



The Corporation of the  
Municipality of Wawa

# 2016 Annual Sewage Performance Report



## **Wawa**

Prepared by:  
Water & Sewer Department  
Infrastructure Services

February 2017

**SIGNATURE PAGE**

**Wawa Townsite  
2016 Annual Sewage Performance Report**

**Prepared by: Municipality of Wawa  
Infrastructure Services  
Water & Sewer Department**

\_\_\_\_\_  
**Mark McRae, Water and Wastewater Lead Hand**

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**Date**

**Marc Liard, Water and Wastewater Operator**

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**Received and Reviewed on behalf of  
The Corporation of the Municipality of Wawa**

\_\_\_\_\_  
**Cory Stainthorpe, Director  
Infrastructure Services**

\_\_\_\_\_  
**Date**

**Presented to Council:**

\_\_\_\_\_  
**Date**

**Presentation Confirmed by Resolution**

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# 2016 Annual Sewage Performance Report

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**Appendix A** Metcon Calibration Report

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**Appendix C** Overview of Sewage Lagoons

**Name of Sewage Plant:** Municipality of Wawa Sewage Lagoons

**Address:** Golf Course Road  
Wawa, Ontario  
District of Algoma

**MOE Works Number:** 110000454

**Report Period:** January 01, 2016 to December 31, 2016

**Prepared by:** Municipality of Wawa – Infrastructure Services  
Water & Sewer Department

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- Public access at Town Hall, Notice via the local newspaper (Algoma News Review) and Internet ([www.myalgoma.ca](http://www.myalgoma.ca)).
- Also available on-line on the Municipality of Wawa website @ [www.wawa.cc](http://www.wawa.cc).

## **1.0 Introduction**

### **1.1 Facility Description**

The Wawa Sewage Treatment Plant was constructed in 1986-1987 and officially opened August 09, 1988, in partnership with the Ministry of the Environment, Ministry of Northern Development and Mines, and The Corporation of the Municipality of Wawa.

Wawa Sewage Collection is a Class 2 System, consisting of a gravity feed system with the exception of a forced sewer main at the west end of Government Road. Approximately 20 homes are on the forced main, each home is equipped with a holding tank (consisting of solid side and grey water side) and each with its own sewage pump on the grey water side of the tank, which pumps the grey water into the force main.

Sewage is pumped into the force main to the intersection of Government Road and Tamarack Street, where a gravity sewer system takes over.

The Wawa Sewage Treatment Plant is a Class 1 plant which consists of 2 aeration ponds that are used for primary treatment. Aluminum Sulphate is added at the end of the second aeration pond before going into the polishing ponds to aid in phosphorus removal. Aluminum Sulphate is considered our secondary treatment. Once the treated effluent is transferred into the polishing ponds for a predetermined amount of time, then it is discharged into the Magpie River on a continuous basis.

The Sewage Treatment Plant building is equipped with two blowers for the aeration ponds, two chemical feed pumps for Aluminum Sulphate and a milltronics OCM II (open channel monitor) for data logging. An open channel flow meter is used to monitor treated effluent leaving the aeration system before being transferred to the polishing pond.

**List all sewage treatment chemical used over this reporting period.**

Aluminum Sulphate (Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>) used at the Wawa Sewage Treatment Plant for phosphorus removal.

**Were any significant expenses incurred?**

- Installed required equipment
- Repaired required equipment
- Replaced required equipment

**Please provide a brief description and breakdown of monetary expenses.**

- Replaced all laterals and headers for the aerate system
- Replace both blowers with variable speed blowers
- Drain both cells and desludge cell #1
- Sludge is in geotubes for dewatering and will be tested and then disposed in summer of 2017
- Approximately - \$ 129500.00

**1.2 Certificates**

An Amended Environmental Compliance Approval (#6343-9VLPM9) was issued on July 13, 2015.

