

2020

ALASKA NATIVE VILLAGES GRANT PROGRAM



Residential homes, above ground water and sewer lines and ATV/snowmobile wooden transportation roadway in the community of Eek, Alaska.

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Table of Contents

Introduction.....4

Financial Highlights.....5

Programmatic Highlights.....6



Alaska Rural and Native Villages

Collaborating with federal, state, and local partners to address water and sanitation needs of remote Alaskan villages since 1996.

Public Health Benefits

Reduction in waterborne and respiratory illnesses through increased access to safe drinking water and sanitary sewer services.



Environmental Benefits

Reduction in the amount of raw sewage discharged to the environment, benefiting Alaska Natives and the fish and wildlife that they depend on.



Economic Benefits

Increased water infrastructure investments reduce health care costs, stimulate local economies, and create local jobs.



Introduction



Aerial view of the community of Quinhagak, Bethel Census Area, Alaska

In 1996, Congress introduced the Alaskan Native Villages Grant Program (ANV) to address the critical infrastructure challenges facing communities living in rural Alaska.

Since its inception, the program has worked to support these communities with new and improved wastewater and drinking water systems and to provide training and technical assistance for the operation and maintenance of these systems. However, construction, operation, and maintenance of water infrastructure in Alaska have been no easy feat, especially given its rural isolation.

Many of these communities can only be reached by small airplanes, and travel within the area is usually achieved through alternative means of transportation (snowmobile and boat).

Alaska has very few roads that link the central population centers to the Alaska Highway, which complicates the construction of wastewater and drinking water infrastructure systems.

The remoteness, geography, permafrost, and cost continue to present challenges to these communities, as many of them lack adequate safe drinking water sources or a means of safe sewage disposal.

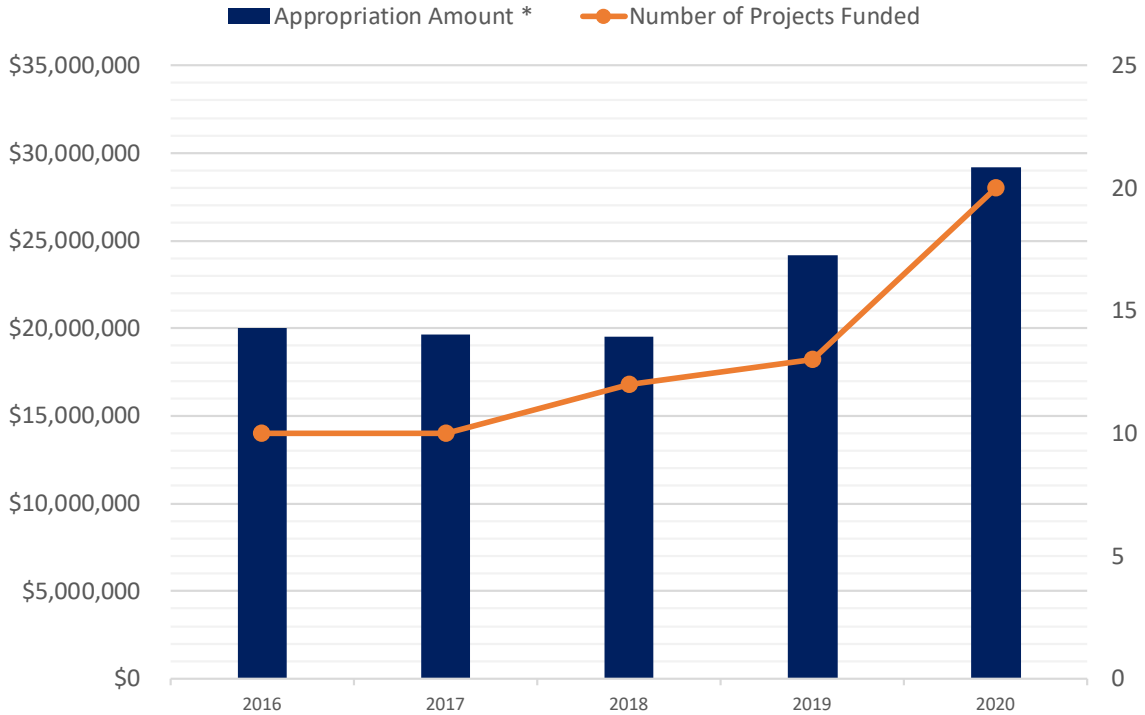
The state and federal governments continue to work with tribal and city governments to fulfill their responsibility to protect human health through the provision of safe water and adequate sanitation to the rural Alaskan communities.

