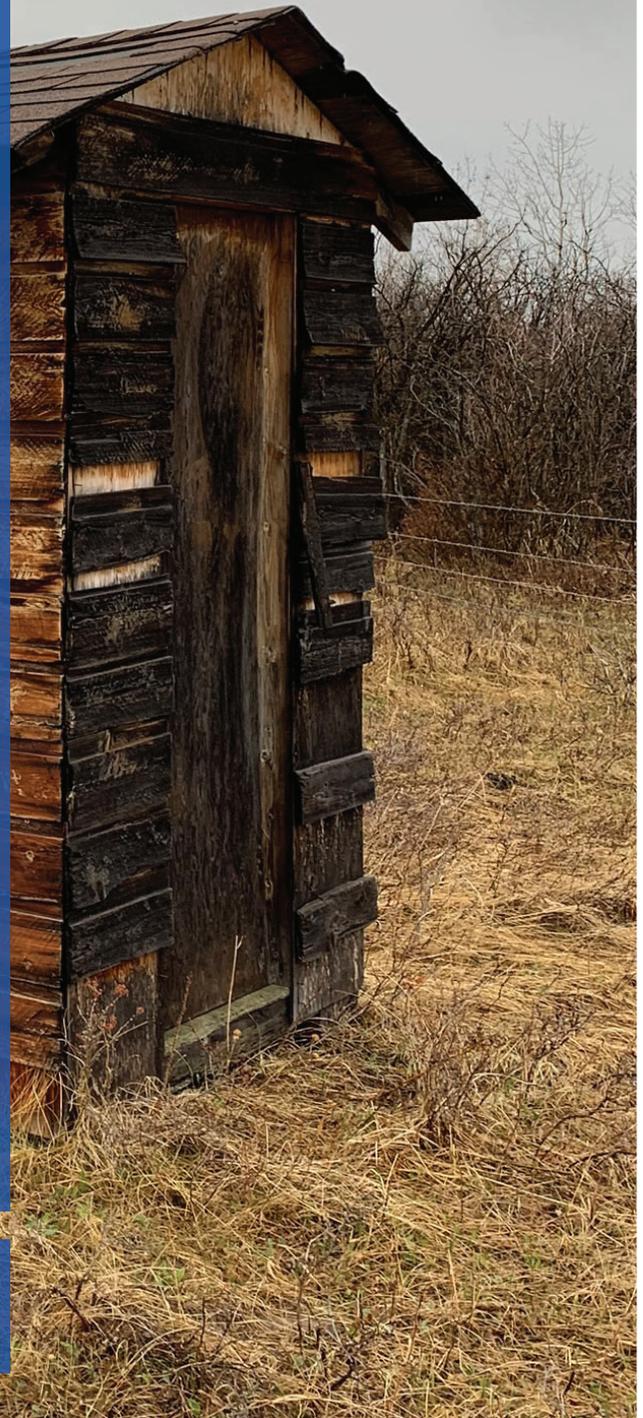


Private Sewage Disposal Systems

An introduction to on-site wastewater treatment and the associated planning considerations.

A private sewage disposal system (PSDS) is a key part of the overall servicing plan for a rural property that isn't connected to a municipal or communal wastewater system. If the physical characteristics of the land are suitable for soil-based treatment, a PSDS can be installed to treat the sewage and dispose of the effluent. Private sewage systems are regulated largely under the Safety Codes Act, but the Municipal Government Act also comes into play due to a Subdivision Authority's mandate to evaluate suitability of the subject land for on-site disposal. Understanding the planning considerations for private sewage can help rural municipalities support responsible land use along with a culture of self-reliance.



Overview

A private sewage disposal system (PSDS) treats sewage from homes and businesses that are not connected to a municipal or communal wastewater system made up of multiple service connections. A PSDS typically includes a soil-based treatment area on the subject property, and in this way it touches and concerns the land to a far greater extent than a wastewater system that collects sewage from multiple parcels and conveys it to an off-site location. Site suitability for a PSDS is therefore highly dependent on the physical features of the land. These in turn influence the system type, its design, and its location on the site in relation to other property features.

