DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Solid Waste Program
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ENVIRONMENTAL ASSESSMENT (EA)

DIVISION/BUREAU/SECTION

Permitting and Compliance Division, Waste and Underground Tank Management Bureau, Solid Waste Management Section.

PROJECT OR APPLICATION:

The Unified Disposal District (District) submitted a solid waste management license application to the Montana Department of Environmental Quality (Department) Solid Waste Program to construct a new Class II Landfill. The proposed landfill will be developed in three phases and will have a total waste disposal capacity of 5,517,800 cubic yards (2,758,900 tons). The operating life of the proposed facility is 110 years at a waste acceptance rate of 25,000 tons per year.

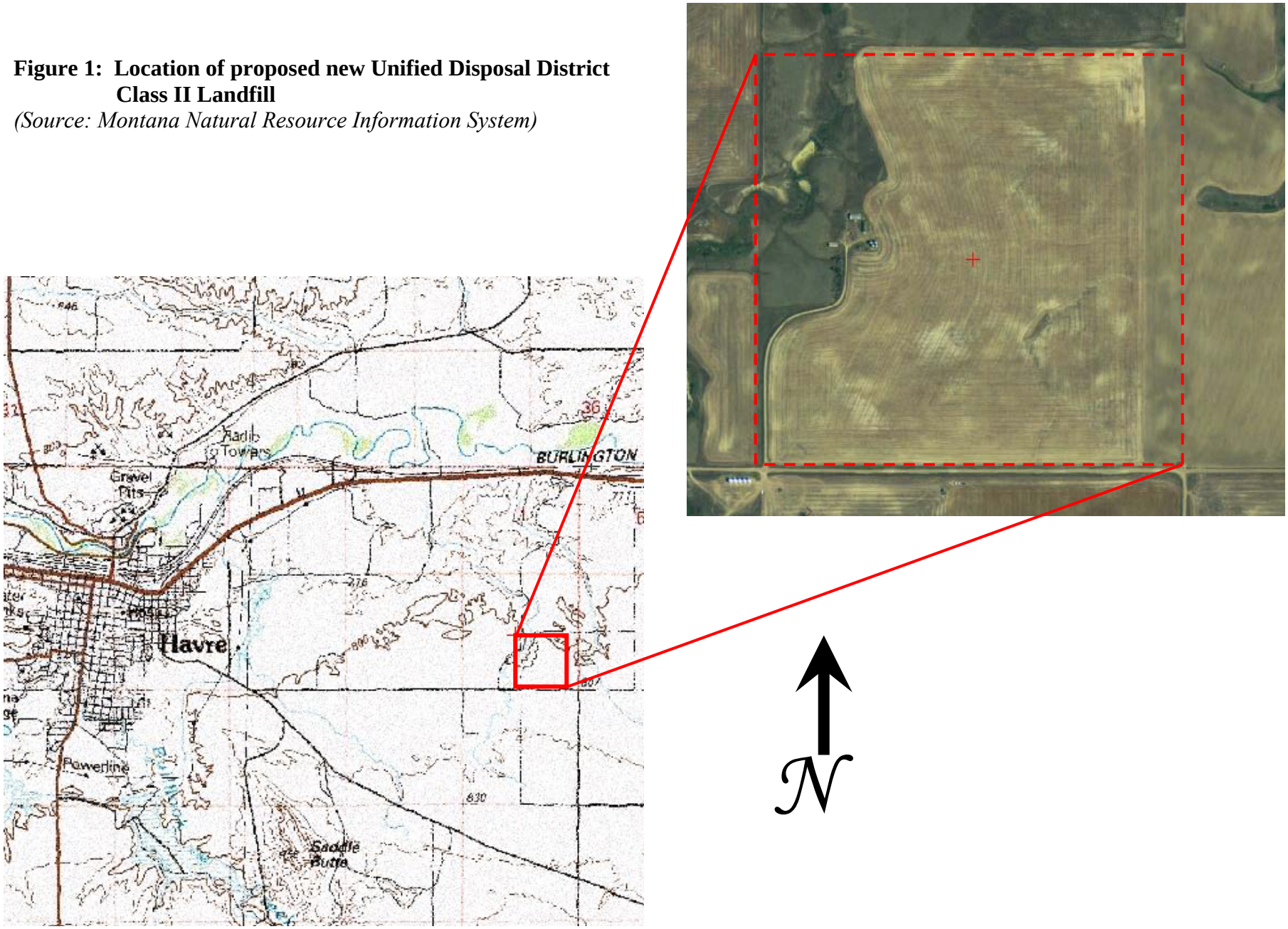
DESCRIPTION OF PROJECT – SUMMARY OF ANALYSIS:

Site Location: The District proposes to license the entire 160-acre parcel for the new Class II facility, but will only use an 89.7-acre portion for active landfilling. This 160-acre District-owned parcel is located approximately three miles east of Havre in the SE ¼ of Section 12, T32N, R16E, Montana Principal Meridian, Hill County, Montana (Figure 1).

Site Geography: The proposed landfill site lies 1.5 miles south of the Milk River, which flows just north of Havre and heads east toward its confluence with the Missouri River east of Fort Peck Dam. The proposed site is located on a bench approximately 195 feet above the Milk River floodplain. The elevation at the proposed site ranges from about 2620 to 2660 feet, rising from the northern boundary towards the southern boundary.

Natural runoff from the proposed site drains into two small coulees – one crossing the northwest corner of the site and another just east of the site. These coulees drain in a northwesterly direction toward the Milk River.

Figure 1: Location of proposed new Unified Disposal District Class II Landfill
(Source: Montana Natural Resource Information System)



No-migration Demonstration: The Department has approved the District's certified no-migration demonstration for waiver of the ground water monitoring at the proposed landfill site. The District provided site-specific data, calculations, and models demonstrating that the relevant ground water protection standards will not be exceeded anytime during at least the 110-year active life plus 30-year post-closure care period for the landfill as required.

The fine-grained Pleistocene glacial tills exposed at the surface in the vicinity of the proposed site do not provide the characteristics necessary to host a shallow unconfined aquifer. Regional drilling data predict that the uppermost deep aquifer beneath the proposed landfill site is probably confined largely within sandstones of the Upper Cretaceous Judith River formation. The Judith River aquifer was not intercepted during on-site drilling to 300-ft total depth beneath the proposed landfill. Drilling passed through approximately 110 feet of glacial till units at the surface and penetrated at least 190 feet of underlying marine shales in the Upper Cretaceous Bearpaw formation. Time of travel calculations, based on a range of parameter estimates, predict that it would take more than 1,400 to 8,000 years for the leachate to migrate to the total drilled depth of 300 feet, probably well above the uppermost Judith aquifer. Travel times for the leachate are greatly increased by migration through the clay-rich glacial till that provides an average 20-ft thick, highly impermeable natural barrier located immediately beneath the base of the entire landfill.

