July 1, 2005

TO INTERESTED PARTIES:

RE: Burnsville Sanitary Landfill Expansion Project
Final Environmental Impact Statement

Enclosed for your information is a copy of the Minnesota Pollution Control Agency (MPCA) Final Environmental Impact Statement (EIS) for the proposed Burnsville Sanitary Landfill Expansion Project, Dakota County (Project). This document contains the MPCA's responses to timely substantive comments submitted to the MPCA on the Draft EIS on the Project, as required by Minn. R. 4410.2700, subp. 1.

This document, the errata sheet with attached revised pages and the Draft EIS document that was mailed on May 6, 2005, to interested parties, together comprise the Final EIS on the Project, as provided in Minn. R. 4410.2700, subp. 2.

A public notice of the availability of the Final EIS is being published in the Environmental Quality Board Monitor on July 4, 2005, pursuant to Minn. R. 4410.2700, subp. 4-6. Pursuant to Minn. R. 4410.2800, subp. 2, publication of the public notice begins a ten-day public review period during which any person may submit comments on the adequacy of the Final EIS to the MPCA. This comment period will expire at the end of the day on July 18, 2005. If you have further questions regarding this Project please contact me at (651) 296-7796

Sincerely,

Kelly Garvey
Project Manager
Environmental Review and Operations Section
Regional Division

KG:gs

Enclosure

MINNESOTA POLLUTION CONTROL AGENCY

ERRATA
for the

Burnsville Sanitary Landfill Expansion Project
FINAL ENVIRONMENTAL IMPACT STATEMENT

July 1, 2005

The attached should replace pages i, 3, 4, 29, 62, and 75 of the Draft EIS dated May 6, 2005. The revisions to the draft are a result of errors discovered during the public review period. The cover page should be replaced with the revised cover page which changed the word Draft to Final. These revisions and the Draft EIS mailed out on May 6, 2005, to interested parties together comprise the Final EIS for the Burnsville Sanitary Landfill Expansion Project.

Burnsville Sanitary Landfill Expansion Project 2005

FINAL ENVIRONMENTAL IMPACT STATEMENT
JULY 2005

Burnsville Sanitary Landfill, Inc.

Minnesota Pollution Control Agency

520 Lafayette Road North, St. Paul, Minnesota, 55155

Cover Sheet

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(5) Draft EIS

Abstract

(6) Waste Management, Inc. owns and operates the Burnsville Sanitary Landfill (Landfill or BSLI) under MPCA Permit No. SW-56 and Dakota County Solid Waste License No. 3378385. The Landfill presently is developed over 145 acres on a 360-acre parcel owned by Burnsville Sanitary Landfill, Inc., a wholly owned subsidiary of Waste Management, Inc. The Landfill receives mixed municipal solid waste and construction and demolition waste from the Twin Cities Metro Area. The proposed project is to expand the Landfill both horizontally and vertically. The horizontal expansion includes 42.2 acres of which 37.8 acres will be used for waste disposal. The vertical expansion consists of increasing the height of the fill by 6.5 feet over the permitted 80.6-acre disposal area. The proposed expansion will provide 6.2 million cubic yards of additional airspace. This Draft Environmental Impact Statement addresses impacts associated with the proposed expansion in regard to groundwater, air quality, alternatives, and economic and social impacts. Mitigation measures are recommended for unavoidable environmental impacts.

(7) Draft EIS public meeting date: Tuesday, May 31, 2005; 7:00-9:00 p.m.
(7) Draft EIS comments deadline date: June 13, 2005

Burnsville Sanitary Landfill Expansion Project 2005

Final Environmental Impact Statement

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1 Summary

1.1 Major Findings

1.1.1 Alternatives Analysis

The following major findings were discovered as part of the alternatives analysis that examined impacts as a result of the "No Build" option where waste would be sent to other facilities than the Burnsville Sanitary Landfill (Landfill or BSLI):

- Wastes being transported to one of the Designated Alternative Landfills would significantly impact the life of the designated facility as shown in Table 5-2. The reduction in landfill operating life for the facilities studied ranged from 44.2 percent up to 95.7 percent. This would result in significant local impacts on available disposal capacity at the Designated Alternative Landfills.

- The Timberline Trail Recycling and Disposal Facility in Weyerhaeuser, Wisconsin, appears to have the best economics should the "No Build" option be implemented. The Minnesota facilities' overall economics are affected by the local and state fees and taxes collected, causing the Wisconsin facilities to have a lower cost for users. The Timberline Trail Landfill also has one of the best landfill liner systems for the Designated Alternative Facilities. From an air emissions impact analysis, Timberline Trail has an active landfill gas (LFG) collection system and a flare, which is environmentally preferred. Thus, the Timberline Trail Recycling and Disposal Facility was designated the "preferred facility" if the "No Build" option is selected. Disposal of BSLI waste at the Timberline Trail Recycling and Disposal Facility will reduce the expected life of the facility by 57.6 percent.

- If the "No Build" option is selected, beneficial impacts identified include:

  - An increase to transfer haul employment can be expected due to the need for trucking to transfer the waste to the Designated Alternative Facility selected.
  - An increase in labor and equipment at the alternative landfills to dispose of waste from the BSLI.
  - Potential lower user costs to BSLI users due to lower overall costs for transfer and disposal at the Designated Alternative Facility versus local disposal.

- If the "No Build" option is selected, adverse impacts identified include:

  - Lost employment at BSLI.
  - The need to site, permit, and build a transfer station, with adequate capacity, at an estimated capital cost of $5 million.
  - Less than full use of potentially available airspace at BSLI.
  - Increased air space consumption at the selected Designated Alternative Facility.
  - Loss of state and local funding as a result of no disposal at BSLI.

1.1.2 Groundwater and Surface Water Resources

The following major findings were discovered during the analysis of groundwater impacts and liner analysis at the Landfill:

- The groundwater quality monitoring network is sufficient to detect contamination provided the current quarry de-watering continues. Should de-watering be discontinued, further hydrogeologic investigation may be warranted to determine if the monitoring network is adequate to detect groundwater impacts from the Landfill.

- Under non-pumping conditions, the analysis indicates that, in portions of the Landfill, there will be less than a 5-foot separation between the water table and the liner; however, the liner will be above the water table.

- The liner and leachate collection system proposed are not anticipated to have significant environmental impacts due to potential failure mechanisms during normal flow conditions.

- The leachate collection system is not anticipated to have major environmental impacts as a result of failure during a 100-year flood event.

- The liner system may have the potential for major failure during the 100-year flood event due to the potential loss of foundation stability. This concern can be addressed by waste buttressing and/or phased filling of the expansion. A complete geotechnical analysis of this potential will be included as part of permitting of the expansion.

1.1.3 Air Quality

The following major findings were discovered in the air quality analysis for the proposed project at the BSLI:

- Landfill gas (LFG) is currently being collected and controlled at the Landfill. The expansion area LFG will also be collected and controlled.

- The existing control devices (engines and flare) are adequate to destroy the LFG generated as a result of this project.

- No significant environmental impacts are expected due to fugitive LFG emissions or control system emissions.

- The ability of the combined (Landfill and Minnesota Methane) facility, after expansion, to meet Ambient Air Quality Standards for PM_{10} emissions needs further study.

1.1.4 Economic and Social Impacts

The following major findings were discovered in the analysis of the project's impacts on economics and recreational resources:

- BSLI is one of only two landfills within the Solid Waste Management Coordinating Board (SWMCB) Regional Planning area that are permitted to dispose of municipal solid waste (MSW). Maintaining MSW disposal capacity within the region appears to be consistent with the SWMCB Regional Solid Waste Master Plan.

- Disposal costs in the region are driven by market conditions (beyond the impact of state and local taxes). There does not appear to be a reason to expect disposal costs to change as a result of approval of the BSLI expansion. If the BSLI expansion is not approved, there is a potential for disposal costs in the SWMCB regional planning area to increase due to decreased market competition.

- The transfer station capacity to transfer the BSLI waste to a Designated Alternative Facility is not currently available. Thus, a risk of having adequate transfer capacity for the wastes currently delivered to BSLI is present should the "No Build" option be accepted.

- Transfer of waste from the BSLI (if the "No Build" option is accepted) will have an impact on local, regional, and state government revenues. The city of Burnsville would lose $4.33 per ton; Dakota County $7.50 per ton; and the State of Minnesota $6.67 per ton Metro Landfill Fee~~, plus 17 percent on commercial waste and 9.75 percent on residential waste~~. This loss of revenue would have negative impacts on governmental agencies.

- It is not anticipated that the expansion of the BSLI will adversely impact recreational resources within the study area. With the expansion of the Landfill, there is evidence that there would not be an adverse impact because the city of Burnsville and the project proposers plan to develop the site for recreational activities~~be a long-term beneficial impact to recreational resources for residents of Burnsville and the surrounding communities~~.

1.2 Areas of Controversy

The following areas of controversy were discovered in preparing the Draft Environmental Impact Statement (EIS):

- **The use of gate rate tipping fees for analysis of the Designated Alternative Facilities**. One of the key considerations in the EIS preparation was to use data that is available in the public domain. It is acknowledged in Section 5 that haulers at some of the Designated Alternative Facilities receive rates less than the posted gate rate. However, these hauler rates are not part of the public domain and can vary greatly at facilities. Thus, the posted gate rate is appropriate to provide a comparative analysis of the Designated Alternative Facilities studied.

- **Use of average tip fees for Designated Alternative Facilities studied was suggested.** Average tip fees are submitted to the MPCA as part of a facility's annual report.

However, in the analysis of the Designated Alternative Facilities, only three of the fourteen Alternative Facilities have data for the average tip fee. Of the three facilities with average tip fees, only the Pine Bend Landfill had a significant change between the posted gate rate and the average tipping fee. Use of the average tip fee versus posted gate rate would cause controversy by using differing disposal costs metrics for each facility. Therefore, the posted gate rates were used in the Designated Alternative Facilities evaluation.

1.3 Issues to be Resolved

The following issues will require resolution prior to permitting the proposed project.

- The proposed expansion project includes vertical landfill development over the existing waste footprint at the Landfill. The Application for Permit Modification, Appendix A, Sheet 7 (McCain and Associates, August 28, 2003) does not depict the liner, leachate collection system, design grades, or limits of excavation to determine impacts associated with the proposed filling in the existing demolition disposal area. Further design detail will be evaluated as part of the permit process to determine potential impacts.

- The liner system stability needs further geotechnical analysis to determine if there is a potential for major failure during the 100-year flood due to differential loading and saturation of the subbase and clay liner as a result of the 100-year flood. This concern can be addressed by waste buttressing and/or phased filling of the expansion. A geotechnical analysis to determine potential impacts and mitigation measures will be performed and evaluated as part of the permitting process for the expansion.

1.4 Mitigation Measures

The following mitigation measures were identified as part of the environmental impact assessment:

- If the “No Build” option is selected, an additional study of impacts may be needed to better determine impacts associated with transfer station construction to transfer BSLI wastes. Mitigation of potential impacts from the “No Build” option would be to allow the Landfill to be constructed.

- Air quality impacts identified will be mitigated as part of permitting for the Landfill and the Minnesota Methane LFG-to-energy facility.

- Landfill liner stability concerns that may cause environmental impacts will be mitigated as part of permitting the Landfill.

- Adverse economic impacts were identified if the “No Build” option is selected. Mitigation of the impacts is to allow the Landfill to be constructed.

2 List of Preparers

The following Foth & Van Dyke employees were primarily responsible for the preparation of the Burnsville Sanitary Landfill Expansion Project 2005 Draft Environmental Impact Statement. The list includes names and qualifications as follows:

Name, Formal Education, Professional Discipline	Professional Experience	Project Responsibilities
Kathleen M. Osborne, P.E. B.S. Civil & Environmental Engineering	17 years experience in solid waste engineering	Project Manager and Client Liaison
Curtis L. Hartog, P.E. B.S. Mechanical Engineering Technology, M.S. Civil Engineering	13 years experience in solid waste facility operations and engineering	Technical Coordinator for the project and Air Quality Impacts
Warren A. Shuros B.S. General Science, M.S. Preventative Medicine & Environmental Health	28 years experience in strategic planning and solid waste planning	Technical Resource for the Alternatives and Economics and Social Impacts
Bruce F. Woods, ALSA B.S. Art, M.F.A. Art, M.A.L.A. Landscape Architecture	23 years experience in aesthetics, landscape architecture and design for landfills	Technical Resource for the Sociological Impacts for nearby recreational facilities
D. Roger Bruner B.S. Water Resources Management/Hydrogeology, M.S. Water Resources Science/Water Chemistry	20 years experience in hydrogeology and groundwater modeling, chemistry and remediation	Hydrogeologist for the Groundwater section
April K. Anderson, EIT B.S. Civil/Environmental Engineering, Master of Environmental Management	7 years experience as a project environmental engineer	Engineering technical support for primary staff

3 Project Description

Burnsville Sanitary Landfill, Inc., a wholly-owned subsidiary of Waste Management, Inc., owns and operates the Landfill under Minnesota Solid Waste Permit Number SW-56 and Dakota County Solid Waste License No. 3378385. The Landfill is located in an industrial/commercial area in the northwest corner of Burnsville, Dakota County, Minnesota (Section 32, Township 27N, Range 24W). The site is bounded by a railroad right-of-way to the south, the Minnesota River approximately 1,000 feet to the north, a limestone quarry to the east, and a grain elevator and barge terminal to the west.

The Landfill is presently developed on 145 acres of the 360-acre property owned by BSLI. The existing Landfill receives construction/demolition debris and mixed municipal solid waste (MSW) from the Twin Cities metropolitan area. The horizontal development area of the expansion project is located in the southwest portion of the Landfill property, and immediately adjacent to the existing permitted Landfill. The vertical development area of the expansion project is east of and contiguous with the proposed horizontal development area. The horizontal development footprint includes open land that is not currently used for any industrial activity. No other structures or facilities are located in the area.

The expansion project includes an approximate 42.2-acre horizontal expansion immediately west of the existing Landfill, 37.8 acres of which will be for the new MSW disposal cells; and a proposed vertical lift of 6.5 feet to the currently permitted 80.6-acre MSW disposal area. The Landfill location is shown on Figure 3-1. The expansion project will be bounded on the east by the existing Landfill, on the north and west side by a new flood levee, and along the south side by an earthen berm. The expansion project will provide approximately 6.2 million cubic yards of disposal capacity, and will be developed to an average elevation of 814 feet Mean Sea Level (MSL), with undulations above and below that elevation to provide varied topography for end-use purposes. The maximum elevation will be 820.5 feet MSL, which is 6.5 feet higher than the currently permitted elevation.

The expansion project will be developed in phases that minimize the size of the active area and allow efficient development of the permitted capacity. MSW is brought to the site by truck and unloaded at a relatively small area within the active area called the working face. The waste is immediately leveled and compacted by heavy equipment. Soil cover is placed over the waste on a daily basis. Once a phase is filled, it is closed in accordance with the permit requirements and a new phase is developed.

Figure 3-1 Burnsville Sanitary Landfill Location Map

4 List of Government Approvals

Unit of Government	Type of Application	Status
U.S. Army Corps of Engineers (USACE)	404 Wetland Permit	Pending
Federal Emergency Management Agency (FEMA)	Conditional Letter of Map Revision	Received August 1, 2003
Minnesota Pollution Control Agency (MPCA)	Solid Waste Permit	Pending
Minnesota Pollution Control Agency (MPCA)	Air Permit	To be amended
Office of Environmental Assistance (OEA)	Certificate of Need	Pending
Dakota County	Solid Waste License	Pending
Dakota County	Monitoring Well Permits	Pending
City of Burnsville	Concept-Stage Planned Unit Development (PUD)	Approved
City of Burnsville	Wetland Conservation Act	Pending
City of Burnsville	Development-Stage PUD	Pending
City of Burnsville	Work in Floodplain Conditional Use Permit (CUP)	Pending

5 Alternatives

5.1 Introduction

This alternatives section addresses the situation in which the expansion of the Landfill does not occur and the wastes currently managed at the Landfill must be handled at another facility. This has been titled the "No Build" option.

The MPCA and OEA conducted a preliminary review of potential sites to use as alternative facilities. This list of facilities was included in the Final EIS Scoping Document approved on May 27, 2004. The facilities include 12 different landfills and two resource recovery facilities. The following 14 facilities make up the Inventory of Designated Alternative Facilities:

- Elk River Landfill, Waste Management Inc., Elk River, MN
- Spruce Ridge Landfill, Waste Management Inc., Glencoe, MN
- Pine Bend Landfill, BFI/Allied, Inver Grove Heights, MN
- Forrest City Road Industrial Landfill, Onyx, Buffalo, MN
- SKB Rosemount Industrial Waste Landfill, SKB Environmental, Inc., Rosemount, MN
- Timberline Trail Recycling and Disposal Facility, Waste Management Inc. Weyerhaeuser, WI
- Seven Mile Creek Landfill, Onyx, Eau Claire, WI
- Sarona Landfill, BFI/Allied, Sarona, WI
- Central Disposal Landfill, Waste Management Inc., Lake Mills, IA
- Dickinson Landfill, Waste Management Inc., Spirit Lake, IA
- Jahner Landfill, Waste Management Inc., Wishek, ND
- Dakota Landfill, Waste Management Inc., Gwinner, ND
- Elk River Resource Recovery Facility, NRG Processing Solutions LLC, Elk River, MN
- Newport Resource Recovery Facility, NRG Processing Solutions LLC, Newport, MN

This section addresses the potential impact on each of these facilities considering the following factors:

- Existing and future capacity
- Trucking requirements and impacts
- Economics of using each facility
- Environmental impacts at the facilities from accepting the Landfill waste stream
- Employment changes caused by the "No Build" option on BSLI and the receiving facility

In addressing the "No Build" option, the following are points of clarification to address specific issues associated with how the waste at the Landfill will be handled:

- The entire waste stream currently (2003 data) going to the Landfill (270,202 tons of MSW and 94,126 tons of industrial wastes for a total of 364,328 tons) should be assumed to go to each of the facilities on the inventory list provided by the MPCA. If and when one of the facilities from the inventory list cannot accept all the waste, whether because of capacity or permit requirements regarding the type of wastes (i.e., municipal solid

wastes cannot be accepted at an industrial waste landfill), the remaining wastes should be assumed to be handled at a single other "preferred" facility. The definition of "preferred" was to be based on economic or environmental factors as appropriate.

- Because several of the alternative facilities are located a relatively great distance from the Landfill, the trucking part of this analysis was assumed to include the construction and operation of a solid waste transfer station in the general vicinity of the Landfill. It is important to point out that this assumption is only for the purposes of completing the trucking analysis with assumptions typical in the solid waste industry. This analysis does not address whether the development and especially permitting of a solid waste transfer station could be completed in the vicinity of the Landfill, which is an issue that would require fairly extensive analysis and is beyond the scope of this Draft EIS. It is appropriate to use the assumption of the transfer station due to the distance to several of the alternatives, which would prohibit direct haul of solid waste.

- It was determined that the EIS would address the potential environmental impacts at each receiving facility as the potential impacts relate to the type of landfill liner in use at the facility, the potential for landfill gas (LFG) to be generated, and the overall use of the available disposal capacity.

