

ENVIRONMENTAL ANALYSIS AND DECISION ON THE NEED

FOR AN ENVIRONMENTAL IMPACT STATEMENT (EIS)

Form 1600-1

Rev. 6-2001

Department of Natural Resources (DNR)

SCR -

Type List Designation

NR 150.03(8)(f) 2.a. and 9.a.

NOTE TO REVIEWERS: This document is a DNR environmental analysis that evaluates probable environmental effects and decides on the need for an EIS. The attached analysis includes a description of the proposal and the affected environment. The DNR has reviewed the attachments and, upon certification, accepts responsibility for their scope and content to fulfill requirements in s. NR 150.22, Wis. Adm. Code. Your comments should address completeness, accuracy or the EIS decision.

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PROJECT SUMMARY AND DESCRIPTION

1. Overview and Project Description

The Fish, Crystal and Mud Lake Rehabilitation District (hereafter referred to as the “Lake District”) has applied to the Department of Natural Resources (“Department”) for the reissuance of an existing Wisconsin Pollution Discharge Elimination System (WPDES) Permit (WI-0049964) for a discharge from Fish Lake to the Wisconsin River. The Lake District has also applied to add an additional outfall that will allow them to discharge water from Crystal Lake to a tributary of Roxbury Creek in order to control high water levels and prevent flooding impacts to residences and infrastructure.

The following environmental assessment (EA) has been prepared to address the above mentioned outfall addition to the WPDES permit issued to the Lake District that will discharge pumped lake water from Crystal Lake to a tributary of Roxbury Creek. This environmental assessment will not address aspects associated with the existing outfall that allows the discharge from the Fish Lake to the Wisconsin River. The EA for the issuance of that permit is listed in the references section.

Crystal Lake is located along the Columbia – Dane County border in south-central Wisconsin and is a natural seepage lake with no outlet or inlet. The lake ranges in size from about 525 acres to over 600 acres depending on the water level. In the last about 20 years, the water level has fluctuated from about 868 to the highest level

of 873.3 feet NAVD 88 in 2011. In October, 1997 Department staff determined the Ordinary High Water Mark (OHWM) on the Crystal Lake was 868.22 feet NGVD89.

There are two commercial campgrounds (including permanent mobile homes) on the lake, one on the west shore and the other on the north shore. There is a public boat ramp located on the south shore of the lake. Several single family homes are also located around the lake. The project site is located within the Roxbury Creek and Lower Wisconsin River watersheds. The area is characterized by agricultural lands, with some wetlands and wooded ridges. The terrain is primarily rolling to flat.

The lake level has risen significantly since the 1950's to the point where the campgrounds, roads, boat ramp and other infrastructure have been significantly impacted by the high water. In 2000 the residents on both Fish and Crystal Lake started to explore ways to address the situation. In 2001, after numerous meetings with citizen groups, a process to identify an alternative to address the flooding was facilitated by UW Extension. It has been proposed that lowering the lake levels by pumping will provide relief from persistent area flooding for homeowners around the lake including two mobile home parks/campgrounds and will minimize the need to continually repair infrastructure and public facilities on the lakes. The Roxbury Township was granted a WPDES permit to discharge pumped water from Fish Lake to the Wisconsin River (2002). According to the issued permit, water that would be pumped into the Wisconsin River from Fish Lake had to meet the background water quality of the Wisconsin River (classified as an Exceptional Resource Water). In 2002, USGS also issued their study of the situation, which stated that pumping 500 gpm of Fish/Mud Lake for one year would reduce water level one-foot in those lakes while Crystal Lake would be reduced by less than 0.2 feet (USGS, 2002). The Fish, Crystal and Mud Lake District was also formed in 2003 and at that time assumed administration managing the water level on Fish, Crystal and Mud Lakes.

Foth Infrastructure & Environment, LLC (Foth) has previously submitted the *Crystal Lake High Capacity Well & Water Transmission Pipeline Environmental Assessment*, dated August 2011, to the Wisconsin Department of Administration in regard to an earlier phase of this project involving a discharge to a tributary of Roxbury Creek from a proposed groundwater well that occurred in January 2011. This scenario, although supported by many (and according to a Wisconsin Division of Hearings and Appeals Stipulation—Case no IH-11-01), turned out to be problematic and not effective according to more detailed analyses. A report prepared by the Wisconsin Geological and Natural History Survey stated that ground water pumping as initially proposed would not be cost effective in reducing lake water levels. The Lake District decided that this proposed action was not feasible and subsequently discarded groundwater pumping as an option.

The goal of this proposed project is to reduce the water level of Crystal Lake and maintain it at its ordinary high water mark (OHWM). The OHWM is “the point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation or other easily recognized characteristic.” The OHWM establishes the boundary between public lakebed and private land. The proposed WPDES permit allows pumping to occur until the OHWM level of 868.22 mean sea level (msl) is reached. The Chapter 30 permit that was previously issued for the Crystal Lake intake structure will be amended to reflect the OHWM.

The proposed pumping station (including a wet well, submersible pump, and filter) would be located in the southeast ¼ of the northwest ¼ of Section 2 of Township 9 North, Range 7 East, Town of Roxbury, Dane County, Wisconsin (see attached map). The proposed intake pump for the new discharge from Crystal Lake is sized for 1100 gallons per minute (gpm). The intake structure would consist of a collection area of two cells filled with stone which drain into a perforated 12 inch pipe. Based on collected data, during the summer months there will be a fabric on top of the stone to provide an additional filter for total suspended solids (TSS). The water would flow through a previously installed 12-inch diameter PVC pressurized water transmission

pipeline within the right-of-way along the north side of Crystal Lake Road for approximately 1,000 feet, then southward within the right-of-way along the east side of Mussen Road for approximately 8,100 feet, and then eastward within the right-of-way along the north side of CTH Y for approximately 900 feet and then cross Hwy Y and continue 4,000 feet on private land easements. Water would then discharge to an agricultural drainage ditch that is a tributary to Roxbury Creek. Ground disturbance is estimated to be approximately 750 square feet at the discharge point. Pumping rates are unknown at this time and are anticipated to be highly variable. The discharge water quality based effluent limitations were calculated using the discharge rate range of 500 gpm (1.12 cubic feet per second or cfs) to 1300 gpm (2.9 cfs). Roxbury Creek, which is proposed to receive the discharge water, has an estimated low flow of 0.03 cfs (based on the $Q_{7,10}$). The $Q_{7,10}$ is defined as the lowest sustained seven day flow to occur in a 10 year period.

The draft WPDES permit for the Lake District has an anticipated effective date of November 1, 2013 with an expiration date of September 30, 2018. For the additional outfall, the proposed discharge (Outfall 004) from Crystal Lake to a tributary of Roxbury Creek, effluent limitations would be included for biochemical oxygen demand (BOD), total suspended solids (TSS), phosphorus, dissolved oxygen (DO), and pH. Seasonal BOD weekly average limits of 5 mg/L (May-October) and 10 mg/L (November-April) are recommended plus a year round TSS monthly average limit of 10 mg/L. A daily minimum DO limit of 7 mg/L plus pH limits of 6-9 are recommended. Total phosphorus limits are recommended as a monthly average of 0.225 mg/L and a six-month average 0.075 mg/L (1.2 lbs/day). Monitoring is recommended for ammonia, temperature, water level and fecal coliform throughout the permit term.

2. Purpose and Need

The water level of Crystal Lake has risen significantly since the 1950's (USGS, 2002). Local units of government have raised flooded roads bordering the lakes several times during the past decade. According to the "Foth Infrastructure & Environment Report: *Crystal Lake High Capacity Well & Water Transmission Pipeline Environmental Assessment*, August 2011", submitted to the Wisconsin Department of Administration, a 2003 Mead and Hunt feasibility study reported that the total costs of flood related impacts have been estimated to be over \$1,000,000. The cost of road maintenance, including raising Crystal Lake Road, was nearly \$400,000 over the past 8 years and is time consuming for local road crews. Flood proofing commercial infrastructure costs in the area have been estimated at approximately \$250,000. Lowering lake levels should eliminate the need for and costs of road maintenance in addition to floodproofing of roads that has already occurred. Some residents have had to abandon or move their mobile homes or have lost living and yard space (rental properties). These same flooded residences at the campgrounds have had to incur the costs of building dikes, sandbagging, maintaining driveways, and pumping water from their mobile home rental sites. One house was moved and one a commercial property was floodproofed to deal with the flooding impact. The use of the public boat ramp is impacted by high water—although construction of a new boat ramp is planned in a more secure location at the time of this writing. Use of the private campgrounds has been severely impacted by high water. As noted above, many floodproofing actions have already occurred, such as floodproofing/raising roads with significant public expenditures. The primary impact from the highwater that occurs is to the private campgrounds which have significant domestic and recreational use impacts and also include large numbers of mobile homes which have year round residents living in them.

3. Authorities and Approvals (list local, state and federal permits or approvals required)

Department Approvals

Chapter 30.12 Permit (3-SC-2002-13-4127LW)

Wisconsin Pollution Discharge Elimination System Permit (WI-0049964)

Land Use Agreement (signed 4/7/09 by DNR)

Stormwater Permit (NR 216)

State Approvals

Department of Administration (Project Funding Approval)

State Historic Preservation Office

Archeological

Federal Approvals

Local Approvals

Fish, Crystal and Mud Lake Rehabilitation District Project Approval

Dane County Land Disturbance Permit

PROPOSED PHYSICAL CHANGES

4. Manipulation of Terrestrial Resources

The proposed intake pipe would collect lake water in a wet well and then pump it through a force main along Mussen Road. The lake water would then discharge to a drainage ditch on the south side of Hwy Y and then ultimately to Roxbury Creek. Ground disturbance is estimated to be approximately 750 square feet at the discharge point, near the unnamed tributary to Roxbury Creek. The 12-inch diameter PVC pressurized water transmission pipeline was previously installed westward within the right-of-way along the north side of Crystal Lake Road for approximately 1,000 feet, then southward within the right-of-way along the east side of Mussen Road for approximately 8,100 feet, and then eastward within the right-of-way along the north side of CTH Y for approximately 900 feet and then crosses Hwy Y and continues 4,000 feet on private land easements.