**2.0 Monitoring Data**

**2.1 Monitoring Program – Environmental Compliance Approval # 6343-9VLPM9**

**Table 2.1 – Effluent Objectives**

Effluent Parameters	Concentration Objectives
CBOD5	20.0 mg/l
Total Suspended Solids	25.0 mg/l
Total Phosphorus	0.8 mg/l

**Table 2.2 – Effluent Limits**

<b>Effluent Parameters</b>	<b>Average Concentration Limits</b>
CBOD5	25.0 mg/l
Total Suspended Solids	30.0 mg/l
Total Phosphorus	1.0 mg/l

**Table 2.3 – Raw Sewage Monitoring**

<b>Parameters</b>	<b>Sample Type</b>	<b>Frequency</b>
BOD5	Composite	Monthly
Total Suspended Solids	Composite	Monthly
Total Phosphorus	Composite	Monthly
Total Kjeldahl Nitrogen (mg/l)	Composite	Monthly

**Table 2.4 – Aerated Lagoon Cells Content Monitoring**

<b>Parameters</b>	<b>Sample Type</b>	<b>Frequency</b>
Dissolved Oxygen	Grab	Weekly

**Table 2.5 – Final Effluent Monitoring**

<b>Parameters</b>	<b>Sample Type</b>	<b>Frequency</b>
CBOD5	Composite	Weekly
Total Suspended Solids	Composite	Weekly
Total Phosphorus	Composite	Weekly
Total Ammonia Nitrogen	Composite	Weekly
E.coli	Grab	Weekly
Temperature	Grab	Weekly
pH	Grab	Weekly
Unionized Ammonia	Calculated	Weekly

**Table 2.6 – Monthly Raw Sewage Sampling Results**

Date	BOD5 (mg/l)	TSS (mg/l)	TP (mg/l)	TKN (mg/l)
January 2016	60	52.5	2.11	14.8
February 2016	39.8	26.6	1.53	13.2
March 2016	35.7	45.9	1.61	11.9
April 2016	45.3	52.1	1.71	15.4
May 2016	66.0	78.1	2.85	21.4
June 2016	57.0	39.0	2.68	27.2
July 2016	64.0	64.9	2.88	26.2
August 2016	99.0	85.0	2.99	24.2
September 2016	77.0	59.0	2.73	23.6
October 2016	58.0	71.8	2.26	18.6
November 2016	82.0	72.0	2.73	22.2
December 2016	62.0	19.9	2.04	19.7

**Table 2.7 – Weekly Effluent Sampling Results**

Date	CBOD5 (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	E.Coli (MPN/100ml)	Field Temp (*c)	Field pH
Jan. 04, 2016	<2.0	3.2	0.161	5.46	<b>326</b>	N/A	N/A
Jan. 12, 2016	<2.0	<2.0	0.219	6.09	1730	N/A	N/A
Jan. 18, 2016	<2.0	2.0	0.243	6.29	>2430	N/A	N/A
Jan. 25, 2016	2.3	3.7	0.322	6.36	>2430	N/A	N/A
Feb. 01, 2016	2.7	4.2	0.339	7.86	>2420	N/A	N/A
Feb. 08, 2016	3.9	7.2	0.0751	6.63	>2430	2.5	7.25
Feb. 16, 2016	3.7	5.7	0.362	5.70	2420	3.3	6.51
Feb. 22, 2016	5.1	6.9	0.446	6.43	>2420	1.34	7.51