Table 5-1 provides a summary showing key data points for each facility on the Inventory of Designated Alternative Facilities. This table summarizes data associated with the name, address, owner, tons of wastes received, capacity, liner characteristics, distance from the Landfill, tipping fees, and the number of employees. The data came from a number of different sources. Some of the data used was provided by the MPCA as it was compiled by staff from the OEA. Their source was reported to primarily be the 2003 Annual Reports submitted by the facility owners to state authorities. Other facility specific data came from surveys conducted as part of this project or direct conversations with company representatives of the various facilities.

The capacity used per year at each facility was not available at all sites and/or not in uniform units of measurement. Some data sources provided the tonnage for a specific year rather than the cubic yards of airspace used per year. This creates inaccurate calculations of the amount of airspace used per ton of waste. There were several facilities for which the year of the tonnage and cubic yards of airspace used per year were known to be the same year. These had an average airspace utilization factor of approximately 0.75 tons per cubic yard of airspace. The use of this specific data in this analysis is for purposes of projecting the speed of use of future airspace for each landfill receiving the quantity of waste projected to be disposed (364,328 tons per year). Therefore, a standard capacity utilization factor of 0.75 ton per cubic yard was used for each facility where the data were not consistent.

Table 5-1 Inventory of Designated Alternative Facilities

Table 5-1 (back side)

5.2 Capacity Issues

Table 5-2 provides an analysis of the impact on the landfill capacity and life expectancy of each alternative landfill, from the Designated Alternative Facilities list, in the "No-Build" option. The table lists the Designated Alternative Landfill, location, owner, and current waste received. Table 5-2 continues by adding the MSW and Industrial Waste to the current Total Waste Received at each facility. The Capacity Used per year in cubic yards of airspace is calculated by the common airspace utilization factor of 0.75 tons of waste per cubic yard of airspace. The Starting Remaining Current Capacity for each landfill is noted. Table 5-2 calculates the Number of Years of Current Capacity Adding BSLI Wastes by assuming all waste received consumes airspace at a rate of 0.75 tons per cubic yard. The next line item in the table is any Known Future Expansion Plans. For purposes of the analysis, the expansion capacity is assumed to become available and be consumed at the same rate. Table 5-2 shows the Number of Years of Expansion Capacity and the Total Years of Capacity when the BSLI wastes are delivered in addition to existing tonnages at each facility. Finally, Table 5-2 shows the Total Years of Capacity at each facility without delivering the BSLI tonnage and the Percent Reduction in each Facility Life by Adding BSLI Wastes.

As a "stand alone" factor, there is "capacity" at the Designated Alternative Landfills to handle the BSLI wastes. The wastes would be able to be managed in an existing permitted landfill. This would be particularly true if each other facility was to obtain the airspace noted in their "Known Future Expansion Plans." Nevertheless, as shown in Table 5-2, there would be significant impacts on any one facility if all the BSLI wastes were diverted to one facility. The reduction in life for the landfills taking the MSW and industrial wastes, ranges from 44.2 percent up to 95.7 percent. If this were to occur, there would be significant local impacts on available waste disposal capacity.

An NRG representative was interviewed as part of this project to determine the capacity to handle the wastes from BSLI. Both the Newport and Elk River Resource Recovery plants have a permitted MSW processing capacity of 500,000 tons per year. However, they are limited by the combustion plant capacity at Red Wing, Wilmarth, and the Great River Energy plant in Elk River such that the realistic capacity is approximately 450,000 tons per year of MSW received at each resource recovery facility. As shown in Table 5-1, each resource recovery facility receives approximately 434,000 tons of MSW per year. NRG indicated that their total additional capacity (both plants) would be 25,000 to 30,000 additional tons per year. Thus, for purposes of this analysis, each NRG Resource Recovery Facility will be assumed to receive 15,000 tons per year. The remaining waste is assumed to be transferred to one of the other Designated Alternative Landfills.

5.3 Trucking Requirements and Impacts

A key aspect to the "No-Build" Option is getting the wastes from the Landfill to each of the Designated Alternative Facilities. As noted, it is necessary to assume that a transfer station would be utilized for this purpose even though it is critical to note that no analysis of the ability to site and permit such a transfer station is included in this Draft EIS. The transfer station assumption is necessary because of the distance to several of the Designated Alternative Facilities. Ten of the facilities are over 50 miles from the Landfill. Seven of the facilities are over 100 miles from the Landfill and the furthest facility is 435 miles from the Landfill. The only realistic method of reaching these locations is via transfer hauling.

The OEA conducted a query of SCORE data for 2002 and 2003 and found that 97 to 99 percent of wastes brought to the Landfill were direct hauled rather than brought from a transfer station. Thus, not much waste is transferred in from another location (i.e., is already loaded on a transfer trailer) that could go elsewhere. This confirms the assumption of transfer hauling wastes from the Landfill to the other Designated Alternative Facilities.

The tonnage assumed to be transferred is the total of 364,328 tons shown in Table 5-1 to be delivered to the Landfill. On a six-day-per-week basis, this represents just under 1,200 tons per day. There would be peak deliveries at times of the year over this average and the facility would need to be capable of accommodating the peak tonnages. Design and detailed cost estimating for a transfer facility to process this amount of waste is beyond the scope of this Draft EIS, but some general industry experience can be used to develop preliminary cost estimates.

Based on input from Waste Management, Inc. (they have extensive experience owning and operating transfer stations in the local market), the capital cost for a transfer station capable of handling the 1,200 tons per day could be from $4 to $6 million. For purposes of this analysis, a capital cost estimate of $5 million will be used. This is assumed to cover the cost of land, permitting, engineering, site development, and building construction. The capital cost estimate will be assumed to be the same regardless of which of the Designated Alternative Facilities is used.

The cost to operate and maintain the transfer station was estimated by Waste Management, Inc. to be from $5 to $7 per ton. For purposes of this analysis, a cost of $6 per ton will be used as the cost to operate the transfer station regardless of which of the Designated Alternative Facilities is used. Thus, the annual cost to operate the transfer station is $2,185,968 ($6 per ton times 364,328 tons).

The hauling cost for the wastes depends on several variables including distance to the site, speed of the transfer vehicle, labor costs, fuel costs, and the like. Generally, some industry averages can be used to develop estimates of the "cost per ton-mile" to transfer haul the wastes.

According to Waste Management, Inc. and in concurrence with industry averages, the cost per mile to own and operate the transfer tractor and trailer (including the equipment, labor, fuel, and maintenance) ranges from $1.25 to 1.50 per mile. The average weight per load for a transfer

Table 5-2 Capacity Analysis of Designated Alternative Landfills

Table 5-2 back side

trailer ranges from 18 to 20 tons per load. Using this data, the average "cost per ton-mile" ranges from 6.25 cents to 8.33 cents (i.e., $1.25/20 tons and $1.50/18 tons respectively).

One of the most critical variables affecting the cost per ton-mile is the overall distance to the site and the type of roads available. The longer the haul, the lower the unit cost per mile. This is also affected by the amount of stop and go highway traffic versus Interstate Highways. For purposes of this analysis, a cost of 8.33 cents per ton-mile is used to estimate the transfer haul cost to the Designated Alternative Facilities that are less than 25 miles from the Landfill. For the Designated Alternative Facilities that are more than 26 miles but less than 100 miles, a cost per ton-mile of 7.5 cents is used. For locations over 101 miles, a cost per ton-mile of 6.25 cents is used. These values will approximate the improved economies of scale of distance and local highway traffic.

Table 5-3 provides the Transfer Haul Cost Estimates. For the Designated Alternative Facilities that could handle all the waste from the Landfill, the transfer haul costs range from $849,759 delivered to Pine Bend (the closest facility) to $19,810,335 to the Jahner Landfill (the furthest facility).

5.4 Employment Changes and Economic Impacts in Using Each Designated Alternative Facility

Some of the economic impacts of using the Designated Alternative Facilities are related to the various employment changes that could occur. Therefore, this subsection combines the employment changes caused by the "No-Build" Option with other economic impacts. Overall, the economic impacts are associated with several changes including:

- Transfer Station Capital, Operating, and Maintenance Costs
- Transfer Haul Costs to each facility and increased transfer drivers
- Tipping Fee Costs at each facility
- Operational changes at each facility that increase equipment and labor needs

This subsection of the report addresses the economic and employment impacts at each facility as well as the Landfill. This subsection also provides the total user cost estimates.

5.4.1 Employment and Economic Impact at BSLI

Waste Management Inc. reports that there are 11 employees currently employed by BSLI, with a total annual payroll of $470,000. These employees and payroll would no longer be present in the "No-Build" option.

5.4.2 Transfer Station/Transfer Haul Employment and Economic Impact

As noted, the modeling for the Trucking Cost Analysis in Section 5.3, Trucking Requirements and Impacts, assumes that a transfer station would be sited, permitted, and operated to receive and transfer the wastes. The capital and operating costs were reported in Section 5.3 to be approximately $5 million in capital and approximately $2,186,000 for operations and maintenance per year. The employment assumptions at the transfer station include up to 4 people employed at approximately $30 per hour (including benefits) for a total employment economic impact of approximately $250,000 per year.

The employment impact associated with transfer haul will vary from facility to facility depending on the distance and travel speed. As noted, the average weight per transfer trailer load is estimated to be from 18 to 20 tons per load. For purposes of this analysis, an average of 19 tons will be used. With a total of 364,328 tons to transfer, it would require a total of 19,175 loads.

Table 5-4 provides an analysis of the number of driver employees required to haul to each facility. The average speed is dependent on the distance and type of highway. Similar to the development of the average cost per ton-mile, three average travel speeds were used. An average speed of 45 miles per hour (mph) was used for facilities located less than 25 miles away. For facilities located more than 26 miles and less than 100 miles from the Landfill, an average speed of 55 mph was used. For facilities over 100 miles away, an average speed of 60 mph was used. These speeds were used to calculate the Hours per Trip (with an allowance of 0.5 hour for unloading at each facility). The number of trips each driver could make in a year is based upon the trip time and an allowance of 2,000 hours per year for each driver. The cost of $60,000 per driver per year was an estimate provided by Waste Management, Inc. based on their experience in this market.

For the landfills that are capable of handling the entire waste tonnage, the number of drivers needed per year ranges from 11 drivers to transfer waste to Pine Bend Landfill (the closest facility) to a high of 144 drivers to transfer waste to the Jahner Landfill in Wishek, North Dakota. The employment cost range varied from a low of $645,564 to a high of $8,628,821.

5.4.3 Employment and Economic Impact on Facility Operations

There will need to be additional labor and equipment at each Designated Alternative Landfill to handle the average 1,200 tons per day of wastes received. In general, the landfill compactors expected to be used for operations of this size, could handle approximately (plus or minus) 550 tons per day per compactor. Thus, to properly handle the approximately 1,200 tons per day would require an additional two landfill compactors. There would also be a need for an additional dozer, earth moving vehicle, new scale, and associated miscellaneous equipment. Table 5-5 provides an estimate of the cost of the additional equipment and facilities. This additional equipment and facilities capital cost would be amortized in the increased tipping fee revenue received at each facility.

Table 5-3 Transfer Haul Cost Estimates

Table 5-3 back side

Table 5-4 Transfer Haul Driver Employment Estimate

Table 5-4 back side

Table 5-5 Additional Equipment Required

Item	Number	Capital Cost Estimate
Compactors	2	$1,350,000
Dozer	1	470,000
Haul Truck (dirt handling)	1	525,000
Scale	1	60,000
Miscellaneous	--	50,000
TOTAL	--	$2,455,000

Source: Equipment needs and preliminary cost estimates provided by Waste Management, Inc.

There will be an associated increase in labor to operate the equipment noted above (total of 4 equipment operators for 2 compactors, a dozer, and a haul truck), as well as an additional maintenance mechanic, a general laborer, and a scale operator. Labor rates vary somewhat from location to location. For the most part, industry professionals note the labor rates at the Minnesota, Iowa, and Wisconsin landfills are fairly consistent from location to location. The North Dakota locations are somewhat lower. Tables 5-6A and 5-6B show the annual additional employment costs for the Iowa, Minnesota, Wisconsin, and the North Dakota sites respectively.

Table 5-6A Additional Annual Operating Employment Costs

Iowa, Minnesota, and Wisconsin Landfills

Classification	Number	Total $
Equipment Operators	4	$240,000
Mechanic	1	65,000
Laborer	1	40,000
Scale Operator	1	40,000
TOTAL	7	$385,000

Table 5-6B Additional Annual Operating Employment Costs

North Dakota Landfills

Classification	Number	Total $
Equipment Operators	4	$160,000
Mechanic	1	45,000
Laborer	1	25,000
Scale Operator	1	20,000
TOTAL	7	$250,000

The additional labor cost would be recouped as part of the increased tipping fee revenue received at each facility.

5.4.4 Summary of Employment and Economic Impacts

Table 5-7 summarizes the changes in the number of employees and the associated costs for the Designated Alternative Facilities to receive BSLI wastes. In the "No Build" Option, the 11 employees and associated $470,000 per year in BSLI's payroll will be lost. In each option to take all the wastes to a Designated Alternative Facility, there will be four added employees at the assumed transfer station and an additional seven employees at each facility that can handle the entire quantity of wastes to be delivered. Thus, the net change in employment is eleven less for BSLI, four more at the transfer station, plus seven at the receiving facility, for a net employment change of zero. The primary change in employment is for all the transfer drivers to truck the wastes from the transfer station to the Designated Alternative Facilities. For facilities that can accept all the wastes, the number of additional drivers ranges from 11 up to 144. The associated additional employment labor cost for the transfer drivers is $645,564 to $8,628,821.

Table 5-8 provides an estimate of the Total User Costs at Each Designated Alternative Facility based on the quantity of wastes each can handle. These are compared to the costs to handle the materials at the Landfill. For purposes of this analysis, the "Posted Tipping Fee or Gate Rate" per ton is used as the basis for the disposal cost to the users. It should be noted that not all users pay the gate rates at any particular facility. There are often contract rates for volume users. Nevertheless, using the common assumption of the "gate rate" for every facility does provide some common basis for comparison. One of the factors of the "gate rate" that needs to be addressed separately due to the extent of the economic impact is the level of taxes and host fees assessed at the facilities. That issue is covered further in this section and in Section 7.

Based on the posted tipping fee of $69.78 per ton at the Landfill, the Total Annual Cost is $25,422,808. In looking at the Designated Alternative Facilities that can handle all the wastes from the Landfill, the Total Annual Costs range from a low of $22,025,449 at the Timberline Trail Recycling and Disposal Facility owned by Waste Management, Inc. in Weyerhaeuser, Wisconsin, to a high of $34,383,125 at the Jahner Landfill owned by Waste Management, Inc. in Wishek, North Dakota. The primary variables in this comparison that affect the Total Annual Costs are the tipping fee and the total distance to the Designated Alternative Facility. The Jahner Landfill has the lowest posted tipping fee, but it is also by far the longest distance to truck the wastes and this longer distance more than offsets the lower tipping fee. Of the Designated Alternative Facilities within the State of Minnesota, the Spruce Ridge Landfill owned by Waste Management, Inc. in Glencoe, Minnesota, has the lowest Total Annual Cost ($24,828,953). The added transfer station and transfer hauling costs are offset by the savings in the posted tipping fee ($69.78 at the Landfill versus $52.20 at Spruce Ridge). Also, despite being the closest landfill capable of handling all the wastes, the Pine Bend Landfill had one of the higher Total Annual Costs, based primarily on the higher posted tipping fee of $75 per ton. As noted, each Designated Alternative Facility typically provides contract rates below the posted tipping fee. Using a contract tip fee at Pine Bend Landfill in this analysis could modify the results for the overall economics. However, doing so without also using contract rates at the other Designated Alternative Facilities would bias the analysis.

Table 5-7 Summary of Employment Changes and Related Economic Impacts

Table 5-7 back side

Table 5-8 Total User Cost Estimates at Each Designated Alternative Facility

Table 5-8 back side

One of the key issues affecting the posted tipping fee is the level of taxes and host community fees charged by public entities. For example, at the Landfill, the posted tipping fee of $69.78 per ton includes the following taxes or fees paid to public entities:

- City of Burnsville $3.33 landfill tax
- City of Burnsville $1.00 host fee
- State of Minnesota $6.67 ~~landfill tax~~Metro Landfill Fee
- Dakota County $7.50 landfill tax average (ranges from $6.84 to $9.13)
- State of Minnesota 17 percent tax on total for commercial wastes and 9.75 percent on residential wastes

According to Waste Management, Inc. the net tipping fee of the posted tipping fee that they keep is $41.30 per ton. That means that there is a total of $28.58 per ton that ends up at the state, county, or city level that would no longer be available from the Landfill in the "No Build" option. The estimates for these revenues are broken down as follows:

- City of Burnsville - $4.33 times 364,328 tons equals $1,577,540 per year
- Dakota County - $7.50 times 364,328 equals $2,732,460 per year
- State of Minnesota - $6.67 times 364,328 equals $2,430,068 per year
- ~~State of Minnesota – 13 percent (average of 9.75 and 17) of $41.30 times 364,328 tons equals $1,956,077 per year~~

Depending on which other Designated Alternative Facility was to receive the wastes could significantly affect these revenues for the public entities. The city of Burnsville would lose the estimated $1.5M per year, as none of the Designated Alternative Facilities is within the city of Burnsville. Dakota County could lose the estimated $2.7M, as there are significantly less expensive Alternatives outside Dakota County. Finally, the lowest Total Annual Cost facility is located in the State of Wisconsin; therefore, the State of Minnesota could lose approximately $2.4M~~$4.4M~~ if waste is transferred out of state.

5.5 Environmental Impacts at Designated Alternative Facilities

5.5.1 Landfill Gas (LFG)

LFG is created due to the biological breakdown of organic material in MSW. LFG is comprised of approximately 50 percent methane and 50 percent carbon dioxide and a small fraction (typically less than 1 percent) of non-methane organic compounds (NMOCs) that include volatile organic compounds and hazardous air pollutants.

Current regulations (40 CFR 60.750 et. seq.) require landfills with a design capacity equal to or greater than 2.5 million megagrams (2.76 million tons), or 2.5 million cubic meters (3.27 million cubic yards) to install an active gas collection and control system unless they can demonstrate from on-site testing (Tier I, II, or III) the NMOC emission rate is less than 50 megagrams (approximately 55 tons) per year. Current regulations also provide the methodology and equation to estimate the NMOC emission from waste deposited at the site.

Table 5-9 contains the site and LFG data for the Designated Alternative Facilities.

LFG collection and control facilities are not required for industrial waste landfills (Onyx FCR Industrial Landfill and SKB Rosemount Industrial Waste Landfill) or Resource Recovery Facilities (Elk River and Newport). Of the remaining sites, only two landfills have no controls—the Dickinson Landfill in Iowa and the Jahner Landfill in North Dakota. Both landfill sites are under the regulatory thresholds for mandated gas collection and control. However, Waste Management Inc. does intend to install an active LFG collection and control system at the Dickinson Landfill in the summer of 2005. The system will consist of gas collection wells, a blower, and a flare. The purpose of the system is for subsurface gas migration control.

Of the remaining facilities, one has a passive gas venting system (Dakota Landfill, North Dakota), four have active systems with flares as the control device, three have active systems that convert the LFG to energy by using internal combustion (IC) engines, and one uses gas turbines to convert LFG to electricity and produce steam.

EPA publication AP-42 "Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Potential Area Sources," Chapter 2, "Solid Waste Disposal" lists the control efficiencies for LFG control systems. Table 5-10 provides a summary of the efficiencies.

