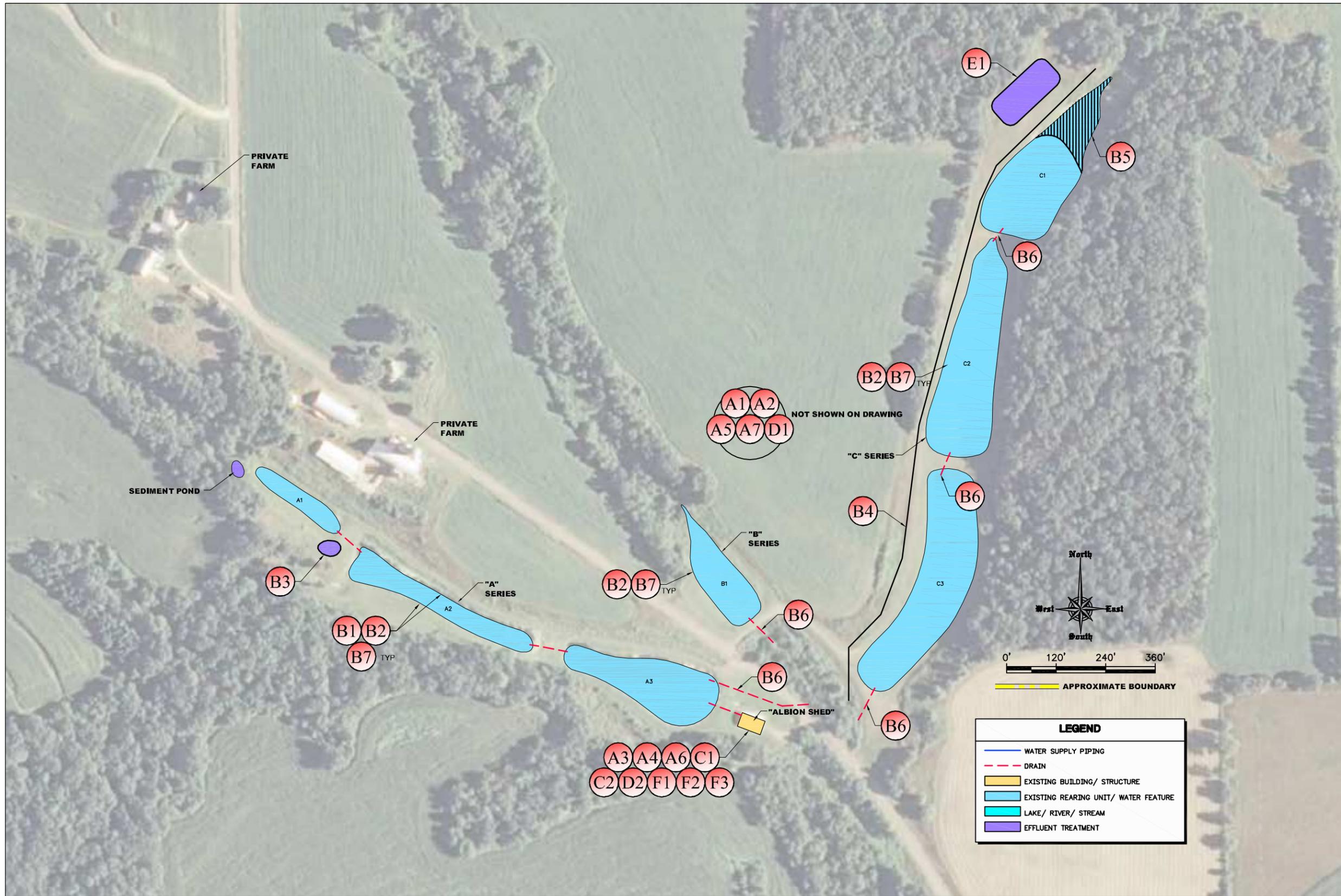
- D1** Replace and install new perimeter fencing
- D2** Install a staff restroom

E Aquaculture Wastewater

- E1** Install a sediment retention pond for holding removed silt

F Utility Systems

- F1** Replace building tank lighting system
- F2** Install telephone system
- F3** Install fire alarm system for the facility



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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

ALBION PONDS- BLACK RIVER FALLS PROPOSED IMPROVEMENTS

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U

9/15/10

SHEET:

BRF-1

Black River Falls Outlying Facilities - Trump Lake Improvements Legend	
A	Water Supply
A1	Perform a groundwater study to determine availability / quality of additional water
A2	Install a well for supplemental pond water supply
A3	Adjust water supply alkalinity
A4	Provide water supply to holding shelter
B	Fish Rearing Units
B1	Renovate water control structure
B2	Repair leak in pond levee
B3	Install fish harvest structure
B4	Divide pond
C	Buildings
C1	None
D	Site
D1	Replace fencing
E	Aquaculture Wastewater
E1	None
F	Utility Systems
F1	Install telephone system
F2	Install fire alarm system for the facility

Black River Falls Outlying Facilities - Northfield Lake Improvements Legend	
A	Water Supply
A1	Adjust water supply alkalinity
B	Fish Rearing Units
B1	Divide rearing pond into 3 ponds
B2	Install harvest kettles
C	Buildings
C1	None
D	Site
D1	Install bypass system
D2	Regrade access roads and install trench drains
E	Aquaculture Wastewater
E1	Install effluent treatment for final pond discharge
E2	Install effluent fish screening system
F	Utility Systems
F1	Install telephone system
F2	Install fire alarm system for the facility

Black River Falls Outlying Facilities - Bill's Pond Improvements Legend	
A	Water Supply
A1	Replace pond blower for aeration system
B	Fish Rearing Units
B1	Regrade pond banks
B2	Replace water control structure
B3	Remove accumulated silt
B4	Rebuild boat access
B5	Rehabilitate silt trap
C	Buildings
C1	None
D	Site
D1	Install access roads around pond
E	Aquaculture Wastewater
E1	None
F	Utility Systems
F1	Install telephone system
F2	Install fire alarm system for the facility



Black River Falls Outlying Facilities - Winding Creek
Improvements Legend

A Water Supply

A1 Install supplemental water supply for holding raceway

A2 Heighten inlet rock filter and add smaller rock for wild fish control

A3 Additional water needed to supply the pond

A4 Perform groundwater investigations

B Fish Rearing Units

B1 Construct permanent sided structure for holding tanks

B2 Replace aeration system

B3 Divide pond

B4 Install mechanical screening for outlet

C Buildings

C1 Roof replacement and siding on compressor building

D Site

D1 Replace fencing

D2 Regrade hill behind the water control structure

E Aquaculture Wastewater

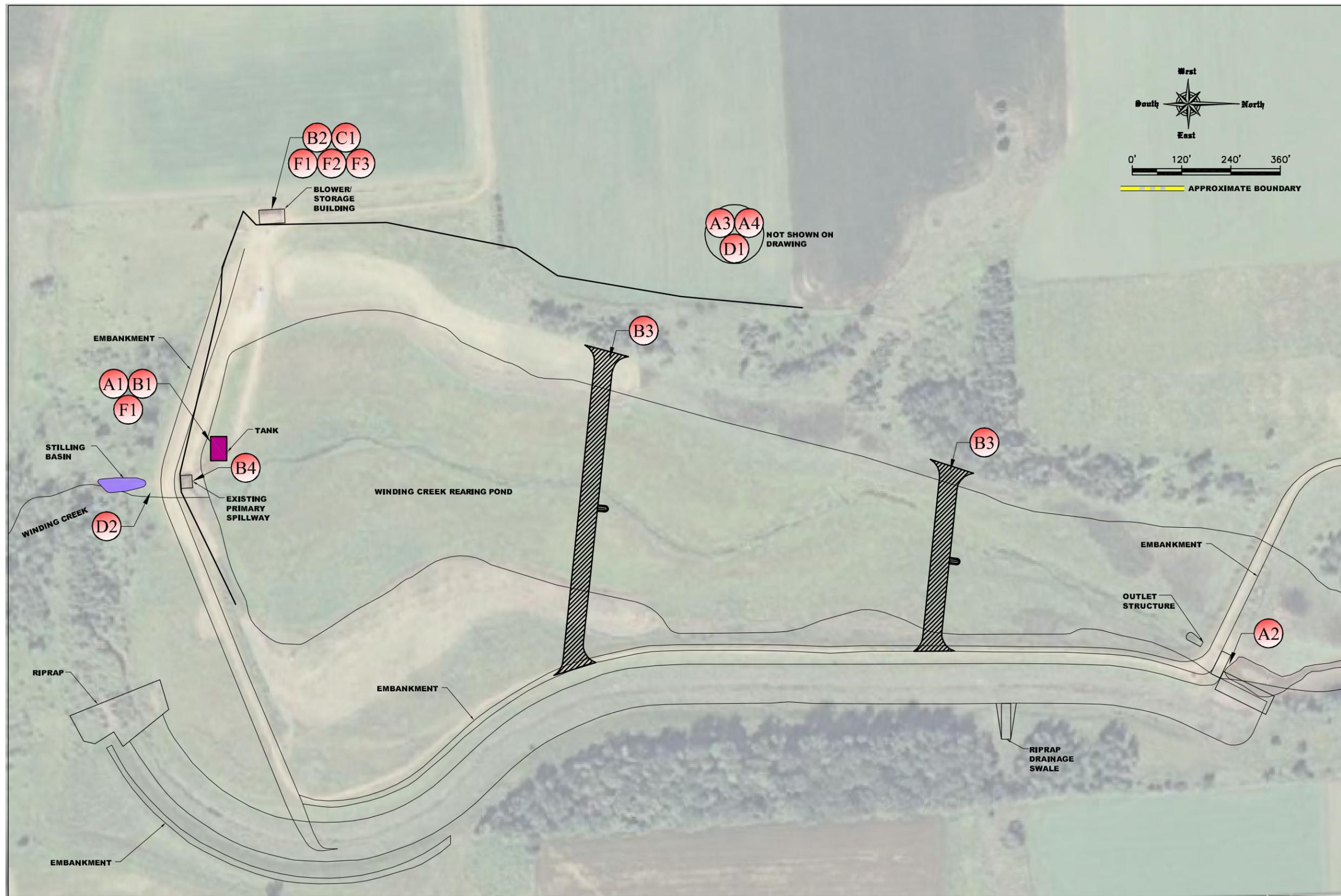
E1 None

F Utility Systems

F1 Install remote cameras for security monitoring

F2 Install telephone system

F3 Install fire alarm system



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WINDING CREEK- BLACK RIVER FALLS
PROPOSED IMPROVEMENTS

COMPREHENSIVE STUDY OF WISCONSIN
FISH PROPAGATION FACILITIES

PROJECT# 08K2U

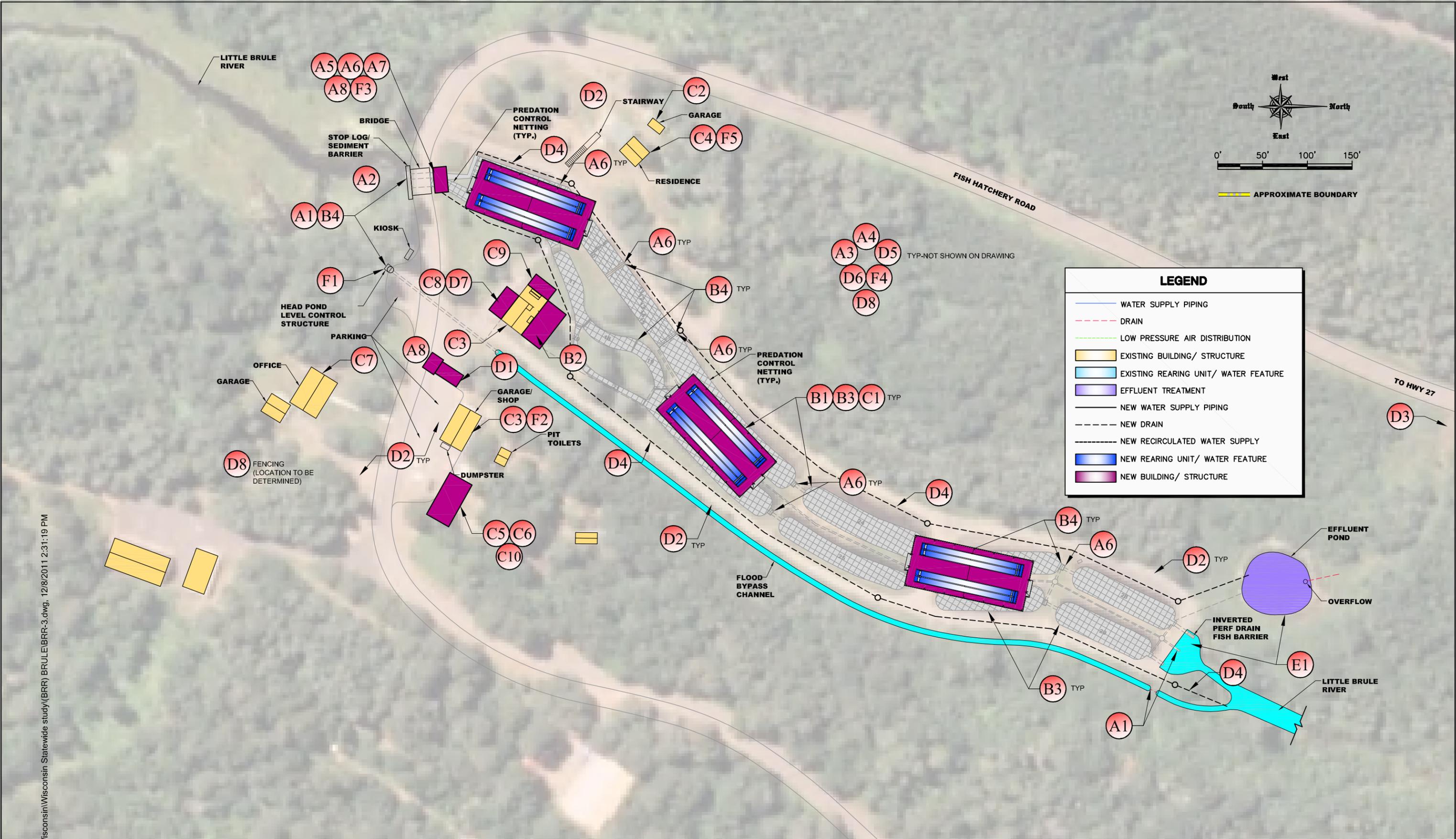
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SHEET:

BRF-3

**Brule River Rearing Station
Improvements Legend**

A Water Supply	
A1	Native fish screening systems for influent and bypass channel
A2	Dredge influent settling pond
A3	Install new water supply well or recirculation
A4	Perform a groundwater study to determine availability / quality of additional water
A5	Install microscreen and disinfection for water supply
A6	Install dissolved oxygen management system
A7	Install water supply flow measurement
A8	Add truck fill pump
B Fish Rearing Units	
B1	Repair or replace outdoor rearing raceways
B2	Add egg incubation and early rearing units
B3	Ponds Repairs
B4	Replace all wooden screens/weir boards for biosecurity
C Buildings	
C1	Construct rearing unit pavilion/building
C2	Remove lead paint and side the residence garage
C3	Roof replacement: hatchery feed storage/shop building, rearing house (visitor center)
C4	Residence Renovations
C5	New vehicle storage building with heated space, feed storage space, and lockers
C6	New code-compliant chemical storage building
C7	Office Building Renovations
C8	Addition to the visitor building and replace windows
C9	Add biosecure egg disinfection room or building
C10	Add laboratory
D Site	
D1	Add truck/equipment disinfection area
D2	Resurface hatchery roads and repave residence driveway
D3	New isolated hatchery entrance road
D4	Install drain tile around perimeter of rearing area
D5	Create a video showing fish rearing and egg take
D6	Add site features to allow biosecure isolation of individual species
D7	Add a visitor's ADA accessible restroom
D8	Enclose entire facility with fence and automatic gates
E Aquaculture Wastewater	
E1	Upgrade effluent treatment system
F Utility Systems	
F1	Install security light by the bypass
F2	Upgrade shop electrical system
F3	Install low flow alarming
F4	Upgrade site electrical system
F5	Upgrade residential electrical system



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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

BRULE RIVER REARING STATION PROPOSED IMPROVEMENTS
 COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
 11/15/11
 SHEET: **BRR-3**