Landfill Features: The 89.7-acre disposal area will be the dominant feature of the proposed 160-acre facility. Natural properties of the uniform, fine-grained glacial till found at the surface will provide an adequate barrier to the migration of leachate through the base of the landfill. A leachate removal system will provide further protection against the buildup of leachate by allowing for the removal of leachate that may collect at the sloping base and flow into the leachate collection trench at the toe of each landfill unit. Areas located adjacent to the active waste disposal units will be developed for the storm-water detention ponds, excavation of new units, cover or topsoil stockpiles, and special use or storage. 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 re-vegetation of this store-and-release alternative cap.

Waste Disposal Units — According to the proposed facility master plan, the 89.7-acre area-fill landfill will consist of nine waste disposal cells or units comprising three phases of construction (Figure 2). The base elevation of each phase of development rises from east to west, whereas the base elevation of each cell in the sequence drops from south to north toward the toe. Located at the southeastern corner of the landfill, Cell I-A will be the first of two independent units constructed on the 20.6-acre Phase I footprint within the proposed disposal area. The 27.9-acre Phase II and 41.2-acre Phase III areas will be constructed in three and four cells, respectively. Each landfill unit is excavated with an independent base and separate leachate removal system, but all three phases are tied together 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 32 acres. Upon reaching final grade, the ultimate waste mound will rise to a maximum height of 90-feet above the surrounding natural topography.

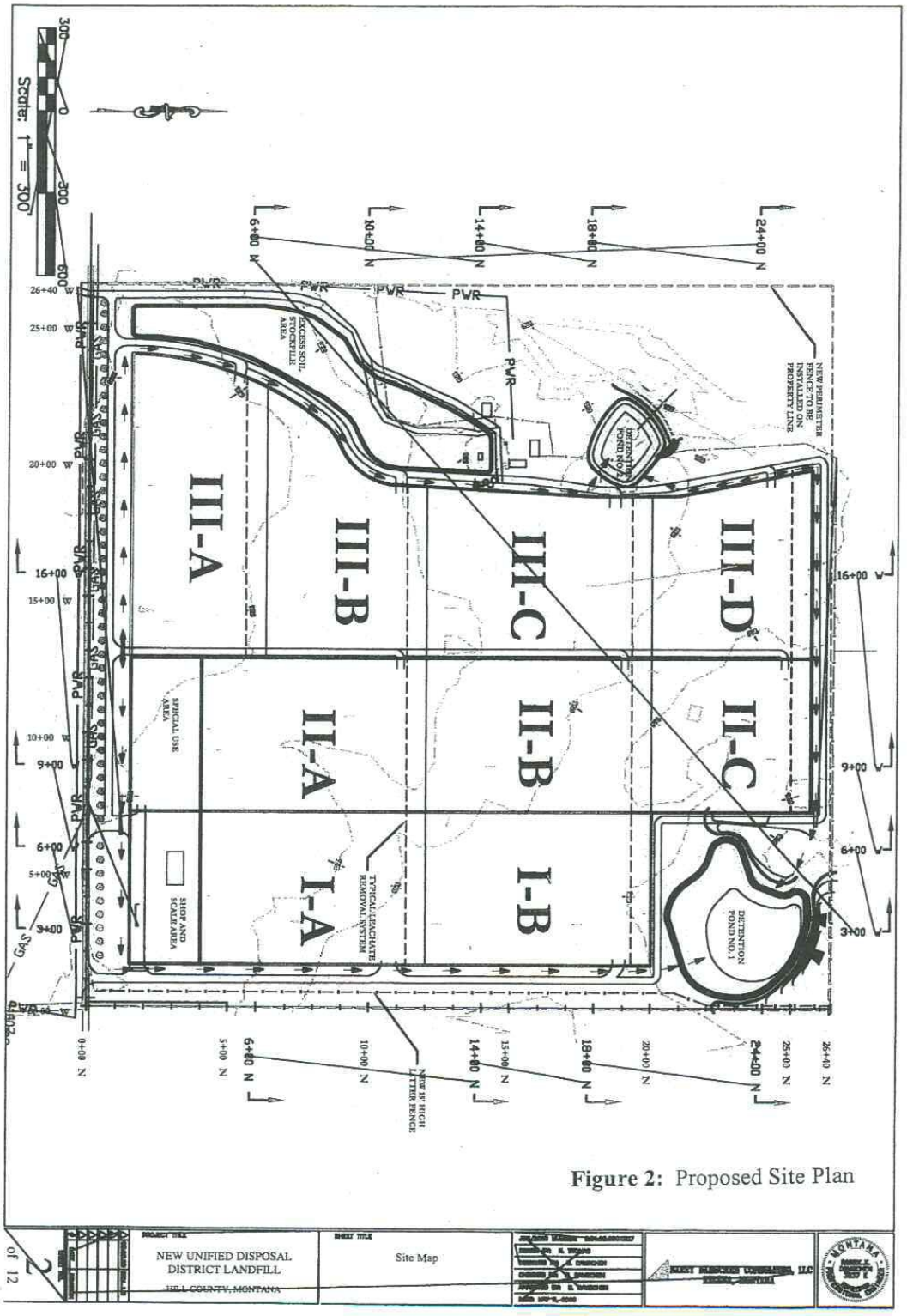


Figure 2: Proposed Site Plan

Cell Construction — Nine landfill cells, each with the average cell footprint of approximately 10 acres, will be constructed in sequence and will reach capacity over an average 10-year life. Each landfill cell will be cut to an average depth 20 feet below natural surface grade, providing 20 feet of the 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 upper till, the top six-inches of glacial till exposed beneath each disposal cell will be scarified and recompacted to 95% of maximum density. This scarification and recompaction effort will provide a uniform base where saturated hydraulic conductivity (Ks) does not anywhere exceed the 1×10^{-7} cm/sec maximum allowed. Three Shelby tube samples will be lab tested to ensure that the final in-place Ks at the base achieves these minimum requirements during construction of each landfill cell. The floor of each cell will have an average slope of 2% toward the lowest point in the leachate removal system at the toe of each cell.

Group II waste will be placed and compacted within the cells in 8- to 10-ft lifts and covered to meet the six-inch daily cover or 12-inch intermediate cover requirements. Waste fill will be placed so that all units tie together from east-to-west into a mound that will achieve 4:1 maximum exterior slopes and a 3% slope on the top deck. Maximum fill thickness will reach approximately 110 feet within the Phase II units along the north-south axis of the landfill. A Class IV cell will be isolated within the Phase I-A unit for the separate disposal of Group IV construction and demolition (C&D) waste. The C&D waste fill will be covered with six inches of quarterly cover as required.

