

Hyle W. Dike

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

***U. W. - STEVENS POINT FOUNDATION, INC.
LAKE CONSTRUCTION
MARIA DRIVE AT MICHIGAN AVENUE***

STEVENS POINT, WISCONSIN

PREPARED BY

WARZYN ENGINEERING AND SERVICE COMPANY, INC.

CONSULTING ENGINEERS

MADISON, WISCONSIN

PREPARED FOR

UNIVERSITY OF WISCONSIN - STEVENS POINT FOUNDATION, INC.

DECEMBER, 1974

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

University of Wisconsin - Stevens Point Foundation, Inc.
Lake Construction
Maria Drive at Michigan Avenue
Stevens Point, Wisconsin

ENVIRONMENTAL IMPACT ASSESSMENT
Type II Action Worksheet

TITLE OF PROJECT

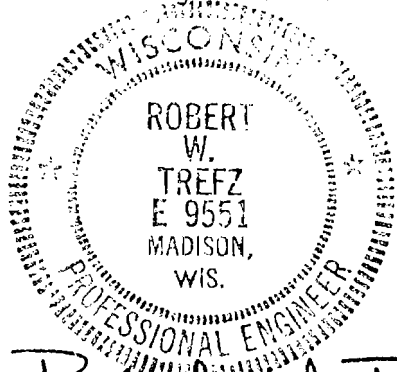
University of Wisconsin - Stevens Point Foundation, Inc.
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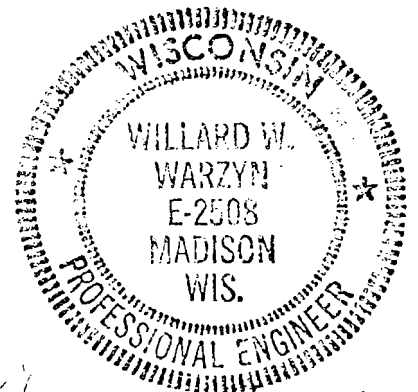
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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
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I DESCRIPTION OF PROPOSED ACTION

A. Title of Project

University of Wisconsin - Stevens Point Foundation, Inc.
Lake Construction

B. Location

Maria Drive at Michigan Avenue
Stevens Point, Wisconsin

Parcel described as the SE 1/4 of the NW 1/4,
Sec. 28 and the west 9.25 acres of the SW 1/4
of the NE 1/4, Sec. 28; T24N, R8E, Town of Hull,
Portage County, Wisconsin

C. Define Proposed Action

1. Project Description (type of facility)

The facility will consist of an artificially created lake
caused by excavating beneath the groundwater table.

2. Purpose (brief statement of project objective)

The purpose of this project is to:

- (a) provide a water recreational facility
offering swimming, fishing, etc..
- (b) provide an academic research and outdoor
laboratory facility to carry on aquatic
studies.
- (c) provide aesthetic improvement of the area
and prove its accessibility to the public.
- (d) provide relief to municipal park facilities
which presently receive heavy student usage.
- (e) provide a source of soil borrow required to
develop the new Sentry Insurance Company office
building site located approximately 2000 feet
to the northwest of the proposed lake site.

SENTRY INSURANCE
OFFICE SITE

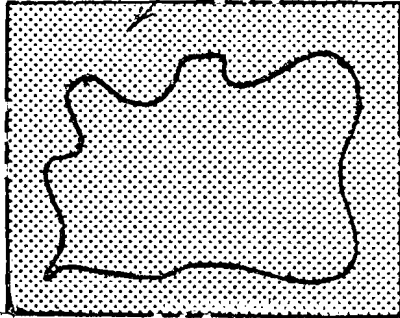
PRIVATE
LANDS

UW

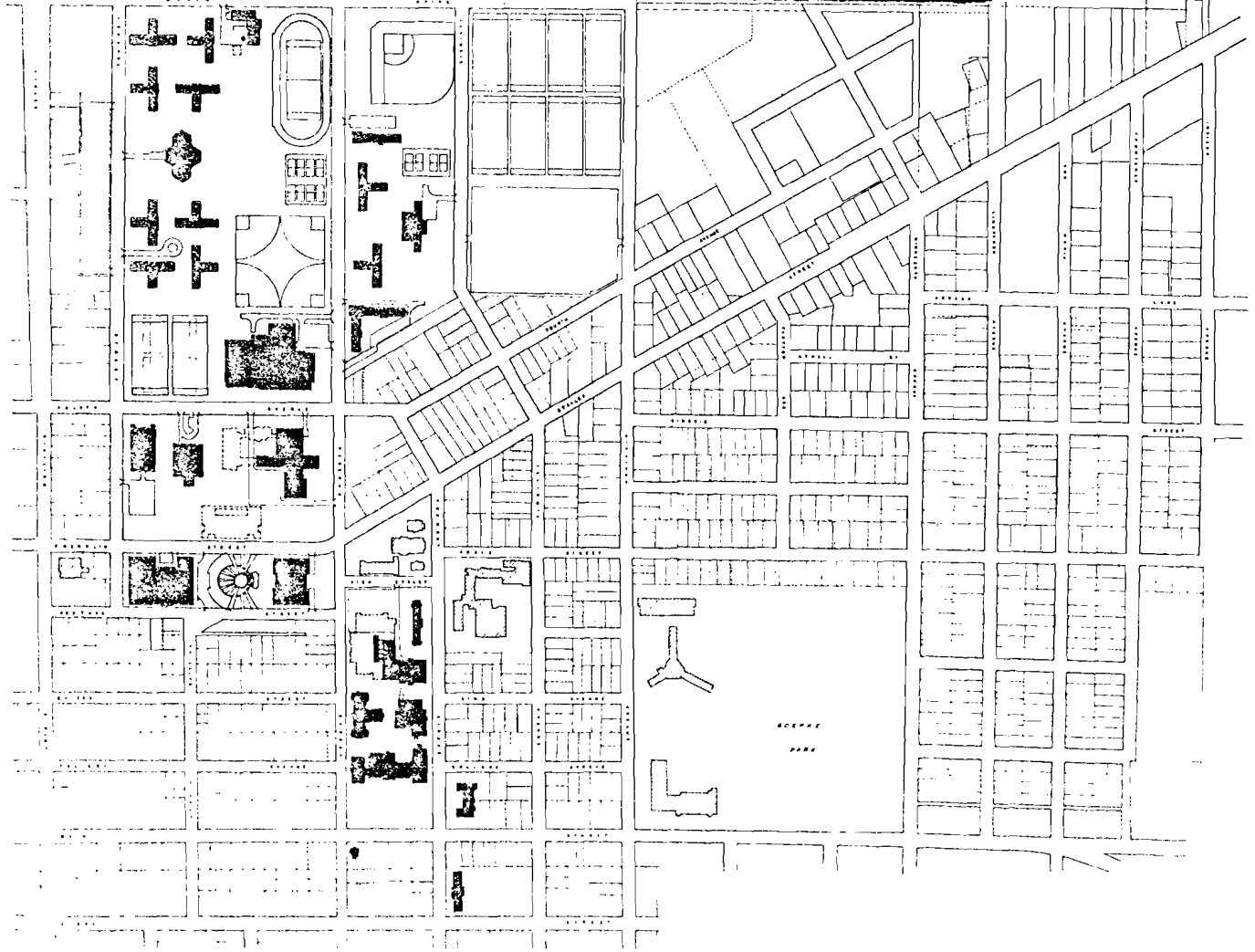
UW

UW

PROPOSED LAKE SITE
UW- STEVENS POINT
FOUNDATION



FEDERAL
LAND



		BOARD OF REGENTS OF THE STATE OF WISCONSIN		WISCONSIN STATE UNIVERSITY		STEVENS POINT	
		PROPERTY MAP		PROPERTY MAP		PROPERTY MAP	

- (f) provide temporary storage of peak runoff flows from Moses Creek to relieve flooding conditions encountered downstream from the proposed lake site in several areas of the campus and adjoining portions of the City of Stevens Point.

3. Estimated Project Budget

- (a) cost of excavation, transportation of borrow soils from the site to the Sentry Insurance Company site and rough grading required at the lake site would be performed by Sentry Insurance Company.
- (b) Some participation in flow control costs related to the control in flow of Moses Creek adjacent to the lake will be provided by the City of Stevens Point.
- (c) Additional shoreline improvements and miscellaneous appurtenances may be provided from University of Wisconsin-Stevens Point funds in the event that transfer of this property from the Foundation to the University is accomplished at some future date and provided that said improvements are deemed necessary and funding therefor is provided.

4. Project Time Schedule:

- (a) Initial Excavation Work - January, 1975 to May, 1975
- (b) Rough Grading in Lake Vicinity - April, 1975 to June, 1975
- (c) Finish Grading, Landscape Work, Construction of Ancillary Facilities - Pending further actions

5. Project Justification (feasibility and need)

(A) Feasibility

Extensive subsurface soils investigations and engineering studies have indicated that the construction of the proposed lake is feasible. The United States Department of Agriculture Soils Conservation Service classifies most of the soils in the lake site area as Meehan and Roscommon. These soils consist of poorly drained organic to loamy sand topsoils overlying poorly graded fine to medium sands. Seasonally high groundwater levels are common for these types of soils. Subsurface soils investigations indicate that rock underlies the area at depths ranging from 17 feet to in excess of 35 feet in the proposed lake area. Shallower depths to bedrock are encountered to the northern part of the site. Lake Susan, an artificial lake constructed a short distance to the north and east of the proposed lake construction has been successfully constructed in an area having similar geological and hydrogeological characteristics.

- (B) The University of Wisconsin - Stevens Point Fnd. lands involved currently are used in academic and research programs, including formal courses in biology, ecology, wildlife, forestry, resource management, soils, etc..

The development of this area as a lake will not interfere with the master plan of the campus, but will instead make for a more effective and better utilization of land for the campus and the community.

To assure continued academic and research utilization, the site west of the proposed Michigan Avenue extension should be established as a permanent environmental center. This development is not only compatible with the mission of the University of Wisconsin - Stevens Point; it is the base of its natural resources program and mission. The development of recreation and education trails as well as an arboretum will increase the productivity from the academic, recreational and research standpoint and provide an outstanding and unique facility for the University of Wisconsin - Stevens Point. All of the activities proposed are compatible with one another and will blend with the natural landscape.

Currently, various outdoor laboratories in the Stevens Point area are used by the academic programs. Establishment of the proposed project will provide on-campus laboratories which will:

- (1) aid the energy situation by providing such activities close to campus;
- (2) provide for economic savings as the result of less travel;
- (3) provide academic savings due to the savings in time to students and faculty (more laboratory time - less travel time);
- (4) provide better and more accessible facilities to the campus and the community
- (5) provide a permanent green belt or open space at the north edge of the existing urban development

In addition to the academic need, the facility will provide an outlet for the aquatic recreational needs and desires of the student body and faculty by providing a facility for canoeing, sailing, fishing, swimming, ice skating, etc.. The lake construction can also provide periodic temporary retention of storm water during periods of peak flows, thereby relieving overloaded storm sewers downstream and reducing the potential for local flooding in several campus areas and portions of the City of Stevens Point adjacent to the campus. It should be noted however, that the retention capacity will be greatly diminished during periods when general high groundwater levels result in a raising of the lake level and corresponding reduction in available storage capacity. Capacity of the existing 72" diameter storm sewer is equivalent to approximately a 2 to 3 year design storm. It is anticipated that the spillway elevation will be established at such a level so as to divert portions of flow of a 7 to 9 year storm. Degree of flooding of adjoining areas will be highly dependent on groundwater level present at the time of the storm. During high groundwater level periods, the areas experiencing flooding would be approximately the same as presently exists during low groundwater periods, slightly greater flooding of low lands to the east and southeast of the proposed lake site would occur with flows equivalent to 3 to 7 year storms. Major storms with high flows would have reduced flooding due to the added storage capacity resulting from the lake construction.

