June 20, 2003

TO: INTERESTED PARTIES

RE: St. Louis County Regional Landfill Major Modification

Enclosed is the Environmental Assessment Worksheet (EAW) for the proposed St. Louis County Regional Landfill Major Modification, St. Louis County. The EAW was prepared by the Minnesota Pollution Control Agency (MPCA) and is being distributed for a 30-day review and comment period pursuant to the Environmental Quality Board (EQB) rules. The comment period will begin the day the EAW availability notice is published in the EQB Monitor, which will likely occur in the June 23, 2003, issue.

Comments received on the EAW will be used by the MPCA in evaluating the potential for significant environmental effects from this project and deciding on the need for an Environmental Impact Statement (EIS).

A final decision on the need for an EIS will be made by the MPCA Commissioner after the end of the comment period. If a request for an EIS is received during the comment period, or if the Commissioner recommends the preparation of an EIS, the MPCA Citizens' Board (Board) will make the final decision. The final EIS need decision will also be made by the Board if so requested by the project proposer, other interested parties or MPCA staff and if this request is agreed to by one or more members of the Board or the MPCA Commissioner. The Board meets once a month, usually the fourth Tuesday of each month, at the MPCA office in St. Paul. Meetings are open to the public and interested persons may offer testimony on Board agenda items. A listing of Board members is available on request by calling (651) 296-7306.

Please note that comment letters submitted to the MPCA do become public documents and will be part of the official public record for this project.

If you have any questions on the EAW, please contact Jim Sullivan of my staff at (651) 297-1788.

Sincerely,

Beth G. Lockwood
Supervisor, Environmental Review Unit
Operations and Environmental Review Section
Regional Environmental Management Division

BGL:mln

Enclosure

ENVIRONMENTAL ASSESSMENT WORKSHEET

Note to reviewers: The Environmental Assessment Worksheet (EAW) provides information about a project that may have the potential for significant environmental effects. This EAW was prepared by the Minnesota Pollution Control Agency (MPCA), acting as the Responsible Governmental Unit (RGU), to determine whether an Environmental Impact Statement (EIS) should be prepared. The project proposer supplied reasonably accessible data for, but did not complete the final worksheet. Comments on the EAW must be submitted to the MPCA during the 30-day comment period which begins with notice of the availability of the EAW in the *Minnesota Environmental Quality Board (EQB) Monitor*. Comments on the EAW should address the accuracy and completeness of information, potential impacts that are reasonably expected to occur that warrant further investigation, and the need for an EIS. A copy of the EAW may be obtained from the MPCA by calling (651) 296-7398. An electronic version of the completed EAW is available at the MPCA Web site http://www.pca.state.mn.us/news/eaw/index.html#open-eaw.

1. Project Title: St. Louis County Regional Landfill Major Modification

2. Proposer: St. Louis County

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3. RGU: Minnesota Pollution Control Agency

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4. Reason for EAW Preparation:

EIS Scoping	Mandatory EAW	Citizen Petition	RGU Discretion	Proposer Volunteered
	X			

If EAW or EIS is mandatory give EQB rule category subpart number and name: 4410.4300 subp. 17

5. Project Location: County: St. Louis City/Twp: Virginia

NE 1/4 ____ 1/4 Section 10 Township 58N Range 17W

Appendices attached to the EAW:

- Appendix A: Map of Minnesota Showing Project Location;
- Appendix B: Map of St. Louis County Showing Project Location;
- Appendix C: U.S. Geological Survey 1:24,000 Scale Topographic Map of Project Location;
- Appendix D: Plat Map Showing Property Ownership;
- Appendix E: St. Louis County Regional Landfill Application for Repermit Drawings;
  - Sheet 1 Index Sheet
  - Sheet 2 Existing Site Conditions
  - Sheet 3 Overall Base Grade Plan
  - Sheet 4 Overall Final Cover Plan
  - Sheet 5 Gas Collection System Plan

Sheet 6 Cross Sections
Sheet 7 Liner System Details
Sheet 8 Leachate Collection System Details
Sheet 9 Leachate Collection System Details
Sheet 10 Closure Details
Sheet 11 Closure Details

- Appendix F: Design Volumes Table;
- Appendix G: St. Louis County Regional Landfill Environmental Monitoring Detail Map;
- Appendix H: Environmental Monitoring System Tables;
- Appendix I: Minnesota Department of Natural Resources (DNR) Natural Heritage Letter.

6. Description:

a. Provide a project summary of 50 words or less to be published in the *EQB Monitor*.

St. Louis County (County) proposes to redesign the Mixed Municipal Solid Waste (MSW) Regional Landfill to allow for increased site life without changing the original footprint (approved in the 1993 permit). The redesign increases capacity and extends the life of the Landfill from 2,011 to 2,036, based on current fill rates.

b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

Background

The St. Louis County Regional Landfill (Landfill) is located on top of mine dump material consisting of a heterogeneous mixture of rocks, sand, silt, and clay (mine tailings are not contained in this mixture). Mine dump filling began in the 1920's. The mine dump material ranges in thickness from 20 feet along the northern Landfill boundary to up to 60 to 80 feet along the southern perimeter.

The Landfill was issued permit SW-405 from the MPCA on April 30, 1993. Under this permit the County is authorized to dispose of 1,650,000 cubic yards (yd^3) of industrial and MSW and cover. The 160 acre facility is located approximately 2.5 miles east of Virginia, Minnesota and 2.5 miles north of State Highway 135 on a 537 acre parcel of land. Maps showing the location of the Landfill can be found in Appendices A, B, and C. The County has designated approximately 42 acres for disposal, approximately 25 acres for leachate pond aeration treatment/spray irrigation, and the remainder for sedimentation ponds, access and service roads, household hazardous waste collection, special waste collection, and recyclables processing. The Landfill is located on in Section 10, Township 58 North, Range 17 West, in St. Louis County, Minnesota. The St. Louis County Solid Waste Department owns property adjoining the Landfill in Section 11, Township 58 North, Range 17 West (Appendix D).

The County began development of the Landfill in 1993 by constructing a nine acre cell (Phase 1) with associated road, leachate management, scale, shop, and other facilities. During construction of the first phase of the Landfill, areas of subsidence occurred immediately after significant precipitation. The settlement was attributed to rapid downward percolation of rainwater pulling fine-grained sediment with it to cause depressions. To minimize future settlement below the Landfill base, a five foot subcut with reinforcing geotextile was approved by the MPCA and required in all future cell construction. Two feet of low permeability clay was placed and compacted above this base material. A 60-mil high-density polyethylene liner was placed over the low permeability clay layer and a one foot drainage layer of granular material was placed over the liner. A leachate collection system was installed within the drainage layer.

The leachate system collects liquids from the bottom of the Landfill via a system of pipes and pumps it into two holding ponds where the leachate is aerated to promote biological processes which remove Volatile Organic Compounds (VOC). These ponds also encourage the settlement of particulates from the leachate. After aeration processing and testing, the leachate is sprayed onto an adjacent 21 acre field for further biological processing. The design capacity of 6,000,000 gallons for leachate storage has proven to be more than adequate. In the summer of 1999, the leachate management system was upgraded by the addition of a Programmable Logic Controller (PLC), modifications to the existing sprayers and the installation of 12 additional sprayers.

Upgradient and downgradient ground water test wells were installed during construction of the Landfill and are sampled and tested in the spring, summer, and fall by an independent laboratory. Test results have shown no contamination in these wells. Should ground water constituents ever exceed allowable limits, the County will take all necessary actions for mitigation and remediation to prevent further contamination. This site has been regularly inspected by the MPCA and has been found to be in compliance.

Phase 1A, a 6.7 acre cell, was constructed in 1995. In July 1996, the County submitted a permit re-issuance application to update landfill information and request additional landfill volume and design modification approval. The landfill redesign reduced the footprint of the Landfill from 42 acres to 29 acres, but increased the Landfill's ultimate design capacity from 1,650,000 million yd^3 to 1,990,000 million yd^3, including final cover. The MPCA landfill permit was issued in July 1999, granting the Landfill a new Certificate of Need (CON) of 429,625 yd^3, 1,366,500 yd^3 of permitted capacity, and 1,990,000 yd^3 of ultimate capacity. In April 2003, the County will submit a Comprehensive Solid Waste Management Plan Update to the Minnesota Office of Environmental Assistance requesting a ten year CON of 774,560 yd^3 for the years 2003 through 2012.

Additional landfill activities have included:

- Construction of Phase 2, a 2.5 acre cell and associated leachate system expansions and improvements in the summer and fall of 1999.
- Cell closure totaling 3.8 acres for parts of Phases 1A and 1 in the summer of 2000.
- Construction of Phase 3, a 2.8 acre cell in the summer of 2002.

MPCA certification for these projects has been received by the County.

On land adjacent to the Landfill, the County also constructed a household hazardous waste collection and storage facility in 1999 and a recyclable materials processing facility in 2000.

The quantity and waste type of each load delivered to the Landfill is recorded on a computerized Landfill Management System (LMS). The vertical and horizontal coordinates of the daily working face are also recorded on the LMS. As a result, the location of all waste placed in the Landfill can be identified by the date it was landfilled.

Incoming waste is screened by the scale attendant for acceptability. In addition, the landfill operator monitors incoming waste as it is placed in the active tipping area of the Landfill. Unacceptable waste deposited there is removed from the Landfill and properly disposed. Loads are randomly inspected to further ensure that unacceptable wastes are excluded from the Landfill.

