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STATE OF MICHIGAN

165918

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JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909

Gordon E. Guyer, Director

November 19, 1986

Mr. R. Richard Eaton, P.E./C.P.E.
Allied Paper, Inc.
2030 Portage Road
Kalamazoo, Michigan 49001

RECEIVED
NOV 21 1986
R. R. EATON

Dear Mr. Eaton:

Enclosed are the Site Inspection Report and Hazardous Ranking System Packet which we sent to EPA concerning the Allied Paper - Portage Creek - Kalamazoo River site. Also enclosed are the instructions for completing the report and packet. Our main goal is for this site to be included on the National Priority List (superfund). Sorry for the delay in providing you with this information.

Sincerely,

Cheryl R. Wallace
Michigan Dept. of Natural Resources
Groundwater Quality Division
Remedial Action Section
517-373-4800

cc: George Carpenter, SAU

SITE DESCRIPTION/EXECUTIVE SUMMARY

Site Name and Location

Allied Paper/Portage Creek/
Kalamazoo River

County: Kalamazoo/Allegan
Michigan Code Number:
DNR Dist.: Plainwell
EPA ID Number:

SAS Score/Screen No.:

Allied Paper Inc., a manufacturer of specialty papers, has operated paper mills in Kalamazoo, Michigan since 1925. Allied's milling facilities are located on Portage Creek, a tributary of the Kalamazoo River, in Kalamazoo Township.

In the past, polychlorinated biphenyls (PCBs) were used in the paper industry in the manufacturing of carbon tissue, carbonless copy paper, and as plasticizers in printing inks. PCBs are the primary contaminant of concern in the Portage Creek and Kalamazoo River system. Portage Creek sediment is heavily contaminated with PCBs. The release of PCB from contaminated sediments are a continuing source of contamination to the down stream water resource. Kalamazoo River sediment is contaminated with PCBs from Portage Creek to Lake Michigan at Saugatuck, approximately 80 river miles.

The presence of PCBs in river sediment, and the re-solution of PCB contaminated sediments are thought to be the cause of PCB levels in fish which are above both the Food and Drug Administration and the State of Michigan food consumption level of 2ppm (parts per million). This has resulted in a fish consumption advisory on the Kalamazoo River being issued by the Michigan Department of Public Health.

The PCB contamination of Portage Creek and the Kalamazoo River has been documented since 1971 and the PCB contamination of fish in the Kalamazoo River System appears to be a continuing problem. The PCB levels in fish have not declined and have been documented in concentrations of up to 47 mg/kg. The Kalamazoo River is also one of the major sources of PCBs entering Lake Michigan.

PCB contamination has not only limited fish consumption, but has also delayed the Michigan Department of Natural Resources' plans to restore the Kalamazoo fishery, at one time considered to be one of the finest bass fishing streams in the State. In the past decade, it is estimated over $500 million have been spent to improve water quality in the Kalamazoo River watershed. The Department of Natural Resources, however, is not committing resources to develop the fishery until the PCB problem is addressed. Due to the loss of the Kalamazoo fishery, an estimated $8 million annually is lost from angler fees and related resources.

PCBs have been determined to be hazardous to human health, and are a documented carcinogen. Bans on PCB usage have been enacted both at State and Federal levels and it remains a strictly regulated chemical to minimize human exposure and to protect human health. The presence of large amounts of uncontained, PCB-

contaminated sediments along Portage Creek and the Kalamazoo River, together with the PCB contamination of the water column and fish, serve to increase human exposure to this substance.

The major historical source of PCBs in the Kalamazoo River appear to be wastewater discharges from paper industries. From present knowledge and past data, it is believed that Allied Paper was the sole source of PCB discharges into Portage Creek.

Date of Previous Summary:
Previous Author:

Current Date: 10/30/86
Author: J. Rodin/
C. Wallace

Site Assessment Unit
Groundwater Quality Division
Michigan Dept. of Natural Resources

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
26	

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Allied Paper - Portage Creek - Kalamazoo River	

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY(S)	07 COUNTY CODE	08 CONG DIST
Kalamazoo to Saugatuck	Mi		Kalamazoo + Allegan	077	05

09 COORDINATES LATITUDE	LONGITUDE	10 TYPE OF OWNERSHIP (Check one)
__ __ __.__	__ __ __.__	■ A. PRIVATE ☐ B. FEDERAL ____ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
10 / 28 / 86 (MONTH DAY YEAR)	■ ACTIVE ☐ INACTIVE	1925 / Present (BEGINNING YEAR / ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR ____ (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ____ (Name of firm)
■ E. STATE ☐ F. STATE CONTRACTOR ____ (Name of firm) ☐ G. OTHER ____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
George Carpenter	Environmental Quality Analyst	MDNR	(517) 373-4800

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Cheryl Wallace	Environmental Quality Analyst	MDNR	(517) 373-4800
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
R. Richard Eaton	Manager	Kalamazoo, MI	(616) 345-7131
Martin Smith, Jr.	Manager	Kalamazoo, MI	(616) 345-7131
Jon DeWitt	Attorney At Law	Grand Rapids, MI	(616) 459-4186
Gregory Peterson	Consultant	Ann Arbor, MI	(313) 973-8300
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
■ PERMISSION ☐ WARRANT	2:00 pm	63°, Sunny

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Galen Kilmer	MDNR / GQD / Plainwell	(616) 685-9886

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
George Carpenter / Cheryl Wallace	GQD	MDNR	517-373-4800	10 / 28 / 86 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☐ A. SOLID
- ☐ B. POWDER, FINES
- ☒ C. SLUDGE
- ☐ E. SLURRY
- ☐ F. LIQUID
- ☐ G. GAS
- ☒ D. OTHER Contam. Sediments (Specify)

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS ≈114

CUBIC YARDS 7952

NO. OF DRUMS

03 WASTE CHARACTERISTICS (Check all that apply)

- ☒ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☒ D. PERSISTENT
- ☐ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	7952	yds³	at Allied's LandFill
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	≈114	tons	Found in River, Creek, + Bryant Mill
IOC	INORGANIC CHEMICALS			Pond sediments
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
OCC	PCBs	1336-36-3	Sediments	0.32-500	ppm
OCC	PCBs	1336-36-3	LandFill monitoring wells	0.07-0.52	ppb
SLU	Paper Sludge Waste		LandFilled		

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	N/A		FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

MDNR Files - Groundwater + Surface Water Divisions

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE: 26	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ■ A. GROUNDWATER CONTAMINATION — 02 ■ OBSERVED (DATE: 3/27/86) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 117,879 — 04 NARRATIVE DESCRIPTION

Samples taken from monitoring wells around landfill show PCBs in groundwater. Municipal wells potentially affected (See G)

01 ■ B. SURFACE WATER CONTAMINATION — 02 ■ OBSERVED (DATE: 1985) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ≈132,035 — 04 NARRATIVE DESCRIPTION

Bryant Mill Pond (drawn down), Portage Creek, + Kalamazoo River water + sediments contaminated with PCBs. Portage Creek + Kalamazoo River are used for recreational purposes.

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

N/A

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

N/A

01 ■ E. DIRECT CONTACT — 02 ■ OBSERVED (DATE: 1985) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ≈132,035 — 04 NARRATIVE DESCRIPTION

Kalamazoo River + Portage Creek travel through densely populated area of Michigan. Both are used for swimming, fishing, etc.

01 ☐ F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: (ACRES) — 04 NARRATIVE DESCRIPTION

N/A

01 ■ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE:) ■ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 117,879 — 04 NARRATIVE DESCRIPTION

Potential from migration of contaminated groundwater to municipal wells of cities of Kalamazoo + Portage

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

N/A

01 ■ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE:) ■ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ≈132,035 — 04 NARRATIVE DESCRIPTION

Potential from contact with contaminated surface waters + sediments and consuming contaminated fish as well as consuming contaminated groundwater

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

N/A

01 ☒ L. CONTAMINATION OF FOOD CHAIN — 02 ☒ OBSERVED (DATE: 1986) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Fish advisory placed on Kalamazoo River. PCBs detected in carp + bass in Kalamazoo River.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☒ OBSERVED (DATE: 11-83) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ≈132,035 — 04 NARRATIVE DESCRIPTION

Contaminated sediments in Bryant Mill Pond + Kalamazoo River are loosely consolidated and appear highly erodible.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

Stream bank + dry impoundment sediments continue to be eroded into the river system. Evidence to date indicates that much of the continuing contamination of the Kalamazoo River is originating from sediment deposits in Bryant Mill Pond + Portage Creek.

III. TOTAL POPULATION POTENTIALLY AFFECTED: ≈132,035

IV. COMMENTS

Bryant Mill Pond has been drawn since 1976 + dewatered contaminated sediments are exposed on the banks of the creek.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

MDNR Files - Groundwater + Surface Water Divisions
Site Inspection 10/28/86

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
26	

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
■ A. NPDES	MI0000779	2/85	2/90	
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
■ F. LANDFILL	7952	yds³
☐ G. LANDFARM		
☐ H. OPEN DUMP		
■ I. OTHER Contam. Sediment (Specify)	≈114	tons

04 TREATMENT (Check all that apply)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER _____ (Specify)

05 OTHER

■ A. BUILDINGS ON SITE

Numerous

06 AREA OF SITE

≈6400 (Acres)

07 COMMENTS

$$80\ \text{miles}\left(\frac{5280\ \text{Ft}}{\text{mile}}\right)(660\ \text{Ft})\left(\frac{0.000022937\ \text{acres}}{\text{Ft}^2}\right) = 6400\ \text{acres}$$

80 miles = from city of Kalamazoo to Saugatuck

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ■ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ■ YES ☐ NO

02 COMMENTS

Landfill waste not easily accessible. River + Creek easily accessible

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

MDNR Files - Groundwater + Surface Water Divisions

Site Inspection - 10/28/86

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE: 26 | 02 SITE NUMBER:

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ☐	B. ■
NON-COMMUNITY	C. ☐	D. ■

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ■	B. ☐	C. ☐
D. ■	E. ☐	F. ☐

03 DISTANCE TO SITE

A. ≈2000 (mi) Ft

B. 2 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING ■ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 117,879

03 DISTANCE TO NEAREST DRINKING WATER WELL ≈2000 (mi) Ft

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
≈17 (ft)	Northwest	300 (ft)	Unk (gpd)	☐ YES ■ NO

09 DESCRIPTION OF WELLS (Including usage, depth, and location relative to population and buildings)

Depth to aquifer is from ground surface to 300 ft in the city of Kalamazoo. The municipal wells serve the entire city of Kalamazoo.

10 RECHARGE AREA

☐ YES ■ NO

COMMENTS

11 DISCHARGE AREA

■ YES ☐ NO

COMMENTS Groundwater probably discharges to Kalamazoo River + Portage Creek

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☐ A. RESERVOIR, RECREATION DRINKING WATER SOURCE ■ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Portage Creek	■	on-site (mi)
Kalamazoo River	■	on-site (mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. ≈416.5 NO. OF PERSONS	B. ≈52,483 NO. OF PERSONS	C. ≈117,879 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION

200 Ft (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE

Numerous

04 DISTANCE TO NEAREST OFF-SITE BUILDING

200 Ft (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

The site extends from the city of Kalamazoo to Saugatuck (80 miles). Population ranges from rural areas to densely populated urban areas.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ■ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

Sand with clay

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ■ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
150-200 (ft)	N/A (ft)	N/A

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
1.75-3.76 (in)	2 (in)	< 3 %	Northwest	< 3 %

09 FLOOD POTENTIAL

SITE IS IN 100 YEAR FLOODPLAIN (River + Creek)

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

N/A

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. N/A (mi)

OTHER: B. adjacent (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

N/A (mi)

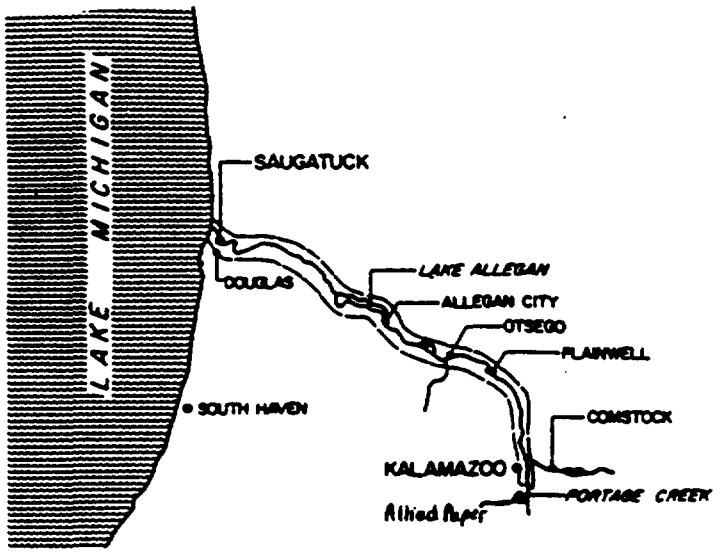
ENDANGERED SPECIES: no endangered species

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. ~1000 (mi) Ft	B. ~400 (mi) Ft	C. N/A (mi)	D. N/A (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY



- See attachment for more detailed description.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

MDNR Files - Groundwater + Surface Water Division
Hydrogeologic Investigation For Allied Paper, Inc.
U.S. Geological Survey

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
26	

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER			
WASTE			
AIR		No Sample Taken	
RUNOFF			
SPILL		During Inspection	
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
	N/A

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☒ AERIAL

02 IN CUSTODY OF MDNR (Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS MDNR

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

N/A

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

MDNR Files

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

II. CURRENT OWNER(S)				PARENT COMPANY (If applicable)			
01 NAME		02 D+B NUMBER		08 NAME		09 D+B NUMBER	
Allied Paper, Inc.				SCM Corporation			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE	
2030 Portage		2621		409 Easton Rd.			
05 CITY	06 STATE	07 ZIP CODE		12 CITY	13 STATE	14 ZIP CODE	
Kalamazoo	MI	49001		Willow Grove	PA	19090	
01 NAME		02 D+B NUMBER		08 NAME		09 D+B NUMBER	
Public Access Lands							
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		12 CITY	13 STATE	14 ZIP CODE	
01 NAME		02 D+B NUMBER		08 NAME		09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		12 CITY	13 STATE	14 ZIP CODE	
01 NAME		02 D+B NUMBER		08 NAME		09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		12 CITY	13 STATE	14 ZIP CODE	

III. PREVIOUS OWNER(S) (Last most recent first)				IV. REALTY OWNER(S) (If applicable; list most recent first)			
01 NAME		02 D+B NUMBER		01 NAME		02 D+B NUMBER	
N/A				N/A			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		05 CITY	06 STATE	07 ZIP CODE	
01 NAME		02 D+B NUMBER		01 NAME		02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		05 CITY	06 STATE	07 ZIP CODE	
01 NAME		02 D+B NUMBER		01 NAME		02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE		05 CITY	06 STATE	07 ZIP CODE	

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

MDNR Files
Site Inspection 10/28/86

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

II. CURRENT OPERATOR (Provide if different from owner)			OPERATOR'S PARENT COMPANY (If applicable)		
01 NAME: Allied Paper, Inc.	02 D+B NUMBER		10 NAME: SCM Corporation	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.): 2030 Portage	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.): 409 Easton Rd	13 SIC CODE	
05 CITY: Kalamazoo	06 STATE: MI	07 ZIP CODE: 49001	14 CITY: Willow Grove	15 STATE: PA	16 ZIP CODE: 19090
08 YEARS OF OPERATION	09 NAME OF OWNER				

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)			PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)		
01 NAME: N/A	02 D+B NUMBER		10 NAME: N/A	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				
01 NAME	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				
01 NAME	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

MDNR Files

Site Inspection 10/28/86

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
N/A	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
N/A			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
N/A			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

MDNR Files
Site Inspection 10/25/86

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
26	

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☒ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

Allied Paper, Inc. required to prepare a Program for Effective Residuals Management in the existing NPDES permit.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

MDNR Files
Site Interview 10/28/86

EPA FORM 2070-13 (7-81)

Facility name: Allied Paper - Portage Creek - Kalamazoo River

Location: Kalamazoo, Mich.

EPA Region: V

Person(s) in charge of the facility: R. Richard Eaton (Allied Paper Inc. - Manager)

Name of Reviewer: C. Wallace (MDNR) Date: 10/30/86

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility, contamination route of major concern; types of information needed for rating; agency action, etc.)

Allied Paper Inc. has operated paper mills in Kalamazoo, Michigan since 1925. In the past, PCBs were used in the manufacture of carbon tissue, carbonless copy paper, and plasticizers in printing inks. PCBs are the primary contaminant of concern in the Portage Creek & Kalamazoo River system. The release of PCB from contaminated sediments is a continuing source of contamination to the downstream water resource. Kalamazoo River sediment is contaminated from Portage Creek to Lake Michigan (≈ 80 river miles)

Scores: S_M = 50.6 (S_{gw} = 83.7 S_{sw} = 25.5 S_a = 0)

S_{FE} = 0

S_{DC} = 62.5

FIGURE 1
HRS COVER SHEET

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					3.5
Ground Water Use	0 1 (2) 3	3	6	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 / 12 16 18 20 / 24 30 32 (35) 40	1	35	40	
Total Targets Score			41	49	
6 If line 1 is 45, multiply 1 x 4 x 5 / If line 1 is 0, multiply 2 x 3 x 4 x 5			47970	57,330	
7 Divide line 6 by 57,330 and multiply by 100			S_{gw} = 83.7		

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	45	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1		3	
1-yr. 24-hr. Rainfall	0 1 2 3	1		3	
Distance to Nearest Surface Water	0 1 2 3	2		6	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					4.5
Surface Water Use	0 1 2 3	3	6	9	
Distance to a Sensitive Environment	0 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	8	40	
Total Targets Score			14	55	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			16386	64,350	
7 Divide line 6 by 64,350 and multiply by 100		S_{sw} = 25.5			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

	S	S^2
Groundwater Route Score (S_{gw})	83.7	7005.7
Surface Water Route Score (S_{sw})	25.5	650.3
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		7656.0
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		87.5
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		50.6

FIGURE 10
WORKSHEET FOR COMPUTING S_M

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Incident	0 45	1	45	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 3	1		3	8.2
3 Containment	0 15	1		15	8.3
4 Waste Characteristics Toxicity	0 1 2 3	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 2 3 4 5	4	20	20	
Distance to a Critical Habitat	0 1 2 3	4	0	12	
Total Targets Score			20	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			13500	21,600	
7 Divide line 6 by 21,600 and multiply by 100			S_{DC} = 62.5		

FIGURE 12
DIRECT CONTACT WORK SHEET

June 28, 1982

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Allied Paper - Kalamazoo River - Portage Creek

LOCATION: Kalamazoo, Mich.

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

PCBs (Aroclor 1242 + 1254)

Ref. 1

Rationale for attributing the contaminants to the facility:

Contaminants Found in monitoring wells around landfill

Ref. 1

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

N/A

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

N/A

Depth from the ground surface to the lowest point of waste disposal/storage:

N/A

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

N/A

Mean annual lake or seasonal evaporation (list months for seasonal):

N/A

Net precipitation (subtract the above figures):

N/A

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

N/A

Permeability associated with soil type:

N/A

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

N/A

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

N/A

Method with highest score:

N/A

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

PCBs

Ref. 1

Compound with highest score:

PCBs · Toxicity = 3 + Persistance = 3

Ref. 2

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

a. 7952.35 yds^3 of paper sludge waste p. 1 (1985 Paper Waste Residua

- and -

b. ≈ 114 tons PCBs in river sediment p. 2

Ref 3 + 4

Basis of estimating and/or computing waste quantity:

a. Waste quantity calculated in Allied's PERM Report by Wilkens + Wheaton Testing Laboratory, Inc. Ref. 3 p. 1

b. Tonage calculated in Kalamazoo River PCB Project Ref. 4 p. 2

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Drinking water, with municipal water from alternate unthreatened sources presently available. All wells are in a glacial drift aquifer

Ref. 5+6

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Nearest well (municipal well) is ½-mile away. There are no private wells in the target area (none within City of Kalamazoo), therefore, municipal wells were used in scoring because they are within the target area + may be affected.

Distance to above well or building:

≈ ½-mile

Ref. 3 p. 2-3

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from acuifer(s) of concern within a 3-mile radius and populations served by each:

14 municipal wells in the cities of Kalamazoo + Portage are within the 3-mile radius. Therefore, population is greater than 10,000.

Ref. 3, 5

Computation of land area irrigated by supply well(s) drawing from acuifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

0

Total population served by ground water within a 3-mile radius:

> 10,000

Ref. 5

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

PCBs

Ref. 4 pp. 3-8

Rationale for attributing the contaminants to the facility:

Sampling of several areas of the creek + river show various concentrations of PCB

Ref. 4 pp. 3-8 * * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

N/A

Name/description of nearest downslope surface water:

N/A

Average slope of terrain between facility and above-cited surface water body in percent:

N/A

Is the facility located either totally or partially in surface water?

N/A

Is the facility completely surrounded by areas of higher elevation?

N/A

1-Year 24-Hour Rainfall in Inches

N/A

Distance to Nearest Downslope Surface Water

N/A

Physical State of Waste

N/A

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

N/A

Method with highest score:

N/A

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated	Toxicity	Persistence
PCBs	3	3

Ref. 4

Compound with highest score:

PCB

Ref. 2

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

a. 7952.35 yds^3 paper sludge waste (1985 Paper Waste Residu

b. 114 tons PCBs in River Sediment

Ref. 3+4

Basis of estimating and/or computing waste quantity:

a. Waste quantity calculated in Allied's PERM Report by Wilkens + Wheaton Testing Laboratory, Inc.

b. Tonage calculated in Kalamazoo River PCB Project

Ref. 3+4

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Recreational

Ref. 7

Is there tidal influence?

NO

Ref. 7

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

> 2 miles

Ref. 7

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

> 1 mile

Ref. 7

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

> 1 mile

Ref. 7

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

Surface water used for irrigation (Kalamazoo River)

333.7 acres

Ref. 8

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

333.7 acres x 1.5 people/acre = 500.55 people

Ref. 8

Total population served:

500.55 people

Ref. 8

Name/description of nearest of above water bodies:

Portage Creek

Kalamazoo River

Ref. 7

Distance to above-cited intakes, measured in stream miles. Ref. 7

80 miles

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:

1986 Fish Advisory - Kalamazoo River

Ref. 9

* * *

2 ACCESSIBILITY

Describe type of barrier(s):

N/A

* * *

3 CONTAINMENT

Type of containment, if applicable:

N/A

* * *

4 WASTE CHARACTERISTICS

<u>Toxicity</u>

Compounds evaluated:

PCBs

Ref. 4 pp. 9-14

Compound with highest score:

PCBs

Ref. 2

* * *

5 TARGETS

Population within one-mile radius

> 10,000 Ref. 7

Distance to critical habitat (of endangered species)

No endangered species

HRS Documentation Log Sheet

Ref. 1 - MDNR sample Results of monitoring wells around Allied Paper's landfill, seven (7) pages

Ref. 2 - Sax, N. I., Dangerous Properties of Industrial Materials, Van Nostrand Rheinhold Co., New York, 4th ed., 1975.