D. Existing Conditions (the present characteristics of project area - No evaluation)

1. Natural Resources

- A. The topography of the area is generally extremely flat. Moses Creek, consisting of a streambed approximately 5 feet deep and a bottom width of approximately 7 feet, has a bed width of approximately 12 feet at the top in most areas. The creek is earthen but has been straightened and improved by dredging through the years, passes through the southeast portion of the site. The ground surface of the area of the proposed lake ranges from approximately Elevation 1091 to Elevation 1093. The level of the land rises somewhat near the north boundary line. The area is generally poorly drained.
- B. The soils characteristic of the area are primarily Meehan and Roscommon. These soils consist of highly organic to loamy sand topsoils overlying fine to medium sands. Rock underlies the area at depths ranging from approximately 17 feet to in excess of 35 feet below the ground surface. These soils are very highly permeable and have characteristically high seasonal groundwater levels. These groundwater levels frequently range from surface to 3 feet below the surface during the wet seasons of the year.
- C. The existing land use is conservancy. The site is essentially in its natural state.
- D. The site, located in the Town of Hull, is zoned commercial.
- E. The site is subject to periodic flooding of Moses Creek. This flooding is the result, at least in part, of inadequate storm sewer capacity downstream from the site.
- F. A great deal of un-uniformity in the groundwater underlying the proposed lake is indicated. This is undoubtedly due to both shallow bedrock and the soil stratification present on the site causing several distinct zones of groundwater to exist i.e., different aquifers present. Without adequate data on movement of groundwater to the proposed lake, it is impossible to state which of these aquifers will have the greatest effect on the lake water quality.

The data shows some distinct differences between the spring and fall sampling, particularly in nutrient levels which are lower in the fall than in the spring. From the nitrogen data, it can be seen that there will probably be a low level of nitrogen compounds entering the lake via groundwater and that nitrogen will likely be the limiting nutrient preventing excessive algal growth in the lake. As nitrogen is extremely soluble and mobile in groundwater, precautions

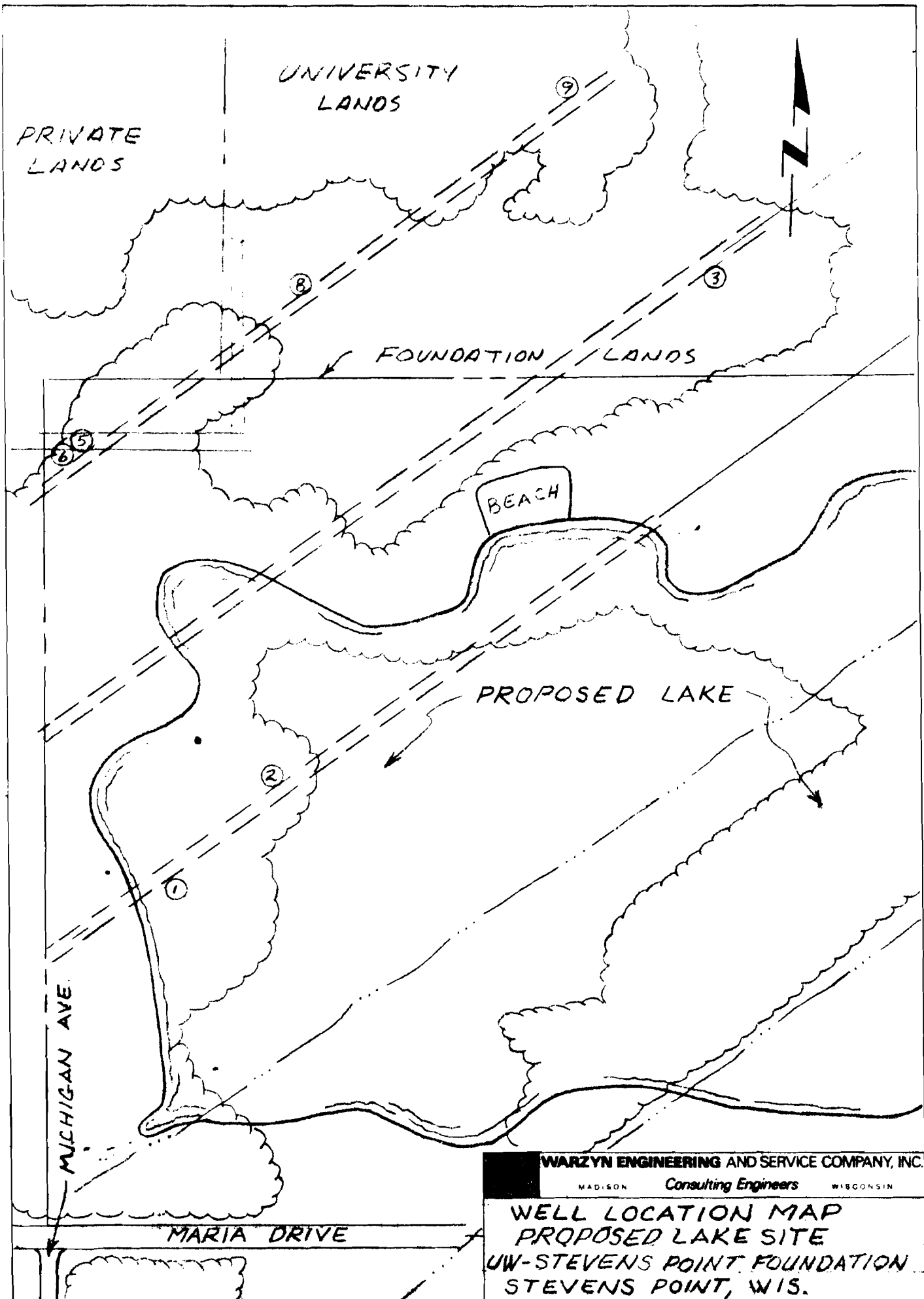
should be taken to insure that the low level of N continue to exist in the lake by preventing over fertilization of lands adjacent to the lake. Phosphate values are quite variable with all samples in May having high available P content while those collected in October are generally very low. It appears that phosphate levels in the lake will at times exceed the .01 ppm level considered sufficient to support an algal bloom.

The oxygen level in the groundwater is extremely variable and with the pump used, I am not totally confident the data obtained is reliable. It does appear that there is at least some oxygen and may have been even lower before pumping as the pump does contaminate the water with air. Two samples run at the time the wells were installed showed 0 ppm O₂ this being late winter. The high iron content during early spring would also indicate low oxygen conditions.

It appears that nuisance algal problems will not occur in the lake due to groundwater input if precautions are taken to limit future nutrient input into the lake. This could be partly overcome by avoiding excessive fertilization of surrounding soils and avoiding contamination of the lake with organic soil material during excavation. Nutrient input from Moses Creek are difficult to evaluate, having only one set of data but at that time soluble nutrients were fairly low with the biggest probable effect being the suspended mineral and organic inputs that could be contributed by this source both filling in the lake and adding nutrients that may become available from the organic matter.

The oxygen relationships in the proposed lake are the conditions that could be potentially most damaging. The groundwater is by no means well supplied with oxygen, meaning the lake will have to depend on surface reaeration and photosynthetic oxygen production to sustain adequate oxygen levels. Surface oxygen conditions will probably be good during the free months but the whole lake could suffer from oxygen depletion during the winter especially if the snow is deep.

The iron coming in with the groundwater will probably precipitate quickly provided oxygen is present in the water and should not cause any excessive color or toxicity problems.



WARZYN ENGINEERING AND SERVICE COMPANY, INC.

MADISON Consulting Engineers WISCONSIN

**WELL LOCATION MAP
PROPOSED LAKE SITE
UW-STEVEN'S POINT FOUNDATION
STEVEN'S POINT, WIS.**

DWN BER

CHK'D RWT

APP'D *T. J. [Signature]*

DATE 12/18/74

C5573-A3

Water Level Fluctuations -- University Foundation, Inc. Lake Wells
 Water Depth in Pipe -- Bottom to Top of Free Water
 (See Attached Map for Locations)

Well Number	1	2	3	4	5	6	7
Total Well Depth	7'6"	26'5"	7'4"	11'4"	7'6"	26'	7'5"
Top of Well to Ground Level	25"	6"	12"	25"	16"	4"	4"
<hr/>							
Date of Meas.							
6-5	4'	24'6"	5'6"	9'10"	5'8"	17'2"	3'2"
6-7	4'	24'6"	5'6"	9'10"	5'8"	17'2"	3'2"
6-10	3'11"	25'5"	6'	9'10"	6'	18'2"	2'7"
6-19	3'9"	24'1"	5'3"	9'2"	5'4"	18'1"	2'4"
6-27	3'2"	23'9"	4'9"	9'2"	5'4"	18'2"	2'2"
6-30	2'8"	23'5"	3'11"	8'5"	4'5"	18'	2'3"
7-3	2'7"	23'4"	3'10"	8'1"	4'4"	18'	2'
7-22	4"	22'7"	2'11"	7'7"	3'9"	19'8"	1'10"
10-15	8"	20'	2'1"	6'3"	2'10"	18'6"	6"

UNIVSERITY LAKE DATA SHEET

IRON

SITE & Date	DEPTH	TEMP C°	PH	COND µMHOS	ALK	TOTAL HARD	Ca ⁺⁺ HARD	D.O.	C.O.D.	Cl ⁻	ORTHO P	TOTAL P	NH ₄ N	NO ₃ -NO ₂ N	TOTAL N
1st Sampling 5-22-74															
Moses Creek 2000' above Maria Dr.		.72	6.6	83	12	30	18	7.2	25	6.0	.001	.012	0	.07	.88
Mose Creek-Maria Dr.		1.06	6.6	81	12	28	17	6.8	24	4.5	.014	.019	.035	.14	.94
SW Well	76/	2.6	6.5	120	54	75	45	NR	25.3	2.0	.15	.22	.07	.14	.74
Center E		.21	6.7	103	22	40	20	7.0	24.6	1.7	.144	.54	0	.105	2.05
NE		1.04	6.3	80	10	28	16	4.7	25.4	4.5	.031	.034	.035	.215	.81
NW Shallow		1.85	6.8	174	80	86	52	8.3	26.0	9.5	.027	.029	.035	.105	.81
E of Village Apts.		2.8	6.4	93	12	43	24	8.4	25.3	4.0	.037	.051	0	.595	.70
2nd Sampling 10-16-74															
SW			6.5	262	96	104	52	6.3	7	2.6	0	.025	0	0	.42
Center E			6.0	78	18	28	18	4.2	13	1.1	.018	.018	0	0	.67
NE			6.3	56	16	20	18	1.6	5	1.0	.005	.006	0	.04	.07
NW			6.8	183	78	86	65	2.5	11	.9	.009	.015	0	0	.07
E of Village Apts.			6.6	106	24	42	30	8.2	86	2.5	.008	.016	0	0	.14

ALL VALUES IN PPM UNLESS NOTED

- G. The hydrology of the proposed lake site is described as follows:

On the deep glacial tills of Central Wisconsin, surface drainage patterns usually do not coincide. For that reason, volume of flow for the surface drainage area has not been calculated as part of this analysis. If surface runoff were calculated for the area, the figures would be most valid for the winter and late spring when the soil is saturated and any precipitation would result in surface runoff. Since this is the time when the water table is highest, the potential surface storage available in a groundwater lake built at the site would be limited.

Studies carried out in the summer of 1974 show that the maximum decline in depth in a nearby groundwater lake ("B" on the attached map) was approximately 23 inches from June to October. Lake Susan ("A" on attached map) had a drawdown of approximately 16 inches over the same period. The difference is probably due to the fact that Lake Susan is partially controlled by a rock and sand dam.

Average elevation in the area of the proposed lake is presently about the same as the water levels of the two lakes. The fact that there is no standing water present in the area indicates that there may not be a hydrologic connection between the site and the two lakes.

If climatic conditions are the only factors controlling change in water levels of groundwater lakes in the Wisconsin Sand Plain, one could have expected a drop of roughly 23 inches in a lake established at the proposed site. Shoreline marks on all of the lakes along the Highway 51 beltline East of Stevens Point indicate that water surfaces have been much higher in past years. One would thus expect that under more moist conditions, the level of water in a lake established at the proposed site would drop less than the 23 inches postulated from the 1974 study.