To minimize environmental impacts from LFG production, the preferred method is to collect the LFG using an active system and convert the LFG to energy using a turbine or IC engine. The facilities that provide LFG conversion include:

- Burnsville Sanitary Landfill
- Elk River Landfill
- Pine Bend Landfill
- Seven Mile Creek Landfill

Assuming the "No Build" option, the environmentally preferred alternative from a LFG perspective would be the Pine Bend Landfill due to the slightly better control efficiency of a turbine compared to an IC engine. However, the environmental preference is extremely small and is based on the published increased control efficiency of gas turbines compared to IC engines. All the facilities utilizing LFG to energy technology and flares can achieve required pollution standards as established by the MPCA and in the case of the Wisconsin landfills, the Wisconsin DNR. Thus, each site that actively collects and controls LFG is considered environmentally compliant should the "No Build" option be implemented.

Table 5-9 Site and Landfill Gas Data

Table 5-9 back side

Table 5-10 Summary of Control Efficiencies for LFG Constituents

Control Device	Constituent	Control Efficiency (%)	
		Typical	Range
Boiler/Steam Turbine (50100423)	NMOC	98.0	96-99+
	Halogenated Species	99.6	87-99+
	Non-Halogenated Species	99.8	67-99+
Flare (50100410) (50300601)	NMOC	99.2	90-99+
	Halogenated Species	98.0	91-99+
	Non-Halogenated Species	99.7	38-99+
Gas Turbine (50100420)	NMOC	94.4	90-99+
	Halogenated Species	99.7	98-99+
	Non-Halogenated Species	98.2	97-99+
IC Engine (50100421)	NMOC	97.2	94-99+
	Halogenated Species	93.0	90-99+
	Non-Halogenated Species	86.1	25-99+

5.5.2 Liner Type and Concerns

Each site in the alternatives analysis has a regulatory compliant landfill bottom liner (see Table 5-9). Some sites have enhanced liners, including:

- SKB Rosemount – this site has a double composite liner consisting of two geomembranes and a compacted clay liner. This type of liner ensures that if the top geomembrane leaks, it can be detected and corrective action initiated before environmental impacts occur.

- Timberline Trail, Seven Mile Creek, and Sarona landfills in Wisconsin – MSW landfills in Wisconsin are required to have bottom composite liners consisting of a geomembrane and 4 feet of clay with a hydraulic conductivity of 1×10^{-7} cm/sec or less (NR 504.05). The additional 2 feet of low permeability clay (above the required 2 feet in Minnesota, Iowa, and North Dakota) provides for additional protection of groundwater resources at these landfills.

The remaining sites all have constructed regulatory compliant landfill liners that are compliant with state and federal standards.

Based solely on bottom liner design, it appears the three Wisconsin landfills offer more environmental protection to groundwater resources by having a geomembrane over 4 feet of clay with a hydraulic conductivity of 1×10^{-7} cm/sec.

5.5.3 Airspace Utilization

Each Designated Alternative Facility has remaining permitted airspace. The landfill sites evaluated in the Alternatives Analysis have considerable remaining airspace. This section

evaluates the impact to the facility should the waste from BSLI be taken at one or more of the facilities. Data on the impact of BSLI transferring waste to the facilities in this analysis are provided in Table 5-2.

The analysis indicates the least impact to accepting BSLI waste would be at the industrial landfills (Onxy FCR Industrial Waste Landfill and SKB Rosemount Industrial Waste Landfill). However, these landfills can only accept a portion of the Landfill waste stream. For the Designated Alternative Facilities that can accept the entire BSLI waste stream, impacts to facility life from least to greatest are:

Facility	Site Life % Reduction
Seven Mile Creek Landfill	44.2%
Elk River Landfill	45.9%
Sarona Landfill	47.6%
Central Disposal Landfill	53.2%
Pine Bend Landfill	54.5%
Timberline Trail Recycling and Disposal Facility	57.6%
Spruce Ridge Landfill	69.4%
Dakota Landfill	73.4%
Dickinson Landfill	82.6%
Jahner Landfill	95.8%

Thus, the least impact to airspace as a result of the "No Build" option is to the Seven Mile Creek Landfill in Eau Claire, Wisconsin. For Minnesota landfills, the least impact as a result of the "No Build" option would occur at the Elk River Landfill.

5.6 Analysis of Designated Alternative Facilities Handling a Portion of the Wastes in Conjunction with a "Preferred Facility"

There are four Designated Alternative Facilities that cannot accept all the wastes from BSLI. The Onyx FCR Industrial Landfill and the SKB Rosemount Industrial Waste Landfill cannot accept the MSW. The two NRG Resource Recovery facilities each can only accept 15,000 tons per year of MSW. Therefore, in those options, the rest of the wastes must be modeled to be brought to another of the Designated Alternative Facilities (i.e., the "Preferred Facility"). As shown in Table 5-8, from an economic standpoint, the Timberline Trail Recycling and Disposal Facility has the best overall economics of all the facilities that can handle the entire waste stream. The Timberline Trail facility also has a four foot clay liner as part of the single composite liner compared to two feet of clay in the other sites in Minnesota, Iowa, and North Dakota. From a LFG standpoint, any of the Designated Alternative Facilities that utilize active LFG collection system and LFG to energy facilities are preferred. Note, the Timberline Trail facility uses a flare for controlling LFG; thus, from a LFG standpoint, Timberline Trail would not be as preferred as other facilities, but still is regulatory compliant with air quality regulations.

The Timberline Trail Recycling and Disposal Facility has the best economics, one of the best liner systems, and, while it does not have a LFG to energy facility, it does actively control LFG.

Therefore, for purposes of this analysis, the Timberline Trail Recycling and Disposal Facility will be the "preferred facility."

Table 5-11 provides the cost estimates to handle the partial waste streams at each of the limited Designated Alternative Facilities along with the remaining wastes being delivered to the "preferred facility." As shown in Table 5-11, the estimated total cost to deliver all the wastes to a combination of the Onyx FCR Industrial Landfill and Timberline Trail is $19,846,903 (i.e., just under $20M). This compares to the estimated cost to deliver the waste to BSLI of $25,422,808. The primary reasons for the lower costs, despite the increased cost for the transfer station and hauling, are the lower tipping fees at these alternative facilities. The tipping fee at Onyx FCR Industrial Landfill was reported to be only $20.46. According to Onyx, there are no local fees and the state fees amount to only $0.46 per ton. In addition, the state fees in Wisconsin are also limited in comparison to Minnesota.

The annual totals to deliver to the other combined partial facilities and the "preferred facility" range between $22,290,454 and $24,414,245.

5.7 Summary

Table 5-12 provides a summary of the effects of not building the Landfill expansion based solely on the factors considered in this alternatives section. The effects are divided between direct and indirect, as well as by potential beneficial and adverse effects.

For direct effects, there are more adverse effects noted than beneficial. The lone beneficial effect noted is the potential significant increase in transfer haul employment.

Adverse direct effects include the loss of employment at BSLI; need to site and permit a relatively large transfer station; a significant increase in transfer hauling cost; and simply not making full use of the potential airspace capacity at the Landfill.

For indirect effects, there are two beneficial ones noted. There will be an increase in equipment and employment at the alternative sites that will contribute to the economy. Also, based upon the analysis, the costs to users could be less (primarily avoiding the cost of local and state taxes for BSLI).

Two indirect adverse effects were also noted. The airspace capacity at the alternative sites will be used up more rapidly. Also, the city of Burnsville, Dakota County, and the State of Minnesota could lose the funding provided by the taxes collected by BSLI.

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Table 5-11 Total User Cost Estimates for “Partial” Facilities Combined with “Preferred Facility”

Table 5-11 back side

Table 5-12 Summary of "No Build" Effects

Direct	
Beneficial	Adverse
♦ Significant increase in transfer haul employment	♦ Lost employment at BSLI ♦ Significant increase in transfer haul costs ♦ Need to site and permit a transfer station capacity with a capital cost of $5M ♦ Less than full use of potential airspace capacity at the Landfill
Indirect	
Beneficial	Adverse
♦ Increase in equipment and labor at the alternative landfills ♦ Potential lower cost to users based on apparent lower tip fees	♦ Use up airspace at other locations ♦ Loss of state and local funding

6 Environmental Impacts

6.1 Groundwater and Surface Water Resources

6.1.1 Review of Current Regulations

The proposed BSLI expansion is associated with an existing, operational sanitary landfill located in the Minnesota River Valley. The facility is located south of the Minnesota River as illustrated in Figure 3-1. The following sections describe the applicable groundwater and surface water regulations. Water quality standards for both the groundwater and the Minnesota River are discussed.

6.1.1.1 Solid Waste Facility Rules

6.1.1.1.1 Groundwater and Surface Water

The MPCA Solid Waste Rules as stated in Part 7035.2565 require that groundwater and surface water resources must be protected from impairment by pollutants emanating from a solid waste facility. Solid Waste Rules Part 7035.2565 subpart 4 requires landfills to establish compliance boundaries. The compliance boundary is a point no more than 200 feet from the limit of waste where groundwater and surface water quality standards are enforced. The permit for the facility, issued August 27, 2003, requires the facility to establish a compliance boundary. The compliance boundary was established and is illustrated in Figure 6-1. Solid Waste Rules Part 7035.2565, subpart 14 also requires landfills to monitor groundwater and surface water at the compliance boundary. The facility permit requires the results to be submitted to the MPCA on a regular schedule.

6.1.1.1.2 Floodplain

The 100-year floodplain is divided into two areas—the floodway and the flood fringe. The floodway is the area immediately outside the actual channel of the river where development could result in an increase stage of more than 0.5 feet in any one reach or for the cumulative effect of several reaches of a river. The flood fringe is beyond the floodway, but within the 100-year floodplain. Development within the flood fringe is not expected to materially increase the flood damage potential due to increasing the flood stage. The BSLI, including the expansion project area, is currently not located within the 100-year floodplain. BSLI submitted an application to FEMA to remove the area from the floodplain. The BSLI application was approved by FEMA on August 2003. The approval required a levee to be constructed to remove the area from the floodplain. This work provided the necessary information for the city of Burnsville to issue a conditional use permit (CUP) for this facility.

6.1.1.1.3 Groundwater Quality Standards

The MPCA Underground Waters Rule 7060.04 classifies all underground waters as potable in order to maintain water quality. The MPCA Waters of the State Rule 7050.0220 specifies standards for groundwater and surface water. Groundwater is classified as Class 1: suitable for domestic consumption. The Minnesota Department of Health (MDH) is authorized to establish and enforce standards for public water supplies under Minnesota Statute 144.381 to 144.387.

Figure 6-1 Monitoring Network and Anticipated Flow Patterns

The MDH has enacted maximum contaminant levels (MCLs) in conformity with National Primary Drinking Water regulations that set minimum standards of acceptable water quality for drinking water sources used as public, potable water supplies. In addition, the MDH is concerned about the health risks of contaminants in well water and has promulgated a list of health risk limits (HRLs) that are standards and/or advisory levels for contaminants in groundwater. The MDH is currently reviewing the HRLs for possible revisions. The permit for BSLI, issued August 27, 2003 establishes groundwater performance standards based on the established HRLs. The groundwater performance standards were included in the Landfill permit. Exceedances of these standards must be addressed as prescribed in Solid Waste Rules Part 7035.2815 subpart 4 and the approved Contingency Action Plan.

6.1.1.1.4 Surface Water Quality Standards

The MPCA classifies the Minnesota River near the Landfill as a 2B and 3C stream. Streams classified as 2B are suitable for fishing and aquatic recreation, including bathing/swimming. Streams classified as 3C are suitable for industrial cooling and materials transport without a high degree of treatment. Water quality standards have been incorporated into the solid waste permit, based on surface water standards.

6.1.1.1.5 Floodplain Regulation

The MPCA Solid Waste Rule 7035.2555 defines the locations standards for solid waste management facilities and does not allow a new solid waste management facility to be located within a floodplain.

The Department of Natural Resources (DNR) sets minimum standards and criteria for floodplain management, which is delegated to municipalities for development of policy and regulations. The DNR rule 6120.5900 controls the location, construction, or modification of private and public liquid or solid waste treatment and disposal facilities in floodplain areas so that:

(1) No new construction, addition, or modification to existing sewage, industrial waste, or other waste disposal systems shall be permitted within the floodplain unless emergency plans and procedures for action to be taken in the event of flooding are prepared, filed with, and approved by the state water pollution control agency.

(2) Emergency plans and procedures established consistent with item B, subitem (1) must provide for measures to prevent introduction of any pollutant or toxic material into the flood waters.

(3) Public or municipal collection and treatment facilities are used where available and where feasible.

(4) There shall be no disposal of garbage or solid waste materials within any floodplain areas, except at those disposal sites approved by the Minnesota Pollution Control Agency provided there will be no further encroachment on the floodway.

The city of Burnsville, through its Flood Plain Regulations (Title 10, Chapter 10) states that there shall be no disposal of garbage or solid waste materials within flood fringe areas except upon issuance of a conditional use permit for sites approved by the MPCA, provided there will be no further encroachment on the floodway.

6.1.2 Description of Site Geology and Hydrogeology

6.1.2.1 Surficial Geology

The BSLI is located in the Minnesota River Valley. The Minnesota River Valley resulted from erosion by Glacial River Warren during late Wisconsinan-age glacial retreat. Glacial River Warren was the southern outlet for Glacial Lake Agassiz and episodically transported catastrophic floodwater south. Eventually, further glacial retreat shifted drainage from Glacial Lake Agassiz to Lake Superior and flow in Glacial River Warren reduced to the present day Minnesota River.

In the floodplain around the BSLI and the associated expansion project area, there is a thin layer of post-glacial alluvial floodplain deposits. The deposits typically consist of silty clay and peaty sediments. The post-glacial deposits overlie coarser fluvial deposits or eroded bedrock. The depth to bedrock in the river valley floor varies from 0 feet to 80 feet. Depth to bedrock increases along the southern bluff line to a range of 50 feet to 150 feet. Depth to bedrock in the expansion area ranges from 1 foot to 6 feet.

The soils in the area of the expansion project have been mapped as predominantly Flaxon silty clay loam. The Flaxon soil is generally described as level, poorly to very poorly drained soil developed on bedrock controlled terraces. The soil typically has moderate permeability; moderate water holding capacity and runoff is slow. The soils mapped for the remainder of the BSLI are primarily Udorthents, which are generally used to describe active landfilling area. There is also a minor area on or near the northern border of the expansion area and extending into the portion of the BSLI that is classified as Aquasols and Histosols. These soils are generally described as level, very poorly drained mineral and organic soils around lakes or rivers, with most areas being continuously ponded.

6.1.2.2 Bedrock Geology

The uppermost bedrock in the area is the Lower Ordovician Prairie du Chien Group. The upper bedrock at the site is jointed, fractured and has numerous small (less than 1 cm in diameter) vugs. The uppermost portion of the Prairie du Chien Group is the Shakopee Formation. The Shakopee Formation consists of a light to dark brown finely crystalline dolomite. The upper portion of the Shakopee consists of a sandy to cherty Willow River Member. The sandy New Richmond Member lies below the Willow River Member. The lower portion of the Prairie du Chien includes the Oneota Formation dolomite. The Jordan Sandstone (Upper Cambrian) lies below the Prairie du Chien Group. The Prairie du Chien Group and Jordan Sandstone act as one hydrogeologic unit. The St. Lawrence Shale separates the Jordan Sandstone from deeper aquifers and acts as a regional confining unit. The relative positions of the geology are illustrated in the stratigraphic column in Figure 6-2.

PERIOD	GEOLOGIC UNIT	RANGE IN THICKNESS (ft.)	HYDROGEOLOGIC UNIT
Quaternary	Alluvial & Colluvial Deposits (Lean Clay, clayey Sand, Sand)	0 – 80	
Ordovician	Prairie du Chien Group (Dolomite)	140	Prairie du Chien/Jordan Aquifer
Cambrian	Jordan Sandstone	80 – 100	
	St. Lawrence Formation	175 – 200	Confining Bed
	Franconia Formation		
	Ironton Sandstone	60 – 65	Aquifer
	Galesville Sandstone		
	Eau Claire Formation	85 - 90	Confining Bed
	Mt. Simon Sandstone	Over 200	Aquifer
Precambrian	Hinkley Sandstone		

Figure 6-2

Geologic Column in Vicinity of Burnsville Sanitary Landfill

(Modified From Norvitch et al., 1972)
Burnsville Sanitary Landfill

6.1.2.3 Site Hydrogeology

The Minnesota River Valley is a local and regional discharge area for groundwater from both the floodplain alluvium as well as the Prairie du Chien/Jordan system. Typically, regional vertical hydraulic gradients are upward from the bedrock to the surficial sediments, reflecting regional discharge of groundwater to the river.

In the area of the expansion project, groundwater flow is controlled by the continuous pumping of high capacity dewatering pumps in the Kraemer & Sons quarry sump, located east of the expansion area. The regional groundwater flow direction under non-pumping conditions is generally north toward the Minnesota River.

The water table in the area of the BSLI is located in either the thin glacial and post-glacial deposits or declining into the upper portion of the Shakopee Formation of the Prairie du Chien Group. The water table is located within the Shakopee Formation over the expansion area. Depth to water was typically 4 to 9 feet during field investigations of the expansion project area. Static water level elevations measured during field investigations were approximately 708 feet NGVD at the southwest corner of the expansion area declining to 700 feet in the northeast corner of the expansion area, reflecting flow toward the quarry sump located northeast of the BSLI and the associated expansion area. An analysis by Waste Management, Inc. (WMI) demonstrated that the groundwater elevation, under quarry pumping conditions, will be 5 feet or more below the liner. Under non-pumping conditions, the analysis indicates that there will be less than a 5-foot separation between the water table and a portion of the liner; however, the liner will be above the water table.

The approach in the WMI analysis developed a worst case scenario water table that was developed using the average water table gradients based on measurements immediately upstream and downstream of the facility and known high water table elevations in the southwest portion of the BSLI, expected to be unaffected by quarry dewatering to estimate the non pumping water table. Efforts were made in the analysis to ensure the approach would yield a conservative result by ignoring the elevation of a future harbor to the Minnesota River identified in the end-use documents. The harbor would control how high the groundwater table could reach. The approach in this analysis is appropriate, although conservative, based on existing information. Portions of the liner along the southeastern and eastern portion of the expansion area and the lower elevations in the leachate line trenches in the same areas would be less than 5 feet above the design water table. A few examples are presented in Table 6-1. The design water table is presented as a contour map. The liner design provides point information of coordinates and elevations along the eastern and western edge of the expansion area. The presentation of this information does not allow an accurate estimate of the area of the liner that would be less than 5 feet above the water table, under non-pumping conditions.

Table 6-1 Comparison of Liner Elevations and Design Basis Water Table

Coordinate			Approximate Water	
Northing	Easting	Liner Elevation	Table Elevation[1]	Area
7,972.15	5,220.94	713.88 feet	713 feet	Leachate Line Trench
8,020.75	5,216.69	715.78 feet	712 feet	Liner
8,272.15	5,235.08	712.17 feet	711 feet	Leachate Line Trench

[1] Interpolated from the design-basis water table map

Minnesota Rules Part 7035.2815, subpart 3, stipulate a minimum number of borings to evaluate the soils, geology, and groundwater conditions prior to landfill development. Subpart 3 indicates that for an expansion of 37.8 acres, as requested for the expansion project area at the BSLI, 34 borings should be installed. The facility has installed 42 borings at 31 different locations as part of the expansion area investigation. The investigation also installed five piezometers within the footprint and three additional water table monitoring wells. This work compliments several previous investigations in and around the current Landfill that have defined the local geology and local groundwater flow system.

