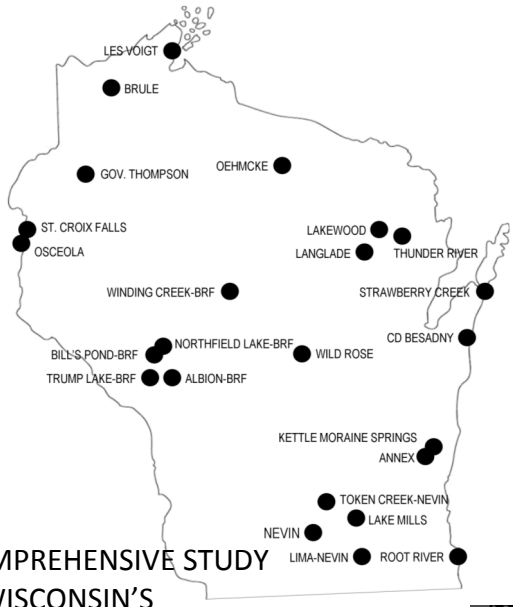

COMPREHENSIVE STUDY
OF WISCONSIN'S
FISH PROPAGATION SYSTEM

WISCONSIN
DEPT. OF NATURAL RESOURCES

VOLUME II

SECTION 9.
Gov. Tommy G. Thompson State Fish Hatchery (GTT)

HDR

9. GOVERNOR TOMMY G. THOMPSON STATE FISH HATCHERY

Facility Inventory

General Facility Description

Governor Tommy G. Thompson State Fish Hatchery (GTT) is located in the northwestern part of the state along the Yellow River in Washburn County (see **Figure 9A,** USGS map). GTT is a coolwater species production facility situated on an 88-acre site. The hatchery was originally constructed in 1914 with renovations completed in 1932 and 1966. In 1994-1995 a total renovation of the building and ponds was completed, along with construction improvements to the locks and dam structure on the Yellow River Flowage that provides the water to the hatchery. Contact information for the facility is:

Supervisor	Gary Lindenberger	Gary.Lindenberger@wisconsin.gov
Facility Address	810 West Maple Road	Spooner, WI 54801
Telephone|Fax	715.635.4149	715.635.4141

Source: WDNR Facility Questionnaires, 2009

One of the major problems at this facility is the water supply. There is intake, water quality, disease, and biosecurity issues associated with the open surface water supply source. The groundwater also is problematic as it has poor water quality due to hydrogen sulfide gas and high iron concentrations.

Walleye, muskellunge and northern pike are the primary sport fish raised at this hatchery with a large spawning, incubation and hatching effort conducted to provide white sucker fry for the feeding of these species. The hatchery has the capability to produce up to 2.5 million fingerling walleye, 100,000 six-inch walleye fingerlings, and 100,000 eight- to twelve-inch muskellunge and/or northern pike fingerlings. In addition to the sport fish production, 85 million white sucker eggs are collected, incubated and hatched for forage to the sport fish. In the past, transfers from GTT have included first fed muskellunge and northern pike to the West Central Region and South Central Region ponds, and Wild Rose Hatchery. The hatchery has also provided walleye fry to West Central Region ponds (Typical Transfer report).

An aerial photograph and existing site plans (**Drawings GTT-1 and GTT-2**) illustrate the hatchery boundary and general hatchery infrastructure features (e.g., water supply, fish rearing units, drainage piping, production buildings, support buildings, roads, and wastewater treatment facilities). The drawings are believed to be reasonable, to-scale representations of hatchery resources for planning purposes. Site and construction drawings (when available) from WDNR (see **Appendix B** for Existing Drawings list) and general questionnaires were filled out by WDNR staff to assist in developing the existing infrastructure analysis. Photographs taken at the Site Evaluation Visit (June 24, 2009) illustrate the existing conditions and highlight problem areas (see **Appendix C**).

GOV. TOMMY G. THOMPSON STATE FISH HATCHERY

Fig. 9A

Fish Production Summary

Historical Production

GTT has raised muskellunge, walleye, northern pike, and white suckers. With the exception of limited muskellunge and pike fry production, few changes in production have occurred over the last five years (2004-2008). White sucker eggs are collected and hatched at the facility for first feeding of muskellunge and forage stocking into ponds for advanced fingerling production. **Table 9A** illustrates five years of stocking (2004-2008) that was compiled from stocking records supplied by the Wisconsin DNR.

Table 9A. GTT 2004-08 Stocking Summary

	MUE Fing.		MUE Fry	NOP Fing.		NOP Fry	WAE Sm. Fing.		WAE Lg. Fing.		WAE Fry		
Year	No.	Lbs.	No.	No.	Lbs.	No.	No.	Lbs.	No.	Lbs.	No.	Total No.	Total Wt.
2004	38,220	9,492	275,000				2,108,234	1,648	31,899	2,692	2,711,000	5,164,353	13,832
2005	35,985	10,321	358,500	28,882	467	345,000	2,083,484	1,652	25,707	2,856	5,597,000	8,474,558	15,296
2006	21,017	6,792		1,609	136		894,433	566	62,214	7,012	1,265,378	2,244,651	14,506
2007	35,214	12,132		3,560	256	87,000	290,816	635	29,696	2,319	1,217,000	1,663,286	15,342
2008	33,736	6,331		19,808	1,681		1,274,527	1,162	10,374	1,190		1,338,445	10,364
Total	164,172	45,068	633,500	53,859	2,540	432,000	6,651,494	5,663	159,890	16,069	10,790,378	18,885,293	69,340
Average	32,834	9,014	316,750	13,465	635	216,000	1,330,299	1,133	31,978	3,214	2,697,595	3,777,059	13,868

Source: WDNR Database, 2009

In the July 1998 ***Production Capacities of the Wisconsin Department of Natural Resources' Fish Propagation Facilities*** report, it was reported that the facility should be capable of an Optimum Sustained Production Capacity of 94,805,170 fish weighing a total of 15,700 pounds and a Maximum Sustained Production Capacity of 119,540,500 fish weighing 30,630 pounds. The majority of that number was to be comprised of fry stockings while the weight was attributed to fingerling production. Production and stocking priorities have changed since 1998. Fry stockings have been reduced with a corresponding increase or demand for fingerling stockings as the survival and return on investment is reported to be more positive. The facility's average annual production from 2004 through 2008 was 13,868 pounds. These annual production totals do not meet either the optimum or maximum production capacities for the facility. If optimum conditions are present, the facility can attain (e.g., 2005 and 2007) the optimum production capacity for weight.

Muskellunge production for the 5-year period ranged from 33,736 fish weighing 6,331 pounds in 2008 to 35,214 fish weighing 12,132 pounds in 2007. Despite the variance in numbers, the weights appeared proportional to the number of fish and thus average fish per pound for these years were somewhat similar. The 5-year stocking average was 32,834 fish and 9,014 pounds resulting in an average size of 3.6 fish per pound.

Over the five-year period, the number of stocked pike reached a high of 19,808 fish weighing 1,681 pounds in 2008 compared to a low of 1,609 fish weighing 136 pounds in 2006. The average pike stocked during 2004-08 was 13,465 fish, 635 pounds or 21.2 fish per pound.

The 5-year walleye production has included fry, small fingerling and large fingerling stockings. Fry production occurred for the first four years of the 5-year period where an average of 2,697,378 fry was stocked. Small fingerling production ranged from 290,816 fish with a weight of 635 pounds in 2007 to 2,108,234 fish and 1,648 pounds in 2004. The five-year averages for small fingerlings stocking were 1,330,299 fish weighing 1,133 pounds. Large fingerling production averaged 31,978 fish was produced that had an average weight of 3,214 pounds. Large fingerling WAE production ranged from 10,374 fish produced in 2008, weighing 1,190 lbs, to 62,214 fish in 2006, weighing a total of 7,012 lbs.

Production Quotas

Table 9B illustrates the assigned quota GTT for 2008 and 2009. Table 9A shows total small walleye and pike stockings in 2008 exceeded their quotas by more than 125,000 and 7,000 fish, respectively. However, muskellunge and large walleye fingerling stockings did not meet the 2008 quota requests. Stockings for these species were short by about 29,000 and 20,000 fish. Factors contributing to the production shortages could include a variety of extensive factors (i.e., weather, water quality, or predation), the number of available ponds and the money and manpower required to operate the ponds.

GTT quotas in 2009 for northern pike, muskellunge, and walleye large fingerlings all exceed the annual 2004-08 averages. The 2009 quota for small walleye appears to be attainable. Increasing stocking/production of NOP, MUE, and large WAE fingerlings may be challenging given historical annual average stockings (2004-08).

Table 9B. GTT Production Quotas 2008 and 2009

Year	NOP Fing. No.	MUE Fing. No.	WAE Sm. Fing. No.	WAE Lg. Fing. No.	Total No.
2008	12,642	62,789	1,157,235	31,180	1,263,846
2009	25,891	56,079	1,292,447	40,723	1,415,140

Source: WDNR Database, 2009

5-Year Stocking Average

Over the 5-year stocking period (2004 – 2008) GTT contributed the majority of small walleye fingerlings by number (51%) and weight (58%) when compared with the hatchery system wide stockings. The large walleye fingerling stockings represent 37% of the total fish stocked (29% by weight) that occurred over the 5-year period with the other coolwater hatcheries (see **Section 3, Table 3I).** Northern pike from the facility made up 10% and 7% of the fry and fingerlings. The hatchery also contributed 75% of the muskellunge fry and 42% of the muskellunge fingerlings within the statewide system. Additional fish production discussion and is included in **Section 3 -** Fish Production Program Evaluation.

Aquaculture Water Supply

Surface Water Source

The main water supply source is from the Yellow River Flowage, where the intakes are located at approximately eight feet below the normal pool level. The two intake structures are reported as being in good condition, but experience problems with silt and dead vegetation during the production season

which is difficult to clean off. Total peak flow to the facility is around 4,000 gpm, which is the flow rate that the intakes allow with the 8-feet of head pressure from the reservoir. Design flow to the hatchery building is in the 1,800 gpm range.

