# Preliminary Engineering Report
# for
# Talkeetna Wastewater Treatment Facility Upgrades
# Talkeetna, Alaska

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**November 2017**

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| | | |
|---|---|---|
| AAC | - | Alaska Administrative Code |
| ADEC/DEC | - | Alaska Department of Environmental Conservation |
| ADF&G | - | Alaska Department of Fish & Game |
| ADNR | - | Alaska Department of Natural Resources |
| ADOL&WF | | Alaska Department of Labor and Workforce Development |
| ADOT&PF | - | Alaska Department of Transportation and Public Facilities |
| AFY | - | Acre-feet per year |
| AHRS | - | Alaska Heritage Resources Survey |
| AMS | | Anchorage Mat-Su Area |
| APDES | | Alaska Pollutant Discharge Elimination System |
| ARC | - | Alaska Railroad Corporation |
| ARRC | - | Alaska Rural Rehabilitation Corporation |
| BOD | | Biochemical Oxygen Demand |
| bgs | - | Below Ground Surface |
| CFR | - | Code of Federal Regulations |
| CDP | | Community Designated Place |
| DO | | Dissolved Oxygen |
| DMR | | Discharge Monitoring Report |
| EA | - | Environmental Assessment |
| EPA/USEPA | - | U.S. Environmental Protection Agency |
| ESA | | Endangered Species Act |
| FPPA | | Farmland Protection Policy Act |
| FEMA | - | Federal Emergency Management Association |
| FC | | Fecal Coliform |
| fps | - | feet per second |
| gpcd | - | gallons per capita per day |
| gpd | - | gallons per day |
| gpm | - | gallons per minute |
| HDPE | - | High Density Polyethylene |
| HP | | Horse Power |
| I/I | | Inflow and Infiltration |
| ISO | - | Insurance Services Office |
| K | - | Thousand |
| M | - | Million |
| MSB | - | Matanuska-Susitna Borough |
| MG | | Million Gallons |
| LF | - | Lineal Feet |
| NEPA | - | National Environmental Policy Act |
| NMFS | | National Marine Fisheries Service |
| NPDES | | National Pollution Discharge Elimination System |
| O&M | - | Operations and Maintenance |
| psi | - | Pounds per square inch |
| PWS | - | Public Water System |
| RUS | - | USDA Rural Utility Service |
| SCADA | | Supervisory Control and Data Acquisition |
| TSS | - | Total Suspended Solids |
| USDA | - | United States Department of Agriculture |
| USFWS | | United States Fish and Wildlife Service |
| WWTF | | Wastewater Treatment Facility |

# 0.0 General

## 0.1 INTRODUCTION

The community of Talkeetna, Alaska is located in the Matanuska-Susitna Borough (MSB) at the confluence of the Talkeetna and Susitna Rivers. Talkeetna is roughly 115 miles north of Anchorage at the end of the Talkeetna Spur Road, which runs 14 miles north of the George Parks Highway at Milepost 98.7. Over the years, Talkeetna has grown from a sleepy stop on the Alaska Railroad to a bustling summer tourist destination. Additionally, from April to June every year, climbers use Talkeetna as a starting point for their expeditions to climb Denali, North America's highest peak.

The growth in tourism and an expanding residential population has stressed Talkeetna's wastewater system to the point that it struggles to comply with its State administered wastewater discharge permit. Correspondence from the Alaska Department of Environmental Conservation (ADEC) notes several permit compliance excursions, the most common of which are occurrences of high effluent fecal coliform (FC) counts and low effluent dissolved oxygen (DO) concentrations. Other less common excursions include inadequate percent removal of five-day biological oxygen demand ($BOD_5$), total suspended solids (TSS), and/or excessively high effluent $BOD_5$ and TSS concentrations.

In August 2016, MSB retained HDL Engineering Consultants (HDL) to prepare a preliminary engineering report (PER) and associated environmental report (ER) to identify and analyze alternatives for upgrades to the existing wastewater treatment facility (WWTF) to bring it into compliance with its current discharge permit. This report expands on a previous sewer and water assessment[1] completed for the Talkeetna wastewater system in 2014.

## 0.2 BACKGROUND

Talkeetna operates a wastewater collection system to convey wastewater flows from homes and businesses in Talkeetna to a WWTF located northeast of the main business and community district. The WWTF and wastewater collection system are operated by the MSB Department of Public Works and were constructed in several phases between 1988 and 1994[1].The collection system consists of 23,000 linear feet of gravity and pressure pipe with three lift stations[1]. Collected wastewater flows to a lift station on G Street where it is pumped via force main to the WWTF. The WWTF provides treatment via three facultative lagoon cells which discharge to a constructed wetland for effluent polishing. The wetland discharges to a slough of the Talkeetna River via a flow measurement weir and conveyance pipeline.

In November 2015, ADEC issued a Notice of Intent to Seek Penalties for Clean Water Act Violations for failure to comply with permit effluent limits for FC and DO.

The MSB submitted a grant application to the United States Department of Agriculture (USDA) for financial assistance in a WWTF upgrade to address their compliance issues. In January 2016, MSB issued a request for proposals for preparation of a PER and ER in support of the USDA grant application. HDL was selected and awarded a contract for the work in August 2016. HDL has subcontracted with GV Jones and Associates (GVJ) to provide wastewater treatment process consulting services.

### 0.3 SCOPE

This report describes the current condition of the Talkeetna WWTF; identifies needs for upgrades; presents and evaluates two feasible design alternatives; recommends a design alternative selection based on life cycle cost analysis and other non-monetary factors, and ultimately presents preliminary design and phasing options for the selected alternative. This report assumes a 20-year design period. All flow and population forecasts correlate to a final design year of 2036.

Because MSB is seeking federal funding through the USDA Rural Utilities Service grant program, this report follows requirements outlined in USDA Bulletin 1780-2.

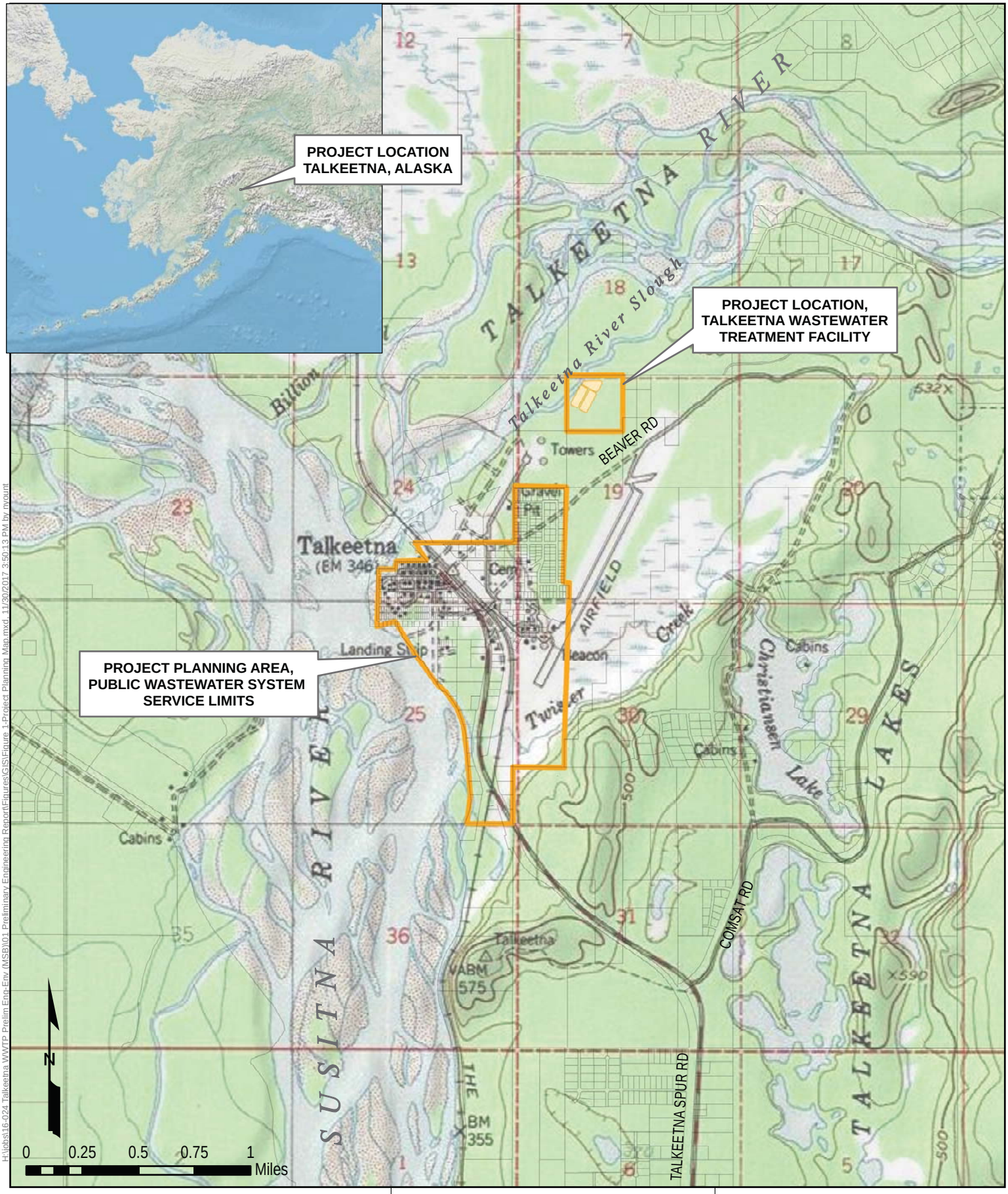
# 1.0 Project Planning

## 1.1 LOCATION

The Talkeetna wastewater system is located within the community of Talkeetna, Alaska. The project planning area comprises the entirety of the wastewater system and the boundaries of Talkeetna's Utility Service Area and is used for population and flow projections to size WWTF upgrades. The project location, the Talkeetna WWTF, is located outside of the project planning area on a 40-acre parcel owned by MSB. *Figure 1-1* defines the project planning area, project location, and general topography, legal, and natural boundaries of the area.

### 1.1.1 Legal Boundary

Per the MSB *Operating Rules, Rates and Procedures for Talkeetna Sewer and Water Service Area, Public Sewer Service*, the legal boundary for the Talkeetna Utility Service Area is described as those lands within that portion of the S½ of the S ½ of protracted Section 24 contained within the Talkeetna Townsite, U.S. Survey No. 1260; that portion of the S ½ of the S ½ protracted Section 24 Easterly of the West boundary of the Alaska Railroad right-of-way; and that portion of protracted Section 25 Easterly of the East high water mark of the Susitna River, all within Township 26 North, Range 5 West, Seward Meridian; and all of the Talkeetna Heights Subdivision, Denali Subdivision, and Denali No. 2 Subdivision within protracted Section 19; and W ½ of the NW ¼ of protracted Section 30, Township 26 North, Range 4 West, Seward Meridian, Talkeetna Recording District, Third Judicial District, State of Alaska.




H:\jobs\16-024 Talkeetna WWTP Prelim Eng-Env (MSB)\01 Preliminary Engineering Report\Figures\GIS\Figure 1-Project Planning Map.mxd, 11/30/2017 3:50:13 PM by nvount

Section 19, Township 4W, Range 26N, Seward Meridian
USGS: Talkeetna B-1
Talkeetna Alaska

Matanuska Susitna Borough
Talkeetna Wastewater Treatment Facility
November 2017

Figure 1-1
Project Planning Area
and Project Location Map

### 1.1.2 Natural Boundaries

Talkeetna is situated near the confluence of three rivers, the Chulitna, Susitna, and Talkeetna. It is generally bounded by the Susitna and Talkeetna Rivers to the north and west, and Twister Creek to the south. The Alaska Railroad tracks split the town in a northwest-southeast alignment and the eastern edge of town is generally bound by the Talkeetna Airport.

## 1.2 ENVIRONMENTAL RESOURCES PRESENT

Environmental resources are summarized in this section and are provided in more detailed analysis in a separate Environmental Review.

### 1.2.1 Farmlands, Rangelands and Forestlands

No areas of important farmland, prime forestland, and/or prime rangeland exist in the project location as defined by The Farmland Protection Policy Act (FPPA) and USDA Departmental Regulation No. 9500-3, Land Use Policy.

### 1.2.2 Wetlands

A review of the MSB wetlands viewer and the National Wetlands Inventory in September 2016 indicated the existing WWTF is located within uplands. A relict glacial drainage way was identified within the project location. The project planning area contains drainage way and riverine wetlands.

### 1.2.3 Wildlife and Fisheries

The Talkeetna River is located approximately 0.25-mile to the west of the proposed project area which provides spawning grounds for coho salmon (Oncorhynchus kisutch) and chum salmon (O. keta) and also contains pink salmon (O.gorbuscha), chinook salmon (O. tshawyscha), and sockeye salmon (O.nerka). The Talkeetna Slough has a direct connection to the Talkeetna River and is considered anadromous water by ADF&G (ADF&G 2017a).

A review of the USFWS IPaC planning tool identified nine birds protected under the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act (ADF&G 2017b; USFWS 2017b).

### 1.2.4 Endangered Species

Because no listed species under USFWS jurisdiction occur in the Anchorage and Matanuska Susitna (AMS) area, it is reasonable to conclude that the proposed project, which is confined to AMS, will have no effect on threatened and endangered species or critical habitat.

### 1.2.5 Historical and Archeological Sites

No historical or archeological sites have been identified in the project location. A letter of concurrence that no historical properties will be affected has been issued by the Alaska Office of History and Archaeology.

### 1.2.6 Flood Hazards

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (panel number 02170C2804E and 02170C283E) and MSB Floodplain Mapping tools were used to determine flood hazards at the existing WWTF and surrounding areas. Figure 1-2 (from MSB Permit Center) depicts flood hazard zones and base flood elevation contours. Base flood elevations are defined as the water surface elevation of the 1% (100 year or base flood) annual flood. From the figure, the existing facility is designated as Flood Zone X, meaning the facility is outside of the special flood hazard area but either within the 0.2% (500 year flood) annual chance flood zone or is an area protected by levees from the 1% annual chance flood. Although a formal determination from FEMA was not solicited for this project, the facility likely falls under the latter definition due to the built up nature of the site.

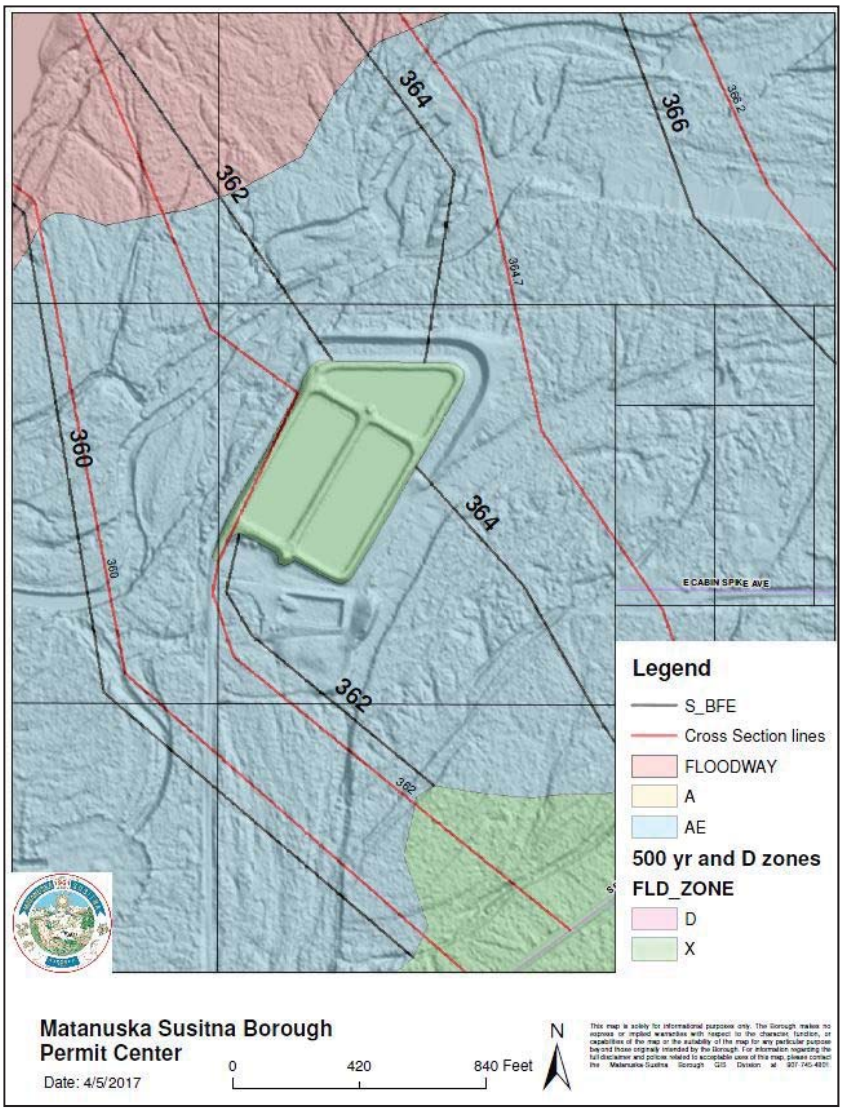



**Figure 1-2: Local Flood Hazard Zones**

The surrounding area is within Zone AE, meaning base flood elevations have been determined and the area lies within the 100 year annual chance flood zone.

Base flood elevations for the area within MSB owned parcel range between 362 and 364 feet above mean sea level. The 500-year flood elevation has been approximated at 365 feet based on FEMA guidance[2].

The project is located outside of the designated floodway.

## 1.3 POPULATION TRENDS

The local economy in the Talkeetna area is driven by tourism. During the summer months, the streets are packed as visitors come to experience the small town charm of Talkeetna. The Alaska Railroad and several cruise ship companies provide rail and bus service for tourists on their way

to or from Denali National Park, located approximately 150 driving miles to the north. A significant portion of wastewater flows to the WWTF are generated from non-residential sources. For this reason, both residential population and tourism must be considered when evaluating population growth trends. For the purposes of planning improvements, a design period of 20 years was used for population projections, with 2036 as the end of the design period.

### 1.3.1 Residential

The Alaska Department of Labor and Workforce Development (ADOL) has published population projections for estimated growth throughout Alaska for the years 2015 through 2045. ADOL estimates are based on historical Census population data, fertility and mortality rates, and migration. Projected populations for Alaska's main census areas are summarized in *Table 1-1*.

**Table 1-1: Projected Populations for Alaska's Main Census Areas[3]**

| Area Name | July 1, 2015 | July 1, 2020 | July 1, 2025 | July 1, 2030 | July 1, 2035 | July 1, 2040 | July 1, 2045 | Growth Rate* |
|---|---|---|---|---|---|---|---|---|
| **Alaska (State-Wide)** | 737,625 | 771,529 | 802,352 | 829,620 | 854,104 | 877,134 | 899,825 | 0.73% |
| **Anchorage/Mat-Su Region** | 399,086 | 423,107 | 445,773 | 466,780 | 486,263 | 504,566 | 522,007 | 1.03% |
| Municipality of Anchorage | 298,908 | 309,692 | 318,629 | 325,533 | 330,821 | 335,148 | 339,171 | 0.45% |
| *Matanuska-Susitna Borough* | *100,178* | *113,415* | *127,144* | *141,247* | *155,442* | *169,418* | *182,836* | *2.75%* |
| **Gulf Coast Region** | 81,111 | 83,703 | 85,819 | 87,404 | 88,516 | 89,298 | 89,920 | 0.36% |
| **Interior Region** | 112,818 | 116,478 | 119,402 | 121,504 | 123,063 | 124,417 | 125,893 | 0.39% |
| **Northern Region** | 27,802 | 28,707 | 29,597 | 30,522 | 31,568 | 32,843 | 34,402 | 0.79% |
| **Southeast Region** | 74,395 | 75,600 | 76,272 | 76,411 | 76,099 | 75,481 | 74,655 | 0.01% |
| **Southwest Region** | 42,413 | 43,934 | 45,489 | 46,999 | 48,595 | 50,529 | 52,948 | 0.83% |

*Averaged Annual

As shown, the MSB is projected to experience significant population growth over the next 20-years with an average projected growth rate of 2.75% for the study period.

For a more detailed look at MSB growth, *Table 1-2* summarizes historic census data from 2000 and 2010, and 2011-2015 American Community Survey 5-Year Estimates prepared by the U.S. Census Bureau for individual cities and towns within the MSB Region.

**Table 1-2: Population by MSB Region**

| Census Region | 2000 Census | 2010 Census | 2015 ACS Estimate | Annual Growth 2000-2010 | Annual Growth 2010-2015 | Annual Growth 2000-2015 |
|---|---|---|---|---|---|---|
| **Fishhook** | 2,030 | 4,679 | 5,323 | 13.0% | 2.75% | 10.81% |
| **Knik Fairview** | 7,049 | 14,923 | 16,017 | 11.2% | 1.47% | 8.48% |
| **Tanaina** | 4,993 | 8,197 | 9,640 | 6.4% | 3.52% | 6.20% |
| **Gateway** | 2,952 | 5,552 | 5,610 | 8.8% | 0.21% | 6.00% |
| **Houston** | 1,202 | 1,912 | 2,206 | 5.9% | 3.08% | 5.57% |
| **Wasilla** | 5,469 | 7,831 | 9,284 | 4.3% | 3.71% | 4.65% |
| **Meadow Lakes** | 4,819 | 7,570 | 7,424 | 5.7% | -0.39% | 3.60% |
| **Butte** | 2,561 | 3,246 | 3,854 | 2.7% | 3.75% | 3.37% |
| **Palmer** | 4,533 | 5,937 | 6,788 | 3.1% | 2.87% | 3.32% |
| **Sutton-Alpine** | 1,080 | 1,447 | 1,602 | 3.4% | 2.14% | 3.22% |
| **Big Lake** | 2,635 | 3,350 | 3,815 | 2.7% | 2.78% | 2.99% |
| **Lazy Mountain** | 1,158 | 1,479 | 1,637 | 2.8% | 2.14% | 2.76% |
| **Willow** | 1,658 | 2,102 | 2,085 | 2.7% | -0.16% | 1.72% |
| **Farm Loop** | 1,067 | 1,028 | 1,081 | -0.4% | 1.03% | 0.09% |
| ***Talkeetna*** | *772* | *876* | *616* | *1.3%* | *-5.94%* | *-1.35%* |

From the table, the majority of population growth in the MSB has occurred in the areas surrounding and including Palmer and Wasilla. From the 5-year estimate prepared by the U.S. Census Bureau, projections for Talkeetna show a slight population decline between 2010 and 2015, however, population is expected to continue on an overall upward trend, although at a reduced rate to the MSB as a whole, similar to the rate Talkeetna experienced in the 2000's. Therefore, a growth rate of 1.5% has been used to forecast populations for the 20-year design period. *Table 1-3* gives residential population projections for Talkeetna using a 1.5% annual growth rate over the design period starting with the 2010 recorded census population.

**Table 1-3: Projected Talkeetna Residential Populations Assuming 1.5% Annual Growth**

| **Year** | 2010 | 2020 | 2030 | 2036 | 2040 |
|---|---|---|---|---|---|
| **Population** | 876 | 1,007 | 1,139 | 1,218 | 1,270 |

### 1.3.2 Tourism

Major package tourism companies, including Princess Cruises, Holland America Line, Royal Caribbean, Norwegian Cruise Line, and the Alaska Railroad, incorporate Talkeetna as a stop on larger Alaskan tours. The Alaska Department of Commerce, Community & Economic Development uses the Alaska Visitor Statistics Program to analyze annual visitor volume estimates. The last full report including information for the Talkeetna community was issued in 2011. From the report, an estimated 205,000 tourists visited Talkeetna during the summer of 2011[4]. *Figure 1-3* shows visitor volumes for regions and communities in Alaska. Talkeetna is within the top 10 visited areas.

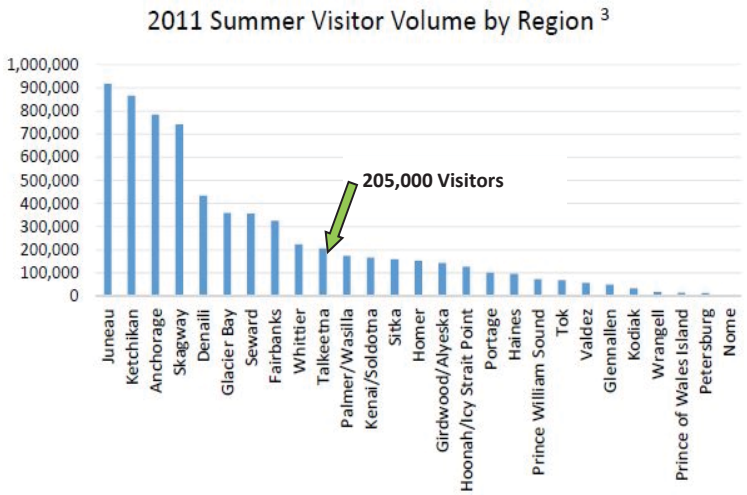



**Figure 1-3: 2011 Summer Visitor Volume**

Over the last two decades, tourism has expanded statewide. A *Community and Tourism Plan for Talkeetna* prepared by a collaborative effort between Christopher Beck and Associates, Land Design North, The Andrews Group, Inc., and Charlier & Associates in 2002, anticipated that demand for visitation to Talkeetna would likely match the level of growth predicted for Alaska as a whole, provided no major attempts were made to accelerate or slow growth[5].

A linear growth rate of approximately 2% can be interpolated from available tourism data from the Alaska Visitor Statistics Program from 1993 to 2015. This growth rate represents a moderate growth scenario in which the Talkeetna community does nothing to accelerate or slow growth.

However, MSB staff have indicated that available commercial land in Talkeetna is close to full build-out. Furthermore, in recent years there have been state budget cuts to tourism marketing and there has been an overall slowdown in the Alaskan economy. For these reasons, a low tourism growth model assuming 1.0% linear growth has also been analyzed.

Applying the moderate and low growth models to available visitor data for Talkeetna gives the following summer tourist population projections over the 20-year design period.

**Table 1-4: Projected Talkeetna Summer Tourist Populations**

| | 2011 | 2020 | 2030 | 2036 | 2040 |
|---|---|---|---|---|---|
| **Moderate Growth (2.06%)** | 205,000 | 244,747 | 291,327 | 319,274 | 337,906 |
| **Low Growth (1.0%)** | 205,000 | 223,860 | 245,385 | 258,300 | 266,910 |

In summary, for this report, the 1.5% annual residential population model and 1% low growth model for tourism will be used.

### 1.4 COMMUNITY ENGAGEMENT

MSB began community engagement concerning upgrades to the Talkeetna water and wastewater system in 2014 as part of the Utility Assessment. Volunteer response surveys, informational flyers, and invitations to a community meeting were mailed to residents. Two public meetings were held to help develop an understanding of the existing WWTF, discuss utility rates, gather comments and questions, and present the draft technical memorandum assessing Talkeetna's water and wastewater system.

For upgrades addressed in this report, MSB will continue with public involvement once an alternative is selected. Future community engagement may include a combination of informational mailers, community surveys, public meetings, and project specific website.

# 2.0 Existing Facilities

### 2.1 LOCATION MAP

An overall location map showing major system components is presented in *Figure 2-1*. The Talkeetna wastewater system consists of a buried pipe collection system, three lift stations, and a facultative lagoon WWTF. All wastewater flows to a lift station located on G Street where it is pumped via force main to the WWTF. While upstream collection infrastructure can have an impact on overall treatment quality, the scope of this report is limited to WWTF upgrades.

SUSITNA RIVER

TALKEETNA RIVER

ALASKA RAILROAD ROW

TALKEETNA SPUR ROAD

TALKEETNA AIRPORT RUNWAY

G STREET

G STREET LIFT STATION

TALKEETNA RIVER SLOUGH

EXISTING WASTEWATER TREATMENT FACILITY

0 400 800
SCALE IN FEET

**LEGEND**

- EXISTING SERVICE AREA
- EXISTING WASTEWATER SYSTEM
- WETLANDS
- WATER BODIES

**TALKEETNA WASTEWATER TREATMENT FACILITY UPGRADES**
**EXISTING WASTEWATER SYSTEM**
**MATANUSKA-SUSITNA BOROUGH**
TALKEETNA, ALASKA

| | | | | | |
|---|---|---|---|---|---|
| DATE: | NOVEMBER 2017 | DRAWN BY: | NMY | SHEET: | FIGURE 2-1 |
| SCALE: | AS NOTED | CHECKED BY: | CJB | JOB NO.: | 16-024 |

*Figure 2-2* shows the general layout and schematic process for the existing WWTF.

All collected wastewater currently flows to Manhole B from the G Street Lift station. From Manhole B, wastewater is directed from Cell 2, to Cell 1, to Cell 3, and finally though the constructed wetlands. Treated effluent is discharged into a slough of the Talkeetna River.

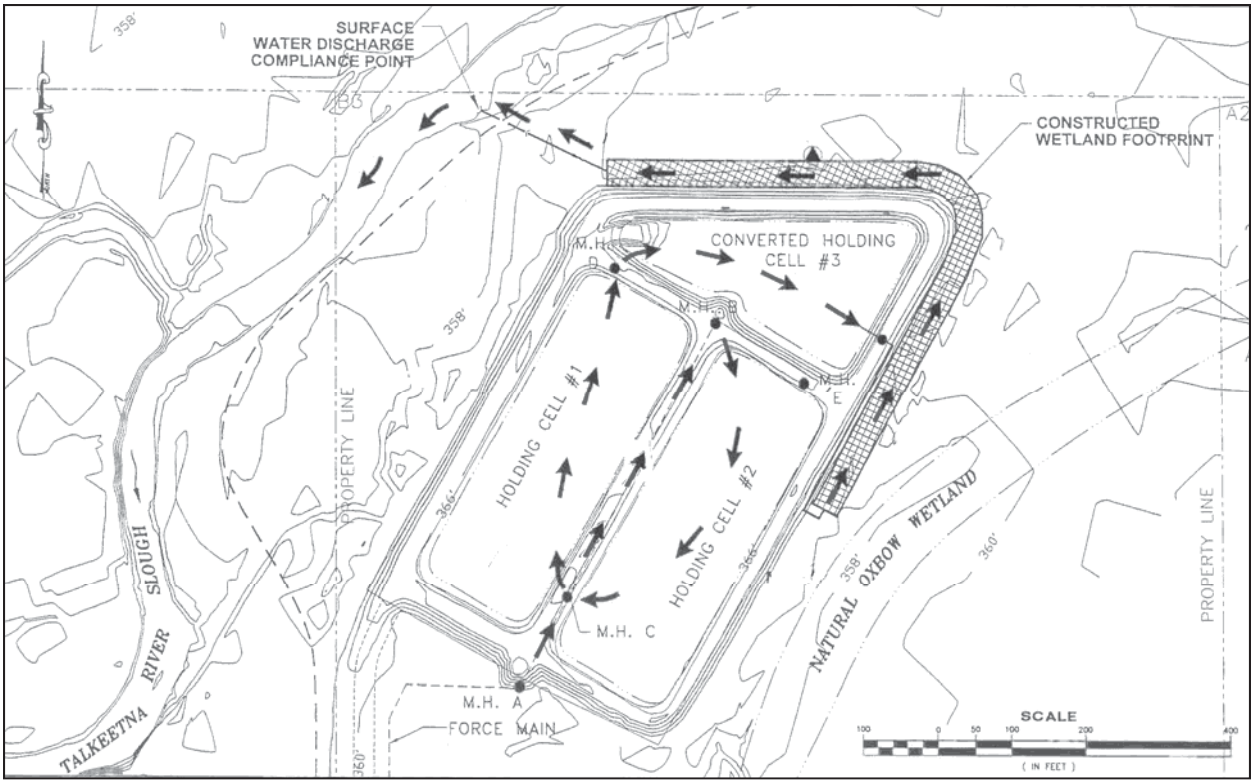



**Figure 2-2: Existing WWTF Layout**

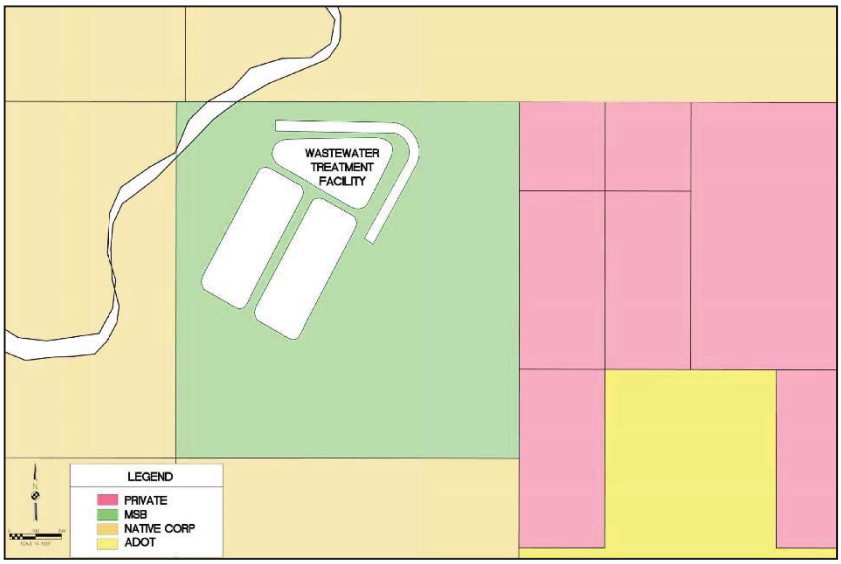



**Figure 2-3: Facility Property Limits**

The WWTF is located on 40-acre parcel owned by MSB. *Figure 2-3* shows adjacent property lines and property ownership. The 40-acre lot is bounded by Native Corporation land to the north, west, and south, and Private land to the east. WWTF upgrades will be designed to remain within existing MSB property limits to the greatest extent possible.