Gov. Tommy G. Thompson State Fish Hatchery
Improvements Legend

A Water Supply

- A1** Perform a groundwater study to determine availability / quality of additional water
- A2** Perform water supply testing and particle size analysis
- A3** New wells
- A4** Install automatic intake screen cleaning system
- A5** Install sand filtration for building water supply
- A6** Microscreen pond influent water
- A7** Install well blow off piping
- A8** Install iron and H₂S treatment system
- A9** Install new degassing column
- A10** Install disinfection system
- A11** Replace water supply line between Ponds C and D
- A12** Install recirculation system for additional rearing
- A13** Install show pool recirculation and treatment system
- A14** Install water supply flow measurement

B Fish Rearing Units

- B1** Replace all pond liners and substandard subsoil
- B2** Replace pond drain valves
- B3** Add intensive rearing tanks and addition
- B4** Add coldwater rearing tanks
- B5** Fix levees and settled areas of Ponds C3, C4, D3 and D4
- B6** Install predation control for selected ponds
- B7** Repair leaks and modify screen slots in indoor holding tanks
- B8** Install new pond aeration system
- B9** Install larger harvest kettles in selected ponds
- B10** Replace all wooden screens/weir boards for biosecurity
- B11** Increase capacity of shallow end supply for large fingerling ponds

C Buildings

- C1** Repair hatchery foundation leak
- C2** Replace hatchery building roof
- C3** Replace hatchery building flooring on upper level
- C4** Hatchery building addition for intensive or coldwater rearing
- C5** Convert part of storage building to heated workshop
- C6** Add building features to allow biosecure isolation of individual lots
- C7** Add biosecure egg disinfection room or building
- C8** Add temperature control to feed storage

Gov. Tommy G. Thompson State Fish Hatchery
Improvements Legend

D Site

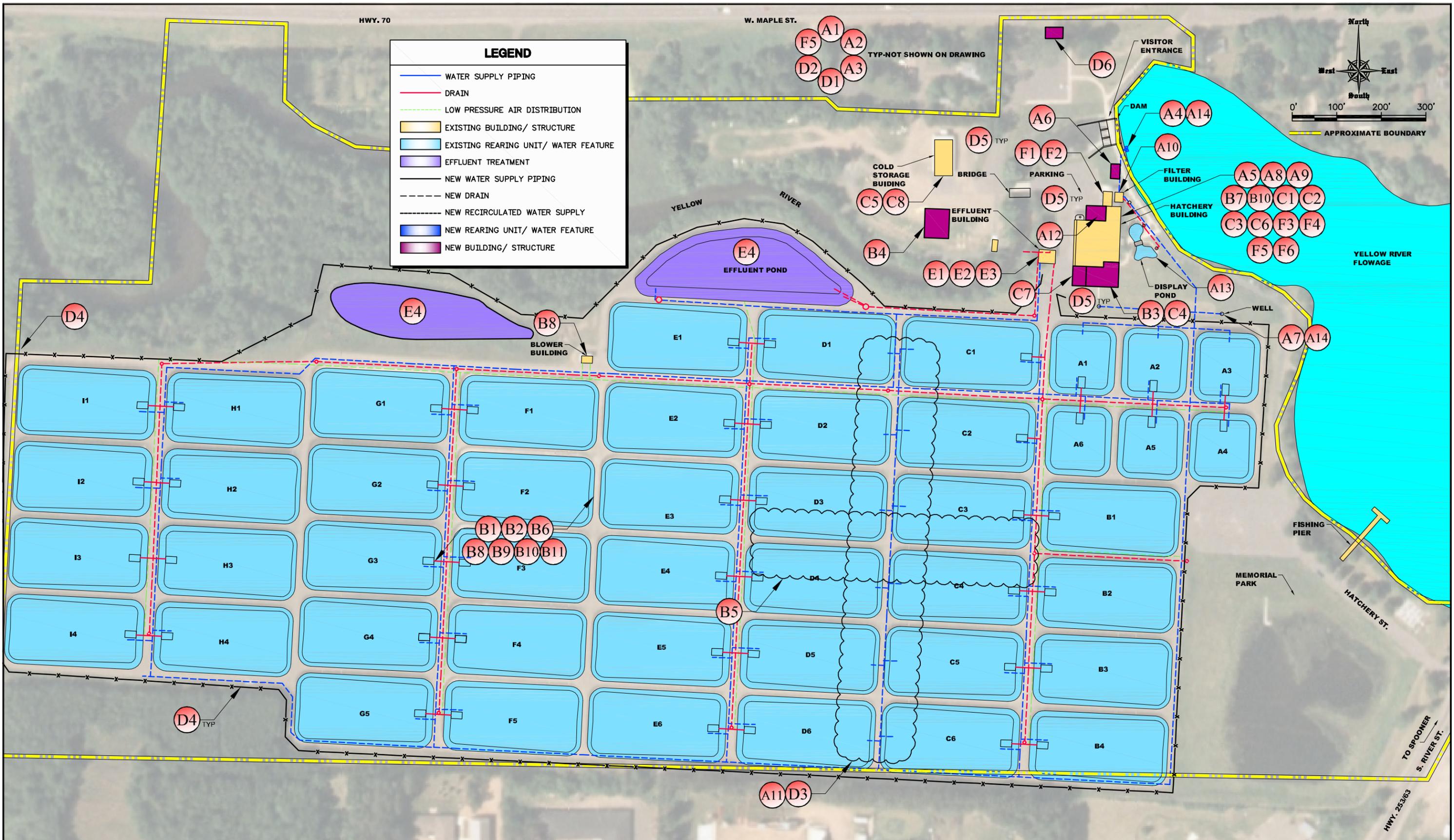
- D1** Create a video showing fish rearing and egg take
- D2** Evaluate site flooding and provide stormwater management system
- D3** Restabilize 30" storm sewer line between C and D pond rows
- D4** Replace fence materials
- D5** Repair and resurface roads and parking areas
- D6** Add truck/equipment disinfection area

E Aquaculture Wastewater

- E1** Install pump hoist
- E2** Replace pump access hatch with larger hatch
- E3** Repair concrete on parshall flume
- E4** Enlarge settling pond or replace with seepage pond

F Utility Systems

- F1** Install load bank on standby generator
- F2** Replace generator with smaller system
- F3** Replace/upgrade instrumentation system hardware and software
- F4** Replace gas piping
- F5** Replace indoor / outdoor lighting
- F6** Install fire alarm system for the facility



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GOV. TOMMY G. THOMPSON HATCHERY PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
 9/15/10
 SHEET:
GTT-3

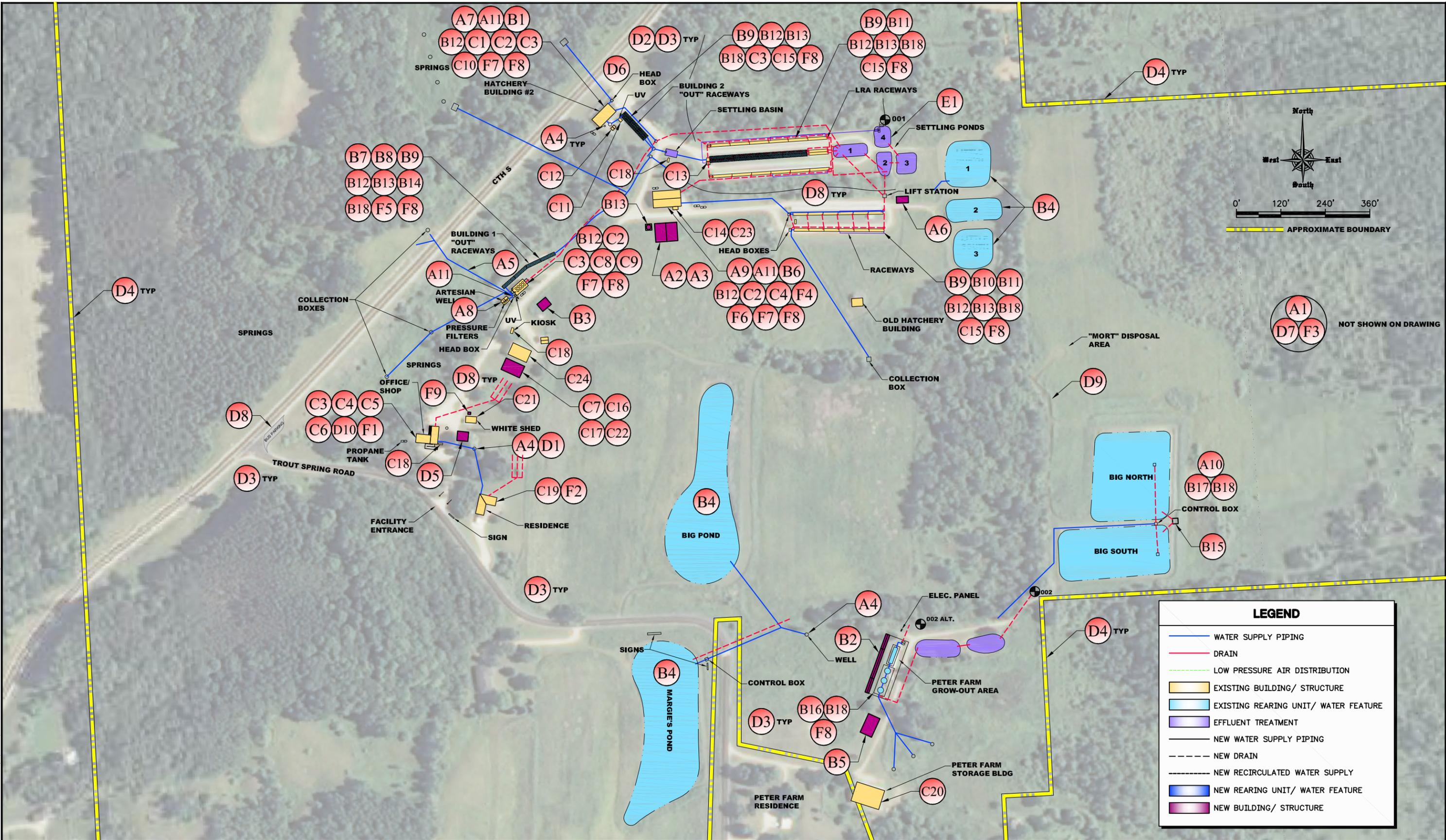
**Kettle Moraine Springs State Fish Hatchery
Improvements Legend**

A	Water Supply
A1	Perform a groundwater study to determine availability / quality of additional water
A2	Install new wells and recirculation treatment system (UV, filtration, pump)
A3	Install centralized water treatment equipment
A4	Renovate all wells to be code compliant
A5	Install air release valves
A6	Renovate recirculation treatment
A7	Replace truss piping (Bldg 2)
A8	Renovate iron filtration system (Bldg 1)
A9	Install water heating equipment for incubation and early rearing
A10	Install permanent pump station for Big S and Big N ponds
A11	Install water supply flow measurement
B	Fish Rearing Units
B1	Replace indoor raceways with circular units
B2	Add isolated broodfish tanks
B3	Construct egg disinfection room addition or biosecurity building
B4	Renovate watershed rearing ponds
B5	Add intensive coolwater rearing units in a building
B6	Add fish pump for harvesting circular tanks
B7	Add shade cloth to the raceways near Bldg 1
B8	Replace raceways B1 (1-4) due to deterioration
B9	Repair and resurface all outdoor raceways
B10	Install raceway building or replace netting for Raceway Unit 4
B11	Replace netting at Raceways
B12	Replace all wooden screens/weir boards for biosecurity
B13	Install dissolved oxygen management system for raceways
B14	Shore raceway walls R1-R3 and replace valves
B15	Install harvest structure for Big S and Big N ponds
B16	Replace drain valves at circular tanks (Peter Farm)
B17	Install aeration for Big N and Big S ponds
B18	Install solar operated feeders
C	Buildings
C1	Repair headbox crack (Bldg 2)
C2	Add building features to allow biosecure isolation of individual lots
C3	Replacement gutters: all buildings
C4	Replace Office Building windows and doors
C5	Evaluate Office Building for code compliance (ADA and electrical)
C6	Office Building Renovations or replacement
C7	New storage building with shop area and gear storage
C8	Building 1: new windows and eaves

**Kettle Moraine Springs State Fish Hatchery
Improvements Legend**

C9	Building 1: new water supply lines and drains
C10	Building 2: new water supply lines and drains
C11	UV Building Renovations
C12	Upper Ozone Building Renovations
C13	Lower Ozone Shed Renovations
C14	Building 3 Filter Shed Renovations
C15	Replace raceway building covers
C16	Replace Screen Building
C17	Net Building Replacement
C18	Replace educational kiosks and install new display materials
C19	Residence Renovations
C20	Peter Farm Pole Barn Renovations
C21	White Shed Replacement
C22	New code-compliant chemical storage building
C23	Building 3 Renovations
C24	Add temperature control to feed storage
D	Site
D1	Evaluate domestic water supply well and provide treatment
D2	Replace fencing as needed
D3	Add signage for facility boundaries
D4	Confirm WDNR boundaries
D5	Add truck/equipment disinfection area
D6	Install surface water management near Bldg 2
D7	Create a video showing fish rearing and egg take
D8	Add bituminous paving to existing gravel roads and add bus parking
D9	New road to connect smaller ponds at Peter Farm
D10	Add a visitor's ADA accessible restroom
E	Aquaculture Wastewater
E1	Replace effluent treatment system
F	Utility Systems
F1	Office Building: lighting, new furnace
F2	Residence: evaluate/renovate electrical system and replace furnace
F3	Upgrade facility electrical system
F4	Replace lighting in Building 3
F5	Install weatherproof electrical boxes at raceways by Bldg 1
F6	Replace furnace and renovate boilers in Building 3
F7	Install telephone system in Hatchery Buildings
F8	Install low flow and low dissolved oxygen alarms
F9	Install emergency generator for facility

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KETTLE MORaine SPRINGS STATE FISH HATCHERY PROPOSED IMPROVEMENTS

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
KMS-3

**Kettle Moraine Springs Annex State Fish Hatchery
Improvements Legend**

A Water Supply

- A1** Renovate water treatment system (aeration, filtration, & disinfection)
- A2** Perform a groundwater study and install a new well
- A3** Install dissolved oxygen management system
- A4** Water heating system for incubation
- A5** Install flow measurement system
- A6** Inspect and renovate wells
- A7** Recirculation system (pumping, screening, and disinfection)

B Fish Rearing Units

- B1** Repair and resurface or replace all outdoor rearing units
- B2** Replace all wooden screens/weir boards for biosecurity
- B3** Install automatic fish feeding system
- B4** Pond repairs

C Buildings

- C1** Hatchery Bldg renovation - roof replacement
- C2** New code-compliant chemical storage building
- C3** Add temperature controlled feed storage
- C4** Construct rearing unit pavilion/building
- C5** Add biosecure egg disinfection room or building

D Site

- D1** Resurface roads
- D2** Add ADA accessible or renovate existing restroom
- D3** Add truck/equipment disinfection area
- D4** Install security fencing
- D5** Install stormwater runoff management system
- D6** Add site features to allow biosecure isolation of individual species