In summary:

1. The probable flood water storage potential of a lake at this site is limited during periods of high groundwater levels, i.e., late winter and early spring, but would have greater potential during periods when groundwater levels, and therefore lake levels, are lower, i.e., summer and fall.
2. A lake developed at this site will have a summer season drawdown of between 16 and 23 inches under climatic and antecedent conditions similar to those experienced during the summer season of 1974. In a wetter season, one would expect less drawdown.

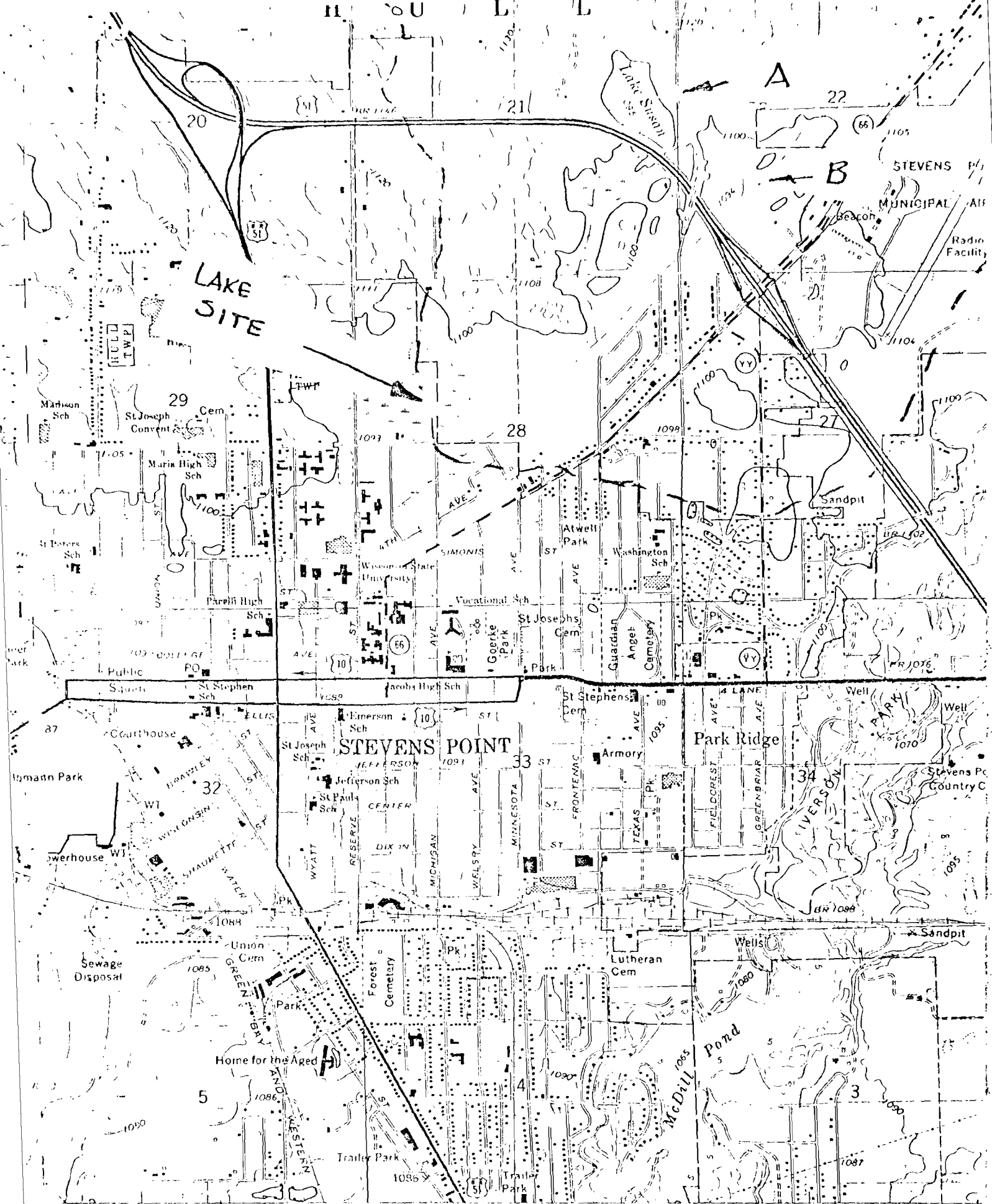
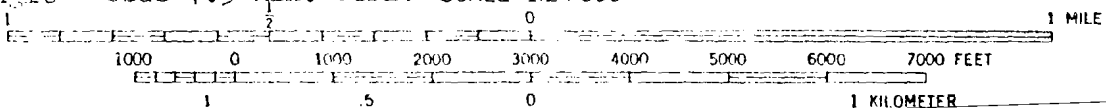


Fig. 1. A portion of Stevens Point (WHITING) 3072 I NE
 Quadrangle - UGSS 7.5 min. series SCALE 1:24,000



2. Energy Resources - Existing

The site, in its present state, imposes no significant demands on energy resources.

3. Biological

The floral survey indicated a good diversity of plant life. There was little spring flora due to high water conditions. The faunal survey found 28 species of birds, 9 species of mammals, 6 species of amphibians and 1 species of reptile. The bird list included species that were summer, winter, permanent and migratory residents due to the time of the year when the survey was conducted. Two species on the bird list and two on the mammal list are classified as game animals by the Wisconsin Department of Natural Resources. No species of animal listed as "endangered" or "with changing status" by the State of Wisconsin or Federal Government were observed or collected in the proposed lake site property.

Moses creek supports no fish life at present but the creek and the temporary ponds on the lake property are utilized in the spring and early summer by amphibians for reproduction and by other animals as watering, feeding, nesting and resting sites.

This assessment does not imply completeness, as it was limited by a time factor, but does give a good picture of the biological components of the ecosystem on the proposed lake site property.

Mammals trapped or observed on proposed lake site property, September 19 through October 21, 1974

Red squirrel	<u>Tamiasciurus hudsonicus</u>
Gray squirrel	<u>Sciurus carolinensis</u>
Star-nose mole	<u>Condylura cristata</u>
Shorttail shrew	<u>Blarina brevicauda</u>
Masked shrew	<u>Sorex cinereus</u>
Meadow vole	<u>Microtus pennsylvanicus</u>
White-footed mouse	<u>Peromyscus leucopus</u>
Cottontail	<u>Sylvilagus floridanus</u>
Whiter-tailed deer	<u>Odocoileus virginianus</u>

Additional mammals seen on land adjacent to proposed lake site property.

Short-tailed weasel	<u>Mustela erminea</u>
Muskrat	<u>Ondatra zibethica</u>
Norway rat	<u>Rattus norvegicus</u>
Eastern chipmunk	<u>Tamias striatus</u>
Flying squirrel	<u>Glaucomys sp.</u>
13-lined ground squirrel	<u>Citellus tridecemlineatus</u>
Striped skunk	<u>Mephitis mephitis</u>
Shorttail shrew	<u>Blarina brevicauda</u>

Birds observed on the proposed Lake site property, September 19 through October 16, 1974.

Ruffed Grouse	<u>Bonasa umbellus</u>
Mourning Dove	<u>Zenaidura macroura</u>
Yellow Shafted Flicker	<u>Colaptes auratus</u> *
Black-capped Chickadee	<u>Parus atricapillus</u>
Wood thrush	<u>Hylocichla mustelina</u>
Hermit thrush	<u>Hylocichla guttata</u>
Blue Jay	<u>Cyanocitta cristata</u>
Starling	<u>Sturnus vulgaris</u>
Common Crow	<u>Corvus brachyrhynchos</u>
Chestnut-sided warbler	<u>Dendroica pennsylvanica</u> *
Robin	<u>Turdus migratorius</u>
White-Breasted Nuthatch	<u>Sitta carolinensis</u> *
House sparrow	<u>Passer domesticus</u>
Redwinged Blackbird	<u>Agelaius phoeniceus</u>
Brown-Headed Cowbird	<u>Molothrus ater</u>
Common Grackle	<u>Quiscalus quiscula</u>
Rose-Breasted Grosbeak	<u>Pheucticus ludovicianus</u> *
Vesper Sparrow	<u>Poocetes gramineus</u>
American Goldfinch	<u>Spinus tristis</u>
State-Colored Junco	<u>Junco hyemalis</u>
White-Throated Sparrow	<u>Zonotrichia albicollis</u>
Song Sparrow	<u>Melospiza melodia</u>
Long-Billed Marsh Wren	<u>Telmatodytes palustris</u> *
Ovenbird	<u>Seiurus aurocapillus</u>
American Woodcock	<u>Philohela minor</u>
Myrtle Warbler	<u>Dendroica coronata</u>

* Based on one sighting

Brown Thrasher

Toxostoma rufum

Purple Finch

Carpodacus purpureus

Additional birds seen on land adjacent to proposed Lake site property, September 19 through October 16, 1974

Eastern Meadowlark

Sturnella magna

Marsh Hawk

Circus cyaneus *

Barred Owl

Strix varia

Great Horned Owl

Bubo virginianus *

Killdeer

Charadrius vociferus

Black and White Warbler

Mniotilta varia

* Based on one sighting

Reptiles and Amphibians observed on proposed lake site property. May 1974 and September 19 through October 19, 1974.

AMPHIBIANS

Leopard frog	<u>Rana pipiens</u>
Green frog	<u>Rana clamitans</u>
Wood frog	<u>Rana sylvatica</u>
Spring peeper	<u>Hyla crucifer</u>
Chorus frog	<u>Pseudacris triseriata</u>
American toad	<u>Bufo americanus</u>

REPTILES

Eastern garter snake Thamnophis sirtalis

Due to the period of the year and secretive nature of these animals, a list of Amphibians and Reptiles which are known to reside in the proposed lake area and adjacent property has been compiled to supplement this list.

The following amphibians are known to reside in the area of the proposed road:

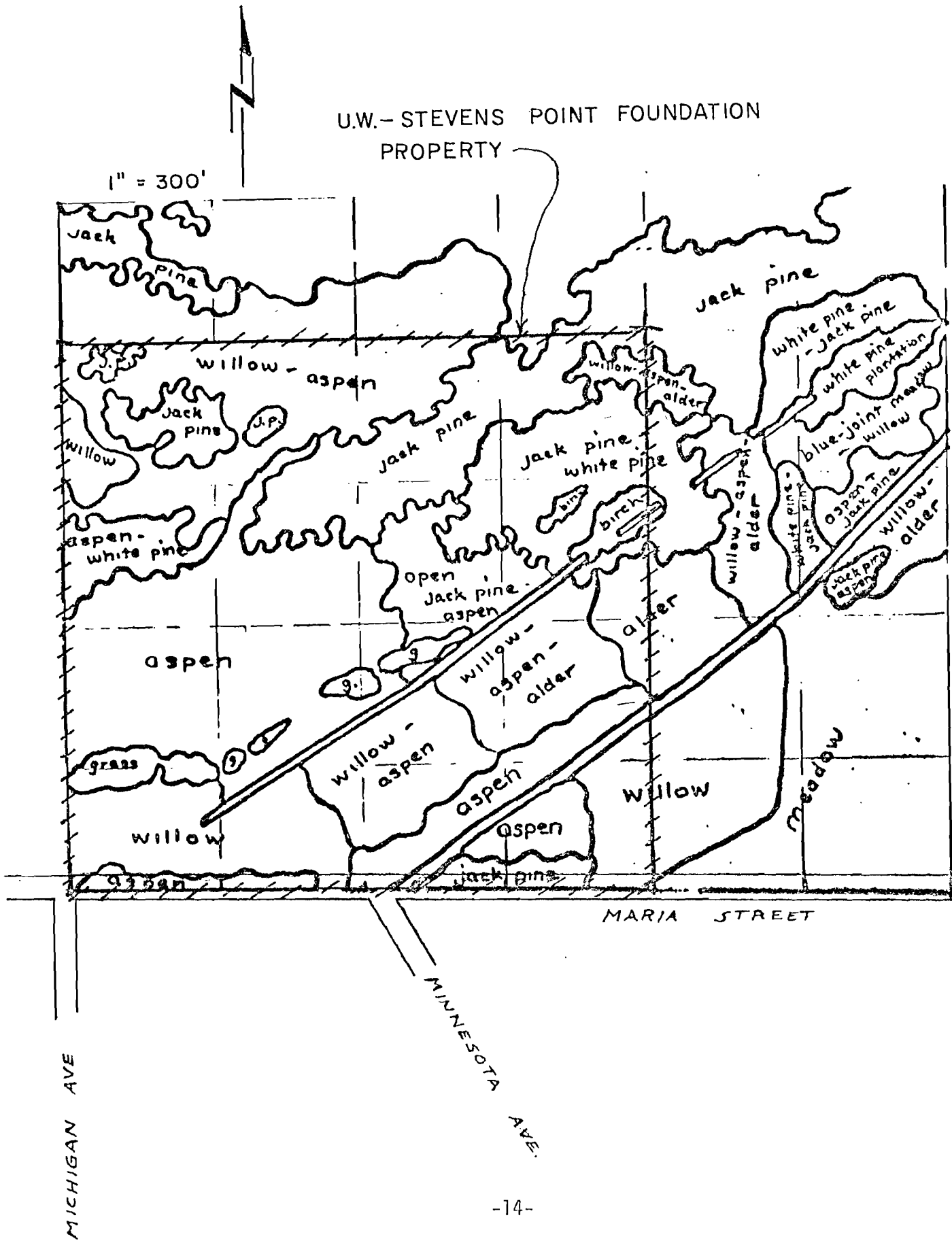
1. Eastern tiger salamander, Ambystoma tigrinum tigrinum
2. Red-backed salamander, Plethodon cinereus cinereus
3. American toad, Bufo americanus americanus
4. Gray treefrog, Hyla versicolor versicolor
5. Spring peeper, Hyla crucifer crucifer
6. Chorus frog, Pseudacris triseriata triseriata
7. Green frog, Rana clamitans melanota
8. Wood frog, Rana sylvatica sylvatica
9. Leopard frog, Rana pipiens pipiens

In addition to the above amphibians, the following reptiles have been observed or otherwise confirmed from this area:

1. Snapping turtle, Chelydra serpentina
2. Wood turtle, Clemmys insculpta
3. Painted turtle, Chrysemys picta marginata
4. Five-lined skink, Eumeces fasciatus
5. Red-bellied snake, Storeria occipitomaculata
6. Northern brown snake, Storeria dekayi wrightorum
7. Eastern garter snake, Thamnophis sirtalis sirtalis
8. Northern ringneck snake, Diadophis punctatus edwardsi
9. Smooth green snake, Opheodrys vernalis
10. Fox Snake, Elaphe vulpina vulpina
11. Eastern hognose snake, Heterodon platyrhinos

It is important to remember that both amphibians and reptiles are very secretive animals. Often their presence in an area may go undetected for years. Therefore, it is virtually impossible to survey an area to determine species diversity and numbers, in a short period of time.

Plant Communities of Proposed Lake Site Property, Sec. 28, T.24N., R.8E



PLANT COMMUNITIES

1. Blue-joint Marsh

Calamagrostis canadensis
Carex spp.
Scirpus cyperinus
Poa palustris
Solidago gigantea
Phalaris arundinacea
Iris versicolor
Glyceria canadensis
Aster tradescantii
Aster umbellatus
Lycopus virginicus

Low, wet ground; with numerous clumps of willows and alders.

Calamagrostis canadensis
Carex spp.
Spartina pectunata
Scirpus cyperinus
Aster tradescantii
A. simplex
Onoclea sensibilis
Solidago gigantea
S. graminifolia
Glyceria canadensis
Muhlenbergia mexicana
Juncus effusus
Iris versicolor
Poa palustris
Epilobrium adenocaulon

Small trees and shrubs on wet ground. Most trees 6-12 feet tall.

2. Alder

Alnus rugosa 85%
 scattered:
Salix amygdaloides
S. lucida
S. rigida
Populus tremuloides, Acer rubrum
 Understory (sparse)
Glyceria canadensis
Calamagrostis canadensis
Scirpus cypermus
Carex spp.
Galium spp.
Iris versicolor
Onoclea sensibilis
Epilobrium adenocaulon

Wet ground; dense growth of alders about 12-15 feet tall; probably slowly invaded by willows, aspen, and red maples.

3. Willow Thicket

Principal Species
Salix amygdaloides 75%
Salix rigida 10%
S. interior 5%
 Others
Spiraea alba
S. tomentosa
Salix lucida
S. petiolaris

4. Willow-Aspen-Alder

Populus tremuloides 40%
Alnus rugosa 30%
Salix amygdaloides 15%
S. bebbiana 3%
Betula papyrifera 3%

Understory:

Calamagrostis canadensis
Onoclea sensibilis
Spiraea alba
Solidago gigantea
Aster lateriflorus
Rubus sp.
Aster umbellatus
Glyceria canadensis
Spiraea tomentosa
Solidago graniunifolia
Dryopteris cristata
Poa palustris

Wet ground; alders and willows yielding to replacement by young aspens.

5 Willow-aspen

<u>Salix amygdaloides</u>	30%
<u>S. lucida</u>	10%
<u>S. bebbiana</u>	10%
<u>Populus tremuloides</u>	30%
<u>Alnus rugosa</u>	3%

Understory:

Calamagrostis canadensis
Solidago gigantea
Glyceria canadensis
Onoclea sensibilis
Poa palustris
Scirpus cyperinus
Solidago uliginosa
Aster umbellatus
Solidago graminifolia
Coptis groenlandica
Aster simplex
Spiraea tomentosa
S. alba
Lycopodium inundatum

Moist soil; fairly open woods with small willows and young aspen.

6 Aspen

<u>Populus tremuloides</u>	75%
<u>Betula papyrifera</u>	20%
scattered <u>Pinus strobus</u> , <u>P. banksiana</u>	

Onoclea sensibilis
Solidago gigantea
Spiraea alba
Carex spp.
Rubus spp.
Potentilla simplex
Spiraea tomentosa
Glyceria canadensis
Scirpus cyperinus
Dryopteris cristata
Solidago graminifolia
Onoclea sensibilis
Salix spp.
Poa palustris

Young to fairly mature aspens on fairly wet sites, perhaps to be replaced by birch and white pines.

7. White Pine-Aspen-Birch (BC-56)

<u>Pinus strobus</u>	35%
<u>Populus tremuloides</u>	40%
<u>Betula papyrifera</u>	10%

Understory and small trees:

Acer rubrum
Quercus velutina
Spiraea alba
Salix humilis
Rubus hispidus
Potentilla simplex

Oryzopsis asperifolia

Intermediate moisture conditions.

Mostly stand of young white pines (a few old, large trees), probably tending toward a white pine stand.

8. Paper Birch

<u>Betula papyrifera</u>	80%
scattered:	
<u>Populus tremuloides</u>	
<u>Pinus strobus</u>	
<u>P. banksiana</u>	

sparse understory

Potentilla simplex
Osmunda claytoniana
Muhlenbergia mexicana
Onoclea sensibilis

Moist soil. Trees form large clumps, in fairly pure stands.

9. White Pine-Jack Pine

<u>Pinus strobus</u>	70%
<u>P. banksiana</u>	20%
scattered:	
<u>Populus tremuloides</u>	
<u>Betula papyrifera</u>	
<u>Acer rubrum</u>	

Understory (sparse)
Carex spp.
Rubus hispidus
Pteridium aquilinum
Potentilla simplex
Lycopodium obscurum

Fairly dry soil. Some large white pines present.

0. Jack Pine-White Pine

<u>Pinus banksiana</u>	40%
<u>P. strobus</u>	40%
<u>Populus tremuloides</u>	5%
<u>Acer rubrum</u>	5%
<u>Betula papyrifera</u>	5%

Understory (sparse):
Carex spp.
Rubus hispidus
Potentilla simplex
Vaccinium angustifolium
Dryopteris spinulosa
Hieracium aurantiacum
Pteridium aquilinum

Jack pine is common in the area, and may be replaced by white pine (in this case) or by oaks. This community represents a successional stage, perhaps to denser white pine, although it includes a few larger, older white pines.

11. Jack Pine

<u>Pinus banksiana</u>	80%
scattered:	
<u>P. strobus</u>	
<u>Populus tremuloides</u>	

Understory:
Carex pensylvanica
Potentilla simplex
Rubus sp.
Lysimachia quadrifolia
Comptonia peregrina
Vaccinium angustifolium
Hieracium aurantiacum

Achillea millefolium
Viola sagittata
Quercus ellipsoidalis seedlings
Q. velutina seedlings

Sandy areas. A common community. In some areas oaks seem to be invading (driest sites), on others (more moist?) white pine is invading, although some large older white pines are present.

12. Meadow (Timothy-Blue Grass-Goldenrod)

<u>Phleum pratense</u>	} 75% of biomass
<u>Poa pratenses</u>	
<u>Solidago canadensis</u>	

Fairly common:

Aster simplex
Salix amygdaloides
Populus tremuloides
Alnus rugosa
 Scattered occurrence:
Salix discolor
Solidago nemoralis
Achillea millefolium
Spartina pectinata
Agrostes alba
Spiraea tomentosa
S. alba
Asclepias syriaca
Juncus tenuis

Sandy upland area. Perhaps once grazed and mowed or burned. Scattered young

Salix amygdaloides, Populus tremuloides and Alnus rugosa

13. Grass (Open)

Danthonia spicata
Potentilla simplex
Solidago canadensis
Agrostis scabra
Carex spp.
Rubus hispidus
Spiraea tomentosa

scattered:
Achillea millefolium

Solidago graminifolia

Hieracium aurantiacum

Agrostis alba

Poa pratensis

P. compressa

Populus tremuloides seedlings

Pinus strobus seedlings

Dry, open areas on upland;
probably slowly fills in with aspen
and white pine.

SPECIES	PLANT LIST	ABUNDANCE
<u>Lycopodiaceae</u>	Club Mosses Family	
<u>Lycopodium annotinum</u>	"Bristly Club Moss"	scattered
<u>Lycopodium obscurum</u>	"Ground Pine"	rare
<u>Lycopodium inundatum</u>	"Club Moss"	rare
<u>Equisetaceae</u>	Horsetail Family	
<u>Equisetum sylvaticum</u>	"Woodland horsetail"	rare
<u>Equisetum arvense</u>	"Field Horsetail"	scattered
<u>Osmundaceae</u>	Royal Fern Family	
<u>Osmunda regalis</u>	"Royal Fern"	scattered
<u>Osmunda cinnamomea</u>	"Cinnamon Fern"	scattered
<u>Osmunda claytoniana</u>	"Interrupted Fern"	fairly common
<u>Polypodiaceae</u>	Polypody Fern Family	
<u>Pteridium aquilinum</u>	"Bracken Fern"	scattered
<u>Adiantum pedatum</u>	"Maidenhair Fern"	rare
<u>Onoclea sensibilis</u>	"Sensitive Fern"	abundant
<u>Athyrium filix-femina</u>	"Lady fern"	scattered
<u>Athyrium angustatum</u>	"Slender Lady Fern"	fairly common
<u>Cystopteris bulbifera</u>	"Bulblet Fern"	rare-
<u>Thelyperis palustris</u>	"Marsh Fern"	fairly common
<u>Dryopteris spinulosa</u>	"Spinulose Wood Fern"	fairly common
<u>Dryopteris cristata</u>	"Crested Shield Fern"	fairly common
<u>Pinaceae</u>	Pine Family	
<u>Pinus banksiana</u>	"Jack Pine"	abundant
<u>Pinus strobus</u>	"White Pine"	common
<u>Pinus resinosa</u>	"Red Pine"	rare
<u>Typhaceae</u>	Cattail Family	
<u>Typha latifolia</u>	"Broadleaf Cattail"	scattered
<u>Alismaceae</u>	Arrowhead Family	
<u>Alisma plantago-aquatica</u>	"Water Plantain"	scattered
<u>Sagittaria latifolia</u>	"Broadleaf Arrowhead"	scattered
<u>Hydrocharitaceae</u>	Frog's bit Family	
<u>Elodea canadensis</u>	"Elodea"	rare
<u>Gramineae</u>	Grass Family	
<u>Bromus inermis</u>	"Smooth Brome"	fairly common
<u>Bromus canadensis</u>	"Fringed Brome"	rare
<u>Glyceria canadensis</u>	"Rattlesnake Manna Grass"	common
<u>Glyceria grandis</u>	"Tall Manna Grass"	scattered
<u>Glyceria striata</u>	"Manna Grass"	rare
<u>Poa pratensis</u>	"Kentucky Blue Grass"	scattered
<u>Poa compressa</u>	"Canada Blue Grass"	fairly common
<u>Poa palustris</u>	"Meadow Blue Grass"	common
<u>Eragrostis spectabilis</u>	"Purple Lovegrass"	scattered
<u>Eragrostis cilianensis</u>	"Stink Grass"	scattered
<u>Eragrostis pectinacea</u>	"Love Grass"	rare
<u>Schizachue purpurascens</u>		rare
<u>Agropyron renens</u>	"Quack grass"	scattered