Leachate Removal System — A leachate collection system covering the base of the landfill is not required when a no-migration petition is approved for a landfill site. All leachate generated in each of nine landfill units will be removed by independent riser pipes in the leachate removal system. Leachate will flow downslope, toward the northeast, along the base of each unit to collect in the sloping leachate removal trench at the toe of each individual unit. Leachate will flow eastward in each lateral collection pipe to the low northeastern corner of each collection trench where the leachate will be removed by the riser pipe. Leachate levels within the leachate removal trench shall not exceed the 12-in (30 cm) depth limit.

The slotted leachate pipe will be installed within the sloping trench to provide at least a 1% slope towards the northeast corner of the unit. The leachate removal system will consist of a single 12-in diameter, slotted, high-density polyethylene (HDPE) lateral pipe installed within the 24-in deep, leachate collection trench at the toe of each cell. The lateral leachate pipe will be bedded within three-in minus pit-run gravel that is wrapped by an eight-ounce nonwoven geotextile filter fabric. Two vertical 15-in diameter, solid HDPE riser pipes will join both ends of the flared lateral leachate pipe. The connections call for two 12.5^{o} and two 22.5^{o} elbows flanking a 45° elbow to allow for a smooth sweep at the bend in each 15-in riser from the floor of the unit to the ½:1 sidewall slope. Two adjacent vertical 15-in risers from adjacent leachate removal trenches will be strapped together to join at the crest of the sidewall trenches that separate the flanks of every interior Phase II unit from the adjacent outer Phase I and III units.

Upon exiting the sidewall, each strapped pair of interior leachate risers will be entirely encapsulated within vertical manholes. The manholes and risers will extend from the top of the

sidewall rib between two trenches upward to the surface of the final cover. All leachate risers and the five interior manholes will be stubbed during fill operations and extended in sections as each landfill unit rises to ultimate grade. Seven exterior 15-in risers will provide for access to the leachate removal system on the outside flanks of all exterior Phase I and Phase III units. This system of independent leachate riser pipes 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.

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 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. 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 flow, erosion, and sediment transport.

All storm water drainage from disturbed areas of the facility will flow to two permanent storm water and sediment detention ponds that will be located at the head of the coulees on the northeast corner and at the northwest flank of the proposed disposal area. The northwest storm water pond will be constructed prior to the development of the Phase III area. The detention ponds 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 District must apply for a Storm Water General Discharge Permit for Industrial Activity from the Department's Water Protection Bureau (WPB). In addition, a Construction General Permit is required by the WPB, prior to the commencement of construction for each landfill unit or other features, where there is more than one-acre of disturbance.

Sediment and erosion control measures will include the installation of silt fences, check dams, fiber matt, geofabrics, aggregate rip-rap, tri-lock blocks, down drains, or other features 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.

Temporary Storage Areas —Approximately five acres adjacent to Cell I-A, near the site entrance, will be set aside for special use and storage. Containers will be maintained in a public drop-off area near the entrance for the disposal of household waste and the separation of wood, metals, and tires from municipal solid waste prior to their disposal or resource recovery. A recovery 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. A soils treatment area (STF) will be properly located over impermeable soil and berms will be constructed around the perimeter to provide for the treatment of petroleum-contaminated soils. Another area will be maintained for the storage of clean wood and the stockpiling of chipped wood and yard waste for composting.

A separate building and collection area will be maintained for the recycling of select materials separated from the household waste stream.

Gate House & Equipment Storage Buildings — The facility will be accessed by an all weather road at the southeast gated entrance where a gate house, scale, and equipment storage and shop buildings will be located. A State Building Permit will be obtained prior to construction of the buildings and installation of the necessary water and sewer services. 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 proposed facility master plan calls for the excavation of approximately 2,865,200 cubic yards (yds^3) of on-site fine-grained glacial till during cell construction throughout the landfill life. Landfill construction and operation activities will use 2,730,100 yds^3 of earthen material. The natural till material excavated during landfill cell construction will be stockpiled on the southwestern boundary of the Phase III disposal area and will be used for daily, intermediate, and alternative final cover. Material suitable for topsoil will be stockpiled separately. All stockpiles will be seeded to prevent runoff and erosion. Other Best Management Practices (BMPs) or features will be used at the soil stockpiles, as needed, to control sediment erosion.

Other Landfill Features — At least two methane monitoring probes will be initially located at the license boundary on the northeastern and southern margins of the proposed Cell I-A disposal area. 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. Upon final closure, a five-foot thick, store-and-release, alternative final cover will be installed over the entire landfill. The monolithic earthen final-cover, from the bottom upward, will consist of three distinct unconsolidated layers: a 12-inch intermediate cover, 42 inches of monolithic on-site till, and six inches of topsoil at the surface. All soils for the final cover will consist of on-site glacial till obtained during excavation of the landfill cells and placed at no more than 85% maximum density. Uniformity of the final cover soils will be ensured by adequate testing of its index properties upon its placement on the landfill cells. Plant species will be selected to provide an adequate range of rooting depths and a sufficient growing season to optimize transpiration of moisture as required. An optimal community of vegetation will be established upon the final cover in a timely manner so as to ensure at least 50% coverage by the end of the first year as verified by DEQ. A complete stand of native grasses shall develop within no more than three years after planting.

Upon reaching ultimate grade, the average elevation of the landfill site will increase by approximately 40 feet. The maximum elevation increase will be 90 feet at the toe of Cell IB. The moderate slope of the largest area of the top deck will average 5%, 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 similar to the surrounding grassland habitat. Vegetated benches and drainage swales, fiber matt, geofabric, check dams, aggregate rip-rap, tri-lock blocks, down chutes, or equivalent erosion control may be installed on the final cover as needed according to the approved Closure Plan for the facility.

The final cover soil properties and select vegetation shall ensure an adequate balance between moisture storage and evapotranspiration so as to reduce the percolation of moisture through the cover in a manner equivalent to the barrier at the base of the unit. On average no more than two mm/yr of moisture shall pass through the alternative final cover as proposed and drain into the waste as leachate. A field performance monitoring system must be installed on site to verify that the average annual cap drainage conforms to the two mm/yr limit. Drainage must not at any time exceed the eight mm/yr median prediction nor cause leachate levels to exceed the 12-in (30 cm) depth limit within the leachate removal trench. Conformance with these alternative final cover drainage standards shall be demonstrated prior to the cessation of post-closure care.

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 be responsible for the administration of the new Unified Disposal District Class II landfill. The day-to-day administration and operation of the landfill will be the responsibility of the landfill supervisor. At the current landfill, the District employs two full-time operators who run heavy equipment at the landfill and two full-time truck drivers who service the container sites. These four employees will fill in for each other during an absence. The District also employs two full-time laborers. 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 DEQ and the Montana Association of Counties (MACo).

Operating Hours — The proposed Class II landfill facility will be open to the public from 8 a.m. to 5 p.m., seven days per week. The proposed facility will be closed on legal holidays.

