



**ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT FACT SHEET –FINAL**

Permit Number: AK0053481

Kodiak Island Borough Landfill Leachate Treatment Facility

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

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Proposed issuance of an Alaska Pollutant Discharge Elimination System (APDES) permit to

KODIAK ISLAND BOROUGH

For wastewater discharges from

Kodiak Island Borough Landfill Leachate Treatment Facility
1203 Monashka Bay Road
Kodiak, AK, 99615

The Alaska Department of Environmental Conservation (the Department or DEC) proposes to issue an APDES individual permit (permit) to Kodiak Island Borough. The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from the Kodiak Island Borough Landfill Leachate Treatment Facility and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions
- technical material supporting the conditions in the permit
- proposed monitoring requirements in the permit

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 15 days after receiving the Department's decision to the Director of the Division of Water at the following address:

Director, Division of Water
Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
Juneau AK, 99811-1800.

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See <http://www.dec.state.ak.us/commish/InformalReviews.htm> for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See <http://www.dec.state.ak.us/commish/ReviewGuidance.htm> for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, application, and other information are located on the Department's Wastewater Discharge Authorization Program website: <http://www.dec.state.ak.us/water/wwdp/index.htm> .

Alaska Department of Environmental
Conservation
Division of Water
555 Cordova Street
Anchorage, AK 99501
(907) 269-6285

Alaska Department of Environmental
Conservation
43335 Kalifornsky Beach Road, Suite 11
Soldotna, AK 99669-9792
(907) 262-5210

TABLE OF CONTENTS

1.0	APPLICANT	5
2.0	FACILITY INFORMATION	5
2.1	Background	5
2.2	Process Description	5
3.0	EFFLUENT LIMITS AND MONITORING REQUIREMENTS	7
3.1	Basis for Permit Effluent Limits	7
3.2	Basis for Effluent and Receiving Water Monitoring	7
3.3	Effluent Limits and Monitoring Requirements	8
3.4	Effluent Monitoring	10
3.5	Whole Effluent Toxicity Monitoring	11
4.0	RECEIVING WATER	11
4.1	Water Quality Standards	11
4.2	Water Quality Status of Receiving Water	12
5.0	ANTIBACKSLIDING	12
6.0	ANTIDegradation	12
7.0	OTHER PERMIT CONDITIONS	15
7.1	Quality Assurance Project Plan	15
7.2	Best Management Practices Plan	15
7.3	Standard Conditions	16
8.0	OTHER LEGAL REQUIREMENTS	16
8.1	Endangered Species Act	16
8.2	Essential Fish Habitat	16
8.3	Permit Expiration	17
9.0	References	18

TABLES

Table 1	Outfall 001: Effluent Limits and Monitoring Requirements	9
Table 2:	Historical Untreated Landfill Leachate Monitoring Data.....	10
Table B-1:	Technology-Based Effluent Limits	22
Table B-2:	Calculation of Ammonia Criteria	23
Table B-3:	Calculation of Zinc Criteria.....	23
Table B-4:	Selection of pH Permit Limits.....	24
Table B-5:	Selection of Zinc Permit Limits.....	24
Table B-6:	Selection of Ammonia Permit Limits	24

Table B-7: Selection of Phenol Permit Limits..... 24

FIGURES

Figure 1: Kodiak Island Borough Landfill Leachate Treatment Facility Map..... 19

Figure 2: Kodiak Island Borough Landfill Leachate Treatment Facility Process Flow Diagram 20

APPENDICES

APPENDIX A. FACILITY INFORMATION..... 19

APPENDIX B. BASIS FOR EFFLUENT LIMITATIONS 21

1.0 APPLICANT

This fact sheet provides information on the Alaska Pollutant Discharge Elimination System (APDES) permit for the following entity:

Name of Facility:	Kodiak Island Borough Landfill Leachate Treatment Facility
APDES Permit Number:	AK0053481
Facility Location:	1203 Monashka Bay Road, Kodiak AK 99615
Mailing Address:	710 Mill Bay Road, Kodiak AK 99615
Facility Contact:	Joe Lipka

A map in Appendix A of this Fact Sheet shows the location of the landfill, treatment plant, and the discharge location.

2.0 FACILITY INFORMATION

2.1 Background

The Kodiak Island Borough (KIB) owns and operates a 26-acre municipal landfill located northwest of the City of Kodiak, Alaska. The landfill has been operating since the 1960s, when it began as an ad hoc dump. The landfill site, leachate treatment facility, outfall location, and process flow diagram are depicted by figures in Appendix A.

The KIB is expanding the landfill site laterally to the northeast, in planning for an additional 40 years of use and growth. The lateral expansion includes installation of a liner in the expanded cells, a leachate collection system, and construction of the leachate treatment facility. The landfill is a municipal Class One landfill that receives an approximate average of 30 tons per day of municipal solid waste.

The first DEC Solid Waste Permit for the landfill was issued in 1974. DEC Solid Waste Program correspondence, compliance actions, and inspection reports detail that the unauthorized discharge of leachate was a significant, perennial issue at the landfill. On November 21, 2005, DEC Solid Waste issued a Notice of Violation to the KIB, which required the KIB to submit a plan detailing how they would legally dispose of liquids generated by the landfill, including liquids generated by baler operations.

The KIB submitted a National Pollutant Discharge Elimination System (NPDES) permit application to the Environmental Protection Agency (EPA) in 2007 that proposed the discharge of treated landfill leachate and baler squeezings to a wetland treatment system. The 2007 NPDES permit application did not result in the issuance of an NPDES permit. The Department received an APDES permit application from the KIB for the proposed landfill leachate treatment facility on February 21, 2013 and an amendment to the permit application on June 11, 2013. Construction of the leachate treatment facility is expected to be complete in 2015.

2.2 Process Description

Municipal solid waste is hauled to the landfill, dumped on the tipping floor of the baler building, and visually inspected for the presence of unacceptable materials such as hazardous wastes. Unacceptable materials are removed and managed separately from the landfill waste. After inspection, the solid waste is then pushed into a hopper, which compresses the waste into bales. Compacted waste bales are hauled to the working face of the landfill and stacked in rows. Waste bales are covered daily with fill.

