SPERLING HANSEN ASSOCIATES

- Landfill Engineering
- Solid Waste Planning
- Environmental Monitoring
- Landfill Fire Control

2024 Annual Report
7 Mile Landfill

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April 22nd, 2025 PRJ25021

Matt Dyck, P.Eng.
Operations Engineer
Regional District of Mount Waddington

Via Email: mdyck@rdmw.bc.ca

Re: 7-Mile Landfill – 2024 Annual Report

Dear Mr. Dyck,

Sperling Hansen Associates (SHA) is pleased to submit the *2024 Annual Report* for the 7-Mile Landfill.

The report has been developed based on the data provided by the Regional District of Mount Waddington (RDMW), data collected during the site visit including topographic surveys, landfill gas scanning, conductivity readings, and SHA's experience at similar sized landfills. The report includes a summary of the waste and recycling quantities, landfill capacity and lifespan, landfill gas scanning summary and GHG reduction efforts, and future operations at the site.

It has been a pleasure working with you on this project, and we look forward to continuing our strong working relationship with the RDMW's solid waste management staff.

Please do not hesitate to contact us with any comments or questions during your review.

Thank-you,
SPERLING HANSEN ASSOCIATES

Scott Garthwaite, AScT
Director

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APPENDIX

1. INTRODUCTION AND SCOPE

Sperling Hansen Associates (SHA) was retained by the Regional District of Mount Waddington (RDMW) to complete the 2024 Annual Report for the 7 Mile Landfill. SHA has provided the 7 Mile Landfill Annual Report to the RDMW for the past ten years. This year the scope of work included a yearly survey and volumetric consumption assessment, an updated lifespan analysis, discussion of the 2024 site operations, recommendations for the next 12 months of operation, and a summary of the landfill gas (LFG) assessment update and greenhouse gas reduction quantification.

2. SITE SETTING

The 7 Mile Landfill is owned and operated by the RDMW. The landfill is currently operated under Operational Certificate MR-08490 (OC), which was issued to the RDMW on December 8th, 2005 and included as Appendix A.

The Landfill began operation in the early ’90s in a Ministry of Transportation and Highway’s gravel pit located along the Island Highway (Hwy 19) approximately 16 km east of Port Hardy. The site is approximately 18 hectares, and was developed in a partially excavated gravel pit on the north side of Highway #19. The 7 Mile Landfill has been in operation since 1992 and receives municipal solid waste (MSW) from residential and commercial sources from within the RDMW, including Port Hardy, Port McNeill, and the villages of Alert Bay and Port Alice.

The Landfill entrance area consists of a residential drop off area, a recycling collection area and a Product Care Depot. To the west of the drop off area is a sand / gravel pit which is used to extract cover soil and stockpile any imported soils. In addition to receiving MSW, wood waste is ground up and mixed with the municipal biosolids and fish wastes which are accepted for composting on inactive portion of the Landfill property. In 2013, the RDMW relocated the composting operation to the crest area of Phase 1 & 2 where the feedstocks are blended together and placed in windrows along the upper north slope of the site.

Some Hazardous Waste is accepted in the form of asbestos on an infrequent basis. Hydrocarbon contaminated soils that have been remediated in biocells under a contract with KBL Environmental are accepted at the site and used as cover material. Stockpiles of compost remain on site for future integration into the topsoil layer for final cover, some of which was applied to the upper northern slopes of Phase 1 and 2 as a biocover or methane destruction layer over the past several years. A detailed analysis regarding the biocover application, sampling and results during the 2024 monitoring period are included below in Section 4.

In the summer of 2009, an area of approximately 2.5 HA was reshaped and lined with an HDPE lining system in preparation for the next stage of filling at the site. This area is referred to as the Phase 3 expansion area and has been divided into three cells or sub-phases, referred to as 3A, 3B and 3C. Also constructed in 2009 was a 1.2 HA equalization pond to provide the first stage of treatment for leachate collected within the site. In 2010, the treatment system was completed, adding two sequencing batch reactors, a settling pond and phyto-remediation area with a spray irrigation system.

3. 2024 SITE OPERATIONS AND DEVELOPMENT

3.1 2024 Site Operations

in 2024 10,238 tonnes of different types of materials were accepted and managed onsite; these included 3,128 tonnes of materials diverted from landfilling for recycling and re-use, and 7,109 tonnes of landfilled waste. This does not include any materials being managed 'Recycle BC'.

During 2024 landfilling operations continued in Phase 3C, where waste materials were managed across the northwest portion of the sub-phase, in a 2-3m thick lift. The operational deck has been constructed in a way that promotes run off of the surface water towards the north and east to leachate collection infrastructure.

The landfill development over the past year is presented in two figures – Figure 1 presents the latest 2025 topography and Figure 2 outlines the landfill topography during Summer 2024. Comparing the 2025 and 2024 surfaces results in a cut and fill analysis presented in Figure 3, where waste filling areas can be visually identified by the 'warm colors' in Phase 3C.

Photo 1 – Active Landfilling Area: Phase 3C

Figure 4 shows a map of the locations that SHA has sampled for conductivity during each annual inspection from 2011 to the present. Table 1 below outlines the conductivity readings at each location. The latest conductivity readings from stations located at the toe of Phase 1 and 2 indicate that leachate has continued to be impacted by historic landfilling and active composting activities.

Table 1: Summary of Conductivity Readings at the 7 Mile Landfill since 2011

Conductivity (µS/cm)															
Year		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Stations	STA-1	-	670	-	-	610	1,482	1,060	979	850	820	840	650	700	750
	STA-2	-	670	742	-	750	1,156	910	869	830	496	600	650	540	600
	STA-3	1,256	1,270	1,310	920	950	1,455	1,490	460	1,450	1,200	1,400	1250	1320	650
	STA-4	472	840	760	920	940	1,384	1,310	490	1,150	1,500	1,300	NW	1250	1,300
	STA-5	605	1,062	910	1,395	1,210	1,298	1,090	830	1,075	1,200	1,150	NW	NW	1,100
	STA-6	720	452	461	850	860	NW	NW	NW	575	NW	NW	NW	NW	NW
	STA-7	949	1,270	1,150	850	910	1,633	1,220	NW	890	1,230	970	NW	NW	NW
	STA-8	670	760	710	850	920	1,171	920	840	770	760	700	650	690	710
	STA-9	-	670	450	1,089	1,150	1,391	553	1,130	1,150	460	450	190	150	150
	STA-10	823	955	1,012	1,244	1,450	1,152	1,130	1,190	1,330	1,366	1,410	1300	1310	1,350
	STA-11	-	931	620	1,076	1,100	1,330	997	1,108	1,230	1,185	1,230	1220	1225	1,275
	STA-12	-	920	600	920	810	820	190	893	880	850	880	820	NA	NA
	STA-13	-	595	480	641	635	601	608	698	465	680	590	NA	NA	NA
	STA-14	271	3,960	3,800	-	-	3,975	4,215	5,040	2,890	3,800	3,910	NW	3790	3,800
	STA-15	-	-	450	499	510	515	505	802	160	455	450	NA	NA	NA
	STA-16	-	-	-	1,119	1,110	1,230	572	1,162	1,250	395	382	175	155	150
	STA-17	-	-	-	1,130	1,250	1,589	1,125	NA	1,275	1,350	1,300	1500	1430	1,350
	STA-18	-	-	-	461	480	475	258	265	315	260	250	NW	280	350
	STA-19	-	-	-	-	-	-	1,570	2,300	350	265	240	NA	NA	NA
	STA-20	-	-	-	-	-	-	455	298	750	315	320	NA	NA	NA
	STA-21	-	-	-	-	-	-	506	520	630	415	550	500	540	600
	STA-22	-	-	-	-	-	-	3,030	5,080	5,170	3,800	3,890	510	490	500
	STA-23	-	-	-	-	-	-	-	-	-	-	4,200	NA	NA	NA

Not Recorded – NR
Not Available – NA
No Water – NW

During 2024 the RDMW continued to maintain the previously placed biocover system along the northern slopes of Phase 1, 2 and 3A. The biocover layer thickness ranges from 300mm to approximately 1,000mm and the annual monitoring has shown a decrease in thickness overtime as the material continues to decompose. Further details regarding biocover operations during 2024/2025 are included in Section 4 below.

Wood waste is stockpiled in the available area west of the public drop off area and is chipped periodically when the pile reaches level indicating significant quantity. As mentioned above, this material is blended with compostables in the fabrication of topsoil and biocover for the site on the crest of Phase 1 and 2.

Asbestos is currently managed on the crest of Phase 3A as outlined in Figure 1. Asbestos is brought to the landfill double bagged in durable plastic bags or bagged in steel drums, and with each bag and drum labeled as Asbestos. Presently the onsite contractor disposes the material with a minimum 1,000 mm of cover material within the designated tipping area.

3.1.1 Waste Diversion Activities

RDMW's Eco-Depot onsite consists of a baling shed, a storage shed and a transfer shed. A residential waste and recycling drop-off area is located to the southwest of the storage sheds and office. The scrap metal pile is situated to the southwest of the public drop-off area. During the 2023/2024 reporting period, 3,128 tonnes of materials were diverted from the landfill, totalling a diversion rate from the landfill of approximately 31%. These materials included outbound metals and salvaged and recycled materials, compostables, wood waste for chipping, and asphalt shingles. The Eco-Depot operation is partially funded by Recycle BC.

The 7 Mile Landfill also currently accepts septage waste. The solids from septage ponds within the region (biosolids) are blended with wood waste diverted from the waste stream, which is chipped onsite, and composted. Potential uses for this organic waste material once composting is complete include blending it with sand/woodchips to create a soil suitable for future progressive closures, as well as, a biocover layer applied to intermediate closure areas including the northern slopes of Phase 1, 2, 3.

3.1.2 Waste Density

Waste compaction involves using specialized heavy equipment to crush and compress waste during disposal. This process not only conserves airspace but also helps to reduce issues associated with litter, odours and vectors. 7 Mile Landfill utilizes medium sized excavators to manage the active filling area as well as compact the waste. It is estimated, based on the yearly survey data as discussed in Section 3.2.1, that a waste density of 0.76 tonnes/m^3 was achieved in 2024 after allowances for materials diverted at the active face. This degree of compaction is considered very good for a small sized landfill and reflects the operator's knowledge of the site, as well as, their experience in landfill operations.

Table 2 below present's waste density and waste to cover ratios at the site over that past 15 years.