Laboratory analysis of industrial waste must be submitted to the County Hazardous Waste/Industrial Waste Specialist for review and approval prior to acceptance in the Landfill. Industrial wastes accepted at the Landfill include empty pesticide containers (if triple-rinsed), asbestos, foundry wastes, incinerator ash, dry paint residue, sandblasting waste, and solidified ink sludge.

The Landfill accepts mixed municipal solid waste (approximately 50,000 tons per year), coal ash (approximately 10,000 tons per year), and industrial waste (approximately 10,000 to 12,000 tons per year). As of December 31, 2002, approximately 883,684 tons of waste (MSW, industrial, demolition and asbestos) and cover have been placed in the Landfill. As currently designed and at projected fill rates, the Landfill will be at capacity in 2011.

Hazardous wastes, liquid wastes, and special wastes such as yard waste, scrap metal, waste oil, oil filters, automobile batteries, fluorescent tubes, appliances, used antifreeze, and tires are handled as separate waste streams and are not landfilled. Medical waste is not accepted at this facility.

General Project Proposal

The proposed Landfill design (Appendix E) addresses development and expansion options for the Landfill. The design has been modified from the original (1993) and current (1999) permit. The modifications currently proposed may be summarized as follows:

- Reduce the number of remaining cells (approximately 7.5 acres) to be constructed in the existing foot print from three to two.
- Increase final cover slopes from approximately 10 to 20 percent on current and future open cells.
- Increase final elevations.
- Incorporate a 13 acre expansion north of the existing foot print (29 acres) to include land that was originally permitted in 1993 (42 acres).
- Increase the ultimate capacity from 1,990,000 yd^3 to 4,208,670 yd^3 and extend the life of the Landfill from 2011 to 2036 (based on current fill rates).

The proposed modifications for the 13 acre expansion of the Landfill footprint and construction of future cells will substantially increase the life of the Landfill while meet or exceed the requirements of Minn. R. 7035.2815.

Proposed Design for Future Landfill Phases

The Landfill is presently permitted for a disposal capacity of 1,990,000 yd^3. As proposed in this permit re-application, the design capacity will be expanded to approximately 4,208,670 yd^3. This will help accommodate an existing disposal rate of approximately 95,000 yd^3 per year. As shown in the Design Volumes Table (Appendix F), the proposed design results in a projected site life of approximately 33 years from January 1, 2003, based on current fill rates.

The County understands that its ability to utilize the capacity anticipated in the proposed site life of 33 years will be restricted by its ongoing ability to obtain a State CON for that capacity. Furthermore, the County recognizes that future permit reissuance will be dependent upon ongoing regulatory compliance, and will be in accordance with regulatory standards and statewide waste management policies in place at the time of permit reissuance.

Subbase Preparation

Construction of future cells will require excavation, preparation, and grading. As with Phases 1, 1A, 2, and 3, a five foot subcut will be completed beneath proposed base grade elevation. The five foot subcut includes installation of a reinforcing geotextile and recompaction of the subcut materials to 95 percent Standard Proctor with all rock material over one inch in diameter being removed. The subcut provides a reinforced mat to protect against movements in the mine spoils.

The construction of future cells will require subbase preparation according to the project specific Technical Specifications and Construction Quality Assurance Manual prior to installation of the liner.

The monitoring of previously installed slope indicators has been conducted. No movements have been detected; therefore, a reduced program is proposed. This will consist of the quarterly monitoring (with ground-water event) using a long bailer dropped down the pipes. If the bailer does not drop the full depth, the slope indicator monitoring will resume.

Base Grades

The base grades for future cells have been designed to maximize site life, and minimize environmental impacts. The grades range from about 33 percent on the side slopes (three horizontal to one vertical) to a minimum of one percent on the base for the leachate lines.

Liner Design

The composite liner will consist of one 60 mil (0.060 inch) high density polyethylene (HDPE) liner, overlying a two foot clay liner. The clay liner will have a maximum permeability of $1x10^{-7}$ cm/sec and will be compacted to a minimum of 95 percent standard proctor dry density with a moisture content zero to five percent wet of optimum moisture content. The Hydrologic Evaluation of Landfill Performance (HELP) model calculations, submitted as part of the Repermit Application, verify that this liner design efficiency of 99.99 percent greatly exceeds the design requirement in the MSW Rules of 98.5 percent.

The HDPE liner will be overlain by 12 inches of granular drainage layer material. The permeability of the drainage layer is specified to be $1x10^{-3}$ cm/sec, or greater. On all side slopes steeper than ten percent, a textured HDPE membrane will be utilized to improve stability of the geomembrane/clay interface and geomembrane/drainage interface.

The granular drainage layer will collect leachate and provide drainage to the perforated leachate collection pipes. To protect the pipes from damage, and to provide increased flow performance, they will be embedded in coarse aggregate (five-eighths inch to one inch). The granular drainage layer also will function as a protective layer to prevent equipment from damaging the HDPE liner. Crushed aggregate will not be used for this reason due to the angulatory of the particles.

Leachate Collection System

The leachate collection system for Phases 1/1A, and Phases 2/3 were constructed to collect and convey leachate over the composite liner to single collection sumps located within Phase 1 and Phase 2. The sumps incorporated side-slope risers to eliminate penetration of the liner.

The sideslope riser pump-out system for Phases 1/1A did not perform as originally intended. The County believes that was due in part to the lack of a piping connection between the manhole and the sideslope riser pump. To address this, the County installed an additional pumping system in the Phase 1 manhole to pump directly from the manhole. This second system handles the majority of leachate from Phases 1 and 1A. The manhole system for Phase 2 was re-designed to incorporate a direct connection between the manhole and the sideslope riser. No further problems are anticipated.

The leachate collected in both sumps is then conveyed to the leachate storage and treatment aerated pond system by a single leachate forcemain. After the ponds, the leachate is pumped to the spray irrigation area for disposal.

It is proposed that the leachate collection system for future cells be designed to collect, convey, treat, and dispose of leachate in a similar manner. Phases 4 through 8 will convey leachate over the composite liner to the collection sump in Phase 4. A side slope riser system, leachate lift station, and connection to the existing forcemain will be incorporated to convey leachate through the leachate forcemain to the two existing storage ponds. Trenches for the leachate collection piping, cleanout risers, and lysimeter piping, along with the leachate collection sump area and lysimeter sumps will be excavated during subbase preparation to provide a 2.5 foot clay thickness beneath all areas of the leachate handling system.

1. Collection Pipes

   The collection pipes will be six inch diameter, perforated, Standard Dimension Ratio (SDR)-11, HDPE pipe. Pipe deflection is calculated to be 1.52 percent (the MPCA, MSW Rules require less than five percent). The factor of safety for buckling is six. The factor of safety for wall crushing is 3.6.

   Locations of collection pipes are shown on Plan Drawing No. 3 in Appendix E.

   Access to the leachate collection pipes will be provided by cleanout risers, which will extend up the side slopes to allow easy access. As with the Phases 2/3 construction, Phases 4/5 construction will provide cleanout risers on the east and west side slopes of the Landfill to ensure access from either direction. Cleanout of the collection pipes will be conducted as required in the Operations and Maintenance Plan.

   A six inch diameter HDPE pipe at 1.0 percent slope has a hydraulic capacity of 273 gallons per minute (gpm). The pipe in this design is not sized for flow capacity, but to provide sufficient strength and to allow for use of standard sewer pipe cleaning and maintenance equipment. The peak flow expected in any leachate pipe was calculated using the HELP model leachate generation rates, in the active condition, at 4.1 gpm.

   The collection pipes will be placed in trenches. Coarse aggregate will be used as bedding and also mounded over the pipes to protect them from loadings from landfill equipment and the waste mass.

Special care will be taken to properly align the pipes according to the invert elevations and locations. The perforations will be oriented to be on bottom.

The geotextile, as specified in the Technical Specifications, will be placed in the pipe trenches. A layer of coarse aggregate three inches thick will be placed in the trench and the pipe will be placed and aligned. The remaining coarse aggregate will be placed after the pipe is fully installed. The granular drainage layer material will then be graded over the trench.

2. Leachate Storage Sump

Leachate collection pipes convey leachate to a storage sump at the base of the Landfill. Existing leachate collection sumps exists in Phase 1 and 2, and a future sump is proposed for Phase 4. The sump area and manhole serve as a wetwell for the side slope. The sump consists of a six foot deep depression in the liner system and will be filled with coarse aggregate. Leachate in the Landfill that flows to the sump area will then be pumped to the leachate ponds.

3. Leachate Head Build-Up

Calculation of the estimated leachate head build-up in the granular drainage layer over the liner indicate an average annual leachate head build-up of .17 inches for the part of Phase 1A that is closed, .59 inches for Phases 1 & 1A that are currently open, .71 inches for Phase 2, and 1.8 inches for Phase 3. Leachate head will be monitored continuously at the riser in accordance with the operations and maintenance plan.

4. Leachate Sump Manhole

A four foot diameter reinforced concrete manhole, similar to the manholes in Phases 1 and 2, will be included in the leachate storage sump for Phase 4. The manhole provides redundancy for removing leachate if the side slope risers fail, a means of direct measurement of leachate head and a means of calibrating the leachate pressure transducer. The manhole was placed on top of a one inch thick sheet of HDPE flatstock to protect the liner. In addition, the lower section of the manhole was perforated to allow leachate to flow in.

5. Side-Slope Risers

In Phase 2, the side-slope riser connects to the manhole in the leachate storage sump. The riser is installed above the 60-mil HDPE liner and up the side-slope to a riser vault. It consists of an 18-inch, SDR-11, HDPE perforated pipe that houses the leachate extraction pump.

The side-slope riser design for Phase 4 will be similar to the Phase 2 design, except that the Phase 4 side-slope riser will be located in a side-slope riser trench.

