



# Fremont Township Water Quality Report

**Fremont Township  
Lake County, IL**

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GHA Project #4191.008

**Fremont Township**

Water Quality Report  
for testing on  
May 11, 2010 and May 17, 2010

## Executive Summary

This water quality testing analysis has been developed for the Fremont Township for the purpose of demonstrating compliance with the minimum standards required by the Illinois Environmental Protection Agency (IEPA) General Storm Water Permit ILR40 for discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The permit requires annual monitoring of receiving waters upstream and downstream of the MS4 discharges, use of indicators to gauge the effects of storm water discharges on the physical/habitat-related aspects of the receiving waters and/or monitoring of the effectiveness of the Best Management Practices (BMPs). MS4 components include the conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, gutters, ditches, swales, manmade channels and storm sewers. Storm water runoff naturally contains numerous constituents; however, urbanization and urban activities (including township activities) typically increase concentrations to levels that may impact water quality. Pollutants associated with storm water include sediment, nutrients, bacteria and viruses, oil and grease, metals, organics, pesticides and gross pollutants.

Test results obtained through this project were compared against the water quality standards (WQS) established by the Illinois Pollution Control Program (IPCB). The Illinois WQS are located in the Illinois Administrative Rules Title 35, Environmental Protection; Subtitle C, Water Pollution; Chapter I, Pollution Control Board; Part 302, Water Quality Standards. The purposes of these standards is to protect existing uses of all waters of the State of Illinois, maintain above standard quality of water and prevent unnecessary deterioration of waters of the State. Not all of the constituents tested for contain a limit under the General Use Water Quality Standard. ***This analysis is in no way meant to identify violations of the Illinois Pollution Control Board Standards.***

For proper analysis, water samples were taken at locations upstream and downstream of the Township's MS4 discharge. Upstream and downstream results were compared to determine if the Township's MS4 discharges are contributing to water pollution in receiving waters. Seven sites were chosen in Fremont Township for testing:

- Fairfield & Owens (Upstream) and Airport (Downstream) of Squaw Creek
- Gilmer (Upstream) and IL-63 (Downstream) of Countryside Lake
- Sylvan (Upstream) and Highland (Downstream) of Sylvan Lake

A location map is included in Appendix B of this report, which identifies the approximate locations of the testing sites. Water quality parameters tested were Ammonia, Chloride, Fluoride, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD, 5 day), Phenolics, Total Phosphorus, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Kjeldahl Nitrogen (TKN), Metals (Potassium), Temperature, Conductivity and pH. Analytical reports from the lab are included in Appendix C.

Based on an analysis of the testing results, it appears that:

- DO levels were *below* the accepted limit at both the Fairfield and Airport sites
- Total phosphorus levels were elevated *above* the generally accepted limit at all seven sites
- TSS levels were elevated *above* the generally accepted limit at all seven sites (with the exception of Highland)

Results from all other tests were determined to be normal. The full report is located in Appendix A. Last year, these tests provided a baseline for future testing. Now, the continuation of these tests will allow for year-to-year comparison which can be used to determine if the BMPS performed by the Township are improving water quality across the Township.

## I. INTRODUCTION

This water quality test analysis has been developed for Fremont Township for the purpose of demonstrating compliance with the minimum standards required by the Illinois Environmental Protection Agency (IEPA) General Storm Water Permit ILR40 for discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The permit requires annual monitoring of receiving waters upstream and downstream of the MS4 discharges, use of indicators to gauge the effects of storm water discharges on the physical/habitat-related aspects of the receiving waters and/or monitoring of the effectiveness of the Best Management Practices (BMPs). MS4 components include the conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, gutters, ditches, swales, manmade channels or storm sewers. Storm water runoff naturally contains numerous constituents; however, urbanization and urban activities (including Township activities) typically increase concentrations to levels that may impact water quality. Pollutants associated with storm water include sediment, nutrients, bacteria and viruses, oil and grease, metals, organics, pesticides and gross pollutants.

Water pollution control programs are designed to protect the beneficial uses of the water resources within the state. Each state has the responsibility to set water quality standards (WQS) that protect these beneficial uses, commonly referred to as “designated uses”. In Illinois, waters are designated for various uses including aquatic life, wildlife, agricultural use, primary contact (e.g., swimming, water skiing), secondary contact (e.g., boating, fishing), industrial use, drinking water, food-processing water supply and aesthetic quality. Illinois’ WQS provide the basis for assessing whether the beneficial uses of the state’s waters are being attained. The purpose of this study is to assess the quality of receiving waters and provide recommendations for BMPs that will target the identified areas of concern.

Test results obtained through this project were compared against the water quality standards (WQS) established by the Illinois Pollution Control Program (IPCB) and to the water quality results of prior testing. The Illinois WQS are located in the Illinois Administrative Rules Title 35, Environmental Protection; Subtitle C, Water Pollution; Chapter I, Pollution Control Board; Part 302, Water Quality Standards. The purposes of these standards are to protect existing uses of all waters of the State of Illinois, maintain above standard water quality and prevent unnecessary deterioration of waters of the State. Not all of the constituents tested for contain a limit under the General Use Water Quality Standard. The table in Section II identifies which section of IPCB standards has been used for the purposes of this analysis. ***This analysis is in no way meant to identify violations of the IPCB Standards.***

## II. TESTING

For proper analysis, water samples were taken at locations upstream and downstream of the MS4 discharge. Upstream and downstream results were compared to determine if the Township’s MS4 discharges are contributing to water pollution in receiving waters. In Fremont Township, seven (7) sites were chosen for testing: Fairfield, Owens, Airport, Gilmer, IL-63, Sylvan and Highland. A map is included in Appendix B of this report, which identifies the locations of the testing sites. Gewalt Hamilton Associates, Inc. (GHA) staff collected water samples in containers provided by the testing company, Environmental Monitoring and Technologies, Inc. Water samples were then delivered to the testing company on ice. Water samples were tested for the

following parameters: Ammonia, Chloride, Fluoride, Biochemical Oxygen Demand (BOD, 5 day), Phenolics, Total Phosphorus, Total Kjeldahl Nitrogen, Total Suspended Solids and Metals (Potassium).

In addition to the off-site testing outlined above, GHA performed on-site testing utilizing a Handheld HANNA 9828 Multiparameter Water Quality Meter. This meter measured Dissolved Oxygen, Total Dissolved Solids, Temperature, Conductivity and pH. Analytical reports from the lab are included in Appendix C.

The following is a summary of each water quality parameter tested and the implications that can be drawn from the results:

### **Ammonia**

Ammonia ( $\text{NH}_3^+$ ) is a gas that is fairly soluble in water. The source of most ammonia in water bodies is from sprawl and urban areas, specifically in the form of road runoff, lawn pesticides and human wastes. Fish and other aquatic life forms contribute to the production of ammonia in streams by producing waste. Aqueous solutions of ammonia are widely used by water treatment facilities as carbonate removing agents to treat for hard water. High ammonia concentrations (> 50.0 milligrams per liter-mg/L) may indicate contamination of liquid wastes from industrial sites.

The established limit of total ammonia (measured as nitrogen, N) is 15.0 mg/L. The test results in Fremont Township ranged between 0.11 and 0.45 mg/L. Based on these results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of ammonia in receiving waters

### **Chloride**

Chloride is essential to life in small doses. Chloride may enter a water system from rocks containing chlorides, agricultural runoff, industrial wastewater, oil well wastes, wastewater treatment plant effluents and road salts. However, when chloride builds up in large quantities, it can have negative impacts such on aquatic life. Aquatic life forms cannot survive high chloride levels.

The established limit for chloride is 500.0 mg/L (*IPCB limits for Public and Food Processing Water Supply Standards*). The test results in Fremont Township ranged between 43.1 and 113.0 mg/L. Based on the results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of chloride in receiving waters

### **Fluoride**

Fluoride is a naturally occurring element that exists in combination with other elements as a fluoride compound. It is a constituent of minerals in rocks and soil. Small amounts of soluble fluoride are present in virtually all water sources. Fluoride is typically added to drinking water to reduce tooth decay. The recommended level of fluoride in drinking water for consumption is from 0.5 to 1.0 mg/L.

The established limit for fluoride is 1.4 mg/L (*IPCB limits for Secondary Contact and Indigenous Aquatic Life Standards*). The test results in Fremont Township all were below 0.5 mg/L. Based on the results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of fluoride in receiving waters.

### **Dissolved Oxygen (DO)**

One of the most important measures of the health of a stream is the amount of available dissolved oxygen (DO) in the water. Oxygen (O<sub>2</sub>) dissolves in water through the mixing of the water surface with the atmosphere. Oxygen is vital to fish and other animals for respiration. If the levels of DO fall too low, many species of fish, macroinvertebrates, and plants could not survive.

The level of DO in the water is inversely related to the water temperature. The lower the temperature, the more oxygen can dissolve in the water. Aquatic animals are most vulnerable to lowered DO levels in the early morning on hot summer days when stream flows are low, water temperatures are high and aquatic plants have not been producing oxygen since sunset.

Upstream and downstream DO levels were measured to identify changes in the level of oxygen in the water as it flows through the Township.

The established minimum for DO level is 5.0 parts per million (ppm) between March and July and 3.5 ppm between August and February. The test results for all sites were above the established minimums. Based on these results, we have no reason to believe that Fremont Township's MS4 is a disproportionate source of dissolved oxygen in receiving waters.

### **Biochemical Oxygen Demand (BOD)**

Biochemical oxygen demand (BOD) represents the amount of oxygen consumed by microorganisms in decomposing organic matter within stream water. Sources of BOD include leaves and woody debris, dead plants and animals, pet wastes, effluents from pulp and paper mills, wastewater treatment plants, feedlots, food-processing plants, failing septic systems and urban storm water runoff.

The rate of oxygen consumption in a stream is affected by a number of variables: temperature, pH, the presence of certain kinds of microorganisms and the type of organic and inorganic material in the water. The test used to assess BOD has to take place during a specified period of time (usually 5 days at 20° C).

The greater the BOD reading, the more rapidly oxygen has been depleted from the water system. This translates as less available dissolved oxygen for higher forms of aquatic life. The consequences of a high BOD reading are the same as those for low DO reading: aquatic organisms become stressed and die.

This test is a widely used parameter to indicate water quality. The established limit for BOD is 8.0 mg/L. The test results in Fremont Township for all sites were < 5.0 mg/L. Based on these

results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of BOD in receiving waters.

## **Phenolics**

Phenolics are a very common group of chemicals that can be found in foods, plants, medicines, cleaning products, industrial products and by-products. Generally, the appearance of phenolics in storm water indicates a misconnected industrial sewer to a storm drain or ditch. A phenolics value greater than 0.100 mg/L would most likely indicate an illicit discharge is present. Toxicity to aquatic life and an unpleasant taste in fish and shellfish are the effects of phenolics contaminated waters.

Industrial sources of phenolics include the following:

- Chemical manufacturing (organic)
- Textile manufacturing
- Paint and coatings manufacturing
- Metal coating
- Resin manufacturing
- Tire manufacturing
- Plastics fabricating
- Electronics
- Oil refining and re-refining
- Naval stores (turpentine and other wood treatment chemicals)
- Pharmaceutical manufacturing
- Paint stripping (for example, automotive and aircraft)
- Military installations (rework and repair facilities)
- Coke manufacturing
- Iron production
- Ferro-alloy manufacturing

Other sources of phenolics include improper handling and disposal of cleaning compounds by institutions such as hospitals and nursing homes. The established limit for phenolics is 0.100 mg/L. The test results in Fremont Township were all < 0.016 mg/L, with the exception of the Airport testing site at 0.274 mg/L. Additional testing is recommended for the Airport testing site.