Access Control — A sign will be installed at the facility entrance that indicates the hours of operation and the types of acceptable wastes. The site will be fenced and gated, and the gate will be locked when the facility is closed. At least one full-time operator will be on duty when the site is open to the public. Public traffic that arrives when the facility is open will be directed to the on-site container site. The public will not access the active working area, but will unload wastes transported in private vehicles at the container site.

Acceptable Wastes — Signs at the facility entrance will 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. All incoming solid wastes will be commingled and placed in the Class II landfill.

Resource Recycling and Recovery — Some materials, such as appliances, scrap metal, yard wastes, and various recyclables, will be segregated in designated areas and either recycled or recovered for beneficial uses. Signs will be used to direct the public to the various recycling

areas. The recycling area will be located near the entrance to the facility, adjacent to the on-site container site, to minimize public traffic within the facility.

The white goods and scrap metal will be crushed and recycled. All appliances using refrigerant must have the CFC/HCFCs (chlorofluorocarbons) removed in compliance with federal EPA regulations. Appliances will be checked by the operators to ensure the refrigerants have been removed from each unit prior to its recovery for scrap metal. Freon-containing units will be segregated from the other white goods until the refrigerant has been removed by a licensed remover. All appliance doors will be disabled by the facility operators prior to being stockpiled for metal recovery.

Yard waste will be segregated and composted on site. Clean wood waste will be chipped and composted with the yard waste. Landfill personnel will monitor and remove any contaminants in the compost pile. The facility plans to use the compost on-site.

Cardboard, plastic, and paper will also be collected on-site in separate containers. The facility will also accept empty pesticide and herbicide containers that have been triple-rinsed for recycling. The facility plans to install a permanent building that will be used for the storage of excess paper, cardboard, and plastic until it can be shipped to market.

Special and Hazardous Wastes — The landfill staff is 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 District proposes to landfarm petroleum contaminated soils. The area used for landfarming will be segregated from other facility operations. Landfarming will be conducted in accordance with the procedures set forth in the Department's "*General Guidelines for the Operation of a Soil Treatment Facility to Bioremediate Petroleum Contaminated Soils from Multiple Source Sites and Sump Solids from Vehicle Service Shops and Car Washes*". The District proposes to stockpile the remediated soils for use as daily, intermediate, and final cover materials.

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

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

- 627 scraper for excavating and transporting soil
- 963 track loader for consolidating the waste and applying daily cover
- 816 compactor for compacting wastes
- Caterpillar grader and one water truck for road maintenance

- D6 Cat
- John Deere tractor
- Bobcat skid steer

Daily Landfill Operations — The public will not access the active working area, but will unload municipal solid wastes transported in private vehicles at a container site on the landfill property. A scale will be installed and all incoming loads, including the full containers, will be weighed prior 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- nches of earthen material. The operators will maintain 12 inches of intermediate cover on all landfill lifts that will not receive waste for 90-days.

Waste Disposal Capacity — The proposed landfill will be developed in three phases. Phase I will contain two landfill cells and will provide for the disposal of 962,700 yds^3 of waste over 19.3 years of life. Phase II will contain three landfill cells and will provide for the disposal of 2,037,900 yds^3 of waste over 40.8 years of life. Phase III will contain five landfill cells and will provide for the disposal of 2,517,200 yds^3 of waste over 50.3 years of life. The total projected landfill life is 110 years.

Soil Excavation and Budget — Excavation for construction of the landfill units will progress in three phases. Approximately 625,000 yds^3 of soil will be excavated for the two cells in Phase I; approximately 979,500 yds^3 of soil will be excavated for the three cells in Phase II; approximately 1,260,700 yds^3 of soil will be excavated for the five cells of Phase III. Excavated material that is suitable for topsoil and plant growth will be stockpiled separately. Other excavated material will be stockpiled and used for daily and intermediate cover. Ultimately, about 2,730,100 yds^3 of soil will be used for daily, intermediate, and final cover, leaving a soil surplus of 135,100 yds^3.

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 required to 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. For the first several years of operation, as the active landfill cell expands during each new disposal phase, active landfilling will occur below grade, out of the wind. This early advantage in litter control is lost as the lifts progress upward toward final grade and ultimate capacity. Since the predominant winds are from the west, northwest, and southwest, the District will install a 15-20-ft high litter screen along the east property line. This fencing will help to control blowing litter. In addition, to the fence on the east property line, the District will also install a hog wire fence, that includes two strands of barbed wire on the top, around the remainder of the site perimeter. The lower hog wire portion will catch much of the wind-blown litter. In addition to the fencing, the landfill operator will maintain a small working face, compact the waste, and apply the necessary daily soil cover to minimize litter outside the active disposal unit.

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 Water Protection Bureau. 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 Havre's wastewater treatment plant (POTW).

Severe Weather Operation — An all weather road will be constructed within the facility boundary to ensure that facility operations are not hindered during inclement weather. 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 wet weather dumping area is located outside the active disposal cell, the waste will be buried at the active face after site conditions improve.

Contingency Planning — The landfill O&M Plan contains contingency plans for unusual situations. Incoming loads containing hot materials will be directed to a dumping area where the load can be extinguished before being placed in the landfill. If a landfill fire occurs, the burning wastes will be pushed away from the working face and extinguished by covering it with soil. In the event of an uncontrolled fire, the local Fire Department will be notified immediately.

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 final cover will be monitored periodically for effectiveness, repair of erosion, and to ensure vegetative success through at least 30-years of post-closure care. The effectiveness and maintenance of the leachate removal system and storm water control system will also be monitored. Leachate will be sampled, removed, and treated as needed without release. The methane gas monitoring system will be evaluated and maintained during post-closure. Methane gas will be monitored quarterly. If there is an exceedance of the methane protection standard at the points of compliance, a Department-approved methane gas control plan, that may require the construction of a methane gas extraction system, will be implemented.

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 while also improving the protection of human health and the environment as required by the Department. The currently active Unified Disposal District Class II landfill performs ground water monitoring at a considerable expense. Licensure of the new landfill with an approved no-migration petition and composite liner waiver should result in considerable savings not only in avoided ground-water monitoring costs, but also liner and leachate collection system construction costs and their associated maintenance costs.

The site is close enough to the City of Havre to keep hauling costs down, but far enough away to reduce citizen complaints that might arise from a municipal landfill operation. Because of the remote location of the proposed landfill, few complaints are expected concerning litter, odors, dust, or operations.

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 issuance of a new solid waste management facility license. The District, however, may at any time choose to withdraw its application by exercising the “no action” alternative. In choosing the no action alternative, the District would keep its current landfill license and continue disposal of solid waste at the currently active Havre landfill site as before. The factors associated with Alternative A illustrate the benefits of the District’s proposal.