To expedite the delivery of critical infrastructure to communities with the greatest need, the ANV uses the Indian Health Service's Sanitation Deficiency System (SDS) to identify projects.

This report will highlight the wastewater and drinking water projects completed in 2016 through 2020.

EPA Region 10 (serving Alaska, Idaho, Oregon, Washington, and approximately 200 Alaskan Native Villages) manages and administers this grant.

Alaska Native Villages Allocations and Total Projects Funded



(* Values as appropriated from Congress and not adjusted to current year dollars)

Over the past 24 years, the ANV has worked to distribute funds for sustainable and affordable in-home water and sanitation services in Alaskan native villages and non-native underserved communities.

ANV funds are used for the planning, design, construction and/or repair of new or improved water and wastewater systems.

There are currently 245 communities eligible for ANV grant funding.¹ Through the continued partnership with local, state, and federal governments, the ANV has helped to improve the health, safety, and well-being of thousands of rural Alaskans.

From 2016 to 2020, EPA awarded over \$112 million in ANV grant funding for the construction of 65 projects to help improve water and sanitation services in communities across Alaska.² The State of Alaska Department of Environmental Conservation reports that in FY 2000 only 69 percent of rural Alaskan homes were served with water and sewer service, whereas now the number is 97 percent, nearly 28 percent point of improvement.³

Still, the Indian Health Service (IHS) identified a \$249 million need for Alaskan water and wastewater infrastructure in 2018.⁴

1. For more information visit <https://dec.alaska.gov/water/village-safe-water>

2. For more information visit the Alaska Native Village and Rural Communities Grant Program Funding History for the Past Decade at https://www.epa.gov/sites/production/files/2020-07/documents/anv_funding_fy20_10_year.pdf

3. As per <https://www.omb.alaska.gov/html/performance/program-indicators.html?p=37&r=1>.

4. Data based on the feasible water and sewer need identified in the IHS 2018 Annual Report to Congress available at www.ihs.gov/dsfc.

New Water Treatment Plant Project: **Kotzebue, Alaska**



Water tank and distribution building in Kotzebue, AK

Kotzebue, Alaska, is located 26 miles north of the Arctic Circle, on a spit of land about 500 miles northwest of Anchorage. The community experiences extremes in temperature, with short, warm summers and long, harsh winters.

Despite these challenges, the community is home to over 3,000 people and is a supply hub for 10 satellite villages in the Northwest Arctic Borough.

The existing Kotzebue water treatment plant was constructed in the early 1970s and has undergone several upgrades and expansions over the years as demand from the city increased.

Currently, treated and drinking water are not in compliance with primary drinking water standards due to elevated disinfection by-product levels. With support from various funding agencies, the city is currently constructing a new water treatment plant that will comply with the drinking water standards.

The new plant will enable the operators to efficiently provide safe drinking water to the residents.

Funding for the project includes a \$16 million ANV Grant and a \$5 million grant from the State of Alaska's Village Safe Water program.

Due to the extremely short construction season in this region, the foundation of the treatment plant was poured in 2019 and construction materials were mobilized to the site in 2020. The project is anticipated to be complete in October 2023.

First-Time Water Service Project: Shageluk, Alaska



View of the community of Shageluk, Alaska

Shageluk, Alaska, is also known as mile 487 checkpoint of the 1,000-mile Iditarod Trail Sled Dog Race. Located on the Innoko River within the vast Yukon-Kuskokwim Delta, the community is only accessible by air or by river travel in summer. In winter, snow machines and dog mushers take to the trails in weather that can plummet to minus 62 degrees Fahrenheit.

The city owns and operates a water well and a water treatment plant that supplies the washeteria and its public watering point, the city office, post office, clinic, and community center. A washeteria is typically one of the few buildings in the community that has running water, often serves as the community drinking water source, and the only structure that provides public showers, laundry facilities and flush toilets.

A gravity sewer system with two 5,000-gallon septic tanks serves the washeteria, city office, post office, clinic, and community center. Residents of the 34 homes in the community haul water to their homes and use pit privies constructed on mounds above the permafrost.