## 2.2 HISTORY

In October 1986, flooding from heavy rains caused the rivers in the Talkeetna area to rise, also raising the local groundwater table. Because Talkeetna is located nearly entirely in the floodplain, this caused massive flooding throughout the town, contaminating the private individual water wells. Testing done in 1986 and 1987 confirmed that fecal coliform bacteria were found in 30% (1986) and 18% (1987) of the water wells tested with most of the contamination found in the east townsite wells. After the contamination was discovered, the MSB applied for and was awarded several ADEC Village Safe Water Program grants to finance the construction of the public water and wastewater systems. In July 1988, work began to install the system in the west townsite, as it had the higher population density, and larger commercial and tourism uses. This is also when the original WWTF was constructed.

Phased construction continued for the water/wastewater distribution and collection network, and by 1994 the system was complete. In 2003, to keep pace with increased flows and to meet more stringent discharge requirements, the original WWTF was upgraded by converting the percolation cell into a facultative lagoon cell, and installing a constructed wetland for final treatment prior to direct discharge to a slough of the Talkeetna River. Since installation, several large flooding events have uprooted wetland plants. In 2014, CRW Engineering Group performed an assessment of the water and wastewater system. MSB implemented several of the recommended operational changes, helping to improve overall treatment quality. Despite these operational changes, the WWTF is still unable to consistently meet prescribed effluent quality standards and, in 2015, MSB received a notice of violation from the Alaska Department of Environmental Conservation (ADEC) for failure to comply with its discharge permit. Correspondence also included a Notice of Intent to Seek Penalties for Clean Water Act Violations. These violations are discussed in more detail in Section 3.3.

Starting in early 2016, MSB began troubleshooting Supervisory Control and Data Acquisition (SCADA) equipment to more accurately measure influent flow to the WWTF. MSB also continued making operational changes to the treatment lagoon process in an attempt to increase DO levels prior to discharge. This ultimately resulted in the installation of temporary aerators at the inlet to Cells 1 and 2 to assist with lagoon aeration.

## 2.3 CONDITION OF EXISTING WWTF

### 2.3.1 Present Condition

The WWTF is functional in its existing configuration, however, due to a variety of factors it is not able to consistently provide adequate treatment of wastewater flows. The most significant factors

are insufficient lagoon volumes and the overall functionality of the treatment wetlands. Due to several flood events damaging the constructed wetlands, vegetative cover is very low and the portions which were revegetated have not had time to fully establish themselves. During a site visit in July 2016, HDL and GVJ observed dark decomposing accumulations at the surface of the constructed wetlands, which likely deplete DO and provide a substrate and additional nutrients for fecal coliform blooms prior to effluent discharge. The photo below illustrates the inadequately performing constructed wetlands.

**Figure 2-4: Talkeetna WWTF Constructed Wetlands from July 2016 Site Visit**

### 2.3.2 Suitability/Adequacy for Continued Use

The existing WWTF discharges seasonally. For six months of the year, the lagoon ponds act as holding basins for influent raw sewage generated by the community. Effluent from the WWTF is typically discharged during the months of May through October. If river ice conditions permit, effluent may be discharged in late April as well.

Although effluent discharge flow data are limited, it is assumed that WWTF performance generally decreases as influent flow increases. Concentrations of effluent $BOD_5$ and, to a lesser extent, TSS are higher from early-May to August with lower concentrations before and after.

In addition to poor $BOD_5$ and TSS removals, effluent fecal coliform counts (FC's) and DO concentrations (DO) have been generally poor during all effluent discharge months. However, in 2016, additional equipment was deployed at the treatment WWTF to add DO to the effluent prior to release, and higher DO values were achieved.

Ultimately, the WWTF is undersized to treat flows generated during the tourism season. Furthermore, as flow continues to increase over time, the WWTF will become increasingly incapable of meeting permit requirements.

### 2.3.3 Conveyance, Treatment, Storage and Disposal Capabilities

According to record documents for the 2003 WWTF upgrades, the existing WWTF is designed for an inflow rate of 42,000 gallons per day (gpd) and $BOD_5$ loading of 70 lb/day. The total combined volume of lagoon cells is 9.4 million gallons (MG). Individual, working lagoon cell volumes are summarized in *Table 2-1*. The WWTF is permitted to discharge up to 180,000 gpd of treated effluent from April through October, although discharge typically does not begin until early May depending on river ice conditions. Towards the end of discharge months, MSB WWTF operators increase discharge rates to draw down the water level in the lagoon cells to provide adequate volume for winter storage.

**Table 2-1: Existing WWTF Working Cell Volumes**

| | Working Volume | Surface Area |
|---|---|---|
| **Cell 1** | 3.725 MG | 2.20 Acres |
| **Cell 2** | 3.725 MG | 2.20 Acres |
| **Cell 3** | 1.935 MG | 1.1 Acres |

### 2.3.4 Compliance with Federal, State, and Local Laws

Nationally, wastewater discharge is controlled through the National Pollutant Discharge Elimination System (NDPES) established under the Clean Water Act and regulated by the United States Environmental Protection Agency (EPA). The EPA granted primacy to the Alaska Department of Environmental Conservation (ADEC) resulting in ADEC assuming full authority to administer the wastewater discharge permitting and compliance program for Alaska. ADEC regulates wastewater discharge through Alaska Pollutant Discharge Elimination System (APDES) permits.

The Talkeetna WWTF has been issued a general APDES permit to discharge treated wastewater into surface waters. *Table 2-2* summarizes the permit requirements.

**Table 2-2: APDES Permit Requirements for Talkeetna WWTF**

| Parameter | | Quantity or Loading | | Quality or Concentration | | |
|---|---|---|---|---|---|---|
| | | Average | Maximum | Minimum | Average | Maximum |
| | **Flow** | | 180,000 gpd | | | |
| | **Final Effluent Fecal Coliform** | | | | 20 FC/100 ml | 40 FC/100 ml |
| | **DO** | | | 7 mg/L | | 17 mg/L |
| | **Final Effluent pH** | | | 6.5 | | 8.5 |
| **Biochemical Oxygen Demand ($BOD_5$)** | **Monthly Final Effluent** | 68 lb/day | | | 45 mg/l | |
| | **Influent** | | | | Report Monthly Average | |
| | **Percent Removal** | | | 65% | | |
| | **Weekly Average** | 98 lb/day | | | 65 mg/l | |
| **Total Suspended Solids (TSS)** | **Monthly Final Effluent** | 105 lb/day | | | 70 mg/l | |
| | **Influent** | | | | Report Monthly Average | |
| | **Percent Removal** | | | 65% | | |

To verify compliance with its discharge permit, MSB submits monthly Discharge Monitoring Reports (DMR) to ADEC. Effluent grab samples are collected at the discharge to the Talkeetna River Slough; influent grab samples are typically collected at Manhole B as shown in *Figure 2-5*. However, during fall of 2016, weekly composite samples were collected at the G Street lift station to assist with preparation of this report; specifically to determine the quality of the influent.

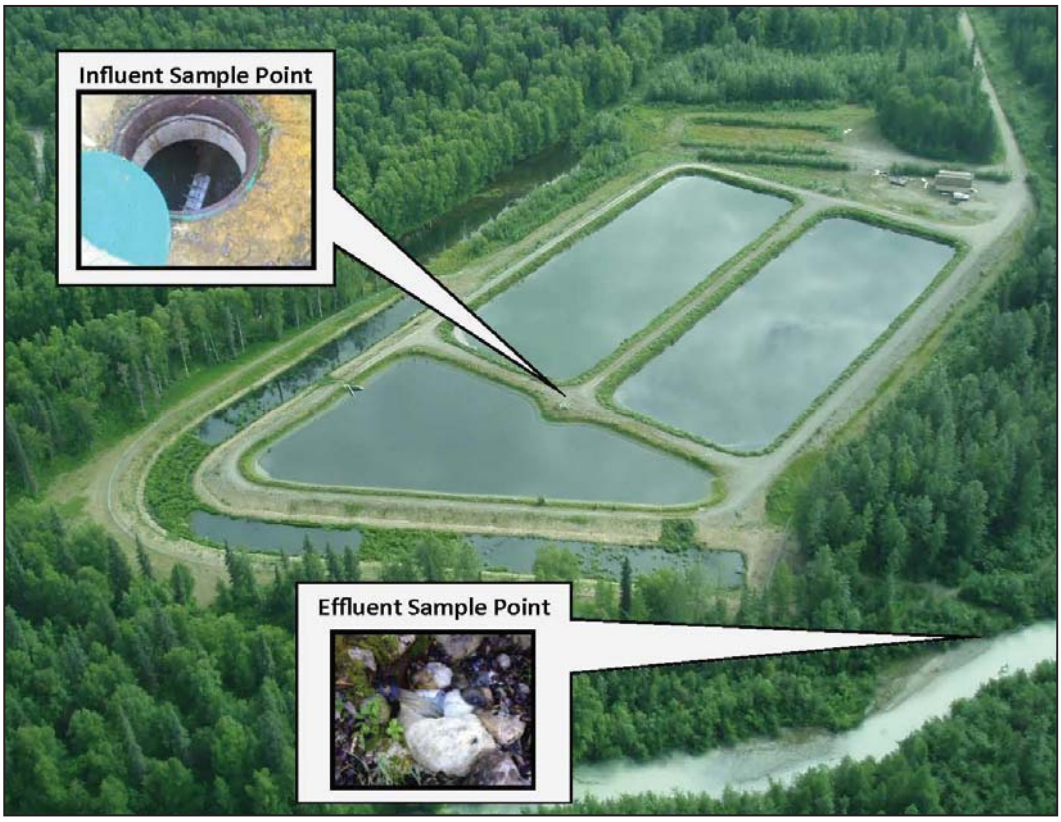



**Figure 2-5: Grab Sample Locations**

DMRs from 2014 through 2016 indicate that effluent DO and FC concentrations consistently violate permit limits. There were also a few instances where the minimum percent removal of BOD and TSS was not achieved. *Table 2-3* summarizes DMR results; instances where permit limits were not met are highlighted in yellow.

**Table 2-3: Discharge Monitoring Report Results**

| | | | Parameter | | | | |
|---|---|---|---|---|---|---|---|
| | | | Effluent DO (mg/l) | Effluent BOD5 (mg/l) | pH | Effluent TSS (mg/l) | Effluent FC (col/100 ml) |
| Permit Requirements | | | 7-17 | 45 Max | 6.5-8.5 | 70 Max | 40 Daily Max |
| Discharge Month | MAY | 2014 | 1.11 | 13.3 | 7-8 | 33.3 | 34 |
| | | 2015 | 1.66 | 24.8 | 7.23 | 20.8 | 62 |
| | | 2016 | 3.6 | 17.4 | 8.5 | 18 | ND |
| | JUNE | 2014 | 9.68 | 40.6 | 7.5 | 68.6 | 14 |
| | | 2015 | 5.69 | 35 | 7.78 | 41 | 510 |
| | | 2016 | 11.45 | 15.4 | 7.5 | 12.7 | 160 |
| | JULY | 2014 | 4.25 | 35.2 | 7.94 | 56 | 70 |
| | | 2015 | 5.96 | 43.3 | 7.47 | 50 | 290 |
| | | 2016 | 8.81 | 35.2 | 8.5 | ND | 410 |
| | AUGUST | 2014 | 2.73 | 22.9 | 7.31 | 42 | 1,130 |
| | | 2015 | 5.7 | 26.6 | 7.49 | 37.9 | 3,100 |
| | | 2016 | 7.13 | 14.4 | 7.43 | 5.5 | 54 |
| | SEPTEMBER | 2014 | 2.7 | 29.8 | 7.6 | 28 | 1,050 |
| | | 2015 | 11.18 | 26.2 | 7.92 | 41 | 73 |
| | | 2016 | ND | 11.3 | ND | 17 | 27 |
| | OCTOBER | 2014 | ND | ND | ND | ND | ND |
| | | 2015 | 8.19 | 14 | 7.68 | 17 | 128 |
| | | 2016 | ND | 13.3 | ND | 7 | 9 |

*ND= NO DATA

### 2.3.5 Analysis of Overall Current Energy Consumption

One advantage of a facultative lagoon facility is the low amount of energy required to achieve treatment. After flows are pumped from the G Street Lift Station, the Talkeetna WWTF utilizes only gravity flow.

**Figure 2-6: Gasoline-Powered Pumps Used to Assist with Aeration During Summer 2016**

To meet permit requirements for DO during 2016 discharge months, WWTF operators utilized gasoline-powered pumps to help aerate the treatment cells. This was achieved by spraying the water about three feet above the lagoon surface creating a fountain, which allowed oxygen to be added to the water by increasing the water surface area in contact with the air. Based on discussions with MSB, facility operators were running one 23-hp pump and four 13-hp Pumps for full 24-hour periods during the majority of the summer discharge months. Total power consumption of the gasoline-powered pumps was estimated to be approximately 1,342 kWh per day of electrical power equivalence.

At the end of September 2016, MSB installed two aerators, one each in Cells 1 and 2. The aerators utilize 3 horsepower (hp) blowers. The electrical consumption for the new aeration equipment is estimated at 161 kWh per day.

## 2.4 FINANCIAL STATUS OF EXISTING FACILITIES

Talkeetna's water and wastewater systems operate under the same budget. In 2014, HDR Alaska completed a comprehensive rate study for the Talkeetna Water and Sewer system. The study assumes that the wastewater system accounts for approximately 45% of the total budget. The following sections describe current and anticipated rate schedules, annual O&M costs, and debts and reserve accounts.

### 2.4.1 Current Rate Schedule

MSB charges a flat monthly sewer rate which varies depending on if the service is classified as residential or commercial. Commercial services include restaurants as well as connections that serve more than one structure. The recent and anticipated monthly sewer rate schedule is shown in *Table 2-4*.

**Table 2-4: Current Rate Schedule for Talkeetna Sewer Services**

| Fiscal Year | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| **Rate Increase** | | 13.5 | 13.5 | Neutral |
| **Residential** | $47.34 | $53.50 | $60.46 | $60.46 |
| **Commercial** | $89.38 | $101.00 | $114.13 | $114.13 |

### 2.4.2 Annual O&M Cost

The total operations and maintenance cost for the 2016 fiscal year was $291,369.18. *Table 2-5* summarizes total O&M costs for the Talkeetna utility system, and estimates wastewater system costs. The estimated O&M costs for the wastewater system include the collection system as well as WWTF. Based on discussions with MSB staff it has been assumed that the collection system accounts for 30% of the total wastewater O&M costs and the treatment facility accounts for 70% of the total wastewater O&M costs. Cost breakdowns between the collection system and WWTF have also been included in *Table 2-5*

**Table 2-5: Talkeetna Utility 2016 Budgeted O&M Costs**

| Expense Description | Total Water and Sewer Expenses | Sewer (45% of Total) | Collection (30% of Sewer Budget) | WWTF (70% of Sewer Budget) |
|---|---|---|---|---|
| **Salaries and Wages (including benefits)** | $151,114.86 | $68,001.69 | $20,400.51 | $47,601.18 |
| **Office Supplies** | $13,476.58 | $6,064.46 | $1,819.34 | $4,245.12 |
| **Utilities/Building Operations** | $33,982.36 | $15,292.06* | $6,116.82** | $679.65*** |
| **Professional Charges** | $6,290.44 | $2,830.70 | $849.21 | $1,981.49 |
| **Insurance and Bond** | $19,159.91 | $8,621.96 | $2,586.59 | $6,035.37 |
| **Maintenance** | $7,347.65 | $3,306.44 | $991.93 | $2,314.51 |
| **Testing/Training Contracts** | $33,853.85 | $15,234.23 | $4,570.27 | $10,663.96 |
| **Office/Maintenance Supplies** | $6,258.95 | $2,816.53 | $844.96 | $1,971.57 |
| **Fuel/Oil** | $1,438.97 | $647.54 | $194.26 | $453.28 |
| **Miscellaneous Supplies** | $6,842.18 | $3,078.98 | $923.69 | $2,155.29 |
| **Other Equipment** | $10,221.43 | $4,599.64 | $1,379.89 | $3,219.75 |
| **Loan Payment/Interest** | $1,382.00 | $621.90 | $186.57 | $435.33 |
| **Total** | $291,369.18 | **$**131,116.13 | **$36,786.17** | **$85,834.38** |

*****Accounts for 20% of System Cost
**Accounts for 90% of Wastewater Cost
***Accounts for 10% of Wastewater Cost

### 2.4.3 Users by Monthly Usage Categories

The Talkeetna System currently serves a total of 195 customers. The current number of residential and commercial users is shown in *Table 2-6*. Seasonal customers do not receive a discount on monthly sewer rates.

**Table 2-6: Wastewater Customers by Category**

| | Full time | Seasonal | Total |
|---|---|---|---|
| **Residential** | 98 | 15 | 113 |
| **Commercial** | 64 | 15 | 82 |

### 2.4.4 Existing Debts and Reserve Accounts

The Talkeetna water and sewer system has been operating at a deficit for a number of years. *Table 2-7* summarizes revenues, expenditures and net change in funds from 2015 to 2016. Note that the budget deficit for the last fiscal year was inflated by a one-time debt obligation of $214,000.

**Table 2-7: Utility System Debts**

| | 2016 Budget | 2016 Actual | 2015 Actual |
|---|---|---|---|
| **Revenue** | | | |
| Charges for Services (Water and Sewer) | $ 262,549 | $ 225,842 | $ 222,418 |
| Intergovernmental (PERS relief) | $ - | $ 1,855 | $ 12,719 |
| **Expenditures** | | | |
| Public services | $ (322,408) | $ (289,987) | $ (275,308) |
| Debt service | $ (1,383) | $ (1,383) | $ (1,462) |
| **Deficiency of Revenues over Expenditures** | $ (61,242) | $ (63,673) | $ (41,633) |
| **Other Financing Uses** | | | |
| Transfers out | $ (214,000) | $ (214,000) | $ - |
| **Net Change in Fund Deficit** | $ (275,242) | $ (277,673) | $ (41,633) |
| **Deficit at the beginning of the fiscal year** | | $ (160,644) | $ (119,011) |
| **Deficit at the end of the fiscal year** | | $ (438,317) | $ (160,644) |

# 3.0 Need for the Project

## 3.1 HEALTH, SANITATION AND SECURITY

MSB is committed to providing safe and reliable water and wastewater service to the community of Talkeetna. As previously noted, the existing WWTF is not in compliance with its discharge permit. ADEC has issued two official Notices of Violations for failure to comply with permit conditions under 18AAC 83.405(b), as well as a Notice of Intent to Seek Penalties for Clean Water Act Violations. The first Notice of Violation related mainly to record keeping and the second Notice of Violation was in response to effluent limit violations. These notices are included in Appendix A.

Addressing compliance issues related to effluent FC and DO concentrations is considered the highest priority as they are the most common violations and were specifically mentioned in ADEC correspondence. Capacity increases to provide additional treatment to remove $BOD_5$ and TSS will also be considered as part of a phased upgrade plan.

## 3.2 AGING INFRASTRUCTURE

The original WWTF, consisting of the two facultative lagoon cells and a percolation cell, was constructed almost 30 years ago. As the Talkeetna community and tourism industry has grown, the WWTF has become undersized to manage hydraulic, solids, and organic loadings. The wetlands were installed in 2003 in an attempt to improve treatment. The system relies on facultative lagoon treatment with wetland polishing to meet permit requirements. Neither facultative lagoons nor wetlands treatment provide the opportunity to increase the DO content of the effluent or provide dependable disinfection to meet required permit levels.

Furthermore, the vertical location of the pipe outlet from Lagoon 3 hinders its ability to draw from the optimal location within the water column to support adequate DO levels. Concerns with hydraulic and treatment capacity, as well as operating deficiencies pertaining to the WWTF, are further explained in the following sections.

### 3.2.1 Hydraulic Loading

#### Inflow

The current hydraulic loading design for the WWTF is for a maximum influent flow rate of 42,000 gpd. Beginning in January 2016, MSB began monitoring flows at the G Street lift station to better quantify influent flow rates. Inflows to the WWTF for January through April 2016 ranged from approximately 20,000 gpd to 40,000 gpd *(Figure 3-1)*. Beginning in May 2016, inflows significantly increased, ranging from approximately 80,000 to 110,000 gpd before tapering off in September 2016. Flows are expected to remain in the 20,000 gpd range for the remaining winter months. It is expected that this flow pattern repeats annually.

This data indicates that wastewater inflows are comprised of two sources. One source is the base inflow generated by year-round residents. The other source is the seasonal inflow generated by tourism and by inflow and infiltration (I&I) from spring melt and rain events, and groundwater entering the collection system.

Existing base flow rates, representing year-round resident contributions, are assumed to be 20,000 gpd. Seasonal flow rates, representing flows from tourism and I&I, are assumed to be 70,000 gpd with occasional peaks of approximately 90,000 gpd. Recorded inflows from January through April and September through December are within the treatment design flow range. From May to September, recorded inflows are approximately double the design flow, demonstrating that the WWTF is hydraulically overloaded for the majority of the discharge season.

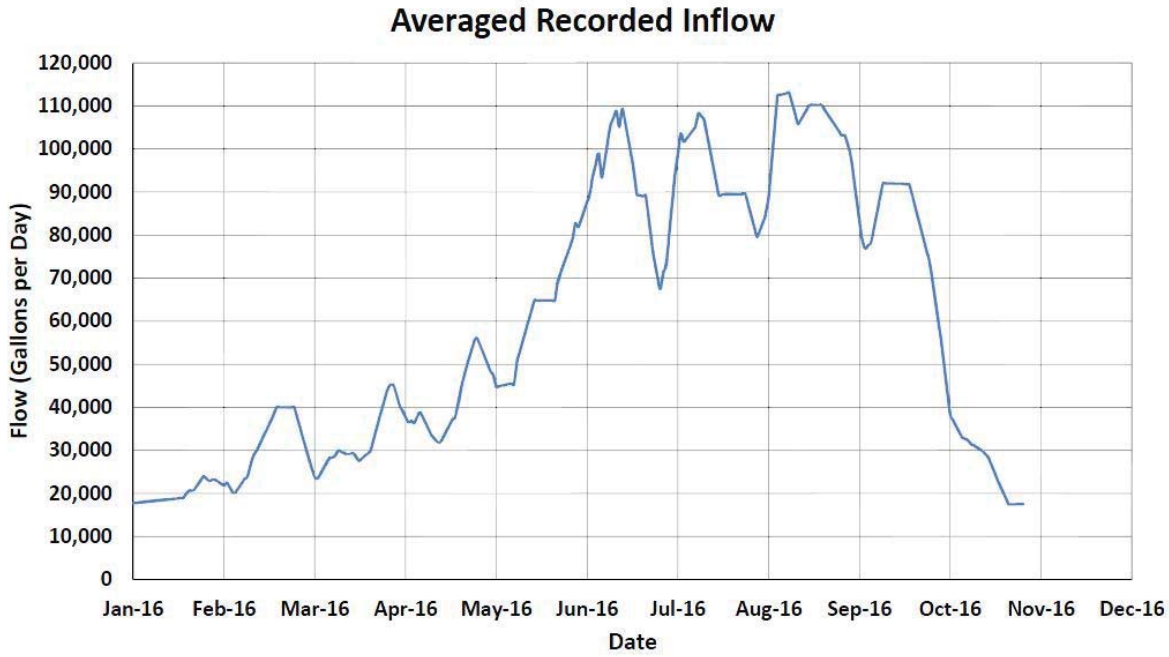



**Figure 3-1: SCADA Averaged Inflows to the Talkeetna WWTF**

During the spring/summer of 2017 MSB began repairing manholes that were causing significant I&I into the system. Additionally, MSB is making efforts to educate residents on water usage characteristics, namely the common practice of continually running water faucets to prevent frozen pipes. MSB also has the option to implement usage based billing for residential users if this practice continues. Due to the timing of these actions, any flow reductions were not captured in the data displayed above and in the overall design calculations. Flows will be re-analyzed during full design of the chosen alternative.

### Hydraulic Retention Times and Storage

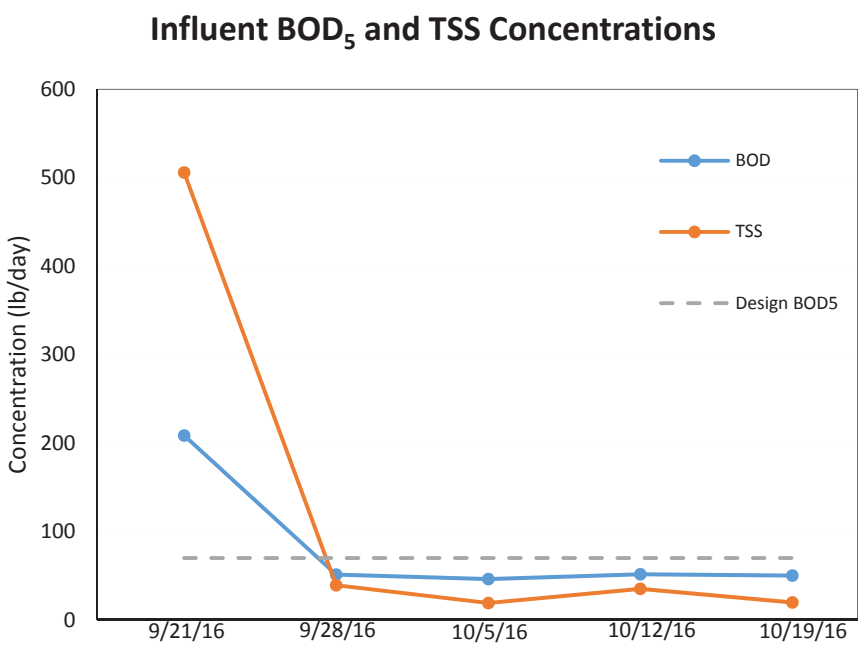
Hydraulic retention time (HRT) is the amount of time wastewater remains in the treatment system and is a function of total working volume and daily inflow. ADEC's *Lagoon Construction Guidelines* require a minimum hydraulic retention time of 240 days. The design parameters used for upgrades to the WWTF in 2003 assumed a retention time of 220 days.

Dividing the total treatment volume for the existing facility (9.3 million gallons) by average summer inflows of 90,000 gpd, gives an operating HRT of 103 days, approximately half of the design retention time. Adding to the reduced HRT experienced during the summer, winter influent flows receive little to no facultative treatment during frozen conditions. This means that minimally treated wastewater from the winter is being prematurely flushed through the WWTF by the increased summer flow rates. Finally, due to sludge accumulation, the working volume within the treatment cells is likely less than the stated 9.4 MG, further decreasing HRT.

In order for the WWTF to operate at an appropriate HRT, additional storage for incoming wastewater flows is needed.

## 3.2.2 Solids/Organic Loading

In September and October 2016, MSB started data collection to better identify influent wastewater characteristics. Weekly composite samples were collected at the G Street lift station and analyzed to determine $BOD_5$, TSS, and Chemical Oxygen Demand (COD). Concentrations were correlated to flow data to determine a daily loading rate in pounds per day of $BOD_5$ and TSS. *Figure 3-2* shows calculated $BOD_5$ and TSS loadings using composite sample results and SCADA flow data.




Sampling occurred after the summer tourism season, thus the collected data represents the residential, i.e. base flow, characteristics. Base flow

organic loading is approximately 50 lb $BOD_5$/day. Although the data set includes one data point with a $BOD_5$ loading of 208 lb/day, which likely correlates with the end of seasonal flows, additional data collection is necessary to make any reliable conclusions regarding seasonal influent loadings.

Because full year influent flow data are unavailable, recommended values for $BOD_5$ and TSS loading rates from Lee Metcalf & Eddy[65] will be applied to forecasted tourism and residential populations to generate design influent loading criteria for alternative analysis.

### Base Loading

A value of 0.17 lbs of $BOD_5$ per capita per day is commonly reported for municipal sewage and is assumed to be the $BOD_5$ contribution from year-round residents. Applying the loading rate to an estimated current population of 955 residents in 2016, equates to a loading of 162 lb $BOD_5$/day from residential sources.

### Seasonal Loading

Most visitors stay at lodges maintained by tourism companies and come into town for day-excursions to eat and shop at local businesses. Since the majority of overnight visitors stay in lodges which are outside of the wastewater service area, it has been assumed that seasonal flows will have a lower $BOD_5$ loading in comparison to base flows generated by year round residents. A value of 0.06 lbs of $BOD_5$ per capita per day is assumed to be the $BOD_5$ contribution from summer visitors to Talkeetna, occurring from June 1st to October 1st. This value represents approximately one third of the daily per capita contribution of residents and is suitable for representing contributions from tourists visiting Talkeetna for only a portion of the day. Applying this loading rate to the number of visitors to Talkeetna over the 2016 summer equates to a daily non-resident loading of approximately 85 lbs $BOD_5$/day.

### Loading Capacity

Design documents from WWTF upgrades in 2003 specify a design BOD loading of 70 lbs $BOD_5$ per day. This design loading rate is less than half of the assumed base loading rate of 162 lbs $BOD_5$/day, adding in seasonal tourist loading increases rates to 247 lbs $BOD_5$/day. Under current conditions the WWTF is overloaded; as tourism and residential populations continue to grow, the system will become increasingly overloaded. Forecasted loading rates for base and seasonal flows over the 20-year design period are discussed in Section 3.3.

## 3.2.3 Inefficient Designs

### Constructed Wetlands

Wetland treatment for FC removal is highly variable and cannot be relied upon to consistently meet the permit limits of 20 and 40 FC/100 mL for monthly average and daily maximum values, respectively. Furthermore, wetland treatment effluents should not be relied upon to consistently produce FC concentrations less than 500 FC/100 mL[76]. Even if the FC permit limits were higher, the configuration of the wetlands may not allow for effective disinfection due to the water depth.

Typically, wetlands disinfection is achieved in part by natural UV disinfection in the very surface of the water. Shallower water also allows for remaining $BOD_5$ to be taken up more easily by the wetlands vegetation

### Location of Outlet Pipes

The layer of water closest to the surface will generally contain more DO than lower portions of the water column. Currently the outlet pipe for pond 3 is at the bottom of the column, likely resulting in reduced DO prior to water entering the treatment wetlands than if it were in the upper levels of the water column.

The weir on the wetland discharge results in discharge at the top of the water column, with the highest DO concentrations. However, the treatment wetlands do not provide a mechanism for increasing the DO concentration of the water.

### 3.2.4 Treatment Limitations of Facultative Lagoons

While there are certain advantages to facultative lagoon treatment, there are also many drawbacks, namely the effluent quality that can be achieved. Under proper hydraulic loading and corresponding detention times, facultative lagoons are capable of meeting Talkeetna's stipulated limits for TSS and $BOD_5$ as evidenced by effluent DMRs during lower flow months. However, facultative lagoons are less consistent in removing FC and supporting adequate DO levels. As previously discussed, past DMR data from the Talkeenta WWTF indicates effluent concentrations for DO and fecal coliform are frequently outside permit limits. FC reduction is typically achieved by capture in the lagoons and long detention times in the wetlands.

## 3.3 REASONABLE GROWTH

### *Base Flow*

Based on projections from Section 1.3.1, residential populations are expected to grow from 955 to 1,218, reflecting a 28% increase over the design period. Applying the same 28% increase to observed base flows of approximately 20,000 gpd yields a 20-year design base flow rate of 25,600 gpd.

As a check on base flow estimates, a brief survey of additional available collection capacity was conducted to determine if growth estimates are within the realm of feasibility. Because MSB requires that new facilities within the existing service area be connected to the water and wastewater system, a full system buildout can be inferred by analyzing the number of vacant lots adjacent to an existing sewer main. Note there are currently no plans to expand the collection system or service area. At full buildout, the system would have an additional 140 sewer connections; an approximate 55% increase from current conditions. Applying a 55% increase to the current base flow of 20,000 gpd yields a future base flow of approximately 31,000 gpd at maximum buildout.

At maximum buildout, the estimated flows are larger than flows based on population projections established in Section 1.3.1. Talkeetna is not expected to reach maximum buildout by the end of the design period, therefore, the lower projected base flow of 25,600 gpd will be used.

## *Seasonal Flow*

As discussed in Section 1.3.2 of this report, tourism in Talkeetna is expected to continue to grow. By the end of the 20-year design period, 258,300 visitors per year can be expected. This is approximately 20% more than current conditions. Applying that 20% increase to existing seasonal flows results in a maximum daily seasonal flow rate of 108,000 gpd at the end of the 20-year design period. Projecting seasonal flows using this method also assumes that contributions from infiltration and inflow (I&I) continue to increase. If efforts are made to mitigate I&I, seasonal flow rates will not rise as fast. However, increases in nutrient loading ($BOD_5$/TSS) from increased tourism will remain unchanged.

## *20-Year Design Flows*

*Table 3-1* summarizes current flows and anticipated flows at the end of the 20-year design period. Ultimately, upgrades to WWTF should be capable of accepting inflows of 133,600 gpd.

**Table 3-1: Design Flows**

| | Current Year | 20-Year Design (2036) | % change over 20-year design period |
|---|---|---|---|
| **Base Flow (Residential)** | 20,000 gpd | 25,600 gpd | 28% |
| **Seasonal Flows (Tourism and I/I)** | 90,000 gpd | 108,000 gpd | 20% |
| **Base Flow + Seasonal** | 110,000 gpd | 133,600 gpd | 21% |

While the existing WWTF is stressed from hydraulic loading in excess of its current design, the issue will continue to be exacerbated as residential populations and tourism continue to increase in Talkeetna. Additionally, even if the MSB can achieve reduced inflows by addressing I&I issues and through user education techniques, biological and nutrient loadings will remain unchanged and a significant reduction in lagoon volumes may not be achieved.

# 4.0 ALTERNATIVES CONSIDERED

The *Talkeetna WWTF Upgrades Alternative Memorandum* (Appendix C) presented five design alternatives capable of bringing the Talkeetna WWTF into regulatory compliance under current permit conditions through a 20-year design period. MSB staff selected two of the five alternatives for further evaluation in this report. The alternatives not selected are briefly discussed later in 4.1.3.

*Table 4-1* summarizes the design parameters at the end of the 20-year design period.

