Montana Department of
ENVIRONMENTAL QUALITY

Brian Schweitzer, Governor
Richard H. Opper, Director

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March 19, 2010

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Ladies and Gentlemen:

To comply with the Administrative Rules of Montana (ARM), specifically ARM 17.4.607(2), 608, 609 and 610, the Department of Environmental Quality (Department) has prepared the enclosed Environmental Assessment (EA). This EA addresses the proposed expansion of the currently licensed and active Valley County Class II landfill. The proposed landfill expansion will incorporate the 80-acre District-owned parcel adjacent to the facility's current southern boundary into the current solid waste license. The proposed 80-acre expansion area will be developed in phases and will increase the total waste disposal capacity of the facility to 4,046,000 cubic yards (2,023,000 tons). The proposed expansion will extend the operating life of the facility to 144.5 years.

The purpose of this EA is to inform all interested governmental agencies, public groups and individuals of the proposed action and to determine whether or not the action may have a significant effect on human health and the environment. The public has until close of business on April 19, 2010 to submit written comments concerning the proposal. The Department will not make a licensing decision until at least 30-days after publication of the EA. A complete color copy of the EA may be viewed on the Department's website at *http://www.deq.mt.gov/ea/WasteMgt.asp*.

If you wish to comment on this proposed action within the 30-day public comment period, please do so in writing by mailing your comments to the Waste and Underground Tank Management Bureau, Solid Waste Program, P.O. Box 200901, Helena, MT 59620-0901, or by E-mail to mailbox *wutbcomments@mt.gov*. In addition, if requested, a formal public meeting may be held. However, requests for a public meeting must be submitted to the Department in writing by U.S. Mail at the address above, by E-mail to the mailbox *wutbcomments@mt.gov*, or by fax to 406-444-1374.

If you have any questions or need additional information, please contact me at the Permitting and Compliance Division, Waste and Underground Tank Management Bureau, Solid Waste Program.

Sincerely,

Mary Louise Hendrickson

Mary Louise Hendrickson
Project Lead
Solid Waste Licensing Program
Phone: 406-444-1808; Fax: 406-444-1374
Email: mhendrickson@mt.gov

Enclosure: Environmental Assessment—Valley County Class II Landfill
File: Valley County\Valley County Class II Landfill\Expansion
Path: G:\WUT\SWS\EAs\sw-ea\Valley-09Exp\Valley-expEA-CoverLtr.doc

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Solid Waste Program
P.O. Box 200901
1520 E. Sixth Avenue
Helena, MT 59620-0901

ENVIRONMENTAL ASSESSMENT (EA)

1.0 DESCRIPTION OF PROJECT

The Valley County Refuse Disposal District #1 (District) submitted a solid waste management system license application to the Montana Department of Environmental Quality (Department) Solid Waste Program for the expansion of their active Class II Landfill. The proposed landfill expansion will incorporate the 80-acre District-owned parcel located immediately south of the landfill into their current solid waste license. The proposed 80-acre expansion area will be developed in phases and will increase the total waste disposal capacity of the facility to 4,046,000 cubic yards (2,023,000 tons). The proposed expansion will extend the operating life of the facility to 144.5 years.

Benefits and Purpose of the Proposal

The main objective of the proposal is to continue to provide cost-effective municipal solid-waste disposal for area residents by expanding the current landfill boundaries to extend the operating life of the facility. The naturally-occurring clay-rich materials in the subsurface enhance the minimum factors necessary to mitigate releases as required for the disposal of municipal waste. Consequently the approved no-migration petition, alternative liner, and alternative final cover result in considerable savings not only by avoiding ground-water monitoring costs, but also by reducing composite liner, leachate collection system, and composite final cover construction and maintenance costs.

By expanding the active facility, the site remains close enough to the City of Glasgow to keep hauling costs down, but far enough away to reduce citizen complaints that might arise from an otherwise nearby municipal landfill operation. Because of the remote location of the proposed landfill expansion, fewer complaints are expected concerning litter, odors, dust, noise, or other daily operational activities.

Site Location: The District proposes to license the additional 80-acre parcel, located along the southern boundary of the current landfill, to expand the active Class II facility. The 80-acre parcel is located approximately three-miles due east of Glasgow in the NE ¼ of Section 16, T28N, R40E, Montana Principal Meridian, Valley County, Montana (Figure 1).

Site Geography: The current landfill lies approximately 1½ miles north of the Milk River, which flows just south of Glasgow and heads east toward its confluence with the Missouri River east of Fort Peck Dam. Although the elevation at the site ranges from 2230 to 2250 feet above mean sea level (msl), the majority of the site is relatively flat. The landfill site is located on a bench approximately 140-feet above the Milk River floodplain. A minor coulee, beginning on the southern portion of the proposed expansion area, is mapped as an intermittent drainage on the United States Geological Survey (USGS) Whately 1:24,000 quadrangle map. Surface water flows draining into this small coulee occur only during periods of

heavy rainfall or rapid snowmelt. The coulee drains in a southeasterly direction away from the site toward the Milk River.

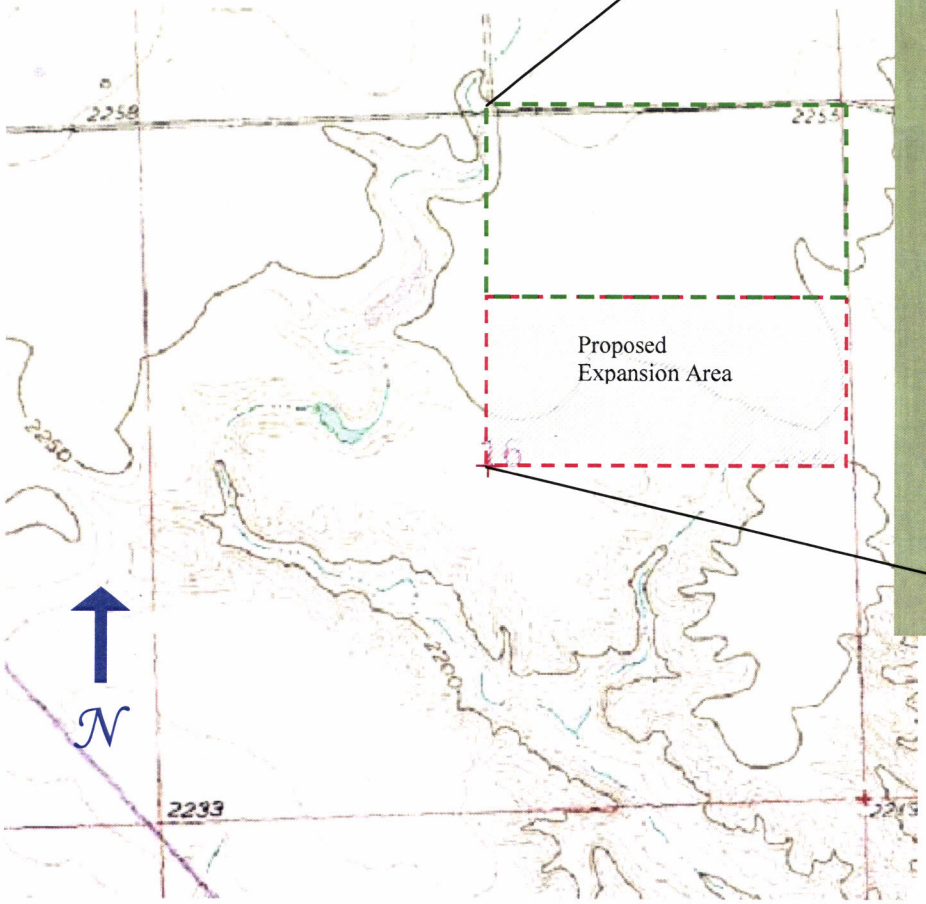
Site Climate: The climate type at Valley County is a cold semi-arid steppe with precipitation arising from a strong northwest continental influence in the spring and a weaker southwest monsoon influence in the fall. Winter temperatures are extreme, summers are hot, and strong winds are common. Local average annual precipitation for the Glasgow area is 12.12 inches per year (including equivalent average annual snowfall). The wettest year on record occurred in 1938 with 20.73-inches of precipitation; the driest year on record occurred during 1984 with 6.74-inches of precipitation.

No-migration Demonstration: The District submitted a no-migration demonstration to the Department in support of a waiver from ground water monitoring requirements. The Administrative Rules of Montana requires that such a demonstration confirms that the ground water protection standards will not be exceeded in the uppermost aquifer at any time during the active facility life plus 30-year post-closure care period. The District provided site-specific data, empirical calculations, and simple models that show the relevant groundwater protection standards will not be exceeded for at least 215 years.

The unconsolidated Pleistocene glacial tills exposed at the surface in the vicinity of the proposed expansion do not provide the characteristics needed to host a shallow unconfined aquifer. The clay-rich glacial till forms a highly impermeable natural barrier. In addition, regional drilling data predict that the uppermost aquifer beneath the expansion site is confined largely within bedrock sandstones of the Upper Cretaceous Judith River formation, approximately 485 feet below the surface. However, the Judith River bedrock aquifer was not intercepted during deep drilling beneath the site. The deepest borehole on-site passed through 52 feet of till sediments and penetrated 148 feet into the underlying clay shales of the Upper Cretaceous Bearpaw Shale. Based on regional geologic mapping, an additional 300-ft section of the lower Bearpaw Shale is located below the depth drilled on site. Therefore, the Bearpaw Shale provides a natural 450-ft thick barrier over the uppermost Judith River aquifer beneath the landfill. Adopting the most conservative estimates, simple conceptual model calculations predict that it would take at least 600 years for leachate to pass through the minimum 35-ft thick glacial till and 450-ft thick Bearpaw Shale before reaching the Judith River aquifer. The natural bentonite-rich bedrock barrier of the Bearpaw Shale thus allows for Department approval of the re-compacted 6-in alternative till liner without first requiring more sophisticated models to predict contaminant fate, transport, and concentrations during the complicated subsurface mixing of leachate into the Judith River aquifer. In addition, the attenuating effects of the abundant clays encountered by the leachate during migration through the glacial till and Bearpaw Shale will significantly decrease the concentration of most contaminants typical of landfill leachate. The high carbon content of the Bearpaw Shale would enhance this attenuation. The Department approved the District's certified no-migration petition thus waiving the ground water monitoring for the proposed expansion area.

Figure 1: Location of Valley County Refuse District #1
Class II Landfill – License # 295
(Source: Montana Natural Resource Information System)

Green shows existing licensed area
Red shows proposed expansion



Aerial photo shows the active facility currently occupying the NW quarter of the NE quarter of section 16.