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 new solid waste landfill license. By deciding to withdraw the application from consideration by the Department, the applicant could continue its current disposal operations at the currently active Class II landfill until its total capacity is reached. Selection of this option by the District is not likely due to the following factors:

1. Subgrade conditions at the currently active landfill, located on the eastern edge of Havre, allow for the release and migration of leachate contaminants into the ground water beneath the site.
2. Continued operations at the currently active landfill would likely increase the contaminant concentration levels and the number of contaminants detected within the ground water at the facility.
3. Corrective action may be necessary for some contaminants should the releases to ground water continue as before at the current landfill.
4. Certain site conditions cause unnecessary difficulties in operations that could make compliance with some regulatory requirements (e.g. litter) more costly.
5. Increased population and development around the Havre landfill could increase the risk of impacts to human health if the release to ground water worsens.

6. Improvements in subgrade characteristics and the depth to groundwater beneath the proposed landfill site would provide much better protection of ground water than currently exist at the active landfill.
7. The District has rejected the viability of this option based on recent comparative analyses by a consultant.

In the absence of the "no action" alternative and prior to its final decision, the Department has considered two other possible alternatives during its preparation of this EA.

Alternative B. The Department denies the license application for a new 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 ground water 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 Havre. The District hired a consultant to provide preliminary analyses and investigation of proposed nearby disposal site locations. After review of the proposed options at public meetings, the proposed site was selected by the District as the most favorable location.
3. Close the Havre landfill, and haul solid waste to another licensed facility. The High Plains landfill at Great Falls is the nearest Class II facility that would consider acceptance of waste from Unified Disposal District residents. Disposal at High Plains landfill would involve transportation costs as well as tipping fees, and could likely cause a significant increase in disposal cost to the District residents.

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

1. The existing licensed Class II facility in Havre already has a known ongoing release of contaminants that may eventually require clean-up action by the District.
2. Continued disposal at the existing licensed Class II landfill could compound the number of contaminants or cause an increase the concentration of contaminants released to ground water.
3. The 89.7-acre disposal area at the proposed site will allow for the additional disposal of 2,758,900 tons of waste over 110 additional years of operation.
4. The proposed site has specific subsurface characteristics that satisfy the no-migration and alternative liner requirements to provide superior ground water protection.
5. The District has a 26-year history of waste disposal in compliance with the Montana solid waste laws and rules.
6. There is an ongoing need for economical disposal services for the area residents. Investigations by the District based on cost and other factors indicate that the option

proposed herein by the applicant is more feasible than continued disposal at the currently licensed Class II landfill.

7. The population, land use, and development of land surrounding the landfill facility are sparse, so the potential effects on human health from the potential release of pollutants to the environment are minimized.

In consideration of these alternatives, the Department reviewed various site-specific documents submitted to the Solid Waste Program by the Unified Disposal District, Barry Damschen Consulting, Hydrometrics, and Crowley Consultants. These were: (i) *New Class II Sanitary Landfill License Application and Operation and Maintenance Plan, Unified Disposal District (July 2008)*: Prepared by Barry Damschen Consulting, Helena, Montana, (ii) *Hydrological and Soils Study and No-Migration Demonstration for the Proposed Unified Class II Landfill, Hill County, Montana (May 2008)*: Prepared by Hydrometrics and Crowley Consultants, Helena, Montana, (iii) Response to NOD (February 25, 2009) and meeting request for information (June 8, 2009) providing updates to the facility design documents, alternative liner and cover demonstrations, and O&M Plan (iv) the current facility compliance history in the DEQ files, and (v) documents provided from the District's Landfill Location Project that include preliminary comparisons of potential Class II landfill sites based on cost analyses and selected factors. Based on the information provided, investigations by the District for potential landfill sites versus continued operation of the licensed Havre landfill, and Department research on the area surrounding the proposed site, the potential environmental impacts of Alternative C were evaluated for the proposed project. The results of the Department's evaluation are summarized in Tables I and II. A detailed discussion of the site-specific environmental impact analysis for Alternative C is provided in the Appendix.

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

The proposed Unified Disposal District Class II landfill will meet the minimum requirements of the Montana Solid Waste Management Act and administrative rules regulating solid waste disposal. Along with standard criteria for the Solid Waste Management System license as issued by the Department, and as validated by the local Hill County Health Officer, the licensee must adhere to the following license conditions:

(1) Compliance with the conditions of the no-migration demonstration and approvals.

(2) Leachate may not be recirculated to the landfill due to the composite liner waiver.

Recommendations:

The recommendation of the Department is to request comments from the public regarding the proposal. In the absence of adverse public comments identifying significant issues or impacts that have not been heretofore identified, the Department is proposing to license the newly proposed Havre site as a Class II Solid Waste Management System.

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 needed due to the mitigating factors provided in the proposal for a new Class II landfill facility at the selected site. Consequently, the cumulative effects of all factors evaluated will ensure to a reasonable extent that any potential impacts from the landfill are minor.

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

The Department finds that construction and operation of the newly proposed Unified Disposal District Class II Landfill will not significantly affect the quality of the human environment within and surrounding Havre. Potential impacts to terrestrial and aquatic life, vegetation and other aspects of the physical and human environment at the proposed facility location are expected to be minor. It is reasonable to expect that potential impacts to the ground water and surface water resources will be minimal due to the low average annual precipitation, the extended thickness of highly impermeable material directly beneath the proposed landfill, the extensive depth to the uppermost aquifer, and the site-specific engineered controls. Therefore, an Environmental Assessment is the appropriate document to address potentially minor impacts of the proposed Class II landfill facility.

Other groups or agencies contacted or which may have overlapping jurisdiction:
Natural Heritage Program
Montana Department of Transportation
State Historic Preservation Office
Hill County Health Department

Individuals or groups contributing to this EA:
Natural Heritage Program
Montana Department of Transportation
State Historic Preservation Office
Hill County Health Department

EA prepared by: Mary Louise Hendrickson, Tim Stepp, and Martin Van Oort – Montana Department of Environmental Quality, Solid Waste Program

Date : July 20, 2009

TABLE I. Potential Impacts on the Physical Environment
[See appendix as indicated for a specific resource analysis]

RESOURCE	LEVEL OF IMPACT					
	Major	**Moderate**	**Minor**	**None**	**Unknown**	**Appendix**
1. Terrestrial and Aquatic Life and Habitat			X			X
2. Water Quality, Quantity, and Distribution			X			X
3. Geology and Soil Quality, Stability and Moisture			X			X
4. Vegetation Cover, Quantity and Quality			X			X
5. Aesthetics			X			X
6. Air Quality			X			X
7. Unique, Endangered, Fragile or Limited Environmental Resources					X	X
8. Demands on Environmental Resources of Water, Air, and Energy			X			X
9. Historical and Archaeological Sites					X	X

CUMULATIVE AND SECONDARY IMPACTS — The cumulative impacts from the proposed Class II Solid Waste Management Facility are minor. Natural site conditions combined with engineering controls will eliminate any impact from leachate. Conditions that minimize leachate seepage were fully evaluated by the Unified 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.

