ENVIRONMENTAL ANALYSIS AND DECISION ON THE
NEED FOR AN ENVIRONMENTAL IMPACT STATEMENT (EIS)
Form 1600-1 Rev. 3-87

Department of Natural Resources

District or Bureau:
Southeast Region

Type List Designation:

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NOTE TO REVIEWERS: Comments should address completeness, accuracy or the EIS decision. For your comments to be considered, they must be received by the contact person before

_____, _____,
(Date)

Applicant:	Village of Newburg
Address:	614 Main Street, PO Box 50
	Newburg, WI 53060
Title of Proposal:	Newburg Dam Removal
Location:	Washington County
	Section 12, T11N, R20E

I. PROJECT SUMMARY

1. General Description

The Village of Newburg in conjunction with the Ozaukee County Planning and Parks Department proposes to remove the dam on the Milwaukee River in Newburg in Washington County, Wisconsin. Attachments 1 and 2 show the project area. The _7_ surface acre impoundment will be drawn down gradually by first opening the gates and then using the lake drains. Once the impoundment is lowered the existing dam structure will be removed so that the river will run free.

2. Purpose and Need

The Village of Newburg became the owner of the land under and around the dam in 1992 and 2007. Prior to that time the dam was owned by the Newburg Fire Department. The Newburg Dam is a large dam.

In 2008, the DNR conducted a routine dam safety inspection and issued orders to the Village requiring the following items be completed to bring the dam into compliance:

INTERIM EMERGENCY ACTION PLAN	July 31, 2009
DAM TRANSFER DOCUMENTATION	July 31, 2009
EMBANKMENT REPAIRS	September 15, 2009
DAM FAILURE ANALYSIS AND DETAILED EAP	March 1, 2010
INSPECTION, OPERATION AND MAINTENANCE PLAN	March 1, 2010
CONCRETE DAM REPAIRS	June 1, 2010 (design), September 1, 2011(repair)
LAKE DRAIN	June 1, 2010 (design), September 1, 2011(repair)

The Village began working on these items but did not complete all of them. In April 2009, Ozaukee County submitted an application for American Recovery and Reinvestment Act funding through a National Oceanic and Atmospheric Administration (NOAA) grant to improve fish passage in the Milwaukee River Basin by modifying tributary debris, dams and culverts, and three dams located on the Milwaukee River. The grant was awarded in June 2009.

The original scope of work under the NOAA grant included the engineering, design, and construction of a passive fishway at the Village of Grafton's Bridge Street Dam. DNR issued a permit for fishway construction with conditions that it would have to be actively managed via a trap-and-sort facility and that only lake sturgeon could be allowed to use the fishway. The Village of Grafton (i.e., the dam owner) determined that the cost of actively managing the

fishway was too high relative to the perceived minor benefit of passing only lake sturgeon. Subsequently, NOAA formally approved an Ozaukee County's scope change request to use portions of the remaining funding originally allocated for the Bridge Street Fishway project to provide fish passage at Newburg Dam, and Ozaukee County and the Village of Newburg (dam owner) entered into a formal Memorandum of Understanding to partner on a fish passage project at the Newburg Dam. The Newburg Dam is the next upstream dam from Grafton.

In addition to the Newburg Dam, historically there were four other dams between the City of Mequon and City of West Bend that negatively affected upstream fish movement. All of these dams were identified as needing modifications to allow fish to move freely through the watershed. The millrace at the Thiensville-Mequon Dam (RM 20) was converted into a natural side channel-type fishway in 2010. The Village of Grafton's Lime Kiln Dam (RM 30) was removed in 2010; and the former Chair Factory Dam (RM 31) in Grafton was removed in 2002 and the Waubeka Dam at was also removed, both prior to the NOAA grant process.

The Milwaukee River Newburg Dam is located 57 miles upstream of the river's confluence with Lake Michigan (RM 57). The current dam consists of a concrete capped rock timber crib structure. It was originally built in 1848 and rebuilt in 1913 and again in the 1950's. Additional concrete work has been done more recently and the raceway has been rock lined and modified. County Road MY crosses the river adjacent to the dam.

The crest of the dam is 150-ft wide with a structural height of approximately 4.5-ft. It creates a small 7-ac impoundment with a maximum water depth of less than 8-ft. Portions of the original adjoining millrace are in place but have been rock-lined and flows through a culvert under County Rd MY. There is a small stilling basin created on the downstream end of the millrace that is used by the fire department for a dry hydrant. The land upstream and downstream of Cty Rd MY is a public park.

Originally the dam was built to power both a feed mill and a sawmill. It appears that the mills were linear along the millrace and that there may have been an elevated channel between the two mills. Both buildings were removed prior to 1970.

Although the spillway is not controlled, there are two ways to lower the level of the impoundment. There is a stop log control structure in the raceway that can be used to incrementally lower the water levels. In addition, the dam was constructed with a lake drain.

The lake drain consists of two large (36") culverts constructed through the dam. There is steel sheet piling in front of each culvert. The steel sheet piling can be removed to allow the impoundment to flow at close to natural riverbed elevation during low flow conditions.

Ozaukee County has stated the following goals/results of the project in the National Environmental Policy Act (NEPA) document:

° Materially contributes to delisting targets for four of the eleven Milwaukee Estuary Area of Concern (AOC) beneficial use impairments (BUIs)

° Provides substantial numbers of construction industry jobs, a sector particularly hard-hit in the current economic situation

° Has region-wide significance and benefit from both biological and socioeconomic standpoints

° Has local support

° Offers great potential for publicity and public awareness of ARRA funding

° Adds tangible value to the millions of dollars and thousands of volunteer hours already devoted to reaching the project goals

° When fully implemented, will be a critical component of a project that serves as both a regional and national model on how to address stream fragmentation

° Is efficient and productive when contrasted to the accrued benefits,

The overall goals of the Ozaukee County Fish Passage Project are:

1. Enable fish passage to historical fish spawning and rearing habitats for river, estuary, and Lake Michigan fish populations, including game, non-game, endangered, threatened and special concern species.

2. Increase the probability of restoring sustainable populations of lake sturgeon and walleye to the Milwaukee River, its estuary and Lake Michigan currently managed through artificial rearing and stocking programs.

3. Increase fish stock genetic diversity.

4. Increase and diversify recreational fishing opportunities for the state's most populated and demographically diverse river basin.

5. Reconnect 268 total miles of river and streams and re-establish access to over 20,000 acres of wetland habitat

Although the dam was originally constructed to power a mill, it has not served that function since before the 1950's.

The millpond and the land on the north and west bank of the river is owned by the Village of Newburg. Attachment 8 shows the following riparian landowners on the millpond: Village of Newburg, St. John's Evangelical Lutheran Church, Union Cemetery, Newburg Sportsmen, Slavic/Ortleib and Wilkens.

3. Authorities and Approvals

S. 31.185, Wisconsin Stats. – approval to remove dam
S. 31.253, Wisconsin Stats. – requirement of public informational meeting
Village of Newburg Shoreland-Wetland and Floodplain Zoning Ordinance
S. 404 Clean Water Act – disposal of dredge or fill material in waters of the US
Possibly Chapter 30 permits for dredging of sediments in impoundment or downstream
Possibly Chapter 30 permits for shoreline stabilization structures, etc.
U.S. Army Corps of Engineers
NOAA approval under grant

4. Estimated Cost and Funding Source

The Newburg Dam Removal is being funded by the NOAA Ozaukee County Fish Passage on the Milwaukee River Watershed Grant. Preliminary cost estimates for planning, designing and removal of the dam were estimated at $650,000. Ozaukee County has spent over $1.5 million for fish passage work upstream of the Bridge Street Dam in the Milwaukee River watershed. In addition, the Village of Newburg was awarded a $50,000 DNR dam removal grant.

II. PROPOSED PHYSICAL CHANGES

This section describes the process and the effects of the proposed remedial activities on the land and vegetation.

5. Manipulation of Terrestrial Resources - Description of Removal Activities

Attachment 3 shows the site plan. There may be some concrete and debris material hauled off site. Approximately 2310 cubic yards of sediment will be removed from the new river channel starting at the dam and going upstream about 180'. This new channel will be about 110' wide.

The material will be moved to a disposal site along the river and covered with 6" of clean material.

All exposed floodplain areas and disturbed areas will be seeded with native upland vegetation. Portions of the floodplain are expected to be inundated approximately once every 1-2 years. This inundation frequency will allow for the establishment of graminoids, forbs, shrubs, and trees tolerant of periodic flooding. Immediate postconstruction stabilization of the final exposed floodplain surface will include seeding and mulch, stone toe construction, and fabric encapsulated soil lifts.

Erosion control fabric will be applied to exposed floodplain areas in the lower 180 ft of the impoundment as indicated on the plan set and described above. In the lower impoundment areas, the targeted vegetation community will be dominated by grasses, forbs and shrubs, with only a few trees along the banks, compatible with landowner requests and low shear stresses expected on these banks. Further upstream, the target community will be floodplain forest.

There will be two staging areas constructed on each side of the river. There will be a series of limestone block steps constructed on each side of the existing dam to transition from the new soil lift banks to the bridge. A new paved pedestrian path will be constructed that will cross under the road via the existing raceway culvert. Four new dry hydrants will be installed this year to replace the one that was in the former impoundment. Some additional paving is proposed for access to these dry hydrants.

6. Manipulation of Aquatic Resources

Starting after the spring high water periods, gates will be removed in the raceway by increments, allowing a paced drawdown. Once all the gates are removed, one or both steel sheet piles will be removed in front of the lake drain culverts. Because this will be done during low flow periods it is not expected that significant notching of the dam will be required.

The current dam is 150 feet long and approximately 4.5-feet high. Historical information indicates the original dam was a timber crib design that was eventually damaged. A secondary earthen fill capped with concrete structure was subsequently built immediately downstream. Most of these structures will be removed.

When the sediments were analyzed, levels of cadmium in the expected channel area upstream of the dam were found to be of concern. In order to reduce the downstream flush of cadmium containing sediment, a sediment management plan has been developed and approved by the DNR on 4/6/12. After drawing down the impoundment and allowing bank sediments to dry enough to drive equipment on them, accumulated sediment in the active channel immediately upstream of the dam to station 15+43 (approximately 180 ft upstream of the dam) will be mechanically excavated. This material will be placed in the sediment reuse location shown in the plan set and covered with a minimum of 6 inches of clean material.

In addition, WDNR staff requested that the sediment outside the active channel but within the impoundment nearest the dam be stabilized quickly due to potential presence of high cadmium concentrations. The County proposes constructing banks in this area with a stone toe and fabric encapsulated soil (FES) lifts as shown in the plan set, to maximize the immediate stability of this material following dam removal. The stone toe will extend below the depth of scour to protect the channel banks from erosion and establish a solid base on which to build the proposed fabric encapsulated soil lifts. Above the stone toe, FES lifts are proposed. In constructing FES lifts, impoundment sediments are excavated, and the bottom layer of soil is installed and stabilized, followed by additional layers up to the proposed floodplain elevation. The soils are compacted to ensure structural soundness, and topsoil (and seed) is placed on what will be the outer exposed faces. The lifts are constructed using an outer woven coconut fiber (coir) net that provides the structural support and inner woven coir that prevents piping loss of soils. The fabrics last about 1-3 years depending on frequency of inundation and drying. By the time the fabrics are degraded, vegetation is well established and roots hold the soil in place. At the top of the lifts, erosion control fabric is proposed to extend to the existing edge of the impoundment to further minimize the movement of the soil closest to the dam.

All exposed floodplain areas and disturbed areas will be seeded with native vegetation. Portions of the floodplain are expected to be inundated approximately once every 1-2 years. This inundation frequency will allow for the establishment of graminoids, forbs, shrubs, and trees tolerant of periodic flooding. Immediate postconstruction stabilization of the final exposed floodplain surface will include seeding.

Erosion control fabric will be applied to exposed floodplain areas in the lower 180 ft of the impoundment as indicated on the plan set and described above. In the lower impoundment areas, the targeted vegetation community will be dominated by grasses, forbs and shrubs, with only a few trees along the banks, compatible with landowner requests and low shear stresses

expected on these banks. Further upstream, the target community will be floodplain forest. The current 7-acre impoundment will be drained to form a free-flowing river.

Approximately 1400' of roughly 6' deep river (at bankfull) will be created in an existing millpond that averages about 1.5' deep at this time.

7. Buildings, Treatment Units, Roads, and Other Structures

Construction equipment will access the site from several locations as shown on the plans.

8. Emissions and Discharges

There will be the emission of exhaust from the heavy equipment during construction. Some sediment will flush downstream as the dam is lowered, both from the water behind the dam and as the river scours a new channel. The drawdown will be done gradually to minimize the flush of sediment-laden water downstream and will be done during low-flow conditions when major storms are not expected so that the scour is not accelerated by major flows.

9. Other Changes

The proposed changes to the floodplain and surrounding areas are all described above.

10. Maps, Plans and Other Descriptive Material Attached

Attachment 1: County map showing the general area of the project
Attachment 2: USGS topographic map
Attachment 3: Site development plan
Attachment 4: Plat map
Attachment 5: DNR county wetlands map
Attachment 6: Zoning map
Attachment 7: Dam inspection report
Attachment 8: Property boundary map
Attachment 9: Sediment depth map
Attachment 10: South Bank Condition Survey Results
Attachment 11: Detailed Drawing and Label of Existing Dam.
Attachment 12. Floodplain maps.
Attachment 13. Soil Survey Maps.
Attachment 14. Victoria Durst comments about no archeological/historical impact

III. AFFECTED ENVIRONMENT

Information Based On:

[X] Literature/Correspondence

New Fane Dam Removal EA

[X] Personal Contacts

Field Analysis By: [X] Author [X] Other (list in item 28)

Past Experience With Site By: [X] Author [X] Other (list in item 28)

11. Physical

Dam Structure and Impoundment

The existing dam creates a 7-acre impoundment on the Milwaukee River. The dam has a structural height of 11 feet and is 150 feet long. It is constructed of timber, rock and rubble with a poured concrete cap. The dam is under water during most flow conditions although concrete overpours and old pieces of the dam are visible on the east side of County MY.

The dam is deteriorated and needs repairs (see Attachment # 7) The Village is also under orders to provide an Emergency Action Plan and complete multiple repairs at a cost to the Village to bring the dam into compliance with dam safety regulations.

The impoundment is extremely shallow with a maximum depth of 5' near the dam and an average depth of 2'. The current river flow is about 6' deep (at bankfull) in the area downstream of the dam.

Topography

The area adjacent to the millpond is fairly flat and there is a large floodplain/wetland complex from the water's edge to the neighboring properties. The immediate topography of the area is that the north side of the millpond slopes gently south the water's edge. The south side of the millpond has a steeper river bank and then flattens out closer to the edge of the floodplain.

Soils/Geology

The south bank is mapped Casco loam. A well drained soil commonly found on broad outwash plains. Casco soils are fine loamy glaciofluvial deposits over sandy and gravelly outwash. The typical profile is loamy topsoil over a clay loam underlain by sand and gravel. The mapped soils

in the impoundment area are wet alluvial soils, made up of sandy and silty alluvium. These soils underlay the floodplain area and form poorly drained riparian wetlands. The north side of the impoundment is a mix of Fabius loam, Mussey loam and Casco-rodman complexes with varying slopes. These loams are less sloped than the casco soils and have a higher sandy component. Fabius loam has less clay and is somewhat poorly drained but does contain some areas of wetter soils. Mussey loam is a poorly drained hydric soil, forming additional riparian wetlands.

Bank Conditions

The banks of the impoundment are mostly vegetated. There are wooded areas along the north bank, especially within the wetland areas.

Sediment Quantity

The impoundments formed behind dams on rivers cause the flow of water to slow down which allows particles to fall out of suspension. Over time, thick sediment deposits often form behind dams. These deposits tend to consist of fine-grained clay and silt particles, and are often high in organic matter.

Sediment transport is part of the natural function of river systems, and material that has accumulated behind the Newburg Dam would have transported downstream naturally, if not for the trapping action of the dam. The "pulsed" nature of the release, however, is obviously not natural, and is one of the unavoidable consequences of dam removal. The dam removal has been planned for the spring season so that flushing flows will continue to wash the sediment downstream so that it does not harm habitat in the river reach downstream of the dam. The material away from the new channel is expected to dewater, compress, and revegetate, thus remaining in place.

In 2011, Ozaukee County staff collected impoundment sediment data, including depth to hard surface, depth to accumulated sediment surface, and accumulated sediment type. They used this information to generate maps of sediment thickness and type, which are attached as Appendix B.

The data collection extended to the upper end of the widened portion of the impoundment (station 27+00). Based on this data, we calculated the total volume of sediment impounded by the dam in the surveyed area to be 60,500 cubic yards. Upstream of station 27+00, the channel narrows and contains smaller depths of accumulated sediment. This channel area was not included in the County's data collection effort, but during Inter-Fluve's survey of the reach for hydraulic modeling, staff observed sand deposition up to approximately station 47+00. If the

sand depth decreases linearly through this reach from 0.5 ft at station 27+00 to no sand at station 47+00, the volume of accumulated material in this reach is approximately 2400 cubic yards. Therefore, the total estimated volume of material impounded is 62,900 cubic yards. However, most of this material is expected to remain in place as floodplain and be stabilized by vegetation after the impoundment is drawn down.

To determine the quantity of material expected to be mobile, dimensions of the postrestoration channel were approximated. The depth of refusal surface developed by the County based on their field explorations did not include a single deeper channel through the impoundment at the hard surface and no data was available regarding the material encountered at the depth of refusal.

Without these indicators, the anticipated channel was approximated based on upstream analogs and hydraulic conditions anticipated in the channel, as predicted using a HEC-RAS model. The approximated channel is 110 feet wide at the base, and follows the existing flow path through the impoundment, which is sandier material and therefore more likely to move than the more cohesive material that has built up outside the existing flow path. This alignment is shown in the plan set attached as Appendix C. The quantity of impoundment sediment within this anticipated channel up to station 27+00 is 13,800 cubic yards. All of the material impounded in the narrow stretch of channel upstream of station 27+00 is expected to move. Therefore, the total volume of material expected to be mobile following dam removal is 16,200 cubic yards.

In 2011, Ozaukee County conducted a study of substrate in three reaches of the Milwaukee River (Ozaukee County Planning and Parks, 2011). They found that the surface substrate in two reaches below the Newburg Dam contained significantly lower quantities of small grained particles, including silt, sand, and gravel, than was observed upstream of the reach impounded by the dam. They concluded that the downstream reach was starved of smaller bedload materials and recommended that accumulated sediment upstream of the Newburg Dam be released to enrich the downstream reaches.

Table 3 – Sediment Volumes

	Volume, cy
Total accumulated sediment impounded	62,900
Accumulated sediment expected to be mobile	16,200
Sediment proposed for active removal (between the dam and station 15+43)	2,310

Sediment Quality

Many pollutants of concern accumulate on the fine-grained, organic sediment particles that settle out behind dams. When the dam is removed, a portion of this sediment will, unavoidably, be lost to downstream areas as the river cuts a new channel through these fine-grained sediment deposits. Therefore, it is important to know what possible pollutants are present in the sediments found behind the dam, so that appropriate actions may be taken before the dam comes out.

The levels of contaminants found in sediments reflect the variety of past and present land uses upstream from the dam. In the case of Newburg, there are very few industrial or heavily urbanized land uses, and so, the sediment found behind the Newburg Dam is generally quite clean.

In 2011, a sediment sampling plan was developed by Ozaukee County and WDNR to provide screening level information regarding sediment quality within the impoundment. In accordance with the sampling plan, on November 29, 2011, AECOM staff collected sediment cores at three locations within the anticipated channel through the impoundment – approximately 40 ft upstream from the dam, approximately 80 ft upstream of the dam, and approximately 120 ft upstream of the dam. Each core extended to the depth of refusal and was divided into subsamples at 12 inch intervals. The three samples were composited according to depth interval such that the sample collected from 0 – 12 inches from each location was composited, and the sample collected between 12 and 24 inches was composited. Because insufficient sample was available at depths greater than 24 inches, only these two composited samples were analyzed. Each of the samples was analyzed by Northern Lake Service, Inc.,

Results of the preliminary sediment sampling are attached in Appendix A and summarized in Table 1 with threshold concentrations identified by WDNR (2003). The thresholds shown are the Threshold Effect Concentration (TEC) which is the concentration below which effects on aquatic life rarely occur, the Probable Effect Concentration, which is the concentration above which effects on aquatic life are likely to occur, and the Midpoint Effect Concentration (MEC) which is the midpoint between the TEC and the PEC. The availability of organic contaminants to aquatic organisms decreases with increasing organic carbon content of the sediment. Therefore, before comparing the organic contaminants (PAHs and PCBs in this study), the sampling results were normalized to 1% total organic carbon (TOC) in accordance with the Consensus Based Sediment Quality Guidelines: Recommendations for Use & Application (WDNR, 2003).
The sediments were reported to consist primarily of sand (>98%), with minor quantities of silt

(1– 1.5%) and clay (<1%). Of the PAHs tested, benzo(a)anthracene, benzo(b)anthracene, chrysene, fluoranthene, and pyrene were present at detectable levels, but when normalized to 1% TOC content, all PAHs were below the TEC in the sample collected at depths between 12 and 24 inches.

In the sample collected at depths from 0 to 12 inches, the TEC was exceeded for benzo(a)anthracene, chrysene, and pyrene but the concentrations were well below the MEC and PEC. When the upper and lower sample concentrations were averaged, only the concentration of pyrene exceeded the TEC. There are no reported threshold values for the specific PCBs for which the samples were analyzed, but thresholds are available for total PCBs. When normalized to 1% TOC, both samples were below the TEC threshold for total PCBs. Based on this analysis, we do not expect organic contaminants to be a limiting factor for aquatic life if these sediments remain in the river.

Table 1 – Newburg Impoundment Sediment Screening Results. Values that exceed the TEC are bold and shaded light grey and those that exceed the PEC are shaded darker grey.

Analyte	D0		D12		avg	TEC	MEC	PEC
	Raw	Normalized to 1% TOC	Raw	Normalized to 1% TOC				
Selected Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg dry weight)								
Acenaphthene	0.0	0.0	0.0	0.0	0.0	6.7	48	89
Acenaphthylene	0.0	0.0	0.0	0.0	0.0	5.9	67	128
Anthracene	0.0	0.0	0.0	0.0	0.0	57.2	451	845
Benzo[a]anthracene	610.0	**174.3**	0.0	0.0	87.1	108	579	1050
Benzo[a]pyrene	0.0	0.0	0.0	0.0	0.0	150	800	1450
Benzo[b]fluoranthene	590.0	168.6	0.0	0.0	84.3	240	6820	13400
Benzo[g,h,i]Perylene	0.0	0.0	0.0	0.0	0.0	170	1685	3200
Benzo[k]fluoranthene	0.0	0.0	0.0	0.0	0.0	240	6820	13400
Chrysene	740.0	**211.4**	540.0	120.0	165.7	166	728	1290
Dibenz[a,h]anthracene	0.0	0.0	0.0	0.0	0.0	33	84	135
Fluoranthene	920.0	262.9	790.0	175.6	219.2	423	1327	2230
Fluorene	0.0	0.0	0.0	0.0	0.0	77.4	307	536
Indeno[1,2,3-cd]pyrene	0.0	0.0	0.0	0.0	0.0	200	1700	3200
Methyl-1-Naphthalene	0.0	0.0	0.0	0.0	0.0			
Methyl-2-Naphthalene	0.0	0.0	0.0	0.0	0.0	20.2	111	201
Naphthalene	0.0	0.0	0.0	0.0	0.0	176	369	561
Phenanthrene	0.0	0.0	0.0	0.0	0.0	204	687	1170
Pyrene	900.0	**257.1**	760.0	168.9	**213.0**	195	858	1520
PCBs (µg/kg dry weight)								
PCB-1016	0.0		0.0		0.0	-	-	-
PCB-1221	0.0		0.0		0.0	-	-	-
PCB-1232	0.0		0.0		0.0	-	-	-
PCB-1242	0.0		0.0		0.0	-	-	-
PCB-1248	0.0		0.0		0.0	-	-	-
PCB-1254	28		80		12.9	-	-	-
PCB-1260	15		64		9.3	-	-	-

Total PCBs	43.0	12.3	140.0	31.1	21.7	60.0	368.0	676.0
Selected Metals (mg/kg dry weight)								
Arsenic	2.6		2.6		2.6	9.8	21.4	33
Cadmium	**13.0**		**20.0**		**16.5**	0.99	3.0	5.0
Chromium	**47.0**		**72.0**		**59.5**	43	76.5	110
Copper	27.0		**40.0**		**33.5**	32	91	150
Lead	**69.0**		**85.0**		**77.0**	36	83	130
Mercury	**0.31**		**0.38**		**0.3**	0.18	0.64	1.1
Nickel	13.00		17.00		15.0	23	36	49
Zinc	**180.0**		**280.0**		**230.0**	120.0	290.0	460.0
Grain Size and Carbon Analysis (%)								
% Sand	98.65		98.12			-	-	-
% Silt	0.98		1.51			-	-	-
% Clay	0.37		0.37			-	-	-
Total Organic Carbon	3.5		4.5			-	-	-

Table 2 – Newburg Sediment Sampling Results. Values that exceed the TEC are bold and shaded light grey and those that exceed the PEC are shaded darker grey.

Analyte	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	TEC	MEC	PEC
	Impoundment						Downstream		Upstream				
Cadmium (mg/kg dry weight)	**10**	**1.3**	0.41	**4.8**	**1.2**	0.29	**1.9**	0.37 [a]	0.43	0.13	0.99	3.0	5.0
Grain Size (%)													
% Sand	98.77	99.56	99.60	99.31	99.23	99.66	99.54	99.60	99.61	99.73	-	-	-
% Silt	0.95	0.16	0.12	0.28	0.70	0.27	0.00	0.00	0.12	0.00	-	-	-
% Clay	0.28	0.28	0.28	0.42	0.08	0.07	0.46	0.40	0.27	0.27	-	-	-

[a] Reported value is below the Limit of Quantitation.

Water Quality

The Newburg Dam exhibits numerous affects on Milwaukee River water quality. The most noticable noticeable change in water quality may be measured by examining water quality parameters associated with the growth of plants.

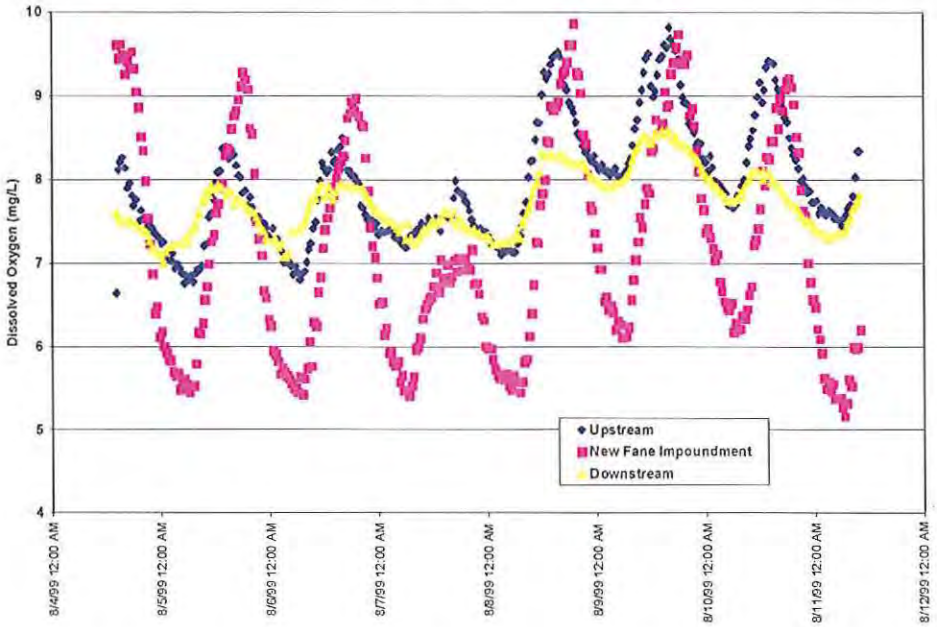
The impoundment formed by the dam creates a shallow-water environment with relatively low water velocities. Accumulated sediments are nutrient enriched and the sediment texture is conducive to rooted aquatic plant (macrophyte) growth. As a result, floating, emergent and especially submergent rooted aquatic plants are very abundant throughout most of the impoundment. Yellow pond lily (*Nuphar advena*) and cattails (*Typha sp.*) are scattered around

the pond shoreline and are most prevalent in the upper 1/2 of the impoundment. Submergent plants are very abundant covering an estimated 90% of the impoundment. Eurasian water milfoil (*Myriophyllum, spicatum*) is the most abundant rooted aquatic plant in the impoundment. Eurasian water milfoil is non-native to North America having originated in Europe and Asia. It is a very aggressive plant, out competing beneficial and less aggressive species of native aquatic plants. Coontail (*Ceratophyllum demersus*) is a common rooted aquatic plant in the impoundment. It is commonly found growing beneath and along the thick beds of Eurasian water milfoil since it is relatively tolerant of shade and low light levels.

Aquatic plants consume carbon dioxide and produce oxygen during daylight hours. During darkness, the same plants consume oxygen and produce carbon dioxide. The chart below shows this process as measured for the New Fane Impoundment from 8/4/99 to 8/12/99.

Dissolved oxygen levels within the impoundment exhibit a much greater daily variation than do dissolved oxygen levels upstream and downstream of the impoundment. This variation limits the number and types of fish and aquatic life that can survive in the impoundment.

