Lake Ashtabula Master Plan

for

Public Use Development
& Resource Management

U.S. Army Corps of Engineers
Bather Ringrose Wolsfeld

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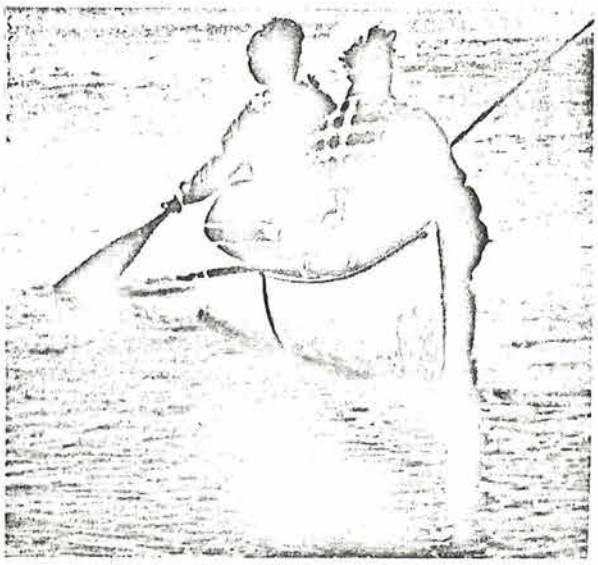


i Preface

This document updates the "Master Plan for Resource Management, Baldhill Dam and Lake Ashtabula Reservoir" dated March, 1967. Design philosophy and a number of other factors have changed over the past ten years. Among these factors are:

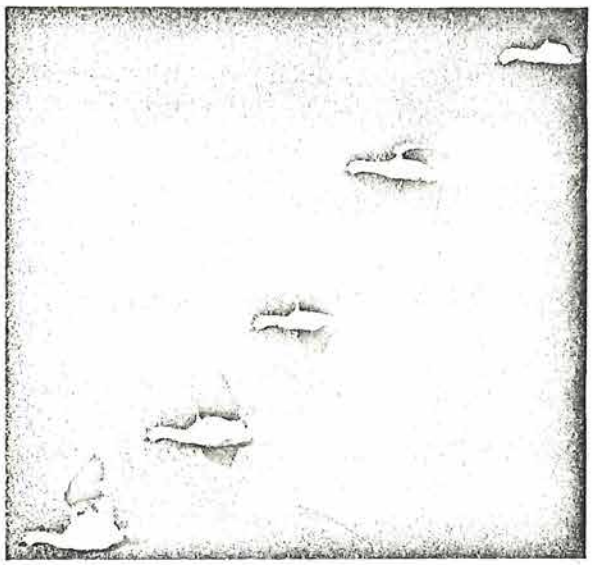
- increases in demand for outdoor recreation facilities.
- development of new recreational vehicles.
- shifts in participation rates and/ or popularity for various recreational activities.

In October, 1976, the St. Paul District Corp of Engineers engaged the consulting firm of Bather-Ringrose-Wolsfeld, Inc., Edina, Minnesota (Contract No. DACW37-76-C-0228) to develop an updated Master Plan for Public Use Development and Resource Management at Lake Ashtabula.

The recommendations contained in this Master Plan are geared to federal lands administered by the U.S. Army Corps of Engineers.

Because of the limited public land holdings around the Lake, these recommendations can only be implemented through a

cooperative effort which includes the local residents and concerned federal, state and local agencies.



ii Summary

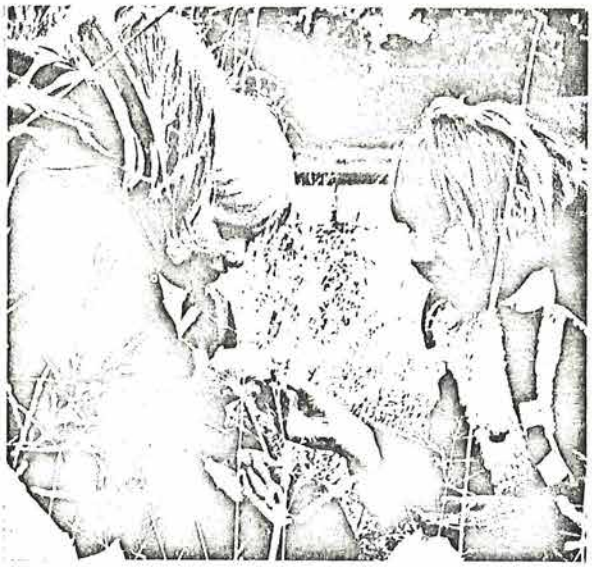
This master plan provides a guide by which Lake Ashtabula can be developed and managed to its maximum proper potential. The master plan evaluates environmental and land use data relating to Lake Ashtabula, recommends land uses, management strategy and scheduling for needed resource development and provides estimates of cost for proposed development. A series of fact-finding public interaction sessions with residents of the Lake Ashtabula area and concerned public agencies have been an essential part of the planning process.

This master plan is presented in three parts. The first part provides a review of existing project features, pertinent laws, an overview of the concerns expressed by area residents and other involved public agencies, along with a review of the quality and adequacy of existing recreational facilities.

The second part contains revised site plans, a design tone for landscape and building elements, a staging plan for needed facility development and construction costs estimates.

The third part updates existing management policies so that the plans and desires expressed in the second part can be implemented in the most environmentally sound and economic way possible.

A goal of project management is to preserve, improve and manage Lake Ashtabula, and its environs for equitable use and enjoyment of all. This master plan will help achieve proper use of the lands and waters of this regionally significant resource.



1 Introduction

Project Authority

1.01 Lake Ashtabula and Baldhill Dam were authorized by the Flood Control Act of 1944. Under that legislation the Corps of Engineers was authorized to implement flood damage reduction measures and improve water utilization.

1.02 During 1892, 1897, 1916, and 1919, the Sheyenne River overflowed its banks and caused significant damage. Then in the 1930's the river basin experienced a serious drought and many river towns lost their water supply. Plagued by the two extremes in water levels, the residents of the river basin asked for help. The Corps of Engineers was asked to study these problems and as a result, a flood control and water supply project was proposed and authorized which, resulted in the construction of Baldhill Dam.

Project Purpose

1.03 Lake Ashtabula is a multi-purpose project, operated for flood control, water supply and to provide recreational opportunities. It is operated primarily for control of the heavy spring runoff from snow melt in order to achieve flood damage reduction in the areas downstream of the dam.

1.04 During the late summer and early fall low-flow periods of the Sheyenne River, the stored water can be released for water supply, irrigation and low flow augmentation to areas downstream of the dam.

1.05 In recent years the importance of providing recreational opportunities has increased. Lake Ashtabula is located in an area where there are few natural water bodies, consequently, this large expanse of water draws large numbers of visitors each year.

Purpose of Master Plan

1.06 The purpose of the Master Plan is to provide guidance that assures conservation of scenic, biological, and recreational resources of the project while, and at the same time, not adversely affecting the primary purposes of the authorized project.

1.07 The Master Plan addresses measures for development and management of the lands and waters of Lake Ashtabula and makes recommendations for enhancing the natural resources and recreational opportunities at the Lake.

1.08 The master plan identifies areas suited to recreational use, identifies which areas should be left to their natural state and recommends how all areas could be improved or managed to minimize deterioration.

1.09 The master plan also analyzes existing development and management practices to determine how well they work and recommends modifications to accommodate changed conditions which have occurred since the previous Master Plan was approved.

Prior Design Memoranda

1.10 General information relating to the background, justification and recommendations for Lake Ashtabula and Baldhill Dam is contained in:

> Senate Document No. 193,
> 78th Congress, 2nd Session.

1.11 Inasmuch as the original project report did not include consideration of the recreational possibilities of the project the following was prepared by the Corps of Engineers:

> Lake Ashtabula and Baldhill Dam Master Plan for the Administration and Development of Project Land and Water Areas, May, 1953.

1.12 Fourteen years later the Corps of Engineers prepared a master plan which provided for the increased demand and developed plans for yet undeveloped sites.

> Master Plan for Resource Management Baldhill Dam and Lake Ashtabula Reservoir, March, 1967. (Approved September 26, 1967)

Applicable Public Laws and Policies

1.13 There are a number of public laws, executive orders and policies or regulations which affect the planning, development and management of any Federal project. Listed below are those which are most applicable to the development and management of Lake Ashtabula.

Public Law 93-291, Enacted in 1974

The Archaeological Conservation Act provides for the preservation of significant scientific, prehistorical, historical, or archaeological data which would otherwise be lost or destroyed as a result of any Federal project. To carry out the purpose of this act, the Federal agency responsible, may authorize up to 1% of the total project cost for recovery of the historical and/or cultural data.

Executive Order 11593 (1971)

This Presidential order directs Federal

agencies to institute procedures to protect and enhance both Federal and non-Federal properties of cultural significance. Agencies are directed to inventory their lands and nominate worthy items for inclusion to the National Register. It also protects such lands from being sold, demolished or altered until proper review for cultural significance.

Public Law 91-190, Enacted January, 1970

This is the National Environmental Policy Act of 1969 (83 Stat. 852). It defined a national policy for protection and enhancement of the environment, established a Council of Environmental Quality, and set forth the requirement for an environmental impact statement on any Federal action significantly affecting the environment.

Public Law 89-665, Enacted in 1966

The National Historic Preservation Act of 1966 declared that the historical and cultural foundations of the nation should be preserved as a living past of our community life and development. It provides for Federal assistance to state and local governments, private organizations, and individuals in historic preservation.

Public Law 89-72, Enacted July 9, 1965

The Federal Water Project Recreation Act of 1965 determines that full consideration be given to opportunities offered by outdoor recreation, fish and wildlife resources, and further provided for a non-Federal participation in land acquisition, development and management of these resources (cost-sharing).

Public Law 93-205, Enacted December, 1965

This law is also cited as the Endangered Species Act of 1973. This law amends the Endangered Species Act of 1969. It is applicable to the protection and management of any endangered species of fish, wildlife, or plant in the project area. Proposed development in the updated master plan allows for the protection of threatened species and species having a wide range of influence, such as migratory waterfowl and fish.

Public Law 534, Seventh-Eighth Congress, Enacted December 22, 1944

Section 4 of this law, the 1944 Flood Control Act, as amended in 1946 and 1954 and by Section 207 of the 1962 Flood Control Act (Public Law 87-874), sets forth the basic departmental authority for the administration and development of project land and water access.

Public Law 74-942, Enacted in 1935

The Historic Sites Act declares it to be a national policy to preserve, for the public, prehistoric and historic sites, buildings, and objects of national significance. It also establishes an Advisory Board on National Parks, Historic Sites, Buildings, and Monuments.

Public Law 59-209, Enacted June, 1906

Public Law 59-209, the Antiquities Act of 1906 (34 Stat. 225), June 8, 1906, provided for the preservation and protection of antiquities on public lands, including archeological remains and historic sites.

There are also a number of internal policies and/or regulations which have been developed by the Corps of Engineers and pertain to all Corps projects. Those listed below are those most applicable to the Lake Ashtabula Master Plan.

EC-1105-2-37
Identification and Administration of Cultural Resources

EC-1105-2-65
Resource Use: Establishment of Objectives

ER-1105-2-129
Preservation and Enhancement of Fish and Wildlife Resources

ER-1110-2-400
Engineering and Design: Design of Recreation Sites, Areas and Facilities

ER-1120-2-400
Investigation, Planning and Development of Water Resources Recreation Resources Planning

ER-1120-2-404
Investigation, Planning and Development of Water Resources Federal Participation in Recreational Development

ER-1130-2-400
Project Operation Recreation-Resource Management of Civil Works Water Resource Projects

ER-1130-2-401
Visitor Center Program

ER-1130-2-406
Lake Shore Management at Civil Works Projects

ER-1165-2-400
Water Resource Policies and Authorities Recreational Planning, Development and Management Policies

2 Project Description

Project Location

2.01 Lake Ashtabula is located on the Sheyenne River in the eastern central portion of North Dakota. The Sheyenne River originates in central North Dakota and flows approximately 500 miles southeasterly and joins the Red River of the North about 10 miles north of Fargo, North Dakota.

2.02 At Baldhill Dam, all the developed public use areas and the bulk of the Lake's surface water lay in Barnes County. The upper portions of Lake Ashtabula and related Federal lands are located in portions of Griggs and Steele Counties. (Plate 1) By highway, the dam is about 75 miles west of Fargo and about 12 miles northwest of Valley City, the Barnes County Seat.

Project History

2.03 Construction of Baldhill Dam began in July of 1947. In the spring of 1950 the Dam, although not entirely completed, was placed in emergency operation because of severe flooding conditions. The Baldhill Dam was substantially completed in June of 1950 and formally dedicated on September 21, 1952.

2.04 A master plan for administration and development of the project land and

water areas of Lake Ashtabula was approved in May of 1953. Recreation facility development proceeded in accordance with that master plan. The Barnes County Park Board developed eight public use areas at Lake Ashtabula on various sites leased from the Corps of Engineers. These sites included: East Ashtabula Crossing, West Ashtabula Crossing, Eggert's Landing, Katie Olson's Landing, Sundstroms Landing, the Main Public Use Area, Keyes Crossing and Old Highway 26 Crossing. The Park Board developed camping and day use facilities at these sites and engaged in an extensive tree planting program with State assistance. At Old Highway 26 Crossing the Corps of Engineers developed most of the facilities and did extensive tree planting.

2.05 In the mid-1960's, Barnes County returned all but three sites to the Corps of Engineers. The remaining County sites were East Ashtabula Crossing, West Ashtabula Crossing and Eggert's Landing. Eggert's Landing has since been returned to the Corps for management. Because of increased maintenance costs of these sites, the County could not afford to maintain them, thus the reason for their return.

2.06 At this time there are no major construction activities underway. Some construction work has been in process to correct a seepage problem at Baldhill Dam.

Project Lands

2.07 Lake Ashtabula is located entirely on Federally owned lands. However, the band of Federally owned land around the lake is extremely narrow and in certain areas is reduced to only a few feet. At points along the lakeshore this Federal ownership expands such that there is room for recreational facilities. It is within these larger tracts that the existing recreational development has taken place.

Figure 1

Project Data

Total Project area:	8483 acres
less flowage easements:	667 acres
Total area in Federal ownership:	7816 acres
Federally owned lands:	7816 acres
less normal pool area	5430 acres
Total project lands:	2386 acres
Total project lands:	2386 acres
less leases (includes the two county maintained recreation areas:	1538 acres
Corps managed lands:	848 acres
Corps managed lands:	848 acres
less developed sites (the six public use areas):	147 acres
BALANCE	701 acres

2.08 Much of the Federally owned land acquired for the project is leased for the purposes of wildlife management. The lands immediately below the dam are used by the U.S. Fish and Wildlife Service for fish hatchery ponds. The Federal lands along Baldhill Creek as well as the marshed areas above the lake are leased to the North Dakota State Game and Fish Department as refuge and wildlife management areas.

2.09 Most recently, in response to established directives the problems of private encroachments, alterations of shoreline and removal of natural vegetation were addressed in an interim Lakeshore Management Plan. This plan designates areas of the lakeshore which are to remain natural and untouched and those areas where limited development is permitted under a permit and/or license

program. This management plan was developed through a combined effort of Federal, State and local government agencies and local special interest groups.

Project Structures

2.10 Baldhill Dam consists of a compact earth embankment with a crest elevation of 1,278.5 feet. The top is 20 feet wide, the maximum height is 61 feet above the stream bed, and the length from the east abutment to the spillway structure is approximately 1,650 feet. The spillway structure is a concrete ogee overflow section surmounted by three 40 x 16 foot tainter gates; at maximum surcharge pool (elevation 1,273.2), spillway capacity is 43,100 c.f.s. (U.S. Corps of Engineers, 1967).

2.11 There are three major buildings located on the west end of the dam near the spillway structure:

- Shop and office building to house government vehicles and provide park manager and office space for the dam operator. The building measures approximately 40 feet by 120 feet.
- Shop and storage shed building located adjacent to the spillway structure. This building measures about 35 feet by 60 feet.
- The park manager's residence is located between and north of the two shop buildings.

2.12 Another major building is located near the east end of the dam in the Main Public Use Area. This building measures approximately 50 feet by 50 feet and is two stories high. The lower level houses restrooms and changing facilities for the swimming beach, adjacent to the building. The upper level is divided into an office

Figure 2

Grantee	Acreage	Purpose
Fish and Wildlife Service	37.1	Fish Hatchery
North Dakota Game & Fish Dept.	1.419.0	Wildlife Management
Griggs County Wildlife Assn.	1.0	Recreational
Board of Trustees, United Methodist Camp, A North Dakota Conference	6.0	Recreational (South of Eggert's Landing)
Luthern Welfare Society, ND	5.0	Recreational (South of Eggert's Landing)
Barnes County Park Board, ND	34.3	Park and Recreation
Freadhoff, George, Jr.	1.53	Commercial Concession (Eggert's Landing)
Paulson, Robert D.	0.57	Commercial Concession (Main Public Use Area)
North Dakota National Guard	33.3	Recreational (South of Eggert's Landing)

for the Area Park Manager and a display area for interpretive exhibits and functions as a public meeting hall as the need arises.

Reservoir Operation

2.13 Each year, flood-control storage is made available in the Lake by releasing the stored water after October 1, to assure a draw-down to at least elevation 1,262.5 by March 1. Drawdown below that elevation is accomplished when warranted by forecasts of larger than normal spring runoff, heavier than normal snow, downstream water supply conditions, or other pertinent factors.

2.14 During the spring and summer the Lake is then filled to elevation 1,266.0 by the spring runoff and snowmelt. The outflow during this high water period is regulated to prevent or reduce flooding at Valley City and other communities downstream. Following the spring runoff period, the discharge from the Lake will never be less than 10 c.f.s. To supplement natural flows downstream for water supply, outflow from the lake will be increased, as required, if sufficient storage is available.

2.15 It is during the summer that the heaviest recreational activity takes place. It is also during the summer that the lake is at its highest level. Thus, during the summer recreational months the Lake is at its greatest depth and has its largest water surface to provide the most opportunity for recreational usage.

Visitation

2.16 Visitation of the Lake Ashtabula project has been on a steady increase since the late 1960's when yearly visitation figures were first developed. During the last five years there has been an average yearly increase of 4-5% in visitation. The lake is also well used in the winter months providing excellent fishing and snowmobiling opportunities. During the winter of 1975-1976 it was estimated that between 1,800 - 2,000 people per month used Lake Ashtabula for winter recreation (U.S. Army Corps of Engineers).

Figure 3

Reservoir Data

Drainage area above dam	4,138 square miles
Average summer storage capacity (ele. R660)	70,700 acre-feet
Maximum storage capacity (elev. 1273.2)	116,500 acre-feet
Desirable operating limits	1262.5 - 1266.0
Desirable summer range	1265.0 - 1266.0
Maximum elevation ever attained	1268.0
Lowest elevation ever attained	1257.5
Lake Area at summer pool (1266.0)	5,430 acres
Length at summer pool (1266.0)	27 miles
Maximum width at summer pool (R66.0)	0.6 mile

2.18 Project costs associated with Lake Ashtabula operation and maintenance has increased in past years. Ten years ago those cost associated with recreation amounted to about one fourth of the total expenditures. Today over one half of all expenditures are recreation oriented. The recreation experience at Lake Ashtabula is increasing in importance.

Figure 4

Yearly Visitor Days*

1971 - 386,833
1972 - 453,200
1973 - 448,666
1974 - 466,026
1975 - 496,600

*U.S. Army Corps of Engineers RRMS 1975 Visitation is latest revised project figures.

Yearly visitor days are developed from traffic counts taken at each site and based on 3.8 people per car.

2.17 In addition to the use of the developed recreational sites there are a number of visitors or users who live year-round along the lake or who own or rent summer cottages along the lake. These people are not always counted unless they use the recreational facilities, but they are never-the-less, using the lake as recreation, whether it be only sightseeing. Lake Ashtabula is well used and provides recreational opportunities for almost a half a million visitors a year.

3 Influencing Factors

General

3.01 Factors directly or indirectly affect resource management and recreational opportunities at Lake Ashtabula are discussed in the following paragraphs.

Climate

3.02 The average annual precipitation over the Lake Ashtabula basin is less than 19 inches (Figure 5). As shown in Figure 6, the months with the highest average precipitation are June, July, and August. Winter precipitation is light with heavy snowfalls being the exception rather than the rule. Snowfall data for Valley City and Lake Ashtabula is not available but it is estimated that this region receives about 32 inches of snowfall annually (Figure 7). Snowfall charts for Fargo and Grand Forks are included in Figure 8, to give an indication of snowfall patterns for the region. It is the combination of the spring snowmelt and the additional runoff from the spring rains that has caused the majority of the damaging floods on the Sheyenne River.

3.03 The terrain surrounding Lake Ashtabula is flat and open. For this reason wind is a major factor in the climate of the project area. The summer winds are generally out of the southeast, blowing up the river valley, with the winter winds

Figure 5

Annual Mean Precipitation in Inches

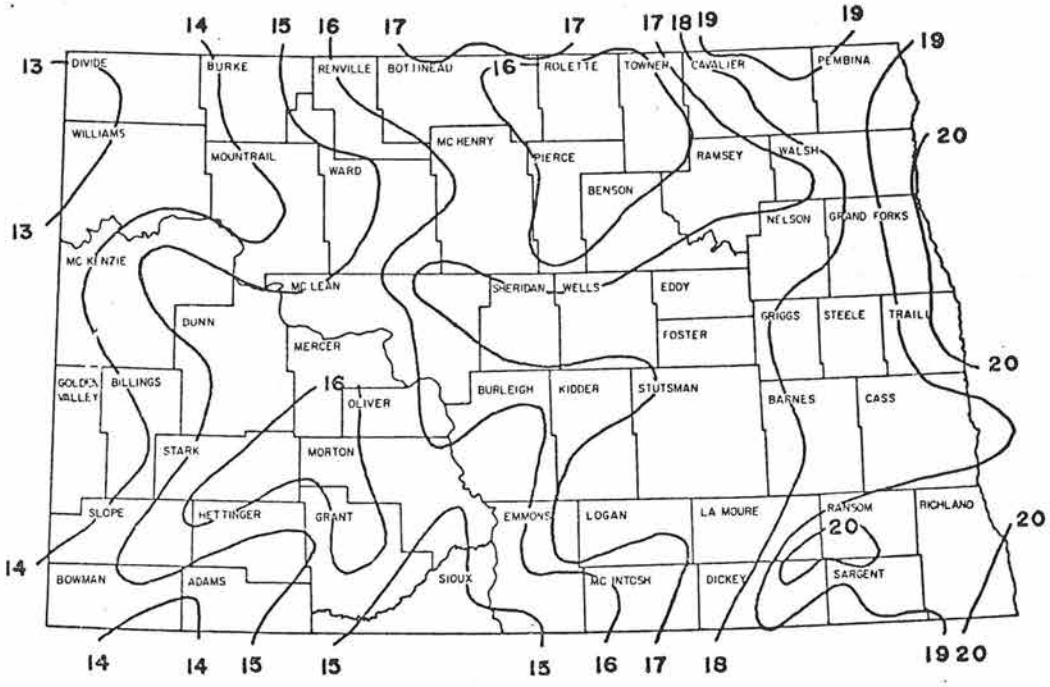
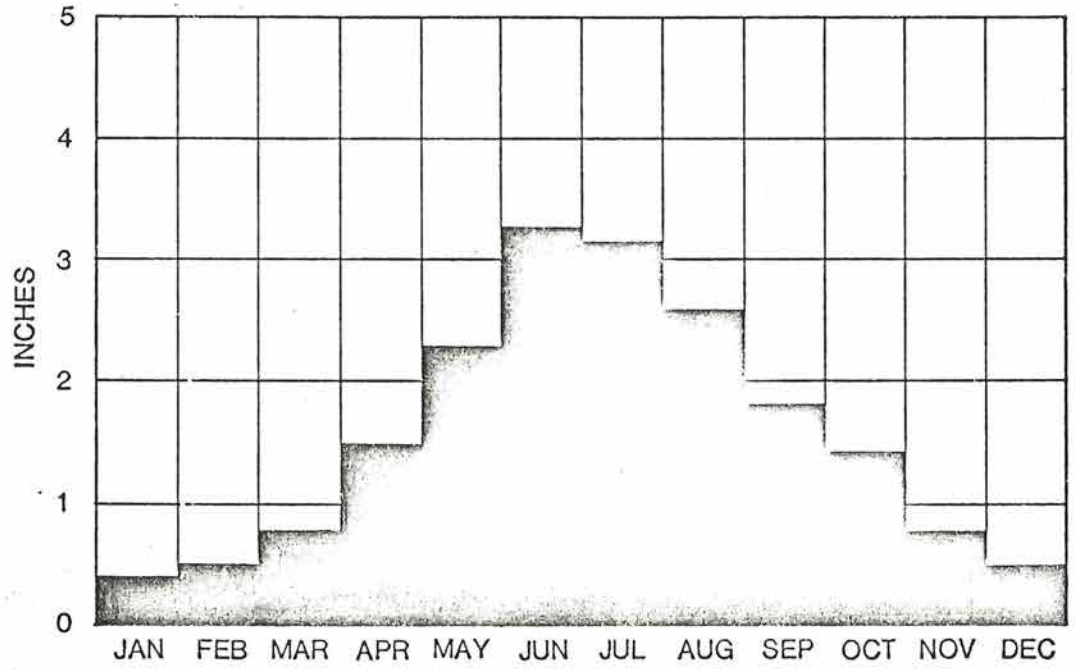


Figure 6

Average Precipitation



blowing out of the northwest. Wind speed has a direct and significant effect on human comfort as it relates to temperature. Winds tend to cool at temperatures below 98.6°F. and heat at temperatures above 98.6°F. Since temperatures in the project area rarely exceed this figure, the cooling effects of wind are the most pertinent to this project. Wind speeds in this area are high, compared to other areas in the Midwest. Wind speeds average 15 miles per hour speeds at 30-40 miles per hour are common (Roy E. Jensen, 1976). Because of the flat open terrain the winds are not dispersed or slowed and remain constant. In the planning of recreational facilities the constant wind is an important factor.

3.04 The summers at Lake Ashtabula are generally comfortable averaging in the low 70's with very few days of hot and humid weather. Nights, with a few exceptions, are comfortably cool, in the upper 50's. The winter months are cold and dry with maximum temperatures rising above freezing only on an average of 6 days each month, and night time lows dropping below zero approximately half of the time. Figure 9 shows the average high and low temperatures for Lake Ashtabula on a monthly basis. Wind is an important factor in the winter as well as summer. A wind chill index (Fiure 10) is included to illustrate the relationship between wind and temperature in terms of human comfort. If winter recreational activities are to be programmed for Lake Ashtabula there will need to be shelters provided for wind protection.

Geology, Topography and Soils

3.05 Lake Ashtabula lies at the eastern edge of the Williston Basin, a large sedimentary basin stretching from the Dakotas to Montana and north into Manitoba and Saskatchewan. This basin is characterized by deposits of glacial till and outwash sands lying on top of dark colored shales of the Pierre Formation. The

Figure 7

Average Mean Annual Snowfall for Period 1930-31 through 1959-60

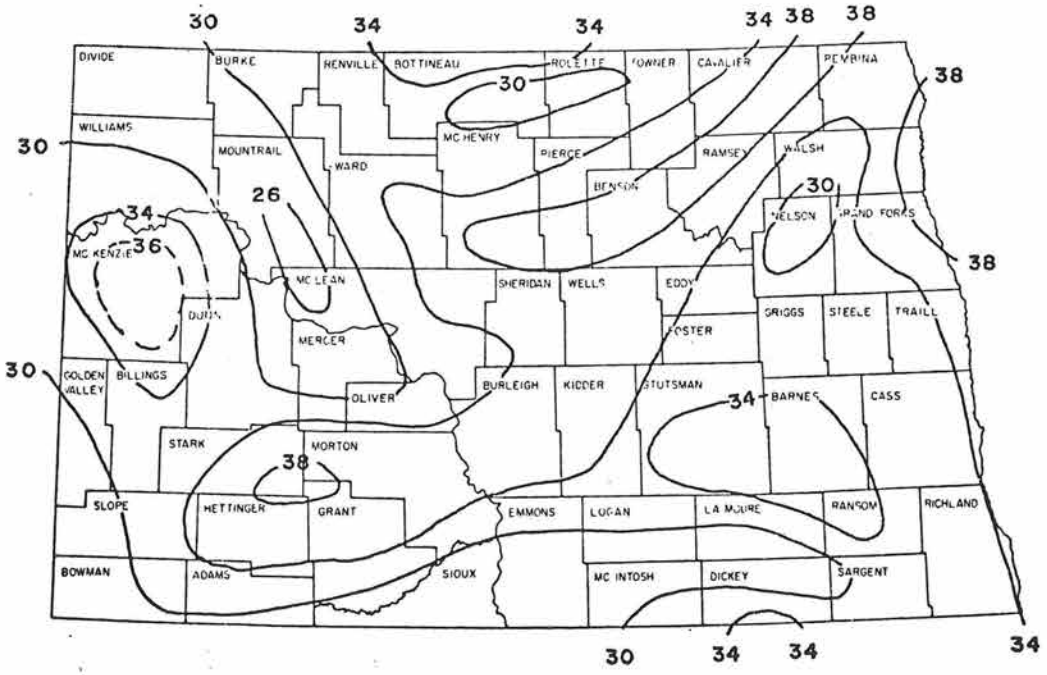
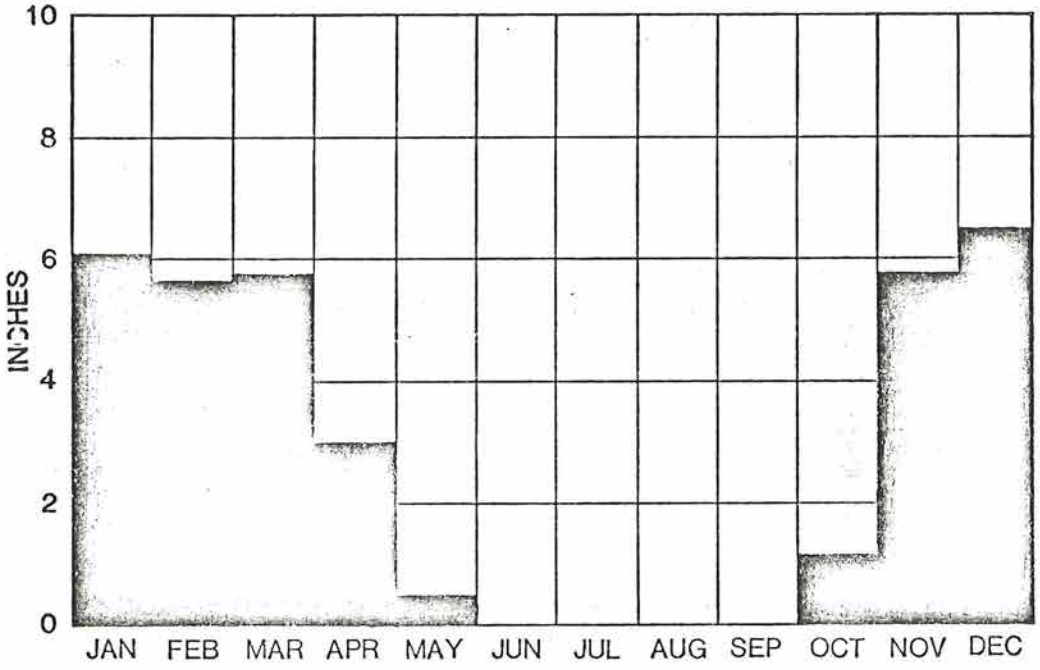


Figure 8

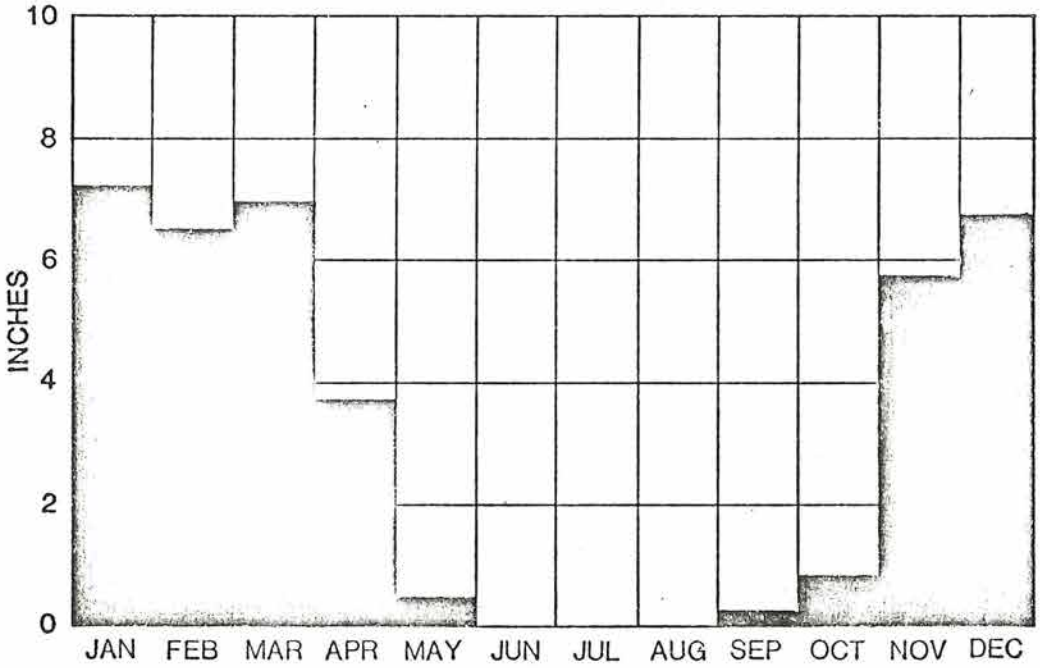
Average Snowfall

Grand Forks - East Grand Forks



Average Snowfall

Fargo - Moorhead



Sheyenne River Basin landforms and drainage system was formed at the time of the late Wisconsin Period glaciation and was a meltwater channel from Glacial Lake Souris (Institute for Ecological Studies, 1974). Large boulders transported from the Canadian Shield by the ice sheets are quite common. The till has an average thickness of about 200 feet, but ranges from less than one foot to 100 feet. At Baldhill Dam the valley is about two hundred feet below the till plain level and it ranges from one-half to one mile wide. Ground water levels have not been affected by Lake Ashtabula because of the impervious glacial tills and shale bedrock surrounding the reservoir.

3.06 The Sheyenne River valley is deeply cut into relatively flat regional topography, the typical slope of which, is about 15 feet per mile. Because of this flatness, the Lake is difficult to perceive from as near as a half-mile to the east or west. The slopes immediately surrounding the Lake are moderate to steep. with frequent and deep branching ravines. Because of the steepness, agricultural use in the area is typically limited to grazing with some scattered areas under cultivation. There are also spotted developments of homes and summer cottages on the flatter terrain along with the recreational areas. The actual project lands are not used for either grazing or farming but act as natural buffers between the lake and the non-project lands.

3.07 Soils in the Lake Ashtabula basin are of the Buse and Renshaw soil series. Both these soils are a dark friable loam, well drained, available water capacity being high and high susceptibility to wind and water erosion. These soils are not very productive and when cultivated they become moderately to severely eroded (Institute for Ecological Studies, 1974). Since these soils are not very fertile the over-grazing by livestock has seriously affected vegetation to the point where natural cover has been eliminated or destroyed, inducing erosion at many areas along the reservoir. The exposed shales along the Lake are also susceptible to erosion through shrink and swell action resulting from fluctuating water levels. Because these soils are so susceptible to erosion, recreational facilities must be located carefully, on the more level areas protected from the wind.

3.08 Erosion caused by either the fluctuating level of the Lake or the elimination of natural cover has resulted in the loss of Federally owned land to the extent that in certain areas there is private ownership down to the water's edge.

