On-site Sewage Disposal Systems Standard

Established by the Minister of Environment and Climate Change

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NOVA SCOTIA

On-site Sewage Disposal Systems Standard

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Approved by: Tim Halman, Minister of Environment and Climate Change

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Table of Contents

List of Tables

List of Figures

Appendices

Applicability and Definitions

Applicability

1 **(1)** This Standard applies only to the requirements for an on-site sewage system which handles sewage that is composed primarily of human waste and grey water from bathrooms, sinks and kitchens but not does include any significant volume of wastewater from an industrial source.

(2) This Standard describes the minimum requirements for selection, design, installation, repair and alteration of an on-site sewage disposal system, or its parts.

Definitions

2 **(1)** In this Standard, the following definitions apply:

"adverse effect" means an effect that impairs or damages the environment or changes the environment in a manner that negatively affects aspects of human health;

“ASTM” means American Society for Testing and Materials;

“ATU” means an Advanced Treatment Unit or packaged sewage treatment solution that is used to treat sewage as part of a system;

“BNQ” means the Bureau de Normalisation du Québec;

“CSA” means the Canadian Standards Association;

“designated service provider” means someone who has been trained and qualified by the manufacturer or supplier of an advanced on-site sewage treatment technology;

“distribution trench” means the highly porous section of a system that is level, typically consists of aggregate surrounding perforated pipe, or arch-shaped chambers, and spreads effluent from a septic tank or ATU across the length of the disposal field;

“drilled well” means a drilled well as defined in the *Well Construction Regulations*;

“dug well” means a dug well as defined in the *Well Construction Regulations*;

“effluent chamber” means a pump or dosing chamber for sewage or septic tank effluent;

“effluent pipe” means a pipe that carries effluent from a septic tank or effluent chamber;

“foundation drainage system” means the perforated piping and aggregate laid around the exterior of the foundation of a dwelling or a structure and includes any part of the piping that extends to a point of discharge;

“impervious geomembrane” means a very low permeability synthetic liner or barrier intended for use within subsurface soils to control fluid migration;

“malfunction” means a release of untreated or partially treated sewage that causes or may cause an adverse effect;

“native soil” means soil that has accumulated naturally over time and is indigenous to the site;

“NSF” means National Sanitation Foundation;

“riser” means a vertical extension of the access port in an underground tank;

“selected system” means a system chosen according to the specifications in Appendix A of the Standard;

“septic tank effluent” means the liquid effluent leaving a septic tank;

“soil effective depth” means the depth of unsaturated permeable soil beneath the organic layer minus the depth of soil required to prevent saturation above the invert distribution pipe;

“swale” means a shallow trench or constructed ditch that diverts surface draining around a system.

(2) Definitions under the Environment Act and On-site Sewage Disposal Systems Regulations apply to this Standard.

System and Site Assessment

Determination of design capacity

3 **(1)** A qualified person must only select a system for residential use that:

i. has flows between1000 and 1500 L/day; and

ii. does not service a multi-residential unit.

(2) Residential sewage flows for selected systems shall be determined in accordance with Table 1:

Table 1 Residential flows for selected systems

	Number of bedrooms	**Average daily flow (L/day)**
Base flow	3 bedrooms or fewer with low water use fixtures	1000
Base flow	3 bedrooms or fewer with high water use fixtures	1200
Base flow	4 bedrooms with low water use fixtures	1350
Base flow	4 bedrooms with high water use fixtures	1500
Additional flow	each additional bedroom with low water use fixtures (can only be used in addition to base flow for multi-residential units)	350
Additional flow	each additional bedroom with high water use fixtures (can only be used in addition to base flow for multi-residential units)	500

(3) A professional engineer must not design a system for residential use with a flow less than 500 L/day.

(4) Backwash water from water treatment devices may only be discharged to a system if the system has been designed by a professional engineer to accept the discharge.

(5) Water from a basement sump, foundation/footer drain, or roof drain must not be discharged to a system.