The community partnered with the Alaska Native Tribal Health Consortium (ANTHC) to seek funding for a project to provide first-time piped water and sewer to the residents. The project includes installation of underground sewer and water mains to the 34 homes, and interior plumbing improvements, a new community well and water storage tank, and upgrades to the washeteria and water treatment plant.

Funding for the project comes from a \$5 million ANV Grant, and a \$1.7 million grant from the State of Alaska's Village Safe Water program. The design is complete, easements have been granted, and the permits have been issued. Construction is scheduled to begin in spring 2022, and the project is due to be completed by fall 2024.

Access to water and sewer has been proven to reduce the incidence of gastrointestinal illnesses and the completion of this project will lead to the overall improved health of the community.

Shageluk has plans for a new subdivision and hopes that the new water and sewer system will attract more families to the community.

First-Time Water and Sewer Service: Eek, Alaska



View of the community of Eek, AK, and aboveground water/sewer arttic pipelines in the foreground

Eek, Alaska, a community of about 350 residents located in the Yukon-Kuskokwim Delta, has recently seen the completion of a five-year project to install first-time running water and sewer services to the entire community.

Before this, the community had a watering point at the local washeteria. Water was hauled from the watering point to individual homes, and five-gallon honeybuckets were used for waste.

The five-gallon honeybuckets typically consist of a bucket with a plastic bag inside. Residents would carry the buckets to a honeybucket dumpsite for disposal, leaving plastic bags and waste strewn over an unlined area of tundra.

The project to bring water and sewer services to Eek homes began in 2014 with the construction of the sewage lagoon. The crew began laying pipe in 2015, and in 2017 started bringing water and sewer services inside the homes. By spring of 2019, all 100 homes in the community had received service.

An ANV grant of \$1,500,000, along with a State of Alaska Village Safe Water matching grant of \$500,000, provided funding to complete water and sewer service to the homes in the community. The project included water and sewer service lines, sewer pumping units, and interior plumbing.

Resident Comments

"Our community will be so much healthier now," one Eek resident said. There used to be accidental spills along the roads when people were hauling their waste to the honeybucket lagoon... our children play in those streets. Now, we won't have to worry about that anymore."

"My grandfather used to say a time would come when we could push a button and everything would happen. Now, I see that it is. When I'm gone, I won't have to worry about my grandchildren having safe water."

In addition, the grants covered repairs to the boardwalk, which had been affected by the installation of the piped system, and completion of the circulation and generator buildings for the community water system. The improvements in safe water and sanitation directly influence the public health of Eek's population.

Along with the improved health outcomes the community will see from the project, the construction created jobs. Most crew members are local residents from Eek. Workers gained qualifications and job skills through this project, which may help them find future employment. Because of the training they've received on the specific aspects of this system, at least four residents will be employed to maintain the community water and sewer systems.

The planning, design, and construction for the Eek water and sewer project were supported by a collaboration of state and federal funding agencies committed to working together with the community of Eek to provide important sanitation services.



First Time Service Piped Water and Wastewater Project: **Buckland, Alaska**

Installation of manholes, precast barrel sections, grade rings, and eccentric cones

Buckland is a community of approximately 416 people in Alaska's Northwest Arctic Borough just south of the Arctic Circle. Prior to the completion of the First Time Service Piped Water and Wastewater Project, Buckland was an un-piped community whose residents hauled water from the water treatment plant for their daily water needs and used five-gallon honeybuckets to collect and dispose of their waste.

Often, in winter months, residents would dump the waste outside of their homes, causing problems during the spring thaw season when melting snow and seasonal floods spread the honeybucket waste around their homes. The only piped infrastructure in town was the school building, the water treatment plant, and washeteria. The existing wastewater from these facilities discharged into a small lagoon located in downtown Buckland.

It took over a decade to provide piped treated drinking water and sewage disposal service to the 88 homes in Buckland. A multi-phased project was required and included: a new lagoon; a river intake system; a new water treatment plant; buried insulated water distribution mains; buried arctic gravity sewer collection mains; service lines; and full bath and kitchen in-home plumbing. This took 12 years to complete, from 2007 to 2019. All phases of construction employed local labor.

The multi-year project to serve Buckland with piped water and sewer began in 2007 with: designs for a new, larger lagoon in preparation for the increased water usage, a new equipment building, and developing a borrow source for all the upcoming work. In addition, it was necessary to build a headquarters office to house design and construction personnel for this long-term project.