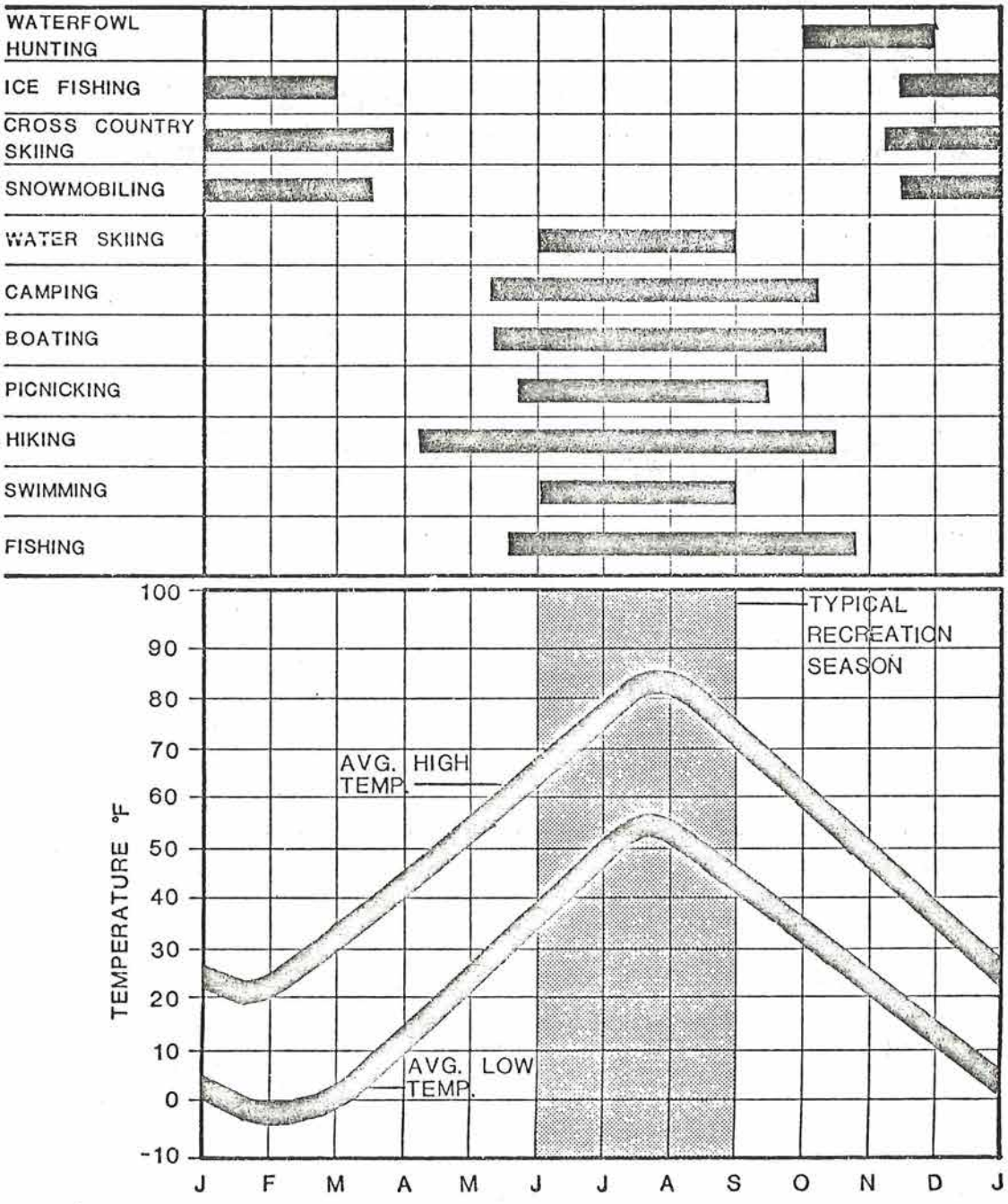
Ecology

3.09 Vegetation or land cover, of the river basin, is oriented to agricultural use with most of the flat or gently sloping land under cultivation while the steeper slopes are used for grazing. Project lands evolve from grasslands to shrub brush communities dominated by wolf-berry to native prairie. Wooded areas can be found along the shoreline at scattered locations and in most of the ravines feeding into the reservoir. The dominant tree species are: Bur Oak, American Elm, Cottonwood, Russian Olive and Boxelder. Wetland vegetaion such as cattails and bulrushes are occasionally found in small stands along the main body of the lake but are the dominant plant communities at the Baldhill Creek area and the upper reaches of the lake (Institute for Ecological Studies, 1974).

3.10 Lake Ashtabula has improved fishing conditions, several times over that of the pre-impoundment condition of the Sheyenne River (Institute for Ecological Studies, 1974). Recreational fishing is very popular with yellow perch, walleye, northern pike and black bullheads being the most commonly caught species. The lake is a good producer of fish because of its high fertility although there is some concern for the supply of spawning habitat for walleye and northern pike. Sedimen-

Figure 9

Temperature & Associated Recreational Activities



tation is responsible for a decrease in spawning grounds and could create a problem for fish production in the future which in turn would decrease the popularity of fishing at Lake Ashtabula.

3.11 The U.S. Fish and Wildlife Service operates a fish hatchery directly below the dam. In the spring of each year FWS personnel catch northern pike and walleye and strip them of their eggs. These eggs are hatched and some of the northern pike and walleye fingerlings are returned to Lake Ashtabula in the fall. The majority of these fingerlings are used to stock other areas in North Dakota and the upper Midwest. Lake Ashtabula is considered an excellent source of high quality fish eggs. It is felt by the Fish and Wildlife Service that it is not so much the annual stocking of fingerlings that is maintaining the northern pike and walleye populations in Lake Ashtabula but that there is still good spawning areas and are reproducing sufficiently through the natural process. It is for this reason that maintaining good spawning habitat is so important in lake management. The stocking of Lake Ashtabula is a result of the agreement by the U.S. Fish and Wildlife Service, to use fingerlings from Lake Ashtabula to stock other lakes, a portion of the spawn taken, would be returned to Lake Ashtabula, in the form of fingerlings.

3.12 Rough fish such as carp, have not

Figure 10

Wind Chill Table

Temp. →	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35
Wind MPH ↓	WIND CHILL INDEX (EQUIVALENT TEMPERATURE) — Equivalent in cooling power on exposed flesh under calm conditions.														
Calm	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35
5	33	27	21	16	12	7	1	-6	-11	-15	-20	-26	-31	-35	-41
10	21	16	9	2	-2	-9	-15	-22	-27	-31	-38	-45	-52	-58	-63
15	16	11	1	-6	-11	-18	-25	-33	-40	-45	-51	-60	-65	-70	-78
20	12	3	-4	-9	-17	-24	-32	-40	-46	-52	-60	-68	-76	-81	-88
25	7	0	-7	-15	-22	-29	-37	-45	-52	-58	-67	-75	-83	-89	-96
30	5	-2	-11	-18	-26	-33	-41	-49	-56	-63	-70	-78	-87	-94	-101
35	3	-4	-13	-20	-27	-35	-43	-52	-60	-67	-72	-83	-90	-98	-105
40	1	-4	-15	-22	-29	-36	-45	-54	-62	-69	-76	-87	-94	-101	-107
45	1	-6	-17	-24	-31	-38	-46	-54	-63	-70	-78	-87	-94	-101	-108
50	0	-7	-17	-24	-31	-38	-47	-56	-63	-70	-79	-88	-96	-103	-110

VERY COLD

BITTERLY COLD

EXTREME COLD

Wind speeds greater than 40 mph have little additional chilling effect.

Figure 11

Slope Capability

RECREATIONAL ACTIVITY	CAPABILITY TO SUPPORT RECREATION		
	0-5% SLOPE	6-19% SLOPE	20%+ SLOPE
TENT CAMPING	HIGH	MODERATE	LOW
VEHICLE CAMPING	HIGH	LOW	LOW
PICNICKING	HIGH	MODERATE	LOW
SWIMMING (BEACH)	HIGH	LOW	LOW
BOATING (ACCESS)	LOW	HIGH	LOW
PLAYGROUND	HIGH	LOW	LOW
PARKING	HIGH	LOW	LOW
HIKING	HIGH	HIGH	LOW
SIGHTSEEING	HIGH	HIGH	HIGH
CROSS COUNTRY SKIING	LOW	HIGH	MODERATE
SNOWMOBILING	HIGH	MODERATE	LOW
BIKE RIDING	HIGH	MODERATE	LOW

yet been a problem in Lake Ashtabula. During the construction phase all fish were poisoned in the basin and the Lake was then restocked with desirable fish. Today it is unlawful to use live minnows for bait on Lake Ashtabula to guard against introduction of rough fish are not introduced into the Lake.

3.13 As compared to pre-reservoir conditions, there has been a general decrease in wildlife habitat for feeding and rearing and subsequently in species populations. Game bird such as pheasant, partridge and grouse populations have diminished because of loss of habitat, which consisted primarily of the wooded shoreline along the Sheyenne River. Many fur-bearers are no longer found at Lake Ashtabula, including muskrats, mink, beaver and raccoon. White-tailed deer populations have also decreased due to the flooding of woodlands that existed along the river.

3.14 Waterfowl habitat for feeding and rearing is not good at the reservoir because the fluctuating water level makes it difficult for wetland plants to get established. During the spring and fall, however, Lake Ashtabula is a major resting area for many species of migratory waterfowl.

3.15 The changes that have occurred

along the reservoir are expected to remain constant. While the North Dakota Game and Fish Department has established a number of game management areas along the Lake upland game are still not common along the Lake (Institute for Ecological Studies 1974).

Water Quality

3.16 Lake Ashtabula is a nutrient-rich water body, which produces frequent algae booms and large fish populations. The Lake is highly eutrophic and is aging faster than normal. There have been a number of studies on the water quality of the Lake. All agree that the Lake is eutrophic but differ as to the source.

3.17 The Sheyenne River carries sediment and nutrients into the Lake. The nutrients entering the Lake come from many sources upstream in the drainage basin of the Lake. The entire area around the Lake and upstream is heavily farmed or ranched. Runoff from the highly fertilized fields and feedlots eventually finds its way into the Lake. Since the Lake has a controlled outlet the nutrients settle out accelerating the aging process. With high nutrient levels frequent algae blooms, large amounts of aquatic vegetation, and large fish populations are produced. In the case of Lake Ashtabula large algae blooms are very common.

3.18 Due to the large number of algae blooms swimming and other water oriented activities have declined in popularity. The Lake remains very productive for fishing however.

3.19 The prospects for improving the water quality of Lake Ashtabula are dependent upon controlling input into the Lake by land use controls, creation of settling ponds upstream, or flushing the Lake. By upgrading the water quality in the reservoir there might be a slight decrease in fish populations but most recreational uses could expect an increase in use because of the improved resource base providing a more aesthetic experience. Water quality is a very important factor in planning future recreational facilities and determining how well they will be used.

3.20 Lake Ashtabula is a valuable resource to the region by the simple fact that water is not abundant and must be managed to fulfill many needs. Going beyond the initial purpose of the Lake, which were flood control and water supply, Lake Ashtabula has become a major recreational resource in the region because there are so few lakes in the region. The quality of the lake will probably not adversely affect any wildlife species or plant communities. Although the waters of Lake Ashtabula can never be made crystal clear, it can continue to provide recreation to many people if carefully managed to preserve its flexibility and usefulness.

Cultural Resources

3.21 The recorded history of the Lake Ashtabula area begins in the early 1800's when bands of Sioux Indians settled and camped along the Sheyenne River. The white man first came to this area as part of military expeditions during 1839 exploring eastern North Dakota from the southern border up the Sheyenne River and onto Devil's Lake. Enthusiastic reports by expedition members inspired later interest in the areas explored. Treaties of 1867 and 1869, when the Sioux gave up claim to much of this land, opened the territory for accelerated settlement. Expansion by the Northern Pacific Railroad in 1872 gave rise to the beginnings of many small settlements along the route. Two of these new towns were Worthington-renamed Valley City in 1881 - and Jamestown.

3.22 There are thirteen known archeological sites in the Lake Ashtabula area, eight occupation sites, seven of which were flooded by the reservoir, four burial mounds and one rock alignment-site. All

of these sites have been disturbed to some extent by souvenir hunters, vandals and others who have dug up or removed parts of these sites. Occupation sites were found only on the first and second terraces along the Sheyenne River and the Smithsonian Institution recommended that an intensive survey and excavation program be conducted to reconstruct the prehistory of the area. Excavation was not carried out but records of the limited reconnaisance survey do exist (Institute for Ecological Studies 1974).

3.23 Developing an interpretative program that incorporates the historical and archeological factors would be valuable tool in educating people of the social and cultural background of the area. The extent of the cultural resources in the area is still not fully known, as an inventory is not yet completed.

3.24 Archaeological sites are currently being inventoried under a contract with the St. Paul District, Corps of Engineers. Ultimately, all Federal lands around Lake Ashtabula will be examined for prehistoric and historic archaeological sites. All sites which are located will be evaluated for their significance and, if eligible, will be nominated for listing on the National Register of Historic Places.

Social Factors

3.25 North Dakota experienced its greatest population in 1930. With the drought and depression years that followed the population dropped rapidly as people sought employment elsewhere. At that same time the trend of people moving to urban centers, leaving rural areas began. (Figure 12). That trend is continuing and is reflected in the population figures for Barnes, Griggs, and Steel Counties (Figure 13).

3.26 Farming and ranching are the major occupations found in this area. Technological advances and economic factors have affected both, moving towards larger operations on large land holdings. Farms and ranches are getting larger but are operated by less people.

3.27 While there are fewer people, in the three county area, than in the past, these people have higher incomes and more leisure time. These two factors, combined with a larger selection of recreational products, have a direct influence on increased use of recreational facilities. An increase in use can be expected in total activity and will become more diverse as the general public becomes better able to afford the specific equipment or facilities they need to fit their personal tastes.

Access

3.28 Vehicular access to Lake Ashtabula is somewhat limited depending upon user origin and destination. The primary factor to poor access is that the Lake was developed or imposed upon an existing road network. Many of the old section line or township roads were cut by the reservoir. Most recreation areas are located at the ends of these severed township roads. Visitors unfamiliar with the area have an almost impossible time finding some of the various recreation areas because they are forced to use a road system which when designed did not anticipate a major recreational facility. (Plate 3)

3.29 Major access to the area is from the south off of Interstate 94 through Valley City. Visitors can follow paved roads and signs to the Main Public Use Area and Baldhill Dam quite easily. However, from other directions traffic filters over State, County and Township roads, most of which are gravel, confusing and poorly signed.

3.30 Direct public access to the Lake is provided at eight developed recreation areas plus the spillway area and on undeveloped access at the Hannaford Crossing. As can be seen on Plate 3 - Land Use, the

northern portion of Lake Ashtabula has very few public access points as this portion of the Lake has been set aside as a State wildlife refuge.

3.31 Those sites on the western side of the Lake, namely Katie Olsen's and Old Highway 26, are the most difficult to find and get to. They both require long drives over gravel roads. Those sites located along the eastern shore are generally easier to get to, with Sunstrom's Landing being the most difficult.

3.32 Access to either the existing sites or future sites will likely remain difficult since there will most likely never be a single perimeter road linking all sites. How this disjointed access will influence future demand projections is difficult to judge. Certainly sites which are easier to find will experience greater usage. However, as people become more familiar with locations and access, the difficulty experienced at first is diminished.

Future Demand

3.33 In the case of Lake Ashtabula extensive user surveys have not been conducted. Therefore, all demand projections rely on state-wide trends developed by the North Dakota State Outdoor Recreation Agency. In developing a zone of influence, discussions with Park Managers and Park Rangers, were relied upon and the resulting zone was heavily based upon their professional judgment (Plate 2). Determining populations of the different zones of influence were developed from U.S. Census figures and projections.

Zone of Influence

3.34 Observations by the Area Manager, Park Manager, and Park Rangers indicate

Figure 12

North Dakota Population Estimates & Projections

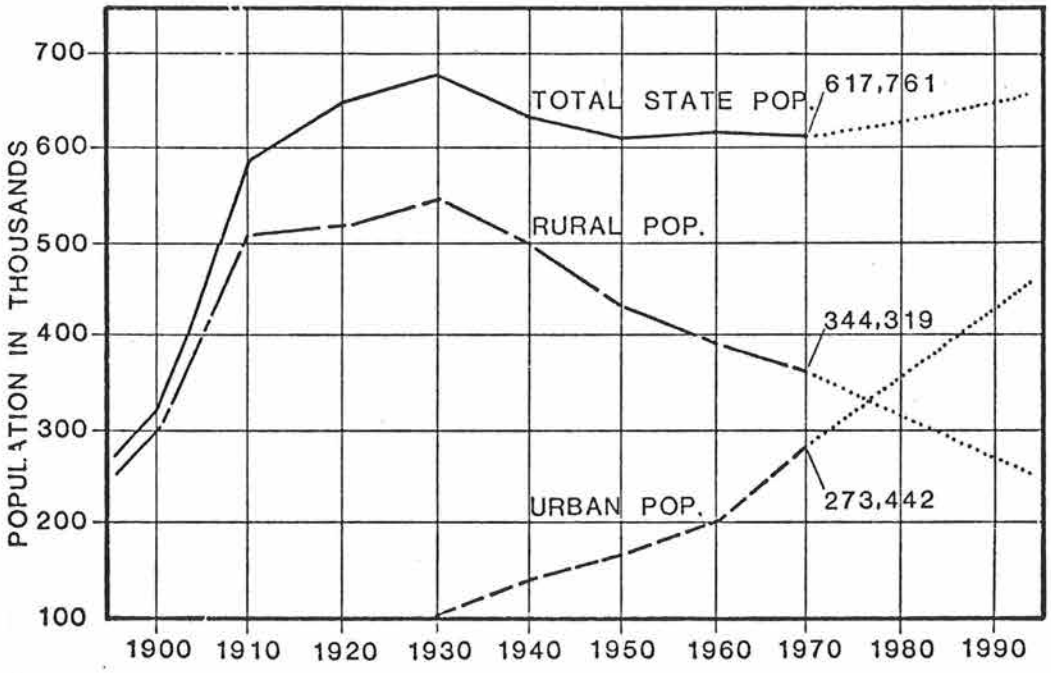


Figure 13

Population Trends in Area

	BARNES		GRIGGS		STEELE	
	POPULATION	RATE OF GROWTH	POPULATION	RATE OF GROWTH	POPULATION	RATE OF GROWTH
1940	17,814		5,818		6,193	
1950	16,884	-.05	5,460	-.06	5,145	-.17
1960	16,719	-.01	5,023	-.08	4,719	-.08
1970	14,669	-.12	4,184	-.17	3,749	-.21

SOURCE: U.S. CENSUS OF POPULATION 1940, 1950, 1960, 1970

that there were two zones of influence. The primary zone of influence from which the majority of users originate is a geographic area within a fifty road mile radius of Lake Ashtabula or an hour's drive (Plate 2). This area would extend east to the West Fargo and Fargo area and west beyond Jamesville. It is estimated that 65% of Lake Ashtabula's visitation originates from this primary zone.

3.35 This primary zone contains approximately 102,500 people. A review of historic population figures with this zone indicates that the population has remained very stable and future predictions suggest that this area will remain stable in future years. The rural portions of this zone have lost population and this trend will continue. The Fargo metropolitan population has grown at about the same rate as the rural area population has decreased. The zone has therefore remained stable in regard to total population numbers.

3.36 There is also a secondary zone of influence from which an estimated 25% of Lake Ashtabula's total visitation originates. This would be a geographic area within a 60 to 100 road mile radius of Lake Ashtabula. The outer line of this secondary zone would be approximately half-way between Lake Ashtabula and other major water oriented recreational areas which would be comparable to Lake Ashtabula. There are a few recreational facilities within this zone which would compete for users on a facility type basis, but none of these offer the same combination of recreational opportunities available at Lake Ashtabula.

3.37 It is estimated that this secondary zone contains approximately 296,500 people. Population in this area has remained stable and is expected to continue to do so in the future. Population in the rural areas of the secondary zone are also decreasing but the urban centers like Grand Froks are expected to continue growing to offset rural losses.

3.38 It is estimated that 10% of the total Lake Ashtabula visitation comes from "non-residents" or the summer tourists traveling through the North Dakota area. It would be impossible to estimate its total population, thus, to accommodate this factor for future demand projections, 10% of the total was added for "non-resident" demand.

Figure 14

1975 Lake Ashtabula Visitor Days

Primary Zone	65%	- 312,650
Secondary Zone	25%	- 120,250
Non-Resident Zone	10%	- 48,100
Total Visitor Days		481,000*

*U.S. Army Corps of Engineers - revised figures.

Participation Estimates

3.39 The process for estimating activity participation was taken from Section 4 of the 1975 North Dakota State Comprehensive Outdoor Recreation Plan (SCORP). In 1973 the Outdoor Recreation Agency conducted two mail surveys in the state that asked for participation information on twenty-eight recreational activities. From these surveys two figures were developed. The first figure is the percent of residents that participate in each activity and the second is the average number of days of participation in an activity during one year. The Outdoor Recreation Agency then projected 1990 participation rates by assuming that if an individual in 1990 had the same socio-economic characteristics as another individual had in 1973, both would have the same participation rates. If all socio-economic characteristics were held constant between 1973 and 1990 except for example, the individual moved up one income class, his change in participation rates would be the same as if he had moved up one income class in 1973. For the purpose of this analysis the 1990 participation data was held constant to the year 2000 so that actual activity levels may be slightly higher by the year 2000.

3.40 Of the twenty-eight activities surveyed by the state, eleven activities were selected for this analysis because they occur at present or are well suited for this project for future development. In the following Figures 15 and 16, the population of the zones, percentages of participation, and participation rates are used to determine the total number of activity occasions which can be expected to occur in one year.

Activity or Recreation Days

3.41 An individual or family visiting Lake Ashtabula may be involved in more than one recreational activity. Each recreation day may account for a number of activity occasions. Picnicking, fishing, camping, swimming and boating are the main summer activities at Lake Ashtabula. The following examples will help to illustrate typical recreation days:

- A family of five arrives for a picnic, the children go swimming while the parents watch, and two of the children go for a walk--ten activity occasions within five recreation days or a 2.0 duplication factor.

- A family of four lives closeby and they bring their boat to do some fishing. After fishing they go home--four activity occasions within four recreation days or a 1.0 duplication factor.

- A family of six goes camping (picnicking is included as part of camping) and only four of them go boating during the day--ten activity occasions within six recreation days or a 1.67 duplication factor.

3.42 Snowmobiling and ice fishing are the main winter activities and it is felt that nearly all visits during the winter will involve only one activity so that all winter there is a duplication factor of 1.0.

3.43 The duplication factor is used to convert total activity occasions into recreation days. Recreation days at Lake Ashtabula have been established by car counts at the various recreational sites.

Figure 15

Primary Zone Participation Estimates

Participation Estimates for Primary Zone - 102,500 Population

1975

Activity	Percent of Resident Participation	Total No. of Participants	Average No. of Days Participated	Total Occasions
Picnicking	67.8	69,495	4.6	319,677
Fishing	36.0	36,900	7.7	284,130
Camping	31.5	32,287	7.9	255,067
Beach Swimming	20.2	20,705	6.2	128,371
Power Boating	16.3	16,707	7.2	120,290
Hiking	12.3	12,607	5.6	70,599
Water Skiing	5.7	5,842	5.5	32,131
Sailing	1.1	1,127	2.7	3,042
Waterfowl Hunting	14.5	14,862	6.9	102,547
Ice Fishing	11.4	11,685	6.8	79,458
Snowmobiling	23.8	24,395	9.7	236,631

Total Activity Occasions which occurred within the primary zone---------- 1,631,943

Recreation Day equivalent-------- 815,971 - 1,087,962

Participation Estimates for Primary Zone - 102,500 Population

Year 2000

Activity	Percent of Resident Participation	Total No. of Participants	Average No. of Days Participated	Total Occasions
Picnicking	72.8	74,620	4.8	358,176
Fishing	36.7	37,617	7.8	293,412
Camping	37.2	38,130	9.3	354,609
Beach Swimming	20.4	20,910	6.4	133,824
Power Boating	19.7	20,192	7.5	151,440
Hiking	15.5	15,887	6.0	119,152
Water Skiing	8.8	9,020	5.7	51,414
Sailing	2.0	2,050	3.0	6,150
Waterfowl Hunting	18.0	18,450	7.6	140,220
Ice Fishing	9.3	9,532	6.5	61,958
Snowmobiling	23.9	24,497	8.9	218,023

Total Activity Occasions which can be expected to occur within the primary zone---------- 1,888,378

Recreation Day equivalent-------- 944,189 - 1,258,918

Figure 16

Secondary Zone Participation Estimates

Participation Estimates for Secondary Zone - 296,500 Population

Activity	Percent of Resident Participation	1975 Total No. of Participants	Average No. of Days Participated	Total Occasions
Picnicking	67.8	201,027	4.6	924,724
Fishing	36.0	106,740	7.7	821,898
Camping	31.5	93,397	7.9	838,936
Beach Swimming	20.2	59,893	6.2	371,336
Power Boating	16.3	48,329	7.2	347,968
Hiking	12.3	36,469	5.6	204,226
Water Skiing	5.7	16,900	5.5	92,950
Sailing	1.1	3,261	2.7	8,804
Waterfowl Hunting	14.5	42,992	6.9	296,644
Ice Fishing	11.4	33,801	6.8	229,846
Snowmobiling	23.8	70,567	9.7	684,499

Total Activity Occasions which occurred within the secondary zone---------- 4,720,731

Recreation Day equivalent----- 2,360,365 - 3,147,154

Participation Estimates for Secondary Zone - 296,500 Population

Activity	Percent of Resident Participation	Year 2000 Total No. of Participants	Average No. of Days Participated	Total Occasions
Picnicking	72.8	215,852	4.8	1,036,089
Fishing	36.7	108,815	7.8	848,757
Camping	37.2	110,298	9.3	1,025,771
Beach Swimming	20.4	60,486	6.4	387,110
Power Boating	19.7	58,410	7.5	438,075
Hiking	15.5	45,957	6.0	275,742
Water Skiing	8.8	26,092	5.7	148,724
Sailing	2.0	5,930	3.0	17,790
Waterfowl Hunting	18.0	53,370	7.6	405,612
Ice Fishing	9.3	27,574	6.5	179,231
Snowmobiling	23.9	70,863	8.9	630,680

Total Activity Occasions which can be expected to occur within the secondary zone---------- 5,393,581

Recreation Day equivalent------ 2,696,790 - 3,595,720

For 1975 there were approximately 481,000 visitors or recreation days. It was decided to use a range of 1.5 to 2.0 as the duplication factor. Using this duplication factor Lake Ashtabula experienced 721,000 - 962,000 activity occasions during 1975.

Future Demand

3.44 Future recreational demand was derived at by comparing the 1975 Lake Ashtabula estimates of visitation to each zone's total visitation. A percentage of the total visitation is arrived at which could be justly assigned to Lake Ashtabula. This percentage is applied to future estimates of total demand in each zone to arrive at the visitation which could be expected at Lake Ashtabula in the future.

3.45 It has been estimated that 312,650 Lake Ashtabula recreation days come from people within the primary zone (Figure 14). This is 28% of the 1,087,962 visitor days (1.5 duplication factor) and 38% of the 815,971 recreation days (2.0 duplication factor). When applied to the year 2000 visitor days, Lake Ashtabula can expect 352,500 to 358,800 recreation days in the year 2000 from the primary zone.

3.46 It is estimated that 120,250 Lake Ashtabula recreation days come from the secondary zone (Figure 14). This is 4% of the 3,147,154 recreation days (1.5 duplication factor) and 5% of the 2,360,365 recreation days (2.0 duplication factor). When applied to the year 2000 possible recreation days, Lake Ashtabula can expect between 134,800 and 143,800 recreation days in the year 2000 from the secondary zone.

3.47 Lake Ashtabula can expect an increase of recreation days by the year 2000 of 13%-16% or between 60,400 and 77,400 visitors. In future years as demand increases and more importantly, demand becomes more diverse, the developed sites will come under pressure to increase existing facilities and provide facilities which presently do not exist. Existing usage of developed sites has been looked at closely to determine those sites in which certain facilities should be increased, or as the case may be, decreased. As total demand increases there will most likely be demand for additional leases from private recreation developers and concessionaires.

Figure 17

PRIMARY ZONE

YEAR	POPULATION	TOTAL OCCASIONS	VISITOR DAYS 1.5 FACTOR	VISITOR DAYS 2.0 FACTOR
1975	102,500	1,631,943	1,087,962	815,971
2000	102,500	1,888,378	1,258,918	944,189

Figure 18

SECONDARY ZONE

YEAR	POPULATION	TOTAL OCCASIONS	VISITOR DAYS 1.5 FACTOR	VISITOR DAYS 2.0 FACTOR
1975	296,500	4,720,731	3,147,154	2,360,365
2000	296,500	5,393,581	3,595,720	2,696,790

Figure 19

TOTAL DEMAND FOR YEAR 2000

PRIMARY ZONE	352,500	358,800
SECONDARY ZONE	134,800	143,800
NON-RESIDENT ZONE (10% OF TOTAL)	54,100	55,800
	541,400	558,400

Existing Supply

3.48 This area of North Dakota and North Dakota in general has experienced a reduction of population. Present projections foresee this decline to level out and stablize. Future demand for recreational facilities at Lake Ashtabula will rely upon socioeconomic changes, increases in leisure time, and changing attitudes. A problem to all projections is that they are never current. By the time demand projections are developed, the base data is usually outdated. Thus, projections can only give an indication as to how a current trend may or may not continue. In

reviewing past visitation figures for Lake Ashtabula it can be seen that there has been an increase in usage each year. This trend is expected to continue as indicated by the preceeding demand projections which foresees increasing usage to the year 2000.

3.49 The only limiting factor to this existing or increasing usage is the current capacity or, the number of visitors the present facilities can comfortably accommodate in one year. To determine the capacity of optimum usage of the existing facilities, a number of equations which have been developed from the 1975 North Dakota SCORP can be used. In developing the following facility capacities, the variables used have also been taken directly from the 1975 North Dakota SCORP.

3.50 The following four recreational activities are the only ones for which capacity figures can be developed. This is because they are the only activities for which there are existing facilities at Lake Ashtabula. There are a number of resource-oriented activities that do take place at Lake Ashtabula. These are: shore fishing, ice fishing and waterfowl hunting. The numbers of participants in these activities are governed by the management of the natural resources which these activities require. Participation will vary according to the availability of fish and waterfowl. Other activities which take place at Lake Ashtabula are recreational trail oriented. These include hiking, cross country skiing, and snowmobiling. At present, there are no facilities designed expressly for these purposes. Persons engaging in these activities use existing roads or open areas in lieu of developed facilities. It must then be assumed the existing use exceeds the capacity of existing facilities to properly accommodate such activities.

3.51 The revised Lake Ashtabula usage figures estimate that 9,155 activity occasions occurred during 1975 in waterfowl hunting, snowmobiling, and ice fishing. These activities are usually the only activity in which a person would participate in a given day, thus there would be no duplication factor. Therefore, 9,155 activity occasions would be equal to 9,155 recreation days or visits.

3.52 The total of the four facility oriented activities would not be singular, in that most people participate in either picnicking, swimming, camping or boating would be likely to participate in another activity. For this reason, the total of 270,475 maximum activity occasions generated by existing facilities must be reduced to recreation days by use of a duplication factor (see paragraphs 3.46-3.48). Using a duplication factor range between 1.5-2.0 there would be an existing capacity of 135,237-180,316 recreation days. Combining the facility oriented activities with the resource and trail oriented activities, Lake Ashtabula has a present capacity to accommodate 144,392-189,471 visitors or recreation days. There are, at present existing facilities or resources to comfortably accommodate 30-39% of the existing usage (Figure 20). Capacity figures include all Federal, State, and County facilities.

3.53 The difference between the existing capacity and the existing use results from overuse of existing facilities and visitor use of unauthorized areas. There are a number of activities it is impossible to arrive at capacity figures. These activities include sightseeing, fishing from shore, pleasure driving and hiking. These activities use either the parking lots or existing roads. Capacity figures for the existing roads would be meaningless and not all parking lots are used for the sightseeing fishermen. Estimates for 1975 were that 10% of Lake Ashtabula visitors were sightseeing but they may have not used any facilities other than to drive through an area. These activities could not account for the total difference between the existing capacity and existing usage figures. It must then be assumed that remaining unaccounted difference between actual use and capacity is attributable to overuse of existing facilities.

Therefore, it is reasonable to conclude that the 1975 demand for facilities exceeded the existing supply.

Figure 20

Existing Supply

- Picnicking

Percent of picnicking done on heavy-use days (weekends & holidays)	=	60%
Typical heavy-use days associated with picnicking (17 weekends and 4 holidays)	=	38
Persons per party	=	4
Turnover (parties per day)	=	2
Percent of picnicking done during summer recreation season	=	90%
Formula: $\frac{\text{Existing tables} \times 38 \times 4 \times 2}{.60 \times .90}$	=	Capacity
Existing capacity = $\frac{228 \times 38 \times 4 \times 2}{.60 \times .90}$	=	128,355 activity occasions

- Swimming

Percent of swimming done on heavy-use days	=	50%
Typical heavy-use days associated with swimming (10 weekends and 3 holidays)	=	23
Persons per beach (based on average of 50 sq. ft. per swimmer)	=	300
Turnover rate	=	1.5
Percent of swimming done during the summer recreation season	=	100%
Formula $\frac{\text{Existing beaches} \times 23 \times 1.5 \times 300}{.50 \times 1.00}$	=	Capacity
Existing capacity = $\frac{3 \times 23 \times 1.5 \times 300}{.50 \times 1}$	=	62,100 activity occasions

- Boating or Boat Launching

Percent of boating (power boating, water skiing, fishing, & sailing) which occurs on heavy-use days	=	75%
Percent of boats launched during peak hours (8:00 a.m to 12:00 noon)	=	75%
Typical heavy-use days associated with boating (17 weekends and 4 holidays)	=	38
Persons per party	=	3
Peak hours per day for launching	=	4
Boats per ramp per hour (one boat ever 15 minutes)	=	4
Percent of boating done during the summer recreation season	=	75%

Formula: $\frac{\text{Existing ramps} \times 38 \times 4 \times 4 \times 3}{.75 \times .75 \times .75}$ = Capacity

Existing capacity = $\frac{10 \times 38 \times 4 \times 4 \times 3}{.75 \times .75 \times .75}$ = 43,428 activity occasions

- Camping

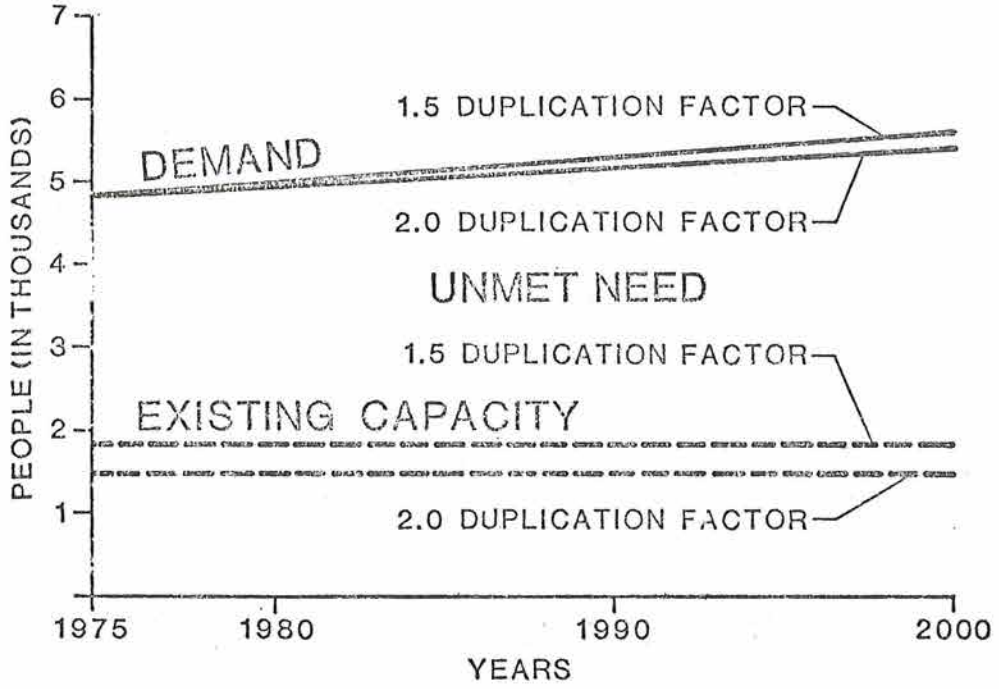
Percent of camping done on heavy-use days	=	60%
Typical heavy-use days associated with camping (17 weekends and 4 holidays)	=	38
Persons per party	=	4
Percent of camping done during the summer recreation season	=	90%

Formula: $\frac{\text{Existing campsites} \times 38 \times 4}{.60 \times .90}$ = Capacity

Existing capacity = $\frac{130 \times 38 \times 4}{.60 \times .90}$ = 36,592 activity occasions

Figure 21

Total Demand, Supply and Needs



Project Structures

3.54 The structure and machinery of the dam itself receives many visitors each year who are interested in the actual workings of the dam. There is at present no interpretive program explaining how the dam or control structure function or why the Corps of Engineers are at Lake Ashtabula.

3.55 The Visitor Center at the Main Public Use Area receives much use. This structure functions as a bath house on the first floor and does provide a small self-guided interpretive program on the second floor. Displayed are various historic artifacts related to the Corps of Engineers history. Also presented is general information regarding Lake Ashtabula and the facilities which have been developed.

3.56 Since these two structures are located at the "front door" of Lake Ashtabula they present a first image of the Lake and also the Corps of Engineers. It is important in light of the existing usage and increased future usage that the first image be a good one.

Related Recreation Areas

3.57 Within a fifty mile radius of Lake Ashtabula there are no other major water oriented recreational facilities. There are other recreation areas within this zone and just outside, which attract users and compete with Lake Ashtabula in certain activities. (Refer to Plate 2.)

3.58 The Devil's Lake area, about 75 miles northwest of Valley City, was at one time a highly developed recreational center. During the past 50-60 years Devil's Lake water diminished in size to about half its original size to such an extent that it no longer was an attractive water body. It has improved somewhat in past years and today provides fishing and limited camping and picnicking.

3.59 Turtle River State Park lying 100 miles northeast of Valley City provides camping and picnicking but no boating or fishing. It does have one swimming pool.