Landfill Features: The disposal areas will be the dominant features of the site. The southward expansion of the current Class II facility will facilitate the development of the site in three phases (Figure 2). Current facility operations are taking place in the Phase I area. Phase I includes a 13.1-acre closed parcel and a 25.4-acre parcel available for active land-filling. The combined 85-acre Phase II and III disposal areas are located in the central and southern margin of the site, respectively.

The District successfully demonstrated that the natural properties of the uniform, fine-grained glacial till at the ground surface and the clay shale located at depth will provide an adequate barrier to the migration of leachate through the base of the landfill and into the uppermost aquifer of the Judith River Formation. A leachate removal system will provide further protection by allowing for the removal of leachate that may flow along the sloping base and collect into the leachate collection trench and sump at the toe of each landfill unit. These features would provide the characteristics necessary to demonstrate conformance with the requirements of the no-migration demonstration, and thereby justify the waiver from groundwater monitoring of landfill units located within the expansion area. Areas located adjacent to the active waste disposal units will be developed for the lined leachate evaporation ponds, storm-water detention ponds, excavation of new units, cover or topsoil stockpiles, and special use or storage areas. Upon closure of the proposed facility, a single continuous, monolithic earthen landfill cap will cover the entire landfill footprint. Erosion and percolation of moisture into the final cover will be minimized by providing topsoil that supports an optimal plant community over this store-and-release alternative cap.

Waste Disposal Units — The landfill and proposed expansion area will be constructed and developed in three phases (Figure 2). The base elevation of each cell in the sequence will slope from north to south toward the toe. Each landfill unit (or cell) is excavated with an independent base and separate leachate removal system. However, the units in all three phases will be tied together upon closure to form a contiguous waste mass beneath a single final cover. The largest open disposal area at any time during the active life of the facility will be approximately 11 acres. Upon reaching final grade, the ultimate waste mound will rise to a maximum height of 40-feet above the surrounding natural topography.

Cell Construction — The landfill cells have an average cell footprint of approximately 11-acres. Each cell will be constructed in sequence and will reach capacity over an average ten-year life. The landfill cell will be cut to an average depth 10-ft below natural surface grade and will expose the naturally, impermeable, fine-grained glacial till unit beneath the landfill. In order to form a barrier to potential leachate migration along local natural fractures that may exist within the till, the top six-inches of the glacial till at the base will be scarified and re-compacted to 95% of maximum density. This will provide a uniform base where the saturated hydraulic conductivity (K) does not anywhere exceed the 1×10^{-7} cm/sec standard for base permeability. Three Shelby tube samples will be lab tested to ensure that the final in-place K at the base achieves this minimum requirement during construction of each landfill cell. Each landfill cell will be constructed in two sub-cells, the western half (e.g. cell II-B-1) being excavated before the eastern half (e.g. cell II-B-2). Each sub-cell floor will slope approximately 2% toward the centerline of the landfill unit. In addition, the floor and centerline of each landfill cell will slope a minimum 2% toward the south, where the sloping leachate collection trench connects to the

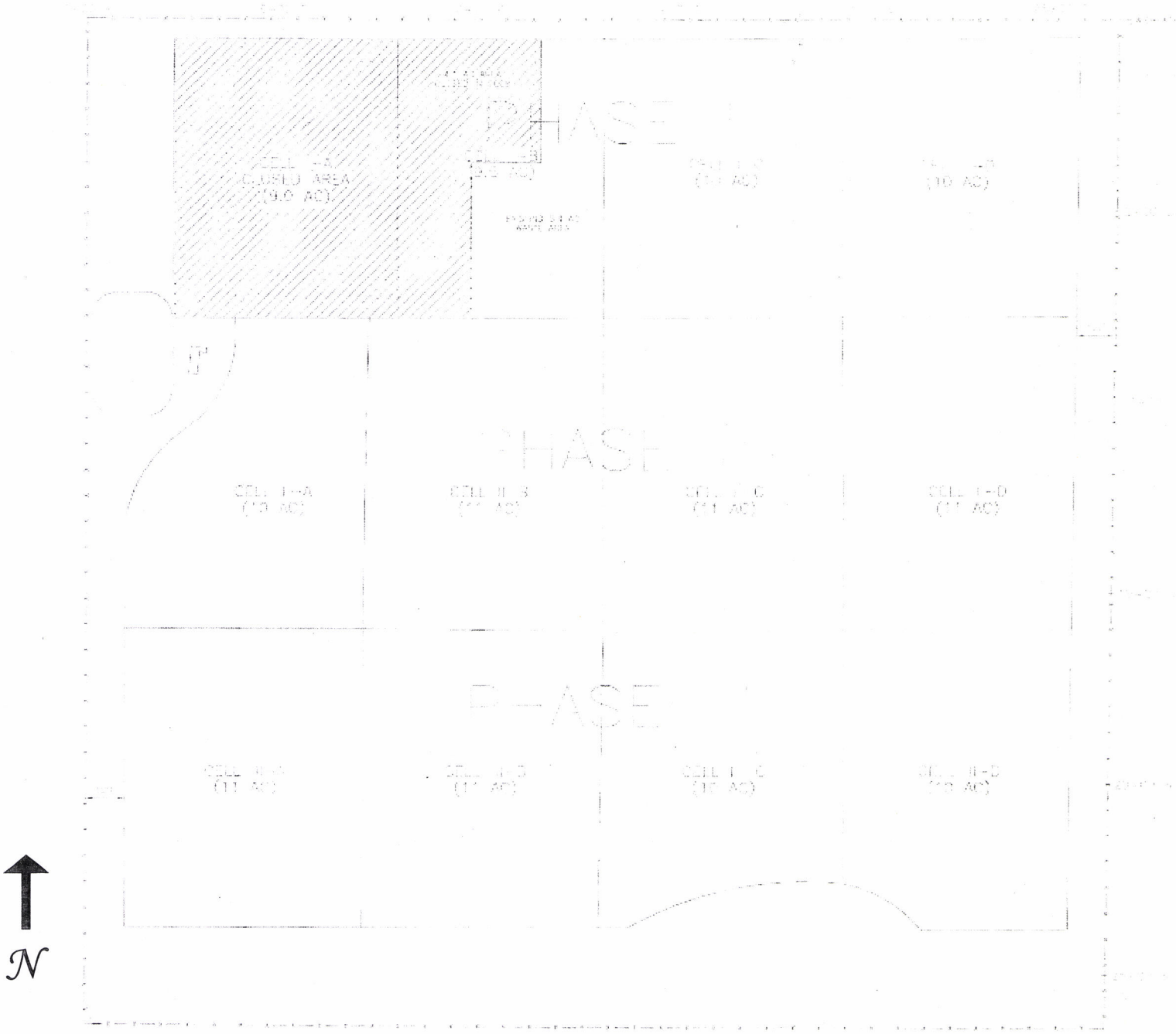


Figure 2: Master Sequence Plan showing Phased Landfill Development

leachate manhole sump at the lowest point in the leachate removal system. An approved construction quality assurance and construction quality control (CQA/CQC) program will ensure that each landfill unit is constructed and tested for conformance with the design plans. The updated engineering design plans and CQA/CQC program shall be reviewed and approved prior to the construction of each landfill unit as required.

Group II waste will be placed and compacted within the cells in 10-ft lifts and covered to meet the six-inch daily cover or twelve-inch intermediate cover requirements (Figure 3). Waste fill will be placed so that all units tie together from north-to-south into a mound that will achieve 5:1 maximum exterior slopes and at least a 2% slope on the top deck. Maximum fill thickness will reach approximately 50-feet within the Phase II units along the central sector of the landfill.

Leachate Removal System — All leachate generated in each of the landfill units will be collected into sumps and pumped from independent riser manholes in the leachate removal system. Leachate will flow down slope, toward the south and along the north-to-south unit centerline, at the base of each unit to collect in the sloping leachate removal trench at the toe of each individual unit. Leachate will flow along the removal trench at the toe toward the centerline to the centralized leachate removal sump where the leachate will be pumped from the base of the riser manhole. This system of leachate trenches and manhole sumps will ensure that leachate levels within the leachate removal manhole shall not exceed the maximum 12-in (30 cm) depth limit over the base of the unit. Thus the leachate may not rise more than 5.5 feet from the floor of the manhole riser sumps. A leachate collection system covering the base of the landfill units is not required, because the no-migration petition was approved for this landfill site.

Slotted leachate pipe will be installed within the sloping removal trench to provide at least 2% slope towards the central removal sump located at the toe of each unit. The leachate removal system will consist of two 6-in diameter, slotted, SDR9 high-density polyethylene (HDPE) lateral pipes installed within the 24-in deep, leachate collection trench at the toe of each cell. The slotted lateral pipes will be bedded within 3-in minus pit-run gravel that is wrapped by an 8-ounce nonwoven geo-textile filter fabric. The two slotted lateral pipes will extend from the central manhole toward both ends of the trench where the pipes terminate with solid caps. Each run of slotted lateral pipe will join via butt-weld to a horizontal solid 6-in diameter, 3-ft long stub, both located 180-degrees apart penetrating the vertical manhole wall at 54-in invert height from the manhole base. The 48-in SDR19 HDPE manhole risers will be terminated with a 6-ft by 6-ft HDPE base plate, bedded and footed within 60-in deep compacted sub-grade fill, and centrally located in the collection trench to extend from the base upward to the surface of the final cover. All ten interior riser manholes will be stubbed during fill operations and extended upward in sections as each landfill unit rises to ultimate grade at the surface of the final cover. The riser manholes will provide access for cleanout of the lateral leachate collection pipes, for required monitoring of leachate levels, and for pumping of leachate during removal from each landfill unit. A portable submersible pump will remove leachate from the manhole sumps through a 4-in diameter, double-walled, flexible hose for discharge or transport by tank truck to the Phase-I, -II, or –III leachate evaporation ponds.

The composite liner for each leachate evaporation pond will consist of two 6-in lifts of compacted and rolled sub-grade till overlain by welded 30-mil PVC geomembrane covered by a 1-ft layer of protective soil. The composite-lined leachate ponds will be abandoned and reconstructed as needed during expansion into disposal Phases II and III.