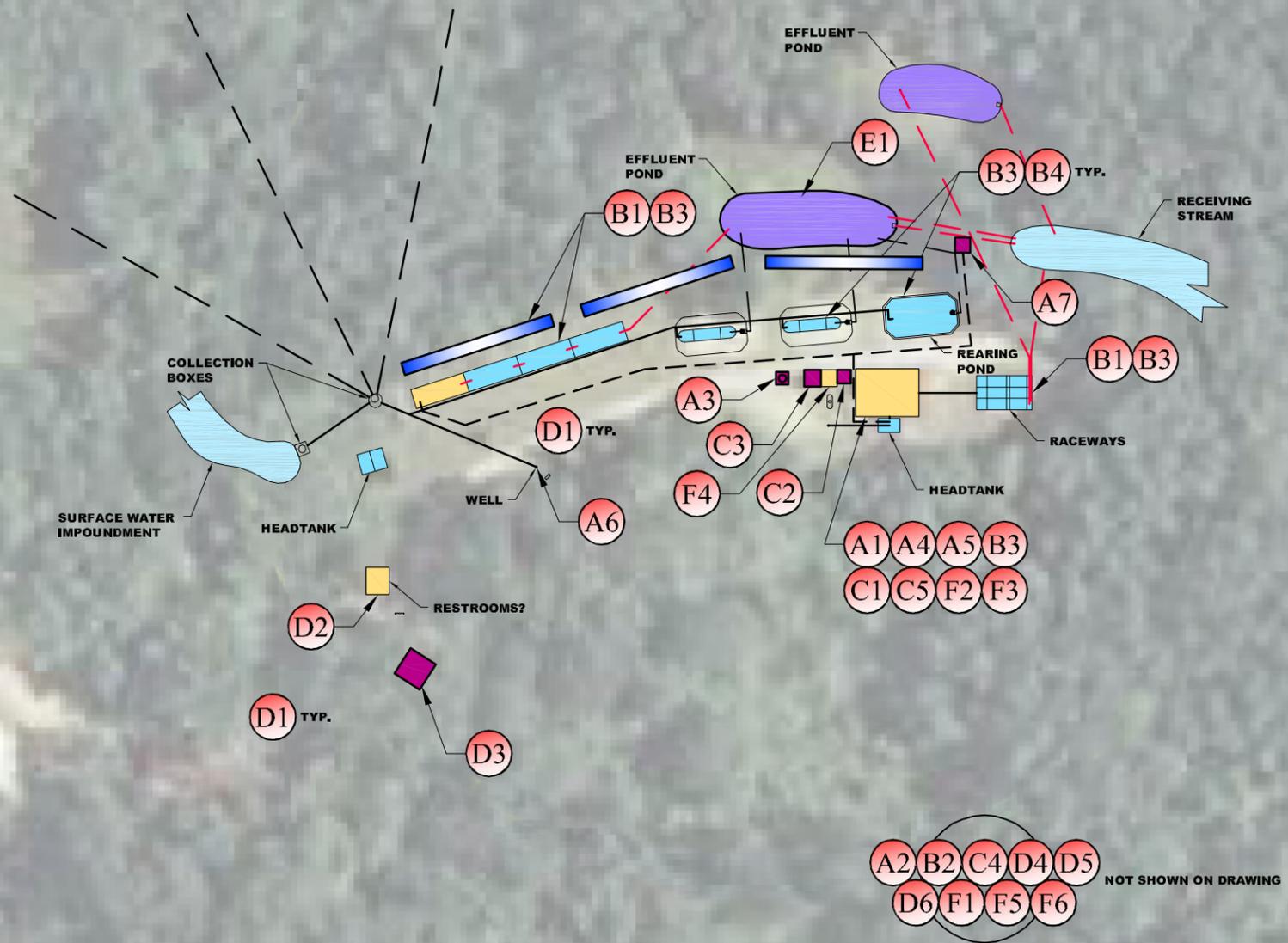
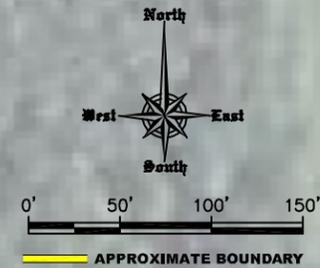
E Aquaculture Wastewater

- E1** Install treatment pond

F Utility Systems

- F1** Install surveillance camera for remote monitoring
- F2** Install telephone system
- F3** Install fire alarm system
- F4** Upgrade emergency generator system
- F5** Upgrade site electrical system
- F6** Install remote water quality monitoring and alarm system

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LEGEND	
	WATER SUPPLY PIPING
	DRAIN
	LOW PRESSURE AIR DISTRIBUTION
	EXISTING BUILDING/ STRUCTURE
	EXISTING REARING UNIT/ WATER FEATURE
	EFFLUENT TREATMENT
	NEW WATER SUPPLY PIPING
	NEW DRAIN
	NEW RECIRCULATED WATER SUPPLY
	NEW REARING UNIT/ WATER FEATURE
	NEW BUILDING/ STRUCTURE

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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

KETTLE MORaine SPRINGS ANNEX PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
KMA-2

**Lakewood Rearing Station
Improvements Legend**

A Water Supply

- A1** Perform a groundwater study to determine availability / quality of additional water
- A2** Underground spring water collection system or new well
- A3** Dredge spring ponds
- A4** Install water supply temperature management
- A5** Replace rotary screens
- A6** Replace intake screens with wedgewire
- A7** Install bypass piping around the building and raceways
- A8** Install recirculation treatment system (UV, filtration, pump)
- A9** Install oxygen management system
- A10** Install water supply flow measurement

B Fish Rearing Units

- B1** Install egg incubation units
- B2** Renovate and resurface raceways or replace
- B3** Renovate rearing ponds
- B4** Replace drain valves in raceways
- B5** Replace all wooden screens/weir boards for biosecurity

C Buildings

- C1** Construct rearing unit pavilion/building on existing units
- C2** Add building features to allow biosecure isolation of individual lots
- C3** New vehicle storage building
- C4** Add temperature control to feed storage
- C5** Shop Building renovation
- C6** Hatchery Building renovation
- C7** Residence renovation
- C8** New code-compliant chemical storage building
- C9** Add biosecure egg disinfection room or building

D Site

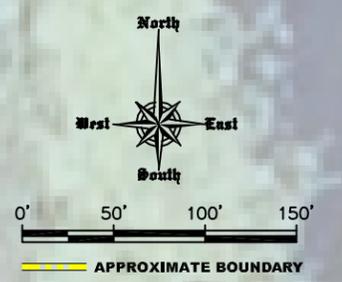
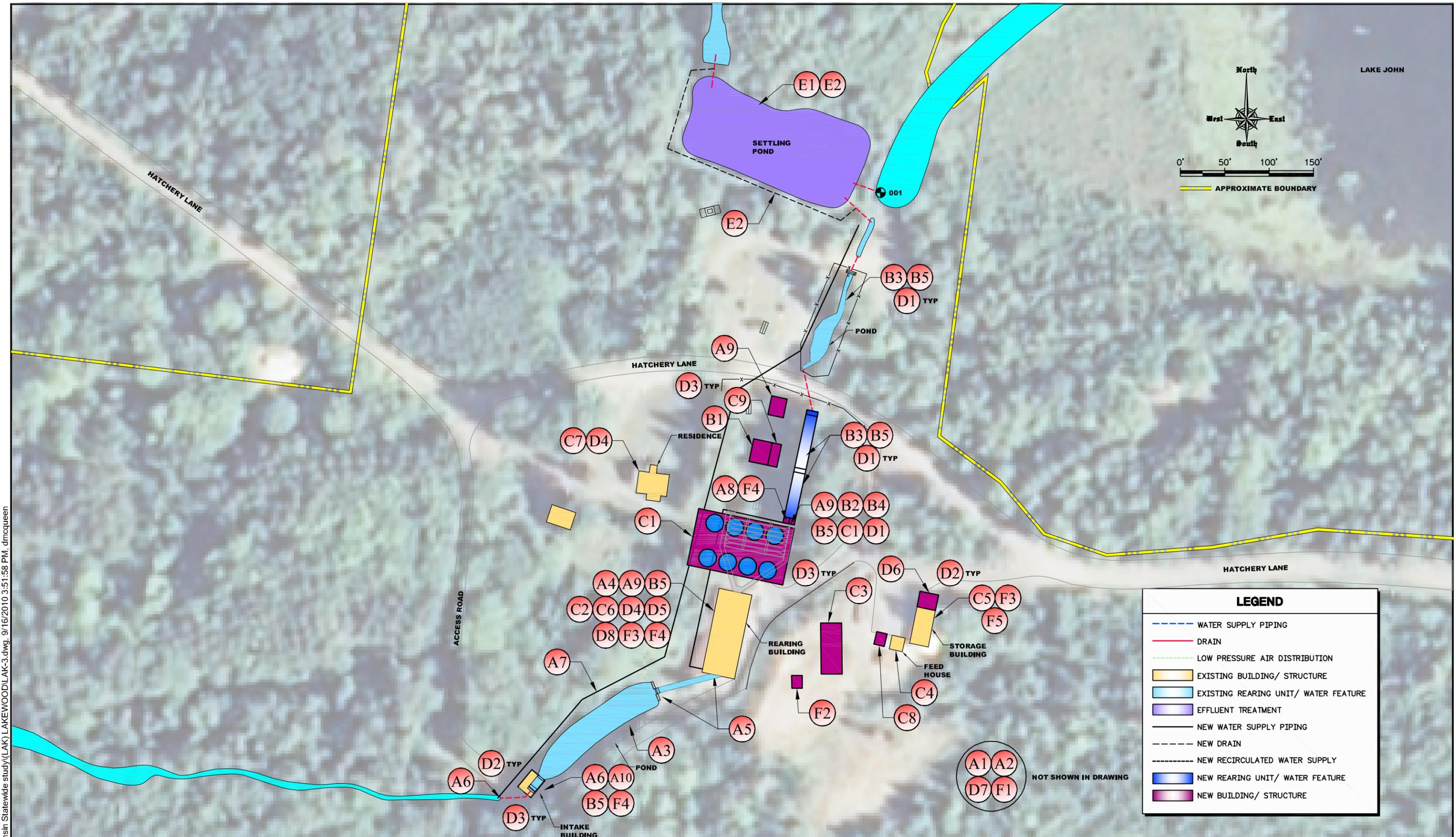
- D1** Install safety railings on raceways and pond bulkheads
- D2** Resurface roads as needed
- D3** Install stormwater management system
- D4** Install domestic well water treatment system
- D5** Install domestic wastewater system for Hatchery Building
- D6** Add truck/equipment disinfection area
- D7** Create a video showing fish rearing and egg take
- D8** Add a visitor's ADA accessible restroom

E Aquaculture Wastewater

- E1** Upgrade effluent treatment system
- E2** Dredge settling ponds and install bypass

F Utility Systems

- F1** Upgrade facility electrical system
- F2** Install emergency generator system
- F3** Upgrade fire alarm system
- F4** Install low flow and low dissolved oxygen alarms
- F5** Add telephone in the Shop Building



LEGEND	
	WATER SUPPLY PIPING
	DRAIN
	LOW PRESSURE AIR DISTRIBUTION
	EXISTING BUILDING/ STRUCTURE
	EXISTING REARING UNIT/ WATER FEATURE
	EFFLUENT TREATMENT
	NEW WATER SUPPLY PIPING
	NEW DRAIN
	NEW RECIRCULATED WATER SUPPLY
	NEW REARING UNIT/ WATER FEATURE
	NEW BUILDING/ STRUCTURE

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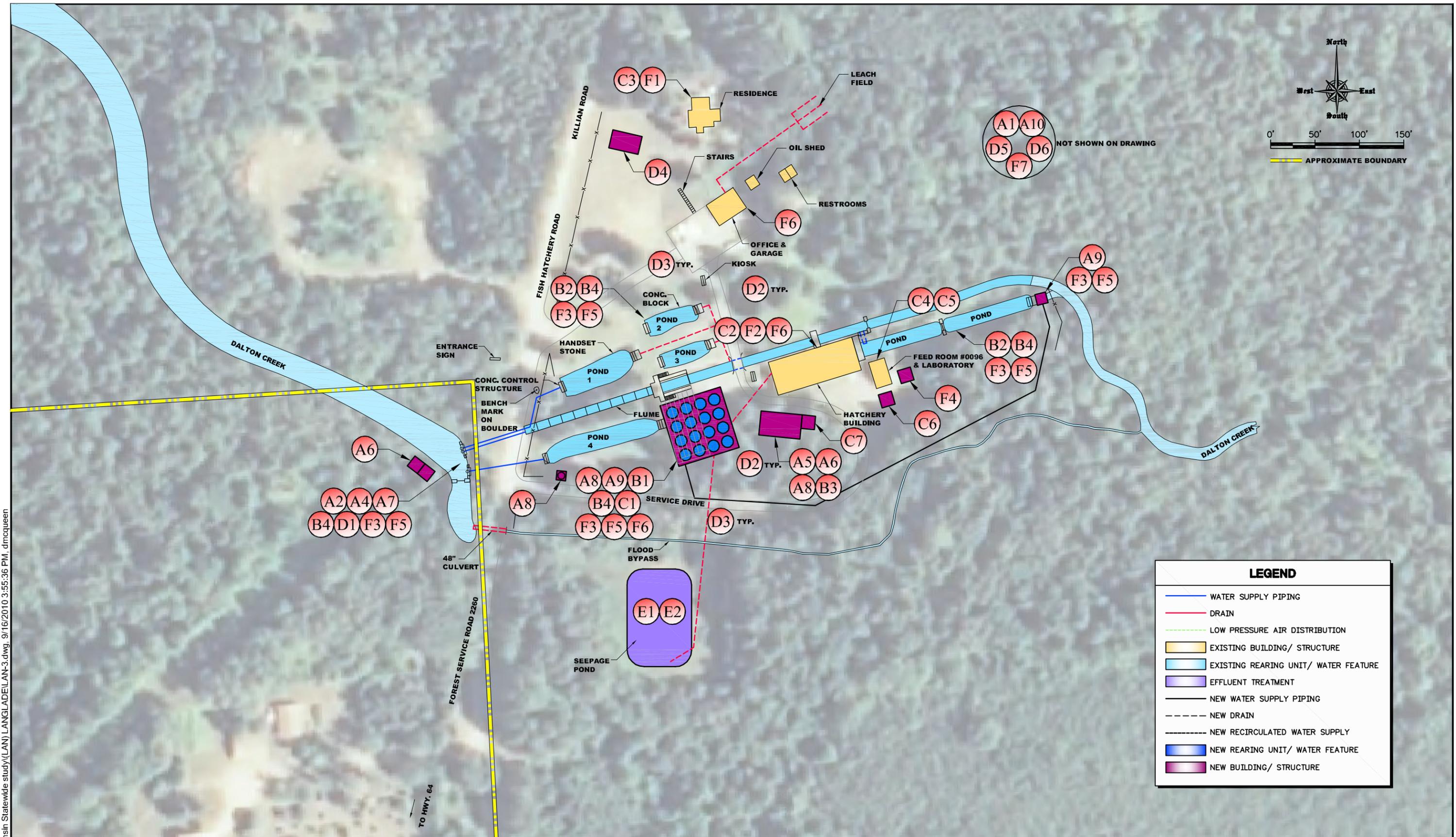
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

LAKWOOD STATE REARING STATION PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
 9/15/10
 SHEET:
LAK-3

**Langlade Rearing Station
Improvements Legend**

A Water Supply	
A1	Perform a groundwater study to determine availability / quality of additional water
A2	Rebuild intake with bypass capability
A3	Replace inlet pipe to Pond 4
A4	Replace inlet bar screens with parabolic screens
A5	Install water temperature management for incubation and early rearing
A6	Install water treatment equipment
A7	Install water supply measurement
A8	Install oxygen management system
A9	Install recirculation treatment system (UV, filtration, pump)
A10	Install well or collection gallery
B Fish Rearing Units	
B1	Renovate and resurface raceways or replace with new units
B2	Replace ponds with new units
B3	Add incubation and intensive rearing building
B4	Replace all wooden screens/weir boards for biosecurity
C Buildings	
C1	Construct rearing unit pavilion/building
C2	Shop Building: siding, ceiling, windows (Note: historically significant)
C3	Residence Renovations
C4	Cold Storage Building renovation
C5	Add temperature control to feed storage
C6	New code-compliant chemical storage building
C7	Add biosecure egg disinfection room or building
D Site	
D1	Add site lighting at intake
D2	Install better stormwater runoff management system
D3	Resurface access roads
D4	Add truck/equipment disinfection area
D5	Create a video showing fish rearing and egg take
D6	Add site features to allow biosecure isolation of individual species
E Aquaculture Wastewater	
E1	Upgrade effluent treatment system
E2	Replace portable solids pump truck (if reused)
F Utility Systems	
F1	Upgrade residence electrical system
F2	Replace shop building heating unit
F3	Add site electrical outlets
F4	Install emergency generator for facility
F5	Install low flow and low dissolved oxygen alarms
F6	Install fire alarm system for the facility
F7	Upgrade facility electrical



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LANGLADE REARING STATION PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
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 SHEET:
LAN-3

