

**MUNICIPALITY OF GRISE FIORD**

**Operation & Maintenance Plan for  
Municipal Water Licence:  
Sewage Disposal Facilities**

**February 2026**

## Document Control

Date	Document Title	Author	Details
October 2014	Operation and Maintenance Manual for the Existing Sewage Lagoon	Government of Nunavut-Community Government Services (GN-CGS)	Initial Document
January 2026	Municipality of Grise Fiord Operation & Maintenance Plan for Municipal Water Licence: Sewage Disposal Facilities	Government of Nunavut – Transportation and Infrastructure Nunavut Services (GN-TIN) and Dillon Consulting Limited	Consolidation of previous information into a standardized template. Updated wetland treatment area defined area. Included maintenance activities for the lagoon and wetland based on CSA W203:19. Updated monitoring section as per the water licence requirements. Added reference to FEQG for assessing water quality samples.
February 2026	Municipality of Grise Fiord Operation & Maintenance Plan for Municipal Water Licence: Sewage Disposal Facilities	Government of Nunavut – Transportation and Infrastructure Nunavut Services (GN-TIN) and Dillon Consulting Limited	Added procedures for sewage collection, transport, and disposal to prevent spills

# Table of Contents

---

## Document Control

---

<b>1.0</b>	<b>Site Description</b>	<b>1</b>
1.1	Location of the Sewage Disposal Facility (SDF) .....	1
1.2	SDF Site Summary.....	2
1.2.1	Site History .....	2
1.2.2	Ground Conditions .....	2
1.2.3	Treatment System .....	2
<b>2.0</b>	<b>Staff</b>	<b>3</b>
2.1	Senior Administrative Officer .....	3
2.2	Foreman .....	3
2.3	Sewage Truck Drivers .....	3
<b>3.0</b>	<b>Health and Safety</b>	<b>4</b>
<b>4.0</b>	<b>Security and Control</b>	<b>5</b>
<b>5.0</b>	<b>Wastewater Conveyance</b>	<b>6</b>
5.1	Operations .....	6
5.2	Influent Volume.....	7
<b>6.0</b>	<b>SDF Design</b>	<b>8</b>
<b>7.0</b>	<b>Effluent Discharge</b>	<b>10</b>
<b>8.0</b>	<b>Maintenance</b>	<b>11</b>
<b>9.0</b>	<b>Monitoring</b>	<b>14</b>
<b>10.0</b>	<b>Modifications and Upgrades</b>	<b>17</b>
<b>11.0</b>	<b>Previous Reports</b>	<b>18</b>

---

**Municipality of Grise Fiord  
Operation & Maintenance Plan for Municipal Water Licence: Sewage Disposal Facilities  
February 2026**

**Figures**

---

Figure 1: Grise Fiord Sewage Disposal Facility (Google Earth, 2025) ..... 1  
Figure 2: Seasonal Effluent Flow Path Through the Wetland Treatment Area ..... 8

**Tables**

---

Table 1: Wastewater Generation Estimates..... 7  
Table 2: License Requirements Related to O&M of the SDF ..... 14  
Table 3: Monitoring Program Station Location and Description..... 15

**Appendices**

---

A Site Drawings

## 1.0 Site Description

---

Date this plan was prepared: January 2026

### 1.1 Location of the Sewage Disposal Facility (SDF)

---

**Municipality:** Grise Fiord  
**Latitude:** 76°25'37" N  
**Longitude:** 82°55'16" W  
**Proximity to Town:** 800 m NW

The Municipality's Sewage Disposal Facility location is shown in **Figure 1**.



Figure 1: Grise Fiord Sewage Disposal Facility (Google Earth, 2025)

## 1.2 SDF Site Summary

---

Year of commissioning the SDF: 1996

Design life of the SDF: 20 Years

### 1.2.1 Site History

---

The Municipality of Grise Fiord is located on the Southern tip of Ellesmere Island by the Baffin Bay. Located approximately 1,160 km North of the Arctic Circle, Grise Fiord has a population of 144 (Statistics Canada, 2021) and is in the Qikiqtaaluk Region of Nunavut.