**Table 4-1: Main Design Criteria**

| Current Year | Design Year | Max Inflow | Average Daily Inflow | Max BOD |
|---|---|---|---|---|
| 2016 | 2036 | 133,600 gpd | 63,162 gpd | 309 lb/day |

In general, when developing initial design alternatives, the following site constraints and design objectives were also considered:

- ✓ Occupy a footprint small enough to fit on the parcel of land on which the treatment WWTF is currently located (approximately 40 acres);
- ✓ Provide adequate separation distance between the WWTF and nearby neighbors;
- ✓ Meet regulatory requirements for vertical separation between treatment structures and high groundwater for the area;
- ✓ Have the capability to withstand flood events without loss of functionality;
- ✓ Meet the regulatory stipulations outlined in the existing WWTF APDES discharge permit;
- ✓ Discharge seasonally into the slough April through October, weather permitting;
- ✓ Provide scalability of treatment for 20-year design flows;
- ✓ Be configured as needed to secure ADEC approval for construction.
- ✓ Not require an increase in current operator level.

## 4.1 DESCRIPTION OF FEASIBLE ALTERNATIVES

Two feasible design alternatives are presented and analyzed in the following section. Design parameters, layout, environmental impact, land requirements, potential construction problems, sustainability considerations, and cost are described for each feasible alternative.

### 4.1.1 Alternative 1 - Expand Facultative Lagoon Per Canadian Guidelines

### Description

Alternative 1 expands the existing facultative lagoon treatment system using a configuration and operation which complies with established standards for the Canadian Province of Alberta. Design components for this alternative include the addition of two anaerobic primary treatment lagoon cells, a storage cell, as well as a new reaeration basin and a chlorination/dechlorination disinfection system. This alternative utilizes the existing facultative lagoons and includes removal of the existing constructed wetlands.

Influent wastewater first flows through two 13.5-foot deep anaerobic cells, where large solids are settled out of the influent waste stream. From the anaerobic cells, wastewater flows through the existing facultative lagoon system to a new storage cell, where further settlement and $BOD_5$ removal takes place. Baffles will be integrated into the existing Cell 3 and the new storage cell to mitigate hydraulic short circuiting. From the storage cell, treated water is directed to a new reaeration basin for DO permit compliance. From the reaeration basin, treated water is directed to a new disinfection building where chlorine is introduced to deactivate fecal coliform and other pathogens. Prior to discharge into the Talkeetna River slough, the effluent is dechlorinated to comply with surface water discharge requirements. *Figure 4-1* shows a conceptual layout and flow process for Alternative 1.

## Design Parameters

Any upgrades to the Talkeetna WWTF must go through a plan review process with ADEC to ensure compliance with wastewater regulations. To ensure consistency with lagoon construction reviews, ADEC has issued Lagoon Construction Guidelines. While the guidelines are not necessarily regulatory, if a design uses alternative methods, a thorough explanation including supporting data is required for plan approval. Based on a meeting with Oran Wooley from ADEC Engineering Plan Approval, ADEC is open to this alternative sizing method.

Since 1982, the Canadian Province of Alberta has been proactive in its research of lagoon performance for 190 facultative lagoons operating in climatic environments not dissimilar to that of Talkeetna. The Province's Ministry of Environment and Parks is the agency which maintains and updates design and operational standards for facultative lagoon treatment systems.

While this alternative does not follow ADEC guidelines for sizing of facultative lagoons, based on published data from the University of Alberta, Edmonton, lagoon systems configured and operated according to provincial standards are capable of meeting Talkeetna's permit limits for $BOD_5$ and TSS. The addition of a reaeration basin and disinfection building allow the design to meet DO and fecal coliform requirements.

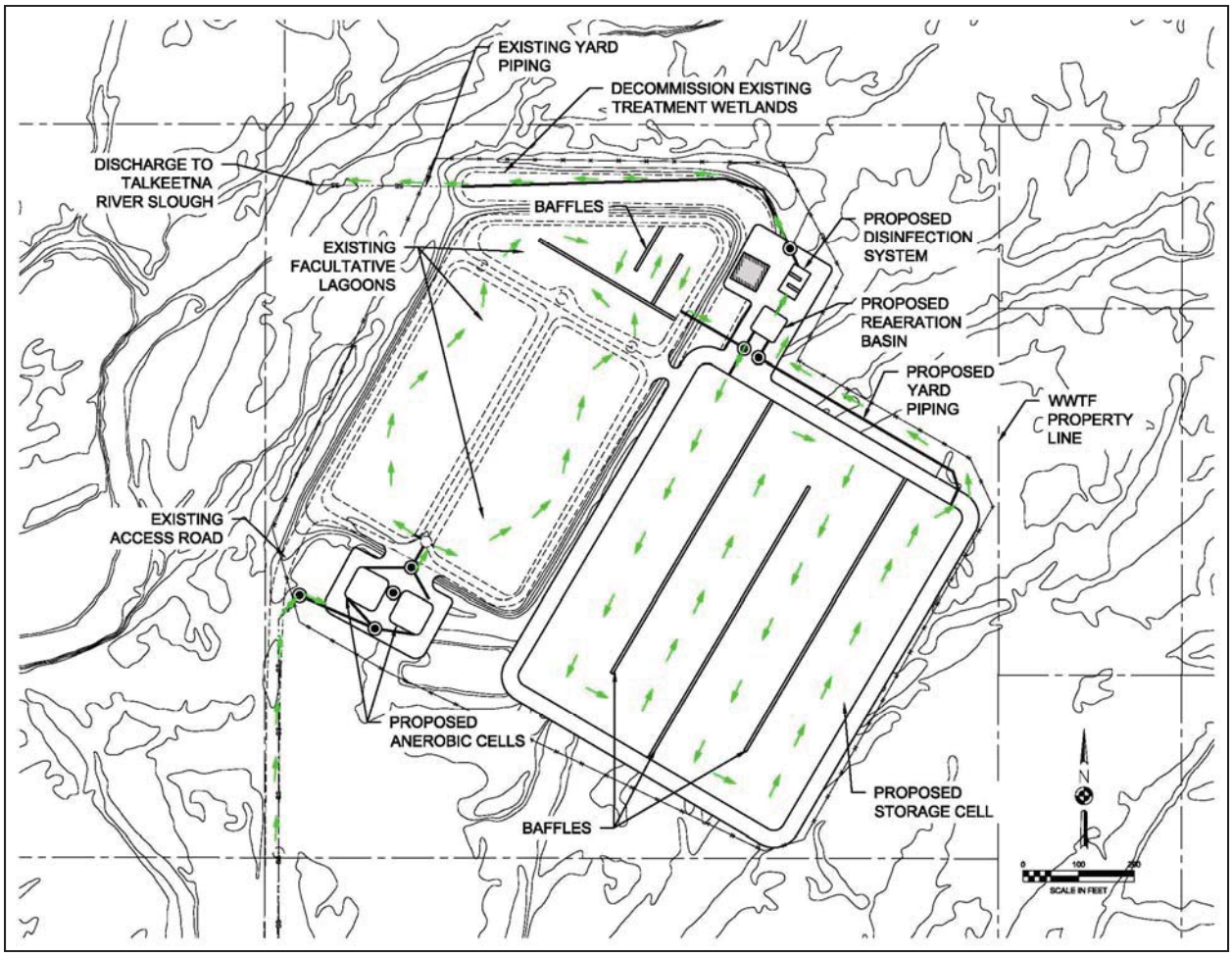



**Figure 4-1: Alternative 1 Conceptual Site Layout**

## Environmental Impacts

### *Floodplains*

WWTF expansion will require construction within the floodplain. To satisfy required depths and flow rates through each treatment cell, berms with 3:1 horizontal to vertical side slopes will be constructed. Berm design and construction will account for flood hazards associated with construction in the floodplain. During a flood event, the WWTF must remain operational and more importantly, ensure wastewater does not breach the lagoon and contaminate surface waters. Therefore, construction of lagoon berms must be of a sufficient height to protect the facility from the 500-year (0.2%) annual chance flood to satisfy USDA requirements.

HDL met with the MSB's floodplain coordinator, Taunnie Boothby, on July 20, 2017 to discuss the overall WWTF expansion project and requirements for construction within the floodplain. It was ultimately determined that the project is permittable provided that FEMA's two-step approval process for a Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR) are followed. With adequate protection berm heights, the CLOMR/LOMR process would either remove the proposed WWTF footprint or show that it is protected from the 500-year flood. Additionally, an MSB flood zone permit will be required to ensure that the addition of fill within the flood zone does not induce a net rise in flood elevation.

***Wetlands***

This alternative removes the previously constructed engineered wetlands. The construction of the additional storage cell and aeration basin will also impact the existing relict wetlands to the east of the existing treatment WWTF.

***Other Land Resources***

Treated effluent from the WWTF will continue to be discharged into a slough of the Talkeetna River. Ultimately, this alternative will improve effluent quality from the WWTF reducing impacts to nearby surface waters.

***Endangered Species***

Alternative 1 has no anticipated impact on endangered species.

***Historical and Archeological Properties***

Alternative 1 has no anticipated impact on cultural resources.

***Generation and Management of Residuals and Wastes***

Periodic solids removal for the storage cell and existing facultative treatment cells will be required every 5-10 years. Solids removal for the two anaerobic treatment cells will be required every 1-2 years. Typically, sludge removal is accomplished with floating dredges discharging sludge into either a mechanical dewatering process or a geotube. Sludge will need to be disposed of at a site or facility holding an ADEC permit for that type of disposal per 18 AAC 72.055.

## Land Requirements

This alternative expands the WWTF footprint by as much as 11 acres, assuming the reuse of the existing infrastructure. The expanded footprint is within the existing property owned by MSB; however, separation distances between the WWTF and existing residential and commercial properties will be greatly reduced.

## Potential Construction Problems

- High water table and addition of deep anaerobic settling cells;
- Retrofitting existing piping configurations for gravity flow between existing facultative lagoon cells and facility improvements;
- Amount of earthwork required to build up berms around storage cell and reaeration basin;
- Construction of a disinfection building in the floodplain or the need to build up site above flood elevations.

## Sustainability Considerations

### *Energy Efficiency*

This alternative introduces a reaeration basin and disinfection system. The reaeration basin will require blowers, and the disinfection system will require chemical injection pumps and likely SCADA monitoring equipment to regulate chlorine and dechlorination agent dosing.

Alternative 1 will be designed to use gravity flow between lagoon basins and will not require additional pumps.

Energy demand for Alternative 1 design components is relatively low in comparison to other alternatives which require 3-phase power.

### *Green Infrastructure*

This project will improve the overall effluent quality of wastewater discharged to the Talkeetna Slough. Further, efforts will be made to maximize energy efficiency of building and mechanical systems to the greatest degree practicable.

### *Operational Simplicity*

Alternative 1 does not introduce additional operational challenges. Current MSB staff will be capable of properly maintaining the system without higher level operator training or additional time. The system changes the existing process slightly with the addition of aeration and disinfection equipment that will need to be checked routinely. A contractor may need to be hired to assist with the periodic dredging of the lagoon and cleaning of anaerobic cells.

## Cost Estimate

A preliminary cost estimate analyzing construction, non-construction, and operations and maintenance (O&M) costs for Alternative 1 was prepared.

Construction costs include major anticipated construction components such as yard piping, treatment equipment, and earthwork. Unit costs from recently bid projects in the region were utilized as much as possible. The preliminary estimate also assumes no inflation between now and the time of construction, a single-season construction period, and a competitive bidding environment. A detailed cost estimate with breakdowns of work items and corresponding unit prices is included in Appendix B.

Non-construction costs include engineering services for design and construction, MSB administration, and a 20% construction contingency. Engineering services include development of plans, specifications, and estimate; permitting; and construction administration, inspection, and testing. For the preliminary estimate, it was assumed that design phases services will be about 10% of the construction cost and construction phase services will be about 10% of the construction cost. MSB administration was assumed to account for 3% of the construction cost.

Combining construction and non-construction costs results in a total capital cost of $7,800,000 for Alternative 1, as shown in *Table 4-2*.

**Table 4-2: Alternative 1 Capital Cost**

| Item | Amount |
|---|---|
| **Construction** | |
| Civil Site Preparation | $ 4,492,800 |
| Treatment | $ 446,000 |
| Process Equipment and Building | $ 265,000 |
| Electrical/Controls | $ 236,000 |
| **Non Construction** | |
| Project Contingency (20% of Total Construction Cost) | $ 1,088,000 |
| Design Phase Services (12% of Total Construction Cost) | $ 544,000 |
| Construction Phase Services (10% of Total Construction Cost) | $ 544,000 |
| MSB Administration (3% of Total Construction Cost) | $ 163,200 |
| **Total Capital Cost (Rounded)** | **$ 7,800,000** |

O&M costs include all anticipated costs needed to properly maintain and operate the WWTF annually. Appendix B includes a more detailed cost estimate breakdown. O&M costs have been summarized based on required materials, labor and energy usages and are summarized in *Table 4-3*. We estimate the annual O&M cost for Alternative 1 will be $119,500.

**Table 4-3: Alternative 1 Annual O&M Cost**

| Description | | Amount |
|---|---|---|
| Personnel | 770 man-hours/season @ $68/hr* | $ 52,360 |
| Administrative Costs | 80 man-hours/year @ $51/hr* | $ 4,080 |
| Energy Costs | 50,000 kWh/season @ $0.01/kWh | $ 5,000 |
| Sodium Hypochlorite for disinfection | 3,150 gal/season @ $3.50/gal | $ 11,025 |
| Sodium Bisulfate dechlorination | 4,680 lb/season @ $6/lb | $ 28,080 |
| Monitoring & Testing | 6 tests/season @ $250/test | $ 1,500 |
| Short Lived Asset | | $ 2,000 |
| Maintenance/Replacement | 6 tests/season @ $250/test | $ 2,500 |
| Professional Services | $50,000 every 5 years | $ 10,000 |
| Lagoon Sludge Disposal | $2,500 /Season | $ 2,500 |
| Anaerobic Cell Sludge Disposal | | |
| **Annual Total (Rounded)** | | **$ 119,500** |

*includes wages plus benefits

### 4.1.2 Alternative 2 - Convert WWTF to Partially Mixed Aerated Lagoon

#### Description

Alternative 2 converts the existing WWTF to a partially mixed aerated lagoon treatment system. Alternative 2 includes the construction of four additional aerated lagoon cells adjacent to the

existing lagoon cells, as well as a disinfection building for chlorination and dechlorination prior to final discharge.

From Manhole B, wastewater flows into the existing facultative cells, where solids settle out of the water column. In winter months, these existing facultative cells will also serve as storage cells. From the existing facultative cells, wastewater is directed in series to a sequence of 13-foot deep aerated lagoon cells. The aerated lagoons supply the required oxygen to metabolizing microorganisms and provide mixing so that the microorganisms come into contact with dissolved and suspended organic matter for increased $BOD_5$ removal.

From the partially mixed aerated lagoons, wastewater is directed to a new disinfection building for chlorine disinfection. As with Alternative 1, de-chlorination is required prior to final discharge. *Figure 4-2* shows a conceptual layout and flow process for Alternative 2.

## Design Parameters

Partially mixed aerated lagoon treatment systems are used by a number of municipal wastewater facilities throughout Alaska. These types of facilities are able to routinely achieve effluent qualities stipulated in the current Talkeetna APDES Permit.

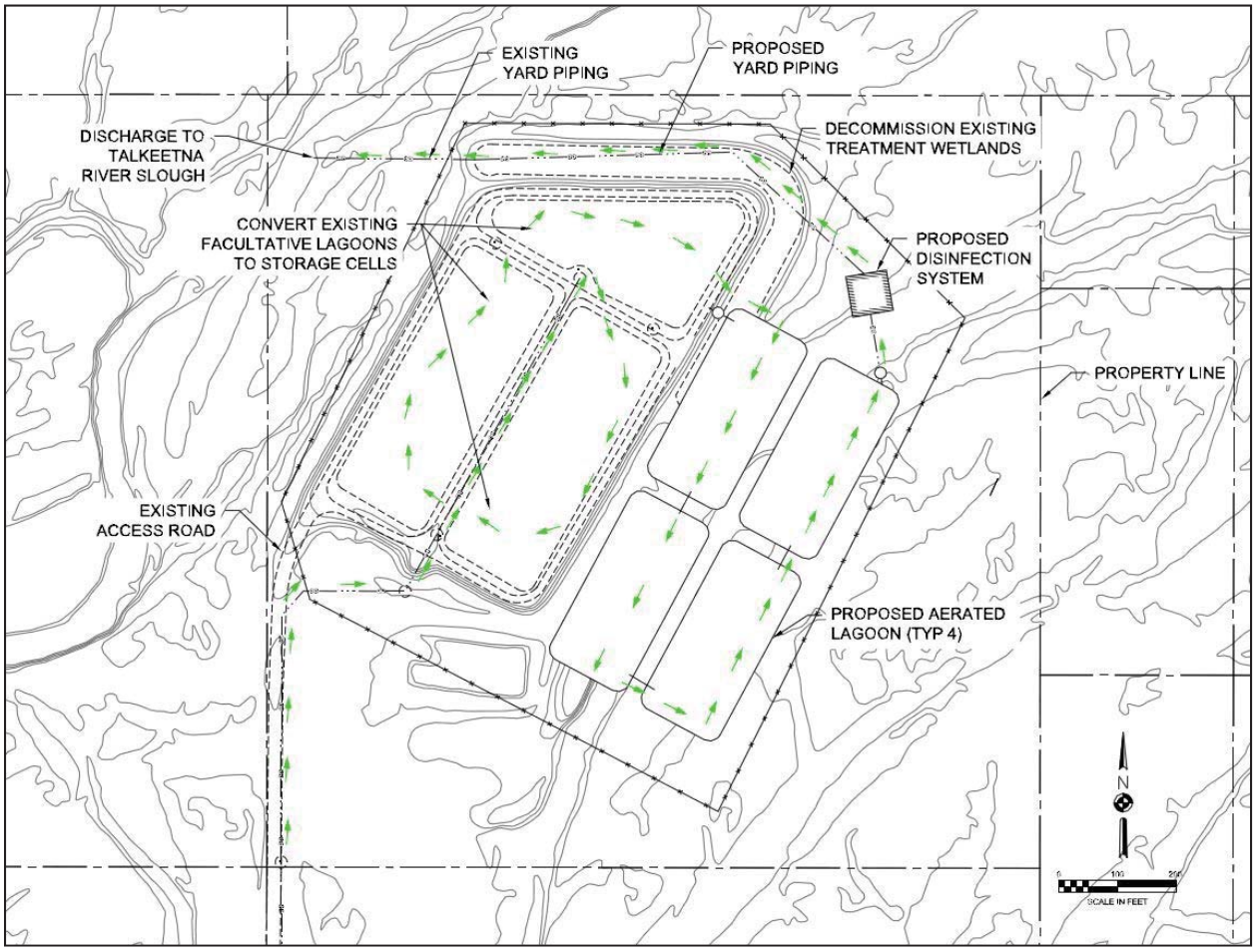



**Figure 4-2: Alternative 2 Conceptual Site Layout**

## Environmental Impacts

### *Floodplains*

As with Alternative 1, Alternative 2 will require construction in the floodplain. To satisfy required depths and flow rates through the aerated lagoons in addition to 2-feet of freeboard, 13-ft tall berms with 3:1 horizontal to vertical side slopes will be constructed. Berm design and construction will account for flood hazards associated with construction in the floodplain.

During a flood event, the WWTF must remain operational and more importantly, ensure wastewater does not breach the lagoons and contaminate surface waters. The disinfection building will also be constructed within the floodplain.

As with Alternative 1, the CLOMR/LOMR process would be followed to remove the WWTF from the flood zone or show that it is adequately protected from the 500-year flood and an MSB flood zone permit will be required to ensure that the addition of fill within the flood zone does not induce a net rise in flood elevation.

### *Wetlands*

This alternative also removes the existing engineered wetlands. The construction of the four partially aerated lagoons will impact the relict wetlands to the east of the existing treatment WWTF.

### *Other Land Resources*

Treated effluent from the WWTF will continue to be discharged into a slough of the Talkeetna River. Ultimately, this alternative will improve effluent quality from the WWTF, reducing impacts on nearby surface waters.

### *Endangered Species*

Alternative 2 has no anticipated impact on endangered species.

### *Historical and Archeological Properties*

Alternative 2 has no anticipated impact on cultural resources.

### *Generation and Management of Residuals and Wastes*

Periodic dredging (every 5-10 years) will be required. The multiple aerated lagoon cell configuration would allow for cells to be drained for sludge excavation one at a time, while leaving the other cells operational. Sludge will need to be disposed of at a site or facility holding an ADEC permit for that type of disposal per 18 AAC 72.055. Aeration equipment must be removed from the basins during dredging to avoid damage.

## Land Requirements

This alternative expands the WWTF footprint by approximately 6 acres. The footprint expansion is within the existing property owned by MSB.

## Potential Construction Problems

- High water table and addition of deep treatment cells;
- Amount of earthwork required to build up berms around treatment cells;
- Construction of a disinfection building in the floodplain and the need to build up site above flood elevations.

## Sustainability Considerations

### *Energy Efficiency*

Alternative 2 requires the addition of 3-phase power to the site for a pair of duty/redundant 30 Hp blowers with variable frequency drive motor control equipment. As with Alternative 1, the disinfection system will require chemical injection pumps and SCADA monitoring equipment to regulate chlorine and de-chlorination agent dosing. Compared to Alternative 1, Alternative 2 requires more energy usage.

### *Green Infrastructure*

This project will improve the overall effluent quality of wastewater discharged to the Talkeetna Slough. Further, efforts will be made to maximize energy efficiency of building and mechanical systems to the greatest degree practicable

### *Operational Simplicity*

Additional staff will not be required to properly operate the system; however, equipment checks and cleaning must be performed on a regular basis. As previously mentioned, the lagoons must be periodically dredged (every five to ten years).

## Cost Estimate

A preliminary cost estimate analyzing construction, non-construction, and operations and maintenance (O&M) costs for Alternative 2 was prepared.

Construction costs include major anticipated construction components such as yard piping, treatment equipment, and earthwork. For purposes of the preliminary estimate unit costs from recently bid projects in the region were utilized. The preliminary estimate also assumes no inflation between now and the time of construction, a single-season construction period, and a competitive bidding environment. A detailed cost estimate with breakdowns of work items and corresponding unit prices is included in Appendix B

Non-construction costs include engineering services for design and construction, MSB administration, and a 20% construction contingency. Engineering services include development of plans, specifications, and estimate; permitting; and construction administration, inspection and

testing. support during construction. For the preliminary estimate, it was assumed that design phases services will be about 10% of the construction cost and construction phase services will be about 10% of the construction cost. MSB administration was assumed to account for 3% of the construction cost.

Combining construction and non-construction costs results in a total capital cost of $12,170,000 for Alternative 2, as shown in *Table 4-4.*

**Table 4-4: Alternative 2 Capital Cost**

| Item | Amount |
|---|---|
| **Construction** | |
| Civil Site Prep | $ 5,182,700 |
| Treatment | $ 2,378,600 |
| Electrical/Controls | $ 948,200 |
| **Non Construction** | |
| Project Contingency (20% of Total Construction Cost) | $ 1,702,000 |
| Design Phase Services (10% of Total Construction Cost) | $ 851,000 |
| Construction Phase Services (10% of Total Construction Cost) | $ 851,000 |
| MSB Administration (3% of Total Construction Cost) | $ 255,300 |
| **Total Capital Cost (Rounded)** | **$ 12,170,000** |

O&M costs include all anticipated costs needed to properly maintain and run the treatment WWTF on a yearly basis. Appendix B includes a more detailed cost estimate breakdown. O&M costs have been summarized based on required materials, labor and energy usages and are summarized in Table 4-5. We estimate the annual O&M cost for Alternative 2 will be $142,000.

**Table 4-5: Alternative 2 Annual O&M Cost**

| Description | | Amount |
|---|---|---|
| Personnel | 790 man-hours/season @ $68/hr* | $ 53,720 |
| Administrative Costs | 80 man-hours/year @ $51/hr* | $ 4,080 |
| Energy Costs | 120,000 kWh/season @ $0.10/kWh | $ 12,000 |
| Sodium Hypochlorite for disinfection | 3,150 gal/season @ $3.50/gal | $ 11,025 |
| Sodium Bisulfate dechlorination | 4,680 lb/season @ $6/lb | $ 28,080 |
| Monitoring & Testing | 6 tests/season @ $250/test | $ 1,500 |
| Short Lived Asset Maintenance/Replacement | | $ 5,000 |
| Professional Services | | $ 2,500 |
| Sludge Disposal | $50,000 every 5 years | $ 10,000 |
| **Annual Total (Rounded)** | | **$ 142,000** |

*Includes wages plus benefits

### 4.1.3 Other Alternatives Considered but Not Deemed Feasible or Practical

A variety of alternatives were considered as possible solutions for achieving regulatory compliance of the WWTF. These alternatives are briefly discussed below, including explanations as to why they were determined to be not feasible or practical. The *Talkeetna WWTF Upgrades Alternative Memorandum* is included as Appendix C to this report. Note that cost estimates were not provided for these alternatives as USDA Bulletin 1780-2 only requires full analysis for alternatives deemed “Technically Feasible”.

### Do Nothing

The do nothing alternative is not considered as an option since it does not meet current state and federal standards for discharge into surface waters.

### Build New WWTF in Different Location

This alternative would have constructed a separate WWTF to decentralize treatment and reduce loading on the existing system. The logical place to construct this new WWTF is on the west side of Talkeetna as the railroad tracks split the town roughly in half.

This alternative was not considered for further development because it would require additional land on the west side of town, which is severely limited and primarily consists of residential development. Because of the small land area, a mechanical treatment plant would also likely be required (see additional discussion below) and additional collection and conveyance piping would be needed resulting in a much more expensive project compared to development at the existing site.

### Expand Facultative Lagoons per ADEC Guidelines

The ADEC Lagoon Construction Guidelines require that lagoons be sized for an HRT of 240 to 365 days. In addition, rain and snow falling on the ponds must be factored into the size of the ponds.

Further, the ponds themselves must be sized according to the anticipated organic loading to the WWTF. Organic loading to the WWTF is often estimated using suggested table values and can misrepresent actual conditions. In order to comply with the ADEC guidelines for the 20-year design period, the WWTF would need to be expanded to 24 acres. This alternative was classified as not practical due to the required footprint and cost compared to the similar alternative to construct a facultative lagoon system in accordance with Canadian guidelines.

### Convert to Extended Aeration Activated Sludge Lagoon Treatment

For this alternative, the WWTF would be converted to an activated sludge lagoon treatment system by converting one of the cells to a biological treatment reactor basin and constructing a process building housing a clarifier and disinfection equipment. The existing lagoon cells would remain in place and be used to capture and store influent wastewater. This alternative was deemed not practical based on capital costs and O&M requirements necessary to keep the WWTF in working order. The Talkeetna WWTF currently operates at a deficit and significantly increasing yearly O&M costs is not a financial option. Additionally, this alternative would likely increase the required operator level for the plant. Talkeetna has experienced operator turnover in the past and it can be very difficult to find qualified personnel for the Talkeetna system.

### Mechanical Treatment Plant

This alternative explored constructing a membrane bioreactor (MBR) mechanical treatment plant with disinfection. Existing treatment cells would remain in place and be used for wastewater storage during non-discharge months. As with the previous alternative, this alternative was

deemed as not practical based on capital costs, intensive O&M requirements and resulting increases to yearly O&M costs, and a likely increase in required operator level for the plant..

# 5.0 SELECTION OF AN ALTERNATIVE

## 5.1 LIFE CYCLE COST ANALYSIS

A present worth life cycle cost analysis was performed based on cost estimates for total capital cost and annual O&M costs. Total capital cost includes project construction cost and non-construction costs, such as engineering services, permitting, and construction contingencies. The analysis examined a 20-year design period and assigned a real discount rate of 0.5% as designated by the Office of Management and Budget to determine a present worth factor of 18.98.

The present worth factor is used to bring annual O&M costs to a present day value and is calculated using the following equation:

$$Present\ Worth\ Factor = \frac{(1+i)^n - 1}{i(1+i)^n}$$

The present worth factor was then applied to the annual O&M cost developed in the previous section. The salvage value for both alternatives was assumed to be negligible at the end of the analysis period. *Table 5-1* summarizes total capital costs and annual costs used to determine present worth for each alternative. The present worth cost for each alternative is governed by the following equation:

*Present Worth Cost = Capital Cost + (O&M Cost x Present Worth Factor)*

**Table 5-1: Alternative Cost Comparisons**

Discount Rate (*i)* = 0.5%

Planning Period = 20 years

| | Alternative 1 | Alternative 2 |
|---|---|---|
| **Capital Cost** | $ 7,800,000 | $ 12,170,000 |
| **Annual O&M** | $ 119,500 | $ 141,400 |
| **Net Present Worth** | $ 10,069,000 | $ 14,855,000 |

Based the present worth analysis, Alternative 1, which upgrades the existing WWTF using Canadian lagoon constructing guidelines, is the less expensive alternative.

## 5.2 NON-MONETARY FACTORS

A variety of non-monetary factors need to be considered in the selection of an alternative. These factors include reuse of existing facilities, adaptability for phased construction, adaptability for future regulatory requirements, overall footprint, and overall operability.

### *Reuse of Existing Facilities*

To minimize cost and maximize the functionality of the existing WWTF, it is preferred that any upgrades to the WWTF utilize existing infrastructure. Alternative 1 continues to use the existing cells for facultative treatment and Alternative 2 converts the existing cells to winter storage. Because both alternative reuse the existing treatment infrastructure, there is no advantage between the two alternatives.

### *Adaptability for Phased Construction*

Depending on available project funding, construction may need to be completed in phases. It is preferred that the selected alternative be adaptable to allow for cost effective construction phasing while still providing functional treatment.

Alternative 1 and 2 both achieve disinfection by utilizing a chlorination/dechlorination system. Alternatives 1 and 2 differ in means of achieving DO levels with Alternative 1 utilizing a reaeration basin and Alternative 2 depending on equipment installed in the aerated lagoons. Alternative 2 is more difficult to phase because to achieve proper DO levels, aeration equipment requires 3-phase power extensions, and additional lagoon construction.

### *Adaptability for Future Regulatory Requirements*

The Talkeetna Slough is an anadromous stream, which may trigger future regulatory requirements on effluent ammonia levels. If future regulations establish ammonia limits, the WWTF may need to include nitrification in the treatment process. Nitrification is the process in which ammonia is converted to nitrate and is influenced by dissolved oxygen, pH, and temperature. Alternative 2 is better suited for future nitrogen removal based on the amount of oxygen and partial mixing within the aerated lagoons. Depending on actual regulatory limits, both alternatives may require additional biological filters.

### *Overall Footprint*

The current WWTF footprint does not meet ADEC recommended separation distances to private property. A smaller footprint is preferred to minimize impacts and keep a positive relationship with surrounding private property owners. Based on preliminary conceptual layouts, Alternative 1 expands the WWTF by approximately 11 acres and Alternative 2 expands the WWTF by approximately 6 acres. Further, Alternative 1 shows a separation distance of 70 feet between edge of WWTF expansion and nearest private property line while Alternative 2 shows a separation distance of 240 feet between the edge of WWTF expansion and nearest private property line. Alternative 2 has a significantly smaller footprint.

### *Overall Operability/Operator Certification Level*

MSB has indicated that there are not sufficient funds to hire additional personnel to assist with WWTF operation and maintenance. It is preferred that the selected alternative not require

additional staff, or additional operator certifications, for successful operation. Currently, the Talkeetna WWTF is classified as a Class 1 treatment system; it is preferred that the selected alternative allow the facility to remain classified as such. ADEC assigns classifications for treatment facilities using a point rating system outlined in 18 AAC 74. *Table 5-2* summarizes anticipated scores for each alternative. As a guideline, a score ranging between 1 and 30 points represents a Class I System Type and a score ranging from 31-55 represents a Class 2 System. Higher point ranges correlate to Class 3 and Class 4 systems.

**Table 5-2 ADEC Facility Classification Rating**

| Criteria | Alternative 1 | Alternative 2 |
|---|---|---|
| **Size** | | |
| 100,001 to 500,000 GPD | 9 | 9 |
| **Pretreatment** | | |
| Influent Pumping | 2 | 2 |
| Flow equalization basin | | 1 |
| **Secondary Treatment** | | |
| Stabilization Pond without aeration | 5 | |
| Aerated Lagoon | | 8 |
| **Solids Disposal** | | |
| Off-site disposal | 1 | 1 |
| **Disinfection** | | |
| Liquid and powdered hypochlorite | 3 | 3 |
| Dechlorination with chemical dechlorination agents other than gas | 3 | 3 |
| **Effluent Discharge** | | |
| Effluent Aeration | 2 | |
| **TOTAL** | **25** | **27** |

Based on the anticipated rating assigned in *Table 5-2*, Alternative 1 and Alternative 2 both fall within Type 1 Classification.

There are other advantages and disadvantages to both alternatives when considering overall operability. Both alternatives will require periodic sludge removal every 5-10 years, and Alternative 1 will require annual or bi-annual sludge removal within the two anaerobic cells and a large storage pond that will require periodic skimming. Alternative 2 utilizes more mechanical equipment requiring routine maintenance. Ultimately, current staff should be capable of maintaining either alternative.

## 5.3 DECISION MATRIX

A scoring and weighting matrix was developed to assist MSB with ranking of the two alternatives. The matrix includes monetary and nonmonetary factors previously described above, and assigns a score ranging from 1-10, indicating how well each alternative meets the criteria.

MSB has assigned an importance factor for each criteria to differentiate between criteria with high importance and those with less importance. To establish importance factors, a total of 100 points were distributed between each of the criteria. High point values indicate high importance and lower point values indicate relatively minor or insignificant importance to MSB. Additionally, some

scoring criteria such as environmental impacts and permitability were left off of the final scoring matrix because there was either no difference in scores or it was not deemed a useful criteria.

The weighted scores for each criteria were obtained by multiplying the importance factor by the corresponding score. The total score for each alternative is the sum of the weighted scores. The alternative with the highest score is the preferred alternative.

MSB staff and members of the consultant team independently scored each alternative using the developed matrix. Appendix D of this report includes the spreadsheet used to compile individual scores.

*Table 5-3* includes average scores for each criterion for each alternative, and applies importance factors as assigned by MSB. After scores from members of MSB and the preliminary engineering team were tallied, Alternative 1 was shown to be the preferred alternative.

