



**2016 ANNUAL NON-AGRICULTURAL SOURCE MATERIAL (NASM) SUMMARY REPORT
Including Biosolids Land Application Program and Biosolids Centralized Storage
Facility (BCSF) with Adjacent Stormwater Pond**

1. General Information

Oxford County prepares an individual report summarizing the Biosolids Land Application Program and BCSF. The report details the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. It is available for review by the end of February on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Oxford County owns and operates nine wastewater treatment plants. They are listed in the table below along with their predominant treatment system and method of biosolids treatment and handling.

Plant Name	Plant Process	Biosolids Processing and Handling
Woodstock WWTP	Conventional Activated Sludge	Anaerobic digestion, centrifuge dewatering, and transported to storage at BCSF prior to land application.
Ingersoll WWTP	Conventional Activated Sludge	Anaerobic digestion, centrifuge dewatering, and transported to storage at BCSF prior to land application.
Tillsonburg WWTP	Conventional Activated Sludge	Aerobic digestion, centrifuge dewatering, and transported to storage at BCSF prior to land application.
Thamesford WWTP	Extended aeration	Aerobic digestion and liquid storage on site prior to land application.
Drumbo WWTP	Sequencing Batch Reactor	No digestion, co-thickened sludge removed for further treatment by truck to the Woodstock WWTP.
Tavistock WWTP	Lagoon System	Stored in lagoons on site until land applied usually between 10 to 20 years storage.
Norwich WWTP	Lagoon System	Stored in lagoons on site until land applied usually between 10 to 20 years storage.
Plattsville WWTP	Lagoon System	Stored in lagoons on site until land applied usually between 10 to 20 years storage.
Mount Elgin WWTP	Black/Grey Water Recirculation Sand Filter and Common Drainage field.	Homeowners have septic tanks maintained by Oxford County requiring septage removal on an as needed basis to the Ingersoll or Woodstock WWTP.

The BCSF Facility description is provided below:

Biosolids Off-site Dedicated Storage:	BCSF
Amendment ECA Number:	3816-76HRTS
BCSF Owner & Contact Information:	Oxford County Public Works Department Environmental Services (Wastewater) P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778
Reporting Period:	January 1, 2016 – December 31, 2016

1.1. Biosolids Land Application Program Description

The biosolids land application program for the beneficial reuse as a nutrient was developed based on the Oxford County Biosolids Management Master Plan (BMMP). The five main elements of the Biosolids Management Master Plan include: more enforcement of the Oxford County Sewer Use By-law, dewatering of stabilized biosolids at each of the major wastewater treatment plants, transporting thickened sludge from smaller plants to the nearest major wastewater treatment plant for processing, land application of all biosolids on farms having a non-agricultural source material (NASM) plan, and centralized storage of biosolids when the material cannot be land applied.

In 2008, the Biosolids Centralized Storage Facility (BCSF) was built for the storage of the dewatered biosolids for periods such as winter months when the dewatered product cannot be directly land applied. The storage building is designed to provide a minimum of 240 days storage. It is also designed with segregated storage bays so that should material be determined to be non-compliant, it can be removed and taken to landfill and not mixed with compliant biosolids destined for land application.

The BCSF is located near Salford, Ontario adjacent to the Oxford County Waste Management Facility (landfill) and behind the compost area.

The BCSF will ultimately have sufficient room to house 7,000 m³ of material and will be built in two phases. The existing building (Phase 1) includes 12 bays; and a future Phase 2 (in 2018 under CWWF funding program) would add an additional four bays. The BCSF has sufficient space to accommodate the 240-day storage requirements for the plants, although not all systems dewater and store at this time. For example, the Thamesford WWTP will stay with a liquid land application program for the time being and may phase into dewatering in the future. The individual bays are slightly inclined with cement walls to allow for easy piling of the material. The incoming material is segregated by system and month and is deposited in the appropriate bay, after which Oxford County staff push the biosolids into higher piles at the back of the bay using a loader. There are large passive ventilation panels in the walls to allow for good ventilation and light into the building. The building is not connected to hydro. While there are lights, they would be powered by a portable generator only if needed during times of biosolids removal. The daily transport of the material into the storage facility is done during daylight hours.

The enforcement of the Oxford County Sewer Use By-law was an important step in protecting the quality of the biosolids, and to this end, Oxford County hired two enforcement personnel, one staff member in 2006 and a second in 2009. The wastewater division also acquired additional sophisticated wastewater automatic sampling equipment. These changes were made with the goal of improving the quality and reducing the quantity of biosolids produced.

Facility	2016 Biosolids Land Applied	2016 Raw Sludge Hauled Between Plants	2016 Total Biosolids Generated	Biosolids Type	Destination
Woodstock WWTP	2592 wet tonnes		2875 wet tonnes	Anaerobic dewatered	BCSF & Land Application
Ingersoll WWTP	769 wet tonnes		868 wet tonnes	Anaerobic dewatered	BCSF & Land Application
Tillsonburg WWTP	1043 wet tonnes		1190 wet tonnes	Aerobic dewatered	BCSF & Land Application
Thamesford WWTP	3788 m ³		3788 m ³	Aerobic liquid	Land Application
Drumbo SBR		991 m ³		Co-thickened Primary Sludge	Woodstock WWTP

1.2. Operating Expenses

In 2016, the Biosolids land application operating and maintenance expenditure was \$170,000.

2. Summary and Interpretation of Monitoring Data

2.1. Biosolids Quality Assurance and Control Measures

Sampling Procedure

Sampling is carried out as per the ECA.