Grise Fiord has a climate which consists of short cool summers and long cold winters. Annual snowfall and rainfall are approximately 118 cm and 15 cm, respectively. The typical temperature range for January is between a low of about -29°C and a high of about -23°C whereas in July, the temperatures range between a low of 3°C to a high of about 7°C. Usually, freeze up occurs during the month of November but it may happen as early as October or even September. In some years, early freeze up may thaw again before final freeze up occurs. Spring thaw typically takes place during the month of July, but the time frame can vary as much as freeze up. During spring runoff, the community experiences mild flooding.

The community uses trucked services for both water delivery and sewage collection. Wastewater is treated using a constructed retention Lagoon cell treatment system that is located approximately 800 m northwest from the center of the community.

### 1.2.2 Ground Conditions

---

Grise Fiord is cradled by the Arctic Cordillera Mountain range. Topography consists of areas of moss surrounded by rock outcrops, bedrock and steep cliffs. Grise Fiord lies within the continuous permafrost zone.

### 1.2.3 Treatment System

---

Wastewater in Grise Fiord is treated by a single cell sewage lagoon system. The lagoon is located 0.80 km from the community. This is a retention lagoon. A one-meter freeboard is maintained at all times in order to protect structural integrity. Ten days advance notice is provided to the Crown Indigenous Relations and Northern Affairs (CIRNAC) inspector prior to start decanting.

## 2.0 Staff

---

### 2.1 Senior Administrative Officer

---

**Name:** David General  
**Phone:** 867-890-9959  
**Email:** gfsao@qiniq.com

**Responsibilities:**

The SAO manages the municipal staff to ensure that:

- Proper operation of the SDF is carried out
- Sampling and inspections are completed
- Information under the water licence monitoring program is provided to the Government of Nunavut Department of Transportation and Infrastructure (GN-TIN) for Annual Report preparation
- Submission of the Annual Report for the Nunavut Water Board (NWB)

### 2.2 Foreman

---

**Name:** Chris Dederick  
**Phone:** 867-980-9060  
**Email:** gforeman@qiniq.com

**Responsibilities:**

- Daily operations and maintenance of the SDF.
- The sampling program at the monitoring stations
- Maintaining signage at the SDF and monitoring stations
- Annual decanting of the lagoon effluent into the adjacent wetland treatment area

### 2.3 Sewage Truck Drivers

---

**Name:** Various  
**Phone:** N/A  
**Email:** N/A

**Responsibilities:** The sewage vacuum truck drivers collect sewage from holding tanks within the municipality. Sewage is transported to the lagoon where it is deposited.

## 3.0 Health and Safety

---

All personnel working within the SDF must follow the Nunavut Safety Act and be made aware of potential health hazards associated with working around sewage and wastewater. This is imperative so individuals make a conscious effort to perform all necessary safety procedures to protect themselves, their co-workers and family members at home. Safety precautions include:

- Ensure all equipment is kept as clean as possible;
- Assume anything touched by sewage is contaminated;
- Protective clothing such as coveralls, gloves, boots, and safety glasses are to be provided to personnel and always worn when working around sewage;
- Workers must always wear protective gloves
- Work clothing is not worn home
- Workers must wash their hands with soap and water on a regular basis, especially before delivering drinking water, eating and before going home;
- Workers are prohibited from eating or drinking in and around the sewage vacuum trunks;  
and
- Workers must keep their vaccinations up to date.

## 4.0 Security and Control

---

Access Control of to the facility:

- Signage
- 450 m restricted land use development setback surrounding the SDF

## 5.0 Wastewater Conveyance

---

Wastewater transportation:	Sewage Vacuum Truck
Annual volume of sewage collected:	Reported in Annual Report
Number of days per week sewage is collected:	5