5. Manipulation of Aquatic Resources

The goal of this project is to reduce the water level of Crystal Lake and maintain it at its ordinary high water mark. The application includes an additional discharge of water from Crystal Lake to a tributary of Roxbury Creek via a pipeline to the OHWM of 868.22 msl. The proposed pumping station (including a wet well, submersible pump, and filter from the lake) would be located in the southeast ¼ of the northwest ¼ of Section 2 of Township 9 North, Range 7 East, Town of Roxbury, Dane County, Wisconsin.

The proposed intake pump for the new discharge from Crystal Lake is sized for 1100 gallons per minute (gpm). The intake structure would consist of a collection area of two cells filled with stone which drain into a perforated 12 inch pipe. Based on collected data, during the summer months, there would be a fabric on top of the stone to provide a filter to meet limits set in the WPDES permit for total suspended solids (TSS) and phosphorus. The pipe that collects the lake water in a wet well and water would then be pumped through a force main along Mussen Road to a drainage ditch on the south side of Hwy Y and then ultimately to Roxbury Creek. The United States Geologic Survey (USGS) calculated the flows for Roxbury Creek. The estimated low flows of 0.03 cfs for $Q_{7,10}$, were used to calculate water quality based effluent limitations in Roxbury Creek. The $Q_{7,10}$ is defined as the lowest sustained seven day flow to occur in a 10 year period.

The 12-inch diameter PVC pressurized water transmission pipeline was previously installed westward within the right-of-way along the north side of Crystal Lake Road for approximately 1,000 feet, then southward within the right-of-way along the east side of Mussen Road for approximately 8,100 feet, and then eastward within the right-of-way along the north side of CTH Y for approximately 900 feet and then crosses Hwy Y and continues 4,000 feet on private land easements. Actual pumping rates are unknown at this time and are anticipated to be highly variable. The discharge water quality based effluent limitations were calculated using the discharge rate range of 500 gpm-1300 gpm.

The proposed WPDES permit for the Lake District has an anticipated effective date of November 1, 2013 with an expiration date of September 30, 2018. For this permit for the proposed discharge (Outfall 004) from Crystal Lake to Roxbury Creek, effluent limitations would be included for biochemical oxygen demand (BOD), total suspended solids (TSS), phosphorus, dissolved oxygen (DO), and pH. Seasonal BOD weekly average limits of 5 mg/L (May-October) and 10 mg/L (November-April) are recommended plus a year round TSS monthly average limit of 10 mg/L. A daily minimum DO limit of 7 mg/L plus pH limits of 6-9 are recommended. Total phosphorus limits are recommended as a monthly average of 0.225 mg/L and a six-month average 0.075 mg/L (1.2lbs/day). Monitoring is recommended for ammonia, temperature, water level, and fecal coliform throughout the permit term.

6. Buildings, Treatment Units, Roads and Other Structures (include size of facilities, road miles, etc.)

At the lake end of the pipe system, the pump inlet pipe and associated pump apparatus, transformer and control panel are proposed to be located along the south shore of Crystal Lake. The 12-inch diameter PVC pressurized water transmission pipeline was previously installed westward within the right-of-way along the north side of Crystal Lake Road for approximately 1,000 feet, then southward within the right-of-way along the east side of Mussen Road for approximately 8,100 feet, and then eastward within the right-of-way on the north side of CTH Y for approximately 900 feet and then crosses Hwy Y and continues 4,000 feet on private land easements.

7. Emissions and Discharges (include relevant characteristics and quantities)

There is potential for dust emissions, noise, and soil erosion along the entire site during construction. The project will need to get coverage by a DNR Stormwater permit and a Dane County Land Disturbance Permit which will require best management practices be used to control erosion during construction. Groundwater or rainwater that enters excavated areas during construction would have to be removed to provide dry conditions for construction (particularly where concrete needs to be poured). This collected rain or groundwater would need to be pumped out and discharged on upland for seepage to groundwater or other appropriate methods of discharge or dewatering as allowed under a stormwater permit.

8. Other Changes

None anticipated.

9. Identify the maps, plans and other descriptive material attached

Detail of Crystal Lake Pump Intake
Map Location of Crystal Lake Pump
Pipeline Route from Crystal Lake to Roxbury Creek
Aerial Photo of Crystal Lake 2005
Aerial Photo of Crystal Lake 2010

10. Information Based On (check all that apply):

Literature/correspondence (specify major sources)

WPDES, Stormwater, Land Use Agreement and Chapter 30 Permit applications and supporting materials submitted by General Engineering, Fish, Mud and Crystal Lake District

Simulation of Fish, Mud, and Crystal Lakes and the Shallow Ground-Water System, Dane County, Wisconsin, USGS, 2002, Water-Resources Investigations Report 02-4014

Crystal Lake High Capacity Well & Water Transmission Pipeline Environmental Assessment, Foth Infrastructure & Environment, LLC 2011, submitted to the Wisconsin Department of Administration

Evaluation of groundwater pumping to reduce the level of Crystal Lake, Columbia County, Wisconsin, Prepared for the Crystal, Fish and Mud Lake District, Scott Johnson and Madeline Gotkowitz, 2012, Wisconsin Geological and Natural History Survey University of Wisconsin-Extension

State of the Lower Wisconsin Basin 2002, Wisconsin Department of Natural Resources

Dane County Regional Planning Commission. 1979. Dane County Water Quality Plan: Appendix B Water Quality Conditions. Madison, Wisconsin.

Marshall, D. 2007. Addendum to the 2007 Aquatic Plant Management Plan for Fish, Crystal and Indian Lakes, Dane County, Wisconsin.

Environmental Assessment of the Fish Lake Pumping Project, 2009, Wisconsin Department of Natural Resources

Personal Contacts

Field Analysis By: Author Other

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Past Experience With Site By: Other

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AFFECTED ENVIRONMENT (describe existing features that may be affected by proposal)

11. Physical Environment (topography, soils, water, air)

The project area lies in northwestern Dane County. Fish, Crystal and Mud (Marx Pond) Lakes and the tributary at the point of proposed discharge are in the Roxbury Creek watershed. The area surrounding the lakes is characterized by wetlands, wooded ridges and agricultural lands. Much of the land along the proposed pipeline is rolling to flat with many wetlands, along with a significant amount of agricultural crops. The dominant soils in the path of the proposed pipeline are moderately well drained, poorly drained to well drained silty loam soils on 0 to 6 percent slopes.

The United States Geologic Survey (USGS) calculated flows for Roxbury Creek. The estimated low flow of 0.03 cfs for Q_{7,10}, was used to calculate water quality based effluent limitations for the proposed discharge to Roxbury Creek. The Q_{7,10} is defined as the lowest sustained seven day flow to occur in a 10 year period.

12. Biological Environment (dominant aquatic and terrestrial plant and animal species and habitats including threatened/endangered resources; wetland amounts, types and hydraulic value)

Terrestrial Resources

Land Cover

The surrounding land use of Fish, Mud and Crystal Lakes is predominantly agriculture with broad leaved deciduous forests wetlands, grasslands and residential/recreational properties. The watershed size of Crystal Lake is approximately 3,700 acres. The watersheds lie in Dane and Columbia Counties. There are two private campgrounds located on the north and west shore of Crystal Lake. The discharge is proposed to outlet on the bank of a tributary of Roxbury Creek above the Ordinary High Water Mark south of County Y bridge in Dane County (see map). The land cover in the vicinity of the pipe and near the outlet is a mix of agricultural fields, wetlands, and farmed wetlands.

Aquatic Resources

Fish, Crystal and Mud Lakes

A hydrologic study of Fish, Crystal and Mud Lakes was funded by a WDNR Lake Planning Grant and conducted by United States Geologic Survey (USGS) and the Dane County Lakes and Watershed Commission. The study's objectives were to determine factors that had influenced the long-term trend of rising water levels, predict future trends in lake water levels by simulating lake stage, and predict the effect of pumping water from Fish Lake on future lake stage as a means to reduce high lake stage (Simulation of Fish, Mud, and Crystal Lakes and the Shallow Ground-Water System, Dane County, Wisconsin, USGS, 2002, Water-Resources Investigations Report 02-4014). Recharge used in the model was based on annual base flow from Black Earth Creek and a groundwater monitoring well located in the Town of Arena was used as a groundwater reference site. Runoff was based on measured coefficients, precipitation, and evaporation from Fish, Crystal and Mud Lakes surfaces. Measured Fish Lake stage was matched to simulated stage to calibrate the transient model. Study results indicated that Fish and Mud Lakes are located in a major ground-water recharge area and are likely to experience water level fluctuations. Increased lake levels were due to regional ground-water recharge. Simulation results of withdrawing water from Fish Lake at 500 gpm, assuming 1990-1998 climatic conditions, indicated that after a year of pumping, the stage of Fish and Mud Lakes would be reduced by just more than one-foot and Crystal Lake reduced by 2.4 inches.