3.60 To the south, Barnes County operates two parks, Clausen Springs which provides the same facilities as does Lake Ashtabula and Little Yellowstone which provides camping and Picnicking. Together these two facilities provide the most competition for visitor use within the fifty mile zone.

3.61 To the west the Jamestown Reservoir provides the same facilities as does Lake Ashtabula but has not been developed to the extent that the Corps of Engineers project has and is not popular.

3.62 At present each of these facilities is capturing or experiencing a certain percentage of the total usage. It is expected that in future years they will capture basically the same percentage of an expanded demand. There are only two things that would drastically effect this percentage. First, if a new facility would be developed within the area it could draw expected visitors away from existing projects. There are at present no new projects programmed for this area. Secondly, if one of the existing projects either expands or improves its facilities, it can then expect to receive more visitors than before. This is true for Lake Ashtabula more importantly since today it is receiving the major portion of all visits to recreational facilities in the area. If Lake Ashtabula expands or improves, it can expect more visitors. Also, if another project expands and/or improves, Lake Ashtabula could receive less visits than it presently does and a reduced portion of the future demand.

Reservoir Plan of Operation

3.63 Operation of the dam has a significant impact on the natural resources of Lake Ashtabula due to the fluctuating water level and impoundment of water. Wetland vegetation along the shoreline has not been established because most plant species cannot tolerate water level fluctuations. Without adequate vegetation, feeding or rearing habitat for certain waterfowl and fur-bearers, such as muskrat, beaver, mink and raccoon, have not been able to establish. On the Sheyenne River above and below the Lake all of these species are found. Because of the limited habitat around Lake Ashtabula, there will never be a large diverse selection of wildlife for interpretive programs.

3.64 Other problems involving the operation of the Lake are those of erosion and sedimentation. The Sheyenne River Valley is made up of shale with little or no till cover. It is very susceptible to erosion. Fluctuating water levels, wave action and land use (i.e. grazing of cattle) all contribute to this erosion problem. Rivers naturally carry a certain amount of sediment but when this flow is slowed or stopped, the sediment settles out and to the bottom. Although not a serious problem, the sediment which settles out each year reduces the total capacity of the Lake and does affect spawning grounds of many fish species.

3.65 Probably the most serious impact of the operation of the reservoir is that of eutrophication. This problem is a natural process of all lakes but is occurring faster than normal at Lake Ashtabula (Institute for Ecological Studies, 1974). It is serious because it is visible in the form of frequent algae blooms which is discouraging swimming and boating and is beginning to affect fishing. If this problem continue it will affect future demand projections which will effect projected programming of additional facilities.

3.66 The actual reservoir operations have had little impact on recreational use of the Lake. All recreation areas function adequately with the fluctuating water levels. If dry conditions continue in this region for any length of time and the stored water is required to supply domes-

tic water needs of communities downstream, the water level could be reduced to a level unsuitable for recreation needs.

3.67 All of these problems associated with the reservoir operations affect recreational usage to differing degrees. There are solutions to some of these problems and it will be based on how and if these problems are alleviated that will determine future demand.

Applicability of Public Law 89-72

3.68 This act authorizes that development of new Federal multi-purpose water projects cannot be undertaken unless there is financial cooperation on the part of the State or some local governmental agencies. If the non-Federal agency is willing to assume all operation and maintenance costs the Corps of Engineers can develop recreation areas on a cost sharing basis. The non-Federal agency is also able to charge a fee for use of the recreational facility for the purpose of recovering their development costs.

3.69 Applied to Lake Ashtabula there would be no new sites developed along the Lake unless some State agency or local governmental agency would be willing to participate financially, on a 50-50 basis, in the development.

3.70 There has been no interest on the part of any local or State agency to participate in the development of any new facility. Local units of government, namely Barnes County and the various townships, are hard pressed for funds for maintaining their existing programs. Barnes County returned most of their original Lake Ashtabula sites because of a lack of funds to operate and maintain them properly.

3.71 While this law has a substantial effect on new projects, it does not mean that increased facilities cannot happen. Many of the existing projects have ample room for expansion and by the improvement of existing facilities future demand may be met.

4 Evaluation of Existing Conditions

General

4.01 There are presently eight developed recreational areas at Lake Ashtabula - Main Public Use, Sundstrom's Landing, Eggerts Landing, Katie Olson's Landing, East Ashtabula Crossing, West Ashtabula Crossing, Old Highway 26, and Keyes Crossing (Plate 3). The Baldhill Dam site functions as an informal interpretive and general sightseeing area. Two of the recreational sites--East and West Ashtabula Crossing--are operated and maintained by Barnes County. Plans were developed for three additional areas--Baldhill Creek, Sheyenne Campsite and The Island as part of the 1967 Master Plan but no development has ever taken place.

4.02 There are a number of problems that are apparent and common to most if not all sites. Some of these problems are the result of the existing terrain and limited land holdings but nevertheless do exist.

- Existing internal roads and parking areas separate activity areas from the Lake. This results in auto-pedestrian conflicts and adverse views of the Lake.

- Spacing of existing campsites has not always taken the existing environment into account. Campsites

located in open areas are sited too close together.

- Signage systems are ineffective. In many areas they are poorly located creating confusion. The different styles used does not portray a unified image. Sign size and color also makes it difficult to see them from an automobile.

Main Public Use Area

4.03 This site covers 70 acres at the south end of Lake Ashtabula on the east bank adjacent to the dam and acts as the "front door" or entrance to Lake Ashtabula (Plate 4). It is accessible by pave roads from Valley City except for a short stretch immediately south of the site. The site is divided into three general use areas, each well separated from the others. Upon entering the site from the south the first major activity area is the large day-use facility. It includes the Visitor Center which provides a small self-guided interpretive program, provides basic information about Lake Ashtabula and its facilities, the Area Park Manager's office, changing rooms and toilets. Included within this day-use area is a large picnic area with play equipment and shelter, a swimming beach and one concessionarie which provides various small items and rental of boats. This day-use area is served by one very large paved parking lot.

4.04 Further into the site, located on the main road is an over-night camping area. This facility provides paved pads for vehicle camping and tent camping areas. The area in which these camp sites are located provides an outstanding view of Lake Ashtabula.

4.05 Located further north on the site is the third major use area. This area consists of one boat launching ramp, with two lanes, and support parking, providing space to park 17 cars and trailers.

4.06 Popularity of this site is based on its excellent access and provision for a full range of activities. Site layout can accommodate many people doing different things without conflicts and without the feeling of being crowded.

4.07 Functional problems associated with this site are as follows:

- Location of the main parking lot and its size detracts greatly from the Visitor Center.

- Location of the support parking for the launching ramp is too close to the water's edge. The parking area was built out into the lake and, with ice movement and fluctuating water levels, could see future maintenance problems.

- Campsites, while having an excellent view of the lake, are located in open areas which are exposed to strong winds most of the time. They are also spaced too close together for such an open area and some are located dangerously close to a major roadway.

Baldhill Dam

4.08 Located at the west end of the earthen dam (Plate 5), the site is difficult to find in that informational signs are either non-existent or poorly designed. Upon finding the site there is limited parking and the placement of support buildings such as the metal maintenance building detract from the dam and control structure. There is no interpretive program to tell the story of how the dam works and limited general information regarding the structure. It is not clear as to where one is allowed or not allowed on the Dam.

4.09 It would seem likely that many first time visitors to Lake Ashtabula would want to see the control structure and the dam and yet this area presently presents a very weak image of the Lake, its facilities, and the Corps of Engineers

involvement in the project.

Sundstrom's Landing

4.10 Sundstrom's Landing located approximately 2.6 miles above the dam is a nine acre site on the east bank of the lake. It is regarded as a day-use area in that it provides for swimming, boat launching and picnicking (Plate 6). This site is fairly remote in that there is not an easy and direct way to get to the area. Access is over gravel township roads. Being remote, there have been security related problems.

4.11 The parking area and intenral roads have been placed so close to the shore that existing picnic facilities are separated from the water's edge by the automobile. Design of the existing changing house and toilet facilites detracts greatly from the very appropriate architecture that has been utilized at other sites.

4.12 A large portion of this site is wooded and offers excellent expansion opportunities.

Eggert's Landing

4.13 Eggert's Landing is located on the east shore of the lake 5.3 miles above the dam. The site totals 28 acres and has excellent access off a paved county road (Plate 7). It provides for boat launching, picnicking and overnight camping. There is also a concessionaire who rents boats and cabins and sells gasoline, fishing tackle and prepackaged food. At present this lease is being reviewed by the Corps of Engineers as to whether it should be continued.

4.14 The three use areas are well separated but to get to the picnic and camp area one must drive through the concessionaire's area. The road separates the picnic area and the rental cabins from the water. In the camping area the access road entirely circles the toilets and by doing so puts more emphasis on them than warranted.

4.15 The picnic and camping areas are well laid out and spacing is adequate. The camping is located in a wooded pleasant camping environment. A large portion of this site has not been developed and provides good opportunities for expansion and development of new facilities.

Katie Olsen's Landing

4.16 Located on the west shore directly across from Eggerts Landing, this site of 11 acres is considered a day-use area, providing boat launching and picnic facilities (Plate 9). This site is difficult to find due to disjointed access over gravel township roads. Signage is inadequate. The site itself is nicely wooded and the use areas are well defined. Again, there is a problem with the location of drives and parking. Picnic areas are separated from the water by the auto. The site does have adequate area for expansion of facilities.

4.17 The site was originally planned for overnight camping but has not been developed. At present, with its remoteness, it does have problems of security.

East Ashtabula Crossing

4.18 Located 10.4 miles above the dam on the east shore, this site is easily accessible by way of a paved county road which crosses the lake at this point. This site is maintained and operated by Barnes County and provides boat launching, swimming, picnicking, and overnight camping (Plate 9). East Ashtabula covers 12 acres and has a mixture of mature trees and shrubs.

4.19 Overcrowding is a severe problem at this site. Overnight camping is not restricted and at times has been estimated to have over 150 camper units on only 50 campsites. A one dollar charge is made for overnight camping but is not enforced. This site is extremely popular but if present utilization continues it will surely begin to deteriorate.

West Ashtabula Crossing

4.20 Directly across the reservoir from East Ashtabula, this 23-acre site provides overnight camping, picnicking, and boat launching. The existing use areas are well separated and provide an enjoyable area for camping including electrical hook-ups for campers (Plate 10). This site presently acts as an overflow facility for East Ashtabula. It is rather limited in present development and has a large undeveloped portion for further expansion.

4.21 Past development again has placed the road and parking between the activity areas and water's edge. It is presently not overused and spacing of campsites is appropriate thereby providing a very comfortable camping environment. This site is also operated and maintained by Barnes County.

Old Highway 26

4.22 This site is located about 12.2 miles above the dam on the western shore and covers approximately 27 acres. Access to the site is difficult over gravel county roads. This site provides overnight camping, boat launching, and picnicking (Plate 11). The site is attractive and gives one a feeling of remoteness. There has been a tree planting program in the past that has provided much of the area's environment and provides the natural cover.

4.23 The use areas are well separated. This is especially true of the camping area. It is well isolated from the day-use facilities. However, the majority of the individual camp sites are located in open areas exposed to the wind and are sited too close together. Location of the day-use facilities are good and relate well to each other. The major parking was not layed-out with the existing terrain and seems to impose upon the natural terrain.

Keyes Crossing

4.24 Keyes Crossing is located 14.9 miles above the dam on the west shore and is easily accessible from State Highway 26 which will be paved during the 1978 construction year (Plate 12). This developed site provides boat launching and limited picnicking. The site's main function is to provide access onto the upper portions of the lake and at present is fully developed with no additional space for expansion.

Other Sites

4.25 There were three other sites that were originally intended to receive recreational facility development according to the 1967 Master Plan. Baldhill Creek (Plate 13) located 9 miles above the dam on the western bank was intended to provide camping and boat launching. Sheyenne Campsite (Plate 14) located 9.3 miles above the dam on the eastern bank was planned to provide camping and boat launching facilities. The Island (Plate 15) located 16.2 miles above the dam was intended to primitive camping with access provided only by boat. Under present policy, development of these sites will depend on finding some interested public sponsor to share in development costs before development can occur. No such sponsor has, to date, expressed interest in development of these sites.

Summary

4.26 The various recreational sites are well used and do provide a variety of activities. In their present condition they do not read as parts to an overall project but rather individual projects, each competing with one another for visitors. With the use of various styled signs, architecture, and design details, the projects do not function as a unified recreational area. With each site trying to provide all possible activities there has been an improper allocation of resources and as important an unnecessary duplication of operational and maintenance costs.

4.27 All sites are equipped with vault comfort stations which are pumped out

Figure 22

Existing Facilities

	MPUA	BALDHILL DAM	SUNDSTROMS LANDING	EGGERTS LANDING	KATIE OLSEN'S	EAST ASHTABULA	WEST ASHTABULA	OLD HIGHWAY 26	KEYES CROSSING
SWIMMING BEACH	1		1			1			
BOAT LAUNCH (LN.)	1(2)		1(2)	1	1	1	1	1	1
PARKING	165	12	75	30	40	—120—		75	60
PLAYGROUND	X		X		X	X			
PICNIC UNITS	65		16	14	12	75	32	10	4
FIREPLACES & GRILLS	31		10	8	8	47	26	5	
FIREWOOD	X		X	X	X			X	
PICNIC SHELTER	X		X	X	X	X	X	X	
CAMPING	27			23		51	9	20	
POTABLE WATER	X	X	X	X	X	X	X	X	
FLUSH TOILETS	X	X							
VAULT TOILETS	X		X	X	X	X	X	X	X
CONCESSIONS	X			X					
MAINTENANCE FACILITY		X							
RESIDENCE		X							
SEWAGE TREATMENT PLANT	X								

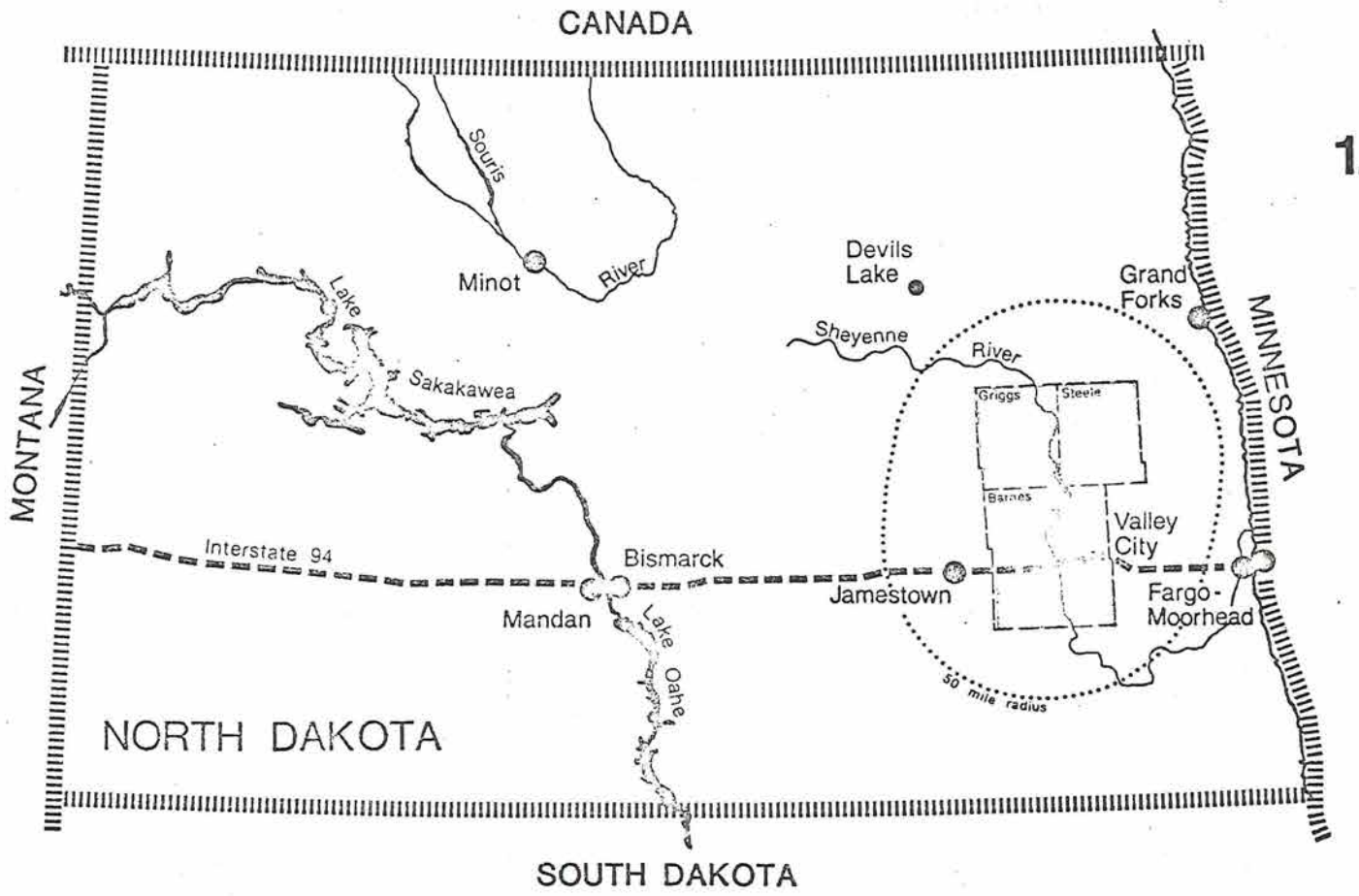
periodically by private contractors. The Main Public Use Area has a small sewage treatment plant which handles the effluent from the Visitor Center and operates at a maximum of 10,000 gal./day. Potable water is provided at all sites with the exception of Keyes Crossing. The water is provided by a private contractor, who maintains 2,500 gallon steel tanks which have been buried and provided with a hand pump. Water quality is periodically checked and the tanks are drained for the winter. The Main Public Use Area, Eggert's Landing and East Ashtabula have supplemental wells but water quality is extremely alkaline.

4.28 One potential problem is that most of the recreational sites are not equipped with any means of communication. With some sites being so remote if serious injury or fire occurred, there would be no means to summon help.

Lake Ashtabula Master Plan

U.S. Army Corps of Engineers
Bather Ringrose Wolsfeld

1. Location Map



NORTH

MILES
0 10 20 50 100

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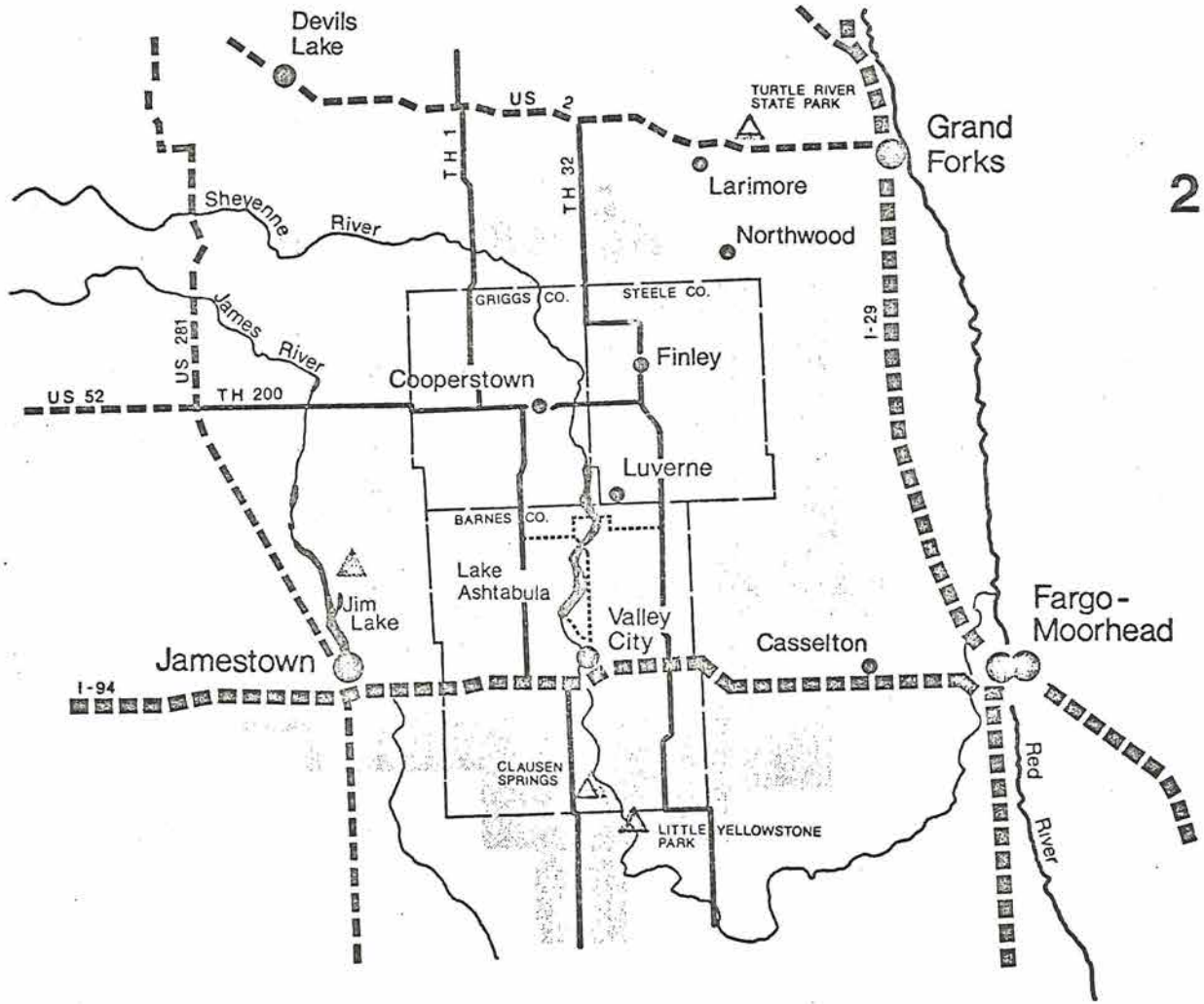
2. Zone of Day-use Influence



NORTH

MILES
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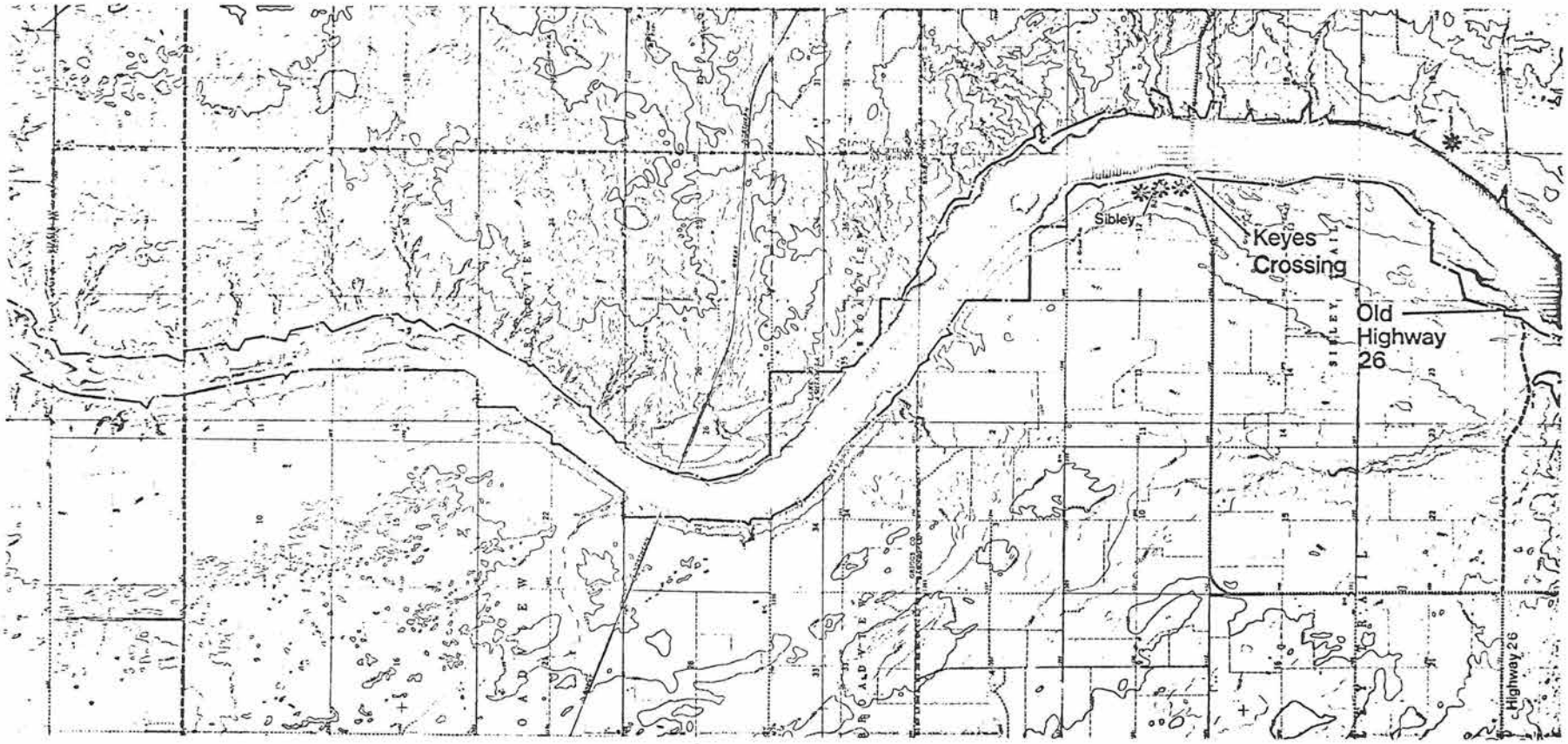

SQUARE MILE
10
ACRES 40
60

NORTH

KILOMETERS
1/2 1 2

MILES
1/2 1 2

LEGEND

LAND USE
- CULTIVATED
- PASTURE
- DEVELOPED
- LAKE ASHTABULA

OWNERSHIP
- CORPS ENGINEERS
- RECREATIONAL PROJECTS
- UNDEVELOPED

LEASES
- STATE GAME & FISH
- OTHERS

LAKESHORE ZONING
- ZONE 1
- ZONE 2

ROADS
- PAVED
- TO BE PAVED
- PRIMARY GRAVEL ROADS

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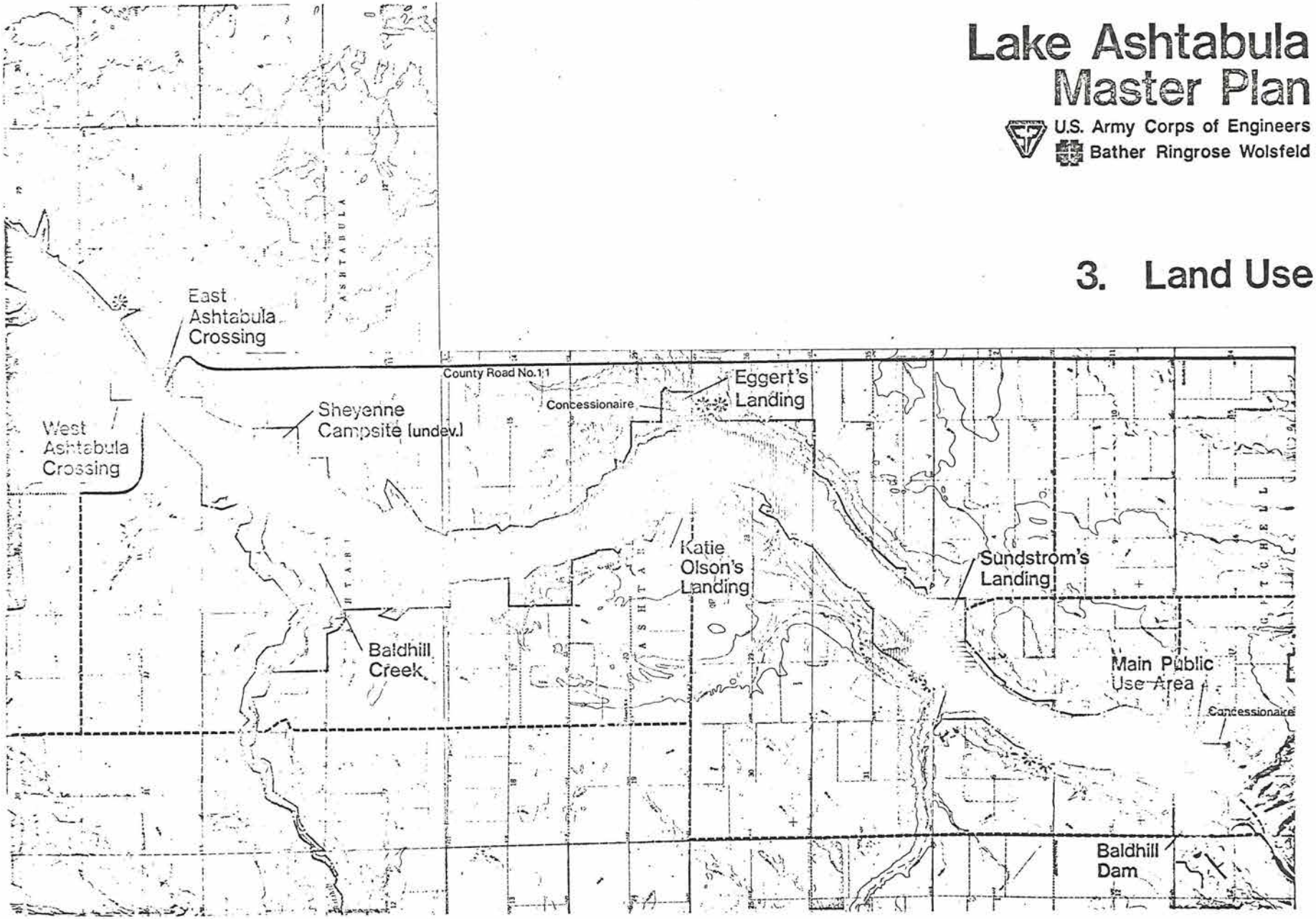
3. Land Use



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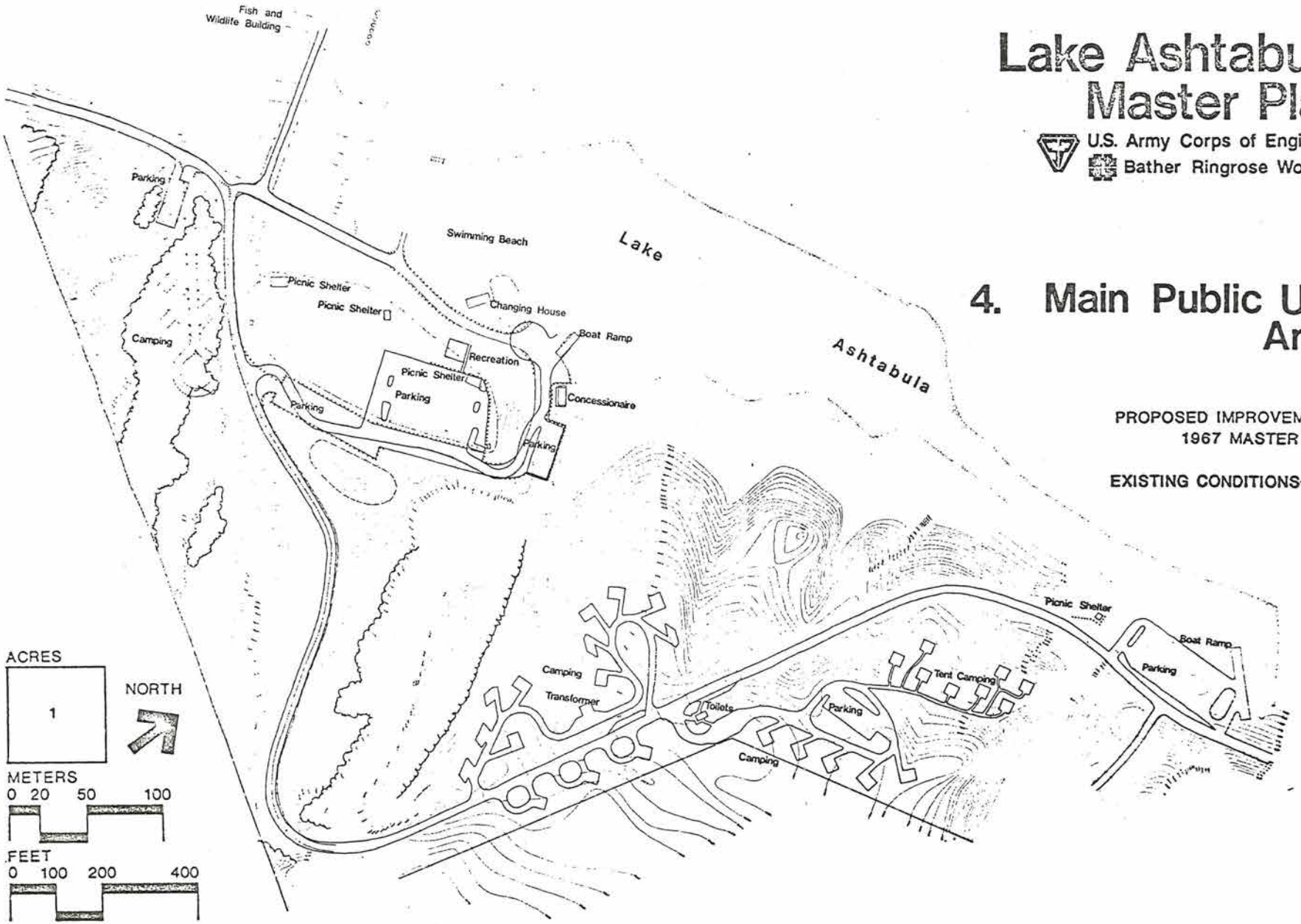
4. Main Public Use Area

PROPOSED IMPROVEMENTS
1967 MASTER PLAN

EXISTING CONDITIONS-1976



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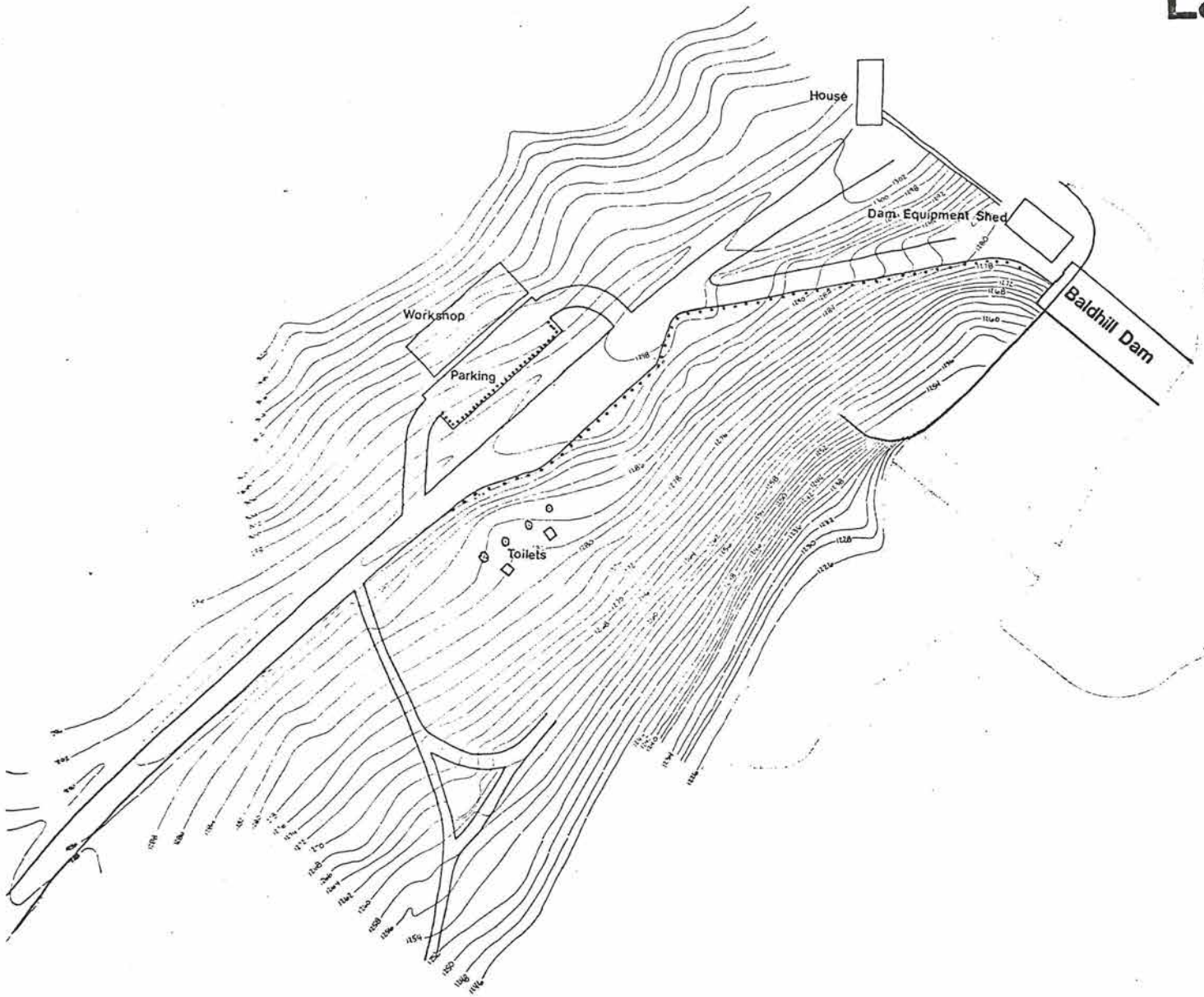
5. Baldhill Dam

