

GLOSSARY

Aquifer	A geologic formation that holds and yields usable amounts of water. Aquifers can be classified as confined or unconfined.
Artesian pressure	This is the confining internal pressure of groundwater in an artesian aquifer. The pressure is sufficiently greater than atmospheric pressure to cause groundwater to rise above its natural level in soil.
Baseflow	The portion of watercourse flow that is not attributable to direct runoff, precipitation or melting snow. That part of the stream flow that is derived from groundwater.
Berm	A raised strip or area of land, usually level, between the edge of a spoil bank and edge of a drainage channel or canal, or a small embankment or ridge for controlling surface water flow.
Best management practice (BMP)	Any structural, non-structural and/or managerial technique recognized to be the most effective and practical means to reduce surface water and groundwater contamination while still allowing the productive use of resources.
Blind inlet	Surface water inlet to a subsurface drainpipe in which water enters by percolation through placed granular material, rather than through open-flow conduits. Does not obstruct tillage and often not visible.
Buffer strip	A permanently vegetated strip of land adjacent to a watercourse that filters runoff and stabilizes the bank.
Capillary rise	Height that water will rise by surface tension above a free water surface in the soil, expressed as length unit of water.
Collector main	A main drain that collects the water from lateral drains on one or both sides of the drainpipe.
Controlled drainage	Conserving water in a subsurface drainage system by means of control dams, check drains, or a combination of these. At the end of a drainage event, the drainage system is stopped to make more water available at a depth favourable to crop growth. Similar to subirrigation, except no water is added to the system to maintain the water table level.
Diversion	A channel or berm constructed across a slope to intercept surface runoff and divert it to a safe or convenient discharge point. Usually placed above the area to be protected.
Drain	Any closed conduit (perforated pipe or tile) or open channel used for removal of excess groundwater or surface water.
Drain envelope	A synthetic material placed around subsurface drainpipe to restrain the entry of soil particles with the drainage water.
Drainage	Process of removing surface or subsurface water from a soil or a specified area.
Drainage system	Collection of surface ditches or subsurface drainpipes, together with structures and pumps used to collect and remove excess surface and subsurface water from an area.
Drainpipe	Any product such as corrugated plastic tubing, clay or concrete drain tile, or other type of conduit used for drainage.
Draw	A natural depression across a field where water collects (converges) and flows. In most cases, the slopes of draws are sufficiently gradual to be cropped.
Drop structure	Hydraulic structure for safely transferring water from a higher level to a lower level safely, without causing erosion.
Envelope	Generic name for materials placed on or around a drainage conduit, irrespective of whether used for mechanical support, hydraulic purposes (hydraulic envelope), or to stabilize surrounding soil material (filter envelope).
Evapotranspiration	The combination of water transpired from vegetation and evaporated from the soil and plant surfaces.
Field capacity	Amount of water remaining in a soil when the downward water flow caused by gravity becomes negligible.
Field ditch	An open channel with two sides and a bottom constructed to convey water within a field either for irrigation or drainage.
Gley	Refers to the dull grey to bluish-grey colour of soil when subjected to prolonged saturation, i.e., oxygen-deprived environment.
Grade	Slope of a channel or natural ground. In field drainage, it is often expressed in metres per 100 metres (feet per 100 feet) or per cent.