Wells

There are three, 95' deep wells with a capacity of 300 GPM each. Horsepower for each pump is unknown. Maximum allowable groundwater flow is restricted to 864,000 gallons per day (or 600 gpm). The pumps are submersible. Water quality is described as poor being high in hydrogen sulfide gas and iron concentration.

Water Storage and Distribution

Supply to the hatchery complex and building can be well water, lake water, or a combination of the two for temperature control, although the main temperature control is for the hatchery building. Aeration and degassing is completed in aeration columns located in the upper level of the hatchery building for hatchery building production water supply. Water mixing for temperature control is in the lower level of the hatchery building via a heat exchanger.

Water Quality

The well water supply is high in hydrogen sulfide, iron and manganese which makes it unsuitable for fish production but is used for cooling the primary water source. The flowage water supply is relatively high in suspended solids resulting in production challenges as the current drum filter system does not adequately remove the suspended solids. In addition to suspended solids, relatively high nitrogen and phosphorous levels are present. It is also reported that high summer temperatures make it difficult to aerate and cool production ponds as desired.

Water Treatment

The flowage water supply is filtered through one of two rotating drum micro-screens, depending on where water is used. For the hatchery building, the water is routed through a 27-micron screen and for pond use it goes through a 110-micron screen. UV disinfection is used on four egg incubation jar batteries and on the truck fill line. Well water is used for cooling incubation water, while flowage water can be used for heating incubation water. There is independent piping for each type of water. Gas stabilization towers within the building are used for oxygen addition and reduction of nitrogen gas supersaturation.

The ponds are aerated and destratified with the addition of low pressure air through perforated, weighted air line supplied by two compressors.

Fish Rearing Units

Indoor Rearing Units

GTT building contains eleven fiberglass rectangular rearing tanks of various sizes (**Table 9C**). Several of these tanks have minor leaks that have not been repaired. When the tanks were originally delivered, the screen slots were not properly constructed resulting in subsequent modifications by the contractor that has not entirely corrected the problems. In addition to the rectangular tanks, there are two 8'

diameter circular tanks. Water supply is delivered to the tanks by way of overhead piping and drainage is via trench drains.

Table 9C. GTT Indoor Rearing Unit Summary

Building	Main Hatchery	Main Hatchery	Main Hatchery	Main Hatchery
Number	T1 - T4	T5 - T10	T11	C1, C2
Condition of Tanks	Good	Good	Good	Good
Shape (Rectangle/Circular)	Rectangle	Rectangle	Rectangle	Circular
Material	Fiberglass	Fiberglass	Fiberglass	Plastic
Dimensions	16'x2'x2.5'	20'x4'x2.5'	15'x4'x2.5'	8'x3'
Operation Water Depth	2'	Varies	Varies	2'
Operational Volume (ft^3)	64	160	120	100
Total Operational Vol. (ft^3)	256	960	120	200
Avg. Water Flow Rate	10 gpm	27 gpm	Varies	Varies
Max. Water Flow Rate	15 gpm	31 gpm	50 gpm	Unknown
Serial Reuse	No	No	No	No
Source Water	UV Treated, Heated, Screened Flowage	Gas Stabilized, Screened Flowage,T5 UV-Heated	Screened Flowage	Well, UV Treated Flowage
Fish Feeders	No	No	No	No
Oxygenation/Aeration	No	No	oxygen	oxygen
Flow Baffles	No	No	No	No
Cleaning	Varies	Varies	Varies	2-3 X/day

Source: WDNR Facility Questionnaires, 2009

Egg Incubation

There are 1,200 McDonald egg incubation jars in the hatchery building used in the production of walleye, northern pike, muskellunge and sucker fry. Separate jar batteries are identified and utilized for the segregation of these species within the building.

Ponds

GTT has an extensive pond production system utilizing 46 geomembrane lined ponds ranging in size from 0.5 to 1.0 acres. Water depths range from 6 feet at the deep end up to 3' at the shallow end. There are both deep end and shallow end water supply lines. See **Table 9D** for a pond summary that includes general condition of each pond. Condition of ponds has been ranked as follows: poor (sometimes abandoned – needs extensive repairs or complete replacement), fair (needs medium improvements for optimal use) and good (no repairs needed). The photo report shows typical pond features and the generally good condition of the ponds and liners. The ponds are not supplied with electrical service.

Table 9D. GTT Existing Pond Summary

Pond #	Year Constructed	Condition	Surface Acres	Deep End Depth	Shallow End Depth	Average Depth	Pond Volume ft³	Fill Time	Drain Time
A1 - A6	1995	Good	3	6'	4'	5.25'	684,336	varies	varies
C3,C4,D3,D4	1995	Poor	4	6'	2'	3.5'	782,100	varies	varies
B1-B4, C1, C2, C5,C6,D1,D2,D5, D6, E1-E6, F1-F5, G1-G5, H1-H4, I1-I4	1995	Good	36	6'	2'	3.5'	6,843,375	varies	varies
46 Ponds			43				8,309,811		

Source: WDNR Facility Questionnaires, 2009

It is reported the ponds are fully drainable in less than a day, depending on size of pond. Pond outlets and harvest kettles are pre-cast concrete using aluminum screens and meshing. Outlets have fixed concrete sills with an upper and lower drain with separate gate valve controls (one with a lift handle and one with a turn spindle). Non-skid galvanized catwalks link the drain structure to the levee. Each pond contains a two-foot deep, U-shaped harvest kettle with a fresh water supply line to be used during harvest.

It is also reported that settling of the 30" concrete storm sewer line between the C and D pond rows has settled. The six- and eight-inch water supply lines located on the opposite ends of the main water supply line has also broken and been abandoned in the area between the C and D row. Settling has occurred in the corners of ponds C3, C4, D3, and D4 resulting in ponded areas that tend to trap fingerlings during harvest. Ponds are cleaned after each draining. The condition of ponds has been reported as "good" for all except C3 and C4 and D3 and D4 by hatchery personnel. When ponds are drained, sludge is removed by hand when dry, and stockpiled for a short period of time under a large tarp, allowing removal by the public. Whatever is left over is hauled to larger farm fields and land spread.

Predation Control

Predation losses are reported as moderate.

Buildings

GTT contains many buildings which are used to facilitate fish production efforts. Summarized information regarding the support buildings at GTT is provided in **Table 9E.**

Table 9E. GTT Support Building Information

Building Name (No.)	Year Constructed	Area SF	Condition	Number of Rooms	Electric	Lighting (Emergency)	Heating	Ventilation (Adequate)	Air Cond.	Emergency Power	Telephone (Internet)	Fire Alarm
Hatchery Building	1995	10,872	Fair	21	277/480V 3PH 4 Wire	Yes Emergency Generator	Natural Gas	Yes	Yes	Yes Emergency Generator	Yes both phone and internet	No
Filter Building	1995	378	Fair	1	277/480V 3PH 4 Wire	Yes Emergency Generator	Natural Gas	Yes	No	Yes Emergency Generator	No	No
Blower Building	1994	425	Good	1	277/480V 3PH 4 Wire	Yes Emergency Generator	Unit Heater	Yes	No	Yes Emergency Generator	No	No
Cold Storage Building	1995	3200	Good	1	277/480V 3PH 4 Wire	No	No	Yes	No	No	No	No
Effluent Building	1995	550	Good	1	277/480V 3PH 4 Wire	No	Natural Gas	Yes	No	Yes Emergency Generator	No	No
Vehicle Storage	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK

Source: WDNR Facility Questionnaires, 2009

Hatchery and Office Building

The current two-story 10,872 ft² hatchery building was completed in 1995 and contains offices, fish production space, laboratory, shop area, chemical storage, bathrooms, crew spaces, visitor information and viewing area, and public restrooms. The building is supplied with domestic water, non-potable well water and flowage water. There is high pressure, chlorinated service water available for rinsing tanks and fish screens. The hatchery production and storage areas are heated with the office area being heated and air-conditioned. The building is lighted with fluorescent light fixtures.

Feed Storage Room

There is no formal feed storage room in the hatchery building. What feed that is used, is received and stored within an enclosed pole barn storage building located across the river, west of the hatchery

Shop and Vehicle Storage Areas

There is vehicle drive thru in the production area of the hatchery that can be used for vehicle parking. Located in the east end of the production area there is small area used for maintenance and repair having a work bench and storage unit built along the east wall.

Filter Building

There are two rotating drum micro-screens located in this building (378 ft²). One drum screen filters water through a 27-micron screen for supply to the hatchery building while the other is 110-microns for the pond complex. The filter structures and associated components are aging and showing signs of corrosion. The concrete walls of the filter box are showing signs of deterioration. The building is supplied with heat by a natural gas fired unit heater that is one year of age.

Cold Storage Building

The building is located across the river, west of the main hatchery building. It is approximately 3,200 ft² in size used for the storage of vehicles, fish culture supplies and equipment, feed and pond fertilizer. There is loading dock located on the east end of the building with an overhead door.

Blower Building

The Blower Building houses two compressors and associated variable frequency drives for aeration of the rearing ponds. The building (425 ft²) is also used for storing some pond rearing supplies and equipment. The building is heated by a 15-year old electric unit heater described as in fair condition. Ventilation is by exhaust fan and automatic vent.

Residences

There are no on-site residences.

Site

Domestic Water/Wastewater Systems

The hatchery complex is supplied with domestic water from the local public utility. The tap size is 2.5" located at the northwest corner of the hatchery. The supply piping material is described as being of steel.

The domestic wastewater is pumped to the local wastewater treatment plant. It is reported that the pump and check-valves have been repaired 2 – 3 times since the 1995 installation. The system is reported as being fair in condition.

Roads and Parking

The entrance road from the public road to the hatchery building complex is asphalt. The roads around the ponds and reservoir are gravel. The asphalt road surfaces are showing signs of cracking and crumbling. The gravel roads around the pond complex are in fair to good condition, but will require grading and additional material in the future. Visitor parking is adequate, located west of the hatchery and city dam.

Fencing and Security Lighting

The main hatchery complex has 10' high, four-inch square mesh steel fencing installed on posts that appear to be non-treated rough hewn timber. The fence material is generally in good condition, but the posts will need replacing as several have rotted or broken off at the base and others are showing signs of deterioration. Hatchery staff did not complain of vandalism or security issues.