Ref. 3 - Program for Effective Residuals Management (PERM) for the Allied Paper, Inc. Solid Waste Disposal Facility for Residuals Disposal prepared by Wilkins + Wheaton Testing Laboratory, Inc., Feb. 1

Ref. 4 - Kalamazoo River PCB Project Kalamazoo and Allegan Counties Michigan, State of Michigan Contract Number 1611, NUS Project Number 7339, prepared by NUS Corporation, March 1986

Ref. 5 - Municipal Water Withdrawals in Michigan, Douglas J. Bedell, Water Management Division, Michigan Department of Natural Resources, 1982

Ref. 6 - Hydrogeologic Atlas of Michigan, Western Michigan University, Percentage of Wells in Bedrock, 1981; two (2) pages

Ref. 7 - Topo Maps

U.S.G.S. Kalamazoo Quad., 7.5 Minute Series, 1967

U.S.G.S. Otsego Quad., 7.5 " " , 1967

U.S.G.S. Millgrove Quad. " " , 1981

" Hamilton " " " " , 1981

" Fennville " " " " 1981

USGS Saugatuck Quad 7.5 Minute series, 1981
" Merson " " " " , 1981
" Allegan " " " " , 1981
Kalamazoo NE " " " " , 1967

Ref. 8 Telephone conversation with ASCS concerning land irrigation using surface water

Ref. 9 Fish advisory, Michigan Fishing Guide 1986

Ref. 1

11784 MICHIGAN DEPT OF NATURAL RESOURCES ENVIRONMENTAL LABORATORY YES / NO - INFO ON BACK

MATRIX = WATER ANALYSIS REQUEST SHEET ***** SAFETY WARNING *****

LAB LOGO 7966 PROJ CODE ---------- COST CENTER 90175 PR II RECEIVED AT LAB RAA DATE TIME 3/27/86 920 AM PM

LOCATION SAMPLED Allied Landfill, Kalamazoo COLLECTED BY Bello TRANSFERED TO Robins/Sample

SAMPLE REMARKS Low level PCB's only if J. Peck called by Bill Creal SEND RESULTS TO (NAME & SECTION) Bello, GQD, Compliance #1, Plainwell

LAB USE ONLY	#	FIELD ID OR DESCRIPTION	SAMPLE INFORMATION	YY/MM/DD	HH:MM
57158	01	MW #1 (downgradient)	MA received but not field filtered; Special request for low detection limit (10 ppt) on PCB	86/03/25	9:00
57159	02	MW #2 (upgradient away Bryant/Mill Pond)			10:00
57160	03	MW #3 "	extra vial that looks like MW-5 — Thrown out		11:00
57161	04	MW #5 "	3 vials		10:30
57162	05	Portage - Upstream			12:00
57163	06	Portage - Downstream			12:30
	07				
	08				
	09				
	10				

RECEIVED APR 18 1986 GQD Plainwell

ORGANIC

PO1 01 HALOCARBONS....1 2 3 4 5 6 7 8 9 10

PO2 02 AROMATIC HC....1 2 3 4 5 6 7 8 9 10

OBN 03 CL HC&PEST &PCB 1 2 3 4 5 6 7 8 9 10
06 PHTHALATES.....1 2 3 4 5 6 7 8 9 10
07 PNA.....1 2 3 4 5 6 7 8 9 10
.....1 2 3 4 5 6 7 8 9 10
.....1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10

OA 08 PHENOLS.....1 2 3 4 5 6 7 8 9 10

OG OIL & GREASE-IR....1 2 3 4 5 6 7 8 9 10
OIL & GREASE-GRAV..1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10
.....1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
.....1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
.....1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10

INORGANIC

MAD FIELD FILTER+PRES..1 2 3 4 5 6 7 8 9 10
MD LAB FILTRATION.....1 2 3 4 5 6 7 8 9 10

MA CA MG NA K.....1 2 3 4 5 6 7 8 9 10
CD CR CU NI PB ZN.1 2 3 4 5 6 7 8 9 10
HG MERCURY.....1 2 3 4 5 6 7 8 9 10
AS ARSENIC.....1 2 3 4 5 6 7 8 9 10
SE SELENIUM.....1 2 3 4 5 6 7 8 9 10
SB ANTIMONY.....1 2 3 4 5 6 7 8 9 10
OTHERS (CIRCLE)
AG AL BA BE CO FE 1 2 3 4 5 6 7 8 9 10
LI MN MO TI V.....1 2 3 4 5 6 7 8 9 10
FURNACE- CD.....1 2 3 4 5 6 7 8 9 10
* CR CU NI PB.....1 2 3 4 5 6 7 8 9 10

MN PH, CONDUCTANCE....1 2 3 4 5 6 7 8 9 10
CL SO4 TOTAL ALK...1 2 3 4 5 6 7 8 9 10
FLUORIDE.....1 2 3 4 5 6 7 8 9 10
CR+6.....1 2 3 4 5 6 7 8 9 10
HCO3- CO3=.....1 2 3 4 5 6 7 8 9 10
CA MG NA K -DISS. 1 2 3 4 5 6 7 8 9 10

MD BRINE (CIRCLE)
* CL SO4 BR 1 2 3 4 5 6 7 8 9 10
* ALK HCO3- CO3=..1 2 3 4 5 6 7 8 9 10

GENERAL CHEMISTRY

DO DISS OXYGEN....1 2 3 4 5 6 7 8 9 10

GN O-PHOS NO2-....1 2 3 4 5 6 7 8 9 10
RES-NF (SS)....1 2 3 4 5 6 7 8 9 10
RES-TF (TDS)...1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
BOD TOT 5 DAY.1 2 3 4 5 6 7 8 9 10
BOD CARB 5 DAY.1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10

GA COD.....1 2 3 4 5 6 7 8 9 10
TOC.....1 2 3 4 5 6 7 8 9 10
NO3+NO2 NH3...1 2 3 4 5 6 7 8 9 10
KJEL N, TOT P..1 2 3 4 5 6 7 8 9 10
PHENOLICS.....1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10

GB TOTAL CN.....1 2 3 4 5 6 7 8 9 10
FREE CN.....1 2 3 4 5 6 7 8 9 10

BC FECAL COLI.....1 2 3 4 5 6 7 8 9 10
TOTAL COLI.....1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10

CA CHLOROPHYLL....1 2 3 4 5 6 7 8 9 10

MICH DNR ENVIRONMENTAL LAB
ORGANIC RESULTS FOR LAB LOG #7966

LAB# 57158 REC# 4500	ug/L	ppb	SCAN 1	COMMENTS
		1.000	Detection limit	
LAB# 57158 REC# 4501	ug/L	ppb	SCAN 2	COMMENTS
		5.000	Detection limit	
LAB# 57158 REC# 4877	ug/L	ppb	SCAN 3 (PCBs only)	COMMENTS
			AROCLOR 1242	INT K.1
			AROCLOR 1260	INT K.1
			AROCLOR 1254	INT K.1
		.010	Detection limit	
LAB# 57159 REC# 4502	ug/L	ppb	SCAN 1	COMMENTS
		1.000	Detection limit	
LAB# 57159 REC# 4503	ug/L	ppb	SCAN 2	COMMENTS
		5.000	Detection limit	
LAB# 57159 REC# 4878	ug/L	ppb	SCAN 3 (PCBs only)	COMMENTS
			AROCLOR 1254	INT K.1
			AROCLOR 1242	INT K.1
			AROCLOR 1260	INT K.1
		.010	Detection limit	
LAB# 57160 REC# 4504	ug/L	ppb	SCAN 1	COMMENTS
		1.000	Detection limit	

LAB LOG #7966 cont.
==========

LAB# 57160 REC# 4505	ug/L	ppb	SCAN 2	COMMENTS
		5.000	Detection limit	
LAB# 57160 REC# 4879	ug/L	ppb	SCAN 3 (PCBs only)	COMMENTS
		.520	AROCLOR 1242 AROCLOR 1254	* * * * INT K.2
		.010	Detection limit	
LAB# 57161 REC# 4506	ug/L	ppb	SCAN 1	COMMENTS
		1.000	Detection limit	
LAB# 57161 REC# 4507	ug/L	ppb	SCAN 2	COMMENTS
		5.000	Detection limit	
LAB# 57161 REC# 4880	ug/L	ppb	SCAN 3 (PCBs only)	COMMENTS
		.490	AROCLOR 1242	* * * *
		.067	AROCLOR 1254	* * * *
		.050	Detection limit	
LAB# 57162 REC# 4508	ug/L	ppb	SCAN 1	COMMENTS
		1.000	Detection limit	
LAB# 57162 REC# 4509	ug/L	ppb	SCAN 2	COMMENTS
		5.000	Detection limit	

LAB LOG #7966 cont.

LAB# 57163 REC# 4510	ug/L ppb	SCAN 1		COMMENTS
	1.000	Detection limit		
LAB# 57163 REC# 4511	ug/L ppb	SCAN 2		COMMENTS
	5.000	Detection limit		

Unless noted above under COMMENTS, analyses were performed for the compounds on attached scan list. Concentrations are rounded to 3 significant figures.

Approved _____

APR 16 1986

ORGANIC SCAN LIST
MATRIX: WATER
JANUARY 1985

SCAN 1 - Purgeable Halocarbons

Bromodichloromethane
Bromoform
Carbon tetrachloride
Chlorobenzene
Chloroform
Dibromochloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene (cis & trans)
1,2-Dichloropropane
1,3-Dichloropropene (cis & trans)
Methylene chloride (request only)
1,1,2,2-Tetrachloroethane
Tetrachloroethene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene

SCAN 2 - Purgeable Aromatic Hydrocarbons

Benzene
Ethylbenzene
Styrene
Toluene
Xylene isomers (o, m, and p)

SCAN 3 - Chlorinated Hydrocarbons, PCBs & Organochlorine Pesticides

Aldrin
*Aroclor 1016
*Aroclor 1221
*Aroclor 1232
Aroclor 1242
*Aroclor 1248
Aroclor 1254
Aroclor 1260
*Aroclor 1262
*Aroclor 1268
g-BHC (lindane)
BP-6 (PBB)
a-Chlordane
g-Chlordane
2-Chloronaphthalene
4,4'-DDD
4,4'-DDE
1,4'-DDT
4,4'-DDT
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Heptachlor
Heptachlor epoxide
Hexabromobenzene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Methoxychlor
Mirex
Pentachloronitrobenzene
*Toxaphene
1,2,4-Trichlorobenzene

SCAN 6 - Phthalate Esters & Polar Pesticides

Bis (2-ethylhexyl) phthalate
Butyl benzyl phthalate
Di-n-butyl phthalate
Diethyl phthalate
Dimethyl phthalate
Di-n-octyl phthalate
Dieldrin
Endosulfan I
Endrin

MICHIGAN DEPARTMENT OF NATURAL RESOURCES	PROCEDURE ENVIRONMENTAL LABORATORY	NO.: PD-13 Appendix A DATE: 9/23/85

SUBJECT: Laboratory Result Remark Codes Most Commonly Used by Organic Lab

EFFECTIVE DATE: September 23, 1985

Below are the remark codes most frequently used when reporting data from the Organic Laboratory. A complete list of all available codes can be found in the Bureau's QA Manual as Appendix 1.C.-9.

The following single-letter STORET remark codes shall be used when reporting applicable laboratory results. The code appears in the comment column and should be included with values that are entered into the STORET system. Because only one STORET remark code can be stored at a time, the most pertinent must be used when more than one applies.

J Estimated value; value may not be accurate.

K Actual value is less than the value given. (Substance, if present, is below this level.)

M Presence of material verified but not quantified.

The following double-letter laboratory remark codes may also appear as comments. They are used to indicate why the laboratory has less confidence in a particular reported value. When more than one code is applicable, the more pertinent should be used. These codes are not compatible with STORET.

BK Reported value has been corrected for a laboratory blank which was greater than half of the detection limit but less than half of the reported value.

DL Sample was not analyzed using an optimum dilution.

DM Sample was diluted to reduce possible matrix interference.

DR High sample dilution was required to bring value into the analytical working range.

HT The recommended maximum laboratory holding time was exceeded before analysis.

LH Quality control indicated possible low recovery. The actual level may have been higher than the reported value.

LL Quality control indicated possible high recovery. The actual level may have been lower than the reported value.

LP Quality control indicated that the precision of the result may have been less than normal.

MM Analytical methodology has not been approved for the submitted sample matrix.

NA Analytical method has not yet been approved by laboratory.

PS Possible interference may have affected the accuracy of the laboratory result.

PT Recommended laboratory preservation technique not used.

SC Recommended laboratory sample container not used.

UC No attempt has been made to confirm the identity of the reported compound by a second independent technique due to equipment or sample problems.

The following triple-letter laboratory remark codes shall be used when no value is obtainable and STORET remark codes are inapplicable. These codes should not be stored in the STORET system. When more than one code is applicable, the more pertinent should be used.

ACC Laboratory accident resulted in no obtainable value.

BLK No value reported because the laboratory blank was greater than half of the detection limit and greater than half of the quantified value.

INT Interference encountered during analysis resulted in no obtainable value.

LSC Lack of proper sample container resulted in no sample suitable for analysis.

NAV Requested analysis not avaialble (lack of method or equipment, long-term equipment failure, etc.).

NOS No sample received suitable for analysis requested.

QNS Quantity not sufficient to perform requested analysis.

XHT No analysis performed or value reported because maximum recommended laboratory holding time was exceeded by a large margin.

APPROVED BY: John Peck
John Peck Organic Unit Supervisor

Ref. 2

TABLE 4
WASTE CHARACTERISTICS VALUES FOR SOME COMMON CHEMICALS

CHEMICAL/COMPOUND	TOXICITY [1]	FLAMMABILITY [2]	IMPLOSIVENESS [3]	REACTIVITY [2]
Acetaldehyde	3	0	3	2
Acetic Acid	3	0	2	1
Acetone	2	0	3	0
Aldrin	3	3	1	0
Ammonia, Anhydrous	3	0	1	0
Aniline	3	1	2	0
Benzene	3	1	3	0
Carbon Tetrachloride	3	3	0	0
Chlordane	3	3	0*	0*
Chlorobenzene	2	2	3	0
Chloroform	3	3	0	0
Crezol-O	3	1	2	0
Crezol-MAP	3	1	1	0
Cyclohexane	2	2	3	0
Endrin	3	3	1	0
Ethyl Benzene	2	1	3	0
Formaldehyde	3	0	2	0
Formic Acid	3	0	2	0
Hydrochloric Acid	3	0	0	0
Isopropyl Ether	3	1	3	1
Lindane	3	3	1	0
Methane	1	1	3	0
Methyl Ethyl Ketone	2	0	3	0
Methyl Parathion in Xylene Solution	3	0Δ	3	2
Naphthalene	2	1	2	0
Nitric Acid	3	0	0	0
Parathion	3	0Δ	1	2
PCB	3	3	0Δ	0Δ
Petroleum, Kerosene (Fuel Oil No. 1)	3	1	2	0
Phenol	3	1	2	0
Sulfuric Acid	3	0	0	2
Toluene	2	1	3	0
Trichlorobenzene	2	3	1	0
α-Trichloroethane	2	2	1	0
Xylene	2	1	3	0

[1] Sax, N. I., Dangerous Properties of Industrial Materials, Van Nostrand Reinhold Co., New York, 4th ed., 1975. The highest rating listed under each chemical is used.

[2] JRB Associates, Inc., Methodology for Rating the Hazard Potential of Waste Disposal Sites, May 5, 1980.

[3] National Fire Protection Association, National Fire Codes, Vol. 13, No. 49, 1977.

* Professional judgment based on information contained in the U.S. Coast Guard CHRIS Hazardous Chemical Data, 1978.

Δ Professional judgment based on existing literature.

Ref. 3

PROGRAM FOR EFFECTIVE RESIDUALS MANAGEMENT FOR THE ALLIED PAPER, INC. SOLID WASTE DISPOSAL FACILITY FOR RESIDUALS DISPOSAL KALAMAZOO, MICHIGAN

February, 1986

Prepared by:

WILKINS & WHEATON TESTING LABORATORY, INC.
Kalamazoo, Michigan

III. INVENTORY OF PAPER WASTE RESIDUALS

Table 1 is a one-year inventory of residuals production at the Allied Paper facility. The period covered is from January through December of 1985, and includes the daily average for each month and the monthly total.

Table 1

1985 PAPER WASTE RESIDUALS PRODUCTION/DISPOSAL

	Daily Average	Monthly Total
January	43,500 lbs/day	1,350,000 lbs.
February	43,000	1,199,000
March	36,500	1,136,000
April	38,500	961,000
May	35,000	837,000
June	32,500	982,000
July	38,000	1,069,000
August	34,500	1,077,000
September	32,000	970,000
October	45,000	1,403,000
November	36,000	1,091,000
December	46,500	1,444,000
ANNUAL	38,417 lbs/day	13,519,000 lbs. = 7952.35 yd.^{3}

As listed, Allied produced approximately 13.5 million pounds of sludge in 1985, which equates to approximately 8,000 cubic yards. Based on the system of operations, the inventory of residuals for production, storage, and disposal is one and the same.

MUNICIPAL WATER AND SEWER SERVICES

The residential areas, commercial areas, and industrial operations in the vicinity of the Allied Paper, Inc. Landfill site are served by the Kalamazoo municipal water system and municipal sanitary sewer system. Because of the industrial nature of the area and the intensity of development, these water and sewer services have been in operation for a considerable portion of the area's urban history. Figure 2 identifies municipal wells in the project area, with the closest one being approximately 1/2 mile to the southeast on the other side of Portage Creek.

As previously addressed, Allied Paper utilizes both municipal water and water from Portage Creek for their processing and sanitary needs. All sanitary wastewater and a portion of the processing water is discharged to the municipal sanitary sewer system. The remainder of processing wastewater is discharged to Portage Creek, as regulated by NPDES Permit No. MI-0000779. The intent of the attached PERM and hydrogeologic investigation is mandated through the NPDES Permit Program.

An extensive storm sewer system also exists in the area. Figure 3 identifies the storm sewer network which discharges into Portage Creek in the project area. As illustrated, the Creek receives a large amount of storm water, which is likely to affect surface water quality (see Portage Creek section of this report).

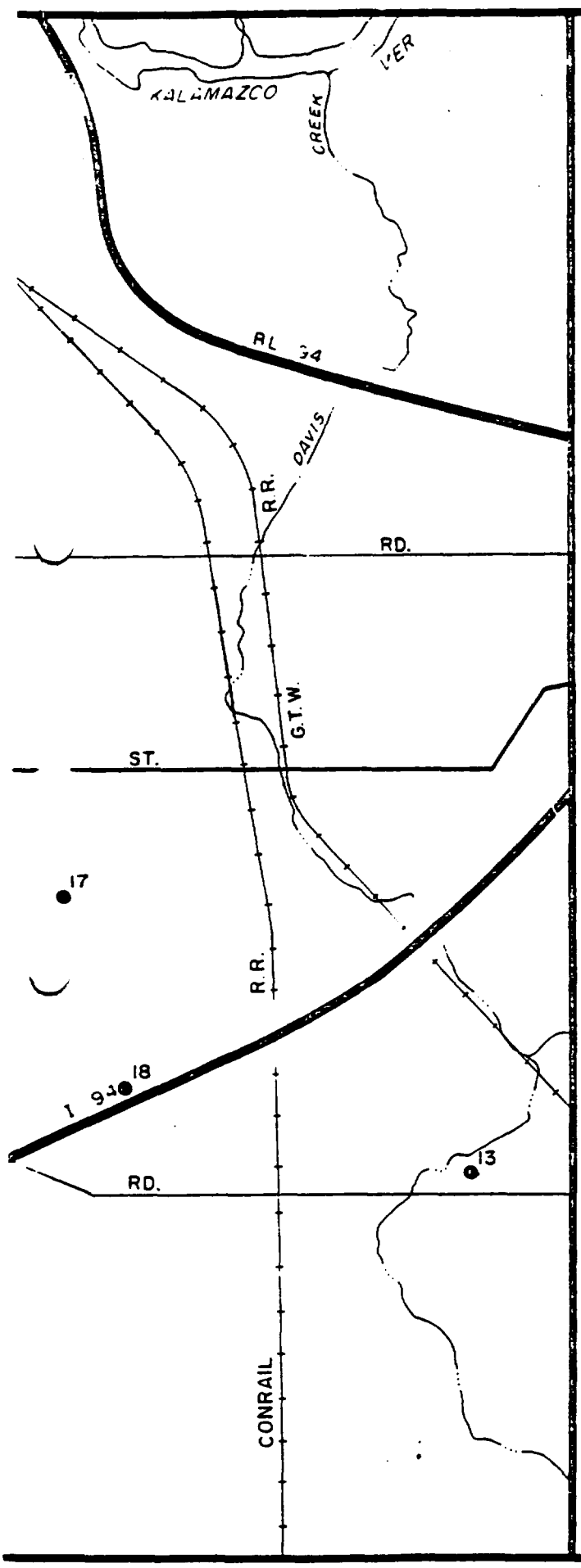


FIGURE 2

N
W E
S

ALLIED PAPER, INCORPORATED
KALAMAZOO, MICHIGAN

SOLID WASTE DISPOSAL FACILITY
FOR
RESIDUALS DISPOSAL

CITY WELL FIELDS
LOCATION MAP

LEGEND

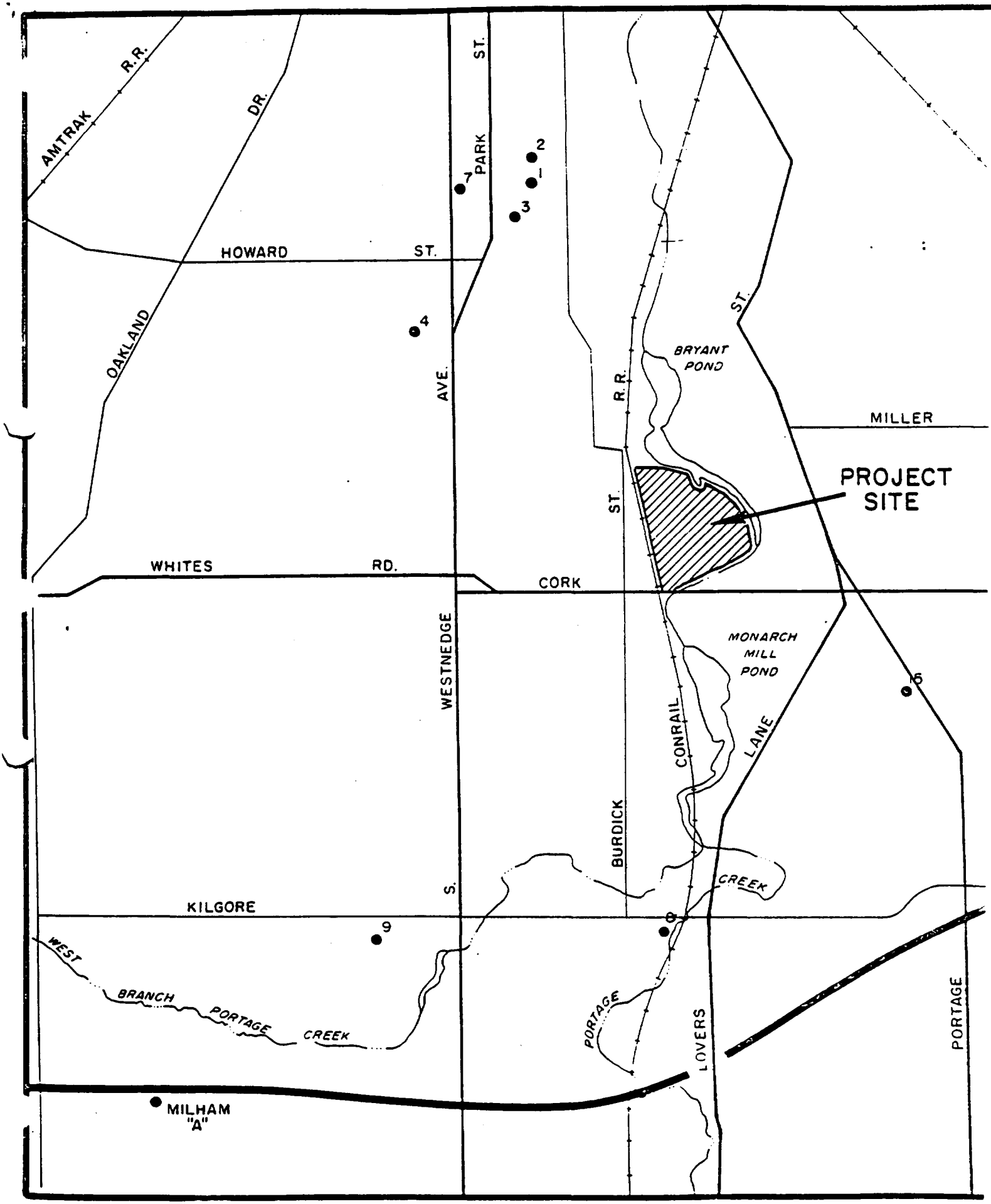
3 — WELL NUMBER

WELL LOCATION
(APPROXIMATE)

0 2,000' 4,000' 6,000'

SCALE: 1" = 2,000'

WILKINS & WHEATON TESTING LAB, INC.