The KIB landfill leachate treatment facility discharges up to 288,000 gallons per day (GPD) of treated landfill leachate from lined and unlined landfill cells, baler squeezings, and baler building washdown. Baler squeezings are liquids squeezed out of the waste during the baling process. Approximately 100 to 1,000 gallons per day of wastewater are produced in the form of baler squeezings. Baler washdown is water produced by washing the baler and the baler building. Leachate is liquid (rain or snow melt) that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from the solid waste.

Biosolids from the City of Kodiak Wastewater Treatment Plant are composted at the landfill and used for inert fill and erosion control. Septic waste from the baler building and the leachate treatment facility are collected in tanks and hauled to the City of Kodiak Wastewater Treatment Plant.

Leachate from the new lined landfill lateral expansion is expected to be more concentrated than the historic leachate flow. The historic leachate flow was derived from unlined landfill cells and was diluted by groundwater. The new treatment facility will treat a waste that likely increases in strength over time as leachate is generated from the new lined cells, which is not typical for a leachate treatment project. On a relative basis, the highest concentrations of contaminants are typically present in leachate of new or very young landfills. The leachate treatment system has been designed in anticipation of treating the higher strength influent over time.

Once collected in the landfill's collection system, leachate and baler wastestreams are channeled to a leachate storage lagoon. The function of the leachate storage lagoon is to equalize pollutant loadings and flow rates. The storage lagoon is designed to accommodate a 25-year, 24-hour rain event. Some settling of solids is expected to occur in the storage lagoon. From the storage lagoon, wastewater is piped to a pumping station. The pumping station conveys the wastewater through fine screens. The screenings fall into a dumpster and are disposed of in the landfill.

After screening, the wastewater enters an anoxic tank (an environment without free oxygen) where denitrification and alkalinity recovery occurs. The wastewater then travels to an aerobic tank to undergo nitrification and Five Day Biochemical Oxygen Demand (BOD₅) removal. Fine bubble diffusers are used for aeration. The wastewater is sent to another tank with a post-anoxic zone for additional denitrification. Lastly, the wastewater reaches a final aerated tank that contains a membrane bioreactor system (MBR) that provides solids separation. The MBR system is a biological treatment process that also provides a physical barrier to pollutants. The KIB facility uses two MBRs, which provides redundancy for cleaning, maintenance, and variable flows. Waste activated sludge from the bioreactors is thickened with a belt filter press and the filtrate is returned to the leachate storage lagoon.

Denitrification requires sufficient BOD₅ in the anoxic tanks to convert nitrate to nitrogen gas. A supplemental carbon source may be necessary to meet effluent limits when the influent ammonia load is high and the influent BOD₅ concentration is low. Per design conditions, carbon addition is required in the post-anoxic zone to achieve sufficient denitrification. Actual usage will be dependent on influent nitrogen and BOD₅ loads. The pH in the bioreactor will be maintained near 7.0 Standard Units (SU) through the addition of 25 percent caustic solution in the aerobic tank. Citric acid and sodium hypochlorite will be used for periodic membrane cleaning. Cleaning will typically occur twice per week per membrane using a total of five gallons of 12 % sodium hypochlorite and once per week per

membrane using citric acid. Membrane replacement is planned for approximately seven to ten year intervals.

Design analysis of flow has determined that an average flow rate of 40 gallons-per-minute (GPM) is required to treat the leachate most of the time. During precipitation events, or to provide storm capacity by draining down the lagoon, the system has been designed for a maximum flow rate of 200 GPM (288,000 GPD). Leachate flows were estimated using historical rainfall information, measured flow at the end of the existing leachate system, and an estimated portion of rainfall infiltrating over the landfill area. Precipitation is heavy year-round in Kodiak, averaging 75 inches per year, though less rain falls in the summer months than in the winter.

The treated leachate and baler wastestreams are discharged from an outfall located at 57° 48' 49" North Latitude and 152° 24' 27" West Longitude. The discharge exits the treatment plant into wetland cells filled with rock. At the end of the wetland cells, the discharge passes over a horizontal weir, then flows to the head of a freshwater wetland system. The effluent is sampled after the last treatment unit within the leachate treatment facility prior to discharge. The permit compliance point for the treated effluent is at the end of pipe, the permit has not authorized a mixing zone. The freshwater wetlands enter an unnamed creek, travel north to the coastline of Kodiak Island, and enter marine water in Monashka Bay. The distance from the outfall to Monashka Bay is approximately a half mile.

3.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

3.1 Basis for Permit Effluent Limits

The Clean Water Act (CWA or Act) requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBELs) or water quality-based limits (WQBELs). TBELs are set according to the level of treatment that is achievable using available technology. The TBELs that apply to the discharge from this facility are found at 40 CFR 445, the Landfills Point Source Category, Subpart B (Non-Hazardous Waste Landfills). The landfill leachate treatment facility is regulated under the New Source Performance Standards. These TBELs limit Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, alpha terpineol, benzoic acid, zinc, ammonia, phenol, and p-cresol.

A WQBEL is designed to ensure that the water quality standards (WQS) of a water body are met. WQBELs may be more stringent than TBELs. WQBELs have also been applied in the permit. The basis for the proposed effluent limits in the permit is provided in Appendix B.

3.2 Basis for Effluent and Receiving Water Monitoring

In accordance with AS 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed of. Monitoring in a permit is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and receiving water data to determine if additional effluent limits are required and/or to monitor effluent impact on the receiving water body quality.

3.3 Effluent Limits and Monitoring Requirements

The permit contains limits that are both TBELs and WQBELs. The following summarizes the proposed effluent limits (see Appendix B for more details regarding the legal and technical basis surrounding the selection of effluent limits).