Grade control	Process of maintaining constant and correct slope of a predetermined trench, ditch, terrace, canal, etc., using optical, laser, or GPS-based surveying equipment.
Gravitational water	Soil water that moves into, through, or out of the soil under the influence of gravity.
Groundwater	Water occurring in the zone of saturation in an aquifer or soil.
Groundwater flow	Flow of water in an aquifer or soil.
Hardpan	A hardened soil layer caused by cementation of soil particles.
Header main	A main usually parallel to drainage channel to capture water from a series of laterals and reduce the number of exit points (outfalls) at the drainage channel. Term is sometimes used when main drain runs along field boundary. Laterals only enter from one side.
Heavy soil	Soils with a high clay content; soils requiring higher draught power requirements to plough.
Herringbone system	Arrangement of a pipe drainage system where laterals enter a main from both sides at angles less than 90 degrees.
Hydraulic conductivity	The rate at which water moves through a soil.
Hygroscopic water	Soil water that is held so tightly to soil particles that it is unavailable to growing plants.
Impermeable layer	A layer of soil that significantly restricts the flow of water. If the permeability of a layer in the soil profile is about one-tenth that of the soil above it, the soil can be considered impermeable.
Infiltration	The process by which water on the ground surface enters the soil.
Inlet	A device to deliver water directly from the ground surface to a subsurface drainpipe.
Iron ochre	A reddish or yellowish brown gelatinous deposit formed by iron-fixing bacteria when exposed to air. With time the gelatinous material hardens into a scale deposit.
Land grading	The shaping of the land surface by cutting, filling and smoothing to continuous planned grades so that each row or surface slopes to a drain without ponding.
Lateral drain	Secondary subsurface drainpipe that collects excess water from a field, and conveys water to a header main/main drain for conveyance to a proper outlet.
Main drain	Principal subsurface drainpipe that conducts drainage water from the lateral drains and sub-mains to an outlet. See also Header main and Sub-main.
Municipal drain	Constructed channels or large-diameter pipes created under the authority of the Drainage Act.
Outfall	Point where water flows from a conduit, stream, or drain.
Outlet / end pipe	A pipe (usually steel or rigid plastic) that connects a subsurface drainage system to a surface water system without causing erosion.
Perched water table	A localized condition of free water held in a pervious layer because of an underlying impervious layer and separated from deeper aquifers.
Percolation	Downward movement of water through the soil profile.
Perforated pipe	Pipe designed to discharge or accept water through small, multiple, closely spaced orifices placed in its circumference.
Permeability	The ease with which gases, liquids, or plant roots penetrate or pass through a layer of soil or porous media.
Porosity	The volume of pores in a soil.
Random drainage	Surface or subsurface drainage system of irregular pattern used mainly in depressional sites.
Recharge area	Land area over which water infiltrates and percolates to replenish an aquifer.
Riparian area	The land adjacent to bodies of surface waters – including shores, banks, floodplains and ravine slopes.
Root zone	Depth of soil that plant roots readily penetrate and in which the predominant root activity occurs.
Runoff	The portion of precipitation or snowmelt that flows over the soil surface.
Sand	A soil particle with a diameter between 0.05 and 2.0 mm.

Seepage	The movement of water through the soil into or out of unlined canals, drainage channels, and water storage facilities.
Silt	A soil particle with a diameter between 0.002 and 0.05 mm.
Soil aeration	Process by which air and other gases enter the soil or are exchanged.
Soil compaction	Consolidation, reduction in porosity, and structure collapse of soil when subjected to surface loads.
Soil conservation	Protection of soil against physical loss by erosion and chemical deterioration through the application of management and land use methods.
Soil erodibility	A measure of the soil's susceptibility to erosion processes.
Soil erosion	The movement of soil by natural or mechanical means.
Soil horizon	A layer of soil differing from adjacent layers in physical, chemical, and biological properties or characteristics.
Soil organic matter	Organic fraction of the soil, including plant and animal residue in various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil populations.
Soil profile	Vertical section of the soil from the surface through all its horizons into the parent material.
Soil series	A conceptualized class of soil bodies having similar characteristics and arrangement in the soil profile.
Soil structure	The arrangement of primary soil particles into secondary particles, units, or peds that make up the soil mass. Soil structure has a major influence on water and air movement, biological activity, root growth, and seedling emergence.
Soil texture	Classification of soil by its relative proportions of sand, silt, and clay.
Soil water	All forms of water in the soil.
Spillway	Conduit through or around a dam or dike for the passage of excess water.
Subirrigation	Regulation of the water table by means of control dams, check drains, or a combination of these, and addition of water by means of the subsurface drainage system to maintain the water table at a depth favourable to crop growth.
Sub-main	Collects water from laterals and delivers it to main drain.
Subsoiling	Tillage operation to loosen the soil below the tillage zone.
Subsurface drainage	The removal of excess water from below the soil surface by means of drainpipe.
Surface drainage	The diversion or orderly removal of excess water from the surface of the land by means of improved natural or constructed channels, supplemented when necessary by sloping and grading of land surfaces to these channels.
Surface inlet	Structure for diverting surface water underground and into an open drainage channel, subsurface drain, or pipeline.
Surface water	1. Water found on the surface of the earth – e.g., ponds, lakes, streams and rivers. 2. Water on cropland soil surface.
Tile	Drainpipe made of burned clay, concrete, or similar material, in short length usually laid with open joints to collect and carry excess water from the soil. Sometimes also refers to plastic drainpipe.
Transpiration	The absorption of soil water by plants and its release into the atmosphere in the form of water vapour. This process regulates plant temperatures.
Vent	A device fitted to a pipeline that permits the passage of air to or from the pipe. Also called a breather.
Watershed	Total land area above a given point on a stream or waterway that contributes runoff to that point.
Water table	The upper surface of a saturated zone within the soil.
Wetland	Lands that are seasonally or permanently covered by shallow water, have very poorly drained soils, and are dominated by water-tolerant plants.