The regulatory framework for private sewage is administered primarily under the *Safety Codes Act (SCA)* through the *Private Sewage Disposal Systems Regulation (PSDS Regulation)*. However, determinations of site suitability at the subdivision stage are made under the authority of the *Municipal Government Act (MGA)*. This periodical will describe the interface between the SCA and MGA in the private sewage context and engage in a broader discussion of PSDS-related planning considerations.

Historical context and PSDS types

The most common type of PSDS is made up of a septic tank to separate solids from the sewage and a treatment field to disperse the effluent into the soils via buried distribution pipes. This prototype “septic system” was invented in France in the 1860s, though its early uptake was cost-prohibitive during western Canada’s formative years. Pioneers relied largely on privies and cesspools. Following Alberta’s incorporation as a province, public health reforms were implemented in response to the inadequate urban infrastructure—namely, the open discharge of sewage. Local health boards were created to oversee municipal sewers and safeguard drinking water supplies. In areas where centralized infrastructure was impractical, septic systems began to emerge, slowly in the first few decades, and then rapidly as the development of acreages proliferated post-WWII. This prompted concerns over the leaching of nitrate into aquifers, which in turn spurred provincial studies aimed at developing more robust standards. Concurrent with this was the goal of integrating private sewage considerations into the subdivision evaluation process as part of a broader emphasis on land use planning. In the 1990s, the governance regime was overhauled with the enactment of the SCA and its accompanying PSDS Regulation.

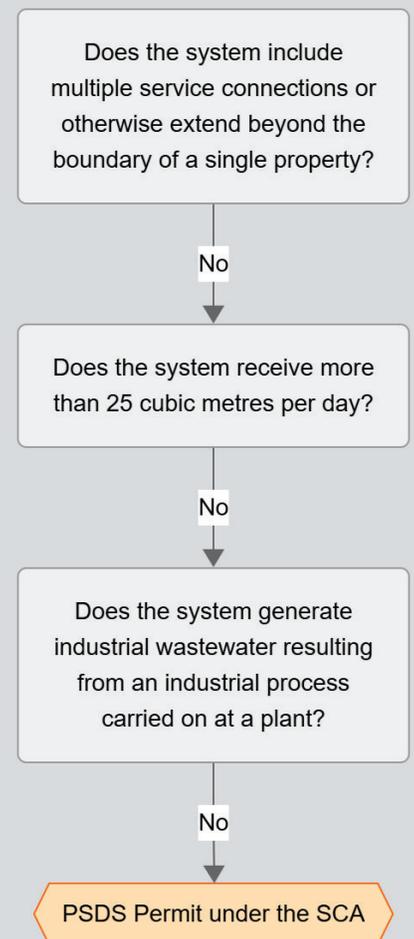
A septic system is best suited for soils containing relatively proportional amounts of sand, silt and clay. These medium-textured soils allow for optimal dispersal of the effluent. Where soil texture is unfavourable or soil depth is shallow, the most common design response is to swap the treatment field for a treatment mound, where distribution pipes are placed in an above-ground sand layer. By the time the effluent in a treatment mound comes into contact with the soils, it is cleaner than the effluent of a

PSDS Terminology

“Sewage” and “wastewater” are analogous terms under the *Safety Codes Act* referring to the composite of liquid and water-carried wastes associated with the use of water for domestic purposes. A closely related term is “effluent,” which is defined as the liquid discharged from any initial wastewater treatment component into a downstream treatment component.

PSDS Permit Flowchart

A wastewater system that does not follow the pathway outlined below is not a PSDS and must obtain an authorization under the *Environmental Protection and Enhancement Act*.



conventional septic system due to the additional treatment component.

Another option for a site with challenging subsurface conditions, or for a site with insufficient space for a treatment field, is a packaged wastewater treatment plant. This PSDS type uses specialized components to treat the sewage and a reduced-size treatment field to handle the resulting effluent. At the rudimentary end of the treatment continuum is the open discharge system, which releases effluent directly onto the land surface. Some other PSDS types include privies, drip dispersal systems and small lagoons.