## **Total Phosphorus**

Total phosphorus is one of the key elements necessary for animal and plant growth. Phosphates ( $\text{PO}_4^{3-}$ ) are formed chemically through oxidation. Rainfall causes varying amounts of phosphates and phosphorus to wash away from farm soils and certain pesticides into waterways in the form of run-off.

Phosphates stimulate the growth of algae and aquatic plants that provide food for fish. This may cause an increase in the fish population. However, excess phosphates may cause disproportionate

growth in algae and aquatic plants, choking waterways and using up large amounts of oxygen (eutrophication).

The established limit for total phosphorous is 0.05 mg/L for any reservoir or lake with a surface area of  $\geq 20.0$  acres, or in any stream at the point where it enters any such reservoir or lake. The test results in Fremont Township ranged between 0.04 and 0.21 mg/L. Six of the seven test sites were above the accepted limit. These results should be compared to future testing to determine if this is a continuous trend. Additional testing is recommended for the Airport testing site.

### **Total Dissolved Solids (TDS)**

Total dissolved solids (TDS) comprise of inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates) and some small amounts of organic matter that are dissolved in water. While not a health hazard, elevated TDS levels decrease the aesthetic quality of water and can cause the water to become corrosive. Additionally, elevated TDS concentrations in water can cause a salty or brackish taste, interference & decreased efficiency of hot water heaters and lime-scale formation. Elevated TDS concentrations indicate elevated levels of ions that are above the Primary or Secondary Drinking Water Standards.

The established limit for TDS is 1000.0 mg/L. The test results in Fremont Township ranged between 176.0 and 319.0 mg/L. Based on these results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of TDS in receiving waters.

### **Total Suspended Solids (TSS)**

Total suspended solids (TSS) are particulate solid materials (organic and inorganic) that have relatively low density and are too small to settle. Usually TSS includes silt, plankton, mud and industrial wastes. As TSS increases, turbidity increases (meaning the transparency of the water decreases). High concentrations of TSS can lower water quality by absorbing light which raises the temperature of the water thereby decreasing DO levels. The combination of warmer water, less light and less oxygen makes it impossible for some forms of life to exist.

The established limit for TSS is 15.0 – 30.0 mg/L (*effluent limit under Part 304 Effluent Standards*). The test results in Fremont Township were all  $< 25.0$  mg/L, with the exception of the Airport test site at 51.0 mg/L. Additional testing is recommended for the Airport testing site.

### **Total Kjeldahl Nitrogen (TKN)**

Total Kjeldahl Nitrogen (TKN) is the sum of organic nitrogen, ammonia ( $\text{NH}_3^+$ ) and ammonium ( $\text{NH}_4^+$ ) of soil, water or wastewater (e.g. sewage treatment plant effluent). Proteins and other forms of organic nitrogen are found in waters due to waste discharges and natural decomposition processes. Organic nitrogen compounds decompose to ammonium. The ammonium concentration can be measured and is known as TKN (organic nitrogen and ammonium). Various compounds of nitrogen are found in storm water runoff from sources including fertilizers, animal wastes and plant decay.

Soil microbes break down ammonia to nitrite, which is then broken down further to nitrate. Nitrate is a useable form of nitrogen. However, excess nitrates in water cause excessive algal growth. As nutrients become limited, the algae die which supports excessive bacteria growth and consumes large amounts of oxygen, resulting in low DO levels.

The established limit for TKN is < 20.0 mg/L (*Standard Methods for the Examination of Water and Wastewater*). All sites were < 1.7 mg/L. Based on these results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of TKN in receiving waters.

### **Potassium**

Potassium occurs in various minerals, from which it becomes available via weathering processes. Ninety-five percent (95%) of commercially applied potassium is added to synthetic fertilizers in the form of potassium nitrate. Potassium is found at relatively high concentrations in sewage, and extremely high concentrations in many industrial process waters. Consequently, potassium can act as a good first screen for industrial wastes.

The established limit for potassium is 20.0 mg/L. The test results in Fremont Township ranged between 1.8 and 3.6 mg/L. Based on these results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of potassium in receiving waters.

### **Temperature**

The rates of biological and chemical processes depend on temperature. Organisms are dependent on certain temperature ranges for their optimal health. Optimal temperatures for fish depend on the species: some survive better in colder water, whereas others prefer warmer water. Benthic macroinvertebrates are also sensitive to temperature and will relocate to find their optimal temperature. If temperatures are outside this optimal range for a prolonged period of time, organisms become stressed and can die.

Temperature affects the oxygen content of the water (oxygen levels become lower as temperature increases), the rate of photosynthesis by aquatic plants, the metabolic rates of aquatic organisms, and the sensitivity of organisms to toxic wastes, parasites, and diseases. Causes of temperature change include weather, removal of shading streambank vegetation, impoundments (a body of water confined by a barrier, such as a dam), discharge of cooling water and urban storm water & groundwater inflows to the stream. Upstream and downstream temperatures were measured to identify changes in water temperature through the Township. The established range for temperature is 60° F from December through March and 90° F from April through November (*General Use WQS Limits*). Moreover, the water temperature at any location should not exceed the maximum limits by more than 3° F. All sites were within the established temperature range.

### **Conductivity**

Conductivity is a measure of the ability of water to pass through an electrical current. Conductivity in water bodies is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron and aluminum cations (ions that carry a positive charge). Organic



compounds like oil, phenol, alcohol, and sugar do not conduct electrical current very well and therefore have a low conductivity level in water. Conductivity is also affected by temperature: the warmer the water, the higher the conductivity.

Discharges to streams can change the conductivity depending on their composition. For example, a failing sewage system would raise conductivity due to the presence of chloride, phosphate and nitrate, while an oil spill would lower conductivity.

The basic unit of measurement of conductivity is the mho or siemens, where one mho or siemens (S) is equal to the reciprocal of one ohm  $\Omega$  (measurement of electrical resistance named after Georg Simon Ohm). Conductivity is measured in micromhos per centimeter ( $\mu\text{mhos/cm}$ ) or microsiemens per centimeter ( $\mu\text{s/cm}$ ). The established range for conductivity is 50-1500  $\mu\text{s/cm}$ . The test results in Fremont Township ranged between 351.0 and 638.0  $\mu\text{s/cm}$ . Based on these results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of conductivity in receiving waters.

## **pH**

Most discharge flow types are neutral, having a pH value of approximately 7.0, (although groundwater concentrations can be somewhat variable). pH is a reasonably good indicator for liquid wastes from industries, which can have very high or low pH (ranging from 3.0 to 12.0). The pH of residential wash water tends to be rather basic (pH of 8.0 or 9.0). Although pH data is often not conclusive by itself, it can identify problem areas that merit follow-up investigations using more effective indicators.

The established range for pH is 6.5-9.0 (*General Use WQS*). The test results in Fremont Township were between 7.2 and 8.1. Based on these results we have no reason to believe that Fremont Township's MS4 is a disproportionate source of pH in receiving waters.

The following is a summary of the accepted limits for each water quality parameter:

Water Quality Parameters	Illinois Water Pollution Control Board WQS*	IPCB Standards or Accepted Limits in mg/L
<b>Off-site Testing</b>		
Ammonia	302.212	15.0
Chloride	302.304	500.0
Fluoride	302.407	1.4
BOD	304 Effluent Standards	< 8.0
Phenolics	302.407	0.100
Phosphorous, Total	302.205	0.05
Total Suspended Solids	304 Effluent Standards	15.0-30.0
Total Kjeldahl Nitrogen	Standard Methods for the Examination of Water and Wastewater	< 20.0
Potassium	none	20.0
<b>On-site Testing</b>		
Dissolved Oxygen	302.206	March - July at least 5.0 ppm Aug - Feb at least 3.5 ppm
Total Dissolved Solids	302.304	1000.0 ppm
Temperature °F	302.211	Dec - Mar 60.0° F Max Apr - Nov 90.0° F Max
Conductivity	USEPA Volunteer Stream Monitoring Manual	50.0 - 1500.0 µs/cm
pH	302.304	6.5 - 9.0

\*Title 35 Part 302 Water Quality Standards unless otherwise noted.

### **III. FREMONT TOWNSHIP TEST LOCATIONS**

On June 2, 2011 GHA collected seven (7) water samples at the following locations:

#### *Squaw Creek*

Fairfield – The location of the test site is on Fairfield Road between IL-60 and Chardon Road in Unincorporated Lake County. The samples were taken from the east side of the road at the upstream side of the roadway culvert along the Lake Helen Drain at the residence located at 30733 North Fairfield Road. This test site is considered upstream.

Owens – The location of the test site is located west of the property located at 27266 North Owens Road in Unincorporated Lake County. The samples were taken from the creek prior to flowing into Davis Lake and the test site is considered upstream.

Airport – The location of the test site is on West Townline Road between North Curran Road and Campbell Airport in Grayslake. The samples were taken on the south side of the road along Squaw Creek and the test site is considered downstream.

#### *Countryside Lake*

Gilmer – The location of the test site is approximately 250 feet northwest of the intersection of Gilmer Road and North Chevy Chase Road in Unincorporated Lake County. The sample was taken from the creek on the west side of Gilmer Road upstream of the roadway culvert. In this report this test site is considered the upstream.

IL-63 – The location of the test site is approximately 350 feet west of the intersection of North Midlothian Road and Countryside Lake Drive in Unincorporated Lake County. The sample was taken on the north side of Midlothian Road just upstream of the roadway culvert along Indian Creek. In this report this test site is considered downstream.

#### *Sylvan Lake*

Sylvan – The location of the test site is at the residential property at 21452 West Sylvan Drive in Unincorporated Lake County. The samples were taken on the east side of Sylvan upstream of the roadway culvert. In this report this location is considered upstream.

Highland – The location of the test site is located at the residential property at 26070 North Highland Drive in Unincorporated Lake County. The samples were taken from the north shoreline at the downstream roadway culvert location. In this report this test site is considered the downstream.

A map of Fremont Township showing the approximate locations of the test sites is included in Appendix B of this report.

#### IV. FREMONT TOWNSHIP SUMMARY AND ANALYSIS

Results were summarized and reviewed to detect changes between upstream and downstream sampling points and also against generally accepted standards. Figures for each testing site and the parameters tested are included in Appendix D.

