

DNREC
PERMIT APPLICATION FOR THE CONSTRUCTION OF WASTEWATER COLLECTION AND
CONVEYANCE SYSTEMS

1. INTENDED PURPOSE AND DESIGN OF THE PROPOSED FACILITIES

The intended purpose of the proposed facilities is for Kent County (County) to provide a new biosolids dewatering and thermal drying facility to replace the existing aged belt filter presses and thermal dryers at the Kent County Regional Resource Recovery Facility (KC RRRF). The County's overall project goals are to increase the plant's solids dewatering and drying capacity and to produce Class A biosolids for beneficial use.

Facility Description - Refer to the enclosed Sludge Process Schematic on the enclosed drawing G-08. The liquid sludge to be processed (waste activated sludge, or WAS) is wasted from an existing extended aeration process (Biolac) and solids are removed by screening using two existing Huber Strainpresses which have 5 mm perforated plate openings for solids capture. The liquid sludge from each Strainpress discharges to existing aerated sludge holding tanks.

In this project, new positive displacement pumps will be provided to withdraw the liquid sludge from the aerated sludge holding tanks and convey it to four new 2-meter BDP belt filter presses (BFP). The BDP BFPs were pre-purchased by the County following a competitive selection process. A new polymer system will be provided to condition the liquid sludge fed to the BFPs which will produce a cake with a solids content ranging from approximately 16-20%. The cake produced by the BFPs will be conveyed to be processed in one of two Andritz BDS thermal belt dryer trains. The belt dryers were pre-purchased by the County following a competitive selection process.

Each dryer train has a cake storage bin. Each cake storage bin will feed an Andritz belt dryer. The cake will be pumped from the cake storage bin and mixed with dried product that will be recycled from the discharge of each dryer. The cake/product mixture will be fed to the belt dryers and will be in direct contact with hot air to evaporate the water. The air will be directly heated by natural gas burners. The size of the biosolids particles exiting the dryer will range from 0.5 mm to 12 mm diameter, with the average being 5-6 mm. The solids content of the dried product exiting the dryer will exceed 90% with an expected bulk density of greater than 25 lbs/cf. The temperature of the dried biosolids exiting the dryer will be greater than 80°C and will be continuously measured to meet Class A requirements. After measuring the temperature, the dried biosolids product will be cooled and conveyed to an existing pavilion for temporary storage prior to being removed from the wastewater treatment plant site for beneficial reuse. The warm, vaporous exhaust air from the dryers will be cooled using the treatment plant effluent as cooling water and the condensed water will be returned to the plant's liquid treatment process via a new pump station and force main. A portion of the exhaust air will be recycled to the dryers and a portion will be treated in an odor scrubber system prior to discharge to the atmosphere.

To provide sufficient water to the new system for dewatering, drying, and fire protection, the RRRF's existing plant water pump station will be replaced with a new, higher capacity pump station.

Design Capacity – The design parameters for the WWTP capacity, WAS solids generated, dewatering capacity and drying capacity are as follows:

- WWTP rated capacity – 20 mgd
- WWTP current operating capacity (approximate) – 12 mgd
- WAS loading, design average – 17.18 dry tons per day
- WAS loading, maximum month – 23.10 dry tons per day
- BFP solids throughput , each of 4 units - 500 to 1,000 lbs/hr
- BFP hydraulic feed rate, each of 4 units – 200 gpm
- Dryer system dry mass loading (both trains in service) – 2,860 lbs/hr
- Dryer system water evaporation rate (both trains in service) – 13,900 lbs/hr

Implementation - The BFPs are currently being stored onsite. The belt dryers are being furnished in accordance with the proposal dated October 31, 2023 and approved shop drawings and have been delivered to the site.

The BFP feed pumps, polymer system and appurtenant equipment will be furnished and installed by a competitively selected contractor in the existing Solids Handling Building. The BFPs, dryer system and appurtenant equipment will be installed by the same competitively selected contractor in a new building designated as the Dryer Building which is currently being designed. Refer to the configuration of the Dryer Building on the enclosed drawing PM-13.

Compliance with Class A Requirements - Andritz is responsible for furnishing dryers that comply with EPA Class A Regulations. Andritz's proposal indicates:

"ANDRITZ will satisfy 40 CFR Part 503 through Alternative 5: Use of a PFRP Option 2 – Heat Drying to reduce the moisture content of the Biosolids to 10% or lower and the temperature of the Biosolids exceeding 80°C (176°F). As the product is dried to 90%, it also meets vector attraction reduction Option B.

The ANDRITZ Belt Drying System dry product temperature exiting the belt will at all times exceed 80°C, and this temperature will be continuously monitored during operation using a thermocouple installed in the discharge screw conveyor (a segment of the conveyor flighting will be left off such that the thermocouple probe will protrude into the space left and be continuously immersed in the flowing dry product being conveyed to the cooling screw). The Conveyor trough and lid will be insulated and clad.

The typical operating regime for the Andritz Belt Drying System (BDS) is

- 92 to 94% DS, and
- >80°C product temperature prior to cooling"

2. CONSTRUCTION PLANS AND SPECIFICATIONS

As indicated in Section 1, the design of the new facility will use dewatering and drying equipment that was pre-purchased by the County.

Multiple construction contracts are being used by the County to implement the project. Existing underground utilities that would have interfered with the new dryer building were relocated by the County's on-call contractor under Contract 1. The building shell that will house the dewatering and drying systems has been designed and is under construction under Contract 2 that was competitively bid in March, 2025.

Contract 3 which will include the installation of all process mechanical and electrical equipment required for the new system along with new pump stations and underground utilities required. Contract 3 Plans and Specifications are included herein for DNREC's review and approval.