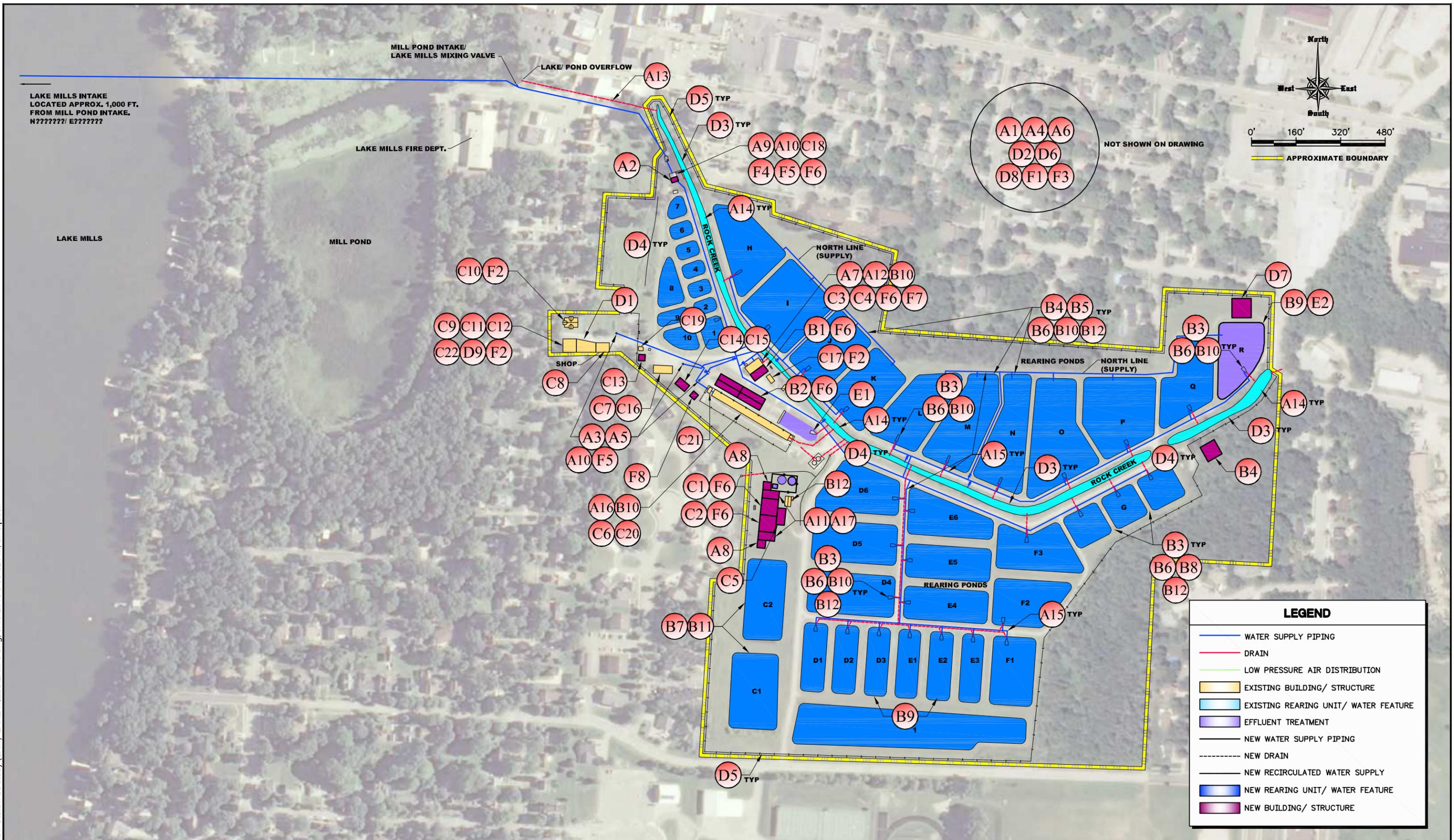
**Lake Mills State Fish Hatchery
Improvements Legend**

A Water Supply	
A1	Perform a groundwater study to determine availability / quality of additional water
A2	Disinfect water supply
A3	Well inspection and rehabilitation
A4	Construct new wells (new buildings and raceways)
A5	Construct new well (backup for existing building)
A6	Construct new well for coolwater ponds
A7	Install a new oxygen management system for the existing site
A8	Install a new oxygen management system for new building
A9	Upgrade and install a backup microscreen
A10	Upgrade water supply measurement
A11	Install recirculation treatment system (UV, filtration, pump)
A12	Install water heating and cooling equipment for current
A13	Install air release valves
A14	Replace pond drainage with piping for biosecurity
A15	Replace pond water supply piping
A16	Install piping bypass around raceways
A17	Install water heating and cooling equipment for future
B Fish Rearing Units	
B1	Add early rearing units
B2	Convert Coho pond to raceways
B3	Replace pond harvest kettles and drains
B4	Elevate ponds for biosecurity or install lift station
B5	Install underdrains to reduce spring inflows
B6	Install liners in ponds
B7	Add harvest kettle, supply and drain to ponds C1 and C2
B8	Reconfigure/resize ponds (G)
B9	Repair ponds (E2, D3, N, R leaks, new bulkhead B2, repair chimney separation)
B10	Replace all wooden screens/weir boards for biosecurity
B11	Construct solar warming ponds for coolwater well water
B12	Replace pond aeration system
C Buildings	
C1	New Coldwater Rearing Building
C2	New Coolwater Rearing Building
C3	Convert Existing Holding House for only fish holding
C4	Add building features to allow biosecure isolation of individual lots
C5	Add biosecure egg disinfection room or building
C6	Add side doors to raceway netting structures for easier harvest
C7	Garage Renovations
C8	Shop Building Renovations
C9	Main Street Office Renovations
C10	Residence Renovations

**Lake Mills State Fish Hatchery
Improvements Legend**

C11	Add laboratory
C12	Add visitor area
C13	New code-compliant chemical storage building
C14	New equipment storage building
C15	New crew space
C16	Add temperature control to feed storage
C17	Coolwater Shed renovations (repair concrete drive access)
C18	Drumscreen Shed renovation (insulation and roofing)
C19	Oil Shed renovation (new doors)
C20	Raceway Building renovation (add sides)
C21	Red Shed renovation (roofing and floor replacement)
C22	Convert University Building for visitation and office space
D Site	
D1	Renovate retaining wall near Main Street Office
D2	Goose control system
D3	Rock Creek bank stabilization
D4	Install better stormwater runoff management system
D5	Add fencing
D6	Add security lighting
D7	Add truck/equipment disinfection area
D8	Create a video showing fish rearing and egg take
D9	Add a visitor's ADA accessible restroom
E Aquaculture Wastewater	
E1	Install wastewater treatment system for existing production
E2	Provide pond effluent management system
E3	Enhance wastewater treatment system for future production
F Utility Systems	
F1	Upgrade site electrical system
F2	Upgrade building electrical: residence, coolwater shed, university building
F3	Renovate utility service to the site
F4	Tie into emergency generator
F5	Install well alarm and drumscreen monitoring
F6	Install low flow and low dissolved oxygen alarms
F7	Hatchery Building: lighting
F8	Install emergency generator for future

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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

**LAKE MILLS STATE FISH HATCHERY
PROPOSED IMPROVEMENTS**

**COMPREHENSIVE STUDY OF WISCONSIN
FISH PROPAGATION FACILITIES**

PROJECT# 08K2U
9/15/10
SHEET:
LKM-3

**Les Voigt State Fish Hatchery
Improvements Legend**

A Water Supply

- A1** Perform a groundwater study to determine availability / quality of additional water
- A2** Rehabilitate wells
- A3** Install new wells
- A4** Install a new degassing headtank
- A5** Abandon lake supply and remove piping segments from lake
- A6** Replace water supply temperature management system
- A7** Install larger drain pipelines
- A8** Water supply rehabilitation
- A9** Replace valves
- A10** Renovate sand filtration system
- A11** Upgrade the recirculation system
- A12** Upgrade dissolved oxygen management system
- A13** Install domestic wells and treatment
- A14** Install water supply flow measurement

B Fish Rearing Units

- B1** Repair and resurface start tanks and rearing tanks
- B2** Install new fish feeding system
- B3** Replace some rearing tanks with circular units
- B4** Resurface tanks in Well House
- B5** Replace all wooden screens/weir boards for biosecurity

C Buildings

- C1** Abate lead paint on support buildings
- C2** Well House (Rearing): new siding, new roof
- C3** Hatchery Building renovations
- C4** Visitor lobby renovations
- C5** Add office space
- C6** Convert office/lab to isolated laboratory
- C7** Enlarge feed storage with new loading dock and temperature control
- C8** Replace compressor in Freezer 2
- C9** Enlarge vehicle storage room and add floor drains
- C10** Pole Shed: fill in abandoned raceways
- C11** Residence 1: bathroom remodel
- C12** Residence 2: total remodel and new windows
- C13** Old Building renovations
- C14** Add building features to allow biosecure isolation of individual lots
- C15** Add biosecure egg disinfection room or building
- C16** Upgrade chemical storage space

**Les Voigt State Fish Hatchery
Improvements Legend**

D Site

- D1** Add truck filling station
- D2** Install better stormwater runoff management system
- D3** Resurface roads and repair frost heave
- D4** WDNR needs to obtain fee title for the property
- D5** Provide alternate public access to state land for biosecurity
- D6** Add truck/equipment disinfection area
- D7** Create a video showing fish rearing and egg take

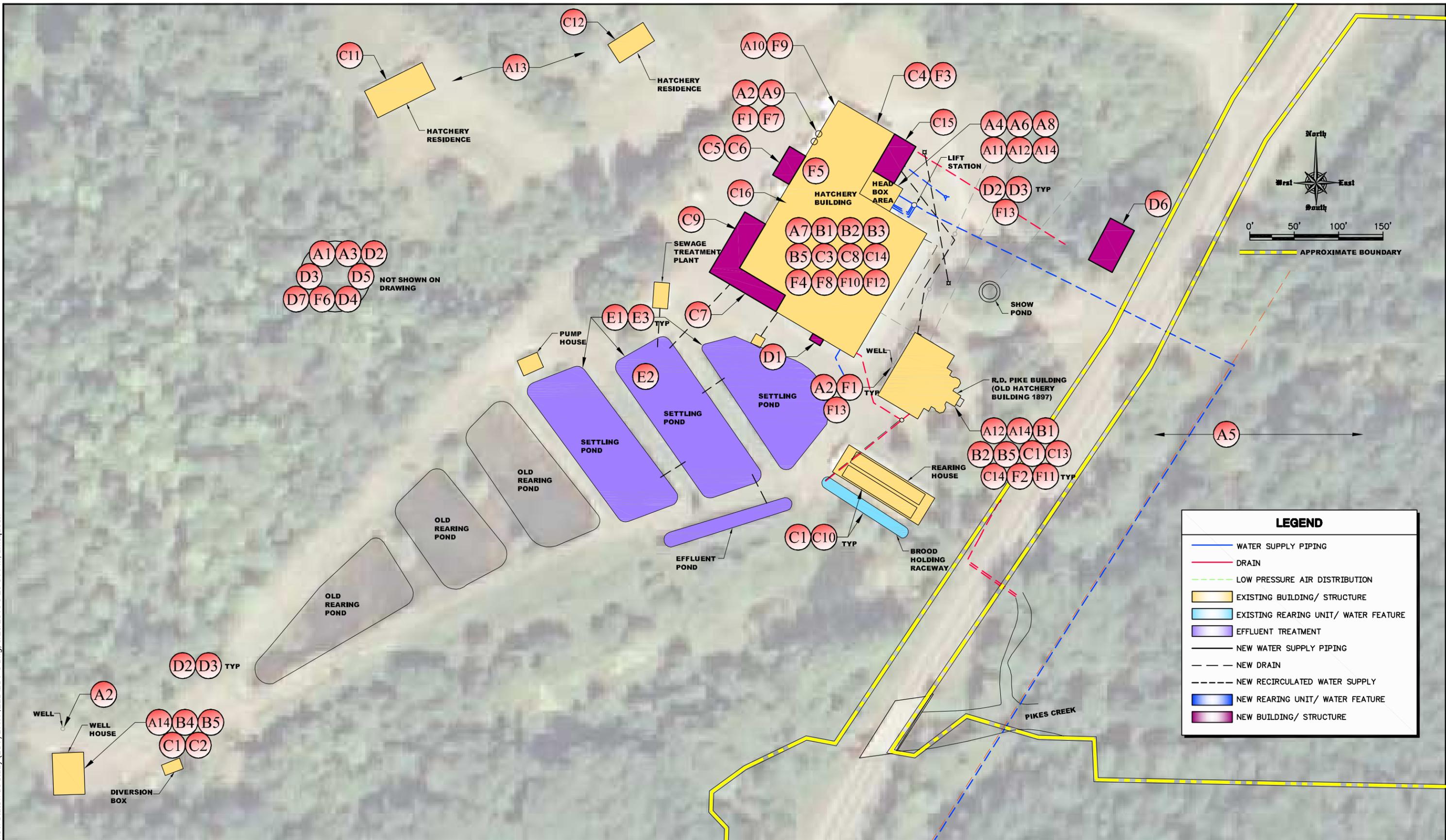
E Aquaculture Wastewater

- E1** Dredge settling and polishing ponds
- E2** Repair settling pond walls
- E3** Upgrade effluent treatment system

F Utility Systems

- F1** Replace electrical controls for wells
- F2** Relocate breaker boxes
- F3** Visitor lobby: new lighting and heating
- F4** Hatchery Building: new energy efficient heating system and insulation
- F5** Add separate heating system for offices, shop and break room
- F6** Upgrade facility electrical system
- F7** Add variable frequency drives or replace pumps
- F8** Update hatchery alarm system and install new instrumentation system
- F9** Upgrade the emergency generator and tie all loads into system
- F10** Install fire alarm in the New Hatchery Building
- F11** Replace electrical box in the Old Hatchery Building
- F12** Replace lighting in the New Building
- F13** Repair exterior electrical poles

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LES VOIGT STATE FISH HATCHERY PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
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**Nevin State Fish Hatchery
Improvements Legend**

A Water Supply

- A1** Perform a groundwater study to determine availability / quality of additional water
- A2** Install aeration/degassing system at Spiral building
- A3** Install a pump in Well No. 10 as backup
- A4** Install an underground spring water collection system or new well
- A5** Install disinfection for the hatchery building inflow
- A6** Concrete repairs to the spring box and install a bypass
- A7** Install water heating and cooling equipment for the hatchery building
- A8** Replace truck fill pump
- A9** Install recirculation treatment system (UV, filtration, pump)
- A10** Install a dissolved oxygen management system
- A11** Install water supply flow measurement
- A12** Install water disinfection from "wild fish" rearing

B Fish Rearing Units

- B1** Safety railing system on pond bulkheads and secure cover for outlet structures
- B2** Enlarge egg incubation & early rearing area
- B3** Add isolated broodfish tanks
- B4** Install drains and quiescent zones
- B5** Renovate dissolved oxygen management system in Spiral Building
- B6** Repair/Resurface deteriorated raceways or replace with new units
- B7** Replace all wooden screens/weir boards for biosecurity
- B8** Install an FRP or epoxy coating to indoor rearing tanks
- B9** Elevate pond 19
- B10** Install harvest structures in ponds
- B11** Install new aeration system in ponds
- B12** Install pond liners
- B13** Install predation netting for ponds
- B14** Add a new show pool at different location

C Buildings

- C1** Add biosecure egg disinfection room or building
- C2** Add building features to allow biosecure isolation of individual lots
- C3** Construct rearing unit pavilion/building
- C4** Spiral Building renovations
- C5** Hatchery Building renovations
- C6** New visitor/education building
- C7** Construct residence
- C8** Renovate laboratory
- C9** New code-compliant chemical storage building

**Nevin State Fish Hatchery
Improvements Legend**

- C10** Add temperature control to feed storage
- C11** Demolish A-Frame
- C12** Enlarge shop area
- C13** Add a new utility shed

D Site

- D1** Reconfigure truck fill access
- D2** Add site features to allow biosecure isolation of individual species
- D3** Replace fencing and install better security fencing along main road
- D4** Surface roads for biosecurity
- D5** Add ADA accessible visitor restroom
- D6** Perform a hydrology study to evaluate flooding issues & provide recommendations
- D7** Install better stormwater runoff management system
- D8** Replace culvert under road
- D9** Add truck/equipment disinfection area
- D10** Create a video showing fish rearing and egg take