6. Leachate Sump Leak Detection

A leak detection system will be installed beneath the leachate storage sump similar to Phases 1 and 2. The leak detection system will consist of horizontal four inch perforated SDR-11 pipe connected to four inch non-perforated SDR-11 pipe approximately five feet inside the secondary liner system. This ensures that no leachate will be transmitted outside the secondary liner system by the leak detection system. Coarse aggregate will be placed around the perforated pipe and wrapped with geotextile. This textile will maintain separation between the coarse aggregate and drainage layer.

The horizontal, non-perforated, leak detection pipes will be connected to vertical six inch non-perforated riser pipes that will extend approximately three feet above the top of berm. Ten foot of protective corrugated metal pipe casing will be placed at the top of the riser pipe along with a hinged locking cap.

7. Leachate Lift Station and Forcemain

Leachate collected in the sump area will be pumped via a side slope riser system to the riser vault located on top of the east berm. At this point, a connection will be made to the existing three inch SDR-11 forcemain, encased in a six inch HDPE protective pipe which conveys leachate to the leachate ponds. A manhole will be installed at the connection point along with check valves to allow proper operation of existing and proposed pumps. See Plan Drawing Nos. 3, 8, and 9 in Appendix E for more detail.

8. Leachate Storage Ponds

Two leachate storage ponds, with a combined capacity of 6,000,000 gallons, were constructed with a composite liner system in 1993. Both ponds are aerated and are operated, in series, with leachate treated in the first pad and then flowing into the second pond for additional treatment. Aeration for the treatment process is provided by three 50 horse power, 908 linear feet per minute blowers, and piping to diffusers in the pond bottoms. The blowers are housed in an adjacent 20 by 40 foot building. Piping and manholes at the ponds allow for each of the ponds to be isolated. The ponds were designed to hold approximately six million gallons of leachate and have approximately 260 days of storage based for peak generation rate estimates.

Effluent from the leachate treatment ponds is pumped to the irrigation site by a 150 gpm, 15 HP, vertical turbine pump, and through a four inch SDR-26 polyvinyl chloride forcemain.

9. Leachate Spray Irrigation Area

The original spray irrigation area is approximately 21 acres in size and is shown in Appendix G. The spray irrigation area consists of the original 16 fixed head rotary gun-type sprinkler nozzles which distribute the leachate to the soil. The spray irrigation site was originally seeded with a variety of perennial grasses containing smooth brome grass, switch grass, birdfoot trefoil, reed canary, and perennial rye grass. Reed canary has become the dominant grass within the leachate spray radius'. The vegetation is harvested annually in July and September. The harvested grass is baled and applied as frost protection to new Landfill cell construction areas.

In the summer of 1999, the leachate management system was upgraded by the addition of a PLC, modifications to the existing sprayers and the installation of six additional fixed head rotary gun-type sprinkler nozzles installed around the perimeter of the leachate ponds. Soil water balance sheets were calculated for irrigation control of the spray irrigation areas.

Also in 1999, the County installed six fixed head rotary gun-type sprinkler nozzles on nine acres north of the current permitted footprint. See Appendix G for the location of this spray irrigation area. The new spray area was designed to provide the Landfill with additional, but temporary, leachate spray irrigation capacity. When the Landfill footprint expands to include land that was part of the original 1993 permitted footprint, the sprinkler nozzles and lines will be removed to allow for development of future landfill cells. The County will consider the development of an additional spray irrigation area prior to removal of the existing temporary spray heads.

Final Cover Design

The final cover is designed to contain or divert precipitation over filled areas of the site. Final cover grades at the site are shown in Appendix E, Plan Drawing No. 4. A typical section for the final is shown in Appendix E, Plan Drawings No. 10 and 11.

In the summer of 2000, the County installed final cover on approximately 3.8 acres of Phases 1A/1. The County plans to close the remainder of Phase 1A/1 in 2004.

If necessary, soil will be added on top of the waste during final closure to achieve correct grades. The surface of the waste or soil buffer layer will be rolled to provide a suitable base for installation of the barrier layer. The barrier layer will consist of a 40-mil Linear Low Density Polyethylene (LLDPE) liner or equal. A drainage layer nine inches thick with a permeability greater than $1x10^{-3}$ cm/sec will overlie the liner. As shown in Appendix A, the average annual total of surface water head over the barrier layer will average approximately two-thirds inch.

The cover soils will consist of nine inches of general fill material and six inches of topsoil. The top six inches of topsoil capable of sustaining vegetation. The final cover topsoil layer will be mulched and seeded with shallow rooted, drought tolerant grasses.

Slopes on the final cover area of Phase 1A/1 range from three percent on top to ten percent on the side slopes. Slopes on future closed cells will range from three percent on top to 20 percent on the side slopes. The highest elevation will be 1,840 feet. The final contours are presented in Appendix E, Plan Drawing No. 4. Differential settlement will occur, but will be handled as a post-closure item. The new 20 percent cover is more effective, providing increased slopes for settlement while meeting MPCA Solid Waste Rules for maximum slope.

These slopes, along with additional runoff management features, provide this facility with environmental protection required by the MPCA Solid Waste Rules.

Runoff will leave the final cover on the surface and through the drainage layer. The transition from the final cover to the perimeter ditch is shown on Appendix E, Plan Drawing No. 5.

Erosion will be controlled by limiting the slopes to 20 percent and by strategic placement of drainage swales, collection piping, erosion control mats, and riprap. Runoff will be directed by the final cover drainage swales to two primary sedimentation ponds (see Appendix E, Plan Drawing No. 2).

The drainage swales and underlying collection pipes both outlet at the same locations. Surface-water control is described in Section H below. No run-on will occur from previously closed areas. Runoff from off-site and undeveloped areas will collect in external perimeter ditches and natural drainage pathways.

Water moving through the drainage layer which is not collected in the drainage swale collection pipes will be collected in slotted, six inch, corrugated, polyethylene perimeter drainage pipes at the toe of the final cover drainage layer. Appendix E, Plan Drawing No. 10 illustrates the configuration. The perimeter drainage pipes will be sloped parallel to the drainage ditches. Outlets will be provided every 200 feet to allow the water to move into the internal ditches.

Surface Water Control

1. Introduction

   The major modification to the final conceptual design of the Landfill includes a slope change from 10 percent to 20 percent for approximately half of the proposed new footprint. With all the drainage ditches, structures and detention basins previously designed and in place the following analysis focused on the new potential surface water run-off and corresponding peak discharge rates for the redesign.

2. Runoff Volume and Peak Discharge Rates

   Haested's Culvert Master was utilized to calculate the theoretical surface water runoff and resultant peak discharge rates from four sub-areas within the Landfill. The following inputs were used in the model analysis: The Spark Control System (SCS) Peak Discharge Method was chosen to best represent the existing conditions. A 25 year, 24-hour storm event of 4.3 inches. A weighted curve number of 76, was calculated for the existing conditions within in the HELP model. This number is generated through the utilization of the slope properties, soil types and vegetation. A time of concentration of 12 minutes was incorporated. Ditch property inputs of the typical ditch design included a slope of 1.0 percent and a well maintained grassed waterway with a corresponding Mannings Coefficient of .030.

   The first two sub-areas included a 19.3 acre watershed area that drained to the existing Eastern detention pond. These were broken down into one area that included eight acres and a larger area that contained 11.3 acres. Two sets of ditches, one on the outside and one on the inside of the perimeter road carry the runoff to the Eastern pond. The smaller sub-area had an estimated discharge of 19.12 cubic feet per second (cfs) and a corresponding ditch velocity of 3.90 feet per second (fps) with a calculated depth of 1.56 feet. The second larger sub-area had a resultant discharge of 27.01 cfs and a maximum ditch velocity of 4.26 fps at a depth of 1.78 feet.

   The next area considered drained to the South ponding area. The estimated watershed draining to this area was 16.3 acres. The total discharge from the slopes was 38.96 cfs and the ditch velocity was calculated at 4.66 fps with a depth of 2.04 feet.

   The remaining area will be drained to the existing culvert that eventually flows to a naturally occurring pond to the Northwest. The corresponding information includes 6.2 acres of watershed area, a discharge of 14.82 cfs, and a ditch velocity of 3.66 fps that included a depth of 1.42 feet.

The model was performed on a worst-case scenario that eliminated the upper swales on the slopes that were used for velocity reduction. The calculated runoff volumes and corresponding peak discharge rates for the redesigned Landfill had a total discharge of 100 cfs and a maximum peak velocity of 4.66 fps. The recommended maximum velocity before potential erosion could occur, which is specified within the Handbook of Channel Design for Soil and Water Conservation is five fps for grassed waterways. The estimated rates also compare favorably to the rates that were calculated in the last model analysis that was performed in 1996. Therefore, the resultant information illustrates that the design of the in-place drainage ditches, structures and retention ponds are more than adequate to support the proposed changes to the Landfill.

3. Sedimentation Pond Design

Two ponds and an existing low area will be used for sedimentation as previously mentioned. The East Pond currently exists. The Northwest Ponding Area also currently exists as a low area below the 1,720 contour in the northwest corner of the site. The South Pond will be constructed when needed and drainage will be rerouted to that area.

The East Pond has substantial volume for detention since there is approximately eight feet from the pond bottom to the rim elevation of the outlet (1,678.2). For a conservative estimate, the routing was conducted assuming the pond had standing water at elevation 1,678. Routing showed the peak elevation to be 1,679.11 at a peak outflow of 67.9 cfs.