EXISTING CONDITIONS - 1976



ACRES
NORTH
1/4
METERS
0 10 20 50
FEET
0 50 100 200

53

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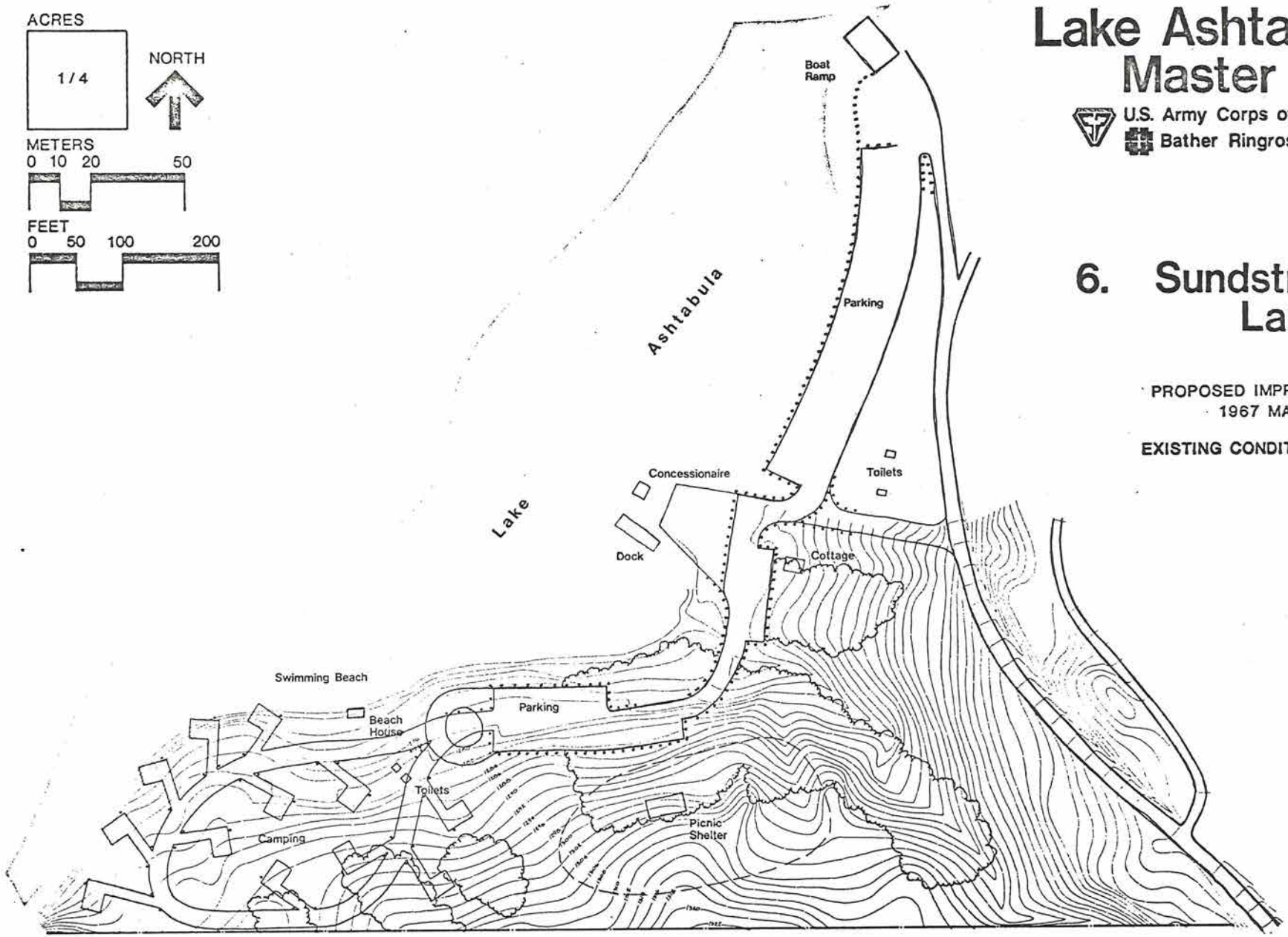
6. Sundstrom's Landing

PROPOSED IMPROVEMENTS
1967 MASTER PLAN

EXISTING CONDITIONS-1976



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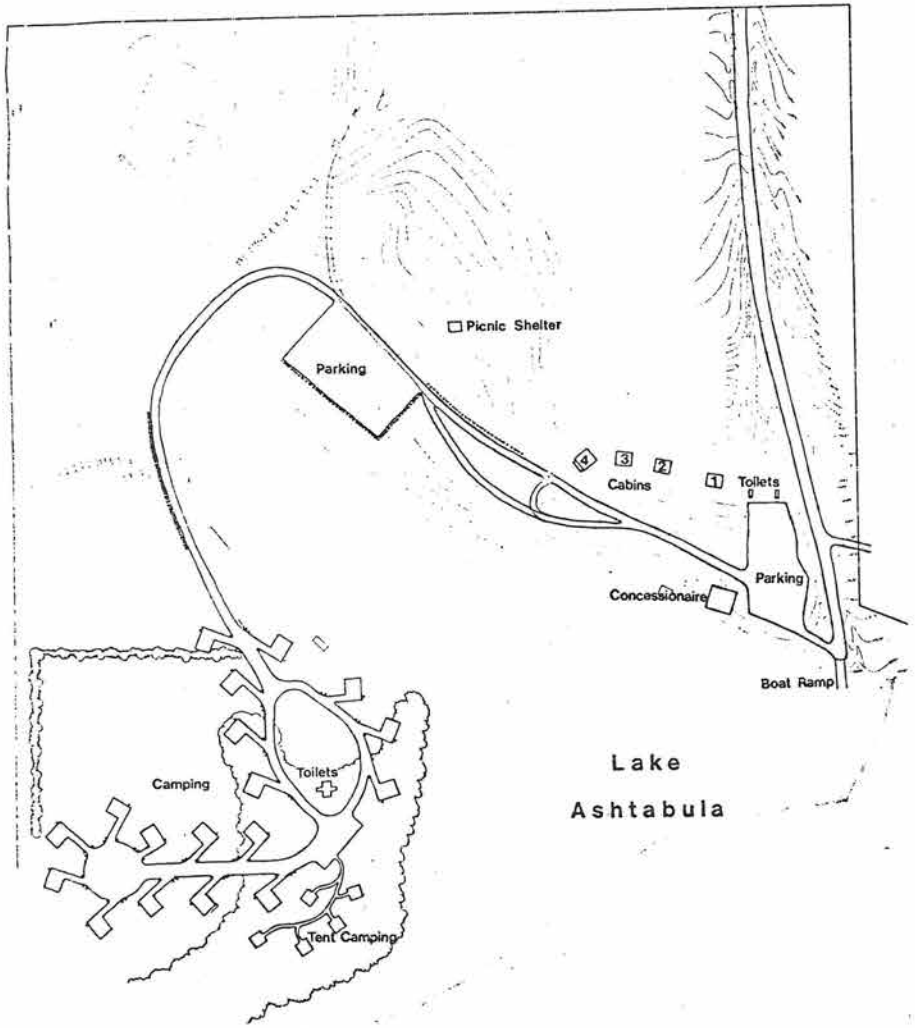
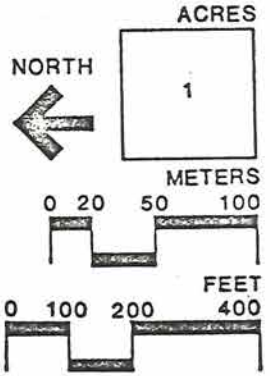
7. Eggerts Landing



PROPOSED IMPROVEMENTS
1967 MASTER PLAN

EXISTING CONDITIONS-1976



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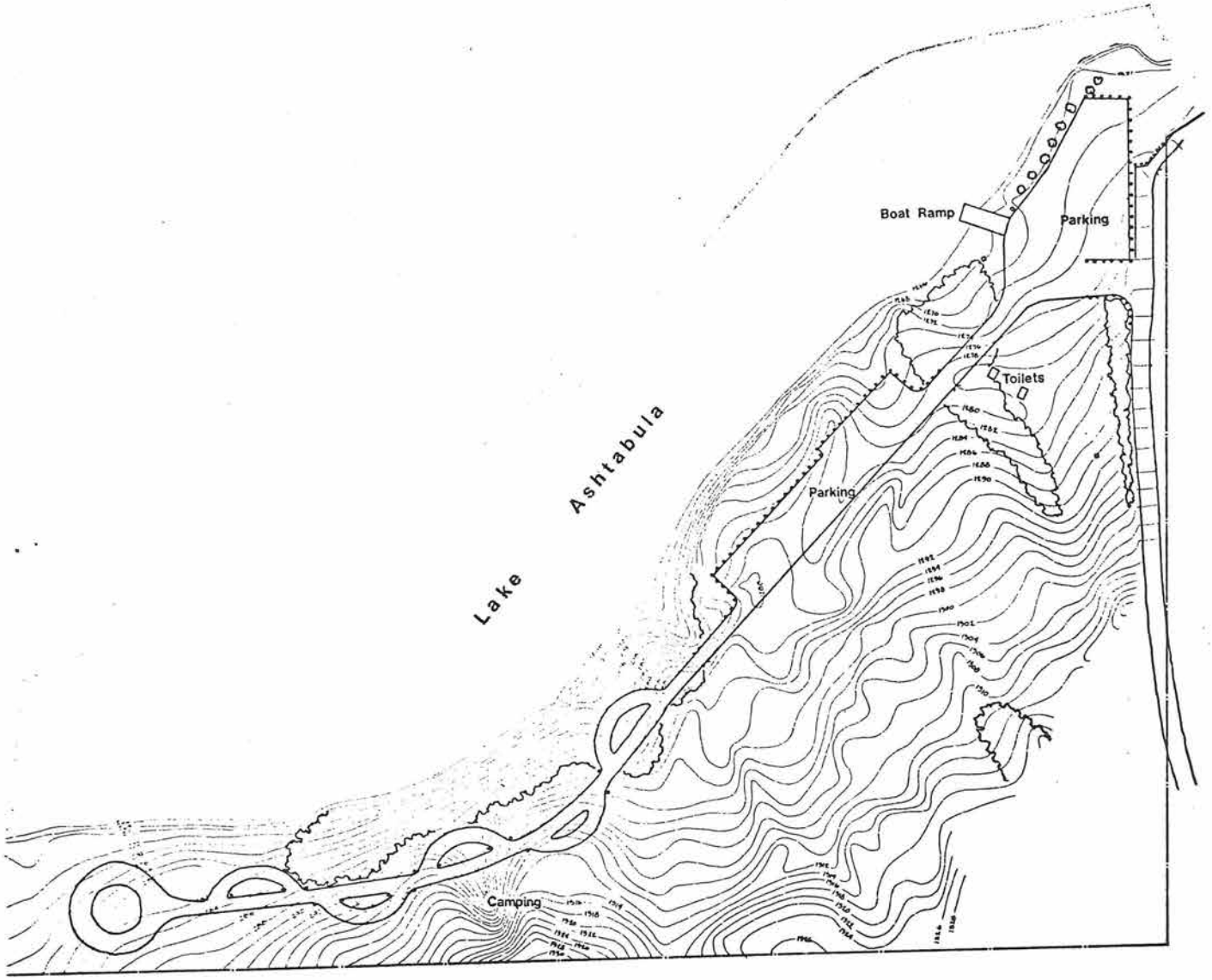
8. Katie Olson's Landing



PROPOSED IMPROVEMENTS
1967 MASTER PLAN

EXISTING CONDITIONS-1976

ACRES
1/4

NORTH

METERS
0 10 20 50

FEET
0 50 100 200

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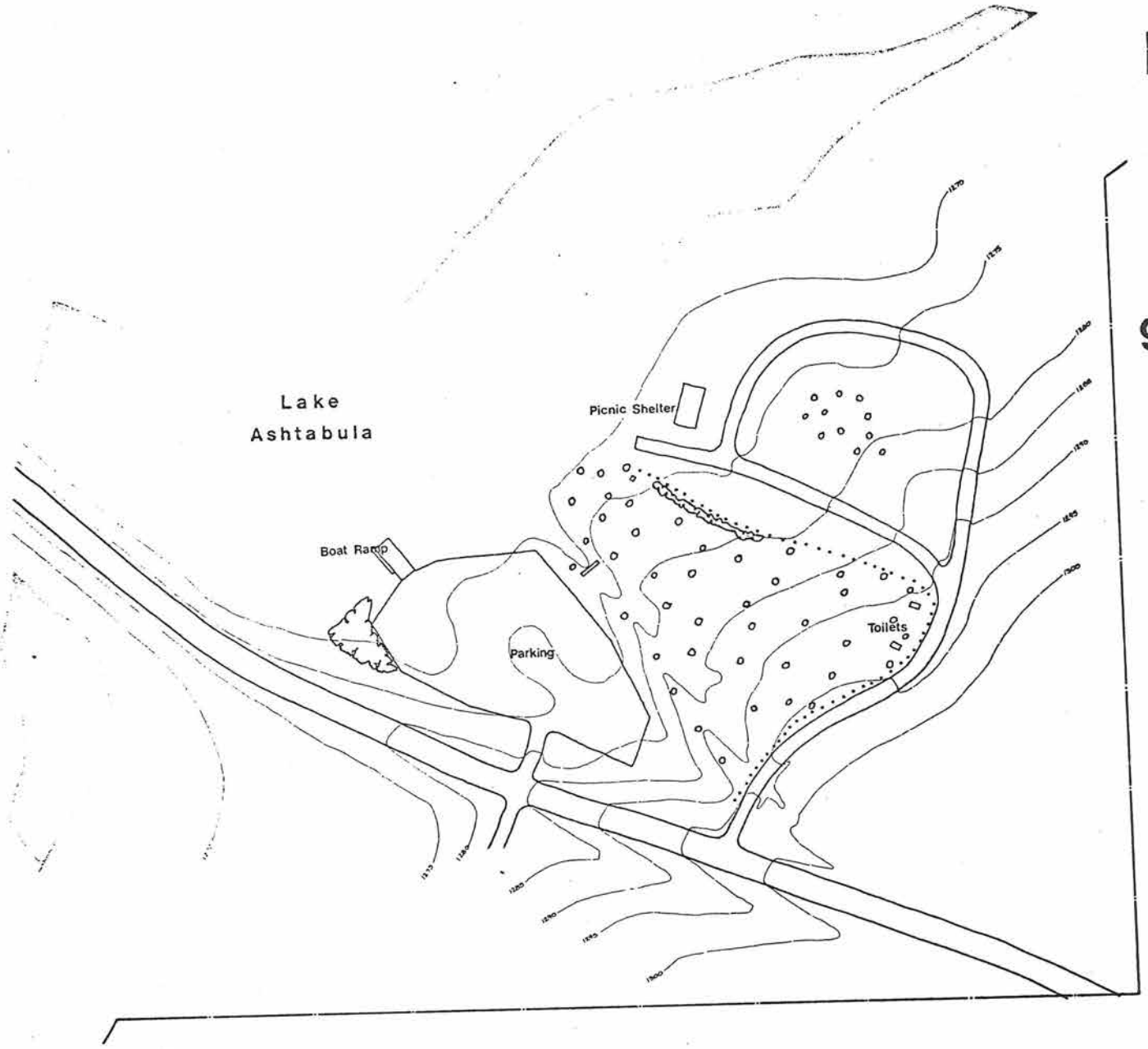
9. East Ashtabula Crossing

EXISTING CONDITIONS - 1976



ACRES
NORTH
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METERS
0 10 20 50
FEET
0 50 100 200

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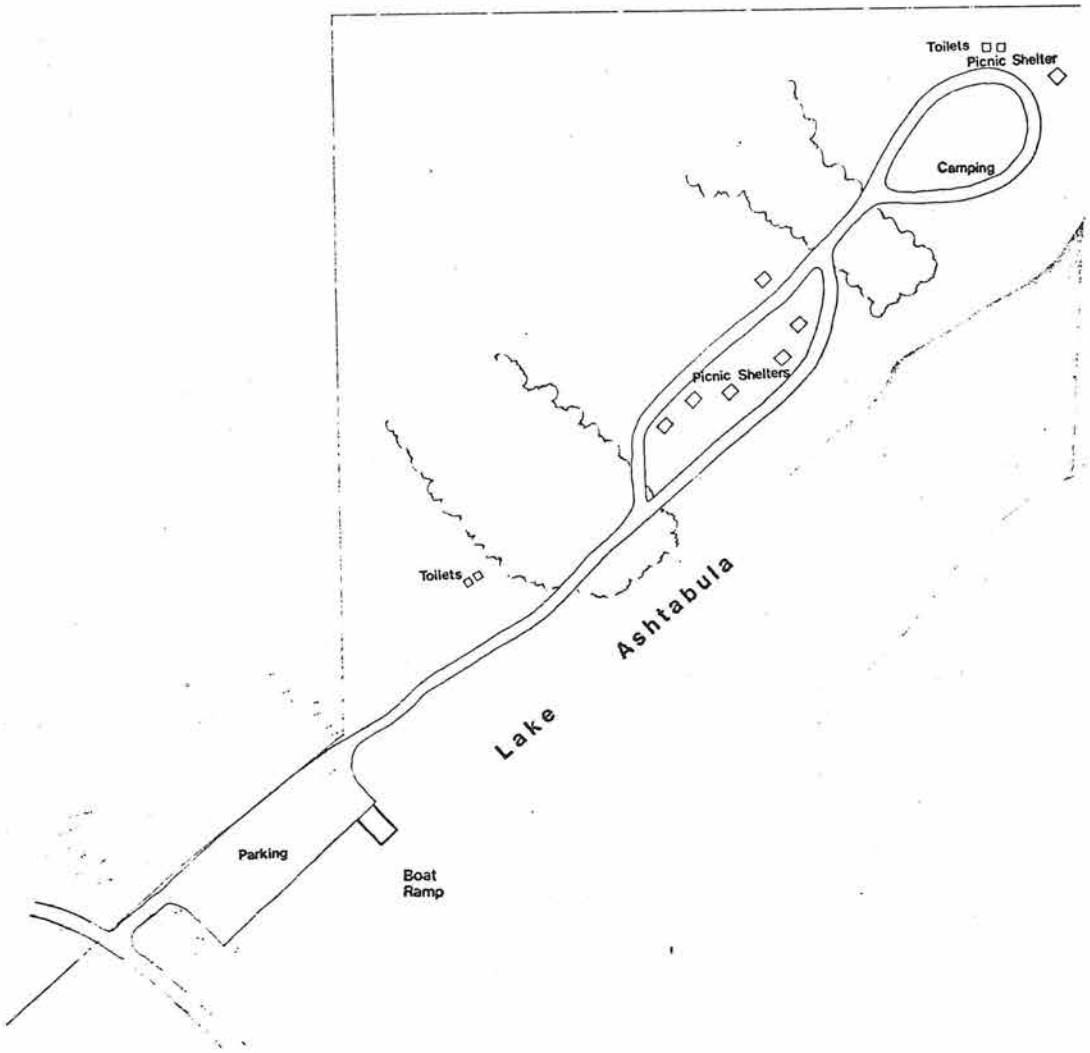
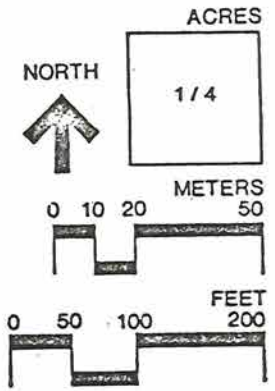
10. West Ashtabula Crossing

EXISTING CONDITIONS - 1976





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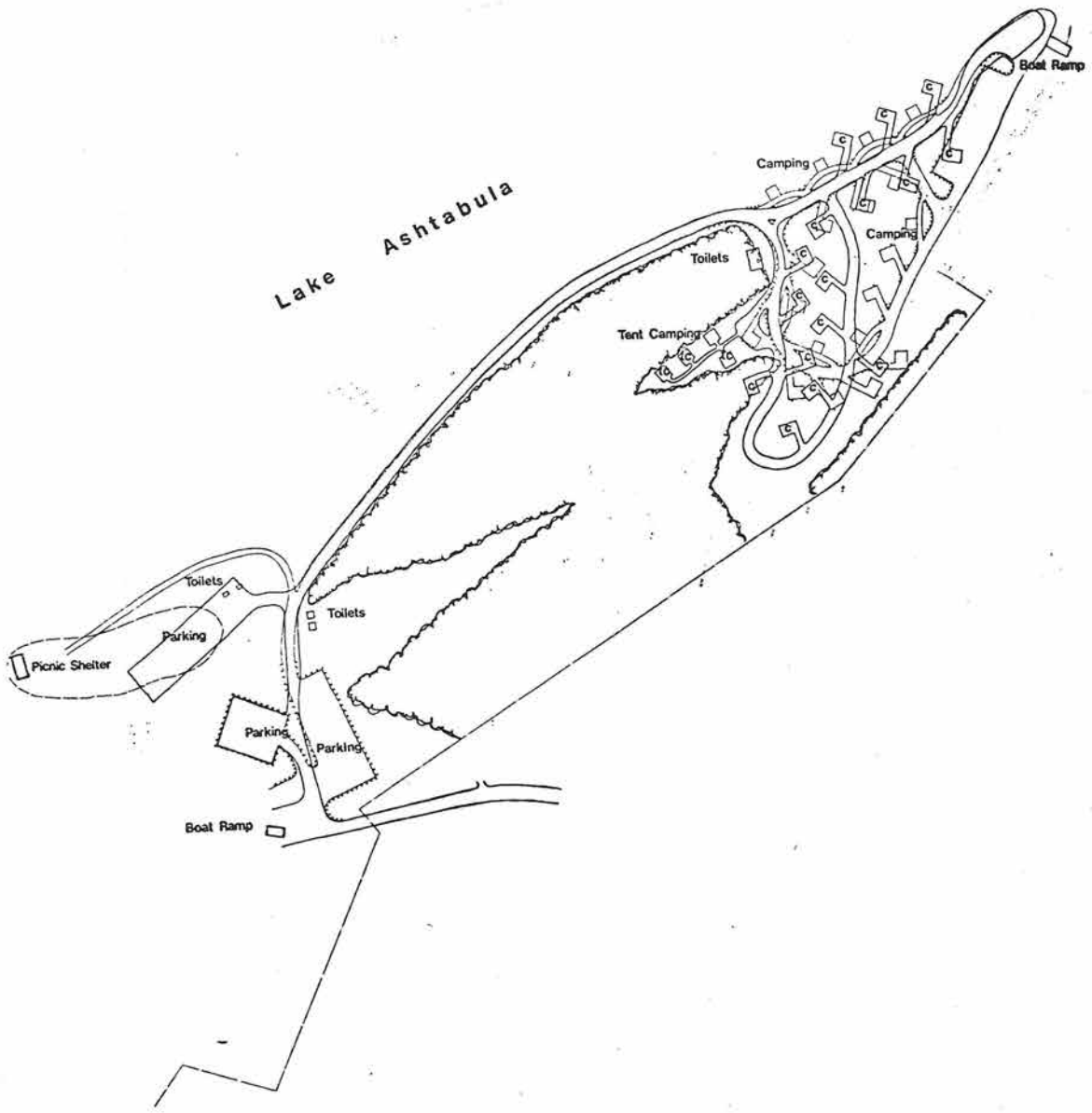
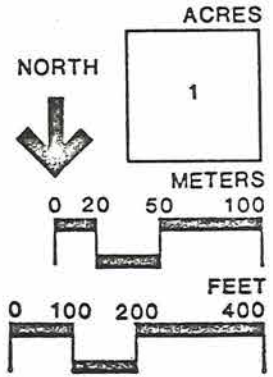


11. Old Highway 26

PROPOSED IMPROVEMENTS
1967 MASTER PLAN

EXISTING CONDITIONS-1976



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Lake Ashtabula Master Plan

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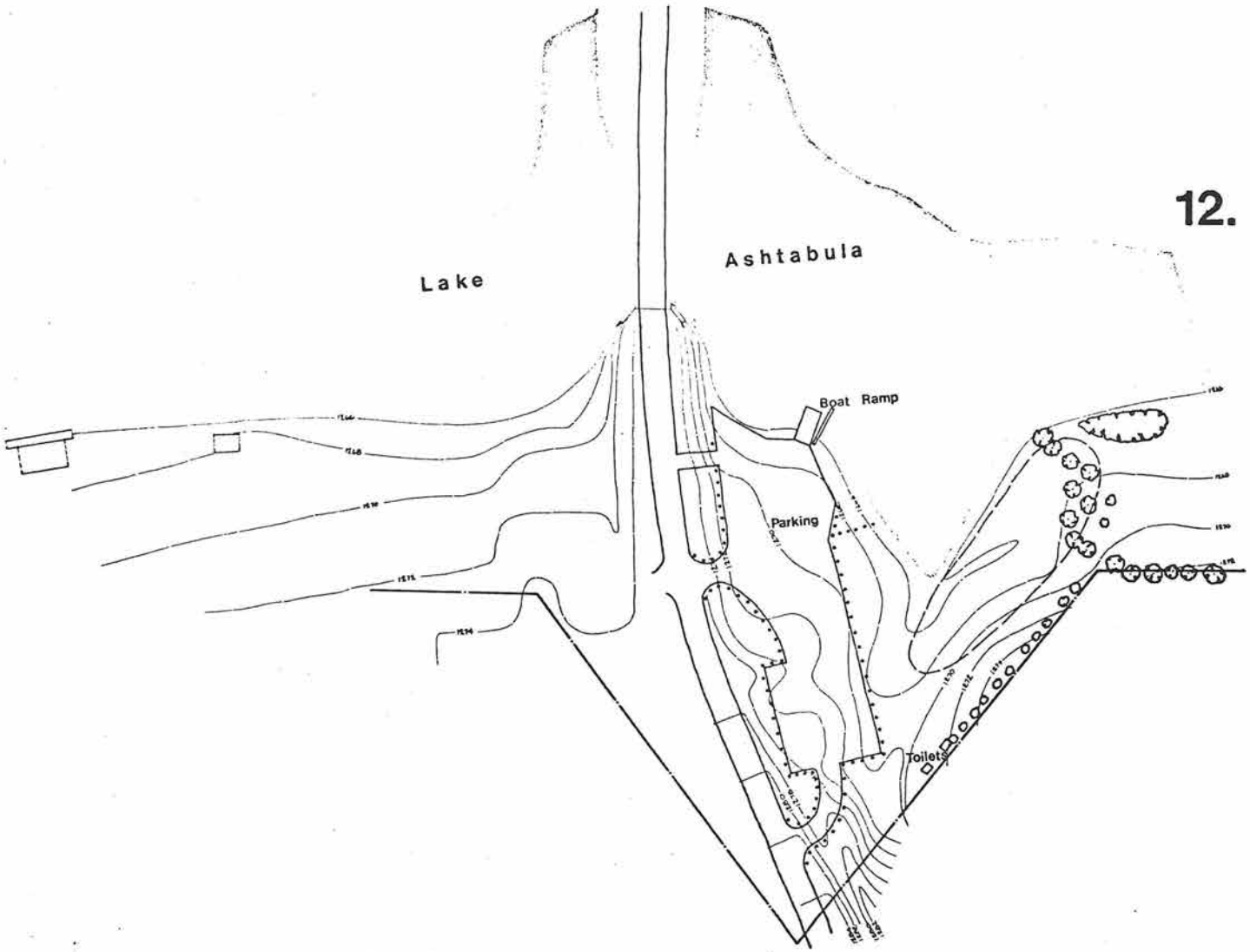
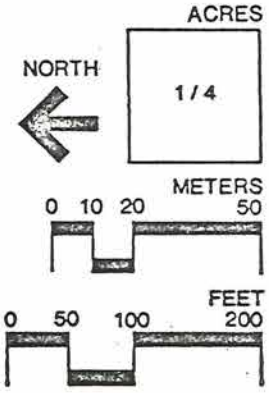
12. Keyes Crossing

EXISTING CONDITIONS - 1976





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Lake Ashtabula Master Plan

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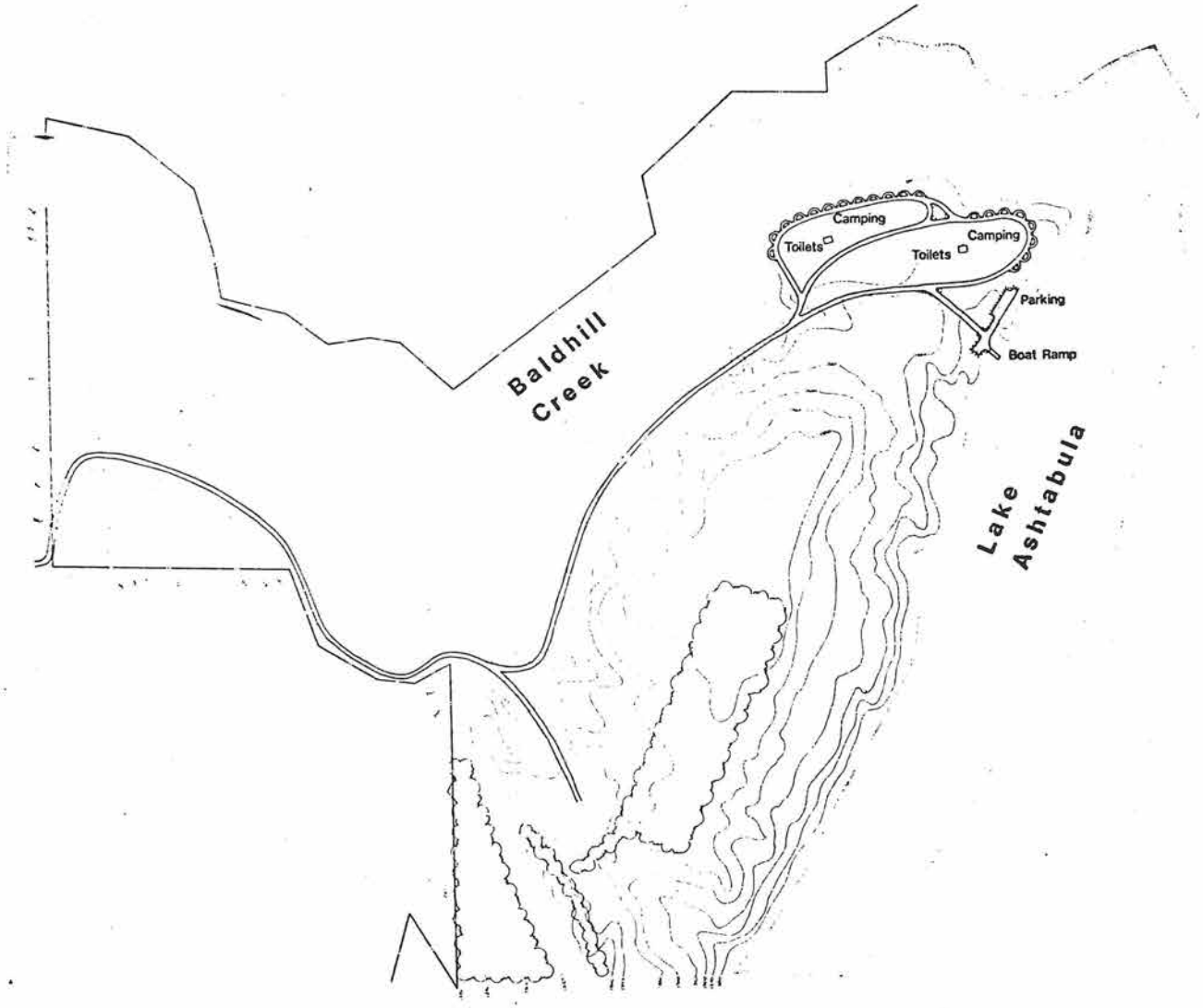
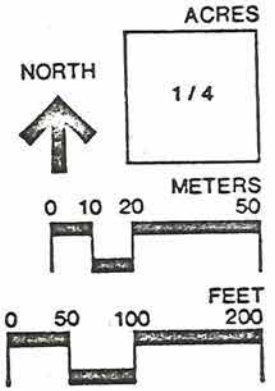
13. Baldhill Creek



PROPOSED IMPROVEMENTS
1967 MASTER PLAN

NO DEVELOPMENT HAS OCCURED



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Lake Ashtabula Master Plan

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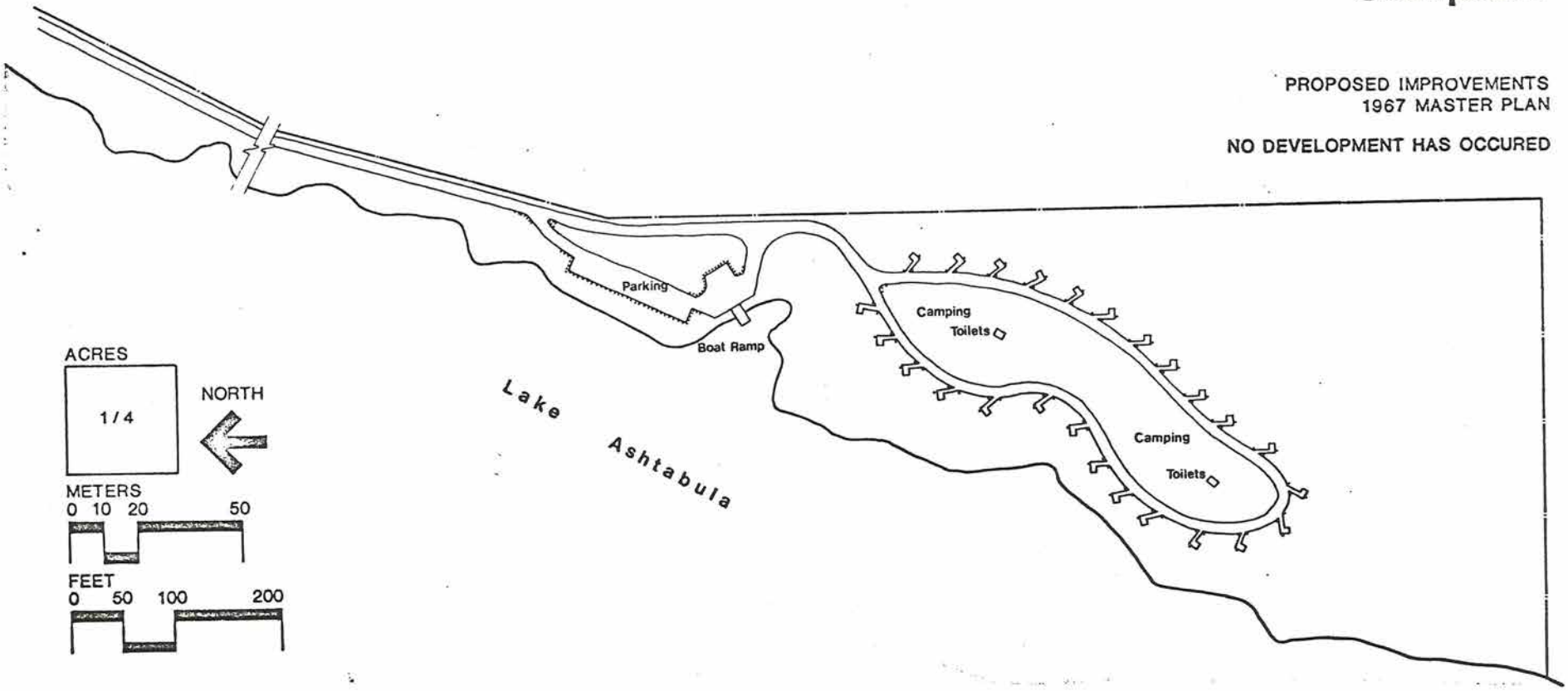
14. Sheyenne Campsite

PROPOSED IMPROVEMENTS
1967 MASTER PLAN

NO DEVELOPMENT HAS OCCURED



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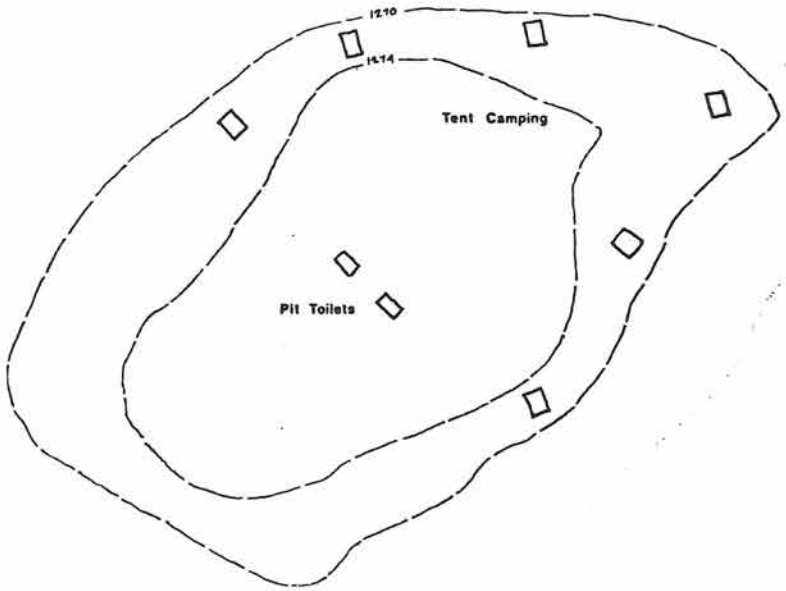
Bather Ringrose Wolsfeld

15. The Island



PROPOSED IMPROVEMENTS
1967 MASTER PLAN

NO DEVELOPMENT HAS OCCURED

ACRES
1/4

NORTH

METERS
0 10 20 50

FEET
0 50 100 200

Lake Ashtabula

5 Public Involvement in the Planning Process

General

5.01 The intent of any comprehensive planning study is to respond appropriately to both the natural and social elements which influence the study area, either directly or indirectly. To be able to respond appropriately to these elements, background or base data regarding the natural and social conditions must be collected. Data relating to the natural conditions is fairly easy to assemble or collect and analyze in that it usually consists of material that is easily identified and collected and/or counted.