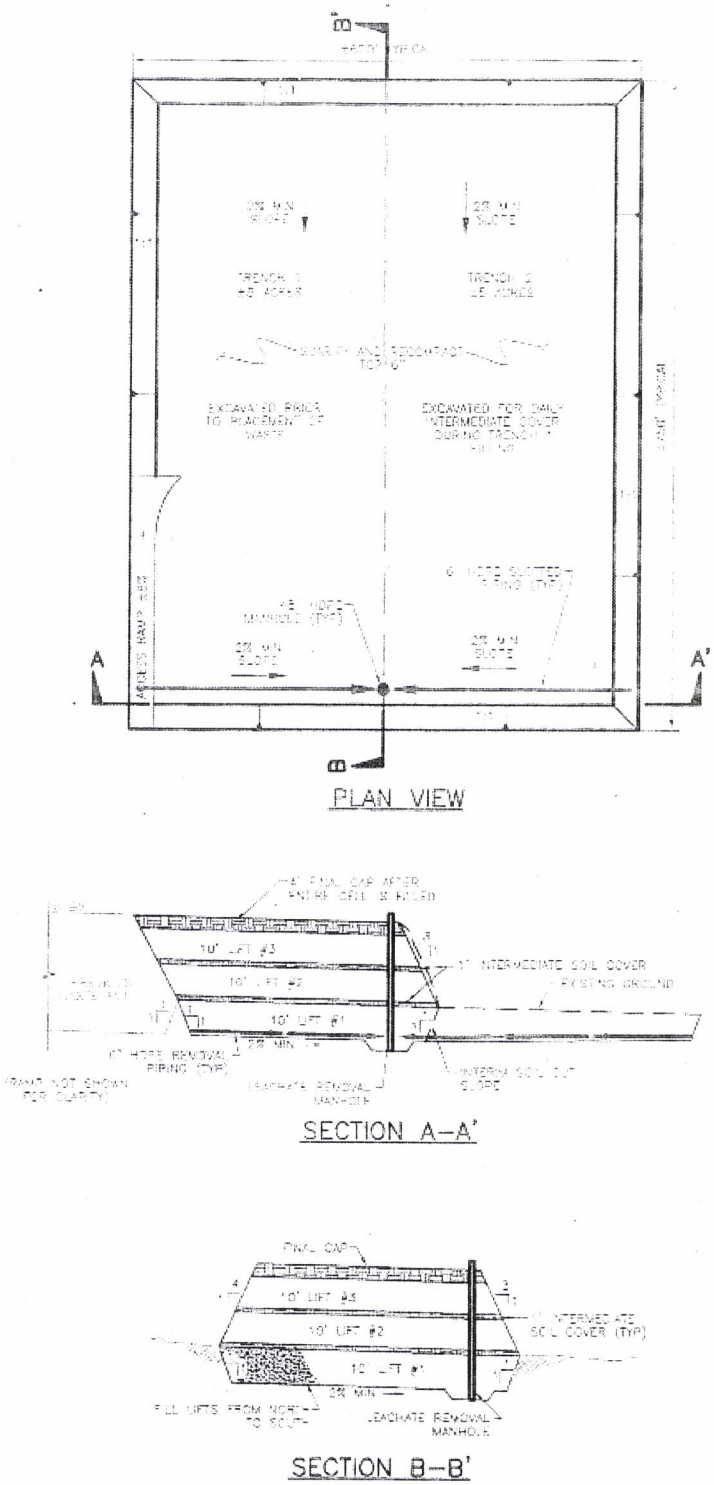


Figure 3: Typical Cell Filling Sequence

Storm Water Detention Ponds, Drainage, and Sediment Control — The storm water control system will capture runoff and sediment from the covered disposal areas, borrow areas, soil stockpiles, and materials handling areas, and will prevent the co-mingling of clean runoff with leachate. Water flowing through or contacting waste is considered leachate and will not be allowed to mix with storm water. All leachate will be retained at the working face for disposal and later removal from the landfill unit. Ditches, swales, and berms will be constructed around the perimeter of the disposal area to divert storm water run-on away from the active landfill cells. Suitable vegetation will be encouraged wherever it will minimize storm water flow, erosion, and sediment transport.

All storm water drainage from disturbed areas of the facility will flow into two storm water and sediment detention ponds that will be phased-in and located at the head of the coulees on the eastern flank and southeastern flank, respectively. The eastern storm water pond will be demolished and the southeastern pond constructed prior to the development of the Cell II-D disposal area. Each detention pond will be built to contain all sediment and runoff generated by a single 25-year, 24-hour storm event. These ponds are designed with an earthen dam, spillway, and a valved drain line for use in the event that the pond is overtopped or an emergency discharge of water is necessary. The County must apply for a Storm Water General Discharge Permit for Industrial Activity from the Department's Water Protection Bureau (WPB). In addition, whenever there is more than one-acre of disturbance, a Construction General Permit is required by the WPB, prior to the commencement of construction for each landfill unit or other features. These WPB permits require the development and regular update of a Storm Water Pollution Prevention Plan (SWPPP) for the entire landfill facility.

Sediment and erosion control measures will include the installation of silt fences, check dams, fiber matt, geo-fabrics, aggregate rip-rap, tri-lock blocks, down drains, or other features and best-management-practices (BMPs) where appropriate. Areas receiving long-term intermediate or final cover will be contoured for positive drainage so that surface runoff will be routed away from the active disposal area and will not pond over the waste. Surface runoff routed to the storm water detention ponds will be held for evaporation, dust control, or irrigation of final cover vegetation on closed areas. A series of flow control berms will be constructed to properly route storm water runoff to the appropriate detention pond as they are sequentially phased in during lateral expansion into new disposal units and closure of full landfill units. Runoff from fully re-vegetated and closed areas of the landfill final cover may discharge naturally to adjacent on-site coulees for mixing with state waters.

Temporary Storage Areas — The gate house scale, maintenance shop, special use, and storage areas are located immediately south of Cell I-A. Containers are maintained in a public drop-off area near the site entrance for the public disposal of household waste and the separation of wood, metals, and tires from municipal solid waste prior to their disposal or recycling. A recycling area will be maintained for the temporary bulk stockpiling and periodic crushing of scrap metal and white goods. A separate area will be maintained for the removal of refrigerants and disabling of doors prior to the stockpiling of refrigerators and freezers. A soils treatment area (STF) is located over impermeable soil and bermed to provide for the treatment of petroleum-contaminated soils in the Cell II-A-1 area. Another 4-acre land application area will be located over impermeable soil and bermed for the treatment of septic pumper wastes in the Cell III-A area. Regulated asbestos is placed in a documented area of the current disposal cell where it is immediately covered.

Gate House & Equipment Storage Buildings — The facility is accessed by an all weather road at the northwest gated entrance where a gate house, scale, and equipment storage and shop buildings are located. An area adjacent to the gate house is designated as a staging area for load inspections and to dump and extinguish hot loads.

Soil Stockpiles — The incorporation of the proposed expansion in the facility master plan increases the total on-site soil available to approximately 2,324,000 cubic yards (yds^3) throughout the landfill life. All of this material will be used for landfill construction and operation activities. The natural till material excavated from each active disposal cell will be stockpiled on the surface, outside the southern margin of each cell, to be used as daily, intermediate, and alternative final cover. The earthen material excavated during Phase III will, however, be stockpiled within the area designated for the next landfill cell in sequence toward the east. Material suitable for topsoil will be stockpiled separately. At a minimum, all soil stockpiles will be seeded to prevent runoff and erosion. In addition, other BMPs may be used to control sediment erosion as needed.

Other Landfill Features — Two methane monitoring probes are located at the license boundary on the northern and western margins of the Cell I-A disposal area. Two additional methane monitoring probes will be located at the northeast corner of Cell I-B and temporarily in the south half of Cell II-C. If methane standards are exceeded at the license boundary, an approved methane collection and control system will be installed and operated according to the standards for its design.

Landfill Unit Cap — Phased closure of the landfill will proceed as needed when each landfill unit reaches its design capacity, with the largest open area occupying 11 acres. Upon final closure, a five-foot thick, store-and-release, alternative final cover will be installed to cap the entire landfill. This monolithic earthen final-cover will consist of three distinct unconsolidated layers, from the bottom upward: a 12-inch intermediate cover, 42-inches of monolithic on-site till, and six-inches of topsoil at the surface (Figure 4). All soils used for the intermediate and final cover will consist of the on-site glacial till obtained during excavation of the landfill cells. Intermediate and final cover soils will be placed at no more than 85% maximum density at optimal moisture. Uniformity of the final cover soils will be ensured by adequate testing of index properties during soil placement on the landfill cells. Plant species, similar to the surrounding native grassland habitat, will be selected to provide an adequate range of rooting depths and a sufficient growing season to optimize transpiration of moisture. Vegetation will be established on the final cover in a timely manner to ensure at least 50% coverage by the end of the first year, as verified by the Department. A complete stand of native grasses shall develop within three years after planting.

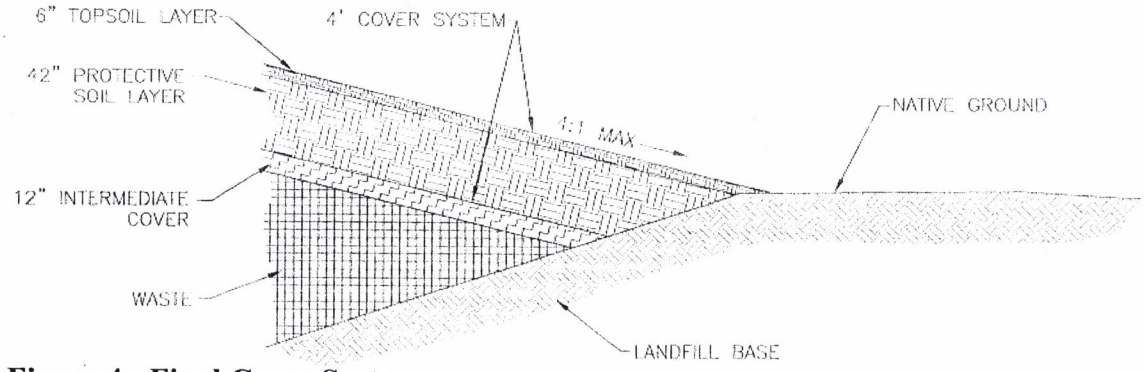


Figure 4: Final Cover System

Upon reaching ultimate grade, the average elevation of the landfill site will increase by approximately 42-feet. The maximum elevation increase from the toe will be 50-feet over the north half of Cell II-C (Figure 5). The moderate slope of the largest area of the top deck will average 2%, but the side slopes will reach a local maximum of 25% (4:1 slope). The cap surface will be graded for drainage, shaped to blend into the existing topography, and vegetated with select native plant species. Vegetated benches and drainage swales, fiber matt, geo-fabric, check dams, aggregate rip-rap, tri-lock blocks, down chutes, or equivalent erosion control may be installed on the final cover to maintain drainage and limit erosion as needed according to the approved Closure Plan for the facility.

