



CAPITAL REGIONAL DISTRICT
SOLID WASTE MANAGEMENT PLAN

Solid
Waste
Library

ENGINEERING
CRD

NOVEMBER , 1987

SOLID WASTE MANAGEMENT PLAN

CRD Engineering

November 25, 1987

TABLE OF CONTENTS
SOLID WASTE MANAGEMENT PLAN

	<u>PAGE</u>
1.0 BACKGROUND.....	1
1.1 History.....	1
1.2 Summary of Planning Process.....	1
1.3 Population Projections and Waste Quantities.....	3
1.4 Current Status of Landfilling.....	8
1.5 Current Status of Recycling.....	9
1.6 Current Status of Composting.....	10
2.0 LANDFILLS.....	11
2.1 Hartland Landfill.....	11
2.2 Blackburn Road Landfill.....	15
2.3 Galiano and Saturna Landfills.....	15
2.4 Jordan River and Port Renfrew Landfills.....	15
3.0 TRANSFER FACILITIES	16
4.0 WASTE REDUCTION.....	17
4.1 Recycling.....	17
4.2 Composting.....	17
4.3 Mechanized Materials Recovery.....	18
5.0 PLAN IMPLEMENTATION.....	19
5.1 Schedule.....	19
5.2 Costs.....	20

APPENDIX A - Supplementary Letters Patent for Solid Waste

APPENDIX B - By-Law No. 1310 (Solid Waste)

LIST OF TABLES

	<u>Page</u>
Table 1 - Projected Population Growth by Sub Area to Year 2006.....	4
Table 2 - Projected Population Growth - Gulf Islands.....	4
Table 3 - Hartland Avenue Landfill - Generation of Refuse by Area - March 1985 - February 1986.....	6
Table 4 - Unit Generation Rates - Gulf Islands.....	7
Table 5 - Future Waste Quantities.....	7
Table 6 - Schedule and Costs.....	21

LIST OF FIGURES

	<u>After Page</u>
FIGURE 1 - Existing Landfill Sites.....	8
FIGURE 2 - Hartland Filling Plan.....	11

1.0 BACKGROUND

1.1 History

Up to 1892 Victoria's garbage was disposed of in James Bay and east of the Empress Hotel. For the next 60 years or so, up until about 1955, garbage was loaded onto barges at the foot of Herald Street and dumped into the sea about two miles out from the entrance to Victoria Harbour. During most of this period, from 1910 to 1955, incineration was used to reduce the volume of waste dumped.

From 1955 to the early 1970's, several dump sites on Millstream Road and one at the present Hartland site accepted most of the region's wastes. Compaction and regular cover were not carried out, and burning was used to reduce the waste volume.

Recognition in the 1960's of the health hazards associated with the open dumps resulted in the Capital Regional District acquiring the Hartland site and assuming responsibility for solid waste disposal in the Region.

The authority for solid waste disposal was conferred on the CRD by issuance of Supplementary Letters Patent on October 4, 1973. A copy of the Letters Patent is contained in Appendix A at the end of the Plan.

1.2 Summary of Planning Process

The preparation of this Plan commenced in the spring of 1986. In essence, the Plan details the Capital Regional District's commitment over the next 30 years, to operate a solid waste management system that will serve the region's people without causing health hazards, environmental damage, or significant nuisance.

Two initial reports were prepared in June 1986, in which a preliminary analysis of solid waste management options was made. This constituted Stage One of the planning process.

Stage Two of the process included a detailed appraisal of options defined in Stage One. The detailed appraisal of each option was carried out by one of the five subcommittees set up by the Solid Waste Management Plan Technical Steering Committee. The five subcommittees studied Landfilling, Recycling/Composting, Incineration/Materials Recovery, Satellite Facilities, and disposal on the Gulf Islands.

The subcommittees had technical representatives from the municipalities and unorganized areas, the provincial Waste Management Branch, the federal Environmental Protection Service, and the CRD.

The five technical subcommittees working on different aspects of solid waste management gathered information in three major ways. First, a general literature search was made, including information from communities and regional districts that have recently studied some form of solid waste processing or disposal, or have prepared Solid Waste Management Plans.

Second, each subcommittee had the services of one or more consultants, to provide up-to-date descriptions of technology, costs, and specific installations, marketability of recycled or recovered products, and landfill site selection.

Third, a proposal call was made, which elicited plans and costs from private companies, for various waste reduction and disposal techniques.

The five Subcommittee reports were summarized and coalesced in a Concepts Report, dated January, 1987.

Presentation of waste management options to the public, and consideration of the public's response, were very important in the planning process. Methods used to inform the public and to invite their participation included newspaper, television and radio ads and interviews, proposal invitations, correspondence, telephone calls, meetings with organized groups, newsletters, and a series of nine open houses. This work was reported in the July, 1987 Public Participation Report.

The public participation program was effective over a 12 month period in reaching virtually everyone in the CRD with an interest in solid waste management.

The essence of the public response, relative to the Greater Victoria area, the Western Communities, and Sooke, was a preference for increased recycling, and a willingness to pay for it. There was also considerable support for mechanized materials recovery, but less support for incineration and mechanized composting. Of ten possible landfill sites considered, an overwhelming majority preferred the existing Hartland site.

Residents of the Gulf Islands indicated the following preferences: On Saltspring, Pender, and Mayne Islands, the choice was for a regionally funded and administered system to transfer solid waste off the islands to a central landfill (Hartland). On Saturna and Galiano Islands, the existing local landfills were generally viewed as adequate, and the islanders preferred no CRD involvement.

1.3 Population Projections and Waste Quantities

The Statistics Canada census of 1981 estimated the total population of the Capital Regional District to be 249,475 people. Of that number, 8,025 lived on the Gulf Islands and the remaining 241,450 people resided within the Vancouver Island portion of the Region. Interim census figures for 1986 give a total Regional population of 265,386 and a Gulf Islands population of 9,075.