5.02 Social data, usually consists of data which is not easily assembled; not easily identified; and extremely diverse. It is desirable nevertheless that the final recommendations of any planning study respond to the needs and desires of many diverse groups and/or individuals.

5.03 The final plan is judged as to its appropriateness and success in part by how well the plan responds to the natural conditions. More importantly, the plan is also judged as to how well it responds to the wants and desires of the local user and those public agencies who are directly involved or affected by it.

Public Agency Involvement

5.04 Those public agencies who are directly affected by the planning study will usually stay involved throughout the study process. Interested or involved public agencies either keep themselves informed or are kept informed through approval procedures. Opportunities for input from public agencies remain constant and open throughout the process.

5.05 The public agency involvement for this study began with an inter-agency information meeting in November of 1976. At that time all public agencies who might have some interest in Lake Ashtabula and its environs were contacted. The purpose of the meeting was twofold. Firstly, the agencies were informed as to the Corps intent, as to updating the Master Plan and Comments were solicited regarding the existing Federal development at Lake Ashtabula.

5.06 Secondly, agencies were informed that there did exist a program and/or authority (Public Law 89-72) by which non-Federal entities could join the Corps on a cost sharing basis, in the development of recreational facilities at Lake Ashtabula.

5.07 The agencies that were contacted were the following:

- Mr. Albert E. Letey
  Acting Director
  U.S.G.S., U.S.D.I.
  Denver Federal Center
  Denver, Colorado 80225

- Mr. Lynn H. Thompson
  Director
  U.S.D.I., National Park Service
  Rocky Mountain Region
  P.O. Box 25287
  Denver, Colorado 80225

- Dr. Sidney R. Galler
  Deputy Assistant Sec. for
  Environmental Affairs
  Department of Commerce
  Washington, D.C. 20230

- Mr. Bill Aultfather, Area Manager
  U.S. Fish and Wildlife Service
  U.S.D.I.
  P.O. Box 1897
  Bismarck, North Dakota 58501

- Mr. Derrall P. Thompson
  Regional Director
  Mid. Continent Region
  B.O.R., U.S.D.I.
  Denver Federal Center
  Denver, Colorado 80225

- Mr. LeRoy Jones
  Deputy Regional Forester
  U.S.D.A., Forest Service
  Federal Building
  Missoula, Montana 59801

- Mr. Gary Poppe
  Executive Secretary
  N.D. State Soil Conservation
  Commission
  The Capitol
  Bismarck, North Dakota 58501

- Mr. R.E. Bradley
  Chief Engineer
  N.D. Highway Department
  Capitol Grounds
  Bismarck, N.D. 58501

- North Dakota State Planning Agency
  Capitol Building
  Bismarck, N.D. 58501

- North Dakota Historical Society
  Memorial Building
  Bismarck, N.D. 58501

- North Dakota Soil Conservation
  Commission
  Capitol Building
  Bismarck, N.D. 58501

- North Dakota State Water Commission
  Capitol Building
  Bismarck, N.D. 58501

- North Dakota Game and Fish Department
  2121 Lovett Avenue
  Bismarck, N.D. 58501

- North Dakota Park Service
  Route 2, Box 139
  Mandon, N.D. 58554

- Dr. Harold Goetz, Director
  Tri-College Center for Environmental Studies
  Stevens Hall - N.D.S.U.
  Fargo, N.D. 58102

- Mr. Kenneth A. Monson
  Chairman, Griggs County Commission
  Copperstown, N.D.

- Mr. Joseph H. Hanson
  Chairman, State County Commission
  Finley, N.D.

- Martin L. Larsen
  Barnes County Commission
  Kathryn, N.D.

- Roger O. Lee
  Consulting Engineer,
  Barnes County
  Box 1068
  Valley City, N.D.

- Mayor
  Copperstown, City Hall
  Copperstown, N.D.

- Mayor
  Valley City, City Hall
  Valley City, N.D.

5.08 There were numerous comments and concerns expressed at that first agency meeting. The comments received are summarized by the following statements:

- The surrounding Counties and Townships have a serious problem in the maintenance of the existing gravel roads which provide access to some of the Corps facilities. They are at present financially strapped and are in need of financial assistance in this regard.

- The various agencies agree that the Lake's water quality is deteriorating and beginning to affect fishing and swimming.

- The limited existing widlife is being reduced by cattle trespass which destroys the existing natural cover. What existing natural prairie exists is unique and should be preserved.

- Corps of Engineers land has an existing problem with Leafy Spurge, an invasive noxious weed.

- Both the State and Barnes County have plans for future upgrading and paving of certain roads and bridges in the Lake Ashtabula area.

- All agencies agree that there is a need for additional recreational facilities at Lake Ashtabula.

5.09 Continued involvement and interaction between those concerned public agencies and the Corps progressed during the entire study process. Those agencies which were most concerned and with which most conversations and interaction continued were: North Dakota Fish and Wildlife Department, which leases a large portion of the Lake Ashtabula project, and Barnes County which maintains and operates two of the recreational facilities on the Lake. The other public agencies were involved to lesser degrees in the planning study.

Public Involvement

5.10 During the initial phase of the planning study a public meeting was held in December, 1976. At that time the study process was explained to the citizens, and comments and/or concerns about the existing development at Lake Ashtabula were solicited. The following is a summary of those concerns:

- Local Counties and Townships need financial assistance for maintenance of existing roads serving Lake Ashtabula.
- Water quality is deteriorating.
- Existing facilities need to be expanded.
- Winter recreational facilities are needed.
- Windbreaks at exposed camp sites are needed.
- Shoreline stabilization is needed at various sites.
- Need for tree planting program.
- Need for more rangers.

There was also, general agreement that the Corps was doing a good job and that the various recreational sites were well maintained and provided the public with much needed recreational facilities.

5.11 As the study process continued a number of problems or concerns emerged:

- A desire and proven need for increased recreational facilities.
- Need for all recreational areas to be operated and maintained as efficiently as possible.
- Development is limited by erodable soils and existing slope conditions.
- Development is limited by existing land holdings of Corps of Engineers.
- Off-site feeder roads are impossible for local government to maintain without financial assistance.
- Deterioration of water quality of Lake Ashtabula.

5.12 At this point, public involvement became more intense. The various concerns and problems associated with Lake Ashtabula were incorporated into site criteria relating to various recreational activities and alternative solutions to various problems. The criteria were divided into three groups, each to be evaluated and ranked by different groups.

5.13 The first group of criteria, relating to various activities and problems, was evaluated and ranked by the users and local citizens. Who could better evaluate where the best fishing was on the Lake, or where the best picnicking and camping was, than the people who were most familiar with Lake Ashtabula?

5.14 The second group of criteria was evaluated by Corps of Engineers personnel. The criteria consisted of evaluating each site as to the cost and ease of maintenance, operation and policy implementation. The project personnel, who deal with these problems every day at Lake Ashtabula, are the most logical to evaluate these site related concerns.

5.15 The final set of criteria were those which could best be evaluated by the consultant. This criteria was that which related to objective data such as distances traveled on gravel township roads, slope, soils, wind direction, etc.

5.16 The process utilized was structured to provide a rational system for identifying, assessing and evaluating potential alternatives.The factors influencing any choice are a necessary mixture of objective data (distance, slope, soil, etc.) and judgmental issues (convenience, environmental, image, etc.). The process expressed these factors in comparable terms, so that the advantages and disadvantages of each alternative could be evaluated in relation to all on an equal basis.

5.17 Scoring, evaluating, assembling and presentation of the findings were accomplished at workshops held in February and

March of 1977. Exhibit A contains a summary of the entire process with the final tabulation of the citizens', Corps of Engineers' and Consultants' evaluations. Those sites or problem solutions which were most desirable, received a low score, consequently the lower the score, the more desirable the site or problem solution.

5.18 This process provides an excellent opportunity for interested and concerned citizens to become involved with and have a direct hand in planning Lake Ashtabula's future. At the same time it also provides a logical, structured process by which local citizens can see and understand the rationale upon which decisions were made in response to their concerns and desires.

LAKE ASHTABULA RECREATION FACILITY SCORE SHEET

	SITE IDENTIFICATION NUMBERS	1	2	3	4	5	6	7	8
1 VEHICLE CAMPING									
COMMUNITY									
A.	Site is protected and has views of the water. Site is attractive, private, and has desireable surroundings.	4	5	3	7	1	2	6	8
B.	Site is easy to find and reach by car.	2	5	4	7	1	3	8	6
C.	Site takes advantage of related facilities such as swimming.	2	3	5	6	1	4	7	8
	SUB-TOTAL	8	13	12	20	3	9	21	22
CORPS OF ENGINEERS									
A.	Site can be easily maintained.	1	3	2	5	4	7	6	8
B.	Site can be easily policed.	1	3	2	4	5	6	7	8
	SUB-TOTAL	2	6	4	9	9	13	13	16
BRW-PLANNING CONSULTANTS									
A.	Site conditions are favorable from a technical standpoint for vehicle camping. (Stable soils, flat, etc.)	5	4	1	8	3	6	2	7
B.	Site has adequate space to accommodate additional camping.	6	2	1	5	7	4	3	8
C.	Site minimizes installation costs, i.e., water, electricity, etc.	3	4	2	7	6	1	8	5
D.	Site minimizes distance traveled on township roads required for access.	4	6	3	7	1	2	8	5
	SUB-TOTAL	18	16	7	27	17	13	21	25
TOTAL		28	35	23	56	29	35	55	63

LAKE ASHTABULA RECREATION FACILITY SCORE SHEET

SITE IDENTIFICATION NUMBERS	1	2	3	4	5	6	7	8
2 BOAT LAUNCHING								
COMMUNITY								
A. Site is in close proximity to the best spring fishing.	7	6	3	4	1	2	8	5
B. Site is in close proximity to the best fall fishing.	3	2	1	5	4	6	7	8
C. Site is in close proximity to the best ice fishing (access onto lake).	6	2	1	4	3	5	8	7
D. Site is easy to reach by car.	1	5	3	7	2	4	8	6
E. Site relates to adjacent facilities such as picnicking and camping.	3	5	4	6	1	2	7	8
SUB-TOTAL	20	20	12	26	11	19	38	34
CORPS OF ENGINEERS								
A. Site can be easily maintained.	1	2	3	4	5	6	7	8
B. Site can be easily policed.	1	2	3	4	5	6	7	8
SUB-TOTAL	2	4	6	8	10	12	14	16
BRW-PLANNING CONSULTANTS								
A. Site minimizes distance traveled on township roads required for access.	4	6	3	7	1	2	8	5
B. Site should be protected from wave action for unloading.	7	8	2	3	6	5	1	4
C. Site has sufficient space for parking.	3	4	7	2	8	5	1	6
SUB-TOTAL	14	18	12	12	15	12	10	15
TOTAL	36	42	30	46	36	43	62	65

LAKE ASHTABULA RECREATION FACILITY SCORE SHEET

SITE IDENTIFICATION NUMBERS	1	2	3	4	5	6	7	8
3 PICNICKING CRITERIA								
COMMUNITY								
A. Site is attractive and desireable for picnicking.	3	4	5	6	1	2	7	8
B. Site has existing picnic facilities and other picnic related facilities.	2	5	3	6	1	4	7	8
C. Site is easy to reach by car.	1	5	3	6	2	4	7	8
SUB-TOTAL	6	14	11	18	4	10	21	24
CORPS OF ENGINEERS								
A. Site can be easily maintained.	1	2	3	6	4	5	7	8
B. Site can be easily policed.	1	3	2	6	4	5	7	8
SUB-TOTAL	2	5	5	12	8	10	14	16
BRW-PLANNING CONSULTANTS								
A. Site has adequate space to accommodate the proposed picnic facilities.	5	1	2	4	7	6	3	8
B. Site minimizes distance traveled on township roads required for access.	4	6	3	7	1	2	8	5
SUB-TOTAL	9	7	5	11	8	8	11	13
TOTAL TOTAL	17	26	21	41	20	28	46	53

LAKE ASHTABULA RECREATION FACILITY SCORE SHEET

4 TENT OR PRIMITIVE CAMPING

SITE IDENTIFICATION NUMBERS	1	2	3	4	5	6	7	8
COMMUNITY								
A. Site is protected and has views of the water.	5	1	2	3	4	6	7	8
B. Site takes advantage of adjacent facilities such as swimming.	3	2	4	6	1	5	7	8
C. Site is easy to find.	1	5	3	6	2	4	7	8
D. Site has a feeling of being remote and very private.	8	1	4	2	5	6	3	7
SUB-TOTAL	17	9	13	17	12	21	24	31
CORPS OF ENGINEERS								
A. Site can be easily maintained.	1	2	3	6	4	5	7	8
B. Site can be easily policed.	1	3	2	8	4	5	7	6
SUB-TOTAL	2	5	5	14	8	10	14	14
BRW-PLANNING CONSULTANTS								
A. Site conditions are favorable from a technical standpoint for primative camping.	4	3	1	6	5	7	2	8
B. Site has adequate expansion space.	5	2	1	3	7	6	4	8
C. Site minimizes distance traveled on township roads required for access.	4	6	3	7	1	2	8	5
	13	11	5	16	13	15	14	21
TOTAL	32	25	23	47	43	46	52	66

LAKE ASHTABULA RECREATION FACILITY SCORE SHEET

5 SWIMMING CRITERIA

	SITE IDENTIFICATION NUMBERS	1	2	3	4	5	6	7	8
COMMUNITY									
A.	Site functions as a support facility to other existing activities.	1	4	5	6	2	3	7	8
B.	Site has suitable beach area.	1	3	6	4	2	5	7	8
C.	Site offers attractive, desireable surroundings for swimming.	1	3	6	4	2	5	7	8
D.	Swimming activity does not conflict with other nearby uses, i.e. boating.	1	2	7	4	3	5	6	8
	SUB-TOTAL	4	12	24	18	9	18	27	32
CORPS OF ENGINEERS									
A.	Site provides easy access for emergency vehicles.	1	2	4	4	3	4	4	4
B.	Site minimizes maintenance costs.	1	2	4	4	3	4	4	4
C.	Site minimizes cost of installation.	1	2	4	4	3	4	4	4
	SUB-TOTAL	3	6	12	12	9	12	12	12
BRW-PLANNING CONSULTANTS									
A.	Location minimizes distance traveled on township roads necessary to reach site.	4	6	3	7	1	2	8	5
B.	Site has adequate space for parking and other required facilities.	1	3	5	4	7	6	2	8
C.	Beach area can be secured aginst unauthorized use.	1	2	3	5	4	6	7	8
	SUB-TOTAL	6	11	11	16	12	14	17	21
TOTAL		13	29	47	46	30	44	56	65

LAKE ASHTABULA RECREATION FACILITY SCORE SHEET

SITE IDENTIFICATION NUMBERS	1	2	3	4	5	6	7	8
6 SNOWMOBILING CRITERIA								
COMMUNITY								
A. Site offers easy winter access for cars with snowmobile trailers.	4	7	1	6	2	3	8	5
B. Site provides good snowmobile access to the lake.	6	5	1	4	2	3	8	7
C. Site minimizes conflict between snowmobile use and neighboring land use, i.e. ice fishing.	4	8	1	6	2	3	7	5
D. Site should have winterized toilet facilities.	5	7	1	4	2	3	8	6
SUB-TOTAL	19	27	4	20	8	12	31	23
CORPS OF ENGINEERS								
A. Site is easily securable against undesireable use and easy to police.	1	3	2	8	6	5	7	4
B. Site minimizes the cost of providing winter toilet facilities and maintenance in general.	1	4	2	5	7	6	8	3
SUB-TOTAL	2	7	4	13	13	11	15	7
BRW-PLANNING CONSULTANTS								
A. Site must provide adequate parking space for cars and snowmobile trailers.	1	3	8	5	7	4	2	6
SUB-TOTAL	1	3	8	5	7	4	2	6
TOTAL	22	37	16	38	28	37	48	36

ALTERNATIVES TO REDUCE NUTRIENT POLLUTION OF LAKE ASHTABULA

SCORE SHEET

ALTERNATIVES	COMMUNITY Alternative is desireable from a community standpoint.	CORPS OF ENGINEERS Alternative minimizes economic and environmental cost.	CONSULTANT Alternative maximizes nutrient reduction.	TOTAL
Remove nutrients from the lake through the harvesting of fish flesh (primarily Yellow Perch) by commercial fishing.	4	6	6	16
Construction of check dams and settling basins in the side canyons or coulees feeding Lake Ashtabula. The purpose of this would be to settle out nutrients from the run-off before it is released into the lake.	3	2	2	7
Construction of marshes and settling basins above the lake to remove nutrients from the in-flow before it reaches the lake.	1	1	1	3
Construction of a low-level release facility at the dam which would remove the most nutrient-laden water from the reservoir bottom.	2	7	3	12
Elimination of feed lots within the direct drainage basin of Lake Ashtabula (cliff line).	5	3	4	12
Fencing of the entire lake so as to eliminate cattle access to the water with assistance to provide cattle watering facilities to lands isolated from the lake by this action.	7	4	5	16
Limited fencing of the lake with the provision of specific access points for the purpose of watering cattle.	6	5	7	18

LAKE ASHTABULA RECREATION FACILITY SCORE SHEET

SITE IDENTIFICATION	FACILITY SCORES					
	VEHICLE CAMPING	BOATING	PICNICKING	TENT CAMPING	SWIMMING	SNOWMOBILING
1 MAIN PUBLIC USE AREA	28	36	17	32	13	22
2 SUNDSTROM'S LANDING	35	42	26	25	29	37
3 EGGERT'S LANDING	23	30	21	23	47	16
4 KATIE OLSON'S LANDING	56	46	41	47	46	38
5 EAST ASHTABULA	29	36	20	43	30	28
6 WEST ASHTABULA	35	43	28	46	44	37
7 OLD HIGHWAY 26	55	62	46	52	56	48
8 KEYES CROSSING	63	65	53	66	65	36

6 Resource Use Objectives

General

6.01 During the first phase of this study process a number of concerns were expressed by the public. Also during the analysis of existing natural conditions a number of environmentally limiting factors were found.

6.02 These limiting factors together with the expressed concerns of the public form the basis of development goals or objectives by which future development and management plans will be evaluated, developed, and implemented.

6.03 The resource use objectives developed for Lake Ashtabula are based upon public input, natural capabilities and capacities, and professional judgment. The following is the list of resource use objectives:

- Existing water quality should be improved or at least maintained and prevented from further deterioration.
- Future recreation development or expansion should be limited to those areas which minimize usage of existing gravel Township roads.
- The existing camping and day use facilities should be expanded and

reorganized to accommodate increased demand and efficient operation and maintenance.

- Development should be excluded from those areas that have poor soils or severe slopes that are prone to erosion or slumping.

- The existing wildlife cover and habitat should be expanded, improved, and maintained.

6.04 These objectives or goals are to be used as guidelines for future development and resource management at Lake Ashtabula. They will be used as a basis for solutions that respond to natural conditions and public desires.

7 Development Plan

Land Allocation

7.01 The allocation of Federal lands around Lake Ashtabula is based upon a combination of existing natural and man-made conditions along with future recreation demand projections and public input and comments. There are those lands, the allocation of which, is quite evident, whereas there are those very narrow tracts of land which are more difficult to allocate. The existing Federal lands around Lake Ashtabula are extremely inadequate to satisfy all collateral uses. This limitation does not result wholly from the restricted land configuration but in part to the steep, highly erodable, unproductive soils and terrain surrounding Lake Ashtabula.

7.02 The categories used for land classifications are consistent with ER 1120-2-400, Investigation, Planning and Development of Water Resources. The following are descriptive criteria and conditions which pertain to each category of land use:

- Project Operations - These are lands acquired and allocated to provide for safe, efficient operation of the project for those authorized purposes other than recreation and fish and wildlife. In all cases this will include those lands on which the

project operational structures are located. At Lake Ashtabula this would include the Baldhill Dam site.

- Operations: Recreation-Intensive Use - These are lands which were originally acquired for project operations and have been allocated for use as developed public-use areas for intensive recreational activities by the visiting public, including areas for concession and guasi-public development. These areas include the existing developed recreational sites around the Lake. It is anticipated at this time that by the upgrading and development of these existing sites there is no need for development of new sites around the Lake. Therefore the only sites allocated for intensive recreation use are those existing sites.

- Operations: Recreation-Low Density Use - These lands were originally acquired for project operations and have been allocated for low density recreation activities by the visiting public as required as open space between intensive recreational developments or between an intensive recreational development and land which by virtue of use, is incompatible with the recreational development and would detract from the quality of the public use. These are generally the narrower bands of land, lying below Keyes Crossing, which connect many of the developed sites and also lie between private developed areas and the Lake. These are the lands which must be closely looked at with regard to the Lakeshore Management Plan (Appendix F). Some of these lands are presently being used by the owners of private residences along the lakeshore and will come under increased pressure as future development takes place.

- Operations: Wildlife Management - Lands acquired for initial project operations but have been allocated as habitat for fish and wildlife or for propagation of such species. These are all the lands lying above Keyes Crossing and the larger tracts of land below Keyes Crossing. At the upper reaches of the Lake as the depth of the Lake deceases there becomes more opportunity for aquatic vegetation to establish and less erosion so that the shoreline is more established. These areas lend themselves to development of wildlife management areas.

PHYSICAL DEVELOPMENT PLAN

7.03 Based on a concensus of professional decisions regarding the environmental and human requirements, both existing and future, all project lands have been classified. As part of the allocation is the premise that the future recreation demand projections are correct and that by redesign and reprogramming the existing recreation sites will be able to accommodate the existing demand.

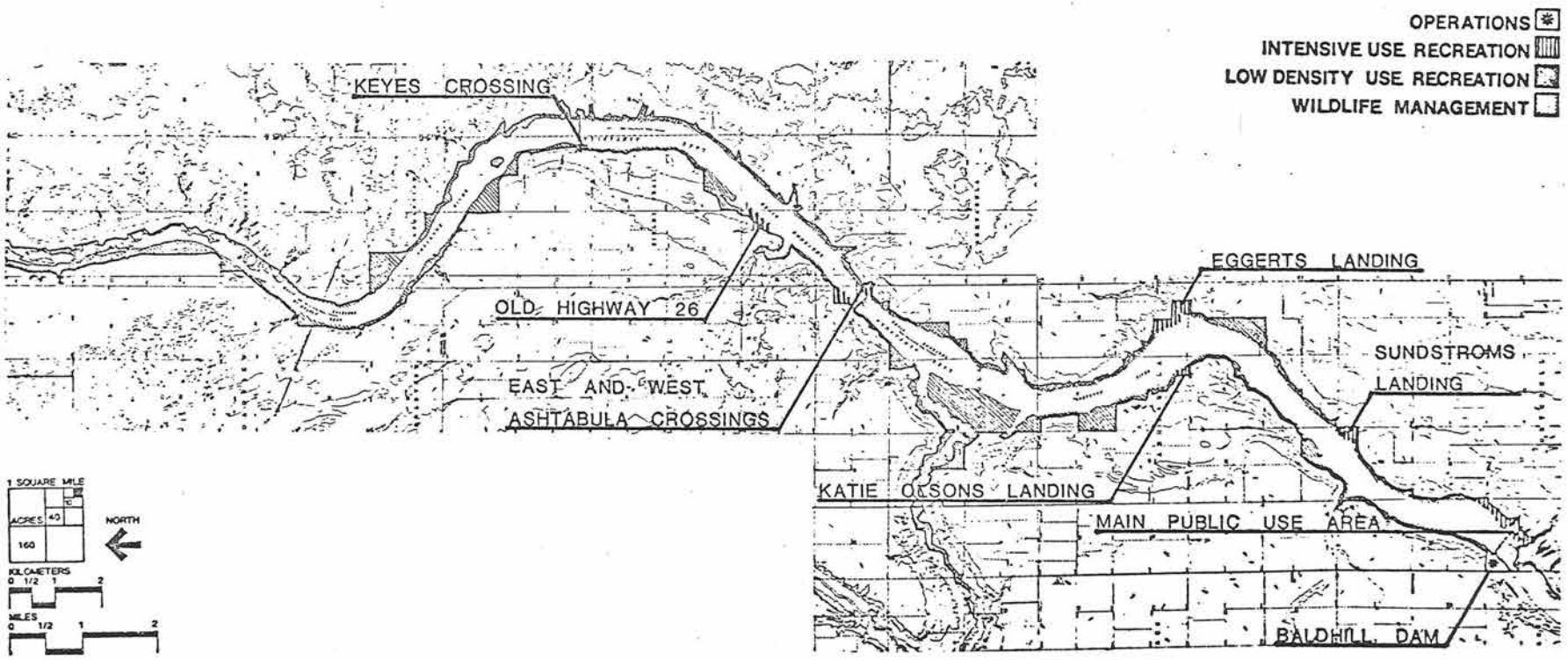
7.04 In evaluating each existing site as to what types of activities were best suited, both from the environmental question and the user, a review of the site ranking, done in Section 5, is needed. Involved in the criteria for each activity were those environmental concerns which would effect development and the most important concerns of the public.

7.05 Due to the very limited nature of the land holdings around Lake Ashtabula the small recreation sites cannot provide all recreation activities at each site. Such a practice would lead to deterioration of the site and conflicts between users. The existing natural conditions of each site also do not lend themselves or are they consistent with each individual recreational activities requirements. The objective ranking of each site as to its desirability to a given activity helped in determining which sites were best suited for a given activity.

Lake Ashtabula Master Plan

U.S. Army Corps of Engineers
Bather Ringrose Wolsfeld

Land Allocation



7.06 The following paragraphs provide descriptions of the plan of development for each recreation site.

Baldhill Dam

7.07 All visitors will be directed to this site. There will be interpretive displays developed to explain why the dam and reservoir were built and the benefits arrived at by its construction. It will also explain how the dam functions. As part of this interpretive program will be a presentation of what recreational activities are provided at Lake Ashtabula and where they are.

Support parking for this facility will be provided for cars, car-trailer combinations and buses. It will be located carefully as there exists soil problems along the bank behind the dam. Access to the existing residence and workshop will be de-emphasized and both will be screened from the parking area and approach drives. All project signs and directional signs located off project lands directing people to Lake Ashtabula will be directed toward Baldhill Dam.
Operations and maintenance facilities will continue to be located at this site. Baldhill Dam will act as the front door to Lake Ashtabula.

Main Public Use

Main Public Use Area is the most popular site at Lake Ashtabula. This site ranks high for all activities however the site is too small to effectively provide all activities. Those activities which ranked highest at Main Public Use were picnicking, swimming and boating. The existing terrain, limited land area, and absence of tree cover makes this area less desirable for camping. Consequently, existing camp sites will be relocated to a more desirable area. Since all activities which ranked highest for Main Public Use were day-use facilities, this area will be programmed as a day-use site. The existing camping area will be utilized for picnicking. Plant material will be added to further enhance this area for more attractive picnicking.

The existing day-use area of Main Public Use will remain as is. The existing swimming beach will be expanded. Roadways and parking areas will be reduced slightly and access to the concessionaire modified. Use of the existing Visitor Center will be modified. The lower floor of the building will continue to serve as the beach changing facility. However, with the initial visitor contact being shifted to Baldhill Dam more emphasis can be placed on interpretive displays which describe the project and the role of the Corps. It will be utilized as a visitor center presenting the Corps role in the Sheyenne River Basin of North Dakota.

Sundstrom's Landing

Sundstrom's Landing is presently a day-use area providing swimming and picnic facilities. It ranks high in tent camping and swimming. The site is large with only a small portion presently developed. The undeveloped portion is moderately sloped with heavy tree cover. It is a perfect site for tent camping, being too steep for vehicle camping. It will be developed for primitive tent camping. A support parking facility will be provided so that campers will have to hike into their camping site. The existing beach will be relocated to a more central location and a new change house/toilet building will be constructed. The existing picnic areas will be maintained and expanded and a new access road will be constructed to serve this area, removing the old facility which was located too close to the Lake. Final location of this new road will have to depend on existing soil conditions and slopes.
Layout of the individual campsites will be done in the field. Final layout will provide for a number of experiences. Certain areas will be set up for individual campsites. There will also be those areas set up for group campsites where church groups, Boy Scouts, Girl Scouts,

etc. can utilize the facilities either for weekends or for week long stays. There is ample room, on top of the bluff above the camping area, to provide for testing or teaching areas. Scouts can move from station to station being tested at each, on a number of nature, camping or scouting items. Depending on demand this camping facility has been designed such that it could be closed off during the week and only open on weekends. The day-use portion of the site will operate all week long.

Eggert's Landing

Eggert's Landing presently provides camping, picnicking, and boat launching. It ranked very high for vehicle camping, boating, tent camping, and to a lesser degree picnicking. Eggert's Landing will become the major campground at Lake Ashtabula. The flat, heavily wooded terrain north of the existing camp area is highly desirable for vehicle camping. Because of the heavy vegetation it provides excellent cover from wind and sun. The campground will be developed in four separate camp loops. The loops can be added as other camp pads are eliminated at other sites around the Lake and relocated to Eggert's. Because each loop is separate they can be easily closed for rehabilitation or maintenance. Each camp site and loops will be located in the field to take advantage of the existing tree cover.

Included in the campground would be the construction of shower facilities/toilets. Boat tie-up areas will be provided along the shoreline for those campers with boats. There is also opportunity for informal swimming along the shoreline. Access into the campground will be provided by a new road which has a campground check-in station at the entrance for security and control.
The existing road and parking area, located near the existing picnic area, will be removed. New parking facilities for day-use activities will be located closer to the entrance thereby letting the picnic areas expand to the Lake.

The existing boat ramp will be improved and parking for car-trailer combinations developed. A fishing dock will be constructed along with fish attractors to provide an opportunity for handicapped and children to fish.

There does exist the need for a commercial concession at Eggert's Landing to provide gas, fishing supplies, and food stuffs for campers. The need for rental cabins needs to be further evaluated.

Katie Olson's Landing

This site presently provides picnicking and boat launching opportunities. Katie Olson's did not rank high for any activity, probably because it is extremely hard to find and requires extensive travel over existing gravel roads. These are the same roads that local townships are having trouble maintaining. The only improvements seen for this area is an upgrading of the boat launch and support parking facility. The existing internal road should also be reduced to open the shoreline for enjoyment by the picnickers. These improvements will be made to reduce operation and maintenance costs, erosion problems and increase picnic areas. It should remain a day-use area with a very low priority for redevelopment. This area should not be redeveloped until the problem with township road maintenance is solved so as not to put an undue hardship on the townships.

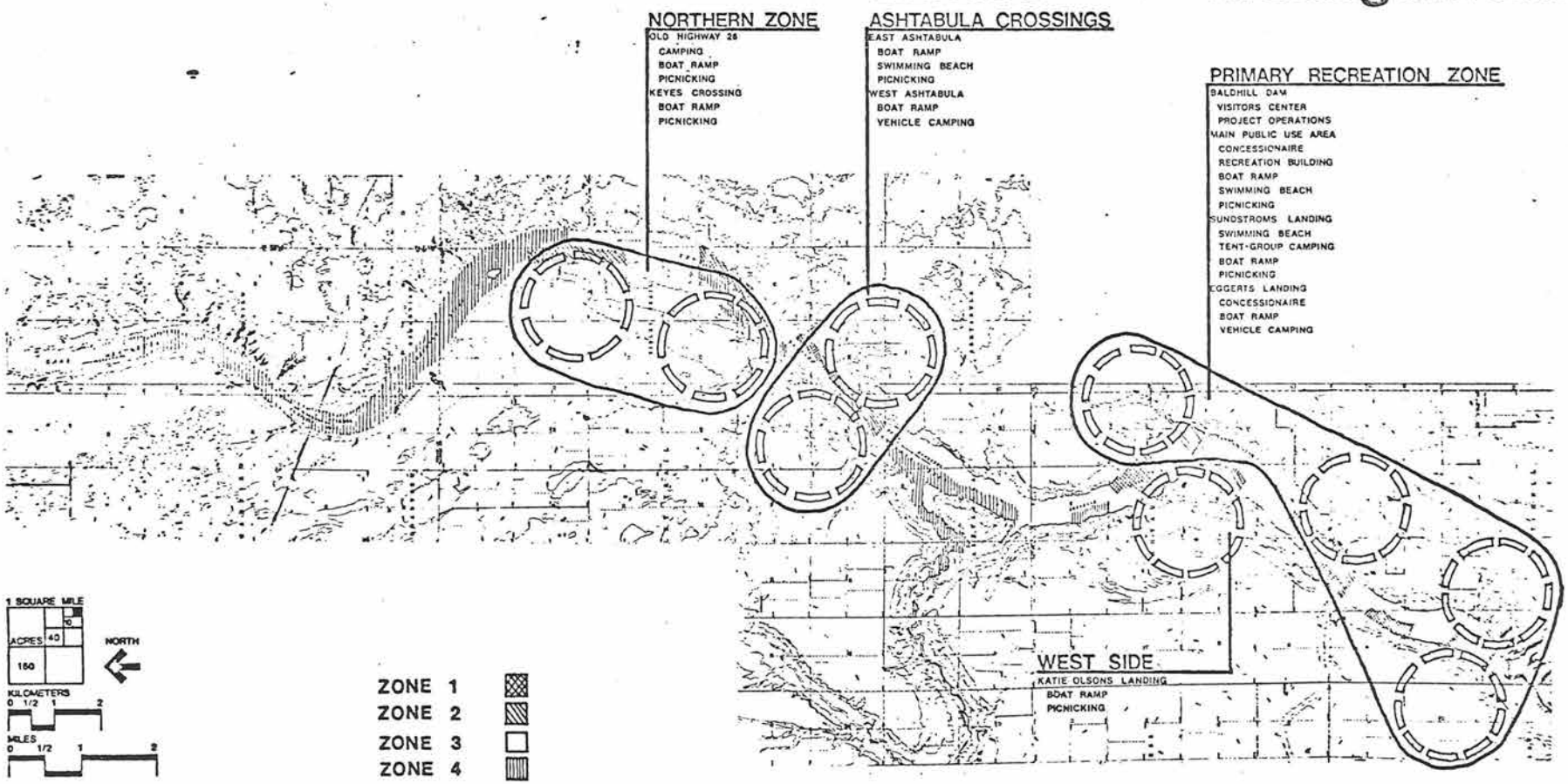
The site is not large enough to provide any camping facilities. Based upon the restricted size, the limited amount of campsites which might be developed, would require facilities, the cost of which, could not be justified. Along with unjustified initial costs would be increased operational and maintenance costs.

Lake Ashtabula Master Plan

U.S. Army Corps of Engineers
Bather Ringrose Wolsfeld

Recreation Zones

Lakeshore Management



East Ashtabula and West Ashtabula

These two sites must be considered jointly because they are both operated and maintained by Barnes County and located directly across the Lake from each other. East Ashtabula is the more popular of the two. East Ashtabula ranked highest for day-use activities such as boating, picnicking, and swimming. It ranks slightly lower with respect to camping. West Ashtabula ranked slightly lower than East Ashtabula in all activities.

East Ashtabula is a small site and at present is being overused. Since it is most popular for day-use activities, camping will be eliminated. Presently there are no developed campsites, which allows campers to use any portion of the site they desire. There is no limit on the number of campers that may use the site, at any one time, consequently severe congestion and over use occurs.

Modifications will include the upgrading of the boat launching area and support parking. Internal roads will be minimized and picnic and swimming parking will be provided at the eastern edge of the site. The balance of the site will be developed into picnic areas, group picnic areas and an open sport area for general field sports. The existing swimming beach will be enlarged and a new beach changing house with toilets will be constructed.

West Ashtabula will be utilized primarily for camping. It is better suited for camping in that it is somewhat removed with less development surrounding it. The existing road will be utilized and individual camp units will be located in the field. The existing boat launch area will be upgraded along with its support parking.

These two sites, when redeveloped, will provide the same recreational opportunities as they do now. By redistributing the facilities, each recreational activity will be more defined and within an environment, both natural and man-made, that is more appropriate. It also provides the opportunity for better control and reduced management problems between campers and day users.

