



# **ENGINEERING/PLANNING EVALUATION AND COST ASSESSMENT**

**McDOUGALL LANDFILL SITE  
McDOUGALL, ONTARIO**

**Prepared For:**

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**FEBRUARY 2003  
REF. NO. 31807 (1)**

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## 1.0 INTRODUCTION

This document provides an engineering/planning evaluation and cost assessment for the potential expansion of the McDougall Landfill in the Municipality of McDougall, District of Parry Sound, Province of Ontario (Site). This evaluation and cost assessment was undertaken to provide a professional opinion on the potential approvability and economic feasibility of an expansion of the Site, under five Site usage alternatives.

The Site currently operates under Provisional Certificate of Approval A522101, issued under Part V of the Environmental Protection Act. The expansion of the Site is anticipated to enable the Municipality of McDougall and possibly other area municipalities to have continued access to an environmentally sound and economically feasible non-hazardous solid waste disposal facility.

It is anticipated that the proposed expansion of the Site will be subject to approvals under the following legislation:

- Environmental Assessment Act;
- Environmental Protection Act; and
- Ontario Water Resources Act.

The objective of this report is to provide the Municipality of McDougall with pertinent information to assist in determining the feasibility of proceeding with expansion plans for the Site. The decision to proceed will be based on both the potential for obtaining the necessary regulatory approvals and the cost of the proposed expansion relative to other solid waste management alternatives. Recognizing that unless the Site is in compliance (or there is a compliance plan, agreed to by MOE, in place and implementation is underway) it is unlikely that MOE would entertain an Environmental Assessment to expand the Site. Therefore this report also reviews current Site compliance issues, and why they may exist, and discusses what would be necessary to bring the Site into compliance.

## **2.0 BACKGROUND**

### **2.1 SITE HISTORY AND REGULATORY SETTING**

The McDougall Landfill Site (Site) is a municipal waste management facility owned by the Corporation of the Municipality of McDougall. The Site has, since 1976, served as the solid non-hazardous waste disposal facility for the Municipality of McDougall, and area municipalities. Including the Town of Parry Sound, the Township of The Archipelago and Seguin Township. Seguin Township includes the former Townships of Christie, Foley and Humphrey and the Village of Rosseau, as well as the western portion of the unorganized Township of Monteith.

The Site was originally owned and operated by a private company, however the Ontario Ministry of Environment (MOE) ordered the Municipality of McDougall to assume ownership of the Site. As such, the MOE issued Emergency Provisional Certificate of Approval (C of A) No. A522101 to the Municipality of McDougall on September 25, 1989, which came into force on October 1, 1989. This C of A provided for the continued operation of the Site for a period of 2 years, ending September 28, 1991.

The following provides additional chronology of approvals leading up to the present.

- on September 26, 1991 the Emergency Provisional C of A was amended to permit 2 additional months of landfilling.
- on November 29, 1991 the Emergency Provisional C of A was revised to allow continued use of the Site to the original volumetric capacity. This revision included a requirement for the submission of a plan to construct a containment cell and move the existing landfilled waste to the containment cell.
- on June 29, 1992 a Notice was issued amending the C of A to include conditions providing additional time to submit the required plan.
- on January 25, 1993 a Notice was issued amending the C of A to include conditions detailing the leachate recovery and recirculation program, the waste excavation and screening procedure and requiring a long-term leachate disposal strategy.
- on April 21, 1994 a Notice was issued amending the C of A to include conditions detailing the closure date (June 30, 2000) and the design of the containment cell.
- on November 21, 1996 a Notice was issued amending the C of A to include conditions detailing groundwater and surface water monitoring programs.
- on December 23, 1996 a Notice was issued amending the C of A to allow continued use of the Site to the revised final contours.

Additional approvals concerning the landfill include:

- C of A Sewage Number 3-0178-94-006, dated April 19, 1994, for the stormwater management facilities at the Site; and
- C of A Waste Management System A900525, dated October 25, 1996, for the haulage of landfill leachate.

## **2.2        SITE DESCRIPTION**

The Site is approved for the use and operation of a 7.2 hectare waste disposal (landfilling) site within a total site area of 74.0 hectares. The Site is located on Part Lots 11 and 12, Concession 4 in the Township of McDougall, District of Parry Sound. The location of the Site limits and landfill limits are shown on the attached Figure 1. As shown on Figure 1 the landfill is located in the southwest corner of the Site. As a result, approximately  $\frac{2}{3}$  or 50 hectares of the Site remains undeveloped and naturally vegetated. In addition, the Municipality of McDougall owns property adjacent to and southeast of the Site.

The Site was originally designed and operated as a natural attenuation landfill over the 7.2 hectare area. The original approximate landfill limit is shown on the attached Figure 2. Subsequently, the landfill was mined and the waste remaining after exhumation was placed in an engineered landfill with an approximate area of 3.5 hectares. The limits of the engineered landfill are also shown on the attached Figure 2. A soil by-product of the landfill mining operation, referred to as "fines", was utilized as daily cover, a final cover amendment and to recontour and fill areas on Site. The areas of "fines" placement are indicated on Figure 2.

The Site abuts an aggregate pit to the west, undeveloped land to the north, a mixture of undeveloped land and residences to the east and south. The landfill is set back approximately 200 metres from McDougall Road and is well screened by local topography, a screening berm and trees. A weigh scale, office, and an equipment shed are located along the on-site access road to the landfill. An area referred to as the "Front Pit" is located east of the landfill within the developed area of the Site. The "Front Pit" can be described as a pit or low-lying area which is a remnant of historic aggregate extraction operations at the Site.

The existing engineered landfill is a lined landfill with an integral leachate collection system. The collected leachate is pumped to a holding tank and transported by truck to the Parry Sound Wastewater Treatment Plant. In addition, a groundwater extraction well (BHA-2) is located southeast of the landfill and pumps leachate impacted groundwater to the leachate holding tank. Stormwater is collected in a perimeter ditch and conveyed to a stormwater management pond located at the northwest corner of the landfill.

### **3.0 REASON FOR PROPOSED EXPANSION**

As noted previously, the engineered expansion of the Site is being considered as a solid waste management alternative that would enable the Municipality of McDougall and possibly other area municipalities to have continued access to an environmentally sound and economically feasible non-hazardous solid waste disposal facility.

In addition, an engineered expansion of the landfill will allow the Municipality of McDougall to address the existing compliance issues in an economical and timely manner.



## **4.0 APPROVAL REQUIREMENTS FOR EXPANSION**

### **4.1 ENVIRONMENTAL ASSESSMENT ACT**

The expansion of the existing landfill will require approval under the Environmental Assessment (EA Act).

The following is an overview of the environmental assessment approval process, including implementation of a public and agency consultation program.

#### **4.1.1 TERMS OF REFERENCE**

Public and agency input and consultation will form an important part of the EA. In order to ensure that an effective, transparent, and accountable process has been conducted, the Municipality of McDougall will develop a comprehensive public and agency consultation process consisting of the following elements:

- preparation of the Terms of Reference will involve the following key steps and will take approximately 4 months (ToR preparation). Once submitted to the MOE approval of the Terms of Reference will take a minimum of 12 weeks;
- submission of Final Draft Terms of Reference to a Core Review Team of key agencies and stakeholders established by the MOE for review and input;
- preparation of Newsletter No. 1, which will provide an overview of the proposed undertaking, an announcement that Final Draft Terms of Reference have been prepared and will be available for review at Public Open House No. 1, a summary of the EA process that will be followed during the project and solicitation of applicants to form a Public Liaison Committee to assist the Municipality of McDougall in ensuring that the concerns and suggestions of the public are incorporated into the EA;
- development of a Public Liaison Committee based on the interest and qualifications of applicants and additional recommendations received from the Core Review Team;
- scheduling of Public Liaison Committee Meeting No. 1 to establish the goals and objectives of the EA, provide an overview of and solicit input on the Final Draft Terms of Reference to conduct the EA, provide a summary of the work plan and schedule; and outline the long term expansion alternative;
- scheduling of Public Open House No. 1 to inform the public of the goals and objectives of the EA, provide an overview of and solicit input on the Final Draft Terms of Reference to conduct the EA, outline the work plan and schedule, present

- the alternatives and alternatives evaluation criteria and solicit input into additional alternatives and/or evaluation criteria;
- submit Final Terms of Reference to the Minister of the Environment.

#### **4.1.2 ENVIRONMENTAL ASSESSMENT**

It is proposed that the existing environmental studies relating to the Site be reviewed and utilized, where appropriate. New field work and assessments will be carried out as required to ensure that any change in environmental conditions on and in the vicinity of the Site have been identified and addressed.

Upon approval of the Terms of Reference the Municipality may then begin the necessary studies and public consultation process for the expansion as set out in the Terms of Reference. Completion of studies, public consultation and preparation of a Draft EA Report will take a minimum of one year. Upon completion of the Draft EA Report the following will be a number of key activities leading to formal submittal of the EA:

- scheduling of Public Liaison Committee Meeting No. 2 to review the Draft EA report and obtain input relative to the recommended alternative(s) and the development of mitigation measures;
- preparation of Newsletter No. 2 to describe the results of the EA process and the development of mitigation measures, and to obtain input relative to the proposed expansion alternatives, work plan and schedule;
- scheduling of Public Open House No. 2 to present the results of the EA process, the proposed mitigation measures identified and obtain input relative to the proposed expansion alternative(s), work plan and schedule; and
- consultation, throughout the EA process, with the agency Core Review Team to ensure that agency concerns and input are incorporated into the evaluation process, that appropriate mitigation measures are considered and that the proposed expansion meets all applicable agency standards and legislative/regulatory requirements.

Upon completion of the public and agency consultation program noted above the Final Draft EA Report (reflecting all input from the public, core review team agencies and the EA Branch) will be formally submitted to MOE for Review. The MOE review process, including timelines for EA Reviews and the Minister's decision is outlined in Ontario Regulation 616/98.

#### **4.2            ENVIRONMENTAL PROTECTION ACT**

Concurrent with the completion of the EA and preparation of the EA Report a comprehensive updated Hydrogeological Assessment and a revised Design and Operation (D&O) Plan will be prepared in support of an application under Part V of the Environmental Protection Act (EPA) to amend the C of A.

The Hydrogeological Assessment and the D&O Plan must be prepared in accordance with the requirements of Ontario Regulation 232/98. Regulation 232/98 under the EPA addresses the design of new or expanding landfills in Ontario.

The Hydrogeological Assessment will build on the current hydrogeological knowledge of the Site and will present how the expansion will fit into and react within the existing groundwater regime at the Site. The D&O Plan will present the design and operational procedures for the expanded Site. The Part V application and supporting documentation will be submitted concurrent with the submission of the EA. The Part V EPA application will be subject to application fees as stipulated in Ontario Regulation 363/98.

#### **4.3            ONTARIO WATER RESOURCES ACT**

An application to amend the existing C of A Sewage Number 3-0178-94-006 issued under Section 53 of the Ontario Water Resources Act will be prepared and submitted, along with supporting documentation, at the time of the EPA submission. The supporting documentation will include an expanded storm water management plan for the Site to accommodate the expansion. The Section 53 application will be subject to application fees as stipulated in Ontario Regulation 364/98.

#### **4.4            PLANNING ACT**

As part of the EA process it will be necessary to review the document "Study of the Official Plan Policies Affecting the Lands Surrounding the McDougall Landfill Site" (J. Jackson, October 3, 2000) and update it, as necessary. If required, Official Plan amendment(s) will need to be prepared to ensure that the proposed expansion complies with the Planning Act.

#### 4.5 SCHEDULE

For the purposes of this report a period of 3 years (2003 through 2005) was assumed for approvals and initial site development for the expansion area. The landfill site life extends from 2006 through the end of 2031 (25-years). It is assumed that the landfill will be developed in stages, with each stage providing approximately 5-years of air space. The post-closure care period would extend from 2032 through to the end of 2056 (25-years).

## **5.0 EXISTING SITE CONDITIONS**

In order to evaluate the potential success of an expansion of the Site, CRA undertook an assessment of the existing conditions of the Site and the potential expansion areas.

The following sections of this report provide a brief description of the hydrogeological setting of the Site compiled through historical investigations.

### **5.1 GEOLOGY AND HYDROGEOLOGY**

In general, the stratigraphy at the Site consists of three main geological units, a silty to medium grained sand layer with occasional lenses of gravel and cobbles, and boulders. The sand layer contains a discontinuous plastic clay layer at depths of approximately 4 metres below ground surface. The thickness of the sand layer varies from 0 to greater than 20 metres. The sand layer is underlain by a mafic gneissic bedrock.

The sand layer comprises a local unconfined aquifer. Groundwater flows radially from the Site in the sand layer and is controlled primarily by the underlying bedrock, which is reported to be massive, not heavily fractured and of low permeability. It is reported that groundwater collects in bedrock depressions or valleys beneath the sand unit and as a result there is a potential for migration in the bedrock fractures. The average linear groundwater velocity is reported to be approximately 100 metres per year.

The water table in the vicinity of the landfill footprint is located at a depth of approximately 10 metres below ground surface. In the low-lying areas, such as the "Front Pit", the water table is located at a depth of 1 to 2 metres below ground surface. The water table within the aquifer appears to be strongly affected by seasonal variations and is highly susceptible to surficial infiltration. The unconfined aquifer is utilized as a source of potable water for the neighboring residences, the closest of which is located approximately 200 metres from the landfill footprint.

### **5.2 GROUNDWATER AND SURFACE WATER QUALITY**

Historical reports prepared for the Site indicate that leachate impacted groundwater is migrating off-Site both northwest of the landfill and southeast of the landfill. As reported in the 2001 Development, Operations and Monitoring Report (Ince, 2002) groundwater monitoring results at the northwest and southeast property boundaries for

chloride, dissolved organic carbon, iron and manganese exceeded the maximum acceptable concentrations defined by the Reasonable Use Concept (MOE, 1994).

Overall the trends in groundwater quality results indicate that the groundwater exhibited the highest impact from the landfill in the years subsequent to the exhumation of waste (1994 through 1996).

The surface water monitoring results reported in the 2001 Development, Operations and Monitoring Report (Ince, 2002) indicate that surface water migrating to the north and south of the Site are being impacted by leachate. However, the surface water quality results do not exceed the Provincial Water Quality Objectives. The surface water impacts appear to be primarily from groundwater seepage to the surface watercourse. The seepage of groundwater to the surface watercourse is a result of the elevation change of approximately 20 metres or more to both the north and south.

### **5.3        SITE DEVELOPMENT**

The Site is divided into 2 development phases. Phase I is the southern half of the landfill and Phase II is the northern half of the landfill. The present fill rate at the Site is approximately 8,000 tonnes per year including all municipal and commercial waste. Reporting for the Site indicates that approximately 71,700 cubic metres of air space remained as of June 26, 2002. This included 5,200 cubic metres remaining in Phase I and 66,500 cubic metres remaining in Phase II. At the present fill rate this provides approximately 6 years of site life. However, a portion of the soil by-product remaining from the landfill mining operation, referred to as "fines", must be landfilled. The volume of fines that must be landfilled is approximately 35,600 cubic metres. This volume consumes approximately ½ of the remaining air space and results in a reduction in site life to approximately 3 years.

### **5.4        EVALUATION**

As noted previously, the landfill expansion must comply with the requirements of Ontario Regulation 232/98, under the EPA which addresses the design of new or expanding landfills in Ontario. In order to determine the potential for obtaining the necessary regulatory approvals CRA evaluated the Site in relation to the requirements of Regulation 232/98.

Regulation 232/98 includes requirements for design, operation, closure and post-closure care for municipal landfills as follows:

- design specifications for groundwater protection;
- the assessment of groundwater and surface water conditions;
- design requirements for buffer areas, final cover design, surface water and landfill gas control, and the preparation of a site design report;
- operation and monitoring requirements;
- leachate contingency planning; and
- site closure and post-closure care.

A number of the above noted requirements concern the physical characteristics of a site, while the remainder are associated with engineering and development. The engineering and development requirements vary depending on the physical characteristics of a site. In particular, the engineering requirements can be satisfied for most sites, not accounting for cost. However, the physical characteristics, with the exception of purchasing additional property, cannot be changed.

The primary physical characteristics are those associated with mitigating the nuisance impacts associated with landfills. The nuisance impacts associated with landfills include traffic, noise, dust, litter, odours and visual impacts. Nuisance impacts are concentrated within 500 to 1,000 metres of a site. As a result, the physical characteristics of importance include:

- the size of the site;
- the surrounding property ownership and land uses;
- access to the site;
- proximity to developed areas;
- number and proximity of neighbouring residences; and
- natural visual screening.

An evaluation of the McDougall Landfill Site for the above noted physical characteristics is as follows:

- The overall Site property area is 74 hectares, which provides more than adequate property to develop expansion areas. The large site area allows the minimum buffer zone requirement of 100 metres to be met. This significantly reduces the potential

for nuisance impacts to adjacent properties and provides space for contingency measures, as required.