Lighting for the site is provided by street lighting fixtures mounted on poles owned by the hatchery. It is reported there are too many lights that require expensive replacement bulbs. Less expensive alternative replacements are desired. It was also noted that a rental lift truck is required to change some of the bulbs.

Site Drainage and Flooding

None of the facility lies within the 100-year floodplain according to the Flood Insurance Rate Map (FIRM) from the National Flood Insurance Program (Panel Number 550470 0001 C, effective January 1, 1982, see **Appendix F**). The show pool is located close to an area designated as the 500-year flood boundary (Zone B). Nearby flood areas have been designated as Zone A3 which is defined as an area inundated by 100-year flooding for which base flood elevations have been established. The wastewater pond is located near an area that floods at elevations between 1052 and 1053. The 100-year floodplain is explained as a region that has a flooding probability of 0.1% every year.

It has been reported that on rare occasions since 1995, during high water periods, the Yellow River has backed-up into the primary outfall and flooded the open floor drains in the hatchery building, though not rising to the level that would flood the hatchery floor. Some areas of the pavements have settled and accumulate stormwater.

Aquaculture Wastewater

The facility is currently operating under a Wisconsin Permit Discharge Elimination System (WPDES) permit (WI-0049191-03-0). The permit was effective on October 01, 2006 and expires on September 30, 2011. Effluent is currently discharged at 1 of 4 outfall locations; the other outfalls discharged storm and

groundwater directly into the Yellow River. The following parameters are monitored on a variable frequency: flow rate, BOD5, TSS, pH field, dissolved oxygen, total ammonia-nitrogen, total phosphorus, chloride, formalin, hydrogen peroxide, oxytetracycline, and aquashade. An excerpt of the current WPDES permit is located in **Appendix H**.

Utility Systems

Utility	Electrical Power	Telephone	Internet
Company	City of Spooner	Centurytel	Badgernet
Contact Information	715.635.2327	800.824.2877	608.261.4400
Type	120/240V 3-Phase, 4 Wire	NA	DSL, adequate speed
Condition	Good	Good	Good

Source: WDNR Facility Questionnaires, 2009

The site contains three metered service points and includes both overhead and underground distribution. There is no electrical power distribution at the ponds, other than at the Blower Building that is located near the ponds.

Fuel Systems

Diesel fuel is located on the site in an 800 gallon aboveground storage tank (AST) for the emergency generator. There is no leak detection system. Fuel is not dispensed on-site for grounds maintenance or highway vehicles. Natural gas is supplied to the hatchery and is used for heating of the building and water supply boilers.

Instrumentation & Alarm Systems

The hatchery has an alarm and instrumentation system. The SCADA system was manufactured by Allen Bradley, and the phone alarm system is by Racoman. The SCADA system was first installed in 1995, with a software upgrade in 1999 as part of the Y2K preparation, along with the phone alarm installation. The system has control, monitoring and alarm functions.

Emergency Power

Emergency power is provided by a 400 kW generator that is auto starting and transfer. The generator services the entire facility including pond aeration compressors, effluent pumps, systems pumps, filters boilers, and the city dam. When the generator is exercised, a load bank is rented every other year for testing and is not used each time the generator is exercised. It is reported the generator is used approximately one time per year with an average of 10 minutes for a power outage. Outages are infrequent.

Public Visitation Information & Education Services

The hatchery has a visitor information center of approximately 1,000 ft² located on the upper floor of the hatchery building. It is designed to allow overhead viewing of the hatchery production area along with numerous informational boards and placards. Public restrooms and a conference room are located next to the visitor area. Viewing ponds have been emptied and are not presently used due to disease transmission concerns. Approximately 2,000 people visit the site annually.

Facility Problems & Improvement Alternatives

This Section of the report provides a description of individual facility infrastructure problems and a discussion of possible solutions to address these identified problems. The list of facility problems and needs was developed after the site inspection/meeting, and consultation with WDNR staff. A summary of facility problems and possible solutions is shown on **Drawing GTT-3**. 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. While the GTT facility has been recently updated, some infrastructure improvements can be completed to enhance production at or management of the facility.

This discussion and the Drawing's keyed notes address improvement recommendations in the following sequence:

A. Aquaculture Water Supply
B. Fish Rearing Units
C. Buildings
D. Site
E. Aquaculture Wastewater
F. Electrical and HVAC

Improvement item numbers in this discussion correspond to the keyed notes shown on the Drawings. It is suggested that the reader refer to keyed notes on the drawings to become familiar with the location and scope of improvements discussed in this section of the report. If further information regarding a particular improvement item is desired, **Appendix A** includes improvement item descriptions in more detail. **Appendix C** contains example photographs of some of the proposed improvements.

A. Water Supply

Item A1 – Perform a groundwater study to determine availability/quality of additional water

Groundwater near the facility is reported to be high in iron and hydrogen sulfide; both complicate fish rearing activities. A hydrogeological study should be conducted to examine and confirm the quality and quantity of groundwater supplies in the area. This will help determine the potential for additional water to the facility or an alternate water supply to replace the open Yellow River flowage source. A groundwater model will also be developed to be used in any future environmental permitting efforts.

Item A2 – Perform water supply testing and particle size analysis

In the event that additional indoor, intensive rearing is preferred at the facility, water supply testing and particle size testing will be required to size and design a filtration system to improve the water supply.

Item A3 – New wells

The open surface water supply presents numerous facility concerns and biosecurity issues. Pending a successful groundwater investigation (**see Item A1**), several wells could be installed with the intention of replacing surface water with groundwater. Another water supply option includes upgrading the filtration system (see **Item A12**) and a disinfection system (see **Item A10**) to treat the existing open surface water supply. Five-1,000 gpm wells are recommended to replace the 4,000 gpm inflow (one well will serve as back-up). If additional early rearing (see **Item B3**) or coldwater rearing (see **Item B4**) is pursued, additional well water supplies of 400 gpm and 700 gpm, respectively, will be required.

New wells are the preferred method for obtaining new water to meet existing rearing requirements. However, further groundwater information is required before this item can be considered so it will be moved to the Other Group (Further Information Required) and water supply treatment (**Items A2, A5, A6 and A10**) will be recommended to ensure that adequate funding is reserved. Similarly, if new wells are not available, recirculation (**Item A12**) could be practiced for the new proposed rearing units. If results indicate that groundwater is viable for this site, new wells should be recommended instead. If the new wells are installed, the intake work (**Item A4**) would not be required.

Item A4 – Install automatic intake screen cleaning system

Hatchery personnel report that sediment and biofouling of the facility's intake screens require manual cleaning by snorkelers. Stainless steel T-screen(s) with an airburst backwashing system could be retrofitted. Diver installation would likely be required. Alternately, a mechanically cleaning screen or wedgewire intake screen could be installed.

Item A5 – Install sand filtration for building water supply

The open water supply is nutrient rich and presents bacterial and fungal issues that compromise egg incubation and early, intensive rearing. In addition, sediment loads from the open water supply source are too high for the existing microscreen system to effectively treat. Install a sand filtration system to remove fines from water for use in the hatchery building. The sand filtration system has been tentatively sized to handle 1,800 gpm.

Item A6 – Microscreen pond influent water

The facility currently operates two drum microscreens, one 27 micron screen for the building and another 110 micron screen for the ponds. Additional screening is needed for the production ponds. Pending particle sizing analysis (see **Item A2**), the microscreen system will be sized to handle all facility surface water inflow. A two stage microscreen filtration building is recommended to be built with sequential openings (e.g., 100 micron, followed by 40 micron). This addresses the need for more finite filtration of the pond water supply as well as allowing for UV or ozone disinfection of the water supply. Filter media size will need to be determined to best address the requirements of disinfection design and hatchery needs.

Item A7 – Install well blow off piping

None of the three production wells at GTT have blow off piping to rid or purge stagnant well water prior to use in the building. This addition would enhance water supply quality to the production building.

Item A8 – Install iron and H_2S treatment system

Groundwater at GTT contains elevated levels of iron and H_2S, which stains infrastructure within the facility and limits its use for fish culture. To enhance the well water quality, a headbox with increased capacity with packed aeration columns could be installed to aerate the water (see **Item A9**). This might remove the H_2S gas and help to precipitate the iron. Some form of filtering device will be needed to remove the iron floc after aeration. The proposed sand filter used for egg incubation could be used for this purpose (see **Item A5**). If this system proposed system is not adequate, a larger-scale municipal type iron and hydrogen sulfide removal system equipment would need to be installed but they are very expensive.

Item A9 – Install new degassing column

The existing degassing columns at GTT can only treat 600 gpm or 2 of the 3 production wells at a time. Install an additional packed column to degas well water. Modifications to the building headbox may be required to accommodate an additional column or the reconfiguration of columns.

Item A10 – Install disinfection system

GTT currently utilizes 5 small capacity UV units during a few weeks of the year to disinfect against bacteria and diseases causing organisms present within the open water supply. If the open water supply use continues at GTT, a disinfection system (preceded by improved microscreening, see **Item A6**) is recommended. The disinfection equipment should be located downstream of the microscreen equipment to allow continued gravity flow. Potential placement of UV or ozone application would be to convert the existing drum filter building to a disinfection building and constructing a new drum filtration building north of the existing drum filter building. The building would require some concrete and retrofit modifications.

Item A11 – Replace water supply line between Ponds C and D

Water supply piping (6" to 8" dia.) within the pond levee between the C and D ponds has failed and is no longer used. Excavate, remove, and install new pond water supply piping and valve systems.

Item A12 – Install recirculation system for additional rearing

If new well water use is restricted, recirculation of a portion of the surface water used within the building would optimize and support future additional early rearing and/or coldwater rearing tanks. Additional screening and filtration (**see Items A5 and A6**) followed by enhanced UV disinfection (**see Item A10**), and potentially adding to the existing boilers or heat exchangers for temperature control would be required. Additional water supply piping connecting the aforementioned water treatment systems and pumping would also be required. A new headbox may be required if the existing headbox and columns cannot address oxygen enhancement and de-gassing requirements.

Item A13 – Install show pool recirculation system

To isolate any potential disease vectors from being introduced to the building, a separate dedicated package recirculation system (similar to **Item A12** minus temperature control) will be required for the show pool. Recirculated water in the show pool would be filtered, disinfected via a UV system, and pumped back through the system. Facility personnel suggest that DATCP rules may prevent this improvement item from occurring.