Horizontal and vertical clearance distances

4 **(1)** A system must meet the minimum vertical and horizontal clearance distances outlined in the following table:

Table 2 Minimum vertical and horizontal clearance distances

FROM SYSTEM PART	TO CONFINING FEATURE	DISTANCE (metres)
VERTICAL CLEARANCE		
The bottom of the gravel in a distribution trench receiving septic tank effluent	The maximum groundwater level, bedrock, or soil with permeability greater than $500x10^{-6}$ meters per second	1
The bottom of an ATU or the gravel in a distribution trench receiving treated effluent from an ATU	The maximum groundwater level, bedrock, or soil with permeability greater than $500x10^{-6}$ meters per second	0.6
Effluent pipe (gravity fed)	Water lateral connected to a central distribution system (waterline above effluent pipe)	0.3
HORIZONTAL CLEARANCE		
Any part of the system including the septic tank, effluent chamber, effluent pipe, distribution trench, ATU, holding tank or privy	All lot boundaries	3
	Downslope lot boundary	9
	Drilled well	15
	Dug well or other drinking water supply	30
Non-water-tight portion of system including the distribution trench, applicable ATU, and pit privy	Underground cistern or contained water supply	8
	Surface watercourse, wetland or marine water body	30
	Downslope ditch or drain that flows intermittently	15
	Any water distribution system	6
	Foundation drainage system	6
Water-tight portion of system including septic tank, holding tank, effluent chamber, applicable ATU, vault privy, and effluent pipe.	Underground cistern or contained water supply	5
	Surface watercourse, wetland, or marine water body	15
	Foundation drainage system	1.5
	Private water distribution system	3
	Water lateral connected to a central distribution system if a pressure-fed effluent pipe	3
	Water lateral connected to a central distribution system if a gravity fed effluent pipe	0.30

(2) The clearance distances for the installation of a system must be measured from the nearest edge of the distribution trench or the wall of an ATU, septic tank, effluent chamber, holding tank, pit, vault privy or other device containing sewage to the closest part of each confining feature described in Table 2.

(3) If the water-tight portion of a system cannot be located far enough from a foundation drainage system or private water distribution system to comply with the requirements in Table 2, one of the following mitigation measures must be taken:

a) an impervious geomembrane must be used to line the water-tight portion of the system.

b) compacted clay, bentonite or equivalent material with low permeability must be used to surround the water-tight portion of the system.

Site Assessment

5 **(1)** A qualified person or professional engineer must consider and document all the following items when assessing a site to determine the most appropriate location and type of system for the site:

(a) slopes and surface drainage;

(b) presence of and depth to bedrock;

(c) changes in grade that may impact surface drainage;

(d) surface watercourses and wetlands;

(e) traffic areas;

(f) types of natural vegetation;

(g) well locations;

(h) groundwater elevation;

(i) whether the site is designated as a protected water area under s. 106 of the Act;

(j) seasonal fluctuations in groundwater and surface water elevations;

(k) property boundaries;

(l) rights of way;

(m) existing and proposed building locations.

(2) A qualified person or professional engineer must conduct a soil assessment before selecting or designing any system.

(3) A qualified person may only conduct a soil assessment that involves native soil.

(4) A professional engineer may conduct a soil assessment that involves native soil or imported soil.

(5) A qualified person or professional engineer must do all of the following to conduct a soil assessment for the purpose of subsection (2):

(a) examine at least one test pit at the proposed distribution trench location;

(b) determine the permeability class and corresponding hydraulic conductivity of each soil layer within the test pit;

(c) categorize the soils into one of the eight soil types listed in the following table:

Table 3 Approximate soil permeability and hydraulic conductivity

SOIL TYPE	**PERMEABILITY CLASS**	**Hydraulic conductivity RANGE (m/sec) x 10^{-6}**	**Hydraulic conductivity AVERAGE (m/sec) x 10^{-6}**
Rock, clean gravel	High	>500	
Medium to coarse Sand	Acceptable	80 - 500	260
Fine sandy gravel	Acceptable	20 - 80	50
Silty sand	Acceptable	8 - 20	15
Sandy silt	Acceptable	3 - 8	5
Clayey silt	Low	0.8 - 3	1.5
Silty clay	Low	0.2 - 0.8	0.5
Clay	Low	<0.2	

(6) A test pit dug for the purpose of clause (5)(a) must be of sufficient depth to confirm all of the following:

(a) the 1 m vertical clearance distance requirement between the bottom of the distribution trench and the maximum groundwater level, bedrock, or soil with permeability greater than $500x10^{-6}$ meters per second;

(b) the total soil depth requirements (D) specified in Appendix A for selected systems.