- The surrounding properties include an aggregate pit, undeveloped land and residences. The nearest residence is located to the west of the Site entrance and is approximately 200 metres from the existing landfill footprint. With the exception of this residence, the nearest residence, not owned by the Municipality of McDougall, is located approximately 1,500 metres east of the existing landfill footprint.
- The active landfilling area is well screened from the nearest residence by natural vegetation and the completed portion of Phase I of the landfill. In addition, the location of the proposed expansion will be similarly screened and will be approximately 350 metres from the residence.
- Access to the Site is obtained via McDougall Road which crosses Highway 69 approximately 7 kilometres west of the Site. As a result, McDougall Road provides good access to a major transportation route and easy access to the primary centres of waste generation. The density of development along McDougall Road from Highway 69 to the Site is low and as a result traffic impacts should be minimal.
- The Site is well screened from McDougall Road and the residences both by natural vegetation and topographic ridge which runs along McDougall Road. The screening of the Landfill is improved by the completed portion of Phase I.

In the case of the McDougall Landfill Site the engineering aspects of the Site are known as a result of historic landfilling operations. The engineering requirements for the expansion will be addressed through the design and development of the landfill. However, there are existing engineering issues associated with the existing landfill. As noted previously, the Site is impacting both the groundwater and surface water off-site. The off-site impacts are a residual effect of the original attenuation landfill and the landfill mining operation. Since the original attenuation landfill has been removed and the landfill mining operation is complete, the source of contamination has been removed. The removal of the source of contamination provides more flexibility in addressing the off-site impacts.

The compliance issues must be addressed to ensure continued use of the existing landfill and to satisfy the engineering requirements for an expansion. Addressing the compliance issues will include the preparation of a remedial or compliance plan. The



compliance plan will include a scope of work or a "road map" of the tasks that will be completed to bring the Site into compliance. Based on CRA's understanding of the Site it is anticipated that the compliance plan will include the following tasks:

- additional investigation, including additional monitoring wells and hydraulic testing;
- update the existing hydrogeological assessment of the Site, based on the findings of the additional investigation;
- prepare a water management plan, based on the hydrogeological assessment, this will be completed to address improvements to surface water drainage and the need for additional extraction wells to reduce production of impacted groundwater and reduce the migration of impacted groundwater;
- an impact assessment based on the updated hydrogeological assessment and water management plan, to determine the contaminant attenuation capacity of the buffer property owned by the Municipality, and the required contaminant attenuation zone;
- establishment of a formalized contaminant attenuation zone (CAZ) including the properties adjacent to the Site owned by the Municipality of McDougall and the acquisition of additional property as required; and
- identification of any Official Plan amendments necessary to accommodate the CAZ.

The estimated cost to complete the compliance plan is \$60,000 to \$75,000.

## 6.0 EXPANSION DESIGN CRITERIA

### 6.1 FILL RATE ALTERNATIVES

At the direction of the Municipality of McDougall the following fill rate and/or Site usage alternatives were considered. The fill rates were utilized to determine the size of expansion required to provide a 25-year life and to determine the potential tipping fee revenue available over the life of the 25-year expansion.

- **Alternative 1** – use of the expanded Site by the Municipality of McDougall, commercial users, Carling and The Archipelago.
- **Alternative 2** – use of the expanded Site by the Municipality of McDougall, commercial users, Carling and The Archipelago and the Town of Parry Sound.
- **Alternative 3** – use of the expanded Site by the Municipality of McDougall, commercial users, Carling, The Archipelago and the Township of Sequin.
- **Alternative 4** – use of the expanded Site by the Municipality of McDougall, commercial users, Carling, The Archipelago, the Town of Parry Sound and the Township of Sequin.
- **Alternative 5** - use of the expanded Site exclusively by the Municipality of McDougall alone (permanent and seasonal residents only, no commercial or MCS waste).

### 6.2 DESIGN CONSIDERATIONS

#### 6.2.1 WASTE QUANTITY PROJECTIONS

The following table provides a summary of the total waste quantity projections (tonnes) for the 25-year expansion period, provided in Appendix A for each of the alternatives.

<i>Contributor</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
McDougall	54,200	54,200	54,200	54,200	54,200
Archipelago	41,464	41,464	41,464	41,464	0
Carling	31,086	31,086	31,086	31,086	0
Commercial	114,007	114,007	114,007	114,007	0
Sequin	0	0	94,485	94,485	0
Parry Sound	0	72,000	0	72,000	0
<b>Total</b>	<b>240,758</b>	<b>312,758</b>	<b>335,243</b>	<b>407,243</b>	<b>54,200</b>

### 6.2.3 LANDFILL DESIGN CRITERIA

The design criteria for the proposed expansion are presented in Table 6.1. The design criteria are reflective of the existing engineered landfill and represent current landfill industry standards as outlined in Ontario Regulation 232/98. Usage of these design criteria, as a minimum, will ensure that the landfill will function in an environmentally acceptable manner. The major components of the landfill include buffer zone, liner, leachate collection system, soil requirements, landfill capacity, final contours, final cover, and surface water management systems.

The location of the expansion will be to the east of the existing landfill as indicated on Figure 2. The expansion would 'piggy back' over a portion of the east side of the existing landfill and extend to the east to the distance required to provide the needed volume. For purposes of cost estimation it was assumed that the expansion would extend to a similar height as the existing landfill.

### 6.2.4 VOLUME ESTIMATES

The following table provides an estimate of the air space required to provide a 25-year site life for the previously calculated waste generation rate for each Alternative. The air space was calculated assuming a relative compacted waste density of 0.6 tonne of waste per cubic metre of landfill consumed.

<i>Alternative</i>	<i>Tonnage</i>	<i>Air Space</i>
Alternative 1	240,758 tonnes	401,263 m <sup>3</sup>
Alternative 2	312,758 tonnes	521,263 m <sup>3</sup>
Alternative 3	335,243 tonnes	558,738 m <sup>3</sup>
Alternative 4	407,243 tonnes	678,738 m <sup>3</sup>
Alternative 5	54,200 tonnes	90,333 m <sup>3</sup>

## 7.0 COST ESTIMATES

### 7.1 GENERAL

A cost estimate has been prepared for each of the five alternatives to help evaluate and compare the alternatives. The cost estimate includes costs for all expenditures which are reasonably anticipated during the development, operational and closure periods of the proposed expansion. The cost estimate includes approvals, development, operation (including leachate management), maintenance and monitoring, closure, and post-closure monitoring and maintenance costs for each alternative. The cost estimate also includes a contingency for a consolidated hearing, if required.

### 7.2 DETAILED COST CALCULATIONS

A summary of the approvals, development, maintenance and monitoring, closure and post-closure monitoring and maintenance costs for each of the four expansion alternatives in 2003 dollars are presented in Table 7.1A. Details of the individual costs for each of the alternatives are presented on the tables included in Appendix B.

Table B.1 presents the EA approval costs and reflects the EA process described in Section 4.1. The EA approval cost for each of the four expansion alternatives is estimated to be the same. For each alternative a contingency allowance of \$50,000 has been included to cover additional work which may be required by the MOE as a result of core review team and/or public comments.

Table B.2 presents the EPA approval costs as mentioned in Section 4.2. These costs include additional hydrogeological assessment (including investigation) and preparation of EPA level Hydrogeological Assessment Report, Site design and supporting documentation, public consultation and completion of Section 27 Application and Application Fees. As of October 1, 1998, Section 27 C of A applications are subject to fees in accordance with Ontario Regulation 363/98 for both private and public sector. For all five expansion alternatives being considered at the Site, the Section 27 C of A application fees are \$22,700.

Table B.3 presents the OWRA approvals. The OWRA approvals include surface water management plan, leachate collection system and leachate treatment facility. OWRA applications are subject to fees in accordance with Ontario Regulation 364/98. The OWRA application fees for all three alternatives is estimated to be \$8,200. As such, the cost estimate for each alternative is the same, (\$183,200).

Table B.4 provides the site development costs. The Site development costs include capital costs for engineering, construction, and contract administration. The unit costs provided in the tables are based on representative unit cost awarded for similar landfill construction projects. In addition to the capital cost, an allowance equal to 15 percent of capital cost is included for mobilization, demobilization, bonds and insurance, and additional requirements established during final design phase. An allowance of 20 percent is included for engineering. The engineering allowance includes contract documents, tender documents, contract administration, construction inspection and materials testing. The cost of site development is the major variable in the assessment and increases in direct proportion to the volume of the proposed expansion.

Table B.5 presents the annual operation, monitoring and maintenance cost for each of the alternatives. These costs include the annual operation of the landfill and leachate treatment and collection systems, the annual monitoring program and maintenance and operation of leachate collection system and storm water management facilities, and an allowance for maintenance and repair. The annual monitoring program costs are based on the existing monitoring program with the addition of approximately five groundwater monitoring wells. This cost includes an allowance for operation, maintenance, and calibration of equipment, and flushing and vacuuming leachate piping. Maintenance and operations of the storm water management facility includes removal of sediment from ditching and pond and erosion repairs. The allowance for site maintenance and repair includes the final cover system, roadways, fencing and monitoring wells. The operation costs are the same for all the alternatives, however in Alternative 5 the Municipality of McDougall may wish to restrict the operating hours of the Site, thereby reducing the operating cost.

Table B.6 presents the closure costs for each of the alternatives. The closure costs assume the final cover design detailed on Table 6.1. An allowance of 15 percent for mobilization, demobilization, bonds and insurance and 20 percent for engineering has been included in the total closure costs. The cost of closure is the other variable in the assessment and increases in direct proportion to the volume of the proposed expansion.

Table B.7 presents the post-closure monitoring and maintenance costs for each of the alternatives. The post-closure monitoring represents the existing monitoring program optimized over the life of the expansion. The maintenance costs includes the leachate collection system and storm water management facilities and allowance for maintenance and repair of the final cover system, roadways, fencing and monitoring wells.

Table B.8 presents the contingency consolidated hearing costs. A consolidated hearing may be required if extensive public objection is evident during the EAA/EPA Approval process. The cost for the consolidated hearing includes preparation for and attendance by engineers, development of conditions of approval and an allowance for peer review and legal assistance. The consolidated hearing cost for the five alternatives is estimated to be the same.

### **7.3        PRESENT WORTH**

In order to compare the total cash value of the five expansion alternatives the present worth of the four alternatives was calculated. The present worth is the total amount that a series of future payments is worth now in 2003 dollars accounting for inflation and return on investment. The present worth calculations were completed using an annual interest rate of 5 percent and an inflation rate of 2 percent.

A summary of the present worth costs for each of the five expansion alternatives are presented in Table 7.1B.

The detailed present worth calculations for the five expansion alternatives are presented on Tables B.9, A through E, respectively. The present worth calculation apportions the previously calculated costs over the active and post-closure phases of the expansion. The calculation utilizes a 3-year period for approvals, followed by the 25-year site life, made up of 5 – 5-year landfill cells, and 25-years of post-closure care.

### **7.4        SUMMARY**

The data presented in the cost calculation tables indicates the following:

- the up-front expansion costs (e.g. ToR, EA and EPA approvals) are the same or very similar for each alternative;
- there is little or no variation in operating costs among the alternatives;
- the greatest variation in cost for the five scenarios lies in the cost of site development, and is a direct reflection of the physical size of the expansion; and
- the present worth costs, which more closely reflect the actual cost to the Municipality of McDougall, are approximately 70% of the 2003 dollar costs.

## 8.0 COST ASSESSMENT

### 8.1 REVENUE

The amount of revenue that can be generated by the landfill expansion will be determined by the Site usage Alternative chosen and the tipping fee charged. The tipping fee charged will be determined in accordance with Ontario Regulation 244/02. The tipping fee will include full cost recovery including a \$2 per tonne contribution to a Future Landfill Development Reserve Fund. As a result, the tipping fee will include the per tonne cost calculated previously which includes development, operation and monitoring, as well as costs for contingency and future landfill development. Also included is a 50 cent per tonne contribution to a contingency fund. While a contingency fund is required by Regulation 232/98 for private sites but not public sites, in CRA's experience such a fund is highly recommended to enable the municipality to deal with unexpected future compliance issues. This will result in estimated tipping fees as indicated on Table 8.1.

Based on the estimated tipping fees provided in Table 8.1 the following table provides the tonnage and resulting tipping fee revenue that can be expected for each Alternative.

<i>Item</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
Tonnage (other than McDougall)	186,558	258,558	281,043	353,043	0
Tipping Fee	\$61.06	\$52.42	\$51.17	\$44.39	0
Revenue	\$11,391,232	\$13,553,610	\$14,380,970	\$15,671,579	0

As noted previously, Regulation 244/02 (Fees and Charges) under the Municipal Act must be considered in evaluating the potential revenue generated from tipping fees. is. The regulation states, with regard to waste:

#### "Waste

4. (1) A municipality or local board does not have the right to impose fees or charges on a person under Part XII of the Act which relate to the management of waste except on a person who, directly or by means of and agent, disposes of the waste,
  - (a). through a waste collection service or at a waste management facility of the municipality or local board, as the case may be; or

(b). through a waste collection service or at a waste management facility of any other municipality or local board to which the municipality or local board imposing the fee or charges pays costs related to the management of waste.

(2) In subsection (1), the management of waste includes the collection, disposal, reuse and recycling of waste.

(3) Subsection (1) does not prohibit a municipality from imposing fees or charges on a person which relate to the clean up or collection of litter or other waste which has been illegally disposed of on any land."

(Under the Municipal Act, a 'person' includes a municipality, local board and the Crown, but does not include a corporation).

The effect of Regulation 244/02 on the Municipality of McDougall's potential waste related revenue stream is that the municipality can charge tipping fees to municipal users of the Site only at a level sufficient to recover the costs of providing the landfill service. That is, the municipality can recover costs relating to the planning, design, approval, operation, closure and post-closure as well as contributions to the contingency fund, but not those costs plus a "profit" (e.g. an extra level of charge that may be redirected to other municipal services). The regulation does not restrict the tipping fees that may be charged to commercial users of the Site.

Notwithstanding the intent of the regulation, though, in practical terms most municipalities recognize that "real" tipping fees (i.e. fully reflecting all true costs relating to providing the landfill service) would likely be high. As a result they tend to charge fees that conform more or less to "market" conditions at other landfills in the region providing comparable service. Given that those fees will still likely be well below what could be charged, compliance with the regulation is assured.

As for the lack of restriction on fees for commercial users, again, the commercial "market" would not likely tolerate "real" fees, and would find less expensive waste disposal services elsewhere, with the result that such tipping fee revenue would be lost to the municipality. Consequently, most municipalities set commercial tipping fees that, while somewhat higher than for domestic users, are still reflective of "market" conditions in the area.



For illustrative purposes some selected examples of tipping fees currently being charged at other small and medium municipal landfills in the Parry Sound, Muskoka, Sudbury, Nipissing and Cochrane Districts are provided in Table 8.1.1.

## 8.2 COSTS

In order to assess the total cost of the five Site usage Alternatives CRA calculated the estimated net costs. The estimated net cost to the Municipality of McDougall can be calculated using the total costs provided on Table 7.1A and the revenue provided in Section 8.1 as follows:

<i>Item</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
Total Cost (2003\$)	\$14,098,013	\$15,614,408	\$16,315,380	\$17,061,053	\$11,496,450
Revenue (2003\$)	\$11,391,232	\$13,553,610	\$14,380,970	\$15,671,579	0
<b>Net Cost (2003\$)</b>	<b>\$2,706,781</b>	<b>\$2,060,798</b>	<b>\$1,934,410</b>	<b>\$1,389,474</b>	<b>\$11,496,450</b>

In order to assist in assessing the per tonne costs (2003\$) for the expansion indicated on Table 7.1, the existing operation cost can be considered. Based on budgetary costs provided by the Municipality of McDougall the present annual cost of operating the Site, excluding capital purchases is approximately \$300,000 for 8,000 tonnes of waste. This gives a per tonne cost in 2003 dollars of approximately \$37.50 per tonne. This contrasts with the estimated per tonne costs for expansion of \$41.89 to \$212.11.

## 8.3 SUMMARY

The cost assessment indicates that the greater the tonnage of waste, the lower the cost to the Municipality of McDougall. The cost assessment indicates that the largest expansion alternative, Alternative 4, defrays the greatest proportion of the expansion cost and results in the largest reduction in cost to the Municipality of McDougall.

## 9.0 CONCLUSIONS AND OPINION

### 9.1 COMPLIANCE

While there have been some complaints from the public about litter in recent years there do not appear to be widespread issues among people living near the Site or along the principal access route (McDougall Road) to Highway 69. The key Site issues relate to groundwater and surface water quality and the need to bring off-Site impacts into regulatory compliance.

Preparation of a compliance plan, based on a complete technical evaluation of the Site and detailed discussions with MOE personnel, is recommended as a precondition to a decision by Council to proceed with an expansion.

It is CRA's professional opinion that all of the current on-Site and off-Site compliance issues can be remedied to bring the Site into compliance before launching an expansion initiative. As noted previously, the cost to complete the compliance plan is \$60,000 to \$75,000 and could be completed within 6 months of commencement.

### 9.2 SITE EXPANSION POTENTIAL

In reviewing the five Site usage alternatives described in this report it is evident that, from a technical, environmental and approvals perspective, the Site could accommodate any or all of them. It is CRA's professional opinion that:

- there is enough physical space at the Site to accommodate the alternative resulting in the greatest air space, Alternative 4;
- all of the alternatives could be designed to meet all of the relevant approvals discussed in the report; and
- the Site could be constructed and operated in accordance with current MOE policies, guidelines and regulations.