The slow-moving, shallow water within Newburg impoundment acts as a collector of solar



radiation. As a result, waters in the impoundment are expected to gain almost 2 degrees Celcius (3.6 degrees Farhenheit) over the upstream reaches on sunny summer days, based on studies on similar impoundments. The chart below shows the temperature variations measured in August, 1999, for the former New Fane Impoundment.

The temperature monitoring sites are 150' downstream of the Mill Road bridge, 30' upstream of the dam, and 45' upstream of the snowmobile bridge north of the impoundment. Note that the waters warmed within the impoundment have not recovered by the time they flowed past the downstream monitoring site. Once the river passes over the dam, the banks are wooded, providing shade which should help cool the water quickly. The fact that the shading has not cooled the water 150' downstream of the Mill Road bridge at the monitoring site indicates that the millpond is having a significant negative impact.

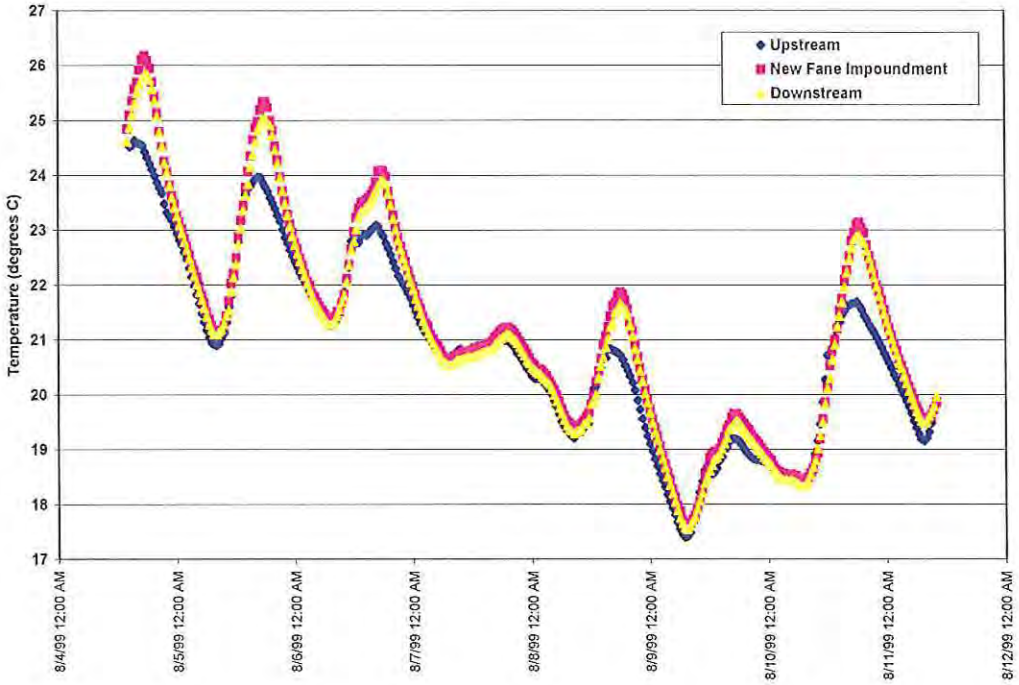


Table 6. Temperature Variations

Similar patterns are expected to hold for measurements of pH in the waters upstream, within, and downstream of the Newburg Dam. The pH of natural waters changes as the level of

carbonates in the system changes with production or consumption of carbon dioxide by aquatic plants.

The presence of the Newburg Dam clearly alters several key measures of water quality, including the dissolved oxygen level, pH, and temperature. The changes and variations in water quality caused by the Newburg Dam and Impoundment are one likely reason that we would expect to find hardier, more pollution-tolerant fish and aquatic life species in this section of the Milwaukee River. In the next section we test our theory and discuss the types of fish and aquatic life actually found upstream, within, and downstream of the Newburg Impoundment.

The most recent water quality data for the East Branch of the Milwaukee River are limited to sampling completed in 1993 (WDNR, 1993). Samples from the East Branch of the Milwaukee River were collected in Washington County, at CTH S, and 100-ft. downstream of the New Fane Dam. Samples were obtained monthly or twice per month between May, 1993 and November, 1993. Analysis was completed for conventional physical (e.g. discharge, temperature) and chemical parameters (e.g. dissolved oxygen and nutrients). These analyses are summarized in Table 7 below.

Table 7. Summary of Physical and Chemical Water Quality – East Br. Milwaukee R. CTH S, Washington County

	Biochemical Oxygen Demand	Chorophyll a	Hardness CaCO3	Ammonia Nitrogen	Nitrite-Nitrate	Total Kjeldahl Nitrogen	Total Phosphorus	Dissolved Phosphorus
	mg/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Average	1.2	2.3	268	0.031	0.073	0.9	0.06	0.032
Standard Deviation	0.3	1.8	29	0.013	0.055	0.1	0.03	0.020
Minimum	1.0	0.9	220	0.017	0.014	0.7	0.03	0.009
Maximum	1.7	6.3	310	0.056	0.173	1.0	0.10	0.065

	Total Solids	Total Volatile Solids	Total Suspended Solids	Volatile Suspended Solids	Turbidity	Water Temperature	Dissolved Oxygen	%Sat.	pH	Discharge

	mg/l	mg/l	mg/l	mg/l	NTU	C	mg/l	%	su	cfs
Average	322	114	4	3	2.2	15.8	9.5	95.2	8.18	57
Standard Deviation	18	7	1	1	2.8	7.0	2.1	12.0	0.28	54
Minimum	292	102	2	2	1.0	4.6	6.7	74.0	7.78	16
Maximum	348	122	6	4	10.0	24.1	13.8	116.0	8.52	183

Overall, water quality can be described as "good" to "excellent", depending on the individual analysis. This subjective rating is especially relevant when considering the wide range of water quality conditions that exist throughout the remainder of the Milwaukee River Basin.

The "good" water quality conditions are a function of the lack of point source discharges (private or municipal) in the basin, and the high percentage of low-impact, low-developed land uses (e.g. forest, wetlands) that exist in this watershed. The effects of land use and other human inputs on water quality in the Milwaukee River Basin can be seen by comparing total suspended solids and total phosphorus from samples collected on the East Branch Milwaukee River at New Fane to those obtained on the Milwaukee River at West Bend. Total suspended solids and total phosphorus are commonly used as indicators of water quality. Elevated levels of these pollutants are often indicative of erosion from developed land uses and other human inputs. As Tables 8 and 9 indicate, total phosphorus and total suspended solids are approximately 2 to 4 times greater on the Milwaukee River at West Bend than those on the East Branch of the Milwaukee River at New Fane.

12. Biological

Fish

DNR does not have much past fish sampling results from the Newburg area so much of this discussion is based on the former New Fane impoundment. The free-flowing reaches of the East Branch of the Milwaukee R., upstream and downstream of the New Fane Impoundment, support a diverse warm water recreational sport, panfish and forage fish community (Fago, 1984; WDNR, 2000) (Table 10). Since 1976, 37-species of fish native to Wisconsin have been documented along the free-flowing reaches of the river. Recreational sport fish include northern pike (*Esox lucius*) and largemouth bass (*Micropterus salmoides*). Other fish species include rock bass (*Ambloplites rupestris*), yellow perch (*Perca falvescens*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), black crappie (*Pomoxis nigromaculatus*) , white crappie (*Pomoxis annularis*), orangespotted sunfish (*Lepomis humilis*) black bullhead (*Ameiurus melas*) and yellow bullhead (*Ameiurus natalis*). Twenty-three forage fish species

have been documented from the free-flowing reaches of the river. The river contains three state special status listed fish species. They include the striped shiner *(Luxilus chrysocephalus)* as Endangered, and the greater redhorse (*Moxostoma valenciennesi*) as Threatened, and longear sunfish (*Lepomis megalotis*) as Threatened. The exotic common carp (*Cyprinus carpio*) is present but their catch numbers are low and their impact on the fish and aquatic life community, and their habitat is not considered to be significant.

Table 10. Summary of fish species present in free-flowing reaches of the East Branch of the Milwaukee River.

COMMON NAME	SCIENTIFIC NAME	STATUS
CENTRAL MUDMINNOW	UMBRA LIMA	
NORTHERN PIKE	ESOX LUCIUS	
CENTRAL STONEROLLER	CAMPOSTOMA ANOMALUM	
LARGESCALE STONEROLLER	CAMPOSTOMA OLIGOLEPIS	
SAND SHINER	NOTROPIS STRAMINEUS	
HORNYHEAD CHUB	NOCOMIS BIGUTTATUS	
STRIPED SHINER	LUXILUS	State
	CHRYSOCEPHALUS	Endangered
COMMON SHINER	LUXILUS CORNUTUS	
BLUNTNOSE MINNOW	PIMEPHALES NOTATUS	
FATHEAD MINNOW	PIMEPHALES PROMELAS	
BULLHEAD MINNOW	PIMEPHALES VIGILAX	
BLACKNOSE DACE	RHINICHTHYS ATRATULUS	
CREEK CHUB	SEMOTILUS ATROMACULATUS	
WHITE SUCKER	CATOSTOMUS COMMERSONI	
GREATER REDHORSE	MOXOSTOMA	State
	VALENCIENNESI	Threatened
BLACK BULLHEAD	AMEIURUS MELAS	
YELLOW BULLHEAD	AMEIURUS NATALIS	
STONECAT	NOTURUS FLAVUS	
TADPOLE MADTOM	NOTURUS GYRINUS	
BROOK STICKLEBACK	CULAEA INCONSTANS	
ROCK BASS	AMBLOPLITES RUPESTRIS	
GREEN SUNFISH	LEPOMIS CYANELLUS	
PUMPKINSEED	LEPOMIS GIBBOSUS	
ORANGESPOTTED SUNFISH	LEPOMIS HUMILIS	

BLUEGILL	LEPOMIS MACROCHIRUS	
LONGEAR SUNFISH	LEPOMIS MEGALOTIS	State Threatened
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	
WHITE CRAPPIE	POMOXIS ANNULARIS	
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	
IOWA DARTER	ETHEOSTOMA EXILE	
FANTAIL DARTER	ETHEOSTOMA FLABELLARE	
JOHNNY DARTER	ETHEOSTOMA NIGRUM	
YELLOW PERCH	PERCA FLAVESCENS	
LOGPERCH	PERCINA CAPRODES	
BLACKSIDE DARTER	PERCINA MACULATA	
MOTTLED SCULPIN	COTTUS BAIRDI	
COMMON CARP	CYPRINUS CARPIO	Exotic

DNR does not have years of fish shocking data for the Newburg impoundment but does have data from the former New Fane impoundment, a similar sized former dam and impoundment in the upper watershed north of West Bend. By comparison to the free-flowing reaches of the East Branch of the Milwaukee R., the New Fane Impoundment supported a low diversity of warm water recreational sport, panfish and forage fish (WDNR, 2000) (Table11). Since 1999, 13-species of fish native to Wisconsin have been documented along the New Fane Impoundment. Recreational sport fish include northern pike and largemouth bass. Other fish species include rock bass, black crappie, yellow perch, bluegill, black bullhead and yellow bullhead. Five species of forage fish have been documented from the impoundment. The impoundment fish collections did not include state special status listed fish species. Unlike the free-flowing river reaches, the impoundment contains an abundant population of the exotic common carp. Their large numbers suggest that they may be impacting other fish and aquatic, and their habitat.

Table 11. Summary of fish species present in the New Fane Impoundment before dam removal.

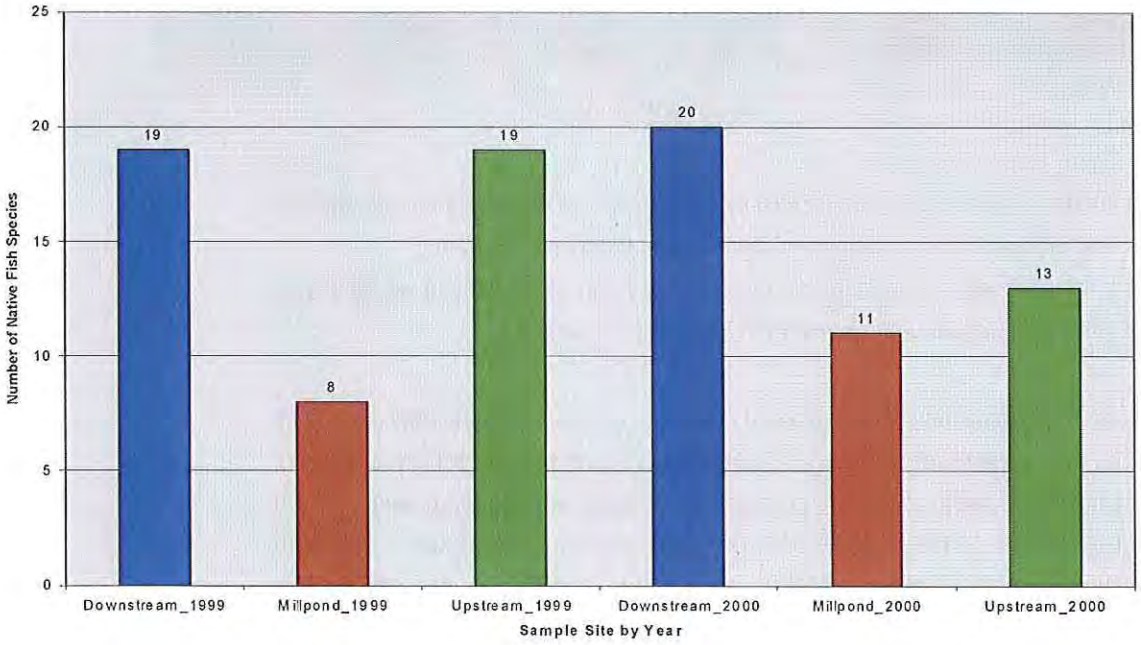
COMMON NAME	SCIENTIFIC NAME	STATUS
NORTHERN PIKE	ESOX LUCIUS	
CENTRAL STONEROLLER	CAMPOSTOMA ANOMALUM	
COMMON SHINER	LUXILUS CORNUTUS	
WHITE SUCKER	CATOSTOMUS COMMERSONI	
BLACK BULLHEAD	AMEIURUS MELAS	
YELLOW BULLHEAD	AMEIURUS NATALIS	
STONECAT	NOTURUS FLAVUS	
TADPOLE MADTOM	NOTURUS GYRINUS	
ROCK BASS	AMBLOPLITES RUPESTRIS	
BLUEGILL	LEPOMIS MACROCHIRUS	
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	
YELLOW PERCH	PERCA FLAVESCENS	
COMMON CARP	CYPRINUS CARPIO	Exotic

In order to more accurately assess biological and physical habitat differences between free-flowing and impounded reaches of the East Branch of the Milwaukee River, the DNR monitored the fish, aquatic insects (macroinvertebrates), and physical habitat within the New Fane Impoundment, and the free-flowing reaches of the river immediately upstream and downstream of the dam during 1999 and 2000. These data are useful in estimating the positive and negative consequences of dam removal.

According to most fish community structure measures, the New Fane Impoundment appeared to have a negative effect on the local East Branch of the Milwaukee River fish community. These effect to the fish community appeared to be most limiting within the impoundment, and to a lesser extent, upstream of the impoundment. Between 1999 and 2000, 22 different native species of fish were collected downstream of the New Fane Impoundment, and 20 different native fish species were collected upstream of the impoundment. By comparison, an average of 13 different native

fish species was collected from the New Fane Impoundment (Table 11). Collectively, the free-flowing reaches contained 25 different native warm water game and non-game fish species while only 13 different native warm water games and non-game fish species were collected from the impoundment. These results are consistent with previous studies which concluded that as the degree of environmental degradation increases in warm water streams, the number of native fish species declines (Karr et al. 1986, Ohio EPA, 1988).

Table 12. Number of native fish species by sample year – New Fane Impoundment and East Branch of Milwaukee upstream and downstream of the impoundment



The relative abundance of fish does not decline until the degree of environmental degradation becomes severe. In addition, as the number of fish declines in severely degraded streams there is often an increase in the number of fish species that are very tolerant of degraded environmental quality, such as the common carp. These conditions are evident in the New Fane Impoundment where the total number of fish are low, and carp numbers or their biomass are relatively high, when compared to free-flowing reaches upstream and downstream of the impoundment (Tables 10 and 11).

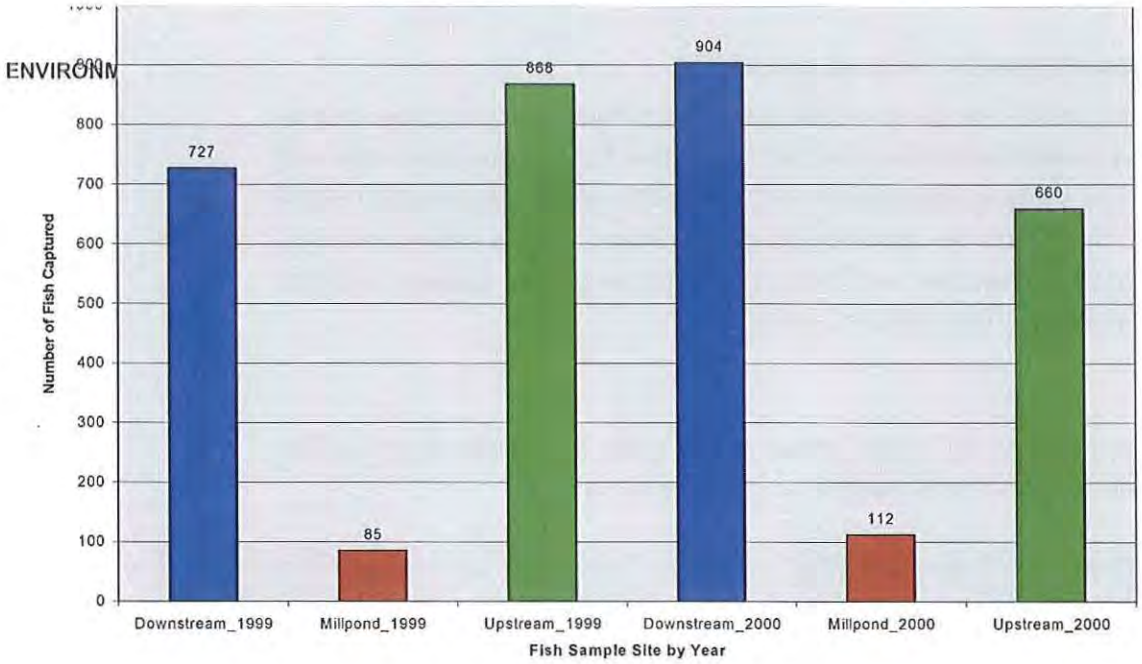
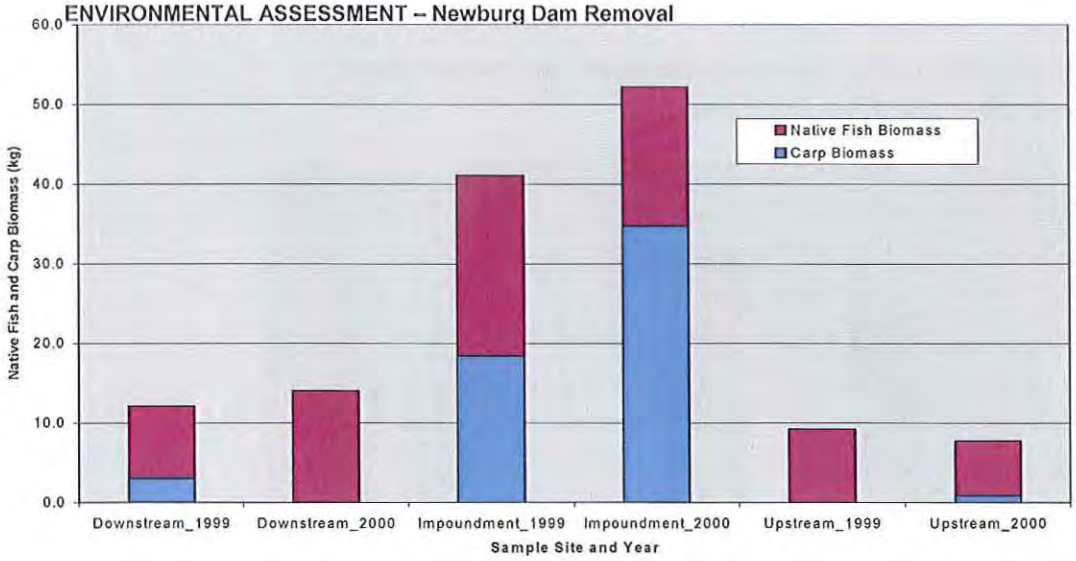


Table 13. Total number of fish captured and catch per unit effort – New Fane Impoundment and the East Branch Milwaukee River upstream and downstream of the impoundment

Table 14. Native fish biomass versus carp biomass – New Fane Impoundment and the East Branch Milwaukee River upstream and downstream of the impoundment

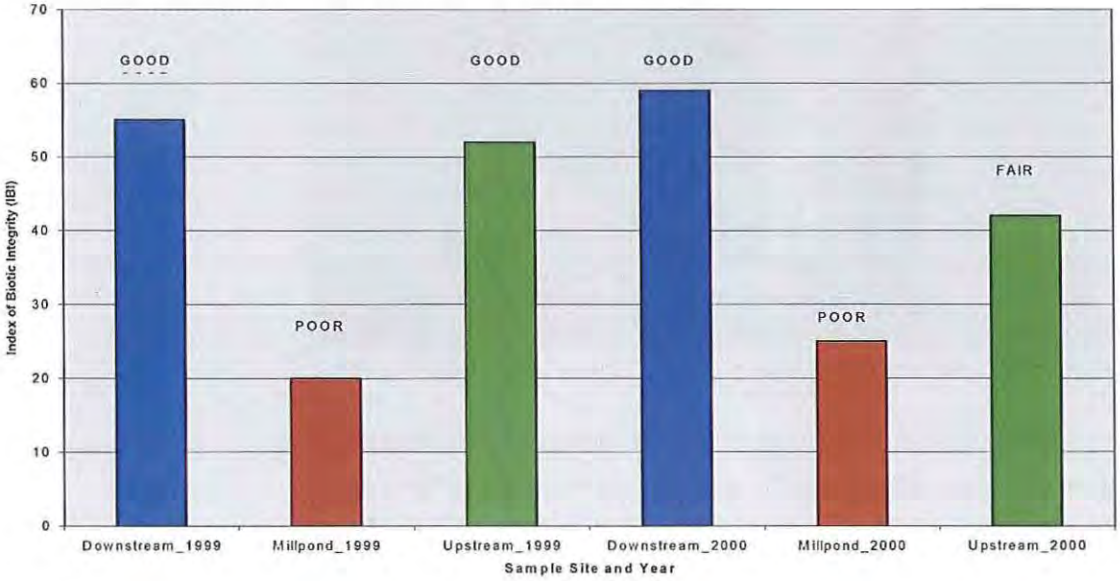
The fish assessment results were further evaluated using the Index of Biotic Integrity (IBI). This index is based on the structure, composition, and functional organization of fish assemblages, and is used to assess the health of aquatic ecosystems. IBI scores and ratings range from 0 ("poor") to 100 ("excellent"). While the index was developed outside of Wisconsin, it has been modified to account for state and regional differences in fish assemblages (Lyons, 1992). The IBI score and rating for the East Branch Milwaukee River downstream of the New Fane Impoundment in 1999 and 2000 were 55 and 59, respectively, indicating "good" environmental quality. The fish attributes associated with these index values suggest that the species richness is somewhat below expectation for a "natural" stream ecosystem, especially due to the loss of intolerant forms of fish. Some fish species, especially top carnivores, are present with less than optimum abundance. Similarly, IBI score and rating for the East Branch Milwaukee River upstream of the New Fane Impoundment in 1999 and 2000 were 52 and 42, respectively, indicating "good" and "fair" environmental quality. A "fair" rating is indicative of additional environmental deterioration associated with decreased species richness, loss of intolerant species, and a reduction in the number of simple lithophillic spawning species or those fish that



require clean, coarse substrate for spawning purposes. The IBI score and rating for the New Fane Impoundment in 1999 and 2000 were 20 and 25, respectively, indicating "poor" environmental quality. The "poor" rating is consistent with the low number of native species, higher numbers of tolerant and very tolerant species, and fewer numbers of simple lithophillic spawning species (Table 14).

The Ozaukee County fish sampling that was done downstream of Fireman's Park supports the New Fane findings. Sampling revealed noticeably low diversity, especially amongst shiner and minnow species, despite overall high abundance of natives. According to the biologists that did the sampling they found "Lots of fish and good size/ health, just low richness."

Table 15. Index of Biotic Integrity (IBI) results - Newburg Impoundment and the East Branch Milwaukee River upstream and downstream of the impoundment



In addition to fish, aquatic insects are also used to evaluate the environmental quality of Wisconsin streams. Similar to the fish IBI, indices have been developed for aquatic insects, which yields information on the present and past quality of water quality and habitat. The Hilsenhoff Biotic Index (HBI) is a methodology for collecting and interpreting aquatic insect communities in Wisconsin streams (Hilsenhoff,, 1977), based on an organic pollutant index. HBI scores and ratings range from 10 ("very poor") to 0 ("excellent"). Aquatic insect samples were collected from the New Fane Impoundment, and East Branch Milwaukee River upstream and downstream of the New Fane Impoundment in 1999. Similar to the fish community, the aquatic insect community in the New Fane Impoundment is indicative of "very poor" environmental and water quality, having scored a HBI value of 9.1. This rating indicates "severe organic pollution". Only 17 genus or species of aquatic insects were contained in the sample. Noticeably absent or present in reduced numbers, were the group of intolerant aquatic insects such as stoneflys (Plecoptera), mayflies (Ephemeroptera), and caddisflys (Tricoptera). Stonefly and caddisfly specimens were absent, and only one genus of mayfly (*Caenis spp.*) was present in the sample. This genus is one of the most tolerant forms of mayfly with respect to degraded environmental and water quality.

Aquatic insect communities from samples collected from the free-flowing reaches of the East Branch Milwaukee River immediately upstream and downstream of the New Fane Impoundment were also consistent with trends observed from the fish IBI samples. HBI values downstream of the New Fane Impoundment was 3.25 indicating "excellent" " environmental and water quality. Thirty-four taxa of aquatic insects were contained in the sample, of which 16 were stonefly (1), mayfly (7) or caddisfly (8). HBI values upstream of the Newburg Impoundment was 4.29 indicating "very good" environmental and water quality. Fifty-two taxa of aquatic insects were contained in the sample, of which 18 were stonefly (1), mayfly (9) or caddisfly (8). These results indicate that the free-flowing reaches of the East Branch Milwaukee River are indicative of "no apparent" or "slight amounts of organic pollution".

Fish habitat assessments were also conducted along the East Branch of the Milwaukee River and the New Fane Impoundment during 1999 and 2000 using protocol and a habitat rating model developed by Simonson et al. (1994). Habitat scores are rated on a scale of 0 ("poor") to 100 (excellent"). These habitat results are presented in table 15 below.

Table 16. Habitat Scores.

Reach / Year	Measure	Bank Stability	Thalweg Depth	Riffle:Riffle	Rocky Substrate	Cover	TOTAL SCORE / RATING
		%	(m)	Ratio	%	%	
Downstream of Millpond 1999	Value	86	0.45	4	87	26	
	Score	8	0	12	25	25	**70**
	Rating	Good	Poor	Excellent	Excellent	Excellent	**Good**
New Fane Millpond 1999	Value	82	1-1.5	>25	<15	>12	
	Score	10	16	0	0	25	**51**
	Rating	Good	Good	Poor	Poor	Excellent	**Fair**
Upstream	Value	77	0.47	9	65	13	

of Millpond 1999	Score	8	0	12	25	25	**70**
	Rating	Good	Poor	Excellent	Excellent	Excellent	**Good**
Downstream of Millpond 2000	Value	82	0.34	4	83	5	
	Score	8	0	12	25	8	**53**
	Rating	Good	Poor	Excellent	Excellent	Fair	**Fair**
New Fane Millpond 2000	Value	82	1-1.5	>25	<15	>12	
	Score	10	16	0	0	25	**51**
	Rating	Good	Good	Poor	Poor	Excellent	**Fair**
Upstream of Millpond 2000	Value	66	0.36	4	67	4	
	Score	4	0	12	25	8	**49**
	Rating	Fair	Poor	Excellent	Excellent	Fair	**Fair**

The habitat results are generally consistent with the fish IBI and aquatic insect HBI results, and help explain which habitat features are most limiting to fish and aquatic insect populations in the East Branch of the Milwaukee River, and in particular, the New Fane Impoundment.

Fish habitat in the impoundment scored 51 points indicating "fair" fish habitat quality. Fish habitat quality in the impoundment is most limited by the lack of riffle habitat and rocky substrate (large gravel, cobble and boulder). The accumulation of fine textured sediment has buried these habitat features once present in the river. The absence of riffles and rocky substrate directly impact the fish community, and resulting fish IBI, by limiting habitat for lithophillic spawning fish species, insectivores, darter species and species generally intolerant of degraded water quality and habitat. While the impounded reach scored well for the amounts of available

cover, most of this cover is associated with dense, nuisance growth of aquatic plants and over water depths at or below 1-ft. The extensive deposits of organically enriched fine sediment provide suitable substrate for tolerant forms of aquatic insects, previously described as being tolerant of " severe organic pollution".