The Northwest Ponding Area is the existing low area below the 1,720 elevation and routing shows a peak elevation of 1,718.3 for the given event. The South Pond will be two feet deep with 1.0 acres of surface area at the berm elevation of 1686. Routing gives a maximum elevation of 1,685.6 for the 4.2 inch rainfall.

Gas Management and Venting

In order to control the release of gas generated in the Landfill, vertical gas vents will be installed during the placement of the final cover on completed phases of the Landfill. Gases generated in landfills through anaerobic processes are composed mainly of carbon dioxide and methane with small amounts of hydrogen sulfide and ammonia. Landfill gas can kill vegetation and accumulate in subsurface voids and low areas thereby enhancing the potential danger of explosion. The final cover system of the proposed Landfill will consist of very low permeability synthetic material which will contain gases and transport the gas to the vertical vents collection piping beneath the barrier layer.

The depth of waste (maximum of approximately 138 feet) and the extended time frame in which the wastes were placed along with the granular daily and intermediate cover soils used during operations would suggest that the Landfill gas generation rate will be low and that vertical gas vents installed in bore holes drilled through the waste should be adequate. It is proposed that 51 vertical gas vents be installed at the location shown in Appendix E, Plan Sheet No. 5. The spacing and location of the vents is based on the potential to convert to an active gas collection system.

Discussions are underway with MPCA staff to evaluate gas collection and utilization at the Landfill, most probably as an energy source for the St. Louis County Recycling Facility.

Available information regarding active gas collection systems suggests that the industry standard for the radius of influence for gas collection wells is typically 150 feet. The vertical gas vents will provide adequate coverage should an active gas collection system become necessary at the site. The borehole diameter will be 30 to 36 inches and the vents will be drilled to ten feet from the bottom depth of waste. Please note that the boreholes will end ten feet from the bottom depth of the waste to protect the integrity of the liner. Monitoring of landfill gas at the site will be incorporated into the Post-Closure Monitoring Program. Please refer to the environmental monitoring section for details on landfill gas monitoring.

Discussions are underway with MPCA staff to evaluate gas collection and utilization at the Landfill, most probably as an energy source for the St. Louis County Recycling Facility.

Environmental Monitoring System

The 2003 Revision of the Environmental Monitoring System (EMS) Workplan was submitted to the MPCA during February, 2003, and included the following modification:

- MPCA comments regarding the 2001 Revised Environmental Monitoring Workplan provided in a January 10, 2002, letter.
- Additions to the monitoring that were recommended in the Evaluation of the Effects of Coal Ash in the St. Louis County Regional Landfill letter report submitted January 28, 2003.

Water Quality Annual Reports are submitted by February 1st of each succeeding calendar year. The annual reports contain all of the fall monitoring data, with a data summary of the previously submitted spring and summer quarterly monitoring results. The reports also evaluate the preceding years monitoring data relative to long term water quality trends and identify any compounds that exceed the groundwater performance standards established in Minn. R. 7035.2815, subp. 4, Minnesota Department of Health (MDH), Health Risk Limits (HRL) and/or limit tables established specifically for the Landfill.

The sampling and analysis protocols are reviewed annually, and if any adjustments are necessary, prior approval from MPCA staff are obtained before implementation. The Landfill EMS includes nine separate monitoring categories as listed below.

- Ground-water monitoring
- Surface-water monitoring
- Landfill liner leak detection
- Leachate pond leak detection
- Spray irrigation area - operation monitoring
- Spray irrigation area - water quality monitoring
- Landfill gas monitoring
- Slope stability monitoring

In addition to the scheduled sampling and analyses conducted for the Landfill, contingency sampling plans for re-sampling and analysis are included in the work plan.

Ground-water Monitoring

The water quality monitoring system at the Landfill includes 15 monitoring wells for monitoring ground-water quality surrounding the Landfill. Appendix H, Table 1 presents a summary of the water quality monitoring system regarding locations of the monitoring wells and surface sites in relation to the Landfill. The table also includes the sampling order rational for the ground-water monitoring locations. Appendix H, Table 2 shows the ground-water collection depths, purging rates and sampling methods used at each monitoring well location. The analytical guide presented in Appendix H, Table 3 shows a summary of the analytical parameters for each sampling location during each scheduled monitoring event.

Surface-water Monitoring

Three surface-water monitoring points SS-1, SS-2 and SS-3 are shown in Appendix G. Surface-water sample locations SS-1 and SS-3 are located near the base of the mine dump where ground water seeps have been identified. Surface site SS-2 is near the outlet of the storm-water retention basin. SS-2 is often dry, making sample collection impossible during most monitoring events. However during wet seasons and/or after significant precipitation, events samples can be collected and the site monitors the potential transport of landfill contamination from the precipitation events. Appendix H, Table 3 includes the analytical parameters for surface water samples collected during each scheduled monitoring event.

Landfill Liner Leak Detection

Four landfill liner leak detection risers (LLDR) LLDR A, LLDR B, LLDR C and LLDR D are located along the southeast and east (downgradient) margin of the waste fill area of the Landfill (see Appendix G). The purpose of the leak detection risers are to provide monitoring points between the Landfill liner and the ground-water surface. Water that accumulates in the risers is analyzed for VOC, which provide adequate indications of contamination from landfill liner leaks.

Leachate Pond Leak Detection

Six leachate pond leak detection risers (PLDR) PLDR 1, PLDR 2, PLDR 3, PLDR 4, PLDR B and PLDR C are present for leak detection from the leachate treatment ponds at the Landfill (Appendix G). PLDR 1 and PLDR 4 monitor the west treatment pond and PLDR 2 and PLDR 3 monitor the east treatment pond. Each of the two pairs of leak detection risers are constructed with horizontal intakes placed in the coarse granular (gravel) layer between the two layers of impermeable synthetic pond liners of each treatment pond. Since the leak detection risers are “paired” for each of the two horizontal intakes, only the PLDR 1 & 2 are utilized for pumping and sample collection. PLDR B and PLDR C have vertical intakes, are located between the treatment ponds, and monitor the vadose zone below the bottom of the treatment pond liners. Pumped liquid is discharged directly back into the leachate treatment ponds.

Modifications were made to the leachate pond leak detection riser system during 2000 following the completion of the Leachate Treatment Pond Liner Investigation Report (NTS, April 2000). Before the pond liner investigation in 1999, pumping of the leak detection riser pipes was performed by manually activated pumps. The volume of liquid pumped was determined (and recorded) by timing a known pumping rate. Based upon the conclusions of the pond liner investigation, automatically activated pumps with flow meters were installed in PLDR 1 & 2 in April 2000.

Since the automatic pumps were installed, the volume of liquid recycled back to the treatment ponds has been recorded monthly by St. Louis County Solid Waste personnel. In addition, samples from the leachate pond leak detection risers were analyzed quarterly in 2002 (see 2002 Annual Report). As concluded in the 2002 Annual Report, continued monthly pumped volume monitoring with quarterly analysis (Appendix H, Table 3A only) provides adequate leak detection monitoring of the leachate treatment pond liner system. Data from 2002 indicates that fluid collecting in the PLDR samples was contaminated with low-level VOC, but pumping data indicates leakage volumes fall far below the MPCA criteria of 500 gallons/acre/day for treatment ponds.

Therefore, monthly volume monitoring data and quarterly VOC analysis (Appendix H, Table 3A) with no further metals and general chemistry analysis is the proposed monitoring for leachate pond leak detection. The Monitoring System Analytical Guide (Appendix H, Table 3) has been modified to indicate the proposed changes.

Leachate Analytical Monitoring

Leachate is treated by aeration in two ponds. The east leachate pond is used for the primary treatment and the west leachate pond is used for the secondary treatment. Untreated leachate produced by the Landfill is pumped to the leachate treatment ponds and monitored four times per year. The samples are collected at the leachate riser vault structures (lift stations) before the leachate is pumped to the primary leachate treatment pond. Samples are analyzed for VOC (Appendix H, Table 3A), metals (Appendix H, Table 3B), general chemistry (Appendix H, Table 3C) and field parameters (Appendix H, Table 3D). The monitoring events are quarterly including winter for untreated leachate.

Treated leachate is collected from irrigation pump station wet well (in the leachate spray irrigation building) and monitored monthly during the spray irrigation season from May – September (five monitoring events). The same analytical parameters as untreated leachate are monitored except spray irrigation water (treated leachate) is also monitored for total Kjeldahl nitrogen (TKN). A summary of the leachate monitoring is included in Appendix H, Table 3.

Spray Irrigation - Operation Monitoring

Besides the monitoring parameters described above for leachate produced at the Landfill, operation monitoring is conducted at the Leachate Spray Irrigation Areas (LSIA). The monitoring is used to regulate the application rate and/or duration of leachate spraying. The north 25 acre LSIA is the primary spray irrigation application site and utilizes two soil moisture monitoring locations. Each location has two installed soil moisture probes (Watermark manufactured by IRROMETR® Company, Inc. of Riverside, California). Two probes are installed in nested configurations (12 and 24 inches below the ground surface) at each monitoring location. The probes are installed each spring before spray irrigation begins. With this configuration, soil moisture is monitored to provide optimal application rates over the north LSIA.

In addition to the Watermark soil moisture probes, the spray irrigation area is redundantly monitored for soil moisture using tensiometers (IRROMETR® Model "LT"). These low-tension instruments are designed for better definition in granular soils and where moisture conditions change rapidly. The tensiometers are installed in a nested configuration (12 and 24 inches below ground surface (BGS)) near the center of the LSIA. The south LSIA is monitored for control of soil moisture during the irrigation season, only when in operation. The south LSIA is used only for back-up capacity when the north LSIA is inadequate to handle the leachate volume. The operational moisture monitoring system includes two Watermark soil moisture probe locations with nested installations as described for the north LSIA.