<u>Elymus canadensis</u>	"Canada Wild Rye"	scattered
<u>Elymus virginicus</u>	"Virginia Wild Rye"	scattered
<u>Hordeum jubatum</u>	"Squirrel-tail Barley"	scattered
<u>Koeleria cristata</u>	"June Grass"	common
<u>Danthonia spicata</u>	"Poverty Oats"	abundant
<u>Calamagrostis canadensis</u>	"Bluejoint"	abundant
<u>Agrostis gigantea</u>	"Redtop"	abundant
<u>Agrostis hyemalis</u>	"Ticklegrass"	common
<u>Cinna arundinacea</u>	"Wood Reed"	rare
<u>Phleum pratense</u>	"Timothy"	fairly common
<u>Muhlebergia mexicana</u>	"Muhly Grass"	fairly common
<u>Muhlebergia racemosa</u>	"Muhly Grass"	scattered
<u>Sporarbolus cryptandrus</u>	"Dropseed"	rare
<u>Sporobolus vaginiflorus</u>	"Dropseed"	rare
<u>Brachyelytrum erectum</u>		
<u>Oryzopsis asperifolia</u>	"Rice Grass"	common
<u>Aristida basiramea</u>	"Triple awn Grass"	rare
<u>Beckmannia syzigachne</u>	"Slough Grass"	rare
<u>Spartina pectinata</u>	"Cord Grass"	fairly common
<u>Phalaris arundinacea</u>	"Reed Canary Grass"	Common
<u>Leersia aryzoides</u>	"Rice Cut Grass"	fairly common
<u>Digitaria sanguinalis</u>	"Hairy Crab Grass"	rare
<u>Digitaria ischaemum</u>	"Smooth Crab Grass"	rare
<u>Leptoloma cognatum</u>	"Fall Witch Grass"	common
<u>Panicum capillare</u>	"Witch Grass"	scattered
<u>Panicum lanuginosum</u>	"Hairly Panic Grass"	scattered
<u>Panicum oligosanthos</u>	"Panic Grass"	scattered
<u>Panicum xariphosum</u>	"Panic Grass"	rare
<u>Panicum latifolium</u>	"Broadleaf Panic Grass"	rare
<u>Panicum boreale</u>	"Northern Panic Grass"	rare
<u>Echinochloa pungens</u>	"Barnyard Grass"	scattered
<u>Echinochloa crus-galli</u>	"Barnyard Grass"	scattered
<u>Setaria viridis</u>	"Green Foxtail"	scattered
<u>Setaria lutescens</u>	"Yellow Foxtail"	scattered
<u>Cenchrus longispinus</u>	"Sandbur"	scattered
<u>Andropogon gerardii</u>	"Big Bluestern"	scattered
<u>Schizachyrium scoparium</u>	"Little Bluestern"	common
<u>Sorghastrum nutans</u>	"Indian Grass"	rare
<u>Cyperaceae</u>		
<u>Cyperus spp.</u>	"Galingale, Nutgrass"	scattered
	perhaps 5-6 spp.	
<u>Dulichium arundinaceum</u>	"Three-way Sedge"	fairly common
<u>Carex spp.</u>	"Sedge"	common
	perhaps 20 spp.	
<u>Scirpus cyperinus</u>	"Woolgrass"	common
<u>Scirpus atrovireus</u>		fairly common
<u>Scirpus acutus</u>	"Bulrush"	rare
<u>Scirpus spp.</u>		scattered
	perhaps 3-4 spp.	
<u>Eleocharis acicularis</u>	"Spike rush"	fairly common
<u>Eleocharis obtusa</u>	"Spike rush"	scattered
<u>Eleocharis spp.</u>	"Spike rush"	scattered
	perhaps 2-3 spp.	
<u>Eriophorum spp.</u>	"Cottongrass"	scattered
	perhaps 2-3 spp.	

Araceae		
<u>Symplocarpus foetidus</u>	"Skunk Cabbage"	rare
<u>Acorus calaums</u>	"Sweet Flag"	scattered
Lemnaceae		
<u>Lemna minor</u>	"Common Duckweed"	scattered
Juncaceae		
<u>Juncus effusus</u>	"Rush"	common
<u>Juncus bufonius</u>	"Toad Rush"	scattered
<u>Juncus terrius</u>	"Rush"	scattered
<u>Juncus canadensis</u>	"Rush"	scattered
<u>Juncus acuminatus</u>	"Rush"	scattered
<u>Juncus spp.</u>	"Rushes"	scattered
<u>Luzula acuminata</u>	"Wood Rush"	fairly common
Liliaceae		
<u>Clintonia borealis</u>	"Blue bead Lily"	Scattered
<u>Maianthemum canadense</u>	"Canada Mayflower"	scattered
<u>Polygonatum pubescens</u>	"Solomon's Seal"	rare
<u>Smilax hispida</u>	"Greenbrier"	rare
<u>Uvularia sessiflora</u>	"Small-flowered Bellwort"	
Amaryllidaceae		
<u>Hypoxis hirsuta</u>	"Stargrass"	scattered
Iridaceae		
<u>Iris versicolor</u>	"Blue Flag"	common
<u>Iris virginica</u>	"Blue Flag"	rare
<u>Sisyrinchium campestre</u>	"Blue-eyed Grass"	rare
Salicaceae		
<u>Salix lucida</u>	"Shining Willow"	common
<u>Salix amygdaloides</u>	"Peach-leaf Willow"	abundant
<u>Salix petiolaris</u>	"Willow"	scattered
<u>Salix discolor</u>	"Pussy Willow"	Scattered
<u>Salix bebbiana</u>	"Beaked Willow"	fairly common
<u>Salix humilis</u>	"Upland Willow"	Fairly common
<u>Salix interior</u>	"Sandbar Willow"	scattered
<u>Salix rigida</u>	"Willow"	common
<u>Populus tremuloides</u>	"Popple; Trembling Aspen"	abundant
<u>Populus grandidentata</u>	"Largetooth Aspen"	scattered
Myricaceae		
<u>Comptonia peregrina</u>	"Sweet Fern"	common-abundant
Betulaceae		
<u>Corylus americana</u>	"Hazelnut"	scattered-common
<u>Corylus cornuta</u>	"Beaked Hazelnut"	scattered
<u>Ostrya virginiana</u>	"Ironwood"	rare
<u>Betula papyrifera</u>	"Paper Birch"	common
<u>Betula pumila</u>	"Bog Birch"	fairly common
<u>Alnus rugosa</u>	"Speckled Alder, Tag Alder"	abundant

<u>Fagaceae</u>		
<u>Quercus alba</u>	"White Oak"	rare
<u>Quercus rubra</u>	"Red Oak"	scattered
<u>Quercus velutina</u>	"Black Oak"	common
<u>Quercus ellipsoidalis</u>	"Hill's Oak Northern Pin Oak"	scattered
<u>Ulmaceae</u>		
<u>Ulmus americana</u>	"American Elm"	fairly common
<u>Ulmus rubra</u>	"Slippery Elm"	scattered
<u>Urticaceae</u>		
<u>Urtica dioica</u>	"Stinging Nettle"	fairly common
<u>Bosmeria cylindrica</u>	"False Nettle"	rare
<u>Lapaortea canadensis</u>	"Wood Nettle"	scattered
<u>Aizoaceae</u>		
<u>Mulogo verticillata</u>	"Carpet weed"	scattered
<u>Portulacaceae</u>		
<u>Portulacae oleracea</u>	"Purilane"	rare
<u>Claytonia virginica</u>	"Spring Beauty"	rare
<u>Caryophyllaceae</u>		
<u>Stellaria media</u>	"Chickweed"	scattered
<u>Cerastium vulgatum</u>	"Mouseear Shickweed"	scattered
<u>Lychas alba</u>	"Corn Cockle"	scattered
<u>Silene cucubalus</u>	"Bladder Campion"	scattered
<u>Dianthus deltoides</u>	"Pink"	rare
<u>Polygonaceae</u>		
<u>Rumex acetosella</u>	"Sheep Sorrel"	common
<u>Rumex crispus</u>	"Dock"	scattered
<u>Rumex orbiculatus</u>	"Water Dock"	scattered
<u>Polygonum erectum</u>	"Tall Knot weed"	rare
<u>Polygonum aviculare</u>	"Knotweed"	fairly common
<u>Polygonum natans</u>	"Aquatic Smartweed"	scattered
<u>Polygonum lapathifolium</u>	"Nodding Smartweed"	scattered
<u>Polygonum pennsylvanicum</u>	"Pennsylvania Smartweed"	fairly common
<u>Polygonum hydropiperoides</u>	"Water Smartweed"	common
<u>Polygonum sagittatum</u>	"Tearthumb Smartweed"	scattered
<u>Polygonum cilinode</u>	"False Buckwheat"	scattered
<u>Chenopodiaceae</u>		
<u>Cyclocoma atriplicifolia</u>	"Winged Pigweed"	rare
<u>Chenopodium album</u>	"Lambsquarter"	scattered
<u>Amaranthaceae</u>		
<u>Amaranthus graecizous</u>	"Prostrate Pigweed"	rare
<u>Amaranthus retroflexus</u>	"Redroot Pigweed"	rare
<u>Ranunculaceae</u>		
<u>Actaea pachypoda</u>	"Baneberry"	rare
<u>Thalictrum dasycarpum</u>	"Meadow Rue"	fairly common
<u>Aquilegia canadensis</u>	"Columbine"	scattered
<u>Caltha palustris</u>	"Marsh Marigold"	fairly common