Table 2: Summary of Operations at the 7 Mile Landfill since 2009

Year	Annual Landfilled Tonnage (tonnes)	Annual Cover Soil Usage (m^3)	Total Airspace Consumed Per Year for Waste Filling Activities (m^3)	MSW Airspace (m^3/year)	Waste Density (tonnes/m^3)	Waste to Cover Ratio (vol/vol)	Airspace Utilization (tonnes/m^3)
2009	7,073	2,943	11,771	8,829	0.80	3.00	0.60
2010	7,067	2,920	12,274	8,761	0.80	3.00	0.60
2011	6,964	2,012	10,993	8,981	0.78	4.46	0.70
2012	6,453	1,875	10,009	8,134	0.80	4.34	0.66
2013	7,343	1,805	9,857	8,052	0.91	4.46	0.79
2014	6,159	1,379	9,240	7,861	0.78	5.70	0.78
2015	6,157	1,429	8,210	6,781	0.91	4.75	0.91
2016	7,763	1,467	9,718	8,251	0.96	5.53	0.90
2017	7,920	1,644	12,327	10,683	0.74	6.50	0.64
2018	7,976	1,601	11,540	9,938	0.80	6.21	0.75
2019	8,192	2,383	13,023	10,640	0.77	4.46	0.67
2020	7,769	1,792	11,343	9,551	0.81	5.33	0.70
2021	7,586	1,683	11,191	9,508	0.80	5.65	0.71
2022	8,117	1,817	11,155	9,339	0.87	5.14	0.79
2023	7,496	2,110	11,564	10,931	0.79	5.18	0.74
2024	7,109	1,890	11,212	9,322	0.76	4.93	0.63
AVERAGE	**7,321**	**1,922**	**10,964**	**9,098**	**0.82**	**4.92**	**0.72**

3.1.3 Daily/ Intermediate Cover

The BC Landfill Criteria for municipal Solid Waste (the Criteria) recommends that a 0.15 m soil layer or a functionally equivalent material must be placed over all exposed solid waste at the end of each working day, and that a 0.3 m of soil or a functionally equivalent material must be placed over all areas that will not receive waste for 30 days or more.

The strategy for daily cover used at the 7 Mile Landfill during the 2024/2025 reporting period has remained the same since 2014. At present the operators are using a fabricated HDPE sheet with conveyor belt reinforced edges to ensure the active face is encapsulated after each working day. The flexible HDPE sheet is removed by an excavator at the beginning of the day and set aside. At the end of the day, after the incoming waste has been compacted and graded smooth, the flexible sheet is re-positioned over the active face. A small berm of soil is placed around the edges to ensure no waste is exposed or the sheet is not prone to wind uplift. This technique saves on large volumes of operational soil being landfilled and extends the lifespan of the site.

In addition, this method of cover also eliminates windblown litter issues and deters vectors such as birds and small rodents from accessing the waste. Another litter control method which was used during 2024/2025, was the continual use of a litter control fence which the contractor installed downwind of the filling area to minimize the amount of litter being spread over the site.

3.2 Volumetric and Lifespan Analysis

3.2.1 Landfill Volume Consumed

The total volume of refuse and cover soil landfilled during the 2024/2025 reporting period was determined from a volumetric analysis based on the digital terrain model developed using survey information. Two surveys were used to calculate the consumed volume during the 2024 reporting period; the survey completed on March 19th, 2025 is shown in Figure 1 and the survey undertaken on July 11th, 2024 is shown on Figure 2. This survey data was then prorated to align with a 365-day period. The in-situ density was then determined by comparing the weight of the incoming waste with the in-situ waste volume, therefore representing the actual density of the waste after it was placed and compacted.

The cut and fill analysis are shown in Figure 3. It was found that a net volume of approximately 7,030 m^3 of airspace was consumed in the Phase 3C are between surveys. Allowing for the settlement (settlement analysis) within the waste mass, and corrected for a 365-day period, the total volume filled equates to 11,212 m^3.

Approximately 1,300 m^3 of cover soil was utilized in waste filling operations between survey events. When corrected for a 1-year period, SHA estimates 1,890 m3 of onsite soil was used in daily operations. Dividing the airspace consumed by waste by the volume of cover soil consumed results in a approximate waste to cover ratio of 4.9 : 1 (vol:vol).

As the contractor has done in the past, cover soil from the previous lift is being salvaged in front of the active face advance and used in daily operations to minimize the amount of soil being landfilled. The contractor does not remove all the cover, but leaves sufficient material in place to act as a physical barrier between cells in the case of a landfill fire incident. SHA recommends that the waste to cover ratio continues to remain between 4.5:1 to 6:1 to ensure that sufficient material is left in place to act as a fire break.

Analysis of the survey data taken from around the perimeter of the active footprint area shows that the Phase 3C waste column is settling. Our 2024 analysis shows differential settlement

across the Phase 3C filling area, which can be correlated to the existing waste mass thickness in those areas. An average of 0.17m of settlement was measured around the perimeter of the active filling area of the phase. Based on the active area footprint, SHA estimates the total settlement within the 2024 active area produced close to 1,000 m^3 of additional capacity throughout the year.

Table 3 below summarizes the volumetric analysis described above using all prorated values for a 365-day period:

Table 3: 2024 Volumetric Analysis Summary

	Units	Phase 3C
Active Footprint Area	m^2	4,000
Air Space Used from Survey	m^3	10,223
Air Space Created by Settlement	m^3	989
Total Filled Air Space	m^3	11,212
Estimated Cover Soil (Per Year)	m^3	1,890
MSW Tonnage (Per Year)	tonnes	7,109
MSW Air Space	m^3	9,322
MSW Density	tonnes/m^3	0.76
Air Space Utilization Factor	tonnes/m^3	0.63
Waste to Cover Ratio	m^3/m^3	4.93

SHA completed a detailed breakdown of the volumetric analysis cover soil usage and comments explaining the breakdown presented in Table 4 at the end of the report.

3.2.2 Remaining Volume and Lifespan

A volumetric analysis was performed to estimate the remaining airspace in Phase 3C. This is included comparing the most recent 2025 topographic survey to the latest Phase 3C Final Design contour, presented in the 2023 Design, Operations and Closure Plan (DOCP), outlined as Figure 5. Additionally, the projected phase volumes we summed to approximate the remaining landfill capacity. Also, based on the most recent Annual Airspace Utilization Rate (11,212 m^3/year), the remaining lifespan was estimated.

Table 5 outlines the Lifespan Analysis for the 7 Mile Landfill based on the above-mentioned estimates. It is predicted that the landfill will reach final capacity in 2158, providing another 134 years of airspace capacity. Roughly 40,000 m^3 of airspace capacity is remaining in Phase 3C for landfilling activities (see Figure 6), and it is predicted that Phase 3 will close in 2027, providing another 3 years of capacity.

Table 5 below summarizes the approximate phase-by-phase lifespan analysis.

Table 5: Lifespan Projection Summary

Phase	Start	End	Lifespan
Phase 3	2023	2027	3
Phase 4	2027	2037	10
Phase 5	2037	2058	21
Phase 6	2058	2104	46
Phase 7	2104	2138	34
Phase 8	2138	2149	11
Phase 9	2149	2158	9
Total	2023	2158	135

The lifespan will depend on a number of factors which were assumed but will likely change throughout the life of the landfill such as the population, waste disposal rate, filling rate, settlement rate, final cover thickness, compaction and waste to cover ratio.

4. LANDFILL GAS

Landfill gas (LFG) emissions are a concern due to potential health issues, nuisance odours and because LFG contributes to global climate change. If LFG is not vented, gas pressures can build up beneath a final cover system or in encapsulated pockets if fine soils are used for daily and intermediate cover, ultimately leading to uplift of the cover system. Additionally, gas can migrate from the site to nearby properties and structures if it is prevented from venting directly to the atmosphere and / or if there is a preferential pathway for the gas to travel easily off the site.

LFG is a by-product of the natural decomposition of organic materials in landfills. The most common form of LFG, which is created when biological anaerobic decomposition occurs, consists primarily of equal parts methane (CH4) and carbon dioxide (CO2). Other trace constituents include more than 166 different Non-Methane Organic Compounds (NMOC), nitrogen (N2) and oxygen (O2); the concentrations of these constituents are subject to the amount and composition of contributing waste material within the landfill, the decomposition rate of the specific contributing material, and the level of atmospheric air intrusion into the landfill.

Methane is a potent greenhouse gas (GHG) with global warming potential (GWP) of 28 to 36 times higher than CO2 in a 100-year timeframe. Methane, at concentrations between 5 to 15 % by volume in air, will cause an explosion if it encounters an ignition source. The lower end of the range (5%) is referred to as the lower explosive limit (LEL). Combustible gases are a concern in relation to LFG migration, for example in utility trenches leading off site.

BC Ministry of Environment and Climate Change Strategy's (ENV) LFG regulations and guidelines as well as the BC Landfill Criteria for Municipal Solid Waste are the regulations and guidelines that apply to LFG management in BC landfills. Environment and Climate Change Canada (ECCC) is also developing a new Federal LFG regulation that is scheduled to be finalized and come into effect by end of 2025.

The ENV Landfill Gas Management Regulation (LFG Regulation) applies to landfill sites in BC that (i) accepted MSW for disposal on or after January 1st, 2009, and (ii) have 100,000 tonnes or more of MSW in place, or receive more than 10,000 tonnes/year of MSW in any calendar year. Regulated landfills are mandated to complete a LFG generation assessment. Landfills that are determined to generate 1,000 tonnes or more of methane per year are required to install an active LFG management system. This system, if required, is to collect LFG actively and reduce methane emissions by flaring such as thermal combustion or other methods that would result in the same amount of emission reduction as flaring. The active LFG management facility shall continuously operate until the methane generation rate at the facility falls below 500 tonnes/year.

4.1 LFG Generation Assessment Summary for 7 Mile Landfill

In 2014, SHA completed a landfill gas (LFG) generation assessment for the 7Mile Landfill using the ENV LFG generation tool (ENV Model). The 2014 assessment showed that the landfill was generating 325 tonnes of methane in 2014. In 2018, SHA conducted a supplementary LFG generation assessment for the landfill. The ENV Model results in 2018 showed that this site was generating approximately 350 tonnes of methane per year. It should be noted that all previous gas generation assessments were completed using a BC average waste composition in lack of site-specific waste composition data.

In 2023, SHA and its LFG-specialized subconsultant, Methane Expert Engineering (MethaneXE), updated LFG generation modelling for the Landfill's updated DOCP report. This analysis, that was completed using site-specific waste composition data, showed that methane generation rates at the Landfill was about 431 tonnes/year, well below the limit set in the BC LFG Regulation (i.e., 1,000 tonnes/year of methane production). Therefore, we concluded that installing an active gas collection system at this landfill site was not mandatory. Because the quantity of waste in place at the Landfill has exceeded 100,000 tonnes, the RDMW is required to prepare and submit to the ENV a gas generation assessment report every 5 years. Lastly, to comply with requirements of the ENV's LFG Regulations, SHA/MethaneXE completed a supplementary LFG generation modeling and reporting for the Landfill. This updated modeling showed that the Landfill produced 416 tonnes of methane in 2024.

A summary of the 2024 LFG generation assessment results is presented in Table 6, indicating that the current methane generation rate from the landfill is approximately 424 tonnes/year.

Table 6: Output Summary of the 2024 LFG Generation Assessment Results

Item	Year of Estimate	Mass of Methane (Tonnes/year)
Estimated Quantity of Methane Produced in the Year Preceding the Assessment	2023	409
Estimated Quantity of Methane Produced in the Year of Assessment	**2024**	416
Estimated Quantity of Methane Produced one Year after the Assessment	2025	424
Estimated Quantity of Methane Produced two Years after the Assessment	2026	431
Estimated Quantity of Methane Produced three Years after the Assessment	2027	437
Estimated Quantity of Methane Produced four Years after the Assessment	2028	444

Figure 7 illustrates the methane generation estimate at the 7Mile Landfill from 2010 to 2028.