AMTRAK R.R.
OAKLAND DR.
HOWARD ST.
PARK ST.
AVE.
WESTNEDGE
WHITES RD.
CORK
KILGORE
S.
BURDICK
R.R.
ST.
CONRAIL
BRYANT POND
MONARCH MILL POND
MILLER
LANE
PROJECT SITE
CREEK
PORTAGE
LOVERS
PORTAGE
WEST BRANCH PORTAGE CREEK
MILHAM "A"
1
2
3
4
5
6
7
8
9

Ref. 4

D-33-11-5-8
DRAFT

FEASIBILITY STUDY OF ALTERNATIVES

VOLUME I

KALAMAZOO RIVER PCB PROJECT
KALAMAZOO AND ALLEGAN COUNTIES, MICHIGAN

STATE OF MICHIGAN CONTRACT NUMBER 1611

NUS PROJECT NUMBER 7339

MARCH 1986

NUS CORPORATION

1.0 INTRODUCTION

1.1 Problem Description

Approximately 80 miles of the Kalamazoo River, between the City of Kalamazoo and the City of Saugatuck (Lake Michigan), are contaminated with polychlorinated biphenyls, or PCBs (see Figure 1-1). The PCB contamination is predominantly found in the sediments of the Kalamazoo River and Portage Creek, although elevated levels of PCBs are also found in the water column and fish due to physical, chemical, and biological interactions with the contaminated sediments. PCBs have been determined to be hazardous to human health, and bans on PCB usage have been enacted at both State and Federal levels. PCBs remain a strictly regulated chemical to minimize human exposure and to protect human health. The presence of large amounts of uncontained PCB-contaminated sediments at various locations along the Kalamazoo River and Portage Creek, together with the concomitant PCB contamination of the water column and fish, serve to increase human exposure to this substance.

PCB contamination of the river has been documented since a 1971 fish survey showed high concentrations of PCB in the flesh of the Kalamazoo River fish population. The Michigan Department of Public Health subsequently issued a fish consumption advisory for this section of the river. The contamination is also delaying Michigan Department of Natural Resources (MDNR) plans to restore the Kalamazoo River fishery. Over $500 million has been spent to improve water quality in the Kalamazoo River, and expectations are for an improved fishery to develop; however, the MDNR is not committing resources to further develop the fishery until the PCB problem is addressed. Other potential activities such as the renovation and retrofitting of dams for low-head hydropower development are reportedly also being affected by the PCB contamination.

The major historical sources of PCBs in the Kalamazoo River appear to be the wastewater discharges from paper industries. The present problem is principally

due to uncontained PCB-contaminated sediments, where an estimated 200,000 pounds of PCBs reside. The evidence to date indicates that much of the continuing contamination of the Kalamazoo River is originating from sediment deposits in a major tributary, Portage Creek.

On the Kalamazoo River, there are additional large quantities of contaminated sediments behind hydroelectric and water-diversion dams, three of which have been drawn down. At the drawn down dams, the Plainwell, Otsego, and Trowbridge Dams, the contaminated sediments exist above the water level, but continual sloughing and bank erosion and periodic inundation reintroduce the sediments into the aquatic ecosystem. These sediments are a factor in decisions regarding renovation or modification of these dams. In the remaining impoundments, the sediments are either in contact with the water or can be easily eroded from depositional areas during precipitation or flood events.

1.2 River Description

The study area for this investigation consists of approximately 80 miles of the Kalamazoo River, between the city of Kalamazoo, and the city of Saugatuck, where the river flows into Lake Michigan; and approximately 3 miles of a major tributary, Portage Creek, between Cork Street and the confluence of Portage Creek and the Kalamazoo River in the city of Kalamazoo (see Figure 1-1). This stretch of the Kalamazoo River is characterized by a series of six dams. Three dams are currently impounded, and three are permanently drawn down. Some sections of river are erosional zones, whereas others are depositional zones. Extensive areas are characterized by wetlands.

For purposes of the study, the river was divided into 10 sections, called reaches. The reaches are numbered 1 through 10, and follow in chronological order from upstream to downstream. Each reach has certain distinguishing features and characteristics, which are pointed out in the following discussion. The limits of each reach and important features of the Kalamazoo River and Portage Creek are highlighted on Drawing 7339-01 (page 1-7).

DRAFT

TABLE 2-1

AVERAGE PCB CONCENTRATIONS (ppm)
FOUND IN SURFACE SAMPLES (0-4")

Year	Bryant Mill Ponds	#1 Portage Creek	#2 Portage Creek Confluence to Main Street, Plainwell	#3 Main Street, Plainwell to Plainwell Dam	#4 Plainwell Dam to Otsego City Dam	#5 Otsego City Dam to Otsego Dam
1971	116.0 (2)					
1972	131.9 (5)	117.6 (1)				
1976		36.8 (3)	9.0 (5)	5.1 (2)		66.6 (1)
1982		85.0 (1)	36.2 (4)	8.8 (2)		27.0 (1)
1983	191.4 (9)	12.6 (4)		19.9 (5)		
1984	226.8 (4)		13.0 (1)			
1985	183.0 (6)				16.5 (2)	

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TABLE 2-1
AVERAGE PCB CONCENTRATIONS (ppm)
FOUND IN SURFACE SAMPLES (0-4")
PAGE TWO

Year	#6 Otsego Dam to Trowbridge Dam	#7 Trowbridge Dam to City Line of Allegan	#8 City Line of Allegan to Allegan City Dam	#9 Lake Allegan	#10 Allegan Dam to Saugatuck
1971					
1972					
1976		0.0 (1)	24.7 (1)	10.8 (3)	
1982					0.23 (11)
1983	28.9 (7)			16.6 (5)	
1984					
1985			5.0 (2)		0.32 (21)

Note: Number in ( ) indicates the number of samples analyzed.
Note: For Bryant Mill Ponds, Reach #3, Reach #5 and Reach #6, only river bank samples were used for averages.

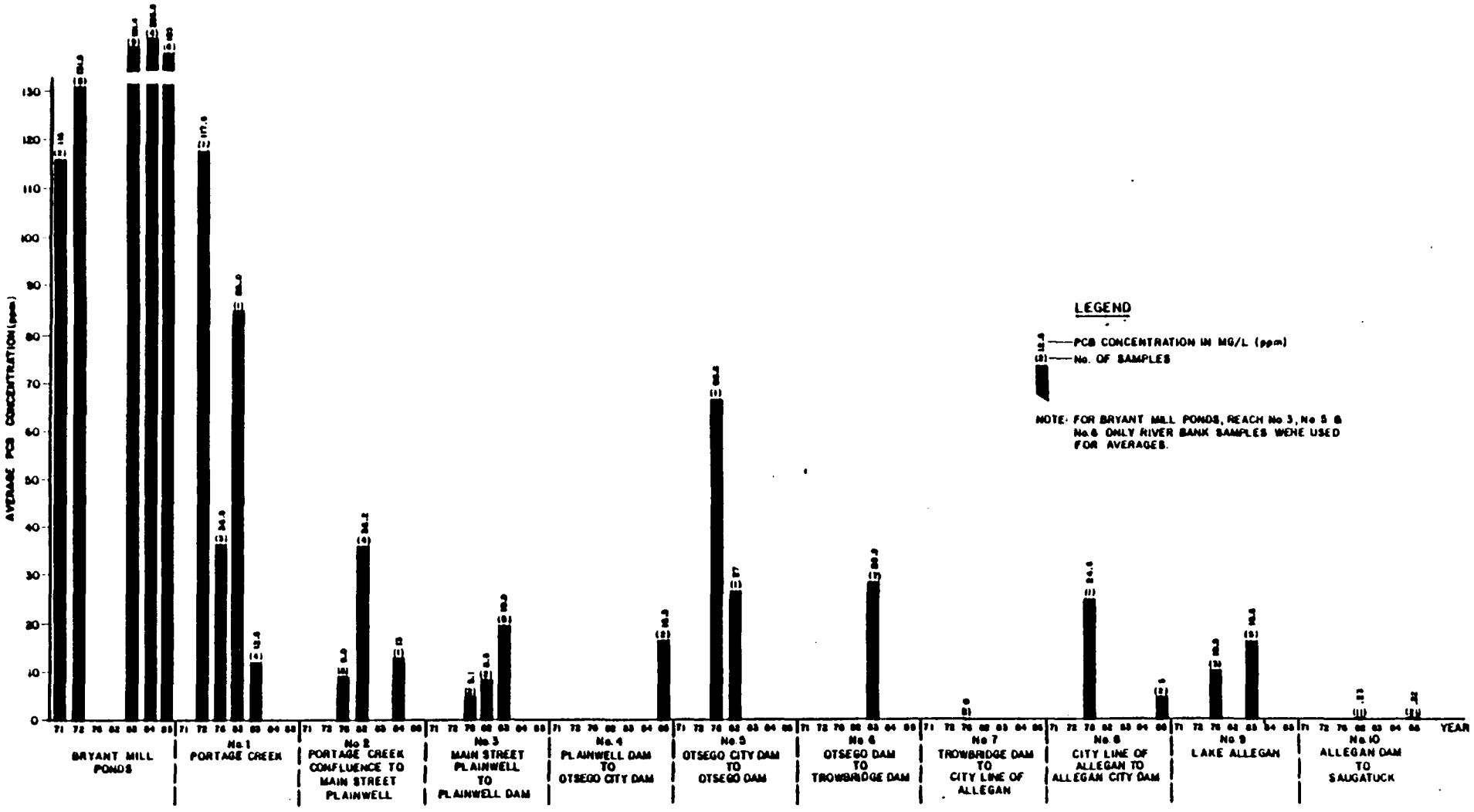

TABLE 2-2
PCB CONCENTRATIONS IN SURFACE SAMPLES (0-4")
KALAMAZOO RIVER STUDY AREA

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TABLE 2-5

SEDIMENT SAMPLES EXCEEDING
ACTION LEVELS OF 50 ppm

	Bryant Mill Ponds	Reach #1	Reach #2	Reach #3	Reach #4	Reach #5	Reach #6	Reach #7	Reach #8	Reach #9	Reach #10	Total
Number of Samples >50 ppm	20	3	2	1	1	1	3	0	1	0	0	32
Total Number of Samples	50	8	11	43	7	18	42	1	15	13	34	242
Percent >50 ppm	40%	38%	18%	2%	14%	5%	7%	0%	6%	0%	0%	13%

Reach 1: Portage Creek
Reach 2: Portage Creek confluence to Main Street, Plainwell
Reach 3: Main Street, Plainwell to Plainwell Dam
Reach 4: Plainwell Dam to Otsego City Dam
Reach 5: Otsego City Dam to Otsego Dam
Reach 6: Otsego Dam to Trowbridge Dam
Reach 7: Trowbridge Dam to City Line of Allegan
Reach 8: City Line of Allegan to Allegan City Dam
Reach 9: Lake Allegan
Reach 10: Allegan Dam to Saugatuck

- "A Survey of PCBs in the Kalamazoo River and Portage Creek Sediments, Kalamazoo to Lake Allegan," (November 1983) by Creal (MDNR).

  - PCB-contaminated sediments were found at all four sampling locations: instream sediment concentrations averaged 37 ppm in Lower Bryant Mill Pond; 25.6 ppm in the Plainwell impoundment; 10.8 ppm in the Trowbridge reach; and 15.7 ppm in Lake Allegan.

  - In the Lower Bryant Mill Pond, Plainwell, and Trowbridge areas, the exposed shoreline sediments had average PCB concentrations of 135.0, 22.6, and 26.0, respectively.

  - The exposed sediments in the above three areas appeared loosely consolidated and easily erodible.

  - PCB contamination of apparently recent stream bank deposits in Portage Creek indicated the continued downstream transport of PCBs.

  - The estimated mass of PCBs in the four areas, plus the Otsego Dam impoundment, was 227,910 pounds. More than half of this mass (132,000 pounds) was contained in the exposed sediments in the Lower Bryant Mill Pond, Plainwell, Otsego, and Trowbridge impoundments. The greatest in-stream mass of PCBs was found in Lake Allegan, approximately 75,000 pounds.

- "PCBs in Fish, Sediments and Water of the Lower Kalamazoo River and Nearby Lake Michigan," (January 1984) by Horvath.

  - PCBs found in significant concentrations in the Lower Kalamazoo River ecosystem. Fish flesh exceeded the FDA "action level" of 5 ppm [since lowered to 2 ppm]. Sediment concentrations were low but widespread throughout the study area.

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TABLE 2-6

SUMMARY TABLE
PCB CONCENTRATIONS IN WATER
(parts per trillion (ppt))

Sample Number	Sample Location		Average PCB Concentration (ppt)	Year	Reference
	• Portage Creek				
1	Cork Street	Upstream of Bryant Mill Ponds (background)	10	1985	MDNR
2	Bryant Mill Ponds	Standing water in Bryant Mill Ponds	580	1985	MDNR
3	Alcott Street	Reach 1 at Bryant Dam	181	1985	MDNR
	• Kalamazoo River				
4	River Street	Below Morrow Dam in Comstock (background)	20	1985	MDNR
5	10th Street	Reach 3 above Plainwell Dam	67	1985	MDNR
6	Plainwell Dam	Reach 4 below Plainwell Dam	55	1985	MDNR
7	Farmer Street	Reach 5 below Otsego City Dam	60	1985	MDNR
8	Otsego Dam	Reach 6 below Otsego Dam	76	1985	MDNR
9	26th Street	Reach 7 below Trowbridge Dam	86	1985	MDNR
10	Williams Road	Reach 8 above Allegan City Dam	100	1985	MDNR
11	Route M-118	Reach 9 below Allegan City Dam	110	1985	MDNR
12	Allegan Dam	Reach 10 below Allegan Dam	111	1985	MDNR
13	New Richmond	Reach 10 town of New Richmond	61	1982	Horvath
14	U.S. 31 Bridge	Reach 10 town of Douglas	96	1982	Horvath
15	Old U.S. 131 Bridge	Reach 10 town of Douglas	53	1985	MDNR
16	Saugatuck	Reach 10 river mouth	54	1982	Horvath
17	Saugatuck	Reach 10 river mouth	40 + 23	1984	Marti

DRAFT

TABLE 2-7

SUMMARY OF AVERAGE PCB CONCENTRATIONS FOR CARP IN THE KALAMAZOO RIVER STUDY AREA

Year	Morrow Pond	Portage Creek	Mosel Avenue	Downstream Plainwell Dam	Lake Allegan	Saugatuck
1971	5.07 (1)	--------	164.50 (1)	20.53 (2)	7.32 (1)	45.43 (1)
	3.40 (1)		7.92 (1)	11.28 (2)	10.76 (1)	21.63 (1)
1976	2.10 (1)	--------	8.00 (1)	12.90 (1)	7.40 (1)	--------
	5.25 (1)		3.08 (1)	1.95 (1)	9.25 (1)	
1978	--------	--------	--------	--------	--------	37.00 (1)
						2.91 (1)
1981	1.71 (9)	--------	2.34 (18)	3.14 (6)	8.01 (20)	7.24 (2)
	0.95 (9)		1.14 (18)	2.82 (6)	2.04 (20)	
1983	--------	--------	3.50 (11)	5.50 (11)	2.80 (3)	8.50 (11)
			1.52 (11)	1.96 (11)	3.50 (3)	1.52 (11)
1985	1.80 (20)	0.80 (10)	3.34 (19)	1.95 (12)	2.97 (19)	2.10 (20)
	1.11 (20)	1.33 (10)	1.74 (19)	0.64 (12)	1.88 (19)	0.38 (20)

Notes: (1) Number in parentheses represents number of fish sampled.

(A) PCB Concentration / Fat Normalized PCB Concentration

(B) All PCB concentrations are in mg/l (ppm).

DRAFT

TABLE 2-8

SUMMARY OF AVERAGE PCB CONCENTRATIONS FOR BASS IN THE KALAMAZOO RIVER STUDY AREA

Year	Morrow Pond	Portage Creek	Mosel Avenue	Downstream Plainwell Dam	Lake Allegan	Saugatuck
1976	0.20 (1)	--------	--------	--------	2.40 (1)	--------
	0.29 (1)				6.00 (1)	
1981	0.34 (23)	--------	1.08 (4)	0.47 (1)	1.09 (9)	5.63 (4)
	0.91 (23)		1.07 (4)	3.36 (1)	2.65 (9)	
1985	1.00 (7)	--------	1.42 (2)	2.00 (1)	2.20 (10)	0.78 (10)
	1.19 (7)		8.35 (2)	1.67 (1)	2.43 (10)	0.98 (10)

Notes: (1) Number in parentheses represents number of fish sampled.

(A) PCB Concentration / Fat Normalized PCB Concentration

(B) All PCB concentrations are in mg/l (ppm).