Table 1 Outfall 001: Effluent Limits and Monitoring Requirements

Parameter	Daily Maximum	Monthly Average	Units	Sample Frequency	Sample Type
Total Discharge Flow	288,000 ^a	Report	Gallons Per Day (GPD)	Continuous	Recorded
BOD ₅	140	37	Milligrams per Liter (mg/L)	1/Quarter	Grab
	336.3	88.9	Pounds per Day (lbs/day) ^b		
TSS	88	27	mg/L	1/Quarter	Grab
	211.4	64.9	lbs/day		
pH	6.5-8.5	6.5-8.5	Standard Units (SU)	1/Quarter	Grab
Alpha-Terpineol	33	16	Micrograms per Liter (µg/L)	1/Quarter	Grab
	0.08	0.04	lbs/day		
Benzoic Acid	120	71	µg/L	1/Quarter	Grab
	0.29	0.17	lbs/day		
Total Zinc	32	32	µg/L	1/Quarter	Grab
	0.07	0.07	lbs/day		
Total Ammonia, as N	10	4.9	mg/L	1/Quarter	Grab
	24	11.8	lbs/day		
Phenol	26	15	µg/L	1/Quarter	Grab
	0.06	0.04	lbs/day		
p-Cresol	25	14	µg/L	1/Quarter	Grab
	0.06	0.03	lbs/day		
Nitrate, as N	Report	N/A	µg/L	1/Quarter	Grab
Metals ^c	Report	N/A	µg/L	1/Quarter ^d	Grab
Total Residual Chlorine	Report	N/A	mg/L	1/Quarter	Grab
Priority Pollutants ^e	Report	N/A	N/A	2/Permit Cycle ^f	Grab
Whole Effluent Toxicity	Report	N/A	Toxic Units, Chronic (TU _c)	2/Year ^g	Grab

a) The wastewater discharge volume shall not exceed the maximum hydraulic design flow rate approved in the Final Approval to Operate (FATO) issued by the Department. FATO means that the Department has reviewed and approved the wastewater treatment works engineered plans submitted to the Department in accordance with 18 AAC 72.210 through 18 AAC 72.285 or as amended.

b) Loading in lbs/day = [(flow in million gallons per day (mgd)) x (concentration in mg/L) x 8.34]; (8.34 is a conversion factor, one pound of water weighs 8.34 lbs).

c) Metals include those identified as Compounds 1-13 by the National Toxics Rule at 40 CFR § 131.36. (Antimony, Arsenic, Beryllium, Cadmium, Chromium III & VI, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc) Results for metals shall be reported as total recoverable metal.

d) Metals monitoring shall occur on the same day as Whole Effluent Toxicity and Priority Pollutant monitoring.

e) Priority pollutants are those pollutants identified as Compound Nos. 1-126 by the National Toxics Rule at 40 CFR § 131.36. Monitoring for the metals, which shall be sampled quarterly, need not be duplicated.

f) Twice per permit cycle means one sample taken in year two of the permit during the summer months (May 1-September 30) and one taken in year four of the permit during the winter months (October 1-April 30).

g) Twice per year consists of taking one sample in the summer months (May 1– September 30) and one sample in the winter (October 1- April 30) each year of the permit.

3.4 Effluent Monitoring

The permit requires monitoring of the effluent for BOD₅, TSS, ammonia, alpha-terpineol, benzoic acid, p-cresol, phenol, zinc, and pH to determine compliance with the permit effluent limits. In addition, the permit requires that the effluent shall be monitored for other pollutants confirmed present in the untreated leachate, as reported by previous leachate monitoring efforts. Specifically, the permit requires monitoring of metals, priority pollutants, total residual chlorine, nitrates and whole effluent toxicity (WET).

Total Residual Chlorine monitoring is required because 12% sodium hypochlorite will be used to clean membranes on a weekly basis. Nitrate monitoring is required to ensure that nitrate treatment is occurring as expected. Metals monitoring is required to evaluate the efficacy of the treatment process at removing metals because concentrations of metals in the leachate have historically been high. Two priority pollutant tests are required to further characterize the treated leachate. WET tests are required to measure the aggregate toxic effect of the effluent.

The data produced by this monitoring will be used to evaluate the effluent for pollutants of concern and to conduct future reasonable potential analysis as needed, which will determine if the discharge of these pollutants might cause an exceedance of the water quality criteria in the receiving water body. Table two presents historical maximum reported values of pollutants of concern in the untreated landfill leachate monitoring data provided by the permittee.

Table 2: Historical (1998-2010) Untreated Landfill Leachate Monitoring Data

Parameter	Maximum Reported Value, in µg/L
Ammonia	182,000
Arsenic	33.3
Cadmium	2
Cobalt	140
Copper	56.4
Iron	74,100
Lead	11.9
Manganese	11,400
Nickel	41
Selenium	24.5
Silver	2
Zinc	132

Some of the monitoring requirements are a subset of other monitoring requirements. For example, metals monitoring is a subset of priority pollutant monitoring and zinc monitoring is a subset of metals monitoring. To the extent that effluent monitoring required by conditions of the permit satisfies other monitoring requirements of the permit, sample results may be used to satisfy both requirements.

The applicant shall consult and review the effluent sampling requirements of application Form 2D. Form 2D requires that no later than two years after the discharge commences, the permittee complete effluent sampling and submit sections six and seven of APDES application Form 2C. The permittee shall also consult and review APDES Application Form 2C. Form 2C contains

specific effluent monitoring requirements due to be submitted in the application for permit reissuance (180 days prior to the permit expiration date). Data from effluent samples taken in the past (such as the samples taken within two years of commencement of discharge to satisfy Form 2D requirements) may be used to satisfy Form 2C sampling requirements if the sampling was completed no more than three years prior. A copy of Form 2C can be found at <http://dec.alaska.gov/water/wwdp/index.htm>.

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. The permittee has the option of taking more frequent samples than required under the permit. These additional samples can be used for averaging if they are conducted using Department – approved test methods (generally found in 18 AAC 70 and 40 CFR § 136 [adopted by reference in 18 AAC 83.010]), and if the Method Detection Limits (MDLs) are less than the effluent limits.

3.5 Whole Effluent Toxicity Monitoring

18 AAC 83.435 requires that a permit contain limitations on whole effluent toxicity (WET) when a discharge has reasonable potential to cause or contribute to exceedances of WQS. The permit does not establish WET limits because no effluent monitoring data is currently available for a determination of reasonable potential to cause or contribute to an exceedance of the chronic WET numeric water quality criterion of 1.0 chronic toxic units (TU_c). The permit requires WET testing twice per year, once in the summer months and one during the winter months as detailed in Table 1.

WET tests are laboratory tests that measure total toxic effect of an effluent on living organisms. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. The two different durations of toxicity tests are acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure. The parameters that will be measured in the WET tests are survival and reproduction of the water flea (*Ceriodaphnia dubia*) and survival and growth of the fathead minnow (*Pimephales promelas*).