Projections of population growth to the year 2006 were prepared by Regional Information Service. For the purpose of the Plan, a straight line growth rate was projected for the 30-year period from 1986 to 2016. On that basis, the study area population is expected to reach 330,000 in 2006 and 366,000 in 2016.

The geography of the Capital Regional District is such that it is convenient to divide the main Vancouver Island area into four sub-areas. The sub-areas are the urban core, comprising the municipalities of Saanich, Victoria, Oak Bay, and Esquimalt; the Saanich Peninsula, containing the municipalities of Central Saanich, Sidney and North Saanich; the western area comprising the municipalities of Colwood and Metchosin and the Langford and View Royal electoral areas; and the sprawling Sooke electoral area.

Population projections for these four sub-areas are shown below in Table 1. Projections for the Gulf Islands are shown in Table 2.

TABLE 1
PROJECTED POPULATION GROWTH
BY SUB-AREA -- TO YEAR 2006

<u>Area</u>	<u>1986 Population</u>	<u>Percent of Total</u>	<u>2006 Population</u>	<u>Percent of Total</u>	<u>% Growth 1985-2006</u>
Urban core	182,280	71.1	218,000	66.1	23
West	36,989	14.4	56,000	17.0	55
Peninsula	28,881	11.3	40,000	12.1	48
Sooke	<u>8,161</u>	<u>3.2</u>	<u>16,000</u>	<u>4.8</u>	<u>82</u>
TOTAL	<u>256,311</u>	<u>100.0</u>	<u>330,000</u>	<u>100.0</u>	<u>32</u>

TABLE 2
PROJECTED POPULATION GROWTH
GULF ISLANDS

<u>ISLAND</u>	<u>1981 CENSUS</u>	<u>1986 CENSUS</u>	<u>1996 ESTIMATED</u>	<u>2006 ESTIMATED</u>
Saltspring	5,443	6,164	7,163	8,598
Pender	1,020	1,151	1,921	2,168
Galiano	721	813	1,358	1,532
Mayne	553	624	1,042	1,176
Saturna	229	259	432	487
Piers	57	64	106	120
TOTALS =	<u>8,023</u>	<u>9,075</u>	<u>12,022</u>	<u>14,081</u>

For the Gulf Islands, 1996 and 2006 estimated populations are based on the projected increase in the total Gulf Islands population provided by the B.C. Ministry of Economic Development. The distribution of this total to individual islands takes into account the fact that the Outer Gulf Island populations have increased at a considerably faster rate over the past 10 years than has the population of Saltspring Island.

It should be noted that the above future population projections for any island could be significantly out, because of the relatively small population on each island. Also, annual population increases on the Outer Gulf Islands have varied from plus 16.98% in 1982 to minus 0.82% in 1984. One substantial development on any of the islands could result in a large percentage increase in that island's population.

Since 1979, quantities of refuse received at the Hartland Avenue Landfill have been weighed. The per capita quantity of refuse varies considerably from year to year, however analysis reveals that the portion of waste which varies is demolition waste, which includes stumps. With demolition waste excluded, the annual per capita contribution of municipal refuse has remained relatively static, at about 0.57 tonnes. During the seven year period for which records exist, the total weight of refuse per capita has varied between 0.57 and 0.74 tonnes, and the fraction of demolition waste has ranged from a high of 24% in 1981 to a low of 2% in 1985.

The year 1985 saw the introduction of a flat rate of \$8.50 per tonne for waste delivered to the landfill. This was raised to \$9.50 in 1986, and \$10.50 in 1987. Previously, charges were set by the operator, who levied a fee based on the size of truck delivering the waste. Dense materials such as demolition rubble and stumps were landfilled at a relatively low unit cost per tonne. With the introduction of a unit rate based on weight in 1985, many contractors found other suitable locations for discharge of these types of materials.

For the purposes of estimating future waste quantities, it is assumed that the trend of the last seven years will continue and that the net contribution of municipal refuse per capita, exclusive of demolition waste, will remain at approximately 0.57 tonnes to the year 2016. With the cost of solid waste disposal continuing to rise, it is assumed that most contractors will continue to find alternative suitable locations for discharge of demolition waste and that demolition waste delivered to regional facilities for disposal will be about 5% of the total amount of municipal refuse. On that basis, the total municipal refuse generated will be about 0.60 tonnes per capita.

Since March 1985, attempts have been made to record sources of waste arriving at the Hartland Landfill weigh scale. A breakdown by municipality is difficult because many private haulers have routes which overlap municipal boundaries. However, it has been possible to calculate a breakdown of refuse arriving from each sub-area with reasonable accuracy. The results are shown in Table 3, which indicates that municipal refuse, excluding demolition waste, varies from 0.27 tonnes per capita in the western sub-area to 0.67 tonnes per capita in the urban core.

TABLE 3
HARTLAND AVENUE LANDFILL
GENERATION OF REFUSE BY AREA
MARCH 1985 - FEBRUARY 1986

<u>Area</u>	<u>1985 Population</u>	<u>Net Municipal Refuse Excluding Demolition</u>		<u>Net Municipal Refuse Per Capita (tonnes)</u>
		<u>(tonnes)</u>	<u>(t/d)</u>	
Urban Core	177,400	118,898	326	0.67
Peninsula	27,000	11,740	32	0.43
West	36,200	9,615	26	0.27
<u>Sooke</u>	<u>8,800</u>	<u>2,644</u>	<u>7</u>	<u>0.30</u>
TOTALS =	<u>249,400</u>	<u>142,898</u>	<u>391</u>	<u>0.57</u>

Based on a straight line projection of populations indicated in Table 1, and a per capita generation rate of 0.60 tonnes per year, the total quantity of waste anticipated in each year, over the next 30 years, can be calculated. These values are shown in Table 5, for the main Vancouver Island portion of the Region.