In 2008, planning began for the water treatment plant's raw water tank and raw water line. In 2009, construction began on the project house office, downtown lift station, sewer mains, and force main to the lagoon. Work on the water system began in 2010, along with the first residential plumbing and service lines.

The construction of the water treatment plant also began with a new 750,000-gallon raw water storage tank. In August 2011, the first phase of the piped water and sewer system was put into service, serving 22 homes.

From 2012 to 2016, more Buckland homes were connected to the new system and a new, more sanitary, honeybucket dump facility was constructed at the lagoon to serve any homes that were unable to be plumbed, as well as for any future residents that may be unable to pay the monthly utility fees.

During this time, a new water treatment plant was completed and brought online. The last component of the community facilities, a new 212,000-gallon treated water storage tank, was constructed and commissioned in late 2017. Much of Buckland is underlain with permafrost and over the last few years, the warming climate has caused the buried pipe systems to exhibit settlement and damage.

From 2018 to 2019, warranty work was performed to correct any construction flaws and permafrost degradation damages and provide a more robust, long-lasting system for Buckland's residents. Today, Buckland's residents enjoy a modern in-home water and sewer system.

Construction of the Water Treatment Plant Project: **Manokotak, Alaska**



Lining the new sewer lagoon

Manokotak is a piped community of 487 residents located in the Bristol Bay region of Alaska. Manokotak has two separate developments, Old Manokotak, the original settlement, and Manokotak Heights, a newer development located approximately four miles to the east. The Manokotak Heights development is served with its own water and sewer system comprised of a well, water treatment system, and sewage lagoon.

However, frequent water shortages at Old Manokotak and new homes planned for construction along with a new school to be constructed in Manokotak Heights required additional water and sewer facilities to meet the growing demands.

In 2010, this multi-year project was funded, and work began in 2011 with the clearing of the lagoon site. Work on the lagoon and sewer main construction continued through 2012, and the lagoon was completed by the year's end except for the lagoon liner.

In 2013, the community wells were drilled, and construction began on the water treatment plant with the raising of the plant's roof and walls.

The associated lagoon and sewer work were completed in 2014, and work continued on the water mains, service lines, and water treatment plant. In summer of 2015, work on the water treatment plant interior was completed along with the remaining distribution system, leading to a successful conclusion of the project.

With the new wells, water treatment plant, sewage lagoon, and distribution system, the residents of Manokotak Heights were served with access to a year-round supply of fresh, safe water.



Construction of the water treatment plant

Water System Improvements

Project: **Mountain Village, Alaska**



Middle water storage tank. Crew tightening tank bolts (right)

The City of Mountain Village is located on the north bank of the Yukon River in southwestern Alaska. A federally recognized Native Alaskan Tribe, led by the Asa'carsarmiut Tribal Council, is part of the community. Mountain Village is situated 20 miles west of St. Mary's and 470 miles northwest of Anchorage. The community is located in the Bethel Recording District and part of the Kusilvak Census Area.

The public water system in Mountain Village is owned and operated by the City of Mountain Village and was originally built in the early 1970s. Over the years, the system has been expanded to accommodate the growing population. The aging water system was in very poor condition with many system deficiencies, which have resulted in community-wide water shortages in the winter. The winter water shortages have forced the community to pump untreated water from the adjacent Yukon River and boil the water before use.

The 2010 amendment to the 2002 Water-Sewer Feasibility Study and Master Plan and the associated 2017 preliminary engineering report identified deficiencies with the water system and identified improvements to include: replacing old water distribution piping; upgrading, repairing or replacing the community's well/pump houses; instituting a well maintenance program; and implementing an information and control system for the entire water system.

This project included: water main and water service replacement; new water storage; and upgrades to two well houses, the upper distribution main pump house, and the lower distribution main pump house. Design began in 2017, construction in 2018, and the project will be 80 percent complete by the end of 2020.

Before this project, the average daily demand in summer was about 110,000 gallons per day or 128 gallons per capita per day, and 168,000 gallons per day in winter. This high per capita water demand was attributable to distribution pipe failures and leaks.

In August 2020, the project commissioned the new water storage tanks. Soon after, while the upper pump house and upper well were bypassed to perform project upgrades, the upper loop was supplied solely with water tank water for a period of 10 days, after which the tanks were still over half full. In summary, the community previously had less than one day of storage, but now has more than 10 days and perhaps even 20 days.