Fish habitat in the East branch Milwaukee River downstream of the impoundment scored 70 points indicating "good" fish habitat. All habitat variables, with exception to depth, were rated "good" to "excellent". While water depth may be inadequate for large-bodied fish species such as northern pike and redhorse, it is more than adequate for all of the small-bodied forage fish and panfish species. Fish habitat in the East branch Milwaukee River upstream of the impoundment scored 49 to 70 points indicating "Fair" to ""good" fish habitat. Similar to reaches downstream of the dam, water depths are less than adequate for large-bodied fish species, but is adequate for small-bodied fish species. Year 1999 and year 2000 habitat rating differences were associated with lesser amounts of cover and less stable banks. Sampling in the natural reaches near the Newburg Dam showed an abundance of Northern Pike and redhorse; water depths this far downstream from New Fane are adequate for large bodied fish species.

Staff from Ozaukee County conducted fisheries surveys downstream of the Newburg Dam. The sample site is a 400m long site ending about 100m downstream of the dam extending along Firemans Park to the "island" area just upstream of the bend to the east.

MRWFPP Milwaukee River Electrofishing
Newburg (Uncon A) - 10/17/11

	Number Captured	Catch/Kilometer	Mean TL (cm)	Max TL (cm)
Blackside Darter	5	12.5	8.4	9.4
Bluegill	5	12.5	14.3	15.4
Bluntnose Minnow	1	2.5	8.0	8.0
Brown Bullhead	1	2.5	18.6	18.6
Central Stoneroller	172	430.0	11.7	16.9
Common Shiner	97	242.5	13.6	17.9
Golden Redhorse	9	22.5	46.2	49.1
Greater Redhorse	33	82.5	25.0	28.6
Green Sunfish	5	12.5	10.4	11.2
Hornyhead Chub	221	552.5	12.3	17.7
Largemouth Bass	2	5.0	8.6	9.4
Logperch	4	10.0	12.2	13.2
Northern Pike	21	52.5	30.0	37.5
Pumpkinseed	17	42.5	11.3	13.3
Rock Bass	346	865.0	13.9	20.8
Shorthead Redhorse	12	30.0	26.2	29.3
Smallmouth Bass	192	480.0	13.9	38.0
Stonecat	58	145.0	14.7	19.6
White Sucker	125	312.5	29.7	44.0
Yellow Bullhead	3	7.5	13.9	17.8
Intolerant	571	1427.5	-	-
Tolerant	134	335	-	-

MRWFPP Milwaukee River Electrofishing - Fall 2011

Location	Date	Species Captured	Fish Captured	Intolerant	Tolerant	I/T	Fish Tagged
Riverside Park (Con C)	10/18/2011	14	311	53	39	1.36	7
Pioneer Road (Con B)	10/6/2011	18	173	65	15	4.33	33
Zarling's (Con A)	10/7/2011	23	337	63	16	3.94	38
Lime Kiln Park (Uncon C)	10/11/2011	17	422	169	8	21.13	32
Newburg (Uncon A)	10/17/2011	20	1328	571	134	4.26	25
Ehler's Park (Uncon B)	10/13/2011	15	311	70	8	8.75	7

MRWFPP Milwaukee River Electrofishing
Newburg (Uncon A) - 08/25/11

	Number Captured	Catch/Kilometer	Mean TL (cm)	Max TL (cm)
Blackside Darter	2	5.0	8.9	9.3
Central Stoneroller	156	390.0	9.7	13.7
Common Carp	2	5.0	63.7	69.8
Common Shiner	133	332.5	12.1	17.2
Golden Redhorse	14	35.0	45.2	54.5
Greater Redhorse	22	55.0	49.2	62.2
Green Sunfish	9	22.5	9.4	11.0
Hornyhead Chub	156	390.0	11.9	17.4
Log Perch	6	15.0	12.5	14.4
Northern Pike	4	10.0	28.7	46.8
Pumpkinseed	9	22.5	11.5	12.5
Rock Bass	97	242.5	14.3	21.5
Rosyface Shiner	1	2.5	9.5	9.5
Shorthead Redhorse	10	25.0	25.0	27.5
Smallmouth Bass	320	800.0	14.9	44.3
Stonecat	85	212.5	14.3	18.7
White Sucker	74	185.0	29.5	42.9
Yellow Bullhead	5	12.5	20.6	21.6
Intolerant	440	1100.0	-	-
Tolerant	90	225.0	-	-

MRWFPP Milwaukee River Electrofishing - Summer 2011

Location	Date	Species Captured	Fish Captured	Intolerant	Tolerant	I/T	Fish Tagged
Riverbarn Park (Con C)	8/9/2011	18	111	19	50	0.38	14
Pioneer Road (Con B)	8/10/2011	28	562	70	61	1.15	49
Zarling's (Con A)	8/16/2011	22	226	45	27	1.67	38
Lime Kiln Park (Uncon C)	8/17/2011	19	318	101	9	11.22	57
Newburg (Uncon A)	8/25/2011	18	1105	440	90	4.89	115
Ehler's Park (Uncon B)	8/26/2011	17	137	103	10	10.30	14

Wildlife

Wildlife that currently use the pond include Canada geese, whitetail deer, small mammals, muskrats, songbirds, frogs, turtles, Great Blue Herons, etc.

Plant community

The plant community is dominated by cattails and filamentous algae. Also present are duckweed, lake sedge, reeds, water lilies, and pondweeds.

The banks of the impoundment have a narrow wooded corridor that includes species of ash, oak, maple, willow, buckthorn, poplar, elm, dogwood, and prickly ash.

Wildlife

The Milwaukee River passing through the Village of Newburg above and below the dam provides many habitat requirements (food, cover, water, space and solitude) for a variety of birds, mammals, reptiles, amphibians and invertebrate species. The river is also a major "wildlife corridor" to other blocks of habitat upstream and downstream of the dam, most notably the 370-acre Riveredge Nature Center located along the river just northeast of the Village.

Adjacent woody, brushy, wetland, and grassy shorelines are important habitat components of the corridor. The trees provide food and cover and screen the river channel from adjacent houses and infrastructure. Wooded areas provide birding opportunities and refuge areas for wildlife in the somewhat urban setting. The corridor also attracts and acts as a migration corridor for neotropical woodland birds, waterfowl, raptors and other migratory species.

Mammals

Common mammals thought to occur on or near the project area are opossum, striped skunk, raccoon, river otter, beaver, muskrat, mink, red, gray and fox squirrel, cottontail rabbit, eastern chipmunk, thirteen-lined ground squirrel, red fox (and possibly gray fox), coyote, woodchuck, badger, white-tailed deer, feral cats and dogs, and various species of moles, voles, shrews, weasels, mice and bats. Black bear, fisher, bobcat, gray wolf, cougar, and other uncommon mammals not normally found in this area may also use the river way as a habitat corridor if traveling through the area.

Birds

The most common bird species occurring along the river way during the breeding season are Canada geese (especially the "giant" subspecies), puddle ducks (especially mallards, and wood ducks), grebes, coots, great blue herons, common egrets, various hawk species (especially Cooper's, sharp-shinned, red-tailed, and American kestrel), wild turkeys, and numerous species of common songbirds (cardinal, chickadee, nuthatch, downy and hairy woodpecker, mourning dove, etc.)

Additional species using the river way especially during migrations may include many other puddle duck species (blue- and green-winged teal, American wigeon, American black duck, northern shoveler, northern pintail, etc.), diving ducks (ring-necked duck, bufflehead, common goldeneye, scaup, common merganser, etc.), and various terns, shorebirds, rails, sandpipers, snipe, American woodcock, and gulls.

DNR survey data from the annual "Mid-Winter Waterfowl Survey" conducted each year during the first week of January indicates a small number of ducks (the maximum was 35 mallards and 6 black ducks in 1997) are present downstream from the dam each year during that time period. Records for the past 10 years showed 0 to12 mallards present.

Reptiles and Amphibians:

Common reptiles thought to occur along the river way are painted turtles, snapping turtles, and eastern garter snakes. Common amphibians include American toads, chorus frogs, green frogs, and northern leopard frogs. Other species of frogs, turtles, snakes and salamanders and newts may be present.

Threatened and Endangered Species

The Natural Heritage Inventory lists the State Threatened longear sunfish (*Lepomis megalotis*) as occurring downstream of the project site. The longear sunfish is found in smaller midwestern streams and Wisconsin is the northern extent of its range. The number of populations in Wisconsin has decreased sp that it's now quite rare. Loss of earlier known populations is associated with factors such as reduced water quality, soil erosion and increased turbidity. Typical preferred habitat is clear, shallow-moving, warm water streams, in or near rooted aquatic vegetation with a coarse substrate of cobble, gravel and sand. Longear sunfish spawn from June until August.

In Wisconsin, the longear sunfish begins to spawn in June and is known to spawn as late as early August. The male fans its nest in gravel when it is available; otherwise it may be built in coarse sand or hard clay. Nests may be built in water 0.2 to 3.4 meters, but are most likely to frequent shallower water in the 0.25 to 0.36 meter range. Longear sunfish feeds primarily on aquatic insects (insectivore) (Becker, 1983).

Wetlands

The existing millpond forms a shallow open water marsh wetland habitat. This marsh provides habitat for fish and wildlife as described above.

13. Cultural

a. Land Use

Riparian property owners along the impoundment include the Village of Newburg, St' John's Evangelical Lutheran Church, Union Cemetery, Newburg Sportsmen, Slavic/Ortleib, and Wilkens. Attachment __ shows these riparian properties.

Property uses include:

Village Park

Cemetery

Church

Shooting range and forested wetlands

One residence

Grass fields and herbaceous wetlands

There is mapped floodplain as shown on Attachment 13.

The impoundment created by the Newburg dam is currently accessible to the public through village owned land around the dam. There is no developed access. Observed uses include fishing and small non-motorized craft such as canoes and kayaks. Swimming or wading is possible, however the deep muck deposits make these activities difficult, and to some degree, dangerous.

b. Social/Economic

There is no longer any economic benefit to the dam because the mill has been torn down and the millrace filled in. There is some cost to the Village to maintaining the dam and to bring the dam into compliance with NR 333.

Any public use of the millpond for recreational purposes is extremely limited by the shallow water depths and aquatic plant growth.

The Newburg Volunteer Fire Department does have a dry hydrant in the millpond that is used for filling water tanks. They have applied for a DNR grant to replace/remodel the existing dry hydrant to that it can be used with the free flowing river.

c. Archaeological/Historical

The area has been reviewed by the SHS and not found to be an area of concern.

14. Other Special Resources

There are no other known special resources that will be impacted by the project.

IV. ENVIRONMENTAL CONSEQUENCES

15. Physical

A shallow, stagnant impoundment will be modified to become a free-flowing river. A 11' high dam will be removed to create a river channel. The surrounding sediment flats will be seeded with colonizing native plants and may eventually become shrubby and/or woody.

The removal of the Newburg Dam and impoundment will result in the removal of a 7-acre impoundment that created a quiescent reflecting pool of water. Following removal of the dam, approximately 6-acres of sediments will be exposed above the river waterline, extending approximately 1000-ft. upstream of the dam. A portion of the remaining sediments will remain submerged as lateral bars while the majority will be exposed as wetland soils (based on the soil mapping and topography). Short and long-term, the total volume of submerged and exposed sediments is expected to decrease due to a combination of scour, physical compaction and de-watering, evaporation and transpiration by new vegetation, and oxidation of organic matter. A gradual draw down will facilitate the de-watering of the exposed sediment. Based on previous dam removal projects, the exposed soils will not result in noxious odors.

Some scour and transport downstream of accumulated sediment is inevitable. Some of the fines could potentially be deposited in the river channel as lateral and point bars, and along the floodplain. This is a natural process by which streams shape and form their channel and floodplain. The area downstream of the Newburg Dam has been sediment starved for many years and DNR resource managers are considering the deliberate deposition of bed material in these areas for fish and invertebrate habitat.

The potential for adverse impacts on fish and aquatic life downstream due to this unavoidable consequence of the draw down and dam removal will be minimized. To minimize scour and erosion, the draw down will be conducted gradually to allow minimal disturbance to the sediments directly behind the dam and in the impoundment. In addition, as the exposed sediments are left in place, they will re-vegetate naturally. To minimize erosion, appropriate

sediment management practices would be employed. On site management alternatives may include bioengineered techniques whereby the sediments are stabilized in place using a variety of temporary or permanent seed mixtures, bank re-shaping, livestake's and brush mattresses and limited armoring with rip rap. Off site management alternatives would likely be limited to removal and disposal at an approved disposal site. If sediment removal is conducted, the most likely method would be removal with excavating equipment. Based on the Newburg Impoundment sediment chemical characteristics, the sediment is classified as a non-hazardous solid waste. Sediment removed from the impoundment would have to be disposed of or re-used in accordance with solid waste rules specified under NR500.08 (3).

The scour of anoxic sediment increases the potential for toxic un-ionized ammonia releases during draw down. Completing the draw down during the spring of the year can minimize the potential for toxic effects. Cool water temperatures and lower water pH will mitigate the effects of un-ionized ammonia.

Removal of the dam and resulting impoundment will restore the historical 1000-ft. long free-flowing reach of the Milwaukee River. Average water depths will decrease within the boundary of the impoundment but the main river channel is expected to run deeper initially. As headcutting and scouring occur and the river returns to its original bed elevation, the river will mirror the width and depth of the free flowing areas upstream and downstream. Because of the large width of the river valley in this area, it is anticipated that the river will have an extensive natural wetland riparian corridor, which generally forms in areas of lesser gradient on the Milwaukee River. Removal of the dam and impoundment will not effect water depths and discharge within the East Branch of the Milwaukee River upstream or downstream of the former impoundment since the dam and impoundment were operated under "run-of-the-river" conditions.

Water velocities will increase within the restored free-flowing river reach due to the return of the historical channel grade line and more compact channel cross-section. Under free-flowing conditions, average stream velocities, stream width and depths will vary depending on river discharge conditions and will be similar to those which currently exist along free-flowing reaches upstream of the impoundment. This reach is expected to eventually evolve into a series of riffle and deeper run areas. Initially, water depths will be shallowest and most diffuse in the uppermost reaches of the former impoundment.

Removal of the dam and impoundment will increase riverine aquatic habitat and may change some of the existing shallow marsh wetland habitat to emergent/shrubby and eventually floodplain forest wetland.

As the fine deposited material is scoured from the new channel, these coarse materials will form the new free-flowing river channel. Because some sediment must be removed from the impoundment due to high levels of contaminants, the future alignment of the free-flowing river will be determined by the dredging upstream of the dam and by the bank work that is being done to stabilize and provide immediate bank habitat. The new river location is shown on the plan sets.

Removal of the Newburg Dam and impoundment will increase the physical re-aeration and the biological availability of dissolved oxygen through this restored river reach. Re-aeration rates increase as water velocity increases and water depth decreases. Similarly, the river will no longer be artificially warmed by the increased surface area and retention time provided by the dam and impoundment. Water temperatures are expected to be similar to those observed in the free-flowing reaches of the river.

Water quality in this part of the river will temporarily decrease due to the scouring of sediments until the new river bed is formed and the banks are stabilized. Once the area is stable, there will be a marked increase in water quality. Dissolved oxygen levels will increase because of the movement of the water and the decreased presence of algae blooms.
Because cadmium is higher than the PEC at the location closest to the dam, WDNR staff indicated that removal of this material from the anticipated active channel and reuse on site would be required prior to dam removal. To characterize the potential for cadmium to leach out of the sediments in their reuse location, a Synthetic Precipitation Leaching Procedure (SPLP) analysis was conducted on the sample that was collected closest to the dam. The result of this analysis was a leachate cadmium concentration of 0.18 µg/L, which is above the limit of detection for the test, but below the limit of certain quantitation (sees results in Appendix A). This is below the EPA primary drinking water standard of 5 µg/L, and below the chronic and acute water quality criteria for freshwater, which are 0.25 µg/L and 2 µg/L, respectively (ATSDR, 2008). It is not anticipated that sediment removed from near the dam and reused within the project area will leach cadmium at concentrations that will cause problems.

16. Biological

Aquatic

Dams and their impoundments can have dramatic effects on lotic or free-flowing river fish communities, with the effects extending both up and downstream of the dam and impounded reach (Petts, 1984; Ward and Sanford, 1995; Gore and Petts, 1989; Ligon et al. 1995). Dams have been established as a principal cause of declines in fish communities and in the biodiversity of species in the State of Wisconsin (Becker, 1983; Gebken et al. 1995).

Riverine fish communities are adversely impacted by dams with effects being direct and indirect, immediate and long term in nature (Nehlsen et al. 1991; Moyle and Leidy, 19922; Laroe et al., 1995; Cross and Moss, 1987; Ebel et al., 1989, Carlson and Muth 1989; Wawrzyn et al. 1994). Immediate and direct effects include the obstruction of migration of fish and aquatic species, fragmentation of fish communities, changes in river thermal regimes, and degraded water quality. These immediate and direct effects have adverse impacts on the overall viability of fish species, for example, resistance to disease and stress. Over time the presence of a dam across a waterway results in the conversion of the lotic (moving water) to lentic (still water) habitat. This conversion from lotic to lentic habitat occurs due to the flow obstruction caused by the dam and the associated effects on the impoundment. The reduction in flow causes increases in eutrophication, sediment accumulation and a decrease in the quality of sediments. Sediment accumulation and poor quality of sediments affect the physical habitat available to fish for cover, spawning, foraging, etc. Eutrophication (excess nutrients) can cause increased plant growth resulting in oxygen depletion, reduced light penetration, and changes in the benthic community and food availability. As a result of these impacts, selective dam removal has been proposed as a technically feasible and cost effective method for accomplishing the restoration of river ecosystems in the State of Wisconsin (Gebken et al. (1995).

Removal of the Newburg Dam and restoring this reach to a free-flowing system has the potential for improving the relative abundance, diversity and habitat of native game and non-game fish species along the abandoned impoundment while at the same time reducing the relative abundance and habitat of the undesirable species such as common carp. Improvements have been observed in the native fish community and their riverine habitat along two formerly impounded reaches of the Milwaukee River at West Bend and Milwaukee (Kanehl et al. 1997; Burzynski, 1998).

Before removal of the Woolen Mills Dam at West Bend in 1988, habitat quality in the Woolen Mills impoundment was rated "poor." The impoundment was shallow and hypereutrophic; dissolved oxygen levels were suppressed below the state water quality standard of 5 mg/l. This impoundment was filled in with extensive deposits of silt. Also cover was nearly absent, and the water was turbid. Smallmouth bass populations were low and common carp were abundant. Biotic integrity, as a measure of the entire fish assemblage, was rated "poor." Five years after removing this dam, habitat quality improved to "good" to "excellent." Smallmouth bass abundance and biomass increased substantially while common carp abundance and biomass declined dramatically. Additionally, biotic integrity was rated "good." Natural habitat recovery and removal of the dam as a barrier to fish movement accounted for many of the physical habitat and biological improvements. Dissolved oxygen levels were routinely measured above the state water quality standard of 5 mg/l (WDNR, 1993).

Prior to the removal of the North Avenue Dam on Milwaukee River at Milwaukee, fish species considered tolerant to very tolerant of degraded environmental quality dominated the fish community. Common carp and goldfish were the most abundant fish species with lesser numbers of white sucker, green sunfish and bullhead. Fish kills were a common occurrence and overall fish and aquatic life habitat was considered "poor." Factors limiting this habitat included warm water temperatures, excessive algae growth and turbidity, low dissolved oxygen levels resulting from aquatic plant respiration and sediment oxygen demand, and extensive sedimentation by fine-textured and polluted sediment (Wawrzyn et al. 1994). Following removal of the North Avenue dam in 1997, 25 species of native fish have been collected from the former impoundment including a range of smallmouth bass young-of-the-year and year classes, and the greater redhorse which is listed as a state threatened species (Burzynski, 1997).

The removal of the Newburg Dam and restoration of this reach to a free-flowing system offers potential for improvements in fish communities. The conversion of the lentic system of the impounded reach back to a lotic, free-flowing river system will occur as a process. This process is complex, including direct, indirect, immediate and long-term benefits accruing in a system composed of inter-related and interactive effects of living species with the physical environment. The conversion of the impounded reach is expected to result in gradual scouring and transport of sediments from the impoundment downstream which should result in improvements in existing habitat for both fish and benthic invertebrate populations.

Other benefits to these fish species may occur through habitat creation, increased habitat availability, and improved physical quality of the existing habitat. Habitat creation and existing habitat improvement should result from the lowered sediment volumes. Increased habitat area is likely to become available as fish and aquatic species can migrate more freely. Anticipated environmental benefits are increases in the relative abundance, diversity, and habitat of native game and non-game fish species. These same environmental benefits are expected to cause correspondent decreases in the relative abundance and habitat availability of undesirable species such as the non-native common carp.

The Woolen Mills Dam and the North Avenue Dam are similar to the Newburg Dam in many respects. The improvements that have been observed in the former impounded areas of Woolen Mills and North Avenue can be expected to occur in the impounded area of the Newburg Dam. The ability of the fishery to respond in a positive manner will be dependent on recruitment of fish species downstream of the Newburg dam, as well as a complimentary increase in local populations whose numbers may have been reduced as a result of poor habitat.

Removal of the Newburg Impoundment will result in a large loss of habitat for the exotic Eurasian water milfoil. This will occur in a very short time as the exposed sediments become desiccated. This will have a positive effect on local and downstream reaches of the river since the impoundment will no be a source of reproducing stock.

The removal of the Newburg Dam poses potential short-term negative impacts and long-term benefits for the state threatened longear sunfish present in the Milwaukee River. Short-term adverse impacts are generally related to the draw down and construction phase of the Newburg Dam abandonment. Specifically, the potential exists for erosion and scour of sediment accumulated behind the Newburg Dam. Excessive releases of these sediments would increase turbidity and siltation downstream. Further, construction activities related to dam demolition, equipment access in the river, and construction site erosion also have the potential to directly or indirectly impact these fish species. As discussed in previous sections, means, methods and sequencing of draw down and construction activities are available to mitigate, but not entirely eliminate, the negative effects of this project. Mitigation techniques include the seasonal timing, the controlled impoundment draw down, minimizing the amount of equipment access along the stream bank and stream bed, and construction erosion control practices.

The plant community will change to reflect a flowing system. We expect to see fewer cattails and more pondweeds. Sedges may colonize the new riverbanks.

Under current conditions, the impoundment suffers from heavy algal growth that affects the use of the area for both habitat and for recreation. Algae grows along the surface and shades the rest of the water column, reducing sunlight and reducing the growth of beneficial aquatic plants and phytoplankton. Not only does that reduce the food source for minnows, invertebrates and other animals, it reduces the dissolved oxygen present in the water because of the loss of transpiration. In addition, the decaying algae releases carbon dioxide, further affecting oxygen depletion. Without the dam in place to create the still water area, algae growth is continuously flushed downstream and does not have the significant negative impact to the plant and animal community.

Wildlife

The planted and/or natural vegetation that would grow on the restored mud flats will provide habitat characteristics somewhat different than what is currently found on the adjacent river banks, which are often mowed and include developed areas. The overall effect of dam removal on wildlife would be positive.

It is highly unlikely that any mammal species would be lost due to removal of the dam. The addition of terrestrial and wetland habitat would improve habitat conditions for most species. The continued presence of the river along with the wider, uninterrupted shoreline would be attractive to raccoon, mink, muskrat, and otter. Mud flat stabilization and revegetation would also benefit shrews, mice, voles, cottontail rabbits, red fox, coyotes, and white-tailed deer. These species would most likely expand their territories into the floodplain after the drawdown. With the increase of quality shoreline, the egress of species such as muskrats, deer, skunks, woodchucks, raccoon, etc.) out of the bank areas onto adjacent developed lands may be reduced.

Removing the dam will reduce the surface water area of the impounded area by several acres, thus reducing the amount of "loafing" habitat and open water for waterfowl and waterbirds such as Canada geese, mallards and especially diving ducks. These species would still be present, however possibly in lower numbers in the drawdown area. Another side effect of removing the dam is an increased probability of freeze-up below the dam, which may reduce winter use in that stretch of the river by diving ducks, mallards, and geese during winter. These birds will relocate to other nearby open water areas to loaf or roost.

DNR Wildlife Biologist Harvey Halverson, in his assessment of the North Avenue dam site along the Milwaukee River in Milwaukee (a site similar in size and scope as the Newburg dam site), indicated as a result of dam removal and mud flat stabilization the habitat conditions would improve for 46 common bird species. Suitable grass/forbs or grass/shrub cover types would attract and provide feeding habitat for raptors. Edge species such as house wrens, gray catbirds, and American goldfinches would use the riparian cover for nesting and feeding sites. Nesting habitat and foraging perches would improve for riparian warblers, notably the yellow warbler and the common yellow throat. Ground nesting waterfowl, such as the blue-winged teal and mallard, would also use established grassy areas as nest cover.

No change in amphibian/reptile species diversity is expected by removing the dam. The exposed and stabilized mud flats would provide suitable feeding sites and nesting cover for beneficial snakes, such as garter snakes. Snake abundance may increase as the riparian habitat matures and produces suitable prey such as small frogs, insects, mice, and snails. Turtle numbers are not expected to noticeably change. Exposed river bottom, tree roots, etc. will be used as basking sites or egg-laying habitat for snapping turtles and painted turtles.

It is possible that habitat for the swamp metalmark butterfly habitat may be created in the drawdown area.

Impacts on Endangered/Threatened Species

The removal of the Newburg Dam will, in the longer term, benefit the longear sunfish by increasing the availability of coarse substrate and stream velocity within the former impoundment. These conditions will increase the amount of rocky substrate for this species, and as such, will enhance the spawning habitat, as well as habitat for aquatic insects their primary food source. Construction activities that have a higher potential to impact these species during their peak spawning period will be avoided to the greatest extent practicable. The actual draw down and removal process will be started in April and should be completed prior to its peak spawning period.

Although there is the potential for some short term impacts on the longear sunfish population downstream of the dam, the effect is not likely to be significant provided measures are taken to control downstream sediment transport. The project will not jeopardize the continued viability of the longear sunfish population.

17. Cultural

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Removing the dam will reduce the surface water area of the impounded area by several acres, thus reducing the amount of "loafing" habitat and open water for waterfowl and waterbirds such as Canada geese, mallards and especially diving ducks. These species would still be present, however possibly in lower numbers in the drawdown area. Another side effect of removing the dam is an increased probability of freeze-up below the dam, which may reduce winter use in that stretch of the river by diving ducks, mallards, and geese during winter. These birds will relocate to other nearby open water areas to loaf or roost.

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Although there is the potential for some short term impacts on the longear sunfish population downstream of the dam, the effect is not likely to be significant provided measures are taken to control downstream sediment transport. The project will not jeopardize the continued viability of the longear sunfish population.

17. Cultural

The impoundment created by the Newburg dam is currently accessible to the public through village owned park land near the dam. Observed uses include fishing, ice fishing, small non-motorized watercraft such as canoes or kayaks, and snowmobiling. Swimming or wading is possible, however the deep muck deposits make these activities difficult, and to some degree, dangerous. Removal of the dam and impoundment will not eliminate access for some these water-based activities, while improving it for wading, fishing, and canoeing/kayaking. Fishing is already a popular activity in free-flowing reaches of the river and is expected to increase following dam removal. Swimming may still be feasible will likely be enhanced as a result of the muck deposits becoming desiccated and compacted. Improvements in fish populations will make fishing more productive. Removal of the dam eliminates a structure that has to be portaged around for canoeists and kayakers.

The still water aesthetics previously associated with the millpond will no longer exist following removal of the dam and impoundment. These aesthetic qualities will be replaced with those associated with a free-flowing stream comparable to those that exist upstream and downstream of the impoundment. This aesthetic improvement will likely be most noticeable during summer months when the former impoundment aesthetics were degraded by algae blooms, nuisance aquatic plant growth, and other undesirable conditions.

a. Land Use

Land use in the area will remain essentially unchanged, although the Village and other riparian landowners will work with Ozaukee County to ensure final land uses are acceptable to affected parties. Newly created Lands following dam and impoundment removal will remain in open space uses and would be managed as floodplain. No new infrastructure will be placed onto these lands. Similarly, newly created lands located on private property will likely remain as floodplain lands, subject to flooding. Consistent with local floodplain ordinances, certain uses may be approved or prohibited

Comment [rm1]:

Areas temporarily disturbed by construction activities will be restored to their original condition or otherwise enhanced using standard landscape practices.

The removal of the dam will not change the land use. Area that is presently shallow millpond will be riverine wetland vegetation instead.

b. Social/Economic

The removal of the dam will improve the use of the river for the canoeing/kayaking and fishing public. It will improve safety and provide increased ~~fishing~~ recreational opportunities, will restore the area's natural scenic beauty, and will improve the health of the river both in the millpond area and downstream.

Based on past studies, there may be some increase in land value from having a free-flowing river rather than a stagnant pool.

This action will not result in any loss of public access the river. Removal of the dam will result in exposure and creation of additional publicly owned land mass. No infrastructure is proposed to be placed onto these newly created lands.

Removal of the dam and impoundment will not eliminate access for water-based activities. Small non-motorized craft will still be useable during medium to high flow river conditions, and fishing will still be possible. The project includes the installation of a canoe/kayak access and observation deck. Wading, and to a lesser extent swimming, will still be feasible and will likely be enhanced as a result of the muck deposits becoming desiccated and compacted.

The current algae blooms in the impoundment reduce recreational use of the area. Algae can be unsightly, odorous and even unhealthy to humans and pets. Algae needs stillwater conditions to thrive and should not be such a concern in a free flowing river system. This should increase the aesthetic and recreational use of the area.

c. Archaeological/Historical

There will be no impacts on any archaeological site, nor is there any indication that unknown artifacts or other archaeologically significant remnants might be present.

18. Other Special Resources

The project is located in an environmental corridor. The project could have some short-term adverse impacts through the disturbance soil and human activity. These impacts aill be short term and in the long term, this action will cause to enhance the quality of this environment through the alteration of wetlands from shallow marsh to emergent and forested floodplain, enhanced fish and aquatic life habitat, and wildlife habitat.