Based on some measurement of waste quantities on Saltspring Island, deliveries to the Hartland landfill from Pender Island, and by comparison with other small communities, estimates of unit generation rates were made for the Gulf Islands. These rates are shown in Table 4, together with estimated 1986 waste quantities based on Table 2.

Population projections and related waste quantity estimates will be revised during the 30 year planning period as new data becomes available.

TABLE 4
UNIT GENERATION RATES
GULF ISLANDS

ISLAND	UNIT GENERATION RATE (Tonnes/Cap-yr.)	ESTIMATED 1986 TONNAGE
Saltspring	0.43	2,567
Pender	0.30	395
Galiano	0.28	260
Mayne	0.26	186
Saturna	0.22	65

TABLE 5
FUTURE WASTE QUANTITIES (EXCLUDING GULF ISLANDS)

YEAR		ESTIMATED POPULATION	ANNUAL TONNAGE
1	1987	258,584	155,150
2	1988	266,387	159,832
3	1989	269,742	161,845
4	1990	273,605	164,163
5	1991	277,468	166,481
6	1992	280,901	168,541
7	1993	284,335	170,601
8	1994	288,197	172,918
9	1995	292,060	175,236
10	1996	295,064	177,038
11	1997	299,356	179,614
12	1998	303,191	181,915
13	1999	306,383	183,830
14	2000	309,657	185,794
15	2001	312,876	187,726
16	2002	317,167	190,300
17	2003	320,815	192,489
18	2004	324,678	194,807
19	2005	327,660	196,596
20	2006	331,760	199,056
21	2007	335,408	201,245
22	2008	339,270	203,562
23	2009	342,918	205,751
24	2010	346,137	207,682
25	2011	350,000	210,000
26	2012	353,648	212,189
27	2013	357,940	214,764
28	2014	360,730	216,438
29	2015	365,021	219,013
30	2016	367,391	220,435

1.4 Current Status of Landfilling

There are seven landfills in the Regional District, of which six are under permit to the Waste Management Branch to accept all types of municipal refuse. Existing landfill sites are shown on Figure 1. Three of these are on the Gulf Islands (Saltspring, Galiano, and Saturna). A fourth landfill is owned and operated by Chew Excavating Ltd. and is permitted to accept only inert municipal refuse, mainly construction and demolition waste. The remaining three landfills are the Hartland landfill and two small landfills at Jordan River and Port Renfrew.

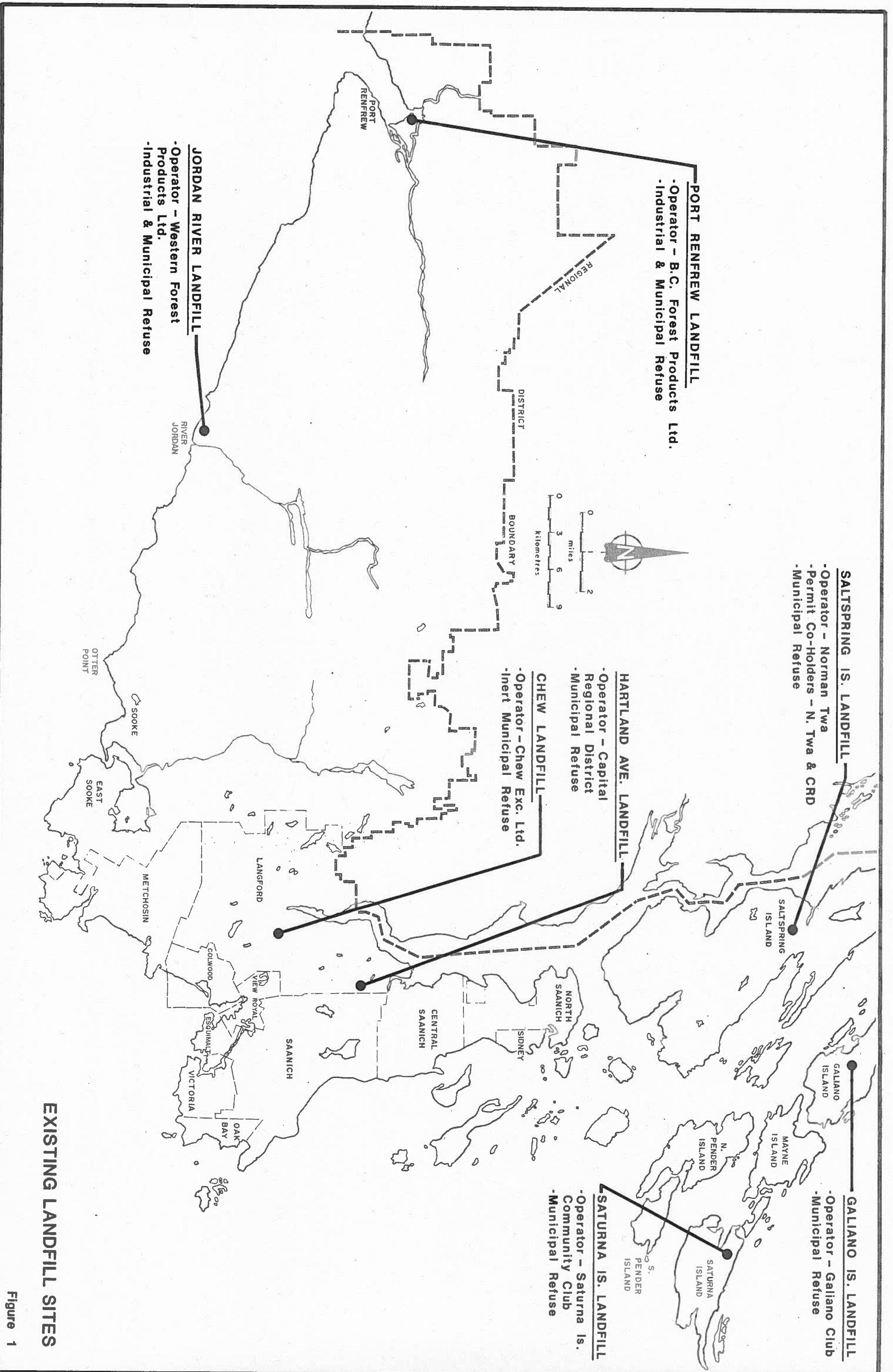
The Hartland Avenue Sanitary Landfill, by far the largest of the landfills, is authorized to accept "typical municipal refuse." This facility receives virtually all of the refuse generated by residents and commercial establishments in the area, which accounts for 97% of the population of the Region.