Crystal Lake

Crystal Lake is a 525 to 600+ acre lake depending on the fluctuating water level and is believed to be hydraulically connected to Fish Lake by groundwater. Rising water levels have coincided in both lakes for decades (USGS 2002). However, the elevation of Crystal Lake dramatically rose during the last several years (since the 2007-2008). Maximum water depths were only 6 feet in the 1940s and increased to 9 feet by 1960. During the 1980's, the WDNR conducted animal waste management (NR 243) investigations on several shoreline feedlots along the lake. The study determined that major sources of phosphorus for the lake are from watershed runoff from feedlots, crop fields, as well as internal loading of phosphorus that mixes throughout the summer because the lake is shallow. Phosphorus, chlorophyll-a and secchi disk samples indicate the lake is classified as hypereutrophic with dense beds of curly leaved pondweed and high concentrations of filamentous

and blue-green algae. Hypereutrophic lakes are very nutrient rich lakes that may have frequent nuisance algal blooms and low water transparency. Frequent winter fish kills had been documented from the 1940s through the 1960s (DCRPC 1979). Aeration and frequent stocking were necessary to create recreational fishing during that period. In recent years the trend of increasing water levels has continued and the maximum water depth has increased to 14 feet. Coinciding with the rising water levels, sustainable largemouth bass and panfish populations in the lake indicate that lack of oxygen related winterkills have declined. The lake is a popular fishery, with good largemouth bass numbers, and plenty of bluegill and pumpkinseed populations with a good size structure. However, periodic columnaris fish kills, largemouth bass virus, and increasing carp and yellow bass numbers are current threats to the fishery. Flooded trees along the perimeter of the lake provide important habitat for fish and herptile populations. Water temperature monitoring in six feet of depth, in the vicinity of the proposed pump inlet, indicated that at one foot intervals in the water column, average temperatures ranged from 76.1 – 77.8 Fahrenheit. Phosphorus monitoring from 2010 and 2013 consisted of 12 samples with an average of 44 µg/L. Two of the results (130 µg/L and 370 µg/L exceeded the water quality criteria established in s. NR 102.06 of 40 µg/L. Total suspended solids collected during the summer of 2010 ranged from 28-31 mg/L. BOD levels ranged from 3.5 – 5.1 mg/L during the summer of 2010.

According to a review of the Natural Heritage Inventory (NHI) database, there are no Endangered Resources identified within Crystal Lake.

Roxbury Creek

Roxbury Creek is a tributary to the Wisconsin River and is characterized by agricultural land use and wetlands. The creek flows through the Village of Roxbury and the Sanitary District discharges approximately 0.25 MGD (0.39 cfs or 174 gpm) downstream of the proposed Lake District discharge. The stream and its tributaries have been extensively ditched and straightened. The stream has low base flow and supports a forage fishery dominated by creek chub and white sucker. Some sport fishes inhabit the lower stream reaches, likely moving up from the Wisconsin River. The stream is officially classified by the Department as a Fish and Aquatic Life Stream and the natural communities' designation is cool cold transition headwater from the headwaters to the mouth where it flows into the main channel of the Wisconsin River. The proposed maximum daily mean water temperature for cool cold transition headwaters is 69.3-72.3 Fahrenheit. Instantaneous temperatures collected during 2011 indicated summer temperatures ranged from 57.5 – 75.2 Fahrenheit. Recent phosphorus monitoring indicates the stream is exceeding the water quality criteria of 75 µg/L. The median phosphorus level calculated from 6 samples collected in 2011 was 129.0 ug/L. Total suspended solids collected during summer of 2011 ranged from 4 -39 mg/L.

According to a review of the Natural Heritage Inventory (NHI) database, there are no Endangered Resources identified within Roxbury Creek.

Downstream of the proposed Crystal Lake discharge, Roxbury Creek flows under County Highway Y, Inama Road, State Highway 12, State Highway 78, WI Southern Railroad tracks and several farm crossings. WI DOT records show that the Highway 12 bridge over Roxbury Creek has a drainage area of 18.4 sq. miles, a 100-year flood flow of 1500 cfs and a maximum 100-year flood elevation does not overtop the bridge.

Wisconsin River

The Wisconsin River begins at Lac Vieux Desert, a lake in Vilas County that lies on the border of Wisconsin and the Upper Peninsula in Michigan. The river is approximately 430 miles long and collects water from approximately 12,280 square miles. As a result of glaciation across the state, the river traverses a variety of

different geologic and topographic settings. The Lower Wisconsin in this segment is free flowing for 92 miles from the Alliant Energy Dam at Prairie du Sac to its confluence with the Mississippi River. In recognition of this great resource, the Wisconsin Legislature created the Lower Wisconsin State Riverway (LWSR) in 1989, which includes the 92.3-mile free-flowing stretch of the river from the Prairie du Sac dam down to the river's confluence with the Mississippi River. The riverway project covers 79,275 acres, of which the state owns more than 43,740 acres with easements on more than 2,800 acres. These publicly owned lands provide opportunities for hunting, wildlife viewing, hiking, biking, horseback riding, skiing, and snowmobiling. In addition to providing diverse recreational opportunities, these lands help to preserve large blocks of upland and lowland habitat for wildlife. The Lower Wisconsin River's historical significance, good quality aquatic and wildlife resources, beautiful scenery and abundant recreational opportunities make the river a special resource.

The Lower Wisconsin River is classified by the Department as a diverse warm water sport fishery (WWSF) and an Exceptional Resource Water (ERW) under Wisconsin Administrative Code NR 102. The ERW status reflects a large river system in the driftless area that has unique natural, biological, historical and cultural resources. ERW status is the second highest level of protection given to surface waters under State law.

The Lower Wisconsin River sustains 98 native fish species that find their home in the main channel, floodplain lakes and sloughs. The high diversity of fishes found in the Lower Wisconsin reflects the natural riverine and off-channel lake and slough habitats. The river is also home to eight species that represent primitive or ancient "living fossil" fish forms, such as paddlefish, lake sturgeon, gars, bowfin, and native lampreys. Several of these fish are specific hosts for the mussel larvae (glochidial) stage of a number of rare, threatened and endangered freshwater mussels found in the Wisconsin River. The river also supports a rich diversity of organisms including mussels, reptiles, amphibians, mammals, birds and insects.

The Wisconsin River provides habitat for several threatened and endangered amphibians and reptiles. Rare dragonflies, as well as eight species of mayflies (Ephemeroptera) and four species of beetles (Coleoptera) are found almost exclusively in the river. Six species of threatened, endangered or special concern fish, and eight state listed endangered, rare, threatened, or special concern mussels are located within a one-mile buffer of the discharge point of the Wisconsin river according to a search of the Natural Heritage Inventory. Of the federally listed species, there are two threatened bird species, one endangered mussel, and two threatened plant species found in Dane County. Mussel surveys conducted downstream of the mouth of Roxbury Creek and the discharge point, indicate the presence of at least one species of state threatened mussel, and several special concern listed mussels.

Phosphorus samples collected from the Wisconsin River at Sauk City and Muscoda indicated the median phosphorus was 99.0 $\mu\text{g/L}$ and 97 $\mu\text{g/L}$, respectively, meeting the water quality criteria of 100 $\mu\text{g/L}$ for phosphorus. Since the current median phosphorous concentration is below the criteria, there is assimilative capacity. However, the Wisconsin River is an ERW and discharges to the Wisconsin River should be equal to or lower than background concentrations.

Sloughs and Side Channels

One of the unique features of the Wisconsin River Valley is the natural geomorphologic cycles linked to the Glacial Lake Wisconsin that have created over 12,000 acres of wetlands, oxbows, side channels, floodplain lakes and sloughs. These habitats function as an important transition zone between riparian and riverine habitats and are critical for reproducing gamefish, panfish, forage fish, and support a variety of plants and rare fish, some significantly different from those found in the main channel. Flow collected in summer of 2012 in the side channel of the Wisconsin River at the mouth of Roxbury creek was 1.73 cfs. A fish survey completed in the side channel during the fall of 2009 after emergency pumping during the summer of 2009 from Crystal

Lake to Roxbury Creek, indicated bluegill, emerald shiners and juvenile common carp were most commonly found in the side channel.

13. Cultural Environment

- a. Land use (dominant features and uses including zoning if applicable)

The area of the proposed discharge is considered to be recreational land owned by the State of Wisconsin. This should not change with this proposal.

Land use around Crystal Lake is mostly agricultural. The Lakes of Fish, Crystal and Mud are used as recreation, offering water based recreational use, fishing and wildlife viewing opportunities. This proposal is not expected to significantly change land use around the lake.

- b. Social/Economic (including ethnic and cultural groups)

Agriculture, forestry, tourism, recreation, government, and light industry are major economic interests in Dane County. Agriculture, recreation and tourism are very important to the community of Roxbury.

Flooding and high water on Crystal Lake has displaced some residents in the area. Additionally, dealing with the high water has been disruptive to many people affected. The decision making process and controversy regarding this project has also been very costly in terms to time and expense that individuals and organizations have devoted to preparing plans

- c. Archaeological/Historical

The State Historical Society Protection Office (SHPO) has approved the site as not having historical significance. A search for Archaeological sites was conducted and no known sites that should be impacted by the project were identified.

14. Other Special Resources (e.g., State Natural Areas, prime agricultural lands)

The State of Wisconsin owns property along the Lower Wisconsin River. The State owns more than 43,740 acres with easements on more than 2,800 acres. These publicly owned lands provide opportunities for hunting, wildlife viewing, hiking, biking, horseback riding, skiing, and snowmobiling. In addition to providing diverse recreational opportunities, these lands help to preserve large blocks of upland and lowland habitat for wildlife.

ENVIRONMENTAL CONSEQUENCES (probable adverse and beneficial impacts including indirect and secondary impacts)

15. Physical (include visual if applicable)

Beneficial Physical

Fish, Crystal and Mud Lake

If pumping is effective in lowering water level on Crystal Lake, a decline in water level could reduce negative

impacts from flooding to infrastructure, roadways, and homes. Township road crews have had to raise and repair flooded roads bordering the lakes several times in the past decade. According to a Mead and Hunt feasibility study conducted in 2003 (and cited by the Foth Report---see References), the total costs of flood related impacts have been estimated to be over \$1,000,000. The cost of road maintenance was nearly \$400,000 over the past 8 years. Flood proofing commercial infrastructure costs in the area have been estimated at approximately \$250,000. Lowering lake levels should eliminate the need for and costs of road maintenance. Some residences have had to abandon or move their mobile homes or lost living and yard space (rental). Flooded residences at the campgrounds have had to incur the costs of building dikes, sandbagging, maintaining driveways, and pumping water from their mobile home rental sites. There is also the cost of construction repairs and cleanup during periods when water levels receded. The costs of protecting permanent and seasonal residences (mobile homes) from floods and subsequent construction repair and cleanup should be eliminated if the project is successful in lowering water levels on Crystal Lake. However, it should be noted that much of the needed flood proofing and infrastructure protection has already occurred as noted above.