One additional location with a nest of two tensiometers is used during operation as described for the north LSIA. Since the soil moisture probes and tensiometers are installed each spring before the spray irrigation season their locations are not included on the site detail drawings.

Leachate spray irrigation soils are tested in the spring, prior to the irrigation season and are compared against Minn. R. 7041 using conductance methods. Limits for soluble salts in the soils are 4 µmohs/cm. The 2002 results for the soils samples were 0.46 and 0.29 µmohs/cm. In addition, the metal loading calculations compared to Cation exchange capacity indicate that metal loading will not present a lifetime limitation for the soils. Therefore, the site soils have a significant remaining lifetime, particularly under the County's good management practices. However, a tentative soil replacement plan which would address two different spray radius' per year over several years will ultimately accomplish total soils replacement without negatively impacting the use of the spray irrigation field. A start date for the soil replacement plan would be determined in a future Spray Irrigation Operation Report section of the Annual Report.

Spray Irrigation Area – Water Quality Monitoring

The LSIA have additional water quality monitoring capability from four suction lysimeters in the north and three suction lysimeters in the south LSIA. TIMCO™ (or equivalent) Porous Ceramic Lysimeters (cup type) with permanent lysimeter head assemblies (vacuum/pressure gauge and taps for vacuum/pressure sampling lines mounted in a waterproof assembly) were installed. All of the suction lysimeters were installed between four and eight feet BGS. The suction lysimeters were installed during the fall of 1999.

The suction lysimeters provide potential vadose zone water quality sampling directly below the spray irrigation areas and are monitored monthly during the spray irrigation season. Field measurements are obtained from each of the north suction lysimeters and the sample volumes are then combined in equal volumes for a composite suction lysimeter sample. The south spray site suction lysimeters are treated similarly. The samples are analyzed for metals (Appendix H, Table 3B), general chemistry parameters (Appendix H, Table 3C) and field characteristics (Appendix H, Table 3D). If sample volume prevents analysis of all the Appendix H, Table 3B and 3C analytical parameters, Nitrate + Nitrite, Ammonia Nitrogen and boron are considered the priority analytes for determining transport from the spray irrigation process.

Landfill Gas Monitoring

Landfill gases are monitored quarterly (including winter) at five locations of the Landfill. The locations include Drainage Ditch A, Lift Station and Blower Building. In addition, subsequent to the repermitting of the Landfill in 1999 two monitoring points GP-1 and GP-2 (Appendix G) were added to the Landfill gas monitoring system according to the Gas Probe Installation Workplan and Landfill Gas Contingency Plan (NTS, January 2000).

Two additional temporary probes (TP-1 and TP-2) were placed along the south and east slopes of the Landfill near the compliance boundary. These two gas probes were to be installed temporarily as drive points for four quarterly monitoring events and then removed if no gas was detected. The probes remain installed but to date no landfill gas has been detected. Since these probes were not installed as part of the permanent landfill gas monitoring system, they will not be routinely monitored. However, since they remain in place, it is proposed that they serve as contingency gas monitoring locations. If landfill gas is detected in any of the permanent monitoring locations TP-1 and TP-2 will be monitored.
The landfill gas monitoring is performed with a Landtec GA-90 gas monitor capable of measuring methane, carbon dioxide, oxygen and barometric pressure.

An HNu 101 photoionization detector, calibrated to a benzene standard, is connected to the exhaust port of the GA-90 to measure the total volatile hydrocarbons. To date no elevated landfill gas has been measured. The landfill gas monitoring points are shown on Figure 1.

Slope Stability Monitoring

The Landfill was built on top of a waste rock/lean ore mine dump, which is approximately 60 feet above the native topography. Settlement and lateral spreading could compromise the synthetic liner. Monitoring the slope stability is performed by measuring deflections in two installed inclinometer casings (INC-1 & INC-2) located along the south and east slopes at the southeast portion of the facility (Appendix G). The inclinometer casings are 64 and 55 feet deep respectively. Inclinometer monitoring frequency is once per year (fall quarter). If increased construction or other operations are conducted that could impact slope stability additional monitoring may be justified. Results are reviewed and discussed in the Annual Report. To date, no indicators of slope instability have been identified.

Monitoring Schedules

The proposed schedule for sampling of the water quality monitoring system is presented in Appendix H, Table 1. Sample preservation and holding times are presented in Appendix III of the June 1999 Water Quality Monitoring Plan and Water Quality Monitoring Protocol.

Any changes in the monitoring system, field procedures, and/or analytical parameters or the contract laboratory, must be submitted in an amended Monitoring Protocol or Addendum by the Permitee to the Commissioner within 30 days of the proposed changes. MPCA prior approval of the changes is required before initiation of the modified monitoring procedures.

MONITORING CONTINGENCY PLANS

Ground-water Monitoring Contingency Plan

The ground-water monitoring frequency at the Landfill for VOC (Analytical Parameters in Appendix H, Table 3A) occurs quarterly. This schedule is warranted since to date no VOC analyte has been detected consistently nor at concentrations approaching any established intervention limits. Since sample analysis of VOC from the water quality monitoring system provides definitive data indicating transport of dissolved phase contamination from the Landfill, a contingency plan for resampling and analysis at any ground-water monitoring point has been established. Ground-water monitoring frequency for metal parameters has been reduced to a biannual schedule (spring monitoring event every two years) starting in the spring of 2000. While dissolved metals in ground water can indicate contaminant transport, several of the metal analytes monitored have elevated natural background concentrations. Therefore, contingency resampling and analysis for metal parameters has to consider the range of background concentrations.

VOC Contingency Plan

Established Intervention Limits (IL) and HRL for the 465E list of compounds are consumption criteria. The Landfill compliance boundary is designed to provide adequate protection for any potential off-site ground water receptor. Therefore, the contingency resampling plan for VOC is based upon the laboratory reporting limits for each analyte not any specific risk limit. However, a Limits Table has been issued by the MPCA for the Landfill as part of the permitting process.

Proposed Construction Schedules

Please refer to the Design Volumes Table in Appendix F for tentative landfill cell expansion and closure construction schedules.

c. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The proposed Landfill expansion project will be carried out by the County and will provide residents of the County with safe and cost effective disposal of mixed municipal solid waste and industrial waste.

d. Are future stages of this development including development on any outlots planned or likely to happen? ☐Yes ☒No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

e. Is this project a subsequent stage of an earlier project? ☒ Yes ☐ No
If yes, briefly describe the past development, timeline and any past environmental review.

The Landfill was issued permit SW-405 from the MPCA on April 30, 1993. Under this permit the county was authorized to dispose of 1,650,000 yd^3 of industrial and mixed municipal solid waste and cover. The County designated approximately 42 acres for disposal, approximately 25 acres for leachate pond aeration treatment/spray irrigation, and the remainder for sedimentation ponds, access and service roads, household hazardous waste collection, special waste collection, and recyclables processing.

The County developed the Landfill in 1993 by constructing a nine acre cell (Phase 1) with associated road, leachate management, scale, shop, and other facilities. Phase 1A, a 6.7-acre cell, was constructed in 1995. In July 1996, the County submitted a permit re-issuance application to update landfill information. The Landfill redesign reduced the footprint of the facility from 42 acres to 29 acres, but increased the facility's ultimate design capacity. The MPCA landfill permit was issued in July 1999, granting the Landfill a new CON of 429,625 yd^3, 1,366,500 yd^3 of permitted capacity, and 1,990,000 yd^3 of ultimate capacity. The current permit expires on July 1, 2004. In April 2003, the County will submit a Comprehensive Solid Waste Management Plan Update to the Minnesota Office of Environmental Assistance requesting a ten year CON of 774,560 yd^3 for the years 2003 through 2012.

Additional Landfill activities have included the construction of Phase 2, a 2.5 acre cell and associated leachate system expansions and improvements in the summer and fall of 1999; cell closure totaling 3.8 acres for parts of Phases 1A and 1 in the summer of 2000; and construction of Phase 3, a 2.8 acre cell in the summer of 2002. MPCA certification for these projects has been received by the County.

7. Project Magnitude Data

Total Project Area (acres) 20.5 or Length (miles) 7.5 acres under the current 1999 Permit and 13 acres (originally included in the 1993 permitted footprint) proposed for expansion.

Number of Residential Units: Unattached 0 Attached 0 maximum units per building 0

Commercial/Industrial/Institutional Building Area (gross floor space): total square feet 0

Indicate area of specific uses (in square feet):

Office	N/A	Manufacturing	N/A
Retail	N/A	Other Industrial	N/A
Warehouse	N/A	Institutional	N/A
Light Industrial	N/A	Agricultural	N/A

Other Commercial (specify) Future landfill cells

Building height N/A If over 2 stories, compare to heights of nearby buildings

8. Permits and approvals required. List all known local, state and federal permits, approvals and financial assistance for the project. Include modifications of any existing permits, governmental review of plans, and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure.

Unit of Government	Type of Application	Status
MPCA	SW-405 Solid Waste Disposal Facility Permit	Under MPCA Review.
MPCA	National Pollutant Discharge Elimination System (NPDES) Storm Water Permit	NPDES Permit will be obtained for new cell construction activity.
Minnesota Office of Environmental Assistance	Certificate of Need	Pending – St. Louis County currently updating its Solid Waste Management Plan.

9. Land use. Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

The County owns the 160 acre tract of land where the Landfill is located and an additional 450 acres of surrounding land. The site is zoned Mining Open by the city of Virginia (City) and consists mainly of mine dumps of overburden material and some waste rock. These materials were generated by iron-ore mining operations at Rouchleau, Missabe Mountain and Sauntry mines beginning in the 1920s. The mine dumps primarily have two levels, with flat to gently sloping tops and relatively steep side slopes. The Landfill is on top of the upper mine dump.