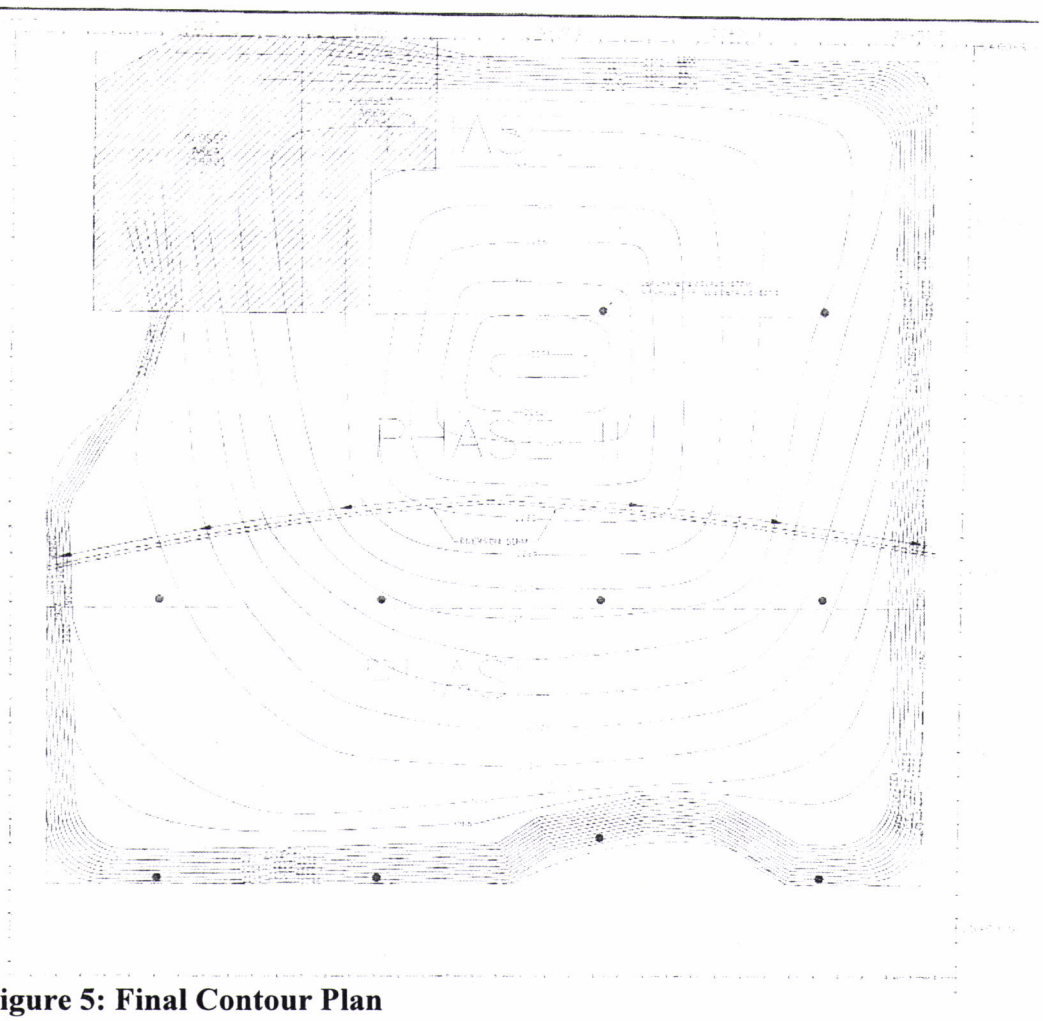


Figure 5: Final Contour Plan

The store-and-release final cover soil properties and select vegetation will ensure an adequate balance between moisture storage and evapotranspiration to reduce the percolation of moisture through the soil cap. On average and as proposed, no more than 4 mm/yr of moisture will pass through the alternative final cover and drain into the waste as leachate. A field performance monitoring system will be installed on site to verify that the average annual cap drainage conforms to the 4 mm/yr limit. In addition, drainage must not at any time exceed the 9 mm/yr maximum prediction, nor cause leachate levels within

the leachate removal manhole to exceed 5.5-ft depth limit. Conformance with these alternative final cover drainage standards will be demonstrated prior to the cessation of post-closure care. Regular monitoring and reporting of leachate levels in the manhole sumps has been proposed to determine its sensitivity as a field performance monitoring method.

Operation and Maintenance Plan: Operations at the facility will follow an Operations and Maintenance (O&M) Plan describing the Department-approved procedures for all landfill activities.

Personnel — The District will continue to be responsible for the administration of the Valley County Class II landfill. The day-to-day administration and operation of the landfill will be the responsibility of the landfill site superintendent. The District currently employs two full-time operators to run heavy equipment, compact the waste and apply soil cover. The site superintendent also operates the heavy equipment as necessary. The landfill employees will continue to attend training courses on solid waste management offered through Montana State University Extension Office that are funded by the Department and the Montana Association of Counties (MACo).

Operating Hours — The Class II landfill facility will be open to the public Monday through Friday from 7:00 a.m. to 4:00 p.m. and Saturday from 8:00 a.m. to noon. The facility will be closed on Sundays and on legal holidays.

Access Control — A sign is posted at the facility entrance that indicates the hours of operation and the types of acceptable wastes. The site is fenced and gated, and the gate is locked when the facility is closed. The additional 80-acre parcel will be fenced prior to the commencement of construction activities. The public will not access the active working area. Customers are directed to drop-off containers near the site entrance for the disposal of household waste and the separation of wood, metals, and tires from municipal solid waste prior to their disposal or recycling.

Acceptable Wastes — Signs at the facility entrance list the acceptable wastes and fees. Group II wastes include decomposable wastes and mixed solid wastes containing decomposable materials, but exclude regulated hazardous waste. Group III wastes include wood wastes and other clean non-water soluble or inert solids. This category includes, but is not limited to, brick, rock, dirt, concrete, unpainted and unglued wood materials, and tires. Group IV wastes include construction and demolition wastes and asphalt, but exclude regulated hazardous wastes. Although the wastes are co-mingled in the Class II cell, the large bulky items and tires are placed within a separate area of the cell so that they can be disposed of more efficiently.

Resource Recycling and Recovery — Some materials, such as appliances, scrap metal, and various recyclables, will be segregated in designated areas and either recycled or recovered for beneficial uses. The recycling area is currently located south of the existing scale. Batteries are collected and stockpiled in the recycling area. Approximately once per year, after a sufficient volume of batteries have accumulated, a recycler is contacted to remove the stockpiled batteries from the facility.

The white goods and scrap metal materials are crushed, as needed, and recycled. White good are currently stockpiled in the recycling area. All appliance doors are disabled by the facility operators prior to being stockpiled for metal recovery. All appliances using refrigerants must have the CFC/HCFCs (chlorofluorocarbons) removed in compliance with federal EPA regulations. The District contracts the

Freon removal to a private licensed individual and the crushing to a scrap metal recycler, as needed. The refrigerants are removed from each unit prior to crushing for the recovery of scrap metal.

Clean, untreated wood waste and tree limbs are stockpiled in a separate area on site, where these wastes are burned two to three times per year. The facility must have a current landfill open burning permit from the Department's Air Resource Management Bureau (ARMB). In addition, a landfill open burning request form must be submitted to the ARMB at least 10-days prior to each burn and each burn must be approved by the Department. The pile will be inspected and approved by the County Sanitarian before it is burned and landfill personnel will monitor and remove any prohibited materials from the clean wood waste pile prior to ignition. The conditions of the burn permit require each burn pile to be completely extinguished at the end of the day. No smoldering piles are allowed overnight. The ash from the burn is hauled to the Class II unit for disposal.

The facility has a 400-gallon container for the collection of used motor oil. Approximately two to four times per year, the District contracts with a private recycler to pump the container and transport the oil off-site for recycling.

Special and Hazardous Wastes — Landfill staff are trained to implement a waste screening program. Waste screening includes conducting and documenting random load inspections to assure landfill compliance with regulations prohibiting the disposal of regulated hazardous waste and polychlorinated-biphenyl (PCB) in solid waste landfills. The Department must be notified if prohibited hazardous wastes are found during waste screening activities at the facility. If hazardous wastes are discovered at the scale, the customer will be instructed to remove the material from the load and dispose of it at an appropriate facility. Any non-acceptable waste discovered by the equipment operators at the working face will be segregated for handling and disposal by a qualified consultant.

The facility will continue to accept friable and non-friable asbestos for disposal. Regulated asbestos will be placed in a documented area of the current disposal cell where it is immediately covered. The location of the asbestos disposal will be mapped.

The District will continue to accept petroleum contaminated soils for treatment by land-farming. The area used for land-farming will remain segregated from other facility operations. Petroleum-contaminated soils are currently land-farmed south of the recycling area. As the facility expands, the land-farm area will be relocated to an area further south of its current location within the license boundary. Before petroleum-contaminated soils are accepted for treatment in the land-farm, the facility must submit the required analytical results to the Department for approval. Only petroleum-contaminated soils containing less than 5% by weight (50,000 ppm) Total Petroleum Hydrocarbons (TPH) will be accepted for treatment. The treatment of contaminated soils with TPH concentrations in excess of 5% by weight, or 50,000 ppm, requires Department approval, since concentrations in excess of this level often contain free liquid and may be toxic to soil microbes or cause leaching into the subsoil. Treatment cells within the land-farm area will be segregated to manage the various waste streams. Incoming waste streams or non-remediated contaminated soils cannot be mixed unless they have been documented to contain similar levels and types of contaminants.

Treatment of contaminated soils is accomplished by the spreading of soils in 6 to 12-inch lifts within the land-farm area. The soils will be tilled to facilitate volatilization of the organic contaminants. Tilling will occur at least twice during the first month after application and then monthly thereafter. Tilling will

be performed during the months of April through October, at a minimum, and will occur in varying directions to disrupt compaction patterns and prevent hardpan development. It may be necessary to add water to the soils under treatment to increase the soil moisture content and to control dust during placement and tilling activities at the site. Water will be added at a rate that prevents runoff from the active treatment areas. Once the contaminated soils have been remediated, as verified by sampling and analysis, the facility will use the remediated soils for cover on the landfill.