<u>Ranunculus rhomboideus</u>	"Early Buttercup"	fairly common
<u>Ranunculus acris</u>	"Tall Buttercup"	scattered
<u>Ranunculus pennsylvanicus</u>	Buttercup	scattered
<u>Ranunculus septentrionalis</u>	"Swamp Buttercup"	fairly common
<u>Anemone canceusis</u>	"Anemone"	scattered
<u>Hepatica americana</u>	"Hepatica"	scattered
<u>Coptis groenlandica</u>	"Goldthread"	scattered
 Papaveraceae		
<u>Sanguinaria canadensis</u>	"Bloodroot"	scattered
<u>Dicentra cucullaria</u>	"Dutchman's Breeches"	scattered
 Cruciferae		
<u>Lepidium campestre</u>	"Pepper Grass"	fairly common
<u>Lepidium virginicum</u>	"Pepper Grass"	fairly common
<u>Thlaspi arvense</u>	"Penny Cress"	rare
<u>Capsella bursa-pastoris</u>	"Shepherd's Purse"	fairly common
<u>Berteroa incana</u>	"Hoary Alyssum"	common
<u>Arabis lyrata</u>	"Rock Cress"	fairly common
<u>Arabis spp. (2 spp.?)</u>		scattered
<u>Rorippa islandica</u>	"Marsh Cress"	scattered
<u>Barbarea vulgaris</u>	"yellow Rocket"	scattered
 Crassulaceae		
<u>Penthorum sedifolium</u>	"Ditch Stonecrop"	rare
 Saxifragaceae		
<u>Mitella diplylla</u>	"Bishop's Cap"	scattered
<u>Ribes spp. (2-3 spp.?)</u>	"Currants, Gooseberries"	scattered
 Rosaceae		
<u>Physocarpus opulifolius</u>	"Ninebark"	scattered
<u>Spiraea alba</u>	"Meadowsweet"	abundant
<u>S. tomentosa</u>	"Hardhack"	abundant
<u>Fragaria virginiana</u>	"Wild Strawberry"	abundant
<u>Potentilla simplex</u>	"Cinquefoil"	abundant
<u>P. norvegica</u>	"Rough Cinquefoil"	fairly common
<u>P. recta</u>	"Pale Cinquefoil"	fairly common
<u>P. argentea</u>	"Silvery Cinquefoil"	fairly common
<u>Potentilla tridentata</u>		
<u>Geum canadense</u>	"Avens"	scattered
<u>G. aleppicum</u>	"Avens"	scattered
<u>Rubus hispidus</u>	"Dewberry"	abundant
<u>R. flagellaris</u>	"Northern Denberry"	common
<u>R. allegherminsis</u>	"Blackberry"	scattered
<u>R. pubescens</u>	"Dwarf Blackberry"	scattered
<u>Rubus strigosus</u>		
<u>R. spp.</u>	"Blackberries, Brambles"	fairly common
<u>Agrimonia grvposepala</u>	"Agrimony"	scattered
<u>Rosa sp.</u>	"Wild Rose"	scattered
<u>Prunus serotina</u>	"Black Cherry"	scattered
<u>P. virginiana</u>	"Choke Cherry"	scattered

<u>P. pensylvanica</u>	"Pin Cherry"	scattered
<u>Aronia melanocarpa</u>	"Chokeberry"	fairly common
<u>Crataegus spp.</u>	"Hawthorns"	rare
<u>Amelanchier spp.</u>	"Serviceberry"	scattered
Leguminosae		
<u>Trifolium pratense</u>	"Red Clover"	scattered
<u>T. arvense</u>	"Rabbit's foot Clover"	scattered
<u>T. repens</u>	"White Clover"	scattered
<u>T. hybridum</u>	"Alsike Clover"	scattered
<u>T. agrarium</u>	"Hop Clover"	scattered
<u>Melilotus alba</u>	"White Sweet Clover"	fairly common
<u>M. officinalis</u>	"Yellow Sweet Clover"	scattered
<u>Medicago lupulina</u>	"Black Medick"	scattered
<u>Vicia villosa</u>	"Vetch"	scattered
Oxalidaceae		
<u>Oxalis stricta</u>	"Yellow Sorrel"	fairly common
<u>O. europaea</u>	"Yellow Sorrel"	fairly common
Polygalaceae		
<u>Polygala polygama</u>	"Milkwort"	scattered
Euphorbiaceae		
<u>Acalypha rhomboidea</u>	"Copperleaf"	scattered
<u>Euphorbia maculata</u>	"Prostrate Spurge"	scattered
<u>E. corollata</u>	"Flowering Spurge"	fairly common
Callitrichaceae		
<u>Callitriche sp.</u>	"Water Starwort"	rare
Anacardiaceae		
<u>Toxicodendron radicans</u>	"Poison Ivy"	rare
Aquifoliaceae		
<u>Ilex verticillata</u>	"Winterberry"	fairly
<u>Nemopanthus mucronatus</u>	"Bog Holly"	rare
Aceraceae		
<u>Acer rubrum</u>	"Red Maple"	fairly common
<u>A. saccharinum</u>	"Silver Maple"	rare
<u>A. negundo</u>	"Box Elder"	scattered
Balsaminaceae		
<u>Impatiens capensis</u>	"Jewelweed"	fairly common
Rhamnaceae		
<u>Rhamnus frangula</u>	"Buckthorn"	rare
Vitaceae		
<u>Vitis sp.</u>	"Wild Grape"	rare
<u>Parthenocissus quinquefolia</u>		scattered
Tiliaceae		
<u>Tilia americana</u>	"Basswood"	rare

Hypericaceae		
<u>Hypericum perforatum</u>	"St. John's wort"	scattered
<u>H. boreale</u>	"St. John's wort"	scattered
<u>H. canadense</u>	"St. John's wort"	scattered
Cistaceae		
<u>Helianthemum canadense</u>	"Frostweed"	scattered
Violaceae		
<u>Viola pedata</u>	"Birdfoot Violet"	scattered
<u>V. papilionacea</u>	"Stemless Blue Violet"	scattered
<u>V. conspersa</u>	"American Dog Violet"	scattered
<u>V. sagittata</u>	"Arrowhead Violet"	scattered
<u>V. pubescens</u>	"Downy Yellow Violet"	scattered
<u>V. spp.</u>	"Violets"	scattered
Onagraceae - <u>L. alternifolia</u>		
<u>Ludwigia palustris</u>	"Marsh Purslane"	rare
<u>Epilobium angustifolium</u>	"Fireweed"	scattered
<u>E. adenocaulon</u>	"Herb Willow"	common
<u>Oenothera biennis</u>	"Evening Primrose"	fairly common
<u>O. perennis</u>	"Sundrops"	scattered
<u>Circaea quadrisculata</u>	"Enchanter's Nightshade"	scattered
Araliaceae		
<u>Aralia nudicaulis</u>	"Wild Sarsaparilla"	fairly common
Umbelliferae		
<u>Sanicula marilandica</u>	"Black Snake root"	scattered
<u>Osmorhiza longistylis</u>	"Sweet Cicely"	scattered
<u>Carum carvi</u>	"Wild Caraway"	scattered
<u>Sium suave</u>	"Water Farnip"	scattered
<u>Cicuta maculata</u>	"Water Hemlock"	scattered
<u>C. bulbifera</u>	"Bulblet Water Hemlock"	scattered
Cornaceae		
<u>Cornus canadensis</u>	"Bunchberry"	abundant
<u>C. alternifolia</u>	"Alternate leaf Dogwood"	scattered
<u>C. stolonifera</u>	"Red ossier Dogwood"	fairly common
<u>C. spp.</u>	"Dogwoods"	common
Ericaceae		
<u>Monotropa uniflora</u>	"Indian Pipe"	rare
<u>Pyrola rotundifolia</u>	"Shinleaf"	scattered
<u>Gaultheria procumbens</u>	"Wintergreen"	scattered
<u>Vaccinium angustifolium</u>	"Blueberry"	fairly common
<u>V. myrtilloides</u>	"Blueberry"	rare
Primulaceae		
<u>Lysimachia quadrifolia</u>	"Yellow Loosestrife"	fairly common
<u>Trientalis borealis</u>	"Star flower"	fairly common
Oleaceae		
<u>Fraxinus pennsylvanica</u>	"Green Ash"	rare

Asclepiadaceae		
<u>Asclepias syriaca</u>	"Common Milkweed"	fairly common
<u>A. incarnata</u>	"Swamp Milkweed"	fairly common
Convolvulaceae		
<u>Convolvulus spithameus</u>	"Low Bindweed"	fairly common
Boraginaceae		
<u>Lithospermum canescens</u>	"Hoary Puccoon"	scattered
Verbenaceae		
<u>Verbena stricta</u>	"Vervain"	fairly common
<u>V. hastata</u>	"Vervain"	fairly common
<u>V. bracteata</u>	"Creeping Verbain"	scattered
Labiatae		
<u>Scutellaria lateriflora</u>	"Mad-dog Skullcap"	scattered
<u>S. galericulata</u>	"Skullcap"	scattered
<u>Prunella vulgaris</u>	"Self-heal"	scattered
<u>Stachys palustris</u>	"Hedge Nettle"	scattered
<u>S. hispida</u>	"Hedge Nettle"	scattered
<u>Monarda fistulosa</u>	"Bergamot"	scattered
<u>Lycopus uniflorus</u>	"Water Horehound"	scattered
<u>L. virginicus</u>	"Water Horehound"	scattered
Solanaceae		
<u>Solanum dulcamara</u>	"Bittersweet Nightshade"	scattered
Scrophulariaceae		
<u>Gratiola neglecta</u>	"Hedge Hyssop"	rare
<u>Verbascum thapsus</u>	"Mullein"	scattered
<u>Chelone glabra</u>	"Turtlehead"	scattered
<u>Linaria vulgaris</u>	"Butter-and-eggs"	fairly common
<u>L. canadensis</u>	"Toadflax"	fairly common
<u>Veronica serpyllifolia</u>	"Speedwell"	scattered
<u>V. peregrina</u>	"Speedwell"	scattered
<u>Gerardia purpurea</u>	"Gerardia"	scattered
Plantaginaceae		
<u>Plantago major</u>	"Plantain"	fairly common
<u>P. rugellii</u>	"Plantain"	fairly common
Rubiaceae		
<u>Galium spp.</u>	"Bedstraws"	fairly common
(about 5 species) <u>G. trifidum</u>		
<u>Mitchella repens</u>	"Partridge berry"	
Caprifoliaceae		
<u>Diervilla lonicera</u>	"Bush Honeysuckle"	fairly common
<u>Lonicera tartarica</u>	"Tartarian Honeysuckle"	scattered
Cucurbitaceae		
<u>Echinocystis lobata</u>	"Wild Cucumber"	scattered

Campanulaceae

Lobelia siphilitica

L. inflata

"Lobelia"

"Indian Tobacco"

fairly common

scattered

Compositae

Helianthus divaricatus

H. occidentalis

Bidens cernua

B. frondosa

Ambrosia artemisiifolia

Helenium autumnale

Achillea millefolium

Chrysanthemum leucanthemum

Matricaria matricarioides

Artemisia candata

Solidago hispida

S. uliginosa

S. flexicaulis

S. nemoralis

S. juncea

S. gigantea

S. canadensis

S. graminifolia

Aster macrophyllus

A. ciliolatus

A. sagittifolius

A. puniceus

A. prenanthoides

A. umbellatus

A. lateriflorus

A. simplex

A. tradescantii

Erigeron strigosus

Conyza canadensis

Antennaria spp.

Gnaphalium obtusifolium

G. uliginosum

Eupatorium purpureum

E. perfoliatum

E. rugosum

Liatris aspera

Cirsium arvense

C. vulgare

Prenanthes alba

Hieracium aurantiacum

H. pratense

H. canadense

Taraxacum officinale

Lactuca canadensis

"Sunflower"

"Western Sunflower"

"Beggartick"

"Beggartick"

"Ragweed"

"Sneezeweed"

"Yarrow"

"Ox-eye Daisy"

"Pineapple Weed"

"Wormwood"

"Slender Bog Goldenrod"

"Slender Bog Goldenrod"

"Twisted-Stalk Goldenrod"

"Gray Goldenrod"

"Early Goldenrod"

"Tall Smooth Goldenrod"

"Tall Goldenrod"

"Grass-leaf Goldenrod"

"Large-leaf Aster"

"Northern Arrowhead Aster"

"Arrowhead Aster"

"Purple-stem Aster"

"Purple-stem Aster"

"Flat-topped Aster"

"Narrow-leaf Woodland Aster"

"Narrow-leaf Marsh Aster"

"Narrow-leaf Marsh Aster"

"Fleabane Daisy"

"Horseweed"

"Pussy-toes"

"Sweet Everlasting"

"Small Everlasting"

"Purple Joe-pyeweed"

"Boneset"

"White Snakeroot"

"Blazing Star"

"Canada Thistle"

"Bull Thistle"

"White Wild Lettuce"

"Orange Hawkweed"

"King Devil"

"Canadian Hawkweed"

"Dandelion"

"Wild Lettuce"

scattered

scattered

fairly common

scattered

fairly common

scattered

scattered

scattered

scattered

scattered

scattered

scattered

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fairly common

scattered

abundant

abundant

common

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scattered

fairly common

fairly common

scattered

fairly common

scattered

scattered

fairly common

fairly common

scattered

fairly common

fairly common

scattered

rare

rare

scattered

scattered

common

fairly common

scattered

scattered

scattered

Bryophytes (Mosses and Liverworts)

Sphagnum 2-3 spp.
Aulacomnia palustre
Polytrichum commune
P. ohioensis
Dicranella heteromalla
Heterophyllum haldanianum
Tetraxis pellucida
Dicranum fuscescens
Hedwigia ciliata
Pterozium schreberi
Calliergon cordifolium
Campylium stellatum
C. sp.
Fylaisella polyantha
Leptodictyum trichotodium
Climacium dendroides
Hypnum curvifolium
H. pratense
H. imponans
Brachythecium plumosum
B. rutabulum
Helodium blandowii

4. Socio-Economic (population, density, conjection, economic impact on community, etc.)

The site is presently unpopulated and provides no significant economic impact on the community. The area is presently used by students and others for a variety of informal activities

Please refer to Pages 32 thru 41 for a discussion of the effects of this proposed action.