(7) A qualified person must only select a system that uses a soil type with a permeability class of ‘Acceptable’ as set out in Table 3.

System Components and Specifications

General tank requirements for septic tanks, holding tanks, and effluent chambers

6 A septic tank, holding tank, and effluent chamber must have been certified as meeting, or as being equivalent to, CSA Standard B66 “Design, material, and manufacturing requirements for prefabricated septic tanks & sewage holding tanks.”

7 Riser access must be installed in accordance with Sections 8 and 9 to provide access to each chamber in a septic tank, holding tank, and effluent chamber for pumping and maintenance.

Riser access requirements

8 A riser must meet all of the following requirements:

(a) it must be water-tight;

(b) it must be firmly attached to the tank with a permanent water-tight seal;

(c) it must be secured to prevent unauthorized access and injury;

(d) it must be visible to provide ease of location.

9 The riser cover must be at or above finished grade and installed so that the area around the cover is graded to divert surface drainage.

Septic tank requirements

10 Septic tanks for residential use must have the following minimum capacities:

Table 4 Minimum septic tank capacity for residential use

Number of bedrooms	Minimum liquid capacity (litres)
Up to 3	2800
4	3300
5	4500

11 Septic tanks for uses not listed in Table 4 must have a minimum capacity of at least 2 times the average daily flow.

12 The minimum liquid capacities in Table 4 must be increased by 20 percent if the residence has a garburator.

13 A septic tank must have a septic tank effluent filter that has been certified as meeting, or as being equivalent to, NSF Standard 46 "Wastewater Treatment System Components and Devices".

14 A septic tank must be buried with a minimum of 150 mm of earth cover, and as specified by the manufacturer's instructions.

15 If a sewage pump discharges to a septic tank, all the following conditions must be met:

(a) the capacity of the septic tank must be at least 4500 L;

(b) the tank must be a two-compartment tank or two single compartment tanksin series;

(c) the discharge per cycle from the sewage pump must not exceed 115 L;

(d) the discharge rate from the sewage pump must not exceed 45 L/min;

(e) the discharge line from the sewage pump must have a flow control valve.

Holding tank requirements

16 A holding tank must not be used for a residential system unless a professional engineer determines that the lot cannot accommodate another type of system, other than a pit or vault privy.

17 A qualified person or professional engineer must prepare a sewage management plan for the owner of a lot on which a holding tank is proposed that includes an estimate of the required pumping frequency and associated cost.

18 A holding tank must have a minimum capacity of 4500 L.

19 A holding tank must be equipped with an audible or visible alarm that emits sound or visually indicates when 75% of the storage volume has been used.

Effluent chamber requirements

20 An effluent chamber must have sufficient discharge capacity to spread effluent equally over the length of the distribution trench during each dose.

21 A pressure-fed system must be selected or designed to have a dosing frequency of at least two times per day.

22 A pump chamber must have level controls and an audible or visible high-level alarm.

23 The high-level alarm and pump in a pump chamber must be on separate circuits.

Pump and dosing device requirements

24 **(1)** A pump or dosing device must be installed in accordance with the manufacturer's specifications.

(2) A qualified person must use the following table to determine maximum dosing volume and minimum pump chamber capacity for pressure-fed systems:

Table 5 Maximum dosing volume and minimum pump chamber capacity for selected systems

System capacity	Maximum dosing amount per discharge event	Minimum pump chamber capacity
1000 L/day	500 L	1000 L
1350 L/day	675 L	1350 L
1500 L/day	750 L	1500 L

(3) Mechanical-electrical systems must be installed according to the latest version of the *National Plumbing Code of Canada*, and CSA C22.1 the *Canadian Electrical Code*.