Old Highway 26

At present Old Highway 26 provides camping, picnicking, and boat launching. It ranked very low in desirability for all recreation activities because it is difficult to get to; it requires travel over gravel township roads and is located at the opposite end of the reservoir from which most visitors approach.

It is recommended that the boat launch area and support parking be improved and the picnic areas and its parking be more appropriately sited to fit into the existing terrain and environment. A portion of the existing camp area should be retained but the spur that provides camping out the western point will be removed. The point will be planted to provide cover for the existing camp pads.

The proposed improvements will not be made until the question of maintenance of the existing gravel townships roads has been resolved. The proposed improvements will provide for reduced operating maintenance costs and improved experiences.

Keyes Crossing

Keyes Crossing is the smallest of the existing recreation sites and the most remote from the point at which most visitors approach Lake Ashtabula. It ranked the lowest for all types of recreational activities. Presently it provides boat access onto the upper portions of Lake Ashtabula and has a few picnic tables. The boat launch and support parking be modified slightly and picnic facilities will be maintained. This area lies adjacent ot the town of Sibley and at present acts as their "city" park.

At the time the bridge and its approaches are upgraded, existing usage and future demand should be examined as to the need for providing a pedestrian underpass which would link both portions of this site.

General

The revised plans for existing recreational sites around Lake Ashtabula are based upon environmental factors, resident and user concerns, resource management concerns and sound planning principals. Recreational activities have been programmed for sites that exhibited the existing environmental factors which best associate with them. Activities were also programmed based upon the rankings by residents and users as far as those most desirable at each site. Finally activities were programmed such that development costs would be spent more efficiently and provide the most benefit for every dollar spent.

Future development should include the establishment of a trail system that would interconnect the major recreational areas on the Lake. This trail should be developed for hiking and biking and cross country skiing in the winter. It should not be utilized by ATV's or snowmobiles. As part of a first leg of this trail system Main Public Use and Sundstrom's Landing will be connected by a bituminous path.

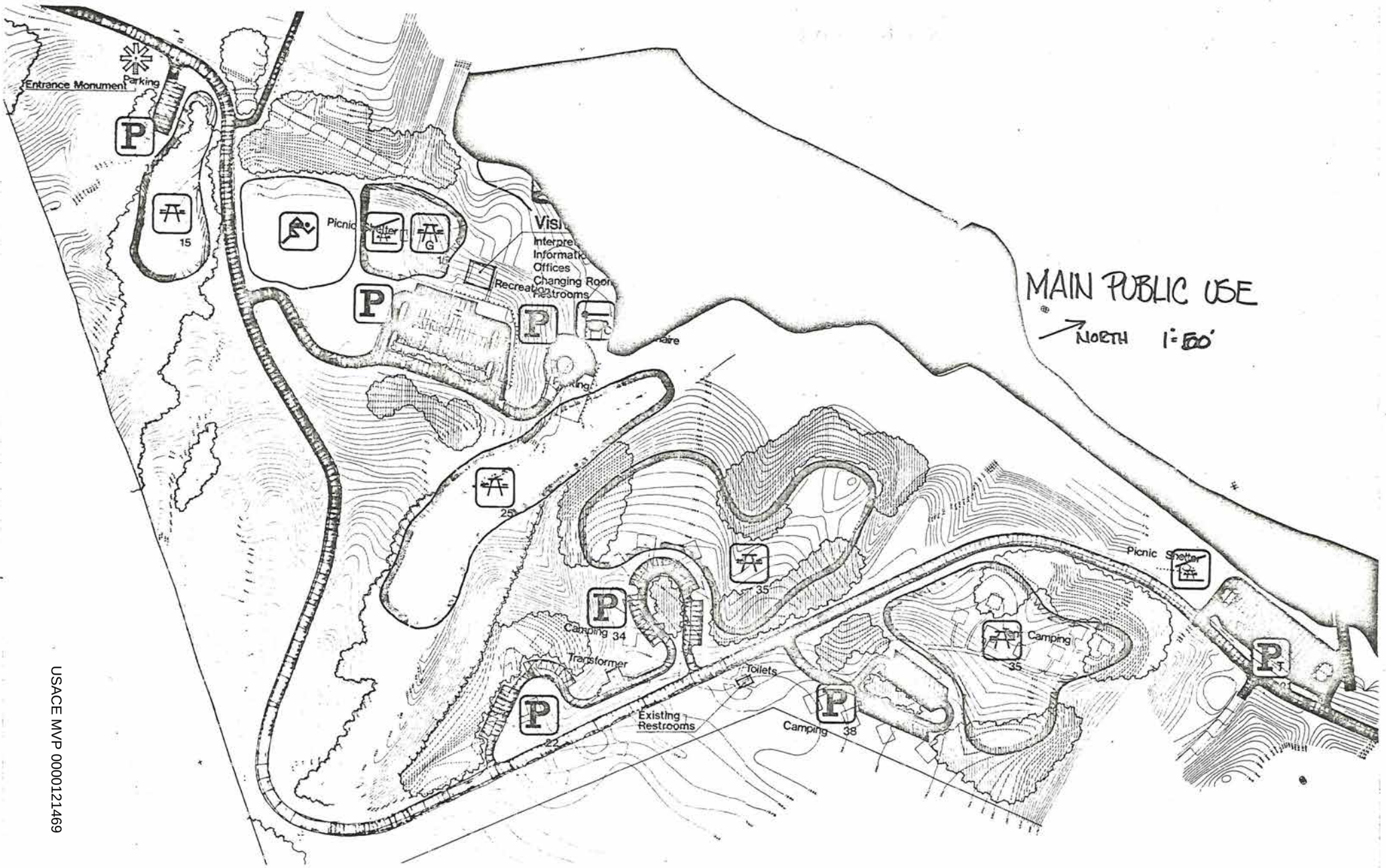
There is at present no private development along this section of shoreline and there exists sufficient Federally owned land to accomplish this section of trail. It will provide the opportunity for campers at Sundstrom's Landing to hike for supplies to the concessionaire at Main Public Use. This section of trail can be utilized as a learning guide or interpretive tool pointing out river valley formation, vegetation indienous to this area and wildlife by the use of informative plaques or bollards. It should be reemphasized that the Lake Ashtabula does not exhibit any unique vegetation or wildlife. Interpretation of the native grasses and limited vegetation and wildlife that do exist can be rewarding.

Federal lands are presently being examined for significant cultural resources, if and when such sites are identified, they should be programmed into some interpretive program. Development of existing recreation sites should proceed only after they have been carefully examined, so as no historic site be destroyed.

Baldhill Dam, Sundstrom's Landing and Eggert's Landing should have the highest priority for redevelopment. Baldhill Dam is the most important since all first time visitors will usually inspect the Dam and its related structures. It is important that they be presented with a clear picture of what the Corps role is at Lake Ashtabula and what Lake Ashtabula has to offer them in the way of recreation. Of second importance are Eggert's and Sundstrom's since these two sites will be providing the major expansion of much needed facilities. As soon as redevelopment of Eggert's Landing has begun the Main Public Use Area camp units can be removed and replaced with picnic facilities.

East and West Ashtabula Crossing should also be redeveloped as soon as possible. Barnes County should begin by eliminating all camping at East Ashtabula and direct campers to West Ashtabula. East Ashtabula cannot continue to be overused as it presently is or it will be destroyed environmentally. If Barnes County does not implement a reprogramming of these two sites it is recommended that their existing lease be examined as to its appropriateness.

All existing land now leased to the North Dakota Fish and Game Department should remain under their control. At present they do not have an intensive management program but are doing occasional planting of woody vegetation to



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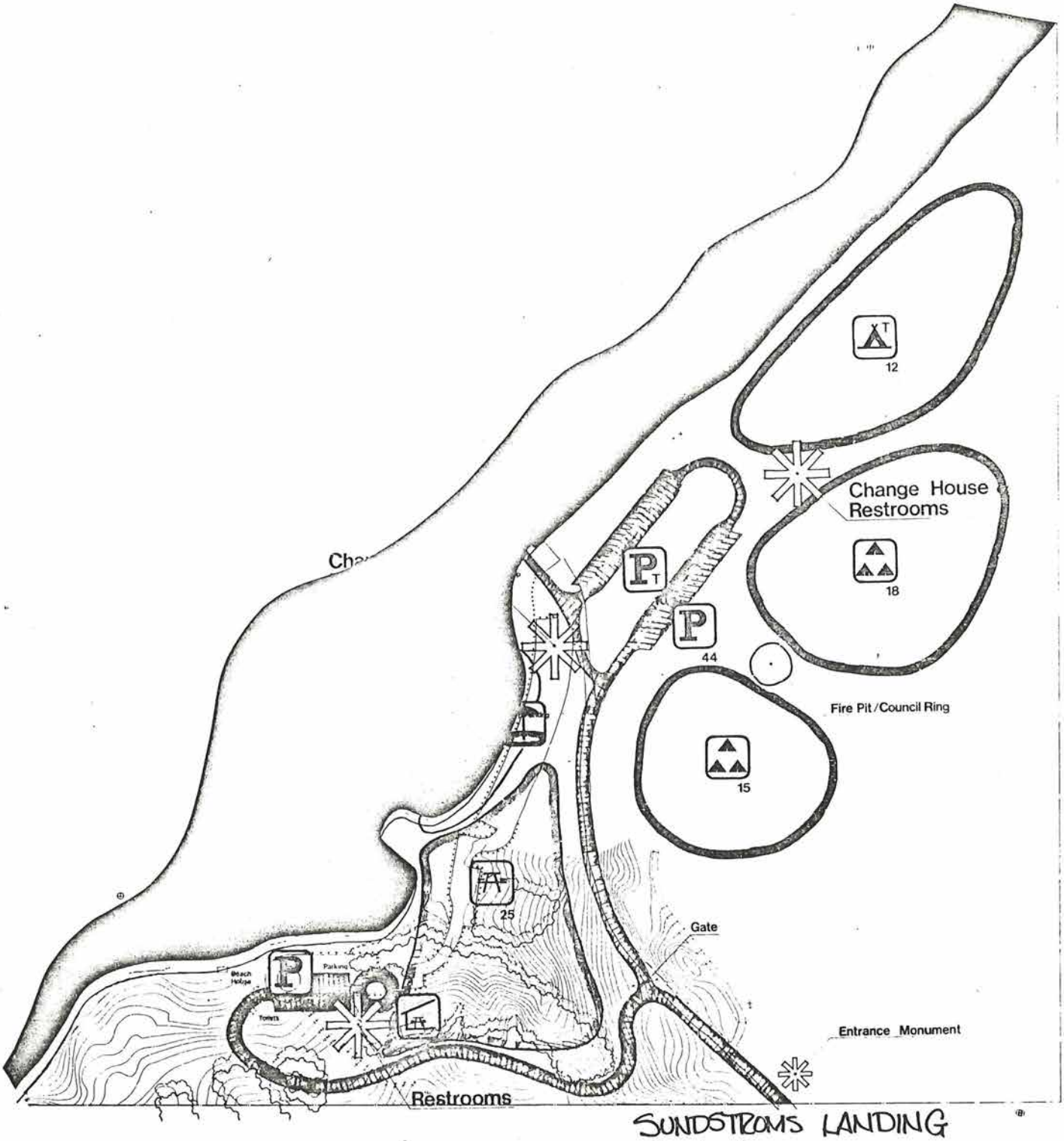
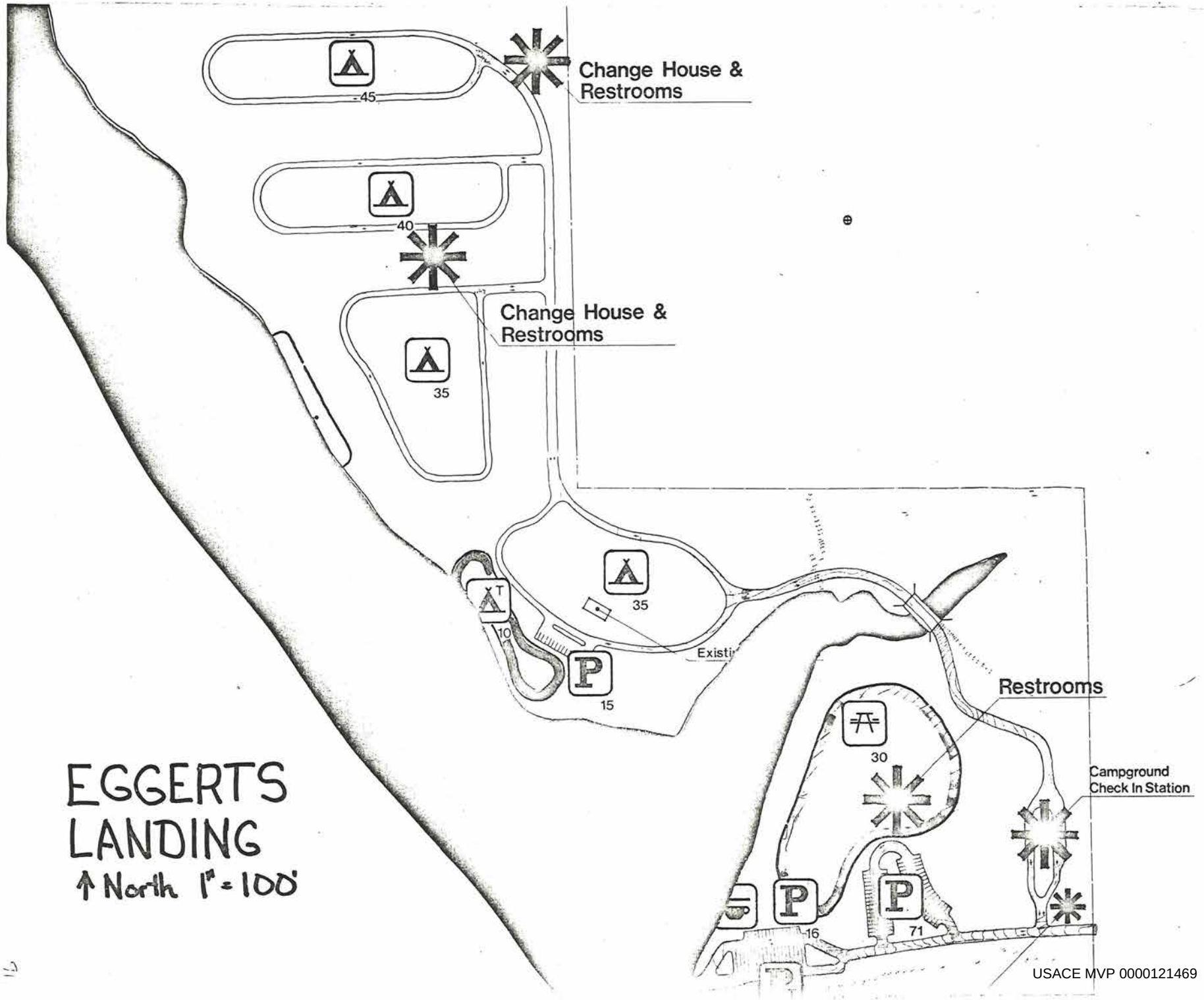
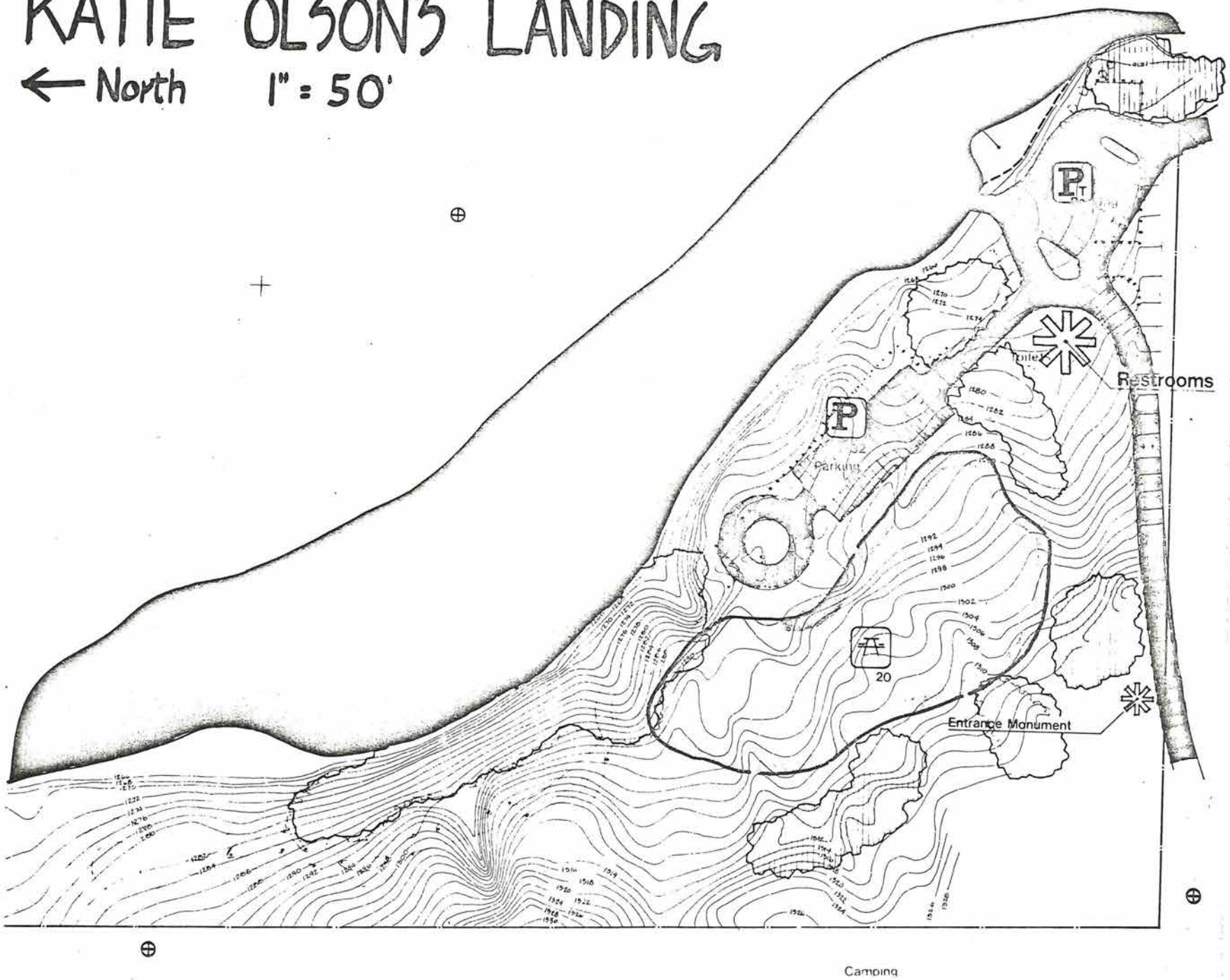


SUNDSTROMS LANDING
1:50' ↑NORTH



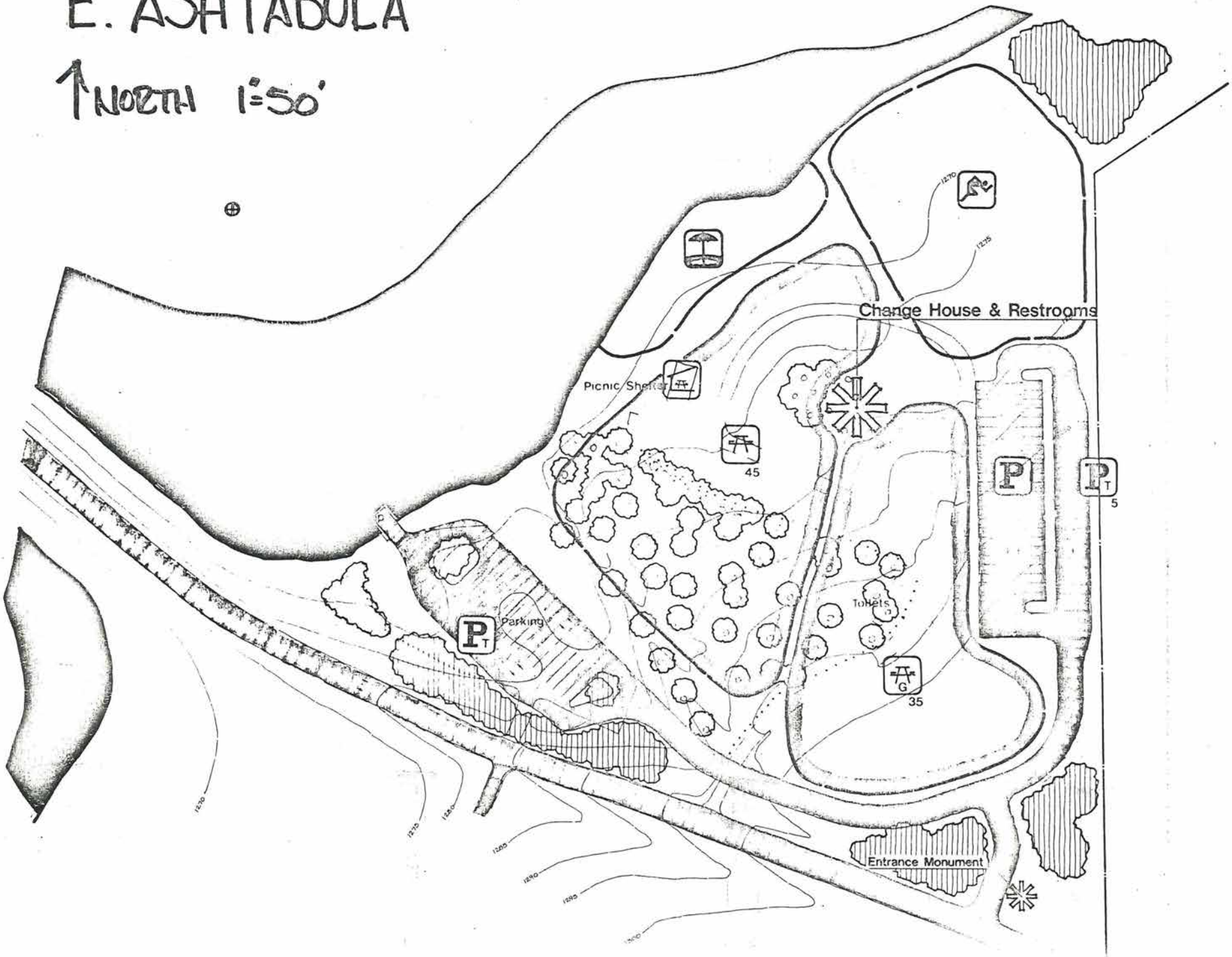
KATIE OLSON'S LANDING

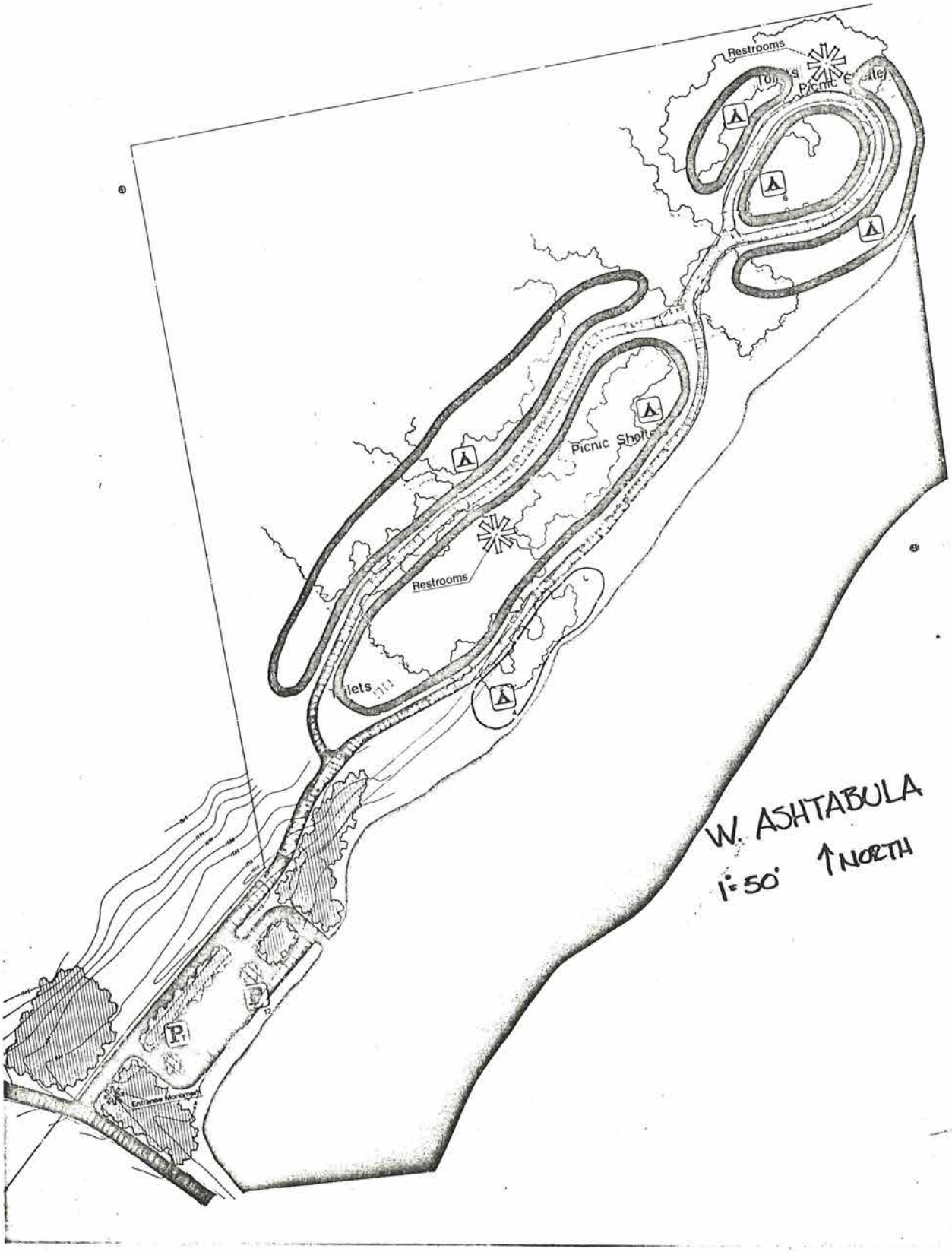
← North 1" = 50'

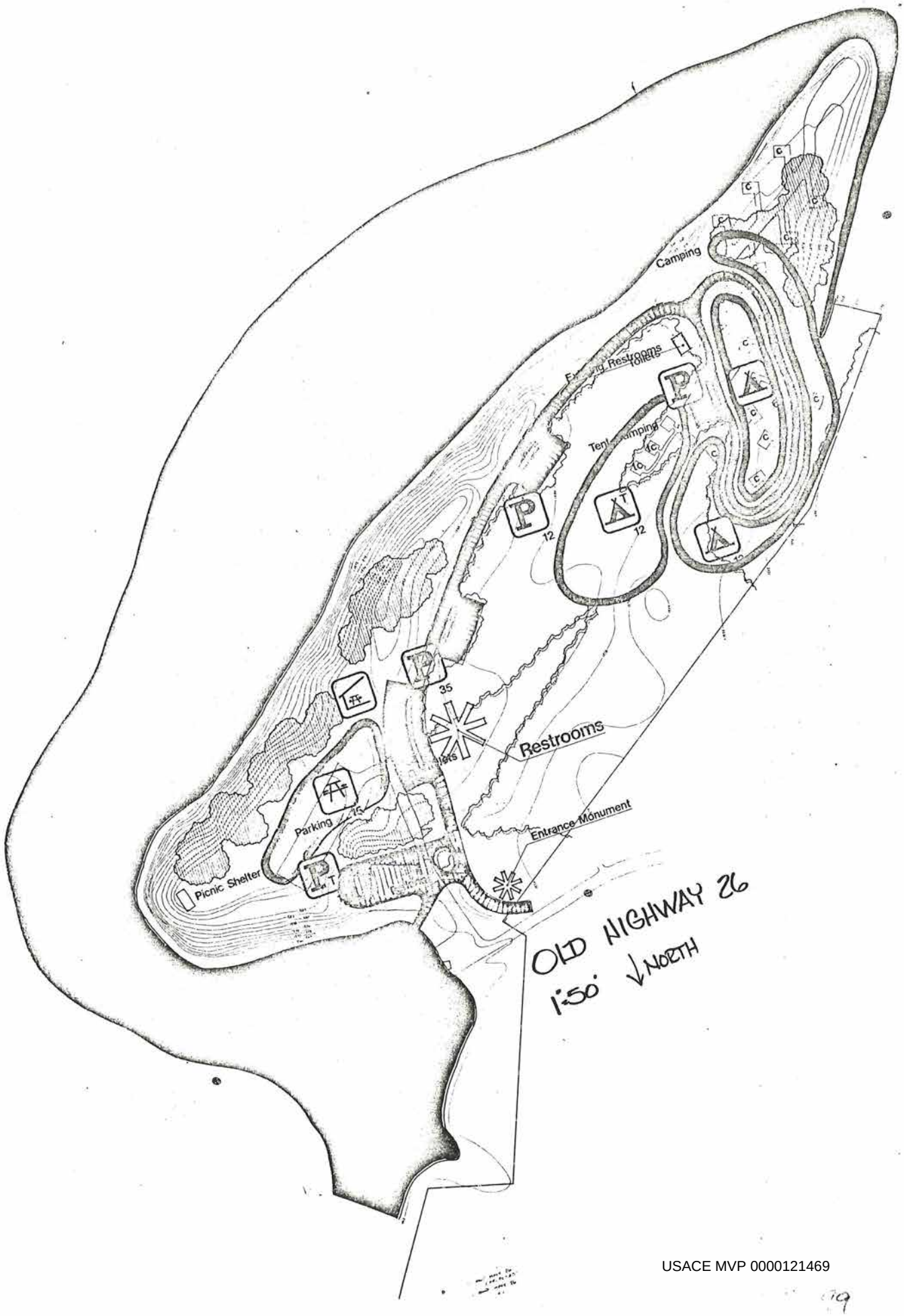


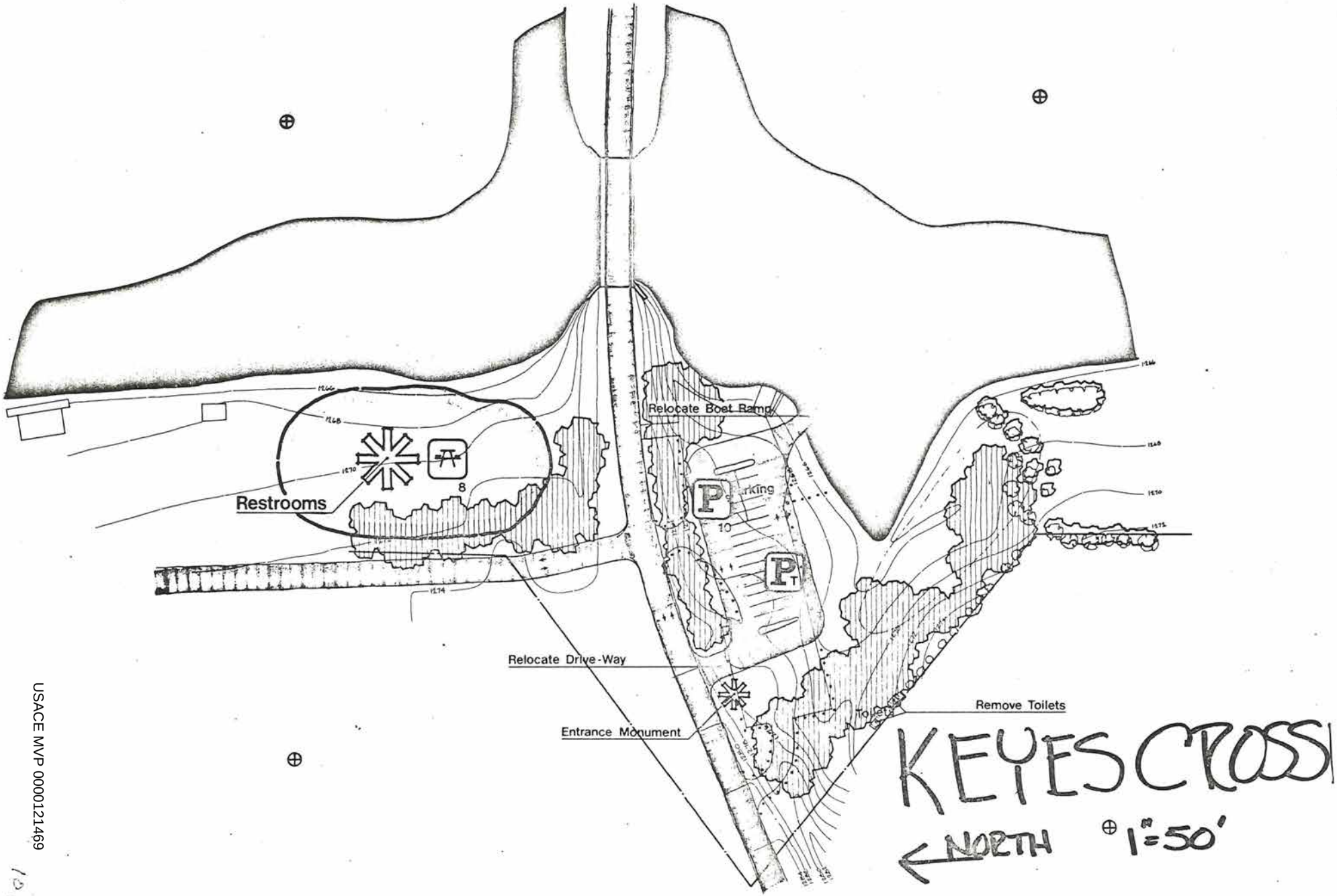
E. ASHTABULA

↑ NORTH 1"=50'




Restrooms
Picnic Shelter
Restrooms
Entrance Monument
W. ASHTABULA
1"=50'
↑NORTH





provide cover and food for wildlife. This should be encouraged to continue, and other larger tracts, below Keyes's Crossing and not adjacent to developed areas, not already leased to them, should be.

Proposed Facilities

	MPUA	BALDHILL DAM	SUNDSTROMS LANDING	EGGERTS LANDING	KATIE OLSEN'S	EAST ASHTABULA	WEST ASHTABULA	OLD HIGHWAY 26	KEYES CROSSING	
SWIMMING BEACH	1		1	1		1			1	5
(EXISTING)	1		1			1				3
BOAT LAUNCH	1(2)		1(2)	1	1	1	1	1	1	10
(EXISTING)	1(2)		1(2)	1	1	1	1	1	1	
PARKING	208	17	82	102	42	73	24	71	20	639
(EXISTING)	165	12	75	30	40	- 120 -		75	60	577
PICNIC UNITS	125	3	25	30	20	80	0	15	8	306
(EXISTING)	65	3	16	14	12	75	32	10	4	231
CAMP UNITS	0		45	165		0	60	30		300
(EXISTING)	27			23		51	9	20		130

Proposed Capacities

SWIMMING BEACH	30,000		30,000	20,700		30,000			20,700	131,4
(EXISTING)	20,700		20,700			20,700				62,1
BOAT LAUNCH	8685		8685	4343	4343	4343	4343	4343	4343	43,4
(EXISTING)	8685		8685	4343	4343	4343	4343	4343	4343	43,4
PARKING	208	17	82	102	42	73	24	71	20	
(EXISTING)	165	12	75	30	40	- 120 -		75	60	
PICNIC UNITS	70,370	1688	14,074	16,888	11,259	45,037	0	8444	4503	172,2
(EXISTING)	36,592	1688	9007	7881	6755	42,222	18,014	5629	2251	130,0
CAMP UNITS	0		12,666	46,444			16,888	8444		84,4
(EXISTING)	7600		0	6474		14,355	2533	5630		36,5

Capacities for facility oriented activities have been increased 63% over the existing capacity.