Comparison of results from the 2010 and 2011 testing resulted in the following conclusions:

##### Fairfield

Parameter	Increase/Decrease/Stable 2010 vs. 2011	Within Accepted Limits?	Recommendation
Ammonia	Decrease	Yes	Continue annual monitoring
Chloride	Increase	Yes	Continue annual monitoring
Fluoride	Stable	Yes	Continue annual monitoring
DO	Increase	Yes	Continue annual monitoring
BOD	Decrease	Yes	Continue annual monitoring
Phenolics	Stable	Yes	Continue annual monitoring
Total Phosphorus	Decrease	No	Continue annual monitoring
TDS	Increase	Yes	Continue annual monitoring
TSS	Decrease	Yes	Continue annual monitoring
TKN	Decrease	Yes	Continue annual monitoring
Potassium	Increase	Yes	Continue annual monitoring
Temperature	Increase	Yes	Continue annual monitoring
Conductivity	Increase	Yes	Continue annual monitoring
pH	Stable	Yes	Continue annual monitoring

## Owens

Parameter	Increase/Decrease/Stable 2010 vs. 2011	Within Accepted Limits?	Recommendation
Ammonia	Stable	Yes	Continue annual monitoring
Chloride	Decrease	Yes	Continue annual monitoring
Fluoride	Stable	Yes	Continue annual monitoring
DO	Increase	Yes	Continue annual monitoring
BOD	Decrease	Yes	Continue annual monitoring
Phenolics	Increase	Yes	Continue annual monitoring
Total Phosphorus	Decrease	No	Continue annual monitoring
TDS	Decrease	Yes	Continue annual monitoring
TSS	Decrease	Yes	Continue annual monitoring
TKN	Decrease	Yes	Continue annual monitoring
Potassium	Decrease	Yes	Continue annual monitoring
Temperature	Increase	Yes	Continue annual monitoring
Conductivity	Decrease	Yes	Continue annual monitoring
pH	Stable	Yes	Continue annual monitoring

## Airport

Parameter	Increase/Decrease/Stable 2010 vs. 2011	Within Accepted Limits?	Recommendation
Ammonia	Stable	Yes	Continue annual monitoring
Chloride	Decrease	Yes	Continue annual monitoring
Fluoride	Stable	Yes	Continue annual monitoring
DO	Increase	Yes	Continue annual monitoring
BOD	Decrease	Yes	Continue annual monitoring
Phenolics	Increase	No	Additional testing
Total Phosphorus	Decrease	No	Additional testing
TDS	Increase	Yes	Continue annual monitoring
TSS	Decrease	No	Additional testing
TKN	Decrease	Yes	Continue annual monitoring
Potassium	Decrease	Yes	Continue annual monitoring
Temperature	Increase	Yes	Continue annual monitoring
Conductivity	Increase	Yes	Continue annual monitoring
pH	Stable	Yes	Continue annual monitoring

## Gilmer

Parameter	Increase/Decrease/Stable 2010 vs. 2011	Within Accepted Limits?	Recommendation
Ammonia	Decrease	Yes	Continue annual monitoring
Chloride	Decrease	Yes	Continue annual monitoring
Fluoride	Stable	Yes	Continue annual monitoring
DO	Increase	Yes	Continue annual monitoring
BOD	-Decrease	Yes	Continue annual monitoring
Phenolics	Stable	Yes	Continue annual monitoring
Total Phosphorus	Decrease	No	Continue annual monitoring
TDS	Decrease	Yes	Continue annual monitoring
TSS	Decrease	Yes	Continue annual monitoring
TKN	Decrease	Yes	Continue annual monitoring
Potassium	Decrease	Yes	Continue annual monitoring
Temperature	Increase	Yes	Continue annual monitoring
Conductivity	Decrease	Yes	Continue annual monitoring
pH	Decrease	Yes	Continue annual monitoring

**IL-63**

Parameter	Increase/Decrease/Stable 2010 vs. 2011	Within Accepted Limits?	Recommendation
Ammonia	Decrease	Yes	Continue annual monitoring
Chloride	Decrease	Yes	Continue annual monitoring
Fluoride	Stable	Yes	Continue annual monitoring
DO	Increase	Yes	Continue annual monitoring
BOD	Increase	Yes	Continue annual monitoring
Phenolics	Stable	Yes	Continue annual monitoring
Total Phosphorus	Decrease	Yes	Continue annual monitoring
TDS	Decrease	Yes	Continue annual monitoring
TSS	Decrease	Yes	Continue annual monitoring
TKN	Increase	Yes	Continue annual monitoring
Potassium	Decrease	Yes	Continue annual monitoring
Temperature	Increase	Yes	Continue annual monitoring
Conductivity	Decrease	Yes	Continue annual monitoring
pH	Stable	Yes	Continue annual monitoring



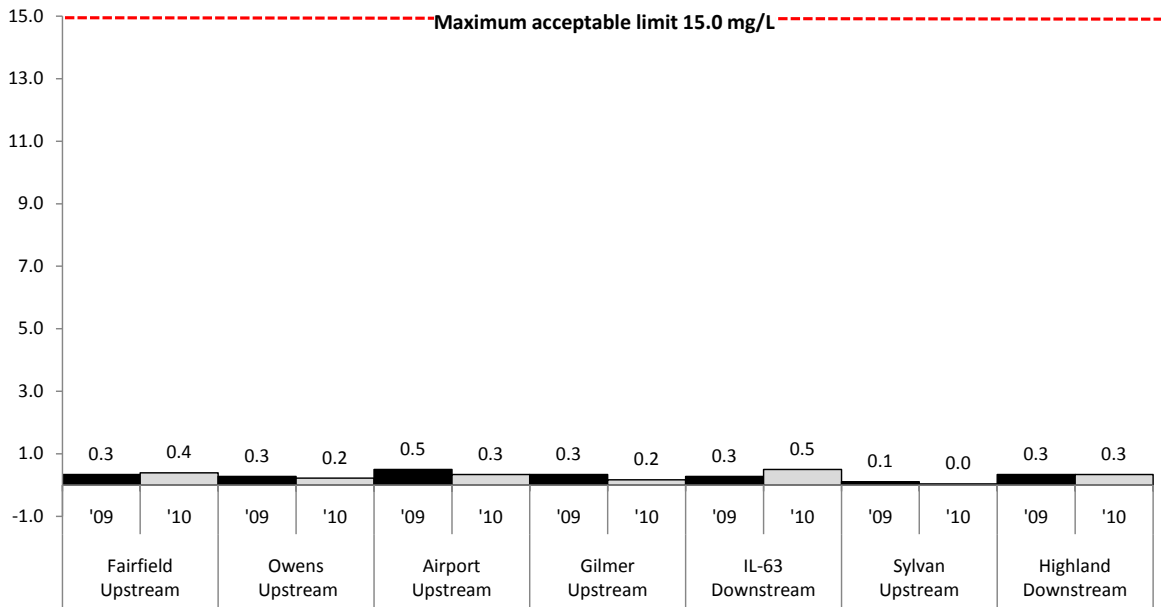
## Sylvan

Parameter	Increase/Decrease/Stable 2010 vs. 2011	Within Accepted Limits?	Recommendation
Ammonia	Increase	Yes	Continue annual monitoring
Chloride	Decrease	Yes	Continue annual monitoring
Fluoride	Stable	Yes	Continue annual monitoring
DO	Increase	Yes	Continue annual monitoring
BOD	Decrease	Yes	Continue annual monitoring
Phenolics	Stable	Yes	Continue annual monitoring
Total Phosphorus	Decrease	No	Continue annual monitoring
TDS	Decrease	Yes	Continue annual monitoring
TSS	Decrease	Yes	Continue annual monitoring
TKN	Increase	Yes	Continue annual monitoring
Potassium	Decrease	Yes	Continue annual monitoring
Temperature	Increase	Yes	Continue annual monitoring
Conductivity	Decrease	Yes	Continue annual monitoring
pH	Stable	Yes	Continue annual monitoring

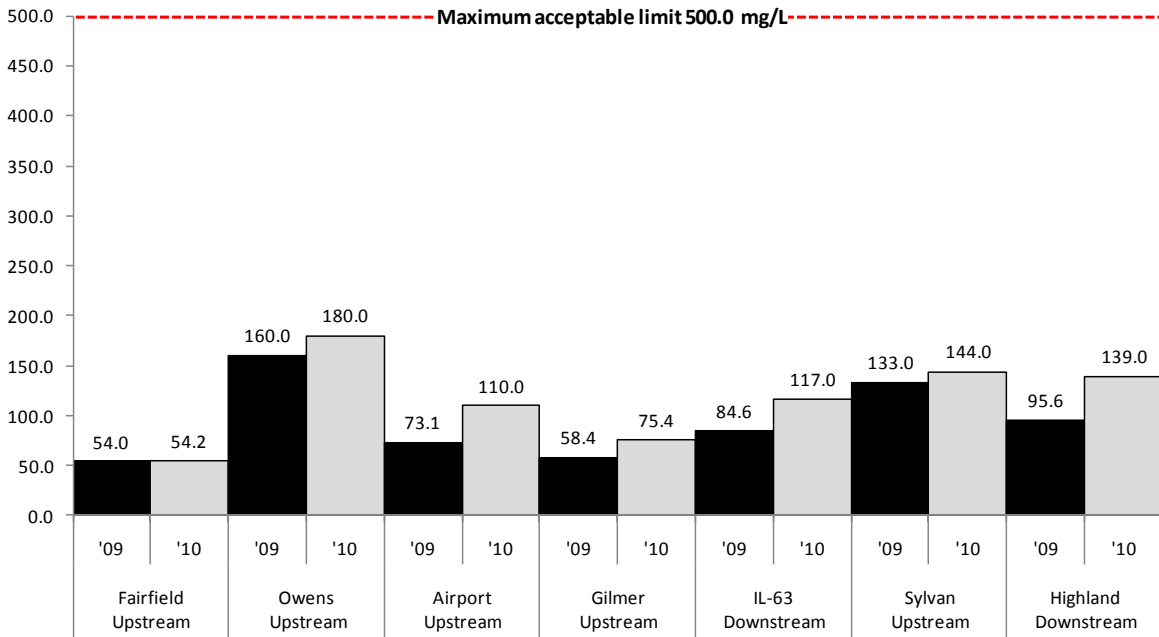
## Highland

Parameter	Increase/Decrease/Stable 2010 vs. 2011	Within Accepted Limits?	Recommendation
Ammonia	Increase	Yes	Continue annual monitoring
Chloride	Decrease	Yes	Continue annual monitoring
Fluoride	Stable	Yes	Continue annual monitoring
DO	Increase	Yes	Continue annual monitoring
BOD	Stable	Yes	Continue annual monitoring
Phenolics	Increase	Yes	Continue annual monitoring
Total Phosphorus	Increase	No	Continue annual monitoring
TDS	Decrease	Yes	Continue annual monitoring
TSS	Decrease	Yes	Continue annual monitoring
TKN	Increase	Yes	Continue annual monitoring
Potassium	Decrease	Yes	Continue annual monitoring
Temperature	Increase	Yes	Continue annual monitoring
Conductivity	Decrease	Yes	Continue annual monitoring
pH	Stable	Yes	Continue annual monitoring