Following this project, the daily water use was much closer to the U.S. average of 88 gallons of water per day.

First Time Service Piped Water and Wastewater Project: **Quinhagak, Alaska**



Construction materials arriving by barge in Quinhagak

Quinhagak is located on the Yukon-Kuskokwim Delta in western Alaska. The community is located along the south bank of the Kanektok River and the east shore of Kuskokwim Bay, less than a mile from the Bering Sea coast. It is approximately 71 miles southwest of Bethel.

Quinhagak was a community whose residents did not have indoor plumbing and had to rely on hauling water for drinking and cooking and honeybuckets for waste collection and disposal. With individual water hauling, significantly less water than the World Health Organization's recommended five gallons per person per day was used, and having to haul their waste in buckets increased the risk of direct contact with raw sewage during transport as well as contamination of routes and tundra ponds where waste was dumped.

In order to bring a full-fledged, modern water and wastewater system to Quinhagak, a 14-year multi-disciplinary project was planned out with 8 phased service areas. In 2003, the planning process of transitioning to a piped community began. Construction commenced in 2005, and by 2008 the initial water and sewer systems were in place for Service Area 1, along with a new 10-acre wastewater lagoon. Design and construction of a new raw water river intake, water storage tanks, new mains, service lines, and plumbing for all eight service areas, with improvements to the water treatment plant, were funded in phases.

The Service Area 2 project began in 2008 with funding to complete the water and sewer to 23 homes and a teen center. In 2011, a new raw water intake was designed and constructed.

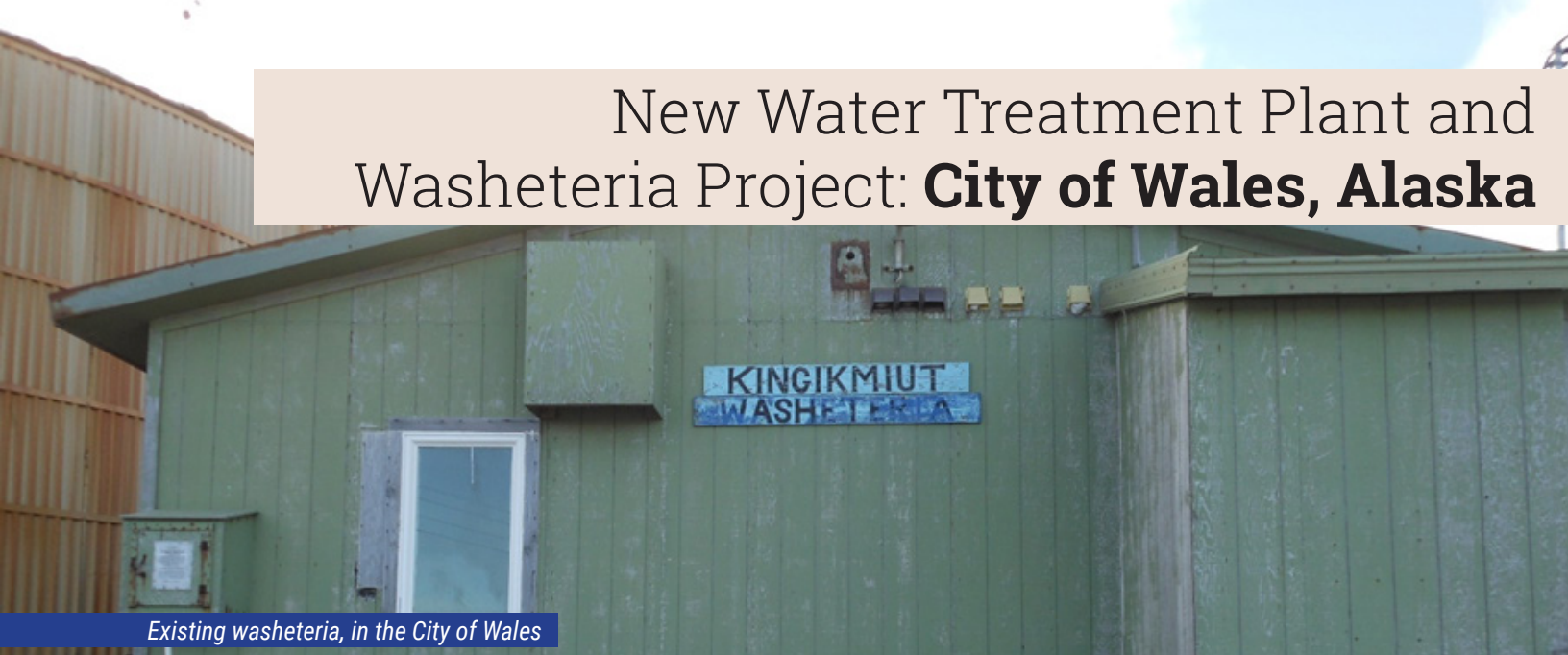
Unfortunately this water source was rejected due to excessive iron bacteria content. Service lines and indoor plumbing for the homes in Service Areas 3 and 5 were completed shortly thereafter.