Agencies and Offices

ONTARIO MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS

For questions regarding farming, agri-business, or rural business:

Agricultural Information Contact Centre
1 Stone Road West
Guelph, ON N1G 4Y2
ph: 1-877-424-1300
email: ag.info.omafra@ontario.ca
web: www.omafra.gov.on.ca

CONSERVATION ONTARIO

Box 11, 120 Bayview Parkway
Newmarket, ON L3Y 4W3
ph: 905-895-0716
email: info@conservationontario.ca
web: www.conservationontario.ca

ONTARIO MINISTRY OF THE ENVIRONMENT

Public Information Centre
1st floor, 135 St. Clair Avenue West
Toronto, ON M4V 1P5
ph: 1-800-565-4923
email: picemail.moe@ontario.ca
web: www.ene.gov.on.ca/environment/en/index.htm

ONTARIO FEDERATION OF AGRICULTURE

Ontario Agricentre
100 Stone Road West, Suite 206
Guelph, ON N1G 5L3
ph: 1-800-668-3276
email: info@ofa.on.ca
web: www.ofa.on.ca

LAND IMPROVEMENT CONTRACTORS OF ONTARIO

For a list of licensed drainage contractors in your area, visit the LICO website: www.drainage.org

For More Information

ONTARIO MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS

The Ontario Ministry of Agriculture, Food and Rural Affairs has numerous factsheets and other information pertaining to cropland drainage. Here is a sampling:

FACTSHEETS

Operating and Maintaining a Tile Drainage System
Order no. 10-091

Drain Problems
Order no. 84-017

Maintenance of the Drainage System
Order no. 87-062

Management of Drained Fields
Order no. 90-156

PUBLICATIONS

Publication 29, *Drainage Guide for Ontario*

Publication 832, *Agricultural Erosion Control Structures: A Design and Construction Manual*

See www.omafra.gov.on.ca/english/landuse/drainage.htm for a complete list. To obtain your copies, please see below.

BEST MANAGEMENT PRACTICES SERIES

A number of BMP books concern on-farm soil and water management, and are strongly recommended to help you make the most of your drainage system. See page i for a complete list.

HOW TO OBTAIN COPIES OF BMP AND OMAFRA PUBLICATIONS

A complete listing of all OMAFRA products and services is available at www.ontario.ca/omafra

To obtain copies of OMAFRA and Best Management Practices publications, please order:

Online at www.publications.serviceontario.ca

By phone through the ServiceOntario Contact Centre
Monday to Friday, 8:30 am – 5:00 pm
416-326-5300
416-325-3408 TTY
1-800-668-9938 Toll-free across Canada
1-800-268-7095 TTY Toll-free across Ontario

In person at ServiceOntario Centres located throughout the province or at any Ministry of Agriculture, Food and Rural Affairs Resource Centre.

Acknowledgements

The Best Management Practices Program is a partnership of Agriculture and Agri-Food Canada, the Ontario Ministry of Agriculture, Food and Rural Affairs, and the Ontario Federation of Agriculture.

FUNDING

Funding for this publication has been provided by Agriculture and Agri-Food Canada and the Ontario Ministry of Agriculture, Food and Rural Affairs.

CONTRIBUTORS

Task Team Chairperson – Ontario Ministry of Agriculture, Food and Rural Affairs: Sid Vander Veen

Task Team and Authors (in alphabetical order by surname and agency/surname) –

Individuals: Peter Darbshire, Don Lobb,

Ken McCutcheon, Jim Myslik, Greg Nancekivell
Agriculture and Agri-Food Canada: Wade Morrison
Conservation Ontario: Davin Heinbuck

Fisheries and Oceans Canada: Thomas Hoggarth
Ontario Ministry of Agriculture, Food and Rural Affairs: Andrew Jamieson, H.J. Smith, Ted Taylor, Sid Vander Veen

Ontario Ministry of Natural Resources: Jack Imhof, Kate MacIntyre

Ontario Ministry of the Environment: Lee Orphan
Ontario Soil and Crop Improvement Association: Harold Rudy

University of Guelph: John FitzGibbon

Technical Authority – James P. Myslik

Technical Coordinator – Ontario Ministry of Agriculture, Food and Rural Affairs: Ted Taylor

Visuals Coordinator – Ontario Ministry of Agriculture, Food and Rural Affairs: H.J. Smith

Photographers – Peter Darbshire, Davin Heinbuck, Andrew Jamieson, Kerry Little, Don Lobb, H.J. Smith

Watercolour Illustrations and Sketch Artist – Irene Shelton, Winduncroft Studio, Belwood

Graphic Illustrator – Ontario Ministry of Agriculture, Food and Rural Affairs: David Rouleau

Graphic Designer – Neglia Design, Inc.

Editor – Alison Lane

Printed 2011

Canada

Ontario

OFA Ontario
Federation of
Agriculture