2-23

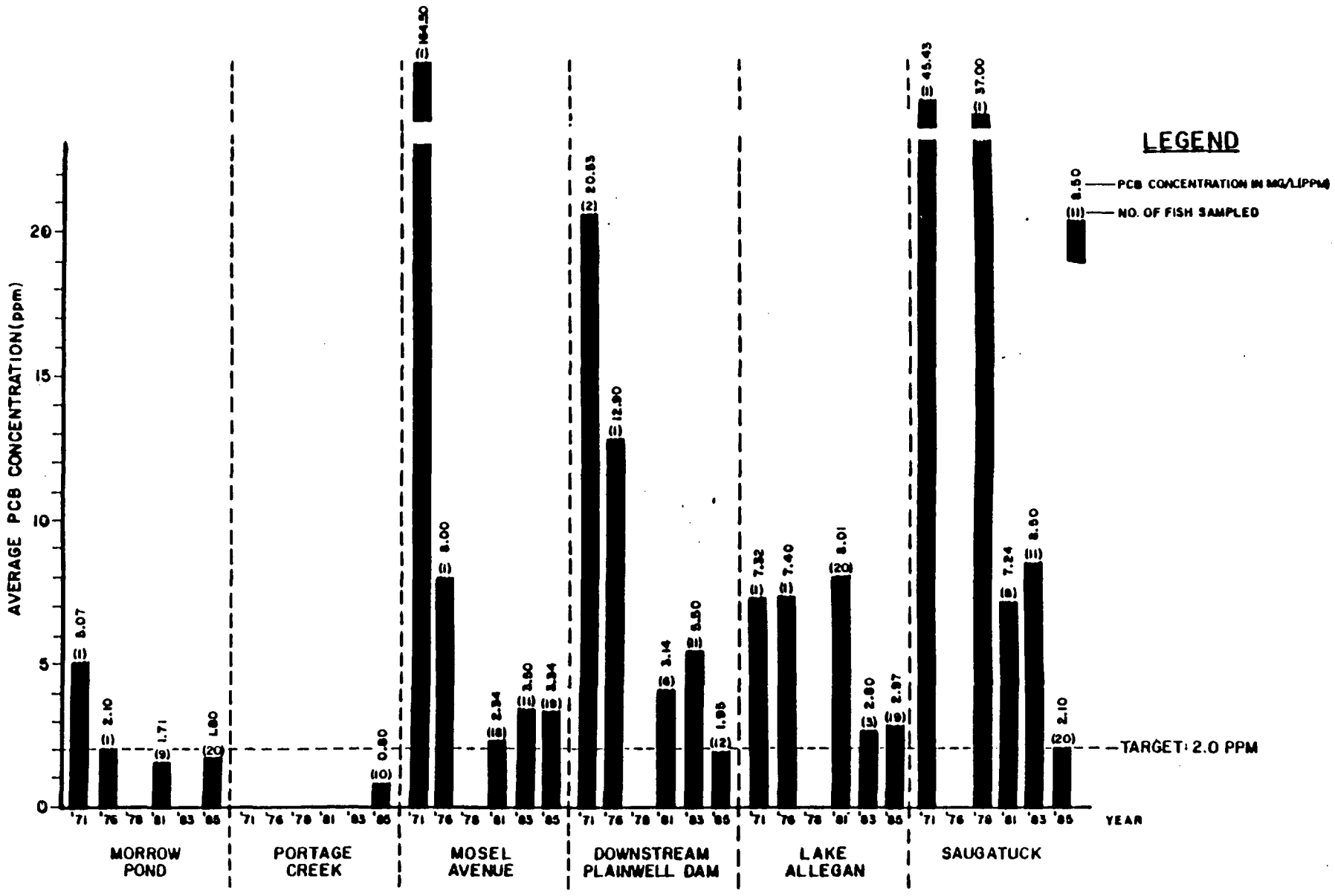


TABLE 2-9
AVERAGE PCB CONCENTRATIONS IN CARP
KALAMAZOO RIVER STUDY AREA

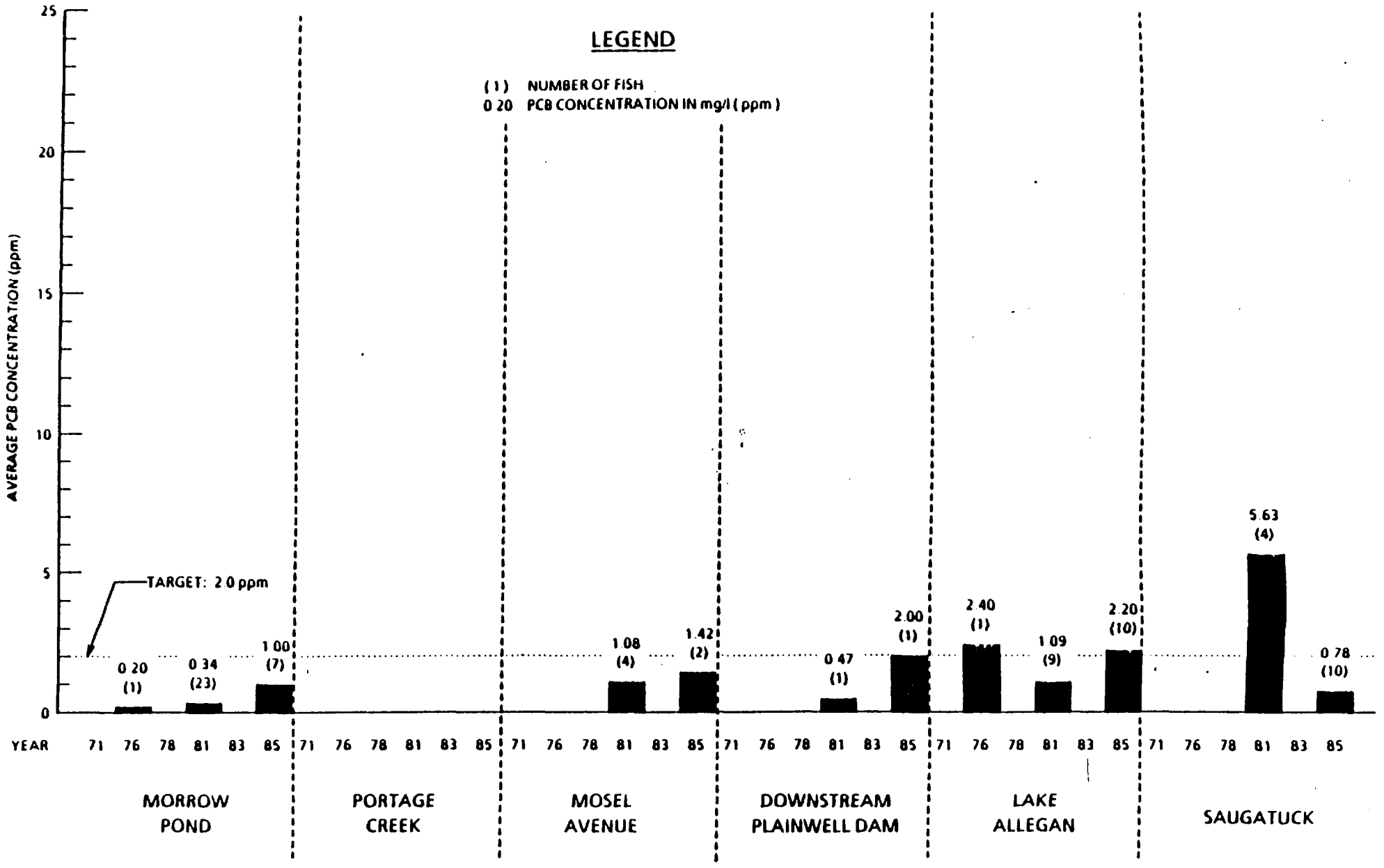


TABLE 2 - 10
AVERAGE PCB CONCENTRATIONS IN BASS
KALAMAZOO RIVER STUDY AREA

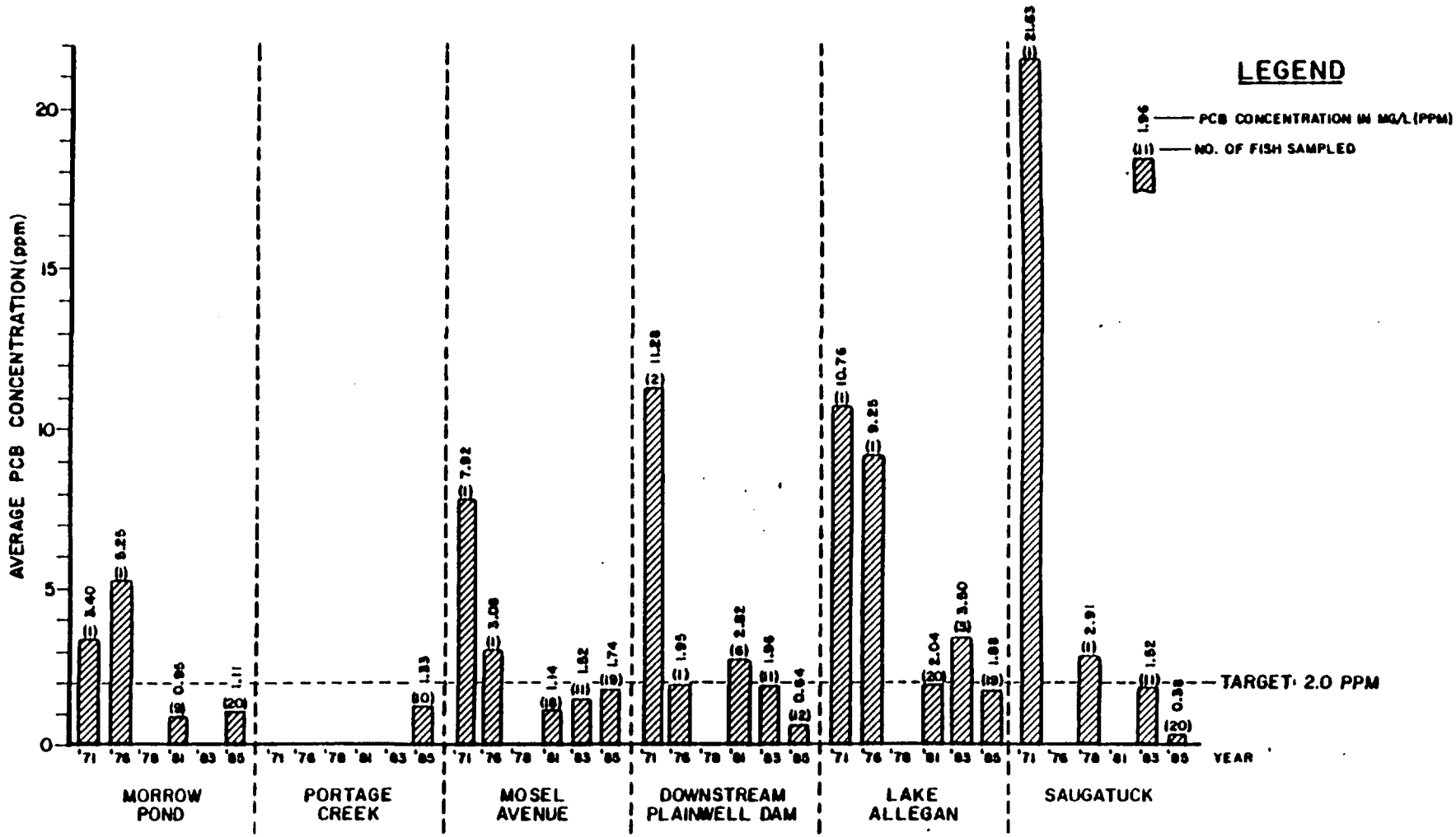


TABLE 2-11
AVERAGE FAT NORMALIZED PCB CONCENTRATIONS IN CARP
KALAMAZOO RIVER STUDY AREA

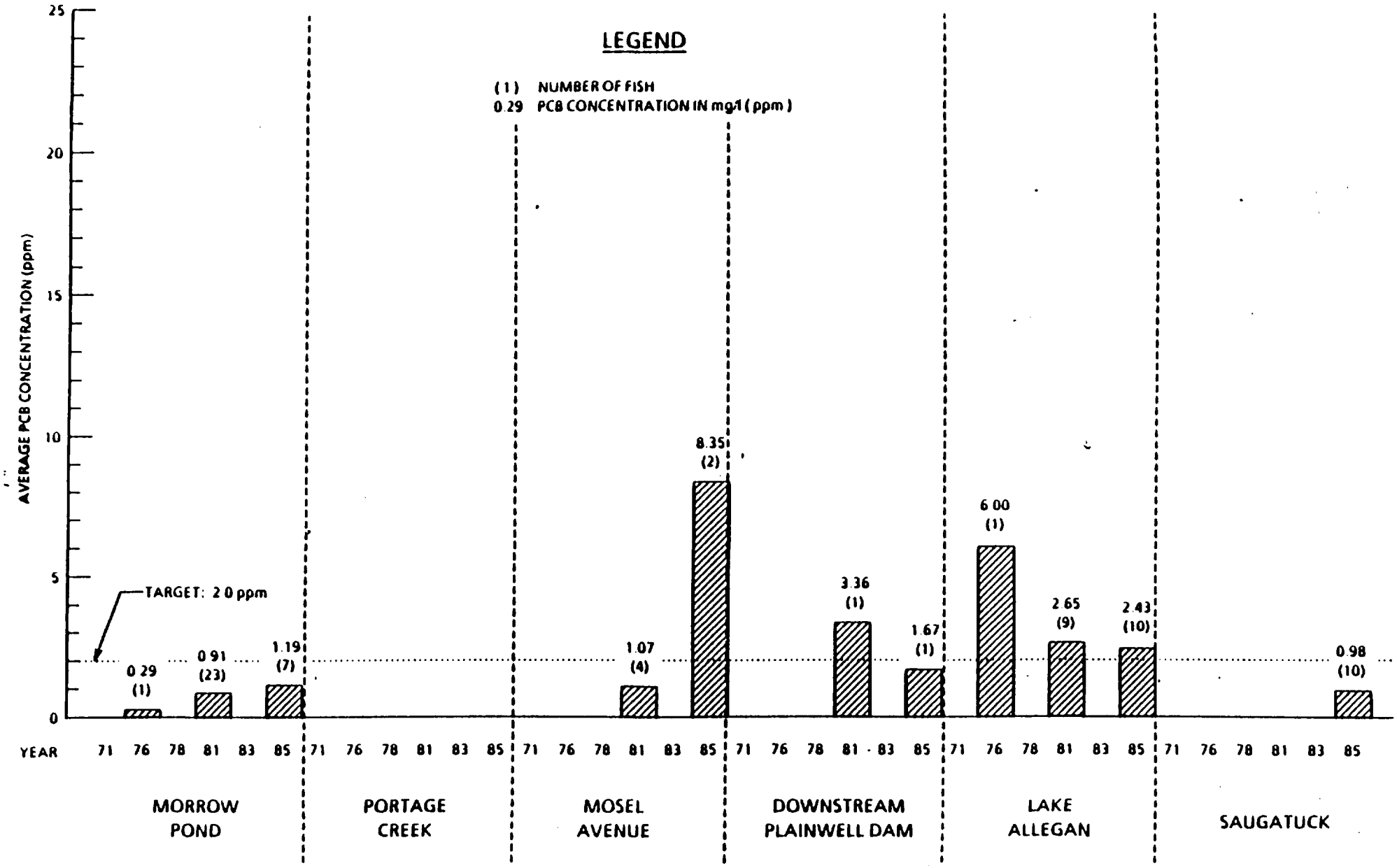
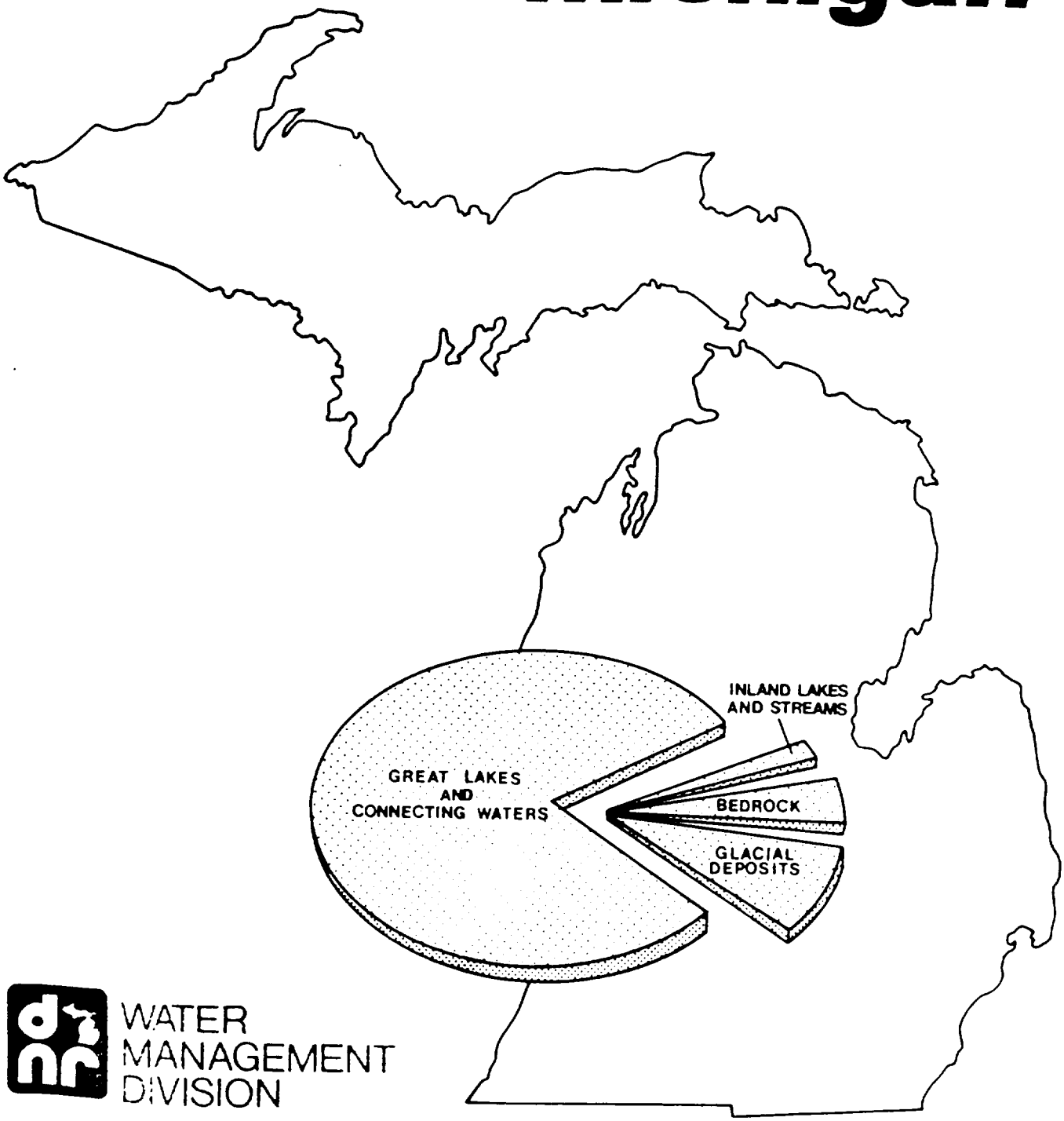


TABLE 2 - 12
AVERAGE FAT NORMALIZED PCB CONCENTRATIONS IN BASS
KALAMAZOO RIVER STUDY AREA

Ref. 5

municipal water withdrawals in michigan



WATER MANAGEMENT DIVISION

PREPARED IN COOPERATION WITH THE UNITED STATES GEOLOGICAL SURVEY

MUNICIPAL WATER WITHDRAWALS IN MICHIGAN

by

Douglas J. Bedell

Water Management Division
Michigan Department of Natural Resources

1982

Prepared in cooperation with the U. S. Geological Survey

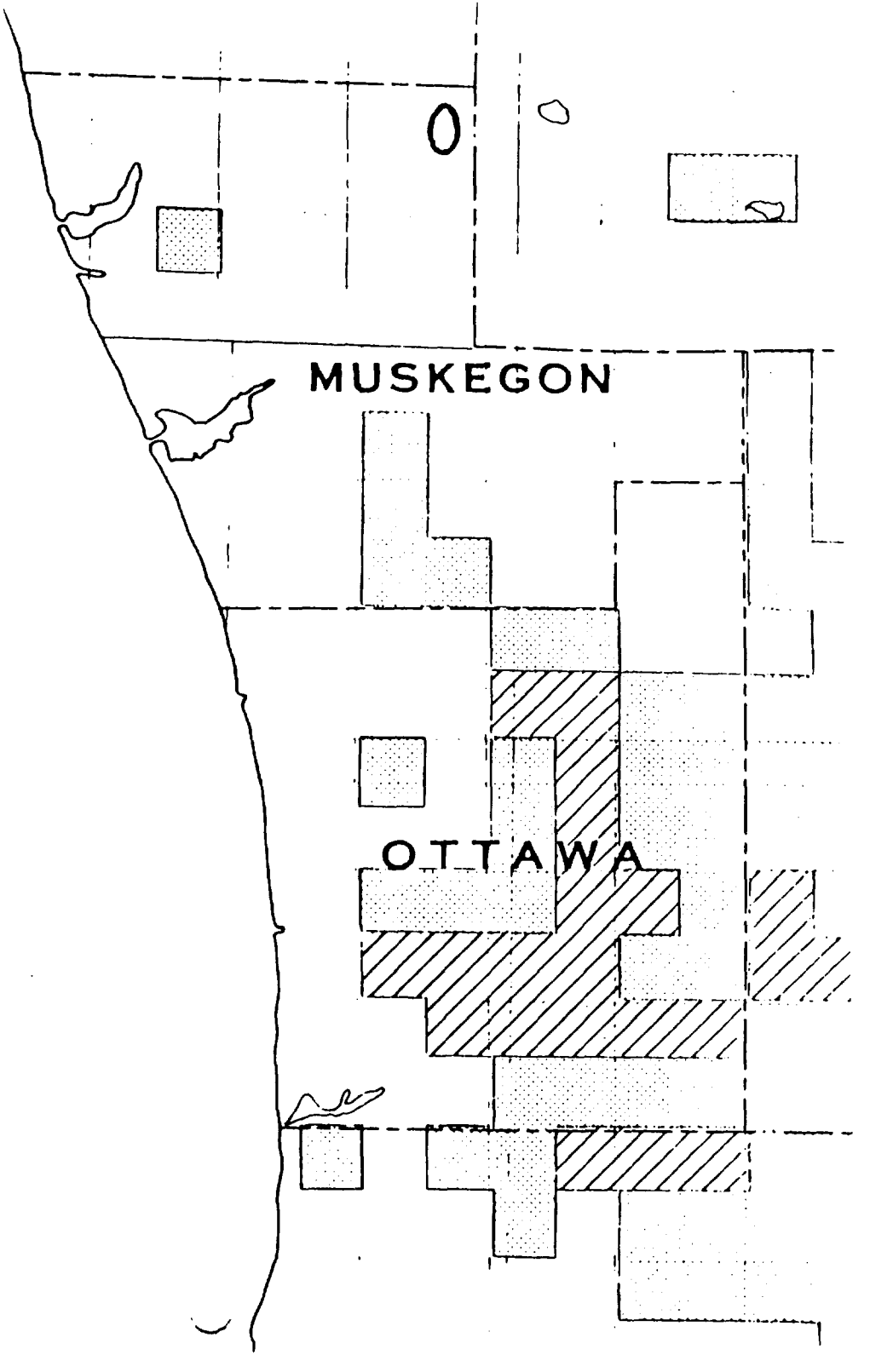
Table 2. Municipal water withdrawal (continued)

WSSN	MUNICIPALITY	CO	BASIN	TREATMENT SLCPFZIDON	POPULATION SERVED	GPCD	MAXIMUM DAY	MAXIMUM USE	SOURCE CO	SOURCE BASIN	SOURCE NAME
1575	Comstock Twp	077	04050003	C F	1,000				077	04050003	Kalamazoo - 3520
1605	Cooper Twp	077	04050003	C F	200				077	04050003	Kalamazoo - 3520
2530	Galesburg	077	04050003	C F	1,729	126	203	0.51	077	04050003	Glacial deposit
3520	~~Kalamazoo~~	077	04050003	CPF	~~104,777~~	170	226	36.55	077	04050003	~~Glacial~~ deposit
3540	Kalamazoo Twp	077	04050003	C F	21,214				077	04050003	Kalamazoo - 3520
5045	Oshtemo Twp	077	04050003	C F	1,474				077	04050003	Kalamazoo - 3520
5200	Parchment	077	04050003	C F I	1,859	153	203	1.04	077	04050003	Glacial deposit
5520	~~Portage~~	077	04050003	CPF	~~23,044~~	63	252	6.53	077	04050003	~~Glacial deposit~~
5970	Schoolcraft	077	04050001	CPF	1,343	157	152	0.42	077	04050001	Glacial deposit
6800	Vicksburg	077	04050001	F	2,207	157	200	0.77	077	04050001	Glacial deposit
3560	Kalkaska	079	04060105	C	3,228	153	218	0.63	079	04060105	Glacial deposit
0190	Alpine Twp	081	04050006	C F	8,780				081	04050006	Plainfield Twp-5370
1185	Cascade Twp	081	04050006	C F	9,966				081	04050006	Grand Rapids - 2790
1260	Cedar Springs	081	04050006	CPF	2,453	165	227	0.72	081	04050006	Glacial deposit
1960	East Grand Rapids	081	04050006	C F	11,244	114	197	3.37	081	04050006	Grand Rapids - 2790
2790	Grand Rapids	081	04050006	SLCPF	245,294	160			139	04060200	Lake Michigan
									081	04050006	Grand River
											Total
2800	Grand Rapids Twp	081	04050006	C F	8,800				081	04050006	Grand Rapids - 2790
2820	Grandville	081	04050006	C F	12,082	138		3.88	081	04050006	Wyoming - 7220
3620	Kentwood	081	04050006	C F	28,412	63		4.66	081	04050006	Wyoming - 7220
3950	Lowell	081	04050006	SLCPF	3,580	161	153	0.95	081	04050006	Glacial deposit
5370	Plainfield Twp	081	04050006	SLCPF	18,780	80	198	2.94	081	04050006	Glacial deposit
5730	Rockford	081	04050006	SLCPF	3,145	142	150	1.13	081	04050006	Rogue River
6200	Sparta	081	04050006	CPFZ	3,317	113	250	0.76	081	04050006	Glacial deposit
6860	Walker	081	04050006	C F	14,898				081	04050006	Grand Rapids - 2790
7220	Wyoming	081	04050006	S C F	126,834	146	198	43.39	139	04060200	Lake Michigan
0050	Ahmeek	083	04020103	N					083	04020103	N Mich Water Co-4800
1920	Eagle Harbor Twp	083	04020103	C			258	0.04	083	04020300	Lake Superior
1930	Eagle River	083	04020103	C			212	0.02	083	04020103	Bedrock
2590	Gay	083	04020103	C					083	04020300	Lake Superior
0350	Baldwin	085	04060101	N	662	225		0.31	085	04060101	Glacial deposit
0150	Almont	087	04090003	C F	1,812				087	04090003	Detroit - 1800
1460	Clifford	087	04080204	C	419	132	225	0.11	087	04080204	Bedrock
1570	Columbiaville	087	04080204	C	949	146			087	04080204	Bedrock
1870	Dryden	087	04090001	N	651	63			087	04090001	Glacial deposit
3340	Imlay City	087	04090001	C F	2,392				087	04090001	Detroit - 1800
3780	Lapeer	087	04080204	C F	6,243	20		0.19	087	04080204	Detroit - 1800
4312	Metamora	087	04080204	N	300	47			087	04080204	Glacial deposit
4770	North Branch	087	04080204	N	903	107	202	0.22	087	04080204	Bedrock
2130	Empire	089	04060104	N	354	127			089	04060104	Glacial deposit
4810	Northport	089	04060105	N	608	207	196	0.28	089	04060105	Glacial deposit
6500	Suttons Bay	089	04060105	N	508	138		0.16	089	04060105	Glacial deposit
0030	Addison	091	04100006	C I	643	171	230	0.25	091	04100006	Glacial deposit
0040	Adrian	091	04100002	SLCPF O	21,025	182	249	6.45	091	04100002	Glacial deposit
									091	04100002	S Br River Raisin
											Total
0750	Blissfield	091	04100002	SLCPF O	3,036	120	251	0.74	091	04100002	River Raisin
0890	Britton	091	04100002	CP O	694	49	151	0.09	091	04100002	Glacial deposit
1470	Clinton	091	04100002	CP	2,209	133			091	04100002	Glacial deposit
1770	Deerfield	091	04100002	S C	932	83			091	04100002	River Raisin
3280	Hudson	091	04100006	C	2,560	138	178	0.74	091	04100006	Glacial deposit
4490	Morenci	091	04100006	I	2,114	134	023	0.54	091	04100006	Glacial deposit
5020	Onsted	091	04100002	C I	647	177	200	0.24	091	04100002	Glacial deposit
6560	Tecumseh	091	04100002	CPF	7,280	144	201	2.19	091	04100002	Glacial deposit
0860	Brighton	093	04090005	C F I	3,906	243	211	1.27	093	04090005	Glacial deposit
0875	Brighton Twp	093	04090005		10,154				093	04090005	
2400	Fowlerville	093	04050004	F	1,978	207	254	0.60	093	04050004	Bedrock
3250	Howell	093	04080203	FZI	6,976	171	202	1.73	093	04080203	Bedrock
6145	SE Livingston WSA	093							093		

PERCENTAGE OF WELLS
IN BEDROCK (%)

- Greater than 10
- Less than 10
- All wells in the glacial drift
- No well records
- Glacial drift thickness greater than or equal to 600 feet

Refer to reverse side of Sheet 1 for further explanation.