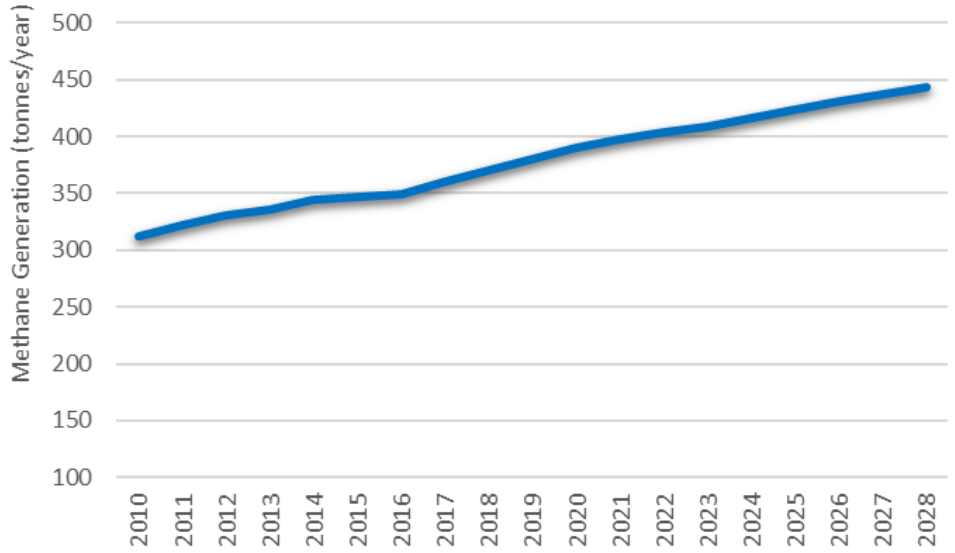


Figure 7 - Methane Generation Estimates for 7 Mile Landfill (ENV Model - 2024)

4.2 GHG Emissions Reduction Quantification Summary 2017-2022

Even though the 7 Mile Landfill is not mandated to collect and oxidize the generated methane, the RDMW volunteered to implement a methane emission reduction initiative through application of biocover at this site. Use of engineered biocover systems for reduction of fugitive methane emissions from landfills is an emerging GHG mitigation technology. Biocover systems, fabricated using organic residuals such as biosolids and compost, can have ideal physicochemical properties that stimulate the growth of methanotrophic bacteria that consume methane and produce carbon dioxide, a less potent GHG.

In the past years, RDMW has retained SHA to quantify the GHG emission reductions achieved through the application of biocover at this site. A summary of the results for the 7 Mile landfill biocover systems methane removal efficiency is presented in Table 7 below.

Table 7: 7 Mile Landfill Biocover Systems Historical Assessment Results

Project #	Quantification Year	Methane Removal Efficiency		GHG Reduction (Tonnes CO_2-e)
		Phase 1&2	Phase 3	
PRJ17009	2016	67%	--	440
PRJ18026	2017	61%	33%	439
PRJ19011	2018	53%	47%	504
PRJ20022	2019	53%	52%	478
PRJ21023	2020	40%	44%	352
PRJ22048	2021	45%	38%	553
PRJ23052	2022	33%	44%	590
PRJ24033	2023	39%	73%	1,288

In 2022-2023, the RDMW initiated a comprehensive vegetation control program along with expansion of biocover systems in both Phases 1&2 and Phase 3. As shown in Table 7, this initiative resulted in significant increase in GHG reductions achieved by landfill's biocover system. The following sections present our analysis and quantification of 2024 GHG emissions reduction achieved by the 7 Mile Landfill biocover.

4.3 Biocover Application and Monitoring in 2024

During 2024, no additional biocover were placed at the landfill. However, RDMW continued to control the vegetation over the existing biocover areas. Additionally, the regional district is planning to further "refurbish" the biocover system in Phase 1&2 in an effort to increase the efficacy of the system and to utilize the onsite compost material which are produced from diversion of organics in the facility.

For consistency with previous reports, we have tagged the biocover areas as follows:

- Biocovers 1, 2, 3, 4, 5, 6, and 9, which are located in Phase 1 & 2 area of the landfill, and,
- Biocovers 7 and 8 which are situated on the north slopes of Phases 3A and 3B, respectively.

Due to disturbances in the BC-5 area, this area has been excluded from the total biocover system over the past couple of years. Additionally, similar to last year, we excluded Biocover 2 from the 2024 GHG reduction analysis due to saturation of the area (inaccessible for scanning and most likely no methane oxidation taking place for the same reason).

Figure 8 below illustrates the layout of the biocover areas.

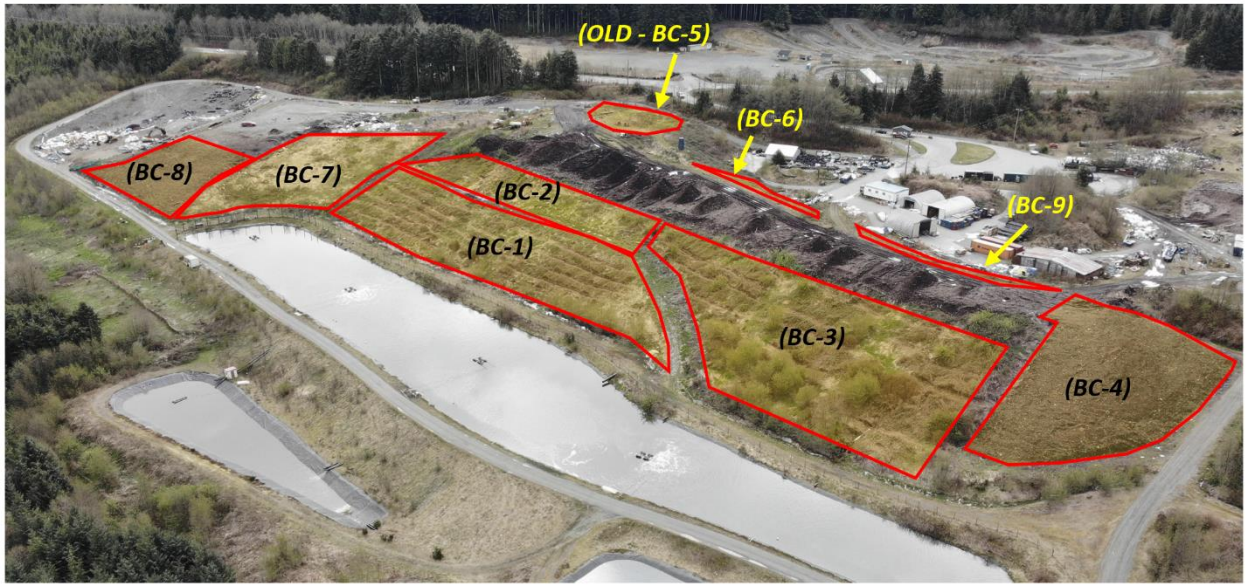


Figure 8 – Layout of 7 Mile Landfill Biocover Areas

The efficiency of each biocover area was assessed using the Surface Scan Emission Quantification Technique (SSEQT), a patented[1] methodology developed by Dr. Abedini of MethaneXE. This technique allowed us to measure methane emission rates during the 2024 GHG emission quantification works, completed in March 2025, and compare them against baseline methane emission rates.

Baseline Data Considerations:
The 2024 baseline data were based on 2023 figures, factoring in a 7% annual decline in gas generation for older Phases (1 & 2) and a 10% decline in gas generation for Phases 3A & 3B. These assumptions helped establish a realistic benchmark for methane emission reductions and are essential in evaluating the long-term performance of the BioCover system.

Biocover Effectiveness in Methane Oxidation:
The surface scan results indicate that the overall effectiveness of the BioCover system in reducing methane emissions as 54% across the entire site, 4% higher than 2023 numbers. The biocover systems in older areas (i.e. Phases 1 & 2) showed a 43% efficiency and the more recently placed biocover systems placed on north slopes of Phases 3A & 3B showed 81% methane emission reduction efficiency.

Additionally, our assessment showed BC-6 to be the least efficient biocover, showing no reduction in baseline methane emissions from this area, due to the formation of several methane emission hot spots and uncontrolled vegetation growth. For similar reasons, BC-9 was ranked the second least effective biocover, with a 33% reduction, which is significantly lower than other areas.

[1] Abedini, Ali. (2020). Method for Quantifying Fugitive Methane Emissions Rate Using Surface Methane Concentration (U.S. Patent No. 11378563). U.S. Patent and Trademark Office.
Abedini, Ali (2017). Method for Quantifying Fugitive Methane Emissions Rate Using Surface Methane Concentration (Canada Patent No. CA 2955844). Canadian Intellectual Property Office.

On the other hand, BC-7 and BC-8 with 80% and 84% methane emission reduction efficiencies, demonstrated the highest effectiveness in GHG emission reduction. These results demonstrate the potentials for a well maintained biocover systems in mitigating landfill gas emissions and importance of regular maintenance of the biocover media and vegetation control on their effectiveness.

Figure 9 shows location of BC-6 and BC-9 on south slopes of Phase 1&2.

Figure 9 – BC-6 and BC-9 Vegetation Cover (March 2025)

4.4 Biocover GHG Emission Reductions in 2024

Based on the footprint areas of the biocover systems and a global warming potential (GWP) of 28 for methane, SHA/MethaneXE estimated that the 7 Mile Landfill biocover system achieved a total GHG emissions reduction of 1,378 tonnes CO2-e/year in 2024, slightly higher than the 2023 results (i.e., 1,288 tonnes CO2-e/year). Table 8 below summarizes the results of the 2024 surface scan and GHG emissions reduction quantification for the 7 Mile Landfill.

Table 8 - Summary of 2024 GHG Emissions Reduction Quantification for 7 Mile Landfill

BioCover Area	Areas (m^2)	Surface Methane Concentrations (ppmv)			Methane Emission Rate ($g/m^2/day$)		Methane Emission Reduction (%)	2024 GHG Reduction (tonnes CO_2-e /year)
		min	max	average	2024	Baseline*		
BC-1	4,700	0.6	30.1	2.1	2.9	5.6	48%	130.3
BC-3	4,634	0.7	46.2	1.9	2.8	5.6	49%	131.4
BC-4	3,000	0.6	28.2	1.4	2.6	5.6	53%	90.9
BC-6	1,500	0.7	372.3	10.4	5.8	5.6	-4%	-
BC-7	4,355	0.7	130.0	4.8	3.8	19.3	80%	687.0
BC-8	1,855	0.7	85.3	2.8	3.1	19.3	84%	306.0
BC-9	1,700	0.7	191.4	4.5	3.7	5.6	33%	32.6
Phase 1 & 2	**15,534**						**43%**	**385.2**
Phas 3A & 3B	**6,210**						**81%**	**992.9**
Total BioCover Area	**21,744**						**54%**	**1,378.1**

* 2024 baseline data are based on 2023 baseline data as well as annual drop in Gas generation from closed phases. For Phase 1 & 2 an annual 7% decline in gas geneartion is used and for Phase 3 an annual 10% decline in gas generation is used.