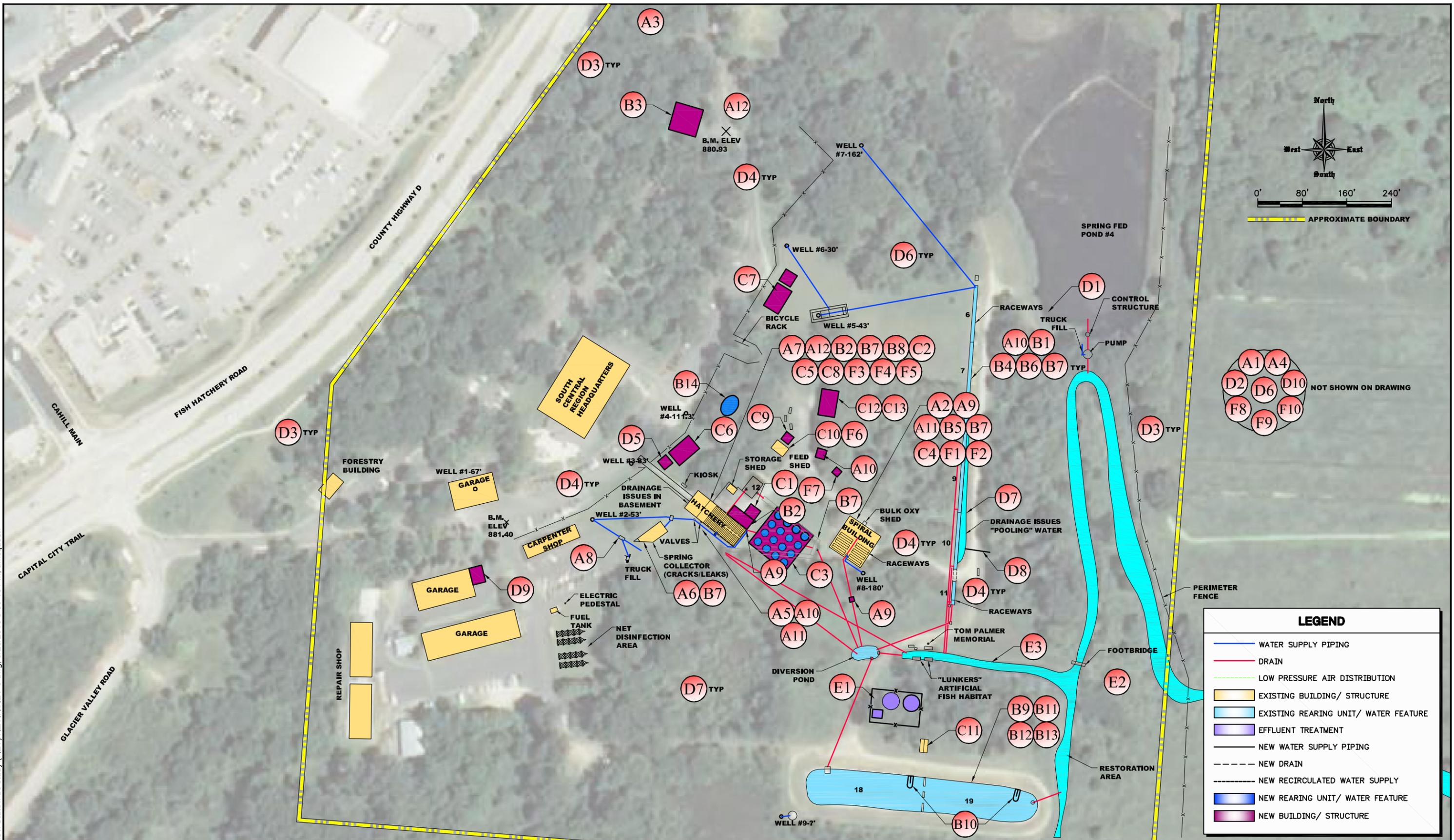
E Aquaculture Wastewater

- E1** Upgrade effluent treatment system
- E2** Move sampling location
- E3** Dredge settling ditch

F Utility Systems

- F1** Install heating and ventilation in Spiral building
- F2** Replace lighting in Spiral Building
- F3** Install new heating system in hatchery building
- F4** Electrical upgrade in hatchery building
- F5** Replace lighting in rearing spaces of hatchery building
- F6** Add electricity and lighting to the feed storage building
- F7** Install emergency generator
- F8** Repair gas pipeline leaks
- F9** Replace alarm system and add dialer
- F10** Upgrade facility electrical system

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NEVIN STATE FISH HATCHERY PROPOSED IMPROVEMENTS

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
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**Osceola State Fish Hatchery
Improvements Legend**

A Water Supply

- A1** Perform a groundwater study to determine availability / quality of additional water
- A2** Renovate headbox to eliminate surrounding inflow
- A3** Redevelop existing well
- A4** Develop new water collection galleries
- A5** Install degassing column at Rearing House
- A6** Replace water supply piping system to egg incubation & early rearing
- A7** Perform bacterial analysis of biofilm and add features to prevent future infestations
- A8** Install recirculation treatment system (UV, filtration, pump)
- A9** Add water supply to downstream raceways
- A10** Install water supply flow measurement
- A11** Install dissolved oxygen management

B Fish Rearing Units

- B1** Repair deteriorated raceways or replace with new units
- B2** Add new grow out tanks
- B3** Replace all wooden screens/weir boards for biosecurity

C Buildings

- C1** Rearing House: replace windows
- C2** Enlarge office space in Rearing House
- C3** New code-compliant chemical storage building
- C4** Garage/Shop: new roof, repair or remove walk-in cooler, remodel
- C5** Meat House: foundation repairs, window/door replacement
- C6** Stone Garage: remodel (Note: historically significant)
- C7** Residence: replace windows and bathroom upgrade
- C8** Add temperature control to pellet shed
- C9** Add biosecure egg disinfection room or building
- C10** New Hatchery Building

D Site

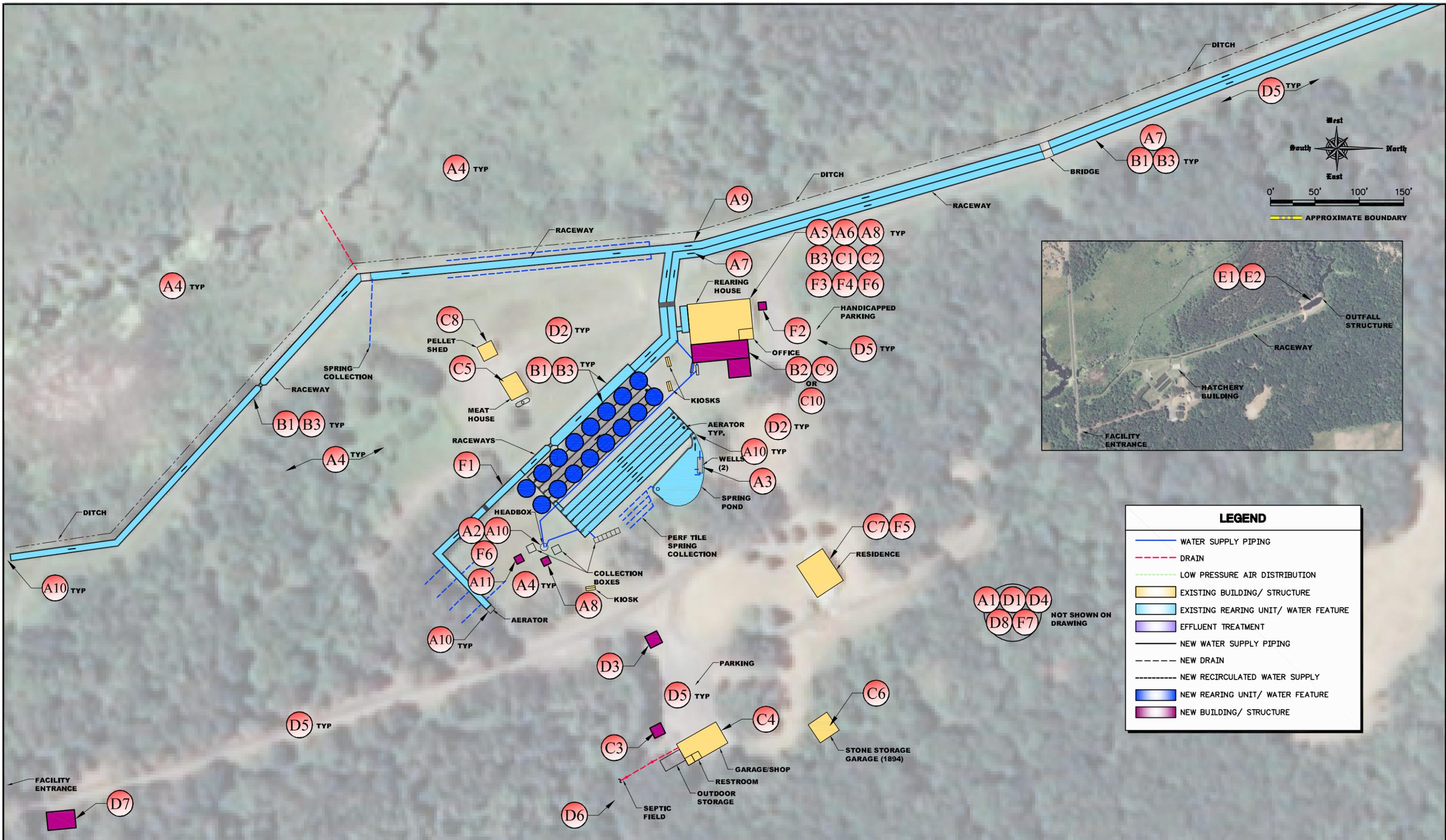
- D1** Add site features to allow biosecure isolation of individual species
- D2** Install better stormwater runoff management system
- D3** Add ADA accessible visitor restroom
- D4** Replace fence and add signage
- D5** Resurface roads and replace base as needed
- D6** Install domestic well water treatment system
- D7** Add truck/equipment disinfection area
- D8** Create a video showing fish rearing and egg take

E Aquaculture Wastewater

- E1** Upgrade effluent treatment system
- E2** Dredge settling pond and remove fish

F Utility Systems

- F1** Upgrade electrical service to the Flat Raceways
- F2** Install emergency power generator
- F3** Add lighting to Rearing House loft area
- F4** Install fire alarm system in Rearing House
- F5** Electrical upgrade for the residence
- F6** Install low flow and low dissolved oxygen alarms
- F7** Upgrade facility electrical system



LEGEND	
	WATER SUPPLY PIPING
	DRAIN
	LOW PRESSURE AIR DISTRIBUTION
	EXISTING BUILDING/ STRUCTURE
	EXISTING REARING UNIT/ WATER FEATURE
	EFFLUENT TREATMENT
	NEW WATER SUPPLY PIPING
	NEW DRAIN
	NEW RECIRCULATED WATER SUPPLY
	NEW REARING UNIT/ WATER FEATURE
	NEW BUILDING/ STRUCTURE

A1 D1 D4
D8 F7
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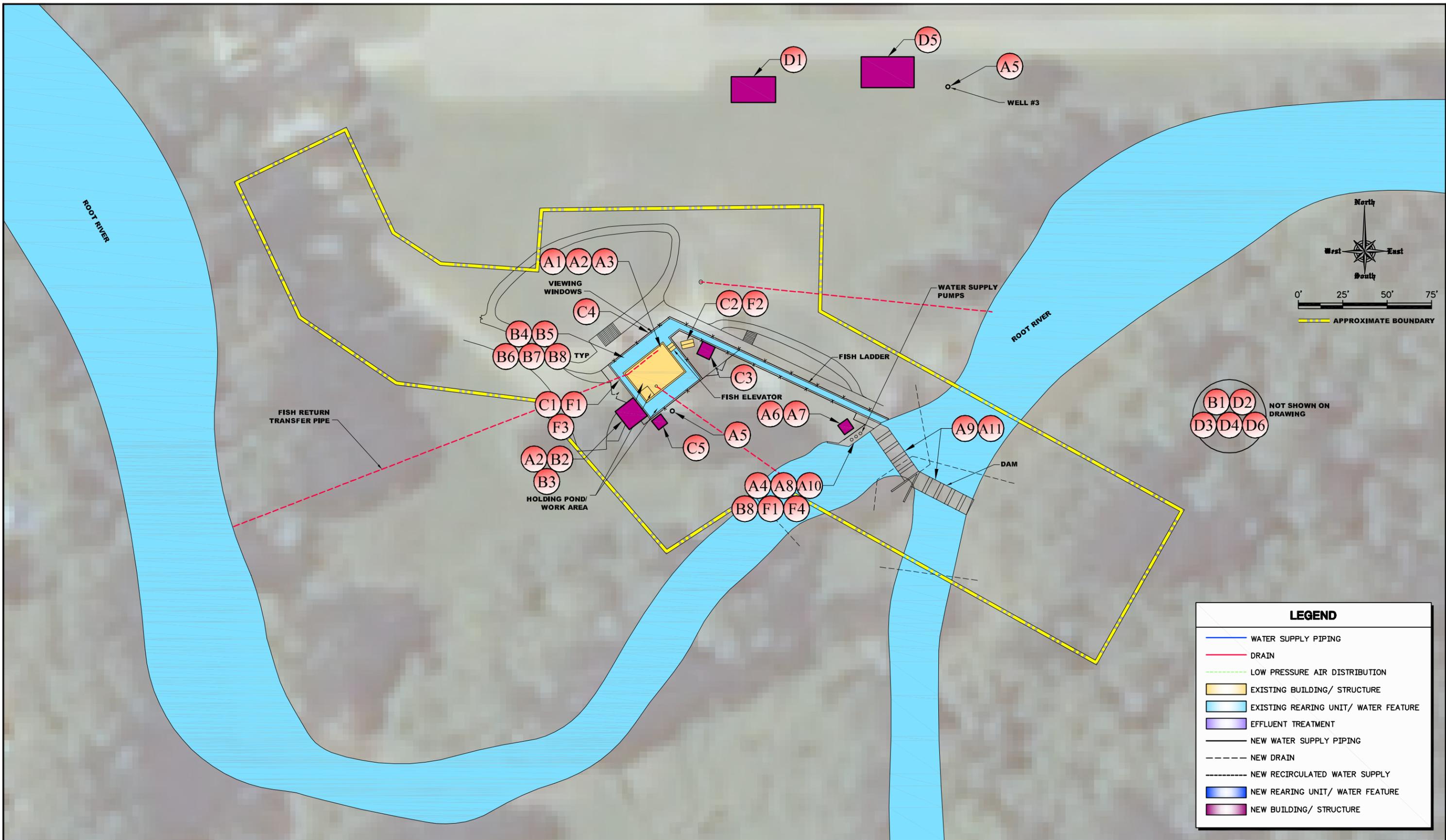
OSCEOLA STATE FISH HATCHERY PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
OSC-3

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**Root River Steelhead Facility
Improvements Legend**

A Water Supply	
A1	Install dissolved oxygen management system
A2	Install disinfection system
A3	Install temperature management system
A4	Fix pump No. 3 cavitation
A5	Seal wells to eliminate need to disinfect
A6	Install recirculation for drought conditions
A7	Install water filtration for turbidity control
A8	Install automatic debris removal for screens
A9	Install debris removal system for dam
A10	Install electric hoist for pump maintenance
A11	Minor concrete repairs at dam
B Fish Rearing Units	
B1	Install carcass disposal system
B2	Expand egg disinfection area
B3	Add isolated egg incubation system
B4	Install worker safety features for access to fish tank
B5	Install automatic fish crowder
B6	Repair concrete and drainage of fish tank
B7	Replace spawning equipment with FRP and/or metal
B8	Replace all wooden screens/weir boards for biosecurity
C Buildings	
C1	Add wind protection walls or a permanent building
C2	Install heat in computer room
C3	Construct storage building for crew gear
C4	Replace garage door
C5	Construct space for freezers
D Site	
D1	Add a staff and visitor's ADA accessible restroom
D2	Perform a hydrology study to evaluate flooding issues and provide recommendations
D3	Install stormwater runoff management system
D4	WDNR to obtain ownership of land
D5	Add truck/equipment disinfection area
D6	Create a video showing egg take
E Aquaculture Wastewater	
E1	None
F Utility Systems	
F1	Install surveillance camera at lift gates and throughout facility for remote monitoring
F2	Remote link to fish counter for easier staff scheduling
F3	Install new dissolved oxygen and temperature probe
F4	Add automatic start to pumps