"Hydrogeologic Atlas of Michigan", Western Michigan University, 1981.

PLATE #21

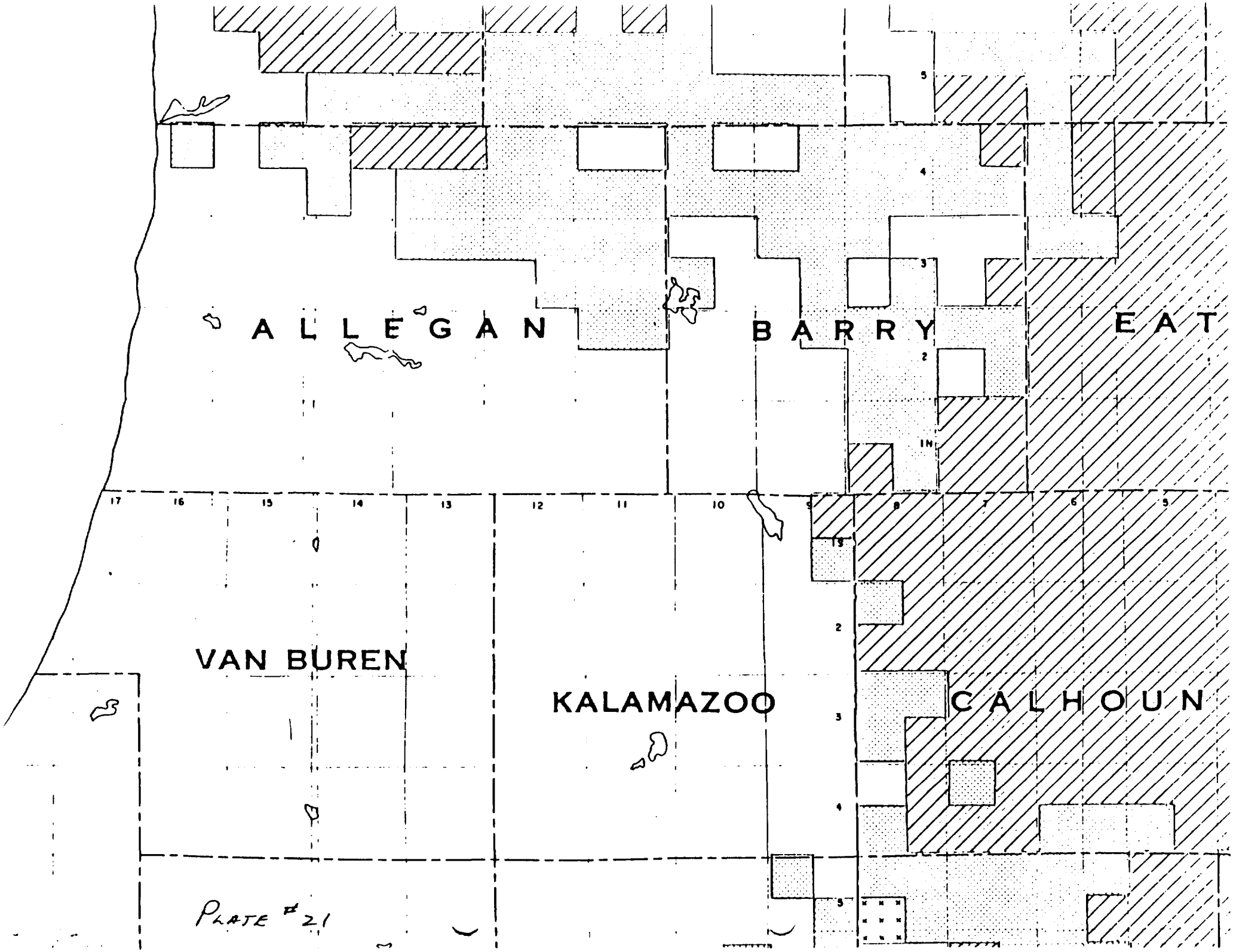

ALLEGAN
BARRY
EAT
VAN BUREN
KALAMAZOO
CALHOUN
PLATE #21

Table 5. Number of Wells by County

NUMBER OF WELLS BY COUNTY

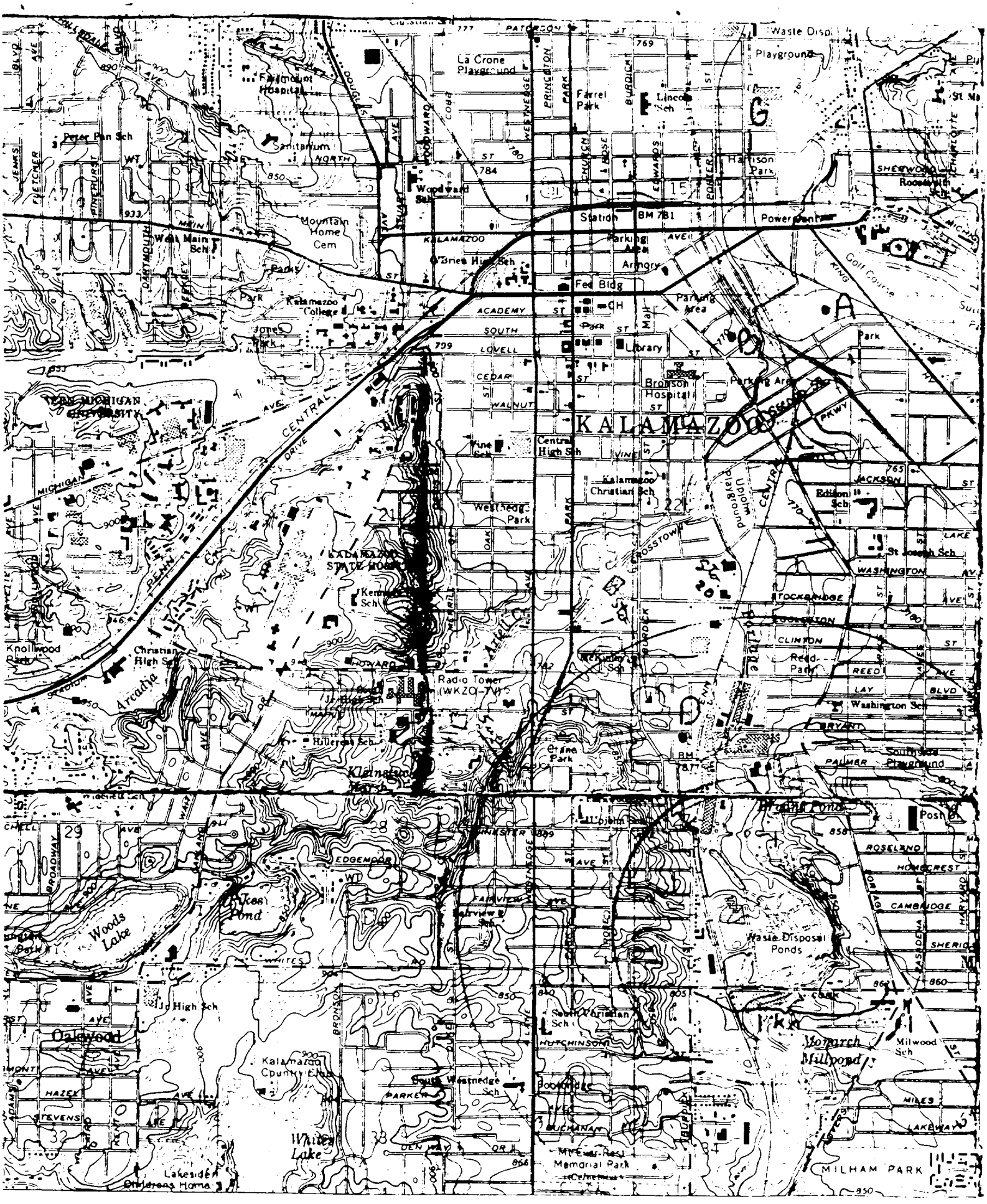
Alcona	1,133	Lake	1,050
Alger	698	Lenawee	3,385
Allegan	3,116	Leelanau	1,848
Alpena	797	Lapeer	2,824
Antrim	1,670	Livingston	8,423
Arenac	852	Luce	426
Baraga	657	Mackinac	1,155
Barry	1,652	Macomb	2,580
Bay	1,485	Manistee	1,585
Benzie	1,073	Marquette	2,413
Berrien	4,515	Mason	1,189
Branch	2,239	Mecosta	1,917
Calhoun	3,917	Menominee	1,688
Cass	2,421	Midland	3,406
Charlevoix	1,276	Missaukee	491
Cheboygan	2,448	Monroe	6,721
Chippewa	2,790	Montcalm	2,196
Clare	3,908	Muskegon	5,025
Clinton	3,706	Montmorency	912
Crawford	1,015	Newaygo	2,293
Dickinson	1,052	Oakland	16,942
Delta	1,639	Oceana	1,947
Eaton	4,477	Ogemaw	2,342
Emmet	1,445	Ontonagon	693
Genesee	13,187	Osceola	1,259
Gladwin	1,830	Oscoda	740
Gogebic	671	Otsego	1,529
Grand Traverse	3,668	Ottawa	3,199
Gratiot	1,353	Roscommon	2,621
Hillsdale	3,670	Presque Isle	1,072
Houghton	1,189	Saginaw	2,325
Huron	1,420	Sanilac	1,715
Ingham	5,492	St. Clair	1,536
Ionia	2,014	St. Joseph	1,631
Iosco	1,911	Shiawassee	2,614
Iron	374	Schoolcraft	746
Isabella	1,849	Tuscola	2,324
Jackson	4,292	Van Buren	2,606
Kalamazoo	3,473	Washtenaw	5,689
Kalkaska	631	Wayne	588
Kent	11,511	Wexford	1,405

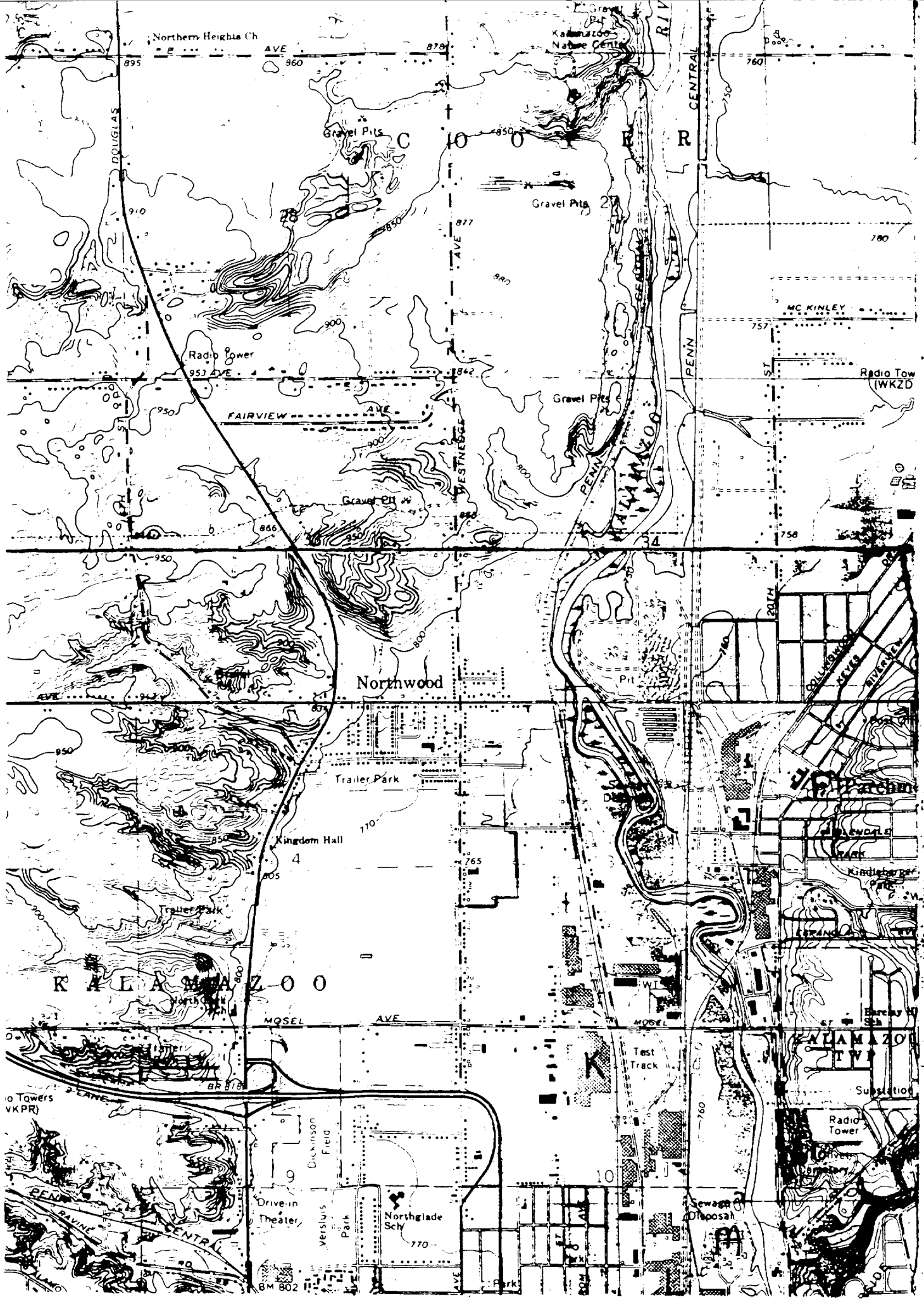
RANK ORDER OF COUNTIES BASED ON NUMBER OF WELLS

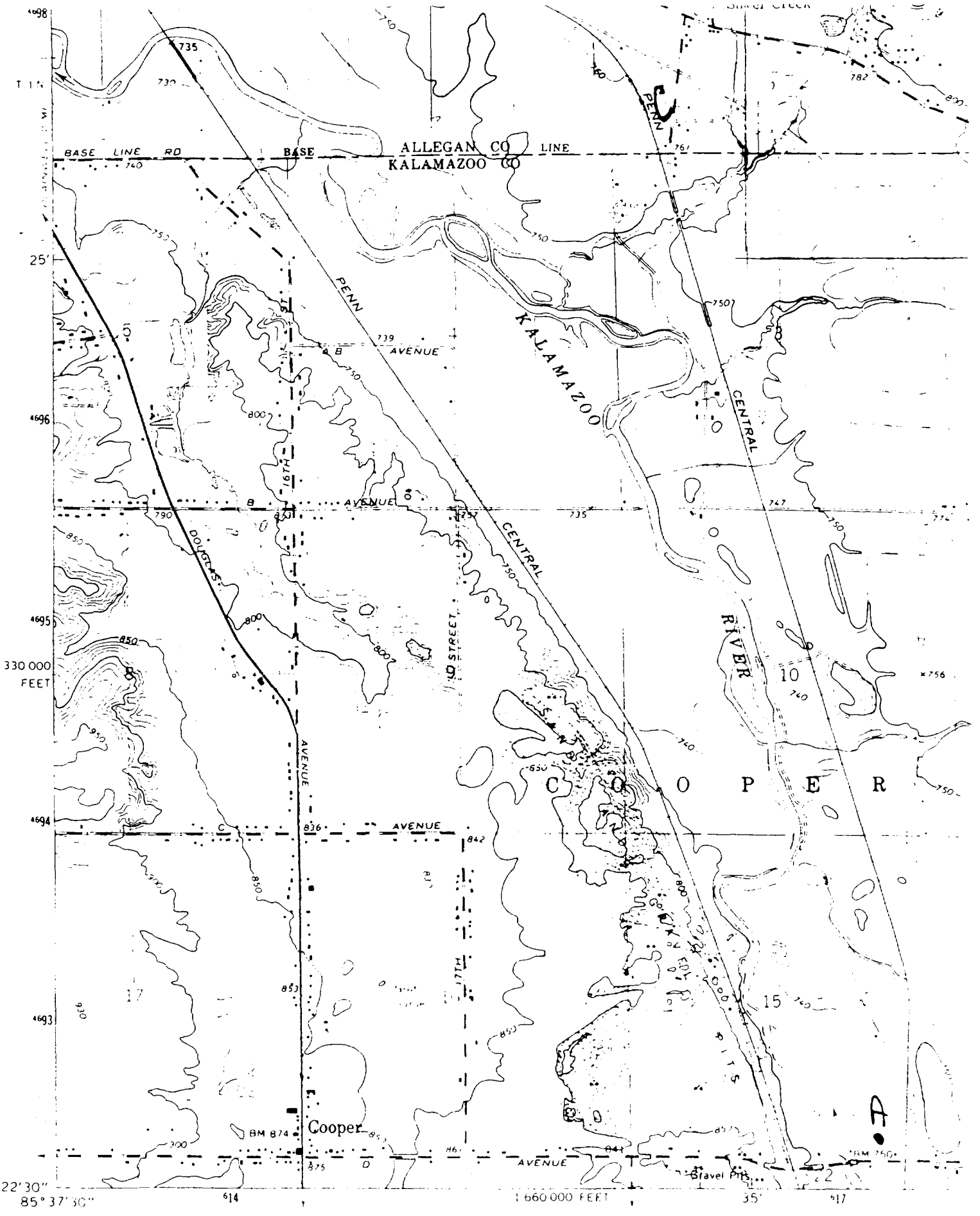
1	Oakland	43	Gladwin
2	Genesee	44	Sanilac
3	Kent	45	Menominee
4	Livingston	46	Antrim
5	Monroe	47	Barry
6	Washtenaw	48	Delta
7	Ingham	49	St. Joseph
8	Muskegon	50	Manistee
9	Berrien	51	St. Clair
10	Eaton	52	Otsego
11	Jackson	53	Bay
12	Calhoun	54	Emmet
13	Clare	55	Huron
14	Clinton	56	Wexford
15	Hillsdale	57	Gratiot
16	Grand Traverse	58	Charlevoix
17	Kalamazoo	59	Osceola
18	Midland	60	Houghton
19	Lenawee	61	Mason
20	Ottawa	62	Mackinac
21	Allegan	63	Alcona
22	Lapeer	64	Benzie
23	Chippewa	65	Presque Isle
24	Roscommon	66	Dickinson
25	Shiawassee	67	Lake
26	Van Buren	68	Crawford
27	Macomb	69	Montmorency
28	Cheboygan	70	Arenac
29	Cass	71	Alpena
30	Marquette	72	Schoolcraft
31	Ogemaw	73	Oscoda
32	Saginaw	74	Alger
33	Tuscola	75	Ontonagon
34	Newaygo	76	Gogebic
35	Branch	77	Baraga
36	Montcalm	78	Kalkaska
37	Ionia	79	Wayne
38	Oceana	80	Missaukee
39	Mecosta	81	Luce
40	Iosco	82	Iron
41	Isabella	83	Keweenaw

PLATE #20

Ref. 7


KALAMAZOO
Waste Disp.
Playground
La Crone Playground
Fairmount Hospital
Farrel Park
Lincoln Sch
Peter Pan Sch
Sanitarium
Harrison Park
Woodward Sch
Mountain Home Cem
Station
Powerplant
West Main Sch
Brees High Sch
Armory
Fed Bldg
Parking Area
Kalamazoo College
Jones Park
Library
Bronson Hospital
WESTERN MICHIGAN UNIVERSITY
CENTRAL
Central High Sch
Kalamazoo Christian Sch
Edison Sch
Upjohn Playground
Westnedge Park
KALAMAZOO STATE HOSPITAL
St Joseph Sch
Kennedy Sch
Knollwood Park
Christian High Sch
Arcadia
Radio Tower (WKZO-TV)
Reed Park
Washington Sch
Hillcrest Sch
Crane Park
Kleinstuck Marsh
Southside Playground
Edgemoor
Tees Pond
Woods Lake
Post Office
Waste Disposal Ponds
Jr High Sch
Oakwood
Kalamazoo Country Club
South Westnedge Sch
South Christian Sch
Monarch Millpond
Milwood Sch
Boomridge
Whites Lake
Lakeside Veterans Home
Mt Ever-Rest Memorial Park
MILHAM PARK


Northern Heights Ch
Kalamazoo Nature Center
Gravel Pits
Gravel Pits
Gravel Pits
Gravel Pits
Radio Tower
Radio Tow (WKZD
MC KINLEY
FAIRVIEW AVE
DOUGLAS
WESTNEDGE
PENN
CENTRAL
Northwood
Trailer Park
Kingdom Hall
Trailer Park
KALAMAZOO
MOSEL AVE
Test Track
Substation
Radio Tower
Dickinson Field
Drive-in Theater
Northglade Sch
Sewage Disposal
Park
BM 802