In Summary:

The field measurements indicated an overall average biocover efficiency of 54% with 43% efficiency of biocover systems implemented in Phases 1 & 2, and an 81% efficiency of the ones in Phase 3, in 2024. As a result, the biocover system reduced 49 tonnes of methane emissions in 2024. Using a methane GWP multiplier of 28 (ECCC, 2025), this corresponds to a total GHG emissions reduction of 1,378 tonnes of CO2-e/year from the 7 Mile Landfill in 2024.

Compared to 2023, the GHG emissions reduction achieved in 2024 was assessed to be 7% higher.

5. OPERATIONAL PLAN FOR THE NEXT 12 MONTHS

The landfill contours as of March 19th, 2025 are as shown in Figure 1. As mentioned previously, waste filling operations will continue in Phase 3C during 2025.

Since daily waste filling operations are still relatively close to the leachate treatment system, more specifically the Equalization Pond, litter control continues to be of high importance to ensure that windblown debris does not begin to accumulate in the ponds. Windblown litter including plastic bags and styrofoam could potentially block the outflows and overflows of the ponds. This could potentially cause uncontrolled overflow of the ponds and erosion of the large sand berms in place. All culverts, outlet pipes and controls should be checked weekly to ensure safe operations and conditions at the site.

Landfilling in Phase 3C will continue to develop vertically in 2025. Access to filling operations will continue to be provided from the southern perimeter road of Phase 3.

Operational and intermediate cover soil will be sourced from both onsite borrow pits / stockpiles as well as imported sources.

Composting of organic residuals will continue on the crest areas of Phase 1 and 2, with the finalized product being used as a biocover layer deployed overtop of intermediate slopes.

5.1.1 Filling Plan

In order to provide guidance on the next 12-month of landfilling, a plan view map has been provided, as shown on Figure 07, to support the RDMW and their Landfill Operator.

Figure 7 outlines the proposed plan to finalize the existing lift on the eastern side of Phase 3C. The existing 2-3m lift along the western side of the phase should be used as a target / guide when constructing the current lift which runs parallel. Maintaining a similar depth of waste, approximately 3m depth on the north side, becoming thinner as the lift advance to the south.

Garbage trucks and contract haulers will access the filling area from the currently established roadway at the south end of Phase 3C. For Cells 1, 2, and 3, trucks will deposit loads at the toe of the active face. For Cells 5, 6, and 7, it may be efficient to provide access to the crest of previously filled Cells 1-3 and push the waste down, onto the active filling area. In either manner, waste should be spread in 300-600mm high loose lifts before compaction efforts commence. Best management practices recommend 3-5 passes across each lift of waste, with one pass referring to both forward and back overtop of the same track.

A slope of 4:1 or 5:1 should be targeted for the active face to ensure efficient use of soil and compaction efforts. The outer slopes should be completed at 2.5H:1V, understanding that they will settle to the design 3:1 slope by the time progressive closure works is initiated.

Further specifications for landfill operations can be accessed through the recently completed DOCP, in the Operations Chapter. Recommendations on soil use, lift thickness, cover applications, and compaction effort are included.

5.2 Summary

Following the 2024 site visits, field investigations, environmental monitoring, surveying and analysis, the following conclusions are made for the reporting period:

- There are no changes to the monitoring program or landfill operations. Landfilling continues in Phase 3C, composting continues along the crest of Phase 1 & 2, and material acceptance and diversion activities continue near the facility entrance.
- Waste is being managed in accordance with the operational guidelines. Approximately 11,000 m^3 of airspace was consumed by landfilling roughly 7,100 tonnes. Cover soil was used efficiently and waste was compacted to a sufficient standard.
- There is approximately 3 years of service life remaining in Phase 3.
- Leachate and stormwater are being managed per the latest DOCP.
- Current methane generation for the site in 2024 is approximately 424 tonnes/year.

- The landfill biocover system achieved a total GHG emissions reduction of 1,378 tonnes CO2-e/year in 2024.
- Filling of waste in Phase 3C should be developed in accordance with 2025 operational plans, including Section 5 above. Ensuring stormwater is managed efficiently to minimize infiltration.

5.3 Recommendations

As the Landfill continues to develop, SHA proposes the following recommendations to ensure that annual operations proceed as efficiently as possible:

- The implementation of a regular weed management program at the site to prevent the formation of gas escape channels within the biocover media.
- A consistent visual inspection of the biocover to identify and rectify any erosion channels, depressions, and punctures is highly recommended
- That the water levels in the monitoring wells along the south bank of the EQ pond continue to be monitored.
- Culvert and sumps along the south bank of the EQ pond, at the toe of slope of Phase 1 & 2 be cleaned out to improve drainage. Additionally, the RD should ensure all culverts along the pond inlet locations are free draining.
- That AAE also conducts annual monitoring of water levels for monitoring wells along south bank of EQ Pond to compare with results from the RDMW.
- That a semi-annual survey be completed in 2025, given a new Landfill contractor has been procured, to make certain airspace is being managed, grades are maintained for surface water controls and leachate generation, and that soil is being used efficiently.
- Regular vegetation control and maintenance of BioCovers #6 & #9 will further increase the GHG reduction. Additionally, we recommend placing new Biocovers over the final slopes of the Phase 3 area.

6. STATEMENT OF LIMITATIONS

This report has been prepared by Sperling Hansen Associates (SHA) on behalf of the Regional District of Mount Waddington in accordance with generally accepted engineering practices to a level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions in British Columbia, subject to the time limits and financial and physical constraints applicable to the services.

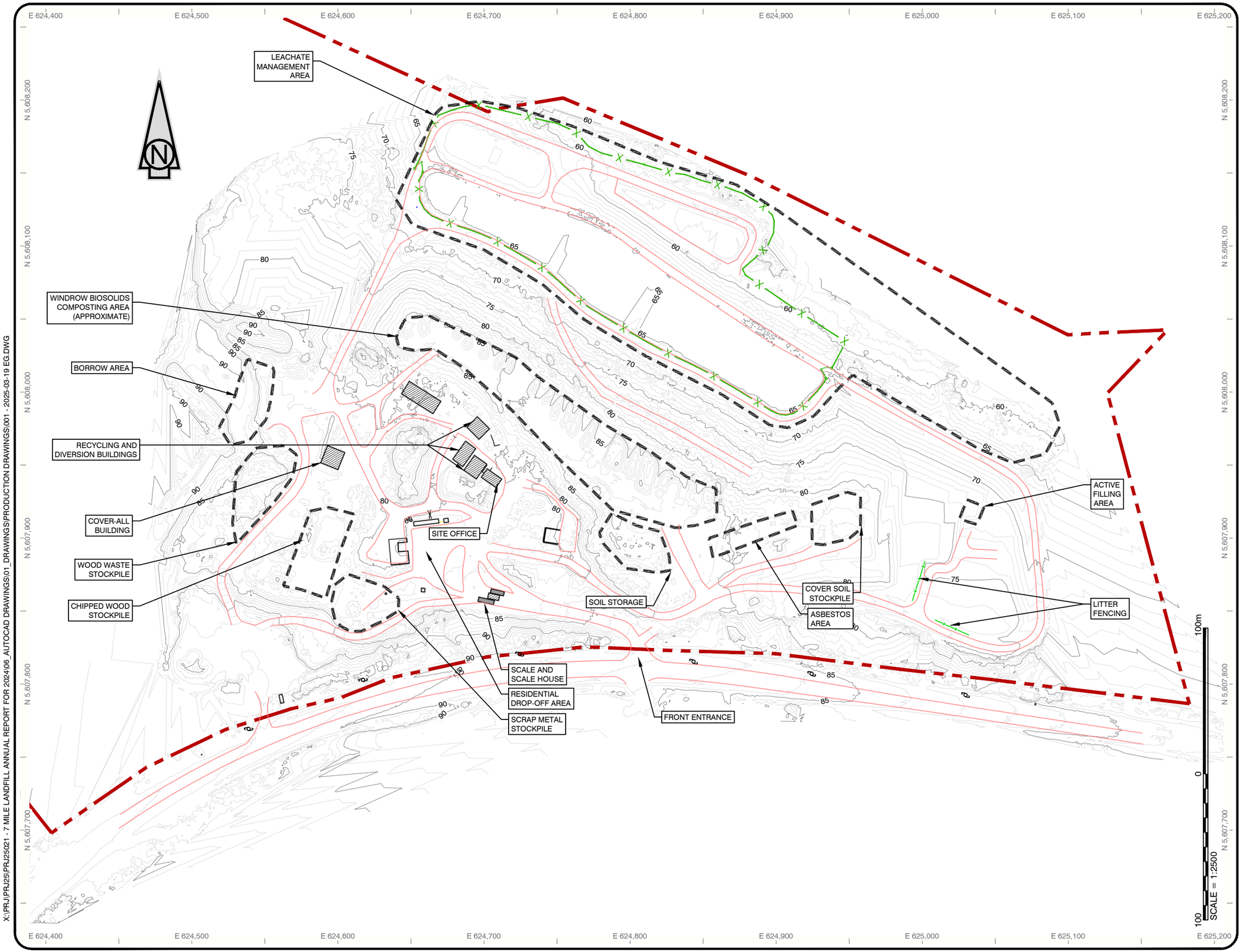
The report, which specifically includes all tables and figures, is based on engineering analysis by SHA staff of data compiled during the course of the project. Except where specifically stated to the contrary, the information on which this study is based has been obtained from external sources. This external information has not been independently verified or otherwise examined by Sperling Hansen Associates to determine its accuracy and completeness. Sperling Hansen Associates has relied in good faith on this information and does not accept responsibility of any deficiency, misstatements or inaccuracies contained in the reports as a result of omissions, misinterpretation and/or fraudulent acts of the persons interviewed or contacted, or errors or omissions in the reviewed documentation.

The report is intended solely for the use of the Regional District of Mount Waddington. Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Sperling Hansen Associates does not accept any responsibility for other uses of the material contained herein nor for damages, if any, suffered by any third party because of decisions made or actions based on this report. Copying of this intellectual property for other purposes is not permitted.

The findings and conclusions of this report are valid only as of the date of this report. The interpretations presented in this report and the conclusions and recommendations that are drawn are based on information that was made available to Sperling Hansen Associates during the course of this project. Should additional new data become available in the future, Sperling Hansen Associates should be requested to re-evaluate the findings of this report and modify the conclusions and recommendations drawn, as required.