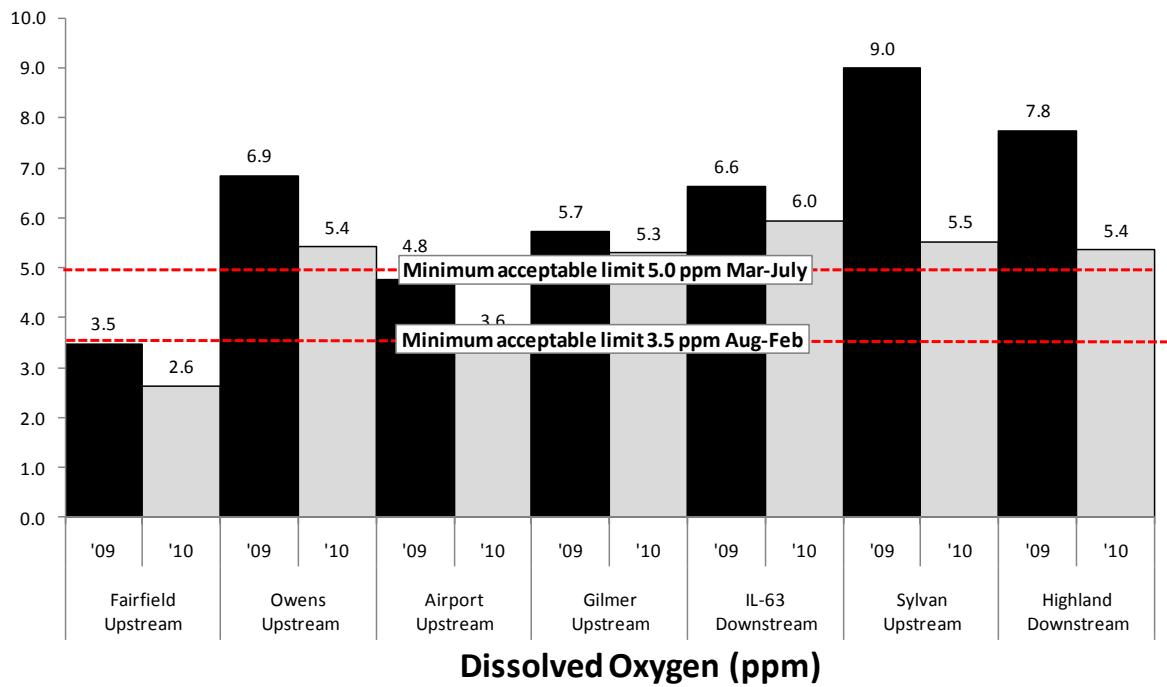
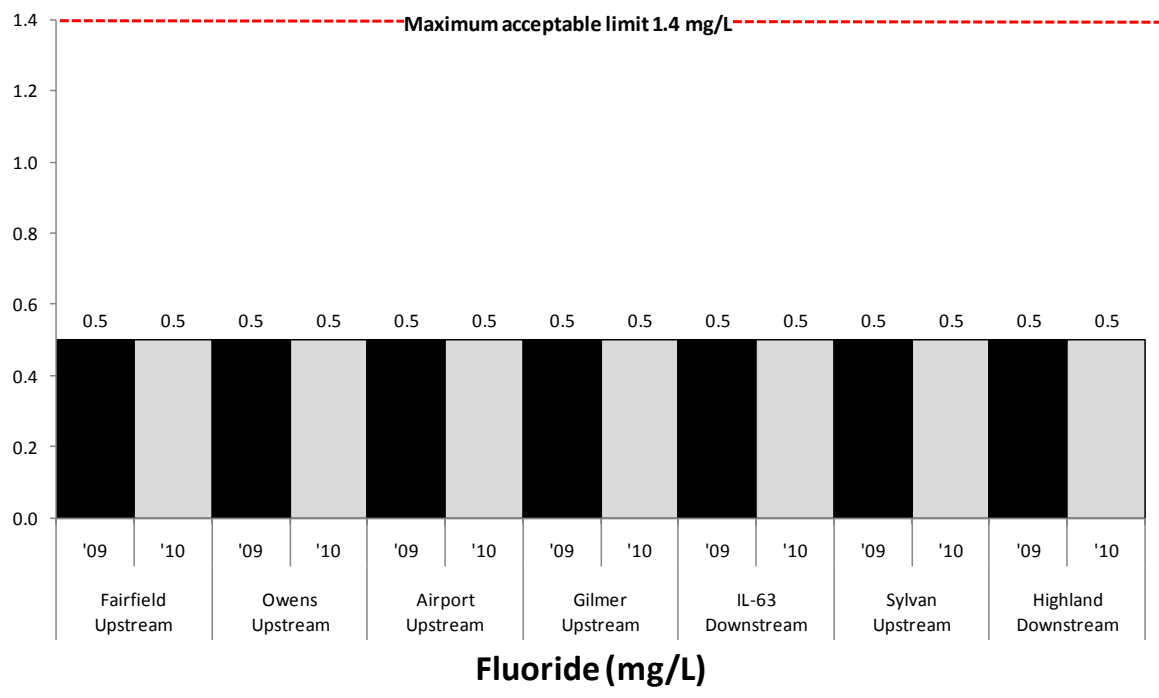
The Township should continue to compare the test results each year to determine if the BMPs performed by the Township are improving water quality in the receiving waters within Fremont Township. The Township should also make an effort to cooperate with upstream neighbors with the purpose of improving upstream water quality. Additional educational material should be provided to the residents by the Township.

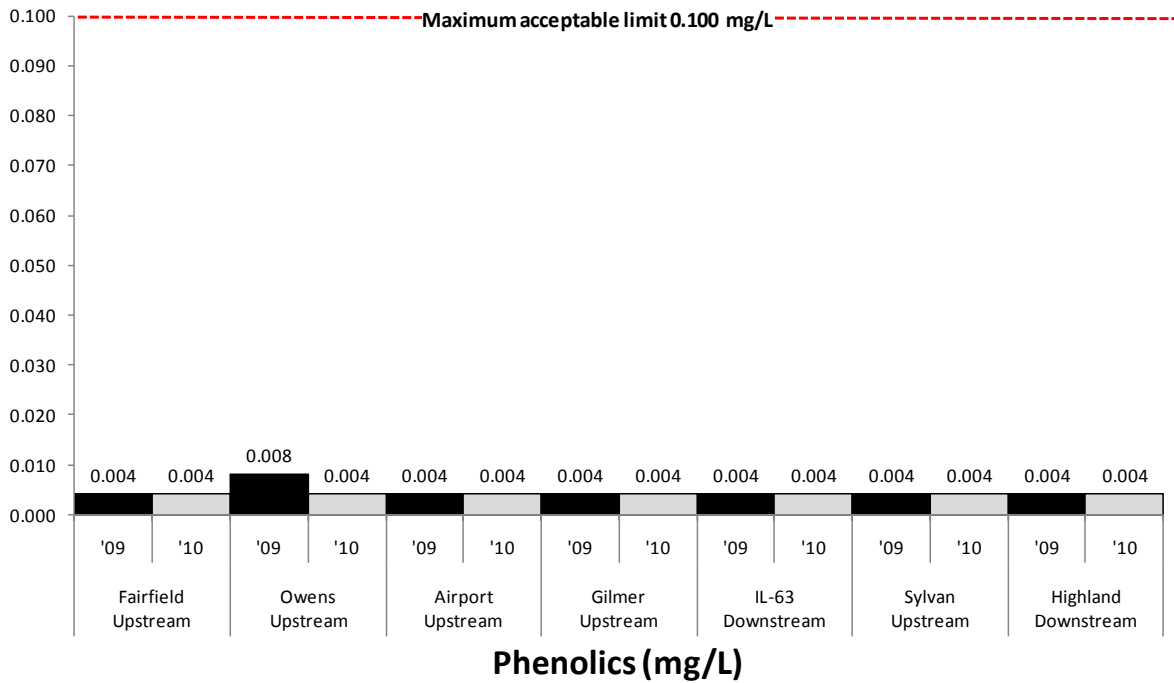
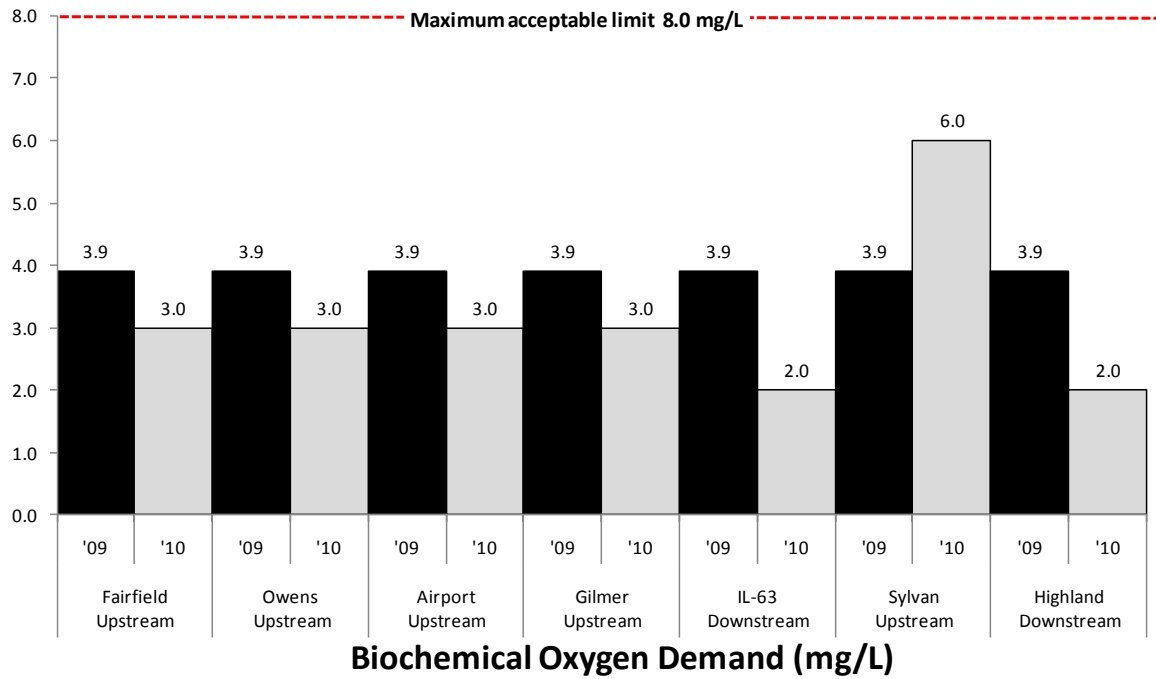


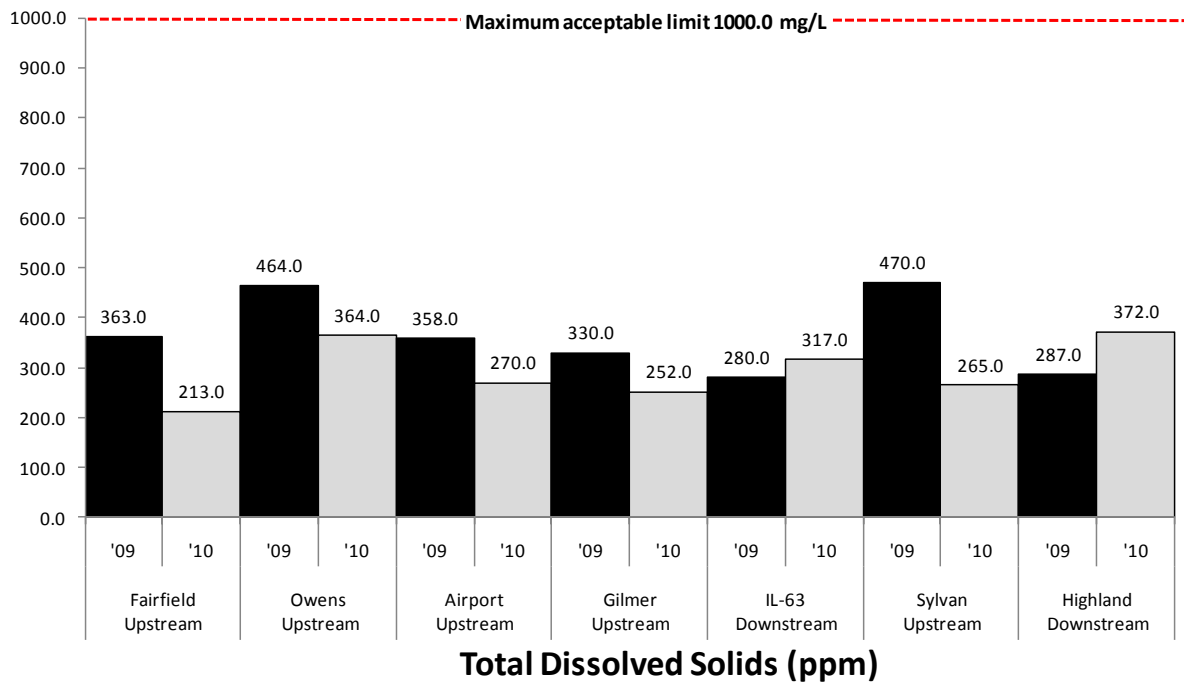
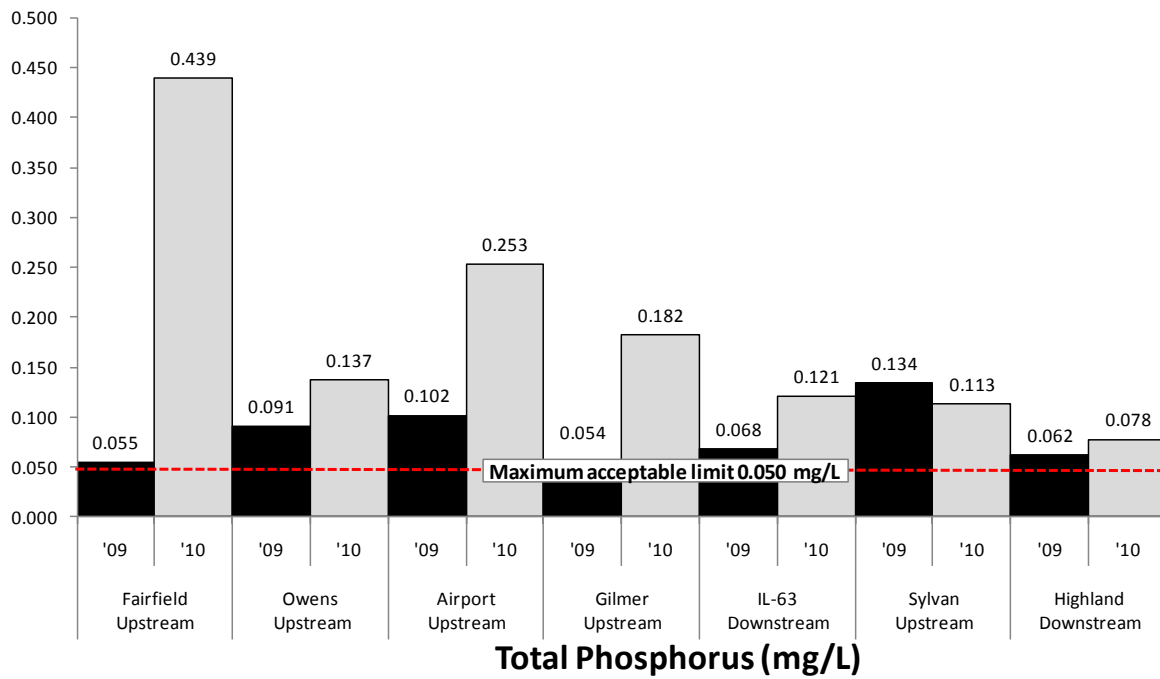
**Ammonia (mg/L)**