Similar mine-waste dumps occupy land to the north, northwest, and south. Land to the east is relatively undisturbed and characterized by a mixture of forested uplands and forested wetlands (Exhibit H). Small tributaries of the Pike River drain these wetlands and eventually flow north. All of the wetlands and streams lie outside of the proposed site and are protected by the design of the Landfill. The Landfill facility lies 80 feet above the wetlands. A lower mine dump, approximately 250 feet wide and more than 25 feet high, lies between the facility and the wetlands.

The nearest residential area is approximately two miles west, in the City. The residential area is separated from the Landfill by a watershed divide, open-pit mines, and similar mine dumps sites. Access roads to the Landfill are constructed over mine-waste dumps.

Adjacent properties are shown in Appendix D. Solid waste landfilling does not require a change in a use or new use permit.

Other adjacent activities on the County-owned property include the St. Louis County Recyclable Materials Processing Facility, the St. Louis County Household Hazardous Waste Facility, and the privately operated Cedar Ridge petroleum contaminated soil composting facility. These are operated under separate permits. Overall, there are no known potential past, present, or future land use conflicts that may result in significant environmental effects.

10. Cover Types. Estimate the acreage of the site with each of the following cover types before and after development:

	Before	After		Before	After
Types 1-8 wetlands	0	0	Lawn/landscaping	0	0
Wooded/forest	0	0	Impervious Surfaces	0	0
Brush/grassland	20.5	0	Other (describe)		
Cropland	0	0	landfill cells		20.5
			TOTAL	20.5*	20.5*

*Includes 7.5 acres within current permitted footprint and 13 acres within the proposed expansion.

When closed, the cells will be capped and the entire landfill area will be seeded to produce grassland following final closure. Runoff from the cover drainage layer will be routed through the site drainage system to one of the site's detention ponds.

11. Fish, Wildlife, and Ecologically Sensitive Resources.

a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

The Minnesota County Biological Survey has not been conducted for area including and adjacent to the Landfill.

The proposed Landfill facility was constructed on the surface of existing mine overburden waste dumps. This area is characterized by a habitat of patchy grasslands and immature forests. There is no fish habitat currently located on site. Disturbance of any wildlife resources will be limited to the displacement of any wildlife that had been established subsequent to the completion of mine-overburden dumping and original Landfill construction activities in 1992.

Adjacent lands to the east are characterized by forested uplands and forested wetlands. These wetland are drained by small tributaries of the Pike River, which eventually flows north. Fish and wildlife resources within the adjacent habitat are protected by the design and environmental monitoring system of the Landfill.

b. Are any state (endangered or threatened) species, rare plant communities or other sensitive ecological resources such as native prairie habitat, colonial waterbird nesting colonies or regionally rare plant communities on or near the site? ☐ Yes ☒ No
If yes, describe the resource and how it would be affected by the project. Indicate if a site survey of the resources has been conducted and describe the results. If the DNR Natural Heritage and Nongame Research program has been contacted give the correspondence reference number. **ERDB 20030789**
Describe measures to minimize or avoid adverse impacts. **N/A.**

See Appendix I for a letter from DNR Natural Heritage Program.

12. Physical Impacts on Water Resources. Will the project involve the physical or hydrologic alteration (dredging, filling, stream diversion, outfall structure, diking, and impoundment) of any surface waters such as a lake, pond, wetland, stream or drainage ditch? ☒ Yes ☐ No
If yes, identify water resource affected. Describe alternatives considered and proposed mitigation measures to minimize impacts. Give the DNR Protected Waters Inventory (PWI) number(s) if the water resources affected are on the PWI.

As part of the original development of the Landfill, the edge of an unnamed shrub/scrub wetland was traversed by the access road. The impounded water was a result of mining activities, i.e., railroad grades, which began in the 1920s. Fill material was placed at the edge of the wetland, impacting approximately 350 feet by 50 feet (0.4) acres. A U.S. Army corps of Engineers permit process was competed for this activity.

Drainage ditches and a sedimentation pond to collect surface water from closed landfill areas were built in 1992. No impacts to any surface-waters have been detected or are anticipated in the future.

13. Water Use. Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? ☐ Yes ☒ No
If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

An environmental monitoring system, consisting of 15 monitoring wells, was installed during the initial construction of the site. Each of the existing 15 wells were constructed to code and have MDH Unique Well numbers. No additional monitoring wells are being proposed for the Landfill construction. It is possible that additional monitoring wells may be needed if the land application system for leachate is expanded.

14. Water-related land use management districts. Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? ☐ Yes ☒ No
If yes, identify the district and discuss project compatibility with district land use restrictions.

15. Water Surface Use. Will the project change the number or type of watercraft on any water body?
☐ Yes ☒ No
If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

16. Erosion and Sedimentation. Give the acreage to be graded or excavated and the cubic yards of soil to be moved: 20.5 acres (includes 7.5 acres within the current permitted footprint and 13 acres within the proposed expansion); 470,000 cubic yards. Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

During and after the construction phase of the project, standard state and local erosion control measures will be implemented to protect the site from erosion and sedimentation problems. Construction activities at the Landfill require preparation of an erosion control plan using best management practices. An NPDES construction activity permit will be obtained for each construction project.

The erosion impact from runoff will be reduced by using silt fences, netting and mulch in areas determined to be susceptible to erosion. All culverts and open channels will be constructed to minimize erosion both during and after construction. Ditches will generally be grass-lined. Where high runoff velocities are expected, ditches will be rock-lined to provide further erosion protection. Erosion and sedimentation from runoff will also be controlled by minimizing the amount of land being graded at any one time. Land disturbed by construction activities will be graded and then seeded as soon as possible to prevent erosion.

Sediment will be retained on-site in detention ponds south and east of the site. All runoff from areas that are being graded, filled or covered will be diverted through the detention ponds to allow sedimentation to occur. Runoff from the cell areas will continue to be diverted through the detention ponds following final cover installation.

Wind erosion during site construction will be minimized by the use of water, as necessary.

17. Water Quality – Surface-water Runoff.

a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any storm-water pollution prevention plans.

The proposed expansion will result in the total construction of 20.5 acres of landfill cells (including 7.5 acres within the current permitted foot print and 13 acres within the proposed expansion). The County will obtain a NPDES General Storm Water Permit for Construction Activity and implement best management practices in the collection and treatment of storm water generated during and after the construction of each new landfill cell.

Final Cover Design

The final cover is designed to contain or divert precipitation over filled areas of the site. Final cover grades at the site are shown in Appendix E, Plan Drawing No. 4. A typical section for the final is shown on Appendix E, Plan Drawings No. 10 and 11. Specifics of the design are discussed in the closure plan.

In the summer of 2000, the County installed final cover on approximately 3.8 acres of Phases 1A/1. The County plans to close the remainder of Phase 1 in 2004.

If necessary, soil will be added on top of the waste during final closure to achieve correct grades. The surface of the waste or soil buffer layer will be rolled to provide a suitable base for installation of the barrier layer.

The barrier layer will consist of a 40-mil LLDPE liner or equal. A drainage layer nine inches thick with a permeability greater than $1x10^{-3}$ cm/sec will overlie the liner. As shown in Appendix A, the average annual total of surface-water head over the barrier layer will average approximately two-thirds inch.

The cover soils will consist of nine inches of general fill material and six inches of topsoil. The top six inches of topsoil capable of sustaining vegetation. The final cover topsoil layer will be mulched and seeded with shallow rooted, drought tolerant grasses.

Slopes on the final cover area of Phase 1A/1 range from three percent on top to ten percent on the side slopes. Slopes on future closed cells will range from three percent on top to 20 percent on the side slopes. The highest elevation will be 1,840 feet. The final contours are presented in Appendix E, Plan Drawing No. 4. Differential settlement will occur, but will be handled as a post-closure item. The new 20 percent cover is more effective, providing increased slopes for settlement while meeting MPCA Solid Waste Rules for maximum slope.

These slopes, along with additional runoff management features, provide the Landfill with environmental protection required by the MPCA Solid Waste Rules.

Runoff will leave the final cover on the surface and through the drainage layer. The transition from the final cover to the perimeter ditch is shown in Appendix E, Plan Drawing No. 5.

Erosion will be controlled by limiting the slopes to 20 percent and by strategic placement of drainage swales, collection piping, erosion control mats, and riprap. Runoff will be directed by the final cover drainage swales to two primary sedimentation ponds (Appendix E, Plan Drawing No. 2).

The drainage swales and underlying collection pipes both outlet at the same locations. No run-on will occur from previously closed areas. Runoff from off-site and undeveloped areas will collect in external perimeter ditches and natural drainage pathways.

Water moving through the drainage layer, which is not collected in the drainage swale collection pipes will be collected in slotted, six inch, corrugated, polyethylene perimeter drainage pipes at the toe of the final cover drainage layer (Appendix E, Plan Drawing No. 10). The perimeter drainage pipes will be sloped parallel to the drainage ditches. Outlets will be provided every 200 feet to allow the water to move into the internal ditches.

Surface-water Control

The major modification to the final conceptual design of the Landfill includes a slope change from 10 percent to 20 percent for approximately half of the footprint. With all the drainage ditches, structures and detention basins previously designed and in place the following analysis focused on the new potential surface-water runoff and corresponding peak discharge rates for the redesign.