Report prepared by:
SPERLING HANSEN ASSOCIATES

Scott Garthwaite, AScT
Director



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Landfill Services Group

- Landfill Siting
- Design & Operations Plans
- Landfill Closure
- Environmental Monitoring

#8 - 1225 Keith Road East
North Vancouver, B.C. V7J 1J3
Phone: (604) 986-7723

LEGEND:

- MAJ. 2025-03-19 EG CONT. (5m)
- MIN. 2025-03-19 EG CONT. (1m)
- PROPERTY LINE
- EXISTING ROAD

CLIENT:

MOUNT WADDINGTON REGIONAL DISTRICT

PROJECT:

7 MILES LANDFILL
ANNUAL REPORT 2024

TITLE:

EXISTING TOPOGRAHY
2025-03-19

SCALE:	DATE:	PROJECT NO:
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DESIGNED	--	DRAWING NO:
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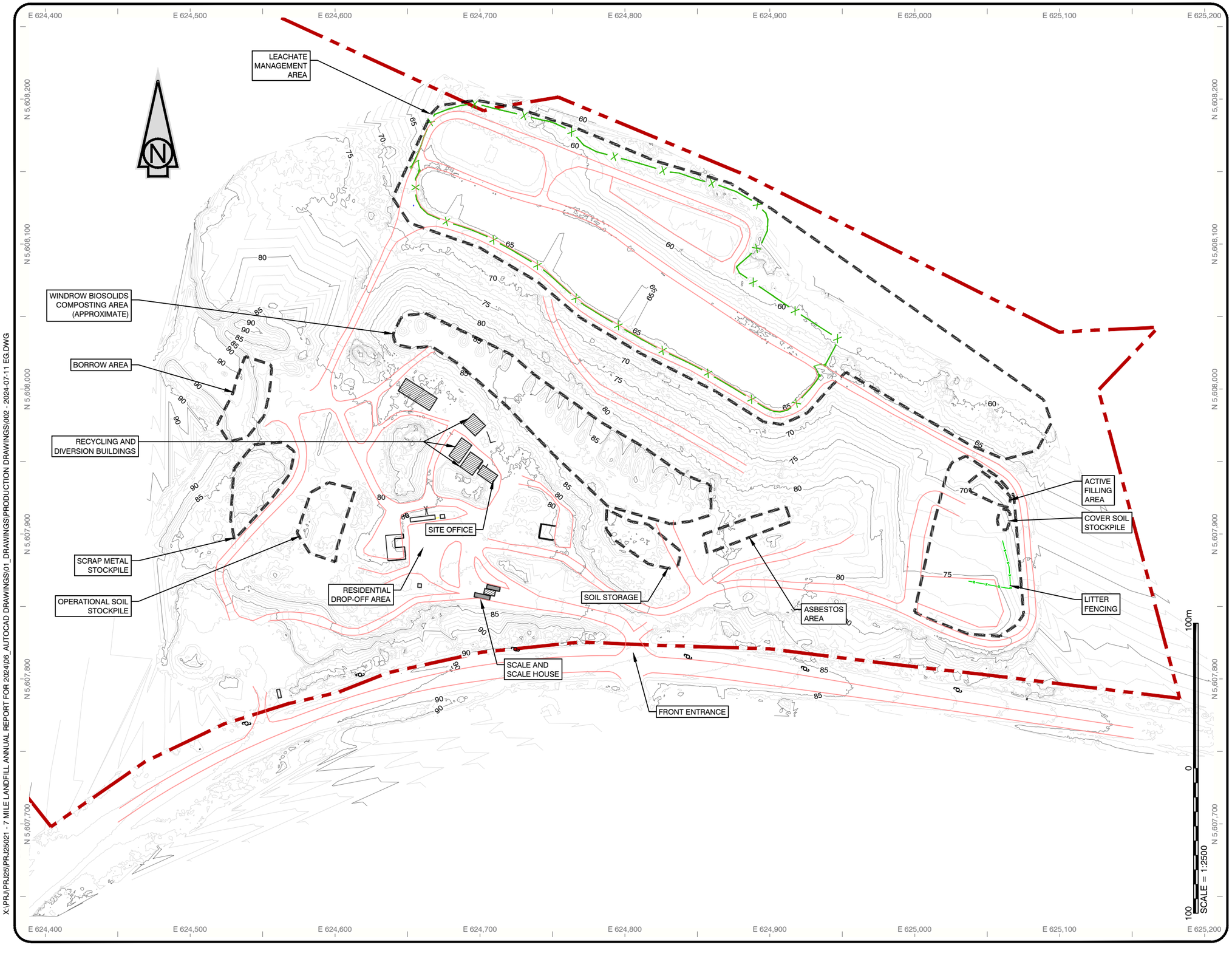

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NORTH SHORE REGIONAL DISTRICT OF MOUNT WADDINGTON

PROJECT:

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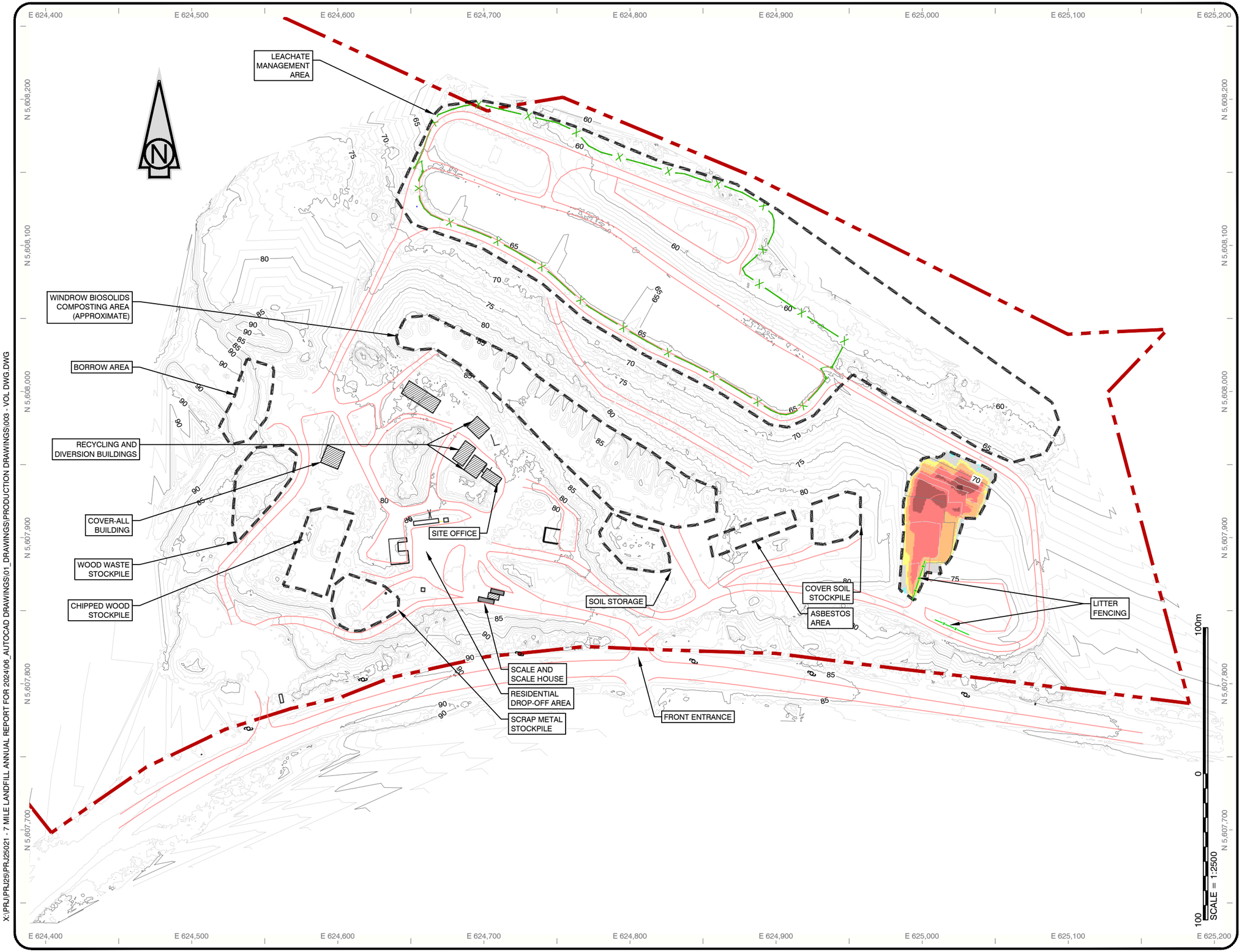

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LEGEND:

- MAJ. 2025-03-19 EG CONT. (5m)
- MIN. 2025-03-19 EG CONT. (1m)
- PROPERTY LINE
- EXISTING ROAD

Elevations Table

MIN. ELEVATION	MAX. ELEVATION	COLOUR
-1.8m	-1.0m	
-1.0m	-0.5m	
-0.5m	0.0m	
0.0m	0.5m	
0.5m	1.0m	
1.0m	2.0m	
2.0m	3.0m	
3.0m	4.0m	
4.0m	4.4m	

VOLUMETRIC ANALYSIS
CUT&FILL

BASE: 7 MILE 2024-07-11 EG
COMPARISON: 7 MILE 2025-03-19 EG

CUT:	0 m³
FILL:	7,030 m³
NET:	7,030 m³

CLIENT:

PROJECT:

7 MILES LANDFILL
ANNUAL REPORT 2024

TITLE:

CUT-FILL
2025-03-19 EG
VS
2024-07-11 EG

SCALE:	DATE:	PROJECT NO:
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DRAWN	AT	**FIGURE 03**
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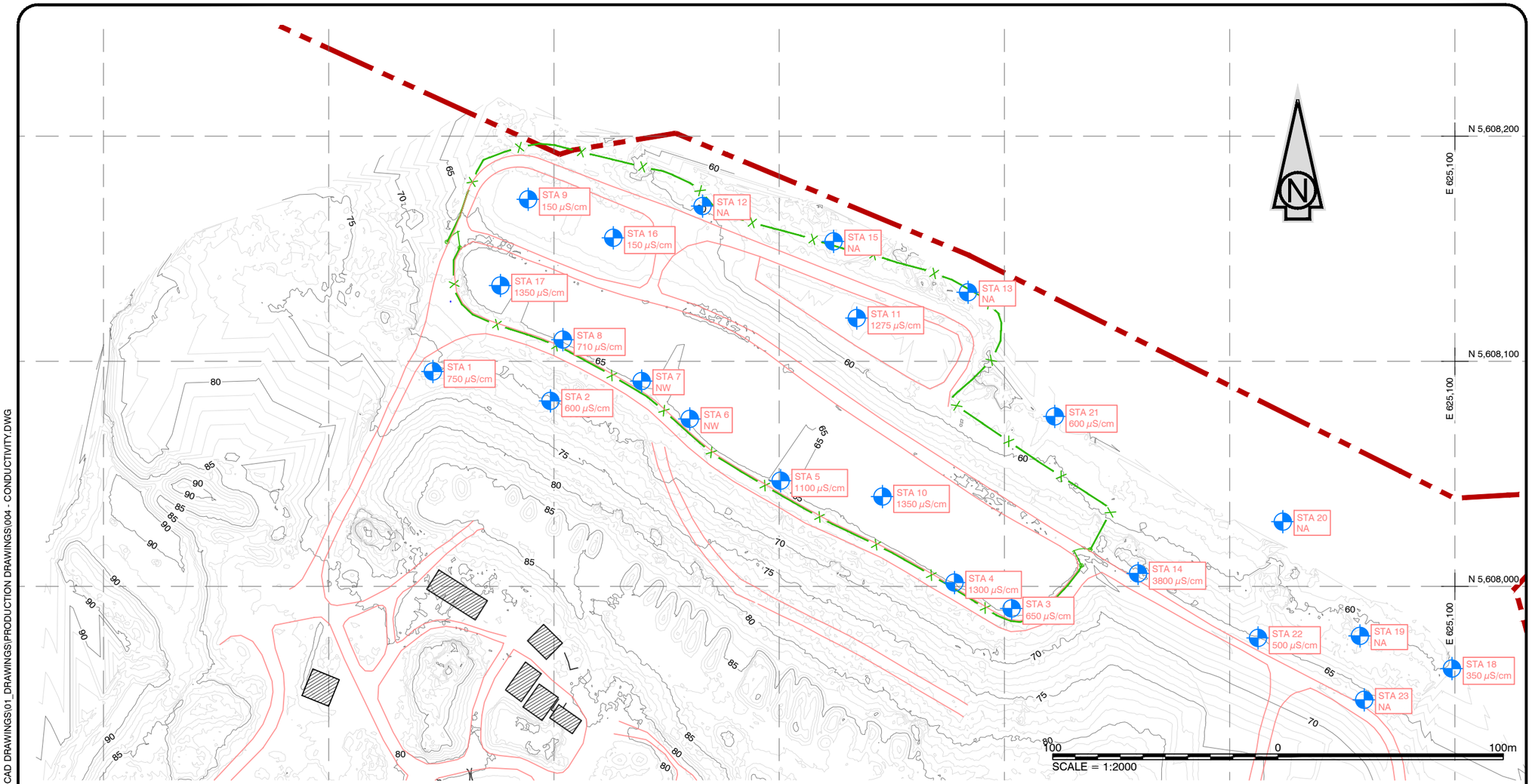