TABLE II. Potential Impacts on the Human Environment
[See appendix as indicated for a specific resource analysis]

RESOURCE	LEVEL OF IMPACT					
	Major	**Moderate**	**Minor**	**None**	**Unknown**	**Appendix**
1. Social Structure and Mores				X		
2. Cultural Uniqueness and Diversity					X	X
3. Local and State Tax Base and Tax Revenue			X			X
4. Agricultural or Industrial Production			X			X
5. Human Health				X		X
6. Access to and Quality of Recreational and Wilderness Activities				X		
7. Quantity and Distribution of Employment			X			X
8. Distribution of Population				X		
9. Demands for Government Services			X			X
10. Industrial and Commercial Activity			X			X
11. Locally Adopted Environmental Plans and Goals				X		

CUMULATIVE AND SECONDARY IMPACTS — The cumulative impacts recognized from the proposed licensing of the new 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.

I. POTENTIAL IMPACTS ON THE PHYSICAL ENVIRONMENT

1. Terrestrial and Aquatic Life and Habitats

The proposed new Unified Disposal 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 dryland 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 semidesert to plains woodland. Because ground cover is generally sparse, large areas of soil are often exposed. The semidesert 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. Loss of the 160-acre proposed facility acreage 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 proposed 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.

A search of the Montana Natural Heritage Program website found a record of one species of concern in the T32N, R16E – the Sauger (*Sander canadensis*). This species is listed as sensitive and is an aquatic species found in the Milk River, located 1.5-miles north of the proposed site. There are no wetlands or permanent surface water bodies located on the proposed site. In

addition, because no continuously active aquatic systems exist within the boundary of the proposed facility, it is unlikely that there is any significant aquatic life or habitat anywhere on the site. The required storm water control systems, including two detention ponds, will prevent any discharge of runoff from the landfill facility to the adjacent coulees. Thus, any impacts to aquatic life and habitat due to the proposed facility will likely be very minor.

Most terrestrial species currently inhabiting the proposed 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.

Proper operation of modern sanitary landfills using appropriate daily and intermediate cover minimizes scavenging by birds and mammals. It is anticipated between the 130-year post-closure model and the final active landfill model were changes in the characteristics of the final soil cap. The 130-year post-closure HELP model results indicate an average annual percolation rate of 0.12 inches per year. Given the low percolation rates and the significant storage capacity of the 60-ft thick lower sandy unit above the Bearpaw Shale, no significant transmission of any landfill seepage through the more than 192 feet of unsaturated, low-permeability shale overlying the nearest usable aquifer would be expected.

2. Water Quality, Quantity and Distribution

Climate

Hill County is located in a region that is considered to be a cold semi-arid steppe. The Fort Assinniboine Agricultural Research Station, reports an average annual precipitation of 12.03 inches per year (including equivalent average annual snowfall) for the Havre area.

Surface Water

The proposed landfill site is situated due east of Havre on an elevated bench above the southern breaks of the Milk River. At approximately 1.5 miles north of the site, the Milk River is the nearest perennial stream and flows eastward toward the Missouri River. Drainage from the site flows northward over Pleistocene glacial tills from the proposed site toward the Milk River floodplain. There are no natural springs known within the immediate area of the proposed landfill facility.

Natural intermittent runoff from the proposed landfill area drains into two small coulees; one that would cross the northwest corner of the site and a second that would drain the eastern portion of the proposed facility. Two detention ponds will retain storm-water 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 minor surface water impacts are anticipated due to the application of best management practices during the proposed operations.

Ground Water

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 drinking water in the vicinity of the proposed facility. Because the glacial till at the surface is barren of water, local water well data are sparse outside the valley, but regional data likely locate the uppermost confined aquifer beneath the landfill site within the Upper Cretaceous Judith River formation. The Judith River bedrock aquifer, located at more than 300 feet below the proposed landfill, is likely confined under the 190-ft thick Upper Cretaceous Bearpaw formation shales. These thick bentonitic shales of very low permeability would function as a secondary natural barrier for the migration of liquids to this deep aquifer.

Nearby Ground-water Supply Wells

The nearest domestic water supply wells are located just over 0.5-miles to the southwest of the proposed site and are apparently completed in coarse glacial materials of the lower till outwash unit at depths of 60 to 70 feet below the surface. Other domestic water supply wells are located approximately 1.5 miles north and northwest of the proposed landfill site and are screened anywhere from 40 to 300 feet below the surface in the shallow unconfined alluvial aquifers associated with the Milk River or the deeper confined Judith River aquifer. 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. Several stock wells are located 0.5 to 1 mile northeast to northwest of the proposed landfill site. These stock wells are drilled to depths of 12 to 200 feet and are also screened in the shallow alluvial Milk River aquifer or the deeper Judith River aquifer.

Hydrologic Evaluation of Landfill Performance (HELP) Models

The one-dimensional HELP models employ the Brooks-Corey approach to predict the average annual percolation rates through the base layer of the landfill. The HELP models are conservative because they incorporate precipitation rates from the decade with the highest average annual precipitation in the period of record. The active landfill HELP model is run in 6 stages which simulate the sequential filling of the proposed initial landfill unit. The predicted average annual percolation rates would be zero throughout the 10-yr active life of the Phase I-A landfill operations. An additional post-closure HELP model simulation was run to evaluate the 30-yr post-closure care period following closure of the proposed landfill. The total length of the post-closure simulation was 130 years, to account for the 100 years needed to fill Phases I-A through III-D of the proposed landfill. The only differences between the 130-yr post-closure model and the final active landfill model were changes in the hydrogeologic characteristics of the alternative five-ft thick final soil cover. HELP model calculations for the 130-yr post-closure simulations indicate an average annual drainage rate of 0.12 inches per year (2 mm/yr) and a median drainage rate of 20 inches per year (8 mm/yr) through the final cover 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 alternative final cover. Three factors provide superior ground water protection at the proposed site: (i) the

potentially low percolation rates into the closed landfill, (ii) the natural impermeable barrier provided by the fine-grained glacial till at the base of the landfill, and (iii) the significant storage capacity of the 60-ft thick lower sandy till unit above the Bearpaw shales. Therefore, no significant landfill leachate would be reasonably expected to reach the upper shale surface and much less to seep through the more than 190 feet of unsaturated, impermeable shale overlying the uppermost aquifer.

3. Geology and Soil Quality, Stability and Moisture

Site Soils and Geology

The soils at the site consist of clay loams of the Scobey-Kevin and Kevin-Hillon series. Soil types are shown on Figure 3 and are described in more detail in Table 1. These soils were developed from the fine-grained Pleistocene glacial tills present on the surface at the site and tend to be deep and well-drained with high available water capacity. The coulee along the western site boundary is characterized by a Hillon series loam. This loam is also a deep, well-drained soil with high available water capacity. All soils at the proposed site are characterized by low permeability and high erosion potential. According to the USDA-NRCS, the compaction characteristics of the on-site soils make them fair to good for use as daily landfill cover material.