(B1 D2)
(D3 D4 D6)
NOT SHOWN ON DRAWING

LEGEND	
	WATER SUPPLY PIPING
	DRAIN
	LOW PRESSURE AIR DISTRIBUTION
	EXISTING BUILDING/ STRUCTURE
	EXISTING REARING UNIT/ WATER FEATURE
	EFFLUENT TREATMENT
	NEW WATER SUPPLY PIPING
	NEW DRAIN
	NEW RECIRCULATED WATER SUPPLY
	NEW REARING UNIT/ WATER FEATURE
	NEW BUILDING/ STRUCTURE

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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

ROOT RIVER SPAWNING FACILITY PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
RRS-3

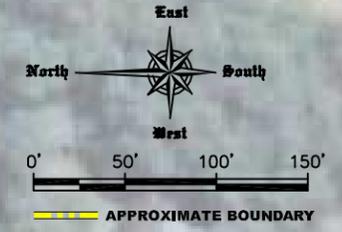
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**St. Croix Falls State Fish Hatchery
Improvements Legend**

A Water Supply	
A1	Perform a groundwater study to determine availability / quality of additional water
A2	Perform video piping inspection to document existing supply network
A3	Install oxygen management system for facility
A4	Develop new water collection galleries
A5	Install recirculation treatment system (UV, filtration, pump)
A6	Install contamination monitoring system
A7	Replace water supply piping system as needed
A8	Add water reuse treatment between upper and lower tanks in Brook Building
A9	Add air release units at the N and S headboxes
A10	Install water supply flow measurement
B Fish Rearing Units	
B1	Renovate and resurface raceways or replace with circular units
B2	Install an RFP or epoxy coating to rearing tanks or replace
B3	Replace all wooden screens/weir boards for biosecurity
B4	Enlarge egg incubation area in Brook Trout Building
C Buildings	
C1	Construct rearing unit pavilion/building
C2	Renovate office building for rearing
C3	Add new office building
C4	Add biosecure egg disinfection room or building
C5	Add building features to allow biosecure isolation of individual lots
C6	Add insulation and temperature control for feed storage area and loading ramp
C7	Brown Trout Building: insulation
C8	Residence: new roof and windows
C9	Brook Trout Building Renovation
C10	New code-compliant chemical storage building
C11	North Garage floor replacement
D Site	
D1	Remove trees along water supply network
D2	Add site features to allow biosecure isolation of individual species
D3	Resurface roads (after WWTP work completed)
D4	Add truck/equipment disinfection area
D5	Create a video showing fish rearing and egg take
D6	Add a visitor's ADA accessible restroom
D7	Coordinate hatchery renovation efforts with WWTP expansion efforts

**St. Croix Falls State Fish Hatchery
Improvements Legend**

E Aquaculture Wastewater	
E1	Increase size of settling clarifier
E2	Upgrade effluent treatment system
F Utility Systems	
F1	Add light and electricity to Unit 3 feed storage
F2	Brown Trout building needs new ventilation
F3	Residence needs new furnace
F4	Update lighting in all rearing buildings with rheostats
F5	Increase ventilation in the Vehicle Storage Building
F6	Install security cameras and security alarm system
F7	Install low flow and low dissolved oxygen alarms
F8	Install electrical service at raceways
F9	Install microturbine for supplemental energy
F10	Upgrade facility electrical system



LEGEND	
	WATER SUPPLY PIPING
	DRAIN
	LOW PRESSURE AIR DISTRIBUTION
	EXISTING BUILDING/ STRUCTURE
	EXISTING REARING UNIT/ WATER FEATURE
	EFFLUENT TREATMENT
	NEW WATER SUPPLY PIPING
	NEW DRAIN
	NEW RECIRCULATED WATER SUPPLY
	NEW REARING UNIT/ WATER FEATURE
	NEW BUILDING/ STRUCTURE

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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

ST. CROIX FALLS STATE FISH HATCHERY PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
 9/15/10
 SHEET:
SCF-3

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Strawberry Creek Spawning Facility
Improvements Legend

A Water Supply

- A1** Perform a groundwater study to determine availability / quality of additional water
- A2** Update water control structures
- A3** Install permanent pump station for water supply
- A4** Bury water supply pipeline
- A5** Install new water supply well
- A6** Install dissolved oxygen management system
- A7** Install high pressure water system for cleaning
- A8** Install a water storage tank and fill with artesian flow

B Fish Rearing Units

- B1** Expand egg collection area
- B2** Install electric lift station
- B3** Replace spawning equipment with FRP and/or metal
- B4** Install automatic fish feeding
- B5** Modify holding tank for easier crowding
- B6** Install automatic fish crowder
- B7** Add isolated egg incubation system
- B8** Replace all wooden screens/weir boards for biosecurity

C Buildings

- C1** Construct portable tents to use during egg hardening
- C2** Add predation control for smolt imprinting holding tanks
- C3** Construct storage building for crew gear
- C4** Construct space for freezers
- C5** Add wind protection walls or a permanent building
- C6** Add temperature controlled feed storage

D Site

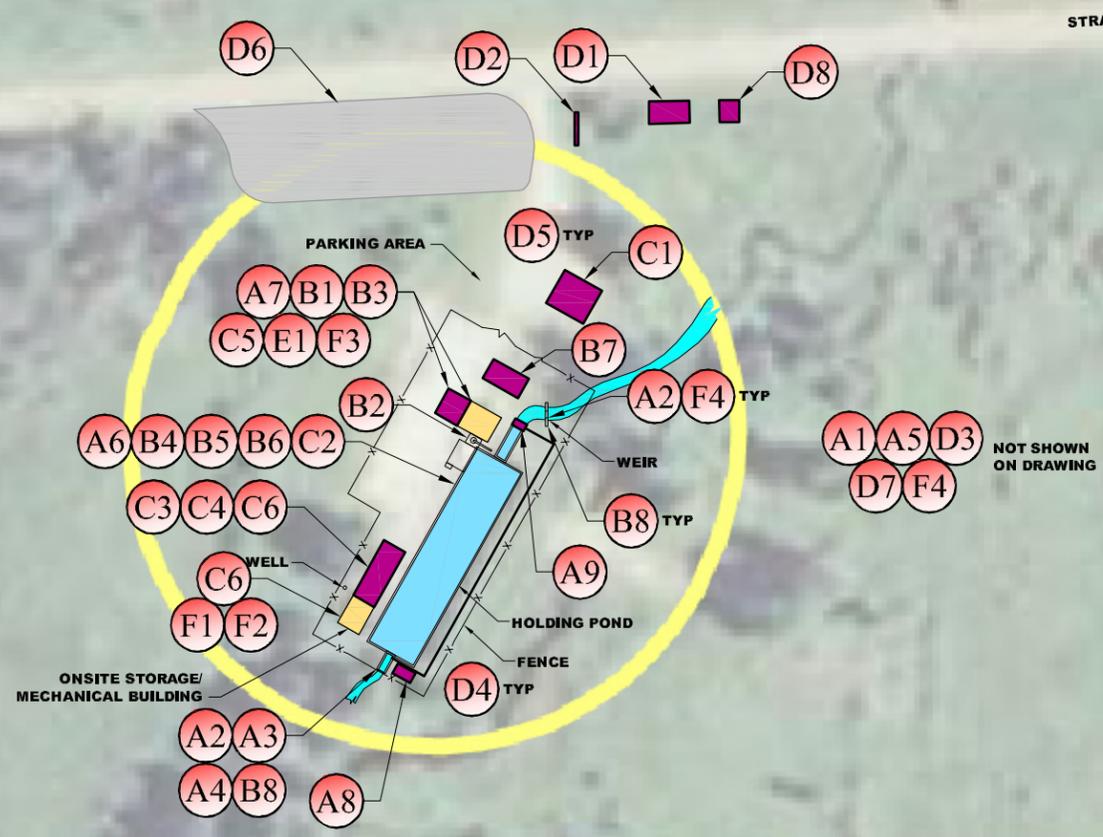
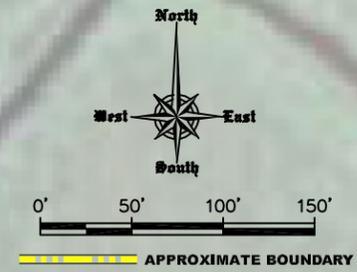
- D1** Add truck/equipment disinfection area
- D2** Add visitor signage and viewing window
- D3** WDNR to obtain ownership of land
- D4** Install stormwater runoff management system
- D5** Surface roads and parking for biosecurity
- D6** Provide bus parking
- D7** Create a video showing egg take
- D8** Add a staff and visitor's ADA accessible restroom

E Aquaculture Wastewater

- E1** Install a drain system for cleaning eggs

F Utility Systems

- F1** Install telephone system for facility
- F2** Install fire alarm system
- F3** Install security cameras
- F4** Provide power to pump station and upgrade facility electrical system



LEGEND	
	WATER SUPPLY PIPING
	DRAIN
	LOW PRESSURE AIR DISTRIBUTION
	EXISTING BUILDING/ STRUCTURE
	EXISTING REARING UNIT/ WATER FEATURE
	EFFLUENT TREATMENT
	NEW WATER SUPPLY PIPING
	NEW DRAIN
	NEW RECIRCULATED WATER SUPPLY
	NEW REARING UNIT/ WATER FEATURE
	NEW BUILDING/ STRUCTURE

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STRAWBERRY CREEK SPAWNING FACILITY PROPOSED IMPROVEMENTS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
 9/15/10
 SHEET:
SCS-3

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**Thunder River Rearing Station
Improvements Legend**

A Water Supply

- A1** Perform a groundwater study to determine availability / quality of additional water
- A2** Water supply treatment (filtration, disinfection)
- A3** Install a new well
- A4** Utilize camera inspection of water supply flume, repair where needed
- A5** Renovate the Water Supply to Ponds with Slide Gates on Main Dam
- A6** Install freeze prevention measures on the intake
- A7** Install recirculation treatment system (UV, filtration, pump)
- A8** Replace screens at ponds with parabolic screens
- A9** Install water supply flow measurement
- A10** Install dissolved oxygen management

B Fish Rearing Units

- B1** Add riprap to Pond B to prevent erosion
- B2** Replace rearing ponds with new units or renovate with walls and floors
- B3** Repair deteriorated concrete on raceways, resurface or replace with new units
- B4** Replace all wooden screens/weir boards for biosecurity

C Buildings

- C1** Inlet covers at ponds
- C2** Construct insulated buildings over all raceways to allow winter operation
- C3** Lower Warehouse renovations
- C4** Residence renovations
- C5** Evaluate Wood Infestation Source and Eliminate
- C6** New code-compliant chemical storage building
- C7** Add temperature control to feed storage
- C8** Repair concrete foundations at House 3 and raceways/flume as needed

D Site

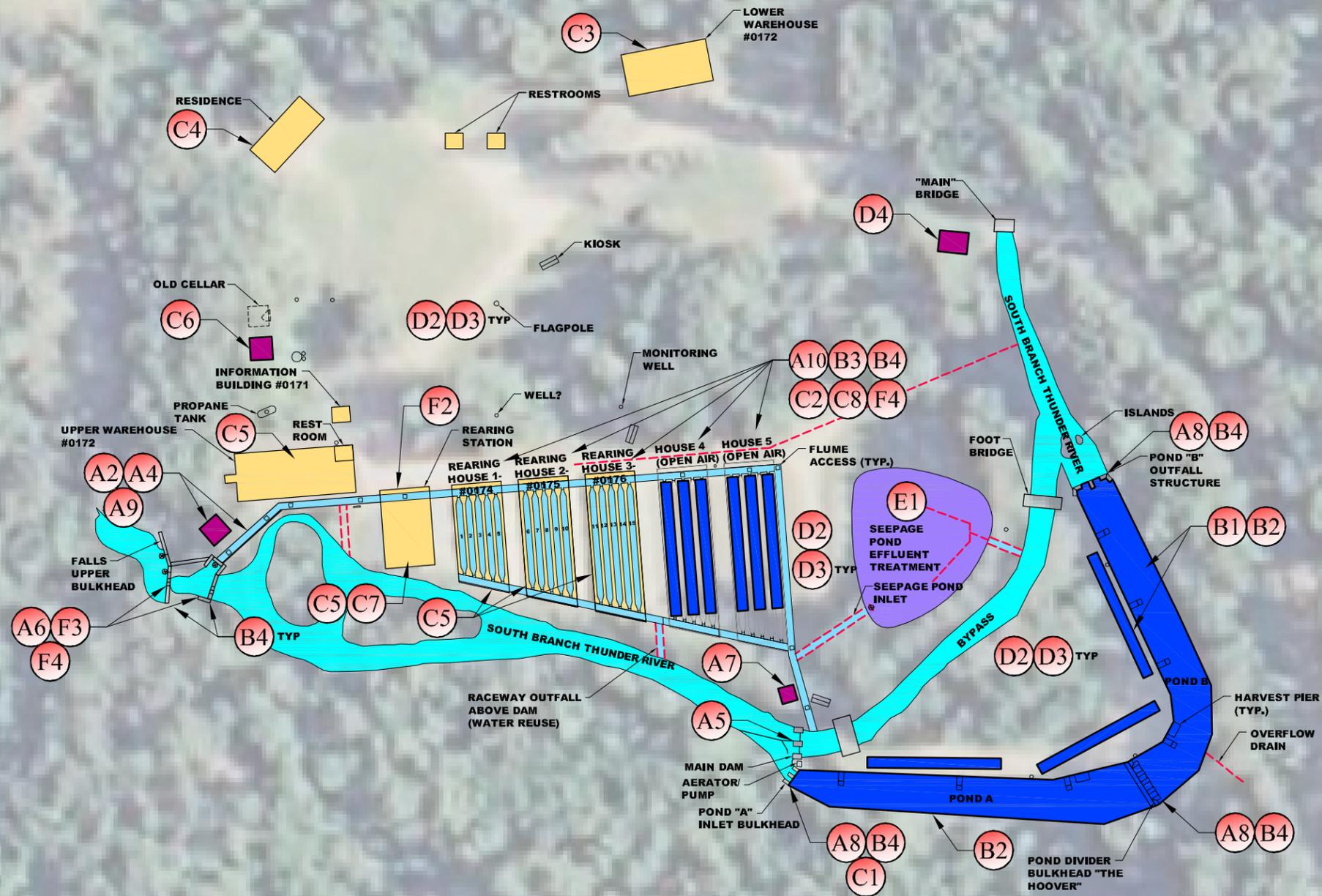
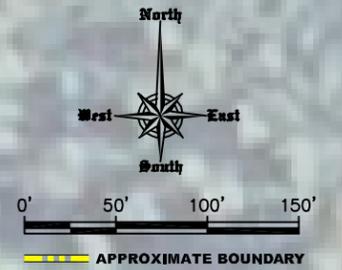
- D1** Add site features to allow biosecure isolation of individual lots
- D2** Resurface roads
- D3** Install better stormwater runoff management system
- D4** Add truck/equipment disinfection area
- D5** Create a video showing fish rearing and egg take

E Aquaculture Wastewater

- E1** Upgrade effluent treatment system

F Utility Systems

- F1** Upgrade facility electrical system
- F2** Update telephone dialing system
- F3** Install microturbine at the dam for energy
- F4** Install low flow and low dissolved oxygen alarms



A1 A3 D1
D4 D5 F1
NOT SHOWN ON DRAWING

LEGEND	
	WATER SUPPLY PIPING
	DRAIN
	LOW PRESSURE AIR DISTRIBUTION
	EXISTING BUILDING/ STRUCTURE
	EXISTING REARING UNIT/ WATER FEATURE
	EFFLUENT TREATMENT
	NEW WATER SUPPLY PIPING
	NEW DRAIN
	NEW RECIRCULATED WATER SUPPLY
	NEW REARING UNIT/ WATER FEATURE
	NEW BUILDING/ STRUCTURE