Haested's CulvertMaster was utilized to calculate the theoretical surface-water runoff and resultant peak discharge rates from four sub-areas within the Landfill. The following inputs were used in the model analysis: The SCS Peak Discharge Method was chosen to best represent the existing conditions. A 25 year, 24-hour storm event of 4.3 inches. A weighted curve number of 76, that was calculated for the existing conditions within in the HELP model. This number is generated through the utilization of the slope properties, soil types and vegetation. A time of concentration of 12 minutes. Ditch property inputs of the typical ditch design included a slope of 1.0 percent and a well maintained grassed waterway with a corresponding Mannings Coefficient of .030. The input data and the results are contained in the following tables.

The first two sub-areas included a 19.3 acre watershed area that drained to the existing Eastern detention pond. These were broken down into one area that included eight acres and a larger area that contained 11.3 acres. Two sets of ditches, one on the outside and one on the inside of the perimeter road carry the runoff to the Eastern pond. The smaller sub-area had an estimated discharge of 19.12 cfs and a corresponding ditch velocity of 3.90 fps with a calculated depth of 1.56 feet. The second larger sub-area had a resultant discharge of 27.01 cfs and a maximum ditch velocity of 4.26 fps at a depth of 1.78 feet.

The next area considered, drained to the South ponding area. The estimated watershed draining to this area was 16.3 acres. The total discharge from the slopes was 38.96 cfs and the ditch velocity was calculated at 4.66 fps with a depth of 2.04 feet.

The remaining area will be drained to the existing culvert that eventually flows to a naturally occurring pond to the Northwest. The corresponding information includes 6.2 acres of watershed area, a discharge of 14.82 cfs and a ditch velocity of 3.66 fps that included a depth of 1.42 feet.

The model was performed on a worst-case scenario that eliminated the upper swales on the slopes that were used for velocity reduction. The calculated runoff volumes and corresponding peak discharge rates for the redesigned Landfill had a total discharge of 100 cfs and a maximum peak velocity of 4.66 fps. The recommended maximum velocity before potential erosion could occur, which is specified within the Handbook of Channel Design for Soil and Water Conservation is 5 fps for grassed waterways. The estimated rates also compare favorably to the rates that were calculated in the last model analysis that was performed in 1996. Therefore, the resultant information illustrates that the design of the in-place drainage ditches, structures and retention ponds are more than adequate to support the proposed changes to the Landfill.

Sedimentation Pond Design

Two ponds and an existing low area will be used for sedimentation as previously mentioned. The East Pond currently exists, the Northwest Ponding Area also currently exists as a low area below the 1,720 contour in the northwest corner of the site. The South Pond will be constructed when needed and drainage rerouted to that area.

The East Pond has substantial volume for detention since there is approximately eight feet from the pond bottom to the rim elevation of the outlet (1678.2). For a conservative estimate, the routing was conducted assuming the pond had standing water at elevation 1678. Routing showed the peak elevation to be 1679.11 at a peak outflow of 67.9 cfs.

The Northwest Ponding Area is the existing low area below the 1720 elevation and routing shows a peak elevation of 1718.3 for the given event. The South Pond will be two feet deep with 1.0 acres of surface area at the berm elevation of 1686. Routing gives a maximum elevation of 1685.6 for the 4.2-inch rainfall.

b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

During Landfill operations and post-closure activities, surface-water runoff is diverted to detention basins. The basins, as described above, are located to the south and east of the Landfill. From the detention basins, the runoff enters the adjacent wetlands. The runoff migrates east toward the Pike River. The Pike River is the major downstream receptor, located approximately three miles east of the site (Appendix C). The surface-water runoff does not come into contact with the deposited waste material. As final cover is applied, the runoff is comparable in quality and quantity to existing grassland runoff.

The quality of runoff may be slightly lower than desired during construction of each cell and during placement of the final cover. This is due to unavoidable erosion. The quality is comparable to existing runoff from the brush/grassland areas. The runoff would not leave the site, but would be infiltrated at the sedimentation basins. Basins are maintained to prevent sediment from filling them. After placement of final cover and the establishment of permanent vegetation, the runoff quality from the site should be better than runoff from existing brush and grassland areas. This is because the entire surface would be permanently vegetated. The runoff would still be infiltrated and should not impact adjoining properties.

18. Water Quality – Wastewater.

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

Sanitary Wastewater
Sanitary wastewater generated by on-site personnel is discharged to an on-site septic tank and drain field.

Leachate
Leachate is produced at the Landfill when precipitation migrates through the waste of a fill area. The leachate is collected above the composite liner through a system of perforated pipes and conveyed via lift stations and a forcemain to two on-site lined leachate treatment ponds. In 2002, approximately 2.1 million gallons of leachate were generated at the Landfill.

b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies, and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

Leachate is treated by aeration in two ponds. The aeration ponds hold approximately six million gallons of leachate with available storage in the ponds allows for 260 days of leachate storage, based on the peak generation rate estimate. The ponds have a composite liner consisting of a 60-mil HDPE liner, along with two feet of clay. A leak detection system is located below the composite liner and above a 30-mil HDPE liner.

The east leachate pond is used for the primary treatment and the west leachate pond is used for the secondary treatment. Untreated leachate produced by the Landfill is pumped to the leachate treatment ponds and monitored four times per year. The samples are collected at the leachate riser vault structures (lift stations) before the leachate is pumped to the primary leachate treatment pond. Samples are analyzed for VOC (Appendix H, Table 3A), metals (Appendix H, Table 3B), general chemistry (Appendix H, Table 1C) and field parameters (Appendix H, Table 1D). The monitoring events are quarterly including winter for untreated leachate.

Treated leachate is collected from irrigation pump station wet well (in the leachate spray irrigation building) and monitored monthly during the spray irrigation season from May – September (five monitoring events). The same analytical parameters as untreated leachate are monitored except spray irrigation water (treated leachate) is also monitored for total Kjeldahl nitrogen (TKN). A summary of the leachate monitoring is included in Appendix H, Table 3.

Effluent from the leachate treatment ponds is distributed over the adjacent 21-acre primary and 9-acre secondary spray irrigation sites. The irrigation sites have an established perennial grass crop.

Irrigation rates and scheduling are controlled using the "Checkbook Method." The Minnesota Extension Service, University of Minnesota Agriculture provided this method (see University of Minnesota Service bulletin FO-01322.) This method considers a variety of factors affecting the amount of water in the soil to determine how much irrigation can be done. In the field, measurements for rainfall and irrigation, air temperature and crop water use data are used to monitor the soil water deficit in the spray irrigation fields. Soil water deficit is then used to calculate the remaining water capacity of the soil and, allowing for forecasted rain events to determine the irrigation rate and schedule. Other considerations include the effluent quality, maintaining uniform irrigation rate over the entire irrigation-site, limiting daily applications to prevent soil saturation or runoff, and management and harvesting of the grass crop on the site. Grasses harvested from the irrigation site are utilized as mulch for frost protection within the cells of the Landfill. All irrigation practices are discontinued during rainfall periods, with no runoff from the site being reported.

The quality of irrigation water applied to the spray irrigation-site is determined by the evaluation of conductivity and sodium levels. Conductivity indicates the amount of salts in water or soil. In 1996, the irrigation waters classification was based upon sodium adsorption ratio. Sodium adsorption ratio averaged 2.8. This indicates a SI-C4 classification. The irrigation waters are classified based upon sodium ("S" classification) and conductivity ("C" classification). The irrigation water was classified in 1996 as a low sodium water of SI. The SI classification means the water can be used for irrigation on almost all soil with little danger of the development of harmful levels of exchangeable sodium. The conductivity classification in 1996 was C4, which is for very high salinity water and not suitable for irrigation under ordinary condition, but may be used under special circumstances. The spray irrigation of leachate is a special circumstance where the soils must be permeable, drainage must be adequate, and plants with good salt tolerance are required. The above conditions are all met at the Landfill spray irrigation-site.

Leachate spray applications are based on the quantity of heavy metals in the leachate with metals loading to the site governed as a lifetime total. Cumulative metal loading calculations indicate that the current heavy metal concentration is low and will not be a limiting factor in irrigation-site management.

Chloride, sulfates, potassium, calcium, sodium and magnesium are soluble salts that are present in leachate. High salt concentrations in soil will adversely affect soil structure, upset the soil/water balance, distress vegetation and leach into the ground water. The soluble salts results from the irrigation area soils indicated a level of approximately one-tenth the trigger limit. If the soluble salts were to exceed the trigger limit, irrigation management would be reviewed. Leachate irrigation can be continued if it is determined that problems do not exist at salt levels greater than the trigger limit.

TKN is monitored on the irrigation water for the determination of nitrogen loading in the soil. Excess nitrogen must be avoided, or it would leach in the ground water. Planting cover crops aids in nitrogen management, along with irrigation management.

In summary, effluent disposal through spray irrigation does not significantly affect water quality from a seep from the mine dump southeast of the irrigation area. Surface water quality parameters are met prior to reaching the ground water, through the nutrient uptake of the grass crop and filtration through the soils. Monitoring of the seeps is included in the monitoring plan for the site to detect any change in water quality at these locations.

In the event monitoring indicates that contaminant concentrations are high in the ground water, or that surface water quality standards may be exceeded in the seep, additional measures will be taken to reduce the concentrations of the constituents involved. These measures would include further reducing the concentrations of the constituents involved, prior to irrigation (through chemical or physical treatment processes), expanding the irrigation area, and cell closure and reducing the size of the working face.