Ironically, while the smallest expansion alternative (Alternative 5 – McDougall alone) would ensure that McDougall residents would be guaranteed landfill capacity for the full 25 year operating life of the Site, it would also be the worst-case scenario in terms of cost (\$11,496,450) and potential revenue (virtually \$0). With only very small quantities of local, non-curbside collected waste being brought to the Site tipping fee revenue would be insignificant, and probably not enough to offset day-to-day operating costs. A

fully local Site would, therefore, be a costly proposition for the municipality, which would have to cover virtually all of the waste disposal costs from 'internal' revenue sources (e.g. the municipal tax base) and some special purpose provincial grants.

Expansion of the Site under any of Alternatives 1 through 4 would therefore, be the most cost-beneficial approach. Costs of planning, design, approvals and construction for the expansion could be at least partially recovered through tipping fees, ongoing operating costs would be spread among users (lowering McDougall's share) as would costs for closure, post closure care and per/tonne contributions to a contingency fund. The cost-benefit would also be improved since the ability to charge higher tipping fees, as proscribed by Reg. 244/02, is allowed for commercial customers only.

In conclusion, it is CRA's professional opinion that, once the Site is brought into compliance, the Municipality's best option, having gained commitments from potential users (to establish the 'need' for the expansion under the EA process), would be to seek approval for the largest capacity identified under Alternative 4.

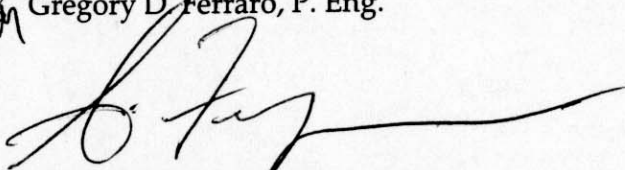
If, at some point in the future, one or more users decide to stop using the Site;

- other potential users could be sought;
- Site use could be extended beyond the 25-year design life; or
- the C. of A. could be amended to remove a number of approved cells. (The last option should be avoided if at all possible; approved landfill capacity in Ontario is at a premium and unanticipated 'excess' capacity at the McDougall could be a source of future revenue for the municipality).

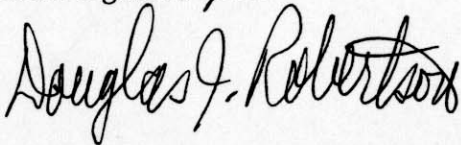
All of Which is Respectfully Submitted,  
CONESTOGA-ROVERS & ASSOCIATES



for Gregory D. Ferraro, P. Eng.



Scott Ferguson, C.E.T.



Douglas J. Robertson, B.A., M.C.I.P., R.P.P.

## **REFERENCES**

Ince, M.K., and Associates, March 2002, "Development, Operations and Monitoring 2001 Annual Report".

Ontario Ministry of the Environment, April 1994, "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities".

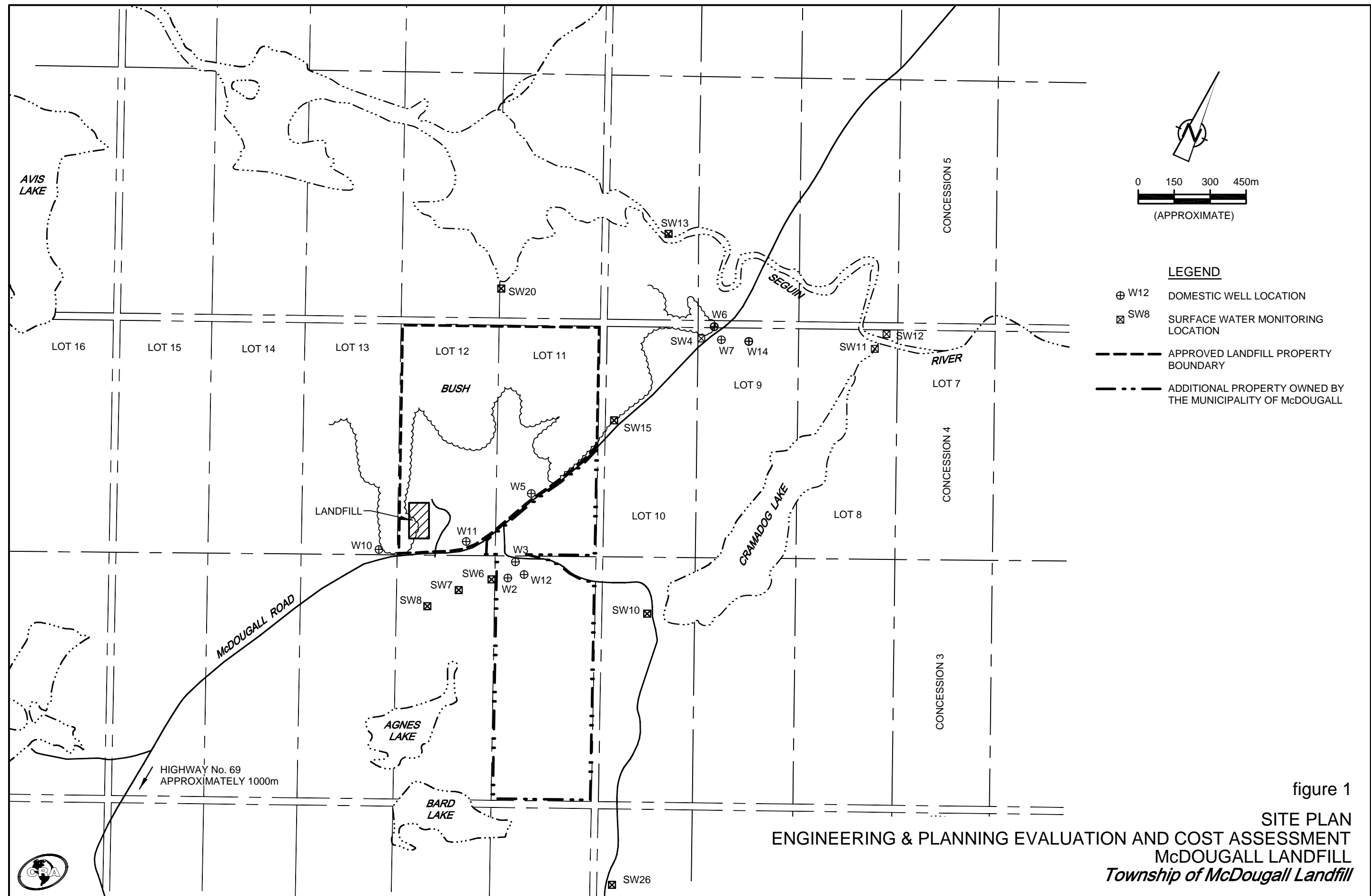
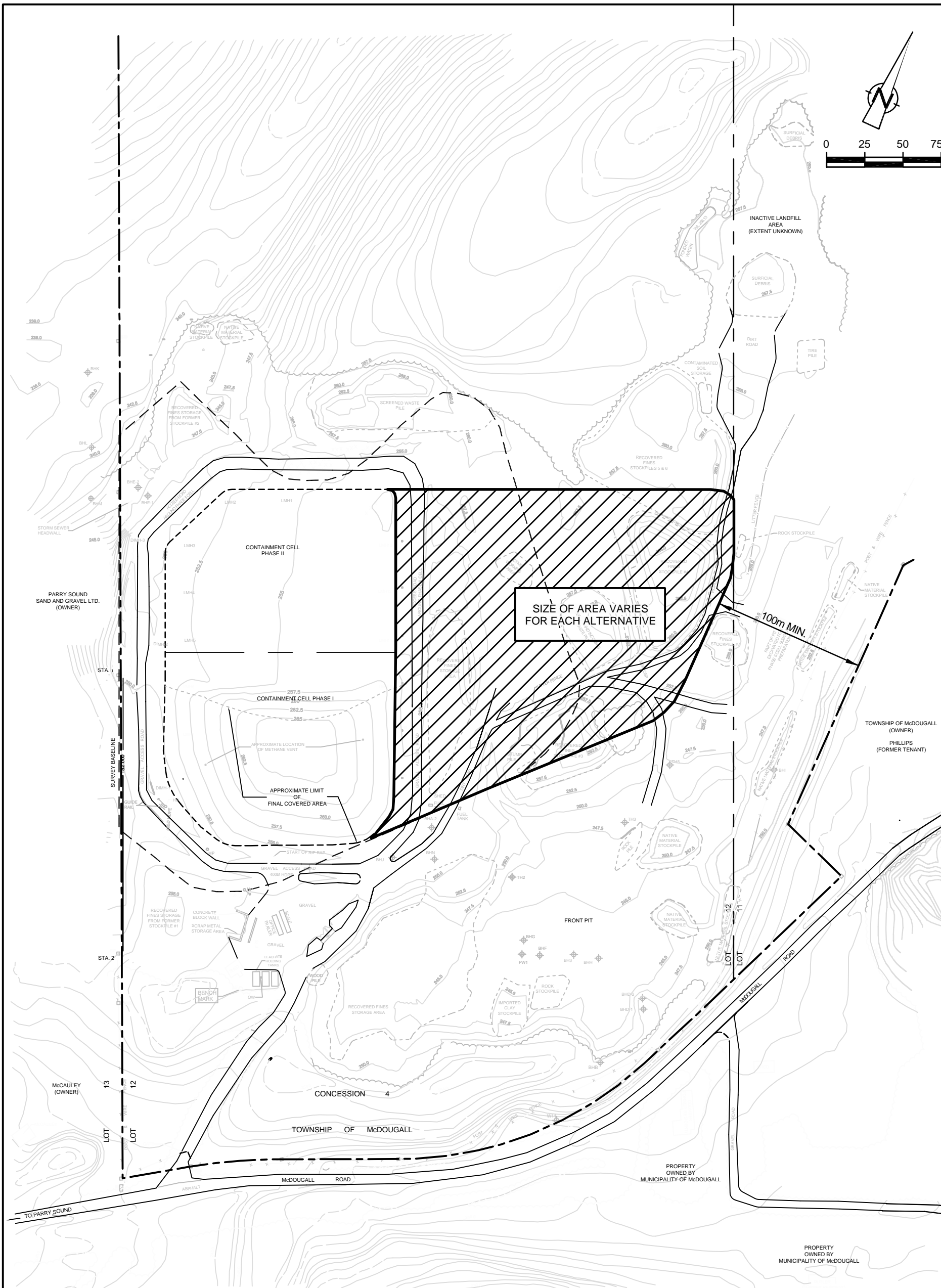


figure 1

**SITE PLAN**  
**ENGINEERING & PLANNING EVALUATION AND COST ASSESSMENT**  
**McDOUGALL LANDFILL**  
*Township of McDougall Landfill*



- LEGEND**
- — — — — PROPERTY BOUNDARY
  - - - - - ORIGINAL LANDFILL LIMIT
  - - - - - EXISTING LANDFILL LIMIT
  - PROPOSED EXPANSION AREA

figure 2  
**LANDFILL PLAN**  
**ENGINEERING & PLANNING EVALUATION AND COST ASSESSMENT**  
**McDOUGALL LANDFILL**  
*Municipality of McDougall*



**TABLE 6.1**  
**LANDFILL DESIGN CRITERIA**  
**ENGINEERING & PLANNING EVALUATION AND COST ASSESSMENT**  
**MCDUGALL LANDFILL SITE**

<i>Item</i>	<i>Criteria</i>
• On-Site buffer zone	• minimum 100 m width for operational, maintenance monitoring control and corrective measures; nuisance controls; and physical separation
• Maximum height of existing Landfill	• approximately 25 m
• Maximum height of expansion	• similar to existing
• Minimum base elevation of landfill	• similar to existing, approximately 3 m below ground surface
• Soil requirements	<ul style="list-style-type: none"> <li>• daily and interim cover soil obtained from on-Site borrow area(s)</li> <li>• low permeability soil obtained from off-Site sources</li> <li>• topsoil obtained from off-Site sources</li> </ul>
• Required site capacity (Refuse and daily cover soils)	• suitable to accommodate 25 year site life.
• Maximum side slopes	• 4:1 (25%)
• Minimum side slopes	• 20:1 (5%)
• Liner	<ul style="list-style-type: none"> <li>• 0.9 m of low permeability soil</li> <li>• 1.5 mm High Density Polyethylene geomembrane</li> <li>• geotextile drainage net</li> <li>• geotextile filter fabric</li> <li>• 0.45 m protective soil layer</li> </ul>
• Leachate collection system	<ul style="list-style-type: none"> <li>• perimeter collection pipe in clear stone drainage media</li> <li>• underdrain collector at 25 m centres in clear stone drainage media</li> <li>• pump station</li> </ul>
• Final cover	<ul style="list-style-type: none"> <li>• 0.15 m vegetated topsoil</li> <li>• 0.6 m low permeability soil</li> </ul>
• Surface water control systems	<ul style="list-style-type: none"> <li>• ditch 25-year design storm</li> <li>• pond 5-year design storm</li> </ul>



**TABLE 7.1 A**  
**COST SUMMARY (2003 \$)**  
**ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT**  
**McDOUGALL LANDFILL SITE**

<i>Activity</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
Approvals	\$607,650	\$607,650	\$607,650	\$607,650	\$607,650
Site Development	\$4,399,500	\$5,547,750	\$6,064,650	\$6,626,250	\$2,408,475
Operation, Maintenance and Monitoring	\$7,033,000	\$7,033,000	\$7,033,000	\$7,033,000	\$7,033,000
Closure	\$920,363	\$1,288,508	\$1,472,580	\$1,656,653	\$309,825
Post-closure monitoring and maintenance	\$1,137,500	\$1,137,500	\$1,137,500	\$1,137,500	\$1,137,500
<b>Total</b>	<b>\$14,098,013</b>	<b>\$15,614,408</b>	<b>\$16,315,380</b>	<b>\$17,061,053</b>	<b>\$11,496,450</b>
<b>Total Unit Cost (2003\$/tonne)</b>	<b>\$58.56</b>	<b>\$49.92</b>	<b>\$48.67</b>	<b>\$41.89</b>	<b>\$212.11</b>
Contingency					
Consolidated Hearing	\$205,000	\$462,702	\$462,702	\$462,702	\$462,702
<b>Total Unit Cost including Contingency</b>	<b>\$59.41</b>	<b>\$51.40</b>	<b>\$50.05</b>	<b>\$43.03</b>	<b>\$220.65</b>

TABLE 7.1 B

**COST SUMMARY (PRESENT WORTH)  
ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT  
McDOUGALL LANDFILL SITE**

<i>Activity</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
Approvals	\$598,969	\$598,969	\$598,969	\$598,969	\$598,969
Site Development	\$3,478,047	\$4,306,082	\$4,678,834	\$5,083,819	\$2,038,924
Operation, Maintenance and Monitoring	\$4,594,355	\$4,594,355	\$4,594,355	\$4,594,355	\$4,594,355
Closure	\$541,811	\$758,535	\$866,897	\$975,259	\$182,392
Post-closure monitoring and maintenance	\$354,196	\$354,196	\$354,196	\$354,196	\$354,196
<b>Total</b>	<b>\$9,567,378</b>	<b>\$10,612,138</b>	<b>\$11,093,251</b>	<b>\$11,606,599</b>	<b>\$7,768,836</b>
<b>Total Unit Cost (Present Worth \$/tonne)</b>	<b>\$39.77</b>	<b>\$33.93</b>	<b>\$33.09</b>	<b>\$28.50</b>	<b>\$143.34</b>
Contingency					
Consolidated Hearing	\$193,453	\$346,390	\$346,390	\$346,390	\$346,390
<b>Total Unit Cost including Contingency (Present Worth)</b>	<b>\$40.54</b>	<b>\$35.04</b>	<b>\$34.12</b>	<b>\$29.35</b>	<b>\$149.73</b>

**TABLE 8.1**  
**TIPPING FEE ESTIMATE (2003 \$)**  
**ENGINEERING/PLANNING EVALUATION AND COST ASSESSMENT**  
**McDOUGALL LANDFILL SITE**

<i>Activity</i>	<i>Alternative 1 \$/tonne</i>	<i>Alternative 2 \$/tonne</i>	<i>Alternative 3 \$/tonne</i>	<i>Alternative 4 \$/tonne</i>	<i>Alternative 5 \$/tonne</i>
Site Development, Operation, Maintenance, Monitoring, Closure and	\$58.56	\$49.92	\$48.67	\$41.89	NA
Contingency Fund <sup>1</sup>	\$0.50	\$0.50	\$0.50	\$0.50	NA
Future Landfill Development Fund	\$2.00	\$2.00	\$2.00	\$2.00	NA
<b>Total</b>	<b>\$61.06</b>	<b>\$52.42</b>	<b>\$51.17</b>	<b>\$44.39</b>	<b>\$0.00</b>

Note:

1 - contingency costs required by Reg.  
232/98 for private landfills

**TABLE 8.1.1**

**SELECTED EXAMPLES OF LANDFILL TIPPING FEES**

<b>Location</b>	<b>Landfill Name</b>	<b>Tipping Fee</b>
Municipality of Magnetawan District of Parry Sound	Chapman LFS Croft LFS	\$100.00 per truck, agreement made at the time of request  No other details available, but they have recently created an official plan or by-law with possible fees within.
Town of Parry Sound		No information available
Municipality of Whitestone, District of Parry Sound	York St Site and Auld's Road Site	Non-Household waste fees: \$10.00-- for any large item \$ 5.00 for a one axle vehicle \$10.00 for a two axle vehicle \$ 5.00 for a one axle trailer \$10.00 for a two axle trailer \$10.00 for any freon unit certified \$40.00 for any freon unit not certified
North Bay	Merrick Landfill	Tipping Fees (Private Vehicles) Solid Waste (equivalent of 6 bags or less) - \$5.00 Solid Waste (over the equivalent of 6 bags e.g. half tonne truck or trailer - \$20.00 Appliances containing refrigerant substances (untagged) - \$25.00 Tipping Fees (Commercial Vehicles) Industrial/commercial/institutional sources - \$39.00/tonne Contaminated fill - \$20.00/tonne Organics free of contaminants already chipped wood/grass/leaves - No Charge Processed biomedical waste - \$100.00 plus applicable tipping fee Tires 16" - \$2.00 plus vehicle fee Tires over 16" - \$5.00 plus vehicle fee Tires 22" or greater - \$156.00/tonne Tires 22" or greater split and cut into quarters - \$78.00/tonne  All commercial vehicles (regardless of size) - \$37.00/M.T Private vehicles with more than 6 bags - \$20.00/Load Vehicles with small quantities (Equivalent to six bags or less) - \$5.00/Load Untagged appliances with refrigerant substance - \$25.00/ <i>Appliance + Tipping Fee</i>
Hearst	On Hwy 583 North	A tipping fee of \$50 per truckload is charged for tandem trucks and commercial refuse boxes, which includes the cost for spreading and covering.