**Table 5-3: Criteria Scoring and Weighting Matrix**

| Criteria | Importance Factor | Alternative 1 - Upgrade Facultative Lagoons Per Canadian Standards | | Alternative 2 - Upgrade to Partially Mixed Aerated Lagoons | |
|---|---|---|---|---|---|
| | *Total Points =100* | *Average Score 1= Least Desirable 10= Most Desirable* | *Rounded Weighted Score* | *Average Score 1= Least Desirable 10= Most Desirable* | *Rounded Weighted Score* |
| **Capital Cost** | 18 | 7.3 | 132 | 3.3 | 60 |
| **Annual O&M** | 22 | 6.9 | 152 | 5.7 | 104 |
| **Reuse of Existing Facilities** | 5 | 6.4 | 33 | 5.6 | 28 |
| **Adaptability for Phased Construction** | 15 | 6.9 | 104 | 5.6 | 84 |
| **Adaptability for Future** | 20 | 4.3 | 87 | 7.3 | 150 |
| **Overall Footprint** | 5 | 4.4 | 23 | 7.4 | 38 |
| **Overall Operability** | 15 | 6.2 | 94 | 7.0 | 105 |
| **TOTAL** | | | **622** | | **564** |

# 6.0 PROPOSED PROJECT

## 6.1 PRELIMINARY PROJECT DESIGN

As discussed previously, the selected alternative expands the existing facultative lagoon treatment system using a configuration and operation which complies with established standards for the Canadian Province of Alberta. This alternative will allow the Talkeetna WWTF to consistently meet APDES permit requirements for projected 20-year wastewater flows previously established in *Table 4-1*.

Design components include the addition of two anaerobic primary treatment lagoon cells, a storage cell, a reaeration basin, and a chlorination/dechlorination disinfection system, as well as associated yard piping. This design utilizes the existing facultative lagoons, which currently

receive influent wastewater from the existing force main. Major system components are described in further detail below and are ordered according to their place in the overall treatment process:

## *Anaerobic Cells*

Two new anaerobic cells will be constructed to handle incoming settleable solids. By placing these new cells at the head end of the overall treatment process, research has shown that 20-30 percent of incoming BOD5 can be removed before it makes its way into the facultative treatment lagoons.

The anaerobic cells are designed to operate in series to maximize the amount of settleable material removed and stored. The cells will be a minimum of 11.5 feet deep with 2 feet of additional freeboard above the standard water level for a 2-day detention time at peak flows. Periodic solids removal will be required for maximum operational efficiency. The proposed design places these cells before the existing Manhole A requiring portions of the existing force main and other conveyance piping be reconstructed to direct incoming flows through the anaerobic cells and further on to the existing facultative lagoons. To accommodate wastewater flows during sludge removal, bypass yard piping will be installed to allow for either cell to operate as the first in the series.

## *Existing 3-Cell Facultative Lagoon*

After leaving the anaerobic cells, wastewater will flow to the existing facultative lagoon cells for further treatment to remove BOD5 and TSS. Existing yard piping will need to be reconfigured to allow for gravity drainage between the anaerobic cells and existing lagoons. Facultative treatment processes will require approximately 60 days of detention time to achieve adequate BOD5 and TSS removal per the Canadian Design Guidelines.

## *Storage Cell*

From the final facultative cell, treated wastewater will be directed to a new 10.2 acre, 12-foot deep, storage cell for further BOD5 and TSS removal. The storage cell is sized to achieve a minimum retention time of 365 days and will provide the additional hydraulic capacity that the facility currently lacks.

### *Reaeration Basin*

From the storage cell, treated wastewater will be directed to the reaeration basin to establish dissolved oxygen levels required in the APDES permit. The basin will be approximately 8 feet deep with an approximate volume of 75,000 gallons.

Air will be forced into the basin via submerged fine bubble diffusers. The diffusers will be suspended from floating aeration headers to allow for easy removal during dredging. A single low pressure air blower will be used to supply air to the submerged diffusers. Based on a maximum permitted discharge of 180,000 gpd, a 7.5 hp blower should be capable of maintaining adequate DO levels. Furthermore, to conserve energy, the blower can be installed with variable speed motor controls to maintain a set dissolved oxygen level based on SCADA equipment installed in the basin.

### *Disinfection System*

From the reaeration basin, treated wastewater will be pumped through a disinfection system for removal of fecal coliforms and other pathogens. The disinfection system will consist of a small disinfection building for chemical storage, a chlorine contact basin, and chemical metering pumps for the addition of chlorination and de-chlorination chemicals. From the disinfection building, effluent piping will connect to a buried discharge pipe and treated effluent will be released into the Talkeetna River Slough, as currently permitted.

*Table 6-1* Below summarizes preliminary dimensions for the major design components.

**Table 6-1: Major Design Components**

| | Quantity | Surface Area | Total Depth (Including 2 ft of freeboard) |
|---|---|---|---|
| **Anaerobic Cell** | 2 | 4,624 SF | 13.5 |
| **Existing Lagoons** | 1 | 5.5 Acres | 7 |
| **Storage Cell** | 1 | 10.2 Acres | 12 |
| **Reaeration Basin** | 1 | 1,000 SF | 10 |
| **Disinfection System** | 1 | NA | NA |

## 6.2 PROJECT SCHEDULE/PROJECT PHASING

Talkeetna primarily struggles with meeting its permit limits for DO and FC. Of secondary, yet still significant concern, are periodic violations of effluent $BOD_5$ and TSS, primarily owing to the need for additional treatment and storage capacity to meet ever increasing flows. To meet these needs in a manner that solves the most pressing issues first, the selected alternative has been broken into phases.

MSB has expressed a desire to address their DO and FC violations as soon as possible, to meet those needs, Phase 1 of the overall project will install the anaerobic cells, disinfection system, and reaeration basin. This will allow the existing facultative lagoons to treat lower strength

wastewater due to the removal of primary settleable solids within the anaerobic cells; and directly treat lagoon effluent to remove FC and introduce additional DO prior to discharge.

Phase 2 would construct the new storage cell, and reconfigure yard piping accordingly to meet the anticipated 20-year design flows.

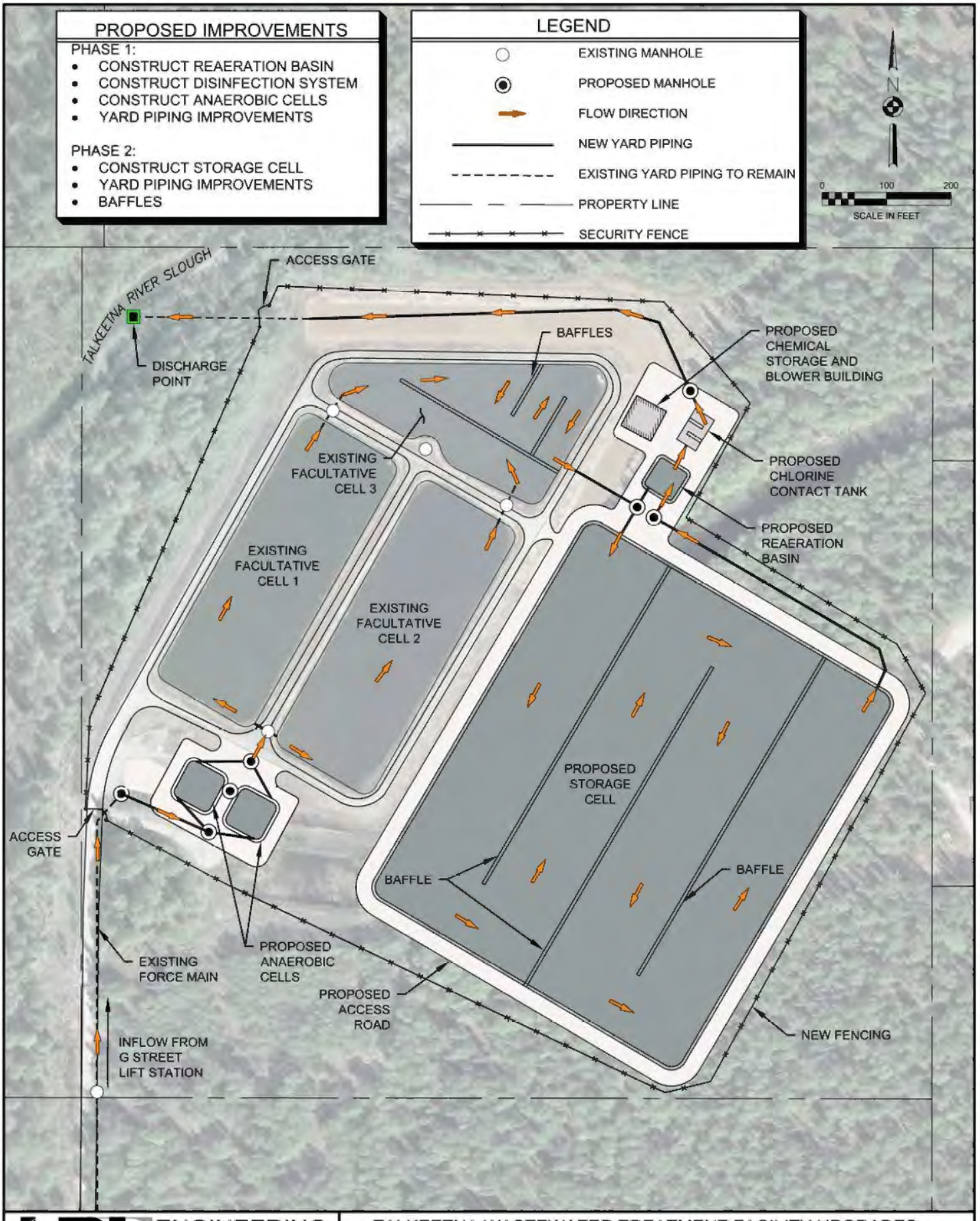
The advantage of this phasing schedule is that Phase 2 can be constructed at any date after Phase 1 is finished, depending on the need for additional treatment capacity. All Phase 1 improvements would be adequately sized to handle future anticipate flows, or will include adequate space so that larger pumps, blowers, and other equipment could be easily swapped in during the subsequent Phase 2 expansions. *Figure 6-1* shows the preliminary layout, treatment process schematic, and proposed phasing for the selected alternative.

*Table 6-2* presents proposed dates for major design and construction components to facilitate the completion of the proposed project. Note that land and easement acquisition has not been included since the proposed project is located entirely on MSB owned land.

**Table 6-2: Project Schedule**

| Task | Proposed Start Date** | Proposed Completion Date** |
|---|---|---|
| USDA Review/Approval of PER | December 1, 2017 | January 15, 2018 |
| **Phase 1** | | |
| Design/Permitting | March 2018 | May 2018 |
| Bidding | June 2018 | June 2018 |
| Construction | July 2018 | June 2019 |
| Initiate Operation/Substantial Completion | | July 2019 |
| Final Completion | | September 2019 |
| **Phase 2** | | |
| As Needed to Meet Future Flows | | |

*All project schedules presented are dependent on approvals by USDA, MSB Assembly, and availability of matching grant funds.

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# TALKEETNA WASTEWATER TREATMENT FACILITY UPGRADES
## PROPOSED PROJECT
## MATANUSKA-SUSITNA BOROUGH
TALKEETNA, ALASKA

| | | | |
|---|---|---|---|
| DATE: NOVEMBER 2017 | DRAWN BY: NMY | SHEET: FIGURE 6-1 |
| SCALE: 1" = 200' | CHECKED BY: CJB | JOB NO.: 16-024 |

## 6.3 PERMIT REQUIREMENTS

The proposed project does not change the discharge point or treatment methods, and will not affect the current APDES permit for discharge into surface waters. Based on discussions between MSB and ADEC, the Talkeetna WWTF discharge permit is not expected to be significantly modified during the next permit cycle in 2018. The proposed design for WWTF modifications must be approved by ADEC through an engineering plan review process that grants Approval to Construct the system.

Additionally, to meet USDA requirements that critical facilities are constructed outside of the 500-year floodplain, a FEMA CLOMR/LOMR permit will be required to remove the WWTF from the floodplain maps. Finally, an MSB Floodplain Development Permit is needed to show that construction within the floodplain results in no net rise of flooding elevations.

Additional permits for wetlands, cultural resources, fish and wildlife, etc. are identified in the Environmental Review document prepared along with this PER.

## 6.4 TOTAL PROJECT COST ESTIMATE

Preliminary cost estimates for construction phases have been developed based on anticipated construction costs and non-construction costs, including engineering design, construction program management, MSB administration, and construction contingency. The proposed project is on MSB owned land and is not anticipated to require additional land acquisition or easements. *Table 6-3* summarizes preliminary cost estimates for completion of Phases 1 and 2. Note that costs differ slightly from what is presented in Section 5 because of the increased cost of phasing work. Complete, itemized phased construction cost estimates can be found in Appendix E. MSB is seeking a grant through USDA Rural Development Program to fund 75 percent of the Total Capital Project Cost, with the remaining 25 percent to be matched by MSB.

| Item | Phase 1 | Phase 2 | Total |
|---|---|---|---|
| **Construction** | $ 2,270,000 | $ 3,140,000 | $ 3,170,000 |
| **Non Construction** | | | |
| Project Contingency (20% of Total Construction Cost) | $ 454,000 | $ 628,000 | $ 634,000 |
| Design Phase Services (10% of Total Construction Cost) | $ 227,000 | $ 376,800 | $ 317,000 |
| Construction Phase Services (10% of Total Construction Cost) | $ 227,000 | $ 314,000 | $ 317,000 |
| MSB Administration (3% of Total Construction Cost) | $ 68,100 | $ 94,200 | $ 95,100 |
| **Phased Project Cost (rounded)** | **$ 3,200,000** | **$ 4,600,000** | **$ 4,500,000** |
| **Project Funding** | | | |
| USDA Grant (75% of Project Cost) | **$ 2,400,000** | **$ 3,450,000** | **$ 3,375,000** |
| MSB Match (25% of Project Cost) | **$ 800,000** | **$ 1,150,000** | **$ 1,125,000** |

## 6.5 ANNUAL OPERATING BUDGET

### 6.5.1 Income

Currently, all income is generated from utility service charges. To supplement service charges, MSB has started discussions to implement a sales tax in Talkeetna to help fund water and sewer operations.

MSB is currently working on a study to assess the revenue brought in by the tourism industry as well as an appropriate sales tax. These studies were not completed at the time of this report.

*Table 6-4* summarizes system users for the current year (2016), and the design year (2036). Total users at the end of the design period were estimated by applying growth rates established in *Table 3-1* of this report. As previously stated, MSB has no plans of extending the collection system, but requires service connections for new developments adjacent to the existing system. Large agricultural or large commercial users are not anticipated to connect to the system.

*Table 6-4* also applies the rate schedule previously presented in *Table 2-4* and assumes annual rate increases along with increased users through the 20-year design period to estimate annual revenues.

**Table 6-4: Sewer Rate Income**

| Year | Rate increase | Residential Sewer Rate | Commercial Sewer Rates | Existing Residential Customers | Projected Residential Customers | Existing Commercial Customers | Projected Commercial Customers | Existing Customer Total Revenue | Projected Customer Total Revenue |
|---|---|---|---|---|---|---|---|---|---|
| 2016 | 13.5% | $ 53.50 | $ 101.00 | 113 | 113 | 82 | 82 | $ 14,327.50 | $ 14,327.50 |
| 2017 | 13.5% | $ 60.46 | $ 114.13 | 113 | 114 | 82 | 83 | $ 16,261.71 | $ 16,646.99 |
| 2018 | 2.5% | $ 61.06 | $ 115.27 | 113 | 116 | 82 | 84 | $ 16,668.26 | $ 17,087.58 |
| 2019 | 2.5% | $ 61.67 | $ 116.42 | 113 | 117 | 82 | 85 | $ 17,084.96 | $ 17,733.71 |
| 2020 | 2.5% | $ 62.29 | $ 117.59 | 113 | 119 | 82 | 86 | $ 17,512.09 | $ 18,404.27 |
| 2021 | 2.5% | $ 62.91 | $ 118.76 | 113 | 120 | 82 | 87 | $ 17,949.89 | $ 19,100.19 |
| 2022 | 2.5% | $ 63.54 | $ 119.95 | 113 | 122 | 82 | 88 | $ 18,398.64 | $ 19,822.42 |
| 2023 | 2.5% | $ 64.17 | $ 121.15 | 113 | 123 | 82 | 89 | $ 18,858.60 | $ 20,571.97 |
| 2024 | 2.5% | $ 64.82 | $ 122.36 | 113 | 125 | 82 | 91 | $ 19,330.07 | $ 21,349.85 |
| 2025 | 2.5% | $ 65.46 | $ 123.59 | 113 | 126 | 82 | 92 | $ 19,813.32 | $ 22,157.15 |
| 2026 | 2.5% | $ 66.12 | $ 124.82 | 113 | 128 | 82 | 93 | $ 20,308.65 | $ 22,994.98 |
| 2027 | 2.5% | $ 66.78 | $ 126.07 | 113 | 129 | 82 | 94 | $ 20,816.37 | $ 23,864.49 |
| 2028 | 2.5% | $ 67.45 | $ 127.33 | 113 | 131 | 82 | 95 | $ 21,336.78 | $ 24,766.87 |
| 2029 | 2.5% | $ 68.12 | $ 128.60 | 113 | 133 | 82 | 96 | $ 21,870.20 | $ 25,703.38 |
| 2030 | 2.5% | $ 68.80 | $ 129.89 | 113 | 134 | 82 | 98 | $ 22,416.95 | $ 26,675.30 |
| 2031 | 2.5% | $ 69.49 | $ 131.19 | 113 | 136 | 82 | 99 | $ 22,977.37 | $ 27,683.97 |
| 2032 | 2.5% | $ 70.19 | $ 132.50 | 113 | 138 | 82 | 100 | $ 23,551.81 | $ 28,730.78 |
| 2033 | 2.5% | $ 70.89 | $ 133.83 | 113 | 139 | 82 | 101 | $ 24,140.60 | $ 29,817.18 |
| 2034 | 2.5% | $ 71.60 | $ 135.16 | 113 | 141 | 82 | 103 | $ 24,744.12 | $ 30,944.65 |
| 2035 | 2.5% | $ 72.31 | $ 136.52 | 113 | 143 | 82 | 104 | $ 25,362.72 | $ 32,114.76 |
| 2036 | 2.5% | $ 73.04 | $ 137.88 | 113 | 145 | 82 | 105 | $ 25,996.79 | $ 33,329.11 |

### 6.5.2 Annual O&M Costs

*Table 6-5* summarizes annual operating costs for the complete facility upgrade. MSB can expect an annual O&M cost of $119,500.

**Table 6-5: Proposed Project Annual O&M Cost**

| Description | | Amount |
|---|---|---|
| Personnel | 770 man-hours/season @ $68/hr* | $ 52,360 |
| Administrative Costs | 80 man-hours/year @ $51/hr* | $ 4,080 |
| Energy Costs | 50 kWh/season @ $0.10/kWh | $ 5,000 |
| Sodium Hypochlorite for disinfection | 3,150 gal/season @ $3.50/gal | $ 11,025 |
| Sodium Bisulfate dechlorination | 4,680 lb/season @ $6/lb | $ 28,080 |
| Monitoring & Testing | 6 tests/season @ $250/test | $ 1,500 |
| Short Lived Asset Maintenance/Replacement | 1,300$/Year | $ 1,300 |
| Miscellaneous Consumables | 700$/Year | $700 |
| Professional Services | | $ 2,500 |
| Lagoon Sludge Disposal | $50,000 every 5 years | $ 10,000 |
| Anaerobic Cell Sludge Disposal | 2,500/season | $ 2,500 |
| **Annual Total (Rounded)** | | **$ 119,500** |

*Includes wages plus benefits

### 6.5.3 Debt Repayments

As previously discussed, the Talkeetna Water and Sewer System has been operating at a deficit for a number of years. For the 2016 fiscal year, the total deficit for the Water and Sewer System was $438,317, roughly half of which was from the system taking on additional, one-time debt. Based on discussions with MSB, debt repayment will be through a combination of utility service charges, future sales tax, and fund transfers from MSB reserve accounts.

To fund the 25% match of the capital cost for upgrades to the facility, MSB will use available funds from their Capital Budget for Federal Grant Program Matches and likely supplement those funds with an Alaska Clean Water Fund loan through the State of Alaska Revolving Loan Program.

### 6.5.4 Reserves

*Table 6-6* summarizes anticipated short lived assets, expected replacement periods, and estimated replacement costs.

**Table 6-6: Short Lived Assets and Recommended Annual Reserve**

| Short Lived Assets | Replacement Period (Years) | Quantity/ Period | Cost/ Each | Total Cost |
|---|---|---|---|---|
| **Five Year Replacement Assets** | | | | |
| **Aeration blowers** | | | | |
| Air Filter | 1 | 5 | $ 200.00 | $ 1,000.00 |
| Lubricant | 1 | 5 | $ 130.00 | $ 650.00 |
| **Aeration diffusers and nozzles** | | | | |
| Complete Replacement | 2 | 2.5 | $ 500.00 | $ 1,250.00 |
| **Lift Station Submersible Pumps** | | | | |
| Lift Station 1 | 5 | 1 | $ 4,500.00 | $ 4,500.00 |
| Lift Station 2 | 5 | 1 | $ 4,500.00 | $ 4,500.00 |
| G-Street Lift Station | 5 | 1 | $ 4,500.00 | $ 4,500.00 |
| **Miscellaneous** | | | | |
| Computer & Software | 5 | 1 | $ 5,000.00 | $ 5,000.00 |
| **Total Five Year Replacement Budget** | | | | $ 21,400.00 |
| Annual Contribution | (Total/5) | | | $ 4,280.00 |
| | | | | |
| **Ten Year Replacement Assets** | | | | |
| **Chemical Feed Pumps** | | | | |
| Bleed valve Assembly | 10 | 1 | $ 150.00 | $ 150.00 |
| Injection Valve | 10 | 1 | $ 200.00 | $ 200.00 |
| Polyethylene discharge tubing | 10 | 1 | $ 4.00 | $ 4.00 |
| Strainer Assembly | 10 | 1 | $ 115.00 | $ 115.00 |
| **SCADA System** | | | | |
| SCADA upgrades | 10 | 1 | $ 2,000.00 | $ 2,000.00 |
| **Flow meters** | | | | |
| Complete Replacement | 10 | 1 | $ 2,000.00 | $ 2,000.00 |
| **Security Devices and Fencing** | | | | |
| General Maintenance | 10 | 1 | $ 1,000.00 | $ 1,000.00 |
| **General** | | | | |
| Sewer Utility Work Truck | 10 | 1 | $ 45,000.00 | $ 45,000.00 |
| **Total Ten Year Replacement Budget** | | | | $ 59,369.00 |
| Annual Contribution | (Total/10) | | | $ 5,936.90 |
| | | | | |
| **Fifteen Year Replacement Assets** | | | | |
| **Chemical Feed Pumps** | | | | |
| Complete Replacement | 15 | 1 | $ 1,500.00 | $ 1,500.00 |
| **Pump Controls** | | | | |
| Complete Replacement | 15 | 1 | $ 1,000.00 | $ 1,000.00 |
| **Security devices and fencing** | | | | |
| General maintenance | 10 | 2 | $ 1,000.00 | $ 2,000.00 |
| **Total Fifteen Year Replacement Budget** | | | | $ 4,500.00 |
| Annual Contribution | (Total/15) | | | $ 300.00 |
| | | | | |
| | | **Recommended Annual Reserve** | | **$ 10,519.90** |

From *Table 6-6*, an annual deposit of $10,519.90 is recommended for short lived asset replacement costs across the entire sewer system. Note that costs reflected in *Table 6-5* for the O&M cost estimate are for the proposed project only.

# 7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the engineering analysis presented in this report we recommend the following:

- Construct Alternative 1-Expand Facultative Lagoon Per Canadian Standards.
- Construct the proposed project in phases starting with Phase 1-Install Reaeration Basin and Disinfection Building. Phase 1 can be further broken into Phase 1a, which procures treatment equipment and installs temporary polyethylene tanks for interim operation while Phase 1b is designed. Phase 1b installs the permanent reaeration basin and disinfection systems and associated buildings and yard piping to address DO and FC concerns.
- Collect weekly influent composite samples during summer 2018 to aid in design of the full treatment system.
- Correct disconnect between SCADA flow readings at the water treatment facility and G-Street lift station to allow for accurate assessment of I&I contributions.
- Implement a sales tax to help fund annual O&M costs, balance the current deficit, and provide debt and equipment reserve accounts.
- Apply for a loan from the State Clean Water Fund Revolving Loan Program.

# REFERENCES

[1] Talkeetna Sewer & Water Assessment, Sewer System Technical Memorandum, Prepared by CRW Engineering Group, LLC for Matanuska-Susitna Borough, August 2014.

[2] FEMA Technical Fact Sheet No. 1.6, *Designing for Flood Levels Above the BFE, December 2010.*

[3] Alaska Population Projections 2015-2045, Alaska Department of Labor and Workforce Development, April 2016.

[4] Alaska Visitor Statistics Program VI-Summer 2011

[5] Talkeetna Community/Tourism Plan, March 2002

[6] Lee Metcalf & Eddy, revised by G. Tchobanoglous, F. Burton, D. Stensel, *Wastewater Engineering Treatment and Reuse*, *4th Edition, New York:* McGraw-Hill Companies, Inc. 2003.

[7] Kadlec, Robert H., and Robert L. Knight. “Pathogens.” Treatment Wetlands. Boca Raton: Lewis, 1996. 537-40.

# APPENDIX A
# ADEC CORRESPONDENCE

THE STATE of ALASKA
GOVERNOR BILL WALKER

**Department of Environmental Conservation**
DIVISION OF WATER
Compliance Program

555 Cordova Street, 3rd Floor
Anchorage, Alaska 99501
Main: 907.269.6285
Fax: 907.269.3487
www.dec.alaska.gov

9/9/2015

## NOTICE OF VIOLATION

Failure to Comply with Permit Conditions under 18 AAC 83.405(b) – Alaska Pollutant Discharge Elimination System Authorization Number AKG573033

Matanuska Susitna Borough
Attn: Terry Dolan, Director of Public Works
1420 S. Industrial Way
Palmer, AK 99645

Enforcement Tracking No: 15-R0495-40-0002

The Department alleges that on or around May 2014 through September 2014, and on or about May 2015 through July 2015, the Talkeetna Lagoon did unlawfully fail to comply with the conditions of the Alaska Pollutant Discharge Elimination System (APDES) General Permit for Domestic Wastewater Treatment Lagoons Discharging to Surface Water, Authorization Number AKG573033. Such noncompliance is in violation of 18 AAC 83.405(b) Duty to Comply and AS 46.03.710.

On September 1, 2015 Alaska Department of Environmental Conservation (ADEC) staff conducted a review of Discharge Monitoring Report (DMR) data from the Talkeetna Lagoon for compliance with permit effluent limits. Table 4 of the permit states the effluent limits that apply to the Talkeetna Lagoon. The following summary of permit effluent violations were identified during the DMR review:

- July 2015: effluent violation(s): dissolved oxygen daily minimum, and fecal coliform monthly mean and daily maximum.
- June 2015: effluent violations(s): dissolved oxygen daily minimum, chlorine monthly average, fecal coliform monthly mean and daily maximum.
- May 2015: effluent violations(s): dissolved oxygen daily minimum, fecal coliform monthly mean and daily maximum.
- September 2014: effluent violations(s): dissolved oxygen daily minimum, fecal coliform monthly mean and daily maximum.
- August 2014: effluent violations(s): dissolved oxygen daily minimum, fecal coliform monthly mean and daily maximum.
- July 2014 effluent violations(s): dissolved oxygen daily minimum, fecal coliform monthly mean and daily maximum.

- June 2014 effluent violation(s): pH instantaneous maximum, chlorine monthly average, and suspended solids minimum percent removal.
- May 2014 effluent violation(s): dissolved oxygen daily minimum, chlorine monthly average, fecal coliform monthly mean.

To address the violation described above, the Department requires that you do the following:

a. Submit a written plan to ADEC that outlines the Boroughs actions it will take to come into compliance with the permit effluent limits. This plan should address future improvements both to the lagoon itself and to the operation and maintenance of the lagoon, and should specify the anticipated dates of the improvements.
b. As a reminder, continue to submit DMR forms are complete in their entirety and are postmarked by the 15th of the following month. DMRs are also required for periods of no discharge.

Please respond to this request by no later than **10/15/2015. Deliverables can be submitted via mail, email, or fax:**

**Attention:**
**Kara Kusche**
**555 Cordova Street**
**Anchorage, AK 99501**
**Kara.kusche@alaska.gov**
**Fax: 907.296.4604**

Penalties for violation of State statutes and regulations can be quite serious. In a civil action, a person who violates or causes or permits to be violated a provision of this regulation may be liable to the State for Substantial monetary damages under AS 46.03.760. Depending on the nature of the violation, you may also be liable for the State's response costs under AS 46.03.822, for spill penalties under AS 46.03.758-759, for administrative penalties under AS 46.03.761, or for other kinds of damages or penalties under other statutes.

In a criminal violation, a person who acts with criminal negligence may be guilty of a Class A misdemeanor. AS 46.03.790. Upon conviction, a defendant who is not an organization may be sentenced to pay a fine not exceeding $10,000.00 and/or sentenced to a definite term of imprisonment of not more than one year. Upon conviction, a defendant that is an organization may be sentenced to pay a fine not exceeding the greater of $500,000.00 or an amount which is three times the pecuniary damage or loss caused by the defendant to another or property of another. AS 12.55.035; each day of violation may be considered a separate violation. Alaska laws allow the State to pursue both civil and criminal actions concurrently.

Nothing in this notice shall be construed as a waiver of the State's authority or as an agreement on the part of the State to forego judicial or administrative enforcement of the above-described violation(s) or to seek recovery of damages, cost and penalties as prescribed by law. In addition, nothing herein shall be construed as a waiver of enforcement for past, present, or future violations not specifically set forth herein.

If you have questions, I may be contacted at (907) 269-7557, or via e-mail: kara.kusche@alaska.gov.

Kara Kusche

Kara Kusche, Enforcement Officer
Credential No. R-0440

Check One:
( ) Personally Served
(X) Sent by Certified Mail
7012 3460 0002 9326 8739

on the 9 day of September, 2015

cc: Amber Bennett, Environmental Program Specialist, ADEC
Mike Solter, Program Manager, ADEC
Rick Cool, EPA

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Environmental Conservation
DIVISION OF WATER
Compliance Program
555 Cordova Street, 3rd Floor
Anchorage, Alaska 99501
Main: 907.269.6285
Fax: 907.269.3487
www.dec.alaska.gov



5/28/2015

# NOTICE OF VIOLATION

Failure to Comply with Permit Conditions under 18 AAC 83.405(b) – Alaska Pollutant Discharge Elimination System Authorization Number AKG573033

Matanuska Susitna Borough
Attn: Terry Dolan, Director of Public Works
1420 S. Industrial Way
Palmer, AK 99645

Enforcement Tracking No: 15-R0495-40-0001

The Department alleges that on or around May 5, 2015 the Talkeetna Lagoon did unlawfully fail to comply with the conditions of the Alaska Pollutant Discharge Elimination System (APDES) General Permit Number AKG573000, Authorization Number AKG573033. Such noncompliance is in violation of 18 AAC 83.405(b) Duty to Comply and AS 46.03.710.

On May 5, 2015 Alaska Department of Environmental Conservation (ADEC) staff conducted an inspection of the Talkeetna Lagoon for compliance with their APDES permit. The following list of permit violations were identified during the facility inspection:

1) The facility does not have a written Lagoon Maintenance Program Plan.
   - Permit part 3.2 states that "the permittee shall develop and implement a Lagoon Maintenance Program Plan" and lists out what the plan must include.

2) The facility did have a copy of the Generic ADEC QAPP, but this QAPP did not contain any facility specific updates or information.
   - Permit part 5.0 discusses the requirements of the QAPP and the minimum facility specific elements of the QAPP.

3) Sampling chain of custody forms were not present onsite.
   - Permit Standard Conditions part 1.11.2.6 states that "the permittee shall retain records… of all monitoring information" which includes "quality assurance chain of custody forms."

4) Self-reported discharge monitoring report (DMR) data was reviewed and showed many non-receipt violations from failing to turn in DMRs or from turning in incomplete DMRs. Appendix 2 of the inspection report itemizes these violations.

- Permit Standard Conditions part 3.2.1 states that monitoring results shall be summarized each month on the DMR. The permittee must submit reports monthly postmarked by the 15th day of the following month.

5) Self-reported discharge monitoring report (DMR) data was reviewed and dissolved oxygen and fecal coliform effluent violations were present in 2014. Appendix 2 of the inspection report itemizes these violations.
   - Permit part 2.3, Table 4 outlines the effluent limits for Class C lagoons.

6) DMRs are being signed by the wastewater operator and not by a principal executive officer or ranking elected official. Delegation of Authority documentation was absent.
   - Permit Standard Conditions part 1.12.2.3 states that reports must be signed by "either a principal executive officer or ranking elected official" or a "duly authorized representative of that person… if the authorization is made in writing."

7) Weekly lagoon inspections have been completed by the wastewater operator and documented in a log for 2014 and 2015. The log does not contain the name of the person conducting the inspections. 2013 records of weekly lagoon inspections were not able to be located onsite.
   - Permit part 3.3 states that "the permittee shall inspect the lagoon on a weekly bases" and that records "must include the…name of the person conducting the inspection."

To address the violation described above, the Department requires that you do the following:

a. Develop a Lagoon Maintenance Program Plan and submit a copy to ADEC.
b. Add facility specific permit-required information to the QAPP and submit a copy to ADEC.
c. Ensure that all records related to monitoring are maintained onsite. This includes chain of custody forms.
d. Ensure that DMR forms are completed in their entirety and are postmarked by the 15th of the following month. As a reminder, DMRs are required for periods of no discharge. Submit or re-submit DMRs for months that show up as non-receipt violations in the Violations Report as seen in Appendix 2 of the inspection report. Ensure that DMRs are signed by a principal executive officer, ranking elected official, or their written authorized representative.
e. Moving forward, update the Weekly Lagoon Inspection documentation to also include the name of the person conducting the inspection. Submit completed Weekly Lagoon Inspection documentation for June 2015 to ADEC

Please respond to this request by no later than **7/31/2015. Deliverables can be submitted via mail, email, or fax:**

**Attention:**
**Kara Kusche**
**555 Cordova Street**
**Anchorage, AK 99501**
**Kara.kusche@alaska.gov**
**Fax: 907.296.4604**

Penalties for violation of State statutes and regulations can be quite serious. In a civil action, a person who violates or causes or permits to be violated a provision of this regulation may be liable to the State for Substantial monetary damages under AS 46.03.760. Depending on the nature of the violation, you may also be liable for the State's response costs under AS 46.03.822, for spill penalties under AS 46.03.758-759, for administrative penalties under AS 46.03.761, or for other kinds of damages or penalties under other statutes.