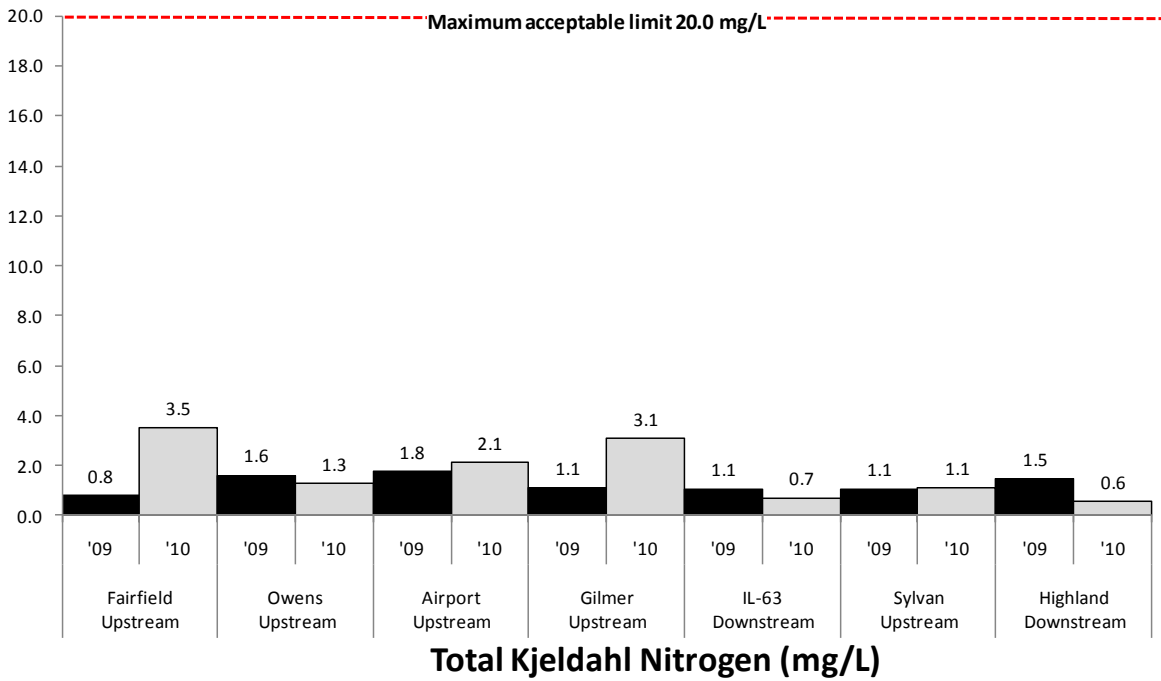
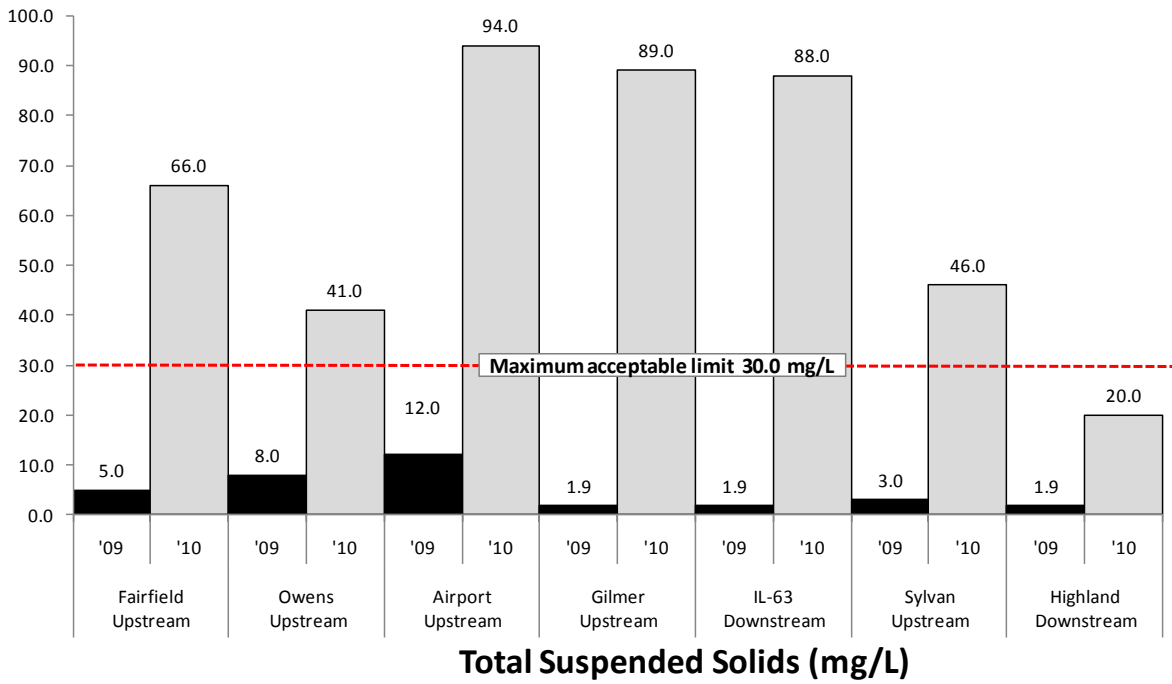


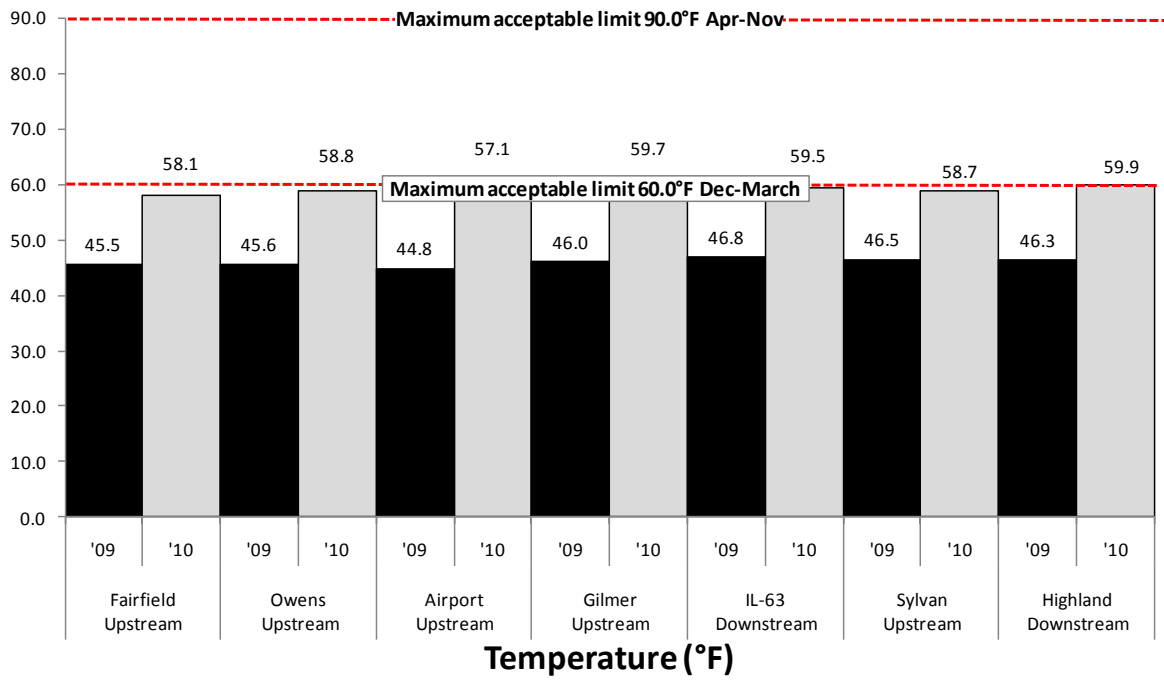
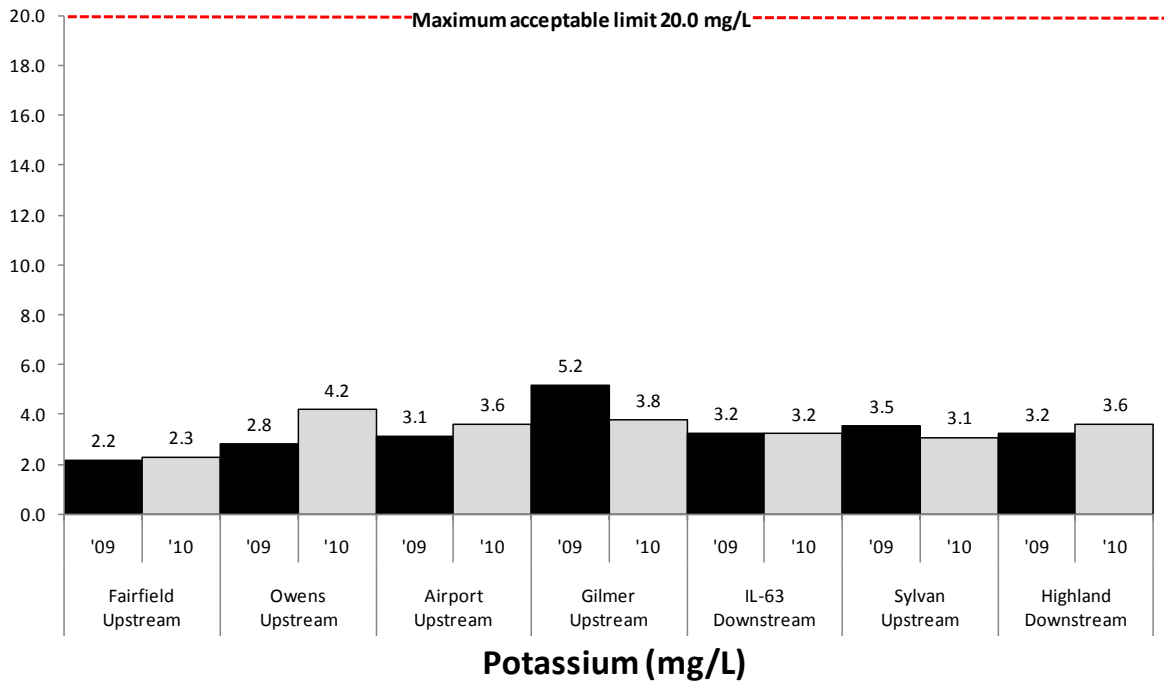
**Chloride (mg/L)**