Pit privies and vault privies

25 A building serviced by a pit or vault privy must have a separate system to treat greywater if the building has a running water supply.

26 A vault privy must have riser access that meets the requirements of Section 8 and 9 of this Standard.

27 A person is not required to be a certified installer to construct a pit privy.

28 A pit privy must be constructed so that all of the following requirements are met:

(a) the bottom of the pit must be at least 1 m above whichever of the following is closest to the surface of the ground surrounding the pit:

(i) the maximum ground water table;

(ii) the bedrock;

(iii) soil with hydraulic conductivity greater than $500x10^{-6}$ meters per second.

(b) the pit must maintain the horizontal clearance distances outlined Table 2.

(c) the sides of the pit must be reinforced to prevent collapse;

(d) the surface of the ground surrounding the pit must be graded so that surface drainage is diverted away from the pit.

Aggregate

29 **(1)** Crushed rock or gravel in a distribution trench must be clean, screened, and free of fine material.

(2) Ninety-eight percent by weight of the crushed rock or gravel in a distribution trench must be able to pass through a 35 mm screen and unable to pass through a 12 mm screen.

(3) Tire-derived aggregate that meets type A TDA of the ASTM Standard D6270 “Standard Practice for Use of Scrap Tires in Civil Engineering Applications” may be used as a replacement for gravel in a distribution and interceptor trench.

Distribution trench

30 **(1)** The bottom and downslope lip of a distribution trench must be level and follow the contour where the trench is being installed.

(2) An infiltration chamber approved by the Department may be used to replace gravel and pipe in a distribution trench.

Gravity distribution pipe

31 **(1)** Solid and perforated pipe used in a gravity system must have been certified as meeting CSA B182.1 “Plastic Drain and Sewer and Pipe Fittings”.

(2) The effluent pipe from a septic tank to the perforated pipe in a gravity distribution trench must be laid at a slope of at least 1 percent, it must be watertight, and it must have an internal diameter of at least 75 mm.

(3) The perforated pipe used in a gravity distribution trench must meet all of the following requirements:

(a) it must have a slope of at least 50 mm/30 m or 0.17 percent and no more than 100 mm/30 m or 0.33 percent from the location where effluent enters the distribution pipe to the opposite end of the pipe;

(b) it must be perforated with 13 mm holes in accordance with Figure 1.