Item A14 – Install water supply measurement

During the site visit in 2009, flow measurement devices were not noted at GTT. Install flow measurement devices in pipeline(s) between water supply source and rearing units. This will allow better monitoring and will assist in determining optimal water usage for the facility.

Facility personnel report that GTT actually has flow measurement devices for the surface water supply going to the rearing ponds and hatchery building and for groundwater that is supplied from the wells. This improvement item does not appear to be required so it has been moved to the Other Group (Not Needed).

B. Fish Rearing Units

Item B1 – Replace all pond liners and substandard soils

Many of these liners systems within the GTT ponds are approaching the end of the life span. Replace liners within ponds. A wide variety of lining materials are available including High Density Polyethylene (HDPE), Very Low Density Polyethylene (VLDPE), Chlorosulfonated Polyethylene (CPSE), polypropylene (PP) and EPDM pond guard. Options include total liner replacement or replacement along the pond side slopes.

Hatchery personnel report the some of the subsoils under the existing liners are substandard. Remove and replace soils, as needed. Borrow from an off-site location will likely be required.

Item B2 – Replace pond slide gates

Several of the pond drainage systems (i.e., slide gates) need replacement.

Item B3 – Add intensive rearing units and addition

Additional space for future early rearing is needed, as the facility currently has limited capacity. Facility personnel suggest that a portion of the egg incubation battery space could be sacrificed to meet this need. Perhaps portable rearing units could be traded in and out with egg incubation batteries to increase rearing flexibility at this location. Early rearing tanks would need to be designed to fit the space. Alternately, an addition could be added to the building to accommodate additional early rearing units (see **Item C4**).

GTT personnel suggest circular tanks for additional intensive rearing are preferred. For purposes of this report, sixteen, 16-foot diameter rearing tanks are proposed which will require about 400 gpm.

Item B4 – Add coldwater rearing units

If Items A1 and A3 prove favorable, coldwater rearing could be added GTT with the intent on replacing one of the existing trout rearing stations. Various rearing unit options include linear raceways or circular tanks. These proposed coldwater rearing units could be covered within a pavilion, building, or suspended netting system. Coldwater flows will need to range from 1,000 gpm to 2,000 gpm to meet the proposed rearing needs. Additional rearing vessels can be added but additional water will also need to be available unless coldwater recirculation is practiced. For purposes of this report, four, 20-foot diameter rearing tanks are proposed which will require about 700 gpm. Biosecurity issues would need to be addressed during the design phase.

Item B5 – Fix levee of Ponds C3, C4, D3, and D4

Several of the pond levees at GTT are in poor condition. Regrade, fill, and compact levee, as needed. Borrow material from an off-site source will likely be required.

Item B6 – Install predation control for selected ponds

Facility personnel estimate that 25% of the fish at GTT are lost to predation. Install a suspended netting system over selected production ponds, as needed.

Item B7 – Repair leaks and modify screen slots in indoor holding tanks

The indoor fiberglass rearing units leak and the screen slots within the tanks are poorly designed. If additional indoor rearing is preferred (see **Item B3**) then replacement of the existing units is recommended. Options include linear or circular tanks. If early unit replacement is not an option, the existing tanks could be coated with either an epoxy or a fiberglass material, and new screens could be fabricated to better fit the screen slots.

GTT personnel suggest circular tanks for additional intensive rearing are preferred.

Item B8 – Install new pond aeration system

Current pond aeration at GTT is low pressure air, which is accomplished by centrifugal air pumps that operate under two compressors with variable frequency drive controllers. The existing system is inefficient. Replace the two (2) existing units with four (4) more efficient, positive displacement blowers, offering more flexibility in operation. It is also recommended to replace the weighted perforated air line in the ponds with Colorite aeration units for more efficient pond water column mixing and dissolved oxygen enhancement.

Another option would be to use mechanical aeration (paddlewheels, spray aerators, propeller-aspirator aerators, and jet aerators); however, each of these would require electrical power to the ponds.

Facility personnel report that current pond aeration system is sufficient for small fingerling production. An aeration system upgrade would be warranted if large fingerling production is completed at GTT.

Item B9 – Install larger harvest kettles in selected ponds

Facility personnel report the existing Kansas style harvest kettles are not large enough to accommodate large fish. Seines are used to harvest the fish in these instances. On a selected number of ponds, replace

existing kettles and rebuild larger internal harvest kettles. Facility personnel suggest an alternative that includes removing the existing kettles and deepening the ponds by 2 feet for temperature control. Costs have been presented for both options.

Item B10 – Replace all wooden screens/weir boards for biosecurity

The existing screens and weir boards within the rearing units are constructed of wood, which can provide a substrate for disease causing organisms. Replace old screens and weir boards and install new units constructed of an inert (i.e., fiberglass or aluminum) material.

Item B11 – Increase capacity of shallow end supply for large fingerling ponds

Facility personnel report the existing shallow end supply pipelines are not large enough to accommodate ponds holding large fingerling fish. Increase the supply line to selected ponds.

C. Buildings

Item C1 – Repair hatchery building foundation leak

Hatchery personnel report there is a foundation leak in the hatchery building. The leak is on the east side of the building near the shower ceiling and electrical fixtures. Foundation repairs are needed to stop the leak and prevent any additional water damage to the building.

Item C2 – Replace hatchery building roof

The hatchery building roof at GTT leaks and need replacement. Personnel state that project request has been filed. A metal roofing system is preferred.

Item C3 – Replace hatchery building flooring on upper level

The flooring on the upper level of the hatchery building is peeling. Flooring replacement is recommended.

Item C4 – Hatchery building addition for intensive or coldwater rearing

An addition to the existing hatchery building will likely be required to support additional intensive (**Item B3**) rearing. Costs will vary depending on construction material and area (SF). Size of a new production area and rearing units would be determined by the production needs and goals, but a small sized addition with circular tanks and egg receiving/disinfection room (see **Item C7**) is recommended. For aesthetic purposes, construction materials are suggested to match (to the extent that is possible) existing materials or appearance of the other buildings on the site.

Item C5 – Convert part of storage building to heated workshop

Hatchery personnel report that the storage building was intended to be partially heated; however, that work was not completed. Insulate and install heating in one of the storage building bays for use as a workshop. Hatchery staff indicate that this is only required if production is increased dramatically for the facility.

Item C6 – Add building features to allow biosecure isolation of individual lots

To help insure the future biosecurity of GTT, separation within buildings to isolate the various fish species and lots on station maybe required. This could include dedicated, quality water supply, spaces for each species or lot incubated, hatched, and reared. Wall partitions and piping modifications might be required.

Item C7 – Add egg disinfection room or building

For biosecurity reasons, each facility should have a designated egg receiving room that is isolated from the rest of the hatchery building. This room would require a small water supply and space to hold and disinfect eggs until they are ready to be distributed into the egg incubation room in the building. A drain and small chemical holding tank may be required. Space will either need to be renovated within existing hatchery buildings or a separate building or addition could be added.

Item C8 – Add temperature control to feed storage

GTT currently does not have climate controlled feed storage. An air-conditioning system for feed storage room in the Cold Storage Building (300 ft^2) should be added to preserve fish feed quality. Feed for both coolwater and potential future coldwater programs would be stored in this area.

D. Site

Item D1 – Create video showing fish rearing and egg take

Video illustrating hatchery production and stocking procedures would enhance the visitor educational and interpretative opportunities at the hatchery, especially during off-season visits.

Item D2 – Evaluate site flooding and provide stormwater management system

A site hydrology study should be conducted to evaluate stormwater quantities for the site. As issues are either confirmed or ruled out, improvement options can be developed to improve site stormwater management and flooding issues

Item D3 – Restabilize 30" storm sewer line between the C and D Ponds

Hatchery personnel report that the 30" storm sewer line in between the C and D ponds has settled and needs replacement. This issue maybe connected to fixing levees of several C and D ponds (**see Item B5**). Excavate, remove, and replace existing sewer line.

Item D4 – Replace fence materials

Facility personnel report current fence heights are sufficient to keep deer out of GTT. Replacement fence mesh material (smaller openings) is needed to keep small, fish eating mammals out. The fencing should also be buried to prevent underground access to the site.

Item D5 – Repair and resurface roads and parking areas

Facility staff report that the roads are in poor condition and that the entrance road has experienced frost heave. Repair and resurface roads, as needed. The following items are included in the paving work:

compaction of gravel, grading and bituminous concrete or gravel surfacing. Exact locations and calculated amounts of repaving may undergo revision after input from facility personnel.

Item D6 – Add truck/equipment disinfection area

Transporting fish through transfers and stockings has the potential to introduce disease vectors and/or invasive species into the hatchery system, all of which can compromise fish production and stocking. A dedicated disinfection area is recommended for hatchery equipment and fish transport and stocking vehicles. This could be developed next to the main entrance.

E. Aquaculture Wastewater

Item E1 – Install pump hoist

Hatchery personnel have requested a way to better access and service pumps within the facility's effluent pump station building. Effluent pumps are already rail mounted and removable. Currently, however, the only way to remove them is with a crane through hatches in the buildings roof. Other than the enlargement of one of the three pump accesses in the floor of the building to remove the pump from the sump, a hoist mounted inside the building is needed for lifting the pumps out of the sump.

Item E2 – Replace pump access hatch with larger hatch

The existing hatches for the facility's effluent pump station are undersized. Install a larger hatch to accommodate better access and the ability to service the effluent pumps (**see Item E1**).

Item E3 – Repair concrete on parshall flume

Concrete spalling has occurred within the parshall flume. Repair concrete structure.

Item E4 – Enlarge settling pond or replace with seepage pond

The facility's settling pond appears to be too small to handle all of the discharge water. Evaluation is needed to determine whether the existing settling pond is adequate to treat effluent. Alternately, a new seepage pond could be constructed to allow no effluent from the facility. However, additional space may be required. The original borrow pit could also be converted to some form of effluent treatment if future WPDES permit limits become more stringent.

Given its location to the Yellow River, the proposed seepage pond (former borrow pit) could be surrounded by wetlands. Jurisdictional wetlands delineation should be conducted around the seepage pond, if it is deemed a plausible wastewater treatment solution.