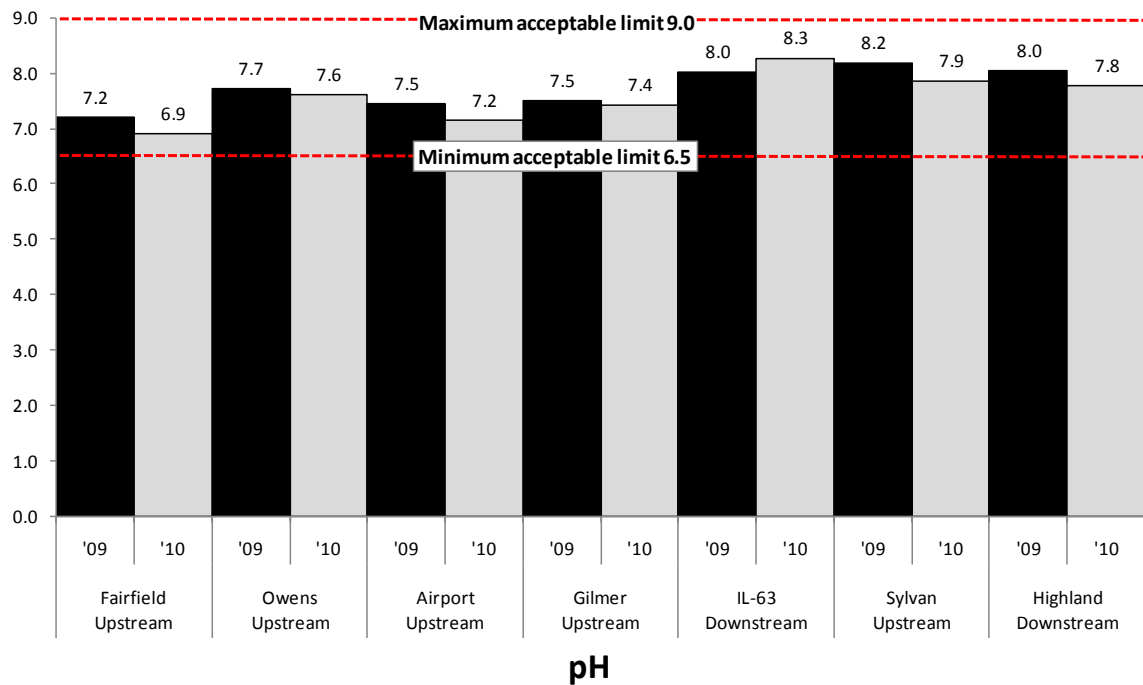
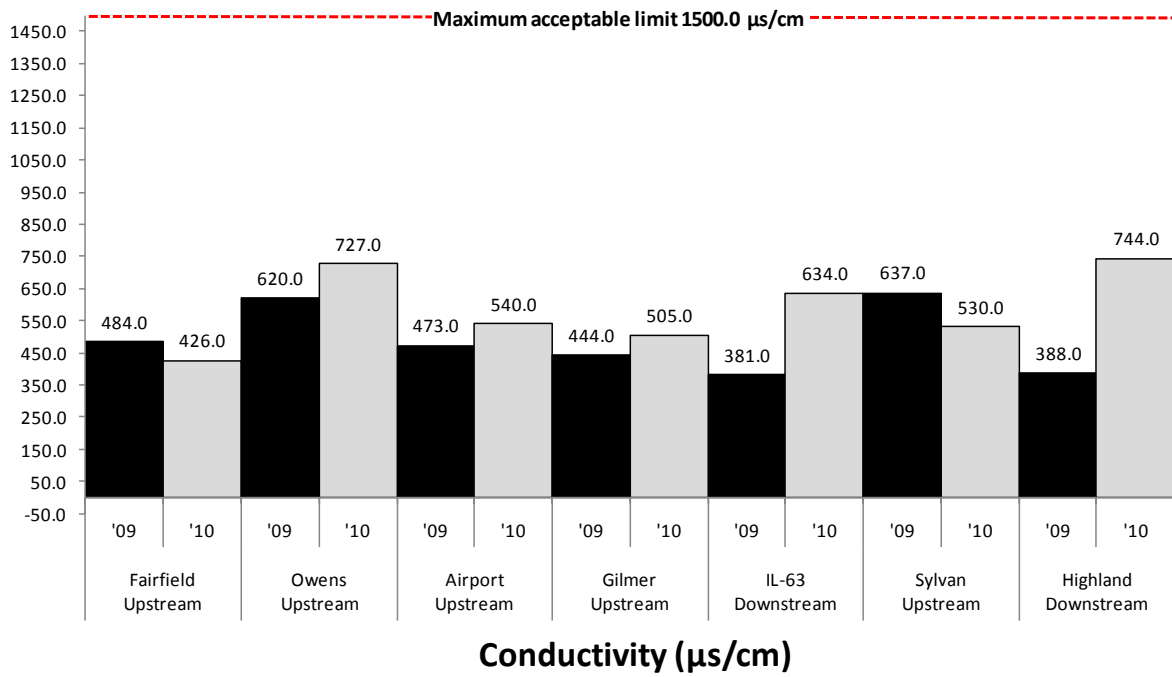












# ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.



8100 North Austin • Morton Grove, IL 60053-3203  
847.967.6666 • 800.246.0663 • fax: 847.967.6735 • www.emt.com

Marcy Knysz  
Gewalt Hamilton Associates  
850 Forest Edge Drive  
Vernon Hills, IL 60060

May 21, 2010

RE Fremont Twp

Lab Orders:  
10050287

Dear Marcy Knysz:

Enclosed are the analytical reports for the EMT Lab Order listed. Also included with this analytical report is a copy of the chain of custody associated with these samples. If you have any questions, please contact me at 847-967-6666.

Sincerely,

A handwritten signature in black ink, appearing to read 'Joe Pavilonis', written over a light blue horizontal line.

Joe Pavilonis  
Project Manager

Approved by,

A handwritten signature in black ink, appearing to read 'Mitchell Ostrowski', written over a light blue horizontal line.

Mitchell Ostrowski  
Laboratory Director

This Report Contains 13 pages

The Contents of this report apply to the sample(s) analyzed. No duplication is allowed except in its entirety.

State of Illinois Chemical Analysis in Drinking Water Accredited Lab. No. 100256  
State of Wisconsin Wastewater and Hazardous Waste No. 999888890

environmental laboratory and testing services  
| water | soil | air | product | waste |



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**CLIENT:** Gewalt Hamilton Associates

**Date:** 5/21/2010

**Project:** Fremont Twp

## CASE NARRATIVE

**Lab Order:** 10050287

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Unless otherwise noted, samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition

Unless otherwise noted, all method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives.

Sample results relate only to the analytes of interest tested and to the sample received at the laboratory.

All results are reported on a wet weight basis, unless otherwise noted. Dry weight adjusted results, reporting limits, method detection limits and dilution factors are indicated by the notation "dry" in the Units column. If present, a dilution factor will adjust the method detection limits and reporting limits.

The test results contained in this report meet all of the requirements of NELAC. Accreditation by the State of Illinois or Wisconsin is not an endorsement or a guarantee of the validity of data generated. For specific information regarding EMT's scope of accreditation, please contact your EMT project manager.

The Reporting Limit listed on the Report of Laboratory Analysis is EMT's reporting limit for the analyte reported. For most test methods this reporting limit is primarily based upon the lowest point in the calibration curve.

Analyst's initials of "OUT" indicate that the analyte was analyzed by a subcontracted laboratory.

### Method References:

SW=USEPA, Test Methods for Evaluating Solid Waste, SW-846.

E=USEPA Methods for the Determination of Inorganic Substances in Environmental Samples; Methods for Chemical Analysis of Water and Wastes; Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, 40 CFR Part 136, App A; methods for the Determination of Metals in Environmental Samples; Methods for the Determination of Organic Compounds in Drinking Water.

SM= APHA, Standard Methods for the Examination of Water and Wastewater.

D=ASTM, Annual Book of Standards

Batch numbers starting with a letter indicate an analytical batch while those that are exclusively numerals indicate a preparation batch.



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**CLIENT:** Gewalt Hamilton Associates

**Date:** 5/21/2010

**Project:** Fremont Twp

## CASE NARRATIVE

**Lab Order:** 10050287

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Analytical Comments for METHOD 5210\_BOD\_W, MB-R140840: The seed correction value of 0.5453 is outside the lab control range of 0.6 to 1.0. Analytical Comments for METHOD 5210\_BOD\_W, 10050287-01A: Reporting limit based upon the MDL multiplied by the bottle dilution factor. Analytical Comments for METHOD 5210\_BOD\_W, 10050287-02A: The dissolved oxygen loss is less than 2.0 on the largest volume set and the sample is reported down to the MDL multiplied by the smallest bottle dilution used. Analytical Comments for METHOD 5210\_BOD\_W, 10050287-03A: The dissolved oxygen loss is less than 2.0 on the largest volume set and the sample is reported down to the MDL multiplied by the smallest bottle dilution used. Analytical Comments for METHOD 5210\_BOD\_W, 10050287-04A: The dissolved oxygen loss is less than 2.0 on the largest volume set and the sample is reported down to the MDL multiplied by the smallest bottle dilution used. Analytical Comments for METHOD 5210\_BOD\_W, 10050287-05A: The dissolved oxygen loss is less than 2.0 on the largest volume set and the sample is reported down to the MDL multiplied by the smallest bottle dilution used. Analytical Comments for METHOD 5210\_BOD\_W, 10050287-06A: The dissolved oxygen loss is less than 2.0 on the largest volume set and the sample is reported down to the MDL multiplied by the smallest bottle dilution used. Analytical Comments for METHOD 5210\_BOD\_W, 10050287-07A: The dissolved oxygen loss is less than 2.0 on the largest volume set and the sample is reported down to the MDL multiplied by the smallest bottle dilution used.