The operation at the Hartland Avenue site is governed by Waste Management Permit No. PR-1284, first issued on May 24, 1973 and most recently amended on February 16, 1987.

The Hartland landfill is located in bedrock terrain on approximately 320 ha of land owned by the CRD in Langford, adjacent to the Saanich municipal boundary. Waste presently occupies about 18 ha located at the northeast corner of the property. The site is bounded on three sides by undeveloped CRD land, Mount Work Regional Park, and the Department of National Defence rifle range.

The Blackburn Road landfill on Saltspring Island is privately owned and operated. It is located about 6 km south of Ganges, in a watershed draining to Blackburn Lake and Cusheon Lake, from which drinking water is extracted. The landfill has been poorly run and is in a bad location relative to public health and environmental risks.

Solid waste on Galiano Island is taken by Island residents to a small landfill off Porlier Pass Road. The landfill is operated by the Galiano Club as an open dump without regular cover and with periodic burning. Recyclables are collected and occasionally picked up by the CRD or hauled to Vancouver. The landfill is acceptable to Galiano residents because it is remote from residential properties.



EXISTING LANDFILL SITES

Figure 1

On Saturna Island, solid waste is disposed of by low heat incineration of combustibles in a large steel barrel, recycling of glass, tin, and clothing, composting of organic material, and landfilling the remainder. The facility, located on a ridge on the north side of Lyall Harbour, is operated by the Saturna Island Community Club. Refuse is brought to the site by the public. Drainage from the site runs toward Lyall Harbour onto private property, and there is some concern for the long-term integrity of ground water resources. Other concerns include the lack of a long-term lease for the property and the amount of volunteer labour required to operate the facility properly.

The landfills at Jordan River and Port Renfrew operate under Waste Management permits issued to logging companies and are primarily intended for the disposal of wood waste. However, they also accept municipal refuse from local residents, in accordance with their permits.

1.5 Current Status of Recycling

The Capital Regional District, through the Operations Division of the Engineering Department, plays an active role in recycling activities. In addition to operating and maintaining a recycling depot on Borden Street in Saanich, the Region picks up recyclables from a number of sub-depots and drop boxes throughout the Region.

For 1986, expenditures by the Recycling Division were approximately \$147,000, which was partially offset by revenue of \$52,000. The net cost to the taxpayers of the Region was \$95,000. 1,189 tonnes of newsprint, cardboard, paper, cans, and glass were recycled at an average cost of \$80.00 per tonne. The material recycled through Regional facilities represents about 0.9% of the total solid waste stream.

In addition to the activities of the Capital Regional District, the District of Saanich provided a grant of \$30,000 in 1986 to Vancouver Island Recycling Society to provide curbside pickup of recyclables in the community. It is reported that 1,652 tonnes of material were recycled by Vancouver Island Recycling in 1985, at a cost of about \$18.00 per tonne. The cost of the recycling grant in 1987, based on public tendering, has reportedly risen to \$45,000.

The recycling activities of the Capital Regional District and Vancouver Island Recycling account for about 2% of the municipal solid waste generated within the Region. The activities of private recyclers are estimated to add an additional 1 to 2 per cent to the fraction of solid waste that is recycled.

1.6 Current Status of Composting

The extent of composting by homeowners of the Region is unknown. However, the generally high standard of yard maintenance, the rural lifestyle enjoyed by a substantial proportion of residents, and the area's reputation as a retirement community suggest that composting of leaves, lawn clippings, and kitchen wastes may be widely practiced throughout the Region.

Participation in organized composting efforts appears to be limited. A poll of municipalities revealed the following information about municipal composting; Victoria, Saanich, Oak Bay, Esquimalt, and Central Saanich have varying levels of yard waste composting operations, from the collection of leaves and clippings from municipal facilities in Central Saanich to an extensive leaf and tree pruning composting operation in Oak Bay. Sidney composts straw and manure from the race track. The Western Communities and North Saanich do not carry out any composting.

On a regional basis, composting by the municipalities presently reduces the volume of waste going to the Hartland landfill by approximately 5,000 cubic metres per year (prior to composting).

2.0 LANDFILLS

2.1 Hartland Avenue

The Hartland Avenue sanitary landfill will continue to be the major waste disposal point in the CRD for the next thirty years, and probably considerably longer.

The Hartland site will be operated as a model landfill, with necessary budget commitments to properly perform compaction and cover, control and divert surface runoff, control leachate and gas movement, minimize rodent and seagull nuisance, and monitor local surface and ground water.