Today, upwards of 150,000 properties throughout the province are serviced by a PSDS. Innovations in system design and tank materials have made these systems increasingly reliable, and landowners have access to a wealth of resources for maintaining their PSDS, such as the Septic Sense program administered by the Alberta Onsite Wastewater Management Association.

Standard of Practice

The PSDS Regulation brings into force the *Alberta Private Sewage Systems Standard of Practice 2021*, which applies to a PSDS serving a single property that is designed to receive a peak daily sewage volume of up to 25 m³. The Standard of Practice uses “on-site wastewater treatment system” interchangeably with the term PSDS to include all treatment components outside a building—including tanks and lift stations—with the exception of the building drain leaving the building.

Part 7 of the Standard of Practice outlines minimum requirements for site evaluations, which focus on the capability of soils to disperse effluent loads. A site evaluation is an essential due diligence practice given that the misidentification of soils is the leading cause of PSDS failure. Its core element is a soil profile investigation, wherein at least two test pits are dug near the intended location of the treatment area and the soil samples are submitted to a laboratory for testing. The requirement for two test pits can be attributed to the variability of soils over short distances.

The site evaluation report summarizes the soil profiles and other relevant subsurface features—namely the depth to bedrock and height of the water table—as well as the surface characteristics of the land. The report must provide a statement on the suitability of the site for soil-based treatment. The PSDS is ultimately designed based on these findings in conjunction with the proposed number of bedrooms and the plumbing fixture specifications.

Interface with Part 17 of the MGA

Evaluation of a subdivision application in accordance with the *Matters Related to Subdivision and Development Regulation* requires consideration of the availability and adequacy of a sewage disposal system. A Subdivision Authority may require an assessment of the land’s subsurface



A test pit dug in support of a soil profile investigation to assess site suitability for a PSDS. A treatment mound was recommended for this property to overcome the poor subsurface drainage associated with the hardpan clay soils.



A percolation test measures the rate at which water is absorbed by the soil. Despite being a popular historical practice to assess site suitability for a PSDS, a percolation test is not accepted under the Standard of Practice as a substitute for a soil profile investigation. Still, supplementing a soil profile investigation with a percolation test can help support the findings of the site evaluation.

characteristics, including its suitability for an on-site sewage disposal system. Where the land will not be serviced by a municipal or communal wastewater system, the subdivision must comply with the minimum separation distances outlined in the Standard of Practice between the PSDS and water sources, buildings and property lines. The Subdivision Authority may also require a report by a qualified person on the intended method of providing on-site disposal to each lot, including the suitability and viability of that method. This is an implicit reference to a site evaluation report prepared under the Standard of Practice.

In its review and interpretation of a site evaluation report, a Subdivision Authority can consult *The Model Process for Subdivision Approval and Private Sewage*, a 2011 publication co-authored by Municipal Affairs and the Alberta Association of Municipal Districts & Counties (the predecessor body to RMA). The Model Process outlines four levels of assessment based on the scale, complexity and environmental impacts of a proposed subdivision. Despite its adaptability to a range of subdivision scenarios, implementation of the Model Process has been a challenge due to its complexity.

While the Model Process is purpose-built for the subdivision evaluation context, a municipality may also require a preliminary assessment of suitability for private sewage systems as part of an area structure plan. A higher-level evaluation like this would typically be undertaken as part of a broader geotechnical investigation. It is recommended where the plan area is prone to poor soils, is a sensitive receiving environment, or is expected to experience a high development density, as these factors can impact the viability of servicing each new lot with a PSDS. As the density in an area increases, so too does the justification for mitigating the environmental and public health risks through a communal wastewater system. Even where PSDS viability is not an issue, a communal system can serve as a more optimal interim solution if local planning or servicing documents contemplate a future municipal system for the area. This is because a communal system can ultimately tie-in to the future municipal system.