**Table 2.7 – Weekly Effluent Sampling Results (Cont.)**

Date	CBOD5 (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	E.Coli (MPN/100ml)	Field Temp(*c)	Field pH
Feb. 29, 2016	5.6	5.2	0.459	6.27	>2420	1.29	7.22
Mar. 07, 2016	5.7	7.6	0.458	5.86	>2420	1.23	7.34
Mar. 14, 2016	5.1	7.6	0.410	5.94	>2420	1.58	7.37
Mar. 21, 2016	4.7	9.5	0.298	5.55	1300	1.89	7.10
Mar. 29, 2016	4.0	6.4	0.218	4.50	36	2.40	7.38
Apr. 04, 2016	3.5	8.5	0.239	4.59	101	2.23	7.29
Apr. 11, 2016	2.9	2.7	0.271	4.48	63	2.87	7.34
Apr. 18, 2016	2.8	5.9	0.234	3.94	3	4.53	7.48
Apr. 25, 2016	<2.0	3.7	0.16	1.85	1	4.82	7.40
May 02, 2016	2.6	4.8	0.069	0.194	<1	11.6	9.20
May 09, 2016	2.2	7.2	0.073	0.098	<1	12.4	8.10
May 16, 2016	<2.0	3.2	0.0457	<0.020	1	12.6	8.55
May 24, 2016	2.1	2.3	0.55	0.040	<1	17.54	9.79
May 30, 2016	<2.0	<2.0	0.058	0.032	<1	17.75	9.33
June 06, 2016	<2.0	3.6	0.062	0.129	4	18.1	9.14
June 13, 2016	<2.0	<2.0	0.131	0.053	<1	16.6	9.64
June 20, 2013	<2.0	<2.0	0.068	0.113	5	17.1	9.31
July 04, 2016	<2.0	<2.0	0.041	0.028	<1	20.28	9.70
July 11, 2016	<2.0	2.1	0.051	0.023	<1	21.82	9.66
July 18, 2016	3.2	2.0	0.056	0.042	2	21.18	9.77
July 25, 2016	2.4	3.7	0.051	0.179	1	21.07	9.69
Aug. 02, 2016	<2.0	3.8	0.049	0.043	1	32.85	9.08
Aug. 08, 2016	<2.0	7.1	0.073	0.096	1	22.10	9.11
Aug. 15, 2016	2.1	2.8	0.057	0.111	2	22.61	9.69
Aug. 22, 2016	2.1	2.3	0.0564	0.109	3	23.1	9.70
Aug. 29, 2016	2.1	5.6	0.068	0.043	<1	24.1	9.71



**Table 2.7 – Weekly Effluent Sampling Results (Cont.)**

<b>Date</b>	<b>CBOD5 (mg/l)</b>	<b>TSS (mg/l)</b>	<b>TP (mg/l)</b>	<b>TAN (mg/l)</b>	<b>E.Coli (MPN/100ml)</b>	<b>Field Temp(*c)</b>	<b>Field pH</b>
Sept. 07, 2016	<2.0	2.3	0.056	0.135	<1	23.0	9.97
Sept. 12, 2016	<2.0	4.2	0.082	0.100	11	22.8	9.93
Sept. 19, 2016	2.5	3.1	0.056	0.124	15	21.6	9.82
Sept. 26, 2016	2.2	3.0	0.027	0.100	15	22.4	9.72
Oct. 03, 2016	<2.0	4.5	0.063	1.48	<1	19.7	9.14
Oct. 11, 2016	<2.0	4.4	0.0412	1.58	10	19.4	9.84
Oct. 17, 2016	<2.0	12.0	0.0624	2.03	1	10.46	7.56
Oct. 24, 2016	2.3	3.5	0.0493	2.14	1	10.68	8.01
Oct. 31, 2016	2.4	<2.0	0.0438	2.81	<1	9.42	8.12
Nov. 07, 2016	<2.0	2.3	0.048	2.64	<1	N/A	N/A
Nov. 14, 2016	<2.0	2.6	0.0310	2.21	<1	N/A	N/A
Nov. 21, 2016	2.7	4.8	0.0295	3.50	<1	N/A	N/A
Nov. 30, 2016	<2.0	<2.0	0.0453	4.72	<1	N/A	N/A
Dec. 05, 2016	<2.0	<2.0	0.070	5.77	<1	2.5	7.18
Dec. 12, 2016	<2.0	3.8	0.113	6.64	<1	4.22	7.68
Dec. 19, 2016	<2.0	<2.0	0.165	7.87	2	3.46	7.83

**Table 2.8 – Weekly Dissolved Oxygen Sampling Results**  
**(From January 01 to June 20 we measured in percentage**  
**and from \*June 27 to December 31 we measured in mg/l)**

<b>Date</b>	<b>Cell #1</b>	<b>Cell #2</b>
January 04, 2016	8.2%	6.1%
January 12, 2016	8.3%	6.8%
January 18, 2016	5.5%	4.2%
January 25, 2016	4.5%	5.4%
February 01, 2016	4.6%	3.6%
February 08, 2016	3.4%	12.9%
February 16, 2016	3.6%	4.1%