F. Utility Systems

Item F1 – Install load bank on standby generator

The electrical system has been prone to lightening strikes and damage. The existing emergency generator is too large for the facility. The hatchery staff cannot put enough of a load on it to exercise it properly. Staff is concerned about keeping a fresh supply of diesel fuel in 800-gallon tank. Install a load bank on the standby generator to exercise properly. Alternately, the system could be

replaced instead (see **Item F2**). For purposes of this study, Item F2 has been selected to be included in the cost projections so this item will be moved to the Other Group (Not Needed).

Item F2 – Replace generator with smaller system

See also **Item F1**. Alternately, the generator could be replaced with a new smaller system. The existing unit could either be sold or used at another hatchery or other WDNR property. Replacement is recommended instead of installing a load bank.

Item F3 – Replace/upgrade instrumentation system hardware and software

The existing instrumentation system has become outdated and difficult to update. Replace/upgrade instrumentation control system hardware and software.

Item F4 – Replace gas piping

The natural gas piping contains some corrosion at the hatchery building and filtration and effluent buildings. Replacement piping is suggested for a few feet on the outside of the hatchery building and a couple feet inside the Filtration and effluent buildings.

Item F5 – Replace indoor / outdoor lighting

Some of the existing lighting at GTT operates with expensive light bulbs and others require a cherry picker to service. Others have failed due to water infiltration. Replace inefficient indoor and outdoor lighting systems across the facility with cost efficient and easy replacement fixtures.

Item F6 – Install fire alarm system for the facility

Install a fire alarm system at the facility to warn personnel in the event of fire.

Prioritization and Opinions of Probable Cost

The **Summary** and **Detailed** O**pinions of Probable Cost** for GTT are provided at the end of this Section. Item numbers match those already presented in the text and illustrated on the Drawings. The GTT improvements plan will cost about **$8.6 million to construct**. After the State design and construction contingencies are added to the total, **the project budget** will need to be about **$10.7 million**. See **Section 24** for an explanation of cost estimating methodologies, assumptions, unit prices, descriptions, and contingency explanations.

All provided costs are in 2011 dollars and will **require escalation (4% per year)** to the appropriate construction period. For example, if a $25 million job is not constructed until 2012, the cost becomes $27 million. Due to the recent natural disasters (e.g., hurricanes) and the oil price increases, the construction industry is faced with shortages, escalated prices, and a large demand for new and renovation construction in the affected areas. Recently bid projects have seen an increase in the range of 10% to 25% above normal opinions of probable cost.

The recommended improvements for each facility have been divided into implementation groups in order to provide optimal funding and construction sequencing flexibility for the entire project. WDNR can use these categories to assist in obtaining appropriate construction funding. These groupings may need to

undergo revision as system-wide scheduling and State funding allocations change. These Improvement Groups have been developed by the Consultant along with input from the WDNR staff to reflect the following categories:

Group 1 - Human Health and Safety. These improvements are considered critical to the station's ability to comply with the State's Human Health and Safety laws and codes such as Commerce DILHR rules. These improvement items include 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 are also included in this group.

Group 2 - Environmental Compliance. These improvement items were selected in order to comply with state environmental laws and WDNR environmental rules. Recommended effluent treatment systems are included in this grouping to assist in meeting the current WPDES permit limits. Water supply measurement systems are included to meet upcoming water supply regulations. Also any site drainage and erosion control items are included.

Group 3 – Fish Health & Biosecurity. These improvement items are intended as a set of preventive measures to 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 are also included in this group such as 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.

Group 4 - Major Building Maintenance. Each facility contains numerous support buildings which are used to support rearing efforts. Many buildings are antiquated and require extensive (i.e., > $5,000) renovations to allow continued usage. These types of improvements include major kitchen, restroom renovations, foundation work, wall/flooring replacement, and exterior siding/painting. Many buildings also required extensive HVAC upgrading or replacement.

Group 5 - Minor Building Maintenance. This group contains support buildings that require minor (<$5,000) renovation projects to allow continued support functions. Typical minor renovations to small buildings generally fall within this category.

Group 6 - Improvements Needed to Meet Stocking Goals. The majority of the remaining improvement items fall within the requirements to meet stocking goals category. Construction of these improvements is considered essential to the station's ability to meet current and future WDNR fish production goals. Renovation is generally required to repair deteriorated infrastructure and restore operational performance. Enhanced water supply, treatment and recirculation items are generally included in this category. Future enhanced new wastewater treatment systems are included in this group to meet requirements for proposed increased production. General site work items, all new support buildings and visitor restrooms also fall within this group.

An **Other** Group was added to include items that have been completed, do not appear to be feasible or are redundant to other selected alternatives. The costs associated with these items are not included in the overall facility subtotal. Sometimes specific issues are addressed by the facility between the time of the initial site visit and the printing of the final report. As the report evolved, either WDNR or further research has indicated that initially recommended items cannot be applied at a certain facility. These types of items have also been moved to the Other group. Sometimes items are not recommended because other similar category items have been selected. For instance, if a new well is able to provide adequate water, recirculation would not be recommended. Sometimes, several options are presented for one improvement item but only one has been selected for subtotaling in the project probable construction costs. The optional costs have been provided to allow WDNR the option to choose alternatives in the future if needs or preferences change.

Note: In the **Detailed Opinions of Probable Cost**, the costs are calculated by taking the number of units by cost per unit. This total is multiplied by the general conditions contingency (5%) and the estimating contingency (10%). This value is shown in the fifth column of the spreadsheet and titled **Subtotal+15% GC/Est**. This value is generally considered the **cost to construct**. The next column takes the previous subtotal and multiplies it by 1.25 to include the Design and Construction Contingencies. This column is entitled **Total Cost+25% Cont** and is generally considered to be the **cost needed to budget** for that improvement item. (See **Section 24** for further explanation regarding all contingencies).

GTT SFH Summary Opinions of Probable Cost

ITEM	DRAWING I.D. #	ROUNDED CONST COST[a]	ROUNDED TOTAL COST[a]	
Total Cost for all Recommended Improvements		**$8,615,000**	**$10,694,000**	
Group 1 - Human Health and Safety		**$91,000**	**$114,000**	
Install pump hoist	E1	$58,000	$72,000	
Replace pump access hatch with larger hatch	E2	$6,000	$8,000	
Replace gas piping	F4	$4,000	$5,000	
Install fire alarm system for the facility	F6	$23,000	$29,000	
Group 2 - Environmental Compliance		**$225,000**	**$281,000**	
Evaluate site flooding and provide stormwater mgmt. sys.	D2	$52,000	$65,000	
Enlarge settling pond or replace with seepage pond	E4	$173,000	$216,000	
Group 3 - Fish Health and Biosecurity		**$2,039,000**	**$2,478,000**	
Perform groundwater study	A1	$285,000	$285,000	
Perform water supply testing & particle size analysis	A2	$7,000	$9,000	
Install sand filtration for building water supply	A5	$299,000	$374,000	
Microscreen pond influent water	A6	$460,000	$575,000	
Install iron and H2S treatment system (see A5 & A9)	A8	$0	$0	
Install new degassing column	A9	$35,000	$44,000	
Install disinfection system	A10	$418,000	$522,000	
Install new pond aeration system	B8	$238,000	$297,000	*
Replace all wooden screens/weir boards for biosecurity	B10	$144,000	$180,000	
Add building features to allow biosecure isolation of individual lots	C6	$69,000	$87,000	
Add biosecure egg disinfection room or building	C7	$42,000	$52,000	
Add truck/equipment disinfection area	D6	$42,000	$53,000	
Group 4 - Major Building Maintenance		**$287,000**	**$356,000**	
Repair hatchery building foundation leak	C1	$29,000	$36,000	
Replace hatchery building roof	C2	$82,000	$102,000	
Replace hatchery building flooring on upper level	C3	$63,000	$78,000	
Convert part of storage building to heated workshop	C5	$12,000	$15,000	
Add temperature control to feed storage	C8	$9,000	$11,000	
Replace indoor/outdoor lighting	F5	$92,000	$114,000	
Group 5 - Minor Building Maintenance		**$0**	**$0**	
None				

GTT SFH Summary Opinions of Probable Cost

ITEM	DRAWING I.D. #	ROUNDED CONST COST[a]	ROUNDED TOTAL COST[a]	
Group 6 - Improvements Needed to Meet Fish Stocking Goals		**$5,973,000**	**$7,465,000**	
Install automatic intake screen cleaning system	A4	$133,000	$166,000	
Install well blow off piping	A7	$9,000	$11,000	
Replace water supply line (Ponds C&D)	A11	$52,000	$65,000	
Install recirc. system for additional rearing	A12	$1,001,000	$1,251,000	*
Install show pool recirculation & treatment system	A13	$58,000	$72,000	
Replace all pond liners & substandard subsoil	B1	$2,102,000	$2,628,000	
Replace pond drain valves	B2	$133,000	$166,000	
Add intensive rearing tanks and addition	B3	$419,000	$524,000	*
Add coldwater rearing tanks	B4	$371,000	$463,000	*
Fix levees & settled areas for Ponds C3, C4, D3 & D4	B5	$111,000	$138,000	
Install predation control for selected ponds	B6	$58,000	$72,000	
Repair leaks and modify screen slots in indoor holding tanks	B7	$32,000	$40,000	
Install larger harvest kettles in selected ponds	B9	$138,000	$173,000	
Increase capacity of shallow end supply for large fingerling ponds	B11	$127,000	$159,000	
Hatchery Building addition for intensive or coldwater rearing (see B3/B4)	C4	$0	$0	*
Create a video showing fish rearing and egg take	D1	$6,000	$8,000	
Replace fence materials	D4	$219,000	$274,000	
Repair & resurface roads and parking areas	D5	$679,000	$849,000	
Restabilize 30" storm sewer line between C & D pond rows	D3	$42,000	$52,000	
Repair concrete on parshall flume	E3	$6,000	$8,000	
Replace generator with smaller system	F2	$104,000	$130,000	
Replace instrumentation system hardware and software	F3	$173,000	$216,000	
Other		**$1,036,000**	**$1,295,000**	
New Wells (Further Information Required)	A3	$955,000	$1,194,000	
Install water supply flow measurement (Not Needed)	A14	$52,000	$65,000	
Install load bank on standby generator (Not Needed)	F1	$29,000	$36,000	

[a] Rounded Construction Costs include 15% Contingency: General Conditions (5%) ; Estimating (10%). Rounded Total Costs (or Costs needed to Budget) also include 25% Contingency: Planning & Design (8%); Construction Phase Engineering (7%); and State Construction (10%, Bidding and Change Order). [Total * (1.10+.05) * (1.10 + 0.08 + 0.07)]

Costs do **NOT** include: Design Reimbursables (Variable); State Agency Administrative Fee; or escalation beyond 2011 Construction. See Section 24 for further discussion and recommendations regarding contingencies.