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

Some transport of fine silts and sediments from the former impoundment area downstream will be unavoidable. The use of mitigation techniques will reduce but cannot completely eliminate solids transport and resulting turbidity.

V. OTHER ALTERNATIVES

20. Identify, describe and discuss feasible alternatives to the proposed action and their impacts. Give particular attention to alternatives that might avoid some or all adverse environmental effects.

No Action - Leaving the dam in place and allowing it to deteriorate due to the effects of river action, weathering and erosion, and freeze and thaw cycle. This is neither a technically or environmentally sound, nor a legally acceptable alternative. There is cost that the Village will incur to bring the dam into compliance with dam safety standards.

Dam failure could occur as an uncontrolled and catastrophic event, releasing downstream a wall of flood of water, structural debris and sediment. Ultimately, this alternative would result in the greatest negative environmental and socio-economic impacts when compared with other alternatives.

Fish passage upstream and downstream, water quality impacts caused by the impoundment, and lack of sediment transport downstream all would remain a concern if the dam remains in place.

Declare the Dam Abandoned and Remove - Proposed Action.

Modify the dam. There is no feasible modification to the dam that would repair the problems other than total reconstruction. This would not alleviate any of the impacts of the current dam.

VI. EVALUATION OF PROJECT SIGNIFICANCE

21. Significance of Environmental Effects

a. Would the proposed project or related activities substantially change the quality of the environment (physical, biological, socio-economic)? Explain.

No. There exists a possibility that fragmented populations have been formed in the aquatic and fish species present, within populations of the same species, and individual species populations, that have been physically segregated for a substantial length of time. This means that small populations of fish communities exist that do not intermingle/breed with larger populations. The extent to which such fragmentation has developed is dependent upon many factors, such as mobility of species, reproductive capacities and habits, life-span etc. The removal of the Newburg Dam should allow these fragmented populations to freely migrate and reproduce. This will be especially beneficial to the longear sunfish. The segmentation of the populations will be effectively ended, allowing them a greater range in which to feed, nest, breed, and seek shelter. Removal of the dam will open an additional 13 miles of mainstem river habitat to fish and other aquatic life species to Barton Dam, which have been isolated downstream of the dam.

Reductions in sedimentation will cause improvements in the quality of physical habitat and convert the substrate back to its natural condition. Most riparian benthic invertebrates require this rocky substrate, and these invertebrates are an important food source for fish. Fish species also prefer these rocky bottom conditions for spawning and feeding. Native species and most sport fishes suffer lowered success and productivity under the stresses of increased turbidity, lowered water quality, and scarcity of suitable habitat. Other, generalist types of species such as carp are unaffected or actually flourish despite these adverse effects and often dominate the fish community in impoundment's.

Although the water quality in the impoundment is fair, the removal of the Newburg Dam should cause the fluctuation of diurnal oxygen levels and water temperatures to decrease. These effects should have positive impacts on fish and aquatic life. The artificial warming effects created by the turbid and stagnant pond will be eliminated.

Following the permanent draw down and removal of the dam, the former mill pond aesthetics will be replaced with a moderately fast free-flowing river dominated by riffles, deep runs and

slack water areas. This would be similar to what existed under pre-development conditions and what currently exists upstream and downstream of the Newburg Dam and impoundment.

Some existing or potential forms of recreational navigation would be eliminated, specifically those forms associated with outboard motors and deeper drafting craft. Other forms of existing recreational navigation involving shallow drafting craft such as kayak and canoes, would remain feasible and perhaps more challenging, during moderate and high flow events.

b. Discuss the significance of short-term and long-term environmental effects of the proposed project including secondary effects; particularly to geographically scarce resources such as historic or cultural resources, scenic and recreational resources, prime agricultural lands, threatened or endangered species or ecologically sensitive areas. (the reversibility of an action affects the extent or degree of impact).

Any adverse impacts associated with this project are expected to be short-term only. These adverse impacts include turbidity in the waterway, soil disturbance and human activity in the area of a current urban park. These adverse impacts will be only those which are unavoidable and which occur despite control measures. There are two state listed threatened fish species exists along this reach of the Milwaukee River. These species may be particularly vulnerable to the effects of increased turbidity. Unavoidable turbidity effects will precede the spawning period when fish are most vulnerable. There should be no significant impacts in terms of temperature.

Short term adverse impacts associated with the conversion of the impoundment back to river may accrue to wildlife which currently uses the pond, including dabbling ducks, herons, painted turtles, and muskrats. These species may still utilize near-shore areas, but for breeding and nesting they will have to seek out other habitats. Habitats suitable for these species are common in the Milwaukee River Watershed. There are no avian or terrestrial species using the Newburg Impoundment that are listed as threatened, endangered or of special concern. Thus the adverse impacts may affect individuals but will have no significant long-term impact on the overall numbers, the reproductive capability, or the success and stability of the species or regional populations as a whole.

Long-term effects on the riparian and aquatic system should be beneficial. Improvements will occur in physical characteristics, which in turn will create ecological and biological benefits. The impoundment will revert back to a natural rocky-cobble substrate characteristic of the East Branch of the Milwaukee River, providing additional habitat for riverine forms of aquatic life.

22. Significance of Cumulative Effects. Discuss the significance of reasonably anticipated cumulative effects on the environment. Consider cumulative effects from repeated projects of the same type. What is the likelihood that similar projects would be repeated? Would the cumulative effects be more severe or substantially change the quality of the environment? Include other activities planned or proposed in the area that would compound effects on the environment.

The cumulative impacts of similar projects would have increasingly beneficial effects on aquatic habitat. The adverse environmental impacts associated with dams and impoundment's are well documented in literature regarding riparian systems. Selective dam removal has been proposed as a cost-effective and technically feasible means of restoring river ecosystems in southeastern Wisconsin. Dams have been constructed across Wisconsin waterways to serve a variety of purposes, including generation of hydraulic power, flood control, and the creation of an impoundment for recreational use.

According to the WDNR Dam Safety Section there are approximately 3,500 dams in the state, with 1,000 of these categorized as large. The Dam Safety Section reviews the condition of dams throughout the State in the interests of public safety, navigability and flood control issues. Many of these dams were put in place over a century ago, becoming obsolete with the development of wide-scale provisions of coal-generated electric power. Many obsolete dams are not providing any other benefit and basically serve no useful purpose. In most cases, these neglected and deteriorated dams are hazards to safety, are obstructions to navigation and fish migration and create adverse environmental impacts.

In 1993, an estimated 80 dams were in need of repair. In 1993, forty-five dam projects were funded, including five removals, eight replacements and thirty-two repair/re-constructions. Thus, the condition of dams and the appropriate means of dealing with issues of deterioration, structural compromises, or inadequate design are dealt with on a case-by-case basis. The removal of the Newburg Dam will not affect this decision- making process or the outcome of any project review. The removal of the Newburg Dam may serve as an example for other cases wherein an owner elects to remove a dam or an abandoned dam has been designated for removal by the WDNR.

Dam removal is being undertaken at many locations across the country. Repeated actions of this type have been found to restore the river systems to healthy ecosystems.

23. **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 analyses would eliminate or reduce these unknowns? Explain why these studies were not done.**

One fish species, the longear sunfish, is listed as a state threatened species and is known to be present in along the East Branch Milwaukee River in the project area. The project design and procedures will take the presence of these species into account in terms of timing, demolition method, and erosion and turbidity controls. Strict mitigation of turbidity effects will be undertaken and Best Management Practices for erosion control will be met or exceeded.

The East Branch Milwaukee River is designated as a "least impacted reference stream". As a result, the WDNR has allocated the necessary resources to continue long-term monitoring of fish and fish habitat conditions along this reach of river. This effort will allow an accurate assessment of the effects of dam removal on the longear sunfish population, other fish and aquatic life, their habitat, and water quality. It is not known which method, gradual notching or complete dam removal, would cause less sedimentation downstream. There is no research or additional studies that could be completed to predict this. The project will be closely monitored and any possible steps will be taken to minimize sedimentation once the original flush has occurred. Scheduling of the removal is critical in minimizing the impacts of the flush of sediment.

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 work site will be inspected at the close of each workday and the integrity of all erosion or flow control measures will be verified or repaired as necessary. Exposed sediment will be

seeded to limit sheet runoff and erosion. Seeding will occur as soon as the exposed sediment can be safely accessed. Pre-construction meetings will be held with potentially effected property owners, local residents, village and county officials, and local emergency officials, as appropriate. Emergency response is available quickly for any operating problems.

24. Significance of Precedent

a. Would a decision on this proposal influence future decisions or foreclosure options that may additionally affect the quality of the environment? Explain the significance.

This project does not set any precedent or hold the potential for influence over future WDNR actions or decisions. This project would not foreclose any option that could potentially affect the environment. Water regulation decisions are made on a case by case basis and this decision would not impact future projects.

b. Describe any conflicts the proposal has with plans or policy of local, state or federal agencies that provide for the protection of the environment. Explain the significance.

This project does not conflict with the plans or policy of the State of Wisconsin, Washington County, or any other local unit of government. This project will be conducted in accordance with the policies of all state-level agencies and the U.S. Army Corps of Engineers.

25. 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.

There are 5 private property owners with frontage on the impoundment that will be directly impacted by the dam removal and river restoration. The expert opinion of WDNR staff in fisheries, wildlife, hydraulic engineering, water management etc. is that these and other potential impacts associated with the dam removal are minimal when compared to the long-term benefits. The most significant potential impacts of this project are short-term in nature and generally associated with the potential for construction erosion, sediment loss and turbidity associated with the impoundment draw down. These potential impacts will be abated using the

previously described Best Management Practices for construction erosion, a controlled draw down, and other in-situ or ex-situ sediment management practices.

26. Explain other factors that should be considered in determining the significance of the proposal.

The Department is generally an advocate of removal of dams that are not serving a purpose. This project shows that we are willing to comply with our own policies and it meets with DNR's goals of protecting and improving the environment.

VII. SUMMARY OF ISSUE IDENTIFICATION ACTIVITIES

27. **27. Summarize citizen and agency involvement activities (completed and proposed).**

The WDNR will be sponsoring a public informational meeting to present the scope of this project prior to implementing dam removal. All affected property owners and local residents will be contacted and informed of that meeting. The project will also be public noticed in accordance with state rules and laws.

28. List agencies, groups, and individuals contacted regarding the project (include WDNR personnel and title).

Will Wawrzyn, WDNR Fisheries Biologist
Craig Helker, WDNR Water Resources Biologist
Michelle Hase, WDNR Dam Safety/Floodplain Engineer
Brad Eggold, WDNR Fisheries Supervisor
Rob Grosch, WDNR Solid Waste Specialist
Tom Isaac, WDNR Wildlife Biologist
Bob Grefe, WDNR Solid Waste Specialist
Marsh Burzynski, WDNR Sediment Specialist
Owen Boyle, WDNR Endangered Species Specialist
State Historical Society
NOAA

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

In accordance with s. 1.11, Stats., and Ch. NR 150, Wis. 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.

29. Complete either A or B below.

A. EIS Process Not Required [ ]

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 on this project.

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

_____

Noted: Regional Supervisor Date Signed

Copy of news release or other notice attached? [ ] Yes [ ] No

Number of responses to public notice: _____

Public response log attached? [ ] Yes [ ] No

_____

CERTIFIED TO BE IN COMPLIANCE WITH WEPA Date Signed

Environmental Coordinator

Noted: Environmental Coordinator/Lead Worker or Regional director or Director of Bureau of Integrated Science Services (or designee) — Date Signed

IX. 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.

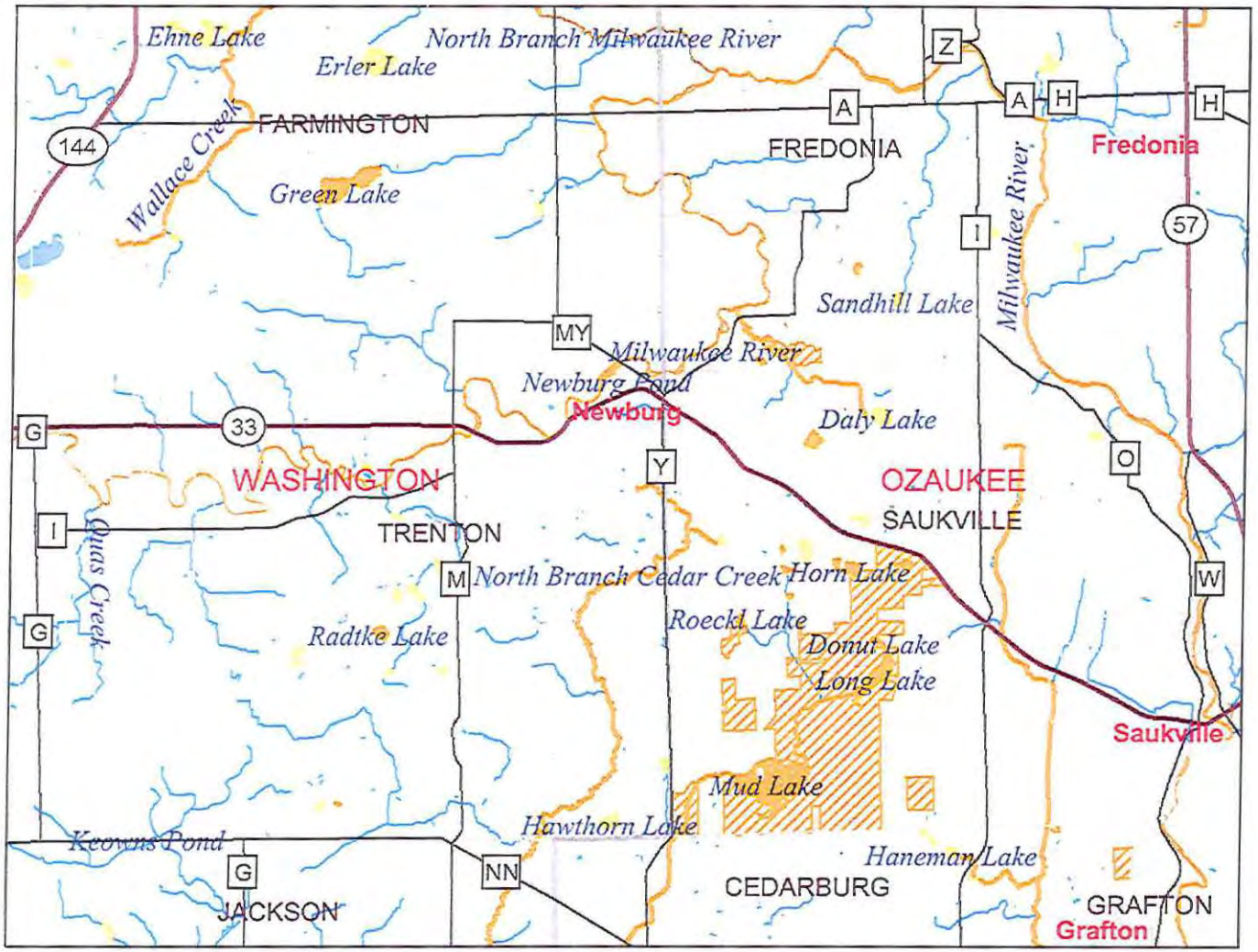
To request a contested case hearing pursuant to section 227.42, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is 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.

Attachment 1

Map Created on May 04, 2012



Legend

Major Highways
- Interstate
- State Highway
- U.S. Highways
- County Roads
- 24K County Boundaries
- Civil Towns
- Civil Town
- PRF Other River Public Rights Features
- PRF Sensitive Rivers
- PRF Other Public Rights Features
- PRF Sensitive Areas of Lakes
- ASNRI Wild Rice Streams
- ASNRI Outstanding and Exceptional Streams
- ERW
- ORW
- ORW
- ASNRI Wild and Scenic Rivers
- ASNRI Trout Streams
- Class I Trout
- Class II Trout
- Class III Trout
- ASNRI Wild Rice Areas
- ASNRI Outstanding and Exceptional Lakes
- ERW
- ORW
- ORW

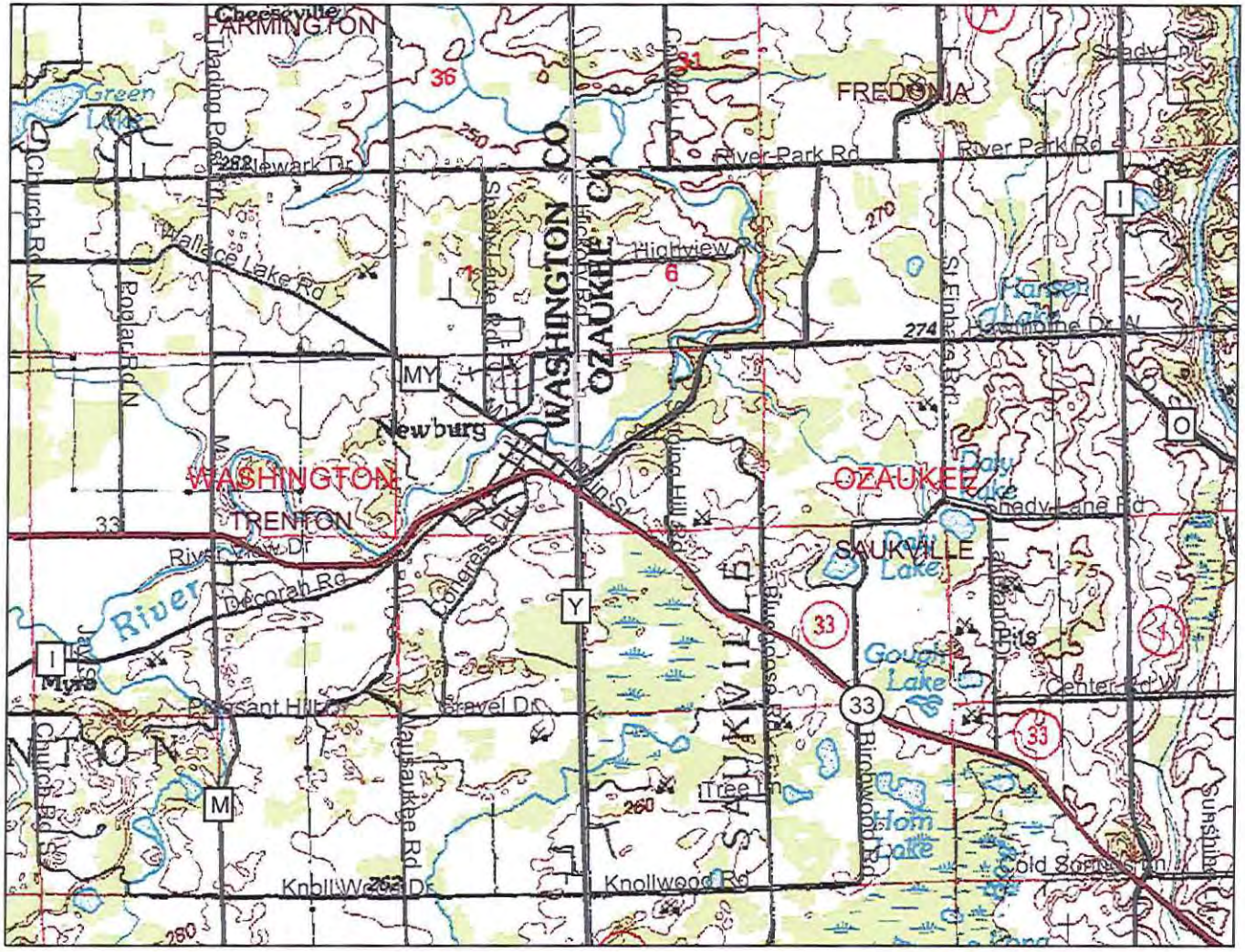
0 1.9 3.8 5.7 mi.

Scale: 1:102,806

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Notes: Attachment 1

Map Created on May 04, 2012



0 5500 11000 16500 ft.

Legend

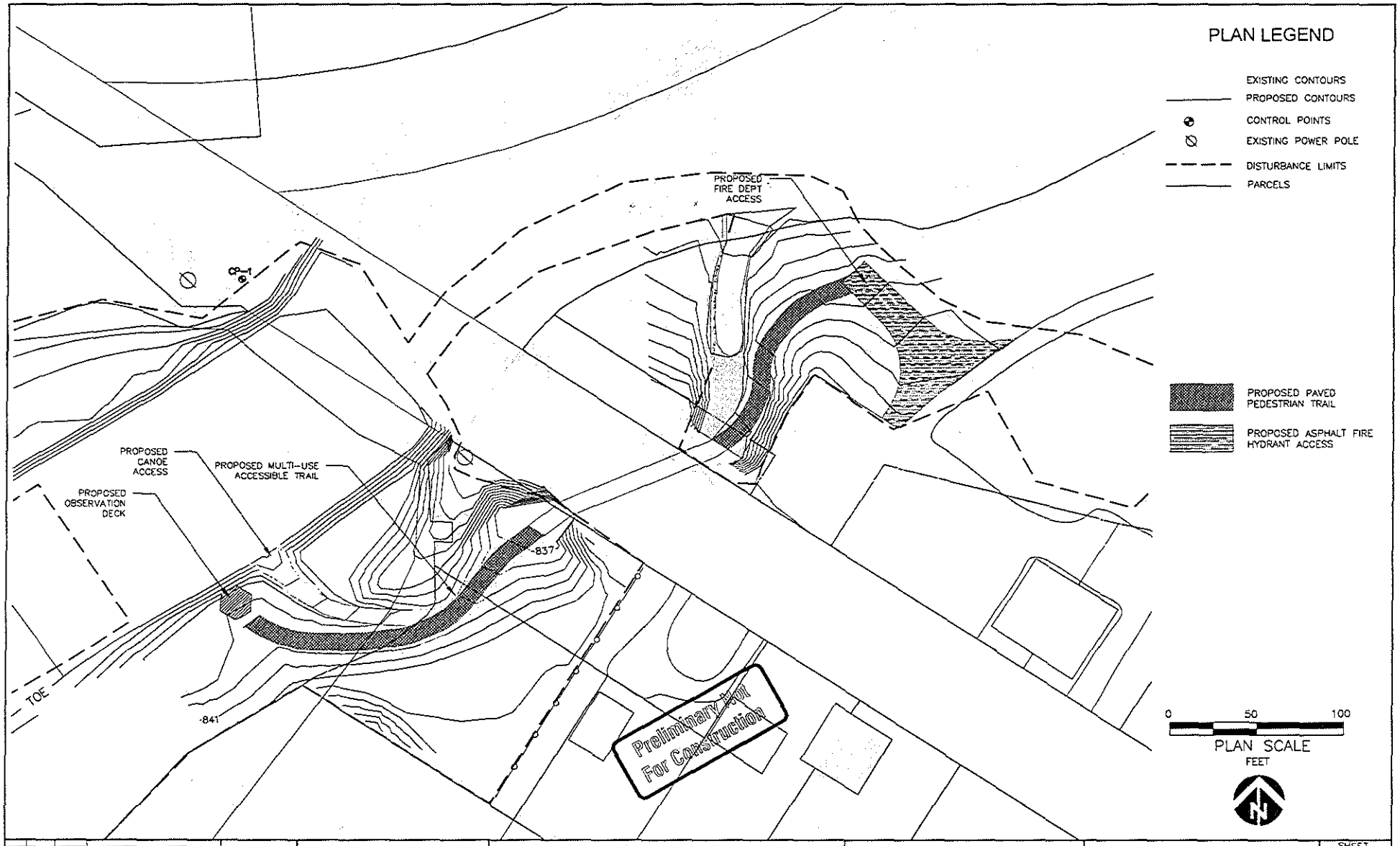
- Major Highways
- Interstate
- State Highway
- U.S. Highways
- County Roads
- Local Roads
- 24K County Boundaries
- Civil Towns
- Civil Town

Scale: 1:58,877

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Notes: attachment 2

2



NO.	BY	DATE	REVISION DESCRIPTION

BJ,BOL	MBW	x
DRAWN	DESIGNED	CHECKED
x	2/10/12	
APPROVED	DATE	PROJECT

Ozaukee County Planning & Parks Department
Newburg Dam Removal
Newburg, Wisconsin

inter·fluve
3602 Atwood Avenue Suite 3
Madison, WI 53714
608.441.0342
www.interfluve.com

Planting Plan

SHEET 11 OF 17

Attachment 3

Inter-Fluve, Inc.

Memorandum

To: Michele Hase, Kathi Kramasz
From: Beth Wentzel
Date: 3/26/2012
Re: Draft Design Narrative

Inter-Fluve has completed 60% design plans for the Newburg Dam Removal. We are in the process of developing a draft design report and sediment management plan to accompany this plan set and hope to have a drafts ready next week. In the meantime, for the benefit of your review of the design, I have summarized some key elements of the proposed design in this memo.

The removal of the Newburg Dam and restoration of the impounded reach will require an adaptive management approach due to anticipated changes to the current bathymetry of the impoundment during dewatering.

Dewatering. As we have discussed, it is important to open the gates at the dam as soon as possible to dewater the impoundment and allow the newly exposed sediment to dry prior to construction. There is a fairly well defined channel through the impounded sediments that we anticipate will widen and deepen during this dewatering process, and the extent to which this occurs will depend on flow conditions in the interim. The depth of refusal data collected by the county suggests that the hard bottom is fairly flat across the impoundment with no defined channel through it (see existing cross sections showing hard and soft bottom surfaces on Sheet 4). This may be due to historical meandering of the channel through this area. Absent an alternative defined channel at the hard bottom surface, we anticipate the existing alignment through the channel to remain active.

Sediment Management. As DNR staff recommended, we are proposing to remove sediments from within the active channel area immediately upstream from the dam to the extent practical due to concentrations of cadmium that exceed the probable effects concentration (PEC). We propose a slow impoundment drawdown and as soon as bank sediments are dry enough to access material in the center of the active channel, we propose excavation of the sediment and reuse in the area shown on the plan set. This material will be covered with at least 6 inches of cleaner fill that is either excavated on site or imported from offsite. Final determination of the quantity of material that will need to be imported will be determined in the final stage of design.

Downstream Riffle. There is an over-steepened riffle downstream of the bridge with a crest that is higher than the base of the dam. This is evident in the field as well as in the plotted profile of the existing hard bottom surface and downstream channel. While fish passage would be improved by lowering the elevation of the crest of the riffle, we understand that a 3 inch gas line currently runs

below the river bed 32 ft downstream of the centerline of the bridge at an elevation that may only be 2 ft below the riffle surface in some locations. Records documenting the elevation of the pipe are not available, but WE Energies staff has indicated they expect the pipe to be only 24 – 42 inches below the river bed. The riffle at its current elevation provides grade control under the bridge and flattens the slope of the channel through the impoundment. This results in low shear stresses through the reach upstream of the bridge after dam removal

Channel and Bank Treatments. We propose minimizing excavation within the channel except as necessary to address sediment quality concerns. Sediment within the active channel will move downstream to add smaller grained substrate to the sediment-starved reaches below. Therefore, proposed construction activities are restricted to excavation of impounded sediment nearest the dam, demolition and removal of the dam and appurtenant structures, and stabilization of key channel banks. Four different bank treatments are proposed – (1) Fabric Encapsulated Soil (FES) lifts supported by a stone toe, (2) limestone block steps, (3) flattening steep slopes as necessary, and (4) wood installation.

Our decision to reinforce the banks with a stone toe and FES lifts near the dam is based on the desires to achieve rapid stability nearest the bridge and park, to guide the river approach the bridge and avoid increasing shears on either side of the bridge, and to limit the mobility of sediment nearest the dam, which has the highest concentration of cadmium. This is balanced with the desires to allow the river to find its preferred path and minimize cost and engineered aesthetics associated with an overly structured channel by restricting this treatment to just ~180 ft. The stone toe of the FES lifts should extend below the hard bottom surface to the depth of scour, which will be determined in the next stage of design. Between the FES lifts and the bridge we propose use of limestone block steps to transition from what will be naturalized vegetated banks to the hard armored riprap under the bridge. This will also direct foot traffic down to the river in a way that does not encourage trampling new vegetation on the FES lifts. If desired, we can extend the limestone block along the toe of the FES lifts to provide a stable walking area along the waters edge during low flow. From the top of the banks to the park, gentle slopes are proposed to ensure accessibility for all park visitors and flexibility to incorporate trails in the future.

Upstream of the FES lifts, we are proposing bank grading only where necessary to address steep banks that may develop during dewatering. We propose making this determination in the field. We have identified the low area adjacent to the existing right bank as an area for potentially reusing excess material removed from the channel banks. Reusing material here addresses the landowner concern regarding stagnant water pooling in the area and avoids costs associated with hauling material offsite. This is also the area proposed for reuse of material excavated near the dam, and it will require at least 6 inches of clean cover as described above. This represents no net reduction in flood storage area because it is material removed from within the proposed wetted cross section. Further, none of this area has been available as flood storage because it is all currently inundated at all times. All disturbed areas outside of the FES lift stretch will be mulched and seeded with cover crop species and planted and seeded as described below.

At the bend near the upper end of the impoundment, we propose incorporating logs with root wads into the bank and pool to provide habitat and encourage localized scouring to maintain the pool depth. Logs placed parallel to the bank also provide protection for the bank toe. These logs must extend below the hard bottom elevation in the impoundment to ensure that impounded sediments are not washed out beneath them, leaving them perched or subject to rolling into the channel. Care will be taken to ensure that sufficient soil covers these logs to prevent buoyancy forces from dislodging them.

Raceway. Consistent with the Village of Newburg and Ozaukee County requests, we have proposed leaving the box culvert portion of the raceway in tact and creating an accessible pedestrian tunnel through it. It will also convey flood waters during larger flood events and as such will require protection to ensure that banks adjacent to the trail are not eroded. This will be designed in more detail during final design.