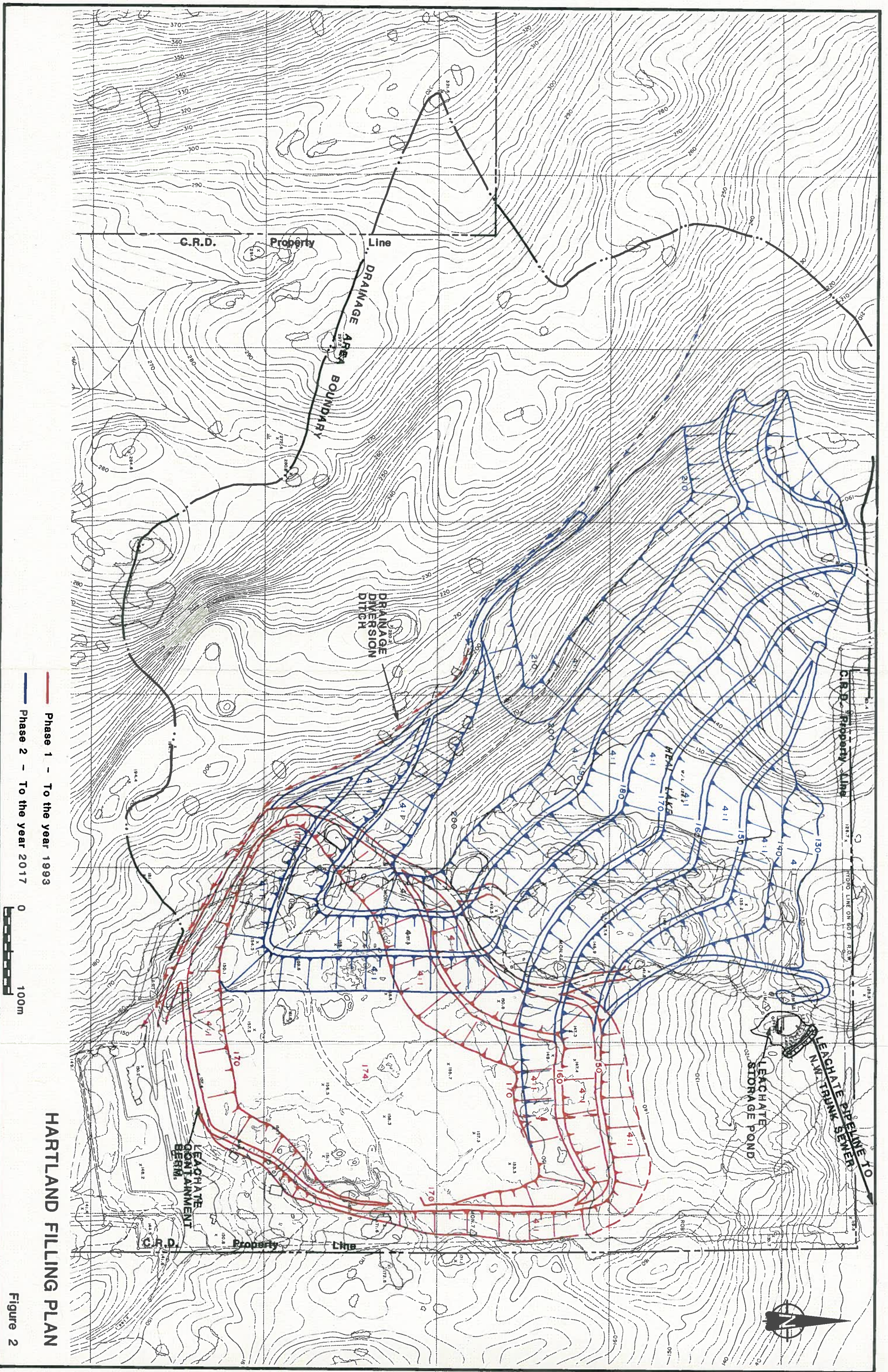
2.1.1 Wastes To Be Accepted

Almost all of the region's municipal solid waste is disposed of at the Hartland landfill. The type of waste accepted at the landfill is defined in By-Law No. 1310 (reproduced in Appendix B). Future By-Law modifications more closely defining acceptable wastes, or setting tipping fees, will be incorporated in this Plan.

In general, the Plan deals with the reduction and disposal of municipal refuse, as defined in the 1981 Pollution Control Objectives for Municipal Type Waste Discharges in British Columbia. No consideration has been given to options for disposal of hazardous waste, refuse of international origin or waste defined as "special waste" by the Province of British Columbia. These are considered to be the responsibility of senior levels of government and are not appropriate for handling by municipal refuse facilities on a routine basis. Notwithstanding the foregoing, the landfill will accept septic tank sludge under emergency conditions, municipal sewage treatment plant sludge, and sewage screenings.

2.1.2 Filling Plan

The thirty year filling plan will occur in two phases, as shown on Figure 2. Phase 1 will involve the finishing of the existing area to a maximum elevation of 174.0 metres. Based on conservative assumptions, the phase one fill will be finished



by the end of 1993, and will be seeded and left as a permanent buffer. An end use plan for the finished area will be developed.

Exploratory drilling will be done in the Heal Lake basin, commencing in 1989, to define geological conditions in order to prepare detailed leachate control plans. In 1991 and 1992, access roads to Heal Lake will be constructed, drainage diversion channels will be built, and Heal Lake will be drained in preparation for Phase 2. Soil from the Heal Lake area will be stripped, stockpiled, and used as final cover on the Phase 1 fill. Prior to draining Heal Lake, a Water Licence will be obtained and the loss of potential fish habitat will be addressed.

Phase 2, as shown on Figure 2, will be bounded by the northwest drainage channel/access road and within the Heal Lake catchment. Filling will begin in 1993 in the drained lake itself. It is considered imperative to remain, as at present, in the Heal Lake watershed and not to encroach on the Prospect Lake watershed to the southeast or the Durrance Lake watershed to the northwest.

Although this Plan sets goals of 10 and 15% for reducing the volume of waste going to the landfill, full landfill backup capacity is available for the 30-year planning period. If no waste reduction at all took place, the phase 2 fill would still last to the year 2017..

As a general rule, areas will be cleared a year in advance of filling, and all available soil will be stripped and stockpiled for use as cover material.

2.1.3 Leachate and Gas Control

The methods of controlling leachate at the Hartland landfill have included or will include a containment berm, drainage diversion ditches, a leachate storage pond, and a pipeline to carry collected leachate to the regional Northwest Trunk sewer system.

The leachate containment berm, constructed in 1985 at a cost of approximately \$1,000,000, is situated at the south end of the

fill, along a bedrock saddle separating the Heal Lake and Killarney Lake watersheds. The purpose of the berm was to retain surface and ground water originating in the fill within the Heal Lake watershed.