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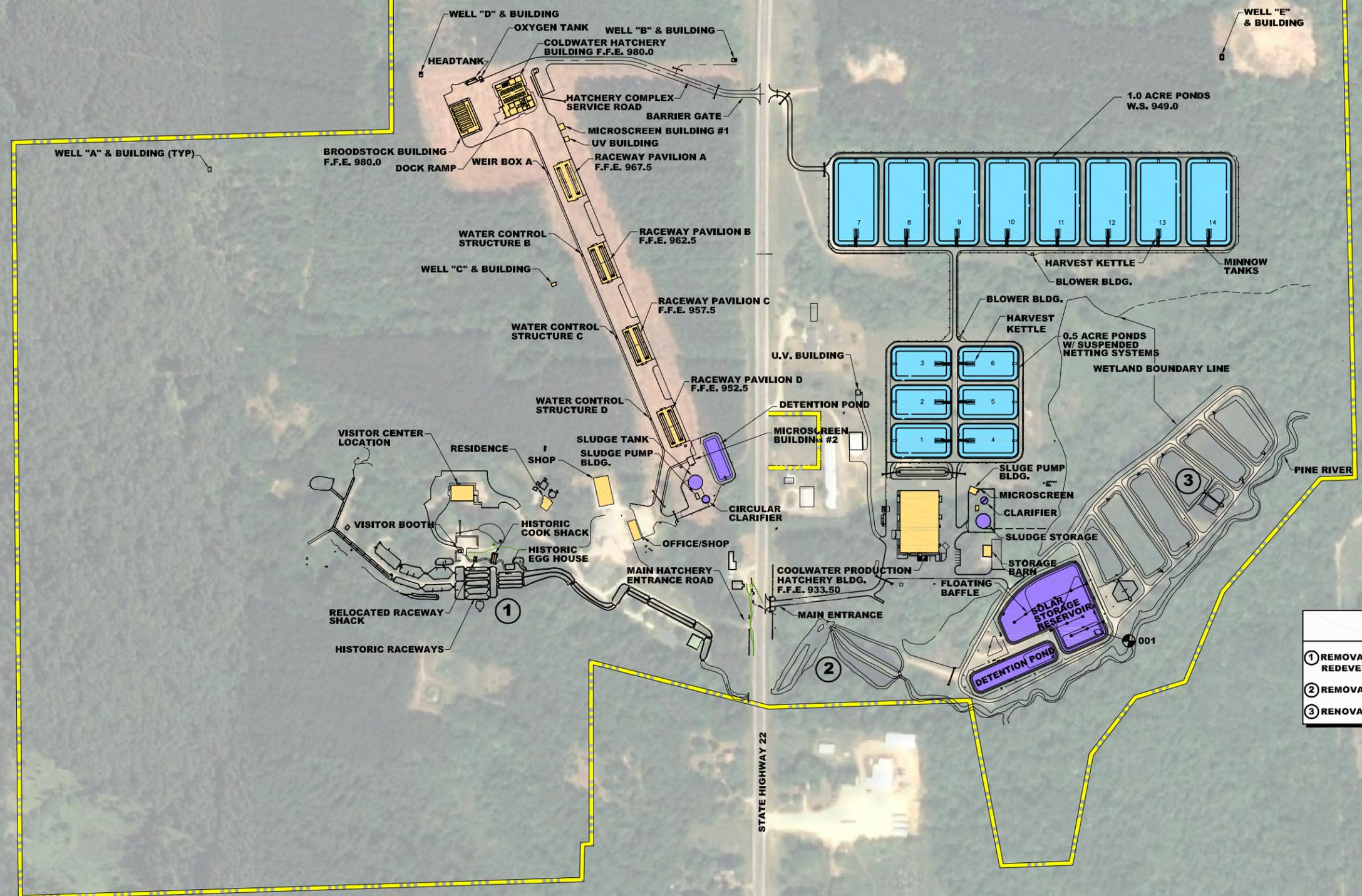
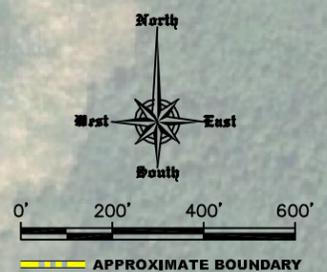


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THUNDER RIVER STATE REARING STATION PROPOSED IMPROVEMENTS

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
THR-3



- | PHASE 3 | |
|---------|--|
| ① | REMOVAL OF MOST HISTORICAL RACEWAYS AND REDEVELOPEMENT OF ORIGINAL HATCHERY STREAM |
| ② | REMOVAL OF DAM AND DAM PONDS |
| ③ | RENOVATE EXISTING PONDS INTO WETLANDS HABITAT |

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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

**WILD ROSE STATE FISH HATCHERY
EXISTING CONDITIONS/FUTURE PROJECTS**

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

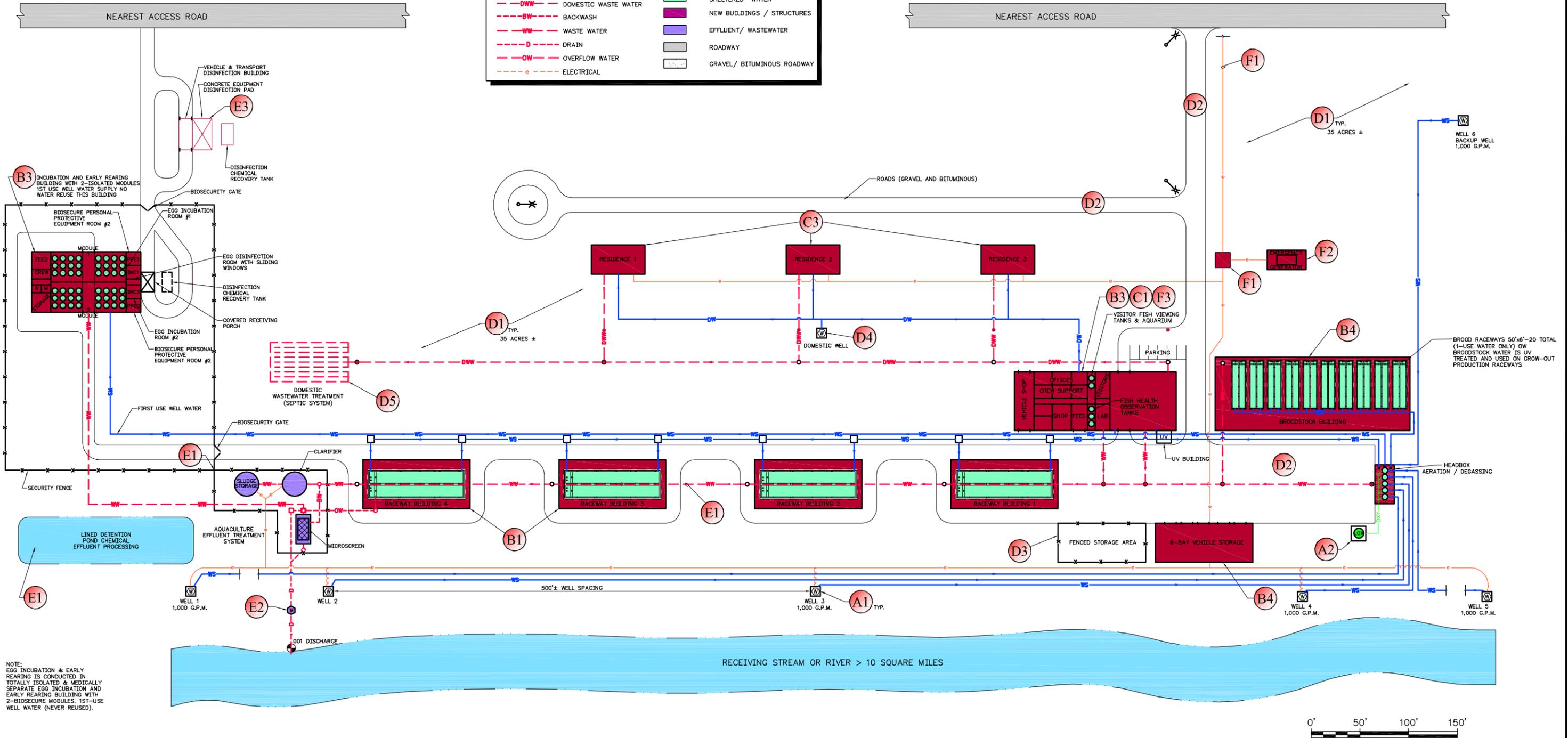
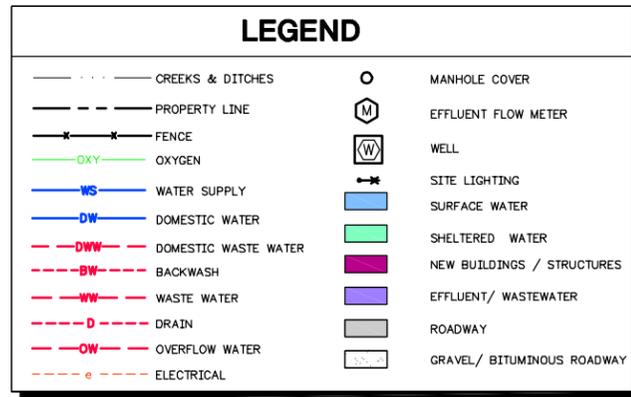
PROJECT# 08K2U
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WRO-1

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WDNR New Coldwater Facility
Improvements Legend

A	Water Supply
A1	Hatchery Groundwater Supply
A2	Oxygenation System for Water Supply and Aeration/Degassing
B	Fish Rearing Units
B1	Production Grow-Out Systems (Raceways - Drawing N-1)
B2	Production Grow-Out Systems (Circular Tanks - Drawing N-2)
B3	Egg Incubation and Early Rearing Building (7,500 SF+/-)
B4	Broodstock Facility
C	Buildings
C1	Hatchery Building
C2	Vehicle/Equipment storage building
C3	Residences
D	Site
D1	Land Acquisition and Site Work
D2	Paved Access to state or local highway
D3	Security Fence
D4	Domestic water
D5	Domestic wastewater
E	Aquaculture Wastewater
E1	Effluent Treatment
E2	Effluent Monitoring
E3	Vehicle and Equipment Disinfection Station
F	Utility Systems
F1	Electrical service
F2	Emergency power
F3	Instrumentation/ Alarm system

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NOTE: EGG INCUBATION & EARLY REARING IS CONDUCTED IN TOTALLY ISOLATED & MEDICALLY SEPARATE EGG INCUBATION AND EARLY REARING BUILDING WITH 2-BIOSECURE MODULES. 1ST-USE WELL WATER (NEVER REUSED).



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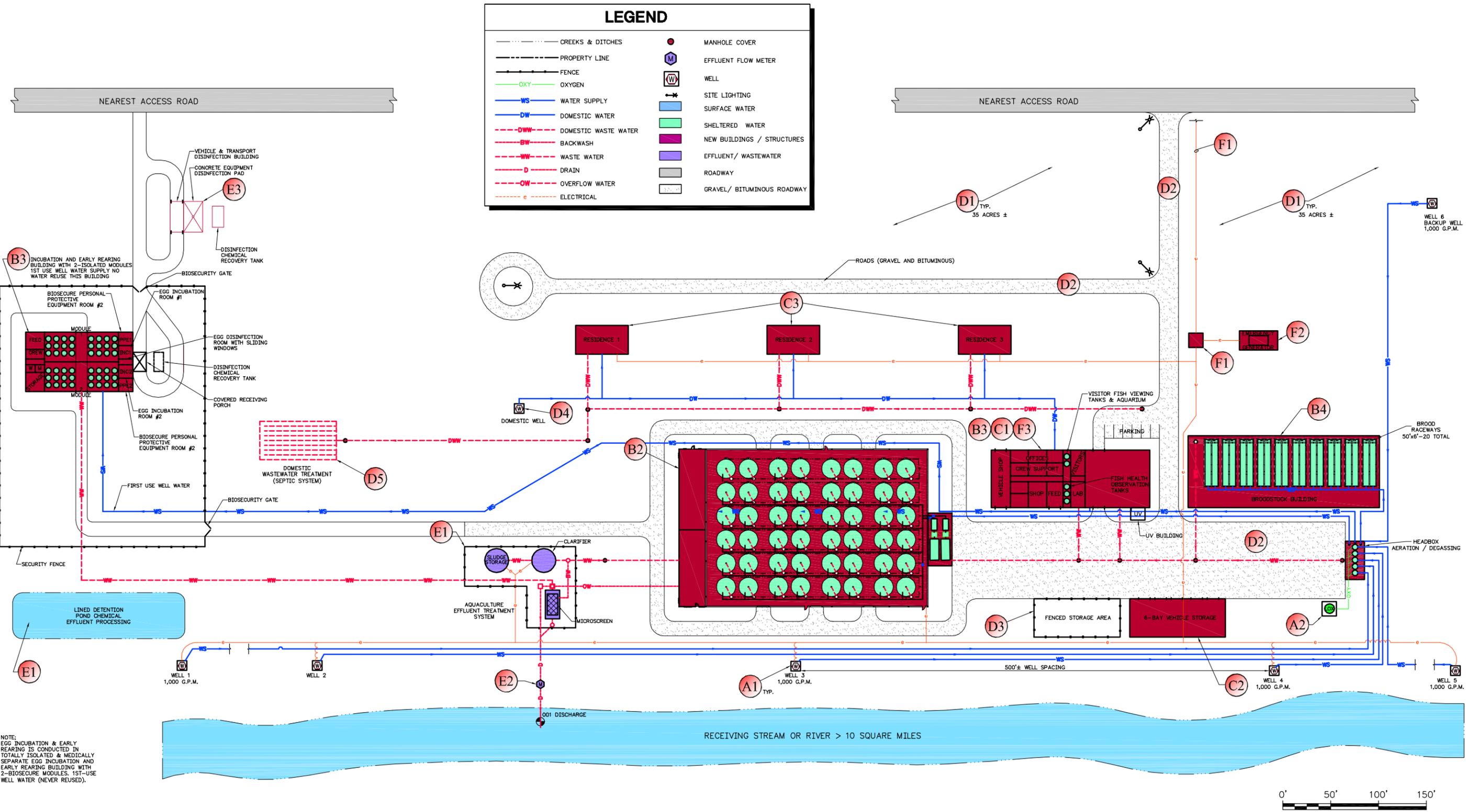
CONCEPTUAL NEW COLDWATER HATCHERY PLAN-RACEWAYS
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
N-1

WDNR New Coldwater Facility
Improvements Legend

A	Water Supply
A1	Hatchery Groundwater Supply
A2	Oxygenation System for Water Supply and Aeration/Degassing
B	Fish Rearing Units
B1	Production Grow-Out Systems (Raceways - Drawing N-1)
B2	Production Grow-Out Systems (Circular Tanks - Drawing N-2)
B3	Egg Incubation and Early Rearing Building (7,500 SF+/-)
B4	Broodstock Facility
C	Buildings
C1	Hatchery Building
C2	Vehicle/Equipment storage building
C3	Residences
D	Site
D1	Land Acquisition and Site Work
D2	Paved Access to state or local highway
D3	Security Fence
D4	Domestic water
D5	Domestic wastewater
E	Aquaculture Wastewater
E1	Effluent Treatment
E2	Effluent Monitoring
E3	Vehicle and Equipment Disinfection Station
F	Utility Systems
F1	Electrical service
F2	Emergency power
F3	Instrumentation/ Alarm system