**Table 2.8 – Weekly Dissolved Oxygen Sampling Results (Cont.)**

<b>Date</b>	<b>Cell #1</b>	<b>Cell #2</b>
February 22, 2016	4.2%	2.1%
February 29, 2016	5.9%	3.6%
March 07, 2016	3.2%	3.0%
March 14, 2016	3.4%	3.7%
March 21, 2016	6.0%	6.3%
March 29, 2016	6.4%	5.8%
April 04, 2016	6.2%	6.0%
April 11, 2016	6.8%	6.1%
April 18, 2016	6.1%	7.3%
April 25, 2016	6.0%	6.9%
May 02, 2016	13.2%	13.0%
May 09, 2016	11.6%	12.4%
May 14, 2016	11.0%	12.8%
May 24, 2016	12.6%	6.1%
May 30, 2016	10.8%	6.3%
June 06, 2016	11.2%	6.4%
June 13, 2016	10.3%	8.3%
June 20, 2016	10.9%	8.7%
* June 27, 2016	1.10 mg/l	1.28 mg/l
July 04, 2016	0.76 mg/l	1.34 mg/l
July 11, 2016	0.30 mg/l	1.02 mg/l
July 18, 2016	0.99 mg/l	5.8 mg/l
July 25, 2016	0.87 mg/l	1.79 mg/l

**Table 2.8 – Weekly Dissolved Oxygen Sampling Results (Cont.)**

<b>Date</b>	<b>Cell #1</b>	<b>Cell #2</b>
Aug.02, 2016	0.27 mg/l	offline
Aug08, 2016	0.38 mg/l	offline
Aug.15, 2016	0.31 mg/l	offline
Aug.22, 2016	0.34 mg/l	offline
Aug.29, 2016	0.60 mg/l	offline
Sept.07, 2016	offline	0.45 mg/l
Sept.12, 2016	offline	0.44 mg/l
Sept.19, 2016	offline	6.24 mg/l
Sept.26, 2016	offline	5.18 mg/l
Oct.03, 2016	offline	5.69 mg/l
Oct.11, 2016	offline	5.52 mg/l
Oct.17, 2016	offline	5.42 mg/l
Oct.24, 2017	offline	5.50 mg/l
Oct.31, 2016	offline	offline
Nov.07, 2016	offline	offline
Nov.14, 2016	offline	offline
Nov.21, 2016	offline	offline
Nov.30, 2016	offline	offline
Dec.05, 2016	1.22 mg/l	3.15 mg/l
Dec.12, 2016	1.69 mg/l	14.37 mg/l
Dec.19, 2016	1.75 mg/l	12.67 mg/l

**During the summer and fall some of the readings were not done because of draining and filling of cell #1 and cell #2.**

**Table 2.9 – Summary Weekly Effluent Sampling Results**

Parameters	Average	Maximum	Objective Limits	Compliance Limits
CBOD5 (mg/l)	2.61	5.7	20.0	25.0
Total Suspended Solids (mg/l)	4.18	12	25.0	30.0
Total Phosphorus (mg/l)	0.149	0.459	0.8	1.0

**Table 2.10 – Summary Weekly Dissolved Oxygen Results**

Cell number	Average %	Maximum %	Average mg/l	Maximum mg/l
Cell # 1	7.35	13.2	0.81	1.75
Cell # 2	6.99	13.0	4.74	14.37

## 2.2 Description of Parameters

**BOD5** – (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogen oxygen demand.

**TSS** – (Total Suspended Solids) are solid organic and inorganic materials that hang below the water surface. Suspended solids, in layman’s terms, are similar to stirring up the sand near the shore of a lake. The water turns cloudy from the suspended solids. Total suspended solids must be coarse enough to be trapped by a coffee filter.

**TP** – (Total Phosphorus) refers to the amount of phosphorus in a sample. Excess TP stimulates algae and weed growth that may cause fluctuations in dissolved oxygen in the receiving waters.

**TKN** - (Total Kjeldahl Nitrogen) is the total concentration of organic nitrogen and ammonia.

**CBOD5** – means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measure in an unfiltered sample.

**TAN** – (Total Ammonia Nitrogen) Ammonia exists in two forms in the water:  $\text{NH}_3$  ( this is called unionized ammonia )  $\text{NH}_4^+$  ( this is called ionized ammonia ) Together, these two forms of ammonia are called TAN which means total ammonia nitrogen.  $\text{NH}_3$  is the principal form of toxic ammonia.