E. Illustrative Descriptions

Plate 1 Campus Property Map

Plate 2 Planimetric Air Photo

Plate 3 Aerial Photo of General Site Vicinity

Plate 4 Aerial Photo of Immediate Site Area

SENTRY INSURANCE
OFFICE SITE

PRIVATE
LANDS

UW

UW

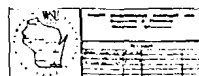
UW

PROPOSED LAKE SITE
UW- STEVENS POINT
FOUNDATION

FEDERAL
LAND

B.

FORREST
PARK



BOARD
OF
REGENTS
OF
STATE
UNIVERSITIES

WISCONSIN STATE UNIVERSITY

STEVENS POINT

LEGEND
PROPERTY LINE
LAKELAND

PROPERTY MAP

NTRY

NORTH POINT DRIVE

PROPOSED LAKE SITE
UW- STEVENS POINT
FOUNDATION

MOSES CREEK

RELOCATED CREEK

ROBERT AVENUE

MARIA STREET

RESERVE STREET

MICHIGAN AVENUE

AVENUE

MINNESOTA

0 500 1000



WARZYN ENGINEERING AND SERVICE COMPANY INC.

Consulting Engineers

PLATE NO. 2

PLATE NO. 3



WARZYN ENGINEERING AND SERVICE COMPANY, INC

Consulting Engineers

WISCONSIN



PLATE NO. 4

F. General Description of Proposed Action

1. Construction

The proposed lake is to be constructed by excavation of natural soils in the manner and configuration as indicated on the attached Drawing C 5573-A1. The exact method of excavation will be the responsibility of the contractor performing the work. It is anticipated however that most of the excavation will be accomplished using conventional large earth moving equipment capable of performing excavation and transporting the excavated materials to the Sentry Insurance Company office site. Excavation below the groundwater level will be facilitated by local dewatering of the soils in the immediate vicinity of the excavation. Some excavation by other means may also be employed. Approximately 800,000 cubic yards of material is proposed to be excavated from the site and transported to the Sentry Insurance Company office site.

Control of flow into the lake area will be accomplished by the construction of an earth embankment which will permit the overflowing of Moses Creek into the lake when flow equivalent to those resulting from a 7 to 9 year storm occur. The spillway will be faced with silty or clayey soils and/or pavement to control erosion. Spillway level will be set at approximately Elevation 1091.5.

Control of flow out of the lake into Moses Creek will be via an undersized pipe (18" to 24" diameter) flowing by gravity, to permit a slow lowering of the lake level after a storm to the level of the surrounding groundwater table. No attempt will be made to artificially maintain the water level of the lake at a level higher or lower than that of the immediate surrounding groundwater level.

Excess materials excavated for lake construction and creek relocation will be transported to the UW-Stevens Point athletic activity area located immediately to the southwest of the lake site and to the Sentry Insurance Company new office building site located approximately 3/8 mile to the northwest of the lake site. Materials would be transported primarily via large, over land, earth moving equipment. The haul routes would consist of the route of the proposed fire lane to be constructed to serve the lake site from the West, and along the road bed of the proposed Michigan Avenue Connection and/or along the existing fire lane which runs from the lake site to North Point Drive to the north. From there, the route would continue over land across lands controlled by Sentry Insurance Company to the office building site. The route would primarily pass through open areas and along lanes and vacated roadways. Some limited widening and improving of the existing fire lane to the North of the lake site may be required. This work would be required in any event in order to provide adequate fire protection and service access to the lake site.

2. Discussion - changes in land form, vegetation and water

The land form will be significantly affected in the immediate area of the lake by this action. In areas proposed to be used for swimming, the lake bottom will be sloped at a pitch of approximately 10 feet horizontal to 1 foot vertical. In the remaining areas of the lake, the lake bottom will be pitched at a slope of approximately 3 feet horizontal to 1 foot vertical. Flatter slopes will be experienced in some portions of the lake where shallower rock strata are encountered. Some wooded area and much brushy areas will be cleared to perform the construction. The remaining portion of the site actually occupied by the lake will be permitted to remain in its natural state except in those areas where ancillary facilities will be provided. The location and configuration of the lake has been established in such a manner so as to preserve as much of the natural wooded area as possible.

The excavation of the lake will expose the underlying groundwater strata. Significant changes in water quality are not anticipated.

MATCH TO SHT. A2

FIRE LANE TO NORTH POINT DR.

FIRE LANE FROM MICHIGAN AVE. EXT.

BEACH

10:1 SLOPE TO 10' DEEP

WOODS

WOODS

NOTE:

HIGH WATER EL - 1092 ±
MEAN WATER EL - 1087.5 ±

WOODS

1067 (TO BE CLEARED)

PROPOSED LAKE CONTOURS

3:1 SLOPE (TYPICAL)

EARTHEN EMERGENCY SPILLWAY CREST ELEV - 1091.5 ±

RELOCATED DITCH (F.L. EL. 1088 ±)

24" Ø R.C.P. BACKFLOW VALVE

RELOCATED MOSES CREEK

MARIA DRIVE

SCALE: 1" = 200'

APPROXIMATE PROPERTY LINE



MOSES CREEK

1090.5

1091.0

1501

1091.0

1092

1087

1077

1067

1092

1067

1077

1087

1092

DWN RGV

CHK'D RWT

APP'D [Signature]

DATE 10/2/74

CS573-A1

REVISION # 1 12/17/74

WARZYN ENGINEERING AND SERVICE COMPANY, INC.
MADISON Consulting Engineers WISCONSIN
PROPOSED LAKES
UW STEVENS POINT FOUNDATION, INC.
SENTRY INSURANCE CO.
MARIA DRIVE AT MICHIGAN AVE.
STEVENS POINT, WIS.

DWN RGV
CHK'D RWT
APP'D Rata W Tmgs
DATE 12/17/74
C5573-A2

NORTH POINT DRIVE

PRIVATE LANDS

UNIVERSITY OF WISCONSIN
STEVENS POINT
LANDS

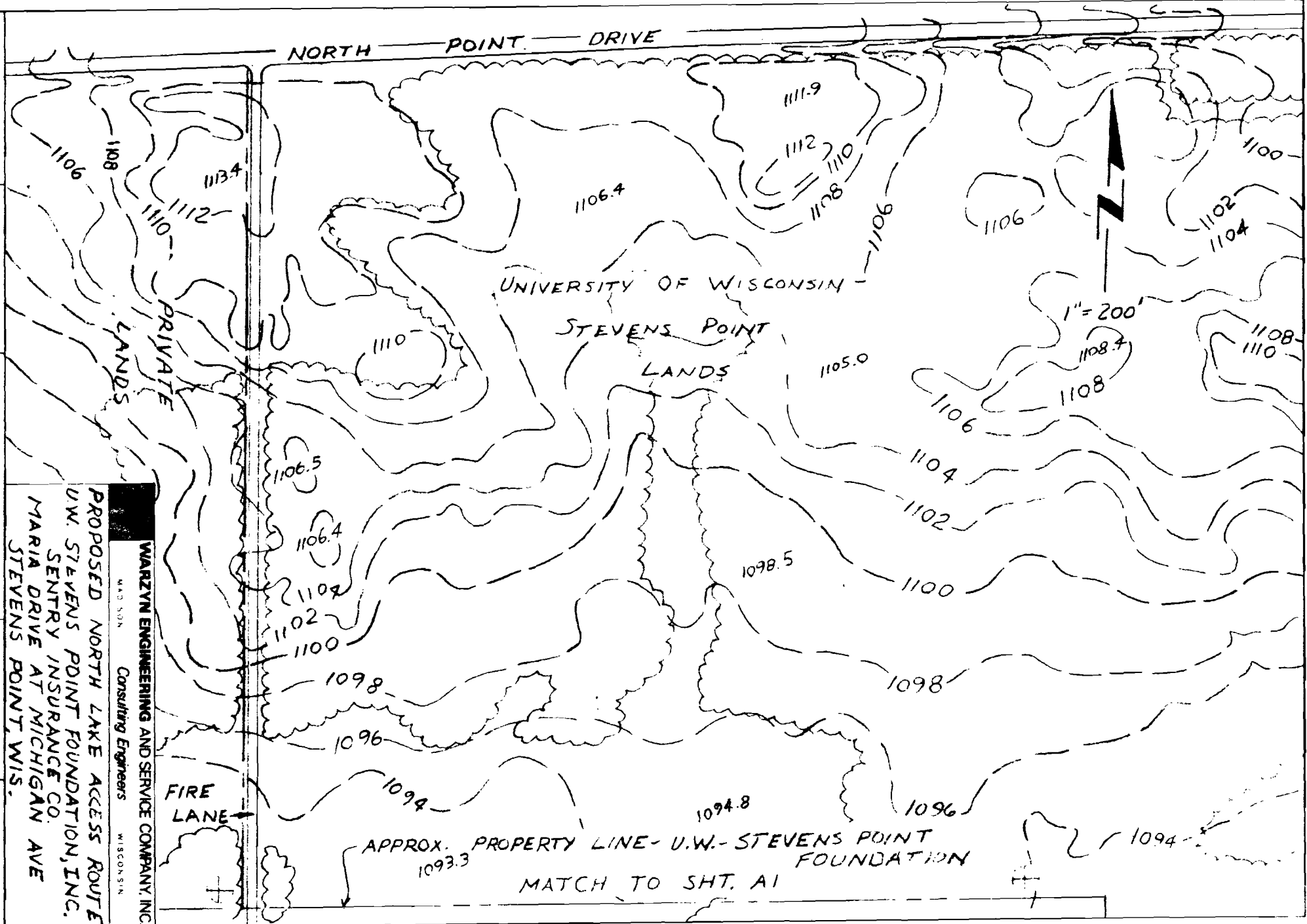
1" = 200'

FIRE LANE

APPROX. PROPERTY LINE - U.W. - STEVENS POINT FOUNDATION
MATCH TO SHT. A1

PROPOSED NORTH LAKE ACCESS ROUTE
U.W. STEVENS POINT FOUNDATION, INC.
SENTRY INSURANCE CO.
MARIA DRIVE AT MICHIGAN AVE
STEVENS POINT, WIS.

