Ravalli County Septage Treatment and Compost Facility

Ravalli County Septage Treatment and Compost Facility

Preliminary Engineering Report - Providing Information and Potential Solutions to Septage Management in Ravalli County

Morrison-Maierle

March 3, 2025

Background

Ravalli County has applied for and has received funding for a wastewater preliminary engineering report that will explore and inform the public about the current and future needs for a septage treatment facility. Septage waste generated from septic systems, generally located outside of municipal and public sewer systems, has historically been land applied within Ravalli County and Missoula County or taken to the City of Missoula Resource Recovery Facility.

Historic Media Coverage

December 2016

Neighbors Concerned About Septic Waste Land Application - Bitterroot Star, Michael Howell

November 2017

New Septic Permits on the Rise in Ravalli County - NBC Montana

November 2022

No Place to Dump? Montana County Plans New Septage Dewatering Facility - Pumper

May 2023

Out of Sight, Out of Mind: An Exploration of Wastewater Issues and Possible Solutions in and Out of Montana - Keely Inez Larson, University of Montana Graduate Student Theses, Dissertations and Professional Papers

November 2023

Valley Septic Pumpers Face Hard Times - Bitterroot Star, Michael Howell

January 2024

What to do With All the Poop: County Considers Septage Disposal - Bitterroot Star, Michael Howell

July 2024

County Looks for Septage Treatment Solutions - Bitterroot Star, Michael Howell

Public Hearing #1: Need For a Project

January 22, 2025, 10:30 AM

Planning Process - Preliminary Engineering Report

Assess Current Situation

- Planning area and demographics
- Condition of existing systems
- Performance of existing systems
- Capacity of existing systems

Assess Future Situation

- Population projections
- Septage flow and load forecasts
- Future environmental regulations

Develop and Evaluate Alternatives

Public Hearing #2, March 3, 2025

Develop Implementation Plan and Project Costs

Public Hearing #3, April 8, 2025

Useful for?

- Establishes uniform planning parameters
- Reviews No Action and Improvement Alternatives for issues
- Used to establish implementation strategy
- Determines operation and management criteria
- Used for state and federal funding applications for both grants and low interest loans

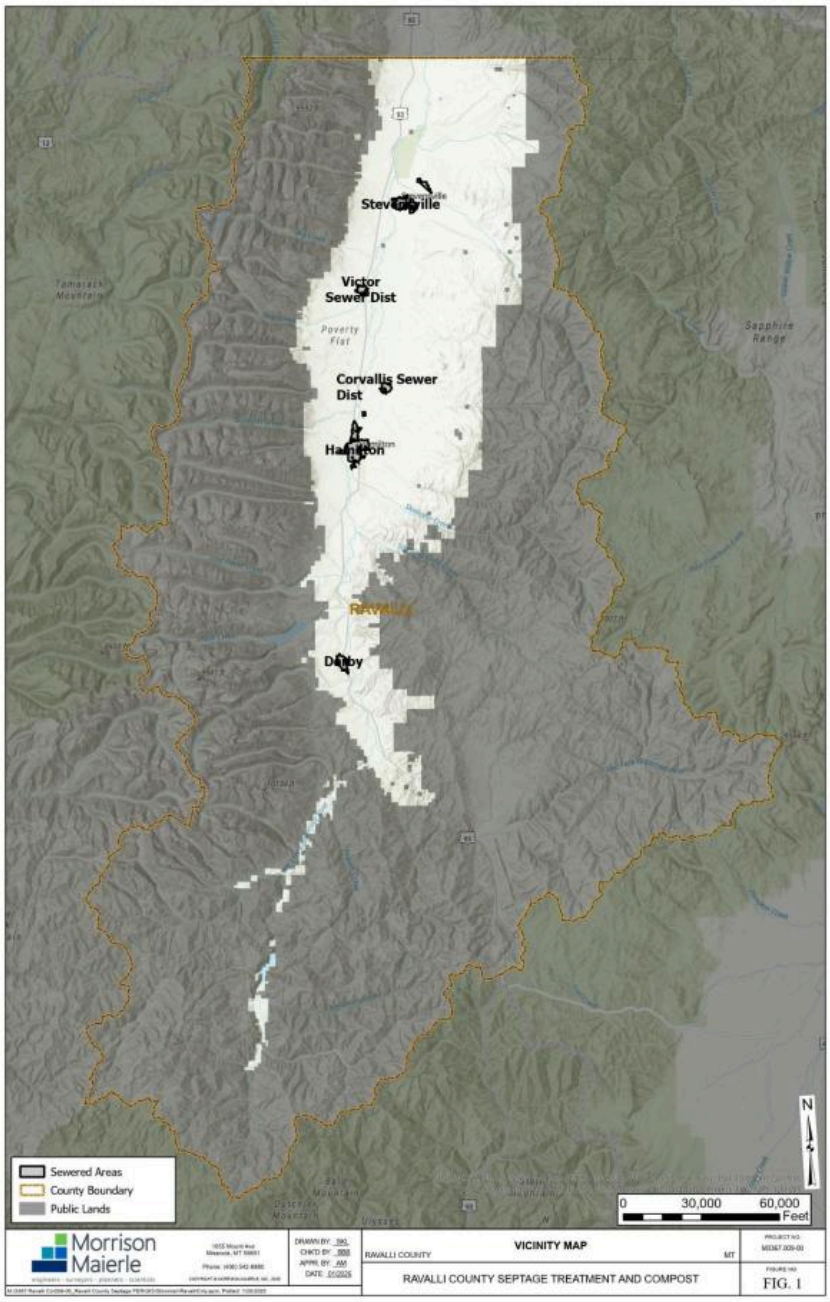
Planning Area and Population

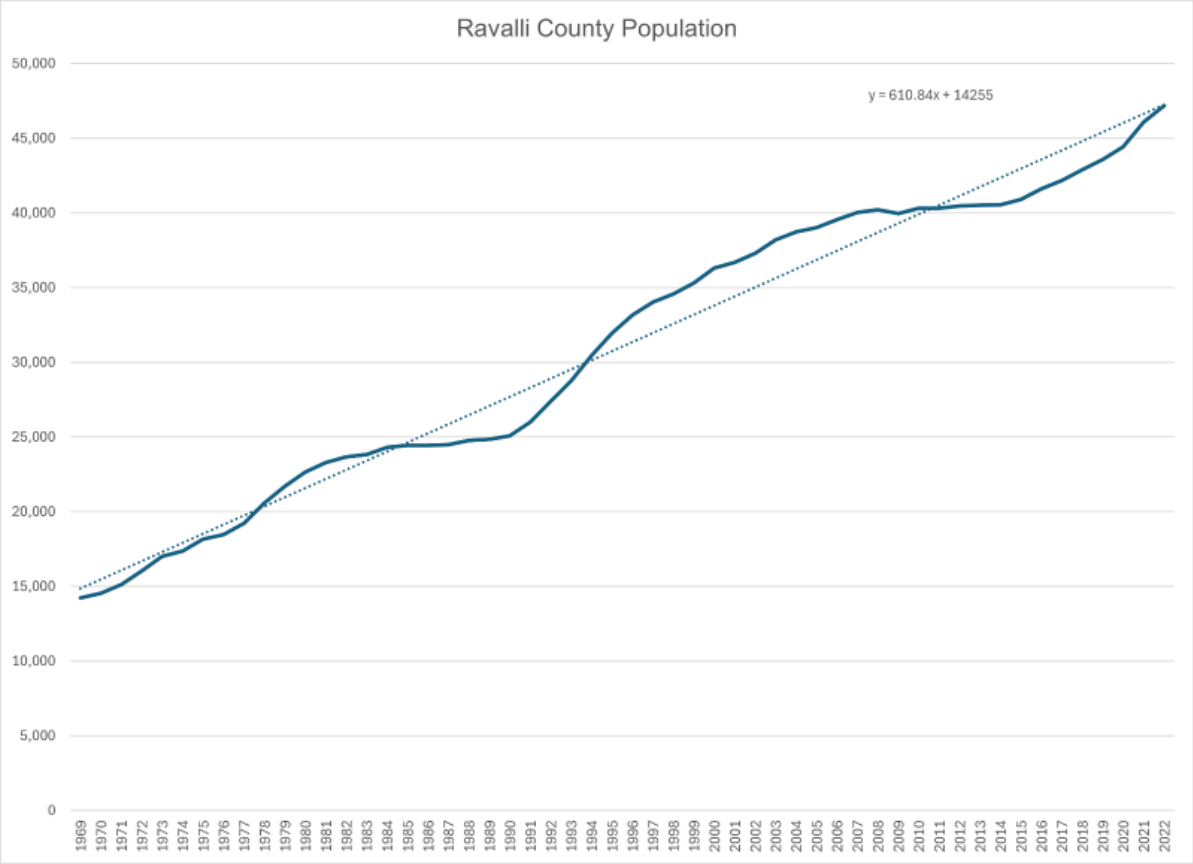
Planning area

The project planning area includes Ravalli County. Within Ravalli County, there are +/—13,328 septic systems that generate septage waste. Approximately 3,000 of these systems have been installed since 2000.

The population of Ravalli County is distributed between county residents and municipal/public sewer residents at a nearly four-to-one ratio. The City of Hamilton is the largest municipality within Ravalli County, with a population of +/—5449 persons.

The planning area for this project includes all non-publicly sewered residents and lots within Ravalli County.