Based on previous groundwater investigations and the current groundwater monitoring system, the de-watering of the Kramer & Sons quarry captures groundwater from the expansion area and induces a reversal of the upward groundwater gradient and flow within the upper bedrock, below the expansion area and adjacent BSLI. Groundwater in the Shakopee Formation, which represents the upper Prairie du Chien bedrock, flows downward and eastward toward the quarry sump. Groundwater in the lower Prairie du Chien and Jordan Formation flows upward and eastward toward the quarry sump. The saturated thickness of the Prairie du Chien/Jordan aquifer is approximately 300 feet in the expansion area.

The permeability of the saturated Shakopee Formation of the Prairie du Chien Group was measured using slug tests of monitoring wells completed at the water table in the upper Shakopee formation and in deeper monitoring wells nested with the water table monitoring wells that were installed as part of the hydrogeologic investigation of the expansion area. Hydraulic conductivities measured in the expansion area have an overall geometric mean of 2.0×10^{-3} cm/sec. The monitoring wells completed in the upper Shakopee Formation of the Prairie du Chien Group exhibited a geometric mean hydraulic conductivity of 1.1×10^{-3} cm/sec and the lower Prairie du Chien exhibited a geometric mean hydraulic conductivity of 6.9×10^{-3} cm/sec.

The groundwater quality documented at the site through the established monitoring network and previous groundwater investigations has indicated minor impacts from the older, unlined portion of the Landfill. This impact is currently collected by the de-watering system at the Kramer & Sons Quarry. There have been no detections above appropriate limits from the de-water system effluent. There has also been data collected in previous investigations that indicates an off-site source of ammonia and nitrate is impacting groundwater at the Landfill.

6.1.2.4 Groundwater Modeling

Two groundwater models have been constructed for the general area of the BSLI and associated expansion area. The original model was constructed in 1993 by Barr Engineering and looked at the effect of the Kraemer & Sons Quarry on the groundwater flow patterns around and under the BSLI and on the closest municipal production wells for the cities of Burnsville and Shakopee. The original model was developed in an analytical element model developed by Professor Otto Strack of the University of Minnesota. The model results indicated that the municipal wells would not be contaminated by the BSLI or impacted by quarry dewatering under both expected water withdrawals from the municipal wells and under maximum water withdrawal scenarios. The model also indicated that the groundwater under the BSLI was captured by the quarry dewatering operation. The model also looked at the effect of stopping the quarry dewatering. The model indicated that groundwater flow would equilibrate and again flow to the Minnesota River. This model supported the contention that known groundwater contamination was not reaching the Minnesota River, but would be captured by the quarry dewatering. Monitoring of the quarry discharge did not indicate the presence of contamination above detection limits.

The 1993 model used a calibrated hydraulic conductivity of 35 feet/day (1.24×10^{-2} cm/sec). The model report discussed the limitations of the model, including the assumptions of a homogeneous and isotropic aquifer, two dimensional flows, and the effect of averaging values over both the Prairie du Chien and Jordan units because, although they act as one hydrologic unit, they have different hydraulic properties. This also affected the calculated dilution factors because known contamination was only detected in the upper Prairie du Chien and not throughout the hydrologic unit. The calibrated model generally had an adequate match between measured groundwater elevations and model calculated groundwater levels when model limitations were taken into account. Discrepancies between measured and calculated groundwater elevation were greater near the sump with calculated elevations generally higher than measured.

A revised model was completed in 2004 by McCain and Associates to re-evaluate (1) the quarry dewatering impacts in light of updated information on quarry withdrawals, (2) updated municipal well pumping information, and (3) additional monitoring well installation. The software used was an updated version of the analytical element model used in the 1993 modeling exercise. The results of the second model continued to show that contaminants at the landfill would not reach and contaminate the municipal wells.

The model update included an increase in quarry pumping from about 4,300 gallons per minute (gpm) in 1990 to the current rate of about 7,300 gpm. The current model used parameters identified in the 1993 model. However, the measured hydraulic conductivities in the expansion area investigation have an overall geometric mean hydraulic conductivity of 5.6 feet/day (2.0×10^{-3} cm/sec), which is significantly lower than the average value used in the 1993 model. The effect of the lower hydraulic conductivity is to increase the drawdown associated with the quarry de-watering operation and limit the area of pumping influence. The updated model adequately reproduces the drawdown effects of the de-watering and, therefore, the value used is appropriate.

6.1.2.5 Groundwater Quality Monitoring Network

The proposed groundwater monitoring network for the expansion area of the Landfill is composed of upgradient Monitoring Well W246 and downgradient monitoring wells W242 and W244. The Phase III report for the expansion area of the BSLI suggests that the three new wells for the expansion area are complimented by existing downgradient monitoring wells W139, W222, W231, W235, W323, and W325 and surface water monitoring location S5. The existing monitoring network is shown on Figure 6-3.

The assumption that the upper-most bedrock is sufficiently fractured to approximate a porous media is assumed in both the groundwater modeling for this site and in the design of the groundwater monitoring network. If the assumption is correct, the number of monitoring wells needed, in the event the quarry dewatering ceases, may need to be increased. However, under current conditions, the monitoring network is adequate.

6.1.3 Liner and Leachate Collection System Evaluation

6.1.3.1 Introduction

As part of evaluating the BSLI expansion project impact, an analysis of the liner and leachate collection system for the project was evaluated. The evaluation includes normal flow conditions and conditions during a 100-year flood event on the Minnesota River. Existing geotechnical data were evaluated to examine water table conditions and the potential for hydrostatic head on the lining system. Impacts are presented should a major liner system failure occur.

The following analysis is separated into three distinct analyses. The first analysis examines the leachate collection system, the second the liner system, and the third is a major liner failure analysis of the expansion area, including subgrade and slope stability.

6.1.3.2 Leachate Collection System

6.1.3.2.1 Introduction

The leachate collection system proposed for the expansion consists of 6-inch diameter SDR-11 polyethylene pipes encased in a graded filter. These pipes are the primary leachate collection conduits for the expansion project area. The pipes are sloped at 0.5 percent from west to east. One foot of drainage sand is to be placed over the lining system to collect the leachate and route it to the collection pipes. The collection pipes are spaced such that leachate travel from the high point to the pipe is a maximum of 50 feet. Drainage is sloped at 2 to 3 percent to the pipes for the 50 foot distance.

Leachate collection lateral and header trenches, piping, aggregate, and drainage sand will be installed on the base liner to collect and transmit leachate to leachate sumps located in Cells WD1 (northern two-thirds of expansion area) and WD2 (southern one-third of expansion area). The sumps will be aggregate-filled and will contain a side slope riser pipe with pumps and intake manifolds. The pumps will operate on automatic level controls to remove leachate from the landfill and maintain 1 foot or less liquid level on the liner.

Figure 6-3 Existing Monitoring Network

The pumps will transfer leachate from the sumps to a new above-ground leachate storage tank to be located in the northeast corner of the expansion area. The tank will serve as temporary storage/buffer capacity function and will operate in conjunction with a leachate recirculation system and/or discharge to the city of Burnsville sanitary sewer system. The tank will also receive leachate from the proposed north development area via forcemain. Leachate transfer from the tank will occur through a forcemain pipe, which will be double contained where it is located outside of lined areas.

Modifications to existing leachate management systems as a result of the expansion include removal of existing gravity leachate transmission piping, which currently transfers leachate from Phases 2B, 5A, 6A, and 7 into underground storage tanks. The proposed design connects leachate discharge from those phase areas directly to the Cell WD1 header trench for collection in the sump. Leachate management in existing Phase 9 is currently served by a sump pump located in a side slope riser pipe. The existing perimeter berm and liner adjacent to the Phase 9 sump will be reconstructed to eliminate the Phase 9 sump and allow gravity drainage of leachate from Phase 9 into the Cell WD2 header trench for collection in the sump.

Existing cleanout risers located on the west side of the existing Landfill will either be extended vertically or abandoned if alternate access is available. New cleanout risers will be constructed on the west side of the expansion area. Cleanout lengths will not exceed 1,000 feet.

Existing underground tanks, buried gravity pipes, and forcemain located within the footprint of the expansion area will be removed.

6.1.3.2.2 Leachate Collection System – Normal Flow Conditions

The critical component to evaluating the leachate collection system operation during normal leachate flow conditions is the head (e.g., liquid level) on the liner. Minnesota Rules require the head on the liner to not exceed 12 inches. Historically, the BSLI has maintained the head on the liner at less than 12 inches. On some isolated incidences, the head on the existing liner at BSLI has exceeded 12 inches. One such case was due to a pump malfunction. Other instances were attributed to sump manhole issues or extreme rainfall events. Since the discovery of leachate levels above 12 inches, bi-annual pump cleaning, quarterly pump performance inspections, and frequent inspection of leachate head levels are performed. Since implementing these measures, leachate levels inside the existing landfill have been below the regulatory requirement.

In the proposed expansion area, a modified design was used to reduce the likelihood of leachate levels in exceedence of 12 inches. The expansion area does not contain vertical sumps, which were attributed to some leachate level exceedences in the existing Landfill. In addition, backup leachate pumps will be available for the expansion area leachate sumps. Thus, if a pump failure should occur, it can be replaced immediately using on-site staff and resources. It is unlikely the expansion area will exceed the regulatory threshold of no more than 12 inches of leachate buildup.

Another possible impact on the leachate collection system is clogging. Soil drainage layers and leachate collection pipes are both components of a landfill that are subject to clogging. Clogging of these components may occur by such mechanisms as chemical precipitation, biological growth and sedimentation.

The primary problem that results from clogging is the potential build up of leachate head on the primary liner. An increase in leachate head puts additional stress on the liner. This may increase the probability of liner leakage, which would then result in contaminant release to the subsurface and groundwater.

Clogging is usually detected through careful monitoring of the leachate collection rates. If the weather conditions have remained fairly constant and suddenly leachate quantities decrease drastically, the likely cause could be a clogged leachate system component. Likewise, if the leachate head is monitored during operation and closure, a drastic increase in the head may indicate a clogged system component.

The prevention of clogging occurs primarily in the design and construction phases of the landfill. If proper materials are designed (e.g., graded filter) into the drainage layer based on relatively accurate leachate production estimates, the chances of clogging occurring is minimal. Furthermore, annual jet cleaning of leachate collection pipes, which is required, further reduces clogging potential. Clogging potential is not considered a likely environmental concern.

Detection of potential problems with the leachate collection system during operation and post-closure can be done by thorough evaluation of monitoring data and by visual inspection. This is currently being completed at the existing Landfill. A rapid flow reduction or rapid change in leachate quality can indicate leachate system problems. In addition, the detection of groundwater contamination may indicate leachate system problems. However, under normal flow conditions, the leachate collection system is adequate.

6.1.3.2.3 Leachate Collection System – 100-Year Flood

This section evaluates the potential performance of the leachate collection system if a 100-year flood event were to occur. During the 100-year flood, the water surface is estimated to be at 719 MSL (CLOMRA, October 1, 2002), or approximately 4.7 to 2.5 of freeboard on the levees that surround the expansion area. The floor of the expansion area is at approximately 712 to 714 MSL, with the sump in the northeast corner of Cell WD1 at approximately 704 MSL, and the sump in Cell WD2 at approximately 712 MSL.

During a 100-year flood, the leachate collection system would only be impacted if the flood waters entered the expansion area. Water entering the cell area coming in contact with waste would be classified as leachate. For water to enter the expansion area during a 100-year flood would require a levee breach or a landfill liner failure. A levee breach is not likely since they have been designed specifically to withstand the 100-year flood. However, when flood waters rise, so does the groundwater levels under the Landfill. Thus, water under the landfill would tend to want to be at the same surface as the 100-year flood waters. This can create vertical uplift pressure in the Landfill liner system. If the geomembrane in the liner system has defects, water from under the site could enter the leachate collection system. However, the leachate

collection system is designed to route leachate, regardless of how it enters the cell, to the sump to be pumped to the leachate holding tank. The potential increased flow of leachate in the expansion cells is not anticipated to cause environmental impact. This is due to the ability of BSLI to construct the geomembrane liner that is virtually defect free using electrical leak location surveys. Furthermore, the relatively small volume of liquid that would be added to the leachate should a defect in the geomembrane allow water to enter the cell would be small and easily handled by the leachate collection system. Therefore, the leachate collection system is not likely to cause environmental damage during a 100-year flood event.

6.1.3.3 Liner System

6.1.3.3.1 Introduction

The liner system for the area of the Landfill expansion is proposed to consist of 2 feet of compacted clay meeting the following requirements:

- A minimum of 50 percent by weight passing the #200 sieve
- A maximum particle size of 3 inches in any dimension
- A Liquid Limit of 25 percent or greater
- A Plasticity Index of 12 percent or greater
- A moisture content at or above optimum at time of placement and compaction
- A maximum saturated hydraulic conductivity of 1×10^{-7} cm/sec when compacted to 95 percent Standard Proctor maximum dry density at a moisture content at or above optimum
- Frozen clay shall not be used for clay liner construction

The clay liner will be overlain by a 60-mil High Density Polyethylene (HDPE) geomembrane. Both smooth and textured geomembranes are proposed to be used. This liner configuration is the minimum regulatory requirement for MSW landfills. It is important to note, the engineering report in the Application for Permit Modification identifies the geomembrane being HDPE, but some of the supporting drawings indicate a Low Linear Density Polyethylene (LLDPE) geomembrane. This discrepancy should be clarified prior to permit issuance for the project. Additionally, the Application for Permit Modification indicates an existing demolition debris disposal area to be mined and lined with a geomembrane and geosynthetic clay liner. The specific design for this area will require further details during permitting to ensure regulatory compliance.

6.1.3.3.2 Normal Conditions

During normal conditions, the liner system is not anticipated to cause or contribute to environmental impacts. The following sections examine potential areas for the liner system to cause environmental impacts and proposed remedies. However, every stage of the expansion

area's life, from design to closure, will be completed with the specific intention to minimize the possibility of environmental impacts.

During construction of the liner, it is of particular importance that the proper quality assurance/quality control (QA/QC) measures are taken and that any areas causing problems are noted. It is in these areas that the possibility of leakage or failure, although low, may be higher than throughout the remainder of the expansion area life. If any "problem areas" are noted during construction QA/QC, they are typically repaired.

After the liner is placed and all seams have been determined to be sound, it is possible that damage may be caused by the heavy machinery during installation of drainage materials on the geomembrane. Because damage caused in this manner, as well as other problems during liner construction occasionally go unseen, electric leak detection will be done on the piggyback liner. During the leak location process, a voltage is applied to an electrode placed in the soil covering the liner and to an electrode connected to earth ground. Because the geomembrane liner is an electrical insulator, a current will flow only through leaks in the liner. The current produces a localized anomalous area of high current density near a leak. Electrical measurements are then made to locate these points of current flow.

Once the leak location service has determined no leaks exist, adequate procedures for placement of the first lift of waste must be followed to minimize the chance of a puncture caused by sharp waste materials.

The design and operation of the expansion area is such that it is expected to result in little or no leakage. However, if geomembrane failure should occur, it would be through friction, degradation, or aging. (Note, the liner system contains a geomembrane and compacted clay component. Thus, geomembrane failure may not lead to a significant environmental impact due to the compacted clay liner limiting release of contaminants from the Landfill to the environment.) The following sections describe these mechanisms.

Friction leading to holes or tears in geomembrane liners can be caused by compaction, subsidence or slippage. In many cases, the movement of soil leading to this friction takes place either in the first couple of years of the facility or in an accessible area. In many such cases, repairs are rather unimpeded and the consequences are minimized. In other cases, the friction and resulting tears will be difficult or impossible to detect early on and might only be deduced as a possible failure after the detection of some other event, such as clogged drains or leachate in the ground water.

If a friction-based failure was to occur, and the bottom (primary) liner was torn, some contaminant release to the environment may occur. The contaminant release would be either of leachate to the subsurface and groundwater or of LFG to subsoil regions beside or below the Landfill. Frictional breaks in other components of the landfill system, such as the geomembrane cap, etc., would have lesser consequences.

With proper landfill design and construction, the probability of such failures is judged to be relatively low, and any failure that did occur would likely be localized, limited in extent, and therefore, of limited environmental consequence.

Degradation and aging of the geomembrane can be caused by a number of mechanisms. Some of these include depolymerization, swelling, extraction, delamination, chemical attack and fire. The mechanisms that cause degradation and aging often come from sources such as ultraviolet light, ozone and oxygen, radiation, chemicals, and microorganisms.

While these mechanisms occur in the absence of physical stress, excess stress may accelerate some of the mechanisms. Such degradation may lead to enhanced permeability and eventually failure of the geomembrane and other liner system components. This could potentially allow the release of leachate and/or LFG to the environment.

Liner degradation often occurs due to poor construction QA/QC. Some examples include liner damage during well installation, desiccation cracking of the compacted clay liner from exposure of the clay during construction of an adjacent cell, and saturation of a GCL beneath a geomembrane liner when rainwater ponds on a tack-seamed patch over a geomembrane hole (Bonaparte, Daniel and Koerner, 2002).

The risk associated with degradation and aging of the primary liner diminishes after closure of the landfill. If an impermeable cap is properly placed on the landfill at closure, the amount of leachate being produced will generally begin to decrease over time as the cap prevents additional moisture from coming into the waste from above. During this time, the landfill cap becomes the main barrier to leachate generation and thus the crucial, long-term protector of the local ground waters. Also, if the landfill wastes become substantially stabilized during the active life (e.g., leachate recirculation or bioreactor) and closure periods of the landfill, the consequences of a contaminant system failure in the distant future are lessened.

It is thought that recirculation of leachate through a landfill may accelerate the waste stabilization process, thus providing additional long-term protection against containment system failures. Leachate recirculation is not being proposed for the expansion area.

Unless a problem arose during the placement of the geomembrane in the landfill liner or cap, several studies have shown that degradation of the geomembranes will likely not occur during the typical design lifetime of the landfill (Rollin, 2004; Koerner and Hsuan, 2003; Ivy, 2002).

6.1.3.3.3 100-Year Flood Conditions

The liner system during a 100-year flood condition may be subject to over saturation and vertical uplift pressure caused by the difference between the surface water elevation during the 100-year flood (719 MSL) and the base elevation of the landfill geomembrane (approximately 712 MSL). Over saturation of the 2-foot thick compacted clay layer of the liner is not a critical issue unless the load on top of the liner system is not uniform. Non-uniform loads may cause settlement or failure of the clay liner. This is discussed further in Section 6.1.3.4. Vertical uplift pressure on the geomembrane is not anticipated to cause major failure of the geomembrane. The geomembrane used at the BSLI is a 60-mil HDPE. HDPE geomembranes have high yield

(130 pounds/inch) and break stresses (243 pounds/inch) and over 700 percent elongation at break. Thus, the membrane is extremely flexible and strong. Vertical uplift pressure will further be offset by overburden pressure of the leachate collection layer (if the cell has no waste) and waste. Therefore, geomembrane damage from vertical uplift pressure is unlikely.

6.1.3.4 Major Liner Failure

A major liner system failure would be classified as a significant breach of the liner system. This is different from the smaller leaks that can occur as a result of puncture of the geomembrane during construction and operation. These small leaks are easily mitigated by good construction quality assurance and control practices that include electrical leak location testing of completed geomembrane installations and by good operating practices that ensure the first lift of waste is placed with minimal compaction and with no long or rigid objects that could puncture the lining system.

