

# Temporary Field Storage of Non-Agricultural Source Material

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## Factsheet

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(replaces OMAFRA Factsheet 11-009 of the same name)

As of January 1, 2011, the land application and some on-farm storage of Non-Agricultural Source Material (NASM) is regulated under Ontario Regulation 267/03, as amended (the “Regulation”), which is made under the *Nutrient Management Act, 2002 (NMA)*. If a material is to be stored at an agricultural operation under a NASM plan for more than 24 hr, it must be kept in either a permanent nutrient storage facility or a temporary field nutrient storage site.

Some types of NASM can be temporarily stored at a field prior to application if a number of regulatory requirements are met. These regulatory requirements take into account the characteristics of the material and the characteristics of the temporary field storage site. This information is used to determine if, and for how long, the NASM can be stored in a specific temporary field storage site.

### CHARACTERISTICS OF THE MATERIAL

Only material meeting the definition of “solid” in section 1 of the Regulation can be stored in a temporary field storage site. Solid, in relation to prescribed materials or nutrients, is defined as: “. . . having a dry matter content of 18 per cent, or more, or a slump of 150 mm, or less, using the (slump test) set out in Schedule 9 to Regulation 347 made under the *Environmental Protection Act* . . .”

### Temporary Storage of Liquid NASM

Liquid NASM cannot be stored in a temporary field nutrient storage site. Liquid NASM can, however, be stored in portable tanks at the field

prior to/during application if the following rules in section 81.3 of the Regulation are met:

1. The capacity of the tank cannot exceed the amount of material that will be applied to the NASM application area in 1 day.
2. All the material that is delivered to the application site must be applied by midnight of the day the material is received.
3. The portable tanks must be empty by midnight of the day of application.

### Odour

NASMs have been divided into three categories based on odour detection thresholds. Table 1 is a summary of the odour categories and examples of materials that fit into each category. **Solid NASM that is OC3 cannot be put into temporary field storage.**

Table 1. Odour categories for NASM

Category	Definition	Example Materials*
Odour Category 1 (OC1)	Odour detection threshold of <500 odour units/m <sup>3</sup>	<ul style="list-style-type: none"> <li>• leaf and yard waste</li> <li>• composted leaf and yard waste</li> </ul>
Odour Category 2 (OC2)	Odour detection threshold of ≥500 to <1,500 odour units/m <sup>3</sup>	<ul style="list-style-type: none"> <li>• culled fruit and vegetables</li> <li>• solid pulp and paper biosolids</li> </ul>
Odour Category 3 (OC3)	Odour detection threshold ≥1,500 to <4,500 odour units/m <sup>3</sup>	<ul style="list-style-type: none"> <li>• grease trap waste</li> <li>• sewage biosolids dewatered by high speed centrifuge</li> </ul>

Material with >4,500 odour units/m<sup>3</sup> cannot be land-applied to agricultural land.

\* A complete list of NASMs and their odour category can be found in the Nutrient Management Tables.

## LOCATION OF TEMPORARY FIELD STORAGE SITES

If solid NASM is stored in a temporary field storage site for longer than 24 hr, the site must meet ALL the requirements shown in Table 2.