BALDHILL DAM

• Visitor's Display	Assume	10,000
• Entrance Sign	1 @ 5,000	5,000
• Internal Signs	2-3 @ 500	1,500
• Picnic Tables	3 @ 300	900
• Plant Material	2.5A. @ 20,000	50,000
• Bituminous Paving	4,500 S.Y. @ 4.50	20,400
• Lights	3 @ 800	2,400
• Grading and Removals	Assume	2,500
		$92,700

MAIN PUBLIC USE

• Entrance Sign	! @ 5,000	5,000
• Internal Signs	7-8 @ 500	4,000
• Picnic Tables	125 @ 300	37,500
• Grills	60 @ 100	6,000
• Lights	14-15 @ 800	12,000
• Bituminous Paving	2,000 S.Y. @ $.00	9,000
• Plant Material	3.0 A. @ 20,000	60,000
• Tot Lot	Assume	15,000
• Grading and Removals	Assume	5,000
		153,500

SUNDSTROM'S LANDING

• Change House Toilets	1 @ 24,000	$24,000
• Vault Toilet	1 @ 19,000	19,000
• Entrance Sign	1 @ 5,000	5,000
• Internal Signs	8-10 @ 500	5,000
• Picnic Tables	25 @ 500	5,000
• Grills	12 @ 100	1,200
• Lights	7-8 @ 800	6,400
• Bituminous Paving	12,000 S.Y. @ 4.00	54,000
• Beach Expansion	Assume	5,000
• Camp Units	45 @ 500	22,500
• Plant Material	2.0 Acres @ 20,000	40,000
• Tot Lot	Assume	15,000
• Grading	Assume	20,000
		$ 224,600

EGGERT'S LANDING

• Shower Facilities	2 @ 30,000	60,000
• Vault Toilets	1 @ 19,000	19,000
• Check-In	1 @ 8,000	8,000
• Entrance Sign	1 @ 5,000	5,000
• Internal Signs	16-18 @ 500	9,000
• Picnic Tables	30 @ 300	9,000
• Grills	12 @ 100	1,200
• Lights	12-14 @ 800	11,200
• Bituminous Paving	32,000 S.Y. @ 4.00	144,000
• Camp Units	165 @ 1,000	165,000
• Plant Material	2.0 A @ 20,000	40,000
• Potable Water Units	4 @ 3,000	12,000
• Tot Lot	Assume	20,000
• Sanitary Dump	1 @ 5,000	5,000
• Clearing	Assume	10,000
• Grading	Assume	15,000
		533,400

KATIE OLSON'S

• Vault Toilets	1 @ 19,000	19,000
• Entrance Sign	1 @ 5,000	5,000
• Internal Signs	3 @ 500	1,500
• Lights	3-4 @ 800	2,400
• Picnic Tables	20 @ 300	6,000
• Grills	8 @ 100	800
• Bituminous Paving	5,000 S.Y. @ 4.50	22,500
• Plant Material	1.5 A. @ 20,000	30,000
• Removal and Grading	Assume	5,000
		92,200

EAST ASHTABULA

• Changing and Toilets	1 @ 24,000	24,000
• Entrance Sign	1 @ 5,000	5,000
• Internal Signs	2-3 @ 500	1,500
• Picnic Tables	80 @ 300	24,000
• Grills	40 @ 100	4,000
• Beach Expansion	Assume	5,000
• Lights	8-10 @ 800	8,000
• Bituminous Paving	8,000 S.Y. @ 4.00	36,000
• Plant Material	.5A @ 20,000	10,000
• Tot Lot and Game Area	Assume	20,000
		135,500

WEST ASHTABULA

• Vault Toilets	2 @ 19,000	38,000
• Entrance Sign	1 @ 5,000	5,000
• Internal Signs	5-6 @ 500	3,000
• Lights	4-5 @ 800	4,000
• Bitminous Paving	12,000 @ 4.00	54,000
• Camp Units	60 @ 1,000	60,000
• Plant Manterial	5.0A @ 20,000	100,000
• Grading	Assume	10,000
		274,000

OLD HIGHWAY 26

• Vault Toilets	1 @ 19,000		$19,000
• Entrance Sign	1 @ 5,000		5,000
• Internal Signs	45 @ 500		2,500
• Picnic Tables	15 @ 300		4,500
• Grills	6 @ 100		600
• Lights	6-8 800		6,400
• Bituminous Paving	13,000 S.Y. @	4.50	58,500
• Plant Material	3.0A @ 20,000		60,000
• Camp Units	12 @ 500		6,000
• Poatable Water Units	1 @ 3,000		3,000
• Grading	Assume		5,000
			$ 170,500

KEYE'S CROSSING

• Vault Toilets	1 @ 19,000	19,000
• Entrance Sign	1 @ 5,000	5,000
• Picnic Tables	8 @ 300	2,400
• Grills	3 @ 100	300
• Bituminous Paving	2,400 S.Y. @ 4.50	10,800
• Plant Material	1.5 A. @ 20,000	30,000
• Lights	2 @ 800	1,600
		69,100

8 Design Criteria

General

8.01 The intent of this section is to establish general design criteria and design details that will be used all sites.

8.02 Siting of all facilities is extremely important. Pool levels and flooding hazards are important considerations in the siting of all facilities. This is true in the case of boat launching facilities. Ramps must be longer than for a normal lake because of the fluctuating water levels. In all cases the scenic and natural qualities of each area must be preserved and enhanced. Siting of recreational facilities must consider buffer areas between different use areas. Each activity will have a different buffer requirement and each activity will have a different spacing requirement depending upon the existing terrain and vegetation.

Buildings

8.03 The newly constructed vault toilets, at a number of the sites, utilizing concrete block and wood, are well layed out and fit into or respond to the existing natural features. All new buildings will use the same materials. New types of buildings proposed are:

- Change House and Restroom -This facility would incorporate a beach changing house with vault toilets and would be proposed for Sundstrom's Landing and East Ashtabula Crossing.

- Shower House - This facility would be an expanded Change House and Restroom to provide shower facilities. It would incorporate vault toilets and showers connected to a drain field. Use of a drain field would necessitate using biodegradable soaps which would be given to all campers. Informational signs would be required to explain the need for using biodegradable soaps. Soap could be handed out at time of check-in and supplied at the shower facilities. This facility is proposed for Eggert's Landing and West Ashtabula Crossing.

- Campground Check-In Station - This would be a small facility used as a control point at the Eggert's Landing campground area. It consists of a small room where a Ranger could control access to the campground, assign camping pads, hand out camp restrictions, rules, etc. and provide information and Corps exposure.

Roads and Parking

8.04 In terms of negative impacts on the environment, roads and parking lots are often the greatest offenders. A road or parking lot which blends into the land is a necessity. Access roads into sites influence the attitude of the visitor toward that site. Road alignment within a park can unite use areas or become undesirable barriers, as when they are placed between a beach and picnic area. Parking lots must also blend into the natural terrain. The ease with which the visitor enters, leaves, and parks his car is extremely important. It should not be hot and confusing. Plant material should be used to provide shade and reduce apparent size of large lots. Mounds or recessed lots should be designed to reduce visibility of parking areas. Layout should also consider how the pedestrians will leave and enter the lot. Care should be given at time of final design to design a facility that will accommodate an average use. There is no need to have large paved parking lots going unused. Thought should be given to the use of grassed areas for overflow parking.

8.05 All project roads and parking areas should be paved all-weather roads. This will reduce maintenance costs and provide better control. Design of roads should utilize a rural section with all overland drainage. There should be no need for drainage structures other than an occasional culvert. All parking stalls must be delineated so that there is no confusion on the part of any visitor as to when they should or should not park. 90^{o} parking is preferred as it utilizes less land and can be used for pull through operation for larger units. Location of all paved areas must respond to soil conditons and existing terrain.

Trails

8.06 There are a number of opportunities for trails at Lake Ashtabula including general circulation, links between recreation areas and natural area trails. Design of trails will depend largely upon usage and the land usage through which the trail is built. There are generally two types of trails which will be utilized.

8.07 The first type of trail will be more informal. It is the type of trail leading through natural areas and leads away from development. These trails would be less defined, in that they will be constructed of gravel, dirt or whatever material is present in the landscape.

8.08 The second type of trail is more formal, intensive use trail found in developed areas. These paths will be

hard surfaced since they will experience heavy use. These trails connect major use areas and connect major use areas and facilities to parking areas. Care must be taken in laying these trails out so that they will be used. This type of trail will be used in connecting recreation areas as they can be expected to receive heavy use from hikers and bikes.

Swimming Beach

8.09 Swimming is typically the center of activity in any day use area and a popular past-time for campers as well. Beaches also provide an important focus for people-watching. Beaches consist of three areas; underwater portion, beach and support area. The underwater portion should consist of a sandy bottom of an optimum slope of one foot in twenty feet. Floating docks or diving platforms should be provided in deeper water for rest and recreation. Beach areas should be flater with a slope of 1%-3%. Beach areas should also be sand and if the swimming area is to be supervised, there should be guard towers along with rescue equipment provided. Support facilities should be of grass and located behind the beach. This area should be shaded and provided with benches for supervision and passive recreationists. The combined area of the beach and support area should be about half the area of the water or swimming area. All swimming areas should be protected from boating by use of floating buoys.

Camping Areas

8.10 Many changes have occurred in camping patterns in recent years. Most notably are the changes and improvements in design of outdoor recreation vehicles and camping equipment. There are those campers who do enjoy roughing it or being with nature. These would include Scout groups who are being exposed to the experience of camping and are being instructed in camping skills. There are other campers who are not interested in nature and are actually looking for social contact. They like contact with other campers and this is their form of recreation. These campers are not looking to rough it, but will spend as much for comfort as they can afford.

8.11 Campgrounds must be planned to accommodate the needs of both groups. The needs of each group are different and each area must be designed accordingly. The trailer or social camper needs less space since he enjoys contact and has his trailer which offers him privacy from noise should he need it. The nature camper needs more space since he would like to be more alone and has usually only a confined tent which offers no audio privacy. Each camping area should provide a mix of campsites which can accommodate all camper types from tents to motor homes. The only exception to that would be those areas set up as primitive areas where there are no designated campsites.

8.12 Tent campers, since they spend most of their time outside need larger spaces and more informal. Units should be spaced at 100-foot intervals or more. Each unit should include a table, fireplace, and level pad for tent placement. There should be some areas spaced closer with shared amenities for group camping. There should also be larger areas where there are only a few scattered fireplaces and no designated tent pads for more primitive camping. Sundstrom's Landing is designated as a tent only area. There should be formal tent areas, group tent areas, and more primitive tent areas.

8.13 Social campers require more defined and substantial pads as it requires accommodating larger units, either trailers or self contained motor homes. Individual units should include a table and fireplace. The actual camp pad will have to be more defined and constructed of gravel so that it will hold up to heavier units. These areas should not be

paved since that would prohibit the use of tents. Units can be spaced closer together in the range of 65-75 feet. It is economically unfeasible to provide utility hook-ups but sanitary dump stations will be provided at each of these areas. There will be a number of group units where two or three units will be located very close, sharing amenities.

Utilities

8.14 The recent system of providing potable water at Lake Ashtabula should be adequate. As areas are expanded more storage tanks will be necessary. All recreation sites are provided with vault toilets and at present is unfeasible to provide sewage treatment plants or drain fields at these sites. Electrical service is provided at all sites and all existing and future electrical lines should be placed underground. Security lighting should be provided at parking areas and within campgrounds. One toilet facility each at Eggert's Landing, East Ashtabula Crossing and Keyes Crossing should be equipped with electric heaters which could provide some comfort for snowmobilers. Telephones should be provided at each site for emergency purposes. These telephones should be incorporated into new or existing buildings and all service lines be placed underground.

Landscaping

8.15 Landscaping should be used to solve functional problems and enhance the landscape. Use of plant material should be used to help define use areas and direct pedestrian movement and vehicular movement. It should also be used as windbreaks and screening from the sun, both of which are very important at Lake Ashtabula. Plant material should be used in an informal or natural setting. There should be a minimum of any clipped or manicured lawn areas. Native species such as green ash, bur oak, box-elder, chokecherry, pin cherry, wild plum and currants plus native grasses should be utilized. Species of red cedar and pine should be utilized in mass plantings to be used as wind screens.

Signs

8.16 Project signs will be standardized and uniform throughout the Lake Ashtabula project. They will be constructed of natural materials such as wood and stone. Metal or plastic will not be allowed. International symbol signs will be utilized in all areas. These signs require less time to understand and react to, they are more attractive and are universally understood, which facilitates use by foreign visitors. All symbol characters will be taken from Henry Dreyfus's "Symbol Sourcebook".

8.17 Entrance signs will be provided at each recreation site. They will provide information as to what activities the visitor can expect to find. It will also incorprate a locking gate which can be used to close the area. Sign format, colors, and symbols will be used throughout the project. This sign format will also be utilized in project signs placed in Valley City and along Interstate 94.

Elderly and Handicapped

8.18 All public use areas and project buildings will be designed with the elderly and handicapped visitor in mind. Not only should any new facilities meet Federal law requirements such as designated parking stalls, building access and facilities access, but area walks and ramps will be at gradients that are easily negotiable for the handicapped person. Other barrier free considerations shall include facilities that are easily reachable by wheelchairs. This shall include drinking fountains, telephones, barbecue or fireplace units, paved beach sections, paved camping pads and certain physical recreational facilities.

8.19 Within the natural areas, paths or

portions of paths will be designed to accommodate the blind. This can be accomplished through surface textures or guide trails. Interpretive signs will provide descriptive text in both written and braille form to accommodate the sighted and unsighted public. During the development phase of the individual areas, continuing efforts should be made towards innovative ways of providing outdoor recreational facilities to the handicapped.

Summary

8.20 There are a number of other visitor amenities which will be utilized throughout the areas. By the use of uniform design and materials throughout, project unity will be achieved and operation and maintenance costs will be reduced or kept to a minimum. Use of standard materials and parts throughout, necessitates less quanitites on hand for replacements.

8.21 Benches and tables will be constructed of wood. There should be a mixture of both permanent installations and movable units. Units must be rugged enough to withstand heavy usage. Fire pits and camp fire areas must be designed to be easily cleaned of ashes. The existing design presently being utilized at Lake Ashtabula is excellent and shall be standardized throughout.

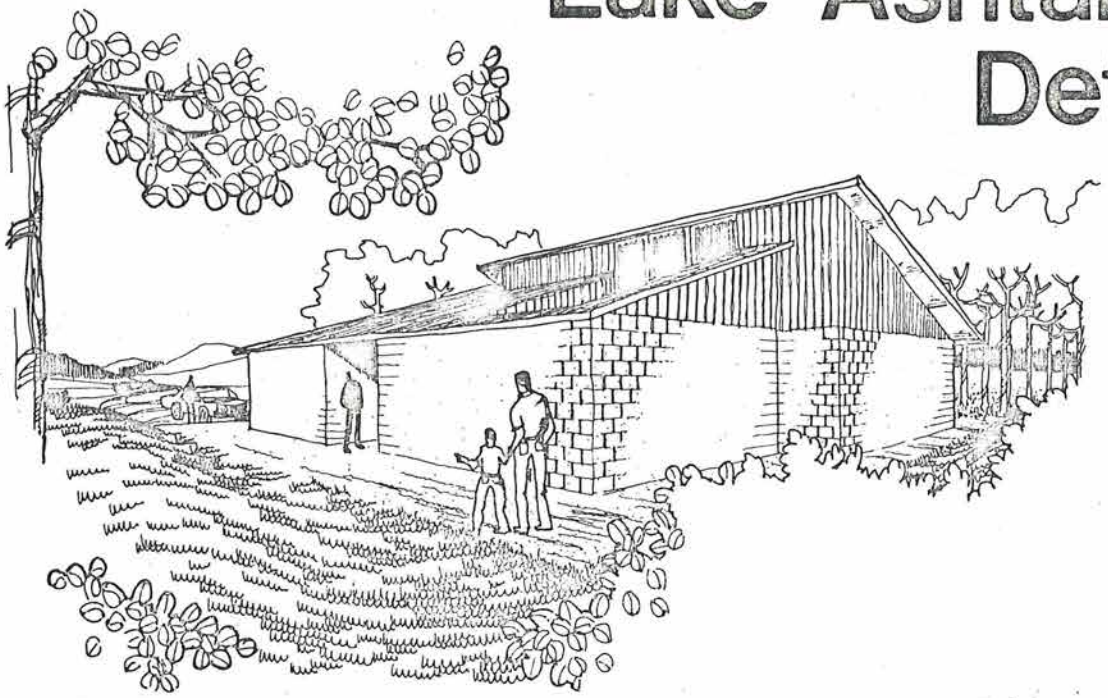
8.22 Playgrounds shall be included in all major intensive-use recreation areas. Each playground should be designed individually as an integral part of each site. Consideration should be given as to placement and provisions for informal supervision. Areas and equipment should be programmed for two age groups; preschoolers, or up to age 5-6, and school age, up to 10-12. Playground apparatus should be designed mainly using wood. There does exist many fine wooden structures being offered by playground companies. The surface of playgrounds should be sand and well defined from other use areas or turf.

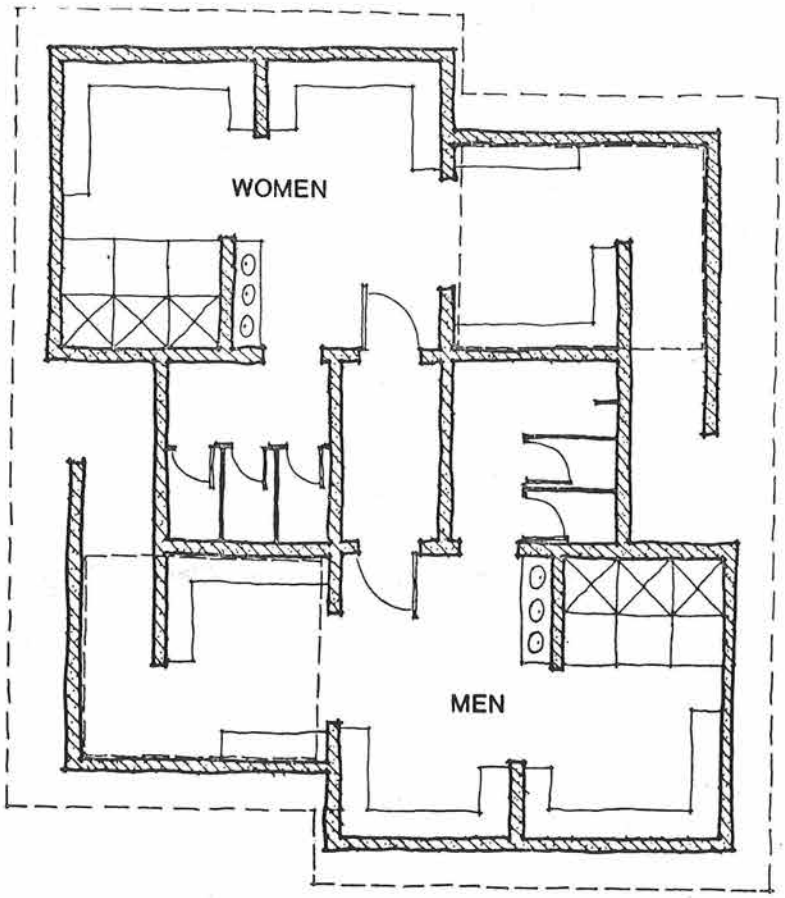
8.23 Trash recepticles should be designed such that they are rugged yet easily maintained. They should be of a consistent design that they are easily recognizable and used.

8.24 Bike racks should be programmed into both Main Public Use and Sundstrom's Landing, both of which will act as terminus points to an interlocking trail. They should be constructed of wood and provide security.

8.25 Kiosks are encouraged at strategic locations throughout the areas. They need not be more than bulletin boards attached to new buildings. In the larger camp areas they should be a free-standing unit constructed of wood. It should be utilized to keep the public aware of rules and regulations, pointing out items of interest and can be used by campers as to meeting notices, etc.