* = Items associated with future increased production

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Project: Comprehensive Study of WI Fish Propagation System
Phase: Study **Hatchery:** Gov. Tommy G. Thompson
By: Team **Date:** 12/1/2011

Gov. Tommy G. Thompson SFH Detailed Opinions of Probable Cost						
Dwg. I.D.#	ITEM	NO. UNITS	UNIT MEAS.	COST PER UNIT	SUBTOTAL +15% GC/EST	TOTAL COST +25% CONT.

See Report Section 24 for detailed explanation of fees & contingencies

A.	**Aquaculture Water Supply**					
A1	**Perform groundwater study**				**$284,625**	**$284,625**
	Groundwater Test Drilling (new well will serve as Backup)	1	LS	$112,500.00	$129,375	$129,375
	Aquifer Test	1	LS	$60,000.00	$69,000	$69,000
	Aquifer Modeling	1	LS	$75,000.00	$86,250	$86,250
A2	**Perform water supply testing & particle size analysis**				**$6,900**	**$8,625**
	Water supply testing	1	LS	$5,000.00	$5,750	$7,188
	Particle size analysis	1	LS	$1,000.00	$1,150	$1,438
A3	**New Wells (Further Information Required)**				**$954,501**	**$1,193,126**
	New Well - 1000 gpm (Replace Lake Supply)	4	EA	$150,000.00	$690,000	$862,500
	New Well - 1000 gpm (New Rearing Supply)	1	EA	$150,001.00	$172,501	$215,626
	Aeration/Degassing Head tank System	1	EA	$80,000.00	$92,000	$115,000
A4	**Install automatic intake screen cleaning system**				**$132,250**	**$165,313**
	Mechanical Screen (Not Included in Subtotal)			*Subtotal*	*$143,750*	*$179,688*
	Install mechanical screen	1	LS	$125,000.00	$143,750	$179,688
	Wedge wire Screen (Not Included in Subtotal)			*Subtotal*	*$69,000*	*$86,250*
	Install wedge wire screen	200	SF	$300.00	$69,000	$86,250
	T-Screens (Recommended)			*Subtotal*	*$132,250*	*$165,313*
	Stainless Steel T-Screen Intake	2	EA	$25,000.00	$57,500	$71,875
	Associated Piping, Fittings & Installation	2	EA	$7,500.00	$17,250	$21,563
	Airburst capabilities	1	LS	$50,000.00	$57,500	$71,875
A5	**Install sand filtration for building water supply**				**$299,000**	**$373,750**
	Package Sand Filtration System w/ Controls	1	LS	$260,000.00	$299,000	$373,750
A6	**Microscreen pond influent water**				**$460,000**	**$575,000**
	Sump and Foundation	400	SF	$75.00	$34,500	$43,125
	Building	400	SF	$150.00	$69,000	$86,250
	Drum Microscreen	4	EA	$55,000.00	$253,000	$316,250
	Plumbing	1	LS	$50,000.00	$57,500	$71,875
	Electrical	1	LS	$25,000.00	$28,750	$35,938
	Backwash Treatment	1	LS	$15,000.00	$17,250	$21,563
A7	**Install well blow off piping**				**$8,625**	**$10,781**
	Install well blow off piping	1	LS	$7,500.00	$8,625	$10,781

Gov. Tommy G. Thompson SFH Detailed Opinions of Probable Cost						
Dwg. I.D.#	ITEM	NO. UNITS	UNIT MEAS.	COST PER UNIT	SUBTOTAL +15% GC/EST	TOTAL COST +25% CONT.
A8	**Install iron and H2S treatment system (see A5 & A9)**				**$0**	**$0**
	Iron and H2S Treatment (Low-Tech, Recommended)			*Subtotal*	*$0*	*$0*
	Degassing Head tank (see Item A9)					
	Filtration System (see Item A5)					
	Iron and H2S Treatment (Large-Scale, Not Included in Subtotal)			*Subtotal*	*$3,312,000*	*$4,140,000*
	Iron Removal System	1,800	GPM	$1,500.00	$3,105,000	$3,881,250
	Hydrogen Sulfide Removal System	1,800	GPM	$100.00	$207,000	$258,750
A9	**Install new degassing column**				**$34,500**	**$43,125**
	Upgrade Existing degassing system	1	LS	$30,000.00	$34,500	$43,125
A10	**Install disinfection system**				**$417,220**	**$521,525**
	UV Channel and Lamp Package	4	PK	$75,000.00	$345,000	$431,250
	UV Building modifications	378	SF	$100.00	$43,470	$54,338
	UV Electrical	1	LS	$10,000.00	$11,500	$14,375
	UV Plumbing	1	LS	$15,000.00	$17,250	$21,563
A11	**Replace water supply line (Ponds C&D)**				**$51,750**	**$64,688**
	Replace water supply line	900	LF	$50.00	$51,750	$64,688
A12	**Install recirc. system for additional rearing**				**$1,000,017**	**$1,250,021**
	Recirculation Pump Station			*Subtotal*	*$160,517*	*$200,646*
	Dewatering	1	LS	$2,500.00	$2,875	$3,594
	Sump Concrete	20	CY	$750.00	$17,250	$21,563
	Grating and Grate Support over Sump	180	SF	$6.00	$1,242	$1,553
	Pump w/fittings - 800 gpm each	3	EA	$11,000.00	$37,950	$47,438
	Metering Water Flow	1	LS	$10,000.00	$11,500	$14,375
	Piping, Reuse Pump Station to Building	500	LF	$50.00	$28,750	$35,938
	Variable Frequency Drives w/ Isolation and Bypass	3	LS	$10,000.00	$34,500	$43,125
	Pump Connections and Electrical	3	EA	$1,000.00	$3,450	$4,313
	Alarming and Instrumentation	1	LS	$20,000.00	$23,000	$28,750
	Sand Filtration System			*Subtotal*	*$0*	*$0*
	See Item A5					
	Microscreen System			*Subtotal*	*$284,625*	*$355,781*
	Sump and Foundation	300	SF	$75.00	$25,875	$32,344
	Building	300	SF	$150.00	$51,750	$64,688
	Drum Microscreen	2	EA	$55,000.00	$126,500	$158,125
	Plumbing	1	LS	$40,000.00	$46,000	$57,500
	Electrical	1	LS	$15,000.00	$17,250	$21,563
	Backwash Treatment	1	LS	$15,000.00	$17,250	$21,563

Gov. Tommy G. Thompson SFH Detailed Opinions of Probable Cost						
Dwg. I.D.#	ITEM	NO. UNITS	UNIT MEAS.	COST PER UNIT	SUBTOTAL +15% GC/EST	TOTAL COST +25% CONT.
	Ultraviolet Disinfection System			*Subtotal*	*$230,000*	*$287,500*
	Package UV System	1600	GPM	$125.00	$230,000	$287,500
	Nitrification System (Not Included in Subtotal)			*Subtotal*	*$135,700*	*$169,625*
	Blower System	1	PKG	$20,000.00	$23,000	$28,750
	Media	1	LS	$40,000.00	$46,000	$57,500
	Plumbing	1	EA	$20,000.00	$23,000	$28,750
	Structural Sump and Pit	1	LS	$30,000.00	$34,500	$43,125
	Electrical	1	LS	$8,000.00	$9,200	$11,500
	Head tank System			*Subtotal*	*$23,000*	*$28,750*
	Add to Existing Head tank/Aeration Degassing System	1	EA	$20,000.00	$23,000	$28,750
	Recirculation Equipment Building			*Subtotal*	*$301,875*	*$377,344*
	Recirculation Equipment Building	1,500	SF	$175.00	$301,875	$377,344
	Temperature Control System (Optional, Not Included in Subtotal)			*Subtotal*	*$258,750*	*$323,438*
	Boiler and Heat Exchange System	1	LS	$225,000.00	$258,750	$323,438
A13	**Install show pool recirculation & treatment system**				**$57,500**	**$71,875**
	Large Package aquarium recirculation system	1	LS	$50,000.00	$57,500	$71,875
A14	**Install water supply flow measurement (Not Needed)**				**$51,750**	**$64,688**
	Magnetic Flow meter w/ remote output	3	EA	$15,000.00	$51,750	$64,688
				$1,500.00		
B.	**Fish Rearing Units**					
B1	**Replace all pond liners & substandard subsoil**				**$2,101,625**	**$2,627,031**
	Replace all pond liners (as needed)	43	AC	$40,000.00	$1,978,000	$2,472,500
	Stabilize soil	43	AC	$2,500.00	$123,625	$154,531
B2	**Replace pond drain valves**				**$132,250**	**$165,313**
	Replace pond drain valves as needed	46	EA	$2,500.00	$132,250	$165,313
B3	**Add intensive rearing tanks and addition**				**$418,600**	**$523,250**
	Circular Units (16-6' dia.)	1,820	SF	$200.00	$418,600	$523,250
B4	**Add coldwater rearing tanks**				**$370,013**	**$462,516**
	New Circular Units with Pavilion (Recommended)			*Subtotal*	*$370,013*	*$462,516*
	New Circular Units (4-20' dia.)	3,575	SF	$90.00	$370,013	$462,516
	New Raceways with Pavilion (Not Included in Subtotal)			*Subtotal*	*$496,800*	*$621,000*
	New Raceways (2-100')	4,800	SF	$90.00	$496,800	$621,000