**TABLE 8.1.1**

**SELECTED EXAMPLES OF LANDFILL TIPPING FEES**

Kapuskasing	Moonbeam Landfill	<p>The following items are all subject to a tipping fee: 1. Freon (CFCs) Appliances: \$30.00/item</p> <p>2. Scrap Tires up to 34 inches \$5.00/tire over 34 inches (max. 49 inches) \$20.00/tire over 49 inches not accepted 3.</p> <p>Construction and Demolition Waste \$12.50/tonne</p> <p>Note: Loads under 500 kg net weight (0.5 tonne) will be exempted from the tipping fee.</p>
Timmins	DeLoro Landfill Tisdale transfer station, Evelyn Township disposal site, German Township disposal site, Robb Township disposal site, Thornloe Township disposal site	<p>Fees:</p> <p>i) Any vehicle or trailer who bed area exceeds 32 sq. ft. and has two or more sides exceeding 1 ft 6" above the bed - \$40.00 (1986-4585).</p> <p>Any vehicle or trailer who bed area exceeds 64 sq. ft. without sides - \$40.00 (1986-4585)</p> <p>ii) Five (5) tonne truck or vehicle with sides or with trailer with sides whose bed area exceeds 64 sq. ft. - \$50.00 (1996-4585)</p> <p>iii) Tandem Truck - \$100.00</p> <p>iv) Triaxle truck - \$125.00</p> <p>v) Semi-trailer - \$150.00</p> <p>vi) Four (4) to six (6) yard containers - \$50.00</p> <p>vii) Twenty (20) yard containers - \$100.00</p> <p>viii) Thirty (30) to Forty (40) yard containers - \$125.00</p> <p>ix) Asbestos packaged in accordance with M.O.E.E. Regulation 347 - Minimum charge \$30.00 - per cubic yard - \$20.00</p> <p>Vehicles: i) Each unit - \$20.00 each plus any charges as per Section 5</p> <p>Tires: a) 0" - 34" - \$5.00</p> <p>b) 35" - 49" - \$25.00</p> <p>c) 50" - 58" - \$70.00</p> <p>d) Over 58" - \$100.00</p>
New Liskeard		<p>Landfill Site Tipping Fees:</p> <p>The existing 2 metre exemption for residential garbage by Town of New Liskeard residents will be eliminated. A new category with a rate of \$2.00 per cubic metre (minimum 1 cubic metre) will be applied to all commercial/residential garbage entering the landfill site. This will include all commercial garbage bins whether it is collected by a collection contractor or a private business. The rate will be applied effective April 1st 2003.</p>

**TABLE 8.1.1**

**SELECTED EXAMPLES OF LANDFILL TIPPING FEES**

District of Muskoka	Dorset LFS Sinclair LFS Dwight LFS Huntsville LFS Gravenhurst LFS Bracebridge LFS	Residential (i) Facility with Weigh Scales Vehicles with three (3) bags or less* no charge Vehicle exceeding three (3) bags \$85.00/Tonne General Residential \$85.00/Tonne (ii) Facility without Weigh Scales Vehicles with three (3) bags or less* no charge Vehicle exceeding three (3) bags \$1.00 per bag over 3 1/2 tonne truck or trailer \$15.00 1/2 tonne truck or trailer (heaped) \$25.00 Commercial: i) Facility with Weigh Scales General \$90.00 / Tonne Wood / Brush \$90.00 / Tonne Chippable Wood / Brush \$60.00 / Tonne Compostable Waste \$40.00 / Tonne Contaminated Soil / Waste \$140.00 / Tonne (ii) Facility without Weigh Scales 1 Rear Axle - Stake Truck \$80.00 1 Rear Axle - Dump Truck \$160.00 2 Rear Axle - Dump Truck \$240.00 Contaminated Soil / Waste (2 Rear Axle Dump Truck) \$350.00 Construction: i) Facility with Weigh Scales General \$90.00 / Tonne Wood / Brush \$90.00 / Tonne Chippable Wood / Brush \$60.00 / Tonne Compostable Waste \$40.00 / Tonne Contaminated Soil / Waste \$140.00 / Tonne (ii) Facility without Weigh Scales 1 Rear Axle - Stake Truck \$80.00 1 Rear Axle - Dump Truck \$160.00 2 Rear Axle - Dump Truck \$240.00 Contaminated Soil / Waste (2 Rear Axle Dump Truck) \$350.00
Sudbury Region – City of Greater Sudbury	Sudbury Site Valley East Site Rayside-Balfour Site Walden Site	Commercial: \$ 72.00/ tonne Residential: anything under 1 tonne is free, over that and the rate is as above \$ 2.00 per tire for residential fee
Espanola	Bass Lake Road C/o Dodge Haulage	Private Site Commercial and Construction waste: \$16.91/metre, White goods free Tires: \$3 for car, \$5 for larger
Kearney	Sand Lake LFS	Commercial and Construction waste: Trailers \$25.00 Single Axle: \$50.00 Tandem: \$100.00 40 yard container truck: \$200.00 Asphalt & roofing: \$90.00/tonne White Goods - \$5.00 each item

**TABLE 8.1.1**

**SELECTED EXAMPLES OF LANDFILL TIPPING FEES**

Powassen	Proudfoot Road	Commercial & Construction: Trailer: \$21.00 Tandem: \$55.00 20 cu yards of wood or steel \$85.00 Residential car load: \$11.00 or ½ \$7.00 Tires: \$2 – 20
Mattawa	Papineau – Cameron Township	Commercial & Construction: Trailer - \$20.00 1 tonne truck - \$20.00 5 tonne truck - \$50.00 Tandem - \$100.00 Triaxle - \$150.00 Residential – \$4-15 depending on load Tires - \$4-7

## APPENDIX A

### WASTE QUANTITY PROJECTIONS



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TABLE A.2	PROJECTED ANNUAL SEASONAL POPULATION AND WASTE
TABLE A.3	YEAR ROUND POPULATION GROWTH RATE
TABLE A.4	SEASONAL POPULATION GROWTH RATE
TABLE A.5	PROJECTED ANNUAL COMMERCIAL AND MCS WASTE

## 1.0 WASTE QUANTITY PROJECTIONS

The purpose of this section is to provide estimates of municipal solid waste (MSW) quantities that might be expected to be generated by people in the West Parry Sound area between 2001 (the year of most recent complete population and waste data) and 2031 (i.e., a 30-year period). All estimates are in tonnes of waste

As requested by the Municipality, estimates of waste generation rates were based on the following five alternatives:

- **Alternative 1** - use of the expanded Site exclusively by the Municipality of McDougall, commercial users, Carling and The Archipelago.
- **Alternative 2** - use of the expanded Site by the Municipality of McDougall and the Town of Parry Sound.
- **Alternative 3** - use of the expanded Site by the Municipality of McDougall and the Township of Sequin.
- **Alternative 4** - use of the expanded Site by the Municipality of McDougall, the Town of Parry Sound and the Township of Sequin.
- **Alternative 5** - use of the expanded Site exclusively by the Municipality of McDougall alone (permanent and seasonal residents only, no commercial or MCS waste).

It should be noted that the Municipality of McDougall includes projected waste quantities from current commercial users, Carling and Archipelago.

## 1.1 METHODOLOGY

Waste generation estimates for each year from 2001 to 2031 were prepared using data from a number of sources including:

- municipal directories;
- Statistics Canada data; and
- data received from the Municipality's Planner, John Jackson.

### **1.1.1      ASSUMPTIONS**

In completing the population and waste projections a number of assumptions were made. These include:

- rates of population increase are as shown on Table A.3 (permanent residents) and Table A.4 (seasonal residents, derived from cottage building permit data and derived using an assumed 4 persons/cottage unit).
- a per capita waste generation rate of 0.6 tonnes per person per year by permanent residents. This rate is a "rule of thumb" for waste generation in rural, seasonal and northern communities. It is recognized that the rate is not consistent among all residents and may vary seasonally throughout a given year. Also, it is a gross (or most conservative case) rate that, in terms of waste arriving at the landfill site, will be influenced by increased or decreased levels of participation in municipal waste diversion programs and other personal diversion activities (e.g. backyard burning, composting). It is, nevertheless, a reasonable basis for estimating the quantities of waste that may be generated by area residents and businesses over the next three decades.
- a per capita waste generation rate of 0.15 tonnes per person per year by seasonal residents. This rate assumes a conservatively high average occupancy rate of 90 days/year (i.e. weekends from Victoria Day weekend to end of June; all of July and August and weekends from Labour Day to Thanksgiving) was assumed. If that assumption is higher than actual numbers it will be offset by seasonal visitors in the snowmobiling season.

If all estimated seasonal residents are present during  $\frac{1}{4}$  of the year, and the assumed permanent waste generation rate is 0.6 tonnes/person/year, then the rate for seasonal residents would be 0.15 tonnes (i.e. 150 kg) per person per year.

- continuation of public, private and institutional waste diversion programs in the subject municipalities will continue at a rate of 25 percent over the period 2001 – 2031.

### **1.1.2      WASTE GENERATION ESTIMATION PROCESS**

Permanent and seasonal population data for 2001 were used as the base for estimation of the following three decades. The annual growth rates were then applied to the base population numbers to develop annual population data.

Waste quantity estimates were then developed using the 0.6 tonne/capita (permanent) and derived 0.15 tonne/capita (seasonal) waste generation rates noted above.

## **1.2        DISCUSSION OF DATA**

Population projections (and the related waste quantity estimates) for this study were developed for each year from 2001 to 2031 (to ensure that each year's compound growth rate was captured). The resulting waste quantities were then summed to obtain a total waste quantity that might be anticipated over the 25-year expansion of the Site (2006 to 2031) for each of the five alternatives noted above.

Table A.1 illustrates the projected annual year round population and waste estimates for the municipalities of McDougall, Parry Sound, The Archipelago, Carling and Seguin.

Table A.2 illustrates the projected annual seasonal population and waste estimates for the municipalities of McDougall, Parry Sound, The Archipelago, Carling and Seguin.

Table A.3 illustrates the year round population growth rate for the West Parry Sound area (Jackson, 2003).

Table A.4 illustrates the seasonal population (based on seasonal dwelling records) growth rate for the West Parry Sound area (Jackson, 2003).

Table A.5 illustrates the projected annual commercial waste quantity. These data are not used for this analysis but are provided here for information.

## **1.3        INTERPRETATION OF DATA**

### **Alternative 1 – 240,758 tonnes**

The data provided on Table A.1 indicates that within the 25-year period 2006 to 2031:

- permanent residents in the Municipality of McDougall will generate approximately 58,172 tonnes of MSW;
- seasonal residents in the Municipality of McDougall will generate an estimated 14,095 tonnes of MSW;
- permanent residents in The Archipelago will generate approximately 7,878 tonnes of MSW;

- seasonal residents in The Archipelago will generate approximately 47,408 tonnes of MSW;
- permanent residents in Carling will generate approximately 21,653 tonnes of MSW;
- seasonal residents in Carling will generate approximately 19,796 tonnes of MSW;

This provides a total of approximately 169,002 tonnes. Assuming 25 percent of the generated waste is successfully diverted from the waste stream through 3Rs programs and other initiatives, this leaves 126,751 tonnes of waste to the landfill.

This can be added to the total commercial waste quantity of 114,007 tonnes to give the total tonnage of 240,758.

#### **Alternative 2 - 312,758 tonnes**

The data provided on Table A.1 indicates that within the 25-year period 2006 to 2031 permanent residents in the Town of Parry Sound will generate approximately 95,534 tonnes of MSW. The data provided on Table 2 indicates that seasonal residents in the Municipality will generate an estimated 467 tonnes. This provides a total of approximately 96,001 tonnes. Assuming 25 percent of the generated waste is successfully diverted from the waste stream through 3Rs programs and other initiatives the total waste to the landfill from the Town of Parry Sound between 2006 and 2031 is estimated at approximately 72,000 tonnes.

Adding this to the estimated waste quantity for McDougall provides an estimated total waste to the landfill from 2006 to 2031 of approximately 312,758 tonnes.

#### **Alternative 3 - 335,243 tonnes**

The data provided on Table A.1 indicates that within the 25-year period 2006 to 2031 permanent residents in the Township of Seguin will generate approximately 68,853 tonnes of MSW. The data provided on Table 2 indicates that seasonal residents in the Municipality will generate an estimated 57,127 tonnes. This provides a total of approximately 125,980 tonnes. Assuming 25 percent of the generated waste is successfully diverted from the waste stream through 3Rs programs and other initiatives the total waste to the landfill from the Township of Seguin between 2006 and 2031 is estimated at approximately 94,485 tonnes.

Adding this to the estimated waste quantity for McDougall provides an estimated total waste to the landfill from 2006 to 2031 of approximately 335,243 tonnes.

**Alternative 4 – 407,243 tonnes**

The total estimated waste to the landfill for McDougall, Parry Sound and Seguin from 2006 to 2031 is approximately 407,243 tonnes.

**Alternative 5 – 54,200 tonnes**

The total estimated waste to the landfill for McDougall, from 2006 to 2031 is approximately 54,200 tonnes.

TABLE A.1

**PROJECTED ANNUAL YEAR ROUND POPULATION AND WASTE  
WASTE QUANTITY PROJECTIONS  
MCDougALL LANDFILL SITE**

Year	Municipality									
	McDougall		Parry Sound		The Archipelago		Carling		Seguin	
	Population (2% growth)	Waste (tonnes)	Population (0% growth)	Waste (tonnes)	Population (0% growth)	Waste (tonnes)	Population (1.5% growth)	Waste (tonnes)	Population (1% growth)	Waste (tonnes)
2001	2,608	1,565	6,124	3,674	505	303	1,063	638	3,698	2,219
2002	2,660	1,596	6,124	3,674	505	303	1,079	647	3,735	2,241
2003	2,713	1,628	6,124	3,674	505	303	1,095	657	3,772	2,263
2004	2,768	1,661	6,124	3,674	505	303	1,112	667	3,810	2,286
2005	2,823	1,694	6,124	3,674	505	303	1,128	677	3,848	2,309
2006	2,879	1,728	6,124	3,674	505	303	1,145	687	3,887	2,332
2007	2,937	1,762	6,124	3,674	505	303	1,162	697	3,926	2,355
2008	2,996	1,797	6,124	3,674	505	303	1,180	708	3,965	2,379
2009	3,056	1,833	6,124	3,674	505	303	1,197	718	4,004	2,403
2010	3,117	1,870	6,124	3,674	505	303	1,215	729	4,044	2,427
2011	3,179	1,907	6,124	3,674	505	303	1,234	740	4,085	2,451
2012	3,243	1,946	6,124	3,674	505	303	1,252	751	4,126	2,475
2013	3,308	1,985	6,124	3,674	505	303	1,271	763	4,167	2,500
2014	3,374	2,024	6,124	3,674	505	303	1,290	774	4,209	2,525
2015	3,441	2,065	6,124	3,674	505	303	1,309	786	4,251	2,550
2016	3,510	2,106	6,124	3,674	505	303	1,329	797	4,293	2,576
2017	3,580	2,148	6,124	3,674	505	303	1,349	809	4,336	2,602
2018	3,652	2,191	6,124	3,674	505	303	1,369	821	4,380	2,628
2019	3,725	2,235	6,124	3,674	505	303	1,390	834	4,423	2,654
2020	3,799	2,280	6,124	3,674	505	303	1,411	846	4,468	2,681
2021	3,875	2,325	6,124	3,674	505	303	1,432	859	4,512	2,707
2022	3,953	2,372	6,124	3,674	505	303	1,453	872	4,557	2,734
2023	4,032	2,419	6,124	3,674	505	303	1,475	885	4,603	2,762
2024	4,113	2,468	6,124	3,674	505	303	1,497	898	4,649	2,789
2025	4,195	2,517	6,124	3,674	505	303	1,520	912	4,695	2,817
2026	4,279	2,567	6,124	3,674	505	303	1,542	925	4,742	2,845
2027	4,364	2,619	6,124	3,674	505	303	1,565	939	4,790	2,874
2028	4,452	2,671	6,124	3,674	505	303	1,589	953	4,838	2,903
2029	4,541	2,724	6,124	3,674	505	303	1,613	968	4,886	2,932
2030	4,631	2,779	6,124	3,674	505	303	1,637	982	4,935	2,961
2031	4,724	2,834	6,124	3,674	505	303	1,662	997	4,984	2,991
<b>Total</b>	<b>58,172</b>		<b>95,534</b>		<b>7,878</b>		<b>21,653</b>		<b>68,853</b>	

NOTE: - Shading indicates expansion planning, design, approvals and construction period.