A reduction in lake levels may help alleviate the addition of pollutants to the lake. Lake shorelines have eroded on all lakes from rising water levels. Occasional high winds on all lakes and motorized boat traffic on Crystal Lake have exacerbated shoreline erosion. Lowering water levels on Crystal Lake may reduce some of the shoreline erosion.

Boat access has been extremely difficult at Crystal Lake in recent years, with much of the area of the landings submerged including the Department of Natural Resources public landing. Extensive watercraft use of the lake has already extremely limited vehicle and boat trailer parking areas at the Crystal Lake public landing. The parking area has nearly been eliminated by flood waters, and the portable toilet frequently inundated. The access road and landing have incurred damage requiring maintenance by the DNR and the township. Lowering the water levels should make landings and parking more accessible. Shore angling of all lakes has also been reduced due to high water. Lowering water levels could benefit access for shore anglers.

Adverse Physical

Roxbury Creek, Wisconsin River, Sloughs and Side Channels

The increased flow of Crystal Lake water discharge could have a destabilizing effect on the channel of Roxbury Creek. Depending on the increase in flow, this could lead to bank failure, new channel cutting and subsequent sediment deposition downstream which may eventually flow into the Wisconsin River. This will be dependent on the flow regime and how and when water is discharged. During the short term emergency pumping in 2009, the Creek was observed to have risen 3.75 inches downstream 500 feet from the outlet of the discharge pipe. The rate of pumping was similar to the proposed pumping rate, averaging a little over 1000 gpm. Also during the emergency pumping, the drainage ditch started to back up due to extra weed and grass growth and the growth had to be removed. The Lake District plans to address this issue as part of their operations plan required as part of the proposed WPDES permit.

Crystal Lake

Crystal Lake is shallow and lowering the lake level has the potential to increase the amount of the littoral zone where plant growth may occur. This would depend on turbidity and corresponding light penetration. Increased amounts of aquatic vegetation may inhibit water recreation activities such as boating and swimming. This may necessitate harvesting or treatment with herbicides to lessen the effects of increased aquatic vegetation on boating and swimming.

16. Biological (including impacts to threatened/endangered resources)

Endangered and Threatened Resources

A review of the Natural Heritage Inventory was conducted by the Department and there are no concerns that the project will impact endangered, threatened or special concern species identified within Crystal Lake or Roxbury Creek. The Wisconsin River provides habitat for several threatened and endangered amphibians and reptiles. Rare dragonflies, as well as eight species of mayflies (Ephemeroptera) and four species of beetles (Coleoptera) are found almost exclusively in the river. Six species of threatened, endangered or special concern fish, and eight state listed endangered, rare, threatened, or special concern mussels are located within a one-mile buffer of the discharge point of Roxbury Creek and the Wisconsin River according to a search of the Natural Heritage Inventory. Of the federally listed species, there are two threatened bird species, one endangered mussel, and two threatened plant species found in Dane County. Mussel surveys conducted downstream of the mouth of Roxbury Creek and the discharge point indicate the presence of at least one species of state threatened mussel, and several special concern listed mussels. The discharge from Crystal Lake to a tributary of Roxbury Creek would be required to meet water quality standards as a condition of the WPDES permit which should help reduce the likelihood that rare or sensitive resources would be impacted by this proposed project.

Beneficial Biological

Crystal Lake

Lowering water levels would expose lake bed and if maintained in a natural vegetative state, could provide a benefit to lakefront owners including reducing runoff from residences and providing screening from lake users. Shoreline erosion has increased around the lakes, especially in areas of roadways and residential lawns. This erosion results in accelerated rates of sediment flowing into the lakes. Reduced sediment may benefit aquatic insects and shallow water spawning fishes. In addition, if lakes are significantly lowered and rock riprap no longer necessary, a more natural shoreline would benefit wildlife that use shore lands.

It is also possible that wetlands, cattail beds and marshes once present at the perimeter of some areas along Crystal Lake would also be re-established if landowners refrain from herbiciding or removal of the vegetation. This could result in an increase in wetland habitat, and benefit populations of northern pike, shore land wildlife, and a state threatened turtle that prefers open marshy habitat and lays its eggs on sandy flats. Lowering water levels of all the lakes may increase the habitat for shore land birds that use mud and sand flats until vegetation succession occurs on the flats.

A reduction in lake levels may trigger a positive response from aquatic vegetation in Crystal Lake. Crystal Lake is shallow and lowering the lake level has the potential to increase the amount of the littoral zone where plant growth may occur; this would be dependent on turbidity and corresponding light penetration. Increased amounts of aquatic vegetation would help to increase water clarity by stabilizing the lake bottom and by uptake of excess nutrients by plant life. Increased amounts of aquatic plants in the littoral zone also means better habitat for fish such as bluegills and largemouth bass, which may lead to an increase in numbers of these fish in the lake.

Adverse Biological

Crystal Lake

Higher water levels overall have improved the Crystal Lake Fishery by creating more available “living space” for biota in the lakes. Lowering water levels will reduce spawning and rearing habitat for shallow water spawning fishes if these shallow areas are lost because of lowered water levels. There is a possibility of fish entrainment of larval sport fish or rare fishes at the inlet pipe in Crystal Lake. Fish entrainment is defined as fish being transported out of their normal water body into other environments.

Higher water levels have provided important environmental benefits to Crystal Lake by eliminating annual winterkill. A return to historic winterkill conditions on Crystal Lake could negatively impact an economically valuable and popular sport fishery; however, this scenario is not likely since pumping is not likely to lower water levels to historic conditions when winterkill occurred. In spite of continued hypereutrophic conditions in Crystal Lake, greater water volume has apparently increased the total lake oxygen for biota.

Lowering the water levels in all lakes may reduce the amount of flooded woody debris available for fish and herptile habitat. However, it is likely that previously submerged woody debris at lower depths will be present in the “new” littoral zone as the water level is lowered.

Seepage lakes benefit from having a fluctuating water surface elevation. As water levels decrease riparian vegetation will begin to grow and develop. When the naturally fluctuating water rises and inundates the new riparian vegetation it provides structure and habitat for juvenile and small fish. Periods of inundation will show increased recruitment and growth rates. If pumping stabilizes water and prevents natural fluctuation this could reduce available habitat for fish and herptiles.

If the water levels are lowered gradually; herptiles should be able to adjust to water level changes in the fall as they select their overwinter habitat (Hay, 2008). If lake levels drop too quickly below hibernation sites (after they have burrowed into the littoral zone of the lake), this can have negative effects on amphibians, during winter hibernation. Green Frogs and bullfrogs in particular are dependent on permanent water in shallow bays. Pumping may reduce shallow water areas necessary for frog breeding initially, but these breeding areas will reappear as littoral zone habitat reappears in response to lowered water levels.

Roxbury Creek

Even if the discharge stays within permitted limits, increased pollutant loading could negatively impact the biota and water quality of Roxbury Creek. However, the limits that are included in the proposed WPDES permit are very stringent and should be protective of local water quality. Lake water temperatures are generally higher than the stream in the warmer months and the stream temperature is likely to increase in the vicinity of the discharge during this time period. Monitoring for temperature is included in the proposed WPDES permit for the first two years, and if there is a reasonable potential the temperature limits are exceeded, the permit will be modified to include temperature limits. Roxbury Creek is already exceeding its water quality criteria for phosphorus (75 µg/L) and therefore there is no more assimilative capacity for phosphorus. Even though there is a phosphorus limit within the proposed permit set equal to the criteria, the discharge from Crystal Lake is still introducing additional phosphorus into the Roxbury Creek watershed. The stream channel morphology may also be negatively affected since the discharge will represent a significant increase in stream flow.

Wisconsin River, Sloughs and Side Channels

The proposed pumping could result in the transfer of lake fish from Crystal Lake into Roxbury Creek and the Wisconsin River and may have negative impacts to riverine fishes. Surveys of nearly a hundred Lower Wisconsin River side channels and sloughs indicated that while juvenile common carp are rarely found, the side channel at the mouth of Roxbury Creek had numerous juvenile common carp after the emergency pumping occurred. It is expected that additional common carp will be discharged into Roxbury Creek and could inhabit the side channel of the Wisconsin River to the detriment of river fishes. However, at present there are now no known fish species that occur in Crystal Lake that do not also occur in the Wisconsin River. Additionally, the Wisconsin River may have genetically distinct populations of fish, which could be negatively impacted when new genetics are introduced. Genetic differences among walleye, largemouth bass and northern pike stocks have been documented even within the same drainage or watershed. Fish transfers can have long-term negative effects on growth, survival, reproduction and health of existing fish populations and newcomers.

Several aquatic species of fish and mussels, some listed as federal or state rare, endangered, threatened and special concern occur in the reach of the side channel and river below the mouth of Roxbury Creek. The flow collected in the side channel near the mouth of Roxbury Creek in August of 2012 was low at 1.73 cfs. There will be some additional organic loading, including the expectation of higher levels of phosphorus, that may negatively impact the biota in the reach of the river below the mouth of Roxbury Creek.