4.0 RECEIVING WATER

As previously discussed at the end of Section 2.2, the permittee discharges effluent into wetland cells. The wetlands are located at the head of a natural freshwater wetland system. The freshwater wetlands enter an unnamed creek, travel north to the coastline of Kodiak Island, and enter marine water in Monashka Bay. The distance from the outfall to Monashka Bay is approximately half of a mile. Note, no mixing zone has been authorized as part of the permitting action.

4.1 Water Quality Standards

Regulations in 18 AAC 70 require that conditions in permits ensure compliance with the WQS. The state's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each water body.

Water bodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some water bodies in Alaska can also have site-specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b). The receiving water for the discharge, an unnamed wetland, has not been reclassified, nor have site-specific water quality criteria been established. Therefore, the wetland must be protected for all fresh water designated use classes listed in 18 AAC 70.020(a)(1).

4.2 Water Quality Status of Receiving Water

Any part of a water body for which the water quality does not or is not expected to meet applicable WQS is defined as a “water quality limited segment” and placed on the state’s impaired water body list. The freshwater wetland is not included on *Alaska’s Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010.

5.0 ANTIBACKSLIDING

18 AAC 83.480 requires that “effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit.” 18 AAC 83.480(c) also states that a permit may not be reissued “to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued.” This facility is a new source and this is the initial APDES permit for this facility; therefore, antibacksliding provisions are not applicable.

6.0 ANTIDegradation

The Antidegradation Policy of the WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. This section analyzes and provides rationale for the Department’s decisions in the permit issuance with respect to the Antidegradation Policy.

The Department’s approach to implementing the Antidegradation Policy, found in 18 AAC 70.015, is based on the requirements in 18 AAC 70 and the Department’s *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*, dated July 14, 2010. Using these requirements and policies, the Department determines whether a water body, or portion of a water body, is classified as Tier 1, Tier 2, or Tier 3, where a higher numbered tier indicates a greater level of water quality protection. At this time, no Tier 3 waters have been designated in Alaska. Accordingly, this antidegradation analysis conservatively assumes that the discharge is to a Tier 2 water, which is the next highest level of protection and is more rigorous than a Tier 1 analysis.

The State’s Antidegradation Policy in 18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water (i.e. Tier 2 waters), that quality must be maintained and protected. The Department may allow a reduction of water quality only after finding that five specific requirements of the antidegradation policy at 18 AAC 70.015(a)(2)(A)-(E) are met. The Department’s findings follow:

1. **18 AAC 70.015 (a)(2)(A).** Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.

Landfills contain solid waste in a centralized location and serve to prevent the solid waste from contaminating the surrounding environment. Having a legal, active landfill to accept waste facilitates social development in Kodiak and protects public health. The landfill evolved in its current location from an open dump in the 1960s to a legal landfill. As such, the landfill site was selected long ago. The generation of leachate is caused principally by precipitation percolating through waste deposited in a landfill. Accordingly, landfills inevitably produce leachate that requires treatment prior to discharge. Treating landfill wastewater reduces adverse risks to the environment and public health.

The KIB conducted extensive investigations into other wastewater disposal options, such as sending wastewater to the City of Kodiak Wastewater Treatment Plant, but this option was ultimately determined to be unfeasible due to cost, schedule, construction feasibility, and future development issues. A subsurface discharge of landfill wastewater is not feasible because the landfill is sited on bedrock. The landfill discharges to wetlands. Some treatment is expected to occur through the natural wetlands, which makes the wetlands a better disposal choice than piping the landfill wastewater for discharge into marine waters located half a mile away.

It would be an extreme financial hardship for the KIB to implement other source control and treatment measures. There are no other feasible wastewater disposal options that avoid a direct discharge to surface water. The Department concludes that the authorization of the discharge accommodates important social development in the KIB and that the finding is met.

2. **18 AAC 70.015 (a)(2)(B).** Except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.

Discharge authorized by the permit for Outfall 001 conforms to the requirements of 18 AAC 70.020. No water quality variance in the form of a mixing zone is authorized and all water quality criteria will be met at the end of pipe prior to discharge. Site-specific criteria as allowed by 18 AAC 70.235 have not been established for the freshwater wetlands the facility discharges to and are therefore not applicable. Whole effluent toxicity testing is required twice per year. If WET tests reveal that the discharge has toxicity, the permittee is required to submit these results to DEC within 14 days of receipt of test results. WET results from this permit issuance will be used when the permittee applies for reissuance of the permit to ensure the applicable criteria of 18 AAC 70.030 are met. The Department finds that the reduced water quality will not violate applicable water quality criteria and that the finding is met.

3. **18 AAC 70.015(a)(2)(C).** The resulting water quality will be adequate to fully protect existing uses of the water.

The issuance of this permit will result in a higher quality, treated landfill leachate to be discharged compared to the untreated landfill leachate previously discharged. The WQS numeric criteria, upon which the permit effluent limits are based, serve the specific purpose of protecting the existing and designated uses of the receiving water. No water quality variance in the form of a mixing zone is authorized and all water quality criteria will be met at the end of pipe prior to discharge. After a review of the expected volume of discharge, the types and amounts of regulated pollutants, and the

effluent limits imposed in this permit, the Department concludes that the resulting water quality will be adequate to fully protect existing uses and that the finding is met.

4. **18 AAC 70.015(a)(2)(D).** The methods of pollution prevention, control, and treatment found by the department to be most effective and reasonable will be applied to all wastes and other substances to be discharged.

The Department finds the most effective and reasonable methods of prevention, control, and treatment are the practices and requirements set out in the APDES permit. This type of treatment and associated discharge is similar in nature to other like facilities and their discharges located throughout the U.S. Further, because of the widespread employment of this type of treatment and subject wastewater discharge, EPA promulgated technology-based Effluent Limit Guidelines (ELGs) to regulate this group of discharges in January of 2000 (40 CFR § 445, Landfills Point Source Category). The development of the ELG included an extensive analysis of the efficacy and economics of ten treatment alternatives for landfill discharges and concluded Membrane Filtration, Nitrification and Denitrification Systems, and Activated Sludge are effective and reasonable treatments.