A new raw water transmission pipeline was designed and installed in 2012 after ice flows compromised the existing pipeline. Piped services and indoor plumbing to the homes in Service Area 4 were postponed until site control issues were resolved in 2016.

In 2013, a redesigned intake system using slant wells on the Kanektok River was brought online. From 2014 to 2017, the homes in the remaining service areas were completed, and in 2018 warranty work was completed to adjust the elevations of service lines and pipes at road and pedestrian crossings. Most homes served were provided with pipes. Homes located a distance away from the mains were provided with on-site water haul tanks and an on-site wastewater disposal system.

This project brought indoor water and sewer to 147 homes, giving Quinhagak residents access to safe and clean water and wastewater services and enabling them to lead healthier lives. The infrastructure consists of aboveground insulated piping. The water system maintains continuous flow using circulation pumps and has heat added to prevent freezing. The sewer collection system is also insulated and has a glycol line that maintains above-freezing temperatures. Each home has a grinder pump station outside that pushes wastewater into the collector/force main pipe that transfers the contents to the community lift station and on to the community lagoon.

New Water Treatment Plant and Washeteria Project: **City of Wales, Alaska**



Existing washeteria, in the City of Wales

The City of Wales is located on Cape Prince of Wales, at the western tip of the Seward Peninsula, approximately 111 miles northwest of Nome and 25 miles southeast of Little Diomed. Wales is the westernmost community on the North American continent. Most of the community is located on an ocean beach formation at approximately 12 to 16 feet of elevation above mean sea level.

The city's existing drinking water treatment plant and washeteria were designed by the IHS and constructed in 1979, with improvements made in 1980. The Water Treatment Plant (WTP) consists of a single multimedia pressure filter, micron filters, and disinfectant chemical injection system.

Wales utilizes a groundwater source in a fill and draw configuration. Two wells with submersible pumps supply raw water to the WTP through an aboveground 4-inch wide transmission line 6,350 feet in length. Water is pumped directly into an existing 500,000-gallon water storage tank.

The current water source was incorporated into the system in 2008. Fluoride concentrations in excess of the secondary drinking water standard were found in the source at the time of drilling. Uranium was found in this source in concentration slightly exceeding the maximum contaminant level for drinking water when sampling for radionuclides began in 2010.

In addition to being incapable of treating the groundwater for uranium and fluoride, the existing WTP/washeteria facility is aging and deteriorating. Some equipment are inoperable. The existing filters are no longer used. Due to the equipment age, spare parts are typically difficult to find and purchase.

The Alaska Department of Environmental Conservation's Village Safe Water Program, in cooperation with EPA, is assisting the community of Wales with planning, design, and construction of a new WTP, washeteria, and intake facility.

An infiltration gallery will be constructed upstream of the culvert where Village Creek flows under the road at the base of Razorback Ridge. The new WTP will use cartridge filtration to treat the surface water source.

The new WTP and washeteria will consist of four modules, constructed and tested off site by a general contractor. The modules will be disconnected and shipped via barge, landed at Tin City, and transported to Wales via road. Once in Wales, the modules will be installed on the field foundation built from treated timber along with the mechanical and electrical systems.

The existing WTP building, also known as the utility building, will be remodeled to be used as a pumping facility from the water storage tank to the existing distribution system and will provide freeze protection for the water storage tank.

Construction of the WTP and washeteria will start in 2021 and is scheduled to be completed in summer 2022.



**Office of Wastewater Management:
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