In a criminal violation, a person who acts with criminal negligence may be guilty of a Class A misdemeanor. AS 46.03.790. Upon conviction, a defendant who is not an organization may be sentenced to pay a fine not exceeding $10,000.00 and/or sentenced to a definite term of imprisonment of not more than one year. Upon conviction, a defendant that is an organization may be sentenced to pay a fine not exceeding the greater of $500,000.00 or an amount which is three times the pecuniary damage or loss caused by the defendant to another or property of another. AS 12.55.035; each day of violation may be considered a separate violation. Alaska laws allow the State to pursue both civil and criminal actions concurrently.

Nothing in this notice shall be construed as a waiver of the State's authority or as an agreement on the part of the State to forego judicial or administrative enforcement of the above-described violation(s) or to seek recovery of damages, cost and penalties as prescribed by law. In addition, nothing herein shall be construed as a waiver of enforcement for past, present, or future violations not specifically set forth herein.

If you have questions, I may be contacted at (907) 269-7557, or via e-mail: kara.kusche@alaska.gov.

Kara Kusche

Kara Kusche, Enforcement Officer
Credential No. R-0440

Check One:
( ) Personally Served
(X) Sent by Certified Mail
7012 3460 0002 9326 5608

on the 28 day of May, 2015

cc: Amber Bennett, Environmental Program Specialist, ADEC
Mike Solter, Program Manager, ADEC
Rick Cool, EPA

# APDES INSPECTION REPORT

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

## Section 1: General Data

| Permit Number | Announced / Unannounced | Receiving Waters | Inspection Date |
|---|---|---|---|
| Number: AKG573033 | Announced | Talkeetna River Slough | Date: 5/5/2015 |
| Effective: 9/1/2013 | | | Entry Time: 8:30am |
| Expiration: 8/31/2018 | | | Exit Time: 3:30pm |

## Section 2: Facility Data

Name of Facility: Talkeetna Lagoon

| On-Site Representative/Physical Address: | Responsible Party/Mailing Address: |
|---|---|
| Name: Kathryn Childs<br>Title: Water and Wastewater Operator<br>Address: Talkeetna, AK<br>Phone: 907-861-7756<br>Email: Kathryn.childs@matsugov.us<br>Latitude/Longitude at the outfall: 62.3333 N, -150.1 W | Name: Terry Dolan<br>Title: Director of Public Works<br>Address: 1420 S. Industrial Way, Palmer, AK 99645<br>Phone: 907-745-9818<br>Email: terry.dolan@matsugov.us |
| Additional Inspection Participants:<br>James Jenson- Operations and Maintenance Division Manager<br>Catherine Beatty- ADEC | *For internal use only:*<br>*SEV: BOR41*<br>*SEV: AOS12*<br>*SEV: EOO12* |

## Section 3: Findings

### Background/Regulatory Status/Compliance History

The Talkeetna Lagoon is a domestic wastewater treatment facility with a design flow of .042 million gallons per day. It discharges to the Talkeetna River Sough April through October and is covered under the general permit for lagoons discharging to surface water. Facility treatment consists of 3 lagoon cells followed by a constructed wetlands. There are approximately 187 connections to the facility, some of which are seasonal.

The facility was last inspected by the ADEC Division of Water on 10/9/2013. The 10/9/2013 inspection did not note any violations.

This inspection covers the time period of 10/2013 through 5/2015 only.

### Field Inspection

Upon arrival at the Matanuska Susitna Borough Public Works Office, introductions were exchanged and inspector credentials were presented. Following a records review at the office, a site tour was conducted of the Talkeetna Lagoon.

The following information was provided verbally by onsite representatives:

- Issues with oil and grease have caused line clogs and wastewater back-ups into crawlspaces.
- Summer 2014 had unusually stronger odors from the lagoon.

- Upcoming planned maintenance activities include: cleaning out the duck weed, cutting back the brush around the lagoon berms to increase wind flow, checking the wastewater main with a camera, and re-planting the wetlands with native vegetation.
- The Borough is working with a contractor to evaluate and recommend improvements to the facility.
- The facility is going to increase internal sampling at various points in the treatment process to determine how much treatment is occurring at each step.
- A dye test will be completed to establish retention time. Current retention time is estimated to be 2-3 months.
- Influent samples are collected from manhole B, located immediately prior to entering cells 1 and 2.
- Effluent samples are collected from the weir, located immediately prior to the discharge pipe.
- The wetland plants are unevenly distributed due to strong winds shortly after wetland construction.
- The collection system has three total lift stations: two in town and one near the lagoon.
- The lagoon cells and wetlands are lined and the liner is believed to be in good condition.
- Mat Su Test Labs collects samples and analyzes for dissolved oxygen and pH. The wastewater operator also collects pH readings. SGS Laboratory performs sample analysis for fecal coliforms, total suspended solids, and biological oxygen demand. Meeting holding times has not been an issue.
- Flow data is collected with a hand-held flow meter at the weir. This is done by the wastewater operator.
- There are no chemical additives used in the treatment process.
- The lagoon is set up to perform a draw-down, but there has not been a need to do one.
- Some storm water does enter the lagoon via man holes, but little storm water flows directly into the lagoon due to the raised banks.
- Brush removal from the lagoon banks is typically done every other year, but the facility is going to try and do brush and weed removal yearly.
- The lagoons are approximately 6.5 feet deep. The constructed wetlands are approximately 1-2 feet deep.
- If needed, a vacuum truck is used to clean out grit, solids, etc. These solids are ultimately landfilled.
- Many businesses seasonally disconnect from the system during winter months. Otherwise, without heat to the business, pipes can freeze and break and flood the business.
- There have been no intentional bypasses of the facility. There is a possibility of an unintentional bypass related to the piping that is currently being looked into, but it is unclear whether or not that was part of the lagoons original intended design.
- Back-ups are uncommon, but can be fixed by the operators or a contractor.
- The G Street lift station has a back-up generator.
- The ground water table in the area is not very deep.
- The overflow pipe between ponds 1 and 2 is present to help balance water should one of the ponds get too full.
- Peak flow is approximately 175,000 gallons per day.
- The facility uses pH test strips instead of an electronic pH meter.

The following observations were made by ADEC inspectors:

- Influent and effluent sampling locations appear to be representative.
- The area around the lagoon and wetland is fenced and locked. The fencing was upright and functional.
- Several warning signs were posted along the fencing around the lagoon and at the main gate.
- Signage was posted on the slough bank near the discharge pipe outfall location.
- Small and medium sized vegetation were intermittently growing along the lagoon berms.
- The water levels in ponds 1 and 2 were below the overflow pipe, thus the overflow pipe between ponds 1 and 2 was not in use.

- Duck weed was floating in some areas of wastewater surface.
- The constructed wetland did not have vegetation present in large sections.
- There was a mild sewage odor present at the facility.
- The effluent flowing across the weir prior to discharge was clear in color. The discharge location and was free of any sheen, unusual color, scum, or solids.
- The outfall pipe was visible through the slough waters, but was fully submerged.
- Both the lagoon and outfall area was free of trash and debris.

| **Sampling** | **YES** ☐ | **NO** ☒ |
|---|---|---|

Sampling was not performed as part of this inspection.

**Records Review**

The following records were reviewed as part of the inspection and are considered complete:

- Operation and Maintenance records are being maintained. These include logs of water usage, logs of meter reads, and records of major activities and projects.
- Mat Su Test Labs Field Sampling Procedures.
- A copy of the general permit is onsite.

The following records were reviewed as part of the inspection and are considered incomplete:

- The facility did have a copy of the Generic DEC QAPP, but this QAPP did not contain any facility specific updates or information.
- DMRs are being maintained onsite. However some DMRs are missing, and most present DMRs contain incomplete data.
- Weekly lagoon inspections have been completed by the wastewater operator and are documented on a log for 2014 and 2015. The log does not contain the name of the person conducting the inspections.

The following records were not available during the inspection:

- The facility does not have a written Lagoon Maintenance Program Plan.
- Sampling chain of custody forms.
- 2013 records of weekly lagoon inspections were not able to be located onsite.

Self-reported discharge monitoring report (DMR) data was reviewed and identified many non-receipt violations from failing to turn in DMRs or from turning in incomplete DMRs. Several effluent violations were also present. See appendix 2 of this report for a full listing of non-receipt and effluent violations. Facility representatives stated that they were unaware that no-discharge months required a DMR, and were unaware until recently that they had been using an incomplete DMR reporting form.

DMRs are being signed by the wastewater operator and not by a principal executive officer or ranking elected official. Delegation of Authority documentation was absent.

## Section 4: Compliance

**Violations**

1) The facility does not have a written Lagoon Maintenance Program Plan.
   a) Permit part 3.2 states that "the permittee shall develop and implement a Lagoon Maintenance Program Plan" and lists out what the plan must include.
   b) Regulatory Citation: 18 AAC 83.405(b) Duty to Comply

2) The facility did have a copy of the Generic ADEC QAPP, but this QAPP did not contain any facility specific updates or information.
   a) Permit part 5.0 discusses the requirements of the QAPP and the minimum facility specific elements of the QAPP.
   b) Regulatory Citation: 18 AAC 83.405(b)
   c) Reference Documents: Generic ADEC QAPP (on file)

3) Sampling chain of custody forms were not present onsite.
   a) Permit Standard Conditions part 1.11.2.6 states that "the permittee shall retain records… of all monitoring information" which includes "quality assurance chain of custody forms."
   b) Regulatory Citation: 18 AAC 83.405(b)

4) Self-reported discharge monitoring report (DMR) data was looked at and identified many non-receipt violations from failing to turn in DMRs or from turning in incomplete DMRs.
   a) Permit Standard Conditions part 3.2.1 states that monitoring results shall be summarized each month on the DMR. The permittee must submit reports monthly postmarked by the 15th day of the following month.
   b) Regulatory Citation: 18 AAC 83.405(b)
   c) Reference Documents: Violations Report, Appendix 2 of this report

5) Self-reported discharge monitoring report (DMR) data was looked at and dissolved oxygen and fecal coliform effluent violations were present in 2014.
   a) Permit part 2.3, Table 4 outlines the effluent limits for Class C lagoons.
   b) Regulatory Citation: 18 AAC 83.405(b)
   c) Reference Documents: Violations Report, Appendix 2 of this report

6) DMRs are being signed by Kathryn Childs (Operator) and not by a principal executive officer or ranking elected official. Delegation of Authority documentation was absent.
   a) Permit Standard Conditions part 1.12.2.3 states that reports must be signed by "either a principal executive officer or ranking elected official" or a "duly authorized representative of that person… if the authorization is made in writing."
   b) Regulatory Citation: 18 AAC 83.405(b)
   c) Reference Documents: DMRs on file at ADEC

7) Weekly lagoon inspections have been completed by Kathryn Childs and are documented on a log for 2014 and 2015. The log does not contain the name of the person conducting the inspections. 2013 records of weekly lagoon inspections were not able to be located onsite.
   a) Permit part 3.3 states that "the permittee shall inspect the lagoon on a weekly bases" and that records "must include the…name of the person conducting the inspection."
   b) Regulatory Citation: 18 AAC 83.405(b)
   c) Reference Documents: Photo 22

**Section 5: Appendixes**

1. Photo Addendum
2. Violations Report from ICIS

**Signature**

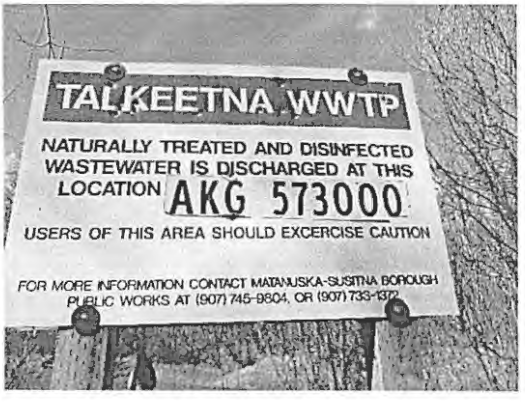
| | |
|---|---|
| **Name** – Kara Kusche<br>Credential Number: R-0440<br>Phone: (907)269-7556<br>E-mail: kara.kusche@alaska.gov | x Kara Kusche<br><br>Date: 5/28/2015 |

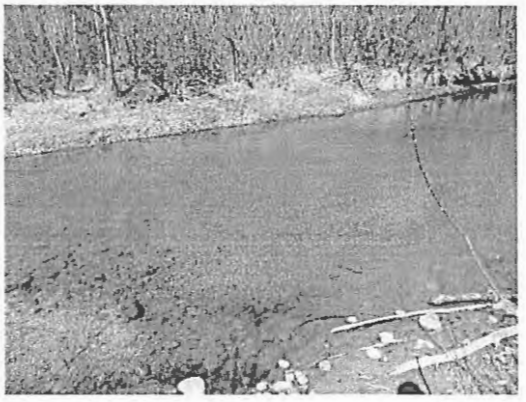
| Photo Addendum | |
|---|---|
| **Photo 01** | **Photo 02** |
|  |  |
| Signage posted at the lagoon gate fencing | Signage posted at the lagoon gate fencing |
| **Photo 03** | **Photo 04** |
|  |  |
| Signage posted at the lagoon gate fencing | Overview of lagoon cell |
| **Photo 05** | **Photo 06** |
|  |  |
| Overview of lagoon cell | Example of lagoon bank |

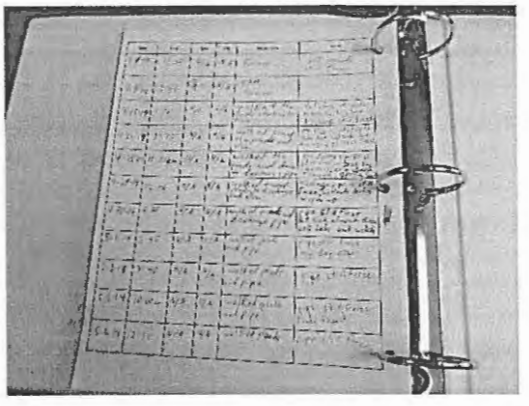
| Photo Addendum | |
|---|---|
| **Photo 07** | **Photo 08** |
|  |  |
| Manhole B, location of influent sampling | Duck weed floating on lagoon |
| **Photo 09** | **Photo 10** |
|  |  |
| Constructed wetlands | Constructed wetlands |
| **Photo 11** | **Photo 12** |
|  |  |
| Cell 1 and 2 overflow pipe | Constructed wetlands |

| Photo Addendum | |
|---|---|
| **Photo 13** | **Photo 14** |
|  |  |
| Constructed wetlands | Constructed wetlands |

| **Photo 15** | **Photo 16** |
|---|---|
|  |  |
| Outfall weir, location of effluent sampling | Outfall weir and constructed wetlands |

| **Photo 17** | **Photo 18** |
|---|---|
|   |  |
| Signage near the outfall location | Talkeetna River Slough discharge location, looking downstream |

| Photo Addendum | |
|---|---|
| **Photo 19** | **Photo 20** |
|  |  |
| Talkeetna River Slough discharge location, looking slightly upstream | Talkeetna River Slough discharge location, looking upstream |

| **Photo 21** | **Photo 22** |
|---|---|
|   |  |
| Flow meter | Log of lagoon inspections |

NPDES ID(s): AKG573033
Major/Minor Indicator: Minor
Violation Date: 09/30/2013 - 03/31/2015
Violation Type(s): DMR Non-Receipt Violation;Effluent Violation;Schedule Violation;Single Event Violation

# Environmental Protection Agency
# Integrated Compliance Information System
# Violations Report

Created Date: 09/15/2010
Refresh Date: 04/27/2015
Report Version 1.2, Modified: 01/03/2011

## AKG573033

| | | | | | |
|---|---|---|---|---|---|
| **Permittee Name:** | MATSU BOROUGH-TALKEETNA LAGOON | **Primary SIC Code:** | 4952 | **Permit Issued:** | 08/01/2013 |
| **Permittee Address:** | 340 EAST DAHLIA AVENUE<br>PALMER, AK 99645 | **Primary SIC Desc:** | Sewerage Systems | **Permit Effective:** | 09/01/2013 |
| | | **Primary NAICS Code:** | | **Permit Expired:** | 08/31/2018 |
| **Major/Minor Indicator:** | Minor | **Primary NAICS Desc:** | | **Permit Status:** | Effective |
| **Compliance Track. Status:** | On | **Cognizant Official:** | CHUCK BRAUN | | |
| **DMR Non Receipt Flag:** | On | **Receiving Body:** | | | |
| **RNC Tracking Flag:** | On | | | | |

## Facility Information

| | | | | | |
|---|---|---|---|---|---|
| **Facility Name:** | TALKEETNA LAGOON | **County:** | Matanuska-Susitna | **FRS ID:** | 110056402922 |
| **Facility Location:** | BEAVER ROAD<br>TALKEETNA, AK 99645 | **Region:** | 10 | **Federal Facility Ownership:** | |
| | | **State-Region:** | | **Type of Ownership:** | |

## DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K<br>04/15/2015 | 1<br>04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N<br>04/15/2015 | 1<br>04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N<br>04/15/2015 | 1<br>04/15/2015 | |
| D80 | 02/28/2015 | 03/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N<br>04/15/2015 | 1<br>04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K<br>04/15/2015 | 1<br>04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K<br>04/15/2015 | 1<br>04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00400 - pH | 1 | 0 | C3 | | K<br>04/15/2015 | 1<br>04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N<br>04/15/2015 | 1<br>04/15/2015 | |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

# Environmental Protection Agency
# Integrated Compliance Information System
# Violations Report

Created Date: 09/15/2010
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Report Version 1.2, Modified: 01/03/2011

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### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 04/15/2015 | 1 04/15/2015 | |
| D80 | 02/28/2015 | 03/15/2015 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 04/15/2015 | 1 04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 04/15/2015 | 1 04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 04/15/2015 | 1 04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 04/15/2015 | 1 04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 04/15/2015 | 1 04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 04/15/2015 | 1 04/15/2015 | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 02/28/2015 | 03/15/2015 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 03/18/2015 | 1 03/18/2015 | |
| D80 | 01/31/2015 | 02/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 03/18/2015 | 1 03/18/2015 | |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

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### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 03/18/2015 | 1 03/18/2015 | |
| D80 | 01/31/2015 | 02/15/2015 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | O2 | | K 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 03/18/2015 | 1 03/18/2015 | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 01/31/2015 | 02/15/2015 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 02/15/2015 | 1 02/15/2015 | |
| D80 | 12/31/2014 | 01/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 02/15/2015 | 1 02/15/2015 | |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

# Environmental Protection Agency
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## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 02/15/2015 | 1 02/15/2015 | |
| D80 | 12/31/2014 | 01/15/2015 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 02/15/2015 | 1 02/15/2015 | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 12/31/2014 | 01/15/2015 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 01/15/2015 | 1 01/15/2015 | |
| D80 | 11/30/2014 | 12/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 01/15/2015 | 1 01/15/2015 | |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 01/15/2015 | 1 01/15/2015 | |
| D80 | 11/30/2014 | 12/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 01/15/2015 | 1 01/15/2015 | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 11/30/2014 | 12/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 12/16/2014 | 1 12/16/2014 | |
| D80 | 10/31/2014 | 11/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 12/16/2014 | 1 12/16/2014 | |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 12/16/2014 | 1 12/16/2014 | |
| D80 | 10/31/2014 | 11/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 12/16/2014 | 1 12/16/2014 | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 10/31/2014 | 11/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 11/15/2014 | 1 11/15/2014 | |
| D80 | 09/30/2014 | 10/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 11/15/2014 | 1 11/15/2014 | |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

# Environmental Protection Agency
# Integrated Compliance Information System
# Violations Report

Created Date: 09/15/2010
Refresh Date: 04/27/2015
Report Version 1.2, Modified: 01/03/2011

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 11/15/2014 | 1 11/15/2014 | |
| D80 | 09/30/2014 | 10/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 11/15/2014 | 1 11/15/2014 | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 09/30/2014 | 10/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 10/16/2014 | 1 10/16/2014 | |
| D80 | 08/31/2014 | 09/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 10/16/2014 | 1 10/16/2014 | |

DMR Non-Receipt Violations: Asterisks around a NQDI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 10/16/2014 | 1 10/16/2014 | |
| D80 | 08/31/2014 | 09/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 10/16/2014 | 1 10/16/2014 | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 08/31/2014 | 09/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 09/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | **X** | N 09/15/2014 | 1 09/15/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 09/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D80 | 07/31/2014 | 08/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | **X** | N 09/15/2014 | 1 09/15/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | **X** | K 09/15/2014 | 1 09/15/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | **X** | K 09/15/2014 | 1 09/15/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 09/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | **X** | N 09/15/2014 | 1 09/15/2014 | 12/31/2014 |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 09/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D80 | 07/31/2014 | 08/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | **X** | N 09/15/2014 | 1 09/15/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 09/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | **X** | N 09/15/2014 | 1 09/15/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | **X** | K 09/15/2014 | 1 09/15/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 09/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 09/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | **X** | | | 12/31/2014 |
| D90 | 07/31/2014 | 08/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | **X** | | | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 08/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | **X** | N 08/15/2014 | 1 08/15/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 08/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D80 | 06/30/2014 | 07/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | **X** | N 08/15/2014 | 1 08/15/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | **X** | K 08/15/2014 | 1 08/15/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | **X** | K 08/15/2014 | 1 08/15/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 08/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | **X** | N 08/15/2014 | 1 08/15/2014 | 12/31/2014 |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 08/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D80 | 06/30/2014 | 07/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | **X** | N 08/15/2014 | 1 08/15/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 08/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | **X** | N 08/15/2014 | 1 08/15/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | **X** | K 08/15/2014 | 1 08/15/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 08/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 08/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | **X** | | | 12/31/2014 |
| D90 | 06/30/2014 | 07/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | **X** | | | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 07/16/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | **X** | N 07/16/2014 | 1 07/16/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 07/16/2014 | 2 12/31/2014 | 12/31/2014 |
| D80 | 05/31/2014 | 06/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | **X** | N 07/16/2014 | 1 07/16/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 07/16/2014 | 1 07/16/2014 | |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 07/16/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 07/16/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | **X** | N 07/16/2014 | 1 07/16/2014 | 12/31/2014 |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 07/16/2014 | 2 12/31/2014 | 12/31/2014 |
| D80 | 05/31/2014 | 06/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | **X** | N 07/16/2014 | 1 07/16/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 07/16/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | **X** | N 07/16/2014 | 1 07/16/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | **X** | K 07/16/2014 | 1 07/16/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | **X** | N 07/16/2014 | 1 07/16/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 07/16/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | **X** | | | 12/31/2014 |
| D90 | 05/31/2014 | 06/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | **X** | | | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | C | | | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | C | K 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | O1 | C | N 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | C | N 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D80 | 04/30/2014 | 05/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | C | N 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | C | K 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | C | K 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | C | | | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | C | K 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | C | N 06/15/2014 | 2 12/31/2014 | 12/31/2014 |

DMR Non-Receipt Violations: Asterisks around a NODI Code (e.g. **X**) indicate the NODI code will not automatically resolve RNC.
Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | C | N 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D80 | 04/30/2014 | 05/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | C | N 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | C | K 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | C | N 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | C | K 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | C | N 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | C | K 06/15/2014 | 2 12/31/2014 | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | C | | | 12/31/2014 |
| D90 | 04/30/2014 | 05/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | C | | | 12/31/2014 |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 05/16/2014 | 1 05/16/2014 | |
| D80 | 03/31/2014 | 04/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 05/16/2014 | 1 05/16/2014 | |

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Schedule Violations: Schedule Type P - Permit, A - Administrative, J - Judicial

# Environmental Protection Agency
# Integrated Compliance Information System
# Violations Report

Created Date: 09/15/2010
Refresh Date: 04/27/2015
Report Version 1.2, Modified: 01/03/2011

## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 05/16/2014 | 1 05/16/2014 | |
| D80 | 03/31/2014 | 04/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 05/16/2014 | 1 05/16/2014 | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 03/31/2014 | 04/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00300 - Oxygen, dissolved [DQ] | 1 | 0 | C1 | | | | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | Q1 | | N 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 04/15/2014 | 1 04/15/2014 | |
| D80 | 02/28/2014 | 03/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 04/15/2014 | 1 04/15/2014 | |

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## AKG573033

### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 04/15/2014 | 1 04/15/2014 | |
| D80 | 02/28/2014 | 03/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 04/15/2014 | 1 04/15/2014 | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 02/28/2014 | 03/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C1 | | | | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | C3 | | K 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | O1 | | N 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | 1 | 0 | C2 | | N 03/18/2014 | 1 03/18/2014 | |
| D80 | 01/31/2014 | 02/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | G | 0 | C2 | | N 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | Q1 | | K 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00310 - BOD, 5-day, 20 deg. C | W | 0 | C2 | | K 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00400 - pH | 1 | 0 | C1 | | | | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00400 - pH | 1 | 0 | C3 | | K 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | Q1 | | N 03/18/2014 | 1 03/18/2014 | |

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### DMR Non-Receipt Violations

| Violation Code | Monitoring Period End Date | DMR Due Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | DMR Value | NODI Code | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date | DMR Val. Rec Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 00530 - Solids, total suspended | 1 | 0 | C2 | | N 03/18/2014 | 1 03/18/2014 | |
| D80 | 01/31/2014 | 02/15/2014 | 001-A | 00530 - Solids, total suspended | G | 0 | C2 | | N 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 50050 - Flow, in conduit or thru treatment plant | 1 | 0 | Q2 | | K 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C2 | | N 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 50060 - Chlorine, total residual | 1 | 0 | C3 | | K 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C2 | | N 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | C3 | | K 03/18/2014 | 1 03/18/2014 | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 81010 - BOD, 5-day, percent removal | K | 0 | C1 | | | | |
| D90 | 01/31/2014 | 02/15/2014 | 001-A | 81011 - Solids, suspended percent removal | K | 0 | C1 | | | | |

### Effluent Violations

| Violation Code | Monitoring Period End Date | Limit Set | Parameter | Mon. Loc. | Seas. ID | SNC Group | EA Identifier | Value Type/ Stat. Base | Reported Value/Units | % Exceed. | Limit Value/ Units | RNC Det. Code/ RNC Det. Date | RNC Res. Code/ RNC Res. Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E90 | 07/31/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | | | C1 DAILY MN | 4.25 mg/l | 39% | >=7 mg/l | | |
| E90 | 07/31/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | | | C2 MO GEOMN | 70 #/100ml | 250% | <=20 #/100ml | | |
| E90 | 07/31/2014 | 001-A | 74055 - Coliform, fecal general | 1 | 0 | | | C3 DAILY MX | 70 #/100ml | 75% | <=40 #/100ml | | |
| E90 | 05/31/2014 | 001-A | 00300 - Oxygen, dissolved [DO] | 1 | 0 | | | C1 DAILY MN | 1.11 mg/l | 84% | >=7 mg/l | | |

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THE STATE of ALASKA
GOVERNOR BILL WALKER

**Department of Environmental Conservation**

DIVISION OF WATER
COMPLIANCE AND ENFORCEMENT PROGRAM

555 Cordova St, 3rd Floor
Anchorage, Alaska 99501
Main: 907.269.6281
Fax: 907.334.2415
www.dec.alaska.gov



November 23, 2015

Terry Dolan
Director of Public Works, Matanuska-Susitna Borough
Talkeetna Wastewater Lagoon
1420 S. Industrial Way
Palmer, AK 99645

Re: Notice of Intent to Seek Penalties for Clean Water Act Violations
Opportunity to Confer

Dear Mr. Dolan:

The purpose of this letter is to inform you that the Alaska Department of Environmental Conservation (ADEC) intends to pursue an enforcement action against Talkeetna Wastewater Lagoon for violations of the Clean Water Act (CWA). By this letter, we are providing you the opportunity to discuss this matter with ADEC prior to the filing of a complaint.

The alleged violations of the CWA arise from the Matanuska-Susitna Borough's failure to comply with the Alaska Pollutant Discharge Elimination System (APDES) General Permit AKG573000, *Domestic Wastewater Treatment Lagoons Discharging to Surface Water* with unique identifier AKG573033, effective September 1, 2013. Specifically, the Talkeetna Wastewater Lagoon has failed to be compliant with permit effluent limits.

Under Alaska Statutes 46.03.760(e), ADEC is entitled to recover civil penalties for violations of Alaska regulations or APDES permits of not less than $500 nor more than $100,000 for the initial violation, nor more than $10,000 for each day after that on which the violation continues for each violation. Under the CWA, ADEC is entitled to recover civil penalties of up to $37,500 per violation per day.

Pre-filing discussions allow us to reach a better understanding of issues where our information may be incomplete, gives us an opportunity to discuss possible settlement options, and can lead to resolution of enforcement matters without resorting to the time and expense of litigation. If we are unable to reach an acceptable resolution through the negotiation process, ADEC may file a civil lawsuit to recover civil penalties, seek appropriate injunctive relief (e.g., corrective action to secure compliance), and recover attorney's fees.

If you wish to schedule a meeting, or if you have any questions about this letter, please contact Steve Ross, Assistant Attorney General, at (907) 269-5278 within **14 days** of receipt of this letter.