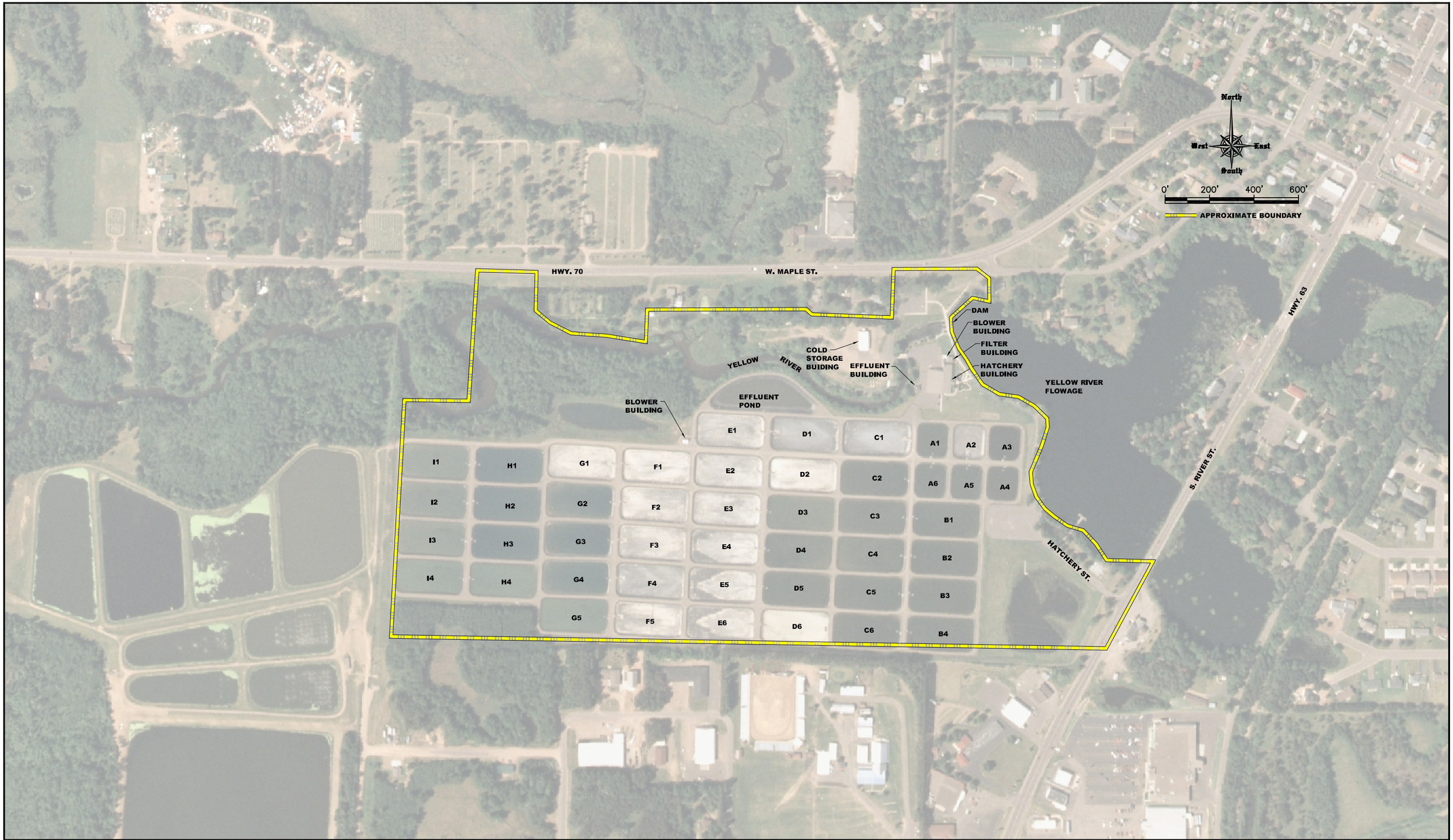
Gov. Tommy G. Thompson SFH Detailed Opinions of Probable Cost						
Dwg. I.D.#	ITEM	NO. UNITS	UNIT MEAS.	COST PER UNIT	SUBTOTAL +15% GC/EST	TOTAL COST +25% CONT.
B5	**Fix levees & settled areas for Ponds C3, C4, D3 & D4**				**$110,400**	**$138,000**
	Levee work and earthwork	9,600	CY	$10.00	$110,400	$138,000
B6	**Install predation control for selected ponds**				**$57,500**	**$71,875**
	Suspended netting system	5	AC	$10,000.00	$57,500	$71,875
B7	**Repair leaks and modify screen slots in indoor holding tanks**				**$31,913**	**$39,891**
	Repair leaks with FRP coating	1,550	SF	$5.00	$8,913	$11,141
	Modify screen slots or replace screens	1	LS	$20,000.00	$23,000	$28,750
B8	**Install new pond aeration system**				**$237,590**	**$296,988**
	Replace LPA pond aeration (Recommended)			*Subtotal*	*$237,590*	*$296,988*
	Replace Blowers (2 replacement, 2 new)	4	EA	$30,000.00	$138,000	$172,500
	Colorite Aerators	46	EA	$1,800.00	$95,220	$119,025
	Hosing	1,200	LF	$1.25	$1,725	$2,156
	Quick Couplings (Cam Locks)	92	PR	$25.00	$2,645	$3,306
	New mechanical pond aeration (not included in subtotal)			*Subtotal*	*$317,400*	*$396,750*
	Paddle Wheel/Colorite Aerators & Indiv. Blower	46	EA	$2,500.00	$132,250	$165,313
	Pond Electrical Receptacles & Distribution	23	EA	$7,000.00	$185,150	$231,438
B9	**Install larger harvest kettles in selected ponds**				**$138,000**	**$172,500**
	Larger Harvest Kettle (Recommended)			*Subtotal*	*$138,000*	*$172,500*
	Larger Harvest Kettle	6	EA	$20,000.00	$138,000	$172,500
	Remove Harvest Structures & Deepen Ponds (Not Included in Subtotal)			*Subtotal*	*$182,850*	*$228,563*
	Remove harvest structures	6	EA	$2,500.00	$17,250	$21,563
	Deepen ponds	12,000	CY	$12.00	$165,600	$207,000
B10	**Replace all wooden screens/weir boards for biosecurity**				**$143,750**	**$179,688**
	Replace all wooden screens/weir boards for biosecurity	500	EA	$250.00	$143,750	$179,688
B11	**Increase capacity of shallow end supply for large fingerling ponds**				**$126,500**	**$158,125**
	New shallow end supply piping	2,200	LF	$50.00	$126,500	$158,125

C.	**Buildings**					
C1	**Repair hatchery building foundation leak**				**$28,750**	**$35,938**
	Concrete repairs	1	LS	$25,000.00	$28,750	$35,938
C2	**Replace hatchery building roof**				**$81,104**	**$101,380**
	Hatchery Bldg. Roofing & Gutters	10,850	SF	$6.50	$81,104	$101,380
C3	**Replace hatchery building flooring on upper level**				**$62,388**	**$77,984**
	New flooring for office building	10,850	SF	$5.00	$62,388	$77,984

Gov. Tommy G. Thompson SFH Detailed Opinions of Probable Cost						
Dwg. I.D.#	ITEM	NO. UNITS	UNIT MEAS.	COST PER UNIT	SUBTOTAL +15% GC/EST	TOTAL COST +25% CONT.
C4	**Hatchery Building addition for intensive or coldwater rearing (see B3/B4)**				**$0**	**$0**
	See Items B3 and B4				$0	$0
C5	**Convert part of storage building to heated workshop**				**$11,500**	**$14,375**
	Add insulation and heat	1,000	SF	$10.00	$11,500	$14,375
C6	**Add building features to allow biosecure isolation of individual lots**				**$69,000**	**$86,250**
	Add building features to promote isolation (major)	1	LS	$60,000.00	$69,000	$86,250
C7	**Add biosecure egg disinfection room or building**				**$41,400**	**$51,750**
	Addition or Building for isolated egg disinfection	300	SF	$120.00	$41,400	$51,750
C8	**Add temperature control to feed storage**				**$8,625**	**$10,781**
	Feed Storage Space Conversion (20*15)	300	SF	$25.00	$8,625	$10,781
D.	**Site**					
D1	**Create a video showing fish rearing and egg take**				**$5,750**	**$7,188**
	Create video	1	LS	$5,000.00	$5,750	$7,188
D2	**Evaluate site flooding and provide stormwater mgmt. sys.**				**$51,750**	**$64,688**
	Perform hydrology study	1	LS	$15,000.00	$17,250	$21,563
	Storm Drain Piping (moderate)	1	LS	$30,000.00	$34,500	$43,125
D3	**Restabilize 30" storm sewer line between C & D pond rows**				**$41,400**	**$51,750**
	Install new storm drain line	900	LF	$40.00	$41,400	$51,750
D4	**Replace fence materials**				**$218,500**	**$273,125**
	Replace fence posts & bottom mesh	7,600	LF	$25.00	$218,500	$273,125
D5	**Repair & resurface roads and parking areas**				**$678,500**	**$848,125**
	Upgrade Roads with new Gravel Surface	32,000	SY	$10.00	$368,000	$460,000
	Bituminous Surface for Entrance and Main Building Area	10,800	SY	$25.00	$310,500	$388,125
D6	**Add truck/equipment disinfection area**				**$41,688**	**$52,109**
	Truck Disinfection Station	1	LS	$15,000.00	$17,250	$21,563
	Water Supply to Disinfection Station	500	LF	$20.00	$11,500	$14,375
	Roadway Aggregate	250	SY	$15.00	$4,313	$5,391
	Electrical	1	LS	$2,500.00	$2,875	$3,594
	Detention Tank	1	LS	$5,000.00	$5,750	$7,188
E.	**Aquaculture Wastewater**					
E1	**Install pump hoist**				**$57,500**	**$71,875**
	Install pump hoist	1	LS	$50,000.00	$57,500	$71,875