In the event that Crystal Lake is subject to introduction of an additional invasive species, then the transfer of that invasive species to the Roxbury Creek and the Wisconsin River is possible. This applies to several invasive species including inter-drainage transfer of pathogens and/or cyanotoxins that may be present in the blue green algae blooms that occur frequently in Crystal Lake. If an invasive species is identified in Crystal Lake that is not believed to be present in Roxbury Creek or the Wisconsin River, the Department will order that the pumping be ceased as a condition of the proposed WPDES permit.

Eurasian Water Milfoil and Curly Leaf Pondweed are both invasive plants that grow in abundance in Crystal Lake and therefore, can be transferred through pumping into the Wisconsin River at the discharge point. It is expected that this may have an impact to the Roxbury Creek and side channel of the Lower Wisconsin River. Although Eurasian Water Milfoil and Curly Leaf Pondweed are already present in the Lower Wisconsin River sloughs and side channels, they are rarely found as compared to native plants. Lake Wisconsin, which is upstream of the discharge point, is also infested with Eurasian Water Milfoil, and is a significant contributor of this invasive plant to the Lower Wisconsin River.

Invasive species are currently being monitored in lakes in Wisconsin, including Crystal Lake, which was last monitored on June 27, 2013. An Early Detection program selects about 200 lakes statewide at random and Crystal Lake was on the list for 2013. Staff follow a specified protocol designed to detect invasive plants and animals and includes the following: Net tows for Zebra Mussels and Spiny Water Flea, any invasive aquatic plant using rake tows and observation and snorkeling (provided there is adequate water clarity for visibility) to find snails such as Chinese Mystery Snails or Faucet Snails. Crystal Lake is already known to have Curly Leaf Pondweed and Eurasian Water Milfoil. No exotic snails were found and results are not yet available for the Zebra Mussel and Spiny Water Flea tows. Other species that we look for but were not found include Purple Loosestrife, Phragmites, Flowering Rush, Hydrilla, Brazilian Waterweed, Yellow Floating Heart, Banded Mystery Snail, New Zealand Mud Snail, Didymo, or anything else unusual.

Pumping water from one water body to another has an inherent risk of transporting aquatic pathogens. Unless water is disinfected or goes through a filter medium with a pore size small enough to restrict virus particles or bacterium there is a possibility to transmit a pathogen if the pathogen can survive externally to a host organism.

Viral Hemorrhagic Septicemia (VHS) virus can survive outside an infected host for a period of 14 days when water temperatures are below 60 degrees Fahrenheit. Testing for the presence or evidence of exposure to a specific pathogen in the resident fish would be a method of determining risk of passing a pathogen (such as VHS) in the effluent. VHS virus has not been detected in Wisconsin except for Lake Michigan, Lake Superior, and the Winnebago system.

17. Cultural

a. Land Use (including indirect and secondary impacts)

Land use will change in the immediate vicinity of the pipe intake and outfall but will be limited to under ½ acre.

b. Social/Economic (including ethnic and cultural groups, and zoning if applicable)

The private and public cost of maintaining the pumping system is a concern to many people. They may believe that it may be more cost effective in the long run to flood proof and relocate structures that are prone to flooding or high water impacts. Some of this has happened already with the raising of roads and structures and one house relocation.

The existence of the diversion system, if successful, could create a false assumption that the lake level could be controlled and foster development that still could be vulnerable to high water levels. In the long-term, it would be very important to protect the lake through strong zoning efforts including: the enforcement of setbacks for structures, appropriate flood proofing, restoration of natural shoreland buffers and enforcement to prevent future building in flood prone areas.

The intake area may need to be barricaded for public safety.

c. Archaeological/Historical

This project is not expected to impact any Archeological or Historical Sites.

18. Other Special Resources (e.g., State Natural Areas, prime agricultural lands)

We are not aware of any special resources that have not been addressed.

19. Summary of Adverse Impacts That Cannot Be Avoided (more fully discussed in 15 through 18)

The effectiveness of the pumping of Crystal Lake is unknown since future precipitation patterns have some degree of uncertainty and could possibly result in additional groundwater recharge. The Wisconsin's Changing Climate: Impacts and Adaptations (2011) showed that this area was predicted to have one of the greatest increases in annual precipitation in the entire state from 1950-2006. Assuming this trend stays the same in the future, this could diminish the ability of the pumping project to alleviate flooding and the large public and private investment in the project may have been wasted. However, the 2012 pumping on Fish Lake appeared to control water level to a significant degree, although 2012 was regarded as a dry weather year for the area.

There will be some additional organic loading to the downstream reach of the Wisconsin River which could adversely impact the biota of the river; however the amount of organic loading is expected to be extremely small. The additional nutrient loading may have a greater affect to Roxbury Creek, which has a relatively low

base flow.

In the event that Crystal Lake is subject to introduction of a new invasive species, then the transfer of that invasive species to the Wisconsin River is possible. This applies to a wide range of invasive species including inter-drainage transfer of pathogens and/or cyanotoxins.

Higher water levels in the lake means there is more available “living space” for biota in the lakes. Lowering water levels in the lake may reduce spawning and rearing habitat for shallow water spawning fishes. Pumping may reduce shallow water areas necessary for amphibian breeding initially, but these breeding areas will reappear as littoral zone habitat reappears in response to lowered water levels.

DNR EVALUATION OF PROJECT SIGNIFICANCE (complete each item)

20. Environmental Effects and their Significance

This section describes risks that people opposed to this project have voiced. These concerns have merit. However, under the Department’s permitting process it has been determined the permit can be issued. The Department has an obligation to follow the law, which in this case allows permit issuance.

- a. Discuss which of the primary and secondary environmental effects listed in the environmental consequences section are long-term or short-term.

Short-Term

The water quality impact of the discharge to the Roxbury Creek will have a major short term impact given that the discharge volume is a significant fraction of Roxbury Creek’s flow during the streams low-flow conditions. The stream bank morphology and biota are likely to be significantly impacted. Higher phosphorus loading may increase algae growth and negatively impact stream biota. The proposed WPDES does contain a condition to which the pumping must cease if it is determined that the discharge is causing algae growth downstream. Channel instability and erosion are likely to occur depending on how much is discharged and when it is discharged.

The ground will be disturbed briefly until vegetation can be re-established at the site. The soil disturbing activity will be regulated in accordance with NR 216, a Lower Wisconsin Riverway Permit, and a Dane County Permit for Disturbing Soil in the Floodplain.

Long-Term

There is a possibility that invasive species could be transferred from Crystal Lake to Roxbury Creek and Wisconsin River. There is Eurasian Water Milfoil in Crystal Lake at the present time. However, Eurasian Water Milfoil is already present in Roxbury Creek and Lake Wisconsin and some floodplain lakes of the Lower Wisconsin River.

In 2007, VHS (Viral Hemorrhagic Septicemia) occurred in Wisconsin for the first time. The first documentation of the disease occurred in Lake Winnebago and in the waters of Lake Michigan. Since 2007, the Wisconsin Department of Natural Resources has conducted extensive testing for the disease to determine its range. To date, VHS has only been detected in fish from the Lake Winnebago system, Lake Michigan and Green Bay. Because of the Department’s extensive testing, the risk of VHS being transmitted to the Wisconsin River from Crystal Lake is determined to be extremely low. Viral testing in Fish (2008) and Crystal (2006) Lakes did not detect VHS or other viral pathogens. Samples of fish tested from the Wisconsin River and from Crystal Lake have been tested for VHS and were found to be

negative. Testing of VHS in Crystal Lake is planned for the fall of 2013 (using the antibody test).

The water level of Crystal Lake can be lowered to the ordinary high water mark through pumping. The littoral zone will change with lake elevations and should reestablish itself accordingly.

The channel morphology of Roxbury Creek could be significantly affected by the increased flow depending on how much it will increase, the capacity of the channel and also when the discharge will take place. Due to the dilution and assimilative capacity available in Roxbury Creek, the proposed WPDES permit contains limits that are extremely stringent and approximately lower than the background in Roxbury Creek. Without filter fabric, the Lake District will only be able to meet the limits a few months in the winter. The proposed WPDES permit requires the Lake District to cease pumping if the sample results are equal to or exceed the BOD or TSS limits. They are unable to resume pumping until they have results that are below the proposed limits. However, if increased nutrients are still added to the stream system, this will favor more nutrient tolerant biota.

- b. Discuss which of the primary and secondary environmental effects listed in the environmental consequences section are effects on geographically scarce resources (e.g. historic or cultural resources, scenic and recreational resources, prime agricultural lands, threatened or endangered resources or ecologically sensitive areas).

Erosion and scouring may occur immediately downslope from the discharge point unless the discharge is contained and scour is prevented. Increased nutrient loads to the side channel of the Wisconsin River below the discharge from Roxbury Creek may increase algae growth and may negatively impact fish, mussels and other biota, some of which are listed as federally or state threatened endangered or special concern. However, if it is determined that the discharge causes algae growth in the vicinity of the outlet or impacts to endangered species, the Department will order the pumping ceased as a condition of the proposed WPDES permit.

- c. Discuss the extent to which the primary and secondary environmental effects listed in the environmental consequences section are reversible.

Even after the proposed discharge pipe is installed, the pumping equipment and pipe could be removed and the site could also be restored where the pipe was located. However, the resources such as time and money spent on that option would not be easily recovered. If the proposed pumping was stopped a more natural water level regime would resume, which could mean the flooding issues for lakeshore property owners would return under current weather patterns.

21. Significance of Cumulative Effects

There is a concern that the cumulative impact of discharges from waters higher in pollutants than the downstream water bodies (Roxbury Creek or the Wisconsin River) will have negative environmental effects over the long term. If other communities or similar entities need to deal with a potential discharge to address a high water problem due to the factors outlined in NR 207 (i.e. health), then the water quality of that water body could be adversely impacted. There are over 80 Exceptional or Outstanding Resource waterways in the Lower Wisconsin basin alone and it is conceivable that some of those may at some time need to use this provision in NR 207 to deal with a flooding issue. The Lower Wisconsin River is an Exceptional Resource Water (ERW), and normally discharges must meet the background limits of the river for water quality under state statutes NR 102. If other lake districts or entities having hypereutrophic lakes are permitted to pump to the Wisconsin River, there may be cumulative impacts of increased eutrophication

to the backwater floodplain sloughs and lakes as well as pools in the main river channel.