Sincerely,

Mike Solter
Compliance Program Manager

# APPENDIX B

# ALTERNATIVE COST ESTIMATES

MSB Talkeetna WWTF Upgrades
Budget Level Capital Project Cost Estimate

**Alternative 1-Expand Facultative Lagoon Per Canadian Guidelines**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **CIVIL** | | | | |
| Mobilization/demobilization (5% of Civil Cost) | Lump Sum | 1 | $ 202,400.00 | $ 202,400.00 |
| Construction Surveying (3% Civil Cost) | Lump Sum | 1 | $ 121,500.00 | $ 121,500.00 |
| SWPPP (3% of Civil Cost) | Lump Sum | 1 | $ 121,500.00 | $ 121,500.00 |
| Clearing and Grubbing | Acre | 16 | $ 7,500.00 | $ 120,000.00 |
| Decomission Wetlands | Lump Sum | 1 | $ 10,000.00 | $ 10,000.00 |
| Surface Roads | Linear Foot | 4,000 | $ 65.00 | $ 260,000.00 |
| Dewatering | Lump Sum | 1 | $ 100,000.00 | $ 100,000.00 |
| Usable Excavation | Cubic Yard | 32,200 | $ 12.00 | $ 386,400.00 |
| Classified Fill | Ton | 50,000 | $ 30.00 | $ 1,500,000.00 |
| Cell Liner | Square Yard | 41,000 | $ 10.00 | $ 410,000.00 |
| Yard Piping (including trench excavation and backfill) | Linear Foot | 2,020 | $ 200.00 | $ 404,000.00 |
| Furnish and Install Manholes | Each | 7 | $ 15,000.00 | $ 105,000.00 |
| 8-foot Chain Link Fence | Linear Foot | 4,000 | $ 45.00 | $ 180,000.00 |
| Topsoil/Seed | Acre | 4 | $ 10,000.00 | $ 40,000.00 |
| Lighting/Security | Lump Sum | 1 | $ 50,000.00 | $ 50,000.00 |
| Connect to Existing | Each | 2 | $ 10,000.00 | $ 20,000.00 |
| Baffles | Linear Foot | 2,200 | $ 210.00 | $ 462,000.00 |
| **TREATMENT** | | | | |
| **Process Equipment Building** | | | | |
| Excavation/compaction/prep site | Lump Sum | 1 | $ 21,000.00 | $ 21,000.00 |
| Concrete pad (20' x 20') | Lump Sum | 1 | $ 38,000.00 | $ 38,000.00 |
| Building Enclosure | Lump Sum | 1 | $ 168,000.00 | $ 168,000.00 |
| Electrical/Lighting | Lump Sum | 1 | $ 90,000.00 | $ 90,000.00 |
| HVAC | Lump Sum | 1 | $ 129,000.00 | $ 129,000.00 |

MSB Talkeetna WWTF Upgrades
Budget Level Capital Project Cost Estimate

**Alternative 1-Expand Facultative Lagoon Per Canadian Guidelines**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **Process Equipment** | | | | |
| Reaeration basin | Lump Sum | 1 | $ 28,000.00 | $ 28,000.00 |
| Blowers | Lump Sum | 1 | $ 53,000.00 | $ 53,000.00 |
| Blower housekeeping pads | Lump Sum | 1 | $ 5,000.00 | $ 5,000.00 |
| Blower Electrical and Controls Wiring | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Blower Commissioning | Lump Sum | 1 | $ 15,000.00 | $ 15,000.00 |
| Diffusers | Lump Sum | 1 | $ 20,000.00 | $ 20,000.00 |
| Air Piping | Lump Sum | 1 | $ 10,000.00 | $ 10,000.00 |
| Contact tank (coated steel) | Lump Sum | 1 | $ 78,000.00 | $ 78,000.00 |
| Chlorination Equipment (chemical pump and tank) | Lump Sum | 1 | $ 14,000.00 | $ 14,000.00 |
| Dechlorination Equipment (chemical pump and tank) | Lump Sum | 1 | $ 14,000.00 | $ 14,000.00 |
| Chemical Dosing Electrical and Controls Wiring | Lump Sum | 1 | $ 9,000.00 | $ 9,000.00 |
| **Electrical** | | | | |
| SCADA integration | Lump Sum | 1 | $ 86,000.00 | $ 86,000.00 |
| Chlorine Residual Instrument (2) | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Effluent flow meter | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Security, Network | Lump Sum | 1 | $ 12,000.00 | $ 12,000.00 |
| Electric Service Extension | Lump Sum | 1 | $ 100,000.00 | $ 100,000.00 |

| | | |
|---|---|---|
| **Total Construction Cost** | **$** | **5,440,000** |
| 20% Contingency | $ | 1,088,000 |
| Engineering Design Phase Services (10% of Total Construction Cost) | $ | 544,000 |
| Construction Phase Services (10% of Total Construction Cost) | $ | 544,000 |
| MSB Administration (3% of Total Construction Cost) | $ | 163,200 |
| **Total Capital Project Cost** | **$** | **7,800,000** |

MSB Talkeetna WWTF Upgrades
Budget Level Capital Project Cost Estimate

**Alternative 2-Partially Mixed Aerated Lagoon**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **CIVIL** | | | | |
| Mobilization/demobilization (5% of Civil Cost) | Lump Sum | 1 | $ 233,500.00 | $ 233,500.00 |
| Construction Surveying (3% Civil Cost) | Lump Sum | 1 | $ 140,100.00 | $ 140,100.00 |
| SWPPP (3% of Civil Cost) | Lump Sum | 1 | $ 140,100.00 | $ 140,100.00 |
| Clearing and Grubbing | Acre | 9 | $ 7,500.00 | $ 67,500.00 |
| Surface Roads | Linear Foot | 3,300 | $ 65.00 | $ 214,500.00 |
| Dewatering | Lump Sum | 1 | $ 100,000.00 | $ 100,000.00 |
| Unclassified Excavation | Cubic Yard | 17,000 | $ 12.00 | $ 204,000.00 |
| Classified Fill | Ton | 112,000 | $ 30.00 | $ 3,360,000.00 |
| Lagoon Liner | Square Yard | 44,200 | $ 5.00 | $ 221,000.00 |
| Yard Piping (including trench excavation and backfill) | Linear Foot | 1,100 | $ 200.00 | $ 220,000.00 |
| Furnish and Install Manholes | Each | 2 | $ 15,000.00 | $ 30,000.00 |
| 8-foot Chain Link Fence | Linear Foot | 3,600 | $ 45.00 | $ 162,000.00 |
| Topsoil/Seed | Acre | 4 | $ 10,000.00 | $ 40,000.00 |
| Lighting/Security | Lump Sum | 1 | $ 50,000.00 | $ 50,000.00 |
| **TREATMENT** | | | | |
| **Upgrade G Street LS Pumps** | | | | |
| Demo Existing Pumps | Lump Sum | 1 | $ 4,100.00 | $ 4,100.00 |
| New Electrical Service | Lump Sum | 1 | $ 69,000.00 | $ 69,000.00 |
| New Wiring, Raceways, Panels | Lump Sum | 1 | $ 34,600.00 | $ 34,600.00 |
| New Pumps, Rails, and Pump Shoes | Lump Sum | 1 | $ 74,000.00 | $ 74,000.00 |
| **Process Building Site Work** | | | | |
| Excavation | Lump Sum | 1 | $ 49,200.00 | $ 49,200.00 |
| Place Geofabric | Lump Sum | 1 | $ 26,700.00 | $ 26,700.00 |
| Place and Compact Embankment | Lump Sum | 1 | $ 199,100.00 | $ 199,100.00 |

**Alternative 2-Partially Mixed Aerated Lagoon**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **Process Equipment Building** | | | | |
| Form and cast steel reinfoced Foundation | Lump Sum | 1 | $ 148,700.00 | $ 148,700.00 |
| Building Enclosure | Lump Sum | 1 | $ 483,700.00 | $ 483,700.00 |
| Building Mechanical Heat and Vent Systems | Lump Sum | 1 | $ 245,000.00 | $ 245,000.00 |
| Building Electrical Lighting and Power Distribution Systems | Lump Sum | 1 | $ 396,000.00 | $ 396,000.00 |
| Communications, Network, and Security Systems | Lump Sum | 1 | $ 23,500.00 | $ 23,500.00 |
| **Aeration Equipment Inside Building** | | | | |
| Aeration Piping Systems | Lump Sum | 1 | $ 97,700.00 | $ 97,700.00 |
| Blower Equipment Steel Reinforced Housekeeping Pads | Lump Sum | 1 | $ 11,300.00 | $ 11,300.00 |
| Aeration Blowers | Lump Sum | 1 | $ 135,700.00 | $ 135,700.00 |
| Electrical Power and Control Wiring, Raceways and Panels | Lump Sum | 1 | $ 57,100.00 | $ 57,100.00 |
| Commission Blower Equipment | Lump Sum | 1 | $ 29,300.00 | $ 29,300.00 |
| **Raw Sewage Lift Station Inside Bldg** | | | | |
| Submersible Duplex Pump System Electrical Power and Control Wiring | Lump Sum | 1 | $ 57,100.00 | $ 57,100.00 |
| Submersible Duplex Pump System | Lump Sum | 1 | $ 88,200.00 | $ 88,200.00 |
| Overhead Hoist for Pump Maintenance | Lump Sum | 1 | $ 13,300.00 | $ 13,300.00 |
| Commission Pump System | Lump Sum | 1 | $ 29,300.00 | $ 29,300.00 |
| **Disinfection Equipment** | | | | |
| Contact tank (coated steel) | Lump Sum | 1 | $ 78,000.00 | $ 78,000.00 |
| Chlorination Equipment | Lump Sum | 1 | $ 14,000.00 | $ 14,000.00 |
| Dechlorination Equipment | Lump Sum | 1 | $ 14,000.00 | $ 14,000.00 |

MSB Talkeetna WWTF Upgrades
Budget Level Capital Project Cost Estimate

**Alternative 2-Partially Mixed Aerated Lagoon**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **ELECTRICAL** | | | | |
| SCADA Integration | Lump Sum | 1 | $ 118,500.00 | $ 118,500.00 |
| Chlorine Residual Instrument (2) | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Effluent Flow Meter | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Security, Network | Lump Sum | 1 | $ 12,000.00 | $ 12,000.00 |
| System Commissioning | Lump Sum | 1 | $ 54,700.00 | $ 54,700.00 |
| Phase 3 Power Exension | Lump Sum | 1 | $ 725,000.00 | $ 725,000.00 |

| | |
|---|---|
| **Total Construction Cost** | **$ 8,510,000** |
| 20% Contingency | $ 1,702,000 |
| Engineering Design Phase Services (10% of Total Construction Cost) | $ 851,000 |
| Construction Phase Services (10% of Total Construction Cost) | $ 851,000 |
| MSB Administration (3% of Total Construction Cost) | $ 255,300 |
| **Total Capital Project Cost** | **$ 12,169,300** |

# APPENDIX C

# ALTERNATIVES MEMORANDUM

HDL ENGINEERING Consultants

# MEMORANDUM

**DATE:** November 23, 2016

**TO:** Matanuska-Susitna Borough

**FROM:** HDL Engineering Consultants

**RE:** Talkeetna Wastewater Treatment Facility Upgrades Alternatives

CIVIL ENGINEERING

GEOTECHNICAL ENGINEERING

TRANSPORTATION ENGINEERING

ENVIRONMENTAL SERVICES

PLANNING

SURVEYING & MAPPING

CONSTRUCTION ADMINISTRATION

MATERIAL TESTING

RIGHT-OF-WAY SERVICES

## INTRODUCTION

The Matanuska-Susitna Borough's (MSB) Talkeetna Wastewater Treatment Facility (WWTF) is not in compliance with its State-administered wastewater discharge permit. Correspondence from the Alaska Department of Environmental Conservation (ADEC) includes a listing of permit compliance excursions, the most common of which are occurrences of high effluent fecal coliform (FC) counts and low effluent dissolved oxygen (DO) concentrations. Other less common excursions include inadequate biological oxygen demand ($BOD_5$), inadequate total suspended solids (TSS) removals, and/or excessively high effluent $BOD_5$ and TSS concentrations. The MSB is seeking to upgrade the WWTF to bring it into regulatory compliance now and into the future.

The purpose of this memo is to screen potential upgrade alternatives to the WWTF and choose two alternatives for further evaluation in a Preliminary Engineering Report (PER).

## ASSESSMENT OF EXISTING WWTF

A review of the existing wastewater treatment facility (WWTF) was completed using the following observations, documents and data:

1. A tour of the facility in July of 2016 with operations personnel;
2. Construction project record drawings;
   A. From the construction of the original ponds in 1988;
   B. From construction of the wetland treatment system upgrade in 2003;
3. Lift station flow data from G Street Sewage Lift Station;
4. Talkeetna Sewer and Water Assessment Technical Memorandum, 2014.

### Background

The original wastewater lagoon was constructed in 1988 and consisted of a two cell, facultative lagoon with a third percolation cell. A facility upgrade project in 2003 converted the percolation cell to a facultative lagoon (referred to as Cell 3), and installed a constructed wetland treatment area with a discharge pipeline to the Talkeetna Slough. Based on treatment parameters used in the 2003 upgrades, the facility is designed for inflows of 42,000

gallons per day (gpd) with a $BOD_5$ loading of 70 lb/day. The existing lagoon cells have a combined volume of roughly 9.4 million gallons (MG).

Raw sewage from the community is pumped from the G Street Lift Station directly into Cell 2. From Cell 2 wastewater flows through Cell 1, to Cell 3, and finally through the treatment wetlands. Treated effluent is discharged through a measurement weir and into the Slough. Flow through the entire treatment system, including wetlands is by gravity. Per the facility's ADEC wastewater discharge permit, the facility is permitted to discharge treated effluent from May to October with wastewater being stored in the lagoon cells November through April. **Figure 1** shows the current operational configuration of the WWTF.

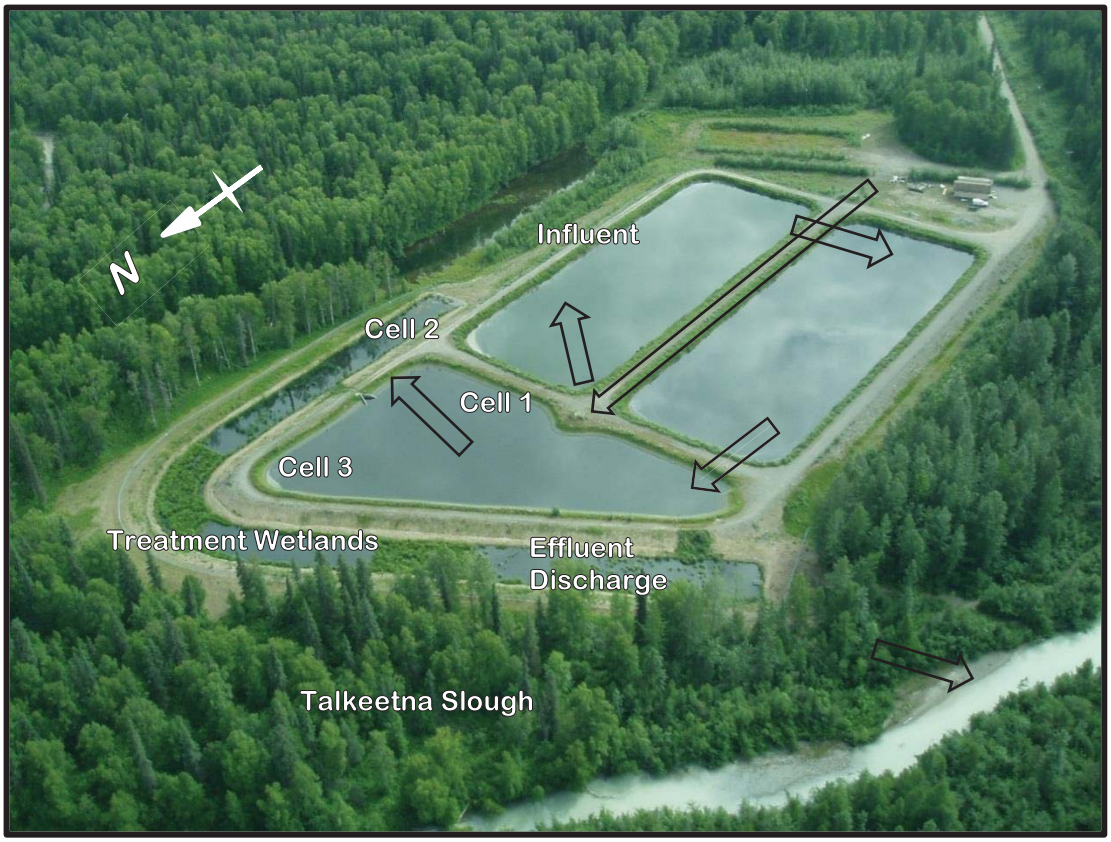


**Figure 1: Talkeetna Wastewater Treatment Facility (Photo Taken June 2007)**

## Influent Flows

Flow volumes entering the treatment system can be inferred from total volume data reported by equipment at the G Street Lift Station as recorded by operations personnel. From those data, flow into the WWTF varies by season with low flows during winter months and significantly higher flows during the summer tourist season. Averaged weekly flows from January through October of 2016 are shown in **Figure 2**.

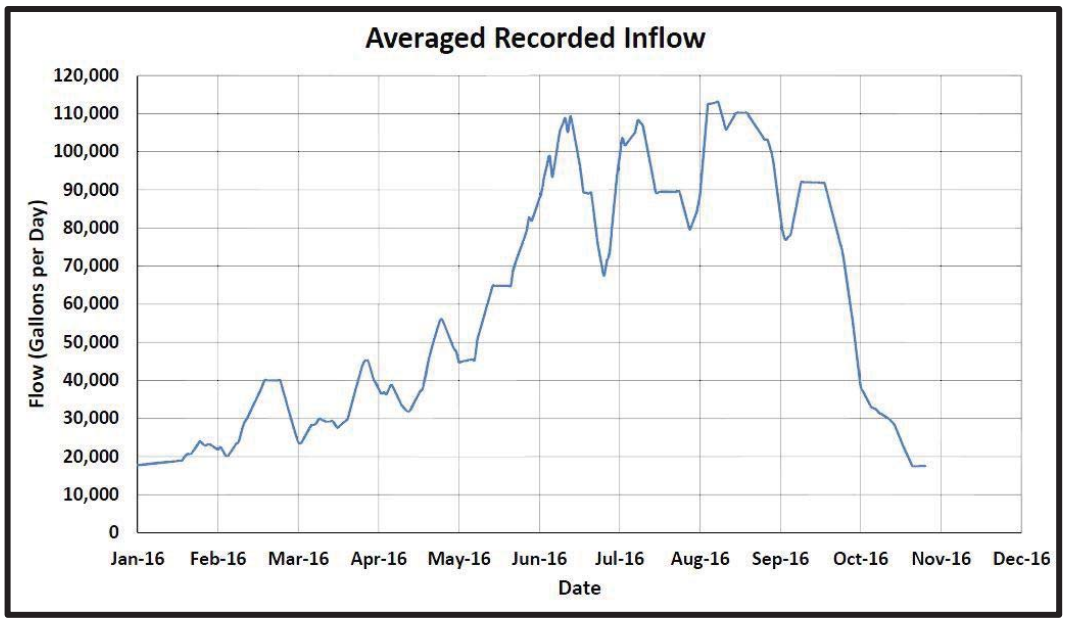


**Figure 2: Influent Flows to the WWTF**

Contributions to wastewater inflow to the WWTF are assumed to be comprised of two sources. One is the *base inflow* generated by year-round residents of Talkeetna. The other is the *seasonal inflow* generated by both the tourism industry and inflow/infiltration (I/I) from spring melt and rain events. From the data, and for the purpose of this memo, the base inflow will be estimated as 20,000 gallons per day (gpd), and seasonal inflow will be estimated as 90,000 gpd in 2016. Adding the base inflow and seasonal inflow gives a peak inflow of 110,000 gpd for 2016.

## Influent Loadings

For this memo, data on solids and/or organic loadings to the treatment facility was limited to monitoring and reporting completed for compliance with the facility's discharge permit. Grab samples for monthly discharge monitoring reports (DMR) are collected for each month the facility discharges to the slough. Available results for these monitoring events from 2014 through 2016, as well as permit limits are provided in **Table 1**. Highlighted cells indicate instances where permit requirements were not met.

To aid in future studies and analysis, MSB collected weekly composite samples of influent wastewater at the G Street Lift Station as well as grab samples from each of the three lagoons. Samples were measured for chemical oxygen demand (COD), biochemical oxygen demand $BOD_5$, Total Suspended Solids (TSS), dissolved oxygen (DO), ultraviolet transmissivity (UVT), and chlorine demand. Results of these samples will contribute to the design of future upgrades and analysis in the PER.

**Table 1: Discharge Monitoring Report Results**

| | | | Analyte | | | | |
|---|---|---|---|---|---|---|---|
| | | | DO (mg/l) | $BOD_5$ (mg/l) | pH | TSS (mg/l) | FC (col/100 ml) |
| **Permit Requirements** | | | 7-17 | 45 Max | 6.5-8.5 | 70 Max | 40 Daily Max |
| Discharge Month | MAY | 2014 | 1.11 | 13.3 | 7-8 | 33.3 | 34 |
| | | 2015 | 1.66 | 24.8 | 7.23 | 20.8 | 62 |
| | | 2016 | 3.6 | 17.4 | 8.5 | 18 | ND |
| | JUNE | 2014 | 9.68 | 40.6 | 7.5 | 68.6 | 14 |
| | | 2015 | 5.69 | 35 | 7.78 | 41 | 510 |
| | | 2016 | 11.45 | 15.4 | 7.5 | 12.7 | 160 |
| | JULY | 2014 | 4.25 | 35.2 | 7.94 | 56 | 70 |
| | | 2015 | 5.96 | 43.3 | 7.47 | 50 | 290 |
| | | 2016 | 8.81 | 35.2 | 8.5 | ND | 410 |
| | AUGUST | 2014 | 2.73 | 22.9 | 7.31 | 42 | 1,130 |
| | | 2015 | 5.7 | 26.6 | 7.49 | 37.9 | 3,100 |
| | | 2016 | 7.13 | 14.4 | 7.43 | 5.5 | 54 |
| | SEPTEMBER | 2014 | 2.7 | 29.8 | 7.6 | 28 | 1,050 |
| | | 2015 | 11.18 | 26.2 | 7.92 | 41 | 73 |
| | | 2016 | ND | 11.3 | ND | 17 | 27 |
| | OCTOBER | 2014 | ND | ND | ND | ND | ND |
| | | 2015 | 8.19 | 14 | 7.68 | 17 | 128 |
| | | 2016 | ND | 13.3 | ND | 7 | 9 |

*ND= NO DATA

The Tabulated DMR values indicate the facility is consistently unable to meet permit requirements for fecal coliform and dissolved oxygen. Furthermore, while the table indicates that the effluent typically satisfies $BOD_5$ and TSS concentration requirements, there were 3 instances between 2014 and 2016 where the facility did not meet the 65 percent removal requirement of the permit. For one of those instances, in June of 2014, the facility did not meet $BOD_5$ or TSS percent removal.

## FUTURE CAPACITY REQUIREMENTS

When addressing the Talkeetna WWTF deficiencies, it is important to consider both population and tourism growth to ensure that potential facility upgrades are capable of meeting existing permit limits.

Projections for year-round population growth of Talkeetna used herein are derived from the Alaska Department of Labor and Workforce Development 2014 report *Alaska Population Projections 2012 to 2042*. That document suggests, as a baseline projection, the statewide population will grow from 770,000 to 897,000 between 2016 and 2036, an increase of approximately 16%. By applying this same increase to the estimated 2016 base wastewater flow, the 2036 base flow can be estimated at approximately 23,000 gpd.

Projections for tourism visitation to Talkeetna are derived from the Talkeetna Community Tourism Plan. Those data report the number of people visiting Talkeetna in 2016 was 248,000. Using a 2.06% growth rate in tourist visitations, which is the average state-wide tourism growth rate reported by the Alaska Visitor Statistics Program, the projected number of visitors to Talkeetna in year 2036 would be 351,000, an increase of 41 percent over the 20-year time interval. By applying this same increase to the estimated 2016 seasonal wastewater flow, the 2036 seasonal inflow is estimated at approximately 127,000 gpd.

Adding the projected base and seasonal flows gives a peak flow of approximately 150,000 gpd in 2036. This compares with year 2016 peak flow of 110,000 gpd and equates to an approximately 36% increase over existing. Existing design flows, actual flows, and 20-year design flows are summarized in **Table 2** below.

**Table 2: Peak Influent Flow Rates**

| | Existing Design | Current Year (2016) | 20-Year Design (2036) |
|---|---|---|---|
| **Base Flow (Residential)** | N/A | 20,000 gpd | 23,000 gpd |
| **Seasonal Flows (Tourism and I/I)** | N/A | 90,000 gpd | 127,000 gpd |
| **Base Flow + Seasonal Flow** | 42,000 gpd | 110,000 gpd | 150,000 gpd |

As shown above, the facility is receiving nearly three times the design capacity during peak flow periods. As residential and seasonal visitors increase over time, the system will become increasingly overloaded.

## FACILITY LOADINGS

In addition to hydraulic loadings, the ability of the WWTF to routinely comply with regulatory criteria is dependent upon the solids and organic loadings anticipated into the future. Estimates of these future loadings are addressed in the following paragraphs.

### Organic Loading

As previously stated, data from DMRs was used to approximate organic loadings to the WWTF. These data represent grab samples of influent flow collected during the summer months. To aid in development of chosen alternatives during the later stages of this project, HDL assisted MSB with collection of additional treatment data at various points in the WWTF during the latter portion of their 2016 discharge. Due to the timing of this data collection,

however, full results were not yet available and the following organic loading assumptions were made:

- **Year-Round Resident Loading -** A value of 0.17 lbs of $BOD_5$ per capita per day is commonly reported for municipal sewage and is assumed to be the $BOD_5$ contribution from year-round residents. For a projected year 2036 permanent population of 1,218 people, this equates to a daily resident population loading of 207 pounds of $BOD_5$ per day.

- **Seasonal Tourist Loading -** A value of 0.06 lbs of $BOD_5$ per capita per day is assumed to be the $BOD_5$ contribution from summer visitors to Talkeetna, occurring from June 1st to October 1st. This value represents approximately one third the daily per capita contribution and may be suitable for representing contributions from tourists visiting Talkeetna for only part of a day. For a projected year 2036 tourist visitor count of 351,000 people in 4 months, or an average of 2,925 visitors per day, this equates to a daily visitor loading of 176 pounds of $BOD_5$ per day during the summer season.

## Solids Loading

As with organic loadings, assumptions of solids loadings for both year-round residents and seasonal visitors have been made per the following.

- **Year-Round Resident Loading -** A value of 0.20 lbs of TSS per capita per day is commonly reported for municipal sewage and is assumed to be the solids contribution from year-round residents. For a projected year 2036 permanent population of 1,218 people, this equates to a daily resident population loading of 243 pounds of TSS per day.

- **Seasonal Tourist Loading -** A value of 0.06 lbs of TSS per capita per day is assumed to be the solids contribution from summer visitors to Talkeetna, occurring from June 1st to October 1st. For a projected year 2036 tourist visitor count of 351,000 people in 4 months, or an average of 2,925 visitors per day, this equates to a daily visitor loading of 176 pounds of TSS per day.

**Table 3** below summarizes anticipated design organic loadings to the WWTF.

**Table 3: Future $BOD_5$ and TSS Loadings**

| | Organic Loading | | Solids Loading | |
|---|---|---|---|---|
| | **Resident Loading** | **Seasonal Tourist Loading** | **Resident Loading** | **Seasonal Tourist Loading** |
| **20-Year Design (2036)** | 207 lb/day | 176 lb/day | 243 lb/day | 176 lb/day |

## UPGRADE ALTERNATIVES ANALYSIS

Five possible WWTF upgrade alternatives are presented below. Based on this memo, MSB will select two alternatives to further analyze in a preliminary engineering report. The following section presents candidate upgrades to meet the design criteria listed in the previous sections.

Each alternative must meet the following site constraints:

- ✓ Occupy a footprint small enough to be accommodated on the parcel of land on which the treatment facility is located (Approximately 40 acres);
- ✓ Provide adequate separation distance between the treatment facility and nearby neighbors;
- ✓ Meet regulatory requirements for vertical separation between treatment structures and high groundwater for the area;
- ✓ Have the capability to withstand flood events without loss of functionality.

In addition to the foregoing, each treatment alternative upgrade must meet the following objectives:

- ✓ Meet the regulatory stipulations outlined in the WWTF discharge permit;
- ✓ Discharge seasonally into the slough May through October,
- ✓ Provide treatment for a 20 year planning horizon;
- ✓ Be configured as needed to secure ADEC approval for construction.

## Candidate Upgrades

As part of the initial alternative screening process, expanding the existing treatment wetlands was considered as a possible solution. To accommodate projected future flows, recommended hydraulic loading rates for effective wetland treatment require up to 10 times the land area occupied by the existing wetland area. Additionally, wetland treatment for FC removal is highly variable and cannot be counted on to consistently meet the existing limits of 20 and 40 FC/100 mL for monthly average and daily maximum values, respectively, as required by the current discharge permit. Several sources suggest that wetland treatment effluents should not be counted on to consistently produce FC concentrations less than 500 FC/100 mL. Based on these treatment limitations, the following alternatives all include the removal of the existing treatment wetlands.

The five alternative upgrades reviewed for this memorandum include:

1. Expand Facultative Lagoon per ADEC Guidelines;
2. Expand Facultative Lagoon per Canadian Guidelines;
3. Partially Mixed Aerated Lagoon Treatment;
4. Extended Aeration Activated Sludge Lagoon Treatment;
5. Mechanical Treatment Plant.

These options are described further below and compared in a table on Page 18 of this memo.

### Alternative 1: Expand Facultative Lagoon per ADEC Lagoon Construction Guidelines

Expanding the existing lagoons will allow for adequate removal of TSS and $BOD_5$ as population expands and wastewater inflow increases; however, to achieve DO and fecal coliform requirements supplemental aeration and disinfection will also need to be included.

The ADEC Lagoon Construction Guidelines utilize the treatment process currently in place where wastewater is treated using facultative pond cells operating in series. Wastewater flows into the primary pond where solids settle, then flow into the secondary pond where further TSS and $BOD_5$ removal takes place.

The ADEC Guidelines require the facility be sized for annual retention of influent wastewater with seasonal discharge during summer months. In addition, rain and snow falling on the ponds must be factored into the size of the ponds. Further, the ponds themselves must be sized according to the anticipated organic loading to the WWTF. With the required geometric configurations of earthen embankments and operating water depths, the footprint of the overall treatment facility is approximately 24 acres. This compares to the existing 3-cell facility which is approximately 8 acres (excluding wetland treatment area).

In addition to the physical size of the upgraded lagoon being approximately 3 times larger than the existing facility, the distance from the current lagoon to existing occupied buildings shown in **Figure 3** is less than the ADEC minimum recommended distance of 1,000 feet. Expanding the treatment area to 24 acres would further decrease this separation distance.


**Figure 3: Separation Distance Between Existing Lagoon and Occupied Building**

## Additional Treatment Addressing Effluent DO and FC's

### Effluent DO

Because of the nature of facultative lagoons, additional modifications to the treatment process will be required to meet prescribed limits of the existing ADEC discharge permit. Options for corrective action that improve effluent DO values are listed and screened in **Table 4**.

| Table 4: Option Screening for DO Compliance | | | |
|---|---|---|---|
| | **Option** | **Advantage** | **Disadvantage** |
| A | Request a mixing zone in the slough large enough to enable compliance with effluent DO requirements | No mechanical power or equipment required for treatment | River is designated as habitat for salmon and likely unavailable for mixing zone |
| B | Deploy in-pipeline aeration of effluent | Easy access to mechanical aeration equipment | 1. Best done with full pipe flow which is not available with existing outfall<br>2. Requires mechanical aeration equipment |
| C | Include reaeration in final cell | Easy access to mechanical equipment. | 1. More air supply required for facultative pond effluent than for wetland treatment effluent.<br>2. Requires seasonal pigging of effluent outfall pipe between third cell and slough |

Options B and C in **Table 4** provide compliance with regulatory effluent DO concentrations; however C is the preferred option.

### Fecal Coliforms

Consistent regulatory compliance with Talkeetna's existing discharge permit for FCs is likely only possible by deployment of an effluent disinfection process. Options for corrective action that improve effluent FC concentrations are listed and screened in **Table 5**.

| Table 5: Option Screening for FC Compliance | | | |
|---|---|---|---|
| | **Option** | **Advantage** | **Disadvantage** |
| A | Effluent disinfection using Chlorination/De-chlorination | 1. Effective in controlling regulated pathogens<br>2. Simple technology and equipment<br>3. Low power consumption | 1. Requires chlorine contact reactor tank and mechanical mixer<br>2. Requires periodic draining and flushing solids out of contact tank<br>3. Requires chemicals for chlorination and de-chlorination<br>4. Requires chemical storage<br>5. Requires online analyzer instrumentation to monitor and report chlorine residual<br>6. Requires periodic pigging sample line to online analyzer |
| B | Effluent disinfection using UV Disinfection | 1. Effective in controlling regulated pathogens<br>2. No chemicals added to effluent<br>3. No chemical storage required<br>4. Small footprint as no mechanical mixer or contact tank required | 1. Requires electrical power for lamp operation<br>2. Requires periodic lamp sleeve cleaning, though can be automated<br>3. Requires periodic lamp replacement |

As previously stated, MSB is in the process of performing a variety of data collection efforts, including ultraviolet transmittance testing (UVT) on effluent wastewater from Cell 3. Provided UVT levels are conducive, UV disinfection is the preferred process.

**Figure 4** shows a conceptual configuration for this alternative including disinfection and aeration equipment.

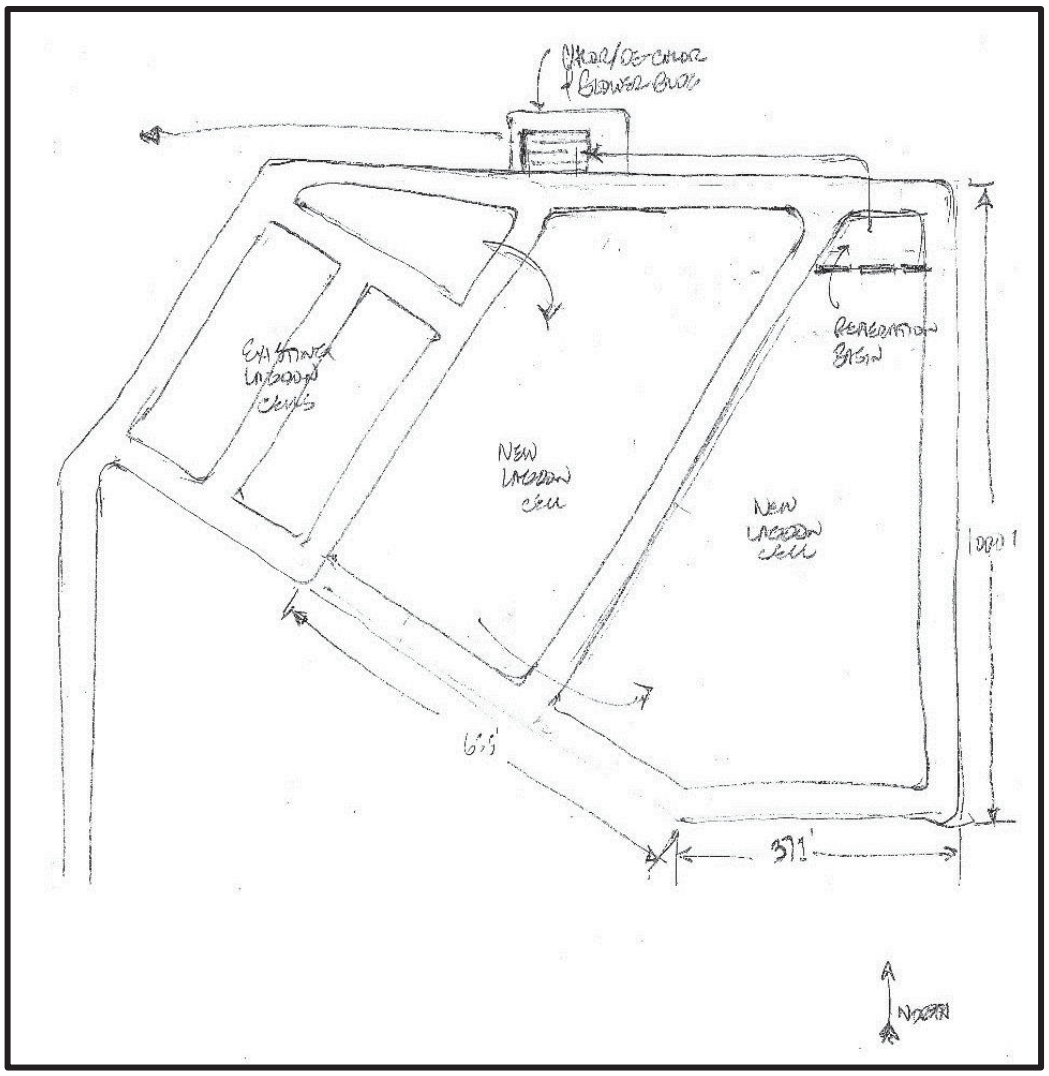


**Figure 4: Conceptual Layout for Alternative 1- Lagoon Upgrade per ADEC Guidelines**

## Alternative 2: Expand Facultative Lagoon Per Canadian Guidelines

The following evaluates the option of upgrading the existing facultative lagoon treatment system utilizing a configuration and operation which complies with Canadian standards, and not necessarily with the ADEC guidelines for lagoon construction.

Since 1982, the Canadian Province of Alberta has been proactive in its research of lagoon performance for 190 facultative lagoons in Alberta operating in climatic environments not dissimilar to that of Talkeetna. The Province's Ministry of Environment and Parks is the agency which maintains and updates design and operational standards for facultative lagoon treatment systems. Based on published data from the University of Alberta, Edmonton, lagoon systems configured and operated according to provincial standards are able to meet Talkeetna's permit limits for $BOD_5$ and TSS. Effluent FCs are reported to be below 30 most all the time, but with excursions that would require supplemental disinfection. Effluent DO is not addressed by the Canadian research, and it is assumed that effluent reaeration would be needed.