The spray irrigation site was originally seeded with a variety of perennial grasses containing smooth brome grass, switch grass, birdfoot trefoil, reed canary, and perennial rye grass. Reed canary has become the dominant grass within the leachate spray radius. The vegetation is harvested annually in July and September. The harvested grass is baled and applied as frost protection to new landfill cell construction areas.

c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

Not applicable.

d. If the project requires disposal of liquid animal manure, describe disposal technique and location and discuss capacity to handle the volume and composition of manure. Identify any improvements necessary. Describe any required setbacks for land disposal systems.

Not applicable.

19. Geologic hazards and soil conditions.

a. Approximate depth (in feet) to Ground water: 24 minimum; 50 average.
Bedrock: 41 minimum; 68 average.
Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

No sinkhole or shallow limestone formations/karst conditions exist on the site. No abandoned or unused wells were found on the site.

b. Describe the soils on the site, giving SCS classifications, if known. Discuss soil granularity and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

The soils are variable over the site and are thin and poorly developed. They range from clay-rich to silty sand with scattered rock and fragments on the surface. The site is a disturbed area, and the soils have not been classified by the SCS.

The site stratigraphy generally consists of mine-waste dump and glacial till, overlying bedrock. The mine waste rock can be characterized by multiple layers of glacial overburden. It was removed from above the ore body by the mining of iron-ore in the region. Mine dump overburden consists primarily of glacial sediments mixed with Upper Cretaceous-aged siltstones. The depths of the mine dump ranges from 20 to 80 feet thick over the proposed site.

The soils below the mine dump and surrounding lands are primarily sandy with cobbles. The parent material is considered to be Rice Lake outwash. Some areas have one foot to one and one-half feet of silty organic soils development. The glacial till beneath the mine-dumps is associated with Wisconsin Age sediments (24,000 - 14,000 years). These sediments were deposited during advance and retreat of the Rainy Lobe glacier. This sequence is characterized as brown/gray to yellow/brown, dense to extremely dense, poorly sorted silty sand till, ranging from two to 22 feet thick over the proposed site. The bedrock consists of Archean Age (greater than 2.6 billion years) metamorphosed volcanic rock.

Construction, operation, and closure of landfill cells according to permit requirements should prevent ground-water contamination from occurring.

20. Solid Wastes, Hazardous Wastes, Storage Tanks.

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

The Landfill accepts mixed municipal solid waste (approximately 50,000 tons per year), municipal utility coal ash (approximately 10,000 tons per year), and industrial waste (approximately 10,000 to 12,000 tons per year).

Waste oil, filters, scrap metal, fluorescent tubes, office waste, paper and food and beverage containers that result from daily operations at the Landfill will be recycled through the existing County recycling programs. A minimal amount of MSW (less than 500 pounds per year) is estimated to be generated by the employees working at the Landfill. This may include non-recyclable food and packaging wastes and will go directly into the Landfill.

Hazardous and medical waste is not accepted for disposal in the Landfill. Any hazardous waste resulting from construction or operation of the Landfill is managed according to the County's industrial waste management plan.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

As stated above, hazardous waste is not accepted for disposal at the Landfill. The County has constructed a household hazardous waste facility at the Landfill site to provide residents with an opportunity to properly dispose of household hazardous waste.

The management of leachate generated in the Landfill has also been discussed previously.

c. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

There is a vented, double-walled above ground 2,000 gallon storage tank for drop off of waste oil located in the public drop-off area at the site. Oil level is monitored daily and pumped as needed by a contractor and used as alternative heating fuel. Fuel for equipment is delivered to the site and transferred directly into the equipment fuel tanks or into the two-250 gallon above ground diesel fuel storage tanks located inside the garage area of the Landfill building. This area is equipped with a sump system for containment of accidental spills. Buildings at the site are heated by either electrical service or LP gas.

21. Traffic. Parking spaces added: 0 Existing spaces (if project involves expansion): 10
Estimated total average daily traffic generated: Same as current, approximately 65 to 70.
Estimated maximum peak hour traffic generated (if known) and its timing: Same as current
Provide an estimate of the impact on traffic congestion affected roads and describe any traffic improvements necessary. If the project is within the Twin Cities metropolitan area, discuss its impact on the regional transportation system.

The site is located two miles north of State Highway 135. Access roads are maintained year-round and are constructed and maintained to prevent interruption of traffic flow due to inclement weather. If inclement weather conditions prohibit spreading and compacting of waste, short term storage areas within the lined area may be used until conditions improve. Traffic is routed to provide a smooth pattern that is circular, if possible, and that avoids crossing patterns.

The Landfill has the capacity to handle more than 100 vehicles per day. No significant increase in traffic is expected due to the on-going nature of Landfill activities. To minimize smaller vehicular traffic at the Landfill face the main public drop-off area is equipped with several six yd^3 canisters and a system of 58 yd^3 roll-off containers. Waste from these containers is brought to the Landfill face as needed by a contractor.

22. Vehicle-related Air Emissions. Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts. Note: If the project involves 500 or more parking spaces, consult *EAW Guidelines* about whether a detailed air quality analysis is needed.

Air pollution from engine exhaust has increased only slightly over pre-landfill conditions. Operational air emissions will continue to be similar to existing Landfill operations. Landfill cell construction activities will generate truck traffic and heavy equipment operation on-site. Construction-related exhaust for cell construction and closures would be greater than under normal operational activities, but of temporary duration. State air quality standards will not be violated, and local air quality will not be significantly changed from that which already exists in the region.

23. Stationary Source Air Emissions. Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing), any greenhouse gases (such as carbon dioxide, methane, and nitrous oxides), and ozone-depleting chemicals (chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

The Landfill has a passive landfill gas extraction system that was, and will continue to be, installed on areas of the Landfill that are closed to allow for venting of gases generated through anaerobic degradation of the waste. Landfill gases are monitored quarterly at five locations on the site, and will continue through the operating life of the Landfill. Landfill gas monitoring will continue throughout the post-closure period. The Landfill gas monitoring program will consist of visual inspections, and if required, field screening and laboratory sample collection and analysis.

The expansion of the Landfill should not have significant negative effects to air quality. A Title V Air Emissions Permit for gas emissions is not required at this time. One will be obtained, if needed under U.S. Environmental Protection Agency's regulations.

24. Odors, noise and dust. Will the project generate odors, noise or dust during construction or during operation? ☒ Yes ☐ No

If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

The project will generate dust, odors, and noise during construction and on-going operations.

Dust

Construction activities will generate localized dust from earth-moving equipment. Due to the site's distance from residences and developed areas, the dust associated with construction activities will not have a significant impact on the surrounding area. Dust generated during construction can be mitigated by occasional site watering. The site access road is paved, and little dust has been generated after initial construction. Permanent wind erosion control will be accomplished by planting vegetation to promote soil stabilization. Dust from the access road at the operating Landfill cell and in the public drop-off area is reduced by application of calcium chloride when needed.

Noise

Heavy construction equipment will be operated during Landfill construction and on-going operation. Machinery operations will be limited to daytime hours to mitigate noise impacts. The machinery will have adequate muffler systems to further mitigate adverse impacts. All machines are operated in stock condition without special noise controls but within requirements of the MCPA's noise regulations. The noise levels resulting from the project should not be significant enough to violate any state noise standards, and are removed from populated areas. The nearest residence is over two miles from the site. These ongoing impacts are already occurring and would not change as a result of future Landfill expansion.

Odors

The Landfill will produce some methane, carbon dioxide, and trace volatile organic chemicals from the decomposition of deposited waste materials. Odors are controlled by compacting waste immediately after placement in the Landfill, and covering it with at least six inches of daily cover. During the post-closure period, Landfill gases will be contained by the cover system, then collected and passively vented. The leachate treatment ponds generate odors similar to those found at a municipal wastewater treatment plant. Odors are diminished with proper aeration. The remote location of site helps to minimize any impact on populated areas.

25. Nearby resources. Are any of the following resources on or in proximity to the site?

a. Archaeological, historical, or architectural resources? ☐ Yes ☒ No
b. Prime or unique farmlands or land within an agricultural preserve? ☐ Yes ☒ No
c. Designated parks, recreation areas, or trails? ☐ Yes ☒ No
d. Scenic views and vistas? ☐ Yes ☒ No
e. Other unique resources? ☐ Yes ☒ No

If yes, describe the resource and identify any project-related impacts on the resources. Describe any measures to minimize or avoid adverse impacts.

26. Visual impacts. Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? ☐ Yes ☒ No
If yes, explain.

27. Compatibility with plans and land use regulations. Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? ☐ Yes ☒ No
If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

The existing land use zoning is compatible with Landfill development. The final site will be prairie land and wildlife area as outlined in the permit.

28. Impact on infrastructure and public services. Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project? ☐ Yes ☒ No
If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

29. Cumulative impacts. Minn. R. 4410.1700, subp. 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement. Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative impacts. Describe the nature of the cumulative impacts and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to cumulative impacts (or discuss each cumulative impact under appropriate item(s) elsewhere on this form).

The current permit allows for approximately eight years of disposal capacity, based on current fill rates. The proposed expansion will provide the County with an additional 20 years of Landfill disposal capacity.

The Landfill and adjacent property, consisting primarily of mine dumps of overburden material and waste rock, should not contribute significant cumulative impacts to the area.

30. Other Potential Environmental Impacts. If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

All anticipated environmental impacts have been addressed in this EAW.

31. Summary of issues. List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

There are no further impacts of issues identified at this time.

RGU CERTIFICATION.

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minn. R. 4410.0200, subps. 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Name and Title of Signer: **Beth G. Lockwood, Supervisor, Environmental Review Unit**
Operations and Environmental Review Section
Regional Environmental Management Division

Date:

The format of the Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at Minnesota Planning. For additional information, worksheets or for *EAW Guidelines*, contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-296-8253, or at their Web site http://www.mnplan.state.mn.us.