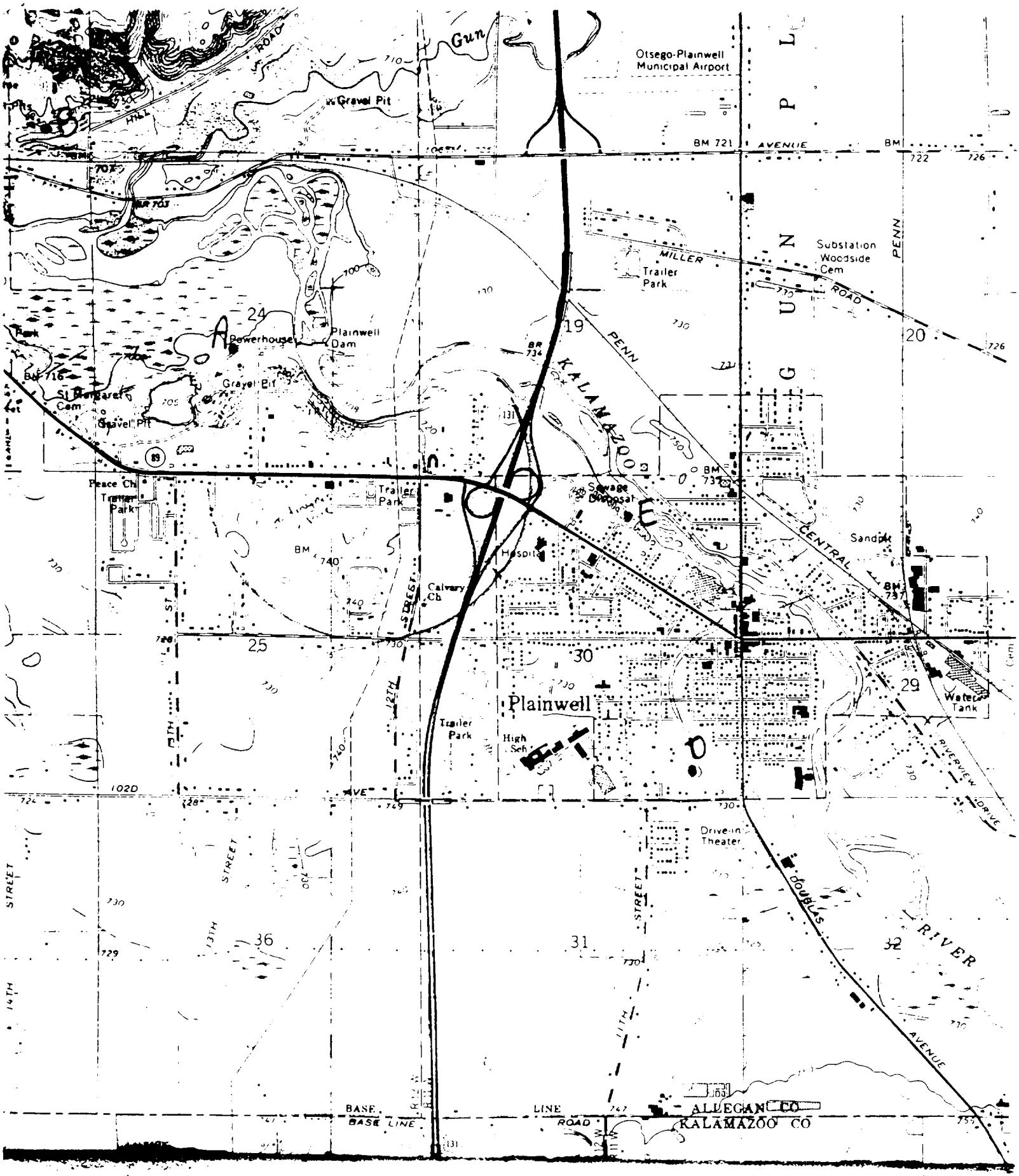


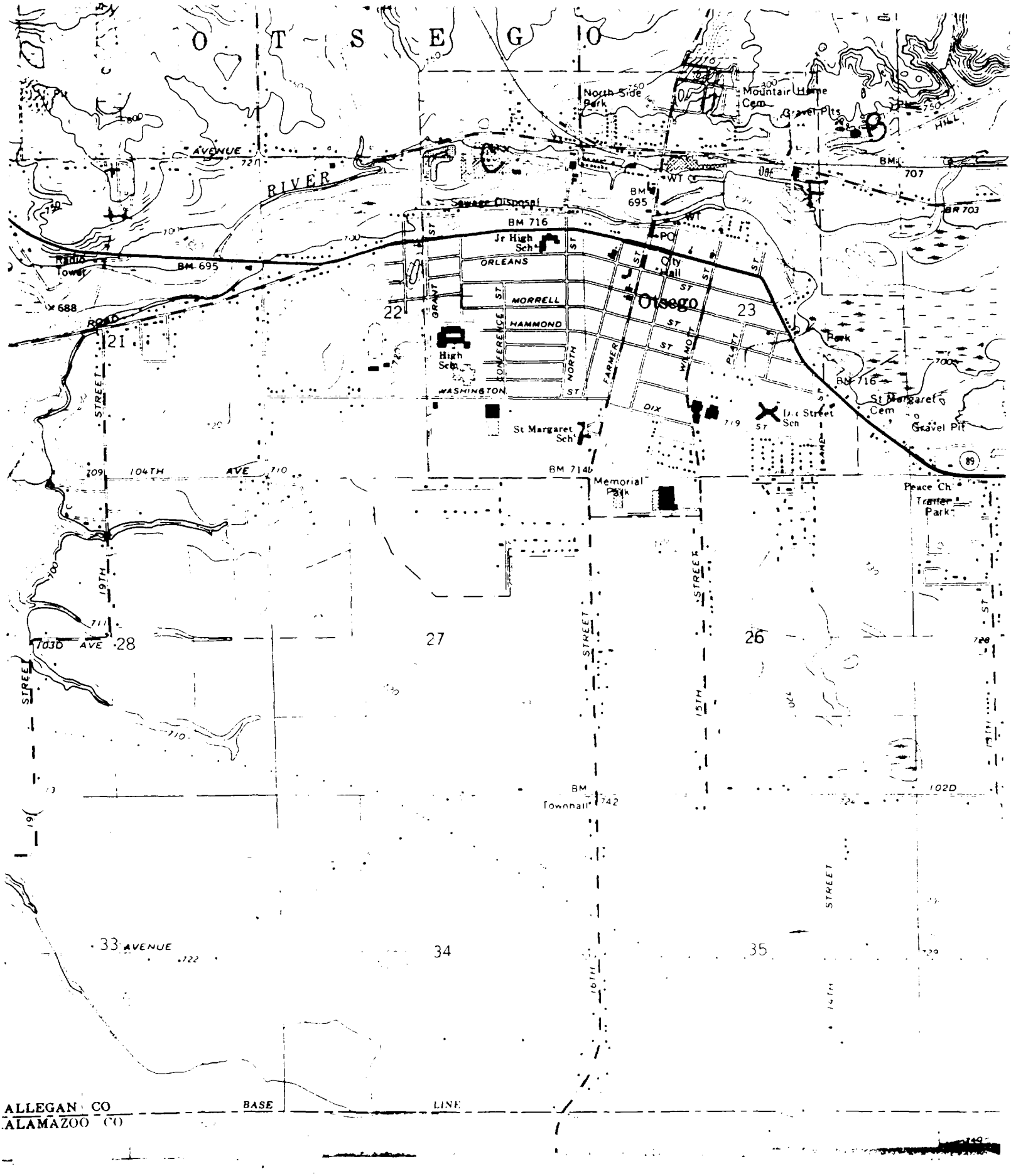
Mapped, edited and published by the Geological Survey in cooperation with State of Michigan agencies

Control by USGS and USC&GS

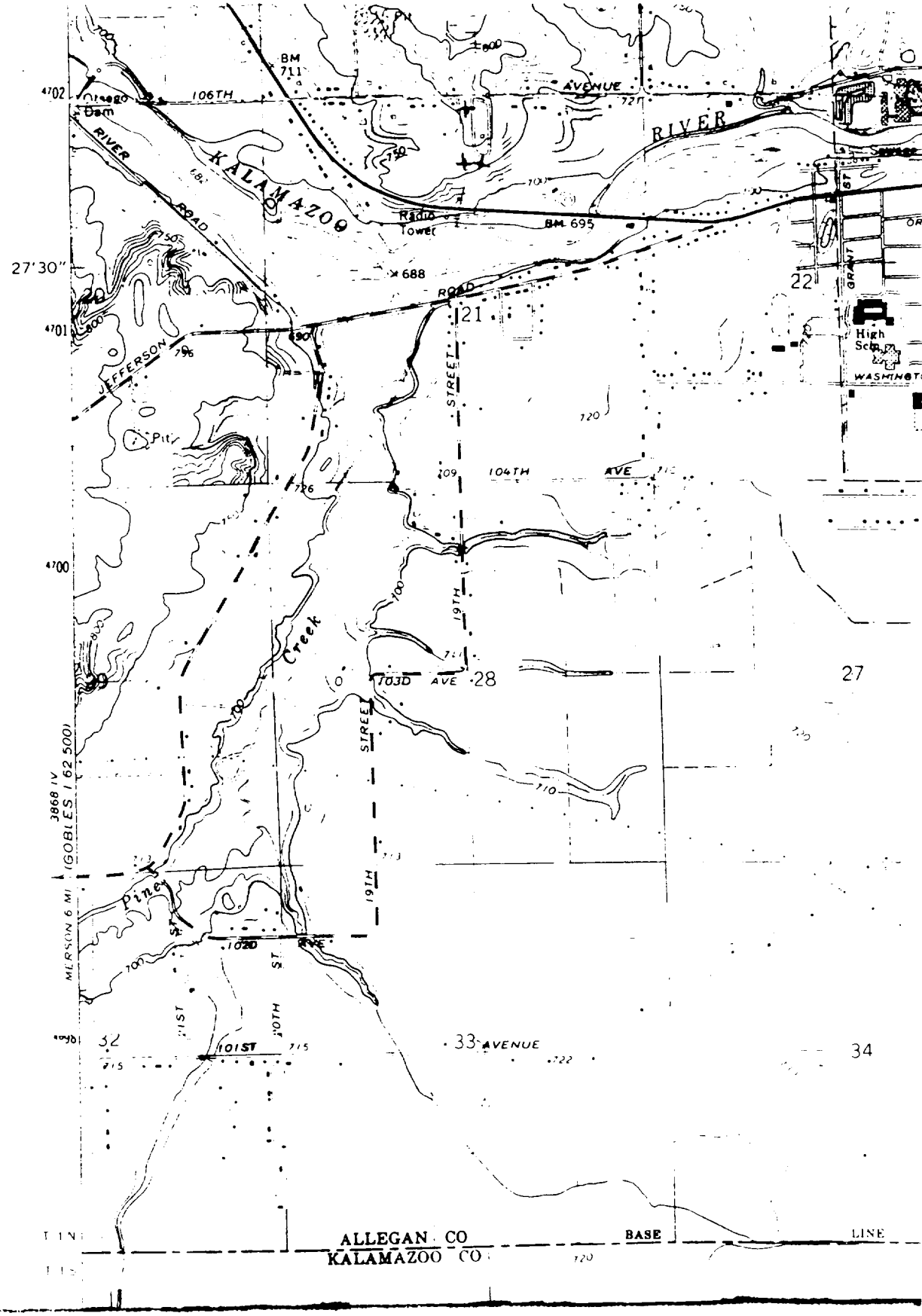
Topography by photogrammetric methods from aerial photographs taken 1965. Field check 1967

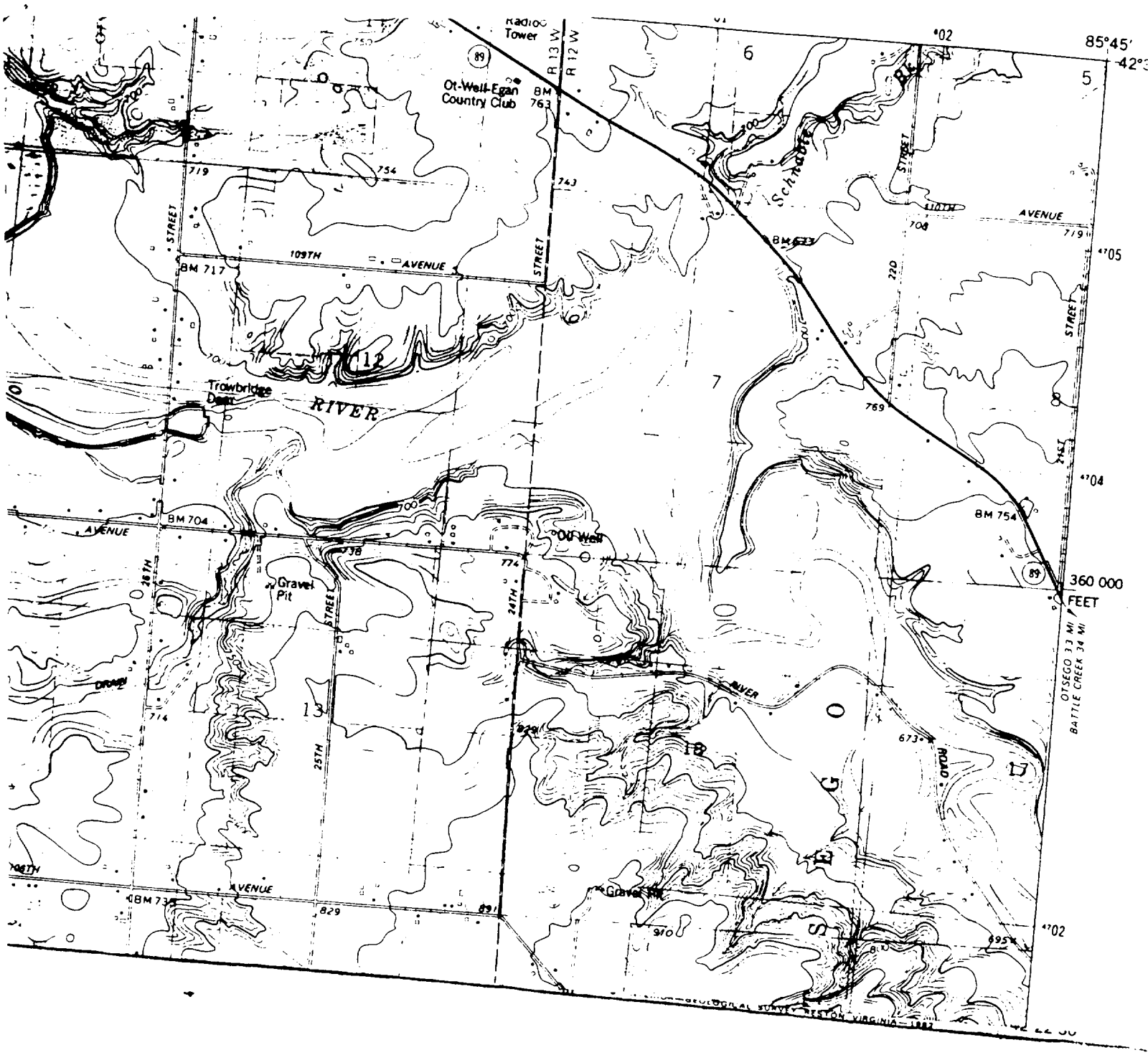
KALAMAZOO SW
3868 I SW

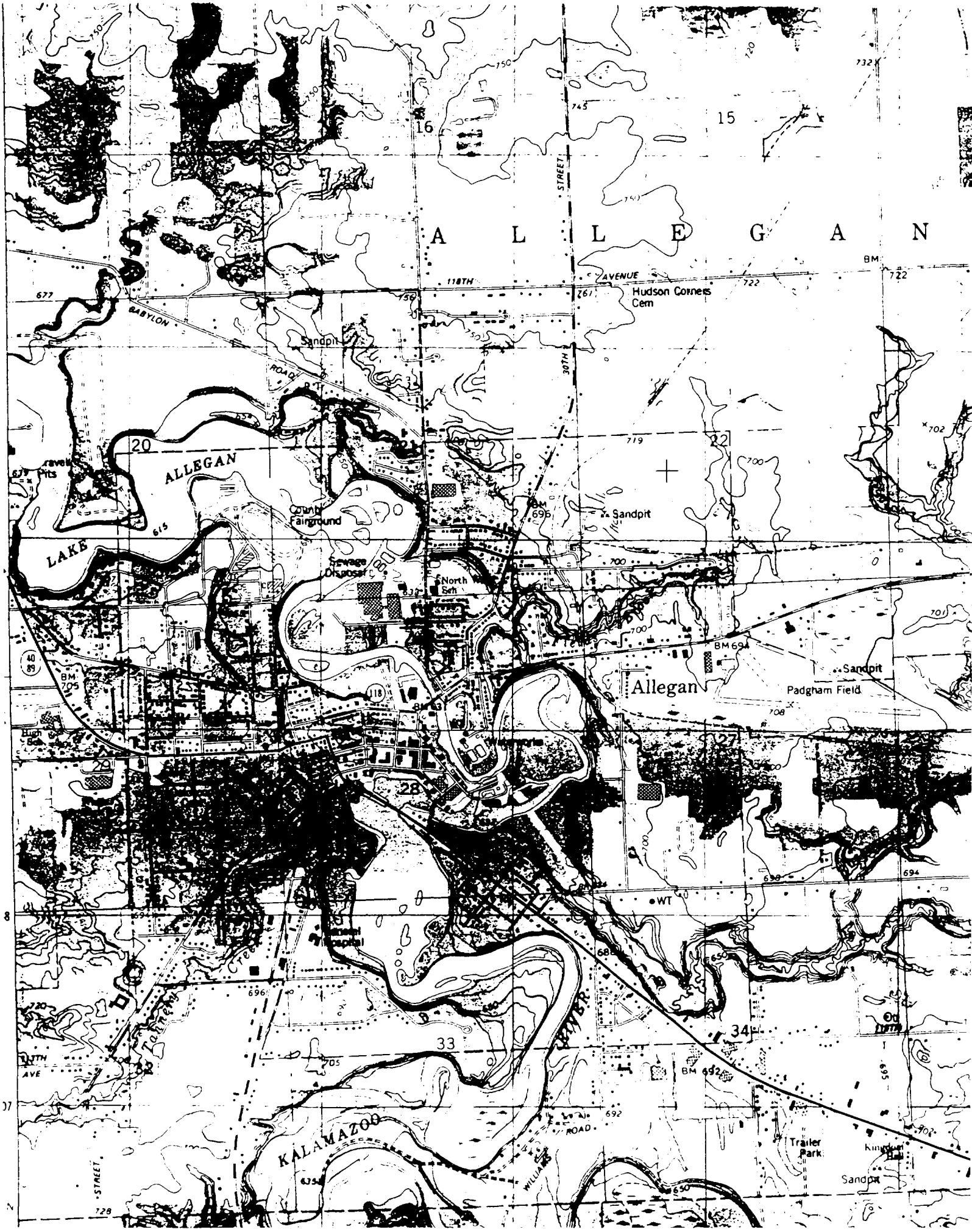

Otsego-Plainwell Municipal Airport
Gun
Gravel Pit
BM 721
AVENUE
BM 722
726
Substation
Woodside Cem
PENN
MILLER
ROAD
Trailer Park
24
19
20
Powerhouse
Plainwell Dam
Gravel Pit
St Margaret Cem
Gravel Pit
KALAMAZOO
PENN
CENTRAL
Peace Ch
Trailer Park
Trailer Park
Sewage Disposal
BM 737
Sandpit
BM 740
Hospital
Calvary Ch
25
30
29
Plainwell
Water Tank
Trailer Park
High Sch
RIVERVIEW
DRIVE
102D
AVE
Drive-in Theater
DOUBLAS
RIVER
36
31
32
AVENUE
BASE LINE
ROAD
ALLEGAN CO
KALAMAZOO CO

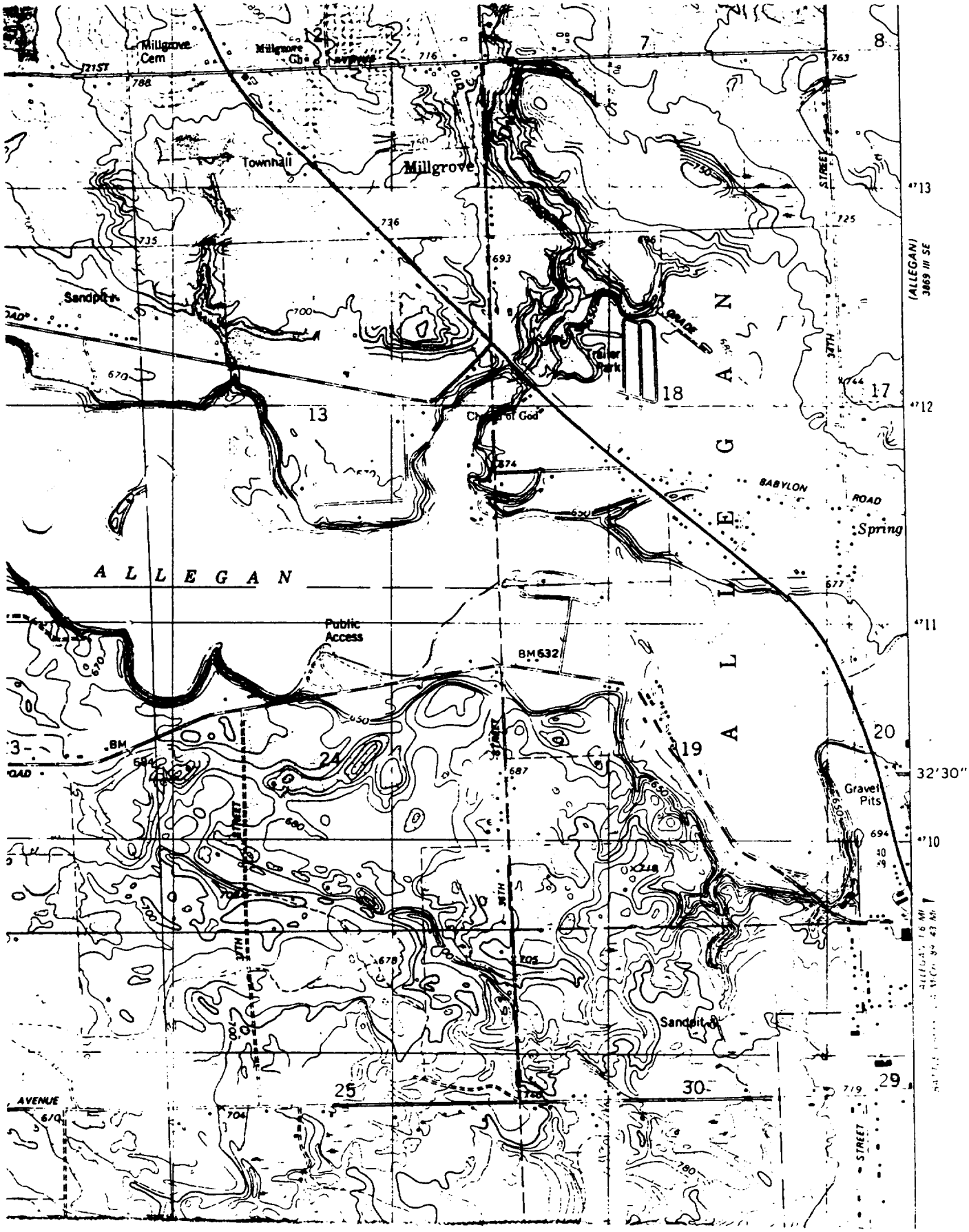

O T S E G O
North Side Park
Mountair Home Cem
Gravel Pits
AVENUE
RIVER
BM 707
BM 695
Sewage Disposal
BM 716
Jr High Sch
ORLEANS
City Hall
Otsego
MORRELL
HAMMOND
High Sch
WASHINGTON
St Margaret Sch
Park
St Margaret Cem
Gravel Pit
Memorial Park
Peace Ch
Trailer Park
104TH AVE
103D AVE
19TH
STREET
15TH
16TH
14TH
Townhall
102D
33 AVENUE
22
23
21
28
27
26
34
35
ALLEGAN CO
ALAMAZOO CO
BASE LINE