A major drainage diversion ditch will be integrated with a new access road, to be constructed at a 7% to 10% grade from the berm to the northwest, as shown on Figure 2. This ditch will be extended as the Phase 2 fill progresses, and will prevent uncontaminated runoff from entering the fill.

The existing leachate storage pond, which has been used to store leachate for recycling onto the fill during the summer, will be replaced by a larger pond. Leachate recycling will cease. Instead, stored leachate will be periodically released down a 150 mm leachate pipeline, which will convey leachate to the northwest trunk sewer system and ultimately out the Macaulay outfall. This system will prevent leachate discharges to Heal Creek and thus eliminate the threat to salmonid enhancement efforts in Tod Creek, for all except disastrous conditions.

Prior to beginning the Phase 2 fill, geotechnical investigations will be carried out to determine whether a toe drain will allow effective leachate collection, as anticipated, or whether an impervious liner will be required under the Phase 2 fill, and to define necessary gas control procedures.

Nineteen wells on the Hartland property, and two domestic wells just to the east on Hartland Avenue, have been monitored for water levels and contaminants. New monitoring wells in and around the fill will be constructed as required to define leachate movement.

The possibility of contamination of domestic water wells in the vicinity of the Hartland landfill is recognized, and although monitoring of selected wells in 1986 and 1987 did not indicate any problem, the construction of a domestic water line up Hartland Avenue to supply homes whose wells could potentially be affected will be evaluated as a precautionary measure.

2.1.4 Rodent and Bird Control

Continued good compaction and daily cover at the Hartland landfill will continue to prevent any problems with rats and other rodents.

Birds, particularly seagulls and crows, have been a more persistent and difficult problem. Gulls have been a nuisance on the site itself, and more seriously to residents around Prospect Lake.

The major control technique which has been used, and will continue to be used, consists of a set of cables installed over the site, with monofilament wires strung across the cables. This system was erected in mid-1987, and has proven remarkably effective in reducing the number of gulls at the landfill. The overhead wire system will be maintained and improved if possible to further reduce bird counts.

2.1.5 Burning

Stumps, slash, and demolition debris (wood), which currently constitute about 6% by weight of the waste received at Hartland will not be landfilled. They will be burned. An area away from the fill will be cleared to allow storage of wood waste for burning, when no fire hazard exists and when weather conditions will minimize smoke problems.

If smoke creates problems and generates complaints, a progression of steps will be tried to resolve the problem.

First, a pipe burner would be constructed; this consists of a perforated steel pipe through which air is blown. The wood waste is simply piled on the pipe. Second, if problems persist, an air-injected, refractory-lined pit burner would be built. If necessary, landfill gas could be extracted and used to fire a pit burner.

As a last resort, if increased residential development makes the burning of wood waste undesirable, all wood waste could be chipped prior to landfilling.

2.1.6 Hartland Area Residents

CRD Engineering staff will meet once per year, or more frequently if requested, with local residents, to discuss problems experienced by neighbours of the landfill. An annual open house will be held, if possible at the Prospect Lake Community Hall.

Communications will continue with local residents regarding monitoring results and other landfill issues.

The CRD will make every reasonable effort to reduce or eliminate problems experienced by residents in the Hartland area.

2.2 Blackburn Road Landfill

The continued operation of the Blackburn Road landfill on Saltspring Island, to accept general municipal waste, is undesirable. However, the CRD neither owns nor controls the landfill. Until an alternative waste disposal site or method is available on Saltspring Island, the Blackburn Road landfill will continue. This alternative may be a transfer station, as discussed below in Section 3.0.

2.3 Galiano and Saturna Landfills

Since residents of Galiano and Saturna Islands have indicated a strong preference to continue operating their own landfills without CRD involvement, this state of affairs will continue. If either or both islands find that they can no longer continue landfilling for any reason, the most viable solution would be either transfer facilities with bulk haulage to the Hartland landfill, or direct haulage in collection vehicles to Hartland.

2.4 Jordan River and Port Renfrew Landfills

The most economical and viable long term course for Jordan River and Port Renfrew is continued landfilling at their local logging company landfills.

3.0 TRANSFER FACILITIES

Due to the isolated nature of the Gulf Islands, the CRD will fund the initial capital cost of transfer facilities, provided the residents of a particular island agree to pay the cost of operating such a facility, including manning, maintaining and replacing the facility, and waste haulage to the Hartland Landfill.

4.0 WASTE REDUCTION

Objectives are set for the reduction of municipal waste being landfilled, of 10% by 1993 and 15% by 1998, to be achieved by recycling, composting, and possibly materials recovery. The cost of achieving these goals is not to exceed 50% of the estimated operating budget for 100% landfilling.

4.1 Recycling

The major method of waste reduction will be recycling. The CRD will set an initial budget of \$50,000 in 1988 for planning, education, and promotion. The CRD will assist municipalities and unorganized areas in preparing tenders for the pickup, storage, handling, and marketing of recyclables. The contracts themselves will be funded on a regional basis, using money raised by a surcharge on the Hartland landfill tipping fee.

The present CRD recycling operation will be phased out as private sector contracts are arranged to take its place. The present level of service will not be diminished. Contracts will first be let to serve the core, higher density areas, then to branch out into the outlying areas of the region. The denser areas will probably institute curbside pickup, and the less dense areas would have drop off depots or boxes.

4.2 Composting

A second method of waste reduction will rely on home composting and increased composting of yard waste by the municipalities.

An annual budget will be set for the production and distribution of pamphlets describing and promoting home composting. Promotion of composting will be linked with promotion of recycling.

As outlined in Section 1.6, the core municipalities already practice composting of yard waste (leaves, grass, and tree prunings) to varying degrees. The CRD encourages these municipalities to increase their efforts, and the outlying municipalities to undertake similar programs.