Composite samples of the soils under treatment will be collected to confirm the attainment of the targets for use as landfill daily cover as follows:

Heavy Fuel hydrocarbons (C24 to C30): 200-2000 ppm
Diesel (C12 to C24): 200-500 ppm
Gasoline (C6 to C12): 100-250 ppm
Benzene: $\leq$0.5 ppm
Toluene: $\leq$40 ppm
Ethylbenzene: $\leq$20 ppm
Xylene: $\leq$20 ppm

Soils that exceed the above-noted contaminant levels will either be retained for further treatment or disposed of within the Class II disposal unit.

The District currently accepts septage from licensed septic tank pumpers for land application. Pumpings will be accepted from only those pumpers that are licensed and have received formal Department approval to use the site. Septage will be land applied using a spreader bar or other dispersive mechanism at a rate not to exceed the calculated annual application rate in accordance with ARM Title 17, Chapter 50, Sub-chapter 8. All non-putrescible litter contained in the septage will be removed from the site and the septage will be tilled into the soil within 6-hours of land application. The land application site will be divided into four, one-acre parcels. These parcels will be rotated on an annual basis, so that parcels used one year will be inactive the next year, thereby allowing vegetation to utilize the nitrogen and other nutrients added from the land application process.

Junk vehicles, liquid waste, infectious/medical waste, PCB waste, and radioactive waste will not be accepted.

Landfill Equipment — The full-time equipment assigned to the landfill includes:

- 950G rubber-tired loader to transport and apply daily soil cover
- 963 CAT track loader for consolidating the waste and applying daily cover
- 816 CAT compactor for compacting wastes
- Two scrapers to excavate disposal cells and stockpile soil

Daily Landfill Operations — The public will not access the active working area, unless they have large bulky items. Public traffic that arrives when the facility is open is directed to public drop-off area near the site entrance for the public disposal of household waste and the separation of wood, metals, and tires from municipal solid waste prior to their disposal or recycling. All incoming loads, including the full containers from the container site, will be weighed prior to disposal. At the working face, the compactor operator will inspect each load for excluded waste as it is spread and compacted at the working face. The waste will be covered at the end of each working day with at least six-inches of earthen material. The

operators will maintain 12-inches of intermediate cover on all landfill lifts that will not receive waste for 90-days. Any alternative daily or intermediate cover proposed for use must be approved in advance by the Department prior to use.

Litter Control — Any person operating a loaded vehicle on a public highway for the purpose of transporting solid waste is required, by law, to secure the load sufficiently to prevent littering or creating an obstruction dangerous to the public traveling on the highway. All incoming loads will be secured to prevent the release of litter during transport. In addition, landfill personnel will regularly patrol the area to gather any litter that is blowing free or is caught by the litter fences to prevent it from leaving the facility.

To control litter outside the working face, the facility will use a combination of operational techniques that include:

- the maintenance of a small working face;
- fill sequence planning to minimize wind impacts;
- the installation of perimeter litter fencing;
- the use of mobile litter fencing around the working face;
- the application of at least six-inches of daily cover; and,
- the use of the mobile litter vacuum to clean the litter screens and fences.

Landfill personnel will also react quickly to pick litter blown outside the working face after strong wind events.

Storm Water Control — The facility will follow erosion, drainage control, and sediment BMPs. Regular inspection and maintenance of the storm water control system by the operators will ensure that the BMPs are being maintained to function as designed. Sources of potential pollution to storm water will be controlled. Leachate may not commingle with storm water runoff or discharge to the storm water pond from the working face. The District must apply for a Storm Water General Discharge Permit for Industrial Activity from the Department's WPB. The application will require an erosion control plan and storm water pollution prevention plan.

Leachate Control — Any water that contacts refuse, or any liquid that drains from refuse, is considered leachate. Operators will manage leachate by capturing it at the working face for disposal in the active landfill cell. Leachate levels will be monitored through the riser pipes of the leachate removal system. If the leachate level reaches a depth of one foot, leachate will be pumped out of the removal system for off-site treatment. Leachate must be appropriately tested prior to its removal for offsite treatment. Department approval must be obtained prior to haulage of the leachate to the City of Glasgow's wastewater treatment plant.

Severe Weather Operation — The containers, located at the facility entrance, will be used by public vehicles. An all weather road will be constructed within the facility boundary to ensure that facility operations are not hindered during inclement weather. If needed, a graveled wet weather dumping area will be constructed in each cell to allow for dumping during muddy conditions. The location of these areas within each cell will vary during landfill operations. If the containers located at the facility entrance are full and a wet weather dumping area located outside the active disposal cell is necessary, the waste will be buried at the active face as soon as site conditions improve.

Waste Disposal Capacity — Each landfill unit has an average cell footprint of approximately 11-acres, will be constructed in sequence, and will reach capacity over an average ten-year life. The current Phase I area has a remaining operating life of 27.5 years. The proposed 80-acre license expansion will be developed in two phases (Phase II and Phase III) and will have a total waste disposal capacity of 3,276,000 cubic yards. The new Phase II area includes the southern portion of the currently licensed landfill. However, the proposed 80-acre expansion incorporates this currently licensed area into the new design. The Phase II area will have a total waste disposal capacity of 1,752,000 cubic yards; the Phase III area will have a total waste disposal capacity of 1,524,000 cubic yards. The Phase II and III areas that will extend the operating life of the facility by approximately 62.6 and 54.4 years, respectively.

Soil Excavation and Budget — Excavation for construction of the landfill units will progress in phases. Each landfill cell would be cut to an average depth 10-ft below natural surface grade. Approximately 433,000 cubic yards of soil will be excavated from the remaining Phase I development, whereas 1,891,000 cubic yards of soil will be excavated during construction of the eight cells in the Phase II and III license expansion area. Excavated material that is suitable for topsoil and plant growth will be stockpiled separately. Other excavated material will be stockpiled separately and used for daily and intermediate cover. Ultimately, the entire 2,324,000 yds^3 of excavated on-site soil will be used for daily, intermediate, and final cover upon closure of the landfill.

Contingency Planning — The landfill O&M Plan contains contingency plans for unusual situations.

Landfill fires can result from a chemical reaction within the waste, from off-site fires or smoking, or from landfill equipment. However, most landfill fires are the result of burning or smoldering material being brought in with a load of garbage. Incoming loads containing hot materials will be directed to a dumping area where the load can be extinguished before being placed in the landfill. Although the landfill equipment operators visually inspect each load for burning or smoldering materials as it is deposited in the working face, fires from these sources might not be spotted until the material is buried. In the event such materials are detected, the burning or smoldering waste will be segregated from the other wastes within the disposal unit and be extinguished using soil as the primary means to smother the fire. If burning or smoldering material goes undetected in the landfill, or a fire results from some other means, a fire can smolder in the garbage for a day or two before it grows large enough for someone to spot it. In this event, the landfill operators will carefully remove the waste using the track loader. The material will be segregated and the fire will be extinguished by smothering the material with soil. Once the fire is extinguished, the waste will be re-disposed. If a fire is discovered that cannot be extinguished by landfill personnel, the facility will contact the local fire department for assistance and notify the Department of the event.

Any rejected wastes not sent back with the customer will be set aside. A company specializing in the management of these types of waste will be contracted to remove and dispose or treat the material. In the event of a hazardous waste spill, the area will be isolated and a specialty contractor called to remediate the spill. The District is responsible for keeping such contractors on call for emergencies.

Post-Closure Care — The alternative final cover (AFC) will be monitored periodically for drainage performance, repair of erosion, and vegetative cover to ensure successful performance of the cap through the 30-year post-closure care period. The effectiveness and maintenance of the storm water control system and leachate removal system will also be monitored. Leachate levels in the leachate collection sumps will be monitored to evaluate AFC drainage. Leachate will be sampled, removed, and treated without release, as needed. Methane gas will be monitored quarterly and the gas monitoring system will be evaluated and maintained as needed. If the methane protection standard is exceeded in any point of compliance well, a Department-approved methane gas control plan, that may require the construction of a methane gas extraction system, will be implemented. Annual engineering inspection reports of the closed facility will be submitted with the annual financial assurance updates that are due by April 1st of each year.

2.0 ANALYSIS OF POTENTIAL IMPACTS

Description and analysis of reasonable alternatives whenever alternatives are reasonably available and prudent to consider:

A decision by the Department is triggered when the District upholds its request for the expansion of the active solid waste management facility. The District, however, may at any time choose to withdraw its application by exercising the "no action" alternative. If the District chooses the 'no-action' alternative, they will continue to dispose of solid waste at the currently active landfill without the added benefits of additional landfill disposal units and increased facility life. The factors associated with Alternative A illustrate the benefits of the District's proposal and the reason why the 'no-action' alternative may not be the alternative of choice.

Alternative A: The "no action alternative". Under this alternative, a final decision by the Department is not required because the applicant will have chosen to withdraw its request for a licensed boundary expansion. By deciding to withdraw the application from consideration by the Department, the applicant could continue its current disposal operations at the active Valley County Class II landfill facility until the site reaches total capacity. Although it is plausible, the District's selection of this alternative is unlikely. Rather, the District will likely continue its request for an expansion of the licensed boundary at the existing facility due to the following factors:

1. The sub-grade conditions and the depth to groundwater beneath the proposed expansion site provide superior protection of groundwater from potential contaminant releases
2. Landfill unit construction and maintenance costs are considerably less than the costs for the standard composite liner and cap that may be necessary at other sites.
3. Expansion of the active facility is more cost effective due to the existing infrastructure, operations support, and monitoring baselines already in place.
4. Continued need by the community and county area residents will likely require the licensure of additional municipal solid waste landfill units to ensure adequate disposal capacity for the future.

In the absence of the District's selection of the 'no-action' alternative and prior to the Department's final decision, two other possible alternatives were considered during the preparation of this EA.

Alternative B: The Department denies the license application for expansion of the active Class II landfill facility because the applicant has failed to provide information needed to address any deficiencies that could arise after public comment. The decision to deny the license is unlikely because the Department has found the application essentially complete for public consideration. Deficiencies could be due to an unforeseen shortfall in meeting technical or landfill performance requirements, licensing criteria, regulatory criteria, or legal issues, or the ability of the applicant to mitigate a potentially substantial impact to human health or the environment. As a result of denial, the applicant could:

1. Modify the application to provide groundwater monitoring and an improved liner at the currently proposed landfill site, if the no-migration and alternative liner petitions were somehow denied.
2. Locate, investigate, and apply for a license at another site suitable for a Class II landfill near Glasgow.
3. Continue to dispose of municipal solid waste at the active Valley County Class II landfill until it reaches ultimate capacity. The District will then close the landfill, and haul solid waste to another licensed facility. The landfills in Malta and Wolf Point are not licensed to accept waste from Valley County. Therefore, the nearest Class II facility that would consider acceptance of waste

from Valley County residents is the High Plains landfill in Great Falls. However, because disposal at High Plains landfill involves transportation costs and tonnage-based tipping fees, Valley County residents would likely see a significant increase in disposal fees.