otsego city wells X

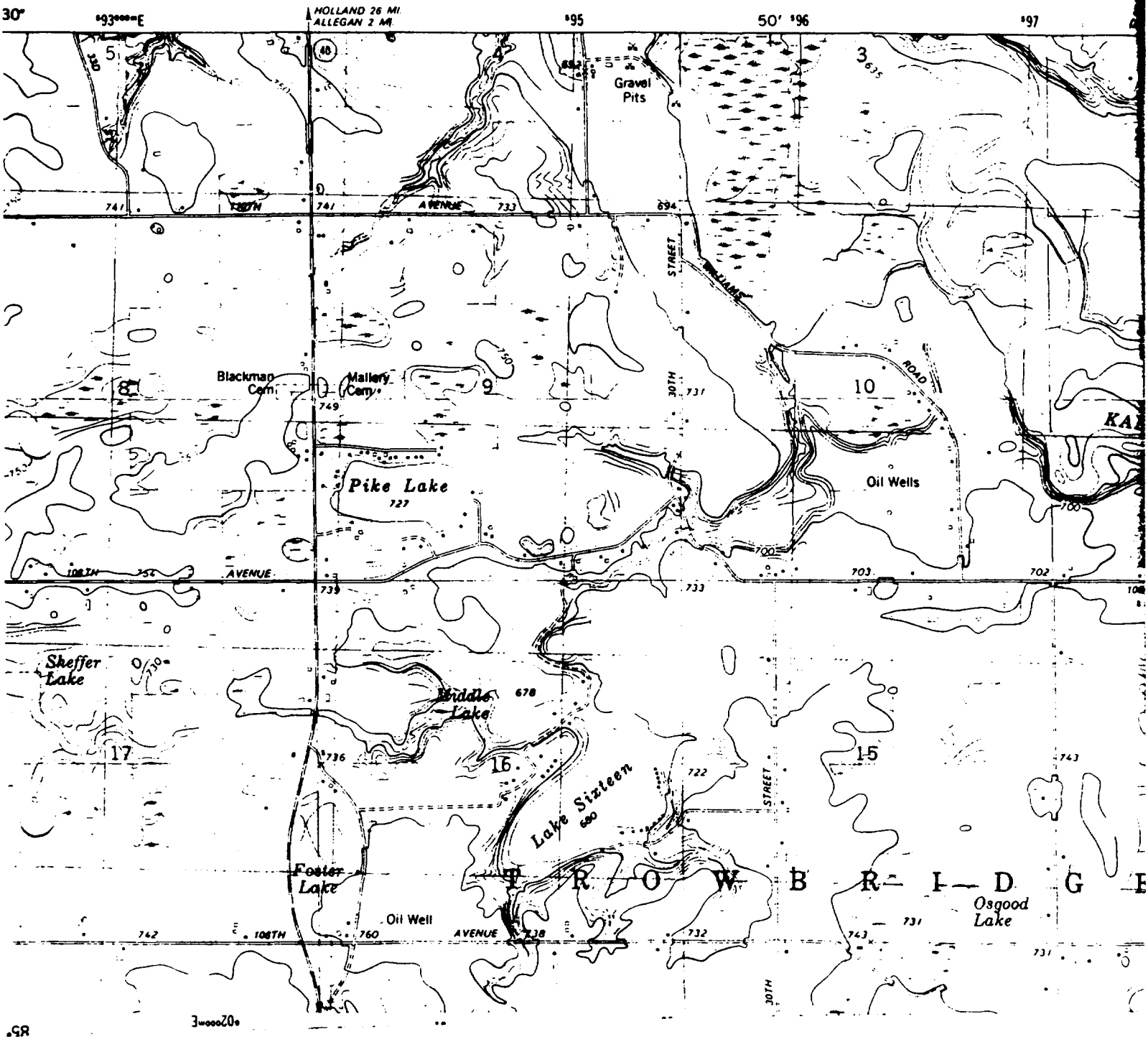


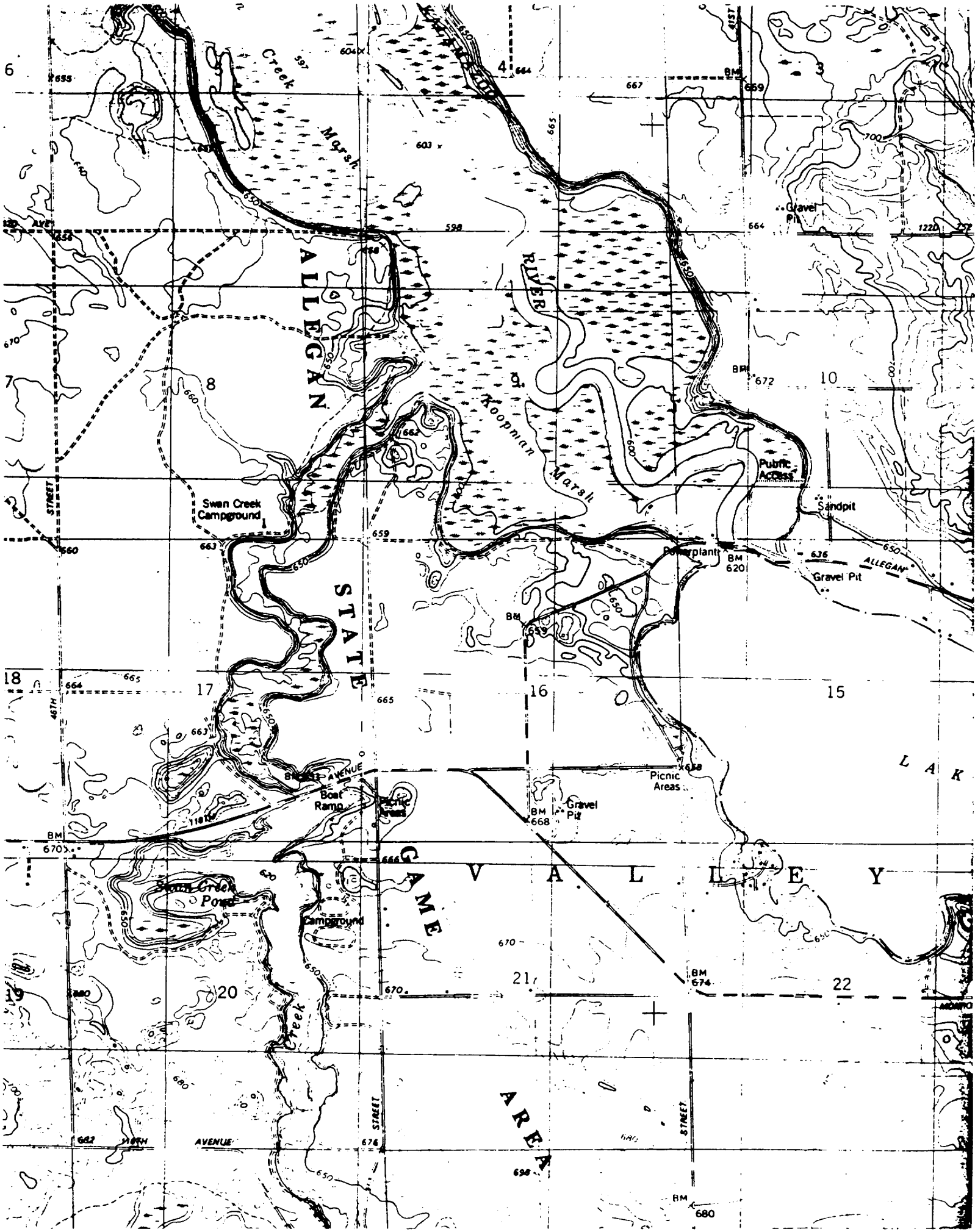

Radio Tower
R 13 W
R 12 W
85°45'
42°
Ot-Well-Egan Country Club
BM 763
89
6
5
719
754
743
STREET
109TH
AVENUE
BM 717
Schadde
BM 673
708
719
705
220
STREET
112
Trowbridge Dam
RIVER
7
769
8
704
BM 704
AVENUE
Oil Well
738
774
BM 754
Gravel Pit
26TH
STREET
24TH
360 000
FEET
DRAIN
714
13
RIVER
829
18
673
ROAD
17
OTSEGO 3.3 MI
BATTLE CREEK 3.4 MI
108TH
AVENUE
BM 735
829
891
Gravel Pit
910
695
702
GEOLOGICAL SURVEY, RESTON, VIRGINIA—1982

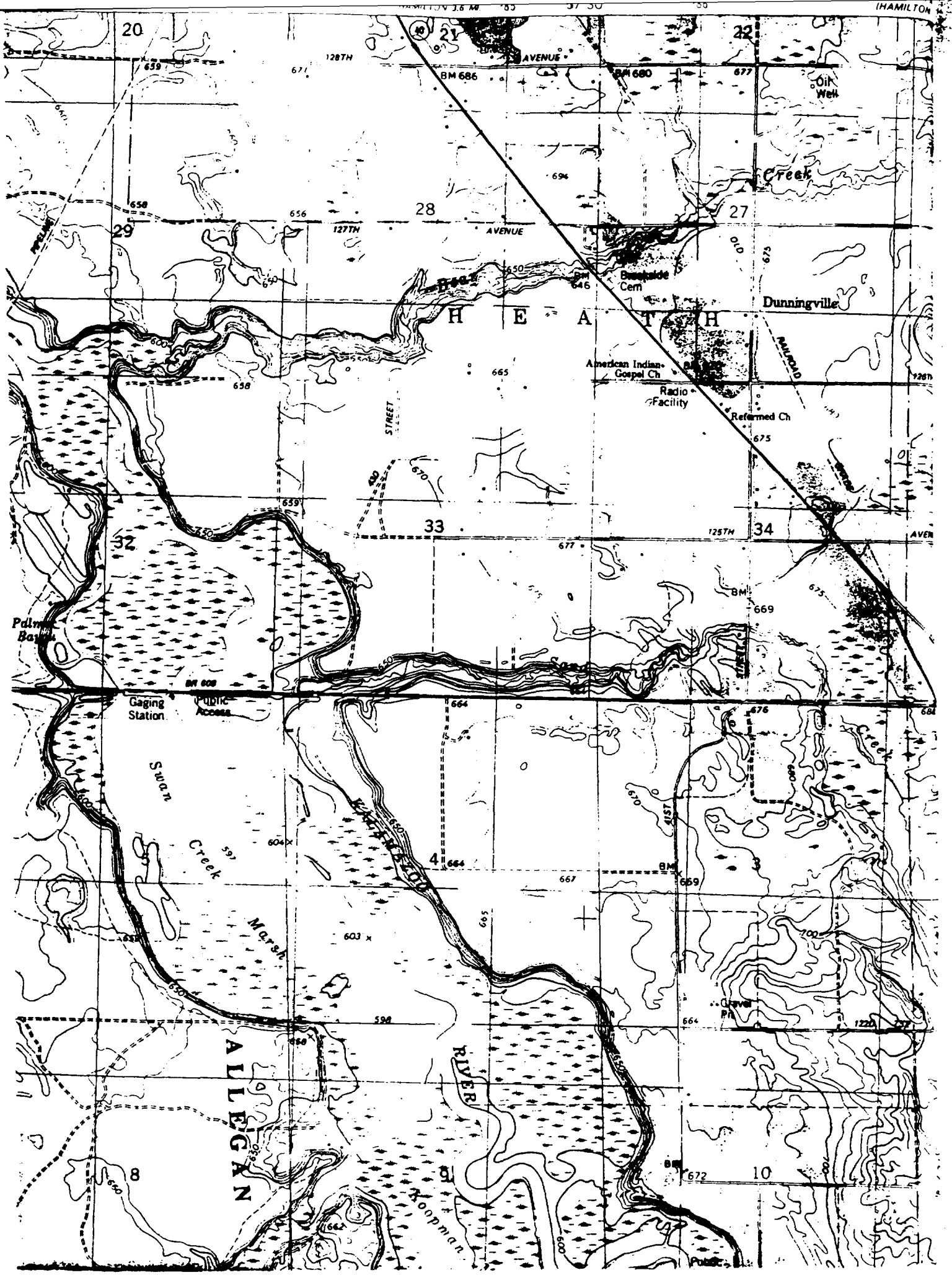

A L L E G A N
16
15
STREET
118TH
AVENUE
Hudson Corners Cem
BABYLON
ROAD
Sandpit
20
21
22
ALLEGAN
LAKE
Pits
County Fairground
Sewage Disposal
North Side
Sandpit
Allegan
Padgham Field
Sandpit
27
28
33
34
WT
Hospital
KALAMAZOO
RIVER
Trailer Park
Sandpit

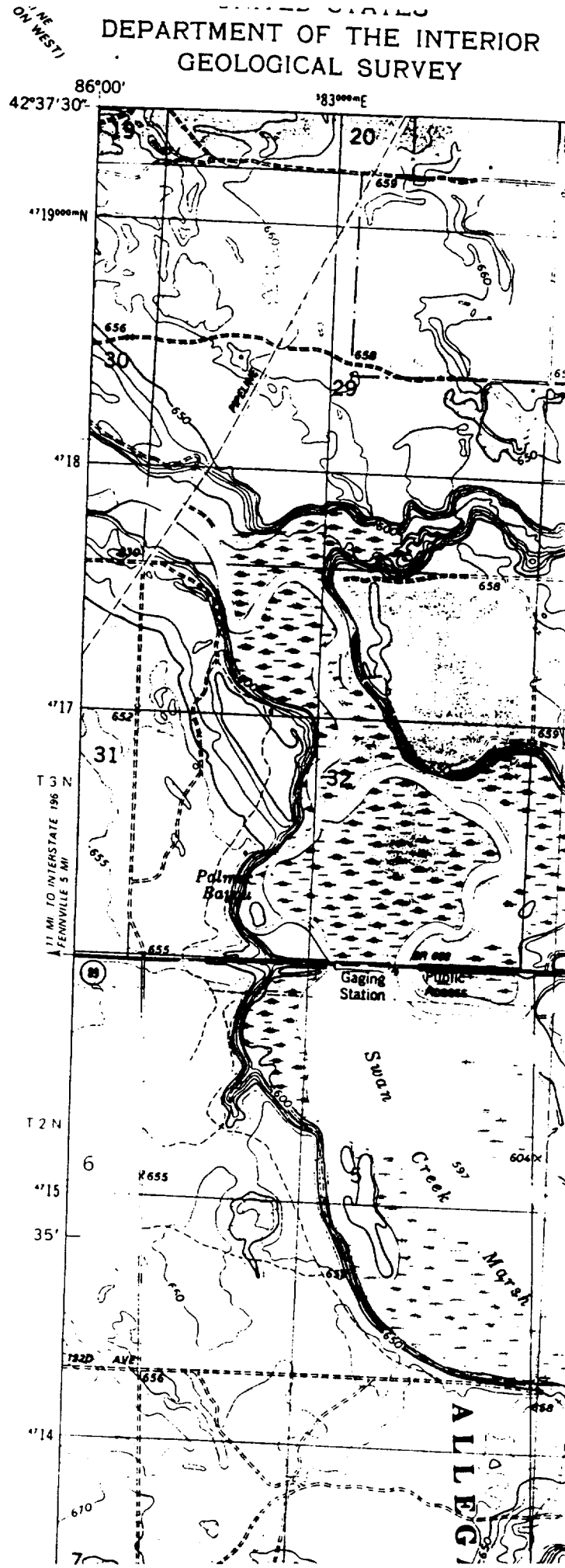

Millgrove Cem
Millgrove Ch
Townhall
Millgrove
Sandpit
Church of God
BABYLON ROAD
Spring
ALLEGAN
Public Access
BM632
Gravel Pits
Sandpit
AVENUE
STREET
(ALLEGAN) 3869 III SE
32'30"

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY




Creek
Marsh
ALLEGAN
RIVER
Koopman
Marsh
Gravel Pit
Public Access
Sandpit
Swan Creek Campground
Powerplant
Gravel Pit
STATE
Picnic Areas
Boat Ramp
Gravel Pit
GAME
V A L L E Y
Swan Creek Pond
Campground
Creek
AREA
STREET
AVENUE
STREET
STREET
NORTH
AVENUE
BM 659
BM 672
BM 620
BM 668
BM 674
BM 680


HAMILTON
20
21
22
128TH
AVENUE
BM 686
BM 680
Oil Well
Creek
28
27
29
127TH
AVENUE
Beaverdale Cem
Dunningville
H E A T H
American Indian Gospel Ch
Radio Facility
Reformed Ch
RAILROAD
STREET
33
34
125TH
32
Palmer Bayou
Gaging Station
Public Access
Swan Creek
Marsh
4
3
Gravel Pit
ALLEGAN
RIVER
Koopman
8
9
10
Public


DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
86°00'
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83000mE
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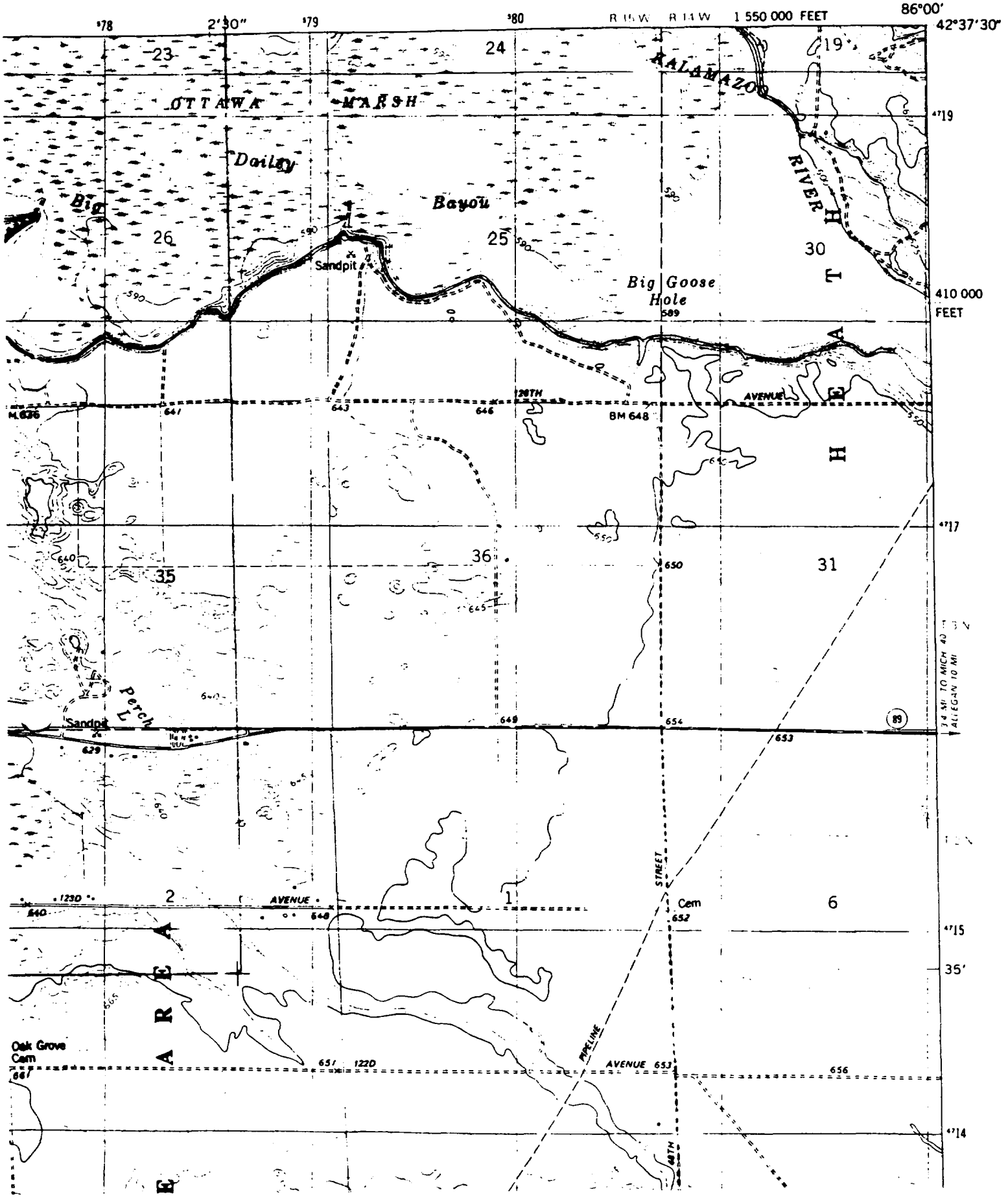
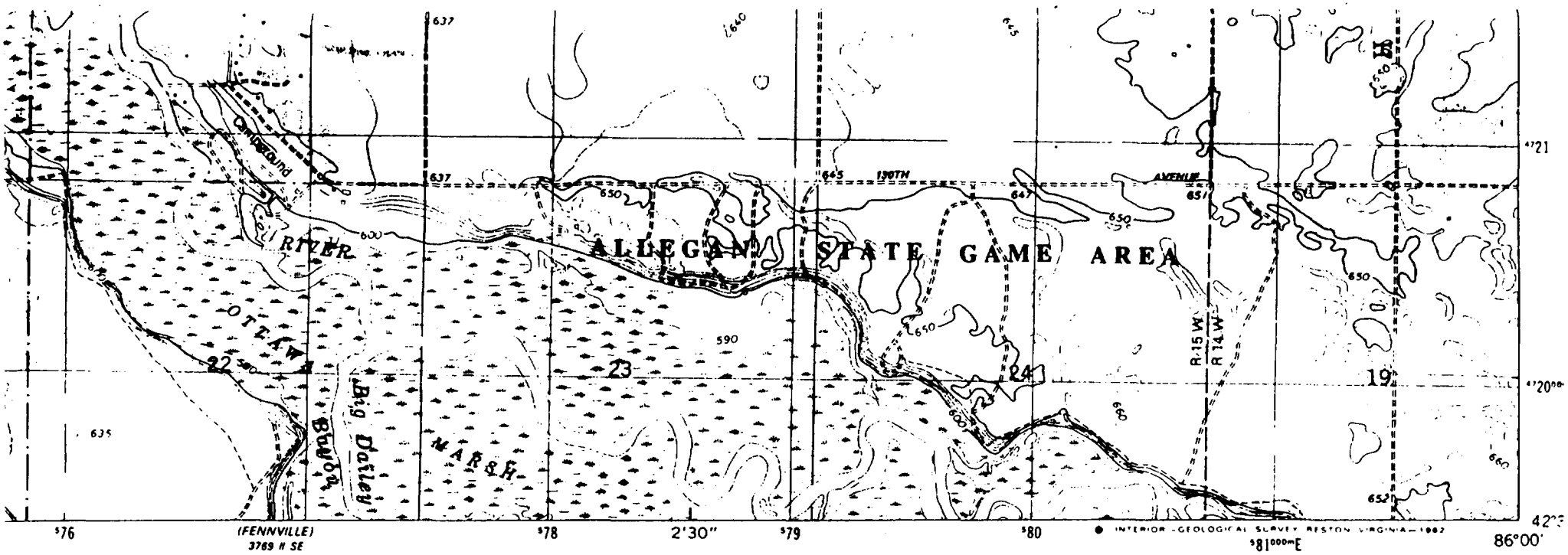
T 3 N
11 MI. TO INTERSTATE 196
FENNVILLE 5 MI
Palmer Bayou
Gaging Station
Public Access
Swan Creek Marsh
T 2 N
6
47 15
35'
132D AVE
47 14
7

FENNVILLE QUADRANGLE
MICHIGAN–ALLEGAN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
SE/4 FENNVILLE 15' QUADRANGLE

3969 II NW (HAMILTON EAST)





SCALE 1:24 000

½ 0 1 MILE

0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
OR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
AND BY THE GEOLOGICAL SURVEY DIVISION
AN DEPARTMENT OF NATURAL RESOURCES, LANSING, MICHIGAN 48909
ER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface

Light-duty road, hard or improved surface

Secondary highway, hard surface

Unimproved road

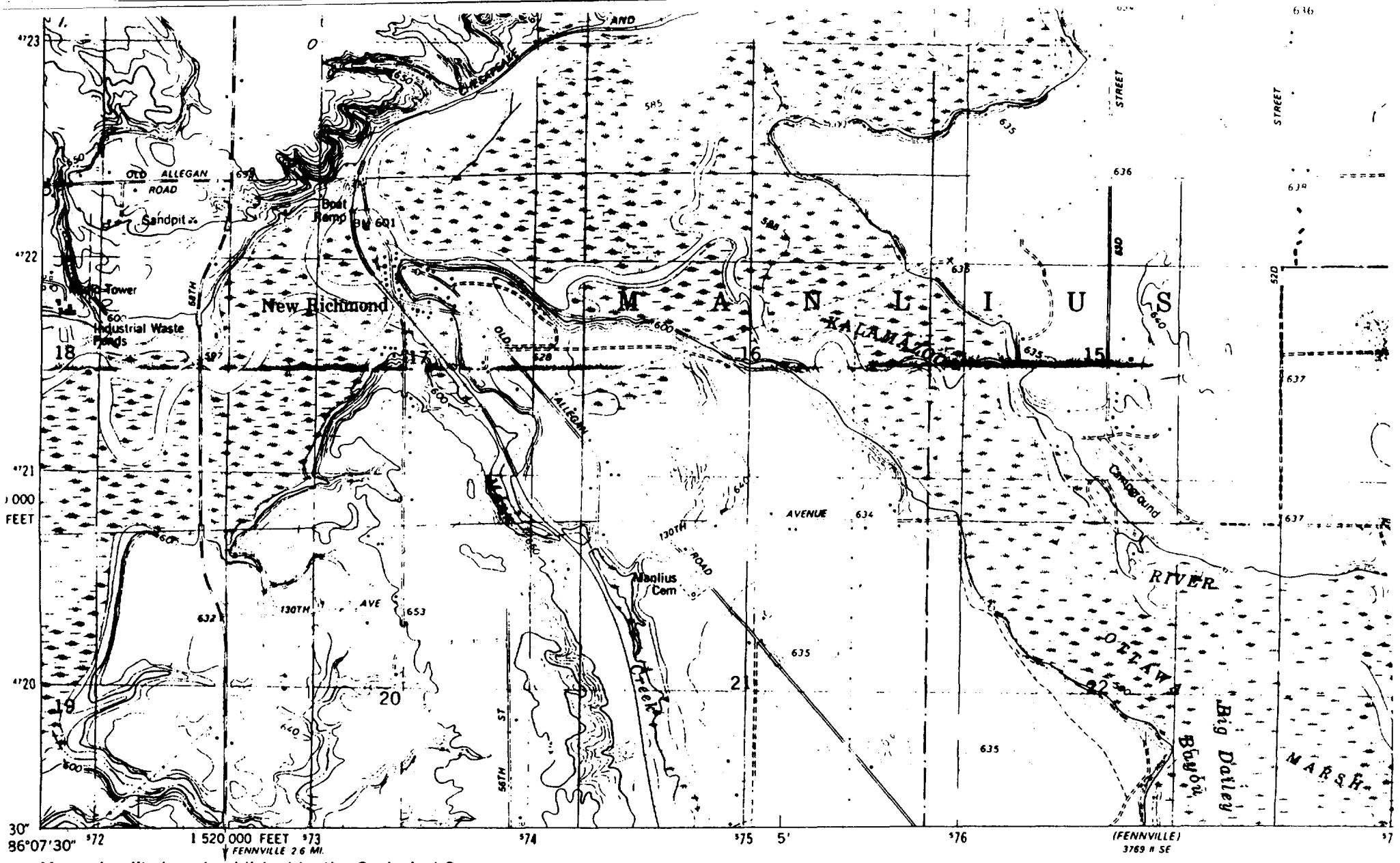
Interstate Route U S Route State Route

HAMILTON WEST, MICH.