TABLE A.2

**PROJECTED ANNUAL SEASONAL POPULATION AND WASTE  
WASTE QUANTITY PROJECTIONS  
MCDUGALL LANDFILL SITE**

Year	Municipality									
	McDougall		Parry Sound		The Archipelago		Carling		Seguin	
	Population	Waste (tonnes)	Population	Waste (tonnes)	Population	Waste (tonnes)	Population	Waste (tonnes)	Population	Waste (tonnes)
2001	2,564	385	108	16	11,456	1,718	4,376	656	11,848	1,777
2002	2,624	394	108	16	11,496	1,724	4,416	662	12,008	1,801
2003	2,684	403	110	17	11,536	1,730	4,456	668	12,168	1,825
2004	2,744	412	110	17	11,576	1,736	4,496	674	12,328	1,849
2005	2,804	421	110	17	11,616	1,742	4,536	680	12,488	1,873
2006	2,864	430	112	17	11,656	1,748	4,576	686	12,648	1,897
2007	2,924	439	112	17	11,696	1,754	4,616	692	12,808	1,921
2008	2,984	448	112	17	11,736	1,760	4,656	698	12,968	1,945
2009	3,044	457	114	17	11,776	1,766	4,696	704	13,128	1,969
2010	3,104	466	114	17	11,816	1,772	4,736	710	13,288	1,993
2011	3,164	475	114	17	11,856	1,778	4,776	716	13,448	2,017
2012	3,224	484	116	17	11,896	1,784	4,816	722	13,608	2,041
2013	3,284	493	116	17	11,936	1,790	4,856	728	13,768	2,065
2014	3,344	502	116	17	11,976	1,796	4,896	734	13,928	2,089
2015	3,404	511	118	18	12,016	1,802	4,936	740	14,088	2,113
2016	3,464	520	118	18	12,056	1,808	4,976	746	14,248	2,137
2017	3,524	529	118	18	12,096	1,814	5,016	752	14,408	2,161
2018	3,584	538	120	18	12,136	1,820	5,056	758	14,568	2,185
2019	3,644	547	120	18	12,176	1,826	5,096	764	14,728	2,209
2020	3,704	556	120	18	12,216	1,832	5,136	770	14,888	2,233
2021	3,764	565	122	18	12,256	1,838	5,176	776	15,048	2,257
2022	3,824	574	122	18	12,296	1,844	5,216	782	15,208	2,281
2023	3,884	583	122	18	12,336	1,850	5,256	788	15,368	2,305
2024	3,944	592	124	19	12,376	1,856	5,296	794	15,528	2,329
2025	4,004	601	124	19	12,416	1,862	5,336	800	15,688	2,353
2026	4,064	610	124	19	12,456	1,868	5,376	806	15,848	2,377
2027	4,124	619	126	19	12,496	1,874	5,416	812	16,008	2,401
2028	4,184	628	126	19	12,536	1,880	5,456	818	16,168	2,425
2029	4,244	637	126	19	12,576	1,886	5,496	824	16,328	2,449
2030	4,304	646	128	19	12,616	1,892	5,536	830	16,488	2,473
2031	4,364	655	128	19	12,656	1,898	5,576	836	16,648	2,497
Totals	14,095		467		47,408		19,796		57,127	

NOTE: - Shading indicates expansion planning, design, approvals and construction period.



**TABLE A.3**

**YEAR ROUND POPULATION GROWTH RATES  
WASTE QUANTITY PROJECTIONS  
MCDOUGALL LANDFILL SITE**

<i>Municipality</i>	<i>Historic Population</i>			<i>Annual Growth Rate</i>
	<i>1981</i>	<i>1991</i>	<i>2001</i>	
McDougall	1,687	2,061	2,608	2%
Parry Sound	6,124	6,125	6,124	0%
Seguin		3,378	3,698	1%
McKellar	686	879	933	1%
Whitestone			853	1%
Archipelago		720	505	0%
Carling	813	951	1,063	1.5%

Source: Statistics Canada  
Projections – John Jackson, Planner Inc.

**TABLE A.4**

**SEASONAL POPULATION GROWTH RATES  
WASTE QUANTITY PROJECTIONS  
MCDOUGALL LANDFILL SITE**

<i>Municipality</i>	<i>Historic Population</i>			<i>Annual Growth Rate</i> (units (persons))
	<b>1981</b>	<b>1991</b>	<b>2001</b>	
McDougall	345 (1380)	384 (1536)	641 (2564)	15 (60)
Parry Sound	-	25 (100)	27 (108)	0
Seguin	2,400 (9600)	2,599 (10396)	2,962 (11848)	40 (160)
McKellar	791 (3164)	807 (3228)	891 (3564)	10 (40)
Whitestone	-	-	1,238 (4952)	20 (80)
Archipelago	2,568 (10272)	2773 (11092)	2,864 (11456)	10 (40)
Carling	933 (3732)	1,041 (4164)	1,094 (4164)	10 (40)

Source: Assessment Records  
Growth Rates confirmed by Building Departments where necessary  
Projections - John Jackson, Planner Inc.

Note: For approximate translation in to persons multiple units by 4 persons.

TABLE A.5

**PROJECTED ANNUAL COMMERCIAL WASTE  
WASTE QUANTITY PROJECTIONS  
MCDOUGALL LANDFILL SITE**

<i>Year</i>	<i>Commercial Waste Quantity (tonnes)</i>	<i>MCS Waste Quantity (tonnes)</i>
2001	2,039	1,635
2002	2,059	1,651
2003	2,080	1,668
2004	2,101	1,684
2005	2,122	1,701
2006	2,143	1,718
2007	2,164	1,735
2008	2,186	1,753
2009	2,208	1,770
2010	2,230	1,788
2011	2,252	1,806
2012	2,275	1,824
2013	2,298	1,842
2014	2,321	1,861
2015	2,344	1,879
2016	2,367	1,898
2017	2,391	1,917
2018	2,415	1,936
2019	2,439	1,956
2020	2,463	1,975
2021	2,488	1,995
2022	2,513	2,015
2023	2,538	2,035
2024	2,563	2,055
2025	2,589	2,076
2026	2,615	2,097
2027	2,641	2,118
2028	2,667	2,139
2029	2,694	2,160
2030	2,721	2,182
2031	2,748	2,204
	<b>63,274</b>	<b>50,733</b>

NOTE: - Shading indicates expansion planning, design, approvals and construction period.

## APPENDIX B

### COST CALCULATIONS

- TABLE B.1 EAA APPROVAL COSTS
- TABLE B.2 EPA APPROVAL COSTS
- TABLE B.3 OWRA APPROVALS
- TABLE B.4 DEVELOPMENT COSTS
- TABLE B.5 ANNUAL OPERATION, MONITORING AND  
MAINTENANCE COSTS
- TABLE B.6 CLOSURE COSTS
- TABLE B.7 ANNUAL POST-CLOSURE MONITORING AND  
MAINTENANCE COSTS
- TABLE B.8 CONTINGENCY CONSOLIDATED HEARING
- TABLE B.9 50-YEAR COST ESTIMATE

**TABLE B.1**  
**EAA APPROVAL COSTS**  
**ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT**  
**McDOUGALL LANDFILL SITE**

<i>Item No.</i>	<i>Description</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
1	Terms of Reference	\$26,750.00	\$26,750.00	\$26,750.00	\$26,750.00	\$26,750.00
2	EA Work					
	- Conduct EA Work and Preparation of Draft EA Report	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000
	- Public and Agency EA Consultation	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
	- Submission of Final EA Report including Response to MOE Concerns and Management of EA Review	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
3	Contingency					
	- Recommended Contingency Allowance	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
<b>Total</b>		<b>\$266,750</b>	<b>\$266,750</b>	<b>\$266,750</b>	<b>\$266,750</b>	<b>\$266,750</b>

**TABLE B.2**  
**EPA APPROVALS**  
**ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT**  
**McDOUGALL LANDFILL SITE**

<i>Item No.</i>	<i>Description</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
1	Hydrogeology					
	- Allowance for completion of detailed hydrogeological assessment	\$45,000	\$45,000	\$45,000	\$45,000	\$45,000
	- Preparation of EPA Level Hydrogeological Assessment Report	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
2	Site Design					
	- Preparation of Design and Operations Plan	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
	- Preparation of Surface Water Management Plan	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
	- Allowance for completion of a Closure Plan	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
	- Allowance for completion of an End Use Plan	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
3	Public Consultation					
	- Consultation process and response to review comments including revisions to EPA documentation <sup>(1)</sup>	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
4	Application and Fees					
	- Preparation of Section 27 Application and Submission of Application and Supporting Documentation to Minister	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
	- Section 27 Application Fees <sup>(2)</sup>	\$22,700	\$22,700	\$22,700	\$22,700	\$22,700
<b>TOTAL</b>		<b>\$157,700</b>	<b>\$157,700</b>	<b>\$157,700</b>	<b>\$157,700</b>	<b>\$157,700</b>

**Notes:**

- 1 Includes Consultation with MOE EA Branch, 1 Residents Meeting, 1 Newsletter, and 1 Open House.
- 2 Fees based on Ontario Regulation 363/98.

TABLE B.3

**OWRA APPROVALS  
ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT  
McDOUGALL LANDFILL SITE**

<b>Item No.</b>	<b>Description</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>	<b>Alternative 4</b>	<b>Alternative 5</b>
<b>1</b>	<b>OWRA APPROVALS</b>					
	- Detailed design and approvals for surface water management plan	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
	- Detailed design and approvals for leachate collection system and pump station	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
	- Detailed design and approvals for leachate treatment system	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
	- Application Fees <sup>(1)</sup>	\$8,200	\$8,200	\$8,200	\$8,200	\$8,200
	<b>TOTAL</b>	<b>\$183,200</b>	<b>\$183,200</b>	<b>\$183,200</b>	<b>\$183,200</b>	<b>\$183,200</b>

**Note**

1 Fees based on Ontario Regulation 364/98.

TABLE B.4  
DEVELOPMENT COSTS  
ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT  
McDOUGALL LANDFILL SITE

Item No.	Description	Unit	Alternative 1			Alternative 2			Alternative 3			Alternative 4			Alternative 5		
			Quantity	Unit Cost	Total Cost	Quantity	Unit Cost	Total Cost	Quantity	Unit Cost	Total Cost	Quantity	Unit Cost	Total Cost	Quantity	Unit Cost	Total Cost
1	Preparation of expansion area base - excavation/fill of native soil	m <sup>3</sup>	75,000	\$5.00	\$375,000	105,000	\$5.00	\$525,000	120,000	\$5.00	\$600,000	135,000	\$5.00	\$675,000	25,500	\$5.00	\$127,500
2	Liner																
	- 0.9 metres of low permeability soil	m <sup>2</sup>	25,000	\$27.00	\$675,000	35,000	\$27.00	\$945,000	40,000	\$27.00	\$1,080,000	45,000	\$27.00	\$1,215,000	8,500	\$27.00	\$229,500
	- HDPE geomembrane	m <sup>2</sup>	25,000	\$10.00	\$250,000	35,000	\$10.00	\$350,000	40,000	\$10.00	\$400,000	45,000	\$10.00	\$450,000	8,500	\$10.00	\$85,000
	- HDPE geotextile drainage net	m <sup>2</sup>	25,000	\$4.00	\$100,000	35,000	\$4.00	\$140,000	40,000	\$4.00	\$160,000	45,000	\$4.00	\$180,000	8,500	\$4.00	\$34,000
	- geotextile filter fabric	m <sup>2</sup>	25,000	\$2.50	\$62,500	35,000	\$2.50	\$87,500	40,000	\$2.50	\$100,000	45,000	\$2.50	\$112,500	8,500	\$2.50	\$21,250
	- 0.45 metre soil protective layer	m <sup>2</sup>	25,000	\$8.00	\$200,000	35,000	\$8.00	\$280,000	40,000	\$8.00	\$320,000	45,000	\$8.00	\$360,000	8,500	\$8.00	\$68,000
3	Leachate Collection System																
	- 200mm perforated HDPE perimeter pipe with drainage media, filter fabric and manholes	m	690	\$160.00	\$110,400	785	\$160.00	\$125,600	820	\$160.00	\$131,200	845	\$160.00	\$135,200	440	\$160.00	\$70,400
	- 200mm perforated HDPE underdrain pipe with drainage media and filter fabric	m	1,125	\$160.00	\$180,000	1,575	\$160.00	\$252,000	1,585	\$160.00	\$253,600	1,800	\$160.00	\$288,000	170	\$160.00	\$27,200
4	Forcemain																
	- HDPE pipe, excavation, bedding and backfill	m	400	\$100.00	\$40,000	400	\$100.00	\$40,000	400	\$100.00	\$40,000	400	\$100.00	\$40,000	300	\$100.00	\$30,000
5	Leachate pump station																
	- including chamber, mechanical and electrical	L.S.	1	\$75,000.00	\$75,000	1	\$75,000.00	\$75,000	1	\$75,000.00	\$75,000	1	\$75,000.00	\$75,000	1	\$75,000.00	\$75,000
6	Access road																
	- including grading, Granular A, Granular B	m	465	\$120.00	\$55,800	560	\$120.00	\$67,200	595	\$120.00	\$71,400	620	\$120.00	\$74,400	270	\$120.00	\$32,400
7	Perimeter ditching and culverts																
	- excavation, grading culverts	m	465	\$20.00	\$9,300	560	\$20.00	\$11,200	595	\$20.00	\$11,900	620	\$20.00	\$12,400	270	\$20.00	\$5,400
8	Stormwater management pond																
	- including excavation, fill, grading, culverts, topsoil, seed and mulch	L.S.	1	\$50,000.00	\$50,000	1	\$50,000.00	\$50,000	1	\$50,000.00	\$50,000	1	\$50,000.00	\$50,000	1	\$50,000.00	\$50,000
9	Leachate Treatment Facility	L.S.	1	\$750,000.00	\$750,000	1	\$750,000.00	\$750,000	1	\$750,000.00	\$750,000	1	\$750,000.00	\$750,000	1	\$750,000.00	\$750,000
				Subtotal	\$2,933,000		Subtotal	\$3,698,500		Subtotal	\$4,043,100		Subtotal	\$4,417,500		Subtotal	\$1,605,650
	Allowance for mobilization, demobilization, bonds and insurance (15% of subtotal)				\$439,950			\$554,775			\$606,465			\$662,625			\$240,848
	Allowance for additional requirements established during final design phase (15% of subtotal)				\$439,950			\$554,775			\$606,465			\$662,625			\$240,848
	Engineering Allowance (20% of subtotal)				\$586,600			\$739,700			\$808,620			\$883,500			\$321,130
	- includes Contract Documents, Tender, Contract Administration, construction inspection and materials testing																
	Total Development Cost (2003 \$)				\$4,399,500			\$5,547,750			\$6,064,650			\$6,626,250			\$2,408,475



TABLE B.5

**ANNUAL OPERATION, MONITORING AND MAINTENANCE COSTS  
ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT  
McDOUGALL LANDFILL SITE**

<i>Item No.</i>	<i>Description</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
<b>1</b>	Annual Operation					
	- landfill	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000
	- leachate treatment plant	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
<b>2</b>	Annual Monitoring	\$35,000	\$35,000	\$35,000	\$35,000	\$35,000
<b>3</b>	Leachate Collection System					
	- allowance for operation, maintenance, and calibration of equipment	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
	- allowance for flushing and vacuuming leachate piping	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
<b>4</b>	Stormwater Management System					
	- removal for sediment from ditching and ponds (1 event per year)	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
	- allowance for maintenance and erosion repairs	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
<b>5</b>	Maintenance and Repair Allowance					
	- final cover system	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
	- roadways	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
	- fencing	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
	- monitoring wells	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
	Annual Operation, Monitoring and Maintenance Costs (2003 \$)	\$270,500	\$270,500	\$270,500	\$270,500	\$270,500

**TABLE B.6**  
**CLOSURE COSTS**  
**ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT**  
**McDOUGALL LANDFILL SITE**