Victor
Sewer Dist
Corvallis Sewer
Dist
Hamilton
Ravalli
Darby
Sewered Areas
County Boundary
Public Lands
N
0
30,000
60,000
Feet
Morrison
Maierle
DRAWN BY
CHK'D BY
APPR. BY
DATE
VICINITY MAP
RAVALLI COUNTY
MT
RAVALLI COUNTY SEPTAGE TREATMENT AND COMPOST
FIG. 1



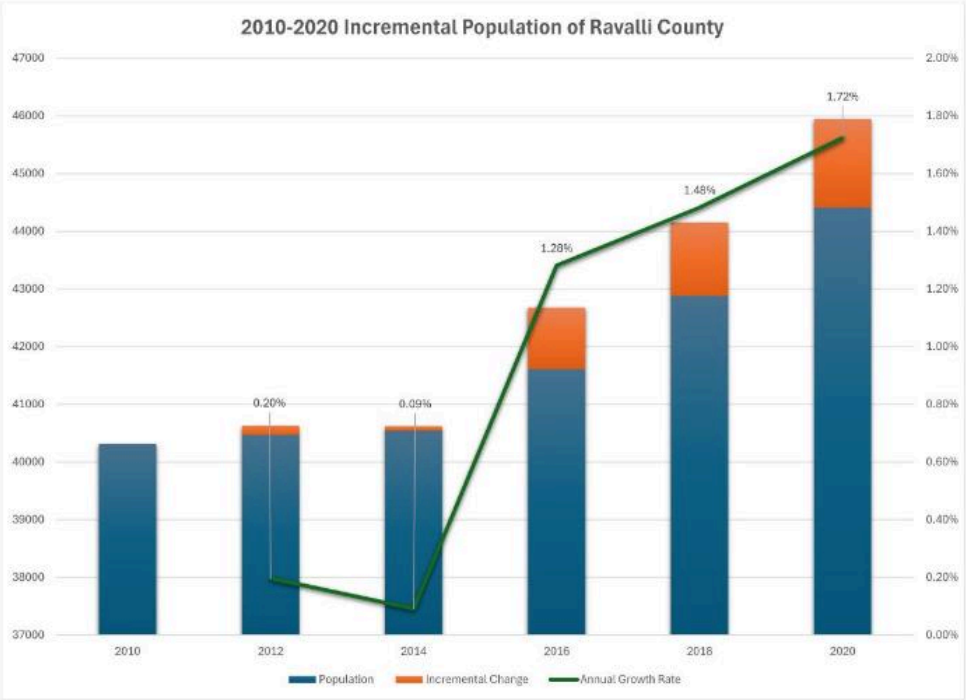
50 Year Population History and Trends

Over the past 50 years Ravalli County has seen cyclical population growth with periods of accelerated growth in the mid 1990's and again in the later 2010's.

The current population of Ravalli County is +/—48,299. Approximately 10,980 of these people live within the municipal or sewer district boundaries of Stevensville, Hamilton, Darby, Corvallis County Sewer District, and Victor Water and Sewer District.

For planning purposes the following per decade scenarios are viable:

1. Low Growth = 0.92%
2. Average Growth = 1.9%
3. Rapid Growth = 3.58%



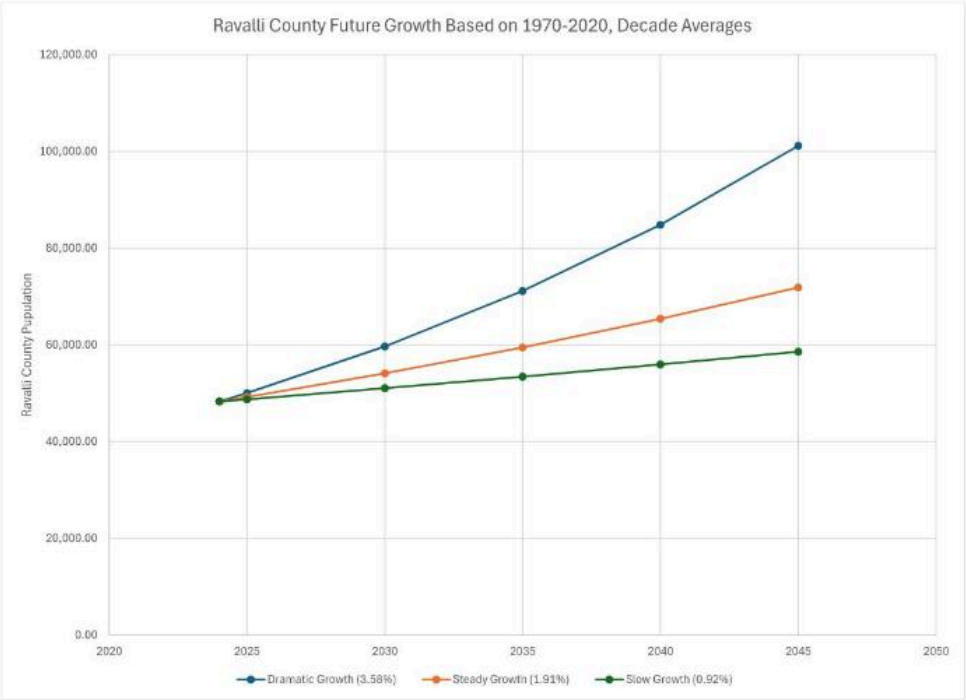
Incremental Population from 2010 - 2020 Census Period

Incremental population changes over the most recent 10 year period provides a review of near term trends. During this period average yearly growth varies from 0.1% to 1.72% at the end of the decade.

For planning purposes the following scenarios are viable:

1. Low Growth = 0.1 %
2. Average Growth = 0.95%
3. Rapid Growth = 1.72%

The average growth rate from 2010 to 2020 is historically lower than it was in the last 50 years. This is predominantly due to the 2010-2014 period when most of Montana experienced stagnated to low periods of growth following the 2008 housing bubble. Growth in the second half of the decade and into the 2020s has been near average compared to the 50-year average.



Future Ravalli County Population

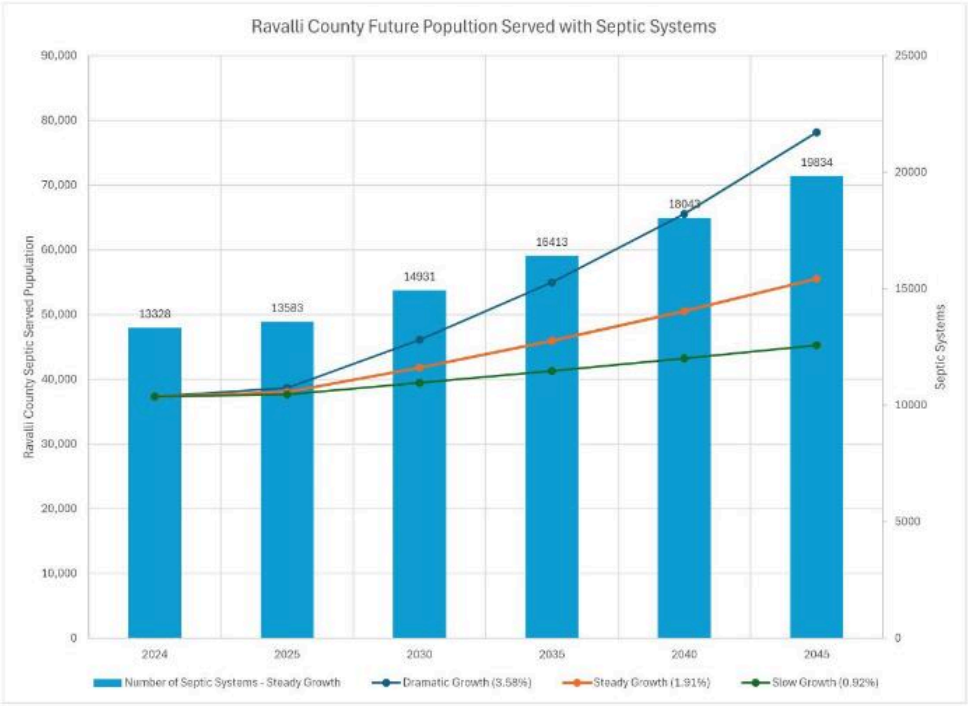
Decade-long population trends from 1970-2020 provide for normalization of economic and housing trends that have led to periods of accelerated growth followed by housing market slumps. The period 2010 - 2020 demonstrates this recurring pattern and, as such, may not be an accurate long-term predictor of future growth within Ravalli County.

Future population growth within Ravalli County may also be impacted by Montana legislative actions. Actions related to water rights are likely to have increased impacts to rural growth, potentially focusing more of the population growth to be located within sewered communities.

Year	Rapid Growth (3.58%)	Average Growth (1.91%)
2024	48,299	**48,299**
2025	50,030	**49,222**
2030	59,658	**54,108**
2035	71,139	**59,479**
2040	84,830	**65,384**
2045	101,156	**71,875**