<b>Table 2.</b> Minimum site requirements for NASM temporary field storage sites	
The Regulation outlines minimum site requirements related to location.	
<b>Minimum Site Requirements</b>	<b>Rationale</b>
The <b>minimum</b> depth of unconsolidated soil <sup>1</sup> to bedrock, under the site and within 3 m of the side of the site, must be 0.3 m.	This minimizes the potential for runoff to reach bedrock under, or near, a temporary storage site.
The <b>minimum</b> depth of soil above the water table <sup>2</sup> , under the site and within 3 m of the side of the site, must be 0.9 m.	This minimizes the potential for runoff to reach the water table under, or near, a temporary storage site.
Nutrients must <b>not</b> be stored on soils whose hydrological soil group is A, unless the depth to soil is greater than 0.9 m to bedrock.	“Hydrologic soil group A” means a soil with rapid infiltration rates, as defined by the <i>Drainage Guide for Ontario</i> . There are very few locations in Ontario with both hydrologic soil group A and shallow soils, but if you suspect your farm is situated on one of them, use a metal rod to probe down at least 1 m to check for possible shallow bedrock.
The storage site must <b>not</b> be located in an area that, according to the flood plain mapping provided by the municipality or conservation authority, is subject to flooding more than once every 100 years.	Storage sites with the potential for flooding are inappropriate. Ask the conservation authority if they have records indicating that the proposed temporary storage is in a 1-in-100-year flood plain.
The site must <b>not</b> have a slope greater than 3%.	3% is a vertical drop of 3 m every 100 m distance, however, slope should be calculated over a minimum length of 10 m. Runoff moves quickly on relatively steep slopes.
There must be a flow path that is at least 50 m to the nearest surface water <b>or</b> tile inlet, and located at least 0.3 m above bedrock.	Flow path is defined in the Regulation as “a surface channel or depression that conducts liquids away from the area.”
<p><b>Setbacks from wells are:</b></p> <ul style="list-style-type: none"> <li>• 45 m of a drilled well that has a depth of at least 15 m and a watertight casing to a depth of at least 6 m below ground level</li> <li>• 90 m of any other well, other than a municipal well</li> <li>• 100 m of a municipal well</li> </ul>	Setbacks help minimize risks to drinking water. Setbacks to wells are greater than those required for permanent storages since there is more risk of runoff.
<p><b>Setbacks from dwelling, residential area<sup>3</sup> or commercial, community or institutional use:</b></p> <p><b>OC1 NASM:</b></p> <ul style="list-style-type: none"> <li>• 125 m from a dwelling</li> <li>• 250 m from a residential area or commercial, community or institutional use</li> </ul> <p><b>OC2 NASM:</b></p> <ul style="list-style-type: none"> <li>• 200 m from a dwelling</li> <li>• 450 m from a residential area or commercial, community or institutional use</li> </ul> <p><b>OC3 NASM:</b></p> <ul style="list-style-type: none"> <li>• cannot be stored in temporary field storage</li> </ul>	Setbacks help minimize odour issues with neighbours. Setbacks from OC2 NASM storage sites are greater because these materials have a higher odour potential.
<p><sup>1</sup> Unconsolidated soil has not been compacted, other than through normal field traffic and cultivation.</p> <p><sup>2</sup> Water table is defined in the Regulation as “In relation to land, the highest level of water found in the ground, as recorded in the water well records for the nearest water wells to the land, or as determined by a test hole dug at or before the placing of materials containing nutrients at a temporary storage site located on the land.”</p> <p><sup>3</sup> “Residential area” means an area in which there are four or more lots of not more than 1 ha, that are adjacent to each other and not separated by anything other than a road allowance or right of way. There must be a residential building on each lot.</p>	

## MANAGEMENT REQUIREMENTS FOR TEMPORARY FIELD STORAGE SITES

The Regulation sets out the minimum management requirements for field sites used to temporarily store solid NASM. These requirements are summarized in Table 3.



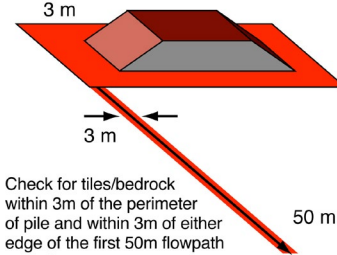
<b>Table 3.</b> Minimum management requirements for NASM temporary field storage sites	
The Regulation outlines several minimum management requirements for storage sites.	
<b>Minimum Management Requirements</b>	<b>Rationale</b>
A farmer who receives and stores NASM on site cannot receive and store more NASM than is expected to be used for crop production on that farm unit in that operating year.	Storage piles should be size-appropriate for the field; a temporary pile is truly temporary when it is used on the field where it is placed.
NASM stored on the site must be used on the farm unit and cannot be transferred to another farm unit.	To limit risk, NASM in temporary field storage must be applied to the farm unit it is stored on. It cannot be stored on one farm unit and then transferred and spread on another.
If more than one type of NASM is stored on site, the nutrients must be managed in accordance with the most restrictive requirements applicable to any of the NASM stored in the site.	If more than one type of NASM is stored at a site, it is very hard to determine the make-up of the combined material. Therefore requirements for the material that is most restrictive apply to all the material stored at the site.
If the site is located in an area that is tile-drained, there must be a contingency plan in place to deal with any contaminated liquid that might get into the tiles.	Land owners must be prepared to deal with runoff getting into tile drains. Proving there are, or aren't, tiles under or near a temporary storage can be difficult. Some ideas include: checking aerial photos of the field; looking for nearby tile outlets; observing the first spots to drain in spring; or asking previous owners and local drainage contractors. Probing at least 1 m deep in more obvious locations for tiles with a metal rod can help, but is difficult over large areas.
NASM must not be stored on site for longer than the maximum time allowed for each nutrient.	If you have more than one temporary field storage on the farm in different locations, each one might have a different allowable maximum time at that site based on the scoring system for that site.
The site may be used again the following year if a minimum of 75% vegetative cover is re-established on the site following the removal of NASM from the surface after the site ceases to be in use each year.	To be used consecutively for temporary field storage, the area must be able to grow vegetation again. This can be difficult when the same site is used annually.