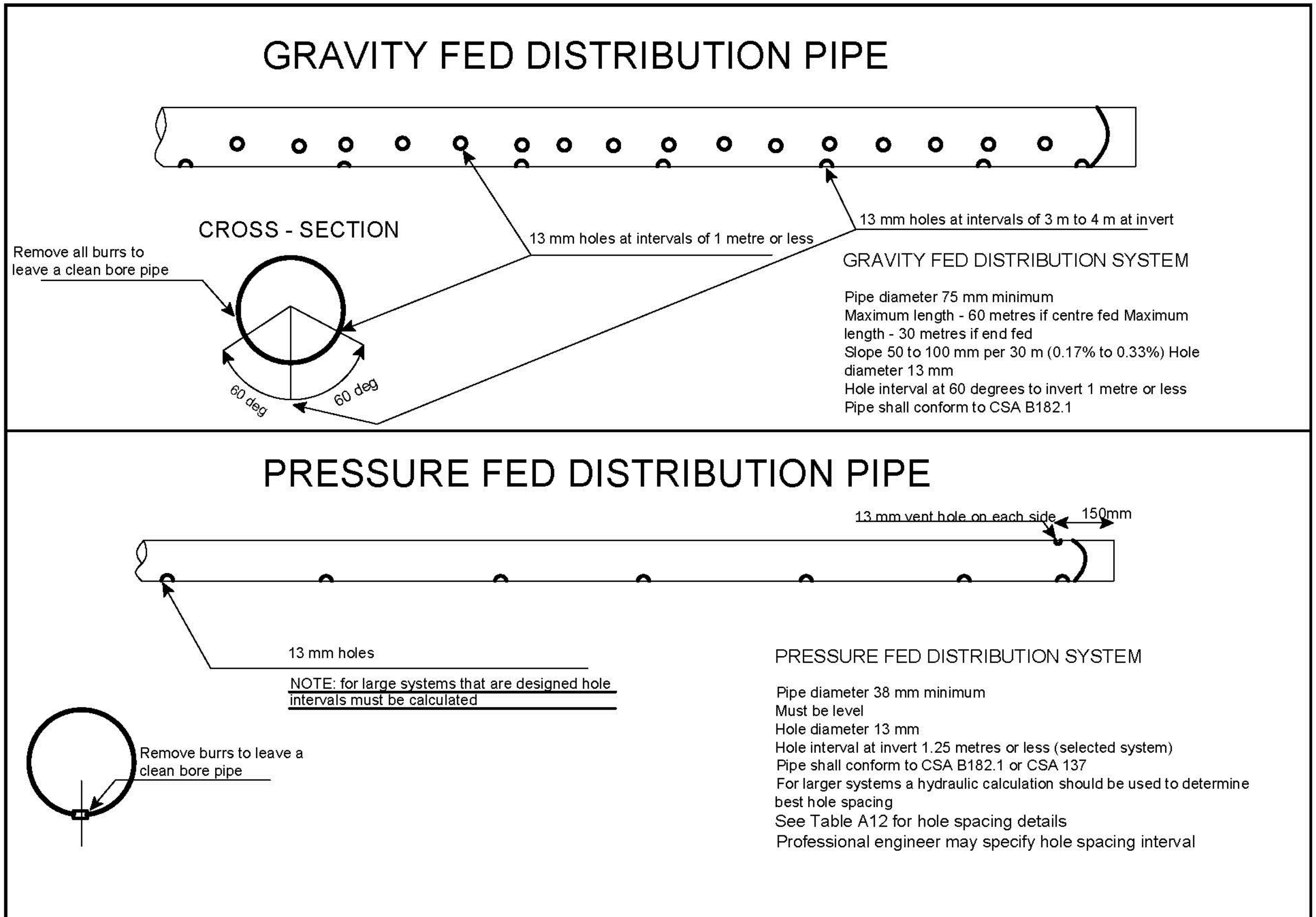

Figure 1: GRAVITY FED DISTRIBUTION PIPE & PRESSURE FED DISTRIBUTION PIPE

Pressure fed distribution pipe

32 **(1)** Perforated pipe must be pressure-fed with a pump or passive dosing device for use in any of the following situations:

(a) an end-fed distribution trench that is longer than 30 m or a center-fed distribution trench that is longer than 60 m;

(b) a natural ground slope that is not uniform;

(c) a C3 system;

(d) a mound system.

(2) The perforated pipe used in a distribution trench must be pressure-fed with a pump for a system where the perforated pipe in the distribution trench is at a higher elevation than the septic tank outlet.

33 (**1)** Solid and perforated distribution pipe in a system pressure-fed using a pump must have been certified as meeting CSA B137 "Thermoplastic pressure piping compendium".

(2) Solid and perforated distribution pipe used in a system pressure-fed using a passive dosing device must either:

(a) have been certified as meeting CSA B182.1 "Plastic Drain and Sewer and Pipe Fittings" with glued joints;

(b) have been certified as meeting CSA B137 "Thermoplastic pressure piping compendium".

34 The pipe from an effluent chamber to the distribution trench in a pressure-fed system must be at least 30 mm in diameter and must be protected from freezing.

35 A solid effluent pipe must be connected directly to the perforated pipe in the distribution trench when the effluent chamber is at a higher elevation than the perforated pipe.

36 A solid effluent pipe must contain a siphon breaker to prevent backflow where the effluent pipe connects to the perforated pipe in the distribution trench if the effluent chamber is at a lower elevation than the perforated pipe.

37 The perforated pipe used in a pressure-fed distribution trench must be level and must be perforated with 13 mm holes including end vent holes as described in Figure 1, or perforated with hole spacing designed by a professional engineer.