4.3 Mechanized Materials Recovery

Mechanized retrieval of paper, ferrous metal, and possibly glass would be evaluated if the 15% reduction goal cannot otherwise be achieved. If it becomes necessary to consider mechanized materials recovery, proposals will be solicited.

5.0 PLAN IMPLEMENTATION

5.1 Schedule

An implementation schedule for the continuing use and development of the Hartland landfill, providing transfer facilities as desired by the Gulf Islands, and for developing and improving waste reduction operations is given below:

5.1.1 Hartland Landfill

- 1988 - Construct new access road/drainage channel to the northwest.
 - Set up area for storing and burning stumps and demolition debris.
 - Construct new leachate lagoon and pipeline to northwest trunk sewer.
- 1989 - Begin geotechnical investigation of Heal Lake area, and continue in subsequent years as required to design leachate and gas control systems.
- 1990 - Tender new contract for landfill operation.
- 1991 - Prepare access road to Heal Lake area.
- 1992 - Drain Heal Lake.
- 1993 - Finish phase 1 fill. Use soil from Heal Lake area for final cover. Begin filling Heal Lake.

5.1.2 Transfer

- 1988 - Carry out referenda on Saltspring, Pender and Mayne Islands to determine residents' willingness to pay transfer station operating costs, and costs of haulage to Hartland Landfill.

5.1.3 Recycling

1988 to 1990

- Undertake detailed planning for recycling program, including resolution of the displacement of present CRD recycling employees, obtaining the co-operation of municipalities, and arranging financing agreements for recycling contracts.
- Prepare tenders and award contract(s) for a core area, multi-material, curbside pickup program.

- Phase out core area pickup by CRD, but maintain Borden Street drop off depot and outlying CRD drop boxes.
- Prepare and distribute advertising and promotional brochures. (Promotion to continue indefinitely.)
- Prepare tenders and award contract(s) for storage, handling, and sale of collected recyclables.
- Phase out CRD Borden Street depot, but maintain outlying CRD drop boxes.
- Prepare tenders and award contract(s) for drop box operation and collection in outlying areas. Phase out CRD drop boxes.

5.1.4 Composting

1988 - Prepare and distribute brochures promoting home composting, and designs for home composters.

5.1.5 Materials Recovery

1993 - Depending on necessity for achieving goals, re-evaluate mechanized materials recovery.

5.2 Costs

Estimated costs of landfilling, recycling, and composting to the year 1993 are given below in Table 6.

TABLE 6 - SCHEDULE AND COSTS (1987 DOLLARS)

YEAR	OPERATION	CAPITAL REPAYMENT & OTHER COSTS (\$)	OPERATING BUDGET (\$)	TIPPING FEE (\$/TONNE)	TOTAL COST (\$/HOUSEHOLD) ^h
1987	Landfill ^a	500,000	1,650,000	10.50	20.28
	Recycle (2%)	-	130,000	0.83	
	TOTAL	500,000	1,780,000	11.33	
1988	Landfill ^a	886,000 ^e	1,800,000	11.26	25.27
	Transfer ^b	26,000	-	-	
	Recycle ^c (2%)	-	195,000	1.22	
	Compost ^d	-	20,000	0.13	
	TOTAL	912,000	2,015,000	12.61	
1989	Landfill ^a	886,000	1,800,000	11.12	26.03
	Transfer ^b	26,000	-	-	
	Recycle ^c (3%)	-	321,000	1.93	
	Compost ^d	-	20,000	0.12	
	TOTAL	912,000	2,141,000	13.17	
1990	Landfill ^a	886,000	2,290,000	13.95	30.79
	Transfer ^b	26,000	-	-	
	Recycle ^c (5%)	-	441,000	2.69	
	Compost ^d	-	20,000	0.12	
	TOTAL	912,000	2,751,000	16.76	
1991	Landfill ^a	898,000 ^f	2,290,000	13.76	31.23
	Transfer ^b	26,000	-	-	
	Recycle ^c (7%)	-	533,000	3.20	
	Compost ^d	-	20,000	0.12	
	TOTAL	924,000	2,843,000	17.08	
1992	Landfill ^a	910,000 ^f	2,290,000	13.59	32.20
	Transfer ^b	26,000	-	-	
	Recycle ^c (9%)	-	687,000	4.08	
	Compost ^d	-	20,000	0.12	
	TOTAL	936,000	2,997,000	17.79	
1993	Landfill ^a	930,000 ^g	2,290,000	13.42	32.66
	Transfer ^b	26,000	-	-	
	Recycle ^c (10%)	-	771,000	4.52	
	Compost ^d	-	20,000	0.12	
	TOTAL	956,000	3,081,000	18.06	

- ^a Roads, drainage, leachate and gas control, new contract in 1990, up \$3.00/tonne. Drain Heal Lake in 1991/1992. Finish existing area in 1993.
- ^b Saltspring, Pender, and Mayne.
- ^c CRD recycling costs include existing operations until phased out, promotion and advertising costs, and recycling contracts.
- ^d Promotion of home composting plus Hartland yard waste operation.
- ^e Leachate line at \$2,100,000 plus water line at \$850,000, plus \$350,000 for access road and drainage diversion. Payback CRF = 0.117 (Water main not approved as of November 1987)
- ^f Access roads to Heal Lake, lake drainage, and preparation of area. Cost \$100,000 each year, CRF = 0.117
- ^g Finishing existing area - final cover, topsoil, and seeding. Cost \$170,000, CRF = 0.117
- ^h Based on an average 2.3 people per household, for capital repayment plus operating costs.