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## Report of Laboratory Analysis

**CLIENT:** Gewalt Hamilton Associates  
**Lab Order:** 10050287  
**Project:** Fremont Twp  
**Lab ID:** 10050287-01

**Client Sample ID:** SYLVAN  
**Report Date:** 5/21/2010  
**Collection Date:** 5/11/2010 1:00:00 PM  
**Matrix:** Wastewater

Analyses	Result	EMT Reporting Limit	Units	Date Analyzed	Batch	Analyst
<b>Ammonia as N</b>		<b>Method:</b>	<b>SM4500-NH3-B-C</b>			
Nitrogen, Ammonia (As N)	< 0.05	0.05	mg/L	5/17/10	58456	TTT
<b>Anions by Ion Chromatography</b>		<b>Method:</b>	<b>E300</b>			
Chloride	144.	2.	mg/L	5/18/10	R140934	GSB
Fluoride	< 0.5	0.5	mg/L	5/18/10	R140934	GSB
<b>BOD, 5 Day, 20°C</b>		<b>Method:</b>	<b>SM5210 B</b>			
Biochemical Oxygen Demand	6.	2.	mg/L	5/12/10	R140840	AM2
<b>Phenolics</b>		<b>Method:</b>	<b>E420.1 REV.1978 BY AQUACHEM</b>			
Phenolics, Total Recoverable	< 0.005	0.005	mg/L	5/12/10	58322	CS2
<b>Phosphorous, Total</b>		<b>Method:</b>	<b>SM4500-P E / SW846 3015 / SW-846 3015</b>			
Phosphorus, Total (As P)	0.113	0.006	mg/L	5/17/10	58454	TTT
<b>Total Kjeldahl Nitrogen</b>		<b>Method:</b>	<b>SM4500-N BC / SM4500-NH3 B</b>			
Nitrogen, Kjeldahl, Total	1.12	0.5	mg/L	5/19/10	58499	TTT
<b>Total Suspended Solids</b>		<b>Method:</b>	<b>SM2540D</b>			
Suspended Solids (Residue, Non-Filterable)	46.	5.	mg/L	5/17/10	R140881	IR
<b>Metals by ICP MS</b>		<b>Method:</b>	<b>E200.8 / SW3015</b>			
Potassium	3.08	1.56	C mg/L	5/13/10	58332	AG

**Qualifiers:**

B - Analyte detected in the associated Method Blank  
E - Estimated  
H - Holding Time Exceeded  
C - Laboratory not accredited for this parameter

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
J - Analyte detected below quantitation limits

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## Report of Laboratory Analysis

**CLIENT:** Gewalt Hamilton Associates  
**Lab Order:** 10050287  
**Project:** Fremont Twp  
**Lab ID:** 10050287-02

**Client Sample ID:** HIGHLAND  
**Report Date:** 5/21/2010  
**Collection Date:** 5/11/2010 1:45:00 PM  
**Matrix:** Wastewater

Analyses	Result	EMT Reporting Limit	Units	Date Analyzed	Batch	Analyst
<b>Ammonia as N</b>		<b>Method:</b>	<b>SM4500-NH3-B-C</b>			
Nitrogen, Ammonia (As N)	0.34	0.05	mg/L	5/17/10	58456	TTT
<b>Anions by Ion Chromatography</b>		<b>Method:</b>	<b>E300</b>			
Chloride	139.	2.	mg/L	5/19/10	R140951	GSB
Fluoride	< 0.5	0.5	mg/L	5/19/10	R140951	GSB
<b>BOD, 5 Day, 20°C</b>		<b>Method:</b>	<b>SM5210 B</b>			
Biochemical Oxygen Demand	2.	2.	mg/L	5/12/10	R140840	AM2
<b>Phenolics</b>		<b>Method:</b>	<b>E420.1 REV.1978 BY AQUACHEM</b>			
Phenolics, Total Recoverable	< 0.005	0.005	mg/L	5/12/10	58330	CS2
<b>Phosphorous, Total</b>		<b>Method:</b>	<b>SM4500-P E / SW846 3015 / SW-846 3015</b>			
Phosphorus, Total (As P)	0.078	0.006	mg/L	5/17/10	58454	TTT
<b>Total Kjeldahl Nitrogen</b>		<b>Method:</b>	<b>SM4500-N BC / SM4500-NH3 B</b>			
Nitrogen, Kjeldahl, Total	0.56	0.5	mg/L	5/13/10	58368	TTT
<b>Total Suspended Solids</b>		<b>Method:</b>	<b>SM2540D</b>			
Suspended Solids (Residue, Non-Filterable)	20.	5.	mg/L	5/17/10	R140881	IR
<b>Metals by ICP MS</b>		<b>Method:</b>	<b>E200.8 / SW3015</b>			
Potassium	3.62	1.56	C mg/L	5/13/10	58332	AG

**Qualifiers:**

B - Analyte detected in the associated Method Blank  
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S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
J - Analyte detected below quantitation limits

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## Report of Laboratory Analysis

**CLIENT:** Gewalt Hamilton Associates  
**Lab Order:** 10050287  
**Project:** Fremont Twp  
**Lab ID:** 10050287-03

**Client Sample ID:** IL-63  
**Report Date:** 5/21/2010  
**Collection Date:** 5/11/2010 2:15:00 PM  
**Matrix:** Wastewater

Analyses	Result	EMT Reporting Limit	Units	Date Analyzed	Batch	Analyst
<b>Ammonia as N</b>		<b>Method:</b>	<b>SM4500-NH3-B-C</b>			
Nitrogen, Ammonia (As N)	0.5	0.05	mg/L	5/17/10	58456	TTT
<b>Anions by Ion Chromatography</b>		<b>Method:</b>	<b>E300</b>			
Chloride	117.	2.	mg/L	5/19/10	R140951	GSB
Fluoride	< 0.5	0.5	mg/L	5/19/10	R140951	GSB
<b>BOD, 5 Day, 20°C</b>		<b>Method:</b>	<b>SM5210 B</b>			
Biochemical Oxygen Demand	2.	2.	mg/L	5/12/10	R140840	AM2
<b>Phenolics</b>		<b>Method:</b>	<b>E420.1 REV.1978 BY AQUACHEM</b>			
Phenolics, Total Recoverable	< 0.005	0.005	mg/L	5/12/10	58330	CS2
<b>Phosphorous, Total</b>		<b>Method:</b>	<b>SM4500-P E / SW846 3015 / SW-846 3015</b>			
Phosphorus, Total (As P)	0.121	0.006	mg/L	5/17/10	58454	TTT
<b>Total Kjeldahl Nitrogen</b>		<b>Method:</b>	<b>SM4500-N BC / SM4500-NH3 B</b>			
Nitrogen, Kjeldahl, Total	0.7	0.5	mg/L	5/13/10	58368	TTT
<b>Total Suspended Solids</b>		<b>Method:</b>	<b>SM2540D</b>			
Suspended Solids (Residue, Non-Filterable)	88.	5.	mg/L	5/17/10	R140881	IR
<b>Metals by ICP MS</b>		<b>Method:</b>	<b>E200.8 / SW3015</b>			
Potassium	3.22	1.56	C mg/L	5/13/10	58332	AG

**Qualifiers:**

B - Analyte detected in the associated Method Blank  
E - Estimated  
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S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
J - Analyte detected below quantitation limits

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## Report of Laboratory Analysis

**CLIENT:** Gewalt Hamilton Associates  
**Lab Order:** 10050287  
**Project:** Fremont Twp  
**Lab ID:** 10050287-04

**Client Sample ID:** OWENS  
**Report Date:** 5/21/2010  
**Collection Date:** 5/11/2010 11:30:00 AM  
**Matrix:** Wastewater

Analyses	Result	EMT Reporting Limit	Units	Date Analyzed	Batch	Analyst
<b>Ammonia as N</b>		<b>Method:</b>	<b>SM4500-NH3-B-C</b>			
Nitrogen, Ammonia (As N)	0.22	0.05	mg/L	5/17/10	58456	TTT
<b>Anions by Ion Chromatography</b>		<b>Method:</b>	<b>E300</b>			
Chloride	180.	20.	mg/L	5/19/10	R140990	GSB
Fluoride	< 0.5	0.5	mg/L	5/19/10	R140951	GSB
<b>BOD, 5 Day, 20°C</b>		<b>Method:</b>	<b>SM5210 B</b>			
Biochemical Oxygen Demand	3.	2.	mg/L	5/12/10	R140840	AM2
<b>Phenolics</b>		<b>Method:</b>	<b>E420.1 REV.1978 BY AQUACHEM</b>			
Phenolics, Total Recoverable	< 0.005	0.005	mg/L	5/12/10	58330	CS2
<b>Phosphorous, Total</b>		<b>Method:</b>	<b>SM4500-P E / SW846 3015 / SW-846 3015</b>			
Phosphorus, Total (As P)	0.137	0.006	mg/L	5/17/10	58454	TTT
<b>Total Kjeldahl Nitrogen</b>		<b>Method:</b>	<b>SM4500-N BC / SM4500-NH3 B</b>			
Nitrogen, Kjeldahl, Total	1.26	0.5	mg/L	5/13/10	58368	TTT
<b>Total Suspended Solids</b>		<b>Method:</b>	<b>SM2540D</b>			
Suspended Solids (Residue, Non-Filterable)	41.	5.	mg/L	5/17/10	R140881	IR
<b>Metals by ICP MS</b>		<b>Method:</b>	<b>E200.8 / SW3015</b>			
Potassium	4.18	1.56	C mg/L	5/13/10	58332	AG

**Qualifiers:**

B - Analyte detected in the associated Method Blank  
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S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
J - Analyte detected below quantitation limits



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## Report of Laboratory Analysis

**CLIENT:** Gewalt Hamilton Associates  
**Lab Order:** 10050287  
**Project:** Fremont Twp  
**Lab ID:** 10050287-05

**Client Sample ID:** GILMER  
**Report Date:** 5/21/2010  
**Collection Date:** 5/11/2010 12:30:00 PM  
**Matrix:** Wastewater

Analyses	Result	EMT Reporting Limit	Units	Date Analyzed	Batch	Analyst
<b>Ammonia as N</b>		<b>Method:</b>	<b>SM4500-NH3-B-C</b>			
Nitrogen, Ammonia (As N)	0.17	0.05	mg/L	5/17/10	58456	TTT
<b>Anions by Ion Chromatography</b>		<b>Method:</b>	<b>E300</b>			
Chloride	75.4	2.	mg/L	5/19/10	R140951	GSB
Fluoride	< 0.5	0.5	mg/L	5/19/10	R140951	GSB
<b>BOD, 5 Day, 20°C</b>		<b>Method:</b>	<b>SM5210 B</b>			
Biochemical Oxygen Demand	3.	2.	mg/L	5/12/10	R140840	AM2
<b>Phenolics</b>		<b>Method:</b>	<b>E420.1 REV.1978 BY AQUACHEM</b>			
Phenolics, Total Recoverable	< 0.005	0.005	mg/L	5/12/10	58330	CS2
<b>Phosphorous, Total</b>		<b>Method:</b>	<b>SM4500-P E / SW846 3015 / SW-846 3015</b>			
Phosphorus, Total (As P)	0.182	0.006	mg/L	5/17/10	58454	TTT
<b>Total Kjeldahl Nitrogen</b>		<b>Method:</b>	<b>SM4500-N BC / SM4500-NH3 B</b>			
Nitrogen, Kjeldahl, Total	3.08	0.5	mg/L	5/13/10	58368	TTT
<b>Total Suspended Solids</b>		<b>Method:</b>	<b>SM2540D</b>			
Suspended Solids (Residue, Non-Filterable)	89.	5.	mg/L	5/17/10	R140881	IR
<b>Metals by ICP MS</b>		<b>Method:</b>	<b>E200.8 / SW3015</b>			
Potassium	3.77	1.56	C mg/L	5/13/10	58332	AG

**Qualifiers:**

B - Analyte detected in the associated Method Blank  
E - Estimated  
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S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
J - Analyte detected below quantitation limits

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## Report of Laboratory Analysis

**CLIENT:** Gewalt Hamilton Associates  
**Lab Order:** 10050287  
**Project:** Fremont Twp  
**Lab ID:** 10050287-06

**Client Sample ID:** AIRPORT  
**Report Date:** 5/21/2010  
**Collection Date:** 5/11/2010 9:45:00 AM  
**Matrix:** Wastewater

Analyses	Result	EMT Reporting Limit	Units	Date Analyzed	Batch	Analyst
<b>Ammonia as N</b>						
<b>Method: SM4500-NH3-B-C</b>						
Nitrogen, Ammonia (As N)	0.34	0.05	mg/L	5/17/10	58456	TTT
<b>Anions by Ion Chromatography</b>						
<b>Method: E300</b>						
Chloride	110.	2.	mg/L	5/19/10	R140951	GSB
Fluoride	< 0.5	0.5	mg/L	5/19/10	R140951	GSB
<b>BOD, 5 Day, 20°C</b>						
<b>Method: SM5210 B</b>						
Biochemical Oxygen Demand	3.	2.	mg/L	5/12/10	R140840	AM2
<b>Phenolics</b>						
<b>Method: E420.1 REV.1978 BY AQUACHEM</b>						
Phenolics, Total Recoverable	< 0.005	0.005	mg/L	5/12/10	58330	CS2
<b>Phosphorous, Total</b>						
<b>Method: SM4500-P E / SW846 3015 / SW-846 3015</b>						
Phosphorus, Total (As P)	0.253	0.01	mg/L	5/17/10	58454	TTT
<b>Total Kjeldahl Nitrogen</b>						
<b>Method: SM4500-N BC / SM4500-NH3 B</b>						
Nitrogen, Kjeldahl, Total	2.1	0.5	mg/L	5/13/10	58368	TTT
<b>Total Suspended Solids</b>						
<b>Method: SM2540D</b>						
Suspended Solids (Residue, Non-Filterable)	94.	5.	mg/L	5/17/10	R140881	IR
<b>Metals by ICP MS</b>						
<b>Method: E200.8 / SW3015</b>						
Potassium	3.62	1.56	C mg/L	5/13/10	58332	AG