Access. To give the construction contractor flexibility and to account for uncertainty associated with securing access agreements from private landowners, we have proposed multiple potential access routes, including routes through the river. These routes may not be necessary or appropriate depending on final access agreements and flow conditions at the time of construction. A route is shown from downstream of the bridge along the river bed up to the impounded area. Due to low clearance under the bridge, this route may only be accessible to smaller equipment.

Planting Plan. All exposed or disturbed areas will be seeded and planted with native vegetation, with the exception that disturbed areas within the existing manicured park space will be reseeded with turf grass. Much of the exposed area is proposed to be planted with floodplain forest species. To address adjacent landowner interests, the area immediately upstream of the bridge is proposed to be seeded with wet meadow grasses and forbs with only a few native floodplain trees incorporated. A larger wet meadow area is also proposed further upstream in the floodplain on the right bank to address landowner interests in having multiple vegetative communities for educational purposes. Planting species and planting densities will be determined in the next stage of design based on feedback from stakeholders and budget.

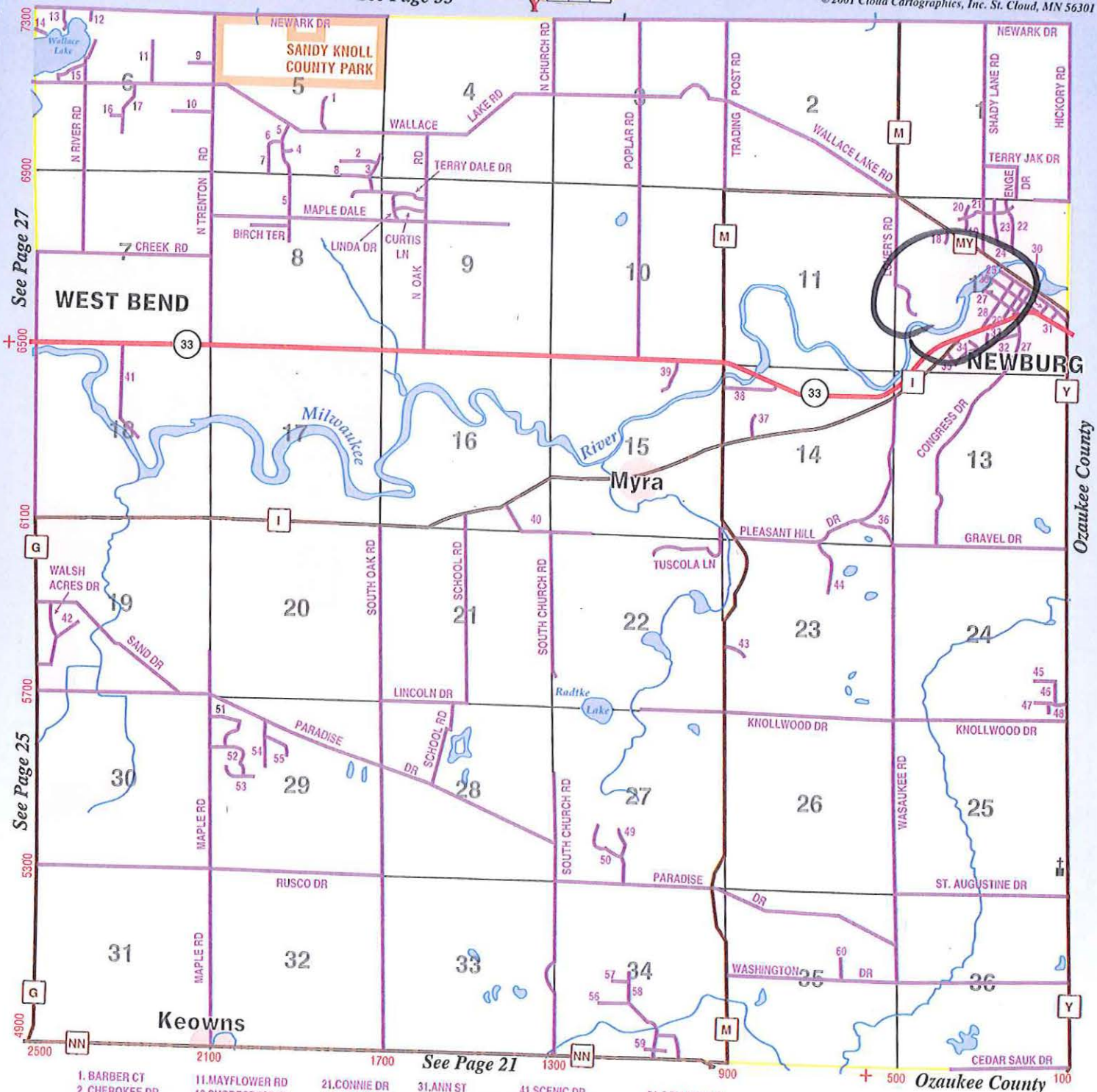
Attachment 4

Trenton

WASHINGTON COUNTY

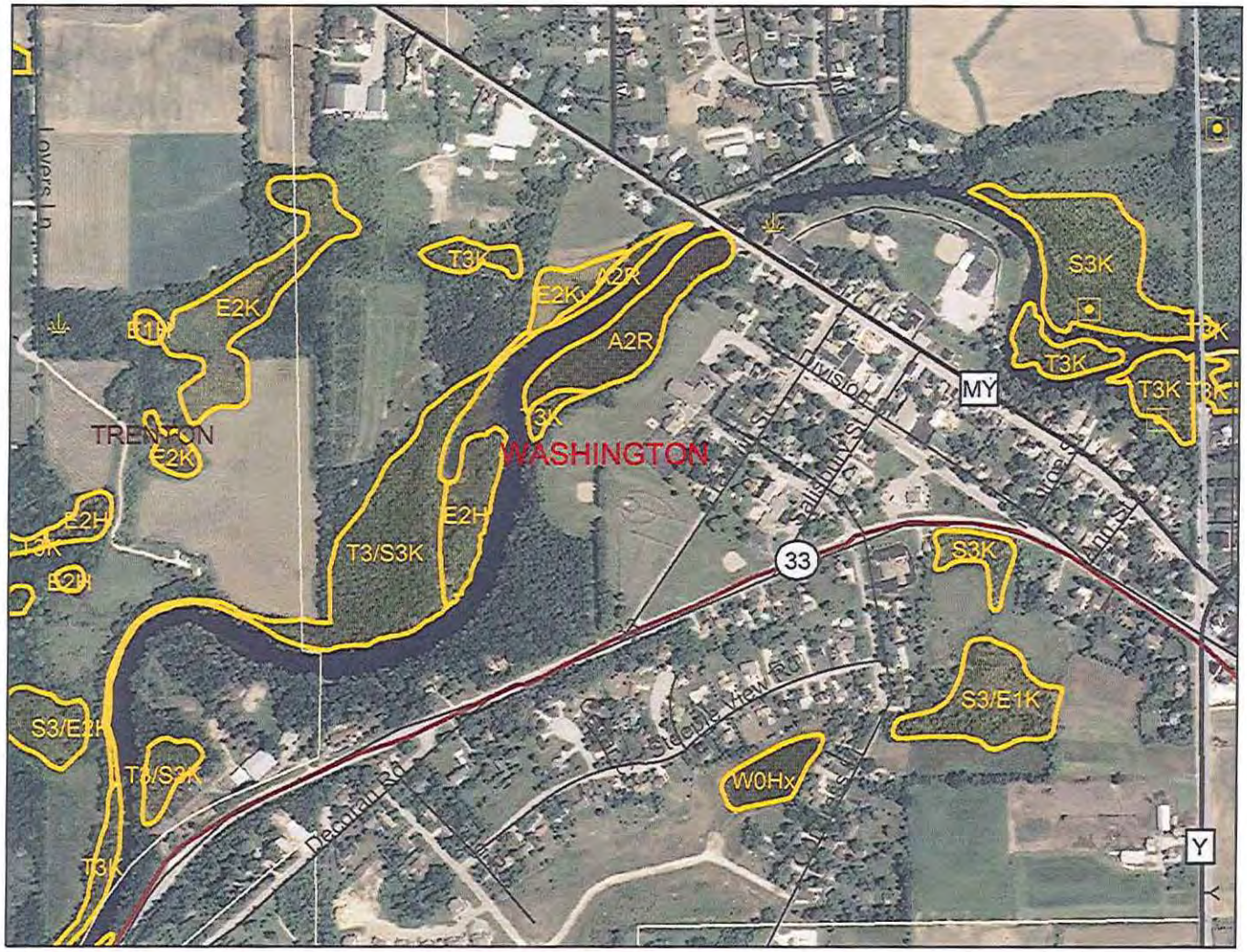
T.11N. - R.20E.

See Page 35



1. BARBER CT
2. CHEROKEE DR
3. INDIAN LORE RD
4. ANNETTE CT
5. EASTWOOD TR
6. BECK LANE NORTH
7. BECK LN SOUTH
8. DAVIDS VIEW
9. SANDY KNOLL CT
10. GLENWAY DR
11. MAYFLOWER RD
12. SHORECREST CL
13. WEST SUMMIT CL
14. N WALLACE LAKE DR
15. S WALLACE LAKE DR
16. TOLBERT LN
17. FORSETH CT
18. CARMODY CT
19. BELLVUE CT
20. NORTHVUE CT
21. CONNIE DR
22. HICKORY RD
23. ENGE DR
24. DIANE DR
25. MAIN ST
26. DIVISION ST
27. CONGRESS ST
28. FRANKLIN ST
29. SALISBURY ST
30. MONROE ST
31. ANN ST
32. STEEPLE VIEW RD
33. CONCORD CT
34. CEDAR CT
35. SPRING RD
36. WASAUKEE RD
37. TIMBER CT
38. RIVERVIEW DR
39. RIVER CT
40. EVERGREEN DR
41. SCENIC DR
42. HEATHER LN
43. DEER VIEW CT
44. OLD FARM LN
45. CORTLAND LN
46. APPLE BLOSSOM LN
47. ORCHARD KNOLL DR
48. MACINTOSH CT
49. EDEN CT
50. CASCADE DR
51. COLLEEN LN
52. JACQUELINE DR
53. PATRICK CT
54. WHISPERING PINES DR
55. FRONTIER CT
56. BIRCHWOOD LN
57. DEER CREEK LN
58. FAIRY CHASM RD
59. CHERI LN
60. WASHINGTON CT

Map Created on May 04, 2012



0 900 1800 2700 ft.

Legend

Major Highways

- Interstate
- State Highway
- U.S. Highways

- County Roads
- Local Roads
- 24K County Boundaries

Civil Towns

- Civil Town

DNR Wetland Points

- Excavated Pond
- Dammed Pond
- Wetland Too Small to Delineate
- Filled Excavated Pond
- Filled Dammed Pond
- Filled Wetland Too Small to Delineate
- Filled or Drained Wetland

DNR Wetland Areas

- Upland
- Wetland
- Filled or Drained Wetland

N

Scale: 1:9,280

Notes: attachment 5

5

Attachment 6

bing Maps

My Notes

On the go? Use **m.bing.com** to find maps, directions, businesses, and more

Bird's eye view maps can't be printed, so another map view has been substituted.

Attachment 7

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary
Gloria L. McCutcheon, Regional Director

Southeast Region Headquarters
2300 N. Dr. Martin Luther King, Jr. Drive
Milwaukee, Wisconsin 53212-3128
FAX 414-263-8606
Telephone 414-263-8500
TTY Access via relay - 711

May 4, 2012

Mr. Bill Cording
Village of Newburg
614 Main Street
P.O. Box 50
Newburg, WI 53060

Subject: Dam Inspection Report for Newburg Dam, Field File No. 66.07, Key Sequence No. 927, Washington County

Dear Mr. Cording:

This is the Department of Natural Resources' Dam Safety Report based on our inspection of the Newburg Dam on August 13, 2008. This report identifies work that needs to be done on the dam and a schedule for when that work is to be completed. Please contact me if you have questions about the needed repairs or are uncertain how to proceed.

The Newburg Dam is located across the Milwaukee River immediately upstream of the CTH "MY" bridge. The dam consists of a fixed crest concrete spillway, a gated culvert section with steel plates across the inlets, and a mill race with a stop log gate. The concrete dam terminates in the road embankment on the left and an earthen embankment extends on the right until it terminates at the upstream church property.

Wisconsin has an excellent record of safety regarding dams. Our safety standards are meant to protect the public and reduce the likelihood of dam failures; therefore, past failures have not resulted in death, injury, or significant property damage. However, I would like to caution you on one potential liability issue. Unfortunately, every year accidents are reported on or near code-compliant dams. My safety inspection does not address injury that could result from trespass or other inappropriate behavior on the dam site. Your insurance carrier may be able to assist you in protection from this type of liability.

INTERIM EMERGENCY ACTION PLAN **July 31, 2009**

An Emergency Action Plan (EAP) is required for the area downstream of the dam. This plan identifies affected downstream properties and resources available for responding to an emergency situation. It is required so that during flooding or imminent failure of the dam, a series of well-planned steps can guide the owner, operator, and emergency workers through a process to minimize the potential for loss of life or property damage.

I can provide an electronic template that you may use to develop this document. Otherwise, more information may be found by using this internet link (http://dnr.wi.gov/org/water/wm/dsfm/dams/eap.html).

DAM TRANSFER **July 31, 2009**

During the inspection we discussed the status of the Village's ownership of the dam. It appeared from my pre-inspection review that the transfer of the dam from the Newburg Fire Department to the Village of Newburg was not finalized in the early 1990s. You also informed me that the Village was able to acquire the remaining portions of the embankment in mid-2008 from Mrs. Monday. Please provide me with copies of documentation (surveys, deeds, etc.) pertaining to the recent property transfer of the Monday parcel. I will follow-up with you on any additional forms and notice requirements after completing a review of the transaction documents.

DAM FAILURE ANALYSIS AND DETAILED EMERGENCY ACTION PLAN **March 1, 2010**

In order to determine the extent of the dam failure floodplain (hydraulic shadow) for the dam, and determine the required hydraulic capacity for the hazard the dam creates, you must hire an engineer registered in the state of Wisconsin to perform a dam failure analysis. The analysis is to be completed by March 1, 2010. In addition to establishing the hazard rating and the required hydraulic capacity for the dam, we will utilize this dam failure analysis to determine the required downstream land use controls that must be implemented.

A dam failure analysis will also provide the information necessary to develop a Detailed Emergency Action Plan (EAP) and determine whether or not there is a need for a flood warning system. This Detailed EAP identifies affected downstream properties based on the dam failure mapping and resources available for responding to an emergency situation. It is required so that during flooding or imminent failure of the dam, a series of well-planned steps can guide the owner, operator, and emergency workers through a process to minimize the potential for loss of life or property damage.

I can provide an electronic template that you may use to develop this document. Otherwise, more information may be found by using this internet link (http://dnr.wi.gov/org/water/wm/dsfm/dams/eap.html).

CONCRETE DAM REPAIRS **October 1, 2009 (investigate), June 1, 2010 (design), September 1, 2011(repair)**

Portions of the concrete structure are in need of repair and/or further investigation. A list of the areas of concern along with a recommended action for insuring the integrity of the concrete portion of your dam is included here:

- The right abutment contact had evidence of seepage. The dam was drawn down for the inspection resulting in the seepage being no more than a trickle. Placement of dye tablets on the upstream face of the dam did not result in observation of dye in the seepage during the inspection. This area should be investigated further and monitored for changing conditions in the future.
- Cracking is present across the entire crest and has progressed to the point of requiring attention. Comparing post construction photos from 1992 it appears that not only have several cracks formed but there also appears to be settling and or lifting of the concrete slabs. Along many of the cracks, the separation is significant enough that material may be pulled from inside the dam resulting in the shifting surface.
- The severity of the concrete deterioration will require that you hire an engineer registered in the State of Wisconsin to evaluate the structures integrity and determine whether repair/reconstruction is necessary to insure stability. Plans and specifications compliant with NR333 must be supplied to this office for review and you must receive approval prior to starting work on the dam. Have your consulting engineer contact me if there are questions on how to precede with the submission of the plans and specifications. Part of this evaluation and design effort will include performing a stability analysis of the structure under loading conditions.

LAKE DRAIN — **October 1, 2009 (investigate), June 1, 2010 (design), September 1, 2011(repair)**

The lake drain consists of two sheet steel slide gates placed in front of two culvert barrels. There is no formal operating mechanism to lift these gates which results in minimal use. To facilitate the inspection, the stoplogs in the mill race had been partially removed to lower the water in the impoundment. However, the gates on the lake drain were still closed and below the water level. Due to that condition, we were unable to observe the gate condition or the upstream face of the dam. The gate does not appear to seat properly as evidence of regular leaking around the gate is apparent. According to drawings from the 1991 repair, brackets should be present to hold the plates but it is possible that the seals are no longer functioning. Submit plans for replacement of the sheet steel with a gate and lifting mechanism to allow full operation of the lake drain.

EMBANKMENT REPAIRS — **September 15, 2009**

The right embankment was almost completely covered with mixed vegetation, of which, very little was appropriate for a dam embankment. The embankment should be cleared of all woody vegetation (trees & shrubs). This process would include removing stumps and roots, refilling any void with compacted tight soils, and covering the disturbed area with topsoil, seed and mulch. The removal of woody vegetation will result in an extensive disturbance of the embankment. It may be in your best interest to consider establishing an entirely new grass cover that can be maintained in the future. If a project of this magnitude is considered, it must be performed under the design of a PE and that design will require Department plan approval prior to construction.

INSPECTION, OPERATION AND MAINTENANCE PLAN — **March 1, 2010**

Please prepare an Inspection, Operation and Maintenance Plan (IOM) for the Newburg Dam and submit the plan for us to review. An IOM is required for all large dams in the State of Wisconsin. You will need to prepare a plan that includes dam specifications, an operation schedule, a maintenance schedule, and the current names and telephone numbers of the operators and key people in the Village. Maintenance should include all of those areas identified on the "Dam Inspection Checklists" which are included as part of this report.

Because our inspection program only allows for a Department inspection of your dam every ten years, you will need to have your engineer visually inspect your dam at least once every two years (for high hazard), three years (for significant hazard), five years (for low hazard) and after every major flood. Copies of the engineer's reports should be sent to this office.

SUMMARY OF REQUIREMENTS	DATE
INTERIM EMERGENCY ACTION PLAN	July 31, 2009
DAM TRANSFER DOCUMENTATION	July 31, 2009
EMBANKMENT REPAIRS	September 15, 2009
DAM FAILURE ANALYSIS AND DETAILED EAP	March 1, 2010
INSPECTION, OPERATION AND MAINTENANCE PLAN	March 1, 2010

CONCRETE DAM REPAIRS	October 1, 2009 (investigate), June 1, 2010 (design), September 1, 2011(repair)
LAKE DRAIN	October 1, 2009 (investigate), June 1, 2010 (design), September 1, 2011(repair)

If you are unable to meet the schedule proposed above, submit your own schedule, in writing, for completing the required modifications and repairs. In order for us to consider a schedule other than the one we have determined, you must submit your alternative schedule by July 31, 2009. If we do not hear from you by then, the schedule we have determined will be in effect.

If you have any questions concerning this report or the operation and maintenance of your dam, please call me at Enter your phone number, email to the address below or write to the address above.

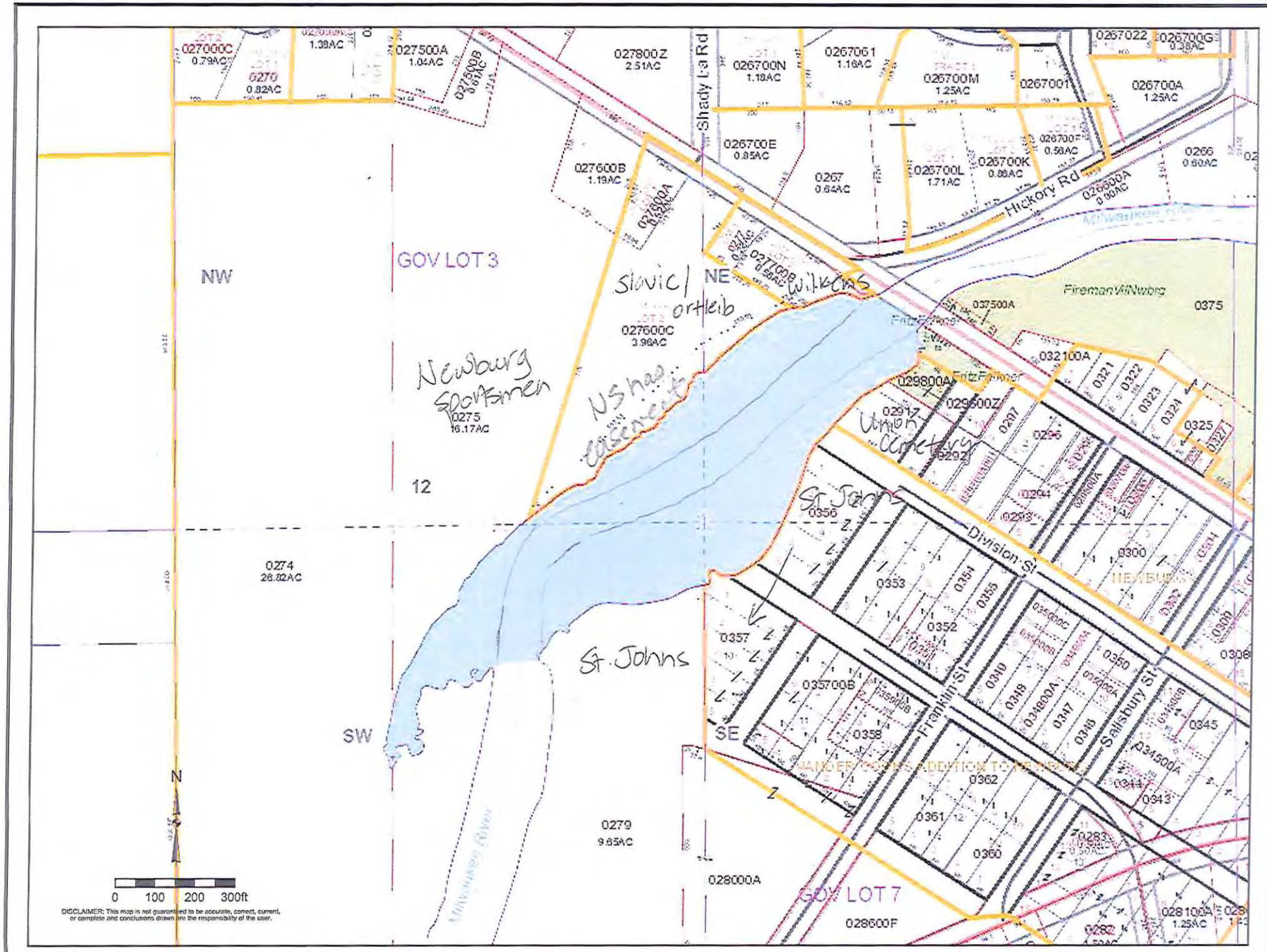
Thank you for your continued cooperation in maintaining safe dams in Wisconsin.

Sincerely,

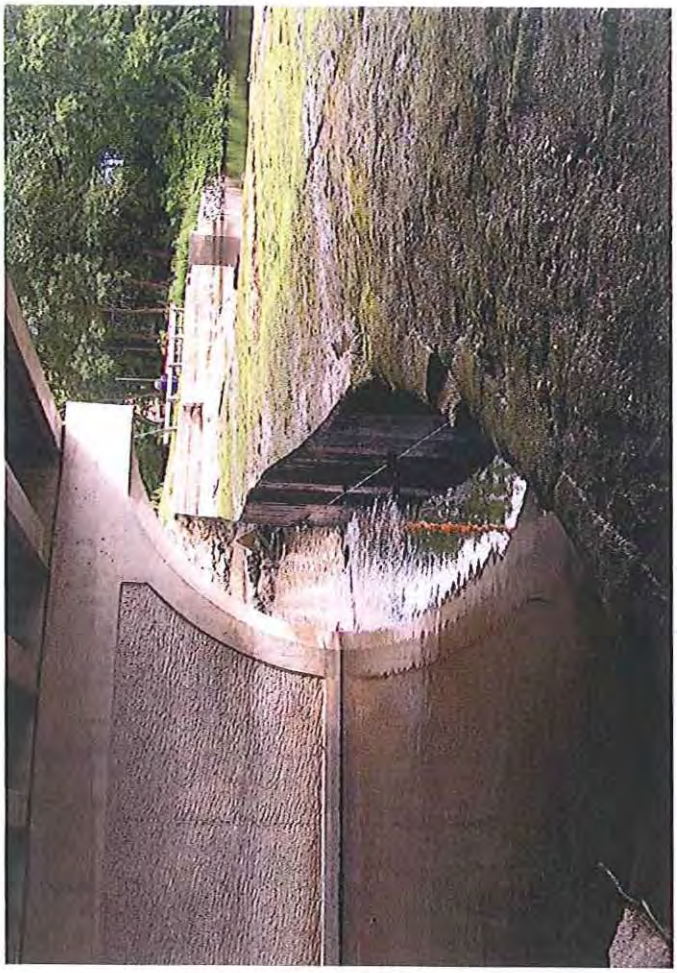
Brent A. Binder, P.E.
Water Management Engineer

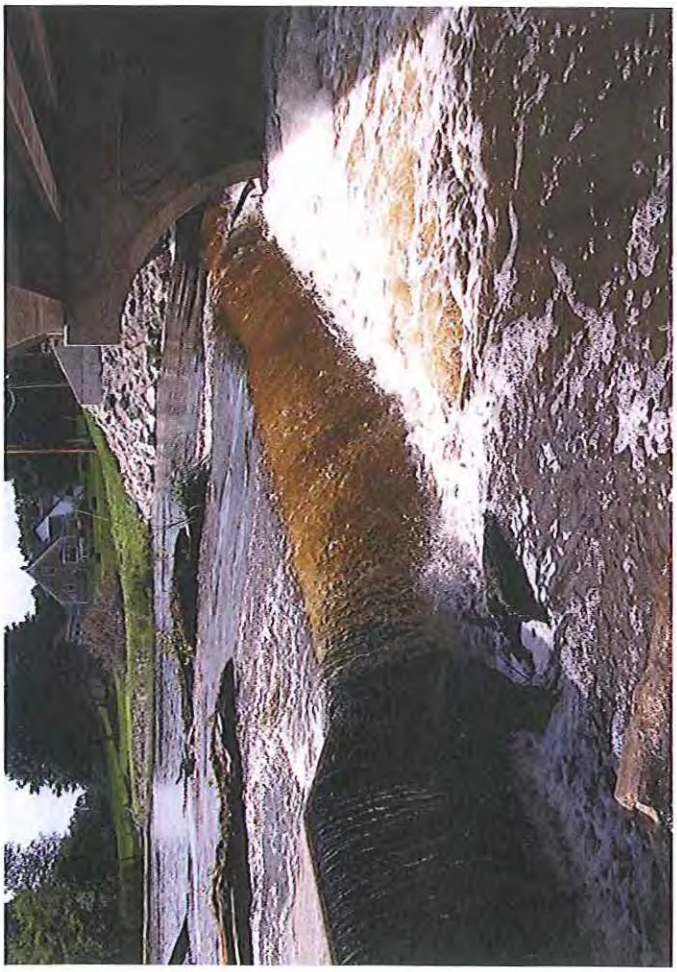
Enc.