The holding tank dilemma

Where a property is not suitable for soil-based treatment and it is not feasible to connect to a municipal or communal wastewater system, the only potential servicing option is a holding tank, which retains sewage on an interim basis until it is hauled to an approved off-site facility. Unlike a septic tank, which only needs to be pumped out every few years to eliminate the accumulated sludge, a holding tank must be pumped out regularly.

Holding tanks are comparatively cheap to install but costly in the long run. They burden landowners with ongoing sewage hauling expenses and impact a municipality's roads and wastewater facilities. A further concern is the potential for landowners to bypass holding tanks and discharge sewage at unauthorized locations. Municipal Affairs cautions that this risk is very real—particularly in remote areas where surveillance is limited.

Minimum Separation Distances from a PSDS

Minimum separation distances from a PSDS are specified in the Standard of Practice for various PSDS types. The distances listed below apply to a PSDS consisting of a septic tank and treatment field.

Septic Tanks:

10 m	water course
10 m	water well
10 m	buried cistern
1 m	building
1 m	property line

Treatment Fields:

90 m	lake *
90 m	river / stream / creek *
15 m	other water course
100 m	licensed water well
15 m	other water well
15 m	buried cistern
5 m	septic tank
10 m	basement / crawl space
5 m	other foundation
1 m	building (no foundation)
1.5 m	property line

** May be reduced to 15 m where a principal building, farm building or other development feature is situated between the soil-based treatment component and the lake, river, stream or creek.*

Source:

Alberta Private Sewage Systems Standard of Practice 2021

“Qualified Person”

A report indicating the intended method of providing sewage disposal facilities to each lot in a proposed subdivision must be prepared by a qualified person.

For a simpler subdivision proposal that will result in no more than 4 parcels in a quarter-section, a certified PSDS installer will usually be qualified to prepare the report.

On the other hand, the report should be completed by a professional engineer where:

- *5 or more parcels will result in the quarter-section;*
- *the daily sewage volume will exceed 5.7 m³; or*
- *the site contains sensitive environmental features or other major physical constraints.*

Regardless of whether an engineer assumes the lead role in preparing a site evaluation report, the Model Process recommends that a certified PSDS installer also be consulted for advice on system type and sizing.

Building Code Excerpt

The requirement to dispose of human waste from a building is embedded in the National Building Code – 2023 Alberta Edition. Where there is no water supply to a property and a sewage system cannot be installed, s. 3.7.2.1.(3) provides that the disposal must be accomplished by sanitary privies, chemical closets or other means.

For these reasons, the Standard of Practice empowers a municipality to set parameters governing the use of holding tanks within its corporate boundary. This authority can be leveraged to prohibit the use of a holding tank. It can likewise be utilized to mandate the use of a holding tank where a site evaluation reveals unsuitable soils, or where on-site disposal would otherwise create an elevated risk of system failure. Some scenarios where holding tanks may be appropriate include seasonal uses like campgrounds, uses involving higher-than-average sewage strength, and properties serviced by a licensed water distribution system. Lastly, the Standard of Practice does not consider the cumulative effects of nitrogen or phosphorus loading (on a sensitive receiving environment or due to a high PSDS density). A holding tank could thus mitigate the cumulative effects in those scenarios. Where a holding tank is proposed, key considerations include the distance to the receiving facility, the estimated hauling frequency, and confirmation that the tank capacity is at least seven times the peak daily volume.

Restricting other PSDS types

Whereas the Standard of Practice only addresses municipal discretion for holding tanks, s. 5.1 of the PSDS Regulation confers a broader municipal authority to restrict system type through passage of a bylaw. As an example, the MD of Taber’s municipal development plan provides that if municipal sewer service cannot be made available, a residential subdivision application involving a holding tank, an open discharge system or a lagoon may be refused on the grounds that these options are generally not considered to be sustainable. These same systems are also discouraged for non-residential uses, though each case is evaluated individually with regard to the viability of alternatives and the anticipated volume of effluent. It is worth noting that the land-intensive nature of an open discharge system makes it particularly ill-suited to the rural subdivision context. Eight acres is needed to meet the 90-metre minimum separation distance from property lines, not including the land allocated for the open discharge area itself. This is well above the maximum parcel size for a vacant residential lot stipulated in most rural land use bylaws. Ultimately, as the installation of an open discharge system on a subdivided parcel is contingent on the parcel being unnecessarily large, this PSDS type undermines the goal of protecting the agricultural land base—a cornerstone of rural planning policy in Alberta for nearly a half-century.