## DETERMINING THE LENGTH OF SOLID NASM STORAGE ALLOWED AT A SITE

Table 4 sets out 10 site characteristics and management practices that can be used to determine the number of allowable days of temporary storage. The table explains how each factor is used to cumulatively determine the maximum allowable time of field storage at each site and the rationale. The storage period is linked to relative environmental risk to surface and groundwater.

The total number of days is cumulative but cannot exceed 300 days. Dewatered municipal sewage biosolids have additional restrictions. No matter what the site characteristics or management practices are, municipal dewatered sewage biosolids that are OC2 cannot be stored for more than 10 days in temporary field storage.

**Table 4.** Temporary field storage of NASM site-scoring system used to determine allowable days of storage

Management Techniques and Field Conditions	Allowable Days of Storage	Your Farm	Rationale
<b>1. % dry matter</b>			
Nutrients stored in the site have a dry matter content of:			<p>The higher the dry matter % of the material, the more rainfall it can soak up. Wetter material sheds rainfall off the sides, or lets it soak through and into the soil.</p> <p>Keeping the top of the pile as flat as possible allows rainfall to soak in, preventing runoff.</p> 
a) 50%, or more	+60		
b) 30% or more, but less than 50%	+30		
c) 18%, or more, but less than 30% (includes horticultural culled materials)	+0		
<b>2. % N and % P added together</b>			
The % of total nitrogen combined with the % of total phosphorus, both on a wet basis, is:			<p>Nitrogen and phosphorus are two nutrients that have environmental risk. The lower the content of these two nutrients in the stored NASM, the lower the environmental risk of runoff. There is a broad range of nutrient contents in solid NASM.</p> 
a) less than 0.8%	+60		
b) at least 0.8%, but less than 1.6%	+30		
c) 1.6%, or more	+0		
<b>3. Drainage tile and bedrock location</b>			
<p>a) There are no field drainage tiles at any depth of the soil surface and no bedrock within 0.9 m of the soil surface, located:</p> <ul style="list-style-type: none"> <li>• under the site</li> <li>• within 3 m of the perimeter of the site, or</li> <li>• within the first 50 m of the flow path to surface water</li> </ul>	+0		<p>Field tiles and/or bedrock are direct conduits that allow runoff from temporary storage piles to enter surface or groundwater.</p> <p>There is less environmental risk if the area chosen to build a temporary storage pile does NOT have bedrock or tile drains under, near, or in the first part of the flow path away from the pile.</p>  <p>Check for tiles/bedrock within 3m of the perimeter of pile and within 3m of either edge of the first 50m flowpath to surface water</p>
<p>b) There are field drainage tiles at any depth of the soil surface or bedrock within 0.9 m of the soil surface, located:</p> <ul style="list-style-type: none"> <li>• under the site</li> <li>• within 3 m of the perimeter of the site, or</li> <li>• within the first 50 m of the flow path to surface water</li> </ul>	-60		