Previously, the facility discharged untreated landfill leachate without authorization. When evaluating and selecting which type of treatment to implement to meet the requirements of the WQS numeric criteria and the ELG, the permittee evaluated three treatment options. The wastewater treatment options evaluated included: sending the wastewater to the existing City of Kodiak Wastewater Treatment Plant, treating the wastewater onsite with an integrated fixed film activated sludge (IFAS) bioreactor, and treating the wastewater onsite with a MBR.

Sending the wastewater to the City of Kodiak Wastewater Treatment Facility was not feasible due to cost, schedule, construction feasibility, and future development issues. The MBR and IFAS systems were chosen for evaluation because they can be operated at high mixed liquor concentrations, which reduces the footprint and building size required for the treatment systems. They were also chosen for evaluation because of their effectiveness at reducing ammonia and BOD₅ concentrations. Both options presented similar capital costs and operating characteristics. According to the permittee, the MBR was chosen over the IFAS for the following reasons:

- a smaller building footprint resulting in less building area to heat
- more reliable process control
- higher mixed liquor concentration for more consistent, reliable treatment and reduced solids handling requirements
- potentially higher metals removal

The permit requires the permittee to implement an approved Best Management Practices (BMP) Plan. The BMP Plan includes pollution prevention measures and controls to prevent and/or minimize the generation and release of pollutants from the facility. The Department concludes that this finding is met.

5. **18 AAC 70.015(a)(2)(E).** All wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements; and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.

For Outfall 001, applicable “highest statutory and regulatory treatment requirements” are defined in 18 AAC 70.990(30) (as amended June 26, 2003) and in the previously referenced July 14, 2010 DEC

guidance titled “*Policy and Procedure Guidance for Interim Antidegradation Implementation Methods.*” Accordingly, there are three parts to the definition, which are:

(A) Any federal technology-based effluent limitation identified in 40 CFR §125.3 and 40 CFR §122.29, as amended through August 15, 1997, adopted by reference;

(B) Minimum treatment standards in 18 AAC 72.040; and

(C) Any treatment requirements imposed under another state law that is more stringent than a requirement of this chapter.

The first part of the definition includes all federal technology-based ELGs, which would include those that apply to the KIB facility at 40 CFR § 445 (Landfills Point Source Category). The permit implements the ELGs; therefore, this requirement is met.

The second part of the definition 18 AAC 70.990(B) (2003) appears to be in error, as 18 AAC 72.040 describes discharges to sewers and not minimum treatment. The correct reference appears to be the minimum treatment standards found at 18 AAC 72.050, which refers to domestic wastewater discharges only. The KIB landfill leachate treatment facility does not treat or discharge domestic wastewater; therefore, this regulation does not apply.

The third part of the definition includes any more stringent treatment required by state law, including 18 AAC 70 and 18 AAC 72. The correct operation of equipment, visual monitoring, and implementing BMPs, as well as other permit requirements, will control the discharge and satisfy all applicable federal and state requirements. The Department concludes that all wastes and other substances discharged will be treated and controlled to achieve the highest statutory and regulatory requirements and finds that this finding is met.

7.0 OTHER PERMIT CONDITIONS

7.1 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to develop or update and implement the Quality Assurance Project Plan (QAPP) within 120 days of the effective date of the final permit. Additionally, the permittee must submit a letter to the Department within 120 days of the effective date of the permit stating that the plan has been implemented within the required time frame. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; and data reporting. The plan shall be retained on-site and made available to the Department upon request.

7.2 Best Management Practices Plan

In accordance with AS 46.03.110 (d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. This permit requires the permittee to develop a Best Management Practices (BMP) Plan in order to prevent or minimize the potential for the release of pollutants to waters and lands of the State of Alaska through plant site runoff, spillage or leaks, or erosion. The permit contains certain BMP conditions that must be included

in the BMP plan. The permit requires the permittee to develop or update and implement a BMP plan within 180 days of the effective date of the final permit. The plan must be kept on-site and made available to the Department upon request.

7.3 Standard Conditions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

8.0 OTHER LEGAL REQUIREMENTS

8.1 Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species.

As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions; however, DEC voluntarily contacted the agencies to notify them of the issuance of this permit and to obtain listings of threatened and endangered species near the proposed discharge. The following are responses from NMFS and USFWS regarding potential effects to threatened or endangered species in the vicinity of the discharge:

- NMFS was contacted via email on April 30, 2013 and they responded in an email dated April 30 confirming that no NMFS-protected species utilize the discharge area.
- USFWS was contacted via email on April 30, 2013. USFWS responded in an email dated May 28, 2013 indicating that a threatened and endangered species consultation for the discharge had already occurred on June 29, 2012 at the request of the permittee. This consultation (FWS consultation number 2011-0146-R001) indicated that the North American breeding Steller's eider (*Polysticta stelleri*) and the southwest distinct population segment of northern sea otter (*Enhydra lutris kenyoni*) are found in the project area.

8.2 Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with NOAA when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. As a state agency, DEC is not required to consult with federal agencies regarding permitting action; however, DEC contacted NMFS to notify them of the issuance of the permit and to obtain listings of EFH near the subject discharge. DEC also consulted both the online Alaska Department of Fish and Game Anadromous Waters Catalog and the NMFS EFH Mapper to ensure fish are not present in or near the wetland. NMFS was

contacted by the Department in an email dated April 30, 2013 and responded on April 30 confirming that no fish were expected to occur in the discharge area.

8.3 Permit Expiration

The permit will expire five years from the effective date of the permit.