**Qualifiers:**

B - Analyte detected in the associated Method Blank  
E - Estimated  
H - Holding Time Exceeded  
C - Laboratory not accredited for this parameter

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
J - Analyte detected below quantitation limits

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## Report of Laboratory Analysis

**CLIENT:** Gewalt Hamilton Associates  
**Lab Order:** 10050287  
**Project:** Fremont Twp  
**Lab ID:** 10050287-07

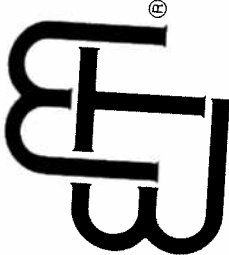
**Client Sample ID:** FAIRFIELD  
**Report Date:** 5/21/2010  
**Collection Date:** 5/11/2010 10:45:00 AM  
**Matrix:** Wastewater

Analyses	Result	EMT Reporting Limit	Units	Date Analyzed	Batch	Analyst
<b>Ammonia as N</b>		<b>Method:</b>	<b>SM4500-NH3-B-C</b>			
Nitrogen, Ammonia (As N)	0.39	0.05	mg/L	5/17/10	58456	TTT
<b>Anions by Ion Chromatography</b>		<b>Method:</b>	<b>E300</b>			
Chloride	54.2	2.	mg/L	5/19/10	R140951	GSB
Fluoride	< 0.5	0.5	mg/L	5/19/10	R140951	GSB
<b>BOD, 5 Day, 20°C</b>		<b>Method:</b>	<b>SM5210 B</b>			
Biochemical Oxygen Demand	3.	2.	mg/L	5/12/10	R140840	AM2
<b>Phenolics</b>		<b>Method:</b>	<b>E420.1 REV.1978 BY AQUACHEM</b>			
Phenolics, Total Recoverable	< 0.005	0.005	mg/L	5/12/10	58330	CS2
<b>Phosphorous, Total</b>		<b>Method:</b>	<b>SM4500-P E / SW846 3015 / SW-846 3015</b>			
Phosphorus, Total (As P)	0.439	0.024	mg/L	5/17/10	58454	TTT
<b>Total Kjeldahl Nitrogen</b>		<b>Method:</b>	<b>SM4500-N BC / SM4500-NH3 B</b>			
Nitrogen, Kjeldahl, Total	3.5	0.5	mg/L	5/19/10	58499	TTT
<b>Total Suspended Solids</b>		<b>Method:</b>	<b>SM2540D</b>			
Suspended Solids (Residue, Non-Filterable)	66.	5.	mg/L	5/17/10	R140881	IR
<b>Metals by ICP MS</b>		<b>Method:</b>	<b>E200.8 / SW3015</b>			
Potassium	2.29	1.56	C mg/L	5/13/10	58332	AG

**Qualifiers:**

B - Analyte detected in the associated Method Blank  
E - Estimated  
H - Holding Time Exceeded  
C - Laboratory not accredited for this parameter

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
J - Analyte detected below quantitation limits



# ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue  
Morton Grove, Illinois 60053-3203

Company: Geyalt Hamilton Associates, Inc.  
Address: 850 Forest Edge Dr.  
Vernon Hills, IL 60061  
Phone #: (847) 478-9700 Fax #: (847) 478-9701  
P.O. #: \_\_\_\_\_ Proj. #: 4191-699  
Client Contact: Marcy Knyaz  
Project ID / Location: Fremont Twp

## Chain of Custody Record

847-967-6666  
FAX: 847-967-6735  
www.emt.com

TURNAROUND TIME:  
 RUSH  
 ROUTINE  
\_\_\_\_\_ day turnaround

Due Date: \_\_\_\_\_ COC #: 040480

**Sample Type:**  
1. Waste Water 4. Sludge 7. Groundwater (filtered)  
2. Drinking Water 5. Oil 8. Other  
3. Soil 6. Groundwater

**Container Type:**  
P - Plastic V - VOC Vial O - Other  
G - Glass B - Tedlar Bag

**Preservative:**  
1. None 4. NaOH 7. Zn Ace  
2. H2SO4 5. HCl 8. Other  
3. HNO3 6. MeOH

### Analyses

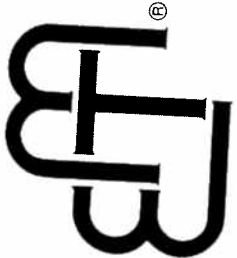
Sample I.D.	Sample Type	Size	Container Type	No.	By	Date	Time	pH	Temp.	Preservation		EMT USE ONLY
										Field	Lab	
Sylvan	7	QT	P	2	DAR	5/11	1:00				1	X
Sylvan	7	QT	P	1	DAR	5/11	1:00				2	X
Sylvan	7	PT	P	1	DAR	5/11	1:00				3	X
Highland	7	QT	P	2	DAR	5/11	1:45				1	X
Highland	7	QT	P	1	DAR	5/11	1:45				2	X
Highland	7	PT	P	1	DAR	5/11	1:45				3	X
IL-83	7	QT	P	2	DAR	5/11	2:15				1	X
IL-63	7	QT	P	1	DAR	5/11	2:15				2	X
IL-63	7	PT	P	1	DAR	5/11	2:15				3	X

Relinquished By: Den Edemore  
Date: 5-11-10 Time: 16:20  
Received By: \_\_\_\_\_  
Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Received For Lab By: Marjory  
Date: 5/11/10 Time: 16:20

EMT USE ONLY  
WORKORDER # 0650287  
TEMPERATURE (Must be recorded if sampling was greater than 6 hrs. prior to sample receipt)  
W

### SPECIAL INSTRUCTIONS:

EMT SAMPLE RETURN POLICY ON BACK



# ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue  
Morton Grove, Illinois 60053-3203

Company: Gewalt Hamilton Associates, Inc.  
Address: 850 Forest Edge Dr  
Vernon Hills, IL 60061

Phone #: (847) 478-9700 Fax #: (847) 478-9701  
P.O. #: \_\_\_\_\_ Proj. #: 4191-699

Client Contact: Marcy Knysz  
Project ID / Location: Fremont Twp

## Chain of Custody Record

847-967-6666  
FAX: 847-967-6735  
www.emt.com

Due Date: \_\_\_\_\_

COC #: 41787

TURNAROUND TIME:  
 RUSH  
 ROUTINE

**Sample Type:**  
1. Waste Water 4. Sludge 7. Groundwater (filtered)  
2. Drinking Water 5. Oil 8. Other  
3. Soil 6. Groundwater

**Container Type:**  
P - Plastic V - VOC Vial O - Other  
G - Glass B - Tedlar Bag

**Preservative:**  
1. None 4. NaOH 7. Zn Ace  
2. H<sub>2</sub>SO<sub>4</sub> 5. HCl 8. Other  
3. HNO<sub>3</sub> 6. MeOH

### Analyses

Sample I.D.	Sample Type	Size	Container Type	No.	By	Date	Time	pH	Temp.	Preservation			EMT USE ONLY	
										Field	Lab	Lab		
Owens	7	QT	P	2	DAR	5/11	11:30 <sup>AM</sup>				1			
Owens	7	QT	P	1	DAR	5/11	11:30 <sup>AM</sup>				2	X		
Owens	7	PT	P	1	DAR	5/11	11:30 <sup>AM</sup>				3	X	X	
Gilmer	7	QT	P	2	DAR	5/11	12:30				1	X		
Gilmer	7	QT	P	1	DAR	5/11	12:30				2	X		
Gilmer	7	PT	P	1	DAR	5/11	12:30				3	X	X	

EMT WORKORDER # 1055287

BOD, Chlor de Fluoride  
TSS  
Ammonia, Phenolics, TKN  
Phosphorus Total  
Potassium

Relinquished By: Don Ridener Received By: \_\_\_\_\_  
 Date: 5-11-10 Time: 16:20  
 Relinquished By: \_\_\_\_\_ Received By: \_\_\_\_\_  
 Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Relinquished By: \_\_\_\_\_ Received For Lab By: Walter H  
 Date: \_\_\_\_\_ Time: \_\_\_\_\_

EMT USE ONLY  
 SAMPLE RECEIVED  
 ON ICE  
 TEMPERATURE  
 (Must be recorded if sampling water less than 6 hrs. prior to sample receipt)

EMT SAMPLE RETURN POLICY ON BACK

### SPECIAL INSTRUCTIONS:



# ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue  
Morton Grove, Illinois 60053-3203

## Chain of Custody Record

847-967-6666  
FAX: 847-967-6735  
www.emt.com

TURNAROUND TIME:  
 RUSH  
      day turnaround  
 ROUTINE

Company: Gevalt Hamilton Associates, Inc.  
Address: 850 Forest Edge Dr  
Vernon Hills, IL 60061  
Phone #: (847) 478-9700 Fax #: (847) 478-9701  
P.O. #:      Proj. #: 4191-699  
Client Contact: Marcy King  
Project ID / Location: Fremont Twp

Due Date:      COC #: 44085

### Analyses

- Sample Type:**  
1. Waste Water 4. Sludge 7. Groundwater (filtered)  
2. Drinking Water 5. Oil 8. Other  
3. Soil 6. Groundwater
- Container Type:**  
P - Plastic V - VOC Vial O - Other  
G - Glass B - Tedlar Bag
- Preservative:**  
1. None 4. NaOH 7. Zn Ace  
2. H<sub>2</sub>SO<sub>4</sub> 5. HCl 8. Other  
3. HNO<sub>3</sub> 6. MeOH

Sample I.D.	Sample Type	Size	Container Type	Sampling			Preservation														
				Type	No.	By	Date	Time	pH	Temp.	Field	Lab									
Airport	7	QT	P	2	DAR	5/11	9:45 <sub>am</sub>														
Airport	7	QT	P	1	DAR	5/11	9:45 <sub>am</sub>							X	X						
Airport	7	PT	P	1	DAR	5/11	9:45 <sub>am</sub>							X	X						
Fairfield	7	QT	P	2	DAR	5/11	10:45 <sub>am</sub>														
Fairfield	7	QT	P	1	DAR	5/11	10:45 <sub>am</sub>							X	X						
Fairfield	7	PT	P	1	DAR	5/11	10:45 <sub>am</sub>							X	X						

EMT USE ONLY

WORKORDER # 1005287

CEA  
B  
C  
7A  
B

Ammonia, Phosphorus, TKN  
Potassium, Total  
BOD, Chloride, Fluoride  
TSS

Relinquished By: Dan Ridener Date: 5-11-10 Time: 16:20 Received By:     

Relinquished By:      Date:      Time:      Received By:     

Relinquished By:      Date:      Time:      Received For Lab By: Martha Valt

SAMPLE RECEIVED ON ICE

TEMPERATURE (Must be recorded if sampling was greater than 6 hrs. prior to sample receipt)

EMT SAMPLE RETURN POLICY ON BACK

### SPECIAL INSTRUCTIONS:

Date: 5-11-10 Jar Lot No.  
Time: 16:20