For a major failure to occur, a foundation stability failure would be the likely cause. This could be caused by differential loading of the lined area coupled with a highly saturated clay liner and subbase condition. This may occur during a situation when a 100-year flood has occurred and the lined areas are filled such that a non-uniform load is placed on the lining system (e.g., when Cell WD1 is at or near capacity and Cell WD2 has been constructed but not partially filled with waste). This condition needs to be analyzed in a geotechnical evaluation. Based on the phased development drawings in the Application, a potential slope stability failure may occur upon interim development of area WD1 and little or no buttressing waste in area WD2 (see Drawing 9 in Application, Appendix A) and a 100-year flood event occurs that saturates the subbase and liner under Cell WD2. A complete geotechnical evaluation of this condition using oversaturated values for the subbase, clay liner, and waste is recommended.

A potential mitigation measure would be to re-phase the development of the expanion area to build successive cells from north to south and place waste across the area uniformly and build vertically using 10- to 20-foot lift heights or to provide waste buttressing in Cell WD2 earlier in the expansion project development. However, these approaches would need to be confirmed in a geotechnical analysis conducted by a competent professional.

6.2 Air Quality

6.2.1 Introduction

The following section evaluates potential environmental impacts to air quality as a result of the proposed project. As required in the Final Scoping Decision Document, the following information is provided:

- An estimate of the volume of LFG currently being generated at the Landfill.
- An estimate of the LFG currently being captured that is flared, utilized in other ways, or discharged to the atmosphere.

- An estimate of the volume of LFG that is expected to be generated as a result of the Landfill expansion.
- An estimate of the percentage of LFG that is expected to be captured by the LFG collection system designed for the proposed expansion.
- An estimate of the percentage of captured LFG that will be flared, utilized in some other method, or allowed to escape to the atmosphere.
- A discussion on the proposed expansion to meet applicable MPCA air quality regulations.
- A discussion on the applicability of the New Source Performance Standards for new or modified MSW landfills.
- An evaluation of mitigation options for controlling LFG emission.

To determine the impacts associated with LFG emissions, the USEPA Landfill Air Emission Estimation Model was used. Emissions associated with LFG, the electrical generating units, and fugitive emissions of LFG was evaluated and compared with Ambient Air Quality Standards or Health Benchmarks.

6.2.2 Background

LFG is a product of decomposition of organic material in landfills and chemicals placed in the landfill. LFG is typically generated in a landfill under anaerobic (without oxygen) conditions. Anaerobic conditions and decomposition of organic material produces two primary gases—methane (CH_4) and carbon dioxide (CO_2). Landfills also produce trace gases that include non-methane organic compounds (NMOCs) in small quantities. The NMOCs produced in a landfill are a result of small quantities of chemical compounds in the waste that may have degraded in the landfill and emitted gases.

LFG generation, including rate and composition, proceeds through four characteristic phases throughout the lifetime of a landfill. The first phase is aerobic (i.e., with oxygen [O_2] available) and the primary gas produced is CO_2. The second phase is characterized by O_2 depletion, resulting in an anaerobic environment where large amounts of CO_2 and some hydrogen (H_2) are produced. In the anaerobic third phase, CH_4 production begins, with an accompanying reduction in the amount of CO_2 produced. Nitrogen (N_2) content is initially high in LFG in the aerobic first phase and declines sharply as the landfill proceeds through the anaerobic second and third phases. In the fourth phase, gas production of CH_4, CO_2, and N_2 becomes fairly steady.

The phase duration and time of gas generation varies with landfill conditions (i.e., waste composition, cover materials, moisture content, design), and may also vary with climatic conditions such as precipitation rates and temperatures.

The rates of emissions from landfills are governed by gas production and transport mechanisms. Production mechanisms involve the production of the emission constituent in its vapor phase through vaporization, biological decomposition, or chemical reaction. Production mechanisms are affected by a variety of factors. Vaporization is affected by the concentration of the individual compounds in the landfill, the physical properties of the individual compounds, and the specific landfill conditions (i.e., temperature and confining pressure). Biological decomposition of liquid and solid compounds into other chemical species is dependent upon:

- The nutrient availability for microorganisms;
- Refuse composition;
- The age of the landfill
- Moisture content;
- pH;
- Temperature;
- Oxygen availability; and
- Exposure to biological inhibiting industrial waste.

Quantification of the impacts of any of these factors on LFG production is not possible with the state of current knowledge. Chemical reactions are dictated by the composition of the waste, temperature, and moisture content in the landfills.

After gas is produced in a landfill, it can be vented to the atmosphere through passive vents, collected using gas wells and vacuum in an active system, migrate to adjacent areas or migrate to the surface and vent to the atmosphere.

Regulations exist that require landfills to control LFG.

6.2.3 Current Landfill Gas Emissions

Estimating the amount of LFG being generated at a landfill site is dependent on several factors, including:

- Quantity of waste,
- Age of waste,
- Moisture content of waste,
- Methane potential of waste, and
- Quantity of degradable and non-degradable waste.

Several models have been proposed to predict the quantity of LFG a landfill will generate. The published models to determine LFG production are either zero order or first order equations based on empirical data. The most widely used model, from a regulatory perspective, to predict LFG environmental impacts at landfills and for air permitting purposes is the USEPA's Landfill Gas Emissions Model (LandGEM).

LandGEM is designed to estimate emission rates of CH_4, CO_2, NMOCs, and individual air pollutants from landfills. The model is based on a first order decay equation:

$$Q_m = \sum_{i=1}^{n} 2kL_0 M_i(e^{-kt_i})$$

Where:

- Q_m = mass rate (Mg/yr) of methane generation,
- M_i = mass of solid waste (Mg) i^{th} section, and
- t_i = age (years) of ith section

The variables in this equation are the factors "*k*" and "L_0" where:

- *k* = rate of gas generation (1/year), and
- L_0 = potential yield (m^3 CH_4/Mg solid waste)

Different default factors are utilized for various applications of the model. The basic default parameters can be found in Volume 1, Fifth Edition of the *Compilation of Air Pollutant Emission Factors, Section 2.4* (AP-42) published by USEPA and are presented below.

Table 4 (from AP-42)
AP-42 Default Factors

Scenario	k value	L_0 value
NSPS Compliance	0.05/yr	170 m^3/Mg
Typical Landfills	0.04/yr	100 m^3/Mg
Arid Landfills	0.02/yr	100 m^3/Mg

For a conservative estimate of the LFG production rate, a "*k*" value of 0.05/year and L_0 value of 170 m^3/Mg can be used. These values represent the upper limit of LFG production and are the default values used for initial regulatory compliance for the New Source Performance Standards (NSPS). For NSPS compliance, the "*k*" value can be changed if site-specific testing is undertaken to determine the value.

LandGEM requires input of values for "*k*," "L_0," and NMOC concentration. For the Landfill, the NMOC concentration was determined by field testing according to regulatory requirements and determined to be 565.33 ppmv. The NMOC value is used to calculate the amount of NMOCs generated. This value is used to determine if an active LFG collection and control system is needed. Since the Landfill has an active LFG collection system, the NMOC value used in the model is appropriate.

For determining the amount of LFG being generated in the existing Landfill, annual tonnage data was provided by Waste Management, Inc. This tonnage data was entered into LandGEM and outputs for CH_4 and CO_2 were generated. The outputs were combined to estimate the total

amount of LFG generated, since LFG is typically 50 percent CH_4 and 50 percent CO_2. LFG also contains trace gases such as volatile organic compounds and hazardous air pollutants.

It is important to note, BSLI submitted modeling results for total LFG production using LandGEM input parameters of

$$k = 0.24/\text{year}$$
and
$$L_0 = 139.6\ m^3/Mg.$$

(Note: NMOC concentration is also inputted into LandGEM. BSLI used 565.33 ppmv as discussed above.)

The "*k*" and "L_0"values were obtained from the "Landfill Gas Collection and Control System Design Plan" prepared by Waste Energy Technologies, Inc. In review of the design plan, the "*k*" and L_0 values used were not based on site-specific testing, but rather WMI's database of "k" values from other landfill sites and WMI's best estimate of the most appropriate value to use for the Landfill. While this may be appropriate for LFG system design, using experienced based values in lieu of site-specific testing may not be appropriate to estimate total LFG production or for regulatory compliance modeling. However, for completeness, LFG production rates are presented using AP-42 default values for "*k*" and "L_0" for NSPS compliance and typical landfills; and WMI's values for "*k*" and "L_0" as shown in Table 6-2.

Table 6-2 LFG Generation Estimates for 2004 - Pre-Expansion Condition

Scenario	*k* (1/yr)	L_0 (m^3/Mg)	CH_4 (m^3/year)	LFG (m^3/year)	LFG[1] (cfm)
Regulatory defaults (NSPS compliance)	0.05	170	2.971×10^7	5.942×10^7	3,992
Recommended AP-42 defaults for a typical landfill	0.04	100	1.581×10^7	3.162×10^7	2,124
WMI	0.024	139.60	1.656×10^7	3.312×10^7	2,225

[1] Convert (m^3/year) to cubic feet per minute (cfm) using 35.31 ft^3/m^3, and 525,600 minutes/year.

LandGEM outputs for methane production of the three scenarios are provided in Appendix D.

Emissions estimates for fugitive emissions from the existing landfill site were calculated by Barr Engineering on behalf of BSLI. A summary of the calculations are provided in Appendix E-1. In review of the data provided, the LFG constituent emissions were based on the LandGEM model using estimated values for the methane generation rate constant, "*k*" and the methane generation potential, "L_0." Using the WMI estimated values in LandGEM versus the recommended AP-42 defaults for a typical landfill values results in a slightly higher LFG generation rate. However, if the initial NSPS applicability regulatory default values are used, the actual LFG generation rate, and thus fugitive LFG emissions, are overestimated.

In order to provide a better estimate of LFG generation, a site-specific"*k*" value should be obtained. This can be conducted using USEPA Method 2E, "Determination of Landfill Gas; Gas Production Flow Rate." This method is the standard to determine "*k*" as required in 40 CFR 60.754(a)(4). Another method may be substituted for Method 2E if approved by the MPCA (40 CFR 60.754[a][5])

6.2.4 Expansion Area Landfill Gas Emissions

The proposed expansion area includes an estimated 42.2-acre horizontal expansion immediately west of the existing Landfill; 37.8 acres will be for a new MSW disposal area and a vertical lift of approximately 6.5 feet over 80.6 acres of permitted landfill. It is estimated the expansion area will provide an additional 6.2 million cubic yards of disposal capacity. At the current fill rate of 511,427 cubic yards of airspace per year, the expansion disposal capacity is anticipated to last approximately 12 years (2020).

As was conducted for the pre-expansion condition, expansion area LFG production was analyzed using three scenarios—NSPS compliance, typical landfill, and WMI values. These scenarios were used to estimate the amount of LFG that will be generated as a result of the expansion. Since LFG generation is based on the age of the waste, the expansion area was modeled to be used from 2011 to 2022. Peak LFG generation rates for the three scenarios are provided in Table 6-3.

Table 6-3 Peak LFG Generation Estimate – Post-Expansion Conditions

Scenario	k (1/yr)	L_0 (m^3/Mg)	CH_4 (m^3/year)	LFG (m^3/year)	LFG[1] (cfm)
Regulatory defaults (NSPS compliance)	0.05	170	4.320×10^7	8.640×10^7	5,804
Recommended AP-42 defaults for a typical landfill	0.04	100	2.346×10^7	4.692×10^7	3,152
WMI	0.024	139.60	2.569×10^7	5.138×10^7	3,452

[1] Convert (m^3/year) to cubic feet per minute (cfm) using 35.31 ft^3/m^3, and 525,600 minutes/year.

However, to determine the total LFG generated as a result of the expansion, the total LFG generated assuming the expansion is filled with waste needs to be determined and subtracted from the total gas generated assuming no expansion. This was accomplished using LandGEM and summing the CH_4 generated at the site from 1963 until 2206, the last year modeled in LandGEM for the pre-expansion condition, for both the no build and expansion scenarios. To calculate total LFG generation, LandGEM outputs were transferred to a Microsoft Excel spreadsheet and yearly CH_4 emission rates were summed. Results are shown in Table 6-4.

Table 6-4 Estimated Total LFG Emissions – Pre- and Post-Development 1963-2206

Scenario	Pre-Development LFG (m^3)	Post-Development LFG (m^3)	Expansion Area Only (m^3)	% Increase
Regulatory defaults (NSPS compliance)	3.28×10^9	4.48×10^9	3.28×10^8	26.8
Recommended AP-42 defaults for a typical landfill	19.16×10^8	2.62×10^9	3.28×10^8	26.8
WMI	2.64×10^9	3.60×10^9	3.28×10^8	26.7

Based on modeling results, it is anticipated the expansion will increase total gas production by 26.8 percent when compared to no expansion.

For the emissions analysis, fugitive emissions from the Landfill after expansion were calculated by Barr Engineering on behalf of BSLI. The calculations and supporting data are provided in Appendix E-2. In review of the data submitted, the LFG constituent emissions were based on the LandGEM model using estimated values for "*k*" and "L_0."

Using the data outlined in Table 6-2, the landfill generation rate varies depending on the values of "*k*" and "L_0." Landfills would be allowed a maximum under the NSPS applicability; however, the facility has test data which identifies a lower amount. AP-42 is a default value that can be used if the facility does not have more specific information.

6.2.5 Control Equipment Emissions

In order to examine the emissions from the existing control equipment, it is important to understand the collection efficiency of the LFG collection system and the destruction efficiency of the control device. Understanding these two parameters will help determine impacts to the environment as a result of LFG after control.

6.2.5.1 Landfill Gas Collection System Efficiency

LFG emissions are typically controlled at landfills through a gas collection system. This system consists of gas collection wells placed in the waste, valves to control collection, header pipes and a source to place vacuum on the system. Thus, methane and non-methane organic compounds are fugitively emitted from the Landfill. The Landfill has an active LFG collection system. This system consists of 59 wells over the 134.1 acres of Landfill development. The proposed expansion will contain 22 wells over the 37.8 acres of new waste footprint. Federal rules (40 CRF 60.753) require the operation of the gas collection system such that the methane concentration at the surface is less than 500 parts per million above background. AP-42 estimates overall collection system efficiency ranges from 60 to 85 percent, with 75 percent being common in the industry.

For the BSLI, data provided from flow of collected LFG at each LFG wellhead for 2004 is presented in Table 6-5. Table 6-5 indicates the ~~volume~~ rate of collection of gas being collected at the Landfill is approximately 1,829 cubic feet per minute (cfm). When this collection quantity is compared to the amount generated, the collection system efficiency can be determined. Collection system efficiency is presented in Table 6-6.

Table 6-5 Burnsville Sanitary Landfill LFG Collected in 2004

Month	Actual LFG Collected (cfm)
January	1,837
February	1,737
March	1,626
April	1,473
May	1,376
June	1,913
July	2,326
August	2,280
September	1,795
October	1,958
November	1,746
December	1,882
2004 Average:	**1,829**

Table 6-6 Burnsville Landfill Estimated Collection System Efficiency

Scenario	LFG Generated (cfm)	Average Estimated LFG Collected (cfm)	Collection System Efficiency (%)
Regulatory defaults (NSPS compliance)	3,992	1,829	45.8
Recommended AP-42 defaults for a typical landfill	2,124	1,829	86.1
WMI	2,225	1,829	82.2

BSLI sends the collected methane to Minnesota Methane LFG-to-energy facility to generate electricity. The Minnesota Methane facility generates 3.3 MW of power using five reciprocating internal combustion engines. According to Minnesota Methane's Title 5 permit (No. 03700192-001) issued by the MPCA, a sixth engine can be added to the facility.

Minnesota Methane has five internal combustion engines/generator sets. These five engines can consume approximately 1,500 cfm of LFG. Therefore, based on the collection efficiency, the

amount of gas collected and the limits of the engines, Table 6-7 provides a summary of the LFG disposition at the Landfill prior to expansion.

Table 6-7 Burnsville Landfill LFG Disposition Prior to Expansion

Scenario	LFG Generation (cfm)	LFG Controlled		Estimated Fugitive Emissions (cfm)
		IC Engines (cfm)	Flare (cfm)	
Regulatory defaults (NSPS compliance)	3,992	1,500	329	2,163
Recommended AP-42 defaults for a typical landfill	2,124	1,500	329	295
WMI	2,225	1,500	329	396

Therefore, for the pre-development emissions of LFG, approximately 1,829 cfm are collected and sent to one of two control devices (engines or flare). The remaining generated gas is fugitive in nature and vented to the atmosphere. Depending on LandGEM parameters used, this can range from 2,163 cfm to 295 cfm, with an average of 951.3 cfm of fugitive emissions.

However, fugitive emissions at the Landfill are limited by regulation to surface emissions of less than 500 ppm above background (40 CFR 60.753). If fugitive readings are detected above the threshold value, the LFG system is required to be adjusted or augmented to reduce fugitive emission to below the threshold value.

6.2.5.2 Control System Emissions

The LFG is collected and routed to a control system. NSPS requires the control system to be (1) an open flare; (2) a control system that reduces non-methane organic compounds by 98 percent by weight or has an outlet concentration of non-methane organic compounds of less than 20 parts per million (dry) as hexane at 3 percent oxygen; or (3) a treatment system that processes the gas for subsequent sale or use.

However, since the existing engines can not burn all the LFG collected, an enclosed flare is also utilized as a control device for the excess LFG. The flare is permitted as part of the BSLI air permit.

Modeling of the pre-expansion and post-expansion conditions for the control devices are provided in Appendices E-3 and E-4, respectively. The modeling presented was conducted by Barr Engineering on behalf of BSLI. In reviewing the data, the maximum flow rate at the flare was modeled at 3,000 dry standard cubic feet per minute (dscfm) for pre-expansion and post-expansion conditions. This estimate is conservative since the flare is likely to burn less methane than modeled. The model tends to overestimate the actual flare emissions However, flare emissions are minimal due to the high destruction efficiency of the flare (98 to 99.7 percent) so re-modeling flare emissions to better represent actual conditions is not recommended.

Furthermore, flare emissions of criteria pollutants are extremely small and do not have significant air quality impacts.

The other control device, the five reciprocating engines used by Minnesota Methane to generate power from LFG, were also modeled by Barr Engineering on behalf of BSLI. To be conservative, all six permitted engines (five existing, plus one engine that can be added) were modeled at their maximum capacity of 8.3781 MMBtu/hour. Internal combustion engine destruction efficiencies, according to AP-42, range from 97.2 percent for NMOCs to 86.1 percent for non-halogenated compounds (components not containing chlorine, bromine, fluorine, or iodine). However, given the extremely small emissions of compounds from the flare operating at 3000 dscfm, the engines running at about one-half of the flare modeled flow rate will not contribute significant hazardous air pollutants or volatile organic compounds to the atmosphere. Thus, the emissions from the engines (other than particulate matter to be discussed later) are not significant.

6.2.6 Combined Emissions

Combined emissions include landfill fugitive emissions, flare emissions, and emissions from the internal combustion engines (ICEs) at the adjacent Minnesota Methane facility. This section addresses the air toxics and criteria pollutants. Combined criteria pollutants for the post-expansion condition are presented in Table 6-8 and are complying with Air Quality Standards with the exception of PM_{10}.