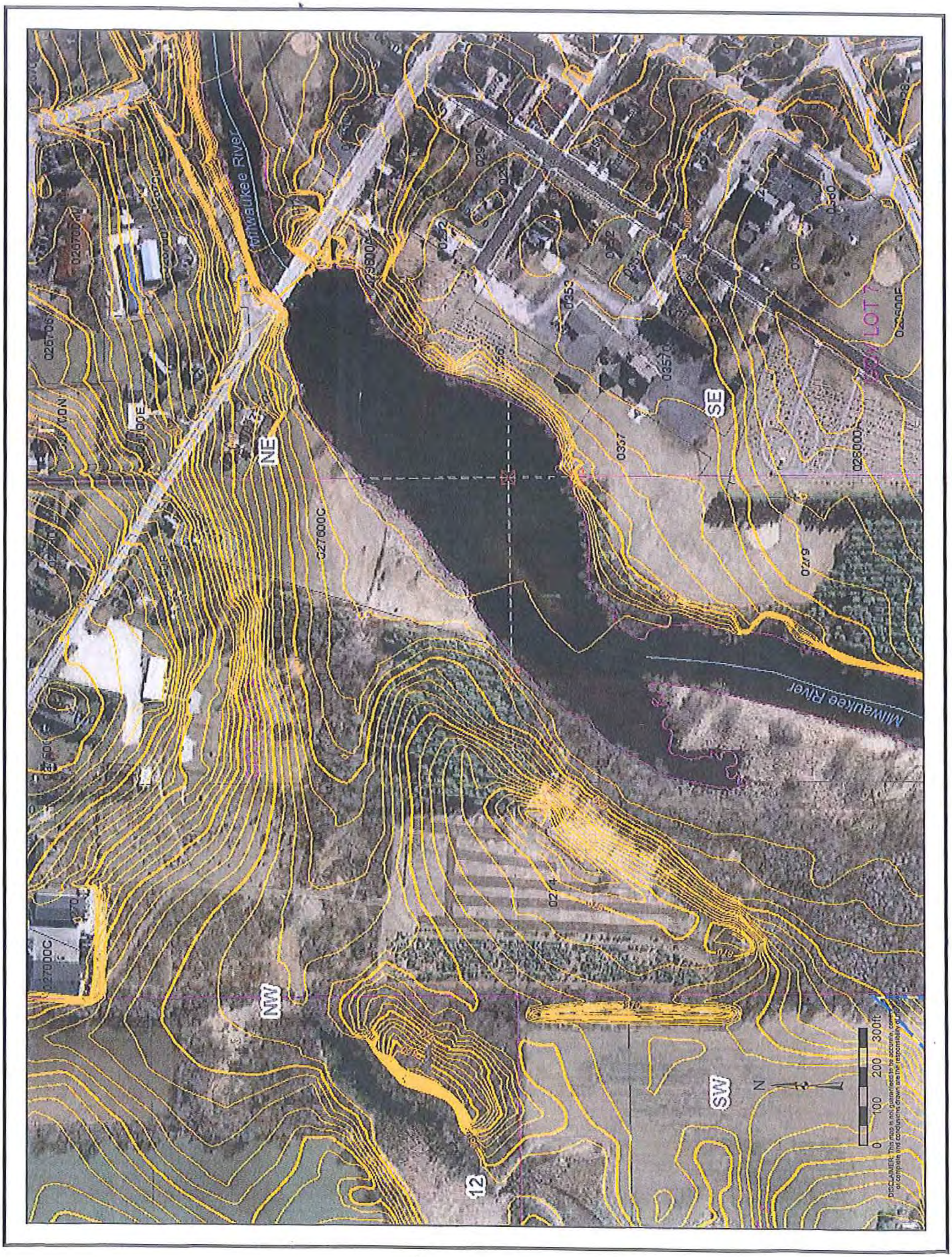
Attachment 8



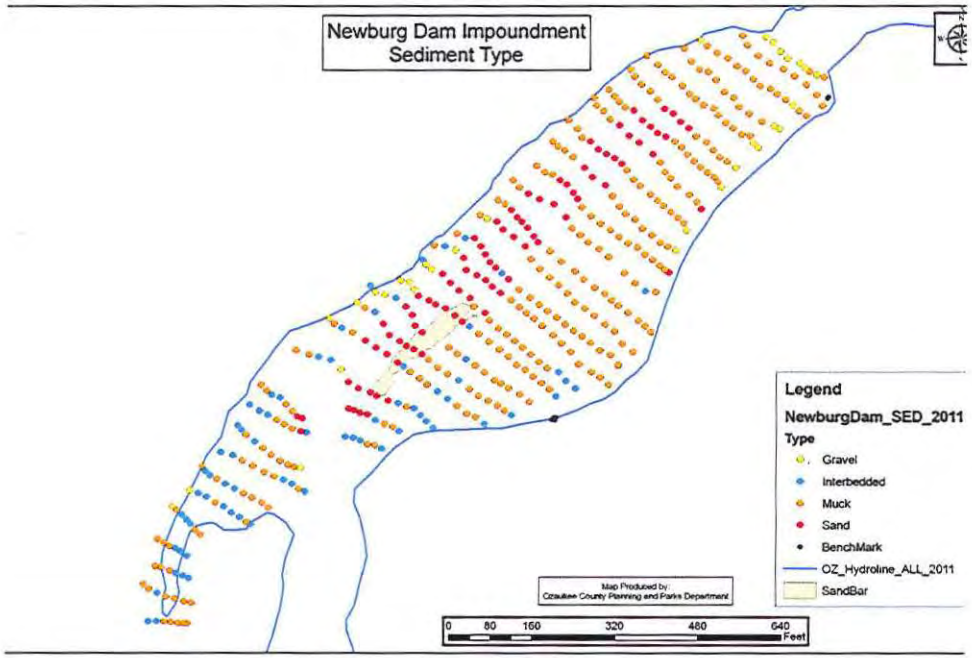
Attachment 7

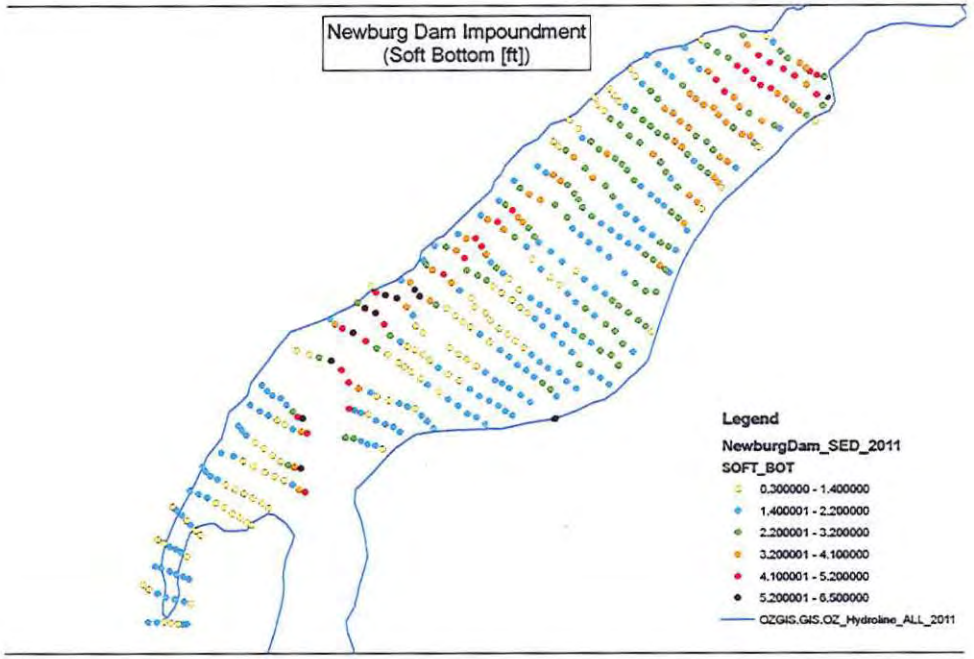


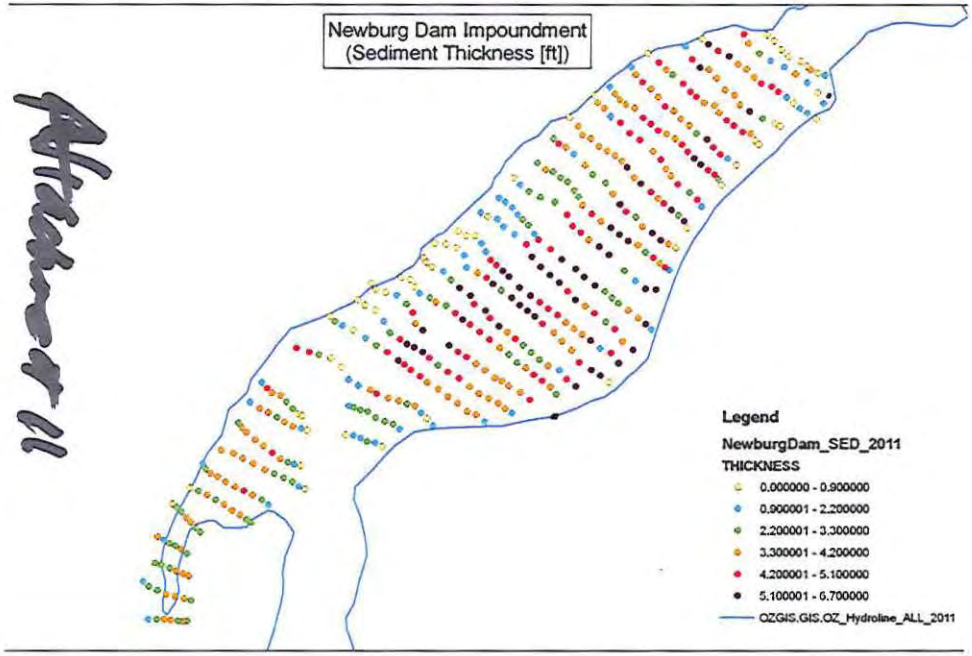




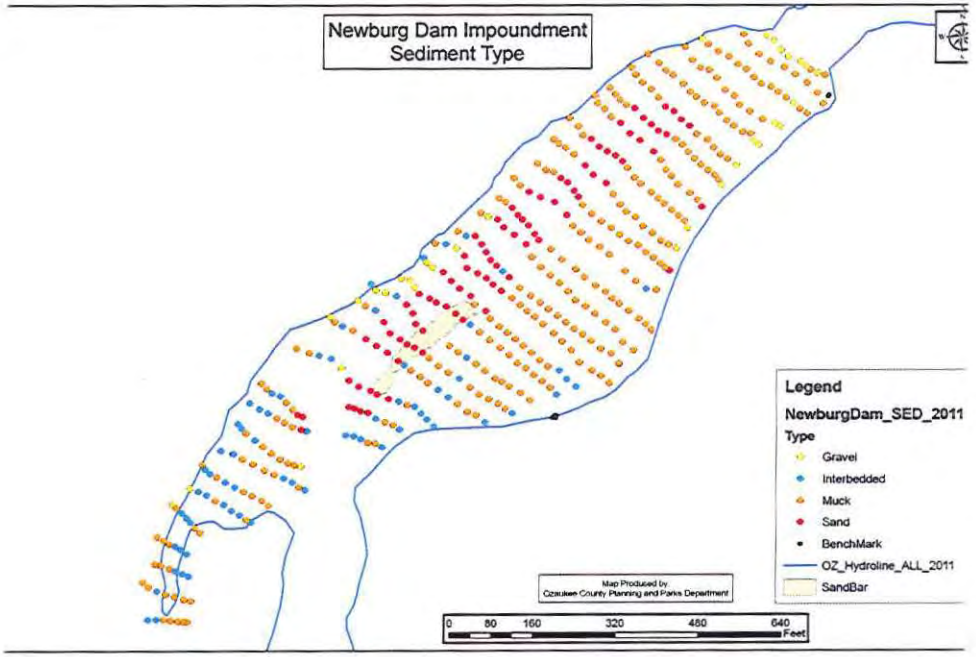
Attachment 10







Attachment 11



NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from the National Agriculture Imagery Program's (NAIP) digital orthoimagery produced by the USDA, Farm Service Agency at a resolution of 1 meter and collected during the summer of 2005.

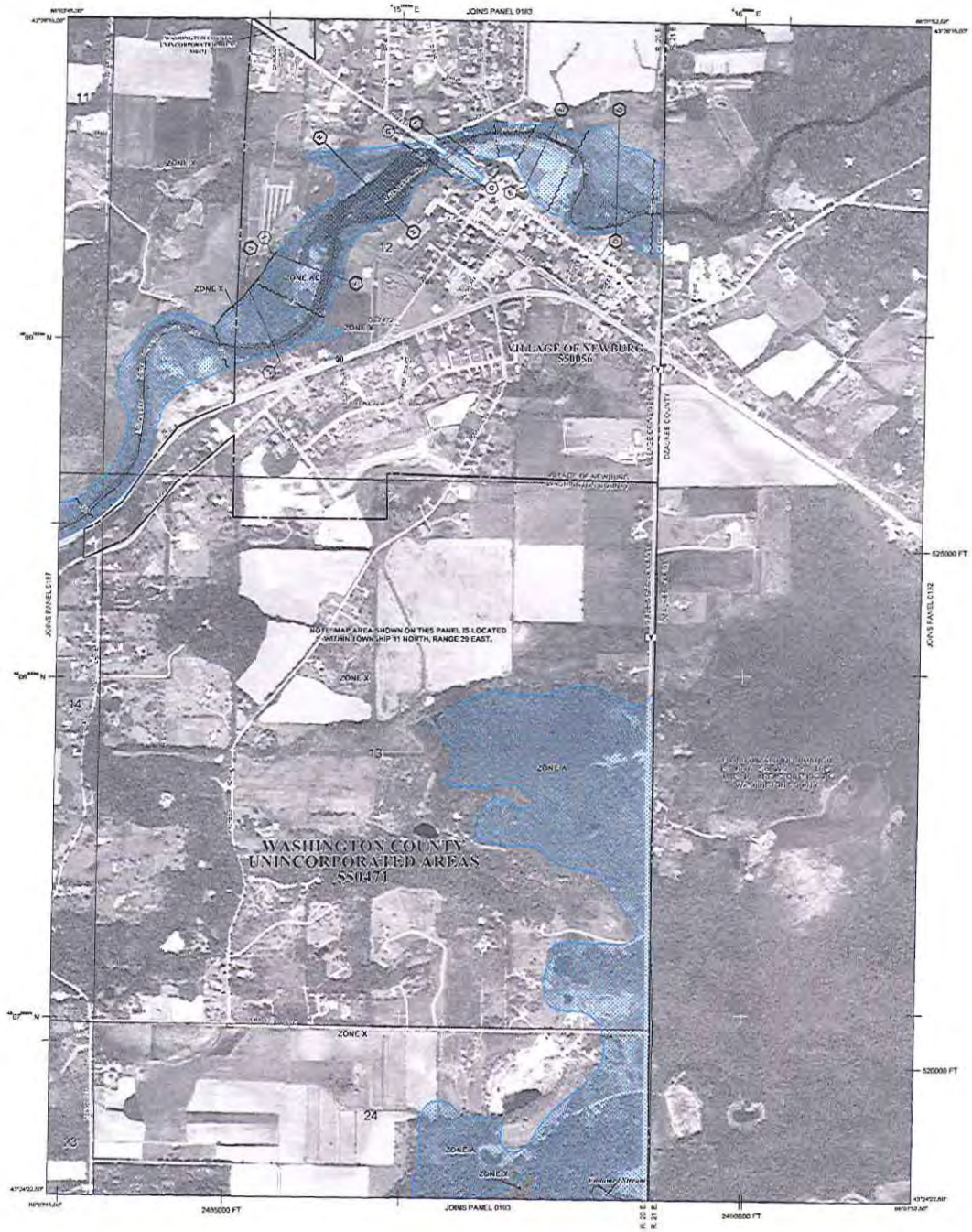
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



Attachment 12

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The Floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30.00" 32°22'30.00" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000 mN — 1000-meter Universal Transverse Mercator grid ticks, zone 16
- 6000000 FT — 2000-foot grid ticks: Wisconsin State Plane coordinate system, south zone (FIPSZONE 4803), Lambert Conformal Conic
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
125 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0191D

FIRM
FLOOD INSURANCE RATE MAP

WASHINGTON COUNTY, WISCONSIN
AND INCORPORATED AREAS

PANEL 191 OF 385
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
WASHINGTON COUNTY	550471	0191	D
NEWBURG, VILLAGE OF	550056	0191	D

PRELIMINARY
JUN 24, 2011

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

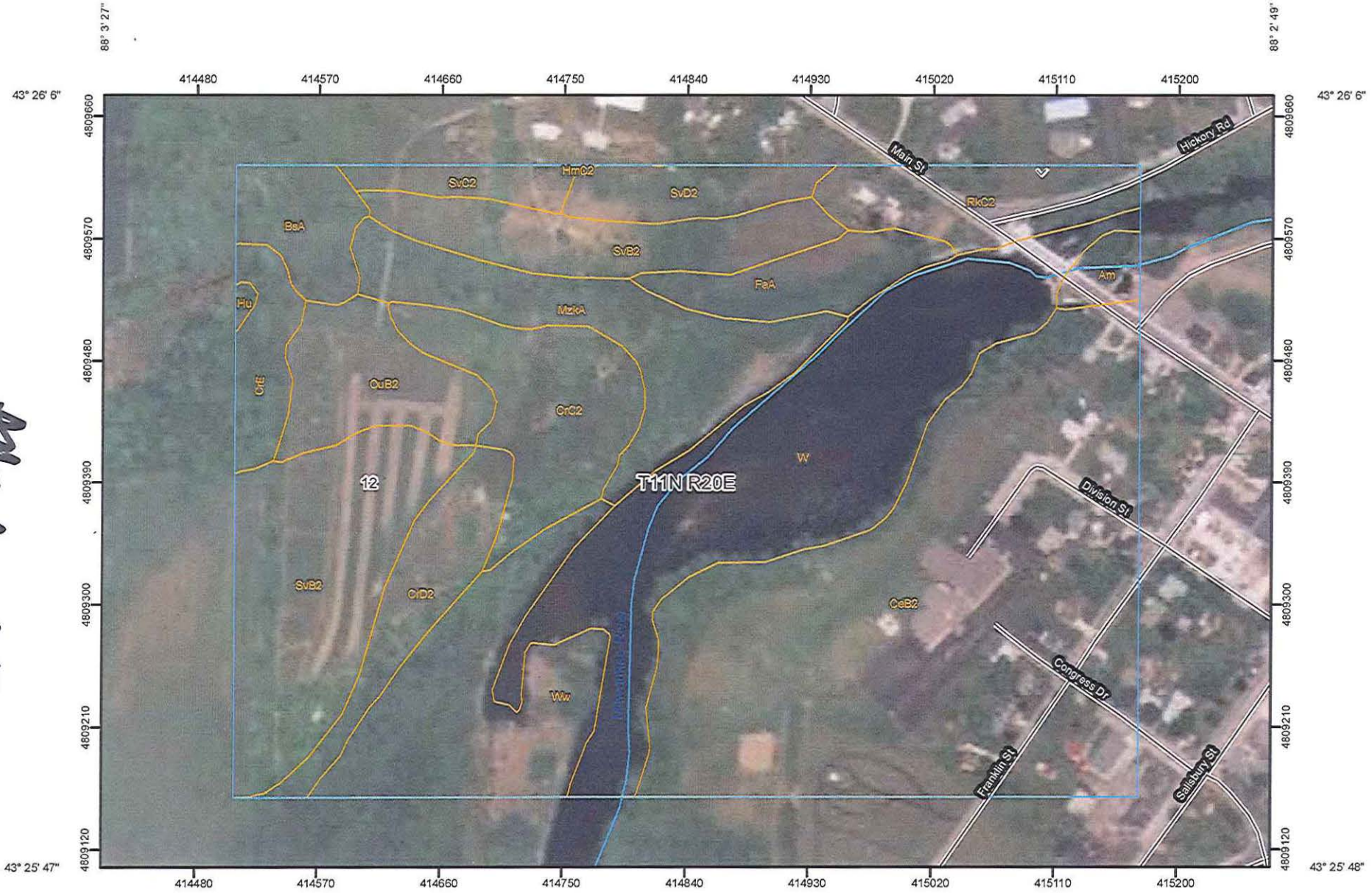
MAP NUMBER
55131C0191D

EFFECTIVE DATE

Federal Emergency Management Agency

Attachment 13

Soil Map—Washington County, Wisconsin



USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities
- PLSS Township and Range
- PLSS Section

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:4,070 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

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

Soil Survey Area: Washington County, Wisconsin
Survey Area Data: Version 11, Sep 1, 2011

Date(s) aerial images were photographed: 6/1/2005

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

Map Unit Legend

Washington County, Wisconsin (WI131)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Am	Alluvial land	0.7	0.9%
BsA	Brookston silt loam, 0 to 3 percent slopes	1.8	2.4%
CeB2	Casco loam, 2 to 6 percent slopes, eroded	22.3	29.1%
CrC2	Casco-Rodman complex, 6 to 12 percent slopes, eroded	4.1	5.4%
CrD2	Casco-Rodman complex, 12 to 20 percent slopes, eroded	2.6	3.4%
CrE	Casco-Rodman complex, 20 to 35 percent slopes	1.5	2.0%
FaA	Fabius loam, 1 to 3 percent slopes	2.1	2.7%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	0.0	0.0%
Hu	Houghton mucky peat	0.1	0.1%
MzkA	Mussey loam, 0 to 3 percent slopes	5.1	6.7%
OuB2	Ozaukee silt loam, 2 to 6 percent slopes, eroded	2.9	3.8%
RkC2	Ritchey silt loam, 6 to 12 percent slopes, eroded	2.9	3.7%
SvB2	Sisson-Casco-Hochheim complex, 2 to 6 percent slopes, eroded	10.1	13.2%
SvC2	Sisson-Casco-Hochheim complex, 6 to 12 percent slopes, eroded	1.0	1.3%
SvD2	Sisson-Casco-Hochheim complex, 12 to 20 percent slopes, eroded	1.7	2.2%
W	Water	11.8	15.5%
Ww	Wet alluvial land	5.8	7.6%
Totals for Area of Interest		**76.4**	**100.0%**

Attachment 11

HP-05-07 (8/15/03)

For SHPO Use Only. Case # 12-0275/WT

REQUEST FOR SHPO COMMENT AND CONSULTATION ON A FEDERAL UNDERTAKING

Submit one copy with each undertaking for which our comment is requested. Please print or type. Return to:

Wisconsin Historical Society, Division of Historic Preservation, Office of Preservation Planning, 816 State Street, Madison, WI 53706

RECEIVED
APR 02 2012
DIV HIST PRES

Please Check All Boxes and Include All of the Following Information, as Applicable:

I. GENERAL INFORMATION

☑ This is a new submittal.
☐ This is supplemental information relating to Case #:_____ and title:_____
☐ This project is being undertaken pursuant to the terms and conditions of a programmatic or other interagency agreement. The title of the agreement is _____

a. Federal Agency Jurisdiction (Agency providing funds, assistance, license, permit): NOAA

b. Federal Agency Contact Person: Terry S. Heatlie, PWS Phone: 734-741-2211

c. Project Contact Person: Andrew T. Struck, Ozaukee County Planning and Parks Phone: 262-238-8275

d. Return Address: 121 West Main Street, Port Washingon, WI Zip Code: 53074

e. Email Address: astruck@co.ozaukee.wi.uw

f. Project Name: Ozaukee County Fish Passage Program: Newburg Dam Removal, Washington County

g. Project Street Address: See report

h. County: Washington City: _____ Zip Code: _____

i. Project Location: Township 11 N, Range 20 E, E/W (circle one), Section 12, Quarter Sections _____

j. Project Narrative Description—Attach Information as Necessary. See attached report

k. Area of Potential Effect (APE). Attach Copy of U.S.G.S. 7.5 Minute Topographic Quadrangle Showing APE.

II. IDENTIFICATION OF HISTORIC PROPERTIES

☐ Historic Properties are located within the project APE per 36 CFR 800.4. Attach supporting materials.
☑ Historic Properties are not located within the project APE per 36 CFR 800.4. Attach supporting materials.

III. FINDINGS

☑ No historic properties will be affected (i.e., none is present or there are historic properties present but the project will have no effect upon them). Attach necessary documentation, as described at 36 CFR 800.11.
☐ The proposed undertaking will have no adverse effect on one or more historic properties located within the project APE under 36 CFR 800.5. Attach necessary documentation, as described at 36 CFR 800.11.
☐ The proposed undertaking will result in an adverse effect to one or more historic properties and the applicant, or other federally authorized representative, will consult with the SHPO and other consulting parties to resolve the adverse effect per 36 CFR 800.6. Attach necessary documentation, as described at 36 CFR 800.11, with a proposed plan to resolve adverse effect(s).

Authorized Signature: _____ Date: 3/30/2012

Type or print name: Jennifer R. Haas

IV. STATE HISTORIC PRESERVATION OFFICE COMMENTS

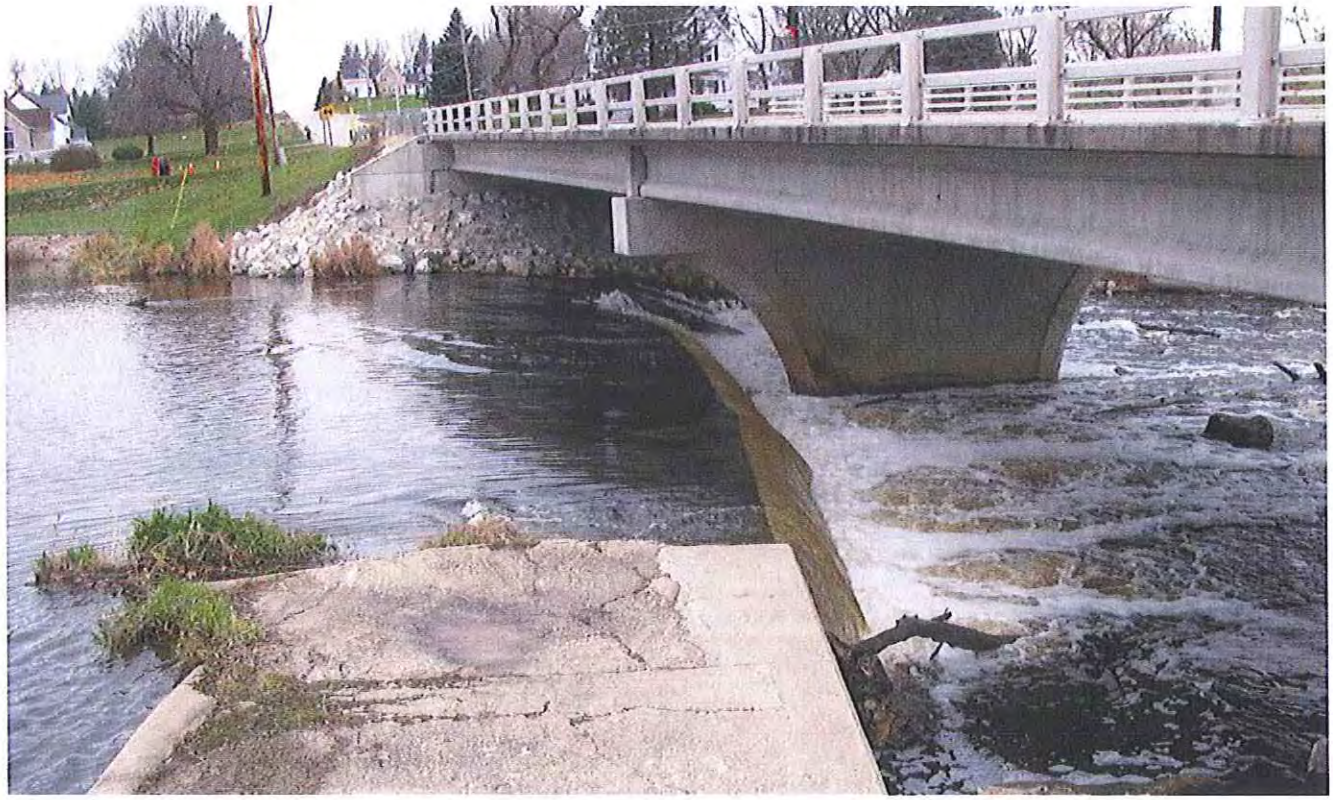
☑ Agree with the finding in section III above.
☐ Object to the finding for reasons indicated in attached letter.
☐ Cannot review until information is sent as follows: _____

Authorized Signature: _____ Date: 4/17/12

Attachment 15

Newburg Dam Removal

Draft Sediment Management Plan



April 5, 2012

Prepared for:

Fish Passage Program
Ozaukee County Planning and Parks Department
121 W. Main Street
Port Washington, Wisconsin

Table of Contents

Appendices

1. Project Background

The Newburg Dam is located on the Milwaukee River at the County Highway MY bridge. A dam has occupied this location since 1848, when the first timber structure dam was constructed to provide power for a saw and flour mill. In 1913, a new concrete dam was built on the site. The mill ceased operations around 1939, and portions of the concrete spillway washed out in 1942 and 1945. By 1958, a new concrete cap had been placed on the spillway, and the dam was being operated by the Newburg Fire Department. In 1978, the retaining wall on the right bank was rebuilt.

In 1988, the Wisconsin Department of Natural Resources (WDNR) issued a repair order, and three years later, the Newburg Fire Department transferred ownership of the dam to the Village of Newburg. In 2011, Ozaukee County Planning and Parks Department offered to remove the dam with funding available from the National Oceanic and Atmospheric Administration, and the Village chose to pursue dam removal rather than repair.

Over the course of its history, the Newburg dam has interrupted the natural transport of sediment through the affected reach of the Milwaukee River. As a result, the impoundment has accumulated material that would have been carried downstream if the dam was not there. Impounded sediment was likely released in the 1950's when aerial photographs indicate that the impoundment was drawn down and again in 2006, when the impoundment was drawn down to facilitate construction of a new bridge at the County Highway MY crossing. The fate of the material remaining must be addressed in the course of the dam removal process. This Sediment Management Plan presents an approach for management of the sediment at the Newburg Dam site. The approach recommended is derived from State and Federal guidelines, assessments of sediment quantity and quality within the Newburg Dam impoundment, previous experience with dam removal in Wisconsin, and planning discussions with project partners and regulatory agencies.

The recommended approach includes a combination of slow impoundment drawdown; excavation of sediment in the active channel near the dam; stabilization of banks near the dam using fabric encapsulated soil lifts with a stone toe and erosion control fabric; on-site reuse of excavated soil; and soil stabilization through use of existing and proposed vegetation.