Year	STA-1	STA-2	STA-3	STA-4	STA-5	STA-6	STA-7	STA-8	STA-9	STA-10	STA-11	STA-12	STA-13	STA-14	STA-15	STA-16	STA-17	STA-18	STA-19	STA-20	STA-21	STA-22	STA-23
2011	-	-	1,256	472	605	720	949	670	-	823	-	-	-	271	-	-	-	-	-	-	-	-	-
2012	670	670	1,270	840	1,062	452	1,270	760	670	955	931	920	595	3,960	-	-	-	-	-	-	-	-	-
2013	-	742	1,310	760	910	461	1,150	710	450	1,012	620	600	480	3,800	450	-	-	-	-	-	-	-	-
2014	-	-	920	920	1,395	850	850	850	1,089	1,244	1,076	920	641	-	499	1,119	1,130	461	-	-	-	-	-
2015	610	750	950	940	1,210	860	910	920	1,150	1,450	1,100	810	635	-	510	1,110	1,250	480	-	-	-	-	-
2016	1,482	1,156	1,455	1,384	1,298	NW	1,633	1,171	1,391	1,152	1,330	820	601	3,975	515	1,230	1,589	475	-	-	-	-	-
2017	1,060	910	1,490	1,310	1,090	NW	1,220	920	553	1,130	997	190	608	4,215	505	572	1,125	258	1,570	455	506	3,030	-
2018	979	869	460	490	830	NW	NW	840	1,130	1,190	1,108	893	698	5,040	802	1,162	NA	265	2,300	298	520	5,080	-
2019	850	830	1,450	1,150	1,075	575	890	770	1,150	1,330	1,230	880	465	2,890	160	1,250	1,275	315	350	750	630	5,170	-
2020	820	496	1,200	1,500	1,200	NW	1,230	760	460	1,366	1,185	850	680	3,800	455	395	1,350	260	265	315	415	3,800	-
2021	840	600	1,400	1,300	1,150	NW	970	700	450	1,410	1,230	880	590	3,910	450	382	1,300	250	240	320	550	3,890	4,200
2022	650	650	1250	NW	NW	NW	NW	650	190	1300	1220	820	NA	NW	NA	175	1500	NW	NA	NA	500	510	NA
2023	700	540	132	1250	NW	NW	NW	690	150	1310	1225	NA	NA	3790	NA	155	1430	280	NA	NA	540	490	NA
2024	750	600	650	1300	1100	NW	NW	710	150	1350	1275	NA	NA	3800	NA	150	1350	350	NA	NA	600	500	NA

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LEGEND:

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- PROPERTY LINE
- EXISTING ROAD

CLIENT:

NOOTKA-WADDINGTON

PROJECT:

7 MILES LANDFILL
ANNUAL REPORT 2024

TITLE:

CONDUCTIVITY MAPPING 2024

SCALE:	DATE:	PROJECT NO:
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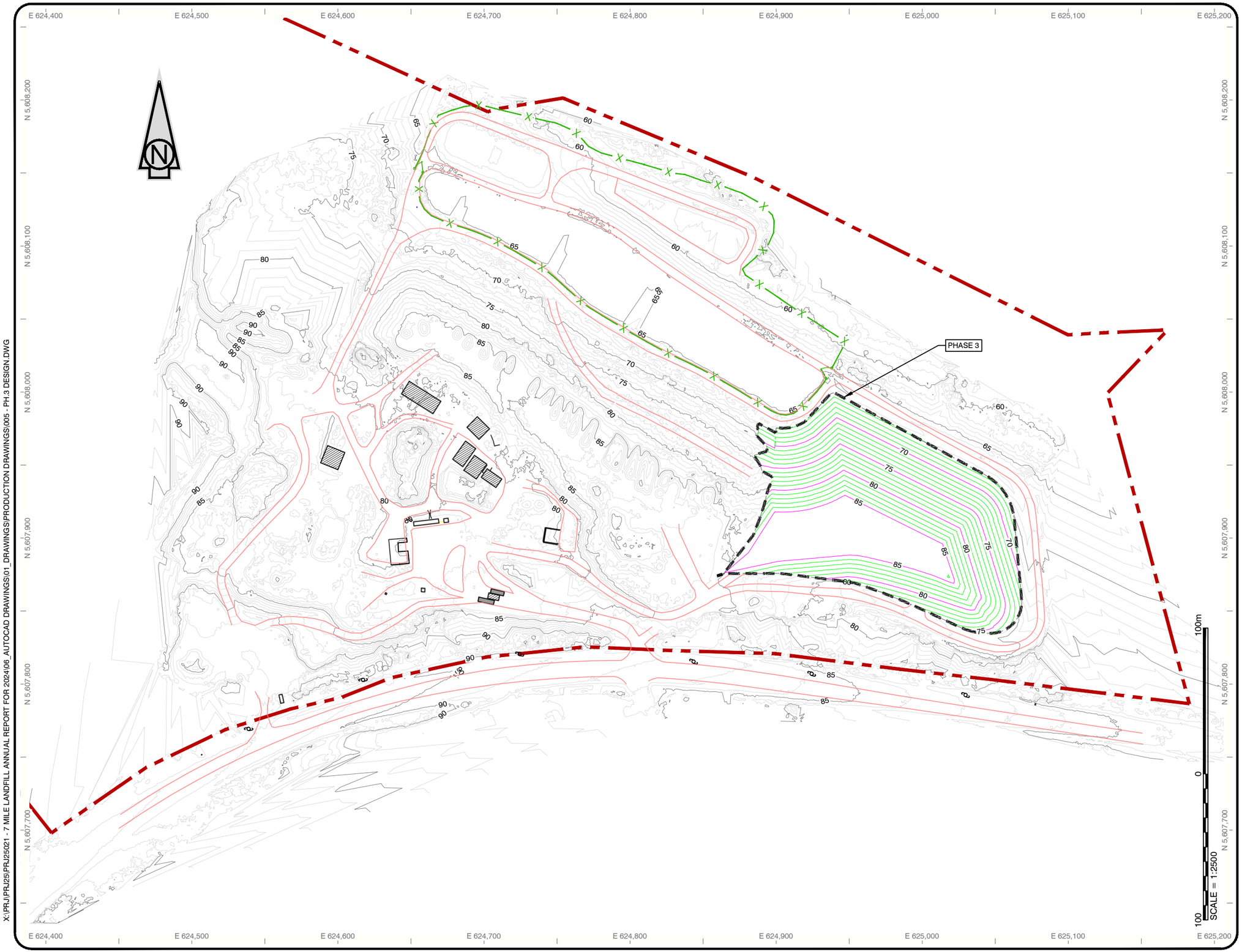

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- MAJ. 2025-03-19 EG CONT. (5m)
- MIN. 2025-03-19 EG CONT. (1m)
- MAJ. PH.3 FILL DES. CONT. (5m)
- MIN. PH.3 FILL DES. CONT. (1m)
- PROPERTY LINE
- EXISTING ROAD

CLIENT:

MOUNT WADDINGTON REGIONAL DISTRICT

PROJECT:

7 MILES LANDFILL
ANNUAL REPORT 2024

TITLE:

PHASE 3
DESIGN CONTOUR

SCALE:	DATE:	PROJECT NO:
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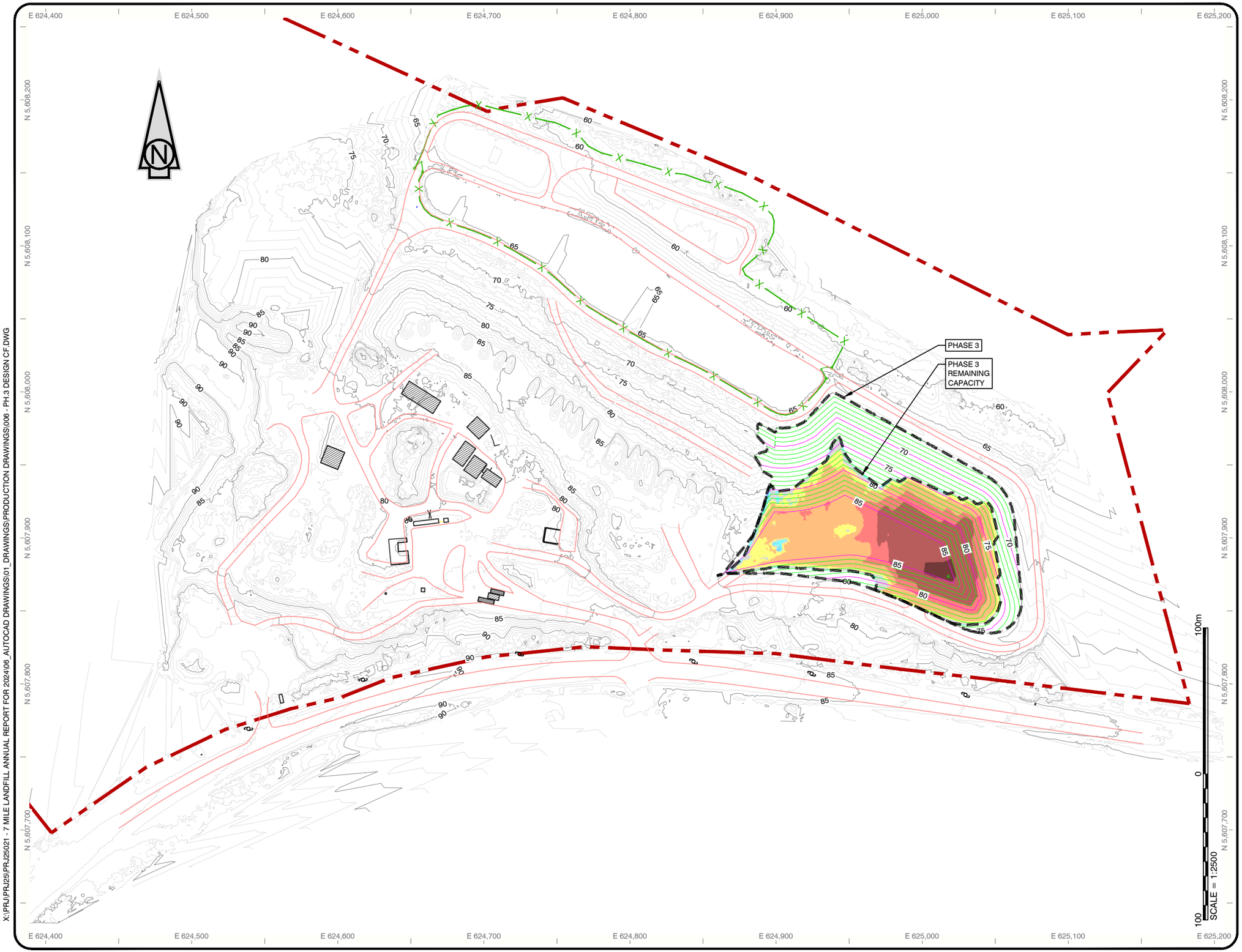