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CONCEPTUAL NEW COLDWATER HATCHERY PLAN- CIRCULAR UNITS

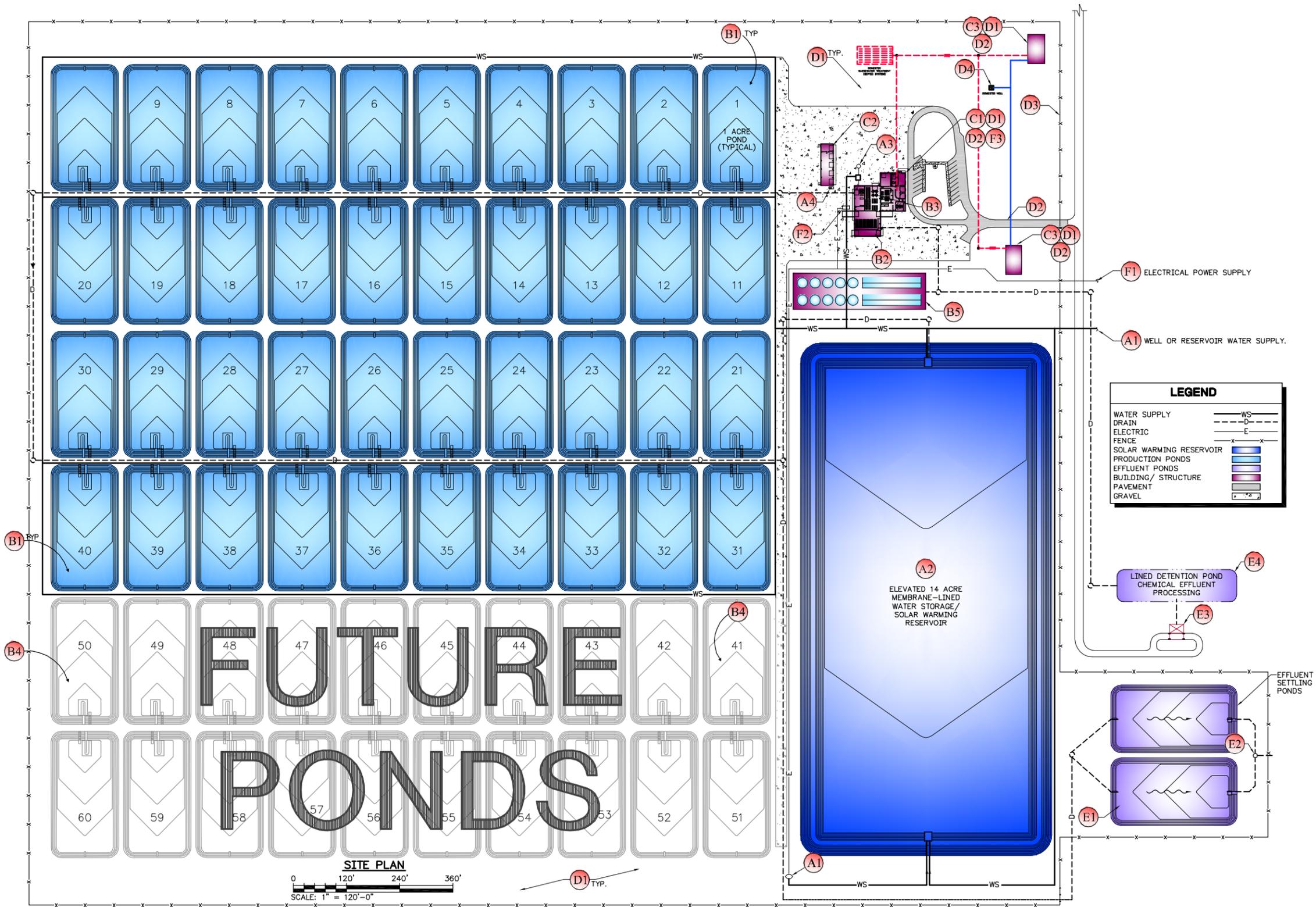
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
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N-2

WDNR New Coolwater Facility
Improvements Legend

A	Water Supply
A1	Aquaculture Water Supply (Wells or Reservoir Intake)
A2	Elevated Water Supply Reservoir for Tempering and Storage
A3	Building Water Supply Well
A4	Dissolved Oxygen Management System
B	Fish Rearing Units
B1	One-Acre Production Ponds
B2	Indoor Production Tanks
B3	Adult Spawning, Egg Incubation & Early Rearing Tanks
B4	Alternative Expanded Rearing Area
B5	Optional Intensive Fish Rearing Pavilion
C	Buildings
C1	Hatchery Building
C2	Vehicle/Equipment storage building
C3	Residences
D	Site
D1	Land Acquisition and Site Work
D2	Paved Access to state or local highway
D3	Security Fence
D4	Domestic water
D5	Domestic wastewater
E	Aquaculture Wastewater
E1	Effluent Treatment
E2	Effluent Monitoring
E3	Vehicle and Equipment Disinfection Station
F	Utility Systems
F1	Electrical service
F2	Emergency power
F3	Instrumentation/ Alarm system

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CONCEPTUAL NEW COOLWATER HATCHERY PLAN

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U

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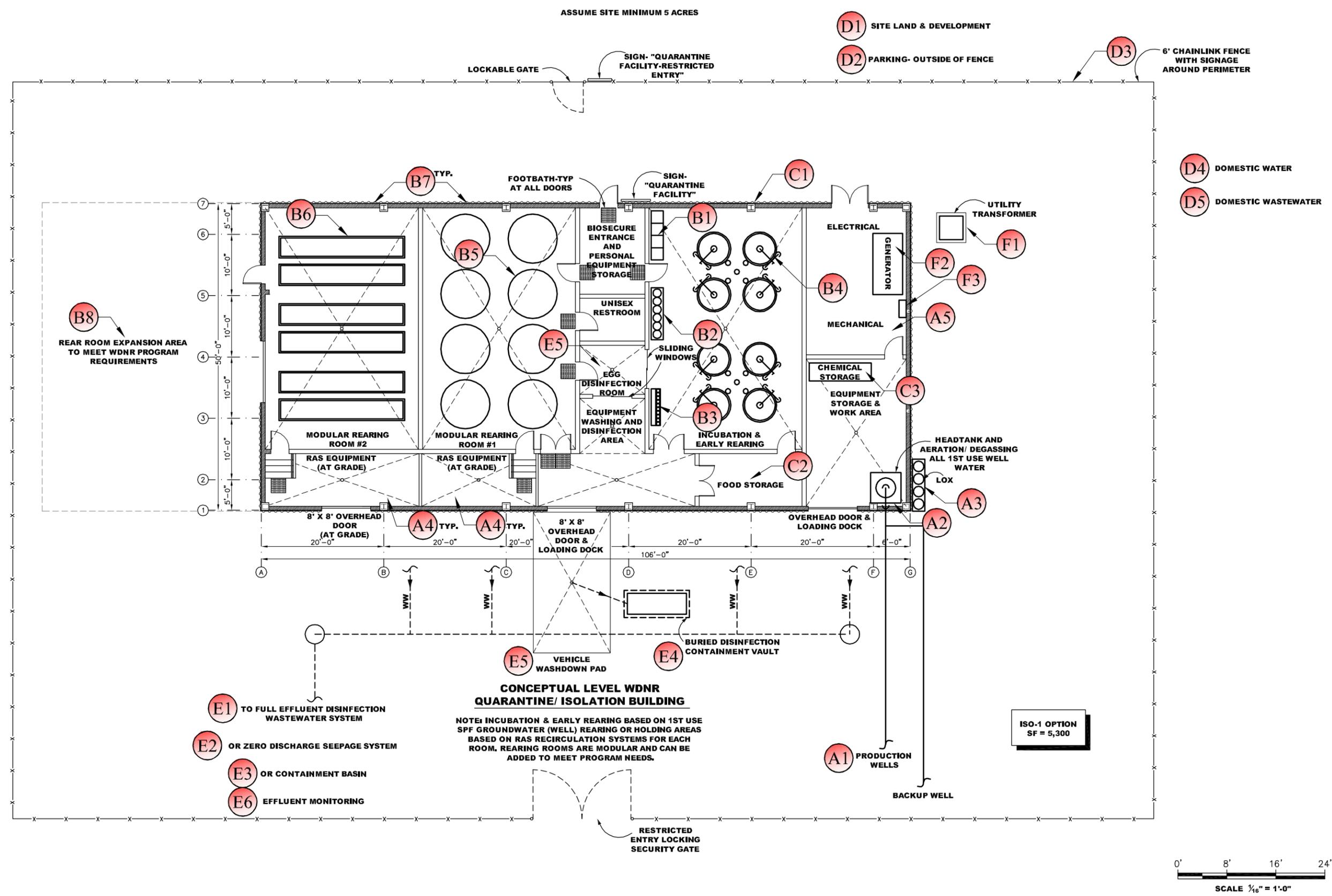
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N-3

WDNR Quarantine/Isolation Building - Option 1
Improvements Legend

A Water Supply	
A1	Groundwater supply
A2	First use well water headtank with aeration/degassing system
A3	Dissolved oxygen management system
A4	Recirculating aquaculture system (RAS) equipment
A5	Mechanical Room with first use water treatment (heat or chill) if required
B Fish Rearing Units	
B1	Vertical flow egg incubation system for coldwater eggs with splash shields
B2	Upwelling jar type coldwater egg incubation jars (alternative coldwater egg incubation)
B3	Portable McDonald jar egg incubation system
B4	Early rearing circular tanks with optional hatchery jar system
B5	Fiberglass circular unit operated on RAS system
B6	Fiberglass rectangle tank units operated on RAS system
B7	Modular Biosecure Rearing Rooms (Suites)
B8	Expansion area to add modular rearing rooms (see Item B7)
C Buildings	
C1	Quarantine / Isolation Building
C2	Food Storage Area
C3	Compliant Chemical Storage
D Site	
D1	Land Acquisition and Site Work
D2	Paved Access to State or Local Highway
D3	Security Fence
D4	Domestic water
D5	Domestic wastewater
E Aquaculture Wastewater	
E1	Effluent Treatment with UV Disinfection – Alt 1
E2	Effluent Treatment with Zero Discharge Seepage System – Alt 2
E3	Effluent Treatment with Chemical Disinfection and Neutralization – Alt 3
E4	Containment System for Disinfection Chemical Disposal
E5	Truck / Equipment Disinfection Area
E6	Effluent Monitoring (not illustrated on Concept Drawing)
F Utility Systems	
F1	Electrical service
F2	Emergency power
F3	Instrumentation, alarm and communication system

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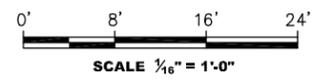


- E1** TO FULL EFFLUENT DISINFECTION WASTEWATER SYSTEM
- E2** OR ZERO DISCHARGE SEEPAGE SYSTEM
- E3** OR CONTAINMENT BASIN
- E6** EFFLUENT MONITORING

CONCEPTUAL LEVEL WDNR QUARANTINE/ ISOLATION BUILDING

NOTE: INCUBATION & EARLY REARING BASED ON 1ST USE SPF GROUNDWATER (WELL) REARING OR HOLDING AREAS BASED ON RAS RECIRCULATION SYSTEMS FOR EACH ROOM. REARING ROOMS ARE MODULAR AND CAN BE ADDED TO MEET PROGRAM NEEDS.

ISO-1 OPTION SF = 5,300



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WISCONSIN DEPARTMENT OF NATURAL RESOURCES

CONCEPTUAL QUARANTINE/ ISOLATION FACILITY (OPTION 1)

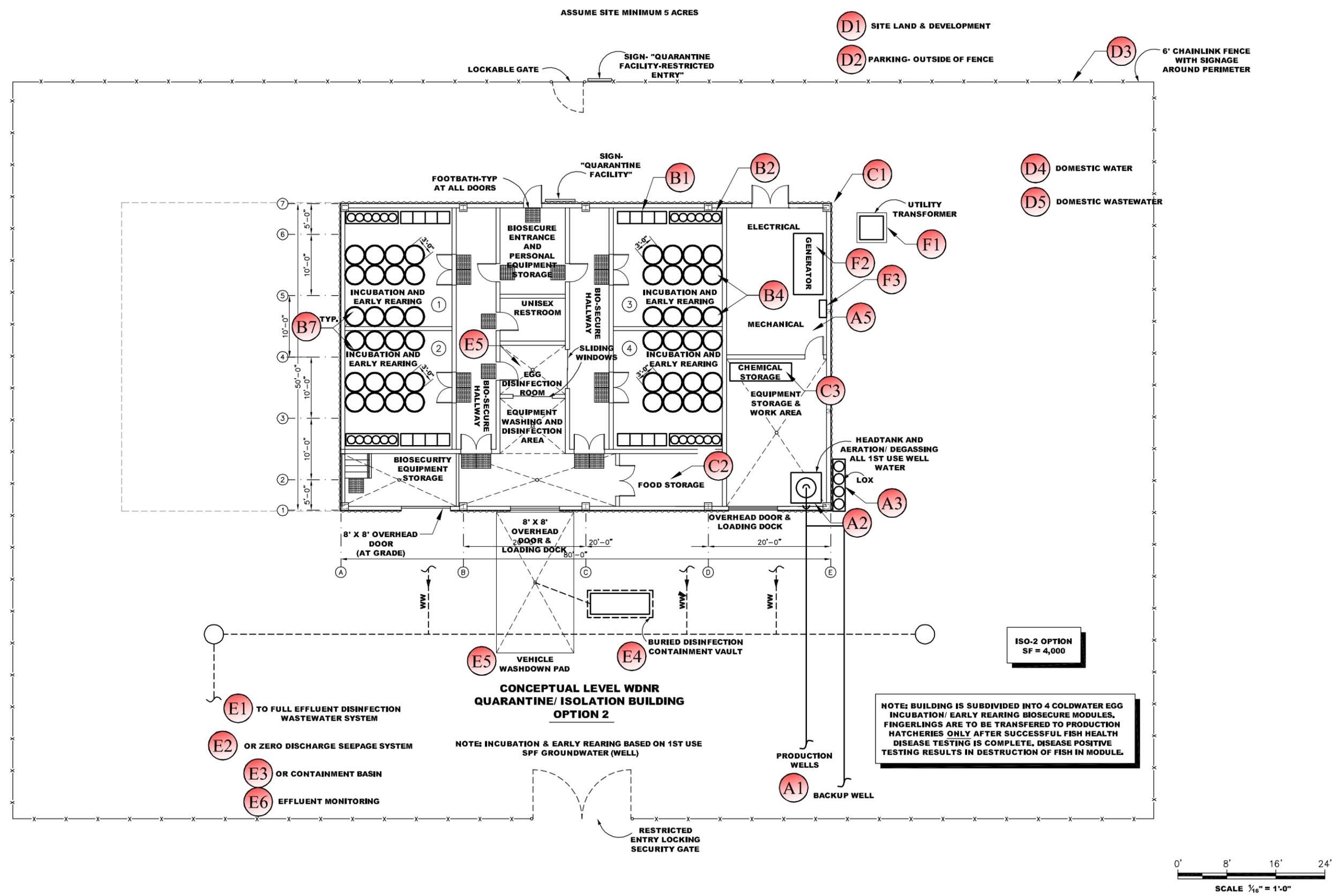
COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U
9/15/10
SHEET:
ISO-1

WDNR Quarantine/Isolation Building - Option 2
Improvements Legend

A Water Supply	
A1	Groundwater supply
A2	First use well water headtank with aeration/degassing system
A3	Dissolved oxygen management system
A4	Reserved
A5	Mechanical Room with first use water treatment (heat or chill) if required
B Fish Rearing Units	
B1	Vertical flow egg incubation system for coldwater eggs with splash shields
B2	Upwelling jar type coldwater egg incubation jars (alternative coldwater egg incubation)
B3	Portable McDonald jar egg incubation system
B4	Early rearing circular tanks with optional hatchery jar system
B5	Reserved
B6	Reserved
B7	Modular Biosecure Rearing Rooms (Suites)
B8	Reserved
C Buildings	
C1	Quarantine / Isolation Building
C2	Food Storage Area
C3	Compliant Chemical Storage
D Site	
D1	Land Acquisition and Site Work
D2	Paved Access to State or Local Highway
D3	Security Fence
D4	Domestic water
D5	Domestic wastewater
E Aquaculture Wastewater	
E1	Effluent Treatment with UV Disinfection – Alt 1
E2	Effluent Treatment with Zero Discharge Seepage System – Alt 2
E3	Effluent Treatment with Chemical Disinfection and Neutralization – Alt 3
E4	Containment System for Disinfection Chemical Disposal
E5	Truck / Equipment Disinfection Area
E6	Effluent Monitoring (not illustrated on Concept Drawing)
F Utility Systems	
F1	Electrical service
F2	Emergency power
F3	Instrumentation, alarm and communication system

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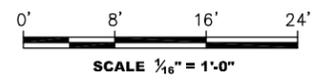


**CONCEPTUAL LEVEL WdNR
QUARANTINE/ ISOLATION
BUILDING
OPTION 2**

NOTE: INCUBATION & EARLY REARING BASED ON 1ST USE
SPF GROUNDWATER (WELL)

NOTE: BUILDING IS SUBDIVIDED INTO 4 COLDWATER EGG
INCUBATION/ EARLY REARING BIOSECURE MODULES.
FINGERLINGS ARE TO BE TRANSFERRED TO PRODUCTION
HATCHERIES ONLY AFTER SUCCESSFUL FISH HEALTH
DISEASE TESTING IS COMPLETE, DISEASE POSITIVE
TESTING RESULTS IN DESTRUCTION OF FISH IN MODULE.

ISO-2 OPTION
SF = 4,000



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WISCONSIN DEPARTMENT
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**CONCEPTUAL QUARANTINE/ ISOLATION
FACILITY (OPTION 2)
EGG & EARLY REARING ONLY**
**COMPREHENSIVE STUDY OF WISCONSIN
FISH PROPAGATION FACILITIES**

PROJECT# 08K2U
9/15/10
SHEET:
ISO-2



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217.585.8300**