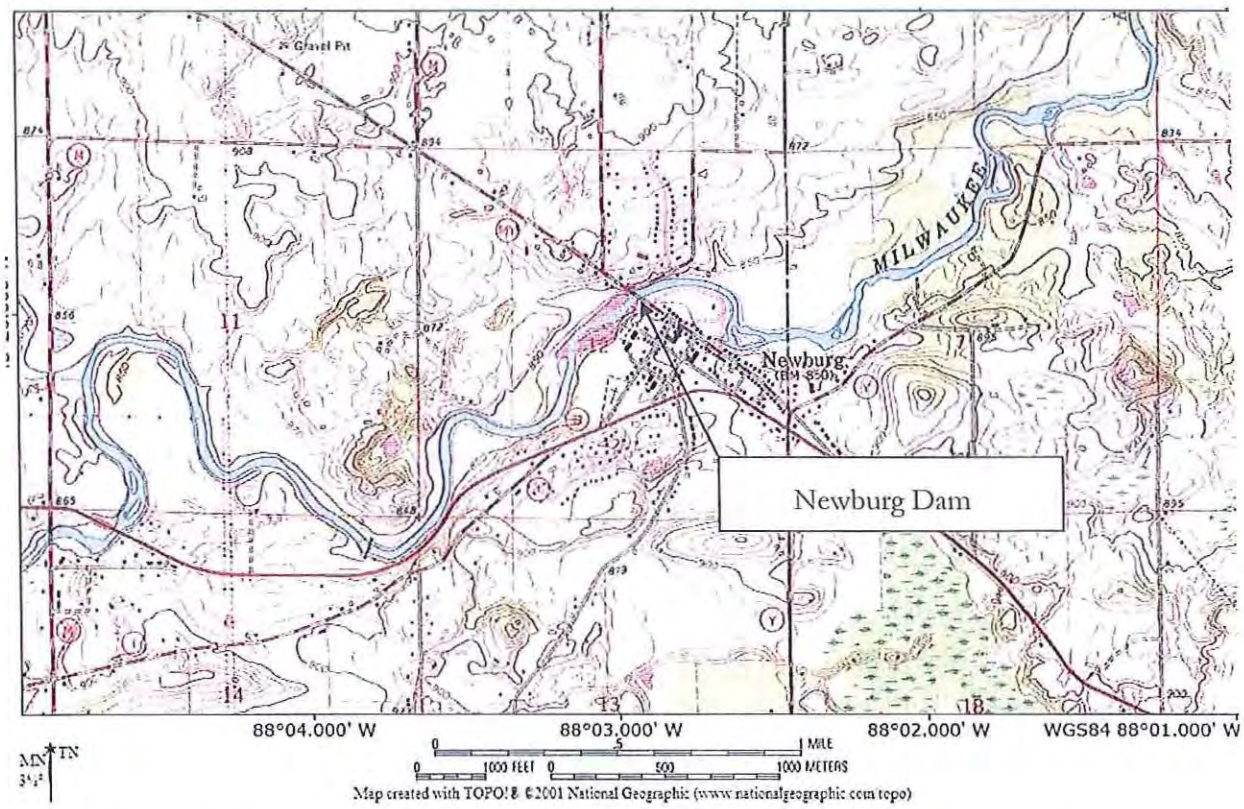


Figure 1: Milwaukee River near Newburg, WI showing the location of the dam.

2. Sediment Quality Summary

In 2011, a sediment sampling plan was developed by Ozaukee County and WDNR to provide screening level information regarding sediment quality within the impoundment. In accordance with the sampling plan, on November 29, 2011, AECOM staff collected sediment cores at three locations within the anticipated channel through the impoundment – approximately 40 ft upstream from the dam, approximately 80 ft upstream of the dam, and approximately 120 ft upstream of the dam. Each core extended to the depth of refusal and was divided into subsamples at 12 inch intervals. The three samples were composited according to depth interval such that the sample collected from 0 – 12 inches from each location was composited, and the sample collected between 12 and 24 inches was composited. Because insufficient sample was available at depths greater than 24 inches, only these two composited samples were analyzed. Each of the samples was analyzed by Northern Lake Service, Inc., for the following parameters:

- Arsenic
- Cadmium
- Chromium

- Copper
- Lead
- Mercury
- Nickel
- Zinc
- PCBs
- PAHs
- Solids
- Sediment size
- Total organic carbon

Results of the preliminary sediment sampling are attached in Appendix A and summarized in Table 1 with threshold concentrations identified by WDNR (2003). The thresholds shown are the Threshold Effect Concentration (TEC) which is the concentration below which effects on aquatic life rarely occur, the Probable Effect Concentration, which is the concentration above which effects on aquatic life are likely to occur, and the Midpoint Effect Concentration (MEC) which is the midpoint between the TEC and the PEC. The availability of organic contaminants to aquatic organisms decreases with increasing organic carbon content of the sediment. Therefore, before comparing the organic contaminants (PAHs and PCBs in this study), the sampling results were normalized to 1% total organic carbon (TOC) in accordance with the Consensus Based Sediment Quality Guidelines: Recommendations for Use & Application (WDNR, 2003).

The sediments were reported to consist primarily of sand (>98%), with minor quantities of silt (1 – 1.5%) and clay (<1%). Of the PAHs tested, benzo(a)anthracene, benzo(b)anthracene, chrysene, fluoranthene, and pyrene were present at detectable levels, but when normalized to 1% TOC content, all PAHs were below the TEC in the sample collected at depths between 12 and 24 inches. In the sample collected at depths from 0 to 12 inches, the TEC was exceeded for benzo(a)anthracene, chrysene, and pyrene but the concentrations were well below the MEC and PEC. When the upper and lower sample concentrations were averaged, only the concentration of pyrene exceeded the TEC. There are no reported threshold values for the specific PCBs for which the samples were analyzed, but thresholds are available for total PCBs. When normalized to 1% TOC, both samples were below the TEC threshold for total PCBs. Based on this analysis, we do not expect organic contaminants to be a limiting factor for aquatic life if these sediments remain in the river.

Table 1 – Newburg Impoundment Sediment Screening Results. Values that exceed the TEC are bold and shaded light grey and those that exceed the PEC are shaded darker grey.

Analyte	D0		D12		avg	TEC	MEC	PEC
	Raw	Normalized to 1% TOC	Raw	Normalized to 1% TOC				
Selected Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg dry weight)								
Acenaphthene	0.0	0.0	0.0	0.0	0.0	6.7	48	89
Acenaphthylene	0.0	0.0	0.0	0.0	0.0	5.9	67	128
Anthracene	0.0	0.0	0.0	0.0	0.0	57.2	451	845
Benzo[a]anthracene	610.0	**174.3**	0.0	0.0	87.1	108	579	1050
Benzo[a]pyrene	0.0	0.0	0.0	0.0	0.0	150	800	1450
Benzo[b]fluoranthene	590.0	168.6	0.0	0.0	84.3	240	6820	13400
Benzo[g,h,i]Perylene	0.0	0.0	0.0	0.0	0.0	170	1685	3200
Benzo[k]fluoranthene	0.0	0.0	0.0	0.0	0.0	240	6820	13400
Chrysene	740.0	**211.4**	540.0	120.0	165.7	166	728	1290
Dibenz[a,h]anthracene	0.0	0.0	0.0	0.0	0.0	33	84	135
Fluoranthene	920.0	262.9	790.0	175.6	219.2	423	1327	2230
Fluorene	0.0	0.0	0.0	0.0	0.0	77.4	307	536
Indeno[1,2,3-cd]pyrene	0.0	0.0	0.0	0.0	0.0	200	1700	3200
Methyl-1-Naphthalene	0.0	0.0	0.0	0.0	0.0			
Methyl-2-Naphthalene	0.0	0.0	0.0	0.0	0.0	20.2	111	201
Naphthalene	0.0	0.0	0.0	0.0	0.0	176	369	561
Phenanthrene	0.0	0.0	0.0	0.0	0.0	204	687	1170
Pyrene	900.0	**257.1**	760.0	168.9	**213.0**	195	858	1520
PCBs (µg/kg dry weight)								
PCB-1016	0.0		0.0		0.0	-	-	-
PCB-1221	0.0		0.0		0.0	-	-	-
PCB-1232	0.0		0.0		0.0	-	-	-
PCB-1242	0.0		0.0		0.0	-	-	-
PCB-1248	0.0		0.0		0.0	-	-	-
PCB-1254	28		80		12.9	-	-	-
PCB-1260	15		64		9.3	-	-	-
Total PCBs	43.0	12.3	140.0	31.1	21.7	60.0	368.0	676.0
Selected Metals (mg/kg dry weight)								
Arsenic	2.6		2.6		2.6	9.8	21.4	33
Cadmium	**13.0**		**20.0**		**16.5**	0.99	3.0	5.0
Chromium	**47.0**		**72.0**		**59.5**	43	76.5	110
Copper	27.0		**40.0**		**33.5**	32	91	150
Lead	**69.0**		**85.0**		**77.0**	36	83	130
Mercury	**0.31**		**0.38**		**0.3**	0.18	0.64	1.1
Nickel	13.00		17.00		15.0	23	36	49
Zinc	**180.0**		**280.0**		**230.0**	120.0	290.0	460.0
Grain Size and Carbon Analysis (%)								
% Sand	98.65		98.12			-	-	-
% Silt	0.98		1.51			-	-	-
% Clay	0.37		0.37			-	-	-
Total Organic Carbon	3.5		4.5			-	-	-

The toxicity of metals is not dependent on organic carbon content, so they are not normalized prior to comparison to thresholds. The PEC concentration was exceeded in both samples for cadmium. Additionally, the TEC was exceeded in both samples for chromium, lead, mercury, and zinc, and the TEC was exceeded in the deeper sample (12-24 inch) for copper. For each of the metals, the concentration was higher in the deeper sample, while for each of the PAHs, the concentration was higher in the sample nearest the surface. This suggests that the metals entered the impoundment at higher concentrations at some point in the past, and concentrations entering more recently are lower. Organics continued to enter the impoundment at comparable or slightly higher concentrations more recently.

Because the concentration of cadmium was considerably higher than the probable effects concentration for both samples, WDNR requested that additional sampling be conducted to better characterize the spatial distribution of cadmium upstream and downstream of the impoundment as well as within the impoundment. Within the impoundment, the sampling was targeted to the anticipated active channel where sediment is most likely to be mobile and where aquatic organisms will come into contact with it. On February 28 – 29, AECOM collected 10 additional samples at locations approved by WDNR – six within the impoundment along the approximate centerline of the anticipated channel, two upstream, and two downstream (Figure 2). At each site, a core was collected to the depth of refusal and composited for the entire depth consistent with WDNR's instruction. Each sample was analyzed for cadmium and particle size. Results are summarized in Table 2 and attached in Appendix A.

Figure 2: Sediment sampling locations.

The impoundment sample nearest the dam (B3) exceeded the PEC for cadmium. The sample just downstream of the bend in the impoundment (B6) exceeded the MEC, while two of the remaining impoundment samples (B4 and B7) and one of the downstream samples (B9) exceeded the TEC.

Table 2 – Newburg Sediment Sampling Results. Values that exceed the TEC are bold and shaded light grey and those that exceed the PEC are shaded darker grey.

Analyte	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	TEC	MEC	PEC
	Impoundment						Downstream		Upstream				
Cadmium (mg/kg dry weight)	**10**	**1.3**	0.41	**4.8**	**1.2**	0.29	**1.9**	0.37[a]	0.43	0.13	0.99	3.0	5.0
Grain Size (%)													
% Sand	98.77	99.56	99.60	99.31	99.23	99.66	99.54	99.60	99.61	99.73	-	-	-
% Silt	0.95	0.16	0.12	0.28	0.70	0.27	0.00	0.00	0.12	0.00	-	-	-
% Clay	0.28	0.28	0.28	0.42	0.08	0.07	0.46	0.40	0.27	0.27	-	-	-

[a] Reported value is below the Limit of Quantitation.

Because cadmium is higher than the PEC at the location closest to the dam, WDNR staff indicated that removal of this material from the anticipated active channel and reuse on site would be required prior to dam removal. To characterize the potential for cadmium to leach out of the sediments in their reuse location, a Synthetic Precipitation Leaching Procedure (SPLP) analysis was conducted on the sample that was collected closest to the dam. The result of this analysis was a leachate cadmium concentration of 0.18 µg/L, which is above the limit of detection for the test, but below the limit of certain quantitation (sees results in Appendix A). This is below the EPA primary drinking water standard of 5 µg/L, and below the chronic and acute water quality criteria for freshwater, which are 0.25 µg/L and 2 µg/L, respectively (ATSDR, 2008). Therefore, we do not anticipate that sediment removed from near the dam and reused within the project area will leach cadmium at concentrations that will cause problems.

Potential Contaminant Source

Cadmium concentrations in soils not contaminated by human sources typically range from 0.06 to 1.1 mg/kg (ATSDR, 2008). Given that the concentration of cadmium nearest the dam is considerably higher, it is likely the result of industrial activity in the watershed. There is no history of potential cadmium sources immediately upstream of the dam in Newburg, so contaminants located in the impoundment likely originated further upstream.

Project partners investigated potential sources upstream and discovered that the former West Bend Plating Site, located on the Milwaukee River in West Bend, was investigated under the

Brownfields Environmental Assessment Program in 1997. The site had been used for various industrial activities over the previous century, including zinc and tin plating; manufacture of brake shoes, hub caps, and radiator caps; manufacture of cattle stantions; manufacture of kitchen utensils; leather tanning; ice storage; knitting mill; manufacture of clam shell buttons; and lumber milling. WDNR identified an outfall that likely discharged from the building's foundation drain directly to the Milwaukee River.

Among other contaminants found at this site, cadmium concentrations as high as 339 mg/kg were found in the surface soils. Since the Woolen Mills Dam was removed in 1988, the Newburg Dam has been the first impoundment downstream of the West Bend Plating Site, and therefore a likely sediment trap for material coming from there. The former plating facility site has been remediated, is now a public park, and is not expected to continue to contribute significant quantities of contaminants to the river.

3. Sediment Quantity Assessment

In 2011, Ozaukee County staff collected impoundment sediment data, including depth to hard surface, depth to accumulated sediment surface, and accumulated sediment type. They used this information to generate maps of sediment thickness and type, which are attached as Appendix B. The data collection extended to the upper end of the widened portion of the impoundment (station 27+00). Based on this data, we calculated the total volume of sediment impounded by the dam in the surveyed area to be 60,500 cubic yards. Upstream of station 27+00, the channel narrows and contains smaller depths of accumulated sediment. This channel area was not included in the County's data collection effort, but during Inter-Fluve's survey of the reach for hydraulic modeling, staff observed sand deposition up to approximately station 47+00. If the sand depth decreases linearly through this reach from 0.5 ft at station 27+00 to no sand at station 47+00, the volume of accumulated material in this reach is approximately 2400 cubic yards. Therefore, the total estimated volume of material impounded is 62,900 cubic yards. However, most of this material is expected to remain in place as floodplain and be stabilized by vegetation after the impoundment is drawn down.

To determine the quantity of material expected to be mobile, dimensions of the post-restoration channel were approximated. The depth of refusal surface developed by the County based on their field explorations did not include a single deeper channel through the impoundment at the hard surface and no data was available regarding the material encountered at the depth of refusal. Without these indicators, the anticipated channel was approximated based on upstream analogs and hydraulic conditions anticipated in the channel, as predicted using a HEC-RAS model. The approximated channel is 110 feet wide at the base, and follows the existing flow path through the impoundment, which is sandier material and therefore more likely to move than the more cohesive

material that has built up outside the existing flow path. This alignment is shown in the plan set attached as Appendix C. The quantity of impoundment sediment within this anticipated channel up to station 27+00 is 13,800 cubic yards. All of the material impounded in the narrow stretch of channel upstream of station 27+00 is expected to move. Therefore, the total volume of material expected to be mobile following dam removal is 16,200 cubic yards.

In 2011, Ozaukee County conducted a study of substrate in three reaches of the Milwaukee River (Ozaukee County Planning and Parks, 2011). They found that the surface substrate in two reaches below the Newburg Dam contained significantly lower quantities of small grained particles, including silt, sand, and gravel, than was observed upstream of the reach impounded by the dam. They concluded that the downstream reach was starved of smaller bedload materials and recommended that accumulated sediment upstream of the Newburg Dam be released to enrich the downstream reaches.

WDNR agreed that clean sediments upstream of the dam may be released to supply material to the river reaches downstream but requested that the impounded material represented by the sample collected nearest the dam be removed and/or stabilized in place due to the cadmium concentration present in that sample. The midpoint between the locations of the sample collected nearest the dam and the next sample upstream is station 15+43. The total volume of accumulated sediment in the active channel upstream of the dam to station 15+43 is 2310 cubic yards. These sediment volumes are summarized in Table 3.

Table 3 – Sediment Volumes

	Volume, cy
Total accumulated sediment impounded	62,900
Accumulated sediment expected to be mobile	16,200
Sediment proposed for active removal (between the dam and station 15+43)	2,310

4. Sediment Management Plan

The proposed sediment management strategy for the Newburg Dam removal incorporates multiple strategies designed to minimize the migration of accumulated sediment with high cadmium concentrations to downstream waters, while allowing cleaner accumulated sediments to move downstream and enrich the sediment starved river reach below the dam. The following measures are proposed:

a. *Plan construction for low flow period.* Construction of the dam removal project will be planned to begin during a period of predicted low flow. Advanced planning will be emphasized to ensure

that the construction window will be as short as possible, minimizing the duration of exposed soils.

b. *Draw down the impoundment slowly.* WDNR staff indicated that a slow drawdown of the impoundment will be required to minimize migration of material nearest the dam. The drawdown will be achieved by removing gates on the existing culverts through the dam one at a time to ensure a slow drawdown. The upstream invert of the culverts was reported in the historical inspection file to be 836.2 when constructed in 1913. The downstream invert of the culverts was surveyed in 2012 and found to be at an elevation of 835.8. Comparing this elevation to the profile on sheet 5 and the cross sections on sheet 4 of the plan set (Appendix C), it is clear that most of the sediment near the gates is below this elevation.

c. *Excavate impounded sediment.* After drawing down the impoundment and allowing bank sediments to dry enough to drive equipment on them, accumulated sediment in the active channel immediately upstream of the dam to station 15+43 (approximately 180 ft upstream of the dam) will be mechanically excavated. This material will be placed in the sediment reuse location shown in the plan set and covered with a minimum of 6 inches of clean material.

d. *Stabilize the banks and floodplain near the dam.* WDNR staff requested that the sediment outside the active channel but within the impoundment nearest the dam be stabilized quickly due to potential presence of high cadmium concentrations. We propose constructing banks in this area with a stone toe and fabric encapsulated soil (FES) lifts as shown in the plan set, to maximize the immediate stability of this material following dam removal. The stone toe will extend below the depth of scour to protect the channel banks from erosion and establish a solid base on which to build the proposed fabric encapsulated soil lifts. Above the stone toe, FES lifts are proposed. In constructing FES lifts, impoundment sediments are excavated, and the bottom layer of soil is installed and stabilized, followed by additional layers up to the proposed floodplain elevation. The soils are compacted to ensure structural soundness, and topsoil (and seed) is placed on what will be the outer exposed faces. The lifts are constructed using an outer woven coconut fiber (coir) net that provides the structural support and inner woven coir that prevents piping loss of soils. The fabrics last about 1-3 years depending on frequency of inundation and drying. By the time the fabrics are degraded, vegetation is well established and roots hold the soil in place. At the top of the lifts, erosion control fabric is proposed to extend to the existing edge of the impoundment to further minimize the movement of the soil closest to the dam.

e. *Leave grade control riffle downstream of the dam in place.* Downstream of the dam, debris from previous structures and stone placed under the bridge creates a grade control riffle that will minimize risk of a head cut progressing up the river. Due in part to the presence of a gas line at an unknown

elevation under this riffle, most of this material is proposed to be left in place. Additionally, backwatering effects of the bridge at high flows limit the hydraulic gradient and shear stresses that will be imposed on banks in the former impoundment.

f. *Stabilize exposed floodplain and upland soils.* All exposed floodplain areas and disturbed areas will be seeded with native upland vegetation. Portions of the floodplain are expected to be inundated approximately once every 1-2 years. This inundation frequency will allow for the establishment of graminoids, forbs, shrubs, and trees tolerant of periodic flooding. Immediate post-construction stabilization of the final exposed floodplain surface will include seeding and mulch. Erosion control fabric will be applied to exposed floodplain areas in the lower 180 ft of the impoundment as indicated on the plan set and described above. In the lower impoundment areas, the targeted vegetation community will be dominated by grasses, forbs and shrubs, with only a few trees along the banks, compatible with landowner requests and low shear stresses expected on these banks. Further upstream, the target community will be floodplain forest.

By following the steps outlined above and implementing standard best management practices to minimize sediments leaving the site through construction site stormwater runoff, sediment will be managed to meet the project objectives.

5. References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Draft Toxicological Profile for Cadmium. US Department of Health and Human Services. Atlanta, Georgia.

Ozaukee County Planning and Parks Department. 2011. Newburg Dam Removal Substrate Composition Analysis and Potential Sediment Transport Evaluation.

Wisconsin Department of Natural Resources (WDNR). 2003. Consensus-Based Sediment Quality Guidelines: Recommendations for Use & Application. DNR Publication #WT-732 2003.

Appendix A – Sediment Analysis Results

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Ph: (715)-478-2777 Fax: (715)-478-3060

ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034
Printed: 01/06/12 Code: WNNN-S

Client: AECOM (Sheb)
Attn: B.J. Le Roy
4135 Technology Parkway (53083-6049)
P O Box 1067
Sheboygan, WI 53082 1067

Project revised on: 01/06/2012 ** See note below ** NLS Project: 171674
NLS Customer: 86867
Fax: 920 458 0550 Phone: 920 458 8711

Project: Ozaukee County - Milwaukee River

SC-A4-D0-11 NLS ID: 643394
COC: W-11014:0 Matrix: SO
Collected: 11/29/11 12:30 Received: 11/30/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Arsenic, tot. recoverable as As by ICP	2.6	mg/Kg DWB	5	0.54	1.9	12/07/11	SW846 6010	721026460
Cadmium, tot. recoverable as Cd by ICP	13	mg/Kg DWB	5	0.019	0.070	12/05/11	SW846 6010	721026460
Chromium, tot. recoverable as Cr by ICP	47	mg/Kg DWB	5	0.11	0.32	12/05/11	SW846 6010	721026460
Copper, tot. recoverable as Cu by ICP	27	mg/Kg DWB	5	0.12	0.36	12/05/11	SW846 6010	721026460
Lead, tot. recoverable as Pb by ICP	69	mg/Kg DWB	5	0.22	0.79	12/05/11	SW846 6010	721026460
Mercury, total as Hg on solids	0.31	mg/Kg DWB	1	0.023	0.068	12/09/11	SW846 7470A	721026460
Nickel, tot. recoverable as Ni by ICP	13	mg/Kg DWB	5	0.15	0.49	12/05/11	SW846 6010	721026460
Solids, total on solids	44.6	%	1	0.10*		12/01/11	SM 2540-G 20ed	721026460
Total Organic Carbon - Walkley Black Method	35000	mg/Kg DWB	1	300	1300	12/06/11	Walkley Black	999407970
Zinc, tot. recoverable as Zn by ICP	180	mg/Kg DWB	5	0.79	1.6	12/05/11	SW846 6010	721026460
Metals digestion - tot. recov (solid) ICP	yes					12/02/11	SW846 3050M	721026460
Sieve test	36.3	% > 75um	1			12/13/11	ASTM D422-63	721026460
Hydrometer	see attached					12/13/11	ASTM D422-63	721026460
PCBs (solid) by SW846 8082	see attached					12/14/11	SW846 8082	721026460
Organics Extraction (Soil) for PAHs	yes					12/12/11	SW846 3550	721026460
Organics Extraction (Soil) for Organochlorine Pesticides/PCBs	yes					12/12/11	SW846 3546M	721026460
PAH (soil) by EPA Method 8270C	see attached					12/21/11	SW846 8270C	721026460

SC-A4-D12-11 NLS ID: 643395
COC: W-11014:0 Matrix: SO
Collected: 11/29/11 12:40 Received: 11/30/11

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Arsenic, tot. recoverable as As by ICP	[2.6]	mg/Kg DWB	5	0.96	3.4	12/07/11	SW846 6010	721026460
Cadmium, tot. recoverable as Cd by ICP	20	mg/Kg DWB	5	0.034	0.12	12/05/11	SW846 6010	721026460
Chromium, tot. recoverable as Cr by ICP	72	mg/Kg DWB	5	0.19	0.57	12/05/11	SW846 6010	721026460
Copper, tot. recoverable as Cu by ICP	40	mg/Kg DWB	5	0.21	0.65	12/05/11	SW846 6010	721026460
Lead, tot. recoverable as Pb by ICP	85	mg/Kg DWB	5	0.40	1.4	12/05/11	SW846 6010	721026460
Mercury, total as Hg on solids	0.38	mg/Kg DWB	1	0.022	0.064	12/09/11	SW846 7470A	721026460
Nickel, tot. recoverable as Ni by ICP	17	mg/Kg DWB	5	0.27	0.88	12/05/11	SW846 6010	721026460
Solids, total on solids	44.0	%	1	0.10*		12/01/11	SM 2540-G 20ed	721026460
Total Organic Carbon - Walkley Black Method	45000	mg/Kg DWB	1	300	1300	12/06/11	Walkley Black	999407970
Zinc, tot. recoverable as Zn by ICP	280	mg/Kg DWB	5	1.4	2.8	12/05/11	SW846 6010	721026460
Metals digestion - tot. recov (solid) ICP	yes					12/02/11	SW846 3050M	721026460
Sieve test	17.0	% > 75um	1			12/14/11	ASTM D422-63	721026460
Hydrometer	see attached					12/14/11	ASTM D422-63	721026460
PCBs (solid) by SW846 8082	see attached					12/14/11	SW846 8082	721026460
Organics Extraction (Soil) for PAHs	yes					12/12/11	SW846 3550	721026460
Organics Extraction (Soil) for Organochlorine Pesticides/PCBs	yes					12/12/11	SW846 3546M	721026460
PAH (soil) by EPA Method 8270C	see attached					12/21/11	SW846 8270C	721026460

NORTHERN LAKE SERVICE, INC.
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400 North Lake Avenue - Crandon, WI 54520
Ph: (715)-478-2777 Fax: (715)-478-3060

ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034
Printed: 01/06/12 Code: WNNN-S

Client: AECOM (Sheb)
Attn: B.J. Le Roy
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P O Box 1067
Sheboygan, WI 53082 1067

Project revised on: 01/06/2012 ** See note below ** NLS Project: 171674
NLS Customer: 86867
Fax: 920 458 0550 Phone: 920 458 8711

Project: Ozaukee County - Milwaukee River

Values in brackets represent results greater than or equal to the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than or equal to the LOQ are considered to be in the region of "Certain Quantitation". LOD and/or LOQ tagged with an asterisk(*) are considered Reporting Limits. All LOD/LOQs adjusted to reflect dilution.

LOD = Limit of Detection LOQ = Limit of Quantitation ND = Not Detected (< LOD) 1000 ug/L = 1 mg/L
DWB = Dry Weight Basis NA = Not Applicable %DWB = (mg/kg DWB) / 10000
MCL = Maximum Contaminant Levels for Drinking Water Samples. Shaded results indicate >MCL.

Reviewed by:

Authorized by:
R. T. Krueger
President

Revision note: ADDED BENZO-E-PYRENE TO REPORT

ANALYTICAL RESULTS: Hydrometer
Customer: AECOM (Sheb) **NLS Project: 171674**
Project Description: Ozaukee County - Milwaukee River
Project Title: **Template: HYDROMETER** **Printed: 01/06/2012 15:21**

Sample: 643394 SC-A4-D0-11 Collected: 11/29/11 Analyzed: 12/13/11 -

ANALYTE NAME	RESULT	UNITS	WWB	DIL	LOD	LOQ	Note
Percent Clay	0.37	%		1			
Percent Sand	98.65	%		1			
Percent Silt	0.98	%		1			

Sample: 643395 SC-A4-D12-11 Collected: 11/29/11 Analyzed: 12/14/11 -

ANALYTE NAME	RESULT	UNITS	WWB	DIL	LOD	LOQ	Note
Percent Clay	0.37	%		1			
Percent Sand	98.12	%		1			
Percent Silt	1.51	%		1			

ANALYTICAL RESULTS: PCBs by Method EPA 8082
Customer: AECOM (Sheb) **NLS Project: 171674**
Project Description: Ozaukee County - Milwaukee River
Project Title: **Template: PCBS Printed: 01/06/2012 15:21**

Sample: 643394 SC-A4-D0-11 Collected: 11/29/11 Analyzed: 12/14/11 - 44.6%Solids

ANALYTE NAME	RESULT	UNITS DWB	DIL	LOD	LOQ	Note
PCB-1016	ND	ug/Kg	1	6.4	22	
PCB-1221	ND	ug/Kg	1	9.0	30	
PCB-1232	ND	ug/Kg	1	6.8	23	
PCB-1242	ND	ug/Kg	1	5.8	19	
PCB-1248	ND	ug/Kg	1	8.5	28	
PCB-1254	28	ug/Kg	1	6.2	21	
PCB-1260	[15]	ug/Kg	1	6.4	21	
Total PCBs	43	ug/Kg	1	6.4	22	
TCMX (SURR)	58%					S

NOTES APPLICABLE TO THIS ANALYSIS:
S = This compound is a surrogate used to evaluate the quality control of a method.
CL = The extract was subjected to florisil and sulfur cleanup before analysis.

Sample: 643395 SC-A4-D12-11 Collected: 11/29/11 Analyzed: 12/14/11 - 44%Solids

ANALYTE NAME	RESULT	UNITS DWB	DIL	LOD	LOQ	Note
PCB-1016	ND	ug/Kg	1	6.4	22	
PCB-1221	ND	ug/Kg	1	9.0	30	
PCB-1232	ND	ug/Kg	1	6.8	23	
PCB-1242	ND	ug/Kg	1	5.8	19	
PCB-1248	ND	ug/Kg	1	8.5	28	
PCB-1254	80	ug/Kg	1	6.2	21	
PCB-1260	64	ug/Kg	1	6.4	21	
Total PCBs	140	ug/Kg	1	6.4	22	
TCMX (SURR)	54%					S

NOTES APPLICABLE TO THIS ANALYSIS:
S = This compound is a surrogate used to evaluate the quality control of a method.
CL = The extract was subjected to florisil and sulfur cleanup before analysis.