9.0 References

1. Alaska Department of Environmental Conservation, 2003. Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances, as amended through December 12, 2008.
2. Alaska Department of Environmental Conservation, 2010. Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report, July 15, 2010.
3. Alaska Department of Environmental Conservation, 2013. Interim Antidegradation Implementation Methods. Retrieved from http://www.dec.state.ak.us/water/wqsar/Antidegradation/docs/P&P-Interim_Antidegradation_Implementation_Methods.pdf
4. U.S. Environmental Protection Agency. 1991. Technical Support Document for Water Quality-based Toxics Control. Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington DC, March 1991. EPA/505/2-90-001.
5. NMFS, Office of Habitat Conservation, 2013. Essential Fish Habitat Mapper v3.0. Retrieved from <http://www.habitat.noaa.gov/protection/efh/habitatmapper.html>.
6. Alaska Department of Fish and Game, 2013. Fish Resource Monitor. Retrieved from <http://gis.sf.adfg.state.ak.us/FlexMaps/fishresourcemonitor.html?mode=awc>.
7. Alaska Department of Environmental Conservation, 2003, Water Quality Standards, as amended June 26, 2003, Alaska Department of Environmental Conservation 18 AAC 70.
8. National Marine Fisheries Service (NMFS), Alaska Region, Protected Resources Division, 2013. Email correspondence. April 30, 2013.
9. U.S. Environmental Protection Agency. 2000. Development Document for Final Effluent Limitations Guidelines and Standards for the Landfills Point Source Category. Office of Water, Washington DC, January 2000. EPA-821-R-99-019.
10. U.S. Environmental Protection Agency, 2000. Landfills Point Source Category, January 19, 2000. U.S. Environmental Protection Agency, 40 CFR Part 445.

APPENDIX A. FACILITY INFORMATION

Figure 1: Kodiak Island Borough Landfill Leachate Treatment Facility Map

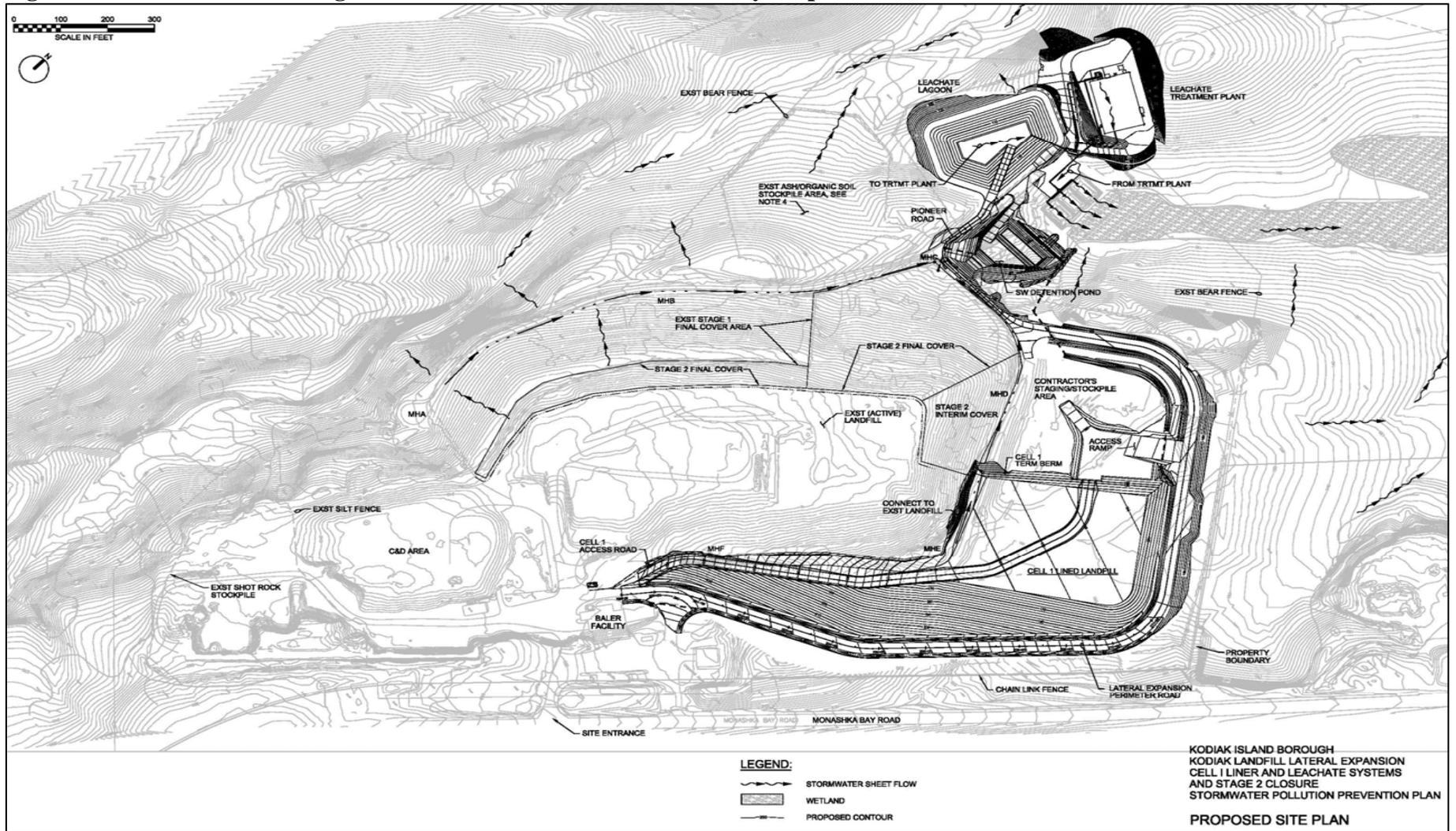
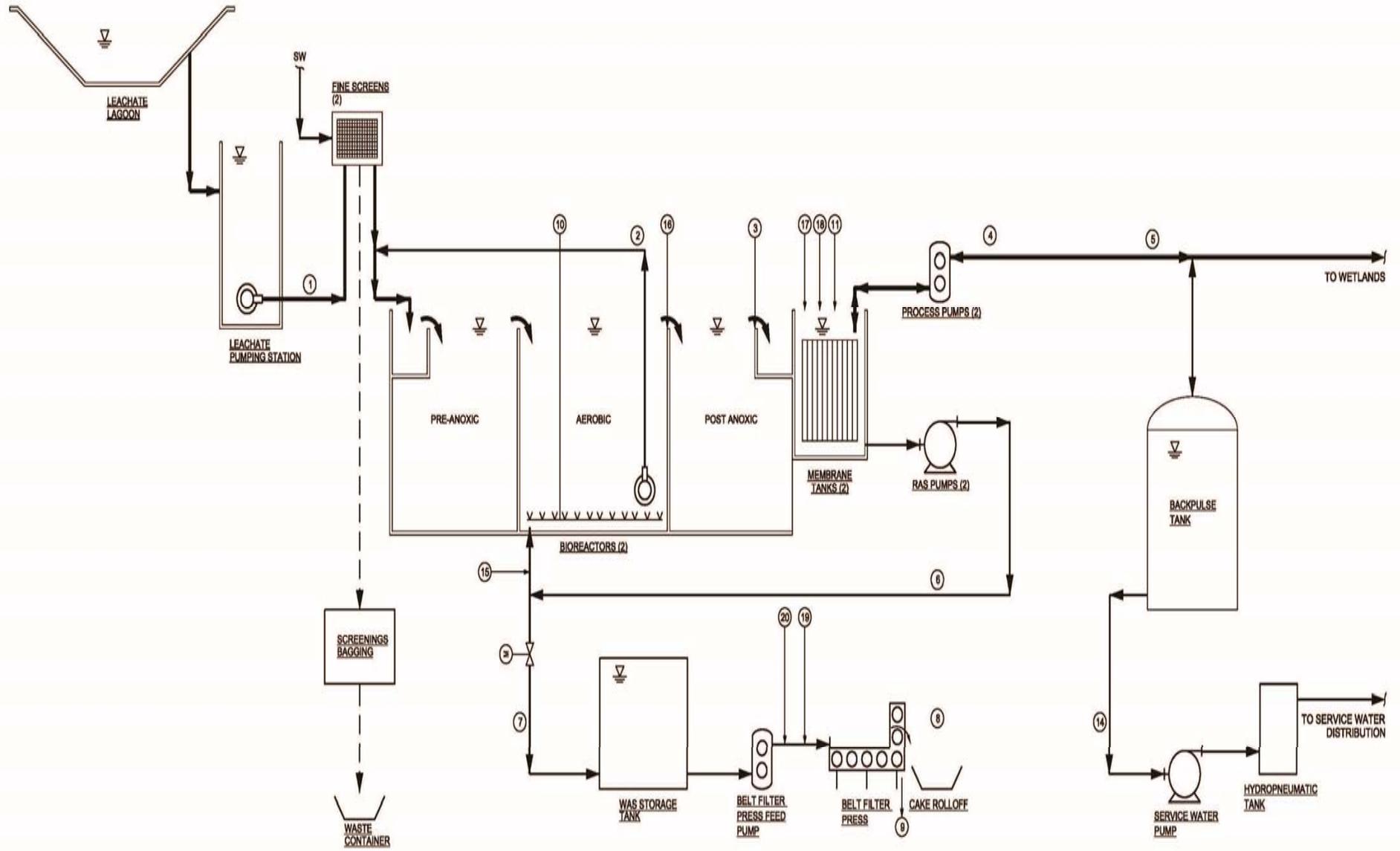