Table 6-8 Post-Expansion Air Emissions[1]

Pollutant	Annual Emissions (tpy)			
	Flare	Landfill (Fugitive)	Engines[2]	Total
Sulfur oxides (SO_x)	4.53	--	2	6.53
Nitrogen oxides (NO_x)	59.77	--	62.41	122.18
Carbon monoxide (CO)	354.78	--	117.34	472.12
Lead (Pb)	--	--	--	--
Volatile Organic Compounds (VOCs)	1.92	20.91	1.0	23.96
Hazardous Air Pollutants (HAPs)[3]	0.04	2.58	--	2.62
PM_{10}	8.04	24.98	6.18	39.2

[1] From RASS data provided by Barr Engineering for BSLI.
[2] Engine emissions assumed a higher stack height and a lower PM_{10} emissions factor.
[3] HAPs were combined in the submitted RASS. They are separated here for clarity.

6.2.7 Particulate Matter

At the request of the MPCA, particulate matter emissions were also reviewed. Particulate matter less than 10 micrometers in diameter (PM_{10}) emissions were modeled using the AERMOD air dispersion model. Model inputs included surface meteorological data from the Minnesapolis-St. Paul airport and upper air data from St. Cloud for years 1986-1990. The PRIME algorithm was used to account for building wake effects for the landfill gas flare stack. These methods are in accordance with MPCA and USEPA modeling guidelines. The model-estimated PM_{10} concentrations were compared to the National Ambient Air Quality Standards (NAAQS) for PM_{10}. Emissions were evaluated using MPCA Air Emissions Risk Analysis methods and software.

For regulatory purposes, particulate matter is divided into two areas:

- Particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}); and
- Particulate matter with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$).

Particulate matter can cause breathing difficulties, trigger asthma and increase respiratory problems.

PM_{10} air concentrations were modeled by Barr Engineering on behalf of BSLI for the pre-expansion condition (see Appendix E-1) and the post-expansion conditions (Appendix E-2), including PM_{10} emissions from the engines at the Minnesota Methane LFG to energy facility. It is important to note that emissions for $PM_{2.5}$ were not estimated or modeled. Appropriate emission factors and EPA guidelines on estimating and modeling $PM_{2.5}$ are not published.

The PM_{10} emissions estimates used in the modeling analysis for the landfill itself were taken from USEPA's AP-42 compendium of emissions factors. These emissions appear to be appropriate for the analysis. However, the emissions estimates used for the internal combustion engines (ICEs) were taken from stack testing at a source in New Jersey, which was claimed to be "identical" to the ICEs at Minnesota Methane. The PM_{10} emission factor was thus taken as 0.028 lbs/10^6 dry standard cubic feet (dscf) rather than the value given in AP-42 (0.047 lbs/MMBtu), a reduction of 58 percent. Furthermore, the modeling analysis assumed a stack height of 30 feet—10 feet higher than the existing stack height of 20 feet.

The changes in the stack height and estimated emissions were used in order to be able to demonstrate attainment of the NAAQS for PM_{10}. These changes should be taken into account in future regulatory actions concerning the ICEs at Minnesota Methane.

Tables 6-9 and 6-10 present the results of the PM_{10} air dispersion modeling analysis for the pre-expansion and post-expansion cases, respectively. In the pre-expansion case, the modeled annual average concentration (including background) was 89 percent of the annual NAAQS for PM_{10} and the modeled 24-hour average concentration (including background) was 100 percent of the 24-hour NAAQS for PM_{10} (note that the highest second high PM_{10} concentration was presented by BLSI rather than the highest sixth high). In the post-expansion case, the PM_{10}

concentrations decreased slightly to 88 percent and 99 percent, respectively of the annual and 24-hour PM_{10} NAAQS.

It should be emphasized that these modeled concentrations assume raised stacks for the internal combustion engine emissions and an emission factor that is lower than the AP-42 value. Without these changes, the modeled concentrations of PM_{10} exceed the PM_{10} NAAQS.

Table 6-9 Results of PM_{10} Air Dispersion Modeling Analysis for the Pre-Expansion Case

Pollutant and Averaging Period	Source Group	Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Concentration incl. Background ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Fraction of Standard
PM_{10} Annual (1H)	All sources	23.38	21	44.38	50	89%
	Flare (SV 001)	0.84				
	Fugitives (FSs 002-005)	10.01				
	ICEs (SVs 101-106)	19.14				
PM_{10} 24-hr (H2H)	All sources	107.73	42	149.73	150	100%
	Flare (SV 001)	6.04				
	Fugitives (FSs 002-005)	107.72				
	ICEs (SVs 101-106)	80.21				

Table 6-10 Results of PM_{10} Air Dispersion Modeling Analysis for the Post-Expansion Case

Pollutant and Averaging Period	Source Group	Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Concentration incl. Background ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Fraction of Standard
PM_{10} Annual (1H)	All sources	23.10	21	44.10	50	88%
	Flare (SV 001)	0.84				
	Fugitives (FSs 002-005)	9.65				
	ICEs (SVs 101-106)	19.14				
PM_{10} 24-hr (H2H)	All sources	106.89	42	148.89	150	99%
	Flare (SV 001)	6.04				
	Fugitives (FSs 002-005)	106.81				
	ICEs (SVs 101-106)	80.21				

6.2.8 Air Toxics

As described in the Final Scoping Document, emissions from BSLI were compared to Ambient Air Quality Standard or Health Benchmarks. The Risk Assessment Screening Spreadsheet (RASS) developed by the MPCA was used in this analysis to quantitatively assess the potential human health impacts. The steps involved in the quantitative process consist of estimating facility emissions, modeling the air concentrations resulting from the emissions, and estimating potential risks (carcinogens) and hazards (non-carcinogens). Both pre-expansion and post-expansion landfill emissions, as well as emissions from the Minnesota Methane facility were included in the RASS analysis for BSLI.

Tables 6-11 and 6-12 present summaries of the air toxics impacts for the pre-expansion and post-expansion cases, respectively, In both cases, the NAAQS screen for oxides of nitrogen (NO_x) indicates a potential to exceed the standard. The source of this potential problem is the internal combustion engine emissions from the Minnesota Methane facility.

Table 6-11 Summary of the Risk Assessment Spreadsheet for the Pre-Expansion Case

	Criteria Pollutant Screen				
Chemical	Fraction of 1-hr std	Fraction of 3-hr Std	Fraction of 24-hr Std	Fraction of Quarterly Std	Fraction of Annual Std
SO_2	0.052	0.068	0.124		0.143
PM_{10}			0.790		0.051
$PM_{2.5}$					
NO_x					1.997
CO	0.095				
Pb					

	Air Toxics Screen		
		Calculated Risk	Risk Management Threshold
Total Inhalation Screening Hazard Indices and Cancer Risks	Acute	3.7E+00	1.0E+00
	Subchronic Noncaner	2.1E-01	1.0E+00
	Chronic Noncancer	7.8E-01	1.0E+00
	Cancer	1.3E-05	1.0E-05
Total indirect Pathway Screening Hazard Indices and Cancer Risks	Farmer Noncancer	7.6E-04	1.0E+00
	Farmer Cancer	--	1.0E-05
	Resident Noncancer	--	1.0E+00
	Resident Cancer	--	1.0E-05
Total Multi-pathway Screening Hazard Indices and Cancer Risks	Farmer Noncancer	7.8E-01	1.0E+00
	Farmer Cancer	1.3E-05	1.0E-05
	Resident Noncancer	7.8E-01	1.0E+00
	Resident Cancer	1.3E-05	1.0E-05

Table 6-12 Summary of the Risk Assessment Spreadsheet for the Post-Expansion Case

Chemical	Criteria Pollutant Screen Fraction of 1-hr std	Fraction of 3-hr Std	Fraction of 24-hr Std	Fraction of Quarterly Std	Fraction of Annual Std
SO_2	0.052	0.068	0.124		0.143
PM_{10}			0.773		0.047
$PM_{2.5}$					
NO_x					1.997
CO	0.095				
Pb					

	Air Toxics Screen	Calculated Risk	Risk Management Threshold
Total Inhalation Screening Hazard Indices and Cancer Risks	Acute	3.7E+00	1.0E+00
	Subchronic Noncaner	2.2E-01	1.0I+00
	Chronic Noncancer	7.9E-01	1.0E+00
	Cancer	1.3E-05	1.0E-05
Total indirect Pathway Screening Hazard Indices and Cancer Risks	Farmer Noncancer	7.6E-04	1.0E+00
	Farmer Cancer	--	1.0E-05
	Resident Noncancer	--	1.0E+00
	Resident Cancer	--	1.0E-05
Total Multi-pathway Screening Hazard Indices and Cancer Risks	Farmer Noncancer	7.9E-01	1.0E+00
	Farmer Cancer	1.3E-05	1.0E-05
	Resident Noncancer	7.9E-01	1.0E+00
	Resident Cancer	1.3E-05	1.0E-05

The modeling supplied by BSLI indicates that the expansion project does not exceed health benchmarks. The largest portion of the cancer risk is due to inhalation of acrylonitrile, which is generally emitted as a fugitive gas from landfills. The modeled inhalation cancer screening risk was 1.3×10^{-5} versus the threshold value of 1.0×10^{-5}. However, when BSLI sampled and analyzed the LFG in 1996, using EPA Method 18, no acrylonitrile was detected in the sample.

6.2.9 Regulations

For the BSLI project, air quality regulations exist to limit pollutants as a result of the expansion from entering the air.

Of primary concern for the Landfill expansion is Chapter 7007, which defines the requirement to obtain an air quality permit from the MPCA, and particularly 7007.0250 Subp 2, which requires air quality permits for all stationary sources that are subject to a standard under the New Source Performance Standard (NSPS) in Title 40, part 60.

The Landfill is subject to the NSPS for MSW landfills (40 CFR 60.750 et. seq.). The following section titles are included in the NSPS for MSW landfills:

- 60.750 Applicability, designation of affected facility, and delegation of authority
- 60.751 Definitions
- 60.752 Standards for air emissions from municipal solid waste landfills
- 60.753 Operational standards for collection and control systems
- 60.754 Test methods and procedures
- 60.755 Compliance provisions
- 60.756 Monitoring of operations
- 60.757 Reporting requirements
- 60.758 Recordkeeping requirements
- 60.759 Specifications for active collection systems

The requirement for the LFG collection and control system to comply with the federal rules is codified in Minnesota rules 7011.3500, 7011.3505, and 7011.3510.

Since the Landfill already meets the initial threshold of applicability of the NSPS (has 2.5 million Mg in place or 2.5 million cubic meters in place), the site is required to have an operational LFG collection and control system in compliance with 40 CFR 60.753. The existing LFG collection and control system has been permitted by the MPCA. The collection system and flare are permitted by Air Emission Permit No. 037700156-001. The Minnesota Methane facility control devices are permitted by Air Emissions Permit is No. 03700192-001. In review of the permits, the landfill air emission permit adequately address the requirements of NSPS as they apply to the Landfill. The addition of the expansion area, may at some point, increase LFG collection rates beyond the permit limit of 2,465 cfm. This is not likely to occur until the expansion area is complete, at which time permit modification can be requested by BSLI.

The control device includes five internal combustion engines owned and operated by Minnesota Methane and a LFG flare owned by BSLI. The flare is permitted under Permit No. 03700156-001 and contains applicable requirements for NSPS compliance. However, the permit for the IC engines (No. 03700192-001) does not reference specific control requirements for control devices subject to NSPS because the LFG system qualifies as a treatment system that processes LFG for subsequent sale or use (40 CFR § 60.752 [b][2][iii][C]).

In regard to the state Ambient Air Quality Standards (AAQS), the limits are placed on area sources and are codified in Minnesota Rules, Chapter 7009, Minnesota Pollution Control Agency Ambient Air Quality Standards. In general, Table 6-13 details the ambient air quality standards as applicable to the project.

In addition, the source may not emit specific hazardous air pollutants of greater than 10 tons per year of any hazardous air pollutants (HAP), or 25 tons per year of any combination of HAPs, without additional permit restrictions being applied. For the Landfill expansion, it is not anticipated that the HAP generation will cause non-compliance.

Table 6-13 Minnesota Ambient Air Quality Standards

Chemical Name	1-hour ($\mu g/m^3$)	3-hour ($\mu g/m^3$)	8-hour ($\mu g/m^3$)	24-hour ($\mu g/m^3$)	Quarterly ($\mu g/m^3$)	Annual ($\mu g/m^3$)
SO_2	1,300	915		365		60
PM_{10}				150		50
$PM_{2.5}$				65		15
NO_x						100
CO	35,000		10,000			
Pb					1.5	

6.2.10 Ability of Expansion Project to Meet Air Standards and/or Benchmarks

As previously discussed, there are three primary considerations to determine if the project can meet applicable standards or health benchmarks. The first criterion is the ability for the project to meet AAQS. The modeling submitted by BSLI for this project indicates the combined emissions for the project can meet the AAQS requirements if:

- The stack height at the Minnesota Methane facility is increased by 10 feet.
- The modeled emission factor for PM_{10} emissions from the engines is taken as actual emissions rather than allowable emissions.

The second criterion is the ability of the project to meet health benchmarks. The modeling supplied by BSLI indicates the expansion project does not exceed health benchmarks if individual air toxic modeling results are allowed to be rounded to one significant digit and the *"k"* and *"L_0"* values used in the LandGEM model represent actual conditions. The only air toxic modeled with significant risk was acrylonitrite. The modeled inhalation cancer screening risk was 1.36×10^{-5} versus the threshold value of 1.0×10^{-5}. However, when BSLI sampled and analyzed the LFG in 1996, using EPA Method 18, no acrylonitrite was detected in the sample.

The third criterion is the ability for the Landfill to meet NSPS requirements. NSPS criteria, as applicable to the Landfill, are included in the facility air permit (No. 03700156-001).

6.2.11 Air Quality Mitigation Measures

Modeling that demonstrated compliance with the AAQS was provided by BSLI. This modeling assumed conditions that are not representative of actual conditions, but rather conditions that include several mitigation measures (specifically, a stack height increase of 10 feet to each of the IC Engine stacks, reduced PM_{10} emission factor for the IC Engines, and non-default values for *k* and L_0). These measures were required for the demonstration of modeled attainment of National Ambient Air Quality Standards.

The implementation of the assumed, or other yet to be identified, mitigation measures will be the subject of future air permitting procedures for BSLI's landfill (permit 037700156-001)and Minnesota Methane's gas-to-energy plant (permit 03700192-001).

7 Economic and Social Impacts

7.1 Risks on the Regional Solid Waste Master Plan

The Regional Solid Waste Master Plan (Master Plan) was recently developed by the Solid Waste Management Coordinating Board (SWMCB). It was adopted on September 22, 2004. There are several aspects of the Master Plan that are pertinent to the consideration of the Landfill expansion. These are highlighted in this section.

Chapter II. C. Key Themes – lists seven key themes, two of which are particularly pertinent. First the - *Solid Waste Management Hierarchy. The Policy Plan stresses the need to manage waste in an integrated system in accordance with the hierarchy of preferred waste management practices, with an emphasis on waste reduction and reuse in order to promote resource conservation and environmental protection.*

Secondly, the *Private Sector Initiative. In the metropolitan area, there has been a long history of solid waste services provided by private businesses and nonprofits. Policies in the Policy Plan call for a greater role by the private sector in solving waste management dilemmas consistent with the public vision for waste management.*

The State of Minnesota has a long history of emphasis on managing wastes according to the hierarchy and as noted the metropolitan area has had a long history of services provided by the private sector. The Policy Plan calls for a greater role by the private sector. While landfilling is not at the top of the hierarchy, it remains a necessary component of the management system for those wastes that cannot be managed higher. Sanitary landfill capacity provided by the private sector is a necessary component of the Master Plan. The Master Plan also notes in Chapter III.C.5 Landfilling – Data Trends "*Landfilling increased from about 724,000 tons in 1998 to about 1 million tons in 2003.*" Thus, landfill capacity has been used at an increasing rate in recent years.

Chapter III.E. notes some *Critical Challenges Facing the Region During the Next Planning Cycle*. Regarding Processing, the Master Plan notes that "*…government has limited ability to increase processing capacity in a market-driven system without costly subsidies. In the next planning cycle, the region is faced with maintaining current processing capacity, which may be challenging as agreements with NRG to process waste into refuse-derived fuel expire*." In Chapter IV: Regional Outcomes, Regional Strategies and County Supporting Initiatives, Part Four: Processing, the Master Plan notes, "*the processing outcomes promote the full utilization of the three waste-to-energy facilities currently serving the region, and recognize the need to reduce the costs and public subsidies of processing. Because the region's population and employment continue to grow, waste generation is increasing and additional processing capacity will be needed. The region will look at the private sector to develop new processing technology and to add to the capacity available to metropolitan generators."*

Because the counties have been required to subsidize processing, the Master Plan does not include publicly sponsored increases in processing capacity. The Master Plan relies on private sector development which will be market driven and the counties' primary focus will be on

maximizing the use of the existing capacity. As noted in Section 5 Alternatives, the two NRG Resource Recovery Facilities included in the Designated Alternative Facility list could only accommodate 25,000 to 30,000 tons of the wastes currently disposed at the Landfill. It is also appropriate to note that the residues from the Newport NRG Resource Recovery Facility currently are landfilled at the Landfill. In 2004, the amount of residues brought from the Newport facility to the Landfill was 92,155 tons (NRG Operating Report, December 2004). Therefore, more residues are currently sent to the Landfill from the Newport facility than both NRG Resource Recovery facilities could accommodate from the Landfill waste deliveries. Without the BSLI expansion, the Newport NRG Resource Recovery Facility must use a different landfill for their residues, likely at a higher cost.

The Master Plan supports a merchant approach at the NRG Newport and Elk River facilities in order to eliminate or reduce public subsidies. In addition, SWMCB will explore opportunities for greater private sector responsibility for processing.

In Chapter IV: Regional Outcomes, Regional Strategies and County Supporting Initiatives, Part Five: Landfilling, the Master Plan notes, "*Landfills continue to serve as a significant part of the solid waste system for the metropolitan area. The Policy Plan acknowledges that landfills are necessary and that landfill capacity is needed for wastes that cannot be reduced, reused, recycled, or processed.*"

In the Master Plan, Regional Outcome # 1 for Landfilling indicates that "*Through the year 2025, landfills will be designed, operated and managed to protect the environment and public health.*" The Master Plan notes that landfill design and operation has improved to better protect groundwater and mitigate other environmental impacts. The Master Plan includes strategies to evaluate newer technologies in landfill management including leachate recirculation and bioreactors.

Regional Outcome # 2 indicates "*Through the year 2025, landfill disposal capacity for MSW that cannot be reduced, recycled, or processed will be available. (Note: The State of Minnesota will manage landfill capacity serving the region and located in Minnesota.).*" This places an emphasis on developing landfill capacity within the State of Minnesota and not utilizing landfill capacity in other states.

The Background, Regional Strategies, and County Supporting Initiatives are also pertinent to the BSLI expansion. These are as follows:

"Background – To provide for a complete integrated waste management system and to accommodate the solid waste disposal needs of the metropolitan region, landfilling needs and capacity must be anticipated and assured. Several MSW landfills in the region will close in the next ten to twenty years, yet the need for landfill capacity for waste that cannot be reduced, reused, recycled, or processed will continue. New technologies, such as leachate recirculation, have the potential to conserve landfill space and to continue to provide for regional landfilling needs.