APPENDIX A

**SUPPLEMENTARY LETTERS PATENT
FOR SOLID WASTE**

SOLID WASTE LETTERS PATENT

Function authorized October 4, 1973
Amended April 30, 1981, and March 7, 1985

Division X - Refuse Disposal

1. Wherever the term "refuse" is used in these Letters Patent it shall include all noxious, offensive, unwholesome, and discarded materials, and the said materials may be classified by by-law.
2. It shall be a function of the Capital Regional District, within the regional district, to provide refuse-disposal facilities and, in particular, but without limiting the generality of the foregoing:
 - (a) To acquire, construct, maintain, operate, and regulate transfer depots or stations with facilities for receiving collected refuse and for packing, processing, loading, and transporting the said refuse to disposal grounds:
 - (b) To acquire, establish, maintain, operate, and regulate refuse-disposal grounds and facilities wherever appropriate within the region, having regard to population distribution and distances:
 - (c) To compel persons within all or designated portions of the region to make use of any system established for the disposal of refuse and to prescribe the terms and conditions upon which persons make use of such system and to impose fines and penalties in respect thereof:
 - (d) To enter into contracts to provide refuse disposal service and to specify the terms and conditions under which the service will be provided:
 - (e) To enter into contracts with any person for all or part of the removal of refuse from any transfer depot or station and for the disposal of refuse.
3. All member municipalities shall participate in the function of the Capital Regional District provided by this Division.
4. The Board may by by-law establish and impose a scale of charges payable for depositing refuse at a transfer depot or station or at a disposal ground and for compelling payment of the charges so fixed.
5. The annual net cost of this function shall not exceed \$0.19 per \$1000 assessment on the basis of the net taxable value of land and improvements for regional hospital district purposes.
6. The annual net cost attributable to this function shall be apportioned among the participating municipalities on the basis of 75 per cent population as defined in the Municipal Act and 25 per cent on the assessed value of improvements as fixed for taxation for school purposes in the current year, excluding property that is taxable for school purposes only by special Act.
7. The amount of debt incurred with respect to this function shall not exceed \$5,700,000.

APPENDIX B

BY-LAW NO. 1310

CAPITAL REGIONAL DISTRICT

BY-LAW NO. 1310

A BY-LAW FOR THE PURPOSE OF ESTABLISHING A TIPPING FEE AND REGULATIONS FOR
SOLID WASTE DISPOSAL AT THE HARTLAND ROAD SANITARY LANDFILL

WHEREAS by Supplementary Letters Patent, dated 4th October, 1973, the Capital Regional District was granted the function of Refuse Disposal under Division X of its Letters Patent;

AND WHEREAS the Capital Regional District is empowered to establish a scale of charges payable for depositing refuse at a disposal ground;

AND WHEREAS the Regional Board of the Capital Regional District deems it advisable to enact regulations pertaining to solid waste disposal and to establish a charge for depositing refuse;

NOW THEREFORE the Regional Board of the Capital Regional District in open meeting assembled enacts as follows:

1. In this By-law unless the context otherwise requires:

"Covered Solid Waste" means a load of refuse secured on the vehicle so that it cannot blow or fall off while in transit;

"Dead Animals" mean dead animals, or portions thereof, equal to or greater than 5 kilograms in weight;

"Disposal Ground" means the disposal ground established under Section 2;

"Hazardous Waste" means special waste and refuse which because of its inherent nature and quantity requires special disposal techniques to avoid creating health hazards, nuisances or environmental pollution. Hazardous Wastes are toxins or poisons, corrosives, irritants, strong sensitizers, flammables, explosives, infectious wastes, condemned foods, etc. Flammable wastes exclude plastics, paper, paper products and the like;

"Prohibited Waste" means refuse deemed by the Regional District as not acceptable for landfilling at Hartland Road landfill. Prohibited waste includes but is not limited to:

1. Explosive material
2. Radioactive substances and waste
3. Hazardous waste
4. Petroleum products
5. Dead animals
6. Industrial chemical waste
7. Motor vehicle bodies and farm implements
8. Other categories of refuse designated by the Regional District
9. Refuse that is on fire or smouldering

"Regional Board" means the Board of the Capital Regional District;

"Regional District" means the Capital Regional District;

"Solid Waste" means refuse suitable for landfilling at Hartland Road landfill but excluding Prohibited Waste;

"Special Waste" means any chemical, compound, mixture, substance or article which is designated as "Special Waste" by regulations of the Waste Management Branch of the Ministry of Environment, Province of British Columbia.

2. The Hartland Road Sanitary Landfill Site more particularly described in Schedule "A" attached hereto is hereby established as a disposal ground.
3. Every person depositing refuse at this disposal ground shall pay to the Regional District the applicable charge set out in Schedule "B" attached hereto.
4. No person shall, in depositing refuse at a Disposal Ground:
 - (a) deposit a Prohibited Waste;
 - (b) deposit Solid Waste except at a location provided by the Regional District for the deposit of the kind of Solid Waste being deposited;
 - (c) unless required by the Regional District, deposit Solid Waste without first having it weighed on the scales at the Disposal Ground;
 - (d) drive a vehicle anywhere on the Disposal Ground except on roads provided by the Regional District for that purpose.
5. Special wastes will be deposited only in those portions of the Hartland Road Sanitary Landfill Site assigned and indicated by the staff in charge thereof.
6. Where a charge under Section 3 is not paid within the time specified in Schedule "B" for its payment the person liable to pay such charge shall:
 - (a) in addition to such charge pay interest thereon at the rate set out in Schedule "B" from the date the charge was due to the date of payment;
 - (b) not deposit any refuse on or at the Disposal Ground until such charge and interest owing thereon has been paid in full.
7. Any person who violates any provision of this by-law or who does or causes to be done any act or thing in contravention of this by-law is liable on summary conviction to a penalty not exceeding Two Thousand Dollars.
8. This By-law may be cited as the "Hartland Road Tipping Fee and Regulation By-law No. 1, 1984"

READ A FIRST TIME THIS 14th day of November 1984

READ A SECOND TIME THIS 14th day of November 1984

READ A THIRD TIME THIS 14th day of November 1984

RECONSIDERED AND FINALLY ADOPTED THIS 28th day of November 1984

SIGNED BY THE CHAIRMAN (Shirley L. Wilde) AND SECRETARY (W.M. Jordan)