ANALYTICAL RESULTS: Polynuclear Aromatic Hydrocarbons by EPA 8270C - Soils
Customer: AECOM (Sheb) **NLS Project: 171674**
Project Description: Ozaukee County - Milwaukee River
Project Title: **Template: 8270PAHS** **Printed: 01/06/2012 15:21**

Sample: 643394 SC-A4-D0-11 Collected: 11/29/11 Analyzed: 12/21/11 - 44.6%Solids

ANALYTE NAME	RESULT	UNITS DWB	DIL	LOD	LOQ	Note
Acenaphthene	ND	ug/Kg	5	210	690	
Acenaphthylene	ND	ug/Kg	5	210	690	
Anthracene	ND	ug/Kg	5	190	620	
Benzo (a) anthracene	[610]	ug/Kg	5	230	750	
Benzo (a) pyrene	ND	ug/Kg	5	200	670	
Benzo (e) pyrene	ND	ug/Kg	5	200	680	
Benzo (b) fluoranthene	[590]	ug/Kg	5	200	670	MS
Benzo (g,h,i) perylene	ND	ug/Kg	5	180	600	
Benzo (k) fluoranthene	ND	ug/Kg	5	220	740	
Chrysene	740	ug/Kg	5	210	690	
Dibenzo (a,h) anthracene	ND	ug/Kg	5	170	570	
Fluoranthene	920	ug/Kg	5	210	710	
Fluorene	ND	ug/Kg	5	210	710	
Indeno (1,2,3-cd) pyrene	ND	ug/Kg	5	180	600	
Methyl-1-Naphthalene	ND	ug/Kg	5	220	720	
Methyl-2-Naphthalene	ND	ug/Kg	5	230	760	
Naphthalene	ND	ug/Kg	5	220	720	
Phenanthrene	ND	ug/Kg	5	210	700	
Pyrene	900	ug/Kg	5	190	650	
Nitrobenzene-d5 (SURR)	73%					S
2-Fluorobiphenyl (SURR)	67%					S
Terphenyl-d14 (SURR)	70%					S

NOTES APPLICABLE TO THIS ANALYSIS:
S = This compound is a surrogate used to evaluate the quality control of a method.
FV = Final extract is 5 mL.
MS = Matrix spike recovery was outside QC limits.
Benzo (b) fluoranthene recovered below QC limits.

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Ph: (715)-478-2777 Fax: (715)-478-3060

ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034

NLS Project: 174809
NLS Customer: 86867

Client: AECOM (Sheb)
Attn: B.J. Le Roy
4135 Technology Parkway
Sheboygan, WI 53083

Fax: 920 458 0550 Phone: 920 458 8711

Project: Newburg Dam Removal

B-11 NLS ID: 652648
COC: NLS Copy:1 Matrix: MS
Collected: 02/29/12 13:30 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	0.43	mg/Kg DWB	25	0.050	0.18	03/06/12	SW846 6010	721026460
Solids, total on solids	76.3	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	68.3	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

B-12 NLS ID: 652649
COC: NLS Copy:2 Matrix: MS
Collected: 02/29/12 12:30 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	0.13	mg/Kg DWB	5	0.0096	0.035	03/06/12	SW846 6010	721026460
Solids, total on solids	79.2	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	78.8	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

B-3 NLS ID: 652650
COC: NLS Copy:3 Matrix: MS
Collected: 02/28/12 13:45 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	10	mg/Kg DWB	5	0.015	0.056	03/06/12	SW846 6010	721026460
Solids, total on solids	52.9	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	30.3	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

B-4 NLS ID: 652651
COC: NLS Copy:4 Matrix: MS
Collected: 02/28/12 12:50 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	1.3	mg/Kg DWB	5	0.0091	0.033	03/06/12	SW846 6010	721026460
Solids, total on solids	76.0	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	64.9	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

B-5 NLS ID: 652652
COC: NLS Copy:5 Matrix: MS
Collected: 02/28/12 11:20 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	0.41	mg/Kg DWB	25	0.052	0.19	03/06/12	SW846 6010	721026460
Solids, total on solids	76.4	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	66.2	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

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ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034

NLS Project: 174809
NLS Customer: 86867

Client: AECOM (Sheb)
Attn: B.J. Le Roy
4135 Technology Parkway
Sheboygan, WI 53083

Fax: 920 458 0550 Phone: 920 458 8711

Project: Newburg Dam Removal

B-11 NLS ID: 652648
COC: NLS Copy:1 Matrix: MS
Collected: 02/29/12 13:30 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	0.43	mg/Kg DWB	25	0.050	0.18	03/06/12	SW846 6010	721026460
Solids, total on solids	76.3	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	68.3	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

B-12 NLS ID: 652649
COC: NLS Copy:2 Matrix: MS
Collected: 02/29/12 12:30 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	0.13	mg/Kg DWB	5	0.0096	0.035	03/06/12	SW846 6010	721026460
Solids, total on solids	79.2	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	78.8	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

B-3 NLS ID: 652650
COC: NLS Copy:3 Matrix: MS
Collected: 02/28/12 13:45 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	10	mg/Kg DWB	5	0.015	0.056	03/06/12	SW846 6010	721026460
Solids, total on solids	52.9	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	30.3	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

B-4 NLS ID: 652651
COC: NLS Copy:4 Matrix: MS
Collected: 02/28/12 12:50 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	1.3	mg/Kg DWB	5	0.0091	0.033	03/06/12	SW846 6010	721026460
Solids, total on solids	76.0	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	64.9	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

B-5 NLS ID: 652652
COC: NLS Copy:5 Matrix: MS
Collected: 02/28/12 11:20 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	0.41	mg/Kg DWB	25	0.052	0.19	03/06/12	SW846 6010	721026460
Solids, total on solids	76.4	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	66.2	% > 75um	1			03/05/12	ASTM D422-63	721026460
Hydrometer	see attached					03/05/12	ASTM D422-63	721026460

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ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034

NLS Project: 174809
NLS Customer: 86867

Client: AECOM (Sheb)
Attn: B.J. Le Roy
4135 Technology Parkway
Sheboygan, WI 53083

Fax: 920 458 0550 Phone: 920 458 8711

Project: Newburg Dam Removal

B-6 NLS ID: 652653
COC: NLS Copy:6 Matrix: MS
Collected: 02/28/12 10:30 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	4.8	mg/Kg DWB	5	0.013	0.047	03/06/12	SW846 6010	721026460
Solids, total on solids	65.6	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	57.6	% > 75um	1			03/06/12	ASTM D422-63	721026460
Hydrometer	see attached					03/06/12	ASTM D422-63	721026460

B-7 NLS ID: 652654
COC: NLS Copy:7 Matrix: MS
Collected: 02/28/12 09:45 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	1.2	mg/Kg DWB	5	0.015	0.054	03/06/12	SW846 6010	721026460
Solids, total on solids	43.7	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	34.6	% > 75um	1			03/06/12	ASTM D422-63	721026460
Hydrometer	see attached					03/06/12	ASTM D422-63	721026460

B-8 NLS ID: 652655
COC: NLS Copy:8 Matrix: MS
Collected: 02/28/12 09:15 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	0.29	mg/Kg DWB	25	0.054	0.20	03/06/12	SW846 6010	721026460
Solids, total on solids	72.4	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	61.8	% > 75um	1			03/06/12	ASTM D422-63	721026460
Hydrometer	see attached					03/06/12	ASTM D422-63	721026460

B-9 NLS ID: 652656
COC: NLS Copy:9 Matrix: MS
Collected: 02/29/12 11:45 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	1.9	mg/Kg DWB	25	0.10	0.37	03/06/12	SW846 6010	721026460
Solids, total on solids	26.7	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	17.0	% > 75um	1			03/06/12	ASTM D422-63	721026460
Hydrometer	see attached					03/06/12	ASTM D422-63	721026460

B-10 NLS ID: 652657
COC: NLS Copy:10 Matrix: MS
Collected: 02/29/12 09:45 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable as Cd by ICP	[0.37]	mg/Kg DWB	50	0.11	0.40	03/06/12	SW846 6010	721026460
Solids, total on solids	57.7	%	1	0.10*		03/02/12	SM 2540-G 20ed	721026460
Metals digestion - tot. recov (solid) ICP	yes					03/05/12	SW846 3050M	721026460
Sieve test	60.0	% > 75um	1			03/06/12	ASTM D422-63	721026460
Hydrometer	see attached					03/06/12	ASTM D422-63	721026460

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Ph: (715)-478-2777 Fax: (715)-478-3060

ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034

NLS Project: 174809
NLS Customer: 86867

Fax: 920 458 0550 Phone: 920 458 8711

Client: AECOM (Sheb)
Attn: B.J. Le Roy
4135 Technology Parkway
Sheboygan, WI 53083

Project: Newburg Dam Removal

Values in brackets represent results greater than or equal to the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than or equal to the LOQ are considered to be in the region of "Certain Quantitation". LOD and/or LOQ tagged with an asterisk(*) are considered Reporting Limits. All LOD/LOQs adjusted to reflect dilution.

LOD = Limit of Detection LOQ = Limit of Quantitation ND = Not Detected (< LOD) 1000 ug/L = 1 mg/L
DWB = Dry Weight Basis NA = Not Applicable %DWB = (mg/kg DWB) / 10000
MCL = Maximum Contaminant Levels for Drinking Water Samples. Shaded results indicate >MCL.

Reviewed by:

Authorized by:
R. T. Krueger
President

ANALYTICAL RESULTS: Hydrometer

Customer: AECOM (Sheb) **NLS Project: 174809**

Project Description: Newburg Dam Removal

Project Title: **Template: HYDROMETER** **Printed: 03/07/2012 16:16**

Sample: 652648 B-11 Collected: 02/29/12 Analyzed: 03/05/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.27	%	1			
Percent Sand	99.61	%	1			
Percent Silt	0.12	%	1			

Sample: 652649 B-12 Collected: 02/29/12 Analyzed: 03/05/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.27	%	1			
Percent Sand	99.73	%	1			
Percent Silt	0.00	%	1			

Sample: 652650 B-3 Collected: 02/28/12 Analyzed: 03/05/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.28	%	1			
Percent Sand	98.77	%	1			
Percent Silt	0.95	%	1			

Sample: 652651 B-4 Collected: 02/28/12 Analyzed: 03/05/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.28	%	1			
Percent Sand	99.56	%	1			
Percent Silt	0.16	%	1			

Sample: 652652 B-5 Collected: 02/28/12 Analyzed: 03/05/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.28	%	1			
Percent Sand	99.60	%	1			
Percent Silt	0.12	%	1			

Sample: 652653 B-6 Collected: 02/28/12 Analyzed: 03/06/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.42	%	1			
Percent Sand	99.31	%	1			
Percent Silt	0.28	%	1			

ANALYTICAL RESULTS: Hydrometer
Customer: AECOM (Sheb) **NLS Project: 174809**
Project Description: Newburg Dam Removal
Project Title: **Template: HYDROMETER** **Printed: 03/07/2012 16:16**

Sample: 652654 B-7 Collected: 02/28/12 Analyzed: 03/06/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.08	%	1			
Percent Sand	99.23	%	1			
Percent Silt	0.70	%	1			

Sample: 652655 B-8 Collected: 02/28/12 Analyzed: 03/06/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.07	%	1			
Percent Sand	99.66	%	1			
Percent Silt	0.27	%	1			

Sample: 652656 B-9 Collected: 02/29/12 Analyzed: 03/06/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.46	%	1			
Percent Sand	99.54	%	1			
Percent Silt	0.00	%	1			

Sample: 652657 B-10 Collected: 02/29/12 Analyzed: 03/06/12 -

ANALYTE NAME	RESULT	UNITS WWB	DIL	LOD	LOQ	Note
Percent Clay	0.40	%	1			
Percent Sand	99.60	%	1			
Percent Silt	0.00	%	1			

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ANALYTICAL REPORT

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. WI00034

NLS Project: 175774
NLS Customer: 101396

Client: Ozaukee County Planning and Parks Department
Attn: Luke Roffler
121 W Main Street
Port Washington, WI 53074

Fax: 262 236 2012 Phone: 262 268 2047

Project: Newburg Dam Sediment

Prev #652650, B3 NLS ID: 655657
Matrix: MS
Collected: 02/28/12 13:45 Received: 03/02/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
SPLP Extraction	yes					03/22/12	SW846 1312	721026460

B3 SPLP Extract NLS ID: 655695
Matrix: EX
Collected: 03/23/12 04:00 Received: 03/23/12

Parameter	Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
Cadmium, tot. recoverable on extract as Cd by ICP	[0.18]	ug/L	1	0.12	0.44	03/27/12	SW846 6010	721026460
Metals digestion - tot. recov.ICP	yes					03/26/12	SW846 3005M	721026460

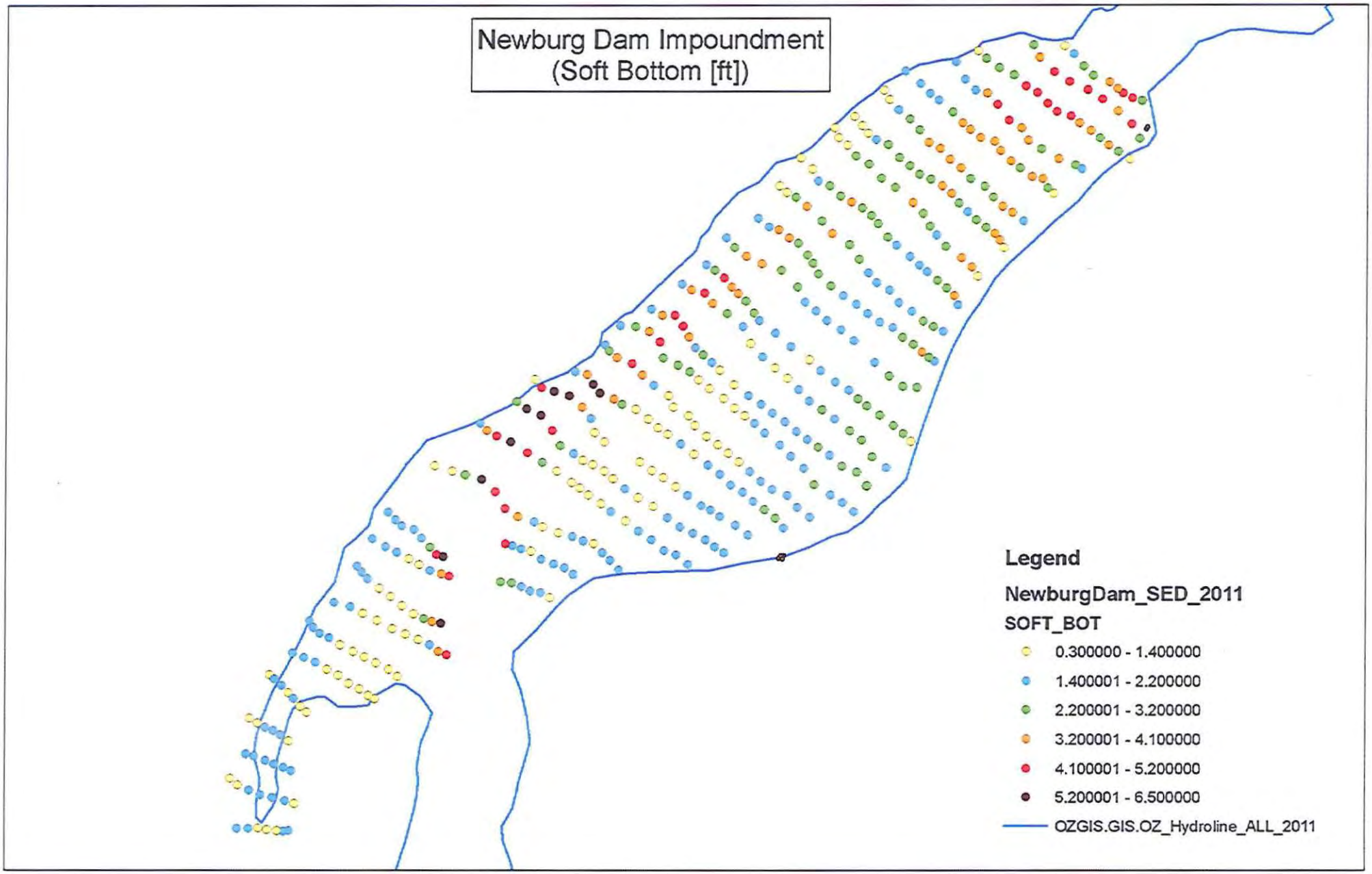
Values in brackets represent results greater than or equal to the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than or equal to the LOQ are considered to be in the region of "Certain Quantitation". LOD and/or LOQ tagged with an asterisk(*) are considered Reporting Limits. All LOD/LOQs adjusted to reflect dilution.

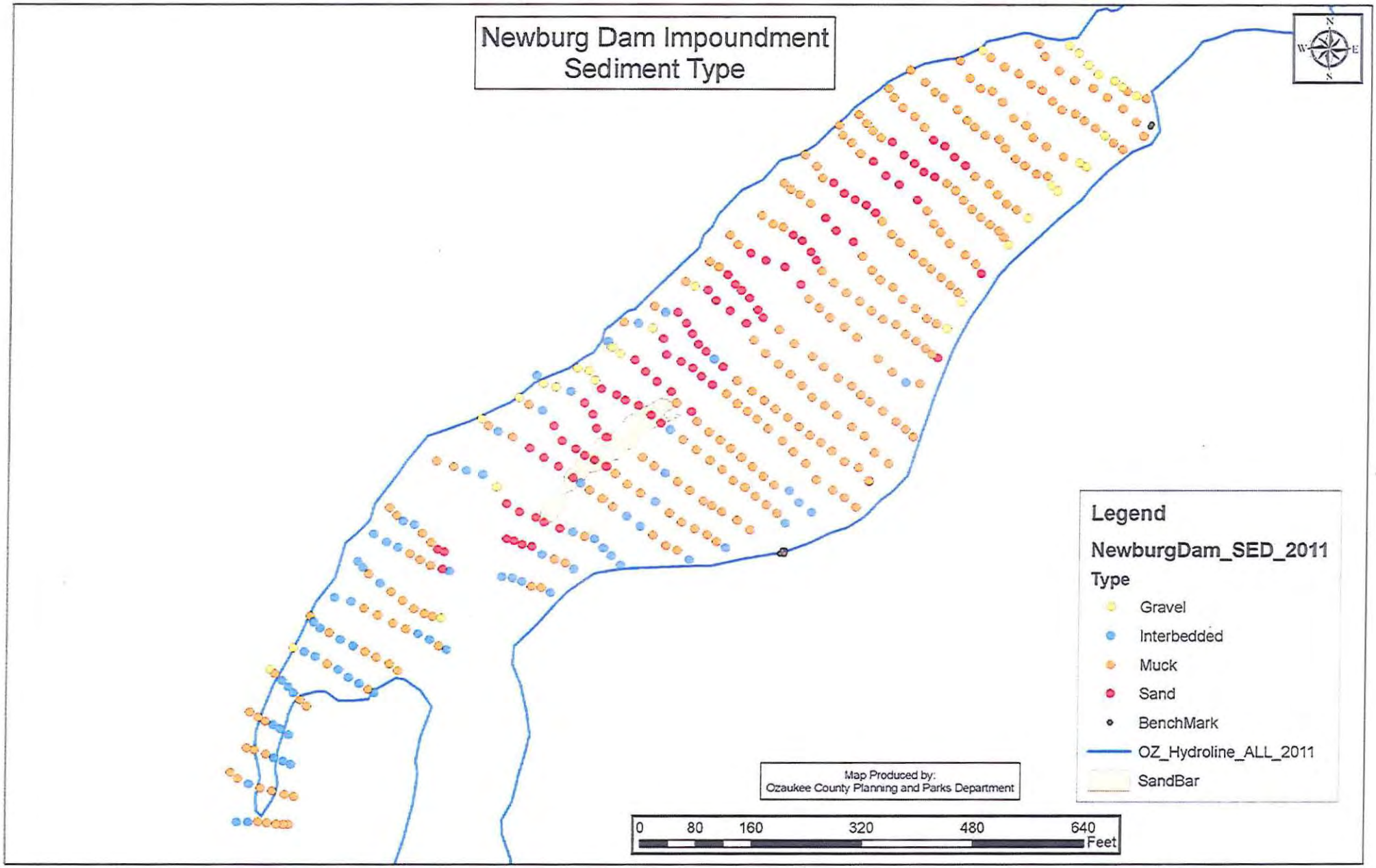
LOD = Limit of Detection LOQ = Limit of Quantitation ND = Not Detected (< LOD) 1000 ug/L = 1 mg/L
DWB = Dry Weight Basis NA = Not Applicable %DWB = (mg/kg DWB) / 10000
MCL = Maximum Contaminant Levels for Drinking Water Samples. Shaded results indicate >MCL.

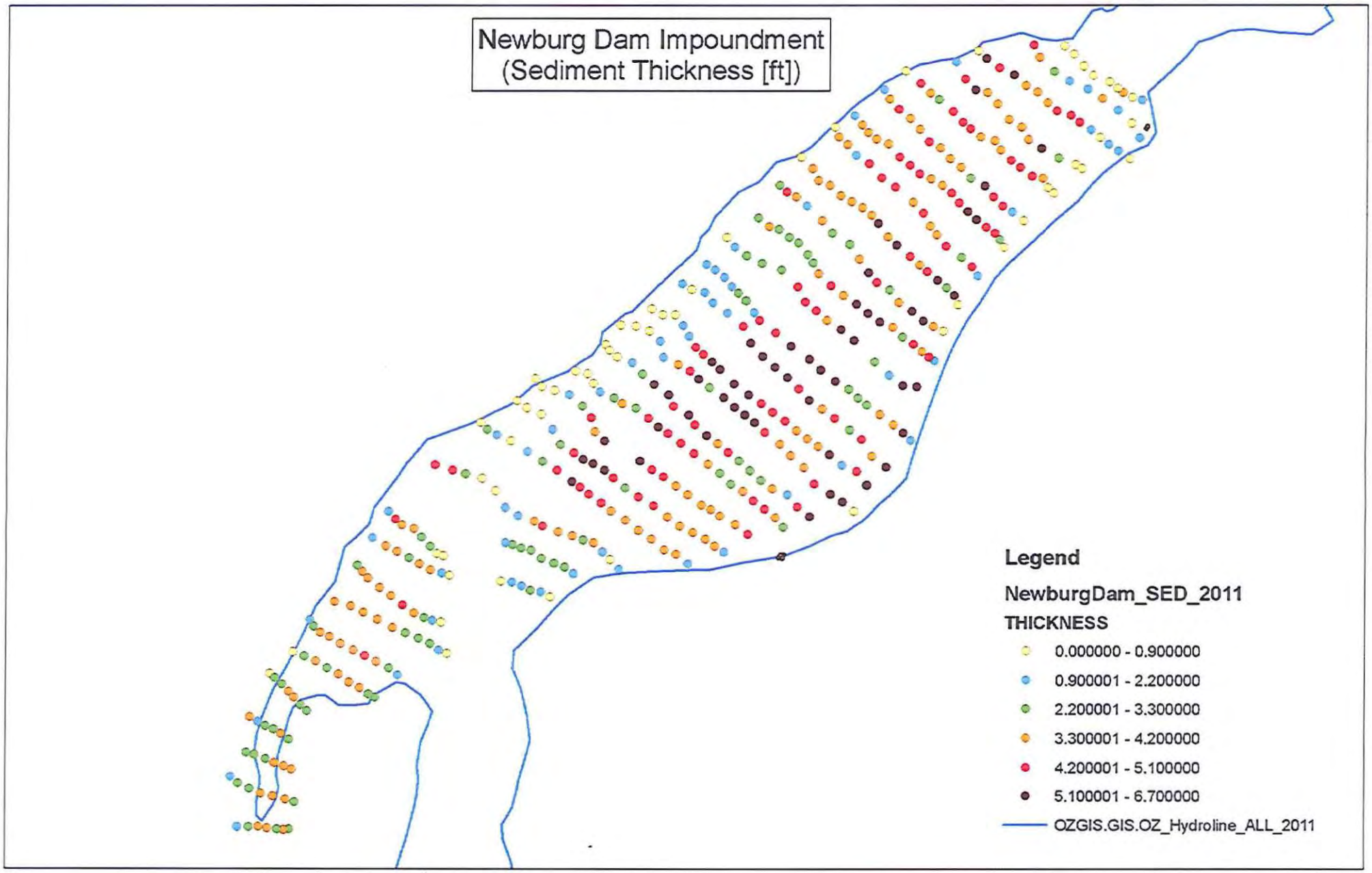
Reviewed by:

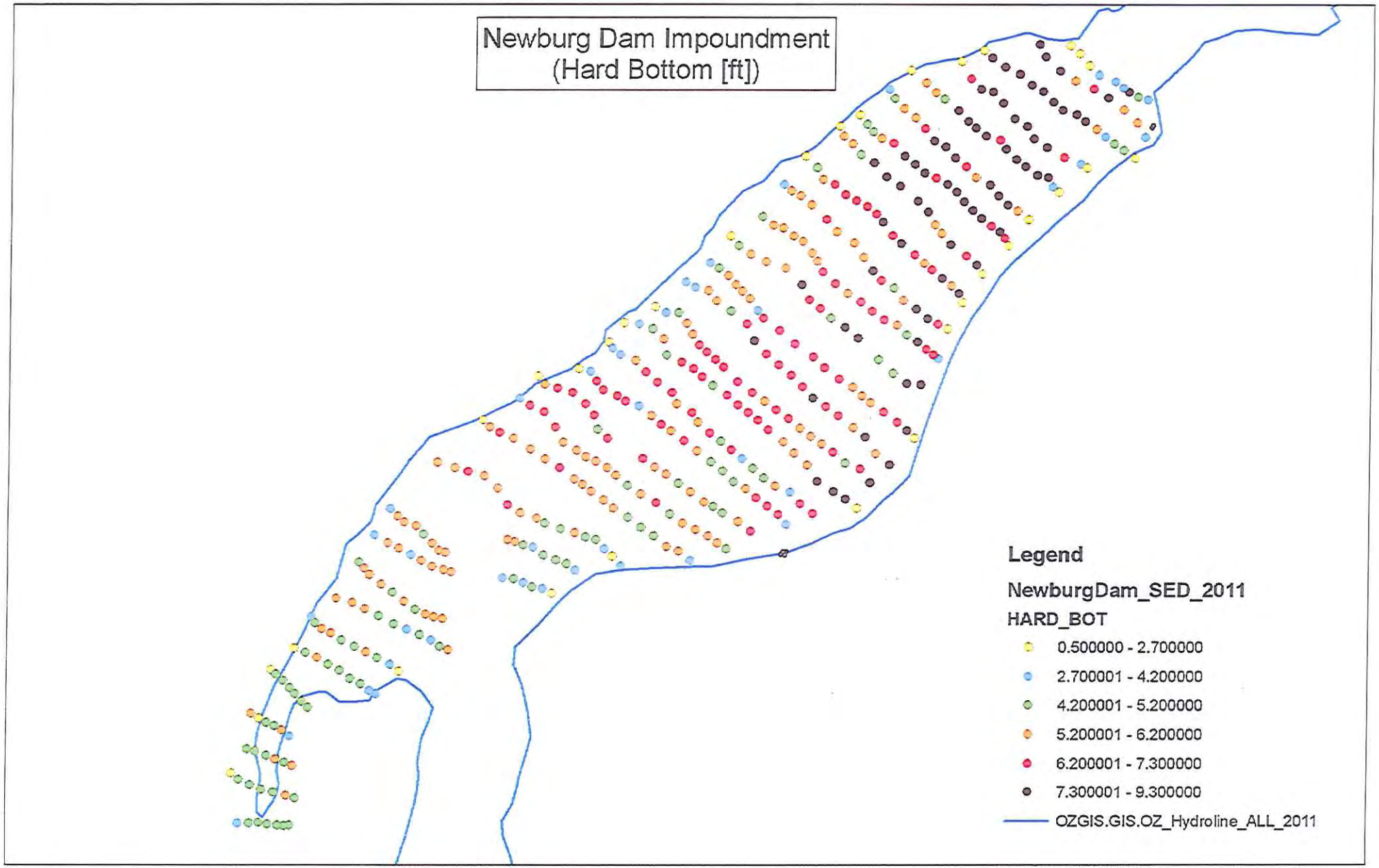
Authorized by:
R. T. Krueger
President

Appendix B – Ozaukee County Sediment Depth Exhibits


Newburg Dam Impoundment
(Soft Bottom [ft])
Legend
NewburgDam_SED_2011
SOFT_BOT
0.300000 - 1.400000
1.400001 - 2.200000
2.200001 - 3.200000
3.200001 - 4.100000
4.100001 - 5.200000
5.200001 - 6.500000
OZGIS.GIS.OZ_Hydroline_ALL_2011


Newburg Dam Impoundment
Sediment Type
N
W
E
S
Legend
NewburgDam_SED_2011
Type
Gravel
Interbedded
Muck
Sand
BenchMark
OZ_Hydroline_ALL_2011
SandBar
Map Produced by:
Ozaukee County Planning and Parks Department
0
80
160
320
480
640
Feet


Newburg Dam Impoundment
(Sediment Thickness [ft])
Legend
NewburgDam_SED_2011
THICKNESS
0.000000 - 0.900000
0.900001 - 2.200000
2.200001 - 3.300000
3.300001 - 4.200000
4.200001 - 5.100000
5.100001 - 6.700000
OZGIS.GIS.OZ_Hydroline_ALL_2011


Newburg Dam Impoundment
(Hard Bottom [ft])
Legend
NewburgDam_SED_2011
HARD_BOT
0.500000 - 2.700000
2.700001 - 4.200000
4.200001 - 5.200000
5.200001 - 6.200000
6.200001 - 7.300000
7.300001 - 9.300000
OZGIS.GIS.OZ_Hydroline_ALL_2011