<i>Item No.</i>	<i>Description</i>	<i>Unit</i>	<i>Alternative 1</i>			<i>Alternative 2</i>			<i>Alternative 3</i>			<i>Alternative 4</i>			<i>Alternative 5</i>		
			<i>Quantity</i>	<i>Unit Cost</i>	<i>Total Cost</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total Cost</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total Cost</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total Cost</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total Cost</i>
1	Closure Costs																
	- supply, place and compact 0.6m low permeability soil	m <sup>2</sup>	25,250	\$18.00	\$454,500	35,350	\$18.00	\$636,300	40,400	\$18.00	\$727,200	45,450	\$18.00	\$818,100	8,500	\$18.00	\$153,000.00
	- place and compact 0.15m topsoil	m <sup>2</sup>	25,250	\$8.00	\$202,000	35,350	\$8.00	\$282,800	40,400	\$8.00	\$323,200	45,450	\$8.00	\$363,600	8,500	\$8.00	\$68,000.00
	- seed and mulch	m <sup>2</sup>	25,250	\$1.00	\$25,250	35,350	\$1.00	\$35,350	40,400	\$1.00	\$40,400	45,450	\$1.00	\$45,450	8,500	\$1.00	\$8,500
	Subtotal				<b>\$681,750</b>			<b>\$954,450</b>			<b>\$1,090,800</b>			<b>\$1,227,150</b>			<b>\$229,500</b>
2	Allowance for mobilization, demobilization, bonds and insurance (15% of subtotal)				\$102,263			\$143,168			\$163,620			\$184,073			\$34,425
3	Engineering Allowance (20% of subtotal)				\$136,350			\$190,890			\$218,160			\$245,430			\$45,900
	- includes Contract Documents, Tender, Contract Administration, construction inspection and materials testing																
	Total Closure Cost (2003 \$)				<b>\$920,363</b>			<b>\$1,288,508</b>			<b>\$1,472,580</b>			<b>\$1,656,653</b>			<b>\$309,825</b>

TABLE B.7

**ANNUAL POST-CLOSURE MONITORING AND MAINTENANCE COSTS  
ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT  
McDOUGALL LANDFILL SITE**

<i>Item No.</i>	<i>Description</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
1	Annual post-closure monitoring					
	- conduct monitoring event (2 per year), analytical expenses and reporting	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
2	Leachate collection system					
	- allowance for operation, maintenance, and calibration of equipment	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
	- allowance for flushing and vacuuming leachate piping	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
3	Stormwater management					
	- removal for sediment from ditching and ponds (1 event per year)	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
	- allowance for maintenance and erosion repairs	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
4	Site Maintenance and Repair Allowance					
	- final cover system	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
	- roadways	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
	- fencing	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
	- monitoring wells	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
	Annual Post-closure Maintenance and Monitoring Cost (2003 \$)	\$45,500	\$45,500	\$45,500	\$45,500	\$45,500

**TABLE B.8**  
**CONTINGENCY CONSOLIDATED HEARING**  
**ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT**  
**McDOUGALL LANDFILL SITE**

<i>Item No.</i>	<i>Description</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
1	Consolidated Hearing					
	- Preparation for and attendance at hearings	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000
	- Development of conditions of approval	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
	- Allowance for peer review and legal assistance	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000
	<b>Total</b>	<b>\$205,000</b>	<b>\$205,000</b>	<b>\$205,000</b>	<b>\$205,000</b>	<b>\$205,000</b>

TABLE B.9.A

ALTERNATIVE 1 - 50 YEAR COST ESTIMATE  
ENGINEERING AND PLANNING EVALUATION AND COST ESTIMATE  
MCDOUGALL LANDFILL SITE

Inflation Rate 0.020  
Discount Rate 0.050

Calendar Year	Development Year	Alternative 1						
		2003 Dollars						
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total
2003	0	\$ 303,825						\$ 303,825
2004	1	\$ 303,825						\$ 303,825
2005	2		\$ 1,977,900				\$ 205,000	\$ 2,182,900
2006	3				\$ 270,500			\$ 270,500
2007	4				\$ 270,500			\$ 270,500
2008	5				\$ 270,500			\$ 270,500
2009	6				\$ 270,500			\$ 270,500
2010	7		\$ 605,400		\$ 270,500			\$ 875,900
2011	8				\$ 270,500			\$ 270,500
2012	9			\$ 184,073	\$ 270,500			\$ 454,573
2013	10				\$ 270,500			\$ 270,500
2014	11				\$ 270,500			\$ 270,500
2015	12		\$ 605,400		\$ 270,500			\$ 875,900
2016	13				\$ 270,500			\$ 270,500
2017	14			\$ 184,073	\$ 270,500			\$ 454,573
2018	15				\$ 270,500			\$ 270,500
2019	16				\$ 270,500			\$ 270,500
2020	17		\$ 605,400		\$ 270,500			\$ 875,900
2021	18				\$ 270,500			\$ 270,500
2022	19			\$ 184,073	\$ 270,500			\$ 454,573
2023	20				\$ 270,500			\$ 270,500
2024	21				\$ 270,500			\$ 270,500
2025	22		\$ 605,400		\$ 270,500			\$ 875,900
2026	23				\$ 270,500			\$ 270,500
2027	24			\$ 184,073	\$ 270,500			\$ 454,573
2028	25				\$ 270,500			\$ 270,500
2029	26				\$ 270,500			\$ 270,500
2030	27				\$ 270,500			\$ 270,500
2031	28				\$ 270,500			\$ 270,500
2032	29			\$ 184,073		\$ 45,500		\$ 229,573
2033	30					\$ 45,500		\$ 45,500
2034	31					\$ 45,500		\$ 45,500
2035	32					\$ 45,500		\$ 45,500
2036	33					\$ 45,500		\$ 45,500
2037	34					\$ 45,500		\$ 45,500
2038	35					\$ 45,500		\$ 45,500
2039	36					\$ 45,500		\$ 45,500
2040	37					\$ 45,500		\$ 45,500
2041	38					\$ 45,500		\$ 45,500
2042	39					\$ 45,500		\$ 45,500
2043	40					\$ 45,500		\$ 45,500
2044	41					\$ 45,500		\$ 45,500
2045	42					\$ 45,500		\$ 45,500
2046	43					\$ 45,500		\$ 45,500
2047	44					\$ 45,500		\$ 45,500
2048	45					\$ 45,500		\$ 45,500
2049	46					\$ 45,500		\$ 45,500
2050	47					\$ 45,500		\$ 45,500
2051	48					\$ 45,500		\$ 45,500
2052	49					\$ 45,500		\$ 45,500
2053	50					\$ 45,500		\$ 45,500
2054	51					\$ 45,500		\$ 45,500
2055	52					\$ 45,500		\$ 45,500
2056	53					\$ 45,500		\$ 45,500
								\$ -
Totals		\$ 607,650	\$ 4,399,500	\$ 920,363	\$ 7,033,000	\$ 1,137,500	\$ 205,000	\$ 14,303,013

Landfilling

Post-closure Monitoring

Calendar Year	Development Year	Alternative 1						
		Present Worth						
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total
2003	0	\$ 303,825	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 303,825
2004	1	\$ 295,144	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 295,144
2005	2	\$ -	\$ 1,866,492	\$ -	\$ -	\$ -	\$ 193,453	\$ 2,059,945
2006	3	\$ -	\$ -	\$ -	\$ 247,970	\$ -	\$ -	\$ 247,970
2007	4	\$ -	\$ -	\$ -	\$ 240,886	\$ -	\$ -	\$ 240,886
2008	5	\$ -	\$ -	\$ -	\$ 234,003	\$ -	\$ -	\$ 234,003
2009	6	\$ -	\$ -	\$ -	\$ 227,317	\$ -	\$ -	\$ 227,317
2010	7	\$ -	\$ 494,218	\$ -	\$ 220,823	\$ -	\$ -	\$ 715,040
2011	8	\$ -	\$ -	\$ -	\$ 214,513	\$ -	\$ -	\$ 214,513
2012	9	\$ -	\$ -	\$ 141,803	\$ 208,384	\$ -	\$ -	\$ 350,188
2013	10	\$ -	\$ -	\$ -	\$ 202,431	\$ -	\$ -	\$ 202,431
2014	11	\$ -	\$ -	\$ -	\$ 196,647	\$ -	\$ -	\$ 196,647
2015	12	\$ -	\$ 427,536	\$ -	\$ 191,028	\$ -	\$ -	\$ 618,565
2016	13	\$ -	\$ -	\$ -	\$ 185,570	\$ -	\$ -	\$ 185,570
2017	14	\$ -	\$ -	\$ 122,671	\$ 180,268	\$ -	\$ -	\$ 302,939
2018	15	\$ -	\$ -	\$ -	\$ 175,118	\$ -	\$ -	\$ 175,118
2019	16	\$ -	\$ -	\$ -	\$ 170,114	\$ -	\$ -	\$ 170,114
2020	17	\$ -	\$ 369,851	\$ -	\$ 165,254	\$ -	\$ -	\$ 535,105
2021	18	\$ -	\$ -	\$ -	\$ 160,533	\$ -	\$ -	\$ 160,533
2022	19	\$ -	\$ -	\$ 106,120	\$ 155,946	\$ -	\$ -	\$ 262,065
2023	20	\$ -	\$ -	\$ -	\$ 151,490	\$ -	\$ -	\$ 151,490
2024	21	\$ -	\$ -	\$ -	\$ 147,162	\$ -	\$ -	\$ 147,162
2025	22	\$ -	\$ 319,950	\$ -	\$ 142,957	\$ -	\$ -	\$ 462,907
2026	23	\$ -	\$ -	\$ -	\$ 138,873	\$ -	\$ -	\$ 138,873
2027	24	\$ -	\$ -	\$ 91,802	\$ 134,905	\$ -	\$ -	\$ 226,707
2028	25	\$ -	\$ -	\$ -	\$ 131,051	\$ -	\$ -	\$ 131,051
2029	26	\$ -	\$ -	\$ -	\$ 127,306	\$ -	\$ -	\$ 127,306
2030	27	\$ -	\$ -	\$ -	\$ 123,669	\$ -	\$ -	\$ 123,669
2031	28	\$ -	\$ -	\$ -	\$ 120,136	\$ -	\$ -	\$ 120,136
2032	29	\$ -	\$ -	\$ 79,415	\$ -	\$ 19,630	\$ -	\$ 99,046
2033	30	\$ -	\$ -	\$ -	\$ -	\$ 19,069	\$ -	\$ 19,069
2034	31	\$ -	\$ -	\$ -	\$ -	\$ 18,525	\$ -	\$ 18,525
2035	32	\$ -	\$ -	\$ -	\$ -	\$ 17,995	\$ -	\$ 17,995
2036	33	\$ -	\$ -	\$ -	\$ -	\$ 17,481	\$ -	\$ 17,481
2037	34	\$ -	\$ -	\$ -	\$ -	\$ 16,982	\$ -	\$ 16,982
2038	35	\$ -	\$ -	\$ -	\$ -	\$ 16,497	\$ -	\$ 16,497
2039	36	\$ -	\$ -	\$ -	\$ -	\$ 16,025	\$ -	\$ 16,025
2040	37	\$ -	\$ -	\$ -	\$ -	\$ 15,567	\$ -	\$ 15,567
2041	38	\$ -	\$ -	\$ -	\$ -	\$ 15,123	\$ -	\$ 15,123
2042	39	\$ -	\$ -	\$ -	\$ -	\$ 14,690	\$ -	\$ 14,690
2043	40	\$ -	\$ -	\$ -	\$ -	\$ 14,271	\$ -	\$ 14,271
2044	41	\$ -	\$ -	\$ -	\$ -	\$ 13,863	\$ -	\$ 13,863
2045	42	\$ -	\$ -	\$ -	\$ -	\$ 13,467	\$ -	\$ 13,467
2046	43	\$ -	\$ -	\$ -	\$ -	\$ 13,082	\$ -	\$ 13,082
2047	44	\$ -	\$ -	\$ -	\$ -	\$ 12,708	\$ -	\$ 12,708
2048	45	\$ -	\$ -	\$ -	\$ -	\$ 12,345	\$ -	\$ 12,345
2049	46	\$ -	\$ -	\$ -	\$ -	\$ 11,993	\$ -	\$ 11,993
2050	47	\$ -	\$ -	\$ -	\$ -	\$ 11,650	\$ -	\$ 11,650
2051	48	\$ -	\$ -	\$ -	\$ -	\$ 11,317	\$ -	\$ 11,317
2052	49	\$ -	\$ -	\$ -	\$ -	\$ 10,994	\$ -	\$ 10,994
2053	50	\$ -	\$ -	\$ -	\$ -	\$ 10,680	\$ -	\$ 10,680
2054	51	\$ -	\$ -	\$ -	\$ -	\$ 10,374	\$ -	\$ 10,374
2055	52	\$ -	\$ -	\$ -	\$ -	\$ 10,078	\$ -	\$ 10,078
2056	53	\$ -	\$ -	\$ -	\$ -	\$ 9,790	\$ -	\$ 9,790
Totals		\$ 598,969	\$ 3,478,047	\$ 541,811	\$ 4,594,355	\$ 354,196	\$ 193,453	\$ 9,760,831

TABLE B.9.B  
ALTERNATIVE 2 - 50 YEAR COST ESTIMATE  
ENGINEERING AND PLANNING EVALUATION AND COST ESTIMATE  
MCDUGALL LANDFILL SITE

Inflation Rate 0.020  
Discount Rate 0.050

Calendar Year	Development Year	Alternative 2						
		2003 Dollars						
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total
2003	0	\$ 303,825						\$ 303,825
2004	1	\$ 303,825						\$ 303,825
2005	2		\$ 2,207,550				\$ 205,000	\$ 2,412,550
2006	3				\$ 270,500			\$ 270,500
2007	4				\$ 270,500			\$ 270,500
2008	5				\$ 270,500			\$ 270,500
2009	6				\$ 270,500			\$ 270,500
2010	7		\$ 835,050		\$ 270,500			\$ 1,105,550
2011	8				\$ 270,500			\$ 270,500
2012	9			\$ 257,702	\$ 270,500			\$ 528,202
2013	10				\$ 270,500			\$ 270,500
2014	11				\$ 270,500			\$ 270,500
2015	12		\$ 835,050		\$ 270,500			\$ 1,105,550
2016	13				\$ 270,500			\$ 270,500
2017	14			\$ 257,702	\$ 270,500			\$ 528,202
2018	15				\$ 270,500			\$ 270,500
2019	16				\$ 270,500			\$ 270,500
2020	17		\$ 835,050		\$ 270,500			\$ 1,105,550
2021	18				\$ 270,500		\$ 257,702	\$ 528,202
2022	19			\$ 257,702	\$ 270,500			\$ 528,202
2023	20				\$ 270,500			\$ 270,500
2024	21				\$ 270,500			\$ 270,500
2025	22		\$ 835,050		\$ 270,500			\$ 1,105,550
2026	23				\$ 270,500			\$ 270,500
2027	24			\$ 257,702	\$ 270,500			\$ 528,202
2028	25				\$ 270,500			\$ 270,500
2029	26				\$ 270,500			\$ 270,500
2030	27				\$ 270,500			\$ 270,500
2031	28				\$ 270,500			\$ 270,500
2032	29			\$ 257,702		\$ 45,500		\$ 303,202
2033	30					\$ 45,500		\$ 45,500
2034	31					\$ 45,500		\$ 45,500
2035	32					\$ 45,500		\$ 45,500
2036	33					\$ 45,500		\$ 45,500
2037	34					\$ 45,500		\$ 45,500
2038	35					\$ 45,500		\$ 45,500
2039	36					\$ 45,500		\$ 45,500
2040	37					\$ 45,500		\$ 45,500
2041	38					\$ 45,500		\$ 45,500
2042	39					\$ 45,500		\$ 45,500
2043	40					\$ 45,500		\$ 45,500
2044	41					\$ 45,500		\$ 45,500
2045	42					\$ 45,500		\$ 45,500
2046	43					\$ 45,500		\$ 45,500
2047	44					\$ 45,500		\$ 45,500
2048	45					\$ 45,500		\$ 45,500
2049	46					\$ 45,500		\$ 45,500
2050	47					\$ 45,500		\$ 45,500
2051	48					\$ 45,500		\$ 45,500
2052	49					\$ 45,500		\$ 45,500
2053	50					\$ 45,500		\$ 45,500
2054	51					\$ 45,500		\$ 45,500
2055	52					\$ 45,500		\$ 45,500
2056	53					\$ 45,500		\$ 45,500
								\$ -
Totals		\$ 607,650	\$ 5,547,750	\$ 1,288,508	\$ 7,033,000	\$ 1,137,500	\$ 462,702	\$ 16,077,109