NE/4 FENNVILLE 15' QUADRANGLE
N4237.5-W8600/7.5

1981

DMA 3769 II NE-SERIES V862



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1976. Field checked 1978. Map edited 1981

Projection and 10,000-foot grid ticks: Michigan coordinate system, south zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 16
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 1 meter north and 2 meters east as shown by dashed corner ticks

There may be private inholdings within the boundaries of

MN GN
2° 36 MILS
0°38' 11 MILS

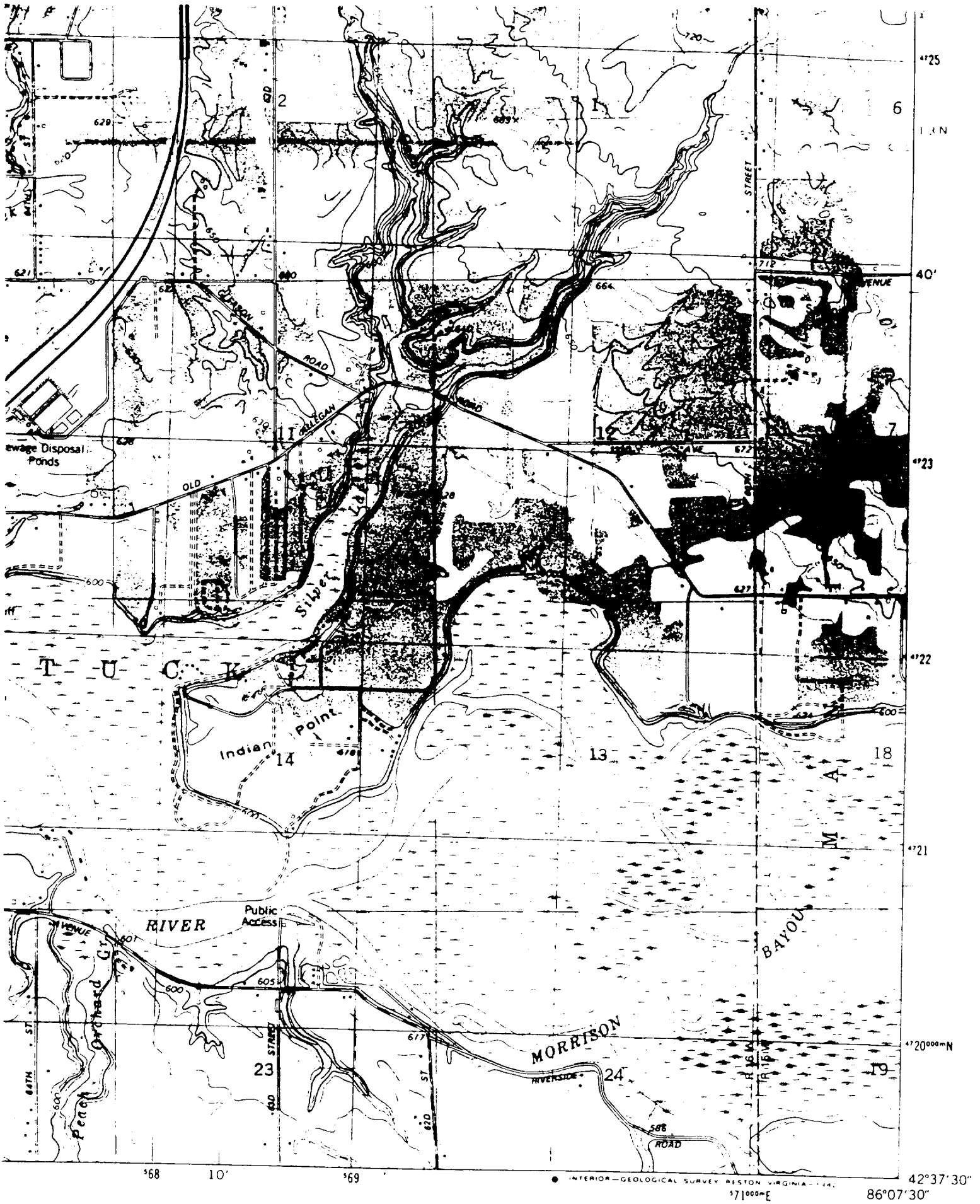
UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0
1000 0 1000 2000 3000 4000 5000 6000
1 .5 0 1 KILO

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
AND BY THE GEOLOGICAL SURVEY DIVISION



1 MILE

0 6000 7000 FEET

1 KILOMETER

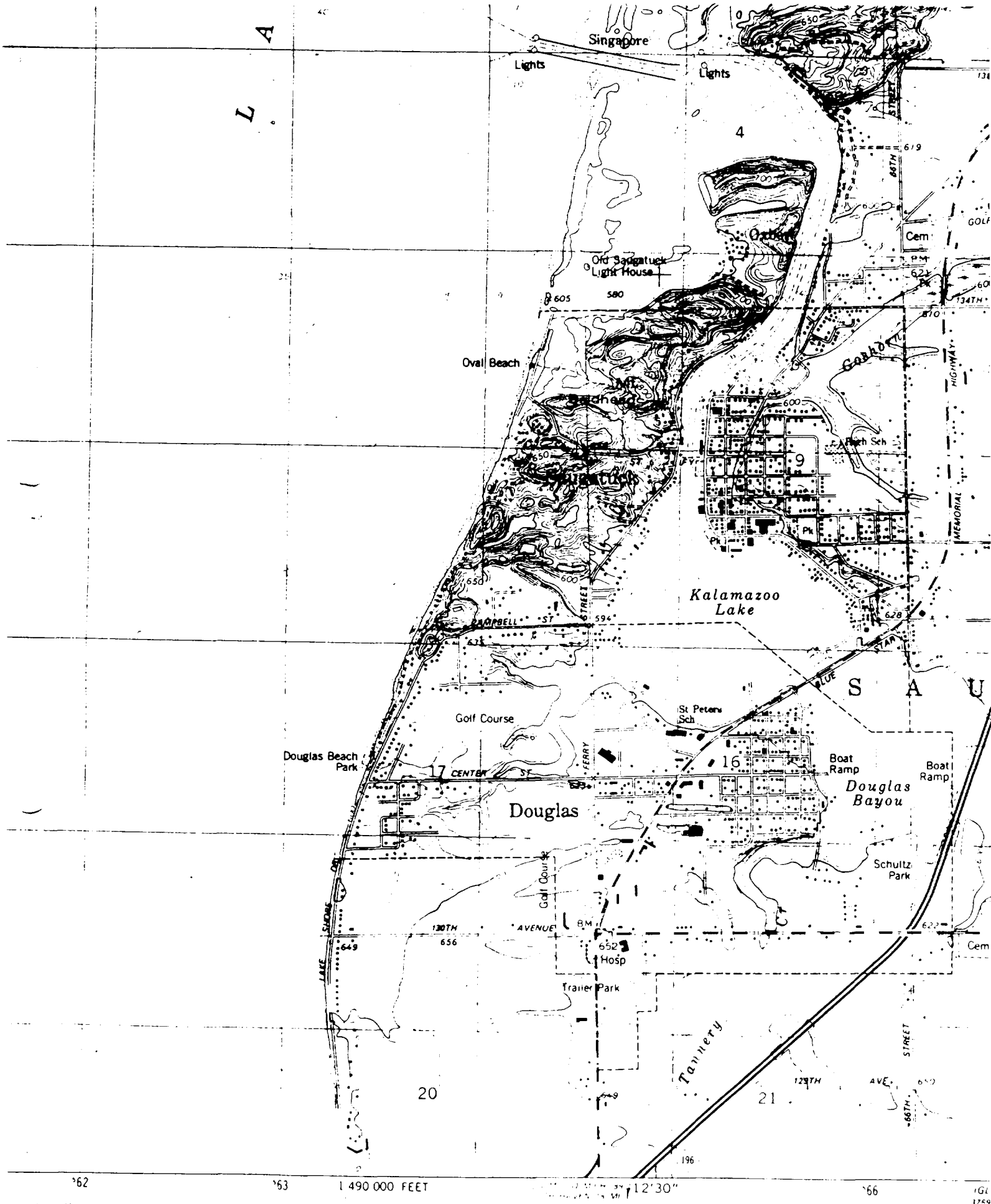
ROAD CLASSIFICATION

Primary highway, hard surface

Light-duty road, hard or improved surface

Secondary highway

(FENNVILLE) 3769 II SE



oped, edited, and published by the Geological Survey

rol by USGS and NOS/NOAA

graphy by photogrammetric methods from aerial photo

Ref. 8

Site Name Allied Paper-Portage Creek-Kalamazoo River

County Kalamazoo + Allegan

CALL LOG

1) Verify Site Location and Size.
2) Verify # and size of each containment structure.
3) Is there existing exposure of people documented?
4) Is the site fenced? Is it secure?
5) If sampling was done, how were samples collected? i.e. random selective, surface grab, composite etc..
6) Has the fire marshall considered the site a fire hazard?
7) What type of companies used the site? (Origin of chemicals)

DATE	AGENCY	PHONE NUMBER	PERSON CONTACTED
10/30/86	Kalamazoo County Agricultural Stabilization + Conservation Services (ASCS)	(616) 327-0940	Linda Mauk

≈ 333.7 acres of farmland spray irrigated with surface water

10/30/86	Allegan County ASCS	(616) 673-6940	Delores

No information available on acreage, but farmers do use surface water for irrigation.

Prepared by: Cherry Wallace

Reg 9 (see p 5)

MACKINAC: Les Cheneaux Channels. Spearing Jan., Feb. only. East and Millecoquin Lakes—no size limit on pike.

MARQUETTE: Dead R. Storage. Michigamme R., Cataract and Tourist Park Basins, Greenwood Res., School, Witch and Michigamme Lakes—no size limit on pike. Peshekee River open to burbot netting by permit Dec. 15-Feb. 28.

MASON: No fishing in Sable R. from Hamlin Dam to mouth between Sept. 15 and Oct. 25 without a fishing permit obtainable at park entrance.

MECOSTA: Haymarsh Lake—no size limit on pike. Horsehead Lake—minimum size limit of 14" on large and smallmouth bass.

MENOMINEE: Westman Impoundment (including North and Hayward lks.)—no size limit on pike. Big Cedar R. open to smelt dipping down from mouth of Elwood Cr., Apr. 10-May 31.

MONROE: Dip net ban on Huron River—See Wayne Co.

MONTMORENCY: Fletcher Pond, Grass Lk., East and West Town Corner lks., Black River and tributaries—No size limit on pike. East Fish, West Fish and Middle Fish lks., Fuller Cr. Pond, Hunt Cr. above Section Z bulkhead and Fuller Cr. in the Hunt Cr. Trout Research Station Area—no fishing. Size restrictions on Little Wolf Lake (See note).

OAKLAND: See Quality Fishing Section.

OGEMAW: Jewett Lk.—fishing by special permit only. May 15-Feb. 28.

OTSEGO: North Twin, South Twin, Lost, West Lost, Ford and Section 4 lks. in Pigeon River Research Area—no fishing. Black R. and tributaries—no size limit on pike.

PRESQUE ISLE: Francis Lk., Ocqueoc R. Watersned, Black R. and tributaries above Tower Dam—no size limit on pike. Grand Lk. Pike Marsh—Unlawful for any person other than state employee to use or operate a motorized vehicle on the access road leading from U.S. 23 to the Grand Lk. Pike Marsh. Shuberts and Clinton Creeks closed to fishing April and May.

ROSCOMMON: L. St. Helen, Backus Cr., Mud Lk. and Little Mud Lk. Waterfowl Flooding—no size limit on pike. Backus Cr. closed March 23-April 30 to fishing from confluence with Cut River upstream to Little Mud Lake Dam. Cut River closed March 23-April 30 to fishing from confluence with Backus Creek upstream to outlet at Marl Lake. Higgins Lk.—16" minimum size limit on all trout and salmon. Houghton Lk.—No spearing.

SCHOOLCRAFT: Big Island Lakes (Big Island, Townline, Mid (Cucumber), Coattail, McInnes, Klondyke, Ned's, Vance, Twilight, Blush, Byers, Bluegill, and connecting waters)—no fishing or spearing Dec. 1-Friday before last Saturday in April, artificial lures only; season closed on Ned's, Mid and Twilight Oct. 1-the day before the last Saturday in April; fishing restricted to artificial lures with single-pointed hooks; size and creel limits: muskellunge and pike, 40" and 1 per day; bass, 18" and 1 per day; trout, 15" and 1 per day; perch, bluegills and pumpkinseed sunfish, 5 per day in any combination, no size limit. Deep, Driggs, Kennedy, Stanley, Straits, McDonald, Thunder and Ross lks., and Seney Wildlife Refuge ponds—No size limit on pike.

SENEY NATIONAL WILDLIFE REFUGE: Limited fishing—check regulations with Refuge office.

WAYNE: Dipnets are banned for the taking of fish in the Huron River from the mouth at Lk. Erie to Flat Rock Dam all year long.

[redacted]

This program receives Federal aid in fish and/or wildlife restoration. Under Title VI of the 1964 Civil Rights Act and Section 504 of the Rehabilitation Act of 1973, the U.S. Department of the Interior prohibits discrimination on the basis of race, color, national origin, or handicap. If you believe that you have been discriminated against in any program, activity, or facility, or if you desire further information regarding Title VI, please write to the Office for Equal Opportunity, U.S. Department of the Interior, Washington, D.C. 20240.

MICHIGAN FISHING GUIDE 1986

[redacted]

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Master Angler Certificates are awarded anglers who catch state-record fish, or one of the top 5 fish of their kind entered during the year. Arm patches are given all entrants whose fish meet established criteria. To be eligible, fish must be weighed on inspected scales, signatures of two witnesses obtained, and pictures taken (in color, with angler holding fish in side view, preferred). For details and entry forms, contact DNR offices listed on page 2. Deadline for entries is Jan. 10.

YES M!CH!GAN FISHING

Inland waters—All waters except the Great Lakes, Lake St. Clair, Saginaw, Detroit, St. Clair and St. Marys rivers.

Great Lakes connecting waters—Lake St. Clair, St. Marys, St. Clair and Detroit rivers. Excluding tributaries.

Trout waters—Trout lake—a lake so designated in which trout are the predominant game fish. See listing in this folder. Trout stream—any stream so designated which contains a significant population of trout or salmon. Generally, fishing is permitted in trout waters only during the regular trout season.

Minnows—Chubs, shiners, dace, stonerollers, muddlers, mudminnows, and suckers of a size used for bait in hook and line fishing.

Landing nets and hand nets—A mesh bag of webbing or wire, suspended from a circular or oval or rectangular frame attached to a handle.

Artificial Fly—Any commonly accepted single- or double-hooked wet or dry fly, streamer or nymph without spinner, spoon, scoop, metal head or any other fishing lure or bait attached. The fly or leader may be weighted.

Artificial Bait—Any commonly accepted lure or fly manufactured in imitation of or as a substitute for natural bait.

Use a net to take a fish within 100 ft. of a dam.

Take fish with firearms, explosives, poisons or methods other than lawful fishing methods.

Plant or import White Amur or live game fish or viable eggs of game fish except under permit from the Department.

Take fish for the sole purpose of removing the eggs.

Deposit fish offal (head, entrails, etc.) or any foreign matter in any waters of the State.

Deposit litter on any lands, private or public.

Fish for any species or possess fishing devices along a closed-to-fishing stream. Possess a spear, gaff, bowarrow along a trout stream at any time. Use a seine for any species other than minnows.

Ice shelters must bear (on all sides) owner's name and address in waterproof letters not less than two inches high and must be removed before ice becomes unsafe. Shelters placed on Lake St. Clair must be removed before February 25. If used after February 25, must be removed daily. **Exception:** Persons who offer for rent 10 or more shanties on Lake St. Clair shall remove them before ice becomes unsafe.

Game and non-game animals, birds and fish, as well as frogs, snakes and turtles, play an important role in nature. They enrich the natural world and add visually and audibly to the pleasures of man. Don't kill or cause any creature to suffer confinement needlessly. A good ethical rule is to never kill what you do not intend to use. Certain species are threatened or endangered and are protected by law.

Fishermen can help in the management of their favorite lake by: 1. Keeping the small to medium-size panfish for food, and by releasing larger ones which help keep the population in balance by predation on the very small ones. 2. Releasing bass except for an occasional "bragging" fish and eating the more plentiful panfish instead.

No person shall in any one day catch, kill or have in possession at any one time more than the daily possession limit, except that a person may have more salmon (see hook & line regulations, Note 7, Page 9). You may transport or ship one day's limit under free permit obtainable at DNR field offices. On public waters, you may not possess mutilated fish that cannot be measured or identified. It is unlawful to possess illegally taken fish. **Fish or parts of fish taken by sport fishing gear and/or under a sports fishing license may not be bought or sold.**

PUBLIC HEALTH ADVISORY

You should be aware that some fish from some locations contain one or more chemical contaminants at levels of public health concern. Mercury, PCB, PBB, DDT, Dieldrin, Chlordane, Toxaphene and Dioxin are contaminants of concern. It should not be assumed that fish from waters which are not listed below are contaminant free. Many lakes and streams have not yet been tested. Even in the locations listed, not all of the fish species in the waterway have been tested in some cases.

As an eating precaution, it is advised that fish be skinned, trimmed, and filleted to remove fatty portions and cooked by baking, barbecuing or broiling on a rack to reduce the level of contaminants in fish.

Based on available monitoring data the following additional precautions are advised:

1. DO NOT EAT ANY FISH caught from: Deer Lake (Carp River and Carp Creek (Marquette County)) and Pine River (downstream from St. Louis), and Shiawassee River (M-59 to Byron Rd.).
2. DO NOT EAT LISTED SPECIES caught from: Kalamazoo River (downstream from Kalamazoo) and Portage Creek (downstream from Milham Park): carp, suckers, catfish and largemouth bass. No more than one meal per week for all other species. Torch Lake (Houghton County): walleye and sauger. Shiawassee River (Byron Rd. to Owosso): carp. Tittabawassee River (downstream from Midland): carp and catfish. Lake Macatawa (Ottawa Co.): carp. Hersey River (downstream from Reed City): bullheads and trout. St. Joseph River (downstream from Berrien Springs Dam): carp. Manistique River (downstream from M-94 C.d. US-2): carp. River Raisin (downstream from Winchester Bridge, Monroe): carp. Lake Michigan*: brown trout, lake trout (over 25"), carp.
3. DO NOT EAT MORE THAN ONE MEAL PER WEEK or 26 pounds per year of fish from the waters listed below:
   Lake Michigan*: catfish, chinook salmon (over 25"), lake trout (all areas), and whitefish (southern half). Lake Huron*: lake trout (all areas), and salmon, trout and muskellunge (southern half). Saginaw Bay*: carp, catfish, salmon and trout. Lake Superior*: (all areas): lake trout. Lake St. Clair and St. Clair River: muskellunge. Detroit River: muskellunge and Belle Isle: carp. Lake Erie (western end): carp, catfish and muskellunge. Lake Michigamme, Michigamme Reservoir, Peavy Pond, Paint River Pond, and the Michigamme River system to its junction with the Menominee River: rock bass greater than 9 inches, northern pike, walleye, smallmouth bass and muskellunge. Cass River (downstream from Bridgeport): carp. Grand River (Clinton County): carp. Saginaw River (entire length): carp. White Lake (Muskegon Co.): carp.

*Advisory also applies to these species migrating into tributary streams to these waters.

NOTE: Nursing MOTHERS, PREGNANT WOMEN, WOMEN WHO ANTICIPATE BEARING CHILDREN, AND CHILDREN AGE 6 AND UNDER SHOULD NOT EAT THE FISH LISTED IN ANY OF THE THREE CATEGORIES LISTED ABOVE.

For further information, call the Center for Environmental Health Sciences hotline 1-800-MI-TOXIC.

November 19, 1986

TO: Galen Kilmer, GQD, Compliance #1 - Plainwell

FROM: Cheryl Wallace, GQD, Remedial Action Section

Enclosed are the materials we sent to EPA concerning the Allied Paper - Portage Creek - Kalamazoo River site. Our main goal is for this site to be included on the National Priority List (superfund). Sorry for the delay is providing you with this information.

cc: George Carpenter, SAU

Cheryl

(Copies were also sent to Jim Akers, KCHD and Richard Eaton, Allied Paper)

November 10, 1986

TO: Valerie Harris, Environmental Enforcement Division

FROM: George Carpenter, Groundwater Quality Division

SUBJECT: Allied Paper, Inc., Kalamazoo County

On October 28, 1986, DNR Groundwater staff met with Allied Paper to show Allied the Site Inspection Report (SI) for Allied Paper-Portage Creek-Kalamazoo River. The SI Report was completed by DNR to meet EPA National Priority List Registration requirements. DNR staff members present were George Carpenter and Cheryl Wallace (Remedial Action Section) and Rich Sadowski (Compliance #1 Section-Plainwell). I contacted you the week prior to the meeting for guidance on conducting the meeting and to extend an invitation to the meeting. You decided not to attend, but provided helpful guidance. Members from Allied were R. Richard Eaton, Martin L. Smith, Jr., Gregory W. Peterson (LTI, Inc.) and Jon F. DeWitt (Attorney at Law). Although verbal comments were made by Allied, it was agreed that written comments shall be sent to Val Harris, Environmental Enforcement Division and to EPA during their Public Comment period.

Information used to complete the SI Report is contained in both Groundwater and Surface Water Divisions files. The primary sources of the information were the Kalamazoo River PCB Project-Kalamazoo and Allegan Counties, Michigan report (NUS) and the Program for Effective Residuals Management for the Allied Paper, Inc., Solid Waste Disposal Facility for Residuals Disposal report (Wilkens & Wheaton). New information was not discussed at the meeting. Copies of the completed SI Report and Hazard Ranking System scoring packet (attached) will be sent to R. Richard Eaton (Allied Paper, Inc.) Jim Akers (Kalamazoo County Health Department), and Galen Kilmer (MDNR-Plainwell).

cc: Cheryl Wallace, SAU, GQD