Biosolids analysis is provided to the contractor and farmer for their use at the time of land application by directly providing the sample analysis results in PDF format to the biosolids contracted land applier when received electronically from the external lab.

Laboratory and Field Testing

The samples are analyzed by SGS Lakefield Research Ltd., a CAEAL certified lab.

The results are entered into an excel spreadsheet and checked for compliance with the regulations at the time of being entered. The analytical results of the dewatered biosolids are also summarized on a spreadsheet which is used for the calculation of monthly and yearly averages (Appendix A).

2.2. Biosolids Quality

The table below highlights the analytical results for metals versus the NMA maximum criteria. All sources of biosolids were compliant and were acceptable to be used as a nutrient for the land application program. More information can be found in Appendix A.

The biosolids were resampled at the farm at the time of application and those results (2016) can be found in Appendix A. These samples provide a further check on the quality of the material. All 2016 samples complied with the NMA criteria.

The Biosolids Contractor provides Nutrient reports to individual farmers on each application to aid in the beneficial use of the product as a nutrient. The contractor's table of NASM plans indicating spreading applications is included in Appendix A.

In summary, Oxford County’s Biosolids Management program provided effective production, transport, storage, and eventual reuse as a nutrient via land application of all biosolids generated under the program. All operation and maintenance activities were performed by Oxford County staff in the wastewater treatment plants.

The transportation of the biosolids from the wastewater treatment facilities to the storage building was done by Oxford County’s wastewater staff and Super Save Disposal (Ontario) Inc. working on Oxford County’s behalf or by Oxford County’s own forces under ECA # A900939.

Comparison of Generated Biosolids to NMA Criteria for Metals in mg/kg Dry Solids.

Parameter	Woodstock WWTP	Ingersoll WWTP	Tillsonburg WWTP	Thamesford WWTP	NMA Metals Criteria
Metals mg/kg dry solids	2016 Annual Average	2016 Annual Average	2016 Annual Average	2016 Annual Average	Maximum
Arsenic	5.5	6.0	5.0	4	170
Cadmium	1.39	0.9	0.70	0.3	34
Cobalt	5.0	4.2	2.3	1.7	340
Chromium	65	67	24	13	2800
Copper	705	762	627	254	1700
Mercury	0.7	0.4	0.7	0.091	11
Molybdenum	13	20	8.1	8	94
Nickel	104	35	50	12	420
Lead	43	17	20	4	1100
Selenium	7.9	9.8	9.4	5	34
Zinc	1058	1705	716	357	4200

The Biosolids from all facilities were compliant with the Nutrient Management Act (NMA) regulations governing NASM.

3. Non-Compliance, Complaints

There were no upsets or spills during the year of operation and no complaints have been received to date.

4. Operation of the Stormwater Management Pond for the Biosolids Centralized Storage Facility (BCSF)

The stormwater management pond services a total drainage area of 4.85 ha consisting of leaf and yard waste composting pad and a biosolids centralized storage facility (BCSF) located east of the Oxford County Waste Management Facility. It was designed to attenuate stormwater runoff from storm events and was constructed as per the amended ECA # 4022-A8YQ6R.

4.1 Sampling Procedure

Samples are collected semi-annually during spring and fall after a significant rainfall event and analyzed for the following:

- | | |
|------------------------|------------------------|
| Alkalinity | Total Ammonia Nitrogen |
| Chloride | Iron |
| Nitrate Nitrogen | Nitrite Nitrogen |
| TKN | Total Phosphorus |
| Total Suspended Solids | Sulphate |
| CBOD | COD |
| Phenol | pH |
| Temperature | Conductivity |
| Dissolved Oxygen | |

4.2 Stormwater Management Pond Performance & Effluent

The facility is inspected regularly and a log book of the inspections is maintained at the BCSF. The results of the sampling program are included in Appendix A in a summary Table.

4.3 Spills, Upset and Abnormal Conditions

There were no spills or abnormal discharge events in 2016.

5. Inspection of the BCSF

The Biosolids Centralized Storage Facility was cleaned and an in-house inspection took place on June 1, 2016.

Waste Management Facility staff swept the building prior to inspection and a vacuum truck was used to pump out the sump pits.

The following is a list of items found during inspection and the actions taken:

Inspection Item	Action Taken
There are cracks in the concrete floor at the aisle end of the concrete divider wall of Bays 1, 3, 4, 5, 6, 7, 8, 9, 10, 11 & 12.	No action required at this time, minor cracks.
In the center aisle east of Bay 5 there is a piece of concrete reinforcing steel exposed.	No action required at this time.
In Bay 12 on the south side near the west end, there are two locations in the floor that are broken.	No action required at this time.
There are minor cracks in the exterior walls on all sides of the building, some have minor staining, but none of them have opened up.	There is no action required.
In Bay 11 near the east opening, on the south side there is a broken piece of concrete approximately 24" in diameter.	There is no action required.
There are some chips in the floor of Bays 2, 4, 5, 8, 10 & 12. The chips are only approximately a ½ inch deep.	There is no action required.
Sump pits have been pumped out.	There is no action required.
Solar panels are being installed on roof.	There is no action required.

6. Summary

The stormwater management facility provided effective attenuation of stormwater in 2016 with no adverse or abnormal conditions occurring.

The BCSF provided effective winter storage for the Oxford County biosolids land application program and was in excellent overall condition. No complaints were received about the operation of either facility in 2016.