38 A qualified person must use Table A12 or Table A15.1 of Appendix A to determine the perforated pipe hole spacing requirements for a pressure-fed system.

Sand fill

39 **(1)** Sand fill and filter sand imported for use in the construction of an above-ground distribution trench, mound, or sloping sand filter must consist of naturally occurring or manufactured sand or recycled crushed glass, with a maximum particle size of 25mm.

(2) Sand fill imported for use in the construction of an above ground distribution trench or mound must have a hydraulic conductivity between $3x10^{-5}$ and $5x10^{-4}$ m/second as determined by the falling head permeameter test outlined in Appendix C.

(3) Filter sand installed under a distribution trench and used in the construction of an above-ground distribution trench, mound, or sloping sand filter must have a hydraulic conductivity between $1x10^{-4}$ and $5x10^{-4}$ m/second as determined by the falling head permeameter test outlined in Appendix C.

(4) A qualified person or professional engineer must document and be able to demonstrate that the sand used in the system construction meets the sand specifications used in the system selection or design.

Permeable barrier material

40 **(1)** A permeable barrier material must be used to cover the surface of a distribution trench as illustrated in Appendix D.

(2) A permeable barrier material used to cover a distribution trench must be made of a non-degradable synthetic fibre such as polyester or polypropylene, with no openings larger than 700 microns in diameter, and have a hydraulic conductivity greater than 0.001 m/second.

Interceptor trench requirements

41 An interceptor trench must be dug at least 150 mm into an impermeable layer when used to divert perched groundwater over a layer of impermeable soil upslope of a system.

42 An interceptor trench must meet all of the following:

(a) it must be at least 300 mm in width and filled with aggregate;

(b) it must be long enough to divert the water to a point where it will not enter the system and it will freely discharge to the surface.

43 An interceptor trench must be located a minimum of 5 m upslope of the distribution trench and pass no closer than within 5 m of the end of the system.

44 Despite Section 43, if an interceptor trench cannot meet the required 5 m separation distances, an impervious geomembrane or fill, such as compacted clay or bentonite, must be used to line the interceptor trench.

45 An impervious geomembrane referred to in Section 44 must not be placed on the upslope side of the trench, and must meet all of the following requirements:

(a) it must be installed along the bottom of the interceptor trench;

(b) it must be installed up the entire vertical face of the downslope side of the trench.

46 An interceptor trench or swale must be used to divert surface drainage from upslope of a system if determined to be necessary by the qualified person or professional engineer.

47 An interceptor trench that is also used to intercept surface drainage must either have aggregate installed to within 50 mm of the surface with no final cover material, or have a swale included at the surface of the interceptor trench.

Swale requirements

48 A swale to divert surface drainage may be used on its own or at the surface of an interceptor trench.

49 A swale must be at least 300 mm deep and 600 mm wide, and must be stabilized with gravel, sod or other material to prevent erosion.

Final cover material

50 **(1)** A completed system must be covered with a layer of soil that will promote the growth of vegetation within the first growing season.

(2) The layer of soil covering a completed system must be seeded or sodded with grass or a similar shallow root vegetation to prevent erosion.

Selection by a qualified person or professional engineer

Selection of system type and length

51 **(1)** A qualified person must select a system in accordance with this Standard and using the tables in Appendix A and B.

(2) On a site with multiple soil types, a qualified person must select a system based on the native soil with the lowest acceptable hydraulic conductivity.

(3) A selected system must be constructed in accordance with the applicable cross section in Appendix D.

Design by a professional engineer

System design

52 A professional engineer must design a system in accordance with this Standard.

53 A professional engineer must not use a linear loading rate greater than 60 L/m/day when determining the appropriate size of a distribution trench for a lateral flow contour system.

54 A professional engineer must not use an area hydraulic loading rate greater than 33 $L/m^2/day$ when determining the appropriate size of a distribution trench.