The configuration for this alternative includes the addition of two anerobic lagoon cells, and one storage cell to the existing system, as well as a reaeration basin in the final storage cell and a chlorination/dechlorination building. A conceptual sketch of the configuration and flow process including reaeration and disinfection is shown in **Figure 5.** Water flows into the anerobic cells, then through the existing 3 cells, to the storage cell. From the storage cell treated water is directed to the reaeration basin, then to the disinfection building and finally discharged to the slough. Based on required depths and flow rates through each cell, using 3:1 horizontal to vertical side slopes, the footprint of the facultative lagoon would be approximately 15 acres. Similar to Alternative 1, this alternative would significantly reduce the separation distance between lagoons and the nearest occupied buildings.

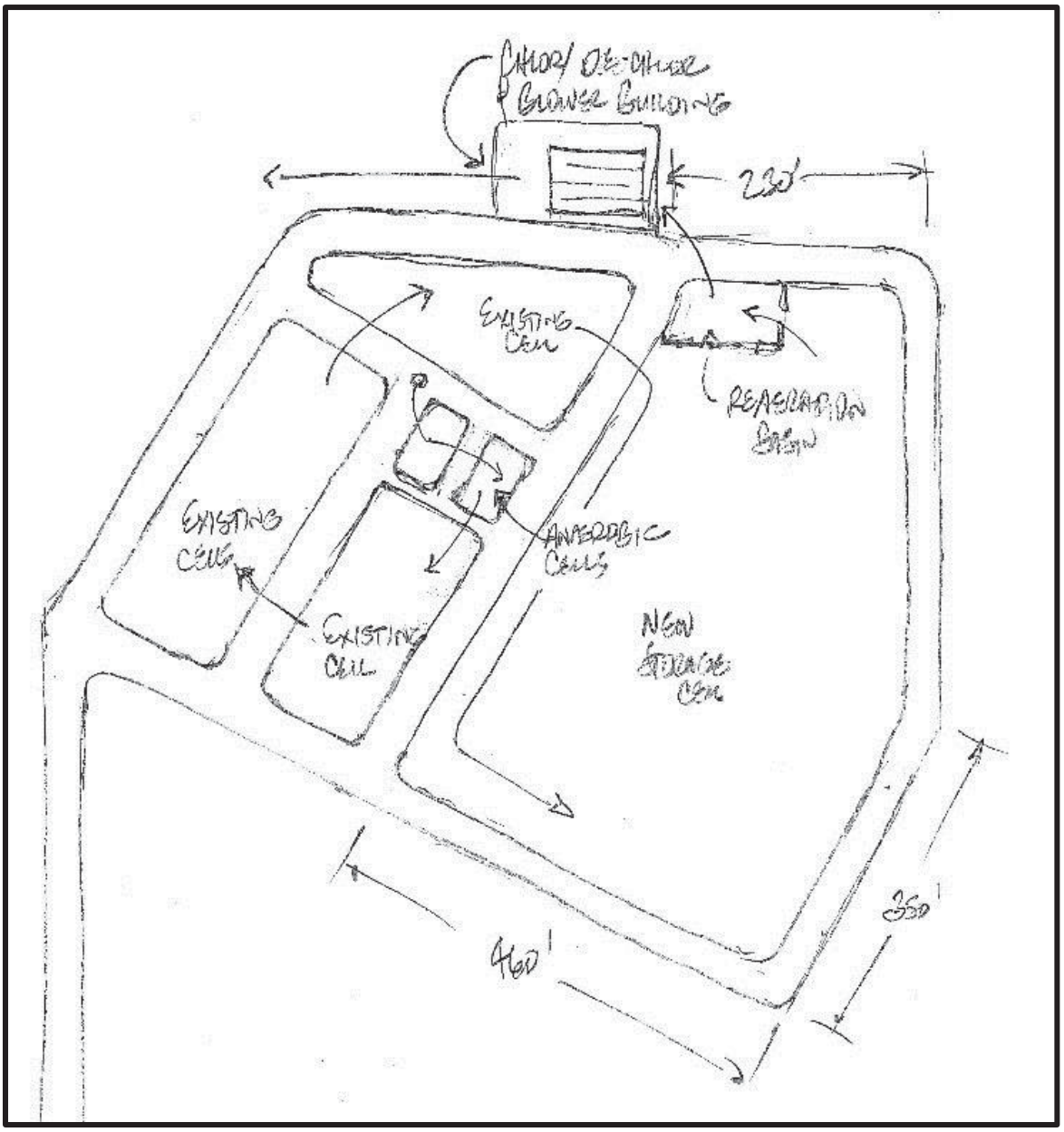


**Figure 5: Conceptual Layout for Alternative 2 - Lagoon Upgrade per Canadian Guidelines**

**Alternative 3: Partially Mixed Aerated Lagoon Treatment**

Another treatment option is deployment of a partially mixed aerated facultative lagoon treatment system. These types of treatment facilities are in use within Alaska operating on municipal wastewater at Palmer, Wasilla, Nome, and North Pole.

In summary, for this process raw sewage would be directed in series to a sequence of aerated lagoon cells prior to effluent disinfection and seasonal discharge to the slough. Properly sized, configured, and maintained with periodic sludge solids removal, these types of facilities are able to routinely achieve the effluent quality stipulated in the current Talkeetna APDES permit. This alternative requires periodic sludge removal once every 5-10 years. Sludge removal is typically accomplished with floating dredges discharging sludge into either a mechanical dewatering process or a geotube.

To minimize the introduction of large debris into the lagoon cells, preliminary treatment equipment may be included upstream of the first lagoon cell. The location of this pretreatment equipment is often referred to as the headworks of the treatment system. The advantage of including headworks treatment is that sludge accumulation in the cells is slower and not hampered by large debris at the bottom of the cells.

Seasonal aeration of partially mixed lagoons can result in release of both odors and foam. Surface foam can be captured by the wind and transported off site. Foam formation is a product of oxidation of anoxic organic material released into the water column by aeration and/or seasonal pond turnovers. Odors released may last between several days to a few weeks depending upon the amount of sludge accumulated on the bottom of the aerated cells and the volume of air introduced for aeration. Continuous aeration would eliminate the odor issue.

Using 2036 loading criteria established previously and the foregoing configuration criteria, the footprint of a partially mixed facultative aerated lagoon system would be approximately 8 acres. Mechanical aeration blowers sized for 2036 loadings would be a pair of duty/redundant 30Hp blowers with VFD motor control equipment. While this alternative will also likely reduce the distance between lagoons and occupied buildings, it would be significantly less than Alternatives 1 and 2. A schematic of how this alternative could be configured for the existing site is illustrated in **Figure 6**.

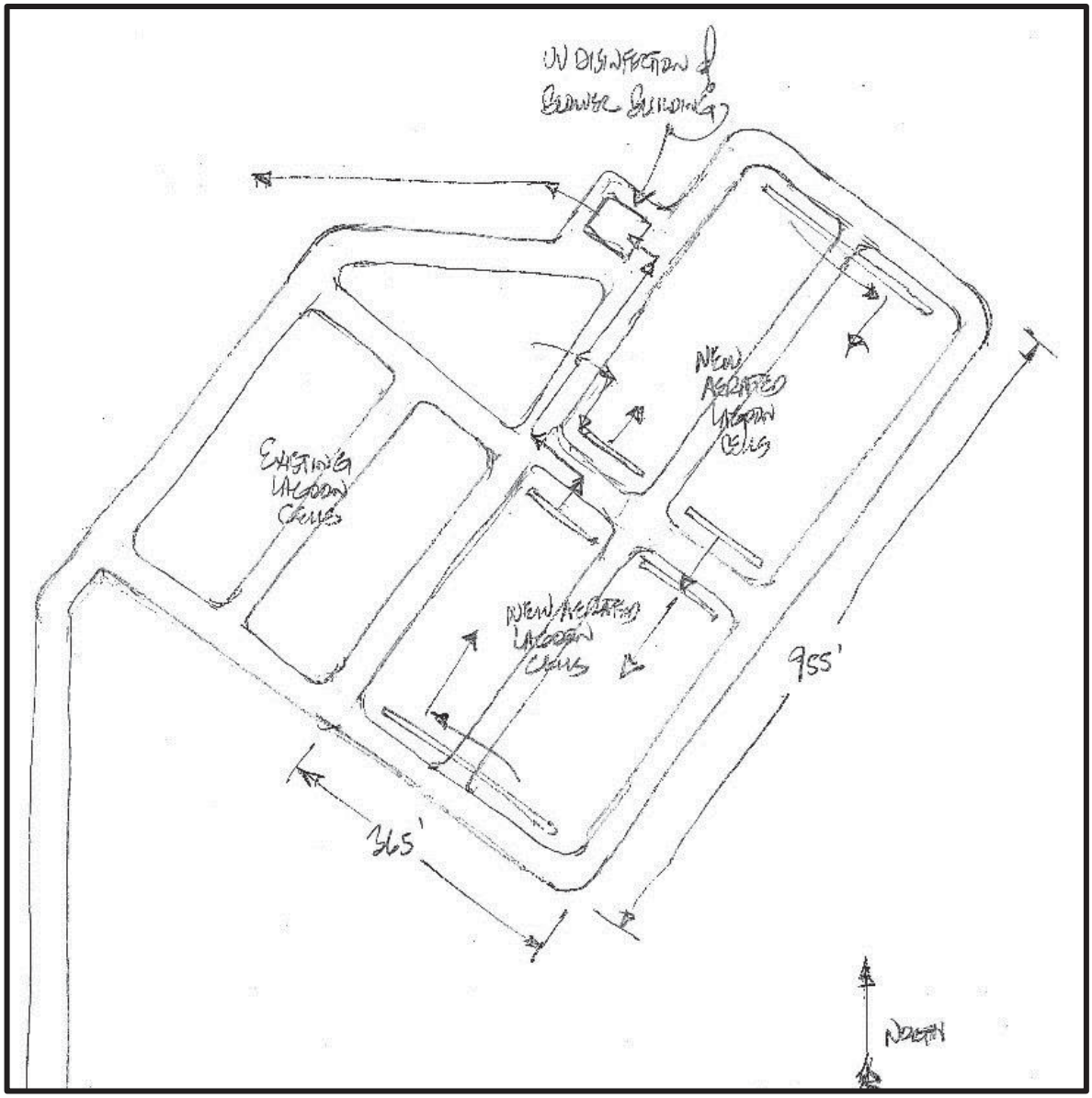


**Figure 6: Conceptual Layout for Alternative 3 - Partially Mixed Aerated Lagoon Upgrade**

**Alternative 4: Extended Aeration AS Lagoon Treatment**

Another wastewater treatment alternative for Talkeetna would be conversion of the existing facultative pond treatment system to a seasonally operated extended aeration activated sludge (AS) lagoon treatment system including effluent disinfection.

This treatment system would make use of a portion of one of the existing earthen diked ponds as a biological treatment reactor basin for an extended aeration AS process. The remainder of the existing ponds would be used to capture and store influent wastewater for subsequent seasonal treatment and discharge during the summer.

Instead of using the ponds for a combination of biological stabilization and sedimentation of solids, the lagoon AS process would use a separate clarifier for solids separation and return a portion of settled sludge to the aerated basin as required by the AS process. A conceptual drawing of the site configuration is shown in **Figure 7.**

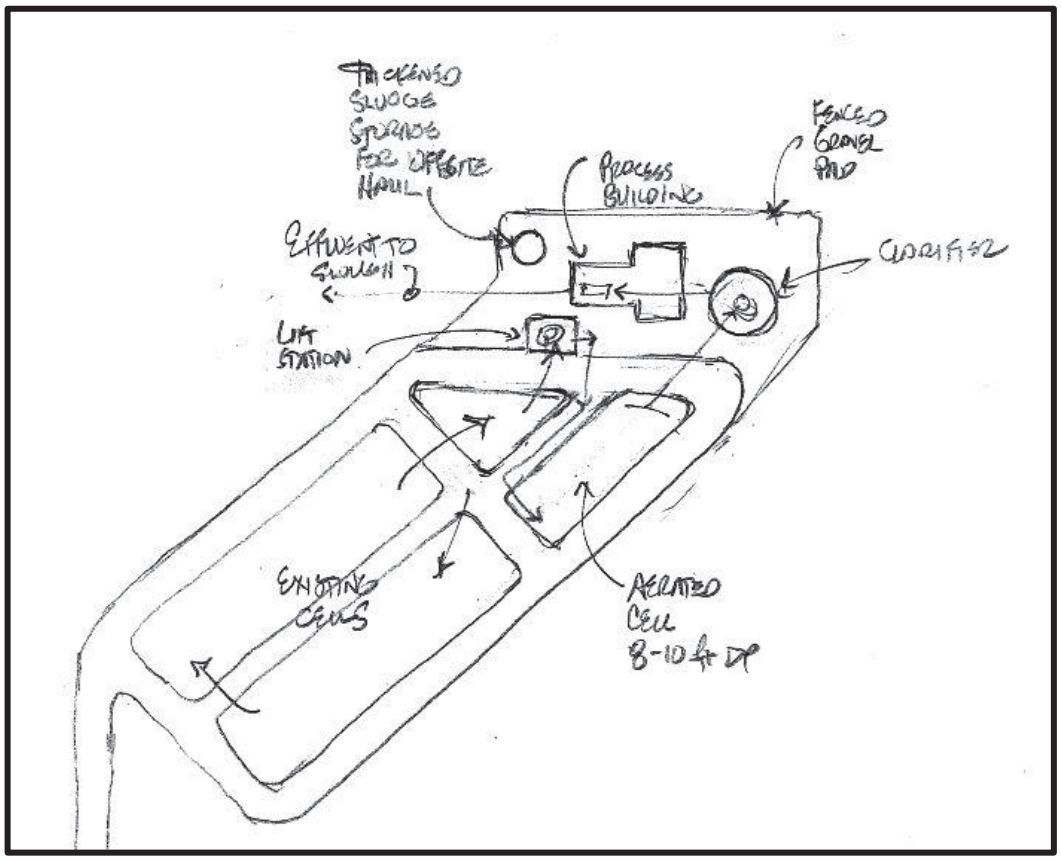


**Figure 7: Conceptual Layout for Alternative 4 - Extended Air Activated Sludge Process**

A schematic process flow diagram for this process is provided in **Figure 8** below.

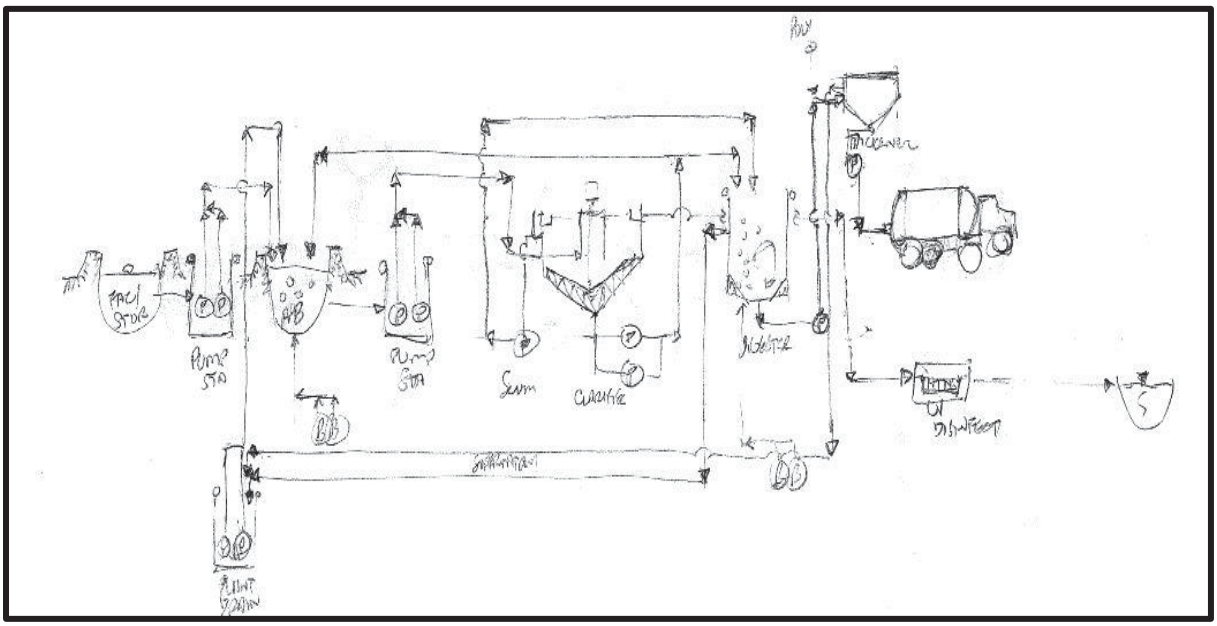

**Figure 8: Schematic Flow Diagram for Alternative 4 - Extended Air Activated Sludge Process**

For the foregoing treatment process, the footprint of the existing lagoon cells would remain the same and a new 3,500 square foot process building would be added. Additionally, a new circular clarifier and a small pump station to transfer wastewater to the new extended aeration treatment system would be needed. A conceptual building layout is provided in **Figure 9** below.

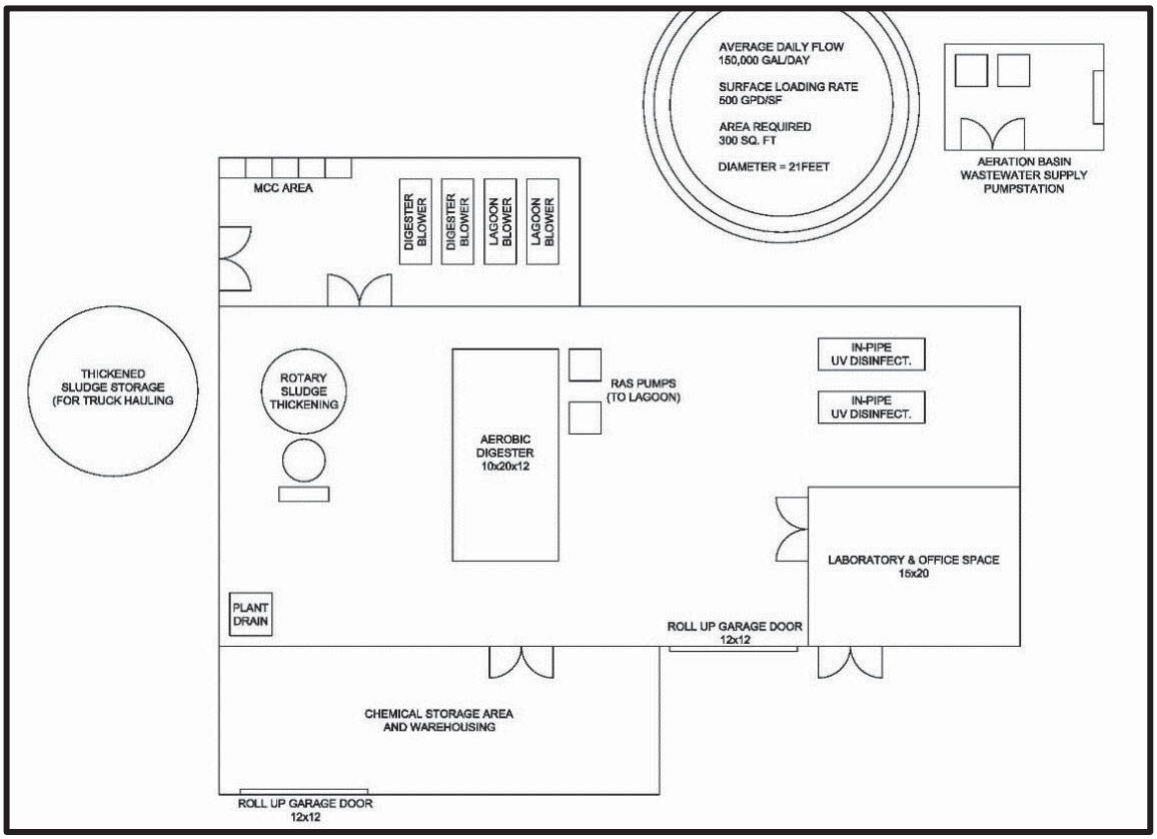


**Figure 9: Conceptual Building Layout for Alternative 4 - Extended Air Activated Sludge Process**

### Alternative 5: Mechanical Treatment Plant

As with Alternative 4, this treatment alternative is also a seasonally operated system. Wastewater generated throughout the year would be directed to the existing three lagoon pond cells for storage. In summer, following ice melt and pond warming, stored wastewater would be withdrawn for treatment in a mechanical treatment plant. The mechanical treatment plant would be a membrane bioreactor (MBR) and includes disinfection and aeration. The MBR process occupies a smaller footprint relative to other mechanical processes, and can be largely automated to operate without continuous operator supervision. A schematic process flow diagram for this process is provided in **Figure 10**.

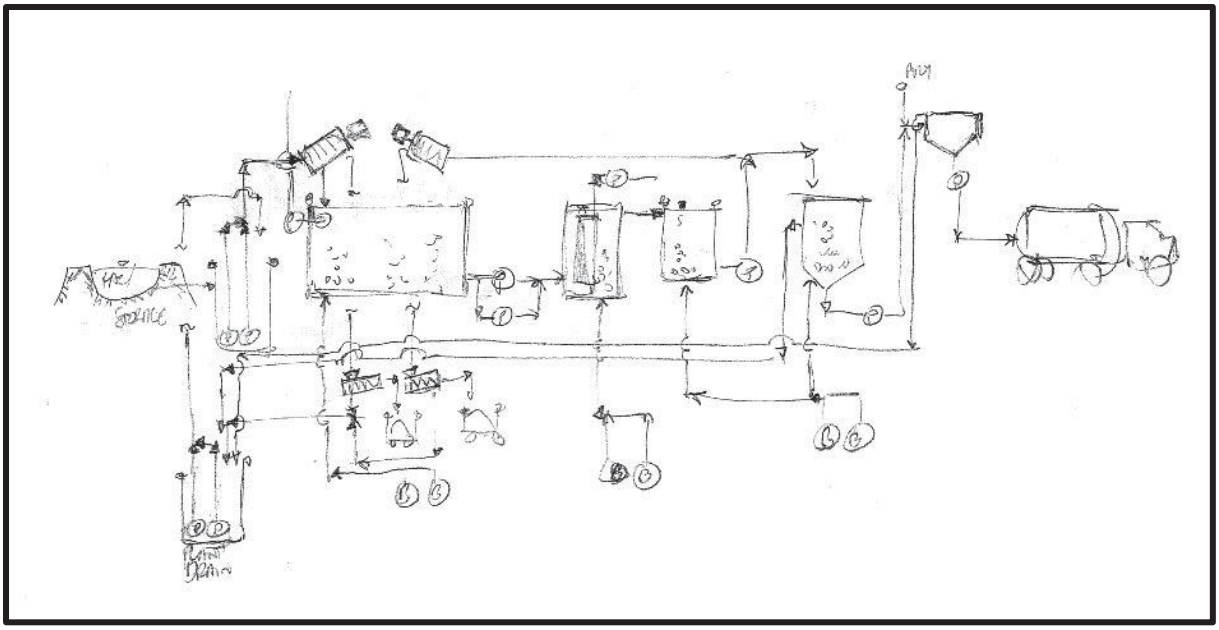

**Figure 10: Schematic Flow Diagram for Alternative 5 - MBR Treatment Plant**

For the foregoing treatment process, the footprint of the existing lagoon cells would remain the same. A new 5,000 square feet process building would be added to house the new MBR treatment system. A conceptual building layout is provided in **Figure 11**.

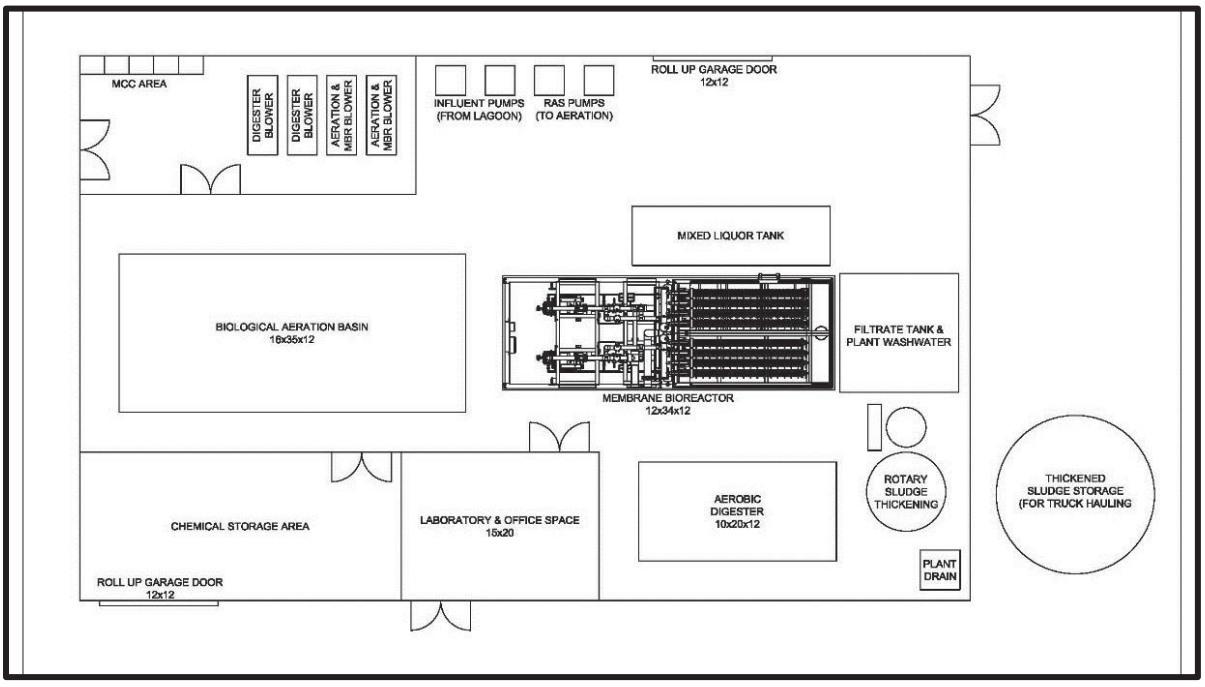


**Figure 11: Conceptual Building Layout for Alternative 5 - MBR Treatment Plant**

## ALTERNATIVES COMPARISON

**Table 6: Alternatives Comparison**

| | Alternative | | | | |
|---|---|---|---|---|---|
| | **1-Expand Facultative Lagoon per ADEC Guidelines** | **2-Expand Facultative Lagoon per Canadian Guidelines** | **3-Partially mixed Aerated Lagoon Treatment** | **4-Extended Aeration Activated Sludge Lagoon Treatment** | **5-Mechanical Treatment Plant** |
| **Footprint** | 29 Acres | 15 Acres | 8 Acres | No Change to Lagoon Basin Size, 3,500 SF Building | No Change to Lagoon Basin Size, 5,000 SF Building |
| **Requires Supplemental Disinfection** | Yes | Yes | Yes | Yes | No |
| **Requires Supplemental Aeration** | Yes | Yes | No | No | No |
| **Operability** | Same Process as existing, requires routine checks on aeration and disinfection equipment | Same process as existing, requires routine checks on aeration/disinfection equip | Less Intensive Than Option 4 | Operator Intensive | Can be mostly automated, likely requires higher operator level |
| **Constructability** | Easy, unless wetland encroachment | Easy, unless wetland encroachment | Difficult | Moderate | Easy |
| **Requires 3 Phase Power** | No | No | Yes | Yes | Yes |
| **Requires Solids Removal** | No | No | YES (Dredge every 5-10 Years) | Yes | Yes |
| **Construction Cost Ranking (1=Lowest 5=Highest)** | 3 | 2 | 1 | 4 | 5 |
| **O&M Cost** | Low | Low | Mid | High | High |

## UPGRADE RECOMMENDATIONS

HDL presented upgrade alternatives to MSB staff in October 2016 upon which MSB directed HDL to further evaluate Alternatives 2 and 3. Furthermore, MSB has asked HDL to explore phasing options for each alternative, with the primary objective of the first phase to address dissolved oxygen and fecal coliform violations.

Chosen alternatives and possible phasing plans, complete with estimated construction and operation and maintenance costs will be further evaluated in a PER following United States Department of Agriculture, Rural Utilities Service Bulletin 1780-2 requirements.

# APPENDIX D

# DECISION MATRIX COMPILED SCORES

# Alternative Scoring Comparison (Unweighted)

Alternative 1 expands the facility using canadian standards for facultative lagoon treatment with suplemental disinfection
Alternative 2 converts the facility into a partially mixed aerated lagoon with suplemental disinfection
Scoring: 1= Least Desirable, 10 = Most Desirable

| Scorer | Capital Cost | | Annual O&M | | Reuse of Existing Facilities | | Adaptability for Phased Construction | | Adaptablility for Future Requirements | | Overall Footprint | | Overall Operability | | Permitability | | **TOTAl SCORE** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | **Alternative1** | **Alternative 2** |
| JJ MSB | 6 | 2 | 7 | 3 | 8 | 4 | 8 | 6 | 4 | 6 | 6 | 8 | 8 | 6 | 7 | 7 | **54** | **42** |
| MSB 1 | 6 | 2 | 8 | 7 | 8 | 8 | 8 | 3 | 4 | 8 | 4 | 8 | 8 | 6 | 6 | 8 | **52** | **50** |
| MSB 2 | 5 | 2 | 5 | 2 | 5 | 5 | 6 | 6 | 4 | 4 | 4 | 6 | 6 | 4 | 5 | 5 | **40** | **34** |
| MSB 3 | 6 | 1 | 4 | 8 | 1 | 1 | 7 | 5 | 5 | 7 | 2 | 6 | 2 | 8 | 4 | 6 | **31** | **42** |
| DL HDL | 5 | 1 | 7 | 5 | 10 | 10 | 6 | 6 | 5 | 8 | 5 | 8 | 5 | 8 | 5 | 8 | **48** | **54** |
| CB HDL | 10 | 6 | 10 | 8 | 7 | 6 | 8 | 5 | 2 | 8 | 3 | 7 | 7 | 7 | 5 | 5 | **52** | **52** |
| NMY HDL | 8 | 4 | 6 | 5 | 8 | 5 | 9 | 4 | 4 | 9 | 5 | 8 | 6 | 9 | 7 | 7 | **53** | **51** |
| AA GVJ | 10 | 4 | 9 | 8 | 6 | 6 | 5 | 10 | 6 | 8 | 5 | 10 | 6 | 9 | 9 | 7 | **56** | **62** |
| GJ GVJ | 10 | 8 | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 8 | 6 | 6 | 8 | 6 | 6 | 6 | **51** | **49** |
| **Average** | **7.3** | **3.3** | **6.9** | **5.7** | **6.4** | **5.6** | **6.9** | **5.6** | **4.3** | **7.3** | **4.4** | **7.4** | **6.2** | **7.0** | **6.0** | **6.6** | **48.6** | **48.4** |

Importance Factor

| | |
|---|---|
| Capital Cost | 18 |
| Annual O&M | 22 |
| Reuse of Existing Facilities | 5 |
| Adaptability for Phased Construction | 15 |
| Adaptability for Future Requirements | 20 |
| Overall Footprint | 5 |
| Overall Operability | 15 |
| Permitability | 0 |
| Total points | 100 |

# Alternative Scoring Comparison (Weighted)

| Scorer | Capital Cost | | Annual O&M | | Reuse of Existing Facilities | | Adaptability for Phased | | Adaptablility for Future | | Overall Footprint | | Overall Operability | | Permitability | | **TOTAl SCORE** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | Alternative1 | Alternative 2 | **Alternative1** | **Alternative 2** |
| JJ MSB | 108 | 36 | 154 | 66 | 40 | 20 | 120 | 90 | 80 | 120 | 30 | 40 | 120 | 90 | 0 | 0 | **652** | **462** |
| MSB 1 | 108 | 36 | 176 | 126 | 40 | 40 | 120 | 45 | 80 | 160 | 20 | 40 | 120 | 90 | 0 | 0 | **664** | **537** |
| MSB 2 | 90 | 36 | 110 | 36 | 25 | 25 | 90 | 90 | 80 | 80 | 20 | 30 | 90 | 60 | 0 | 0 | **505** | **357** |
| MSB 3 | 108 | 18 | 88 | 144 | 5 | 5 | 105 | 75 | 100 | 140 | 10 | 30 | 30 | 120 | 0 | 0 | **446** | **532** |
| DL HDL | 90 | 18 | 154 | 90 | 50 | 50 | 90 | 90 | 100 | 160 | 25 | 40 | 75 | 120 | 0 | 0 | **584** | **568** |
| CB HDL | 180 | 108 | 220 | 144 | 35 | 30 | 120 | 75 | 40 | 160 | 15 | 35 | 105 | 105 | 0 | 0 | **715** | **657** |
| NMY HDL | 144 | 72 | 132 | 90 | 40 | 25 | 135 | 60 | 80 | 180 | 25 | 40 | 90 | 135 | 0 | 0 | **646** | **602** |
| AA GVJ | 180 | 72 | 198 | 144 | 30 | 30 | 75 | 150 | 120 | 160 | 25 | 50 | 90 | 135 | 0 | 0 | **718** | **741** |
| GJ GVJ | 180 | 144 | 132 | 90 | 25 | 25 | 75 | 75 | 100 | 160 | 30 | 30 | 120 | 90 | 0 | 0 | **662** | **614** |
| **Average** | **132.0** | **60.0** | **151.6** | **103.3** | **32.2** | **27.8** | **103.3** | **83.3** | **86.7** | **146.7** | **22.2** | **37.2** | **93.3** | **105.0** | **0.0** | **0.0** | **621.3** | **563.3** |