Alternative C: The Department approves the application for a licensed area expansion and issues a new license expanding the Valley County Class II landfill facility southward as proposed by the applicant. Several factors support the viability of this option:

1. There has been no known release of contaminants within the uppermost aquifer adjacent to the active Class II facility, after 20 years of disposal at the site.
2. The southward expansion of the disposal area at the existing facility would allow for the additional disposal of 3,276,000 tons of waste over 117 additional years of operation.
3. The proposed site has specific subsurface characteristics that satisfy the no-migration and the alternative liner and final cover requirements to provide superior ground water protection.
4. The District has a total 30-year history of licensed waste disposal in compliance with the Montana solid waste laws and rules.
5. There is a future need to ensure the continuance of economical disposal services for the area residents. Site-specific factors will provide potential savings in liner, cover, and maintenance costs, and will mitigate the potential release of contaminants to the uppermost ground water aquifer, thus supporting the proposed expansion of the active Valley County Class II landfill facility at the current site.
6. The population, land use, and development of land surrounding the active landfill facility are sparse, minimizing the potential risk of adverse effects on human health due to the unlikely release of pollutants to the environment from the proposed expansion.

In consideration of these alternatives, the Department reviewed various site-specific documents submitted to the Solid Waste Program by the Valley County Disposal District #1 and its consultants: (i) *Landfill Expansion and Operation and Maintenance Plan Update, Valley County, Montana, Class II Landfill (October 2009)*: Prepared by Barry Damschen Consulting, Helena, Montana; (ii) *Landfill License Expansion Application (April 28, 2009)*; (iii) *No-Migration Demonstration for the Proposed Addition to the Valley County Landfill, Glasgow, Montana (May 2008)*: Prepared by Barry Damschen Consulting and Crowley Consultants, Helena, Montana; (iv) *Operation & Maintenance Plan Update (January 2005)*: Prepared by Barry Damschen Consulting, Helena, Montana; (v) *Hydrogeologic & Soils Study, Valley County Landfill, Montana (November 1993)*: GEO Research Inc., Billings, Montana; and (vi) the current facility compliance history in the MDEQ files.

The potential environmental impacts of Alternative C were evaluated for the proposed project based on the information provided; on-site investigations by the District for the proposed expansion of the active Valley County Class II landfill; and Department research on the area surrounding the proposed site. The results of the Department's evaluation of potential environmental impacts related to the proposed facility expansion are summarized in Tables 2.1 and 2.2.

TABLE 2.1 - POTENTIAL IMPACTS ON THE PHYSICAL ENVIRONMENT

PHYSICAL ENVIRONMENT	Major	Moderate	Minor	No	Unknown	Attached
1. SITE GEOLOGY & SOIL QUALITY - STABILITY & MOISTURE: Are there unusual geologic features?				X		X
Will the surface features be changed?			X			
Are fragile, compactible or unstable soils present?				X		
Are there special reclamation considerations?				X		
2. WATER QUALITY, QUANTITY & DISTRIBUTION: Are important surface or ground water resources present?				X		X
Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?				X		
3. AIR QUALITY: Will pollutants or particulate be produced?			X			X
Is the project influenced by air quality regulations or zones (Class I air-shed)?				X		
4. DEMANDS ON ENVIRONMENTAL RESOURCES OR LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area?				X		X
Are there other activities nearby that will affect the project?				X		
5. TERRESTRIAL, AVIAN, AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish?				X		X
6. VEGETATION COVER, QUANTITY & QUALITY: Will vegetative communities be permanently altered?				X		X
Are any rare plants or cover types present?				X		
7. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified habitat present?				X		X
Any wetlands?				X		
Any species of special concern?				X		
8. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?				X		X
9. AESTHETICS: Is the project on a prominent topographical feature?				X		X
Will it be visible from populated or scenic areas?				X		
Will there be excessive noise, light or odors?				X		

CUMULATIVE AND SECONDARY IMPACTS — Direct and indirect impacts are those effects that occur in or near the proposed project area and might extend over time. Often, the distinction between direct and indirect effects is difficult to define, thus in the following discussion, impact or effect means both types of effects. Cumulative impacts are restricted to the net effects of the proposed project because no other known projects are proposed in this area. Secondary impacts are induced by a direct impact and occur at a later time or distance from the triggering action. The cumulative impacts from the proposed expansion of the current Class II Solid Waste Management Facility are minor. The proposed action consists of an expansion of a current landfill operation. Natural site conditions combined with engineering controls will eliminate any impact from leachate. Conditions that minimize leachate seepage were fully evaluated by the Valley County Refuse Disposal District in its No-migration Demonstration and determined to adequately meet the requirements of the state and federal solid waste regulations. There are no recognized secondary impacts.

ANALYSIS OF TABLE 2.1 - POTENTIAL IMPACTS ON THE PHYSICAL ENVIRONMENT

This section evaluates the potential environmental effects that may occur on the physical environment if the proposed facility expansion is approved. The number on each of the underlined resource headings corresponds to a resource listed in the tables. Generally, only those resources potentially affected by the proposal are discussed. Therefore, if there is no effect on a resource, it may not be discussed.

1. Site Geology and Soil Quality - Stability and Moisture

The Valley County landfill is situated near the western flank of the Williston Basin and at the southernmost edge of continental glaciation during final advancement of the Laurentide ice sheet. The bedrock unit beneath the expansion consists of the Upper Cretaceous-age Bearpaw Shale formation. Based on the stratigraphic analysis in other regional geologic reports, this section of Bearpaw Shale in the local area extends at least 450-feet beneath the buried till contact to its contact with the top of the Judith River formation.

The Bearpaw Shale formation is a dark-gray to black, finely laminated, carbonaceous clay shale with a few small limestone or gypsum concretions. These shales were deposited in a restricted marine depositional environment and contain discrete layers rich in bentonitic clays. The Cretaceous age Bearpaw Shale outcrops that are located east and south of the site are covered by the Tertiary-age Fort Union formation. However, on-site, the Bearpaw Shale is covered by a 30 to 70-ft thick sequence of Pleistocene-age unconsolidated ground moraine deposits. These deposits are comprised of an upper and lower glacial till unit.

The upper glacial till unit is characterized by a 20 to 50-ft thick section of dark brown, moderately sorted, sandy clay till with minor polylithic pebble to boulder-sized clasts. This unit grades into a lower till unit that consists of a yellowish-brown to olive-gray, fine-grained, clay till containing an abundance of distinct orange to brown, well-rounded, pebble to boulder-sized clasts. Grain-size analysis supports the normal variability in gradation of typical ground moraine deposits, with fine fractions (sands and silts) in the range of 42-70% and clay fractions in the range 20-37%. However, samples from the topsoil zone within the upper till unit (upper 6-inches) are enriched in the sand fraction due to winnowing.

The soils at the site consist of loam to clay loams of the widespread Phillips-Scobey and Scobey series. Soil types are shown on Figure 7 and key soil properties are summarized in Table 1. The soils were developed from the fine-grained glacial tills present on the surface at the site. Soil characteristics trend toward deep and well-drained with high available water capacity. The soils in the A horizon are grayish-brown, clay loam; the B horizon consists of a brown, heavy clay loam or clay; and the C horizon is characterized by a light brownish-gray, calcareous clay loam. The compaction characteristics of the on-site soils make them fair to good for use as daily landfill cover material. Based on lab tests, soil samples collected from the upper till unit on-site were classified as a sandy lean clay with average peak density values in the range 107.0 to 110.5 pounds/cubic-foot.

After excavation of the landfill units, an average thickness of 35-ft of glacial till will remain below the base of the proposed expansion. Based upon the numerical model estimates (presented in the next section), the

glacial till unit will provide an effective, natural impermeable barrier to the migration of leachate from the landfill.

Figure 7: Map of Soil Types

Soil Type	Map Key	Depth	Drainage	Permeability	Available Water Capacity	Erosion Hazard	Compaction Characteristics
Phillips-Scobey clay loams, 2-9% slopes	49	Very deep	Well drained	Slow	High	Medium	Good
Scobey clay loams, 1-9% slopes	57	Very deep	Well drained	Slow	High	Medium	Good

Table 1: Summary of Soil Properties at Landfill Facility

2. Water Quality, Quantity and Distribution

Surface Water

The Valley County landfill is located on relatively flat uplands approximately three-miles east of Glasgow. The site is located adjacent to the northern breaks of the Milk River approximately 140-feet above the Milk River floodplain. The nearest Total Maximum Daily Load impaired surface water is the 136-mile reach of the Lower Milk River (#MT400001_010) from Beaver Creek to its confluence with the Missouri River. This segment of the Milk drainage is impaired for fecal coliform, mercury, and lead.

A minor coulee, beginning on the southern portion of the proposed expansion area, is mapped as an intermittent drainage on the United States Geological Survey (USGS) Whately 1:24,000 quadrangle map. Surface water flows draining into this small coulee occur only during periods of heavy rainfall or rapid snowmelt. The coulee drains in a southeasterly direction over the glacial tills towards the Milk River. There are no natural springs known within the immediate area of the proposed landfill facility.

Two detention ponds will retain storm-water and suspended sediment runoff from the landfill facility. The ponds will have the capacity to capture all storm water runoff from a single 25-year, 24-hour storm event. A permit for storm water discharge from the proposed landfill may not be required, since all storm water runoff and sediment from the active facility should be retained on site, thus no surface water impacts are anticipated due to the application of best management practices during the proposed operations.

Groundwater

A shallow unconfined aquifer is hosted by the alluvial gravels of the Milk River valley. This shallow system provides a significant source for much of the lowland drinking water in the vicinity of the proposed expansion area. These shallow sources of upland of drinking water include Pleistocene glacial outwash deposits and the Upper Tertiary Wiota gravel formation, both typically buried beneath the surface ground moraine tills. However, the Pleistocene outwash and Wiota gravel aquifers are absent at the site. Based on regional geohydrologic data, the uppermost confined bedrock aquifer beneath the landfill site is found within the Upper Cretaceous Judith River formation. The Judith River bedrock aquifer is confined beneath the shales of the Upper Cretaceous Bearpaw Shale formation and is located at least 450-feet below the proposed expansion. In addition to the glacial till barrier directly beneath the base of the proposed landfill expansion, the thick, low-permeability, carbonaceous bentonitic shales will function as an excellent secondary natural barrier for the migration of leachate to the Judith River aquifer.