22. Significance of Risk

- a. Explain the significance of any unknowns that create substantial uncertainty in predicting effects on the quality of the environment. What additional studies or analysis would eliminate or reduce these unknowns?

There is a possibility that invasive species could be transferred between the water bodies. This is especially so for transfer of invasive species from Crystal Lake to the Wisconsin River. For example, there is Eurasian Water Milfoil in Crystal Lake and relatively little in the reach of the Wisconsin River where this discharge will take place. However, Eurasian Water Milfoil is in Lake Wisconsin and in some floodplain lakes of the Wisconsin River, so this is already in the Lower Wisconsin River.

In 2007, VHS (Viral Hemorrhagic Septicemia) occurred in Wisconsin for the first time. The first documentation of the disease occurred in Lake Winnebago and waters of Lake Michigan. Since 2007, the Wisconsin Department of Natural Resources has conducted extensive testing for the disease to determine its range. To date, VHS has only been detected in fish from the Lake Winnebago system, Lake Michigan and Green Bay. Because of the Department's extensive testing, the risk of VHS being transmitted to the Wisconsin River from Crystal Lake is determined to be extremely low. Samples of fish tested from the Wisconsin River and from Crystal Lake have been tested for VHS and were found to be negative. Viral testing in Fish (2008) and Crystal (2006) Lakes did not detect VHS or other viral pathogens. Testing for VHS in Crystal Lake is planned for the fall of 2012 (using the antibody test).

There is a risk that precipitation patterns could continue at high levels and the pumping would not adequately lower the water levels in the lakes and the high water problems may not be addressed. This would result in a significant loss in terms of funding and time that have been invested in this project.

- b. Explain the environmental significance of reasonably anticipated operating problems such as malfunctions, spills, fires or other hazards (particularly those relating to health or safety). Consider reasonable detection and emergency response, and discuss the potential for these hazards.

The technology utilized in the proposed discharge is relatively common and used frequently in similar situations. Pipes do rupture on rare occasions and this could happen to the Crystal Lake discharge pipeline. Such a rupture could result in localized soil erosion. The pipeline follows town or state roadways over most of its route so detection by passersby could easily occur and the pump could be shut off until repairs were made. A condition will be added to the draft permit requiring the Lake District to suspend pumping until such a malfunction is corrected.

It is possible that the proposed filter at the intake site could malfunction and not be effective in eliminating suspended solids from entering the discharge stream and lowering the water quality of Roxbury Creek. As a condition of the proposed WPDES permit, pumping must cease if the suspended solids of BOD results equals or exceeds the limit.

23. Significance of Precedent

Would a decision on this proposal influence future decisions or foreclose options that may additionally affect the quality of the environment? Describe any conflicts the proposal has with plans or policy of local, state or federal agencies. Explain the significance of each.

There has been a concern over establishing a precedent regarding allowing a WPDES discharge to an a tributary of stream that flows into the Wisconsin River Exceptional Resource Water (ERW) to be regulated by standards for Fish and Aquatic Life (FAL) Waters rather than the more stringent ERW standards. The Department does not view this proposal as precedent setting because it is already established in Wisconsin Administrative Code Ch. NR 207 and effluent limits in the permit have been calculated to account for the impact of Roxbury Creek on the Wisconsin River.

The proposed eventual discharge to an ERW water (the Wisconsin River) from a lower quality FAL water (Roxbury Creek) is very unusual – perhaps the only one currently in Wisconsin. If similar proposals arose elsewhere in the Lower Wisconsin Basin, the Department would review them using existing regulations and issue the appropriate permits/approvals or denials as it has with this proposal.

24. Significance of Controversy over Environmental Effects

Discuss the effects on the quality of the environment, including socio-economic effects, that are (or are likely to be) highly controversial, and summarize the controversy.

Impacts of Flooding on Residences

The high water of Fish, Crystal and Mud Lakes has been rising for many years (USGS, 2002) and has caused real impacts to property, posed a health impact to residents due to flooded septic systems, and incurred economic costs to local government and private businesses. Residents have also been displaced from their homes (permanent and seasonal). They have incurred costs to their property (property damage), have had to deal with mold in the house/mobile homes, damage to infrastructure including roads, and costs in terms of installing and maintaining the pumping system.

There is no precedent being set because that procedure is clearly already set forth in the code (NR 207). It has been estimated that repairs to infrastructure such as roads to address flooding impacts has exceeded \$400,000. According to the 2003 Mead and Hunt feasibility study, total costs of flood related impacts was estimated to be over \$1,000,000.

Impact to the Roxbury Creek and the Wisconsin River from the Discharge

The increased discharge to the Roxbury Creek and subsequently to the Wisconsin River from the pump installed at Crystal Lake will have limits that have been calculated to protect the immediate receiving stream (Roxbury Creek) and pollutants are not expected to reach the downstream ERW at concentrations above background levels.

The Discharge to the Roxbury Creek and Wisconsin River Will Adversely Impact Water Quality

The discharge into Roxbury Creek will have restrictions on the effluent designed to protect water quality of the creek. The flow regime may adversely impact the bank and create erosion/sedimentation problems. The discharge from Roxbury Creek represents a very small portion of the flow condition of the Wisconsin River; however, the flow in the side channel of the river is much lower than the main channel. While it is not anticipated this will adversely impact the flora and fauna of the Wisconsin River main channel, it could adversely impact the flora and fauna in the side channel because of the relatively large amount of discharge to the total volume of the side channel of the Wisconsin River in the reach of the mouth of Roxbury Creek.

Lowering the Water Level in Crystal Will Harm Biota

Lowering the water level in Crystal Lake will be done in a very gradual manner. This will allow biota (including herptiles) time to adjust and react to these changes in water level. The pumping will not be allowed to lower water level below the Ordinary High Water Mark (868.22 msl)

Effectiveness of this Pumping Project

In 2002, USGS issued their study of the situation, which stated that pumping 500 gpm of Fish and Mud Lakes for one year would reduce water level one – foot in those lakes and that Crystal Lake would be reduced by less than 0.2 feet (USGS, 2002). Four months of pumping during the summer and fall of 2008 resulted in Fish Lake being reduced in lake level by 1.18 feet and Crystal Lake 0.44 feet. Although this represents a lowering of the water level, weather periods during the pumping did not have heavy rains. The effectiveness of the pumping rate is dependent of the amount of rainfall and snowfall that the basin receives. Pumping may not succeed in lowering the lake level if the current weather patterns continue.

The lake level declines that occurred during the pumping from Mud Lake in 2006 and 2007 also coincided with area trends of decreasing groundwater levels (or increased vertical distance to water table below the land surface), based on well monitoring data (USGS). The cause and effect of lake level declines during those years may not be attributed to pumping alone and an updated model could be helpful to better assess lake pumping effectiveness. Information on pumping volume and lake level volume change can be useful, but that information alone may not reflect area groundwater trends.

At this time, many impacts from the high water have been already addressed, such as floodproofing/relocating structures and raising roads. The remaining need from a flood protection standpoint concerns impacts to mobile homes at the private campgrounds. Dane County is at this time planning to acquire property so that the boat ramp can be relocated with needed parking space. The ramp will be installed to accommodate high water conditions.

ALTERNATIVES

25. Briefly describe the impacts of no action and of alternatives that would decrease or eliminate adverse environmental effects. (Refer to any appropriate alternatives from the applicant or anyone else.)

No Action

If no action is taken, the homes on Crystal Lake may continue to be impacted by rising waters if current and past weather patterns for the last decade continue. Property and infrastructure damages will likely continue and homes will continue to deteriorate. Some homes would continue to be inhabitable. Infrastructure such as roads would likely continue to be damaged. Eventually homes would need to be relocated or demolished if the water gets high enough; however, the amount that the water level will continue to rise is unknown. Lakeshore property owners would continue to face loss of dry shoreland, as well as threats to structures and property during high water cycles. This has a detrimental spin-off effect on property values, salability, tax base, tourism and recreation. The loss of this tax base and economic impact would be significant to the Townships of Roxbury and West Point. The waters may eventually recede and the homes may or may not be inhabitable depending on the condition of the homes.

Purchasing Property from or Relocating Landowners/Renters Impacted in Flooded Areas

Owners of commercial property are not readily eligible for a “buyout” based on flood hazard at this time. This would apply to the two campgrounds, which are located on Crystal Lake. Impacts from an economic standpoint for these campgrounds could be significant if high flood waters prevent use of these campgrounds. For mobile homes residents who rent space in the campgrounds, their losses could be offset if these mobile homes could then relocate to other locations (higher ground) in the campground.

The Department considers this option a viable solution to address flooding issues and could be the best overall and most cost effective considering the uncertainty associated with the effectiveness of the pumping and the long term ability to sustain the pumping system.

Diverting water to Dry Acreage and/or Quarry

An initial discharge to agricultural fields was considered, however, the pumping to these areas would likely raise water levels in the ground because of already raised groundwater levels. This alternative would require sufficient acreage to absorb a large volume of water without overflowing to surface water or raising the groundwater table to a nuisance level. There is also a quarry in the area (due west on Highway 188) that has been suggested as a possible site to pump the water (a relatively long way from the pump site). This may involve a land purchase by the Lake District and a significant change in the pipe routing (which has already been installed).