# APPENDIX E

# PROPOSED PROJECT PHASED CONSTRUCTION COST ESTIMATES

**Alternative 1-Expand Facultative Lagoon Per Canadian Guidelines**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **CIVIL** | | | | |
| Mobilization/demobilization (5% of Civil Cost) | Lump Sum | 1 | $ 202,400.00 | $ 202,400.00 |
| Construction Surveying (3% Civil Cost) | Lump Sum | 1 | $ 121,500.00 | $ 121,500.00 |
| SWPPP (3% of Civil Cost) | Lump Sum | 1 | $ 121,500.00 | $ 121,500.00 |
| Clearing and Grubbing | Acre | 16 | $ 7,500.00 | $ 120,000.00 |
| Decomission Wetlands | Lump Sum | 1 | $ 10,000.00 | $ 10,000.00 |
| Surface Roads | Linear Foot | 4,000 | $ 65.00 | $ 260,000.00 |
| Dewatering | Lump Sum | 1 | $ 100,000.00 | $ 100,000.00 |
| Usable Excavation | Cubic Yard | 32,200 | $ 12.00 | $ 386,400.00 |
| Classified Fill | Ton | 50,000 | $ 30.00 | $ 1,500,000.00 |
| Cell Liner | Square Yard | 41,000 | $ 10.00 | $ 410,000.00 |
| Yard Piping (including trench excavation and backfill) | Linear Foot | 2,020 | $ 200.00 | $ 404,000.00 |
| Furnish and Install Manholes | Each | 7 | $ 15,000.00 | $ 105,000.00 |
| 8-foot Chain Link Fence | Linear Foot | 4,000 | $ 45.00 | $ 180,000.00 |
| Topsoil/Seed | Acre | 4 | $ 10,000.00 | $ 40,000.00 |
| Lighting/Security | Lump Sum | 1 | $ 50,000.00 | $ 50,000.00 |
| Connect to Existing | Each | 2 | $ 10,000.00 | $ 20,000.00 |
| Baffles | Linear Foot | 2,200 | $ 210.00 | $ 462,000.00 |
| **TREATMENT** | | | | |
| **Process Equipment Building** | | | | |
| Excavation/compaction/prep site | Lump Sum | 1 | $ 21,000.00 | $ 21,000.00 |
| Concrete pad (20' x 20') | Lump Sum | 1 | $ 38,000.00 | $ 38,000.00 |
| Building Enclosure | Lump Sum | 1 | $ 168,000.00 | $ 168,000.00 |
| Electrical/Lighting | Lump Sum | 1 | $ 90,000.00 | $ 90,000.00 |
| HVAC | Lump Sum | 1 | $ 129,000.00 | $ 129,000.00 |

**Alternative 1-Expand Facultative Lagoon Per Canadian Guidelines**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **Process Equipment** | | | | |
| Reaeration basin | Lump Sum | 1 | $ 28,000.00 | $ 28,000.00 |
| Blowers | Lump Sum | 1 | $ 53,000.00 | $ 53,000.00 |
| Blower housekeeping pads | Lump Sum | 1 | $ 5,000.00 | $ 5,000.00 |
| Blower Electrical and Controls Wiring | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Blower Commissioning | Lump Sum | 1 | $ 15,000.00 | $ 15,000.00 |
| Diffusers | Lump Sum | 1 | $ 20,000.00 | $ 20,000.00 |
| Air Piping | Lump Sum | 1 | $ 10,000.00 | $ 10,000.00 |
| Contact tank (coated steel) | Lump Sum | 1 | $ 78,000.00 | $ 78,000.00 |
| Chlorination Equipment (chemical pump and tank) | Lump Sum | 1 | $ 14,000.00 | $ 14,000.00 |
| Dechlorination Equipment (chemical pump and tank) | Lump Sum | 1 | $ 14,000.00 | $ 14,000.00 |
| Chemical Dosing Electrical and Controls Wiring | Lump Sum | 1 | $ 9,000.00 | $ 9,000.00 |
| **Electrical** | | | | |
| SCADA integration | Lump Sum | 1 | $ 86,000.00 | $ 86,000.00 |
| Chlorine Residual Instrument (2) | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Effluent flow meter | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Security, Network | Lump Sum | 1 | $ 12,000.00 | $ 12,000.00 |
| Electric Service Extension | Lump Sum | 1 | $ 100,000.00 | $ 100,000.00 |

| | | |
|---|---|---|
| **Total Construction Cost** | **$** | **5,440,000** |
| 20% Contingency | $ | 1,088,000 |
| Engineering Design Phase Services (10% of Total Construction Cost) | $ | 544,000 |
| Construction Phase Services (10% of Total Construction Cost) | $ | 544,000 |
| MSB Administration (3% of Total Construction Cost) | $ | 163,200 |
| **Total Capital Project Cost** | **$** | **7,800,000** |

**Phase 1-Install Reaeration Basin, Disinfection System & Anaerobic Cells**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **CIVIL** | | | | |
| Mobilization/demobilization (5% of Civil Cost) | Lump Sum | 1 | $ 59,600.00 | $ 59,600.00 |
| Construction Surveying (3% Civil Cost) | Lump Sum | 1 | $ 35,800.00 | $ 35,800.00 |
| SWPPP (3% of Civil Cost) | Lump Sum | 1 | $ 35,800.00 | $ 35,800.00 |
| Clearing and Grubbing | Acre | 3 | $ 7,500.00 | $ 22,500.00 |
| Decommission Wetlands | Lump Sum | 1 | $ 10,000.00 | $ 10,000.00 |
| Surface Roads | Linear Foot | 1,500 | $ 65.00 | $ 97,500.00 |
| Dewatering | Lump Sum | 1 | $ 20,000.00 | $ 20,000.00 |
| Usable Excavation | Cubic Yard | 700 | $ 12.00 | $ 8,400.00 |
| Classified Fill | Ton | 20,000 | $ 30.00 | $ 600,000.00 |
| Anaerobic Cell Liner | Square Yard | 4,000 | $ 10.00 | $ 40,000.00 |
| Yard Piping (including trench excavation and backfill) | Linear Foot | 1,500 | $ 200.00 | $ 300,000.00 |
| Furnish and Install Manholes | Each | 6 | $ 15,000.00 | $ 90,000.00 |
| Topsoil/Seed | Acre | 0.25 | $ 10,000.00 | $ 2,500.00 |
| **TREATMENT** | | | | |
| **Process Equipment Building** | | | | |
| Excavation/compaction/prep site | Lump Sum | 1 | $ 21,000.00 | $ 21,000.00 |
| Concrete pad (20' x 20') | Lump Sum | 1 | $ 38,000.00 | $ 38,000.00 |
| Building Enclosure | Lump Sum | 1 | $ 168,000.00 | $ 168,000.00 |
| Electrical/Lighting | Lump Sum | 1 | $ 90,000.00 | $ 90,000.00 |
| HVAC | Lump Sum | 1 | $ 129,000.00 | $ 129,000.00 |
| **Process Equipment** | | | | |
| Reaeration basin | Lump Sum | 1 | $ 28,000.00 | $ 28,000.00 |
| Blowers | Lump Sum | 1 | $ 53,000.00 | $ 53,000.00 |
| Blower housekeeping pads | Lump Sum | 1 | $ 5,000.00 | $ 5,000.00 |
| Blower Electrical and Controls Wiring | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Blower Commissioning | Lump Sum | 1 | $ 15,000.00 | $ 15,000.00 |
| Diffusers | Lump Sum | 1 | $ 20,000.00 | $ 20,000.00 |
| Air Piping | Lump Sum | 1 | $ 10,000.00 | $ 10,000.00 |
| Contact tank (coated steel) | Lump Sum | 1 | $ 78,000.00 | $ 78,000.00 |
| Chlorination Equipment (chemical pump and tank) | Lump Sum | 1 | $ 14,000.00 | $ 14,000.00 |
| Dechlorination Equipment (chemical pump and tank) | Lump Sum | 1 | $ 14,000.00 | $ 14,000.00 |
| Chemical Dosing Electrical and Controls Wiring | Lump Sum | 1 | $ 9,000.00 | $ 9,000.00 |
| **ELECTRICAL** | | | | |
| SCADA integration | Lump Sum | 1 | $ 86,000.00 | $ 86,000.00 |
| Chlorine Residual Instrument (2) | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |

MSB Talkeetna WWTF Upgrades
Budget Level Capital Project Cost Estimate

**Phase 1-Install Reaeration Basin, Disinfection System & Anaerobic Cells**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| Effluent flow meter | Lump Sum | 1 | $ 19,000.00 | $ 19,000.00 |
| Security, Network | Lump Sum | 1 | $ 12,000.00 | $ 12,000.00 |
| Electric Service Extension | Lump Sum | 1 | $ 100,000.00 | $ 100,000.00 |

| | | |
|---|---|---|
| **Total Construction Cost** | **$** | **2,270,000** |
| 20% Contingency | $ | 454,000 |
| Engineering Design Phase Services (10% of Total Construction Cost) | $ | 227,000 |
| Construction Phase Services (10% of Total Construction Cost) | $ | 227,000 |
| MSB Administration (3% of Total Construction Cost) | $ | 68,100 |
| **Total Capital Project Cost** | **$** | **3,200,000** |

MSB Talkeetna WWTF Upgrades
Budget Level Capital Project Cost Estimate

**Phase 2-Construct Storage Pond**

| Work Description | Unit | Estimated Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| **CIVIL** | | | | |
| Mobilization/demobilization (5% of Civil Cost) | Lump Sum | 1 | $ 142,700.00 | $ 142,700.00 |
| Construction Surveying (3% Civil Cost) | Lump Sum | 1 | $ 85,700.00 | $ 85,700.00 |
| SWPPP (3% of Civil Cost) | Lump Sum | 1 | $ 85,700.00 | $ 85,700.00 |
| Clearing and Grubbing | Acre | 13 | $ 7,500.00 | $ 97,500.00 |
| Surface Roads | Linear Foot | 2,500 | $ 65.00 | $ 162,500.00 |
| Dewatering | Lump Sum | 1 | $ 80,000.00 | $ 80,000.00 |
| Usable Excavation | Cubic Yard | 31,500 | $ 12.00 | $ 378,000.00 |
| Classified Fill | Ton | 30,000 | $ 30.00 | $ 900,000.00 |
| Storage Cell Liner | Square Yard | 37,000 | $ 10.00 | $ 370,000.00 |
| Baffles | Linear Foot | 2,200 | $ 210.00 | $ 462,000.00 |
| Yard Piping (including trench excavation and backfill) | Linear Foot | 520 | $ 200.00 | $ 104,000.00 |
| Connect to Existing | Each | 2 | $ 10,000.00 | $ 20,000.00 |
| Furnish and Install Manholes | Each | 1 | $ 15,000.00 | $ 15,000.00 |
| 8-foot Chain Link Fence | Linear Foot | 4,000 | $ 45.00 | $ 180,000.00 |
| Lighting/Security | Lump Sum | 1 | $ 50,000.00 | $ 50,000.00 |
| Topsoil/Seed | Acre | 3.5 | $ 10,000.00 | $ 35,000.00 |

| | | |
|---|---|---|
| **Total Construction Cost** | **$** | **3,170,000** |
| 20% Contingency | $ | 634,000 |
| Engineering Design Phase Services (10% of Total Construction Cost) | $ | 317,000 |
| Construction Phase Services (10% of Total Construction Cost) | $ | 317,000 |
| MSB Administration (3% of Total Construction Cost) | $ | 95,100 |
| **Total Capital Project Cost** | **$** | **4,500,000** |

# APPENDIX F

# PUBLIC INVOLVEMENT COMMENTS FROM PREVIOUS PROJECTS

Hope we [illegible] payments on time or are out of town won't get This.

# HOW'S THE WATER?

What are the challenges being experienced with the Talkeetna Sewer/Water System? The Mat-Su Borough has hired CRW Engineering Group, LLC to assess the current system's operations, facilities, and costs. To best understand what problems the Talkeetna community is experiencing with the water system, we need to hear from you. Please take a few minutes to provide the information below to help solve your community's water system challenges.

It is our goal to make the system run more efficiently, be more cost effective, and best meet the needs of the Talkeetna community.

THANK YOU FOR BEING PART OF THE SOLUTION!

NEAREST INTERSECTION TO RESIDENCE: G + Front

| Water Quality: Look, Feel, Taste and Smell. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| My water is always clear. | | | | | |
| My water pressure is acceptable. | | X | | | |
| The taste of my water is pleasing. | | | | | |
| My water is odorless. | | | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | all winter | | | | |
| My waterline pipes have burst due to freezing in the past. | YES / (NO) (Please circle one) because we let it run | | | | |

**Water Use (Please choose one)**

- ☐ I don't know how much water I use per month.
- ☒ I use less than 1,000 gallons of water per month.
- ☐ I use less than 2,000 gallons of water per month.
- ☐ I use less than 4,000 gallons of water per month.
- ☐ I use more than 8,000 gallons of water per month.

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | X | | | | |
| I think my monthly water bill is too low. | | | | | X |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | | X |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | YES / NO (Please circle one) | | | It is in the red ... no one seems to be paying | |

**Water Education: What would you like to know?**

| | |
|---|---|
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | YES / (NO) (Please circle one) |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | YES / (NO) (Please circle one) |

**Additional Comments/Concerns:**

The borough needs to step up to the plate to replace the dysfunctional system they put in. →

Please Bring Your Completed Survey to the Talkeetna Community Meeting on March 25, 2014 or send to:

ATTN: Jessica Smith | CRW Engineering Group, LLC | 3940 Arctic Blvd #300 | Anchorage, AK 99503

comments@crweng.com

The taxes we generate every summer should be paying for— This rather than being spent in the valley. Give Talkeetna its fair share at least.

# HOW'S THE WATER?

What are the challenges being experienced with the Talkeetna Sewer/Water System? The Mat-Su Borough has hired CRW Engineering Group, LLC to assess the current system's operations, facilities, and costs. To best understand what problems the Talkeetna community is experiencing with the water system, we need to hear from you. Please take a few minutes to provide the information below to help solve your community's water system challenges.

It is our goal to make the system run more efficiently, be more cost effective, and best meet the needs of the Talkeetna community.

THANK YOU FOR BEING PART OF THE SOLUTION!

NEAREST INTERSECTION TO RESIDENCE:

| Water Quality: Look, Feel, Taste and Smell. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| My water is always clear. | | X | | | |
| My water pressure is acceptable. | | X | | | |
| The taste of my water is pleasing. | | X | | | |
| My water is odorless. | | X | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | | X | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | X | | | | |
| My waterline pipes have burst due to freezing in the past. | (YES) / NO (Please circle one) | | | | |

**Water Use (Please choose one)**

- ☐ I don't know how much water I use per month.
- ☒ I use less than 1,000 gallons of water per month. — unless it's winter - then water has to run frequently to so pipes don't burst
- ☐ I use less than 2,000 gallons of water per month.
- ☐ I use less than 4,000 gallons of water per month.
- ☐ I use more than 8,000 gallons of water per month.

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | | | X | | |
| I think my monthly water bill is too low. | | | X | | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | X | | |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | (YES) / NO (Please circle one) | | | | |

**Water Education: What would you like to know?**

| | |
|---|---|
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | (YES) / NO (Please circle one) |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | (YES) / NO (Please circle one) |

**Additional Comments/Concerns:**

It's the sewer that is the problem AND the fact that the water lines were never installed properly. The Borough needs to work on installing proper water lines & take care of the sewage issue. It is NOT up to those that had nothing to do with the installation originally. →

Please Bring Your Completed Survey to the Talkeetna Community Meeting on March 25, 2014 or send to:

ATTN: Jessica Smith | CRW Engineering Group, LLC | 3940 Arctic Blvd #300 | Anchorage, AK 99503

comments@crweng.com

Why does it smell like sewage near the river?

How come revenue from businesses is so close to amt. from residential? Businesses must use thousands + thousands of gallons more than

# HOW'S THE WATER?

What are the challenges being experienced with the Talkeetna Sewer/Water System? The Mat-Su Borough has hired CRW Engineering Group, LLC to assess the current system's operations, facilities, and costs. To best understand what problems the Talkeetna community is experiencing with the water system, we need to hear from you. Please take a few minutes to provide the information below to help solve your community's water system challenges.

It is our goal to make the system run more efficiently, be more cost effective, and best meet the needs of the Talkeetna community.

THANK YOU FOR BEING PART OF THE SOLUTION!

**NEAREST INTERSECTION TO RESIDENCE:**

| Water Quality: Look, Feel, Taste and Smell. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| My water is always clear. | | ✓ | | | |
| My water pressure is acceptable. | | ✓ | | | |
| The taste of my water is pleasing. | | ✓ | | | |
| My water is odorless. | | ✓ | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | | ✓ | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | | | | ✓ | |
| My waterline pipes have burst due to freezing in the past. | (YES) / NO (Please circle one) | | | | |

**Water Use (Please choose one)**

- ☐ I don't know how much water I use per month.
- ☒ I use less than 1,000 gallons of water per month.
- ☐ I use less than 2,000 gallons of water per month.
- ☐ I use less than 4,000 gallons of water per month.
- ☐ I use more than 8,000 gallons of water per month.

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | ✓ | | | | |
| I think my monthly water bill is too low. | | | | | ✓ |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | | ✓ |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | (YES) / NO (Please circle one) | | | | |

**Water Education: What would you like to know?**

| | |
|---|---|
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | (YES) / NO (Please circle one) |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | YES / (NO) (Please circle one) |

**Additional Comments/Concerns:**

WE USE LESS THAN 2000 gal

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THANK YOU FOR BEING PART OF THE SOLUTION!

NEAREST INTERSECTION TO RESIDENCE:

| Water Quality: Look, Feel, Taste and Smell | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| My water is always clear. | | X | (occasionally we smell the fluoride - sometimes can taste) | | |
| My water pressure is acceptable. | | X | | | |
| The taste of my water is pleasing. | | X | | | |
| My water is odorless. | | X | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | | X | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | | | x (again it depends on the year and location) | | |
| My waterline pipes have burst due to freezing in the past. | (YES) / NO (Please circle one) | | | | |

**Water Use (Please choose one)**

- [X] I don't know how much water I use per month.
- [ ] I use less than 1,000 gallons of water per month.
- [ ] I use less than 2,000 gallons of water per month.
- [ ] I use less than 4,000 gallons of water per month.
- [ ] I use more than 8,000 gallons of water per month.

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | | | X | | |
| I think my monthly water bill is too low. | | | X | | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | X | | | |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | (YES) / NO (Please circle one) | | | | |

| Water Education: What would you like to know? | |
|---|---|
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | YES / NO (Please circle one) |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | YES / NO (Please circle one) |

**Additional Comments/Concerns:**

I would be willing to pay my share but I strongly suspect there are many "bootleg" attachments that are not paying. Sewer lagoon smells - summer and winter.

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|---|---|---|---|---|---|
| **Water Quality: Look, Feel, Taste and Smell.** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| My water is always clear. | ✓ | | | | |
| My water pressure is acceptable. | ✓ | | | | |
| The taste of my water is pleasing. | ✓ | | | | |
| My water is odorless. | ✓ | | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | ✓ | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | | | | | ✓ |
| My waterline pipes have burst due to freezing in the past. | YES (NO) (Please circle one) | | | | |

**Water Use (Please choose one)**

- ☐ I don't know how much water I use per month.
- ☑ I use less than 1,000 gallons of water per month.
- ☐ I use less than 2,000 gallons of water per month.
- ☐ I use less than 4,000 gallons of water per month.
- ☐ I use more than 8,000 gallons of water per month.

| **Water Rates in Talkeetna** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | ✓ | | | | |
| I think my monthly water bill is too low. | | | ✓ | | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | | ✓ |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | (YES) NO (Please circle one) | | | | |

**Water Education: What would you like to know?**

| | |
|---|---|
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | YES (NO) (Please circle one) |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | YES (NO) (Please circle one) |

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| NEAREST INTERSECTION TO RESIDENCE: | | | | | |
|---|---|---|---|---|---|
| **Water Quality: Look, Feel, Taste and Smell** | | | | | |
| My water is always clear. | Yes | | | | |
| My water pressure is acceptable. | Yes | | | | |
| The taste of my water is pleasing. | [illegible] | Yes | | | |
| My water is odorless. | | | | No | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | Yes | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | Yes | | | | |
| My waterline pipes have burst due to freezing in the past. | YES / (NO) (Please circle one) | | | | |
| **Water Use (Please choose one)** | | | | | |
| ☒ I don't know how much water I use per month. | | | | | |
| ☐ I use less than 1,000 gallons of water per month. | | | | | |
| ☐ I use less than 2,000 gallons of water per month. | | | | | |
| ☐ I use less than 4,000 gallons of water per month. | | | | | |
| ☐ I use more than 8,000 gallons of water per month. | | | | | |
| **Water Rates in Talkeetna** | | | | | |
| I think my monthly water bill is too high. | Yes | | | | |
| I think my monthly water bill is too low. | | | | | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | | |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | (YES) / NO (Please circle one) | | | | |
| **Water Education: What would you like to know?** | | | | | |
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | YES (NO) (Please circle one) | | | | |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | YES (NO) (Please circle one) | | | | |
| **Additional Comments/Concerns:** | | | | | |
| Water on main Street has smell of Clorine. | | | | | |

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| NEAREST INTERSECTION TO RESIDENCE: | | | | | |
|---|---|---|---|---|---|
| **Water Quality: Look, Feel, Taste and Smell.** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| My water is always clear. | ✓ | | | | |
| My water pressure is acceptable. | ✓ | | | | |
| The taste of my water is pleasing. | ✓ | | | | |
| My water is odorless. | ✓ | | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | ✓ | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | N/A term H2O off winter suspend sew | | | | |
| My waterline pipes have burst due to freezing in the past. | YES / NO (Please circle one) | | | | |
| **Water Use (Please choose one)** | | | | | |
| ☑ I don't know how much water I use per month. | | | | | |
| ☐ I use less than 1,000 gallons of water per month. | | | | | |
| ☐ I use less than 2,000 gallons of water per month. | | | | | |
| ☐ I use less than 4,000 gallons of water per month. | | | | | |
| ☐ I use more than 8,000 gallons of water per month. | | | | | |
| **Water Rates in Talkeetna** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| I think my monthly water bill is too high. | ✓ | | | | |
| I think my monthly water bill is too low. | | | | | ✓ |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | | ✓ |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | YES / NO (Please circle one) | | | | |
| **Water Education: What would you like to know?** | | | | | |
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | YES / (NO) (Please circle one) | | | | |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | (YES) / NO (Please circle one) | | | | |
| **Additional Comments/Concerns:** | | | | | |

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| NEAREST INTERSECTION TO RESIDENCE: | | | | | |
|---|---|---|---|---|---|
| **Water Quality: Look, Feel, Taste and Smell.** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| My water is always clear. | ✓ | | | | |
| My water pressure is acceptable. | ✓ | | | | |
| The taste of my water is pleasing. | ✓ | | | | |
| My water is odorless. | ✓ | | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | ✓ | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | N/A Item #2 | suspend sewer | off in | Winter | |
| My waterline pipes have burst due to freezing in the past. | YES / NO (Please circle one) | | | | |
| **Water Use (Please choose one)** | | | | | |
| ☑ I don't know how much water I use per month. | | | | | |
| ☐ I use less than 1,000 gallons of water per month. | | | | | |
| ☐ I use less than 2,000 gallons of water per month. | | | | | |
| ☐ I use less than 4,000 gallons of water per month. | | | | | |
| ☐ I use more than 8,000 gallons of water per month. | | | | | |
| **Water Rates in Talkeetna** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| I think my monthly water bill is too high. | ✓ | | | | |
| I think my monthly water bill is too low. | | | | | ✓ |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | | ✓ |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | (YES) NO (Please circle one) | | | | |
| **Water Education: What would you like to know?** | | | | | |
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | YES / (NO) (Please circle one) | | | | |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | (YES) / NO (Please circle one) | | | | |
| **Additional Comments/Concerns:** | | | | | |

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|---|---|---|---|---|---|
| **Water Quality: Look, Feel, Taste and Smell.** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| My water is always clear. | ✓ | | | | |
| My water pressure is acceptable. | ✓ | | | | |
| The taste of my water is pleasing. | ✓ | | | | |
| My water is odorless. | ✓ | | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | ✓ | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | | | | | ✓ |
| My waterline pipes have burst due to freezing in the past. | YES (NO) (Please circle one) | | | | |

**Water Use (Please choose one)**

- ☐ I don't know how much water I use per month.
- ☑ I use less than 1,000 gallons of water per month.
- ☐ I use less than 2,000 gallons of water per month.
- ☐ I use less than 4,000 gallons of water per month.
- ☐ I use more than 8,000 gallons of water per month.

| **Water Rates in Talkeetna** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | | | ✓ | | |
| I think my monthly water bill is too low. | ✓ | | | | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | ✓ | |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | YES (NO) (Please circle one) NOT IN FULL. | | | | |

**Water Education: What would you like to know?**

| | |
|---|---|
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | (YES) / NO (Please circle one) AND TREATS WASTE WATER |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | (YES) / NO (Please circle one) |

**Additional Comments/Concerns:**

I WAS IN TALKEETNA WHEN THE SEWER & WATER SYSTEM WAS FIRST INSTALLED. WE WERE TOLD AT THAT TIME THAT BECAUSE OF THE SMALL POPULATION THE SYSTEM WOULD REQUIRE ADDITIONAL FUNDING & NOT JUST USER FEES, TO OPERATE

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| Water Quality: Look, Feel, Taste and Smell. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| My water is always clear. | ✓ | | | | |
| My water pressure is acceptable. | ✓ | | | | |
| The taste of my water is pleasing. | ✓ | | | | |
| My water is odorless. | ✓ | | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | ✓ | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | | | | | |
| My waterline pipes have burst due to freezing in the past. | YES / NO (Please circle one) | | | | |

**Water Use (Please choose one)**

- ☑ I don't know how much water I use per month.
- ☐ I use less than 1,000 gallons of water per month.
- ☐ I use less than 2,000 gallons of water per month.
- ☐ I use less than 4,000 gallons of water per month.
- ☐ I use more than 8,000 gallons of water per month.

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | | | | | |
| I think my monthly water bill is too low. | | | | | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | ? | | | | |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | YES / NO (Please circle one) | | | | |

**Water Education: What would you like to know?**

| | |
|---|---|
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | YES / NO (Please circle one) |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | YES / NO (Please circle one) |

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|---|---|---|---|---|---|
| My water is always clear. | | | X | | |
| My water pressure is acceptable. | | | X | | |
| The taste of my water is pleasing. | | | X | | |
| My water is odorless. | | | X | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | | X | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | | | | X | |

My waterline pipes have burst due to freezing in the past. YES (NO) (Please circle one)

**Water Use (Please choose one)**

- [X] I don't know how much water I use per month.
- [ ] I use less than 1,000 gallons of water per month.
- [ ] I use less than 2,000 gallons of water per month.
- [ ] I use less than 4,000 gallons of water per month.
- [ ] I use more than 8,000 gallons of water per month.

NEED METER THAT READS RIGHT
EST AVG USE SUMMER
APRIL - SEPT - 6 MOS @ 12,000 TOTAL

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | X | | | | |
| I think my monthly water bill is too low. | | | | | X |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | NOT UNLESS | SYSTEM | INCERTABLE | | GOOD ORDER |

I understand that the Talkeetna water system is paid for by its residents and business owners. (YES) / NO (Please circle one)

BUT SHOULD BE SUBSIDIZED BY MSB + OTHERS

**Water Education: What would you like to know?**

I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. (YES) / NO (Please circle one)

I would like to attend a community meeting to learn more about the cost of water in Talkeetna. (YES) / NO (Please circle one)

**Additional Comments/Concerns:**

CONCERNS
1. QUALITY OF SEWER SYSTEM
2. FIRE HY DRANT STATUS
3. RATE COST INCREASES
4. COST OF SYSTEM VS. REVENUES
5. STAIR MARKET COSTS
6. OVERSIGHT OF SYSTEM

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|---|---|---|---|---|---|
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| My water is always clear. | | ✓ | | | |
| My water pressure is acceptable. | | ✓ | | | |
| The taste of my water is pleasing. | | ✓ | | | |
| My water is odorless. | | ✓ | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | | | ✓ | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | | | | | ✓ |
| My waterline pipes have burst due to freezing in the past. | YES / (NO) (Please circle one) | | | | |
| **Water Use (Please choose one)** | | | | | |
| ☒ I don't know how much water I use per month. | | | | | |
| ☐ I use less than 1,000 gallons of water per month. | | | | | |
| ☐ I use less than 2,000 gallons of water per month. | | | | | |
| ☐ I use less than 4,000 gallons of water per month. | | | | | |
| ☐ I use more than 8,000 gallons of water per month. | | | | | |
| **Water Rates in Talkeetna** | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| I think my monthly water bill is too high. | | | | ✓ | |
| I think my monthly water bill is too low. | | | | ✓ | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | ✓ | | |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | (YES) / NO (Please circle one) | | | | |
| **Water Education: What would you like to know?** | | | | | |
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | (YES) / NO (Please circle one) | | | | |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | (YES) / NO (Please circle one) | | | | |

**Additional Comments/Concerns:**

We have Seasonal Short-Stay for our Business. & would like to know more about the Sewer treatment System.

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# HOW'S THE WATER?

What are the challenges being experienced with the Talkeetna Sewer/Water System? The Mat-Su Borough has hired CRW Engineering Group, LLC to assess the current system's operations, facilities, and costs. To best understand what problems the Talkeetna community is experiencing with the water system, we need to hear from you. Please take a few minutes to provide the information below to help solve your community's water system challenges.

It is our goal to make the system run more efficiently, be more cost effective, and best meet the needs of the Talkeetna community.

THANK YOU FOR BEING PART OF THE SOLUTION!

**NEAREST INTERSECTION TO RESIDENCE:**

| Water Quality: Look, Feel, Taste and Smell. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| My water is always clear. | | ✓ | | | |
| My water pressure is acceptable. | | ✓ | | | |
| The taste of my water is pleasing. — some days I taste the clorine - most days not | | | ✓ | | |
| My water is odorless. | | | | | |

| Water System: Infrastructure (Exterior) | | | | | |
|---|---|---|---|---|---|
| My waterlines are generally in good working condition. | | ✓ | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. If real cold I get up + run liner at night once - Have heat tape on most lines are needed ✓* | | | | | |

My waterline pipes have burst due to freezing in the past. YES / (NO) (Please circle one)

**Water Use (Please choose one)**

- [X] I don't know how much water I use per month.
- [ ] I use less than 1,000 gallons of water per month.
- [ ] I use less than 2,000 gallons of water per month.
- [ ] I use less than 4,000 gallons of water per month.
- [ ] I use more than 8,000 gallons of water per month.

< 4000 gal gap here! If you 4000 – 8000 gal – no place to respond!

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | | ✓ | ✓ | | |
| I think my monthly water bill is too low. | | | | | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. ? Do we have much of a choice? We will have to pay regardless won't we? or move! | | | | | |

I understand that the Talkeetna water system is paid for by its residents and business owners. (YES) NO (Please circle one)

**Water Education: What would you like to know?**

I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. ? YES / NO (Please circle one) Have gotten fair amount of info already explained with I think.

I would like to attend a community meeting to learn more about the cost of water in Talkeetna. YES (NO) (Please circle one)

**Additional Comments/Concerns:**

I am not ~~~~ crazy about drinking clorinated water. I would have preferred having untreated well water as before. I am not aware of people having arsnic related health problems in our area. I wish they hadn't changed the accepta levels!

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(*) Note - right now our family is doing laundry for a neighbor (since flood 1½ yr. ago) that uses our usage + lowers their washer/dryer when their basement flooded. that ups our usage + lowers since it is a flat rate - no problem - but when reading our water - it will still will ↑ this

appear that we guzzle more water, but it isn't all for our own use. It has been a long process for them getting things fixed - Fema red tape just to get a low interest loan + still needing to get work done - but neighbors need to help each other & we were blessed not to suffer any major loss - but hope you realize that these types of factors might be out there esp. if you ever get rid of flat rate.

JC

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**NEAREST INTERSECTION TO RESIDENCE:**

| Water Quality: Look, Feel, Taste and Smell. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| My water is always clear. | X | | | | |
| My water pressure is acceptable. | X | | | | |
| The taste of my water is pleasing. | X | | | | |
| My water is odorless. | X | | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | X | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | | | | | X |

My waterline pipes have burst due to freezing in the past. YES / NO (Please circle one)

**Water Use (Please choose one)**

- ☐ I don't know how much water I use per month.
- ☒ I use less than 1,000 gallons of water per month. Way less
- ☐ I use less than 2,000 gallons of water per month.
- ☐ I use less than 4,000 gallons of water per month.
- ☐ I use more than 8,000 gallons of water per month.

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | X | | | | |
| I think my monthly water bill is too low. | | | | | X |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | | X |

I understand that the Talkeetna water system is paid for by its residents and business owners. (YES) / NO (Please circle one) But all property owne need to pay $ / Visito

**Water Education: What would you like to know?**

I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. (YES) NO (Please circle one)

I would like to attend a community meeting to learn more about the cost of water in Talkeetna. (YES) / NO (Please circle one)

**Additional Comments/Concerns:**

Hangar

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| Water Quality: Look, Feel, Taste and Smell. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| My water is always clear. | ✓ | | | | |
| My water pressure is acceptable. | ✓ | | | | |
| The taste of my water is pleasing. | | (1) | | | |
| My water is odorless. | ✓ | | | | |
| **Water System: Infrastructure (Exterior)** | | | | | |
| My waterlines are generally in good working condition. | ✓ | | | | |
| I often have to let my water drip or run to prevent freezing in my waterline pipes. | ✓ | | | | ✓ |
| My waterline pipes have burst due to freezing in the past. | (YES) / NO (Please circle one) froze not burst | | | | |

**Water Use (Please choose one)**

- ☐ I don't know how much water I use per month.
- ☒ I use less than 1,000 gallons of water per month.
- ☐ I use less than 2,000 gallons of water per month.
- ☐ I use less than 4,000 gallons of water per month.
- ☐ I use more than 8,000 gallons of water per month.

TA390 residence

| Water Rates in Talkeetna | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| I think my monthly water bill is too high. | | | | | |
| I think my monthly water bill is too low. | | | | | |
| I would be willing to pay more for my monthly water bill if I knew why the rates were increased. | | | | | |
| I understand that the Talkeetna water system is paid for by its residents and business owners. | (YES) / NO (Please circle one) | | | | |

The rate structure needs up-date. Everyone benefits who lives in Talkeetna and should pay. Usage needs to be bigger factor. I think tour companys should pay something.

**Water Education: What would you like to know?**

| | |
|---|---|
| I am interested in learning more about how the water system treats and distributes drinking water in Talkeetna. | (YES) / NO (Please circle one) |
| I would like to attend a community meeting to learn more about the cost of water in Talkeetna. | (YES) / NO (Please circle one) |

**Additional Comments/Concerns:**

① taste - it was better prior to addition of treatment plant.

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