Figure 3: Site Soils Map
441C: Kevin-Hillon Series Soils
561B: Scobey-Kevin Series Soils
(*from: USDA-NRCS, Soil Survey of Hill County, Montana, Part 1, 2003)*

Soil Type	Map Key	Depth	Drainage	Permeability	Available Water Capacity	Erosion Hazard	Compaction Characteristics
Scoby-Kevin clay loams, 0-4% slopes	561B	Very deep	Well drained	Slow	High	High	Good
Kevin-Hillon clay loams, 2-8% slopes	441C	Very deep	Well drained	Slow	High	High	Good
Hillon loam, 15-25% slopes	22E	Very deep	Well drained	Slow	High	High, Steep Slopes	Poor: slope

Table 1: Summary of Properties of Site Soils

Shallow bedrock beneath the proposed landfill site consists of the Upper Cretaceous age Bearpaw formation shales. Results from the site investigations show that the Bearpaw shale is mantled by a 100-ft thick sequence of Pleistocene glacial till deposits. These unconsolidated glacial deposits consist of a 35- to 45-ft thick upper unit of fine-grained, moderately sorted, silty clay till overlaying an average 60-ft thick lower unit of dry, porous, silty sand till of unknown origin. Grain size analysis of two samples of the upper clay till provided silt- plus clay-sized fine fractions varying from 71 to 90 percent, typical of continental ground tills for the area. Examination of aerial photos in the vicinity of the proposed facility suggest that the sandy lower till unit apparently daylights in the coulee beyond the northwest corner of the proposed licensed boundary.

The Bearpaw formation is a dark gray to black, finely laminated, carbonaceous, clay shale with a few small limestone or gypsum concretions. The shales were deposited in a restricted marine environment and contain discrete layers rich in bentonitic clays due to volcanic ash eruptions. Drilling terminated after penetrating at least 190 feet into the Bearpaw shales at the site. The Upper Cretaceous Judith River formation or equivalent was not encountered during drilling and presumably lies beneath the buried lower Bearpaw contact at the proposed site.

Site Hydrogeology and No-migration Demonstration

During the Barry Damschen Consulting 2005, and Hydrometrics 2006 site-specific investigations, a total of 10 borings and 28 test pits were installed at the site (Figure 4). Significant ground water was observed in only one of the borings (BH-8) drilled near the northern boundary of the proposed site. The water was encountered in the lower glacial unit in a sandy layer overlying a sandy clay near the lower contact of the tills with the weathered gray-black shale bedrock at a depth of approximately 85 feet. The water was of sufficient quantity to impede drilling, but no estimate of ground water yield was made. No water bearing zones were encountered in any of the other site borings or test pits, suggesting that the water encountered occurs in a perched zone of limited areal extent. None of the test pits or borings contained ground water in the upper clay till. Water-bearing porous zones were not encountered in the upper portion of the 190-ft section of the Bearpaw shales intercepted in any drill borings at the site.

Laboratory permeability testing on materials collected during both site investigations obtained an average result of 1.4×10^{-8} cm/sec at optimal density after compaction of four upper clay till samples; values ranged from a maximum of 3.9×10^{-8} cm/sec at boring BH-10 to a minimum of 3.5×10^{-9} cm/sec at TP-3. The sample collected during the 2006 Hydrometrics study from the Bearpaw shale yielded the lowest lab permeability of 6.8×10^{-9} cm/sec. No samples were analyzed from the lower sandy glacial unit, but handbook permeabilities for silty sand are expected to be on the order of 1×10^{-4} cm/sec.

The uppermost aquifer beneath the proposed landfill facility is probably hosted by the Judith River formation, which is likely located beyond the maximum drilled depth of 300 feet below the surface. This aquifer lies beneath the 190-ft thick confining layer of the Bearpaw shales. This thick shaly unit of very low permeability materials will function as a natural barrier for the migration of liquids to this predicted Judith River aquifer of unknown depth and high variability in water quality. In the various travel-time model calculations by the District and the Department, the minimum total depth to the Judith River aquifer was taken as 300 feet beneath the site based on drilling.

The Department has found that the certified *No-Migration Demonstration* adequately demonstrates that there are no apparent fluid migration pathways that might allow a significant quantity of landfill leachate to escape the waste fill area and reach the uppermost aquifer under the waste or a relevant point of compliance within 30-yrs of the closure of the proposed facility as required. Therefore, any potential impacts to geology, soil quality, stability and moisture, or ground water quality are probably minor based on the data provided by the District.