Figure 2: Kodiak Island Borough Landfill Leachate Treatment Facility Process Flow Diagram



APPENDIX B. BASIS FOR EFFLUENT LIMITATIONS

The Clean Water Act (CWA) requires landfills to meet effluent limits based on available wastewater treatment technology, specifically, technology-based effluent limits (TBEL). The Department may find, by analyzing the effect of an effluent discharge on the receiving water body, that TBELs are not sufficiently stringent to meet water quality standards (WQS). In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBEL), which are designed to ensure that the numeric WQS of the receiving water body are met. End of pipe water quality criteria limits, which are WQBELs, have been assigned for zinc and pH.

Landfill leachate varies from site to site based on a number of factors, including: the types of waste accepted, operating practices, depth of fill, compaction of wastes, annual precipitation, and landfill age. The main contaminants in the leachate wastewater are derived from the materials deposited as the fill. Accordingly, leachate may contain metals and other toxic pollutants.

TBELs have been developed for five-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), pH, ammonia, alpha-terpineol, benzoic acid, p-cresol, phenol, and zinc based on the promulgated Effluent Limit Guideline (ELG) discussed in detail in Section B.1.2 below. When TBELs do not exist for a particular pollutant expected to be in the effluent, the Department must determine if the pollutant may cause or contribute to an exceedance of a WQS for the water body. If a pollutant may cause or contribute to an exceedance of a WQS, a WQBEL for the pollutant must be established in the permit.

This new facility has not yet discharged treated landfill leachate. Accordingly, there is no effluent data on which to perform a reasonable potential calculation. However, pollutants of concern are identified in the permittee's application as pollutants currently present in the untreated landfill leachate monitoring data. These parameters will continue to be monitored to secure data on which to perform reasonable potential calculations in future permit re-issuances.

B.1 Technology-Based Effluent Limitations

B.1.1 Mass-Based Limitations

The regulation at 18 AAC 83.540 requires that effluent limits be expressed in terms of mass, if possible, based on the design flow of the facility. The mass based limits are expressed in pounds per day (lbs/day) and are calculated as follows:

Mass based limit (lbs/day) = concentration limit (milligrams per liter) × design flow (million gallons per day) × 8.341¹

B.1.2 Effluent Limitation Guidelines

The Environmental Protection Agency (EPA) promulgated ELGs for wastewater discharges from landfills at 40 CFR § 445 in January of 2000. ELGs are national in scope and establish performance standards for all facilities within an industrial category or subcategory. The ELGs applicable to a new source are sources that have commenced construction after EPA promulgated the ELGs in January 2000. The Kodiak Island Borough landfill is considered a new source. The ELG states that the New Source Performance Standards (NSPS) are the same as those specified at 40 CFR § 445.21 as Best Practicable Control Technology Currently Available (BPT). EPA has not identified any other demonstrated technologies or combinations of technologies for new sources

¹ 8.341 is a conversion factor with units (lbs x liter) / (milligrams x gallon x 10⁶)

that are different from those used to establish BPT, Best Conventional Pollutant Control Technology (BCT), and Best Available Technology Economically Achievable (BAT) for existing sources. Therefore, EPA established NSPS limitations that are identical to those promulgated in both subcategories for BPT, BCT, and BAT. Table B-1 lists the ELGs by parameter. Therefore, based on the above, the NSPS apply to the facility's discharge.