**Table 4.** Temporary field storage of NASM site-scoring system used to determine allowable days of storage

Management Techniques and Field Conditions	Allowable Days of Storage	Your Farm	Rationale												
<b>4. Soil type under the site</b>															
The site is situated on soil included in the following hydrologic soil groups as defined by OMAFRA Publication 29, <i>Drainage Guide for Ontario</i> :			The heavier the soil under a temporary field storage, the less opportunity there is for leachate to percolate to the groundwater. Clay soils are denser and better at preventing downward percolation than lighter, coarser soils one might find in a peach orchard.												
a) B, C or D	+30														
b) A	+0														
<b>5. Perimeter of the site</b>															
The outer edge of the site (of all piles), at the ground surface, has a perimeter of:			Piles that have a more square and compact footprint will soak up more rainfall than piles of equivalent volume that are long and narrow, since they have less total perimeter for runoff. This table shows the perimeter of three pile types, all storing 100 tonnes of solid NASM, stored 1.2 m deep (4 ft) when dumped from a truck; one long and narrow, one medium length, and one short and wide pile.												
a) less than 100 m	+30														
b) 100 m, or more	+0														
<table border="1"> <thead> <tr> <th>Pile Type</th> <th>L x W (m)</th> <th>Per. (m)</th> </tr> </thead> <tbody> <tr> <td>Long and narrow</td> <td>84 x 4.25</td> <td>177</td> </tr> <tr> <td>Medium length</td> <td>43 x 8.5</td> <td>103</td> </tr> <tr> <td>Short and wide</td> <td>29 x 12.8</td> <td>84</td> </tr> </tbody> </table>				Pile Type	L x W (m)	Per. (m)	Long and narrow	84 x 4.25	177	Medium length	43 x 8.5	103	Short and wide	29 x 12.8	84
Pile Type	L x W (m)	Per. (m)													
Long and narrow	84 x 4.25	177													
Medium length	43 x 8.5	103													
Short and wide	29 x 12.8	84													
<b>6. Covers and tarps</b>															
a) The site is covered with a rain-shedding tarp that: <ul style="list-style-type: none"> <li>has been anchored against wind removal</li> <li>has been placed on site the same day on which the first materials were placed, and</li> <li>remains in place for entire storage period</li> </ul>	+120		Tarps prevent contaminated runoff, since rainfall does not touch the material. However, tarps are unpopular because they are inconvenient and difficult to anchor against wind removal.												
b) The site is <b>not</b> covered with rain-shedding tarp.	+0														
<b>7. Distance to surface water</b>															
The site has a flow path to the nearest surface water or water inlet for field tile drainage of:			If runoff does occur, there is less environmental risk if the runoff has to travel a long distance to surface water or to a water inlet for field tile drains. Surface water is defined in the Regulation. Although water inlets for field tile drains are not surface water under the Regulation, temporary field storages should not be located near them.												
a) 150 m, or more	+30														
b) at least 50 m, but less than 150 m	+0														
<b>8. Location of the site</b>															
The site is situated on the same location, or within 125 m of the same location:			Temporary field storage in the same location year after year is considered permanent storage. Storage in one area causes a build-up of nutrients in the soil that may leach to groundwater or harm crops that are grown in the area in the future. Piles should be sized appropriate to fields, and moved from field to field, as needed, for each crop.												
a) not more often than once every 3 years	+60														
b) more often than once every 3 years	+0														



**Table 4.** Temporary field storage of NASM site-scoring system used to determine allowable days of storage

Management Techniques and Field Conditions	Allowable Days of Storage	Your Farm	Rationale
<b>9. Materials removed from site</b>			
a) The site is not situated on the same location, or within 125 m of the same location, more often than once every 3 years, and the materials stored are removed from the site and applied to land between August 15 and October 15 in any year.	+60		Many farmers want to spread NASM between mid-summer and early fall, such as after wheat is harvested. Usually, during this time, more moisture evaporates than is replaced by rainfall, so there is reduced risk of runoff. The Regulation provides an incentive for temporary field-stored NASM that will be spread during this drier period, as long as different sites are chosen each year. The period of August 15 to October 15 corresponds to the time of year that a cover crop can be planted on the field to reduce the risk of environmental loss of nutrients from the NASM.
b) The situation described above does not apply to the site.	+0		
<b>10. Turning of stored materials</b>			
a) The pile of materials stored on site: <ul style="list-style-type: none"> <li>• has dry matter between 25% and 60%, and</li> <li>• has C:N ratio between 20:1 and 40:1, and</li> <li>• is turned so that every piece of material in the pile is displaced from its former position and mixed or inverted once weekly for the first 3 weeks, and once monthly after that</li> </ul>	+120		An increasing number of operators compost their solid material for use on cropland, as shown here. Long windrows of material with a high carbon source, such as straw or wood shavings, are placed in the field, and then turned on a regular basis to mix and introduce oxygen into the pile. This improves the compost process, removes moisture from the piles and breaks up surface crusting, allowing the piles to act as sponges for any rainfall that lands.
b) The site described above does not apply.	+0		
<b>Total score: Add the totals in the "Your Farm" column:</b>			<b>&lt;&lt;&lt; Maximum allowable consecutive days of temporary field storage at this location</b>