**E.coli** – (*Escherichia coli*) is commonly regarded as one of first microorganisms of choice in water and wastewater quality monitoring programs and serves as the primary indicator for water contaminated with fecal matter due to their prevalence in the gut of warm-blooded animals as well as high numbers excreted in both human and animal.

**PH** - is a measure of how acidic/basic water is. The range goes from 0 - 14, with 7 being neutral. PH's of less than 7 indicate acidity, whereas a PH of greater than 7 indicates a base. PH is really a measure of the relative amount of free hydrogen and hydroxyl ions in the water.

**Unionized Ammonia** – it is the calculation using total ammonia concentration, PH and temperature using the methodology stipulated in "Ontario Provincial Water Quality Objectives".

**Dissolved Oxygen** - (DO) refers to microscopic bubbles of gaseous oxygen (O<sub>2</sub>) that are mixed in water and available to aquatic organisms for respiration—a critical process for almost all organisms. Primary sources of DO include the atmosphere and aquatic plants.

### **2.3 Summary of Parameters**

In 2016, the effluent from the Wawa Sewage Treatment Facility was within the compliance limits listed in the Environmental Compliance Approval # 6343-9VLP9. The average and maximum sampling results is listed in tables 2.13 of this report and the maximum and average dissolved oxygen is listed in table 2.14.

### 3.0 Summary of Flow Data for 2016

The Wawa Sewage Treatment Plant continuously discharges to the Magpie River with a yearly average of 2507 m<sup>3</sup>/day, which is 58% of the Sewage Plant capacity. The maximum daily flow for 2015 was 4913 m<sup>3</sup>/day which happened in April 2015. Below is a summary of monthly minimum, average and maximum flows.

**Table 3.1 - Effluent Flow - Plant Rated Capacity (m<sup>3</sup>/day): 4300**

	<b>Minimum Flow (m<sup>3</sup>/day)</b>	<b>Average Flow (m<sup>3</sup>/day)</b>	<b>% of Plant Capacity</b>	<b>Maximum Flow (m<sup>3</sup>/day)</b>	<b>Total Flow (m<sup>3</sup>)</b>
<b>January</b>	2850	3297	76	3961	102232
<b>February</b>	2904	3441	80	4013	99805
<b>March</b>	2972	3498	81	4348	108468
<b>April</b>	2264	3150	73	3924	94500
<b>May</b>	1856	2364	55	3979	73288
<b>June</b>	1775	2101	48	3459	63059
<b>July</b>	1492	2268	52	2915	69032
<b>August</b>	1895	2155	50	2723	66826
<b>September</b>	721	1631	37	2780	48947
<b>October</b>	709	1821	42	3815	56481
<b>November</b>	420	1373	31	2362	41212
<b>December</b>	1244	1840	42	2427	57048

**Table 3.2 - Summary of Effluent Flow**

<b>Minimum Flow</b>	<b>Average Flow</b>	<b>Average % of Plant Capacity</b>	<b>Maximum Flow</b>	<b>Total Flow</b>
420	2411	55.5	4348	880898

#### **4.0 Calibrations**

The calibration on the open channel flow meter OCM II was performed by Metcon Sales and Engineering Limited on September 27, 2016. This flow meter is calibrated for accuracy yearly. The calibration report is under **Appendix A**.

#### **5.0 Complaints**

Over the period of 2016, the Municipality did not receive any complaints of odours emitting from the sewage lagoons.

# **APPENDIX A**

**Metcon**

**Calibration**

**Report**



# **APPENDIX B**

## **Environmental Compliance**

### **Approval**

**# 6343-9VLPM9**

# **APPENDIX C**

## **Overview of Sewage Lagoons**

Scale	1" = 100'
Sheet No.	1
Project No.	1000
Date	1950

Author	U.S. Army Corps of Engineers
Checked	
Approved	

The Department of the Army  
 Engineer Division  
 Corps of Engineers  
 (Civil Works Division)  
 Washington, D.C.