Pumping Groundwater from a Well Adjacent to Crystal Lake and Pumping Water to Lodi Creek

This was explored in 2011 and was discarded as an option by the Lake District because downstream landowners were not in favor of receiving additional water to deal with and because of the potential adverse impacts to Lodi Marsh in the headwaters area.

Pumping Groundwater from a Well Adjacent to Crystal Lake and Pumping Water to Roxbury Creek

It was proposed that a high capacity well installed on the south shore of Crystal Lake to lower the groundwater level in the vicinity of Crystal Lake could possibly lower the lake level. Subsequent analysis showed that the soils on the south shore of Crystal Lake at the proposed pumping site were not conducive to pumping enough water to effectively lower the water level of the lake.

Flood-proofing and/or Moving Threatened Structures

The affected homeowners have the option of flood-proofing their individual structures, and to a large extent this has already occurred. However, many property owners have opted to temporarily move out of their residences. So far one structure was floodproofed (public funding), and another structure was relocated (private funding). Since the majority of the structures are mobile homes, it may indeed be feasible to eventually move the mobile homes out of harm’s way. The private campgrounds would need to provide or acquire available land for those mobile homes. There are current plans to relocate the boat ramp to a more secure and floodproof location pending the upcoming purchase of the property by Dane County.

Find an industrial or commercial use for the extra water

Use of the water in an industrial process would be one way to remove water from the lake without diverting it to another water body. However, this would require a process that uses extremely large volumes of water without producing a proportionate volume of wastewater. Supplemental water would need to be supplied by wells in drought periods. This option does not appear to be feasible at this time.

SUMMARY OF ISSUE IDENTIFICATION ACTIVITIES

26. List agencies, citizen groups and individuals contacted regarding the project (include DNR personnel and title) and summarize public contacts, completed or proposed).

- 2001 Meetings with representatives from the Fish Lake Association, Roxbury and West Point Townships , Dane County and private citizens
- 2002 Stakeholder issue identification process facilitated by UW Extension, Lower Wisconsin Riverway Board, State legislature inquiry and involvement. Meetings with representatives from USGS, the Fish Lake Association, Roxbury and West Point Township and private citizens
- 2003 Meetings with representatives from the Fish Lake Association, Roxbury and West Point Townships and private citizens
- 2006 Meetings with as part of Chapter 30 issuance process.
- 2007 Meetings with the Fish, Mud, and Crystal Lake District to deal with permit issues regarding permit. Planning and design of infiltration cell design.
- 2008 Meetings and discussions with the Fish, Mud, and Crystal Lake District to address issues concerning the infiltration cell discharge (failure) and emergency pumping approvals during the flooding that occurred. WPDES permit modification for discharge to the Wisconsin River.
- 2009 Public hearing held on 1/22/09 regarding discharge to the Wisconsin River and Chapter 30 request for modification. Numerous contacts with the Fish, Mud, and Crystal Lake District, Dane and Columbia County, Lower Wisconsin Riverway Board, news media, and private media regarding the permit application/modification for pumping directly to the Wisconsin River. Emergency pumping allowed for Crystal Lake to Roxbury Creek
- 2010 Continued management and meetings of the pump at Fish Lake
- 2011 Permitting process and meetings for Crystal Lake pump installation involving Dane/Columbia County, Lake District , Private Campgrounds, Town of West Point, Citizens Groups and stipulation Issued regarding pumping on Fish and Crystal Lake involving Dane/Columbia County, Lake District , Private Campgrounds, Town of West Point, Citizens Groups
- 2012 Permitting process ongoing and meetings for Crystal Lake pump installation involving Dane/Columbia County, Lake District , Private Campgrounds, Town of West Point, Citizens Groups
- 2013 Permitting process ongoing and meetings for Crystal Lake pump installation involving Dane/Columbia County, Lake District , Private Campgrounds, Town of West Point, Citizens Groups

DECISION (This decision is not final until certified by the appropriate authority)

In accordance with s. 1.11, Stats., and Ch. NR 150, Adm. Code, the Department is authorized and required to determine whether it has complied with s.1.11, Stats., and Ch. NR 150, Wis. Adm. Code.

Complete either A or B below:

A. EIS Process Not Required

The attached analysis of the expected impacts of this proposal is of sufficient scope and detail to conclude that this is not a major action which would significantly affect the quality of the human environment. In my opinion, therefore, an environmental impact statement is not required prior to final action by the Department.

B. Major Action Requiring the Full EIS Process

The proposal is of such magnitude and complexity with such considerable and important impacts on the quality of the human environment that it constitutes a major action significantly affecting the quality of the human environment.

Signature of Evaluator	Date Signed

Number of responses to news release or other notice:

Certified to be in compliance with WEPA	
Environmental Analysis and Liaison Program Staff	Date Signed

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to sections 227.52 and 227.53, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing pursuant to section 227.42, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

Note: Not all Department decisions respecting environmental impact, such as those involving solid waste or hazardous waste facilities under sections 144.43 to 144.47 and 144.60 to 144.74, Stats., are subject to the contested case hearing provisions of section 227.42, Stats.

This notice is provided pursuant to section 227.48(2), Stats.

Project Name: Crystal Lake Pumping to the Roxbury Creek County: Dane

DECISION (This decision is not final until certified by the appropriate authority)

In accordance with s. 1.11, Stats., and Ch. NR 150, Adm. Code, the Department is authorized and required to determine whether it has complied with s.1.11, Stats., and Ch. NR 150, Wis. Adm. Code.

Complete either A or B below:

A. EIS Process Not Required

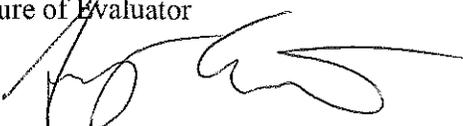


The attached analysis of the expected impacts of this proposal is of sufficient scope and detail to conclude that this is not a major action which would significantly affect the quality of the human environment. In my opinion, therefore, an environmental impact statement is not required prior to final action by the Department.

B. Major Action Requiring the Full EIS Process



The proposal is of such magnitude and complexity with such considerable and important impacts on the quality of the human environment that it constitutes a major action significantly affecting the quality of the human environment.

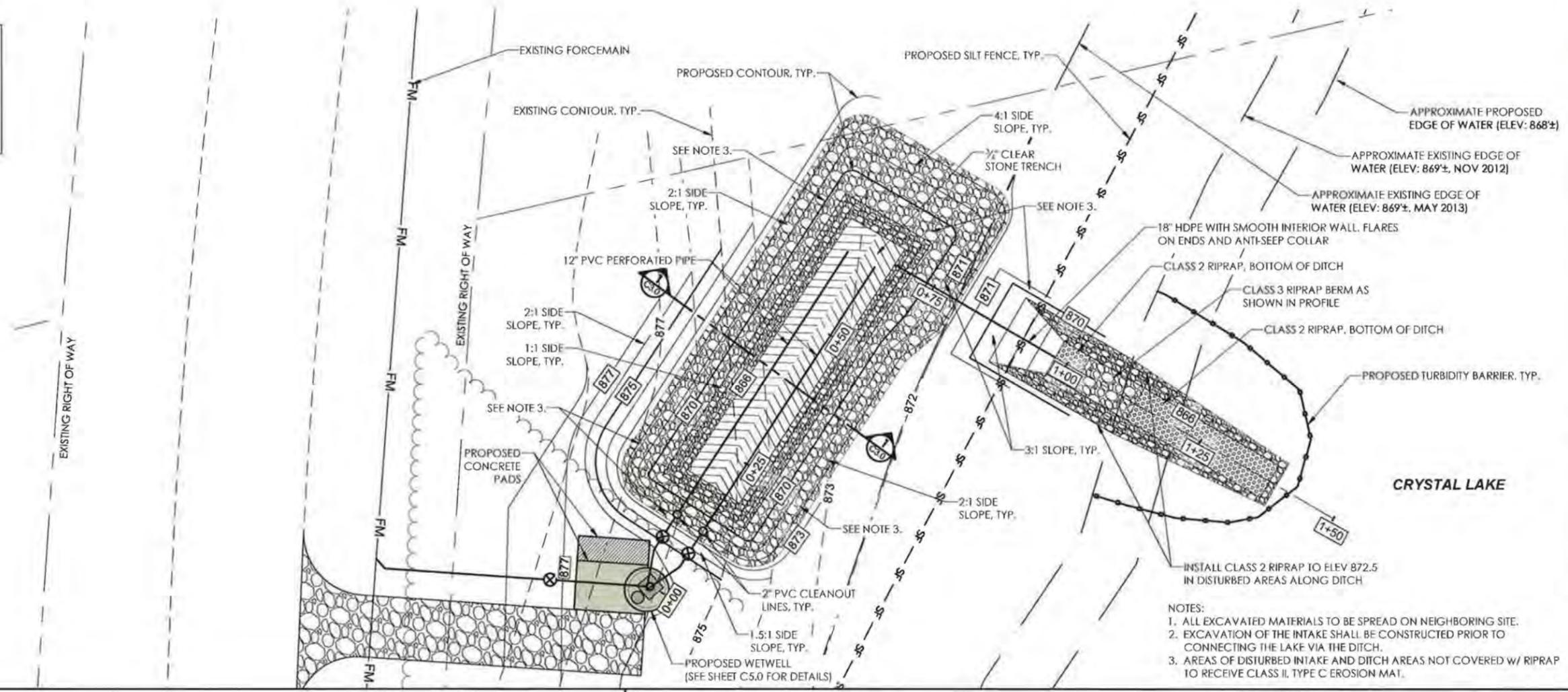
Signature of Evaluator 	Date Signed 9/16/13
---	------------------------

Number of responses to news release or other notice:

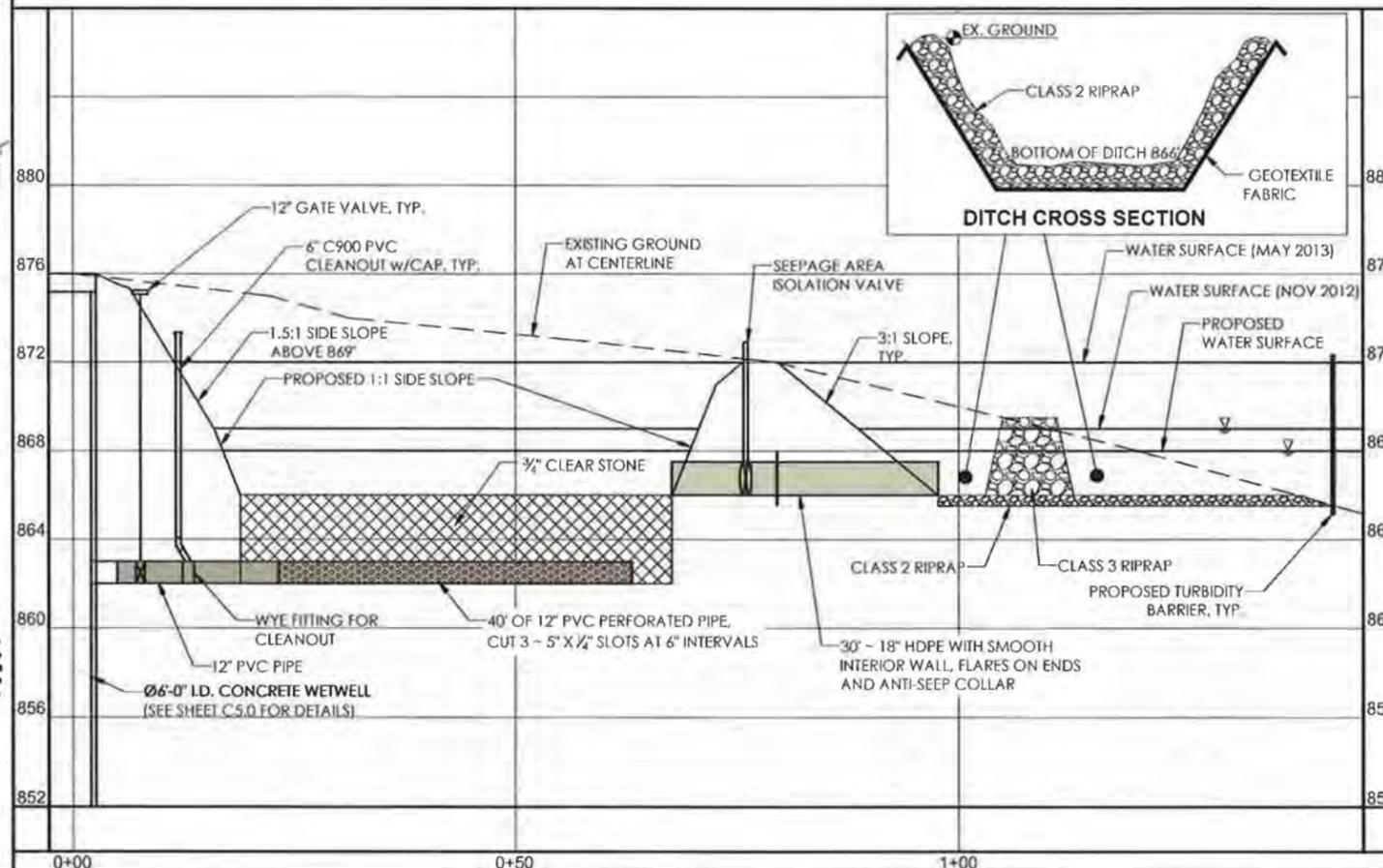
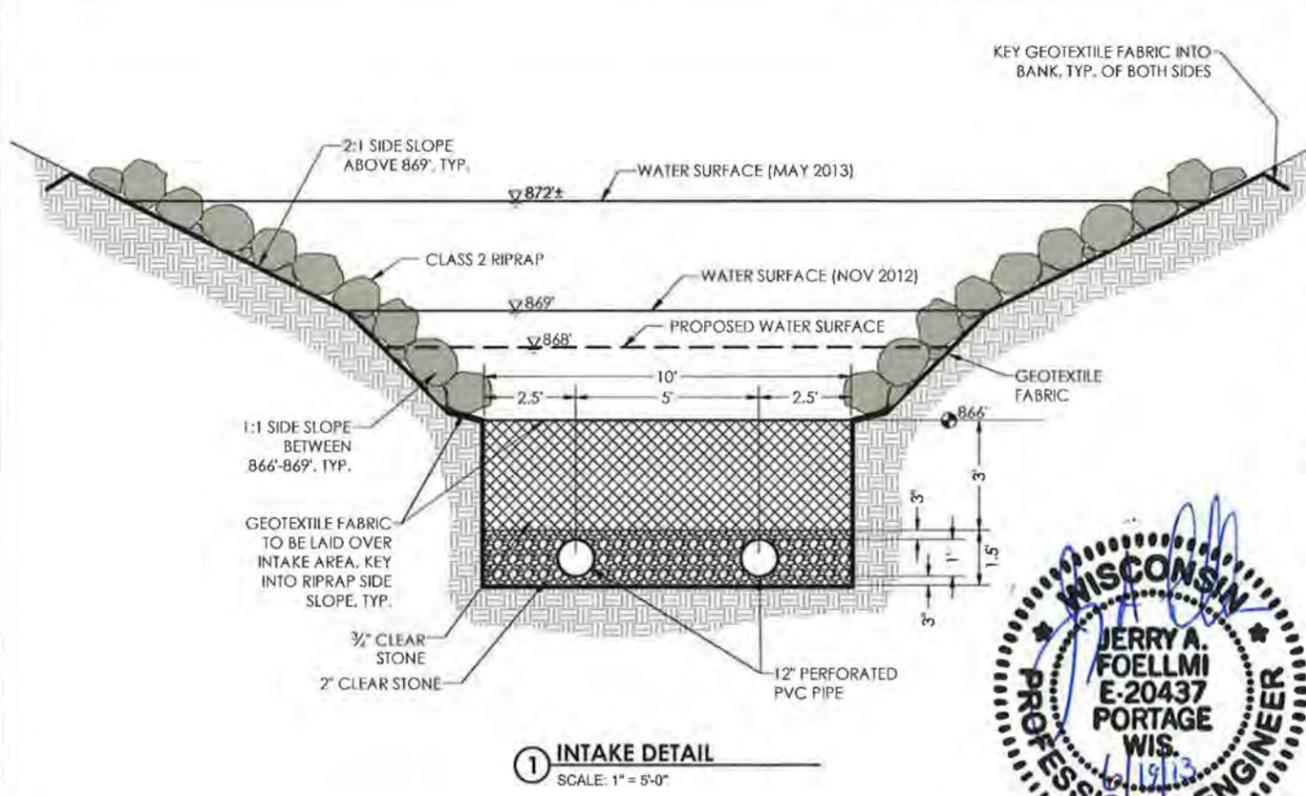
Certified to be in compliance with WEPA	
Environmental Analysis and Liaison Program Staff 	Date Signed 11/26/13

Member Wisconsin Diggers Hotline
 To Obtain Location of Participant's Underground Facilities Before You Dig in Wisconsin
CALL DIGGERS HOTLINE
 1-800-242-8511
 Wis Statute 182.0175 (1974)
 Requires Min. 3 Work Days
 Notice Before You Excavate

G:\Current Files A-D\Crystal, Fish & Mud Lakes Protection & Rehabilitation District 1211-266C Intake Design\CAD 1211-266C Intake Design\2-C3.0-PP-1211-266C-R3.dwg, 5/19/2013 8:42:44 AM, 1:1



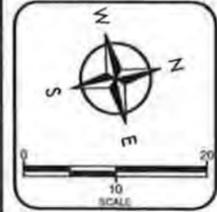
- NOTES:
 1. ALL EXCAVATED MATERIALS TO BE SPREAD ON NEIGHBORING SITE.
 2. EXCAVATION OF THE INTAKE SHALL BE CONSTRUCTED PRIOR TO CONNECTING THE LAKE VIA THE DITCH.
 3. AREAS OF DISTURBED INTAKE AND DITCH AREAS NOT COVERED W/ RIPRAP TO RECEIVE CLASS II, TYPE C EROSION MAT.



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 This document contains confidential or proprietary information of General Engineering Company. It is not to be distributed outside of the project or used for any other project without the written consent of General Engineering Company.

INTAKE PIPE PLAN & PROFILE
Crystal Lake Intake
Fish, Crystal, and Mud Lake
Rehabilitation District
Town of Roxbury
Dane County, WI

NO.	DATE	BY	REVISIONS
1	12/10/12	SRR	Added Cleanout
2	04/29/13	SRR	Added 1.5' Pipe
3	06/19/13	SRR	May 2013 Water Surface, Water Pipe Size



DRAWN BY: SRR
 DATE: 11/09/2012
 GEC FILE NO: 1211-266C
 SHEET NO:
C3.0



Existing 12" Crystal Lake
Effluent Forcemain

Charles Fuchs
8425 CTH Y
Sauk City, WI

Raymond Kruchten
8484 Kruchten Rd
Sauk City, WI

Gerald Campbell
7197 Loper Rd
Sauk City, WI

Proposed 12" Cross-
Over Forcemain

Raymond Kruchten
8484 Kruchten Rd
Sauk City, WI

Gerald Campbell
7197 Loper Rd
Sauk City, WI

Twin City Rod & Gun Club
8877 CTH Y, Sauk City, WI

Map Created on Aug 29, 2013



Legend

Major Highways

-  Interstate
-  State Highway
-  U.S. Highways
-  County Roads
-  Local Roads

Municipalities

-  Village
-  City

0 2000 4000 6000 ft.



Scale: 1:20,000

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Map Created on Aug 29, 2013



Legend

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