Regional Strategies

1. *The SWMCB will work with the state to monitor landfill disposal and capacity available to serve the region.*
2. *The SWMCB will examine landfilling needs and options for the region, while relying on the market to provide landfill capacity.*

County Supporting Initiatives

Dakota – Dakota County will work with landfills located in the county to develop and review innovative approaches to conserved landfill space and provide landfilling capacity for the long term."

The Landfill is one of only two landfills within the actual SWMCB Regional Planning area that are permitted to dispose of MSW.

7.2 Impact on Disposal Costs

Disposal costs in the Region are market driven (beyond the impact of the state and local taxes covered in the next section). There does not appear to be a reason to expect disposal costs to change either up or down as a result of approval of a BSLI expansion. If the expansion does not occur and there is only one remaining landfill within the SWMCB Region that is permitted to accept MSW, there could be a risk of an increase in disposal rates due to the potential decrease in competition in the market place.

As noted in Section 5, Alternatives, there are other disposal facilities located outside the region that are capable of handling the wastes disposed at the Landfill. The projected costs to transport and dispose of the wastes at some of the alternatives compare favorably to the current costs at the Landfill. But, one of the key assumptions in the economic analysis in Section 5 is the availability of a transfer station capable of handling the average 1,200 tons per day currently managed by BSLI. This transfer capacity is not currently available and therefore the risk to the region is still present.

7.3 Economic Impact on the County and Regional Solid Waste Management System

As noted in Section 5.4.4, Summary of Employment and Economic Impacts, for every ton of MSW disposed at the Landfill, at total of $28.58 per ton is paid to public entities broken down as follows:

- City of Burnsville $3.33 landfill tax
- City of Burnsville $1.00 host fee
- State of Minnesota $6.67 landfill tax
- Dakota County $7.50 landfill tax average (ranges from $6.84 to $9.13)
- State of Minnesota 17 percent tax for commercial wastes and 9.75 percent on residential wastes

Depending on the total tons of MSW and industrial wastes delivered to the Landfill, these taxes and fees amount to a significant source of revenues for the City, the County and the State (in excess of ~~$8M~~$6M per year). Depending on where the wastes are disposed, all or portions of these revenues could be lost for the public entities. The city of Burnsville would lose all their revenues as none of the Alternate facilities are located in Burnsville. Dakota County could lose a portion or all and even the State of Minnesota could loss the $6.67 ~~landfill tax~~Metro Landfill Fee portion if the wastes were disposed in another state. Thus, not expanding the Landfill presents a risk of lost tax revenues for the city of Burnsville, Dakota County, and the State of Minnesota.

7.4 Social Impacts

7.4.1 Background

According to the City of Burnsville, Park Master Plan dated September, 2000, "a few additional parks are anticipated, as certain areas such as the Heart of the City, the Gateway area and the Northwest Quadrant are redeveloped. With these anticipated additions, the park system is essentially complete." The northwest quadrant includes the future Kraemer Quarry Park, which will be part of the redevelopment of the Edward Kraemer & Sons (EKS) mining operation and the BSLI site owned and operated by Waste Management.

Within less than a half mile from the existing Landfill there are two community parks within the city of Burnsville—Sue Fischer Memorial Park provides open space and facilities for organized sports and Rudy Kraemer Nature Preserve provides for a passive recreational experience for the public. There are several hiking trails throughout the preserve offering a variety of habitat types to view and enjoy. Currently there is a trail that connects these two parks to each other and other areas of the City. The City of Burnsville's Park Master Plan shows a proposed trail that would connect the City with the property that surrounds the Landfill to the east and the Landfill itself, once the Landfill is closed and available to the public.

To the east of the Landfill property, and east of Interstate 35W, is the Black Dog Unit of the Minnesota Valley National Wildlife Refuge, which is approximately 1,300 acres in size. This wildlife refuge is a major conservation and recreational resource approximately one-half mile from the BSLI site. There are future plans to connect the refuge with the future parks that will be developed on the west side of Interstate 35W. But until the quarry is finished with their operations and the Landfill is completed and closed, there are no plans to extend a trail system into this industrial corridor.

On July 15, 2002, the Burnsville City Council met to consider an application for BSLI, a concept stage approval of a Planned Unit Development amendment for expansion of the existing Landfill. The PUD amendment will allow for a defined end use plan. The end use plan of an 18-hole golf course is a goal of the Comprehensive Land Use Plan. It also states that, "the existing Landfill and proposed expansion is an interim use within this PUD. The permanent end use is a golf course and open-space, and/or recreational." This end use plan will benefit the local community by expanding its recreational opportunities.

There is no evidence that the operation of the existing Landfill has had a direct adverse or beneficial impact on the plans and development of the local recreational resources. It is not anticipated that the expansion of the Landfill will adversely impact the local recreational resources. With the expansion of the landfill and the proposed end use for the facility there is evidence that there would be a long-term beneficial impact for the recreational opportunities for the citizens of Burnsville and the surrounding communities.

8 Mitigation Measures

8.1 Introduction

The following sections identify measures that could reasonably eliminate or minimize adverse environmental, economic, employment or sociological effects of the proposed expansion project. The mitigation measures are presented according to the sections of this document.

8.2 Alternatives Analysis

The major findings of the alternatives analysis indicated the preferred Designated Alternative Facility was the Timberline Trail Recycling and Disposal Facility in Weyerhaeuser, Wisconsin, if the "No Build" option is selected. A "No Build" option, however, would place economic burdens on local and state government through the loss of revenue should the Landfill expansion project not be completed. Furthermore, the construction of a transfer facility in the region to transfer the estimated 1,200 tons per day from the Landfill to Wisconsin could potentially create additional impacts. Thus, if the "No Build" option is selected, additional study and mitigation would be required that would otherwise not be needed if the Landfill expansion project is permitted.

8.3 Environmental Analysis

An environmental analysis was conducted for potential impacts to groundwater, landfill liner, and air quality. Air quality PM_{10} impacts require further study, which will be conducted as part of permitting the Landfill and the Minnesota Methane LFG-to-energy facilities. Potential impacts to air quality as a result of the project may be a violation of the AAQS for PM_{10}. These impacts can be mitigated using several options, including increasing the stack height at the Minnesota Methane facility, applying more aggressive dust control measures at the Landfill, and conducting site-specific testing at the Landfill and Minnesota Methane to determine emission factors.

Although the analysis indicates a minimal risk of contamination to groundwater should the expansion be permitted, the landfill liner has potential for failure due to slope stability issues identified in Section 6.1.3.4. This will be mitigated by conducting a slope stability analysis and examining mitigation options, should slope stability be a concern, as part of permitting the Landfill.

8.4 Economic and Social Impacts

Adverse economic impacts were identified to occur if the "No Build" option is selected. If the Landfill expansion is not pursued, economic impacts to users, local, regional, and state government could be significant. Mitigation would be to allow the expansion to proceed. No impacts to recreational facilities were identified; thus, there are no mitigation measures recommended.

Appendix A

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Appendix B

Materials Incorporated by Reference

Materials Incorporated by Reference

The following materials are incorporated by reference into the document in order to reduce bulk without impeding governmental and public review of the project. The materials presented below are reasonably available for inspection.

Alternatives Section. For the alternatives section, the primary document incorporated by reference is the September 27, 2004, memorandum from Don Kyser of the Minnesota Office of Environmental Assistance to Kelly Garvey of the MPCA Environmental Impact Review Staff regarding available landfill site data for analysis of the "No Build" option. This information was used as the basis for the "No Build" option analysis.

Environmental Impacts Section. The development of this section included review of several documents that have been included in the bibliography. For completeness of this document, the "AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Chapter 2 – Solid Waste Disposal, January 1995" is incorporated by reference. This document provides emission factors, efficiencies, calculations, procedures, and other information pertinent to determining air emissions for solid waste landfills.

Economics and Social Impacts. Materials incorporated by reference for this section include:

- Regional Solid Waste Master Plan developed by the Solid Waste Management coordinating Board (SWMCB) and dated September 22, 2004. This document is the regional solid waste policy plan impacting the project.

- The City of Burnsville Park Master Plan, dated September 2000, is incorporated by reference. This document contains the park master plan for the area around the project and was used to evaluate potential impacts as a result of the project.

Appendix C

Definitions

Definitions

Aquifer. "Aquifer" means unconsolidated material or rock capable of producing water to supply a well.

Bedrock. "Bedrock" means any solid rock exposed at the surface of the earth or overlain by unconsolidated material.

Biodegradable. "Biodegradable" means an organic compound that can be degraded or converted to simpler compounds by micro-organisms in the natural environment.

Cap. "Cap" is a waterproof cover of soil, clay or plastic placed on a completed landfill lift after it has been completely filled, brought to final grade, and closed. Also called final cover.

Cell. "Cell" means compacted solid waste that is enclosed by cover material in a land disposal site.

Closure. "Closure" means actions to prevent or minimize the threat to public health and the environment posed by a closed facility including removing contaminated equipment, removing liners, applying final cover, grading and seeding final cover, installing monitoring devices, constructing ground water and surface water diversion structures, and installing gas control systems, as necessary.

Collection. "Collection" when referring to solid and hazardous waste, means the aggregation of solid or hazardous waste from the place where it is generated, and includes all activities up to the time the waste is delivered to a waste facility.

Commercial solid waste. "Commercial solid waste" includes solid waste generated by stores, offices, businesses, restaurants, warehouses and other non-manufacturing activities, and non-process wastes such as office and packing wastes generated at industrial facilities.

Compliance boundary. "Compliance boundary" means the planar surface that circumscribes the permitted waste boundary, lies between the permitted waste boundary and the property boundary, extends vertically downward from the land surface, and constitutes the place at which compliance with agency ground water quality standards is measured.

Control equipment. "Control equipment" means an "air contaminant treatment facility" or "treatment facility."

Cover material. "Cover material" means material approved by the agency that is used to cover compacted solid waste in a land disposal site. Important general characteristics of good cover material are low permeability, uniform texture, cohesiveness, and compactibility.

Criteria pollutant. "Criteria pollutant" means any of the following: sulfur dioxide, particulate matter, nitrogen oxides, carbon monoxide, ozone, lead, and any other pollutants for which national ambient air quality standards have been established in Code of Federal Regulations, title 40, part 50, as amended, or for which state ambient air quality standards have been established.

Daily cover. "Daily cover" is soils placed on top of landfilled waste at the end of each day, or at the completion of a landfill cell, as a control against rodents and vectors.

Decomposition. "Decomposition" refers to the breakdown of organic wasts by various means. Complete chemical oxidation leaves only carbon dioxide, water, and inorganic solids.

Decomposition gases. "Decomposition gases" means gases produced by chemical or microbial activity during the decomposition of solid waste.

Demolition debris. "Demolition debris" means solid waste resulting from the demolition of buildings, roads, and other structures including concrete, brick, bituminous concrete, untreated wood, masonry, glass, trees, rock, and plastic building parts. Demolition debris does not include asbestos wastes.

Demolition debris land disposal facility. "Demolition debris land disposal facility" means a site used to dispose of demolition debris.

Design capacity. "Design capacity" means the total volume of compacted solid waste, topsoil, intermittent, intermediate, and final cover specified in the facility permit, as calculated from final contour and cross-sectional plan sheets that define the areal and vertical extent of the fill area.

Disposal. "Disposal" or "dispose" means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any waste into or on any land or water so that the waste or any constituent thereof may enter the environment or be emitted into the air, or discharged into any waters, including groundwaters.

Emissions. "Emissions" are odors or substances—usually gaseous or particulate—generated by the combustion of fuels and waste streams and discharged into the air.

Emission facility. "Emission facility" means any structure, work, equipment, machinery, device, apparatus, or other means whereby an emission is caused to occur.

Emission factor. "Emission factor" means the most accurate and representative emission data available from one of the following sources:

A. For criteria pollutants, the emission factor listed in the Compilation of Air Pollutant Emission Factors (AP-42), fifth edition, United States environmental Protection Agency, Technical Support Division, Office of Air Quality Planning and Standards, Research Triangle park, North Carolina 27711, January 1995, which is incorporated by reference and is available through the Minitex interlibrary loan system. It is subject to frequent change. Where more than one emission factor is listed in AP-42, "emission factor"

means the one approved by the commissioner using best engineering judgment and based on one or more of the considerations in items C, subitem (2).

B. For hazardous air pollutants (HAPs), the emission factor listed in Factor Information Retrieval (FIRE) Data System, EPA-454/C-94-032, United States Environmental Protection Agency, Technical Support Division, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27111, October 1994, which is incorporated by reference and is available through the Minitex interlibrary loan system. Where more than one emission factor is listed, emission factor means the one approved by the commissioner using best engineering judgment and based on one or more of the considerations in items C, subitem (2). It is not subject to frequent change.

C. (1) Where no emission factor is available in one of the documents described in item A or B, or where a more representative emission factor is available under this item, emission factor means an emission factor developed or approved by the commissioner and derived from the following sources:

a. the AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants, EPA, 450/4-90-003, United States Environmental Protection agency, Technical Support Division, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711, March 1990, which is incorporated by reference and is available at the Minnesota state law library and through the Minitex interlibrary loan system; it is not subject to frequent change;
b. other EPA publications, including, but not limited to, Locating and Estimating documents, Control Technology Center documents, the preamble and background information documents for New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants;
c. EPA databases and computer programs;
d. Engineering publications;
e. Performance test data from the same or a similar emission unit at the same or a similar facility;
f. Manufacturer's performance tests; or
g. Emission data developed by the regulated party using the best engineering judgment criteria listed in subitem (2).

(2) The commissioner shall develop or approve an emission factor using best engineering judgment and based on one or more of the following considerations:

a. The precision and accuracy of the data;
b. The design and operational similarity between the emission units tested and the emission units to which the emission factor is to be applied;
c. The number of emission units tested in developing the emission factor under consideration;
d. The availability of emission data of equal or greater quality;
e. The emission unit operating conditions under which the tests were conducted; and
f. The data analysis procedures.

Emission unit. "Emission unit" means each activity that emits or has the potential to emit any air contaminant or pollutant. This includes each piece of equipment, machinery, device, apparatus, activity, or any other means whereby an emission is caused ot occur ro has the potential to occur.

Facility. "Facility" means the land, structures, monitoring devices, and other improvements on the land used for monitoring, treating, processing, storing, or disposing of solid waste, leachate, or residuals from solid waste processing.

Floodplain. "Floodplain" means any land that is subject to a 1 percent or greater chance of flooding in any given year from any source.

Fugitive emissions. "Fugitive emissions" means pollutant discharges that could not reasonably pass through a stack, chimney, or other functionally equivalent opening.

Garbage. "Garbage" means discarded material resulting from the handling, processing, storage, preparation, serving, and consumption of food.

Generation. "Generation" means the act or process of producing waste.

Groundwater. "Groundwater" means water contained below the surface of the earth in the saturated zone, including, without limitation, all waters whether under confined, unconfined, or perched conditions, in near-surface unconsolidated sediment or regolith, or in rock formations deeper underground.

Industrial solid waste. "Industrial solid waste" means all solid waste generated from an industrial or manufacturing process and solid waste generated from non-manufacturing activities such as service and commercial establishments. Industrial solid waste does not include office materials, restaurant and food preparation waste, discarded machinery, demolition debris, municipal solid waste combustor ash, or household refuse.

Industrial solid waste land disposal facility. "Industrial solid waste land disposal facility" means a site used to dispose of industrial solid waste in or on the land.

Inert material. "Inert material" means the uncompostable material remaining in a compost system after decomposition. Inert material does not include soil particles or other naturally occurring materials that may be found in the compost system.

Land disposal facility. "Land disposal facility" means any tract or parcel of land, including any constructed facility, at which solid waste is disposed of in or on the land.

Leachate. "Leachate" means liquid that has percolated through solid waste and has extracted, dissolved, or suspended materials from it.

Leachate management system. "Leachate management system" means the structures constructed and operated to contain, transport, and treat leachate, including liners, collection pipes, detection systems, holding areas, and treatment facilities.

Liner. "Liner" means a continuous layer of reworked natural soil or synthetic materials beneath and on the sides of a land disposal facility, compost facility, or storage area that restricts thee downward or lateral escape of solid waste, leachate, or gas.

Mixed municipal solid waste land disposal facility. "Mixed municipal solid waste land disposal facility" means a site used for the disposal of mixed municipal solid waste in or on the land.

Monitoring point. "Monitoring point" means any installation or location used to determine the quality or physical characteristics of groundwater, surface water, or water in the unsaturated zone.

New Source Performance Standard. "New Source Performance Standard" means a standard of performance promulgated by the administrator of the United States Environmental Protection agency under the Clean Air Act, United States Code, title 42, section 7411, as amended.

Nitrogen oxides. "Nitrogen oxides" means all oxides of nitrogen except nitrous oxide.

NGVD. The "National Geodetic Vertical Datum" used to establish elevation based on observed mean sea level height.

Other wastes. "Other wastes" mean garbage, municipal refuse, decayed wood, sawdust, shavings, bark, lime, sand, ashes, offal, oil, tar, chemicals, dredged spoil, solid waste, incinerator residue, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, cellar dirt or municipal or agricultural waste, and all other substances not included within the definitions of sewage and industrial waste set forth in this chapter which may pollute or tend to pollute the waters of the state.

$PM_{2.5}$. "$PM_{2.5}$" means finely divided solid or liquid material, with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by an applicable reference method, or an equivalent or alternative method.

PM_{10}. "PM_{10}" means finely divided solid or liquid material, with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by an applicable reference method, or an equivalent or alternative method.

Particulate matter. "Particulate matter" means material, except water, which exists at standard conditions in a finely divided form as a liquid or solid as measured by an applicable reference method, or an equivalent or alternative method.

Permeability. "Permeability" refers to hydraulic conductivity or coefficient of permeability, not intrinsic permeability, and has the dimensions of distance per unit time. Permeability is the

measure of the ability of a soil or rock medium to transmit groundwater flowing under a hydraulic gradient of one unit of change in head per unit change in length.

Permitted waste boundary. "Permitted waste boundary" means the perimeter or outer limit of the waste fill, leachate piping, and leachate holding and treatment areas at a solid waste land disposal facility, as specified in the permit for the facility issued by the agency.

Piezometer. "Piezometer" means a type of monitoring well or other device that is constructed for the purpose of measuring hydraulic head in groundwater.

Pollutant. "Pollutant" means any "sewage," "industrial waste," or "other wastes," as defined in this chapter, discharged into a disposal system or to waters of the state.

Pollution of water, water pollution, pollute the water. "Pollution of water," "water pollution," or "pollute the water" mean: (a) the discharge of any pollutant into any waters of the state or the contamination of any waters of the state so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially harmful or detrimental or injurious to public health, safety or welfare, to domestic, agricultural, commercial, industrial, recreational or other legitimate uses, or to livestock, animals, birds, fish or other aquatic life; or (b) the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state.

Postclosure; postclosure care. "Postclosure" or "postclosure care" mean actions taken for the care, maintenance, and monitoring of a facility after closure that will prevent, mitigate, or minimize the threat to public health and environment posed by the closed facility.

Potential emissions, potential to emit. "Potential emissions" or "potential to emit" mean the maximum capacity while operating at the maximum hours of operation of an emissions unit, emission facility, or stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restriction on hours of operation or on the type or amount of material combusted, stored, or processed, must be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. Secondary emissions must not be counted in determining the potential to emit of an emissions unit, emission facility, or stationary source. Fugitive emissions shall be counted when determining potential to emit unless an applicable state rule or federal regulation states otherwise.

Property boundary. "Property boundary" means the line circumscribing parcels of land entirely enclosing the facility.