Slow Growth (0.92%)
48,299
48,745
51,038

Slow Growth (0.92%)
53,438
55,951
58,583



Septic System Growth Forecasts

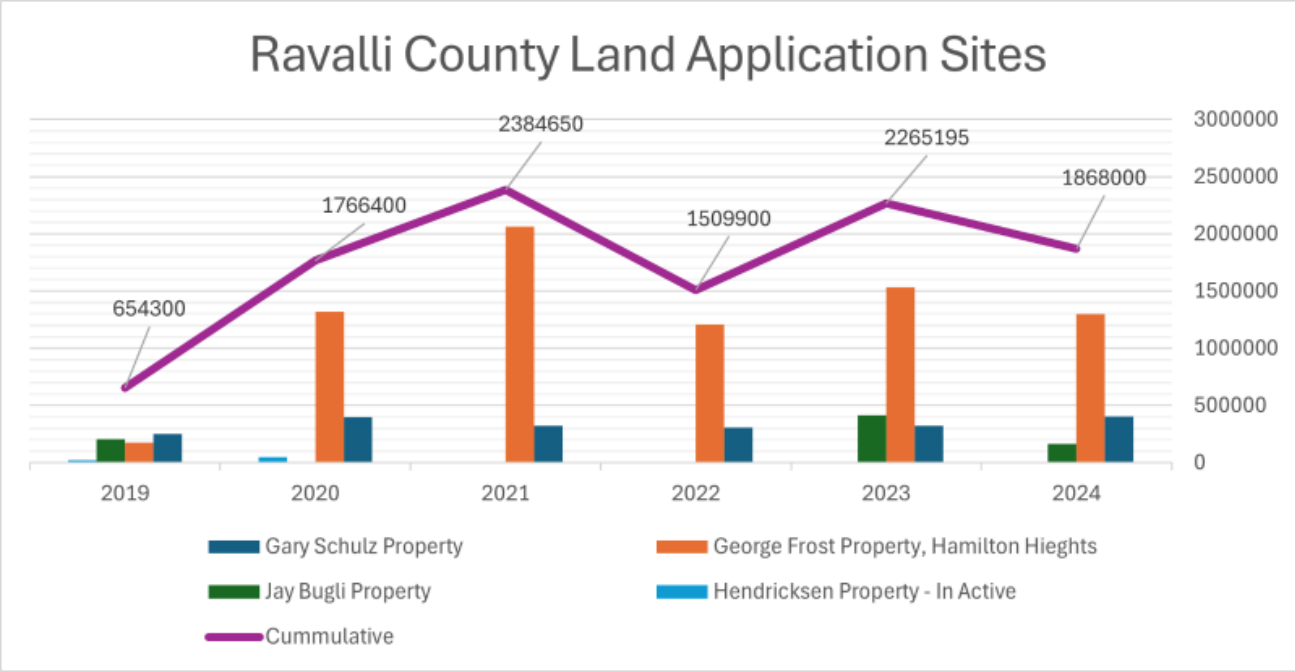
Populations within Ravalli County that are sewered with municipal or public sewer systems are +/- 10,980 in 2024. The remaining +/- 37,319 persons are assumed to be connected to onsite septic treatment systems whether individual or community systems. A total of +/- 13,328 septic systems are known in Ravalli County. There are +/- 2.8 persons per septic system.

The Steady Growth Scenario provides for realistic future populations based on long-term trends. In this scenario, the number of septic systems within the county can be anticipated to increase from 13,328 to 19,834 by 2045. This is approximately 310 new septic systems installed per year over the next 20 years.

Septage Flows

Septic tank pumpers with the State of Montana are regulated by Montana Department of Environmental Quality's (DEQ) Solid Waste Management Section. All septic tank pumpers operating in Montana are required to be licensed with Montana DEQ. As part of the license, all pumpers must submit disposal records twice annually. Septic pumpings are allowed to be disposed of at one of the following facilities: Wastewater Treatment Site, Septage Processor or Composter, Landfill, or Land Application Site. Records of disposal must be maintained by pumpers for no less than 5 years.

A records request has been submitted to Montana DEQ for all pumpers known to be operating in Ravalli County.



Current Septage Pumping from Ravalli County

Septic tank pumping originating from Ravalli County is currently either land-applied or taken to the City of Missoula Resource Recovery Facility. Three active land application sites exist within Ravalli County, and one that has been inactive since 2020.

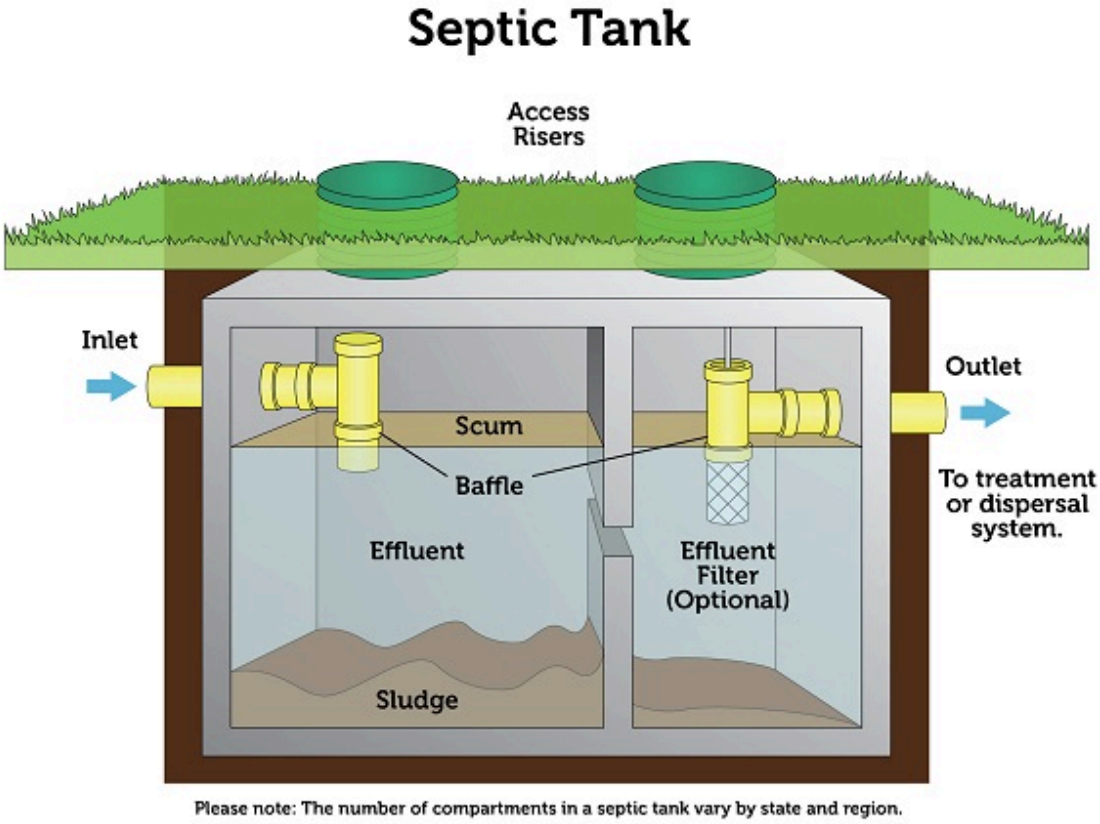
The City of Missoula has historically accepted septage, including out-of-county septage. In 2023, the city began to limit out-of-county septage for the maintenance of their primary digester. Prior to 2023, up to 66% of septage received at the City of Missoula Resource Recovery Facility originated from outside of Missoula County. From 2019-2022 an average of 53% of all septage received at the Missoula facility originated from outside of Missoula County. From 2020-2022, the 3-year average of out-of-county septage originating from Ravalli County is 64%, with the maximum being in 2022 when 66% of out-of-county septage originated from Ravalli County. In 2022, 1,903,265 gallons of septage was received at the Missoula Resource Recovery Facility. In 2024, the city restricted septage to +/- 947,150 gallons, with an estimated 602,000 gallons of septage being from Ravalli County.

Recommended Septic Tank Pumping

Montana DEQ and EPA recommends that septic tanks should be pumped every two-six years. Modern septic tanks include a baffle wall and effluent filter prior to either the drainfield distribution box or effluent pump chamber.

Residential septic tanks include a minimum 1,000-gallon primary treatment chamber. For larger homes (greater than three bedrooms), septic tanks must be increased to 1,500 gallons for homes with up to five bedrooms and 2,000 gallons for homes with up to seven bedrooms.

Non-residential septic systems have a minimum 1,000-gallon septic tank and are sized to have 2.5 days minimum retention time for primary treatment.



Septage Composition

Septage is the liquid and solid materials pumped from septic tanks and cesspools. Scum accumulates at the top of the septic tank, while sludge accumulates at the bottom of the tank, comprising 20-50% of the total septic tank volume when pumped.

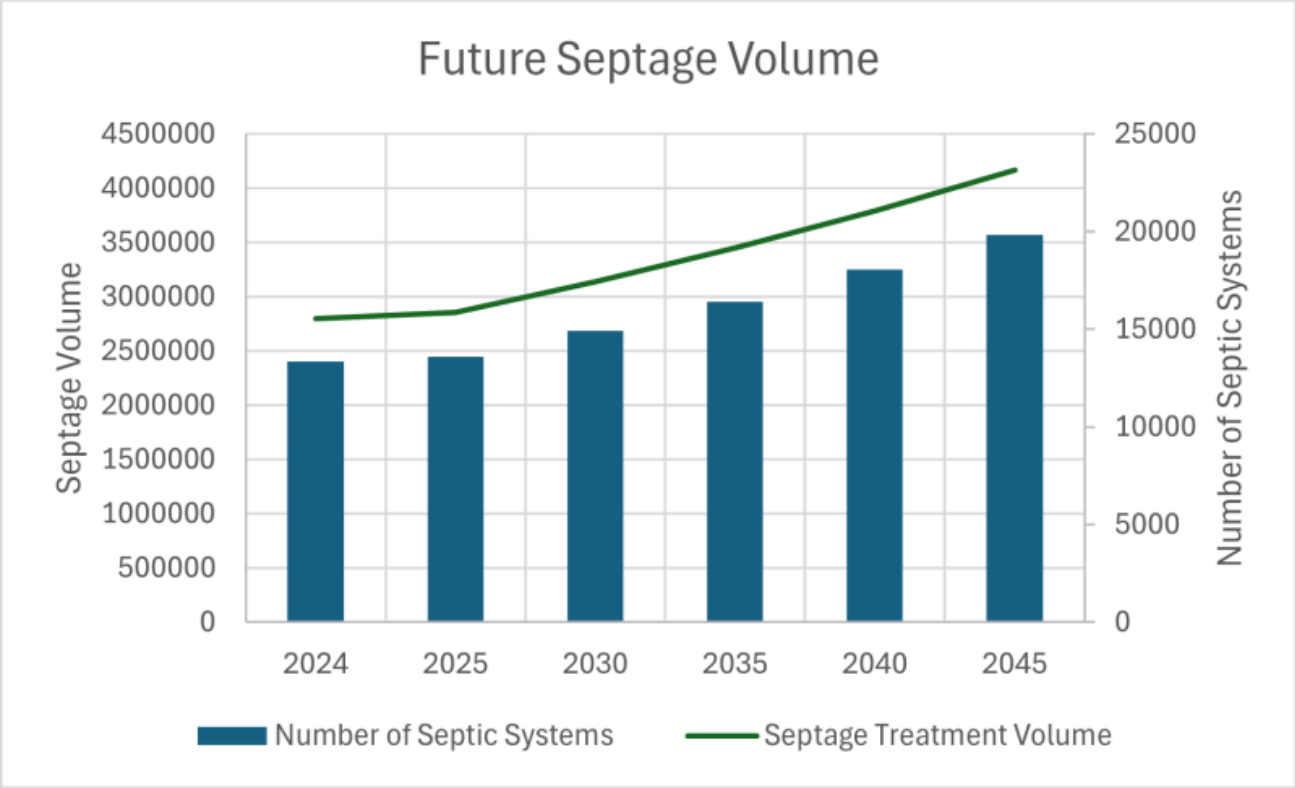
Septage is received at wastewater treatment facilities is often considered a low-volume, high-strength waste.