### 5.1 Operations

---

- Sewage is collected Monday through Friday from holding tanks in residences and other buildings in the community. Sewage is collected using sewage vacuum trucks.
- The vacuum trucks pump out sewage from the building holding tanks and transport it to the detention cell.
  - The suction hose should be connected securely to the holding tank outlet
  - Start the vacuum pump then open the suction valve once the vacuum is established
  - Maintain vacuum pump operation for an additional 30 seconds following emptying the holding tank to clear residual sewage from the suction piping and connection fittings ensuring that piping is elevated and straighten so all residual sewage is purged and vacuumed
  - Place hose in the containment tray and empty and clean the containment tray if any accumulation of wastewater is observed
  - The containment tray should be utilised if there are any cracks in the piping that lead to a sewage leak and vacuuming sewage shall stop immediately
    - The procedures for sewage spill management outlined in the Environmental Emergency Contingency Plan shall be enacted, which include management of the sewage spill and reporting the spill
- Sewage is deposited into the lagoon from the vacuum trucks using the offload chute at the truck pad. The sewage truck backs up to the offload chute and the release valve of the truck is opened. Bollards with railings have been placed in front of each offload chute for safety precautions. Ensure all sewage is released from the truck tank into the sewage lagoon before closing the valve and driving away, so sewage does not drip during truck transport
- The volume of sewage discharged into the lagoon is estimated from the municipal water delivery records

Influent volume estimates from 2015 to 2023 have been provided in **Table 1**.

## 5.2 Influent Volume

Table 1: Wastewater Generation Estimates

Year	Estimated Wastewater Volume (m <sup>3</sup> )	Difference (%)
2015	5354.6	0
2016	5387.4	0.61
2017	5420.3	0.61
2018	5453.1	0.60
2019	5486.0	0.60
2020	5518.8	0.60
2021	5551.7	0.59
2022	5617.4	1.17
2023	5617.4	0

## 6.0 SDF Design

Lagoon Capacity:	19,360 m <sup>3</sup>
Lagoon Dimensions:	97 m x 55 m
Wetland Treatment Area:	15,800 m <sup>2</sup>
Wetland Hydraulic Retention Time:	Unknown
Effluent Path Length:	250 m
Discharge Method:	Decant
Final Receiving Body:	Baffin Bay
Type of Receiving Environment:	Marine

### An overview of the wastewater treatment process:

Sewage is discharged into the detention cell year-round. The detention cell provides primary treatment of sewage as effluent is held in the impervious cell for a period of time. In August the lagoon is decanted. Sewage trucks will continue discharging to the lagoon throughout the decanting process. The seasonal effluent flow through the wetland treatment area is shown in Figure 2.



Figure 2: Seasonal Effluent Flow Path Through the Wetland Treatment Area

**Description of the Final Receiving Environment:**

Baffin Bay is an arm of the Atlantic Ocean bounded by the Baffin Island in the west, Greenland in the east, and Ellesmere Island in the north. It connects to the Atlantic through the Davis Strait, and to the Arctic through several narrow channels of Nares Strait. It is a northwestern extension of the North Atlantic and Labrador Sea. It can also be viewed as a long strait separating Baffin Island and Greenland.

## 7.0 Effluent Discharge

---

<b>Discharge Method:</b>	Decant
<b>Time of Decant:</b>	August
<b>Duration of Decant:</b>	3 weeks
<b>Average Discharge Flowrate:</b>	Approximately 381 cubic metres per day

### **Description of Effluent Sampling Procedures:**

Per water license 3BM-GRI2025, the Municipality is required to measure and record, in cubic metres, the monthly and annual quantities of raw sewage offloaded from trucks and the number of days of use for the Sewage Disposal Facilities. The Municipality is also required to measure and record, in cubic metres, the monthly and annual quantities of effluent pumped from Monitoring Program Station GRI-4. The results must be reported within the Annual Report. All sampling, sample preservation, and analyses must be conducted in accordance with methods prescribed in the current edition of Standard Methods for the Examination of Water and Wastewater, or by such other methods approved by the Board in writing. All analyses must be performed by a laboratory accredited according to ISO/IEC Standard 17025. The accreditation should be current and in good standing.

### **Description of Operations:**

Municipal wastewater is collected from holding tanks at each residence and commercial building by sewage (vacuum) trucks. Sewage (vacuum) trucks pump the wastewater out of the holding tanks and transport it to the sewage treatment area.

Throughout the year, the wastewater is discharged into the lagoon through the offload chute located at the truck pad. The sewage truck backs up to the lagoon (bollards are placed for safety purposes) and the valve is opened. Wastewater is discharged into the lagoon, over the splash pad.