Calendar Year	Development Year	Alternative 2						
		Present Worth						
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total
2003	0	\$ 303,825	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 303,825
2004	1	\$ 295,144	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 295,144
2005	2	\$ -	\$ 2,083,206	\$ -	\$ -	\$ -	\$ 193,453	\$ 2,276,659
2006	3	\$ -	\$ -	\$ -	\$ 247,970	\$ -	\$ -	\$ 247,970
2007	4	\$ -	\$ -	\$ -	\$ 240,886	\$ -	\$ -	\$ 240,886
2008	5	\$ -	\$ -	\$ -	\$ 234,003	\$ -	\$ -	\$ 234,003
2009	6	\$ -	\$ -	\$ -	\$ 227,317	\$ -	\$ -	\$ 227,317
2010	7	\$ -	\$ 681,693	\$ -	\$ 220,823	\$ -	\$ -	\$ 902,515
2011	8	\$ -	\$ -	\$ -	\$ 214,513	\$ -	\$ -	\$ 214,513
2012	9	\$ -	\$ -	\$ 198,525	\$ 208,384	\$ -	\$ -	\$ 406,909
2013	10	\$ -	\$ -	\$ -	\$ 202,431	\$ -	\$ -	\$ 202,431
2014	11	\$ -	\$ -	\$ -	\$ 196,647	\$ -	\$ -	\$ 196,647
2015	12	\$ -	\$ 589,716	\$ -	\$ 191,028	\$ -	\$ -	\$ 780,744
2016	13	\$ -	\$ -	\$ -	\$ 185,570	\$ -	\$ -	\$ 185,570
2017	14	\$ -	\$ -	\$ 171,739	\$ 180,268	\$ -	\$ -	\$ 352,007
2018	15	\$ -	\$ -	\$ -	\$ 175,118	\$ -	\$ -	\$ 175,118
2019	16	\$ -	\$ -	\$ -	\$ 170,114	\$ -	\$ -	\$ 170,114
2020	17	\$ -	\$ 510,149	\$ -	\$ 165,254	\$ -	\$ -	\$ 675,403
2021	18	\$ -	\$ -	\$ -	\$ 160,533	\$ -	\$ 152,937	\$ 313,470
2022	19	\$ -	\$ -	\$ 148,567	\$ 155,946	\$ -	\$ -	\$ 304,513
2023	20	\$ -	\$ -	\$ -	\$ 151,490	\$ -	\$ -	\$ 151,490
2024	21	\$ -	\$ -	\$ -	\$ 147,162	\$ -	\$ -	\$ 147,162
2025	22	\$ -	\$ 441,318	\$ -	\$ 142,957	\$ -	\$ -	\$ 584,275
2026	23	\$ -	\$ -	\$ -	\$ 138,873	\$ -	\$ -	\$ 138,873
2027	24	\$ -	\$ -	\$ 128,522	\$ 134,905	\$ -	\$ -	\$ 263,427
2028	25	\$ -	\$ -	\$ -	\$ 131,051	\$ -	\$ -	\$ 131,051
2029	26	\$ -	\$ -	\$ -	\$ 127,306	\$ -	\$ -	\$ 127,306
2030	27	\$ -	\$ -	\$ -	\$ 123,669	\$ -	\$ -	\$ 123,669
2031	28	\$ -	\$ -	\$ -	\$ 120,136	\$ -	\$ -	\$ 120,136
2032	29	\$ -	\$ -	\$ 111,181	\$ -	\$ 19,630	\$ -	\$ 130,812
2033	30	\$ -	\$ -	\$ -	\$ -	\$ 19,069	\$ -	\$ 19,069
2034	31	\$ -	\$ -	\$ -	\$ -	\$ 18,525	\$ -	\$ 18,525
2035	32	\$ -	\$ -	\$ -	\$ -	\$ 17,995	\$ -	\$ 17,995
2036	33	\$ -	\$ -	\$ -	\$ -	\$ 17,481	\$ -	\$ 17,481
2037	34	\$ -	\$ -	\$ -	\$ -	\$ 16,982	\$ -	\$ 16,982
2038	35	\$ -	\$ -	\$ -	\$ -	\$ 16,497	\$ -	\$ 16,497
2039	36	\$ -	\$ -	\$ -	\$ -	\$ 16,025	\$ -	\$ 16,025
2040	37	\$ -	\$ -	\$ -	\$ -	\$ 15,567	\$ -	\$ 15,567
2041	38	\$ -	\$ -	\$ -	\$ -	\$ 15,123	\$ -	\$ 15,123
2042	39	\$ -	\$ -	\$ -	\$ -	\$ 14,690	\$ -	\$ 14,690
2043	40	\$ -	\$ -	\$ -	\$ -	\$ 14,271	\$ -	\$ 14,271
2044	41	\$ -	\$ -	\$ -	\$ -	\$ 13,863	\$ -	\$ 13,863
2045	42	\$ -	\$ -	\$ -	\$ -	\$ 13,467	\$ -	\$ 13,467
2046	43	\$ -	\$ -	\$ -	\$ -	\$ 13,082	\$ -	\$ 13,082
2047	44	\$ -	\$ -	\$ -	\$ -	\$ 12,708	\$ -	\$ 12,708
2048	45	\$ -	\$ -	\$ -	\$ -	\$ 12,345	\$ -	\$ 12,345
2049	46	\$ -	\$ -	\$ -	\$ -	\$ 11,993	\$ -	\$ 11,993
2050	47	\$ -	\$ -	\$ -	\$ -	\$ 11,650	\$ -	\$ 11,650
2051	48	\$ -	\$ -	\$ -	\$ -	\$ 11,317	\$ -	\$ 11,317
2052	49	\$ -	\$ -	\$ -	\$ -	\$ 10,994	\$ -	\$ 10,994
2053	50	\$ -	\$ -	\$ -	\$ -	\$ 10,680	\$ -	\$ 10,680
2054	51	\$ -	\$ -	\$ -	\$ -	\$ 10,374	\$ -	\$ 10,374
2055	52	\$ -	\$ -	\$ -	\$ -	\$ 10,078	\$ -	\$ 10,078
2056	53	\$ -	\$ -	\$ -	\$ -	\$ 9,790	\$ -	\$ 9,790
Totals		\$ 598,969	\$ 4,306,082	\$ 758,535	\$ 4,594,355	\$ 354,196	\$ 346,390	\$ 10,958,528

TABLE B.9.C  
ALTERNATIVE 3 - 50 YEAR COST ESTIMATE  
ENGINEERING AND PLANNING EVALUATION AND COST ESTIMATE  
MCDUGALL LANDFILL SITE

Inflation Rate 0.020  
Discount Rate 0.050

Calendar Year	Development Year	Alternative 3 2003 Dollars						
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total
2003	0	\$ 303,825						\$ 303,825
2004	1	\$ 303,825						\$ 303,825
2005	2		\$ 2,310,930				\$ 205,000	\$ 2,515,930
2006	3				\$ 270,500			\$ 270,500
2007	4				\$ 270,500			\$ 270,500
2008	5				\$ 270,500			\$ 270,500
2009	6				\$ 270,500			\$ 270,500
2010	7		\$ 938,430		\$ 270,500			\$ 1,208,930
2011	8				\$ 270,500			\$ 270,500
2012	9			\$ 294,516	\$ 270,500			\$ 565,016
2013	10				\$ 270,500			\$ 270,500
2014	11				\$ 270,500			\$ 270,500
2015	12		\$ 938,430		\$ 270,500			\$ 1,208,930
2016	13				\$ 270,500			\$ 270,500
2017	14			\$ 294,516	\$ 270,500			\$ 565,016
2018	15				\$ 270,500			\$ 270,500
2019	16				\$ 270,500			\$ 270,500
2020	17		\$ 938,430		\$ 270,500			\$ 1,208,930
2021	18				\$ 270,500		\$ 257,702	\$ 528,202
2022	19			\$ 294,516	\$ 270,500			\$ 565,016
2023	20				\$ 270,500			\$ 270,500
2024	21				\$ 270,500			\$ 270,500
2025	22		\$ 938,430		\$ 270,500			\$ 1,208,930
2026	23				\$ 270,500			\$ 270,500
2027	24			\$ 294,516	\$ 270,500			\$ 565,016
2028	25				\$ 270,500			\$ 270,500
2029	26				\$ 270,500			\$ 270,500
2030	27				\$ 270,500			\$ 270,500
2031	28				\$ 270,500			\$ 270,500
2032	29			\$ 294,516		\$ 45,500		\$ 340,016
2033	30					\$ 45,500		\$ 45,500
2034	31					\$ 45,500		\$ 45,500
2035	32					\$ 45,500		\$ 45,500
2036	33					\$ 45,500		\$ 45,500
2037	34					\$ 45,500		\$ 45,500
2038	35					\$ 45,500		\$ 45,500
2039	36					\$ 45,500		\$ 45,500
2040	37					\$ 45,500		\$ 45,500
2041	38					\$ 45,500		\$ 45,500
2042	39					\$ 45,500		\$ 45,500
2043	40					\$ 45,500		\$ 45,500
2044	41					\$ 45,500		\$ 45,500
2045	42					\$ 45,500		\$ 45,500
2046	43					\$ 45,500		\$ 45,500
2047	44					\$ 45,500		\$ 45,500
2048	45					\$ 45,500		\$ 45,500
2049	46					\$ 45,500		\$ 45,500
2050	47					\$ 45,500		\$ 45,500
2051	48					\$ 45,500		\$ 45,500
2052	49					\$ 45,500		\$ 45,500
2053	50					\$ 45,500		\$ 45,500
2054	51					\$ 45,500		\$ 45,500
2055	52					\$ 45,500		\$ 45,500
2056	53					\$ 45,500		\$ 45,500
Totals		\$ 607,650	\$ 6,064,650	\$ 1,472,580	\$ 7,033,000	\$ 1,137,500	\$ 462,702	\$ 16,778,082

Landfilling

Post-closure Monitoring

Calendar Year	Development Year	Alternative 3 Present Worth						
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total
2003	0	\$ 303,825	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 303,825
2004	1	\$ 295,144	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 295,144
2005	2	\$ -	\$ 2,180,763	\$ -	\$ -	\$ -	\$ 193,453	\$ 2,374,216
2006	3	\$ -	\$ -	\$ -	\$ 247,970	\$ -	\$ -	\$ 247,970
2007	4	\$ -	\$ -	\$ -	\$ 240,886	\$ -	\$ -	\$ 240,886
2008	5	\$ -	\$ -	\$ -	\$ 234,003	\$ -	\$ -	\$ 234,003
2009	6	\$ -	\$ -	\$ -	\$ 227,317	\$ -	\$ -	\$ 227,317
2010	7	\$ -	\$ 766,087	\$ -	\$ 220,823	\$ -	\$ -	\$ 986,909
2011	8	\$ -	\$ -	\$ -	\$ 214,513	\$ -	\$ -	\$ 214,513
2012	9	\$ -	\$ -	\$ 226,886	\$ 208,384	\$ -	\$ -	\$ 435,270
2013	10	\$ -	\$ -	\$ -	\$ 202,431	\$ -	\$ -	\$ 202,431
2014	11	\$ -	\$ -	\$ -	\$ 196,647	\$ -	\$ -	\$ 196,647
2015	12	\$ -	\$ 662,723	\$ -	\$ 191,028	\$ -	\$ -	\$ 853,752
2016	13	\$ -	\$ -	\$ -	\$ 185,570	\$ -	\$ -	\$ 185,570
2017	14	\$ -	\$ -	\$ 196,273	\$ 180,268	\$ -	\$ -	\$ 376,542
2018	15	\$ -	\$ -	\$ -	\$ 175,118	\$ -	\$ -	\$ 175,118
2019	16	\$ -	\$ -	\$ -	\$ 170,114	\$ -	\$ -	\$ 170,114
2020	17	\$ -	\$ 573,306	\$ -	\$ 165,254	\$ -	\$ -	\$ 738,560
2021	18	\$ -	\$ -	\$ -	\$ 160,533	\$ -	\$ 152,937	\$ 313,470
2022	19	\$ -	\$ -	\$ 169,791	\$ 155,946	\$ -	\$ -	\$ 325,737
2023	20	\$ -	\$ -	\$ -	\$ 151,490	\$ -	\$ -	\$ 151,490
2024	21	\$ -	\$ -	\$ -	\$ 147,162	\$ -	\$ -	\$ 147,162
2025	22	\$ -	\$ 495,954	\$ -	\$ 142,957	\$ -	\$ -	\$ 638,911
2026	23	\$ -	\$ -	\$ -	\$ 138,873	\$ -	\$ -	\$ 138,873
2027	24	\$ -	\$ -	\$ 146,882	\$ 134,905	\$ -	\$ -	\$ 281,787
2028	25	\$ -	\$ -	\$ -	\$ 131,051	\$ -	\$ -	\$ 131,051
2029	26	\$ -	\$ -	\$ -	\$ 127,306	\$ -	\$ -	\$ 127,306
2030	27	\$ -	\$ -	\$ -	\$ 123,669	\$ -	\$ -	\$ 123,669
2031	28	\$ -	\$ -	\$ -	\$ 120,136	\$ -	\$ -	\$ 120,136
2032	29	\$ -	\$ -	\$ 127,064	\$ -	\$ 19,630	\$ -	\$ 146,695
2033	30	\$ -	\$ -	\$ -	\$ -	\$ 19,069	\$ -	\$ 19,069
2034	31	\$ -	\$ -	\$ -	\$ -	\$ 18,525	\$ -	\$ 18,525
2035	32	\$ -	\$ -	\$ -	\$ -	\$ 17,995	\$ -	\$ 17,995
2036	33	\$ -	\$ -	\$ -	\$ -	\$ 17,481	\$ -	\$ 17,481
2037	34	\$ -	\$ -	\$ -	\$ -	\$ 16,982	\$ -	\$ 16,982
2038	35	\$ -	\$ -	\$ -	\$ -	\$ 16,497	\$ -	\$ 16,497
2039	36	\$ -	\$ -	\$ -	\$ -	\$ 16,025	\$ -	\$ 16,025
2040	37	\$ -	\$ -	\$ -	\$ -	\$ 15,567	\$ -	\$ 15,567
2041	38	\$ -	\$ -	\$ -	\$ -	\$ 15,123	\$ -	\$ 15,123
2042	39	\$ -	\$ -	\$ -	\$ -	\$ 14,690	\$ -	\$ 14,690
2043	40	\$ -	\$ -	\$ -	\$ -	\$ 14,271	\$ -	\$ 14,271
2044	41	\$ -	\$ -	\$ -	\$ -	\$ 13,863	\$ -	\$ 13,863
2045	42	\$ -	\$ -	\$ -	\$ -	\$ 13,467	\$ -	\$ 13,467
2046	43	\$ -	\$ -	\$ -	\$ -	\$ 13,082	\$ -	\$ 13,082
2047	44	\$ -	\$ -	\$ -	\$ -	\$ 12,708	\$ -	\$ 12,708
2048	45	\$ -	\$ -	\$ -	\$ -	\$ 12,345	\$ -	\$ 12,345
2049	46	\$ -	\$ -	\$ -	\$ -	\$ 11,993	\$ -	\$ 11,993
2050	47	\$ -	\$ -	\$ -	\$ -	\$ 11,650	\$ -	\$ 11,650
2051	48	\$ -	\$ -	\$ -	\$ -	\$ 11,317	\$ -	\$ 11,317
2052	49	\$ -	\$ -	\$ -	\$ -	\$ 10,994	\$ -	\$ 10,994
2053	50	\$ -	\$ -	\$ -	\$ -	\$ 10,680	\$ -	\$ 10,680
2054	51	\$ -	\$ -	\$ -	\$ -	\$ 10,374	\$ -	\$ 10,374
2055	52	\$ -	\$ -	\$ -	\$ -	\$ 10,078	\$ -	\$ 10,078
2056	53	\$ -	\$ -	\$ -	\$ -	\$ 9,790	\$ -	\$ 9,790
Totals		\$ 598,969	\$ 4,678,834	\$ 866,897	\$ 4,594,355	\$ 354,196	\$ 346,390	\$ 11,439,641

TABLE B.9.D

ALTERNATIVE 4 - 50 YEAR COST ESTIMATE  
ENGINEERING AND PLANNING EVALUATION AND COST ESTIMATE  
MCDOUGALL LANDFILL SITE

Inflation Rate 0.020  
Discount Rate 0.050

Calendar Year	Development Year	Alternative 4						
		2003 Dollars						
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total
2003	0	\$ 303,825						\$ 303,825
2004	1	\$ 303,825						\$ 303,825
2005	2		\$ 2,423,250				\$ 205,000	\$ 2,628,250
2006	3				\$ 270,500			\$ 270,500
2007	4				\$ 270,500			\$ 270,500
2008	5				\$ 270,500			\$ 270,500
2009	6				\$ 270,500			\$ 270,500
2010	7		\$ 1,050,750		\$ 270,500			\$ 1,321,250
2011	8				\$ 270,500			\$ 270,500
2012	9			\$ 331,331	\$ 270,500			\$ 601,831
2013	10				\$ 270,500			\$ 270,500
2014	11				\$ 270,500			\$ 270,500
2015	12		\$ 1,050,750		\$ 270,500			\$ 1,321,250
2016	13				\$ 270,500			\$ 270,500
2017	14			\$ 331,331	\$ 270,500			\$ 601,831
2018	15				\$ 270,500			\$ 270,500
2019	16				\$ 270,500			\$ 270,500
2020	17		\$ 1,050,750		\$ 270,500			\$ 1,321,250
2021	18				\$ 270,500		\$ 257,702	\$ 528,202
2022	19			\$ 331,331	\$ 270,500			\$ 601,831
2023	20				\$ 270,500			\$ 270,500
2024	21				\$ 270,500			\$ 270,500
2025	22		\$ 1,050,750		\$ 270,500			\$ 1,321,250
2026	23				\$ 270,500			\$ 270,500
2027	24			\$ 331,331	\$ 270,500			\$ 601,831
2028	25				\$ 270,500			\$ 270,500
2029	26				\$ 270,500			\$ 270,500
2030	27				\$ 270,500			\$ 270,500
2031	28				\$ 270,500			\$ 270,500
2032	29			\$ 331,331		\$ 45,500		\$ 376,831
2033	30					\$ 45,500		\$ 45,500
2034	31					\$ 45,500		\$ 45,500
2035	32					\$ 45,500		\$ 45,500
2036	33					\$ 45,500		\$ 45,500
2037	34					\$ 45,500		\$ 45,500
2038	35					\$ 45,500		\$ 45,500
2039	36					\$ 45,500		\$ 45,500
2040	37					\$ 45,500		\$ 45,500
2041	38					\$ 45,500		\$ 45,500
2042	39					\$ 45,500		\$ 45,500
2043	40					\$ 45,500		\$ 45,500
2044	41					\$ 45,500		\$ 45,500
2045	42					\$ 45,500		\$ 45,500
2046	43					\$ 45,500		\$ 45,500
2047	44					\$ 45,500		\$ 45,500
2048	45					\$ 45,500		\$ 45,500
2049	46					\$ 45,500		\$ 45,500
2050	47					\$ 45,500		\$ 45,500
2051	48					\$ 45,500		\$ 45,500
2052	49					\$ 45,500		\$ 45,500
2053	50					\$ 45,500		\$ 45,500
2054	51					\$ 45,500		\$ 45,500
2055	52					\$ 45,500		\$ 45,500
2056	53					\$ 45,500		\$ 45,500
								\$ -
Totals		\$ 607,650	\$ 6,626,250	\$ 1,656,653	\$ 7,033,000	\$ 1,137,500	\$ 462,702	\$ 17,523,754