Refuse. "Refuse" means putrescible and nonputrescible solid waste, including garbage, rubbish, ashes, incinerator ash, incinerator residue, waste combustor ash, street cleanings, and market and industrial solid waste, and including municipal treatment wastes which do not contain free moisture.

Refuse-derived fuel. "Refuse-derived fuel." Means the product resulting from techniques or processes used to prepare solid waste by shredding, sorting, or compacting for use as an energy source.

Rock. "Rock" means a consolidated or coherent, hard, naturally formed aggregation of mineral matter. Rock excludes alluvium, glacial drift, glacial outwash, and glacial till.

Rubbish. "Rubbish" means nonputrescible solid wastes, including ashes, consisting of both combustible and noncombustible wastes, such as paper, cardboard, tin cans, yard clippings, wood, glass, bedding, crockery, or litter of any kind.

Saturated zone. "Saturated zone" is that part of the earth's crust in which all the voids, large and small, are ideally filled with water under pressure greater than atmospheric.

Sewage. "Sewage" means the water-carried waste products from residences, public buildings, institutions or other buildings, or any mobile source, including the excrementitious or other discharge from the bodies of human beings or animals, together with such groundwater infiltration and surface water as may be present.

Solid waste. "Solid waste" means garbage, refuse, sludge from a water supply treatment plant or air contaminant treatment facility, and other discarded waste materials and sludges, in solid, semisolid, liquid, or contained gaseous form, resulting from industrial, commercial, mining and agricultural operations, and from community activities, but does not include hazardous waste; animal waste used as fertilizer; earthen fill, boulders, rock; sewage sludge; solid or dissolved material in domestic sewage or other common pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents or discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended, dissolved materials in irrigation return flows; or source, special nuclear, or by-product material as defined by The Atomic Energy Act of 1954, as amended.

Solid waste collection. "Solid waste collection" means the gathering of solid waste from public or private places.

Solid waste land disposal facility. "Solid waste land disposal facility" means a facility used to dispose of solid waste in or on the land.

Solid waste management facility. "Solid waste management facility" means a facility for the storage, collection, transportation, processing or reuse, conversion, or disposal of solid waste.

Solid waste transportation. "Solid waste transportation" means the conveying of solid waste from one place to another by means of vehicle, rail car, water vessel, conveyor, or other means.

Static water level. "Static water level" means the distance measured from the established ground surface to the water surface in a well neither being pumped, nor under the influence of pumping nor flowing under artesian pressure.

Transfer facility. "Transfer facility" means a facility in which solid waste from collection vehicles is compacted or rearranged for subsequent transport. A transfer facility may be fixed or mobile.

Unconsolidated materials. "Unconsolidated materials" means geological materials that are not rock and includes alluvium, glacial drift, glacial outwash, and glacial till.

Underground water. "Underground water" means the water contained below the surface of the earth in the saturated zone, including, without limitation, all waters whether under confined, unconfined, or perched conditions, in near surface unconsolidated sediment or regolith, or in rock formations deeper underground. The term ground water shall be synonymous with underground water.

Unsaturated zone. "Unsaturated zone" is the zone between the land surface and the water table. It includes the capillary fringe. Generally, the water is under less than atmospheric pressure.

Volatile organic compound (VOC). "Volatile organic compound (VOC)" means any organic compound which participates in atmospheric photochemical reactions.

Waste boundary. "Waste boundary" means the perimeter around the area permitted for filling with waste at a disposal facility.

Waste collection service. "Waste collection service" means a public or private operation engaged in solid waste collection and transportation.

Waste containment system. "Waste containment system" means the system used to control the movement of solid waste, gas, and leachate generated from the solid waste disposed of at a land disposal facility.

Water monitoring system. "Water monitoring system" means a system of monitoring points in the vicinity of a facility that is used to determine the quality or physical characteristics of groundwater, surface water, and water in the unsaturated zone.

Waters of the state. "Waters of the state" means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof.

Water table. "Water table" means the surface of the groundwater at which the pressure is atmospheric. Generally this is the top of the saturated zone.

Well. "Well" means an excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed if the excavation is intended for the location, diversion, artificial recharge, or acquisition of groundwater. "Well" includes monitoring wells, drive point wells, and dewatering wells. "Well" does not include:

(1) an excavation by backhoe, or otherwise for temporary dewatering of groundwater for nonpotable use during construction, if the depth of the excavation is 25 feet or less;

(2) an excavation made to obtain or prospect for oil, natural gas, minerals, or products of mining or quarrying;

(3) an excavation to insert media to repressure oil or natural gas bearing formations or to store petroleum, natural gas, or other products;

(4) an excavation for nonpotable use for wildfire suppression activities; or

(5) borings.

Appendix D

Landfill Gas Generation Estimates

Appendix E

Landfill Emission Estimates and Modeling

Appendix E-1

Landfill Emission Estimates and Modeling

Pre-Expansion Conditions

Appendix E-2

Landfill Emission Estimates and Modeling

Post-Expansion Conditions

Minnesota Pollution Control Agency

Burnsville Sanitary Landfill (Landfill) Expansion Project 2005
Draft Environmental Impact Statement (Draft EIS)

RESPONSE TO COMMENTS ON DRAFT EIS

1. <u>Comments by Kevin D. Bigalke, Director of Conservation Programs, Friends of the Minnesota Valley. Letter received via facsimile June 13, 2005.</u>

Note: It appears the commenter submitted comments regarding the Scoping Environmental Assessment Worksheet (SEAW) for the Landfill project which was published in the EQB Monitor on February 16, 2004. The purpose of the EQB Monitor public notice May 2005 was to determine if the Draft EIS is adequate with respect to the SEAW. Below are the comments included in the letter which were comments made on the SEAW and not the Draft EIS.

Comment 1-1: The commenter is concerned about the extent of wetland impacts as a result of the Landfill expansion.

Response 1-1: Wetland impacts were evaluated as part of the SEAW. Evaluation of wetlands and vegetation was presented as part of the Wetland Delineation Report prepared by Graham Environmental Services in 2002. Appropriate permitting for wetland impacts has or is being developed for this project with agencies with jurisdictional authority. It was determined that wetland impacts as a result of this project have been adequately addressed in the SEAW and thus were not brought forward to the Environmental Impact Statement (EIS).

Comment 1-2: The commenter suggested the Landfill donate a conservation easement to protect the remaining natural shoreline on the Minnesota River.

Response 1-2: The SEAW addressed impacts to fish, wildlife and geologically sensitive resources and it was determined that impacts to this area would not be brought forward to the EIS. A habitat buffer has been incorporated into the property boundaries for wildlife access between-, on-, and off-site areas. The donation of a conservation easement to protect the natural shoreline on the Minnesota River is beyond the scope of the EIS and not in the jurisdiction of the RGU.

Comment 1-3: The commenter expressed concerns regarding removal of natural areas and its impacts on outdoor recreational opportunities and wildlife habitat.

Response 1-3: An evaluation of the impacts of this project on recreational resources was conducted as part of the EIS. The EIS concluded on page 76, "with the expansion of the landfill and the proposed end use for the facility there is evidence that there would be a long-term beneficial impact for the recreational opportunities for the citizens of Burnsville and the surrounding communities."

2. <u>Comments by Lynn Moratzka, Manager, Office of Planning, Dakota County. Letter received via facsimile June 13, 2005.</u>

Comment 2-1: The commenter requested an adjustment to the per ton loss of revenue to Dakota County from $7.50 to $5.00-$5.50 per ton.

Response 2-1: As stated in Section 5.4.4 in the EIS (page 29), the landfill taxes paid as reported by Waste Management, Inc. are $6.84 to $9.13 per ton. For EIS analysis purposes, an average of $7.50 per ton was used to project potential impacts to Dakota County should the "no build" option be pursued. Regardless of the estimated average tax value, if the "no build" option is implemented, Dakota County would suffer financial impacts. Modification of the per ton revenue loss to Dakota County as a result of the "no build" option would not impact the findings stated in Section 1.1.4 of the EIS.

Comment 2-2: The commenter requested the Final EIS include a provision for the Landfill to include the addition of one more compactor position.

Response 2-2: Operational requirements for the landfill are outside the scope of the EIS. The section referenced by the commenter refers to impacts at alternative facilities should all BSLI waste be transferred to an alternative facility. It was estimated in the EIS that if waste is transferred to another facility, two compactors would be needed at the alternative landfill to handle the BSLI waste. The current and future equipment complement at BSLI was not evaluated and is not part of the scope of this EIS. Furthermore, the SEAW did not identify landfill equipment complement as an area of potential environmental impact to be evaluated in the EIS.

Comment 2-3: The commenter requests the Final EIS to fully address the environmental impacts of the "Build" option.

Response 2-3: The "build" option impacts were addressed as part of the SEAW. The SEAW evaluated environmental impacts of the proposed project and concluded environmental impacts for this project, which need further analysis, were in the areas of groundwater; alternatives, including "no build"; economic impacts; and social impacts. These impacts were evaluated in the EIS.

Comment 2-4: The commenter requests the Final EIS include a geotechnical analysis of the impact of the 100-year flood on the Landfill liner system.

Response 2-4: The EIS recommends a geotechnical analysis be conducted as part of the landfill permitting process to determine if stability concerns identified in the EIS can be mitigated. Several mitigation options exist to address the geotechnical stability concerns identified in the EIS. It is the project proposer's responsibility to provide the geotechnical analysis and propose conditions to mitigate any potential adverse impacts. Since the geotechnical stability concerns are not "unmitigatable," it was determined the best process to address the geotechnical concerns was during permitting since mitigation measures may include detailed design and operational modifications best evaluated by MPCA landfill permitting staff.

Comment 2-5: The commenter requests the Final EIS be revised to indicate the Prairie du Chien Group and the Jordon Sandstone act as two distinct aquifers, according to a recent Minnesota Geologic Survey study.

Response 2-5: Regionally, the Prairie du Chien and the Jordon Sandstone may act as two distinct aquifers. It has been documented that at this facility a vertical groundwater divide exists in the Prairie du Chien. Therefore, groundwater monitoring will be focused on the Prairie du Chien.

Comment 2-6: The commenter requests the Final EIS be revised to state groundwater flow under the Landfill is controlled by both the Minnesota River and the quarry dewatering.

Response 2-6: The groundwater that could potentially be impacted by the landfill is currently controlled by the dewatering of the Kramer Quarry as discussed in Section 6.1.2.4. Section 6.1.2.3 of the EIS also discusses the point that if pumping stops, groundwater will return to pre-pumping conditions and flow will go to the Minnesota River.

Comment 2-7: The commenter requests the Final EIS contain a map showing the design basis water table, including the locations referred to on Table 6-1.

Response 2-7: Table 6-1 integrates information from two different figures—the liner design sheet from the "Application for Permit Modification MSW Landfill West Development Area, Burnsville Sanitary Landfill" and the design basis water table map attached to a March 24, 1998, letter from Waste Management, Inc. to the MPCA describing the design basis water table. Additional figures will not impact the EIS conclusions.

Comment 2-8: The commenter requests the Landfill perform continuous monitoring of the river and monitoring wells during river flood events to confirm assumptions used to predict water table elevations during the 100-year flood event in lieu of slug tests on wells.

Response 2-8: Specific groundwater monitoring requirements will be addressed as part of the permitting process.

Comment 2-9: The commenter requests the Final EIS evaluate the advantages of managing the entire Landfill as a partially "in-gradient" system due to the stoppage of quarry dewatering.

Response 2-9: The current liner design for the WDA does not indicate the liner will be in the water table under non-pumping conditions.

Comment 2-10: The commenter has not received groundwater model input data sets.

Response 2-10: Comment noted.

Comment 2-11: The commenter requests the Final EIS recognize the prohibition against re-circulating leachate for Cells C and D and change the operating procedures accordingly.

Response 2-11: Leachate recirculation projects and conditions are part of MPCA permitting for pilot projects. Pilot projects, and thus any conditions, are not subject to environmental review pursuant to Minn. R 4410.4600, subp 23.

Comment 2-12: The commenter requests that financial assurance be required for levee repair.

Response 2-12: Financial assurance requirements for the BSLI expansion project 2005 will be addressed as part of permitting and are beyond the scope of the EIS. Financial assurance requirements for landfills are addressed in Minn. R 7035.2665 et. seq.

Comment 2-13: The commenter requests quantification of leakage into the leachate collection system should a liner defect go unnoticed and a 100-year flood event occur.

Response 2-13: EIS Section 6.1.3.2.3 evaluates the potential for environmental impact from the leachate collection system during a 100-year flood. During a 100-year flood, water could enter the cell through small defects in the geomembrane that could go unnoticed. These defects would be relatively small and any liquid entering the cell would be handled by the leachate collection system, which is designed to handle leachate from the entire cell.

Flow through defects in geomembranes is dependent on the size of the defect and the hydraulic head (or pressure) in the area of the defect. Determining the exact quantity of liquid entering the cell from a defect is beyond the scope of the EIS since environmental impacts as a result of the defect are not probably.

Comment 2-14: The commenter requests the Final EIS address whether electronic leak location detection will also be used in other areas that are not in the piggyback section.

Response 2-14: The use of electrical leak location services and other construction quality assurance (CQA) functions specific to the project are beyond the scope of the EIS. CQA requirements for landfill construction are addressed as part of the permitting process and subject to the requirements in the Minnesota Rules.

Comment 2-15: The commenter requests the Final EIS text regarding the Landfill gas collection rate be revised.

Response 2-15: This change has been made in the Final EIS.

Comment 2-16: The commenter requests the Final EIS address whether health benchmarks are exceeded if more than one significant digit is used in the evaluation of the project to meet air standards and benchmarks.

Response 2-16: The EIS indicated the "expansion project does not exceed health benchmarks if individual air toxic modeling results are allowed to be rounded to one significant digit…" and further concluded, "The only air toxic modeled with significant risk was acrylonitrile." When the landfill sampled for acrylonitrile in 1996, none was detected. The EIS, page 20, explains the situation concisely. Any adjustment in modeling methods, conclusions, or testing will be addressed as part of permitting of the facility.

3. Comments by Thomas W. Balcom, Supervisor, Environmental Policy and Review Unit, Division of Ecological Services, Department of Natural Resources. Letter received via facsimile June 13, 2005.

Comment 3-1: The commenter expresses concern regarding the project's impacts on loss and diminished value of habitat as a result of the project.

Response 3-1: Potential habitat loss and impacts to fish, wildlife, and ecologically sensitive resources were addressed in Item II of the SEAW. This issue was not brought forward to the EIS since no potential significant impact was identified in the SEAW.

Comment 3-2: The commenter expresses concern that the project does not contain habitat suitable for supporting the rare species previously found on other portions of the Landfill site.

Response 3-2: Potential habitat loss and impacts to fish, wildlife, and ecologically sensitive resources were addressed in Item II of the SEAW. This issue was not brought forward to the EIS since no potential significant impact was identified in the SEAW.

Comment 3-3: The commenter requests the MPCA initiate contact with the DNR and U.S. Fish & Wildlife Service in evaluating an end use plan for the Landfill.

Response 3-3: End use planning evaluation in regard to habitat formation is beyond the scope of the EIS. End use was evaluated as it pertains to recreational resources. The EIS concluded the end use of the facility will not adversely impact recreational resources. Further details regarding end use planning and habitat formation were provided in the SEAW.

4. Comments by Phyllis Hanson, Manager, Local Planning Assistance, Metropolitan Council. Letter received via facsimile June 14, 2005.

Comment 4-1: The commenter requests further evaluation of long-term potential impacts to groundwater quality following termination of dewatering in the adjacent quarry site.

Response 4-1: The scoping decision document required the EIS to evaluate five scenarios as part of the potential groundwater impacts analysis. The five scenarios were:

1. The EIS will contain a description of the soils and geologic conditions at the existing Landfill and proposed Expansion site.
2. The EIS will contain a description of the quality and quantity of groundwater in the vicinity of the site.
3. The EIS will describe the existing groundwater monitoring plan for the existing Landfill and, conceptually, the proposed groundwater monitoring plan for the proposed Expansion.
4. The EIS will analyze the effect of continuous groundwater pumping at the Kramer Quarry and from nearby high capacity wells (within a two-mile radius) would have on the direction of the groundwater flow under the existing Landfill and proposed Expansion site.
5. The EIS will include an analysis to define water table conditions should the Kramer Quarry stop its dewatering activities under non-flood conditions.

Analysis of long-term potential impacts of groundwater quality following termination of dewatering in the adjacent quarry is beyond the scope of the EIS. However, the EIS does indicate that upon quarry dewatering ceasing, the number of groundwater monitoring wells may need to be increased to adequately monitor groundwater quality (see page 48, Section 6.1.2.5).

Comment 4-2: The commenter requests further evaluation of the potential for catastrophic failure in the landfill following termination of quarry dewatering in the adjacent quarry.

Response 4-2: Liner and leachate collection system performance were evaluated in the EIS for potential environmental impacts during normal flow conditions and the 100-year flood event on the Minnesota River according to the Final Scoping Decision Document. The current liner design for the WDA does not indicate the liner will be in the water table during non-pumping conditions. The liner and leachate collection system were evaluated in Draft EIS sections 6.1.3.2.2, 6.1.3.3.2 and 6.1.3.4. Upon the termination of dewatering in the adjacent quarry, the adequacy of the groundwater monitoring system will be evaluated.

Comment 4-3: The commenter requested the complete geotechnical evaluation recommended in Section 6.1.3.4 of the Draft EIS be conducted now during the environmental review process rather than as part of permitting process as recommended in the Draft EIS.

Response 4-3: The EIS recommends a geotechnical analysis be conducted as part of the landfill permitting process to determine if stability concerns identified in the EIS can be mitigated. Several mitigation options exist to address the geotechnical stability concerns identified in the EIS. It is the project proposer's responsibility to provide the geotechnical analysis and propose conditions to mitigate any potential adverse impacts. Since the geotechnical stability concerns are not "unmitigatable," it was determined the best process to address the geotechnical concerns was during permitting since mitigation measures may include detailed design and operational modifications best evaluated by MPCA landfill permitting staff.

Comment 4-4: The commenter requested the Draft EIS evaluate the future consideration that the Kraemer and Sons quarry dewatering well system is being considered as a potential potable surface water supply source and impacts to this potential source should a major liner failure or contaminant plume discharge impact this potential source.

Response 4-4: Evaluation of the potential future consideration of the Kraemer and Sons quarry dewatering well system being used as a potable source and the potential impact the expansion project may have on the well is beyond the scope of the EIS. Evaluation of impacts to the well system and its use as a potable water source should be conducted as part of an evaluation should the Kraemer and Sons quarry dewatering well system be proposed as a potable water source.

Comment 4-5: The commenter requested any sanitary sewer connection and/or leachate management system connected will need to be submitted to the Metropolitan Council Environmental Services, Municipal Services staff for review and permitting.

Response 4-5: This is beyond the scope of the EIS and will be handled as part of permitting the project area.

5. Comments by Dennis A. Gimmestad, Government Programs and Compliance Officer, Minnesota Historical Society. Letter received June 17, 2005.

Comment 5-1: The commenter requested a cultural resource assessment be conducted for the expansion area to assess any potential impacts to cultural resources.

Response 5-1: The SEAW indicated no archaeological, historical, or architectural resources are in proximity to the project area. In addition, an August 13, 2002, letter from the State Historical Society indicated there are no known or suspected archaeological or historical resources in the proximity of the project area.