55 The parameters defined in the following table are used throughout this section:

Table 6 Design parameters definitions

Symbol	Definition	Units
L	distribution trench length	Metres
I	slope at the location of disposal field	metres/metres
Q	average daily sewage flow	litres/day
H	soil effective depth	Metres
$\mathbf{K_{avg}}$	soil hydraulic conductivity (weighted average)	metres/second
$\mathbf{H_{soil}}$	total depth of permeable soil	Metres
$\mathbf{K_{fill}}$	hydraulic conductivity of imported sand fill	metres/second
$\mathbf{D_{sat}}$	saturation depth in fill	Metres
$\mathbf{R_{linear}}$	linear loading rate	litres/metre/day
W	width of distribution trench	Metres
A	area of distribution trench	$metres^2$
$\mathbf{L_r}$	basal hydraulic loading rate for soil below system	litres/ $metres^2$/day
$\mathbf{K_{fill}}$	hydraulic conductivity of imported sand fill	metres/second

Design of lateral flow contour systems

56 **(1)** A professional engineer must use the following equation to determine the minimum length of a C1 contour trench:

$$L = \frac{Q}{8.64x10^7 * I * H * K_{avg}}$$

(2) A professional engineer must use the following equation to determine the minimum length of a C2 contour trench:

$$L = \frac{Q}{8.64x10^7 * I * (K_{\text{avg}} * H_{\text{soil}} + K_{\text{fill}} * D_{\text{sat}})}$$

D_{sat} must be less than or equal to 100 mm.

(3) A professional engineer must use the following equation to determine the minimum length of a C3 contour trench:

$$L = \frac{Q}{R_{\text{linear}}}$$

(4) A professional engineer must use the following equation to determine the minimum width of a distribution trench for a lateral flow contour system:

$$\mathrm{W} = \frac{Q}{33 * \mathrm{L}}$$

Design of vertical flow systems

57 **(1)** A professional engineer must use the following equation to determine the minimum length for a mound system:

$$L = \frac{Q}{R_{\text{linear}}}$$

(2) A professional engineer must use a basal hydraulic loading rate less than or equal to 10 L/m^2/day for a mound system.

(3) A professional engineer must not design an area bed or multiple trench if there is less than 600 mm of unsaturated permeable soil below the distribution trench.

(4) A professional engineer must use basal hydraulic loading rates less than or equal to the values from the following table when designing an area bed:

Table 7 Maximum basal hydraulic loading rates for area beds

Permeable soil type	Maximum basal hydraulic loading rate (L/day)/ m^2
Fine sandy gravel/ medium to coarse sand	14
Silty sand	11
Sandy silt	9

(5) A professional engineer must use the following equation to determine the minimum area for an area bed:

$$A = \frac{Q}{L_r}$$

(6) A professional engineer must use basal hydraulic loading rates less than or equal to the values from the following table when designing a multiple trench:

Table 8 Maximum basal hydraulic loading rates for multiple trench systems

Permeable soil type	**Maximum basal hydraulic loading rate (L/day) /m^2**
Fine sandy gravel/ medium to coarse sand	25
Silty sand	20
Sandy silt	15

(7) A professional engineer must use the following equation to determine the minimum length for a multiple trench**:**

$$L = \frac{Q}{W * L_r}$$

Design of sloping sand filters

58 **(1)** A professional engineer must design a sloping sand filter to meet the minimum basal area requirements in accordance with subsection (6).

(2) A professional engineer must design a sloping sand filter with a vertical toe depth from finished grade that does not exceed the depth of saturation used in the design.

(3) A professional engineer must design a sloping sand filter with a slope on the bottom of the sand filter greater than or equal to 3 percent.

(4) A professional engineer must use the following equation to determine the minimum length for a sloping sand filter:

$$L = \frac{Q}{8.64x10^7 * I * K_{fill} * D_{sat}}$$

D_{sat} must be less than or equal to 150 mm.

(5) A professional engineer must use a linear loading rate less than or equal to 100 L/m/day when designing a sloping sand filter.