	BOD (mg/L)	Total P (mg/L)
Septage	5,291	244
Influent	230	6

Historical septage strength of wastewater plant influent and septage

Total N (mg/L)	Total Solids (m/L)
674	27,799
44	400

Historical septage strength of wastewater plant influent and septage



Future Septage Pumping Demands from Ravalli County

Based on a sum of land application and municipally treated septage originating from Ravalli County, Ravalli County disposes of +/- **2,800,000 gallons of septage annually or 210 gallons of septage per year per septic system**.

Within the planning period it is anticipated that the annual amount of septage generated within Ravalli County needing treatment or disposal will increase from 2,800,000 gallons annually to 4,165,000 gallons annually.

Existing Septage Treatment

Septic tank pumpers operating in Ravalli County utilize surface land application and the City of Missoula Resource Recovery Facility as treatment and disposal sites for pumped septage. The following pumpers are based out of Ravalli County for operation:

License #	**Company**
S-1167	Bitterroot Valley Septic
S-833	Brown's Septic Services
S-1169	DJ Septic Service
S-456	Eckerts Patriot Pumpers
S-1191	Montana Septic and Sewer
S-1144	Outback

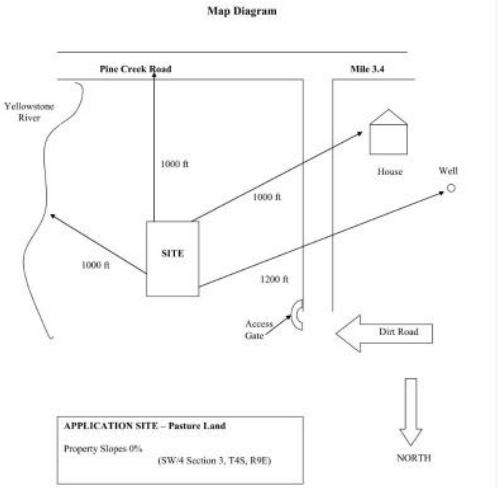
Land Application Site Requirements and Operation and Maintenance Requirements

Land application sites are reviewed by the Montana Department of Environmental Quality to follow the Administrative Rules of

Montana (ARM) 17.50.809. The following primary requirements are mandatory for all septic land application sites in Ravalli County:

Site Setback Requirements

- *No application with 500 feet of any occupied or inhabited building*
- *Pumpings may not be applied within 150 feet of any surface waters including ephemeral or intermittent drainages and wetlands*
- *Pumpings may not be applied within 100 feet of any state, federal, county or city maintained roadway*
- *Pumpings may not be applied within 100 feet of a drinking water supply source*
- *Pumpings many not be applied to land with slopes greater than 6%*
- *Pumpings may not be applied to land where seasonal high groundwater is 6 feet or less below ground surface*



Site Operation and Maintenance Requirements

- All non-putrescible litter must be removed within 6 hours of application
- Pumpings may not be applied at a rate greater than the annual application rate of the site for crop nitrogen requirements on an annual basis
- Pumpings may not be applied to flooded, frozen or snow covered ground if pumpings may enter state waters
- Pumpings may only be applied when completing vector attraction and pathogen reduction methods such as: injection below ground surface, incorporation into soils within 6 hours of application, addition of alkali to raise the pH at 12 or higher for 30 minutes
- Grazing and crop harvest restrictions existing for livestock and human health protections. Depending on treatment and beneficial use of the application land restrictions vary from 30 days restricted access to 38 months to harvest edible parts of below ground crops.

City of Missoula Resource Recovery Facility -Missoula, MT

The City of Missoula has owned and operated the WRRF since 1962. In 2010 the City started construction of a new headworks facility that included a septage receiving station. Since 201…

Site-147681 Schulz Property - Connor, MT

This property is located south of Connor and consists of +/- 4.6 acres of active application area.

Site 148216 - Frost Property

This property is located east of Hamilton and south of Corvallis along Charley's Gulch Road and consists of +/- 107 acres of historic use. Use of this site has reduced in the recent years…

Site 228457 - Bugli Property

This property is located south of Stevensville and consists of +/- 14 acres of active application area. The site was originally reviewed in 2016 and includes 72 acres of potential land…

Hanson Property

Some of Ravalli County's septic pumping waste is hauled to land application sites within adjacent Missoula County. The largest site is the Hanson Property site located north of I-90…

Town of Stevensville WWTP

The wastewater treatment facility in the Town of Stevensville started operating in 1979 and was modified in 2006. The facility has a capacity to treat 0.30 MGD. A single discharge from…

City of Hamilton WWTP

The wastewater treatment facility in the City of Hamilton started operating in 1984 with modifications in 1998, 2009, 2015, and 2016 and currently treats 750,000 gallons of…

Town of Darby

Wastewater treatment for the Town of Darby is facilitated by a lagoon treatment system that was originally constructed in 1964 as a single cell lagoon and was improved in 1980 with two…

Victor Water and Sewer District

The Victor Water and Sewer District was formed in the 1970s to provide centralized wastewater treatment to the community which was originally only served by individual septic…

Corvallis County Sewer District

The Corvallis County Sewer District was formed in the 1970s to provide centralized wastewater treatment to the small community which was originally served by individual septi…

Evaluation of Land Application Sites

Health, Safety and Security

- ***Controlled Access:*** Fenced and gated site restriction of public access.
- ***Screening and Solid Waste Management:*** All septage are to be screened to 3/4". The screenings will be taken to a Class II landfill.
- ***Groundwater and Surface Water Resources:*** Shallow groundwater resources and/or runoff to state surface waters. Applications on frozen ground must be alkali-stabilized.
- ***Vector Attraction and Pathogen Reduction:*** Injection, addition of lime/alkali stabilized or tilling. *(Characteristics of sewage sludge that attract rodents, flies, mosquitos, or other organisms capable of transporting infection agents and diseases to humans)*
- ***Animal Grazing and Crop Restrictions:*** Grazing is limited to 30 days, and crop restrictions vary. Applications are maintained at the annual application rate.

Capacity and Aging Facilities

- ***Annual Application Rate:*** Application rate is related to pounds of nitrogen needed within one year by the vegetation or crop.
- ***Land and Setback Requirements:*** Large tracts of land that maintain slopes less than 3% for frozen ground and 6% for non-frozen ground are limited.
  - Outside of a 100-year floodplain
  - > 150 feet to surface waters
  - > 100 feet to any state, county, federal, or city roadway
  - > 100 feet to drinking water well
- ***Capital Cost of Large Land Tracts:*** Most land tracts need to be greater than 100 acres to be viable.
  - AAR (Gal/Ac/Yr) = Pounds Nitrogen Required for Crop / 0.0026 *(EPA 503 Rule)*
  - For Grass Pasture AAR = 25 lbs/0.0026 = 9,615 Gal/Ac/Year
  - Current Land Application Demand = 300 acres *(Not accounting for crop rotation)*
  - Future Land Application Demand = 440 acres *(Not accounting for crop rotation)*

Evaluation of Wastewater Treatment Facilities

Health, Sanitation and Security

- ***Solid Waste and Screenings:*** No wastewater treatment facilities within Ravalli County have a dedicated septage receiving station. All screenings are to be taken to a Class II landfill.
- ***Controlled Access***: Appropriate receiving station limits access to authorized haulers.
- ***Potential Upset of Treatment Process:*** Septage acceptance needs to be metered appropriately if accepted. The smaller the facility, the more potential there is for plant upset and potential permit violations. Plant upsets and permit violations threaten receiving state waters (surface water and groundwater).

Aging Infrastructure and Capacity

- ***Organic Plant Capacity:*** Existing facilities are designed for reasonable growth for residential and commercial development and have limited availability for high-strength wastes.
- ***Treatment Plant Operation Staffing:*** Additional treatment processes require additional staffing at receiving stations, lab facilities, and solids management facilities.
- ***Access Management:*** Frequent truck access may be limited to facilities located in residential areas. Access limitations include turning movements, roadway structural design, and hours of operation security.

Permit Limitation and Conditions

- ***Existing Discharge Permits:*** Existing wastewater treatment facilities operate under Montana Pollutant Discharge Elimination System (MPDES) or Montana Ground Water Pollution Control System (MGWPCS) permits. Future permit conditions likely will target point sources for reduced nutrients in state water resources.
- ***Bitterroot River Nutrient Protection Plan:*** The river remains impaired by nutrients. The plan identifies and helps minimize risks to the river's aquatic resources.
- ***Bitterroot Watershed Total Maximum Daily Loads and Water Quality Improvement Plan:*** Lists 11 impaired water bodies within the Bitterroot River watershed. Most do not meet applicable water quality standards associated with total Nitrogen.