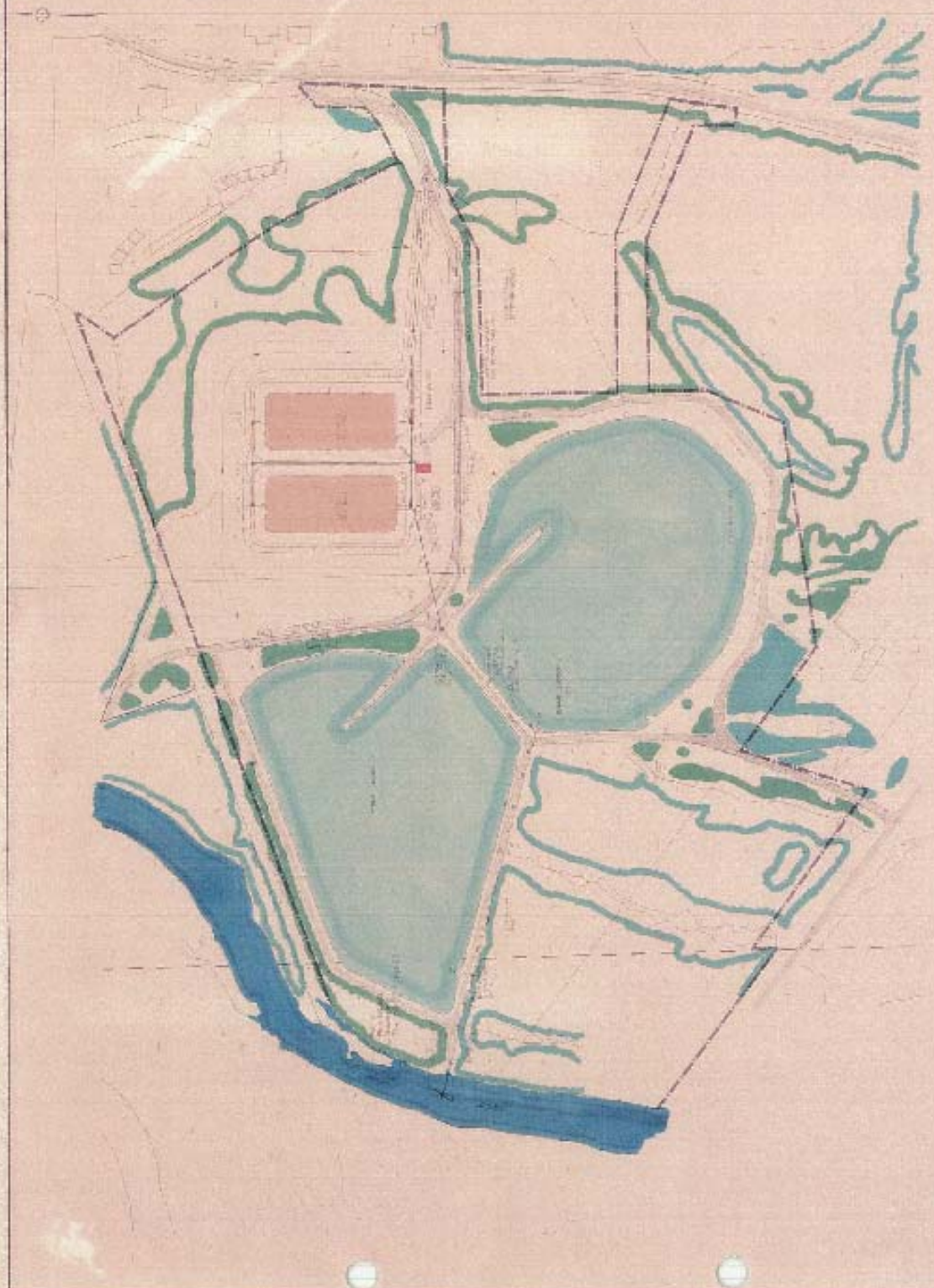


GENERAL

GENERAL  
 PLAN



Sheet No.	1
Project No.	1000
Date	1950



U.S. Army Corps of Engineers  
 Engineer Division  
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