(6) A professional engineer must determine the basal area requirements for a sloping sand filter based on the native soils below the system and must use loading rates less than or equal to the values from the following table:

Table 9 Maximum vertical hydraulic loading of treated sewage effluent

Soil type	**Permeability (hydraulic conductivity) range** m/s $x10^{-6}$	**Treated effluent MAC 30 mg/L TSS & BOD5** $L/d/m^2$
Medium to coarse sand	80 – 500	45
Fine sandy gravel	20 – 80	45
Silty sand	8 – 20	22
Sandy silt	3 – 8	15
Clayey silt	0.8 – 3	11
Silty clay	0.2 - 0.8	8
Clay (if deemed permeable)	< 0.8	8

Advanced on-site sewage treatment technologies

59 **(1)** An ATU can be used if the system is designed by a professional engineer and at least one of the following requirements is met:

(a) it has been certified as meeting CAN/BNQ 3680 “Onsite Residential Treatment Technologies” Class II minimum;

(b) it has been certified as meeting BNQ 3680 “Wastewater Treatment – Stand-alone Wastewater Treatment Systems for Isolated Dwellings” Class II minimum;

(c) it has been certified as meeting NSF 40 “Residential Onsite Systems” Class I;

(d) it has been approved in writing by the Department.

60 A system that uses an ATU must be designed so that treated effluent is discharged subsurface.

61 The infiltration area of a system that uses an ATU must be designed based on the native soil receiving the effluent.

62 The infiltration area of a system that uses an ATU must be designed based on the manufacturer's engineering design manual or, if there is no applicable manual, one of the following:

(a) the basal hydraulic loading rates outlined in Table 9 for vertical flow systems;

(b) the design equations for lateral flow contour systems outlined in Section 56, without the linear or area hydraulic loading rate restrictions in Sections 53 and 54.

63 The infiltration area for a system that uses an ATU must maintain all clearance distances required by Table 2.

64 The professional engineer who designs a system that incorporates an ATU must ensure an operation and maintenance contract between the landowner and a designated service provider is in place prior to the installation of the ATU.

Malfunction replacement systems

Malfunction replacement requirements

65 A qualified person or professional engineer must do all of the following in respect of a malfunction:

(a) perform a system assessment and based on the site-specific conditions, determine whether the malfunction can be repaired or whether a replacement system is required;

(b) document the details of the malfunction on a form established by the Department and submit it with the notification or application for approval required to be submitted under the *Activities Designation Regulations* for a system to replace the malfunction.

66 A malfunction replacement system selected by a qualified person must comply with this Standard.

67 Subject to Sections 68 and 69, a system selected or designed by a professional engineer for malfunction repair or replacement must comply with this Standard.

68 A system selected or designed by a professional engineer for malfunction repair or replacement must meet the following requirements if the site on which the malfunction is located does not permit compliance with all of the required minimum horizontal clearance distances as specified in Section 4(1):

(a) The system must meet the required minimum vertical clearances distances as specified in Section 4(1).

(b) Priority must be given to meeting the required minimum horizontal clearance distances to any water well or other drinking water supply and surface watercourse.

(i) If it is not possible to meet both the required minimum horizontal clearance distance to a water well or other drinking water supply and required minimum horizontal clearance distance to a surface watercourse, priority must be given to the horizontal clearance distance to the water well or other drinking water supply.

(c) Priority must be given to maintaining the required minimum horizontal clearance distance to the distribution trench to the confining features if it is not possible to meet both the required minimum horizontal clearance distances from the distribution trench to the confining features and the required minimum horizontal clearance distance from the water-tight portion of the system to the confining features.

(d) The system design capacity must not exceed the design capacity of the malfunctioning system, as determined by a professional engineer in accordance with Section 3.

69 A system designed by a professional engineer for malfunction repair or replacement must meet the following requirements if the site on which the malfunction is located does not permit compliance with Section 58(2) and a drainage feature is required:

(a) The system design must provide the minimum required basal area as specified in Section 58(1).

(b) The system must not discharge directly to a watercourse.

(c) Subject to Section 68(b), the system design must maximize the horizontal clearance distance from the drainage point to any water well or other water supply, or surface watercourse.