Public Hearing #2: Development of Improvement Alternatives

March 3, 2025, 1:30 PM MST

Review of background from Public Hearing #1, held January 22, 2025, 10:30 AM

Assess Improvement Alternatives for Septage Treatment and Disposal in Ravalli County

- **No Action Alternative** - Continue land application and out-of-county treatment and disposal
- **Septage Treatment Facility**—It has been determined that no current wastewater treatment facilities within Ravalli County have the capacity to accept untreated septage. Several facilities may be willing to accept septage waste after receiving initial treatment. Features of a treatment facility are reviewed here, and the final alternatives will combine preferred processes and locations.
  - Receiving Alternatives
  - Treatment Alternatives
  - Biosolids Dewatering Alternatives
  - Solids Disposal Alternatives
  - Effluent Disposal Alternatives
  - Location Alternatives

Develop Implementation Plan and Project Costs

Public Hearing #3, April 8, 2025

Alternatives for Septage Treatment

Improvement alternatives are organized in this section to evaluate processes that can be applied in multiple locations. During initial screening of municipal wastewater treatment systems within Ravalli County, it was determined that no existing facilities are able to accept non-pretreated septage. Depending on location and discharge receiving entity the level of treatment may vary.

Discharge at a industrial pretreatment level may require less energy than complete treatment and discharge to a new groundwater or surface water discharge permit.

Improvement alternatives considered have been determined to be viable for treatment flow equal to the 2045 design flows. The treatment facility is anticipated to average day septage flow of around 10,000 gallons per day, with peak day flows near 25,000 gallons per day.

No Action Alternative

A no-action alternative is considered and would continue the current operations of land application and out-of-county hauling for septage treatment and disposal. There are currently three active sites utilized within Ravalli County for septage land application and several sites in adjacent counties that accept septage generated from Ravalli County. Additionally, the City of Missoula accepts limited amounts of out-of-county septage. The capacity of these facilities has been discussed in Public Hearing #1 and in Chapters 2 and 3 of the Preliminary Engineering Report.

Land application sites within Ravalli County, Missoula County, and the City of Missoula Resource Recovery Facility provide for current septage volumes. Limitations, as seen starting in 2023, increased loading on land application sites within Ravalli County. Land applications within Ravalli County will need to be increased to meet future demands.

Emerging contaminants such as PFAS and PROA may reduce the future availability of willing property owners to accept septage that is not tested, as these "forever" chemicals can bind to soils and plants in the application areas.

Receiving Alternatives

Critical to the operation of a septage treatment facility is a receiving station that tracks waste received and provides for initial screening

and grit removal. Receiving station components are generally open and free, and several vendors provide similar services to meet technical and regulatory requirements.

Instrumentation and Tracking

Managing septage influent prior screening and treatment is critical to financial success and operations. Hauler stations provide an automated interface for haulers to secure access to the receiving station and treatment facility.

Features:

- Permitted access via card swipe
- Tracks loads/chain of custody
- Records transactions/prints transaction records
- Load metering for billing

Grinding

Grinding is commonly used to process septage to a uniform size and ensure that no large debris harms downstream equipment.

Advantages:

- Uniformly processes debris
- Protects downstream equipment from rocks and other heavy solids

Disadvantages:

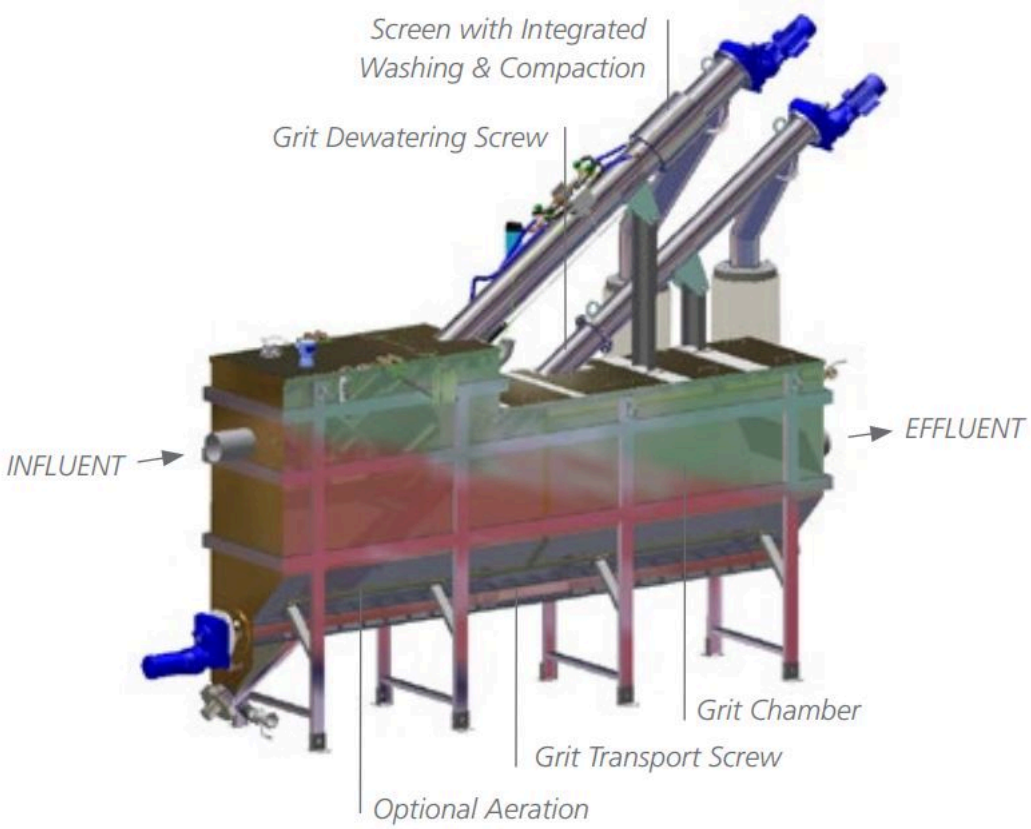
- Can reduce amount amount of debris removed from screening
- Increased electricity demand

Screening

Screening is an essential component of septage headworks. Screen removes foreign debris and trash from the treatment process. Screenings are typically rinsed and compacted prior to being discharged to a solid waste container. Solid waste containers can be disposed of at landfills.

Features:

- Shaftless augers remove rags and ropes without clogging
- Cylindrical bar rakes or screens screen process and remove larger debris from plant influent
- Washing and compacting zones clean and consolidate waste prior to a solid waste container
- Potable or non-potable recycled plant effluent can be used for washdown cycles



Grease and Grit Removal

Grit chambers remove grit before it can damage equipment or accumulate within downstream treatment channels, filter media, or wetlands.

Septage can be mixed with other sediment-laden pumpings, leading to high levels of grit and grease. In addition to sand and soils, grit can also include bone chips, seeds, coffee grounds, and other nondecomposed heavy waste.

Design Alternatives:

- Vortex/spiral flow grit removal
- Inline slope grit chambers with baffles
- Combined screening and grit removal for lower flows (Similar to Ravalli County Septage Facility)

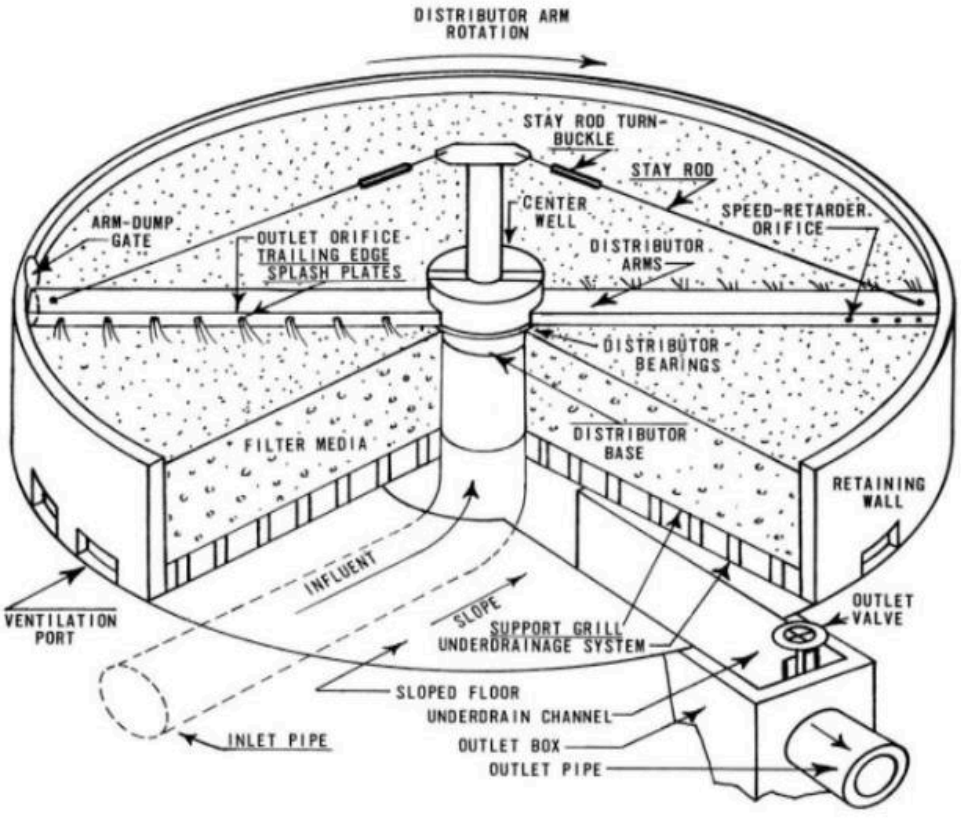
Treatment Alternatives

The treatment alternatives presented are considered viable for partial treatment with effluent disposal to a municipal treatment system or complete treatment with effluent discharged under a permit to either groundwater or surface water. Sizing and/or

recirculation ratios would be modified depending on the location and effluent disposal.