Another municipality with distinct PSDS requirements is Rocky View County. There, standard septic systems are only allowed on residential parcels at least four acres in size (subject to the findings of a site evaluation). For residential parcels two to four acres in size, the allowable system type depends on the development density. Where the total number of existing lots, approved lots and proposed lots within 600 m of the centre of the proposed development is 60 or less, an individual packaged treatment plant can be installed on each parcel. Where the lot count exceeds 60, the feasibility of connecting to a municipal or communal wastewater system must be assessed. If those connections are determined to be infeasible, packaged treatment plants may be used, provided that a development

agreement respecting deferred servicing is registered against the new parcels to mandate connection to a future municipal or communal system. All new residential parcels under two acres in Rocky View County must connect to a municipal or communal system. Holding tanks are generally mandatory for new non-residential parcels, though soil-based systems may be considered for isolated uses on a case-by-case basis.

Mandatory municipal connection

An area that historically relied on private sewage systems may experience sufficient growth over time warranting the installation of a municipal wastewater system. In anticipation of this, a rural municipality may wish to add a provision to its development agreements requiring new development to tie-in to the municipal wastewater system if and when it becomes available. Alternatively, a utility bylaw can be passed compelling landowners to connect to the municipal system.

The authority to compel service connections through a utility bylaw was affirmed in *Kozak v Lacombe (County)*, 2017 ABCA 351, where a resident challenged a local bylaw that stipulated the wastewater strategy for the area. Previously, the Court of Queen’s Bench had declared the bylaw invalid, relying on MGA provisions governing public utilities to argue that the County had overstepped its authority. The Court of Appeal reversed the decision, citing the general bylaw-making powers in s. 7, 8(a) and 9 to conclude that the bylaw was authorized to regulate conduct in relation to a public utility. In its ruling, the Court also held that the bylaw was not rendered inoperative by s. 66 of the SCA, which prevents a bylaw under the MGA from duplicating a matter regulated by the SCA. The Court reasoned that while the standards for a PSDS are established under the SCA, the municipal bylaw defined the circumstances—namely the location and type of development—under which a PSDS could be used. The Court concluded that allowing landowners to opt out of the municipal servicing strategy would undermine the County’s ability to maintain viable infrastructure.

Concluding remarks

Methods for disposing of private sewage have evolved over the years, from rudimentary systems to contemporary ones that integrate on-site treatment for a variety of subsurface conditions. As the majority of homes in rural Alberta are not connected to a municipal or communal wastewater system, a properly designed, installed and operated PSDS remains integral to rural self-sufficiency. That said, the need to protect the subsurface environment is in the public interest, and requires that municipalities give thought to when a communal system should be required. Establishing expectations for a viability review of different sewage disposal methods can be embedded in a municipality’s planning portfolio beginning with the municipal development plan—providing for high-level consideration that supports informed decision making and sustainable growth.

Unserviced areas within urban municipalities

For many southern Alberta urban municipalities, unserviced areas are contained within their corporate limits, and development proposals in these areas do not always coordinate with the municipality’s expectation of logical and orderly growth. For subdivision and development permit applications requesting the use of a PSDS in an urban municipality, the approving authority must carefully evaluate the merits of the proposal in the context of the availability and capacity of municipal wastewater infrastructure, the cost of extending infrastructure, the timing of the proposal relative to adjacent growth and infrastructure improvements, and any other relevant matters. Installation of a PSDS may be allowed as an interim option; however, this could potentially preclude the realization of long-term servicing plans. With this in mind, an urban municipality may decide to prohibit the use of any PSDS within its corporate boundary. The utility bylaw for the Village of Hill Spring (Bylaw #2020 – 294) is one example from within the region.

For more information on this topic contact admin@orrsc.com or visit our website at orrsc.com.

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