The retention period is minimum to satisfy the effluent quality to the water licence requirement. Decanting occurs for roughly three weeks during open water season, which is normally in August each year.

## 8.0 Maintenance

---

### Overview of Maintenance Activities:

- Annual inspections will be undertaken by Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) accompanied by a licensee from the Municipality of Grise Fiord and/or a licensee representative from GN-TIN. The inspection report and recommendations will be reviewed by a GN-TIN municipal engineer and submitted in the Annual Report submitted to the Nunavut Water Board (NWB).
- Regular visual inspections by municipal staff of the:
  - Offload chutes
  - Lagoon berms
  - Wetland treatment area
  - Signage
- Any issues identified by municipal staff must be reported to the regional municipal engineer. Follow-up actions will be undertaken by the municipality with support from the GN-TIN.
- Maintenance activities prescribed in this document align with the CSA W203:19 June 2019 National Standard of Canada

### Lagoon Maintenance:

- On an annual basis, berms, dams, and liners shall be inspected for damage which can include erosion, cracking, slumping, and lifting of liners. If damage is noted, repairs should be made immediately.
- On an annual basis, the exterior of the berms shall be inspected for signs of seepage. If seepage is noted, then further investigation and remediation might be required.
- On an annual basis, truck discharge areas and turning pads shall be inspected for damage, including settlement, erosion, and damage to guideposts and chutes. If damage is noted, repairs should be made immediately.
- On an annual basis, fences and signage shall be inspected for damage and repairs be made immediately if noted.
- On a daily basis, during discharge periods, all outlet structures (channels, valves, manholes, and pump/siphon intakes) shall be inspected for signs of erosion or blockage and remediated if necessary.
- On a weekly basis, during the open water season, freeboard and water levels in the lagoon should be recorded.

**Municipality of Grise Fiord**  
**Operation & Maintenance Plan for Municipal Water Licence: Sewage Disposal Facilities**  
**February 2026**

- On a weekly basis, during the open water season, floating debris, algae, and plant growth should be removed.

**Wetland Maintenance:**

- On an annual basis, visual assessment of vegetation shall be conducted to ensure that OLRs are not negatively impacting vegetation.
- At the start of the period of wetland loading, inlet structures shall be inspected and repaired. This could include removal of debris and solids and levelling of flow distribution systems. During the loading period, inspections should be conducted on a daily basis.
- On an annual basis, flow diversion and attenuation structures shall be inspected and repaired immediately if damaged.
- On an annual basis, the extent of channeling and short-circuiting should be visually assessed when the wetland is receiving effluent. Flow diversion and attenuation structures should be considered if channeling is noted.
- On an annual basis, fences and signage shall be inspected for damage and repairs be made immediately if noted.

**Sludge Management:**

The sludge blanket will be monitored as part of the annual discharge procedure. A study may be undertaken to determine the need and frequency for sludge removal and disposal over the lifetime of the lagoon. If the lab test results from the lagoon discharge quality, specifically BOD and TSS analyses, become noncompliant, then a sludge removal study can be conducted.

Sludge in the sewage lagoon should be sampled more often if required. The purpose of the sampling is to ensure that the sludge remains of a quality suitable for land disposal. Sampling shall consist of a sample collected from the center point of a grid no less than 10 m by 10 m. Sufficient samples shall be taken to describe the entire sewage lagoon. Results from the sludge analysis are to be reported upon completion of the test and in the annual report.

Evaluating the analytical results obtained by sludge sampling, the Government of Nunavut defaults to criteria established by the Canadian Council of Ministers of the Environment (CCME). For soil, the CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (updated September 2007) is used to compare the metals and VOC analytical results. The CCME has also established the Canada-Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil (April 2001), which is the federal remedial standard for petroleum impacted soils. The CCME and CWS criteria are based on four land use categories: i)

**Municipality of Grise Fiord**  
**Operation & Maintenance Plan for Municipal Water Licence: Sewage Disposal Facilities**  
**February 2026**

agricultural; ii) residential/parkland; iii) commercial; and iv) industrial. As the sludge is to be disposed of at the landfill site, the industrial land use category is utilized for assessing the sludge management.