Calendar Year	Development Year	Alternative 4						
		Present Worth						
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total
2003	0	\$ 303,825	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 303,825
2004	1	\$ 295,144	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 295,144
2005	2	\$ -	\$ 2,286,757	\$ -	\$ -	\$ -	\$ 193,453	\$ 2,480,210
2006	3	\$ -	\$ -	\$ -	\$ 247,970	\$ -	\$ -	\$ 247,970
2007	4	\$ -	\$ -	\$ -	\$ 240,886	\$ -	\$ -	\$ 240,886
2008	5	\$ -	\$ -	\$ -	\$ 234,003	\$ -	\$ -	\$ 234,003
2009	6	\$ -	\$ -	\$ -	\$ 227,317	\$ -	\$ -	\$ 227,317
2010	7	\$ -	\$ 857,779	\$ -	\$ 220,823	\$ -	\$ -	\$ 1,078,602
2011	8	\$ -	\$ -	\$ -	\$ 214,513	\$ -	\$ -	\$ 214,513
2012	9	\$ -	\$ -	\$ 255,246	\$ 208,384	\$ -	\$ -	\$ 463,631
2013	10	\$ -	\$ -	\$ -	\$ 202,431	\$ -	\$ -	\$ 202,431
2014	11	\$ -	\$ -	\$ -	\$ 196,647	\$ -	\$ -	\$ 196,647
2015	12	\$ -	\$ 742,044	\$ -	\$ 191,028	\$ -	\$ -	\$ 933,073
2016	13	\$ -	\$ -	\$ -	\$ 185,570	\$ -	\$ -	\$ 185,570
2017	14	\$ -	\$ -	\$ 220,807	\$ 180,268	\$ -	\$ -	\$ 401,076
2018	15	\$ -	\$ -	\$ -	\$ 175,118	\$ -	\$ -	\$ 175,118
2019	16	\$ -	\$ -	\$ -	\$ 170,114	\$ -	\$ -	\$ 170,114
2020	17	\$ -	\$ 641,925	\$ -	\$ 165,254	\$ -	\$ -	\$ 807,179
2021	18	\$ -	\$ -	\$ -	\$ 160,533	\$ -	\$ 152,937	\$ 313,470
2022	19	\$ -	\$ -	\$ 191,015	\$ 155,946	\$ -	\$ -	\$ 346,961
2023	20	\$ -	\$ -	\$ -	\$ 151,490	\$ -	\$ -	\$ 151,490
2024	21	\$ -	\$ -	\$ -	\$ 147,162	\$ -	\$ -	\$ 147,162
2025	22	\$ -	\$ 555,314	\$ -	\$ 142,957	\$ -	\$ -	\$ 698,271
2026	23	\$ -	\$ -	\$ -	\$ 138,873	\$ -	\$ -	\$ 138,873
2027	24	\$ -	\$ -	\$ 165,243	\$ 134,905	\$ -	\$ -	\$ 300,148
2028	25	\$ -	\$ -	\$ -	\$ 131,051	\$ -	\$ -	\$ 131,051
2029	26	\$ -	\$ -	\$ -	\$ 127,306	\$ -	\$ -	\$ 127,306
2030	27	\$ -	\$ -	\$ -	\$ 123,669	\$ -	\$ -	\$ 123,669
2031	28	\$ -	\$ -	\$ -	\$ 120,136	\$ -	\$ -	\$ 120,136
2032	29	\$ -	\$ -	\$ 142,948	\$ -	\$ 19,630	\$ -	\$ 162,578
2033	30	\$ -	\$ -	\$ -	\$ -	\$ 19,069	\$ -	\$ 19,069
2034	31	\$ -	\$ -	\$ -	\$ -	\$ 18,525	\$ -	\$ 18,525
2035	32	\$ -	\$ -	\$ -	\$ -	\$ 17,995	\$ -	\$ 17,995
2036	33	\$ -	\$ -	\$ -	\$ -	\$ 17,481	\$ -	\$ 17,481
2037	34	\$ -	\$ -	\$ -	\$ -	\$ 16,982	\$ -	\$ 16,982
2038	35	\$ -	\$ -	\$ -	\$ -	\$ 16,497	\$ -	\$ 16,497
2039	36	\$ -	\$ -	\$ -	\$ -	\$ 16,025	\$ -	\$ 16,025
2040	37	\$ -	\$ -	\$ -	\$ -	\$ 15,567	\$ -	\$ 15,567
2041	38	\$ -	\$ -	\$ -	\$ -	\$ 15,123	\$ -	\$ 15,123
2042	39	\$ -	\$ -	\$ -	\$ -	\$ 14,690	\$ -	\$ 14,690
2043	40	\$ -	\$ -	\$ -	\$ -	\$ 14,271	\$ -	\$ 14,271
2044	41	\$ -	\$ -	\$ -	\$ -	\$ 13,863	\$ -	\$ 13,863
2045	42	\$ -	\$ -	\$ -	\$ -	\$ 13,467	\$ -	\$ 13,467
2046	43	\$ -	\$ -	\$ -	\$ -	\$ 13,082	\$ -	\$ 13,082
2047	44	\$ -	\$ -	\$ -	\$ -	\$ 12,708	\$ -	\$ 12,708
2048	45	\$ -	\$ -	\$ -	\$ -	\$ 12,345	\$ -	\$ 12,345
2049	46	\$ -	\$ -	\$ -	\$ -	\$ 11,993	\$ -	\$ 11,993
2050	47	\$ -	\$ -	\$ -	\$ -	\$ 11,650	\$ -	\$ 11,650
2051	48	\$ -	\$ -	\$ -	\$ -	\$ 11,317	\$ -	\$ 11,317
2052	49	\$ -	\$ -	\$ -	\$ -	\$ 10,994	\$ -	\$ 10,994
2053	50	\$ -	\$ -	\$ -	\$ -	\$ 10,680	\$ -	\$ 10,680
2054	51	\$ -	\$ -	\$ -	\$ -	\$ 10,374	\$ -	\$ 10,374
2055	52	\$ -	\$ -	\$ -	\$ -	\$ 10,078	\$ -	\$ 10,078
2056	53	\$ -	\$ -	\$ -	\$ -	\$ 9,790	\$ -	\$ 9,790
Totals		\$ 598,969	\$ 5,083,819	\$ 975,259	\$ 4,594,355	\$ 354,196	\$ 346,390	\$ 11,952,989



TABLE B.9E

ALTERNATIVE 5 - 50 YEAR COST ESTIMATE  
ENGINEERING AND PLANNING EVALUATION AND COST ASSESSMENT  
MCDOUGALL LANDFILL SITE

Inflation Rate 0.020  
Discount Rate 0.050

Calendar Year	Development Year	Alternative 5								Calendar Year	Development Year	Alternative 5							
		2003 Dollars										Present Worth							
		Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total				Approvals	Development	Closure	Landfill Operations, Monitoring & Maintenance	Post Closure	Contingency	Total	
2003	0	\$ 303,825						\$ 303,825	Landfilling	2003	0	\$ 303,825	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 303,825	
2004	1	\$ 303,825						\$ 303,825		2004	1	\$ 295,144	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 295,144	
2005	2		\$ 1,567,695				\$ 205,000	\$ 1,772,695		2005	2	\$ -	\$ 1,479,392	\$ -	\$ -	\$ -	\$ 193,453	\$ 1,672,845	
2006	3				\$ 270,500			\$ 270,500		2006	3	\$ -	\$ -	\$ -	\$ 247,970	\$ -	\$ -	\$ 247,970	
2007	4				\$ 270,500			\$ 270,500		2007	4	\$ -	\$ -	\$ -	\$ 240,886	\$ -	\$ -	\$ 240,886	
2008	5				\$ 270,500			\$ 270,500		2008	5	\$ -	\$ -	\$ -	\$ 234,003	\$ -	\$ -	\$ 234,003	
2009	6				\$ 270,500			\$ 270,500		2009	6	\$ -	\$ -	\$ -	\$ 227,317	\$ -	\$ -	\$ 227,317	
2010	7		\$ 210,195		\$ 270,500			\$ 480,695		2010	7	\$ -	\$ 171,593	\$ -	\$ 220,823	\$ -	\$ -	\$ 392,415	
2011	8				\$ 270,500			\$ 270,500		2011	8	\$ -	\$ -	\$ -	\$ 214,513	\$ -	\$ -	\$ 214,513	
2012	9			\$ 61,965	\$ 270,500			\$ 332,465		2012	9	\$ -	\$ -	\$ 47,736	\$ 208,384	\$ -	\$ -	\$ 256,120	
2013	10				\$ 270,500			\$ 270,500		2013	10	\$ -	\$ -	\$ -	\$ 202,431	\$ -	\$ -	\$ 202,431	
2014	11				\$ 270,500			\$ 270,500		2014	11	\$ -	\$ -	\$ -	\$ 196,647	\$ -	\$ -	\$ 196,647	
2015	12		\$ 210,195		\$ 270,500			\$ 480,695		2015	12	\$ -	\$ 148,441	\$ -	\$ 191,028	\$ -	\$ -	\$ 339,469	
2016	13				\$ 270,500			\$ 270,500		2016	13	\$ -	\$ -	\$ -	\$ 185,570	\$ -	\$ -	\$ 185,570	
2017	14			\$ 61,965	\$ 270,500			\$ 332,465		2017	14	\$ -	\$ -	\$ 41,295	\$ 180,268	\$ -	\$ -	\$ 221,563	
2018	15				\$ 270,500			\$ 270,500		2018	15	\$ -	\$ -	\$ -	\$ 175,118	\$ -	\$ -	\$ 175,118	
2019	16				\$ 270,500			\$ 270,500		2019	16	\$ -	\$ -	\$ -	\$ 170,114	\$ -	\$ -	\$ 170,114	
2020	17		\$ 210,195		\$ 270,500			\$ 480,695		2020	17	\$ -	\$ 128,412	\$ -	\$ 165,254	\$ -	\$ -	\$ 293,667	
2021	18				\$ 270,500		\$ 257,702	\$ 528,202		2021	18	\$ -	\$ -	\$ -	\$ 160,533	\$ -	\$ 152,937	\$ 313,470	
2022	19			\$ 61,965	\$ 270,500			\$ 332,465		2022	19	\$ -	\$ -	\$ 35,723	\$ 155,946	\$ -	\$ -	\$ 191,669	
2023	20				\$ 270,500			\$ 270,500		2023	20	\$ -	\$ -	\$ -	\$ 151,490	\$ -	\$ -	\$ 151,490	
2024	21				\$ 270,500			\$ 270,500		2024	21	\$ -	\$ -	\$ -	\$ 147,162	\$ -	\$ -	\$ 147,162	
2025	22		\$ 210,195		\$ 270,500			\$ 480,695		2025	22	\$ -	\$ 111,087	\$ -	\$ 142,957	\$ -	\$ -	\$ 254,044	
2026	23				\$ 270,500			\$ 270,500		2026	23	\$ -	\$ -	\$ -	\$ 138,873	\$ -	\$ -	\$ 138,873	
2027	24			\$ 61,965	\$ 270,500			\$ 332,465		2027	24	\$ -	\$ -	\$ 30,903	\$ 134,905	\$ -	\$ -	\$ 165,809	
2028	25				\$ 270,500			\$ 270,500		2028	25	\$ -	\$ -	\$ -	\$ 131,051	\$ -	\$ -	\$ 131,051	
2029	26				\$ 270,500			\$ 270,500		2029	26	\$ -	\$ -	\$ -	\$ 127,306	\$ -	\$ -	\$ 127,306	
2030	27				\$ 270,500			\$ 270,500		2030	27	\$ -	\$ -	\$ -	\$ 123,669	\$ -	\$ -	\$ 123,669	
2031	28				\$ 270,500			\$ 270,500		2031	28	\$ -	\$ -	\$ -	\$ 120,136	\$ -	\$ -	\$ 120,136	
2032	29			\$ 61,965		\$ 45,500		\$ 107,465	Post-closure Monitoring	2032	29	\$ -	\$ -	\$ 26,734	\$ -	\$ 19,630	\$ -	\$ 46,364	
2033	30					\$ 45,500		\$ 45,500		2033	30	\$ -	\$ -	\$ -	\$ 19,069	\$ -	\$ -	\$ 19,069	
2034	31					\$ 45,500		\$ 45,500		2034	31	\$ -	\$ -	\$ -	\$ -	\$ 18,525	\$ -	\$ 18,525	
2035	32					\$ 45,500		\$ 45,500		2035	32	\$ -	\$ -	\$ -	\$ -	\$ 17,995	\$ -	\$ 17,995	
2036	33					\$ 45,500		\$ 45,500		2036	33	\$ -	\$ -	\$ -	\$ -	\$ 17,481	\$ -	\$ 17,481	
2037	34					\$ 45,500		\$ 45,500		2037	34	\$ -	\$ -	\$ -	\$ -	\$ 16,982	\$ -	\$ 16,982	
2038	35					\$ 45,500		\$ 45,500		2038	35	\$ -	\$ -	\$ -	\$ -	\$ 16,497	\$ -	\$ 16,497	
2039	36					\$ 45,500		\$ 45,500		2039	36	\$ -	\$ -	\$ -	\$ -	\$ 16,025	\$ -	\$ 16,025	
2040	37					\$ 45,500		\$ 45,500		2040	37	\$ -	\$ -	\$ -	\$ -	\$ 15,567	\$ -	\$ 15,567	
2041	38					\$ 45,500		\$ 45,500		2041	38	\$ -	\$ -	\$ -	\$ -	\$ 15,123	\$ -	\$ 15,123	
2042	39					\$ 45,500		\$ 45,500		2042	39	\$ -	\$ -	\$ -	\$ -	\$ 14,690	\$ -	\$ 14,690	
2043	40					\$ 45,500		\$ 45,500		2043	40	\$ -	\$ -	\$ -	\$ -	\$ 14,271	\$ -	\$ 14,271	
2044	41					\$ 45,500		\$ 45,500		2044	41	\$ -	\$ -	\$ -	\$ -	\$ 13,863	\$ -	\$ 13,863	
2045	42					\$ 45,500		\$ 45,500		2045	42	\$ -	\$ -	\$ -	\$ -	\$ 13,467	\$ -	\$ 13,467	
2046	43					\$ 45,500		\$ 45,500		2046	43	\$ -	\$ -	\$ -	\$ -	\$ 13,082	\$ -	\$ 13,082	
2047	44					\$ 45,500		\$ 45,500		2047	44	\$ -	\$ -	\$ -	\$ -	\$ 12,708	\$ -	\$ 12,708	
2048	45					\$ 45,500		\$ 45,500		2048	45	\$ -	\$ -	\$ -	\$ -	\$ 12,345	\$ -	\$ 12,345	
2049	46					\$ 45,500		\$ 45,500		2049	46	\$ -	\$ -	\$ -	\$ -	\$ 11,993	\$ -	\$ 11,993	
2050	47					\$ 45,500		\$ 45,500		2050	47	\$ -	\$ -	\$ -	\$ -	\$ 11,650	\$ -	\$ 11,650	
2051	48					\$ 45,500		\$ 45,500		2051	48	\$ -	\$ -	\$ -	\$ -	\$ 11,317	\$ -	\$ 11,317	
2052	49					\$ 45,500		\$ 45,500		2052	49	\$ -	\$ -	\$ -	\$ -	\$ 10,994	\$ -	\$ 10,994	
2053	50					\$ 45,500		\$ 45,500		2053	50	\$ -	\$ -	\$ -	\$ -	\$ 10,680	\$ -	\$ 10,680	
2054	51					\$ 45,500		\$ 45,500		2054	51	\$ -	\$ -	\$ -	\$ -	\$ 10,374	\$ -	\$ 10,374	
2055	52					\$ 45,500		\$ 45,500		2055	52	\$ -	\$ -	\$ -	\$ -	\$ 10,078	\$ -	\$ 10,078	
2056	53					\$ 45,500		\$ 45,500		2056	53	\$ -	\$ -	\$ -	\$ -	\$ 9,790	\$ -	\$ 9,790	
								\$ -											
Totals		\$ 607,650	\$ 2,408,475	\$ 309,825	\$ 7,033,000	\$ 1,137,500	\$462,702	\$ 11,959,152		Totals		\$ 598,969	\$ 2,038,924	\$ 182,392	\$ 4,594,355	\$ 354,196	\$ 346,390	\$ 8,115,227	