## RECORDS

The Regulation requires records to be kept when using temporary field storage. The records must include:

- the date the pile was established
- the date the material was removed from the pile
- the date(s) the pile was turned, if the management of the material includes the turning of the pile. See item 10 of Table 4.
- a sketch showing the location of the site relative to the required setback distances shown in Table 2, and distance to any other temporary field storage sites
- management techniques and site conditions used in calculating the allowable days of storage. Be able to show how the allowable days of storage were calculated.

## EXAMPLES

The following two examples show how allowable days of storage are calculated for different types of material.

### Example 1



For this example, a temporary field storage of cullered onions from a food processor has these characteristics:

#	Characteristics	Example 1	Days
1	% dry matter <sup>1</sup>	13%	+0
2	% N added to % P	0.25%	+60
3	Tiles/bedrock under/nearby	none	+0
4	Soil type	clay (D)	+30
5	Perimeter of pile	30 m	+30
6	Cover	none	+0
7	Distance to surface water	500 m	+30
8	Location of site	once/3 years	+60
9	Removal date	May	+0
10	Turning of pile	not turned	+0
<b>Total maximum days allowed at this site</b>			<b>+210</b>

<sup>1</sup> These cullered onions are less than 18% dry matter, but would pass a “slump” test, so should be considered in the lowest dry matter range of 18%–30% for purposes of scoring the temporary storage site.

In this example, the producer could increase the allowable days of storage by covering the pile or removing the material between August 15 and October 15. No matter what the characteristics for the site, material cannot be stored for more than 300 days.

### Example 2



Pulp and paper biosolids are the solid residues from the treatment of wastewater from pulping, papermaking and paper recycling operations. A temporary field storage for pulp and paper biosolids has these characteristics:

#	Characteristics	Example 2	Days
1	% dry matter	40%	+30
2	% N added to % P	0.55%	+60
3	Tiles/bedrock under/nearby	tile present	-60
4	Soil type	sand (A)	+0
5	Perimeter of pile	50 m	+30
6	Cover	none	+0
7	Distance to surface water	75 m	+0
8	Location of site	every year	+0
9	Removal date	September	+0 <sup>1</sup>
10	Turning of pile	not turned	+0
<b>Total maximum days allowed at this site</b>			<b>+60</b>

<sup>1</sup> Note that even though the pile will be spread in September, the site does not score an additional 60 days because it does not meet the additional condition of “not situated on the same location more often than once every 3 years.”

In this example, a producer could increase the allowable storage time by finding a site without tiles, by moving it farther from surface water or by moving to different locations every year in a crop rotation and continuing to spread in September.

This Factsheet was originally written by Hugh Fraser, P.Eng, Horticultural Crop Protection and Post-Harvest Engineer, OMAFRA, Vineland, and revised by Matt Wilson, Environmental Specialist, OMAFRA, Woodstock, and Trevor Robak, Environmental Specialist, OMAFRA, London.

Do you know about Ontario's *Nutrient Management Act*?

The provincial *Nutrient Management Act* (NMA) and the Regulation 267/03 regulate the storage, handling and application of nutrients that could be applied to agricultural cropland. The objective is to protect Ontario's surface and groundwater resources.

Please consult the regulation and protocols for the specific legal details. This Factsheet is not meant to provide legal advice. Consult your lawyer if you have questions about your legal obligations.

For more information on the NMA, call the Agricultural Information Contact Centre at 1-877-424-1300, e-mail [nman.omafra@ontario.ca](mailto:nman.omafra@ontario.ca) or visit [ontario.ca/omafra](http://ontario.ca/omafra).

Factsheets are continually being updated, so please ensure that you have the most recent version.



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