**Surface Water Management:**

Surface water and stormwater entering the Sewage Disposal Facility are monitored annually to confirm that site grading directs runoff away from the lagoon berms, thereby minimizing the potential for contact water.

At some point, for a variety of reasons, impacted surface water may accumulate in the SDF. The water may or may not be impacted contaminants from sewage. In the event this occurs, the following procedures will be followed:

1. Collect samples from the water licence monitoring program at stations as outlined in the Environmental Monitoring Program and QA/QC Plan. It is recognized that it may take some time for results to be received from the accredited laboratory.
2. Analyze samples for parameters of concern and compare the results to the relevant Canadian Water Quality Guidelines:
  - Federal Environmental Quality Guidelines (preferentially)
  - Canadian Council of Ministers of the Environment Water Quality Guidelines for the Protection of Aquatic Life
3. Water should be inspected for odours, stain, or signs of visible impact (sheens, floating scum).
4. Consult with the GN-TIN municipal engineer and CIRNAC on discharge options.

If effluent quality does not meet water licence discharge requirements, the discharge must be treated. The contact water shall be pumped into the lagoon for treatment and tested after appropriate retention time prior to discharge. The condition of berms and drainage features will also be inspected and repaired as required to restore proper surface water diversion.

## 9.0 Monitoring

**Regulatory Inspection:** The annual CIRNAC inspection will take place accompanied by the licensee from the Municipality and/or with a licensee representative from GN-TIN. The inspection report will be reviewed by a GN-TIN municipal engineer and submitted with the annual report.

Reporting requirements per the Water License have been provided in **Table 2**. Monitoring Program station information related to the SDF are provided in **Table 3**.

**Table 2: License Requirements Related to O&M of the SDF**

Requirements	Reported
Monthly and annual quantities of wastewater disposal	Annual report submitted to NWB
Notice of commencement of monitoring program and observed flow	Notice given to the CIRNAC inspector
A summary of modifications and/or major maintenance work carried out on the SDF	Proposal submitted to NWB 60 days prior
A list of spills and unauthorized discharges.	Annual report submitted to NWB
A summary of any studies requested for the SDF and future planned studies planned	Annual report submitted to NWB
Monitoring Program Station GRI-4 shall not exceed the effluent quality limits: 120 mg/L BOD <sub>5</sub> 180 mg/L TSS 1x10 <sup>6</sup> CFU/dl Fecal Coliform No visible sheen of Oil and grease 6-9 pH	Annual report submitted to NWB
GRI-2 and GRI-4 shall be grab sampled and analyzed for the following parameters and certification of analyses obtained from an accredited, approved laboratory: Biochemical Oxygen Demand (BOD <sub>5</sub> )	Annual report submitted to NWB

**Municipality of Grise Fiord**  
**Operation & Maintenance Plan for Municipal Water Licence: Sewage Disposal Facilities**  
**February 2026**

<b>Requirements</b>	<b>Reported</b>
Fecal Coliforms Total Suspended Solids pH Conductivity Nitrate-Nitrite Oil and Grease Magnesium Calcium Sodium Potassium Chloride Sulphate Total Hardness Total Alkalinity Ammonia Nitrogen Total Zinc Total Cadmium Total Iron Total Cobalt Total Manganese Total Chromium Total Nickel Total Copper Total Lead Total Aluminum Total Arsenic Total Mercury Total Organic Carbon (TOC)	
A freeboard of 1.0 m in the lagoon must be maintained	Annual report submitted to NWB

**Table 3: Monitoring Program Station Location and Description**

<b>Station</b>	<b>Description</b>	<b>Latitude</b>	<b>Longitude</b>
GRI-4	Effluent discharge from the Final Discharge Point at the Sewage Disposal Facility	76°25'33"	82°55'42"



## **10.0 Modifications and Upgrades**

---

### **Planned modifications or upgrades:**

There are no planned modifications or upgrades at this time.