Several of the treatment processes would benefit from small maintenance influent flows to provide their base carbon needs. Ideal for some treatment processes would be seasonal or low-flow diverting of influent into the facility to maintain biological processes.

In addition to seasonal influent loading supplements, potential effluent discharge to treatment facilities with nutrient limits may allow for non-nutrient limited months to have increased septage loading. The City of Hamilton is currently the only facility in Ravalli County that has nutrient limits to the Bitterroot River; however, it is possible that the Town of Stevensville may receive nutrient limits in future permit renewals.



Trickling Filter (Attached Growth Filter)

Fixed-film biological treatment system where wastewater is distributed over a bed of media (such as plastic or various synthetic materials), promoting the breakdown of organic matter.

Primary treatment or fine screening is necessary upstream of the trickling filter.

Advantages:

- Low Energy Consumption (passive aeration, little to no blower use)
- Relatively resistant to shock-loading from high-strength waste
- Lower sludge yield compared to other packaged alternatives
- Minimal labor requirements and simple operation, allowing for location flexibility

Disadvantages:

- Needs larger footprint compared to more compact packaged treatment systems or SBR's
- Potential for odor concerns, limiting to locations distanced from residential communities
- May have trouble with nutrient loading
- Limited direct process control

Downflow Wetland (Attached Growth)

Constructed wetland where wastewater flows downwards through a bed of soil or gravel media, typically planted with other wetland

vegetation, allowing treatment during percolation through the substrate.

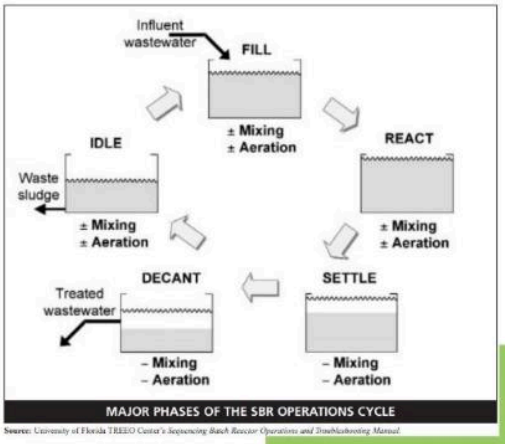
Fine screening and solids settling tanks or sedimentation structures are required for primary treatment prior to the engineered downflow wetlands. Downflow wetlands can include 2 stages for BOD and nutrient removal. Rotating wetlands are commonly used for maintenance, such as mowing and vegetation removal. The Bridger Bowl downflow wetlands treat +/—10,000 gpd, during the winter season.

Advantages:

- Low energy consumption and minimal mechanical components
- Aesthetic blending with the environment
- Highest resilience to shock-loading, less reliant on flow equalization
- Denitrification options allow for more efficient nutrient removal
- Less frequent sludge handling maintenance leads to flexible location options, given the available footprint

Disadvantages:

- Requires the largest footprint of various options
- Requires mowing
- Seasonal performance concerns - efficiency tends to decline in colder climates
- Less capable of rapid processing of wastewater
- Limited direct process control
- Possible anaerobic conditions leading to odor concerns, limiting to locations distanced from residential communities



Sequencing Batch Reactor (SBR)

Activated sludge treatment system that operates in batches, with aeration and settling occurring in a single tank in controlled sequences

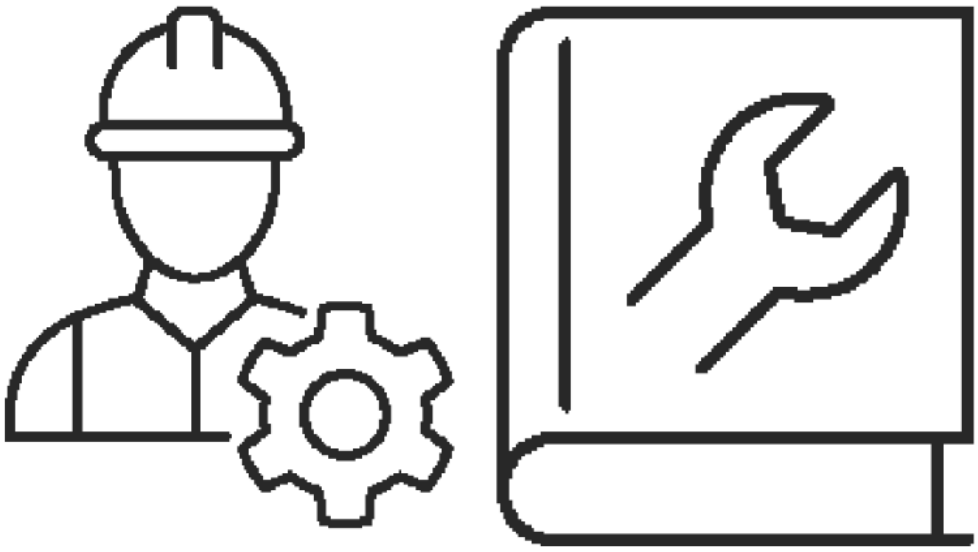
Advantages:

- Can be contained within a small 40x60' building due to minimal footprint
- Flexible operational control, with variable aeration and settling times
- Better nutrient removal compared to attached growth options

Disadvantages:

- Requires upstream equalization, likely 5,000 - 10,000 gallon tank
- Increased solids generation requires additional on-site drying beds or other solids handling facilities
- Much higher energy requirements due to aeration, mixing, and pumping needs
- Generates higher levels of sludge compared to attached growth options
- More complex operations, less flexibility with location.

Annual Operations Maintenance Contract



Package Plant / Contract Operations

Vendors may be solicited for design and operation of a treatment facility. There are several entities that may be interested in provided services to Ravalli County.

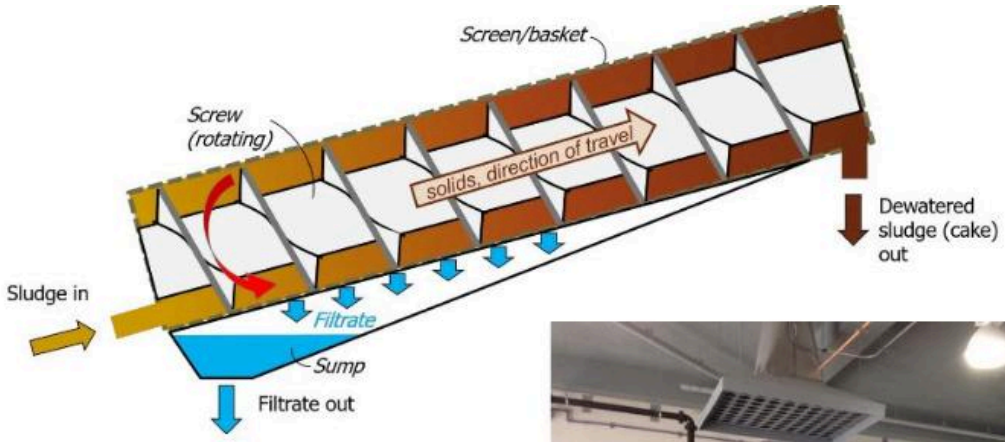
Advantages:

- Turnkey operations
- Limited risk
- No operations input
-

Disadvantages:

- Cost control after construction
- Customer service

Solids Handling Alternatives



Sludge Screw Press Dewatering

Sludge Belt Filter Press Dewatering

Mechanical Dewatering

Mechanical dewatering device for separation of solids and liquids in sludge. Uses a rotating screw inside a cylindrical screen to gradually compress sludge to remove water while filtrate can drain through perforations.

Advantages:

- Compact and energy efficient.
- Can run 24/7 with minimal operator attention
- Solids concentration of cake is around 15-25%
- Quieter operation compared to centrifuges
- Requires less polymer addition compared to belt filters
- Flexibility in odor control

Disadvantages:

- Less drying capabilities compared to thermal drying processes
- Screens can clog without proper maintenance
- Higher capital cost compared to drying beds/gravity thickeners

Types:

- Screw Press

- Belt Filter Press
- Ceramic Plates

Geotubes/Geobags

Act like a filter container, trapping solids while liquids permeate through the membrane surface via gravity.

Advantages

•Very low maintenance and simple design/minimal infrastructure
•Low capital and O&M cost

Disadvantages

- The dewatering process is slow, relying on gravity and natural drainage
- Limited solids capture efficiency, some smaller particles can pass through the geotextile fabric.
- More heavily dependent on weather conditions due to rehydration of sludge
- Risk of overloading
- Odor concerns in warmer months

Solar Sewage Sludge Drying Facility

Sludge Drying Bed Facility

Drying Beds

Provide sludge dewatering by allowing liquid to drain under gravity through a permeable medium that the sludge sits on top of, with evaporation under ambient conditions.

Advantages:

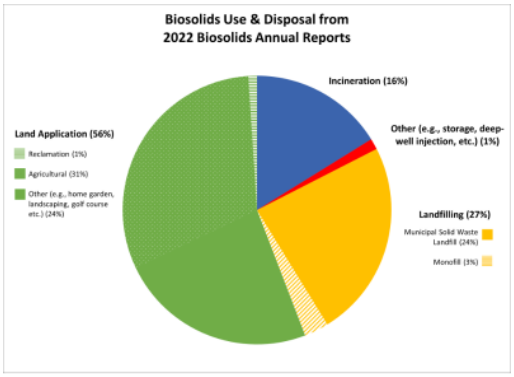
- Currently in use at Hamilton - easy to add on
- Ease of operation, gravity and evaporation
- Low capital and O&M costs due to minimal energy requirements and mechanical parts
- Solids concentration of cake around 20-30% under favorable environmental conditions
- Scalable

Disadvantages:

- Weather dependent for drying efficacy
- Larger footprint compared to other options
- Possible odor and vector concerns in warmer climates

Solids Disposal Alternatives

Dewatered sludge can be disposed of or put to beneficial use. Over 50% of sludge is land applied for the beneficial use of reclamation, agriculture, or composted garden/landscaping. The methods of sludge disposal may change as new information and regulations about emerging contaminants such as PFAS become available.