WARZYN ENGINEERING AND SERVICE COMPANY, INC.
MADISON
Consulting Engineers
WISCONSIN



II ENVIRONMENTAL IMPACT EFFECTS OF PROPOSED ACTION (EVALUATION)

A. Beneficial Effects

1. Provide an outdoor laboratory facility for aquatic and terrestrial study, outdoor classroom teaching, and independent research.
2. Provide ~~so~~ ~~rely~~ ~~needed~~ ~~ac~~quatic recreational facilities for the student body and faculty.
3. Provide relief to existing municipal parks which presently receive high usage by student population.
4. Provide temporary storage of peak storm water flows from Moses Creek resulting in relief of potential flooding conditions downstream in the campus and adjoining City areas. Extent of this relief is dependent on ambient groundwater levels existing at the time of the storm.
5. Create a fishery.
6. May tend to lower local water table thereby reducing neighborhood basement flooding.
7. Elimination of a mosquito breeding area.
8. Provide habitat and watering facility for wild animals, reptiles, amphibians, and birds.
9. Provide a convenient source of earth fills necessary to complete the construction of the Sentry Insurance Company office facility. These fill materials are required to provide earth embankments required to permit access to multi-level parking ramps constructed at the lower levels of the office building complex. Alternatives would require that other borrow sources located further from the site be utilized, thereby expending significantly greater amounts of energy for fuel for transportation of these soils and possibly resulting in removal of farm land adjacent to the City from production. An alternative to the multi-level parking structure would be to provide many acres of paved surface parking lots surrounding the office building, thereby destroying significant amounts of natural wooded areas which otherwise could be preserved on the office building site, and resulting in significant increases in the amount of storm water runoff from the office building site which would further tax already overloaded storm sewer facilities in the City of Stevens Point.

B. Adverse Effects

The major adverse effect would be the loss of the natural ecological communities, their habitat and components (plants and animals).

The actual adverse impact (plus beneficial impact) depends to a large degree upon what is to be done to the entire property during and after construction. If the vegetation on all except the actual lake site and its immediate shoreline was left undisturbed, it would aid in minimizing the ecological impact on the area. If the lake area is developed into a large recreation area (swimming, picnic, park and camping areas) it would be detrimental to the ecological diversity and stability of the entire north campus area. Re-establishment of natural ecological communities on the lake shores and disturbed areas, limiting human access, and minimizing development of beaches, park, camping, and picnic areas may actually increase the ecological diversity of the area and thus increase the ecological stability of the north campus area.

To prevent overuse, it is recommended that access to the property be managed to aid in preventing environmental degradation of the area.

C. Irreversible and Irretrievable Commitments of Resources Involved in the Project if it is Implemented

1. The construction of this project will provide a permanent lake structure and will result in the loss of some wooded and brush areas. Although the site is presently zoned commercial, the construction of this lake project would effectively insure that the use of this land area would remain as one of conservancy and recreation.

III ALTERNATIVES TO PROPOSED ACTION (Discussion and Alternatives)

A. No Action

1. Based on present zoning and trends evident in immediately adjoining areas, it is quite likely that this site would develop as high density residential and/or commercial usage. Proposed annexation action by the City of Stevens Point would cause the rezoning of these lands to conservancy use.
2. The University of Wisconsin - Stevens Point would lose an opportunity to have a lake constructed for them by one of the major employers of the City of Stevens Point.
3. Alternative earth borrow sources would have to be developed by Sentry Insurance Company to complete the work of their current office construction project. Alternative borrow sites might be located significantly further from the site and consequently result in the expending of significantly greater amounts of energy in the transportation of these materials to the site. These borrow sources possibly could be located in the agricultural areas to the north of the City.

B. Other Alternatives Considered

1. No other potential lake site located in the immediate vicinity of the campus is presently available to the University.
2. Other potential earth borrow sources have been investigated by Sentry Insurance Company. These sites are not as convenient to the office building site and would not provide the academic and recreational benefits which could be accomplished by this project.

IV AGENCIES, GROUPS, CLUBS, COMMITTEES OR INDIVIDUALS CONTACTED
REGARDING PROJECT

January 10, 1974 Meeting - Vickerstaff and Specht

January 11, 1974 Meeting - Vickerstaff and Mayor of Stevens Point

January 23, 1974 Meeting - Vickerstaff and Industrial Development Group

January 30, 1974 Meeting - Vickerstaff with Environmental Awareness Council

February 1, 1974 Meeting - Vickerstaff with Specht

February 5, 1974 Meeting - Vickerstaff with Exo, Bert Anderson, and Don Gerhard

February 19, 1974 Meeting - Vickerstaff with Mayor of Stevens Point and Mr. Hoffbeck

February 19, 1974 Meeting - Vickerstaff and representatives of Sentry Insurance Company

February 27, 1974 Meeting - Vickerstaff and Specht

March 18, 1974 Meeting - Vickerstaff and Borham

April 11, 1974 Meeting - Vickerstaff and Charles Gust

April 11, 1974 Meeting - Vickerstaff and Mayor of Stevens Point

April 16, 1974 Meeting - Vickerstaff and Mr. Exo

April 23, 1974 Meeting - Vickerstaff with Industrial Development Committee

April 24, 1974 University of Wisconsin-Stevens Point Foundation Meeting

April 25, 1974 Regional Planning Commission Meeting

April 29, 1974 Conference in Madison

May 9, 1974 Conference in Madison

May 9, 1974 Meeting - Vickerstaff and Mr. Exo

May 10, 1974 Meeting - Vickerstaff with Mayor of Stevens Point and Mr. Exo

May 20, 1974	Meeting - Vickerstaff and Trainor
June 3, 1974	Meetings - Vickerstaff with Specht and Mayor of Stevens Point
June 11, 1974	Stevens Point Board of Public Works Meeting
June 25, 1974	Meeting - Vickerstaff and Trainor
July 8, 1974	Meeting - Vickerstaff and Willard Warzyn
July 16, 1974	Meeting - Vickerstaff, Warzyn, Trefz, Good, Gremmer, and the Mayor
July 30, 1974	Meeting - Vickerstaff, Warzyn, Trefz, Good, Kumlien, Roden, Gerhard, Gebken, and Besadny
August 5, 1974	Meeting - Vickerstaff and Specht
August 27, 1974	Meeting - Vickerstaff, Warzyn, and Trainor
August 27, 1974	Meeting - Vickerstaff and the Mayor
August 27, 1974	Meeting - Warzyn and Hiram Krebs
August 27, 1974	Meeting - Warzyn and Gremmer
September 3, 1974	Conference - Warzyn and LaVerne Morehouse
September 5, 1974	Meeting - Vickerstaff and the Mayor
September 12, 1974	Conference - Warzyn and Morehouse
September 13, 1974	Meeting - Vickerstaff, Warzyn, Trainor and Hillier
September 17, 1974	Meeting - Vickerstaff, Trainor, Warzyn, Anderson, Copes, Freckmann, Hillier, Shaw, White and Specht
September 26, 1974	Conference - Warzyn and Morehouse
September 30, 1974	Conference - Warzyn and Wally Berg
September 30, 1974	Meeting - Vickerstaff and City of Stevens Point Common Council
October 1, 1974	Meeting - Fred Copes and Jeffrey Littlejohn
October 2, 1974	Meeting - Vickerstaff and Lyle Updike
October 3, 1974	Meeting - Vickerstaff and Mayor Borham

October 7, 1974	Meeting - Copes and Steven Gutreuter
October 8, 1974	Meeting - Copes and Littlejohn
October 9, 1974	Meeting - Copes and Gutreuter
October 10, 1974	Meeting - Copes and Environmental Council
October 10, 1974	Meeting - Copes and Updike
October 10, 1974	Meeting - Vickerstaff and Zoning Commission
October 11, 1974	Meeting - Copes and Robert Wiza of the Ecological Task Force
October 14, 1974	Meeting - Vickerstaff and Environmental Council
October 15, 1974	Meeting - Vickerstaff and City Planning Commission
October 15, 1974	Meeting - Copes and Wiza
October 18, 1974	Conference - Warzyn and Morehouse
October 23, 1974	Meeting of Staff Members of the Biology Department and College of Natural Resources
October 29, 1974	Meeting - Copes and Wiza
Period from September 20 to October 28, 1974	Conferences - Copes and approximately 30 interested students
November 1, 1974	Conference - Warzyn, Trefz and Copes
November 5, 1974	Meeting - Vickerstaff, Trefz, Warzyn, Copes, Gerhard, Updike and others
November 5, 1974	Informal public hearing moderated by Updike, sponsored by the University of Wisconsin - Stevens Point Student Government
November 6 to date	Numerous items of correspondence, conferences, meetings, with County Zoning staff, University staff, McKnight, Gebken, Nestigen, Morehouse, Wisconsin Department of Natural Resources and other parties who have expressed interest in the project and/or have offered comments and suggestions pursuant to the November 5, 1974 meeting.

V. EVALUATION SECTION.

EFFECTS Changes to or Results in:	YES	NO	Positive	Negative	Magnitude			Comments (Add additional pages if needed)
					Some	Major	Un- Known	
A. Campus Plan		X						Proposed action is consistent with campus plan
B. Community Plan		X						No community plans for this area exist
C. Regional Plans		X						No regional plans for this area exist
D. Land Use (Zoning)	X		X			X		See attached for comments
E. Urban Development Encouraged Requiring Additional Service Expenditures		X	X					
F. Vehicular Traffic Patterns/Services	X			X	X			See attached for comments
G. People Traffic Patterns	X		X			X		See attached for comments
H. Archeological, Historic, Scientific or Other Unique Sites		X	X					
I. Unique Environmental Land Forms or Sites		X	X					
J. Water Quality/Supply, i.e., Lakes, Rivers, Marshes	X		X			X		
K. Air Quality and Pollution		X	X					
L. Energy Requirements		X	X					
M. Erosion or Siltation <u>Except</u> Temporary Effects during Construction Period		X	X					
N. Temporary Erosion during Construction	X			X	X			See attached for comments
O. Plant or Animal Life	X		X		X			See attached for comments
P. Health Hazard		X	X					

EFFECTS Changes to or Results In:	YES	NO	Positive	Negative	Magnitude			Comments (Add additional pages if necessary)
					Some	Major	Un- Known	
Q. Mineral and Fuel Use		X	X					
R. Services, i.e., Sewer, Water, Electric Communications, Police, Fire	X			X	X			See attached for comments
S. Local Economy		X						
T. Social Impact	X		X			X		See attached for comments
U. Aesthetics and Visual Effects	X		X			X		See attached for comments
V. Transportation, i.e., Parking, Transit, Bicycle	X		X		X			See attached for comments
W. Effect on Public Use	X		X			X		See attached for comments
X. Noise <u>Except</u> Temporary during Construction		X	X					
Y. Odor <u>Except</u> Temporary during Construction		X	X					
Z. Potential for Resolving Conflicts	X		X			X		See attached for comments
* Miscellaneous (add items that may aid in evaluation)								

V EVALUATION SECTIONCOMMENTS

- D. Site is presently zoned commercial and quite possibly would otherwise be developed as high density residential and/or commercial usage. Present annexation action pending would change this zoning to conservancy.
- F. The proximity to the campus in absence of parking facilities should effectively minimize the generation of vehicular traffic relative to this facility.
- G. This construction will make this area much more accessible to students and faculty.
- N. Scheduling of major portions of work during Winter months and conscientious actions by the contractor and developer should result in minimal affect.
- O. Lake construction will provide a habitat for fish and other aquatic life as well as terrestrial animal life.
- R. Extremely limited services would be required for public safety and sanitation.
- T. A much needed recreational facility will be provided for students and faculty.
- U. This construction should provide a very attractive recreational facility.
- V. Some facilities for bicycle parking would probably be provided.
- W. The lake development would very substantially increase the use of this site by the public.
- Z. The recreational attributes of this facility will reduce significantly conflicts between local residents and students in the use of present municipal park facilities. Municipal park facilities would still probably be utilized for group and non-water sport activities.

VI. CONCLUSIONS (Check appropriate answers)

	YES	NO
A. Contrary to campus, community, regional plans?	_____	X _____
B. Substantial effect on waters?	_____	X _____
C. Substantial land use alteration?	X _____	_____
D. Significant effect on air quality?	_____	X _____
E. Substantial environmental change without replacement or improvement?	_____	X _____

VII. RECOMMENDATION (Check appropriate box)

No significant impact (EIS not necessary)

Prepare EIS (Mandatory if 3 or more items in conclusions are positive)

Respectfully submitted,

WARZYN ENGINEERING & SERVICE CO., INC.

Robert W. Trefz

Robert W. Trefz
Professional Engineer

Willard W. Warzyn

Willard W. Warzyn
Professional Engineer