## **11.0 Previous Reports**

---

- Operation and Maintenance Manual for the Existing Sewage Lagoon, Unknown Author, 2014

**Note:** As the Sewage lagoon was constructed in 1996, there are no as-built drawings available.

# **Appendix A**

## ***Site Drawings***

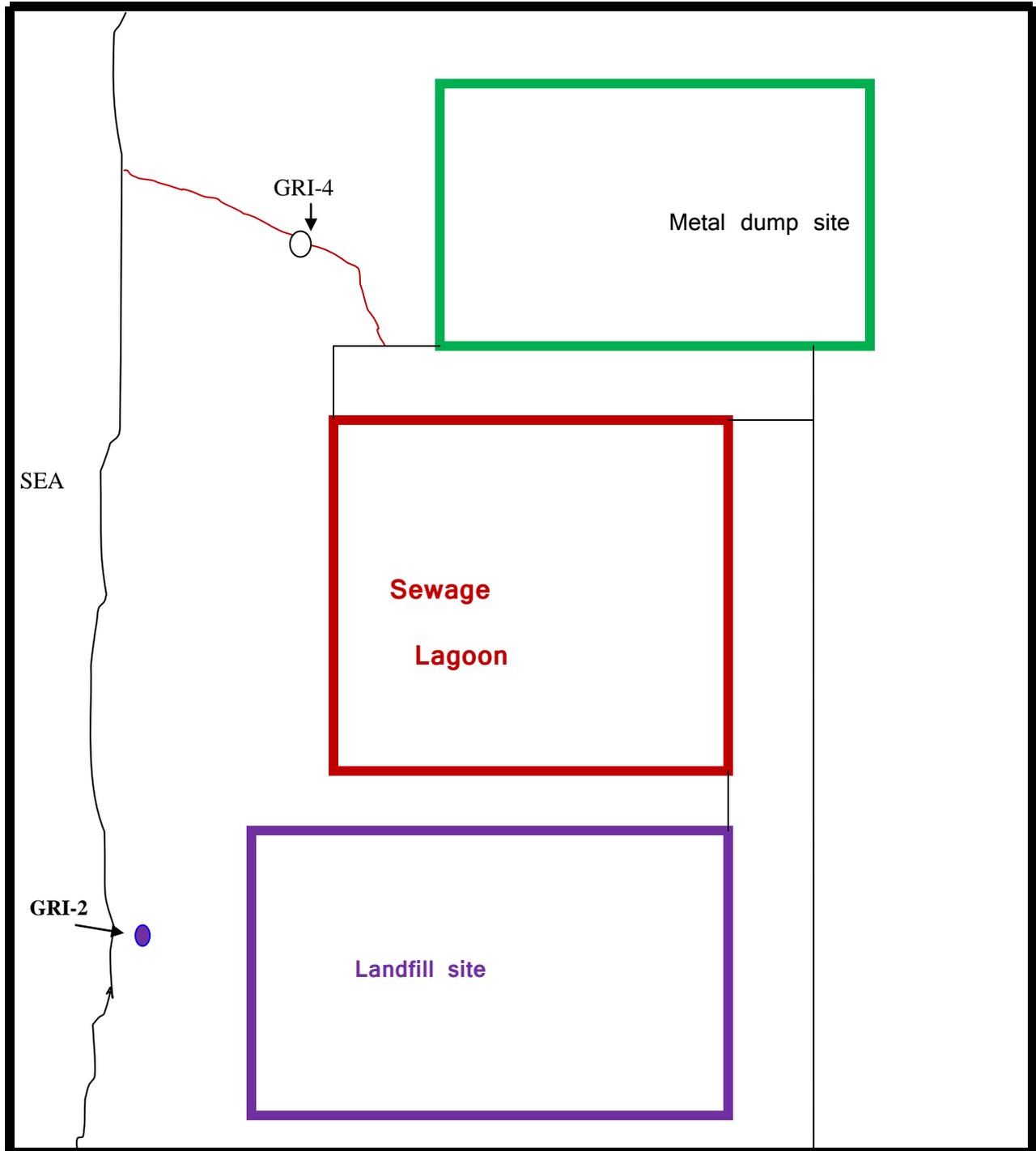


Figure 2: Location of Water Licensed Facilities