EPA

Due to the limited quantity of sludge anticipated to be generated, incineration was not considered a viable alternative.

Landfilling

Sewerage sludge may disposed of in solid waste landfills regulated under EPA 40 CFR 258 and Montana ARM 17.50. Sludge is required to meet Class A or B standards for pathogen standards.

Landfilled sludge must be dewatered removing free liquid to minimize leachate generation.

Advantages:

- Consistent location for disposal regardless of season
- Reduced risk of releasing sludge borne pathogens or pollutants
- Landfill beneficial use for nutrient rich compostable material

Disadvantages:

- Tipping fee expenses
- Transportation expenses to Missoula

Land Application

Spreading, incorporation, or injection of sewage sludge into or onto approved land application sites.

Advantages:

- Improved soil health and carbon sequestration
- Reduced phosphorous demand
- The existing Frost and Bugli land application sites are available in the county.
- Frost site larger capacity, closer to Hamilton (100+ acres)
- Bugli Site smaller (70 acres) and closer to Stevensville

Disadvantages:

- Hauling requirements
- Existing sites have limited capacity
- Must comply with 40 CFR 503 regulations
- Not guaranteed as permanent solution
- Concerns relating to runoff into surface and groundwater
- Emerging containment restrictions for PFAS

Partnering Compost Facility

Both the City of Hamilton and the City of Missoula use stabilized organic wastewater biosolids in compost facilities. These biosolids provide nutrient-rich supplements for soil amendments and fertilizer.

Dewatered biosolid sludge could be transferred to facilities for use within existing compost facilities. However, a stand-alone facility has not fully been vetted due to the expense of developing one and the competition with existing municipal facilities in the region.

Advantages:

- Limited capital upfront expense
- Flexibility for disposal facilities
- Beneficial use for nutrient rich soil amendments

- Scalable treatment facility construction

Disadvantages:

- Transportation expenses to existing compost facilities
- Uncertainty from emerging contaminants such as PFAS
- Restrictions from non county owned facilities
- Tipping fees for disposal

Discharge Alternatives

Treated effluent requires discharge, which is permitted by Montana DEQ. All new permits would include sampling and reporting requirements. There are several viable alternatives, these are listed below:

Discharge Under Existing Permits -

Utilizing existing municipal discharge permits would be a viable alternative. Both the Town of Stevensville and the City of Hamilton have existing Montana Pollutant Discharge Elimination Systems (MPDES) permits for the discharge of treated wastewater. Treated effluent could be disposed of into the existing collection systems or treatment facilities as an Industrial Pretreatment Permit Equivalent.

Groundwater Discharge Permit (Montana Ground Water Pollutant Control System) -

Groundwater discharges greater than 5,000 gallons per day require an MGWPCS permit that provides for nutrient limits of nitrates and phosphorous. Non-degradation of groundwater and surface water is required as part of the permitting process. It is likely that a fate and transport groundwater model would be required to rereview potential impacts on aquatic and groundwater resources.

Subsurface drain fields or rapid infiltration and percolation cells would be considered groundwater discharges. Separation from groundwater is required, along with considerations of groundwater mounding.

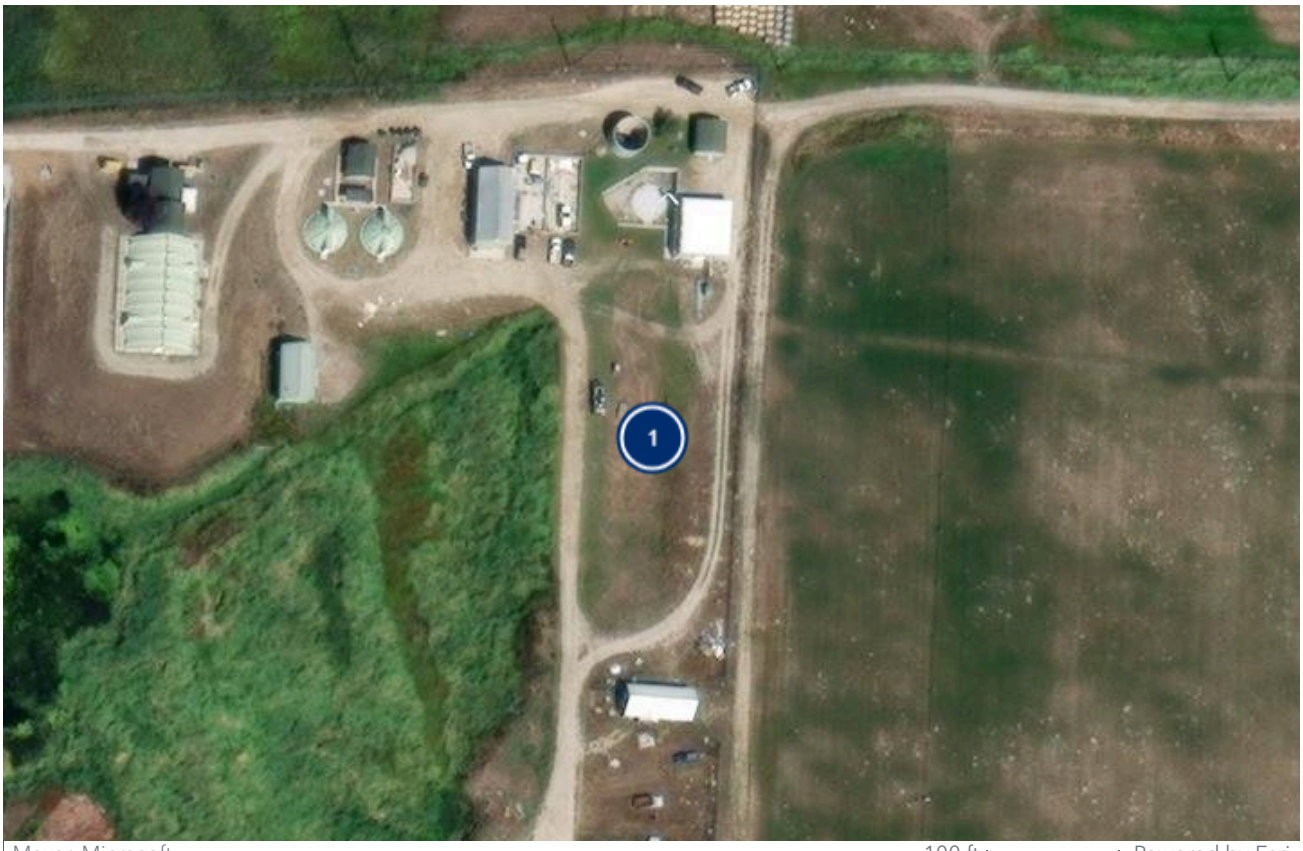
Surface Water Discharge Permit (Montana Pollutant Discharge Elimination Systems) -

A new surface water discharge is difficult to permit because of non-degradation requirements in Montana Statute.

Review and consideration would be dependent on the Montana Department of Environmental Quality.

Location Alternatives

Location alternatives are general in nature and have considered Ravalli County or public land at this point. Private property has not been considered at this time but could be considered within proximity of treatment facilities or with available lands for treated effluent discharge.



1 Town of Stevensville - East of Treatment Facility

Pros: Location would allow for base sewer flow from Stevensville to be metered through septage facility to maintain biology during low flow periods.

Truck access can be routed from Stevensville Cutoff, this would require an easement and new access road.

Location is away from residential areas.

Cons: No ability to split flow between different facilities.

May be disruptive to the Town of Stevensville's future operations.

Areas likely has high groundwater that would need mitigated during construction.

Needs easement from private property Owner.

2 Town of Stevensville - South of Treatment Facility

Pros: Location would allow for base sewer flow from Stevensville to be metered through septage facility to maintain biology during low flow periods.

Truck access can be routed from Stevensville Cutoff, this would require an easement and new access road.

Location is away from residential areas.

Cons: No ability to split flow between different facilities.

Distance for recycle or discharge to Town of Stevensville treatment facility is not direct.

Areas likely has high groundwater that would need mitigated during construction.

Needs easement from private property Owner.

3 Hamilton North of Treatment Facility

Pros: Near existing wastewater treatment facility.

Near potential partnering compost facility and drying bed sludge facility.

Cons: Limited are for growth, may impact City of Hamilton's future operations.

Access route is through local residential streets, up to 3,200 truck trips per year.

No ability to split flow between multiple treatment facilities.

Treatment facilities would need to meet nutrient removal for City of Hamilton discharge permit.