Site Hydrogeology and No-Migration Demonstration

The 2008 Soils and Hydrogeology Report provided an analysis of the data from the on-site test pits and boreholes to support the models and leachate migration calculations submitted for the expanded No-Migration Demonstration. In the various travel-time model calculations performed by the District and the Department, the minimum total depth to the Judith River aquifer was taken as 500-ft beneath the site based on drilling and regional geologic mapping. In order to obtain the velocities for leachate flow through the till and Bearpaw Shale, conservative estimates for the saturated hydraulic conductivity (K) were selected. Saturated flow takes place when the soil pore spaces are completely filled with water. The saturated hydraulic conductivity describes the ease with which the pores allow water movement and depends upon the type of soil or rock, the effective porosity of the soil or rock material, and the configuration of the pores within the soil or rock unit. The hydraulic conductivity is an important property used to determine the likelihood of groundwater contamination by a contaminating source, in this instance, the landfill units. Soils or rock materials with high hydraulic conductivities and high effective porosity values are more likely to

result in groundwater contamination from a contaminating source. The average K of 3.84×10^{-8} cm/sec at 15% effective porosity was used to calculate the leachate velocity through the till. For the Bearpaw Shale, the regulatory minimum K of 1.0×10^{-7} cm/sec for base permeability at 10% effective porosity was used to calculate the leachate velocity.

The certified No-Migration Demonstration adequately demonstrated that the minimum landfill leachate-to-aquifer migration time would be at least 580-years; consisting of 130-years of travel through 35-ft of glacial till and 450-years through 450 ft of Bearpaw Shale to the deep Judith River aquifer. Therefore, there are no anticipated impacts to geology, soil quality, stability and moisture, or ground water quality based on the data provided by the District. The No-Migration Demonstration was approved by the Department for the south expansion area.

Hydrologic Evaluation of Landfill Performance (HELP) Models

The one-dimensional HELP model numerical was used to predict the average annual infiltration rate through the final cover. Original HELP model calculations for normal precipitation over the standard landfill cap predicts that post-closure drainage to the liner will stabilize at approximately 1-mm depth after 200 years. More conservative HELP model predictions of the alternative final cover (AFC) scenario incorporates precipitation rates from the decade with the highest average annual precipitation in the period of record for Glasgow. The District proposes the construction of a store-and-release AFC system at closure. Therefore, a simulation of drainage through the proposed store-and-release AFC during post-closure was designed to evaluate the 100-yr post-closure care observations in the manhole sump following closure of the proposed Phase I-C landfill unit. For the purpose of the evaluation, the AFC design used in the model consisted of: (i) a 12-in intermediate cover ($K = 3.84 \times 10^{-8}$, 37.3% porosity), (ii) a 42-in monolithic storage layer ($Ks = 5.4 \times 10^{-6}$ cm/s, 43.7% porosity), and (iii) a topsoil layer with properties set to the HELP 11 defaults. These conservative simulations predict an average annual drainage rate of 0.17-inches per year (4.3 mm/yr) and a stressed drainage rate of 0.36-inches per year (9.1 mm/yr) through the AFC into the waste. This low level of average predicted annual drainage through the unconsolidated cap provides a demonstration for acceptance of the proposed soils for construction of the proposed AFC. Three factors support the superior ground water protection at the proposed site: (i) the potentially low percolation rates into the closed landfill, (ii) the natural impermeable barrier and storage provided by the fine-grained glacial till at the base of the landfill, and (iii) the significant natural barrier and storage provided by the Bearpaw Shale confining the Judith River aquifer at depth. Therefore, no significant landfill leachate would be reasonably expected to penetrate the till to reach the upper shale surface and much less to seep through the more than 450-feet of unsaturated, impermeable clay shale overlying the uppermost aquifer.

Nearby Groundwater Supply Wells

Few water supply wells are located near the proposed landfill expansion because the shallow Pleistocene glacial outwash and the Wiota gravels are absent in the vicinity of the landfill. Based on a review of the Montana Bureau of Mines and Geology (MBMG) database of existing water supply wells, there are no domestic water supply wells located in Judith River aquifer within a one-mile radius of the site. The nearest domestic water supply wells are located approximately one-mile northeast of the proposed site and appear to be completed in coarse glacial materials of the lower till outwash unit at depths slightly over 60-feet below ground surface. Other domestic water supply wells located more than one-mile from the proposed landfill expansion are screened either in the shallow unconfined glacial outwash or alluvial aquifers associated with the Milk River, or the deeper confined Judith River aquifer. The shallow unconfined glacial outwash and alluvial aquifer materials are not present at the site. Based upon the natural characteristics of the subsurface,

the design of the construction and closure of the landfill units, and the lack of shallow unconfined aquifers on-site, there are no anticipated impacts to groundwater resources.

3. Air Quality

Air quality concerns related to sanitary landfills are frequently associated with increased dust from landfill traffic, construction and maintenance activities, and open burning at the site.

Additional traffic on the gravel road from Highway 24 to the landfill, related to the construction of the landfill, will cause an increase in the levels of airborne dust. As this occurs, dust suppression methods such as watering the road will lessen the impact. Construction of new landfill cells will cause an increase in internal landfill traffic and will cause an increase in airborne dust during the period of excavation and construction of the base. Since the construction periods will be short in relation to the operating life of the facility, these effects will be minor. During construction, dust control measures, such as wetting the surface before working on it, will be initiated as is typical for earthwork. Normal operational traffic on the site could cause a minor increase of suspended dust particles in the air during the summer months. If this becomes a problem, dust control measures, including the application of a dust palliative or water, will be implemented on the interior roads.

The excavation and placement of cover material may increase the dust in the air. During the dry summer and fall months, the cover material will be wetted prior to its placement so that the net effect will be minor. All long-term soil stockpiles will be seeded to prevent erosion and airborne dust.

Decomposing buried waste can produce varying amounts of methane, depending on the amount of water reaching the waste. A properly constructed cover on the landfill minimizes the amount of water that seeps down to the waste by storing the precipitation so that it may evaporate from the land surface and be transpired by the vegetation growing on it.

Methane monitoring wells will be installed as each phase of the landfill is developed. As site development continues, additional methane monitoring wells will be installed at the facility boundary to monitor for the presence of methane. Methane monitoring will continue to be performed on a quarterly basis. Methane concentrations may not exceed the lower explosive limit (LEL) at the facility boundary. If these methane gas levels are exceeded, the facility must take all necessary steps to protect human health, which may include the construction of a methane gas extraction system.

4. Demands on Environmental Resources of Water, Air and Energy

Energy demands related to landfill operation are primarily due to the hauling of waste to the facility. Lesser demands are from excavation and construction of new cells, and the compaction, covering and other routine landfill activities. Waste is currently being hauled to the facility. Approval of the expansion will result in the continued use of this site. Therefore, no additional impacts are anticipated.

5. Terrestrial and Aquatic Life and Habitats

The Valley County Refuse District's Class II landfill is located in the Northwestern Glaciated Plains ecoregion. This ecoregion lies between the more level, moister Northern Glaciated Plains to the east and the more irregular, drier Northwestern Great Plains to the south. The southern boundary of this ecoregion lies

near the limit of continental glaciation and its soils are derived from glacial drift. This area is characterized by level to rolling terrain underlain by till and covered by sagebrush, mixed short-grass prairie, and croplands.

This area consists of plains, terraces, fans, and floodplains that formed in glacial till, gravel deposits, and alluvium over clay shale, sandstone, and siltstone. Mean annual precipitation ranges from 10 to 15-inches, with about 20 to 30-percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Primary natural disturbances are drought and fire. Another important natural disturbance regime is prairie dog complexes. Land use is predominantly livestock grazing and dry-land farming.

The vegetation community is mostly steppe type, consisting mainly of numerous species of short grasses that typically grow in sparsely distributed bunches. Scattered shrubs and low trees sometimes grow in the steppe, but all gradations of cover are also present, from semi-desert to plains woodland. Because ground cover is generally sparse, large areas of soil are often exposed. The semi-desert shrubs are usually sagebrush and juniper.

Wildlife forage and habitat is typical of the grassland steppe found on the extensive open rolling high plains of glaciated northern Montana. This community type is associated with more terrestrial species in greatest need of conservation than any other community type in Montana. Of the 364 known terrestrial species found, 202 species are essentially associated with the community. One amphibian, four reptiles, ten mammals, and eight birds are identified as essential and in greatest conservation need. A search of the Montana Natural Heritage Program website found a record of 1 species of concern in the T28N, R40E – the Western Hog-nosed Snake (*Heterodon nasicus*). This species is listed as sensitive and is a reptile species found in the area. Loss of the 80-acre proposed facility expansion as wildlife habitat will not be considered critical, as it is not a unique or rare wildlife environment. Due to the sparse development and human population surrounding the site, there is adequate acreage of similar habitat available in the vicinity to accommodate any terrestrial or avian species that may be forced to relocate.

Transient populations of grazing large game might include pronghorn antelope, mule deer, white-tailed deer, and elk. Wandering predators like the coyote and red fox may occasionally inhabit the landfill area and surrounding rangeland. Permanent residence by burrowing small mammals like hares, jackrabbits, rodents; reptiles like turtles and snakes; frequent residence by various avian species including waterfowl, crows, ravens, and opportunist raptors like eagles, merlins, falcons, and burrowing owls are more likely.

Most terrestrial species currently inhabiting the proposed expansion area will be displaced by the landfill during the period of operation. After closure, the area will be re-seeded to native plant species typical of the surrounding grassland habitat. The impacts of landfill construction and operation will be minor due to the abundance of surrounding habitat.

6. Vegetation Cover, Quantity and Quality

A search of the Montana Natural Heritage Program website (NRIS, 2005) found no records of any plant species of concern in T28N, R40E. Although the landfill will occupy roughly eighty percent of the total facility area, it will be constructed, developed, and closed in phases. Therefore, vegetation will be removed as portions of the site are developed. However, as portions of the landfill are filled to final grade, they will be covered with an earthen final cover and topsoil and will then be re-seeded with native plant species appropriate to the area as recommended by the Natural Resource Conservation Service. The spectrum of

native plant species will not be as broad as the natural grassland vegetation currently developed on site, but will gain in diversity as natural succession progresses during the 30-year post-closure period.

After final closure of the proposed landfill, re-vegetation will make the area suitable for wildlife habitat and livestock grazing. In order to assure the integrity of the landfill cover re-vegetation process, grazing will be restricted sufficiently to allow the cover vegetation to become fully established. The District will monitor grazing on the final cover to prevent overgrazing.