Gov. Tommy G. Thompson SFH Detailed Opinions of Probable Cost						
Dwg. I.D.#	ITEM	NO. UNITS	UNIT MEAS.	COST PER UNIT	SUBTOTAL +15% GC/EST	TOTAL COST +25% CONT.
E2	**Replace pump access hatch with larger hatch**				**$5,750**	**$7,188**
	Replace pump access hatch with larger hatch	1	LS	$5,000.00	$5,750	$7,188
E3	**Repair concrete on parshall flume**				**$5,750**	**$7,188**
	Repair concrete on parshall flume	1	LS	$5,000.00	$5,750	$7,188
E4	**Enlarge settling pond or replace with seepage pond**				**$172,500**	**$215,625**
	Enlarge Settling Pond (Not Included in Subtotal)			*Subtotal*	*$86,250*	*$107,813*
	Enlarge Settling Pond	1	AC	$75,000.00	$86,250	$107,813
	New Seepage Pond (Included in Subtotal)			*Subtotal*	*$172,500*	*$215,625*
	New Seepage Pond	1	LS	$150,000.00	$172,500	$215,625

F.	**Electrical and HVAC**					
F1	**Install load bank on standby generator (Not Needed)**				**$28,750**	**$35,938**
	Install load bank on standby generator	1	LS	$25,000.00	$28,750	$35,938
F2	**Replace generator with smaller system**				**$103,500**	**$129,375**
	Emergency Generator: 150kW with Outdoor Enclosure	1	LS	$60,000.00	$69,000	$86,250
	Automatic Transfer Switch: 600A, 4P	1	LS	$17,000.00	$19,550	$24,438
	Fuel Tank	1	LS	$13,000.00	$14,950	$18,688
F3	**Replace instrumentation system hardware and software**				**$172,500**	**$215,625**
	Replace instrumentation system (large)	1	LS	$150,000.00	$172,500	$215,625
F4	**Replace gas piping**				**$3,450**	**$4,313**
	Replace gas piping	200	LF	$15.00	$3,450	$4,313
F5	**Replace indoor/outdoor lighting**				**$91,138**	**$113,922**
	Replace indoor lighting	10,850	SF	$5.00	$62,388	$77,984
	Replace outdoor lighting	10	EA	$2,500.00	$28,750	$35,938
F6	**Install fire alarm system for the facility**				**$23,000**	**$28,750**
	Install fire alarm system for the facility (moderate)	1	LS	$20,000.00	$23,000	$28,750



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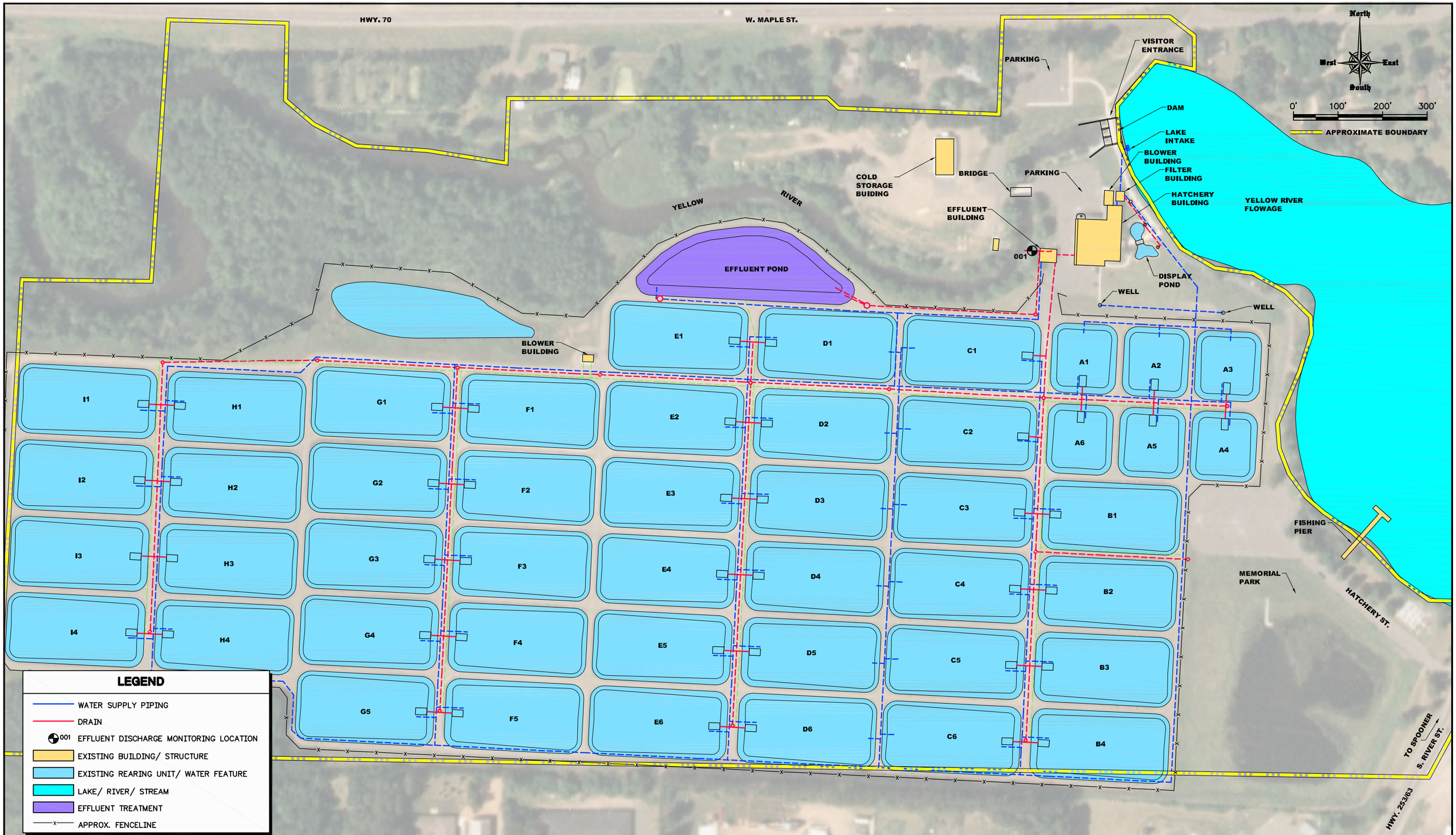
GOV. TOMMY G. THOMPSON HATCHERY
AERIAL PHOTO

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U

9/15/10

SHEET: GTT-1



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GOV. TOMMY G. THOMPSON HATCHERY
EXISTING CONDITIONS

COMPREHENSIVE STUDY OF WISCONSIN FISH PROPAGATION FACILITIES

PROJECT# 08K2U

9/15/10

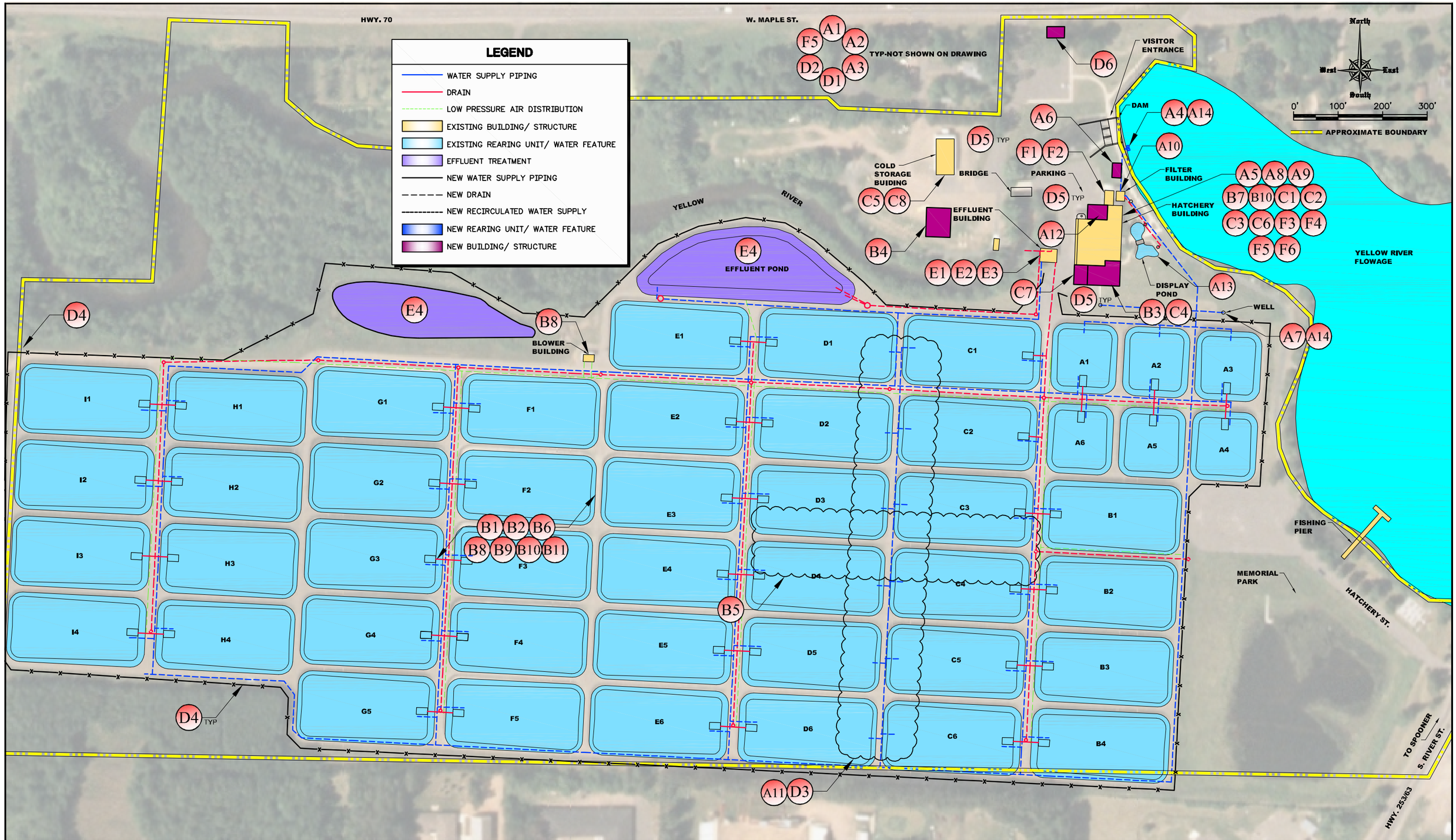
SHEET: GTT-2

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**