4 Hamilton South of Treatment Facility

Pros: Near existing treatment facility

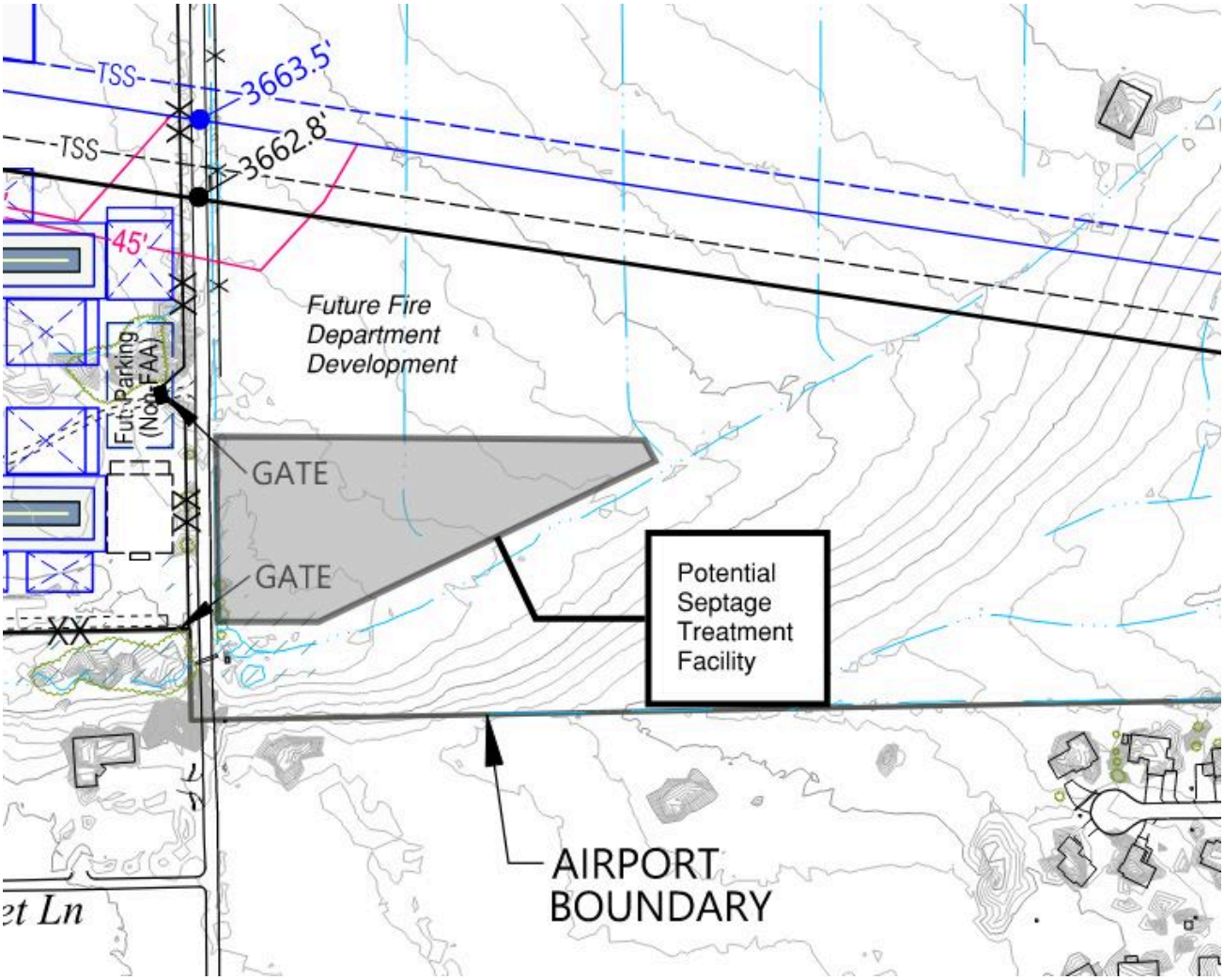
Near potential partnering compost facility and drying bed sludge facility.

Cons: Adjacent to residential development.

Access route is through local residential streets, up to 3,200 truck trips per year. Access within the treatment facility is not direct.

Treatment facilities would need to meet nutrient removal for City of Hamilton discharge permit.

5 Tammany Lane



Pros - Adaptability to multiple treatment processes.

Allows mixing of discharged treated effluent with City of Hamilton collection system.

Good truck access.

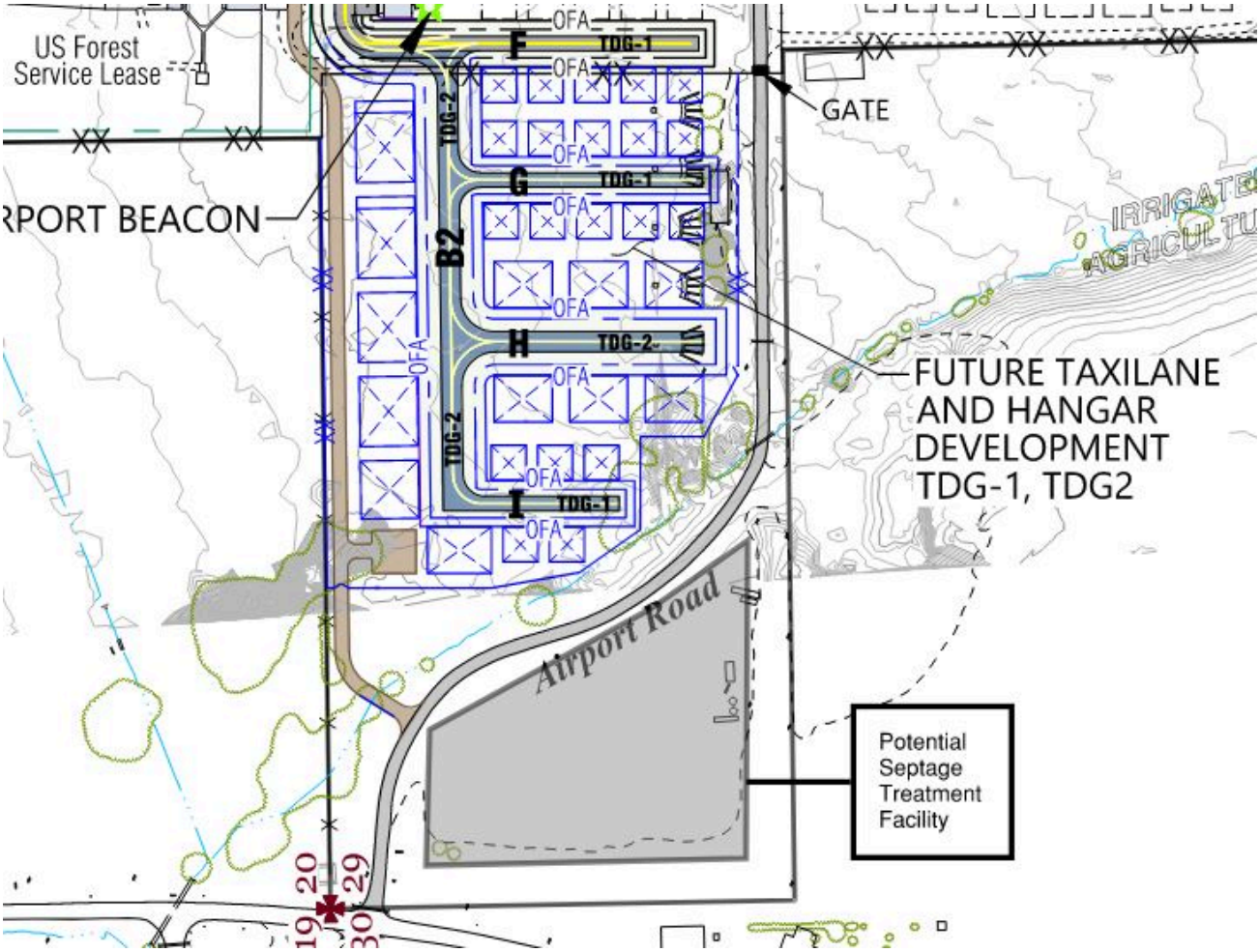
Cons - Distance to existing treatment facility for staffing.

Limitations on building height and open water bodies within airport influence area.

Base flows to support treatment process are difficult to divert from airport.

Treatment facilities would need to meet nutrient removal for City of Hamilton discharge permit.

6 Ravalli County Gravel Pit, Airport Road Hamilton



Pros - Truck access to East Side Hwy is available.

Allows mixing of discharged treated effluent with City of Hamilton collection system.

Adaptability to multiple treatment processes.

Cons - Displaces county road department operations from gravel pit.

Distance to existing treatment facility for staffing.

Base flows to support treatment process are difficult to divert from airport.

Treatment facilities would need to meet nutrient removal for City of Hamilton discharge permit.

7 Old Corvallis Road - Ravalli County Fairgrounds

Pros - Truck access to Old Corvallis Road and US Hwy 93 is good.

Available discharge into City of Hamilton sewer collection system for mixing.

Adaptability to multiple treatment processes.

Availability of divert some wastewater from the City of Hamilton to maintain treatment process during low flows.

Cons - Treatment facilities would need to meet nutrient removal for City of Hamilton discharge permit.

Would reduce area available for fairground parking.

Distance to existing treatment facility for staffing.

8 Stevensville Airport Road - Gravel Pit

Pros - Truck access to East Side Hwy is good.

Adaptability to multiple treatment processes.

Cons - No municipal system to use for discharge of treated effluent.

Drainfield areas limited to areas not disturbed by gravel pit operations.

No availability for base non septage flows for treatment process.

No partnering municipality to pursue operational support from

9 Stevensville Airport Property

Pros - Truck access to East Side Hwy is good

Adaptability to multiple treatment processes.

Would provide sewer to airport and adjacent commercial businesses that are limited.

Cons - No municipal system to use for discharge of treated effluent.

Limited availability for base non septage flows for treatment process.

No partnering municipality to pursue operational support from

Next Steps

Ranking Matrix

- Capital Cost
- Process construction phasing/scalability
- Operating Cost
- Public Acceptance
- Discharge Limitations
  - High groundwater, slopes
- Operational Organization
  - Staffing/Municipal Partnerships
- Proximity to sewer base flows

Updates to Background Data, Need for a Project

- Distribution of septic pumpings on the Hanson Property.
- Existing WWTP limitations.
- Public Comments

Develop Implementation Plan and Project Costs

Public Hearing #3, April 8, 2025

Contact Information

Morrison-Maierle

Aaron McConkey, PE - Project Manager

406-543-4845

amcconkey@m-m.net