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- MAJ. PH.3 FILL DES. CONT. (5m)
- MIN. PH.3 FILL DES. CONT. (1m)
- PROPERTY LINE
- EXISTING ROAD

Elevations Table		
MIN. ELEVATION	MAX. ELEVATION	COLOUR
-3.3m	-3.0m	
-3.0m	-1.0m	
-1.0m	-0.5m	
-0.5m	0.0m	
0.0m	0.5m	
0.5m	1.0m	
1.0m	3.0m	
3.0m	5.0m	
5.0m	10.0m	
10.0m	11.7m	

VOLUMETRIC ANALYSIS
CUT&FILL

BASE: 7 MILE 2025-03-19 EG
COMPARISON: PH.3 DESIGN FILL

FILL: 42,360 m³

CLIENT:

PROJECT:

7 MILES LANDFILL
ANNUAL REPORT 2024

TITLE:

PHASE 3
DESIGN CAPACITY

SCALE:	DATE:	PROJECT NO:
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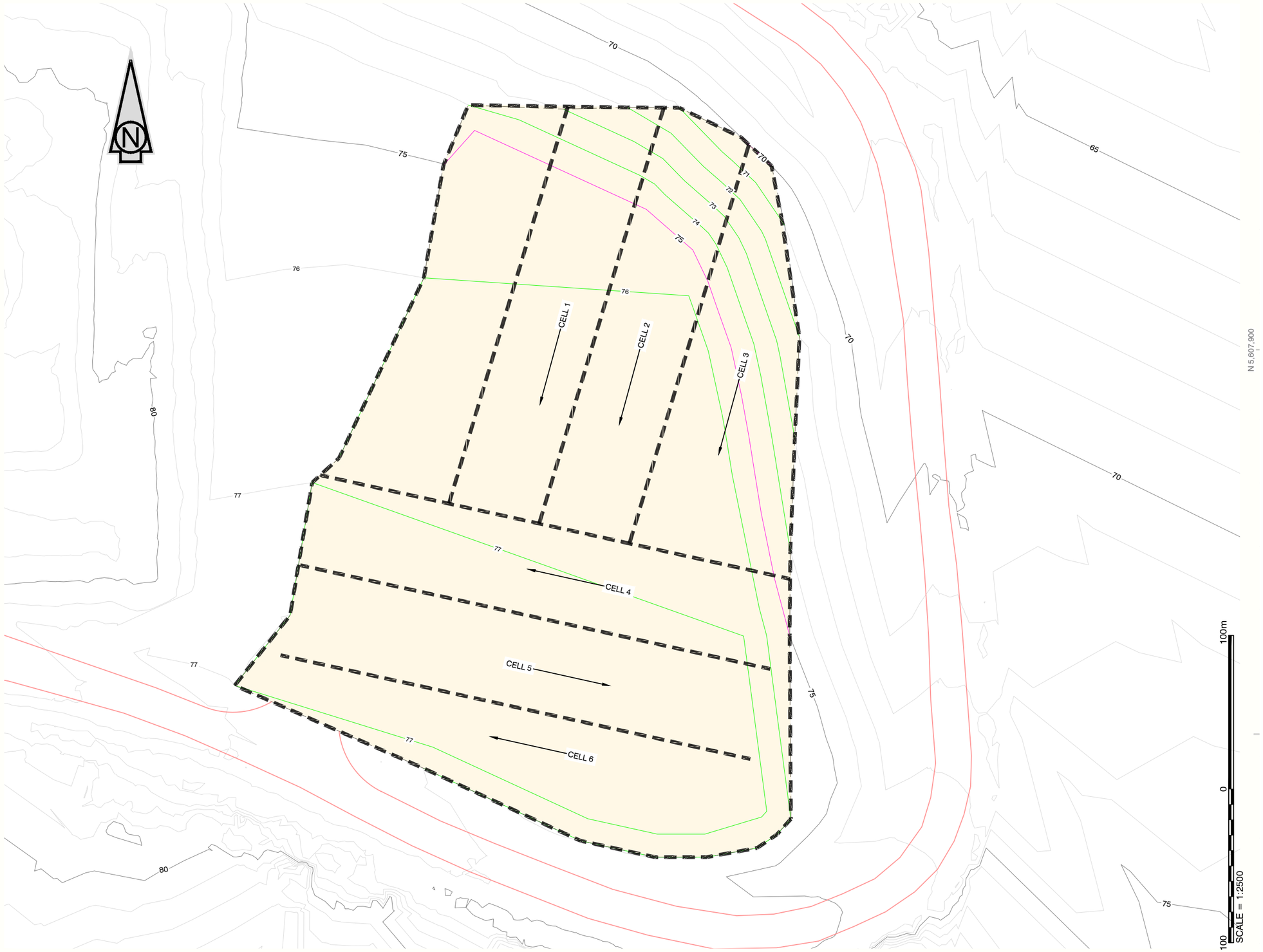

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Phone: (604) 986-7723

LEGEND:

- MAJ. 2025-03-19 EG CONT. (5m)
- MIN. 2025-03-19 EG CONT. (1m)
- MAJ. LIFT 1 DES. CONT. (5m)
- MIN. LIFT 1 DES. CONT. (1m)
- PROPERTY LINE
- EXISTING ROAD

CLIENT:

PROJECT:

7 MILES LANDFILL
ANNUAL REPORT 2024

TITLE:

PHASE 3C FILL PLAN
2025: LIFT 1

SCALE:	DATE:	PROJECT NO:
1:500	2025/03/25 yyyy/mm/dd	PRJ 25021
DESIGNED	--	DRAWING NO:
DRAWN	AT	**FIGURE 10**
CHECKED	SG	

Table 4: Summary of Annual Air Space Utilization - 2024 (Diversion at Active Face

Date of 2024 Survey		11-Jul-24	
Date of 2025 Survey		19-Mar-25	
Days Between Surveys		251	
	Units	Ph. 3C	Comments
Active Footprint Area Ph.3C	m^2	4,000	2024-2025 Operational Footprint
Air Space Used From Survey	m^3	7,030	Phase 3C
Air Space per 365 days		10,223	
Air Space from Settlement (251 days)	m^3	680	Settlement for Ph.3C AVG: 0.17m
Air Space from Settlement (365 days)	m^3	989	
Total Filled Air Space (251 days)	m^3	7,710	Total Airspace Consumed with Settlement - 2024 survey period
Total Filled Air Space (365 days)	m^3	11,212	Annual Correction
Cover Soil Used (from Load Counts)	m^3	1,299.65	Cover Soil Material Sourced onsite by Contractor
Intermediate Cover Soil Applied	m^3	0	Salvageable - Intermediate Cover Soil applied to Phase 3C
Total Soil Usage (per year)	m^3	1,890	Annual Correction
MSW Tonnage for 365 days	tonnes	7,109	RDMW Scale Data for 2024 Calendar Year
MSW Air Space (365)	m^3	9,322	Total Airspace Consumed minus Cover Soil Volume
MSW Density	$tonnes/m^3$	0.76	
Air Space Utilization Factor	$tonnes/m^3$	0.63	
Waste to Cover Ratio	no dimension	4.93	Vol/Vol

APPENDICES

APPENDIX A
Operational Certificate

BRITISH COLUMBIA

2010 VANCOUVER

File: MR-08490

Date: DEC 08 2005

REGISTERED MAIL

Regional District of Mount Waddington
PO Box 729
Port McNeill British Columbia V0N 2R0

Dear Operational Certificate Holder:

Enclosed is Operational Certificate MR-08490 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate. An annual fee will be determined according to the Permit Fees Regulation.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the operational certificate holder. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

.../2

Ministry of Environment
Regional Operations
Vancouver Island Region
Mailing/Location Address
2080A Labieux Road
Nanaimo, BC, V9T 6J9
Telephone: (250) 751-3100
Facsimile: (250) 751-3103
www.gov.bc.ca/env

Administration of this operational certificate will be carried out by staff from the Vancouver Island Region. Plans, data and reports pertinent to the operational certificate are to be submitted to the Regional Manager, Environmental Protection, at Ministry of Environment, Regional Operations, Vancouver Island Region, 2080A Labieux Road, Nanaimo, BC V9T 6J9.

Yours truly,

R. Alexander
for Director, *Environmental Management Act*
Vancouver Island Region

Enclosure

cc: Environment Canada

OPERATIONAL CERTIFICATE
MR-08490

Under the Provisions of the Environmental Management Act

Regional District of Mount Waddington
PO Box 729
Port McNeill, British Columbia
V0N 2R0

is authorized to manage waste and recyclable material from the Regional District of Mount Waddington and environs at the Seven Mile landfill located near Port McNeill, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may result in prosecution.

1. MANAGEMENT OF WASTE AND RECYCLABLE MATERIAL

1.1. This section applies to the discharge of waste to a **SANITARY LANDFILL.**

1.1.1 Waste may be discharged to the sanitary landfill shown on Site Plan A.

1.1.2 The characteristics of the discharge must be municipal solid waste as defined under the *Environmental Management Act* and other wastes as approved in writing by the Director.

1.1.3 The authorized works are a sanitary landfill and related appurtenances approximately located as shown on Site Plan A.

1.1.4 The authorized works must be completed and in operation on and from the date of this operational certificate.

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1.2. This section applies to the **MANAGEMENT OF LEACHATE** from the landfill.