Table B-1: Technology-Based Effluent Limits

(40 CFR § 445.21, Non-Hazardous Waste Landfill Subcategory)

Parameter	Maximum Daily Limit	Average Monthly Limit	Units
Biochemical Oxygen Demand (BOD ₅)	140	37	Milligrams per Liter (mg/L)
Total Suspended Solids (TSS)	88	27	mg/L
Ammonia (as N)	10	4.9	mg/L
pH	Range of 6.0-9.0	Range of 6.0-9.0	Significant Units (SU)
Alpha-Terpineol	0.033	0.016	mg/L
Benzoic Acid	0.12	0.071	mg/L
p-Cresol	0.025	0.014	mg/L
Phenol	0.026	0.015	mg/L
Zinc	0.2	0.11	mg/L

B.2 Water Quality – Based Effluent Limitations

B.2.1 Statutory and Regulatory Basis

18 AAC 70.010 prohibits conduct that causes or contributes to a violation of the WQS. 18 AAC 17.090 requires that permits include terms and conditions to ensure criteria are met, including operating, monitoring, and reporting requirements.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water body. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation (WLA).

While the Department is able to determine pollutants of concern using the historical monitoring results for the untreated landfill leachate, the Department is currently unable to account for the controls on this point source of pollution, i.e., the treatment of the landfill leachate as described by effluent data. As such, the Department has required monitoring of pollutants of concern in order to perform a reasonable potential analysis in future permit re-issuances. End of pipe water quality criteria limits, which are WQBELs, have been assigned for zinc and pH.

B.2.2 Specific Water Quality-Based Effluent Limits

B.2.2.1 pH

The criteria for water supply, aquaculture, water contact recreation, and growth and propagation of fish, shellfish, other aquatic life, and wildlife are the most stringent standards for pH. These standards state that fresh waters, “May not be less than 6.5 or greater than 8.5.”

B.2.2.2 Ammonia

The numeric criteria in the WQS for Aquatic Life for Fresh Water are dependent on pH and temperature, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. The formula for calculating the acute, freshwater ammonia numeric criteria (salmonids absent) is located in Appendix C, Table I of the Alaska Water Quality Criteria Manual for Toxic, Other Deleterious Organic, and Inorganic Substances (Toxics Manual). The formula for calculating the numeric chronic criteria for Aquatic Life for Fresh Water (salmonids absent) is located in Appendix E, Table VI of the Toxics Manual.

The permittee provided a pH of 6.36 and a temperature of 50.7 degrees Fahrenheit (which converts to 10.4 degrees Celsius), acquired in a sampling event on June 24, 2013. Although this is only one data point, it represents critical conditions in the receiving water. Given the pH and temperature provided by the permittee, the numeric criteria for ammonia based on WQS would limit ammonia to a daily maximum discharge of 51.14 mg/L and a monthly average discharge of 8.84 mg/L.

Table B-2: Calculation of Ammonia Criteria

Standard	Criterion Formula	Criterion (mg/L)
Acute	$(.411/(1+10^{7.204-6.36}))+(58.4/(1+10^{6.36-7.204}))$	51.14
Chronic	$([.0577/(1+10^{7.688-6.36})]+[2.487/(1+10^{6.36-7.688})])*1.45*10^{-0.28*(25-\text{MAX}(10.4,7))}$	8.84

B.2.2.3 Zinc

The zinc numeric criteria in the WQS for Aquatic Life for Fresh Water limit discharge of zinc to no more than an average monthly concentration of 0.03 mg/L and a maximum daily concentration of 0.03 mg/L. A receiving water hardness value of 21, provided by the permittee and collected on June 24, 2013, was used to calculate the zinc criteria.

Table B-3: Calculation of Zinc Criteria

Criterion Formula	Criterion (mg/L)
$\exp(0.8473*\ln[\text{hardness}]+0.884)$	0.03193
$\exp(0.8473*\ln[\text{hardness}]+0.884)$	0.03193

B.2.3 Selection of Most Stringent Limitations

B.2.3.1 BOD₅ and Total Suspended Solids

The permit proposes TBELs for BOD₅ and TSS, which apply at the end of pipe. WQS numeric criteria do not exist for BOD₅ and TSS.

B.2.3.2 *pH*

The ELG requires a pH limit of between 6.0 and 9.0 SU. The pH permit limits of between 6.5 SU and 8.5 SU are WQBELs and shall apply at the end of pipe.

Table B-4: Selection of pH Permit Limits

Limit Type	Minimum Daily (SU)	Maximum Daily (SU)
TBEL	6.0	9.0
WQBEL	6.5	8.5
Selected Limits	6.5	8.5

B.2.3.3 *Zinc*

The zinc permit limits are set equal to the zinc water quality standard numeric criteria and shall apply at the end of pipe.

Table B-5: Selection of Zinc Permit Limits

Limit Type	Average Monthly (mg/L)	Maximum Daily (mg/L)
TBEL	0.11	0.2
WQS Numeric Criteria	0.03	0.03
Selected Limits	0.03	0.03

B.2.3.4 *Ammonia*

The current ammonia limits are TBELs and shall apply at the end of pipe.

Table B-6: Selection of Ammonia Permit Limits

Limit Type	Average Monthly (mg/L)	Maximum Daily (mg/L)
TBEL	4.9	10
WQS Numeric Criteria	8.84	51.14
Selected Limits	4.9	10

B.2.3.5 *Phenol*

The permit proposes TBELs for phenol. The WQS numeric criterion for phenol found in the Human Health for Consumption of Water and Aquatic Organisms use is 21 mg/L. The WQS numeric criterion for phenol found in the Human Health Aquatic Organisms use is 4,600 mg/L. The ELG requires a discharge of no more than 0.026 mg/L as a maximum daily limit and 0.015 mg/L as an average monthly limit. The current phenol limits are TBELs and shall apply at the end of pipe.

Table B-7: Selection of Phenol Permit Limits

Limit Type	Average Monthly (mg/L)	Maximum Daily (mg/L)
TBEL	0.015	0.026
WQBEL	4,600	21
Selected Limits	0.015	0.026

B.2.3.6 *Alpha Terpineol*

The permit proposes TBELs for alpha terpineol that apply at the end of pipe. WQS numeric criteria do not exist for alpha terpineol.

B.2.3.7 *Benzoic Acid*

The permit proposes TBELs for benzoic acid that apply at the end of pipe. WQS numeric criteria do not exist for benzoic acid.

B.2.3.8 *p-Cresol*

The permit proposes TBELs for p-Cresol that apply at the end of pipe. WQS numeric criteria do not exist for p-Cresol.