SOIL BORING LOCATION MAP

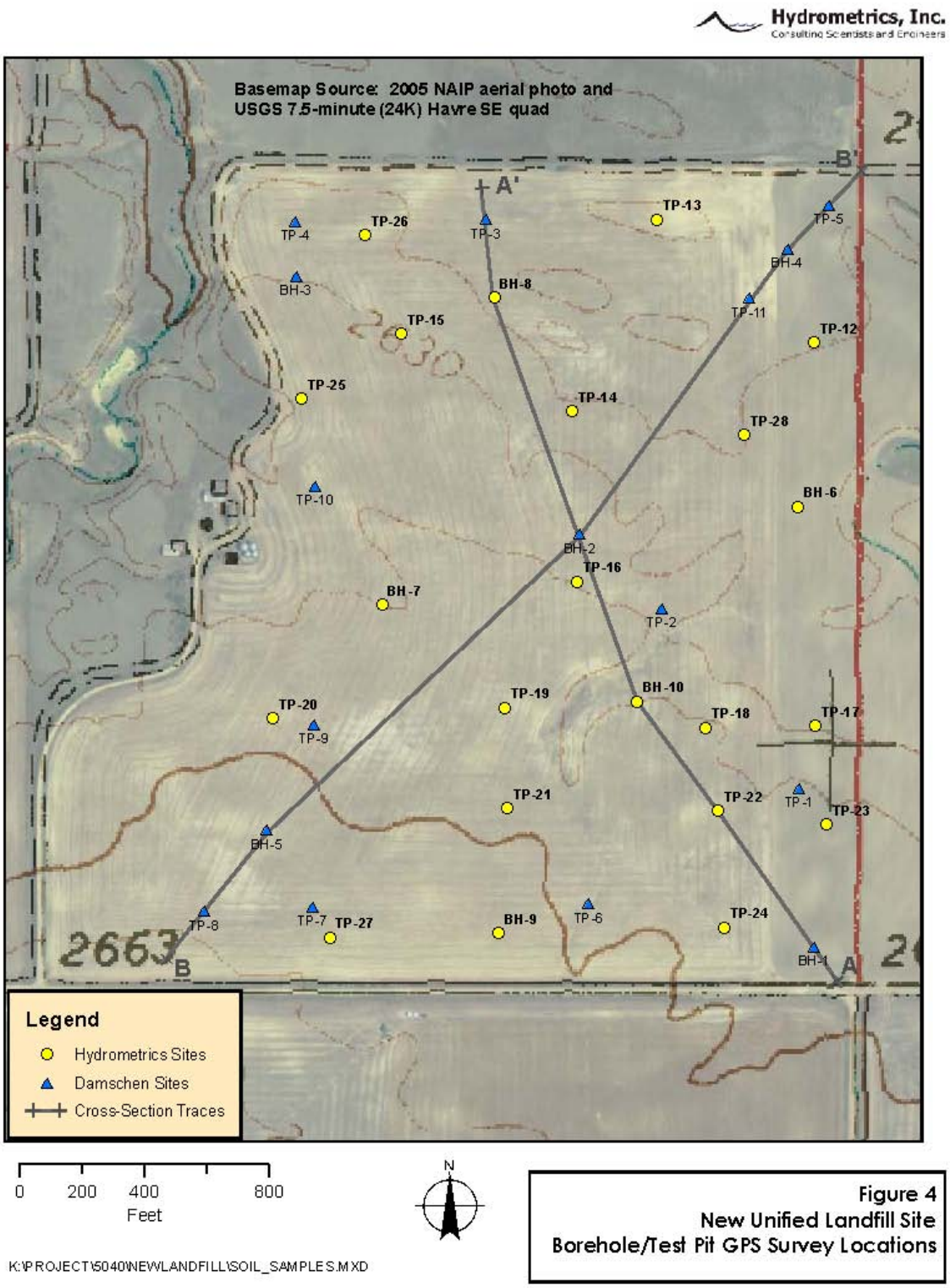


Figure 4
New Unified Landfill Site
Borehole/Test Pit GPS Survey Locations

4. 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 T32N, R16E. Approximately 65% of Hill County is cropland, 33% is rangeland, and 2% is woodland. Hill County is known for its production of spring wheat, winter wheat, and barley. Soils at the proposed facility mainly support dryland cultivated crops such as spring wheat, winter wheat, and barley. Recently the land within the proposed facility boundary has been used for dryland cultivation.

Most plant species will be removed from the proposed 89.7-acre disposal unit. Although the landfill will occupy forty percent of the total proposed facility area, it will be closed in phases wherein the largest open area will encompass 32 acres over the facility life.

As portions of the landfill are filled to their final grade, they will be covered with an earthen final cover and topsoil. This cap 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, such re-vegetation will then 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 likely be restricted sufficiently to allow the cover vegetation to become fully established. Grazing on the final cover will be monitored to prevent overgrazing.

5. Aesthetics

Visual

The proposed landfill will likely have only minor, if any, impact on aesthetics. The proposed site is located approximately 1.5 miles south of U.S. Highway 2 in a sparsely populated area. The landfill will not be 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 hog-wire bottom on the perimeter fence and tall eastern perimeter fence, the landfill will use hand-picking and a mobile litter vacuum system to further control litter on the site. The first few years of operation of the proposed Class II landfill will occur below the existing ground level, which will also serve to control litter.

This early advantage in litter control is lost as the disposal lifts progress upward toward final grade and ultimate capacity. 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. Portable screens may be utilized, if necessary, during high wind events. The anticipated aesthetic impacts

from windblown litter are found to be minor due to the sparse development and human population surrounding the proposed new area and the litter control measures for the facility.

6. 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 2 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. If dust from construction becomes a problem, 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, it will be mitigated by adequate dust control measures on the interior roads such as applying a dust palliative or water.

The excavation and placement of cover material could increase the dust in the air. If it becomes a problem, 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 commences, there will be at least two methane monitoring wells located on the south and east side of cell IA. These wells will be monitored quarterly to assure that standards for lateral migration of methane gas are not exceeded at the boundary.

7. Unique, Endangered, Fragile or Limited Environmental Resources

A search of the Montana Natural Heritage Program website indicated there is one species of concern in the general area of Hill County - the Sauger (*Sander canadensis*) The Milk River lies about 1.5 miles north of the proposed landfill site and contains the Sauger, (G5S2, BLM sensitive).

No intensive site survey was conducted to study the presence of sensitive, unique, endangered, or fragile species within or adjacent to the proposed new area. The impact to these resources remains unknown but is suspected to be minimal. Historically, the site has been used for agricultural production. Due to the sparse development and human population surrounding the

proposed site, there is adequate acreage of similar habitat available in the vicinity to accommodate any avian or terrestrial species that may be forced to relocate.

8. 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 now being hauled to the currently licensed facility located approximately 8.5 miles east of the City of Havre. The close proximity of the proposed facility to Havre will result is some fuel savings to the city and county as well as the customers.

9. Historical and Archaeological Sites

The State Historical Preservation Office (SHPO) was informed of the plans to license a new landfill at this site. SHPO searched their records and found no documented historical or archaeological sites in the area proposed for landfill activities. 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 50 years of age be recorded and a determination of its eligibility for listing on the National Register of Historic Places be made.

II. POTENTIAL IMPACTS ON HUMAN ENVIRONMENT

2. Cultural Uniqueness and Diversity

The effects on these resources are not fully known because the applicant did not submit information on historical or archaeological sites within the proposed site boundary. Since there are many known Native American sites elsewhere in Hill County, the SHPO recommends that a cultural resource survey be conducted prior to ground disturbance. SHPO also required that their office be contacted if any cultural materials are inadvertently discovered during construction or operation of the facility.

3. Local and State Tax Base and Tax Revenue

Because construction of the proposed landfill 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 for City residents and in landfill tipping fees for County residents. Since there will be a few additional workers hired during the construction phases of the proposed landfill, construction of the proposed facility could have a very minor positive effect on the local tax base.

4. Agricultural and Industrial Production

The area proposed for the landfill is currently used for the cultivation of dryland crops. Operation of the facility is anticipated to have a very minor effect on agricultural production by

elimination of the 160 acres encompassed by the proposed facility boundary for cultivation. The vegetative cover of the landfill will be used as rangeland during post-closure. Overgrazing and growth of noxious weeds will not be allowed.

5. Human Health

The most common potential for impacts to human health from the proposed landfill arise from the potential release of leachate contaminants to surface or ground water 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 ground water. 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 and local permits 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.

7. Quantity and Distribution of Employment

During the construction phases of the landfill 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 as are currently working at the facility.

9. Demands for Governmental Services

The potential impact of the proposed facility will be minor. Department personnel must spend time reviewing the proposal and licensing the landfill. 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.

10. Industrial and Commercial Activity

Construction of the proposed facility 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, no additional secondary impact to industrial or commercial activity of the area is expected beyond the 160 acres of lost agriculture. The landfill will continue to provide a legal and environmentally sound waste disposal option for industrial and commercial establishments for the residents of the Unified Disposal District.

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