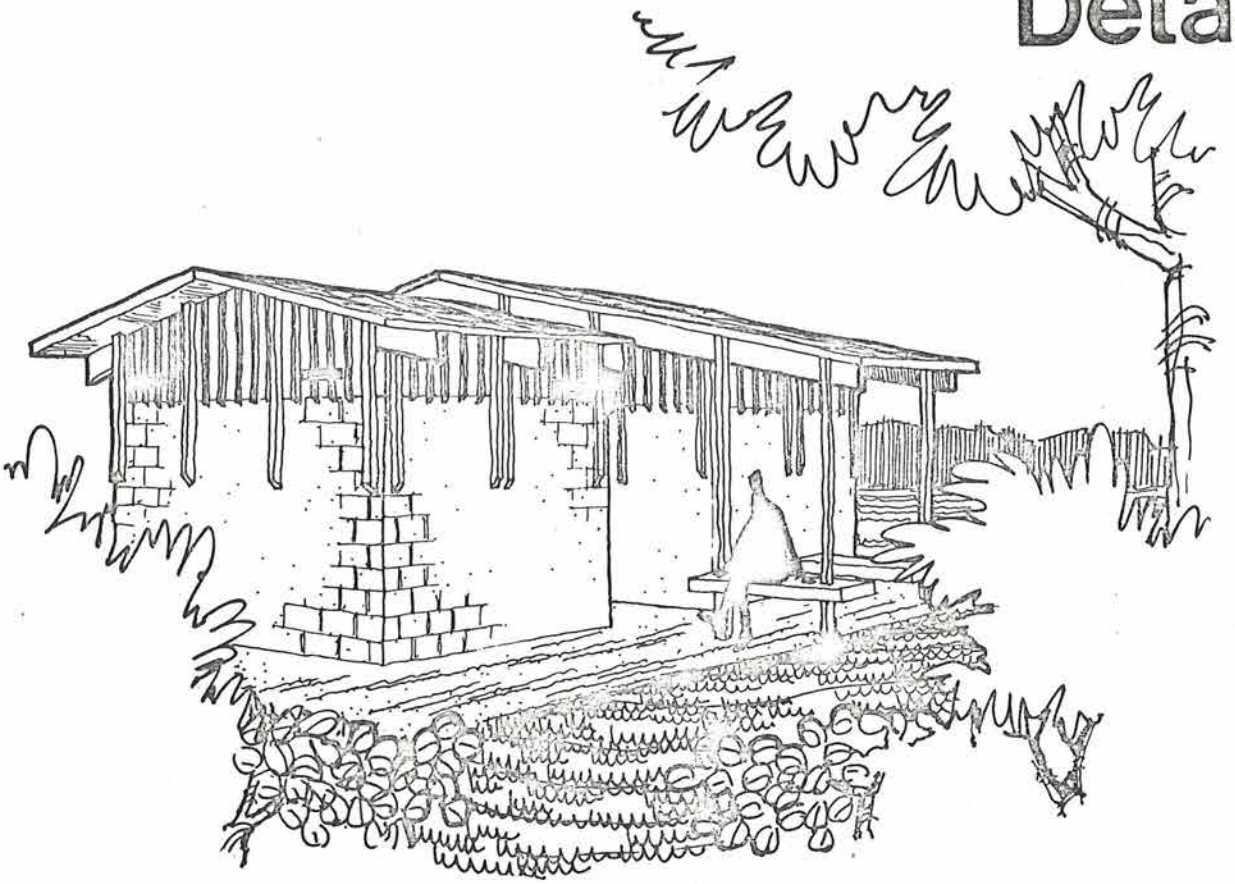
Lake Ashtabula Details

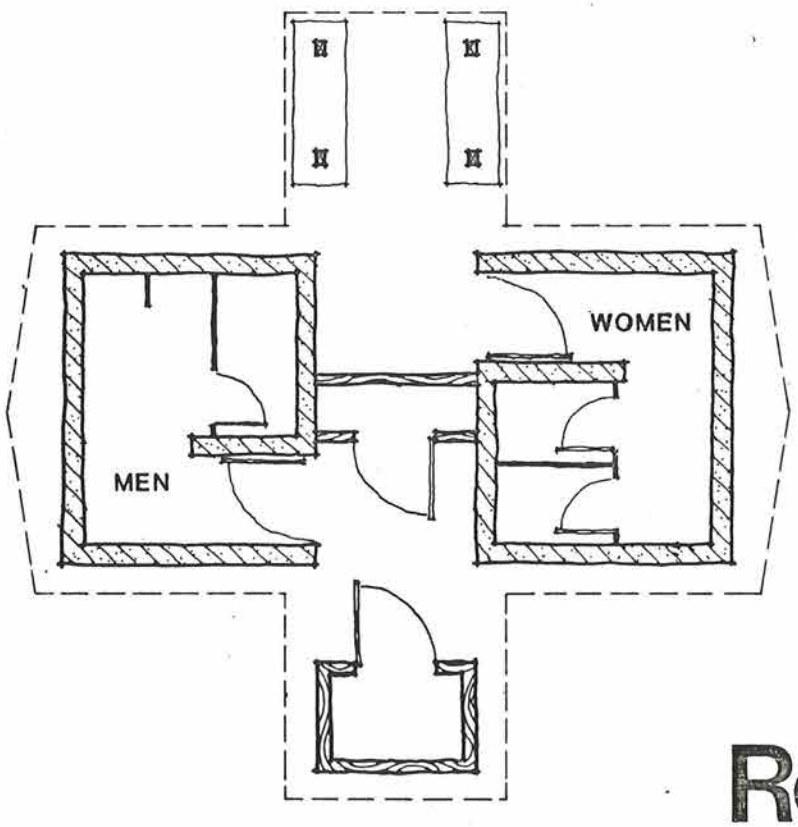




Restroom and Shower Facility

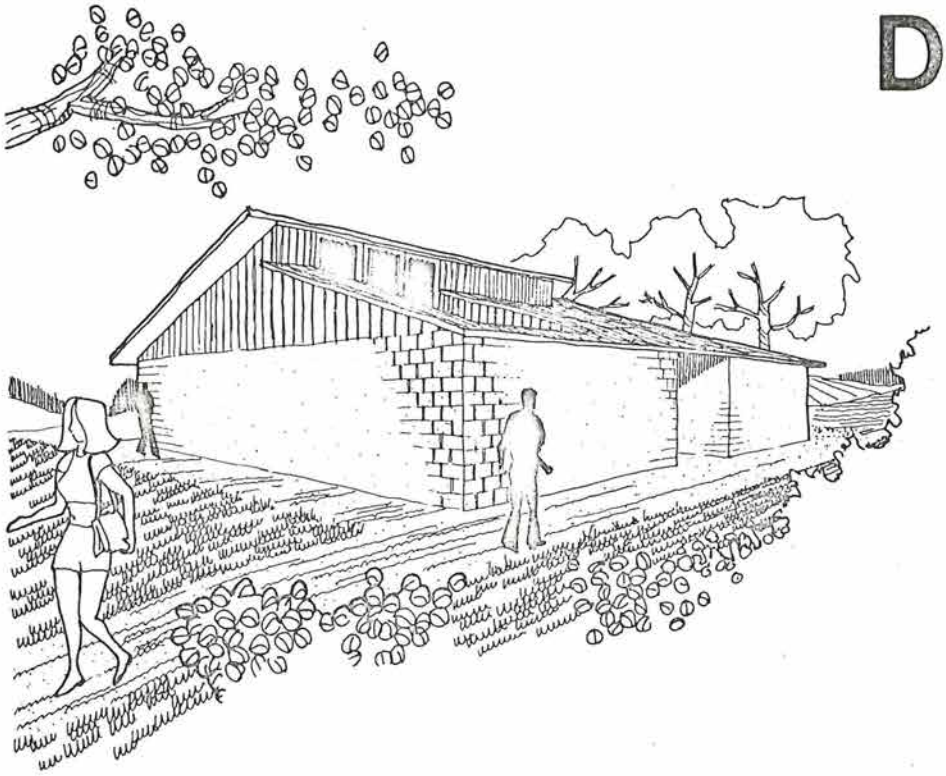
Lake Ashtabula Details

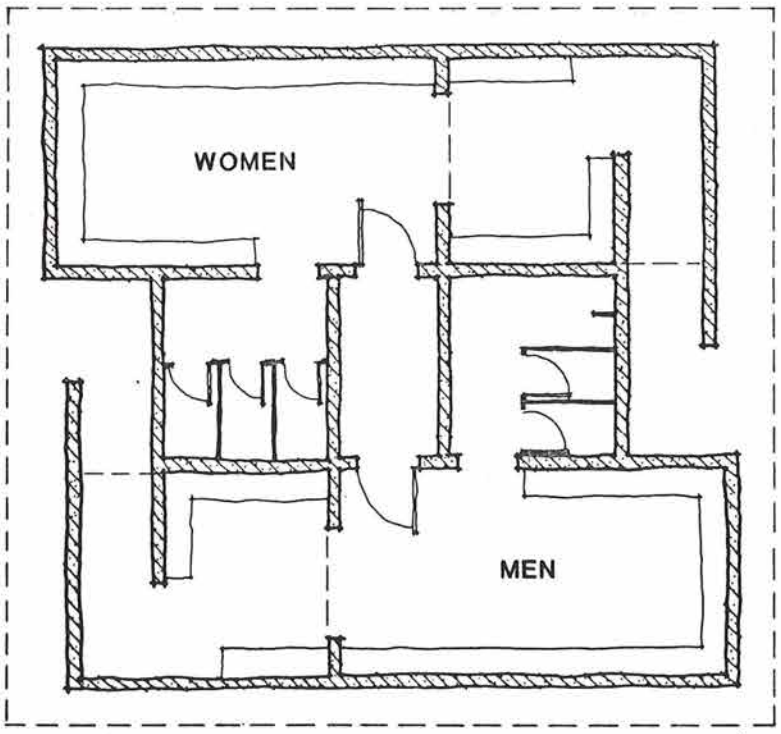




Restrooms

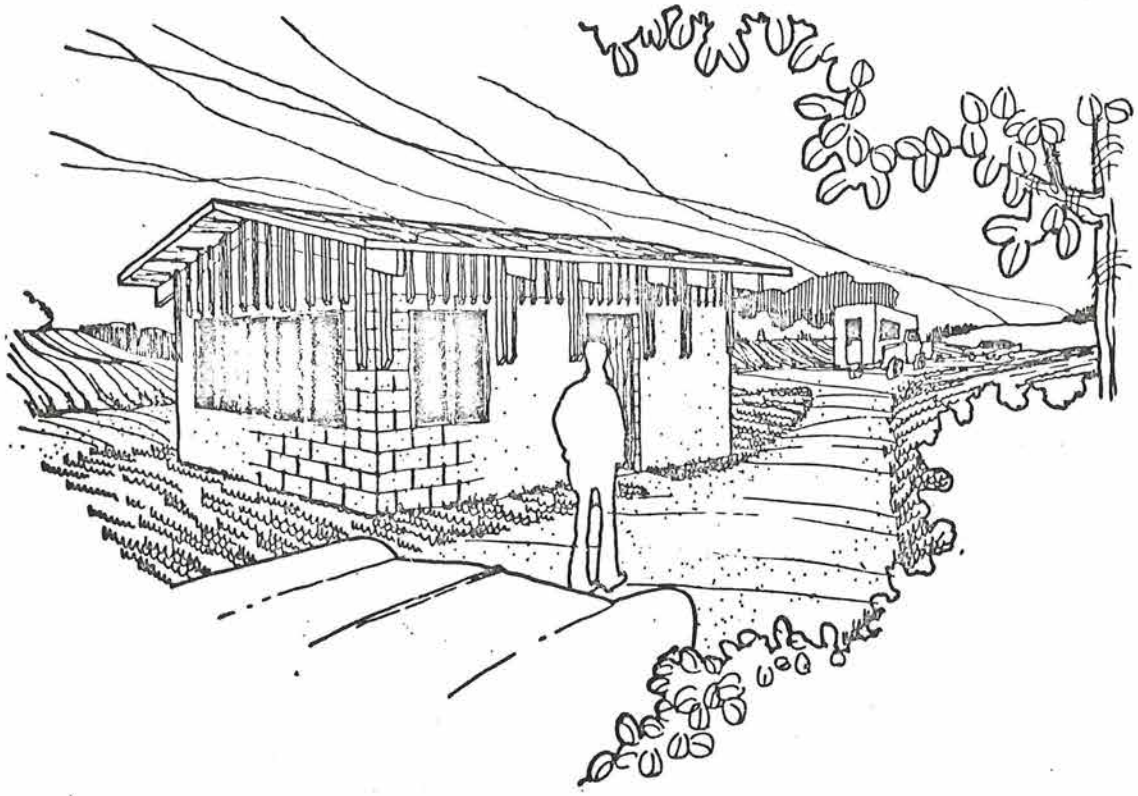
Lake Ashtabula Details

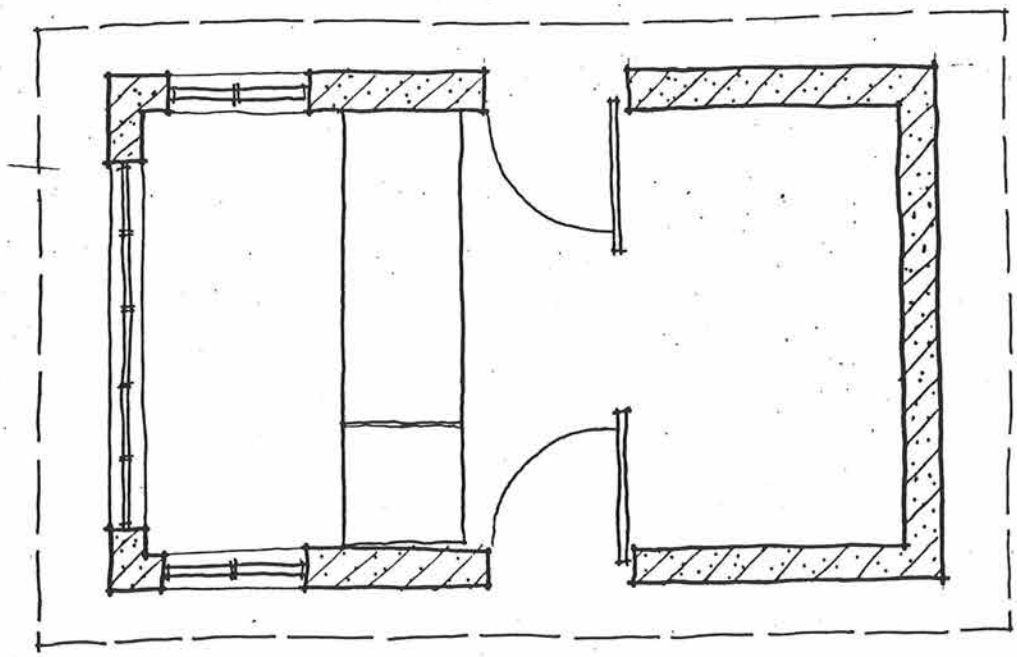




Restrooms and Changing Rooms

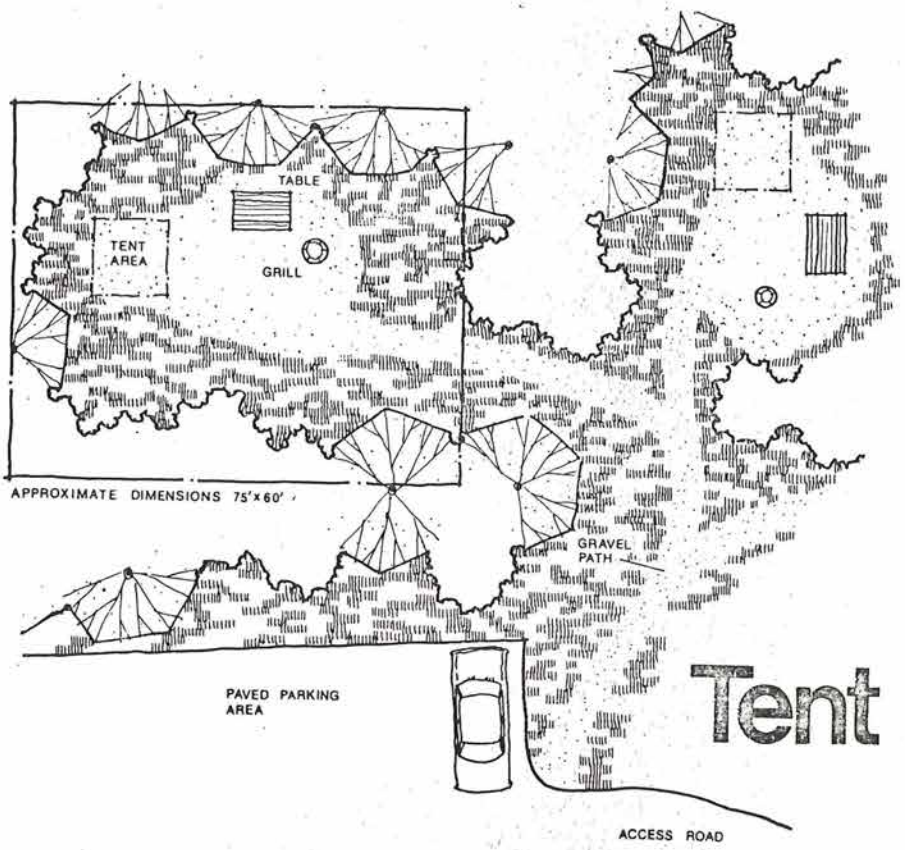
Lake Ashtabula Details



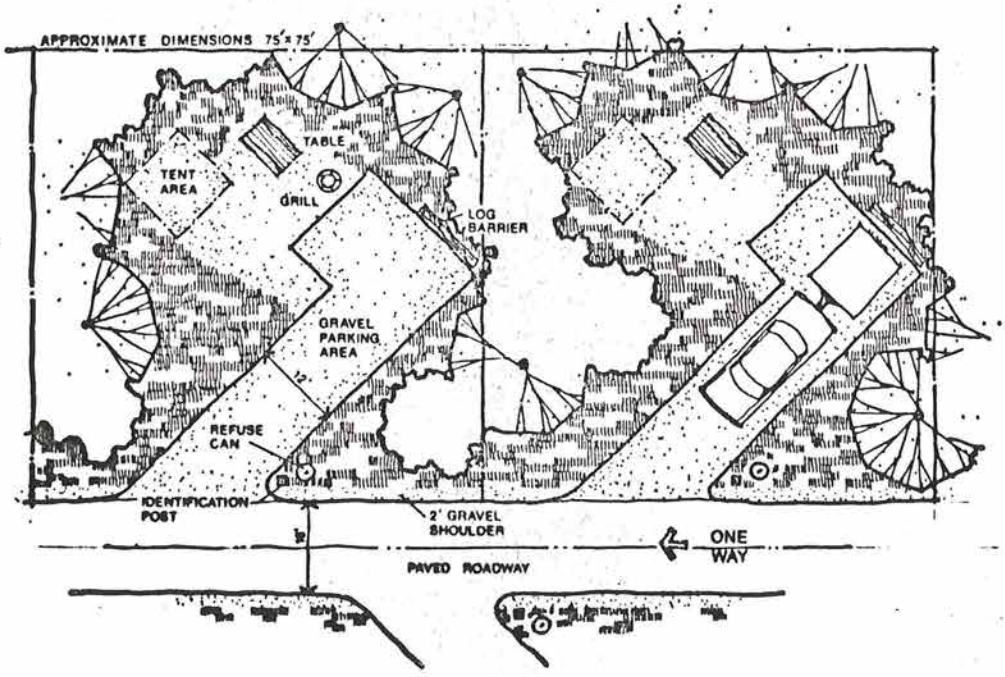


Ranger Station

Lake Ashtabula Details



Tent Camping



Vehicle Camping

Lake Ashtabula Details

BLACK PLEXIGLASS OR WOODEN BASE WITH WHITE SYMBOLS PAINTED USING TEMPLATES

FIELD GAMES

BEACH

FISHING

BOAT RAMP

PARKING
T-TRAILER

BOATING

PICNIC
SHELTER

CAMPING
T-TENT

GROUP
PICNICS

GROUP
CAMPING

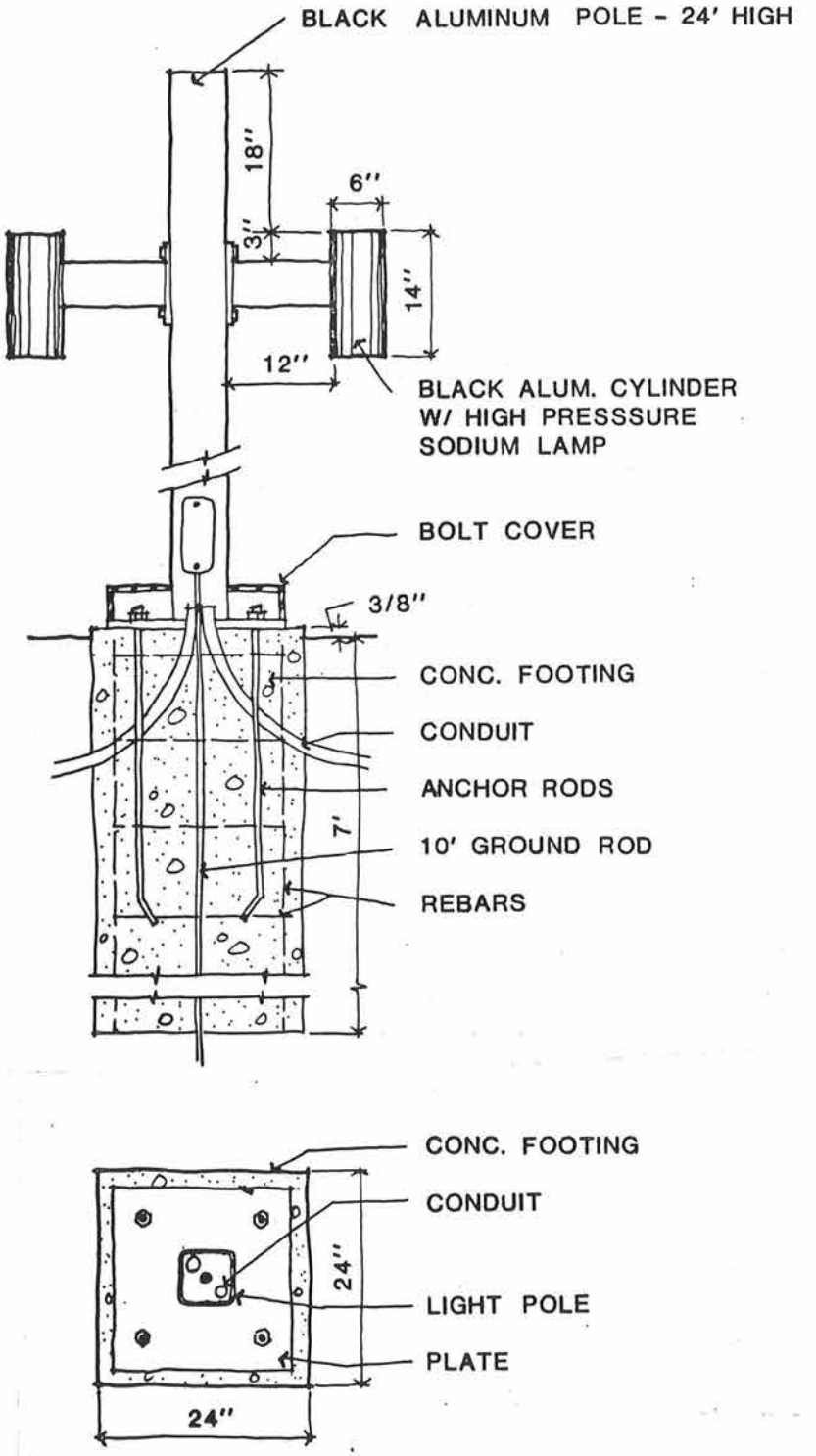
RANGER
STATION

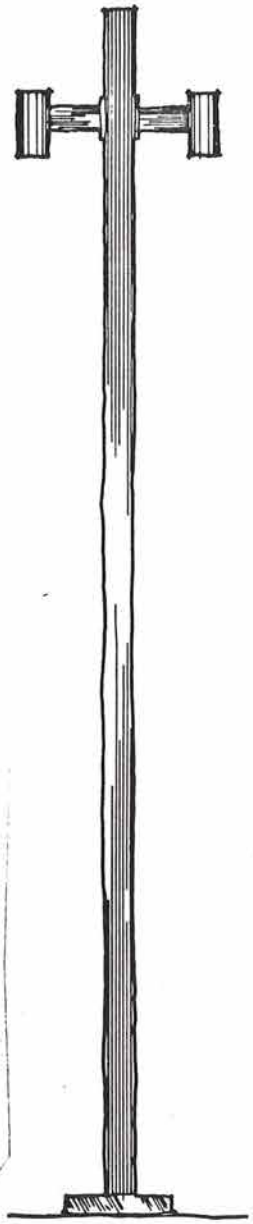
CONCESSION-
AIRE

SWIMMING

Identification Plaques

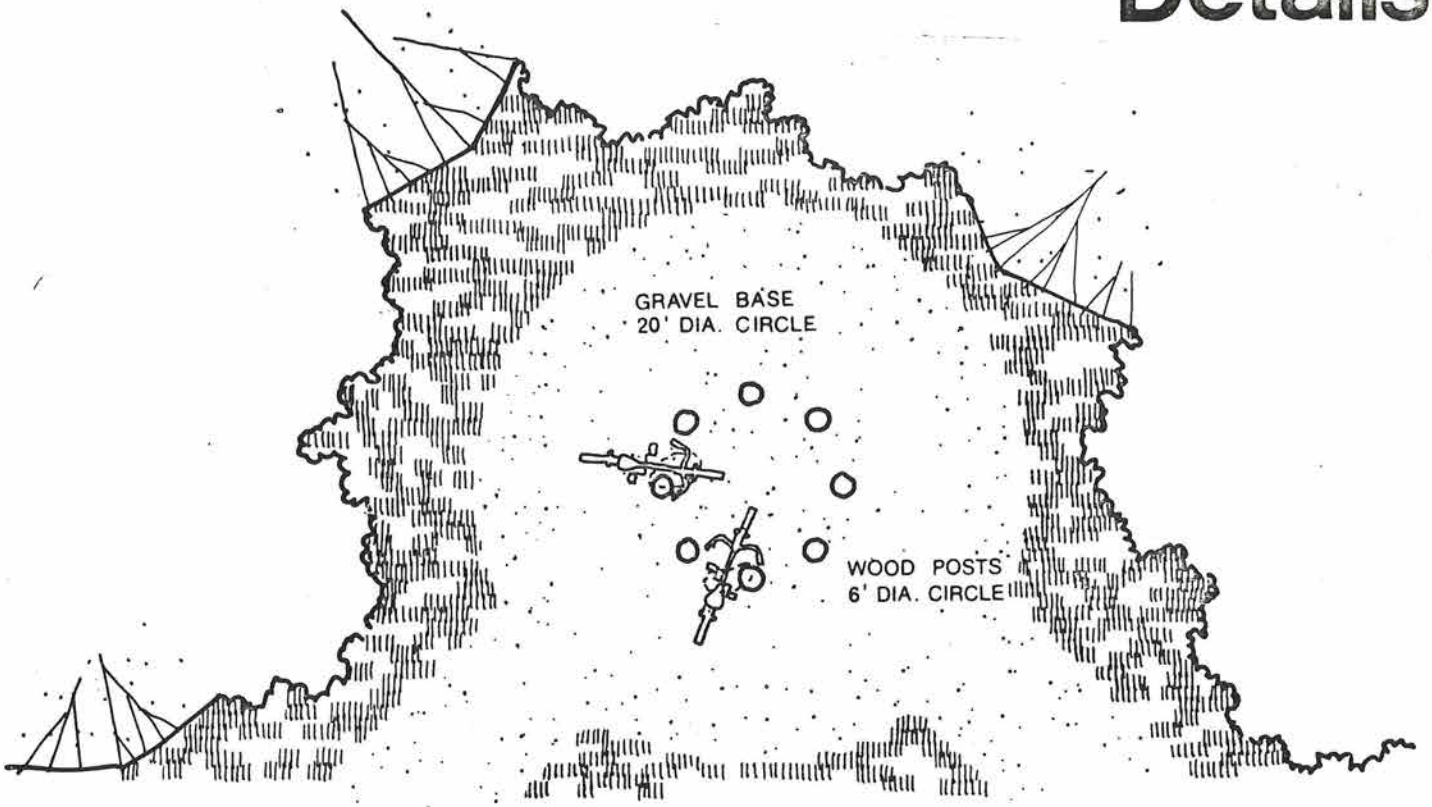
Lake Ashtabula Details

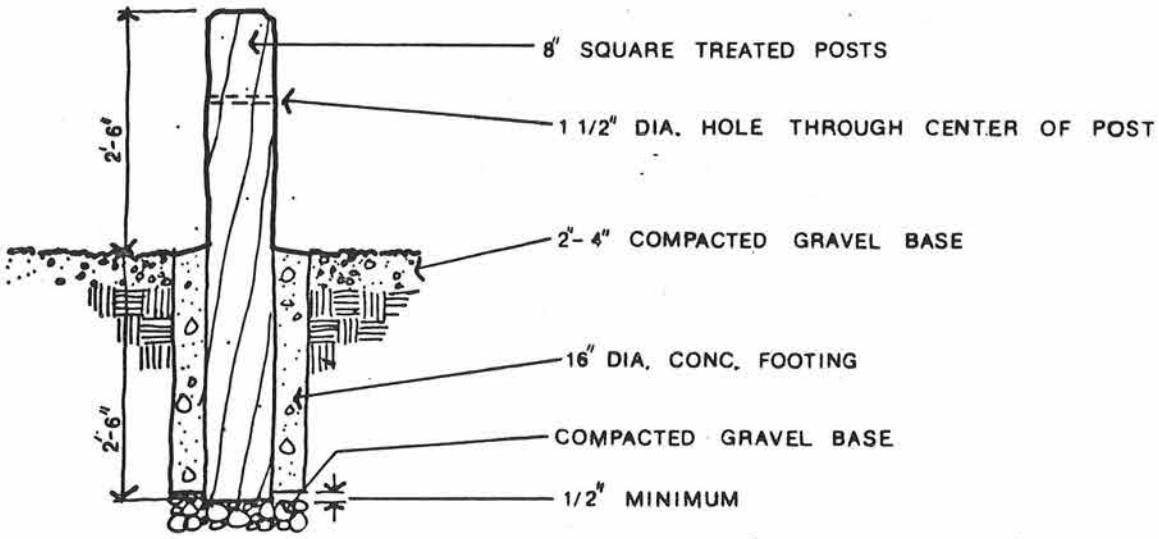




Lighting

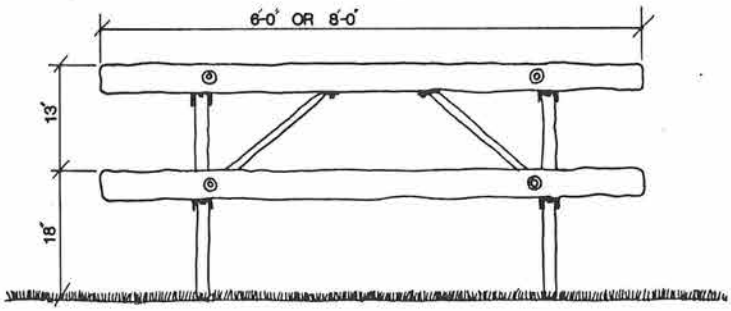
Lake Ashtabula Details

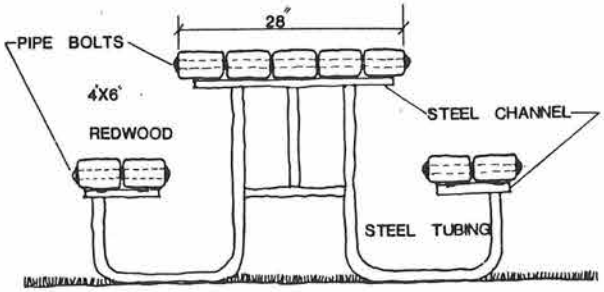




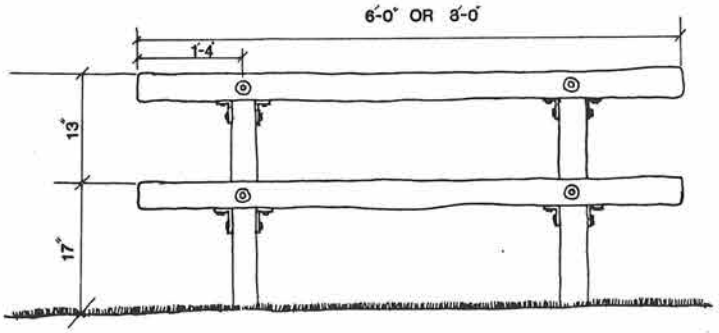
Bike Rack

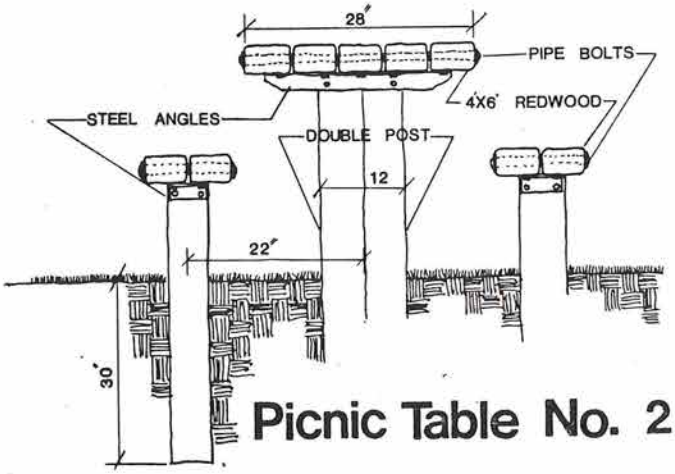
Lake Ashtabula Details



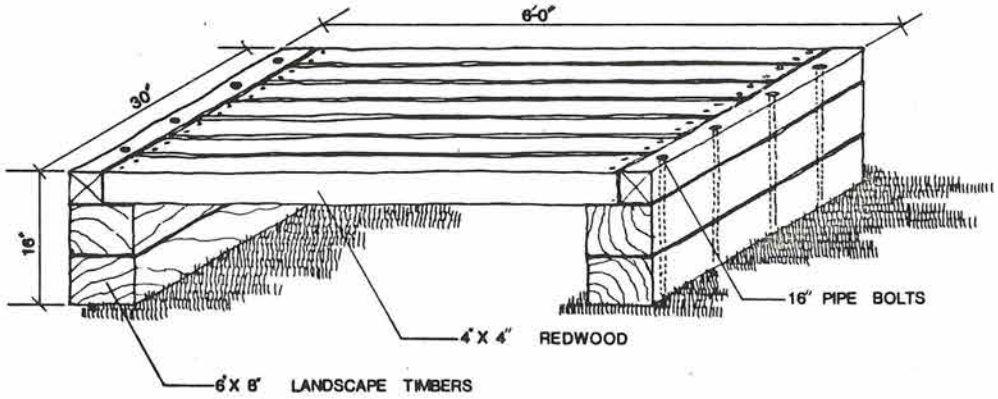


Picnic Table No. 1





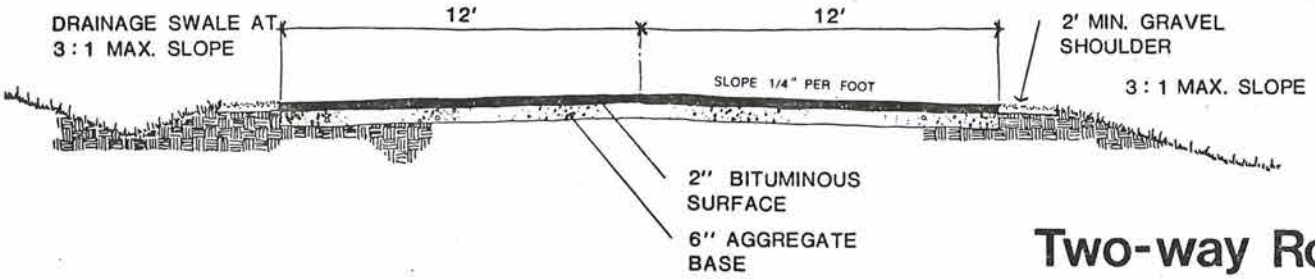
Picnic Table No. 2



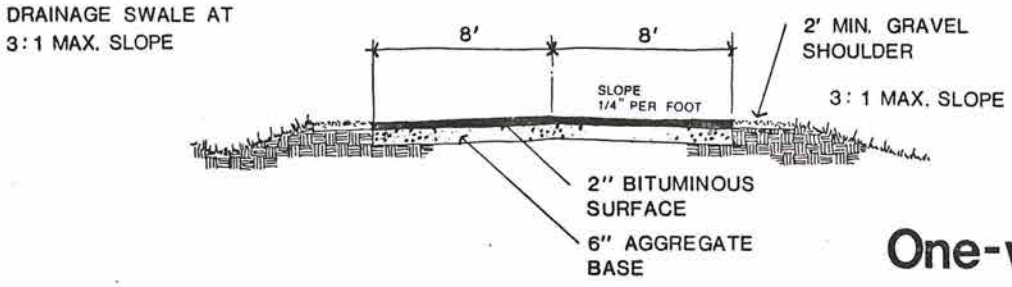
Bench

Site Furniture

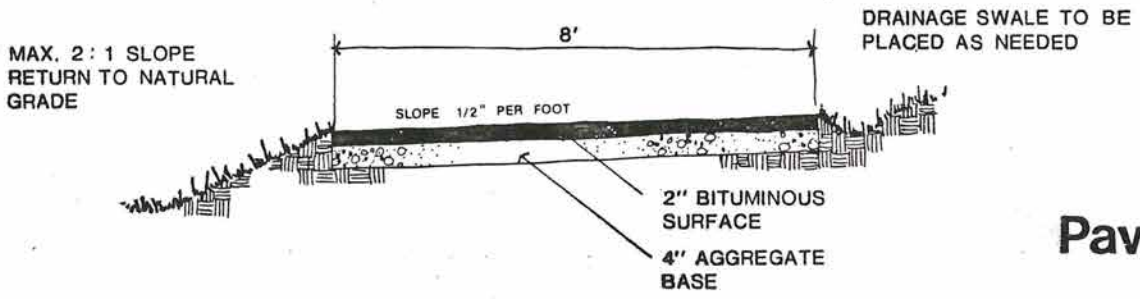
Lake Ashtabula Details



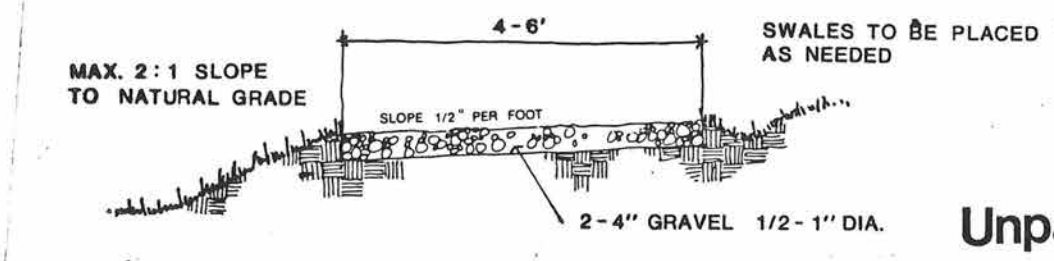
Two-way Road



One-way Road



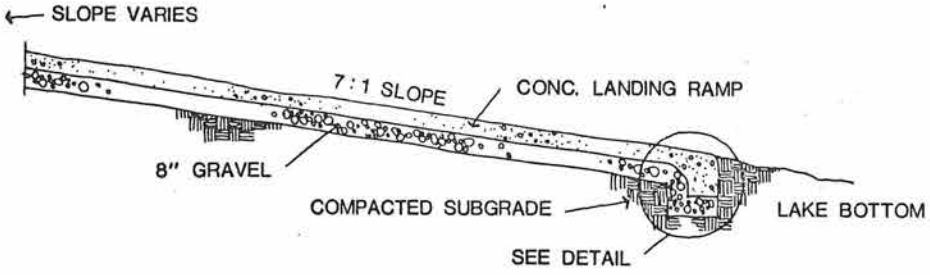
Paved Trail



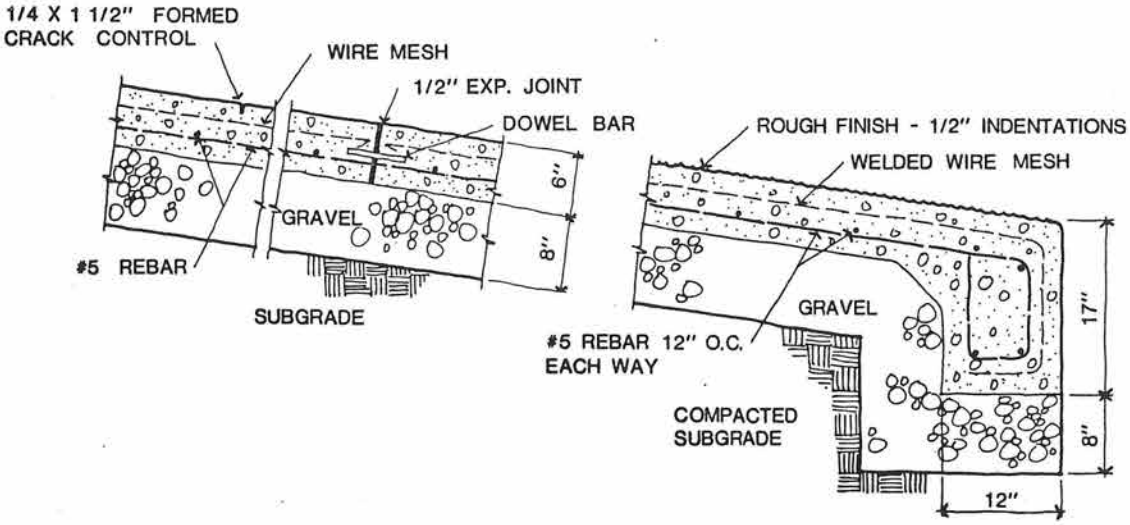
Unpaved Trail

Trails and Roads

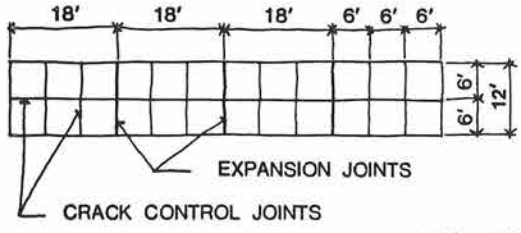
Lake Ashtabula Details



Section



Detail Section



Joints Layout

Boat Ramp

9 Special Problems

General

9.01 During the entire planning process there have been a number of problems identified and evaluated. Some of these problems warrant further mention because of their importance, in that they can dictate future use of Lake Ashtabula and no satisfactory solutions have been worked out.

Water Quality

9.02 Everyone involved with this master plan whether consultant, Corp personnel, resident or user, agrees that the water quality of Lake Ashtabula is deteriorating. There has been numerous studies done by numerous people. All agree it is deteriorating, but disagree as to the exact source or speed of deterioration. The North Dakota Game and Fish Department has indicated a concern about the quality of fishing due to deterioration of water quality. Population of yellow perch, suckers and bullheads are increasing. Nutrient levels are rising, dissolved oxygen levels are decreasing, and aquatic vegetation increasing which all contribution to a decrease of high quality game fish such as Northern Pike and Walleye. Existing residents and users agree that fishing for Walleye and Northerns is declining. It is felt, by the Game and Fish Department,

It is recommended that:

1. The land use allocation shown on the Land Use Map in this master plan be used as a guide to future planning and management at Lake Ashtabula.

2. The improvements to the recreation areas be implemented as soon as possible to handle more appropriately the existing demand.

3. This master plan be approved as a guide for continued preservation and enhancement of the area's natural resources while providing opportunities for enjoyment of the environment.

4. This master plan serve as a basis for the preparation of future design memorandum and construction documents.

Bibliography

1. Zoning Regulations, Barnes County, 1965.

2. The Chemical and Thermal Stratification of a Shallow, Eutrophic Lake, Both Vertically and Horizontally, Carol Griffin, 1976.

3. Environmental Impact Assessment of Baldhill Dam and Lake Ashtabula, North Dakota, Institute for Ecological Studies, December, 1974.

4. Climate of North Dakota, Ray E. Jensen.

5. Preliminary Report on Lake Ashtabula, National Eutrophication Survey, May 1976.

6. 1974 Inventory of North Dakota Outdoor Recreation Facilities, North Dakota State Outdoor Recreation Agency, 1974.

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8. Grazing and Forage Needs, North Dakota State University Cooperative Extension Service, October 1973.

9. Leafy Spurge Control, North Dakota State University Cooperative Extension Servic,e November, 1973.

10. Grazing Systems, North Dakota State University Cooperative Extension Service, October 1974.

11. Preliminary Report on Age and Growth of a Black Bullhead Population Under Commecial Exploritation in North Dakota, John B. Owen and Charles Wahtola Jr., June, 1970.

12. Commercial Fisheries Development on Inland Reservoirs, Dr. John B. Owen, 1976.

13. Water Quality in Relation to Productivity of Lake Ashtabula Reservoir, John J. Peterka, March, 1969.

14. Productivity of Phytoplankton and Quantities of Zooplankton and Bottom Fauna in Relation to Water Quality of Lake Ashtabula Reservoir, North Dakota, John J. Peterka, February, 1970.

15. Benthic Invertebrates in Lake Ashtabula Reservoir, North Dakota, John J. Peterka, 1972.

16. Chemical, Physical and Biological Characteristics of Lake Ashtabula Reservoir, Leonard Arthur Gordon Reid, August, 1967.

17. Letter from the Secretary of War pursuant to Red River of the North, Senate Document 193 78 Congress 2nd Session, May 1944.

18. Reconnaissance Study - Lake Ashtabula, Tri-College Center for Environmental Studies, December, 1976.

19. Preliminary Report on Need for Recreational Development, Baldhill Reservoir, Corps of Engineers, St. Paul District, July, 1947.

20. Master Plan for the Administration and Development of Project Land and Water Areas, Lake Ashtabula, Corps of Engineers, St. Paul District, May 1953.

21. Master Plan for Resource Management Baldhill Dam and Lake Ashtabula Reservoir. Corps of Engineers, St. Paul District, March 1967.

22. Encroachment Action Handbook, U.S. Army Corps of Engineers, Missouri River Division, March 1974.

23. Biological Species Lists, Sheyenne River, North Dakota, U.S. Army Corps of Engineers, St. Paul District, November, 1976.

24. Wildlife Habitat Development Report For Baldhill Reservoir, U.S. Fish and Wildlife Service, March 1949.

NCSED-ER

17 November 1976
MCNALLY/st/7574

We are currently updating the existing public use development and resource management master plan for Lake Ashtabula, Sheyenne River Basin, North Dakota. Bather, Ringrose, Wolsfeld, Inc., a planning firm located in Edina, Minnesota, has recently been contracted to prepare this study.

The contractor will be responsible for examining existing facility development, reviewing current visitor use and projecting future facility demands. The contractor will also revise site plans and resource management practices and policies where needed to optimize management of the natural resources and increase visitor satisfaction. This work was initiated in October 1976 and is scheduled for completion by 1 July 1976.

An interagency meeting is needed to obtain inputs as to any current or proposed programs which may directly or indirectly affect this planning study. The meeting will also serve as a means of briefing concerned agencies on the nature of our study.

This interagency meeting will be held at the Lake Ashtabula Visitor Center, which is located on the east bank of Lake Ashtabula adjacent to the Baldhill Dam (Valley City, North Dakota), on Monday 22 November at 10:30 A.M.

As a part of our continuing effort to inform interested agencies of Corps activities, I cordially invite you and/or members of your staff to attend this interagency meeting. Please inform Mr. Norman Wildrum, Chief, Public Use Development Section (612-725-7574) if you or your representative(s) plan to attend.

Sincerely,

NORMAN C. HINTZ
Lieutenant Colonel, CE
Acting District Engineer

U.S. ARMY ENGINEER DISTRICT
ST. PAUL
1135 U.S. POST OFFICE & CUSTOM HOUSE
ST. PAUL, MINN. 55101

NEWS RELEASE

FOR IMMEDIATE RELEASE
26 November 1976
PA-67-76

PUBLIC AFFAIRS OFFICE
JAMES E. BRAATZ, Chief
612-725-7505

ST. PAUL, MINN. -- A public meeting on the updating of a public use master plan for Lake Ashtabula has been scheduled for December 13, according to the St. Paul District, U.S. Army Corps of Engineers.

The 7:00 p.m. meeting, to be held in the Valley City, North Dakota auditorium, was called to provide an opportunity for area residents to provide input for the master plan which will guide future development of publicly owned land under Corps jurisdiction at Lake Ashtabula during the next five years.

Scheduled for completion in July 1977, the plan will provide direction in the areas of lake shore management, fish and wildlife concerns, and safety requirements for the future use of the recreational area.

All parties interested in the course of future recreational development of the Corps managed lands are urged to attend. However, to facilitate input from as many individuals, Federal, State and local agencies as possible, those unable to attend are asked to submit written facts, arguments or suggestions to: District Engineer, St. Paul District, Corps of Engineers, 1135 U.S. Post Office and Custom House, St. Paul, Minnesota 55101.

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DEPARTMENT OF THE ARMY
St. Paul District, Corps of Engineers
1135 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

NCSED-ER

19 November 1976

ANNOUNCEMENT OF PUBLIC MEETING
FOR THE UPDATING OF THE MASTER
PLAN FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT
AT LAKE ASHTABULA, NORTH DAKOTA

MEETING TO BE HELD AT 7 P.M. CST
ON 13 DECEMBER 1976
AT THE CITY AUDITORIUM
VALLEY CITY, NORTH DAKOTA

The St. Paul District, Corps of Engineers is currently updating the Master Plan for Public Use Development and Resource Management for Lake Ashtabula, Sheyenne River, North Dakota.

We recognize that information obtained from interested citizens at public meetings is an extremely valuable and needed source of input for our updated Master Plan.

All questions and comments concerning our recreation facilities, policies and procedures at Lake Ashtabula will be welcomed at this meeting. Some questions which may be addressed include:

- Are there recreational facilities that should be developed at Lake Ashtabula which presently do not exist?
- Are there existing facilities which should be eliminated?
- Are there areas on the reservoir which should be left entirely alone?
- Is the fishing deteriorating, improving, or staying the same?
- Is the water quality deteriorating, improving, or staying the same?
- Are there difficulties in using the reservoir?
- What are its good points; its bad points?

Please bring this announcement to the attention of anyone you know who is interested in these matters.

Forrest T. Gay III

1 Incl
Map

FORREST T. GAY, III
Colonel, Corps of Engineers
District Engineer

DEPARTMENT OF THE ARMY
St. Paul District, Corps of Engineers
1135 U.S. Post Office & ~~Custom House~~
St. Paul, Minnesota 55101

NCSED-ER 12 January 1977

ANNOUNCEMENT OF PUBLIC WORKSHOP
FOR UPDATING THE MASTER PLAN
FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT
AT LAKE ASHTABULA, NORTH DAKOTA

WORKSHOP TO BE HELD AT 9 A.M. CST
ON 29 JANUARY 1977
AT THE CITY AUDITORIUM
VALLEY CITY, NORTH DAKOTA

We are currently updating the Master Plan for Public Use Development and Resource Management for Lake Ashtabula, Sheyenne River, North Dakota.

A public information meeting was held on 13 December 1976 for the purpose of receiving input from interested citizens as to problems which they have encountered and the need for additional public use development at Lake Ashtabula.

The next step in updating the master plan is to arrive at potential solutions to each of the problems which have been raised. This public workshop has been scheduled to provide an opportunity for those who use this resource to have a hand in planning its future and solving its problems.

Please bring this announcement to the attention of anyone you know who is interested in these matters.

FORREST T. GAY, III
Colonel, Corps of Engineers
District Engineer

DEPARTMENT OF THE ARMY
St. Paul District, Corps of Engineers
1135 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

NCSED-ER

31 January 1977

R E S C H E D U L E D

ANNOUNCEMENT OF PUBLIC WORKSHOP
FOR UPDATING THE MASTER PLAN
FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT
AT LAKE ASHTABULA, NORTH DAKOTA

WORKSHOP TO BE HELD AT 9 A.M. CST
ON 5 FEBRUARY 1977
AT THE CITY AUDITORIUM
VALLEY CITY, NORTH DAKOTA

We are currently updating the Master Plan for Public Use Development and Resource Management for Lake Ashtabula, Sheyenne River, North Dakota.

A public information meeting was held on 13 December 1976 for the purpose of receiving input from interested citizens as to problems which they have encountered and the need for additional public use development at Lake Ashtabula.

The next step in updating the master plan is to arrive at potential solutions to each of the problems which have been raised. This public workshop has been scheduled to provide an opportunity for those who use this resource to have a hand in planning its future and solving its problems.

Please bring this announcement to the attention of anyone you know who is interested in these matters.

Forrest T. Gay III

FORREST T. GAY, III
Colonel, Corps of Engineers
District Engineer

R E S C H E D U L E D

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
1135 U. S. POST OFFICE & CUSTOM HOUSE
ST. PAUL, MINNESOTA 55101

IN REPLY REFER TO
NCSED-ER

8 March 1977

ANNOUNCEMENT OF 2ND PUBLIC WORKSHOP
FOR UPDATING THE MASTER PLAN
FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT
AT LAKE ASHTABULA, NORTH DAKOTA

MEETING TO BE HELD ON MARCH 24 AT 7:00 P.M.
AT THE CITY AUDITORIUM
VALLEY CITY, NORTH DAKOTA

We are currently updating the Master Plan for Public Use Development and Resource Management for Lake Ashtabula, Sheyenne River, North Dakota.

Our first public workshop, on 5 February 1977, was held to gather information from interested citizens concerning possible approaches to potential future recreation development and resource management options at Lake Ashtabula. This information has been reviewed and organized and we would like to present the results of the first workshop at this workshop. We will also be available to discuss all aspects of the master planning effort.

Please bring this announcement to the attention of anyone you know who might be interested in attending this second workshop.

Walter L. Heme

WALTER L. HEME
Major, Corps of Engineers
Acting District Engineer

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DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
1135 U. S. POST OFFICE & CUSTOM HOUSE
ST. PAUL, MINNESOTA 55101

IN REPLY REFER TO

NCSED-ER

9 June 1977

ANNOUNCEMENT OF 3RD PUBLIC WORKSHOP
FOR UPDATING THE MASTER PLAN
FOR PUBLIC USE DEVELOPMENT AND RESOURCE MANAGEMENT
AT LAKE ASHTABULA, NORTH DAKOTA

MEETING TO BE HELD ON 23 JUNE 1977 AT 7:00 P.M.
AT THE CITY AUDITORIUM
VALLEY CITY, NORTH DAKOTA

We are currently updating the Master Plan for Public Use Development and Resource Management for Lake Ashtabula, Sheyenne River, North Dakota.

At our earlier public workshops we gathered information from interested citizens concerning possible approaches to potential future recreation development and resource management options at Lake Ashtabula. This information has been reviewed and organized and we would like to present the tentative recommendations which we propose to include in the draft Master Plan scheduled for public release in July 1977. We will also be available to discuss all aspects of the master planning effort.

Please bring this announcement to the attention of anyone you know who might be interested in attending this third workshop.

Forrest T. Gay III

FORREST T. GAY, III
Colonel, Corps of Engineers
District Engineer