7. Unique, Endangered, Fragile or Limited Environmental Resources

A search of the Montana Natural Heritage Program website found a record of 1 species of concern in the T28N, R40E – the Western Hog-nosed Snake (*Heterodon nasicus*). This species is listed as sensitive and is a reptile species found in the area. No other unique, endangered, fragile, or limited environmental resources were identified.

Loss of the 80-acre proposed facility expansion area as wildlife habitat will not be considered critical, as it is not a unique or rare wildlife environment. The area proposed for expansion has been used for agricultural purposes and is sparsely developed. There is adequate acreage of similar habitat available in the vicinity of the proposed expansion to accommodate any terrestrial or avian species that may be forced to relocate because of the expansion. Therefore, there are no anticipated impacts to these resources.

8. Historical and Archaeological Sites

The State Historic Preservation Office (SHPO) was informed of the proposed facility expansion. SHPO searched their records and found no documented historical or archaeological sites in the area proposed for expansion. This does not mean that there are no such sites in that location, but that no sites are known to exist, to date. SHPO recommended that any disturbance or alteration to a structure over fifty years of age be recorded and a determination of its eligibility for listing on the National Register of Historic Places be made.

9. Aesthetics

Visual
The proposed landfill will likely have only minor, if any, impact on aesthetics. The proposed site is located approximately one-mile north of U.S. Highway 2 in a sparsely populated area. The landfill is not visible from the highway.

Litter Control
All vehicles coming to the facility will be required to have their loads covered. Wastes placed in the landfill will be covered with earthen material on a daily basis. In addition to the perimeter fence, the landfill will use hand-picking to further control litter on the site. To prevent the migration of wind-blown litter off site, the facility will utilize mobile litter fences and screens around the working face to capture the wind-blown litter. Windblown litter will be minimized by sequencing each new lift so that a small working face advances on the lee side, away from the prevailing wind. The most effective litter control practice will be the rapid placement of adequate daily cover. The anticipated aesthetic impacts from windblown litter are found to be minor due to the sparse development and human population surrounding the proposed expansion area and the litter control measures for the facility.

TABLE 2.2 - POTENTIAL IMPACTS ON THE HUMAN ENVIRONMENT

HUMAN ENVIRONMENT	Major	Moderate	Minor	No	Unknown	Attached
1. SOCIAL STRUCTURES & MORES: Is some disruption of native or traditional lifestyles or communities possible?				X		
2. CULTURAL UNIQUENESS & DIVERSITY: Will the action cause a shift in some unique quality of the area?				X		X
3. DENSITY & DISTRIBUTION OR POPULATION & HOUSING: Will the project add to the population and require additional housing?				X		
4. HUMAN HEALTH & SAFETY: Will this project add to health and safety risks in the area?				X		X
5. COMMUNITY & PERSONAL INCOME: Will the facility generate or degrade income?				X		
6. QUANTITY & DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs?			X			X
If so, estimate number.						
7. LOCAL & STATE TAX BASE REVENUES: Will the project create or eliminate tax revenue?			X			X
8. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads?			X			X
Will other services (fire protection, police, schools, etc.) be needed?				X		
9. INDUSTRIAL, COMMERCIAL & AGRICULTURAL ACTIVITIES & PRODUCTION: Will the project add to or alter these activities?			X			X
10. ACCESS TO & QUALITY OF RECREATIONAL & WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract?				X		
Is there recreational potential within the tract?				X		
11. LOCALLY ADOPTED ENVIRONMENTAL PLANS & GOALS: Are there state, county, city, USFS, BLM, tribal, etc., zoning or management plans in effect?				X		
12. TRANSPORTATION: Will the project affect local transportation networks and traffic flows?				X		

CUMULATIVE AND SECONDARY IMPACTS — Direct and indirect impacts are those effects that occur in or near the proposed project area and might extend over time. Often, the distinction between direct and indirect effects is difficult to define, thus in the following discussion, impact or effect means both types of effects. Cumulative impacts are restricted to the net effects of the proposed project because no other known projects are proposed in this area. Secondary impacts are induced by a direct impact and occur at a later time or distance from the triggering action. The cumulative impacts recognized from the proposed expansion of the Class II landfill are minor. The net potential impact of the proposed facility on the human environment is probably very minor. Development and population surrounding the proposed site is extremely sparse. The increased employment that may be generated by the construction of the facility will have a very minor but positive effect on the local income and tax base of the county. There are no recognized secondary impacts.

ANALYSIS OF TABLE 2.2 - POTENTIAL IMPACTS ON HUMAN ENVIRONMENT

This section evaluates the potential environmental effects that may occur on the human environment if the proposed facility expansion is approved. The number on each of the underlined resource headings corresponds to a resource listed in the tables. Generally, only those resources potentially affected by the proposal are discussed. Therefore, if there is no effect on a resource, it may not be discussed.

2. Cultural Uniqueness and Diversity

The SHPO was informed of the proposed facility expansion. SHPO searched their records and found no documented historical or archaeological sites in the area proposed for expansion. This does not mean that there are no such sites in that location, but that no sites are known to exist, to date. SHPO recommended that any disturbance or alteration to a structure over fifty years of age be recorded and a determination of its eligibility for listing on the National Register of Historic Places be made.

4. Human Health and Safety

The most common potential for impacts to human health from the proposed expansion arise from the potential release of leachate contaminants to surface or groundwater resources; air pollution from methane release and fires; and disease transmission from bird, animal and insect vectors. The criteria established for the approval of the leachate removal system protects the surface water. The criteria established for the approval of the alternative liner and no-migration petition protects the groundwater. There are no close residences downwind of the facility that will be impacted by dust resulting from operations, but dust control is required to protect customers and employees of the facility. The Department's Air Quality Program will control burning. Rules governing the application of daily and intermediate cover will control birds, rodents or other possible disease vectors by hindering their access to the waste, in addition to reducing the potential for landfill fires. Consequently no impacts to human health are anticipated.

6. Quantity and Distribution of Employment

During the construction phases of the landfill expansion there could be a very minor increase in local employment due to the need for contractors and associated support. Between construction phases there will be no additional impact because the landfill will continue to operate with the same number of employees currently working at the facility.

7. Local and State Tax Base and Tax Revenue

Because construction of the proposed landfill expansion has additional costs to the District, a future increase in the cost of waste disposal is highly probable. Thus, a minor potential impact will be the local increase in taxes and/or in landfill tipping fees for District residents. Since there will be a few additional workers hired during the construction phases of the proposed landfill expansion, construction of the proposed facility expansion could have a very minor positive effect on the local tax base.

8. Demands for Governmental Services

The potential impact of the proposed facility expansion will be minor. Department personnel must spend time reviewing the proposal and licensing the landfill expansion. The Department will perform inspections of the site during and after construction, in addition to continuing the regular inspections that are already conducted on the existing landfill. During the construction phases, there will be a slight increase in traffic on the roads leading to the landfill, but the impact is expected to be minor because very little added wear and tear or traffic enforcement will result due to the few contractors briefly involved over several weeks.

9. Industrial, Commercial, and Agricultural Activities and Production

Construction of the proposed facility expansion will cause a minor increase in the industrial activity of the area during construction due to the need for contractors and associated materials and machinery repairs. Since the area immediately surrounding the proposed site is undeveloped rural land with no commercial or industrial activity other than grazing and limited farming and ranching, no additional secondary impact to industrial or commercial activity of the area is expected beyond the 80-acres of lost agriculture. The vegetative cover of the landfill will be used as rangeland during post-closure. Overgrazing and growth of noxious weeds will not be allowed. The landfill will continue to provide a legal and environmentally sound waste disposal option for industrial and commercial establishments for the residents of the Valley County Refuse District.

3.0 CONCLUSIONS AND RECOMMENDATIONS

A listing and appropriate evaluation of mitigation, stipulations and other controls enforceable by the agency or another government agency:

The proposed expansion of the active Valley County Class II landfill will meet the minimum requirements of the Montana Solid Waste Management Act and administrative rules regulating solid waste disposal. Adherence to these Department licensing criteria will mitigate the potential for harmful releases and impacts to human health and the environment by the proposed facility expansion. Along with standard criteria for the Solid Waste Management System License as issued by the Department, and as validated by the local Valley County Health Officer, the licensee must adhere to the following specific license conditions:

(1) Compliance with the conditions of the no-migration demonstration and approvals.
(2) Leachate may not be re-circulated to the landfill due to the composite liner waiver.

Recommendations:

The recommendation of the Department is to distribute the EA and request comments from the public regarding the proposed Valley County Class II landfill expansion.

If an EIS is needed, and if appropriate, explain the reasons for preparing the EA:

The Department finds that an Environmental Impact Statement (EIS) is not necessary due to the mitigating factors provided by the solid waste rules and the District's proposal for licensure of the Valley County Class II landfill facility expansion at the selected site. Consequently, the combined effect of all such factors at the site will ensure to a reasonable extent that any potential direct or cumulative impacts to human health and the environment from the proposed landfill expansion are minor.

If an EIS is not required, explain why the EA is an appropriate level of analysis:

The Department finds that construction, operation, and post-closure care of the proposed expansion at the active Valley County Class II landfill will not significantly affect the quality of the human environment both within and surrounding the local Glasgow area. The proposed expansion project will be reasonably expected to have minor additional impacts on terrestrial and aquatic life, vegetation and other aspects of the physical and human environment relative to the existing active Class II landfill facility located adjacent to the proposed site. It is also reasonable to expect that additional potential impacts to the groundwater and surface water resources will be minimal due to the low average annual precipitation, extended thickness of highly impermeable material directly beneath the proposed landfill, extensive depth to the uppermost aquifer, site-specific engineered controls, operations according to approved plans, and other mitigating license conditions. Therefore, an Environmental Assessment (EA) is the appropriate document to address potentially minor impacts of the proposed expansion of the active Valley County Class II landfill.

Other groups or agencies contacted or which may have overlapping jurisdiction:
Montana Natural Heritage Program
State of Montana Historic Preservation Office
U.S. Geological Survey
Montana Bureau of Mines and Geology
U.S. Department of Agriculture - Natural Resource Conservation Service

Individuals or groups contributing to this EA:
Natural Heritage Program
State Historic Preservation Office
Barry Damschen Consulting, LLC
Crowley Consulting, LLC
Valley County Refuse Disposal District #1
U.S. Geological Survey
Montana Bureau of Mines and Geology
U.S. Department of Agriculture - Natural Resource Conservation Service

EA prepared by: Mary Louise Hendrickson & Tim Stepp – Montana Department of Environmental Quality, Solid Waste Program

Date: March 19, 2010

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