1.2.1 The characteristics of leachate, surface water and groundwater at the property boundary must not exceed concentrations set in the *British Columbia Approved Water Quality Guidelines (Criteria)* and *A Compendium of Working Water Quality Guidelines for British Columbia*. Where natural background water quality concentrations exceed these guidelines, the characteristics of leachate, surface water and groundwater at the property boundary must not exceed background concentrations.

1.2.2 The authorized works are leachate collection works, leachate treatment works and related appurtenances approximately located as shown on Site Plan A.

1.2.3 The authorized works must be completed and in operation on and from the date of this operational certificate.

1.3. This section applies to the discharge of air contaminants from the **CONTROLLED OPEN BURNING OF CLEAN WOOD.**

1.3.1 The authorized burning frequency is once per calendar month. Burning is not authorized from July 1 to September 30 of each year.

1.3.2 The authorized burning duration is 48 hours.

1.3.3 Only clean wood may be burned. Clean wood does not include non-wood refuse, plastic, hazardous waste (as defined in the *Hazardous Waste Regulation*), composite wood products including fibreboard, chipboard, particleboard or plywood, wood with paint, stain, or coating, or wood with preservative including but not limited to creosote, pentachlorophenol, bituminous coating, chromated copper arsenate (CCA), ammoniacal copper arsenate (ACA) or ammoniacal copper zinc arsenate (ACZA).

1.3.4 The authorized works are controlled open burning works, forced air works and related appurtenances approximately located as shown on Site Plan A.

1.3.5 The authorized works must be completed and in operation on and from the date of this operational certificate.

1.4. This section applies to the **ENTRANCE FACILITIES** for the landfill.

1.4.1 The authorized facilities are signs, weigh scales, recyclable material and waste drop-off and storage facilities and related appurtenances approximately located as shown on Site Plan A.

1.4.2 The authorized facilities must be completed and in operation on and from the date of this operational certificate.

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1.5. The **LOCATION** of the facilities for the management of waste and recyclable material to which this operational certificate is applicable is the unsurveyed portions of District Lots 11, 12 and 13, and Section 23 of Township 3, Rupert Land District, approximately located as shown on Site Plan A.

2. GENERAL REQUIREMENTS

2.1. Qualified Professionals

2.1.1 All facilities and information, including works, plans, assessments, investigations, surveys, programs and reports, must be certified by qualified professionals.

2.2. Plans

2.2.1 Site development, operating, leachate management, closure and post-closure plans must be submitted to the Regional Manager, Environmental Protection, by June 30, 2006.

2.2.2 The plans referenced in subsection 2.2.1 must address, but not be limited to, each of the subsections in the *Landfill Criteria for Municipal Solid Waste* including performance, siting, design, operational and closure and post-closure criteria.

2.2.3 The facilities must be developed, operated and closed in accordance with the plans referenced in subsection 2.2.1.

2.3. Bear-Proof Facilities

2.3.1 Bears must not access attractants at the landfill facility. Attractants include waste, municipal solid waste, recyclable material, refuse, organic matter, compost, garbage, food or food waste that attract bears.

2.3.2 The active landfill cell(s) must be enclosed by an electric bear-proof fence.

2.3.3 Attractants must be enclosed by an electric bear-proof fence or a bear-proof enclosure.

2.3.4 The electric bear-proof fence(s) and bear-proof enclosure(s) must be completed and in operation on and from the date of this operational certificate.

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2.4. Open Burning

2.4.1 Burning shall be restricted to a location on the site that is satisfactory to the Director.

2.4.2 This operational certificate does not relieve the operational certificate holder from complying with the requirements of federal, provincial, regional district and municipal authorities and agencies including the Ministry of Forests and Range, and the *Wildfire Act* and *Wildfire Regulation*. Burning must not take place when burning is prohibited by government authority, agency, legislation or regulation.

2.4.3 The Director may prohibit burning during specified times or require the operational certificate holder to cease burning.

2.4.4 As soon as the residue of combustion has cooled to ambient temperature it shall be incorporated into the landfill authorized in Section 1.1 or managed in accordance with the *Environmental Management Act*.

2.5. Landfill Gas

2.5.1 When 100,000 tonnes of waste have been discharged at the landfill, an assessment of the potential for landfill gas generation must be submitted to the Regional Manager, Environmental Protection.

2.5.2 The landfill gas assessment must address, but is not limited to, subsections 4.2 and 6.4 of the *Landfill Criteria for Municipal Solid Waste* and section 6 of the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*.

2.5.3 The potential for landfill gas generation is to be re-assessed at least once every 5 years after the initial assessment.

2.6. Additional Facilities or Works

2.6.1 The Director may require investigations, surveys, and the construction of additional facilities or works including, but not limited to, additional leachate, bear-proof and landfill gas facilities. The Director may also amend the requirements of any of the information required by this operational certificate including plans, programs, assessments and reports.

3. MONITORING AND REPORTING REQUIREMENTS

3.1. Monitoring Program

3.1.1 A monitoring program must be developed to identify any impacts to the environment and public health from the landfill.

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3.1.2 The monitoring program must address, but not be limited to, subsections 4.1, 4.2 and 7.15 of the *Landfill Criteria for Municipal Solid Waste* and the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills.*

3.1.3 Monitoring must be conducted in accordance with the monitoring program.

3.2. Annual Operating and Monitoring Report

3.2.1 An annual operating and monitoring report for the preceding 12 month period from January 1 to December 31 must be submitted to the Regional Manager, Environmental Protection, by April 30 of each year.

3.2.2 The report must include:

- An executive summary;
- Tonnage of each type of waste discharged to the landfill for the year;
- Tonnage of wood burned, burning dates and durations;
- Remaining site life and capacity;
- Leachate management including leachate quantities and qualities;
- Review of the preceding year of operation, plans for the next year and any new information or proposed changes relating to the facilities and plans;
- In the event of any non-compliance with the conditions of this operational certificate, an action plan and schedule to achieve compliance;
- Comparison of the monitoring data with the performance criteria in section 4 of the *Landfill Criteria for Municipal Solid Waste* and the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*, interpretation of the monitoring data, identification and interpretation of irregularities and trends, recommendations, and any proposed changes to the monitoring program.

4. SITE CLOSURE

4.1. Closure and Post-Closure Fund

4.1.1 A closure and post-closure fund must be built up over time. The closure and post-closure fund must ultimately meet or exceed the estimated closure and post-closure costs plus a reasonable contingency for any remediation that may be required.

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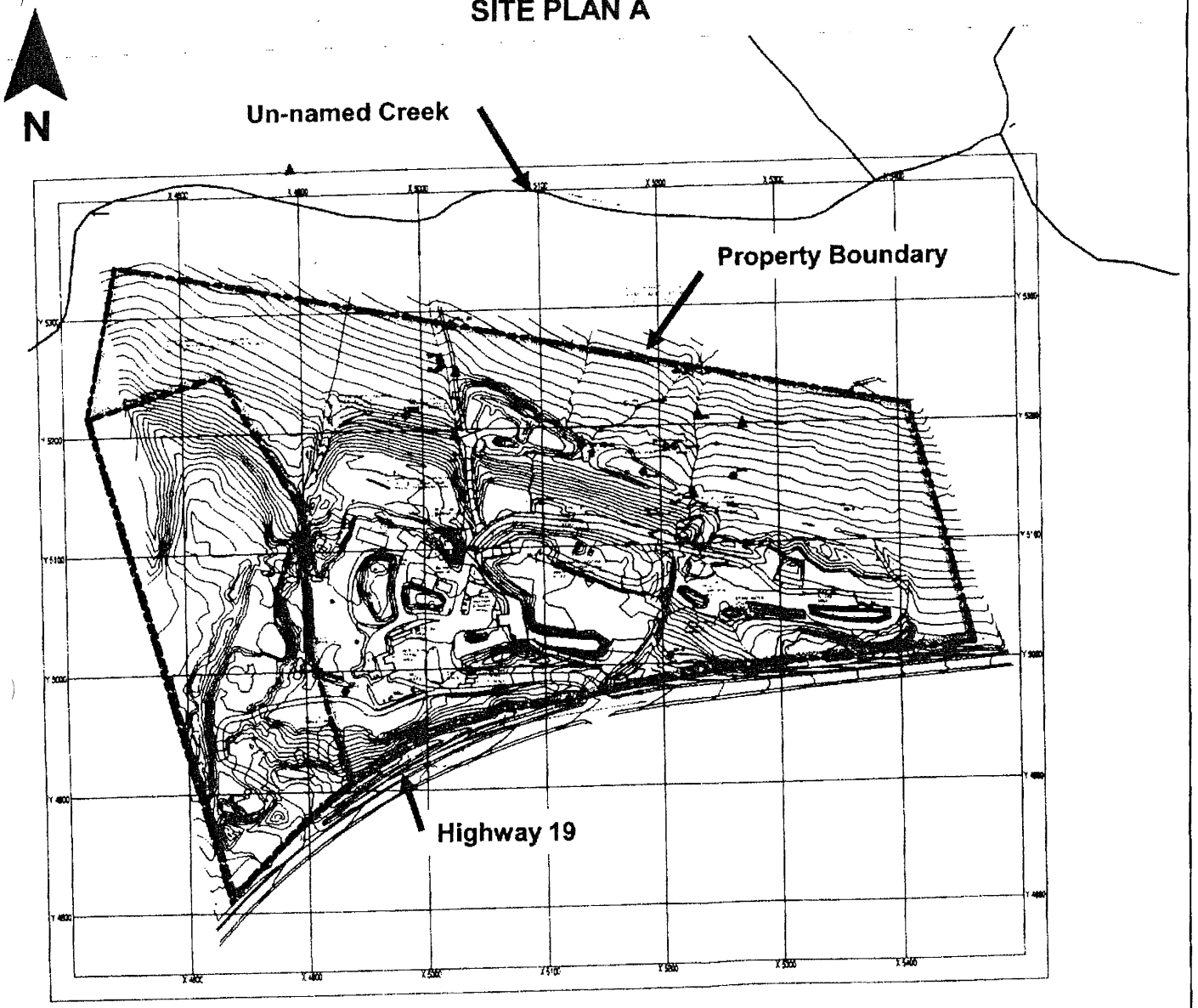
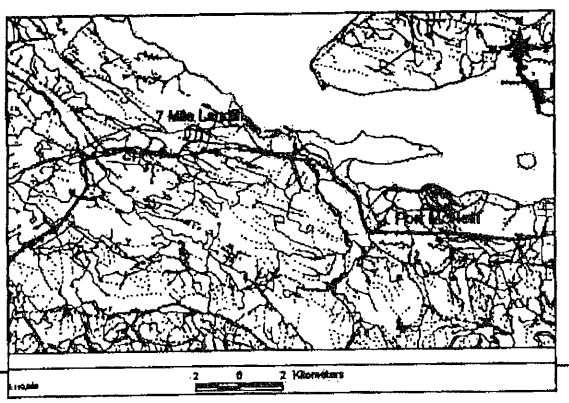
PROVINCE OF
BRITISH COLUMBIA

Environmental Protection

SITE PLAN A



Location Map



Scale: N.T.S.

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