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Dan Ferguson
State of Washington Dept. of Ecology
re: Old Schoolhouse Brewery, Twisp, WA
Engineering review

Hello Dan,

As we discussed on the phone, the Oldschoolhouse Brewery (OSB) project in Twisp, WA has been classified as a significant industrial user with respect to wastewater and the town of Twisp. As such, an engineering report is required of any wastewater pretreatment system. The following description is intended to satisfy requirements outlined in WAC 173-240-130 and WAC 173-240-140.

Note: Some questions are deleted as they are irrelevant to this project.

WAC 173-240-130:

- a) Type of industry or business;
 - i. *Malt Beverage Production, NAICS code 312120*
- b) The kind and quantity of finished product;
 - i. *Production of ales, quantity of 1,000 barrels per year (31,000 gallons)*
- c) The quantity and quality of water used by the industry and a description of how it is consumed or disposed of, including:
 - i. The quantity and quality of all process wastewater and method of disposal;
 - *Average year 1 flow of 467 gallons per day discharge to municipal sewer.*
 - ii. The quantity of domestic wastewater and how it is disposed of;
 - *Domestic wastewater will go direct to sewer.*
 - *During the first year of operation there will be 2 restrooms and 1 shower, shared by a total of 3 staff.*
 - *Standard domestic wastewater volume per employee in a factory = 25 gals/day*
 - *Projected total daily domestic wastewater volume = 75 gals/day*
 - iii. The quantity and quality of noncontact cooling water (including air conditioning) and how it is disposed of; and
 - *Cooling water in the brewhouse will be captured and reused for the next brew.*
 - iv. The quantity of water consumed or lost to evaporation.
 - *Consumed water:*
 - *For process = 680 gals/day*
 - *This includes water in product, evaporation, industrial wastewater, and water hauled off site*
 - *As domestic wastewater = 75 gals/day*
 - *General consumption = 3 gals/day*
 - *Total = 758 gals/day*
- d) The amount and kind of chemicals used in the treatment process, if any;

- For pH adjustment, the brewery will use:
 - 50% caustic (NaOH, max 110 gallons on site) and
 - 95% sulfuric acid (H_2SO_4 , max 30 gallons on site)
- e) The basic design data and sizing calculations of the treatment units;
 - The basis of design for pretreatment tank size is a maximum of 4 tanks exchanges per day.
 - Usable tank capacity = 1500 gals.
 - 1st year process wastewater volume per day = 467 gals/day.
 - Projected maximum process wastewater volume per day = 2800 gals/day.
 - $2800/4 = 700$ gal tank volume minimum, well within the basis of design.
- f) A discussion of the suitability of the proposed site for the facility;
 - The brewery will be located in the town of Twisp and will be connected to the local sewer, leading to the local POTW. The brewery will have a pretreatment system installed on site, for pH adjustment and flow monitoring. A calamity tank will be available as well for potential spill containment. The POTW has available capacity to accept this brewery wastewater, treat it, and dispose of it.
- g) A description of the treatment process and operation, including a flow diagram;
 - Please see included OSB Wastewater Process Description.
 - Please see included Process Flow Diagram.
- h) All necessary maps and layout sketches;
 - Please see included 'OSB WW Layout' drawing set
- i) Provisions for bypass, if any;
 - Calamity tank, as described in (h) above.
- j) Physical provision for oil and hazardous material spill control or accidental discharge prevention or both;
 - Turn off the discharge pumps. Switch valve to calamity tank, transfer spill to calamity tank.
- k) Results to be expected from the treatment process including the predicted wastewater characteristics, as shown in the waste discharge permit, where applicable;
 - Large particles to be removed.
 - Discharge pH will be in range.
 - Flow will be measured and within daily limit.
 - BOD and TSS load will be calculated and within daily limit.
- ~~l) A description of the receiving water, location of the point of discharge, applicable water quality standards, and how water quality standards will be met outside of any applicable dilution zone;~~
- ~~m) Detailed outfall analysis;~~
- ~~n) The relationship to existing treatment facilities, if any;~~
- o) Where discharge is to a municipal sewerage system, a discussion of that system's ability to transport and treat the proposed industrial waste discharge without exceeding the municipality's allocated industrial capacity. Also, a discussion on the effects of the proposed industrial discharge on the use or disposal of municipal sludge;
 - The following information is from Andrew Denham, Public Works Director, Town of Twisp
 - Expansion plans with the Dept of Ecology are currently underway, as are funding plans.
 - OSB will have the following limits until the WWTP is able to accept higher loads:
 - BOD lbs/day = 35
 - TSS lbs/day = 50
 - Flow gals/day = 10,000
 - pH range = 6.0 – 9.0
 - Biosolids production will be fairly significant, about 15% initially and increasing to above 35% of the current volume. The Twisp WWTP plant operators manage the process in a way that minimizes biosolids production. They have reduced biosolids production by

45% since 2012 due to the biological process changes at the WWTP. Also, our current CWSRF grant includes a biosolids evaluation in the Scope of Work to identify options for handling biosolids more efficiently.

- *Maintaining compliance with the 35 lb/day BOD limit is not expected to be a problem until the 4th year of operation, or 3,000 barrels per year.*
- ~~p) Where discharge is through land application, including seepage lagoons, irrigation, and subsurface disposal, a geohydrologic evaluation of factors such as:~~
 - ~~i. Depth to groundwater and groundwater movement during different times of the year;~~
 - ~~ii. Water balance analysis of the proposed discharge area;~~
 - ~~iii. Overall effects of the proposed facility upon the groundwater in conjunction with any other land application facilities that may be present;~~
- q) A statement expressing sound engineering justification through the use of pilot plant data, results from other similar installations, or scientific evidence from the literature, or both, that the effluent from the proposed facility will meet applicable permit effluent limitations or pretreatment standards or both;
 - *This is a standard offering from Brewery Wastewater Design.*
 - *There are many similar installations at craft breweries around the US with good results.*
 - *Once operational, the system maintains and emails weekly a full datalog of all key parameters. The controls also allow remote access for remote control and troubleshooting from employees office, work station, home or from the Brewery Wastewater Design office in Colorado.*
- r) A discussion of the method of final sludge disposal selected and any alternatives considered with reasons for rejection;
 - *The underground tank will be pumped annually via a septic pump truck to remove accumulated solids in the bottom of the tank. There is no sludge or biosolids that a typical aerobic treatment system would create.*
- s) A statement regarding who will own, operate, and maintain the system after construction;
 - *The system will be fully owned, operated, and maintained by OSB.*
- t) A statement regarding compliance with any state or local water quality management plan or any plan adopted under the Federal Water Pollution Control Act as amended;
 - *The system will comply with local discharge requirements, as stated in o) above.*
 - *On updated sewer ordinance is in the works to formalize these limits.*
 - *The Twisp POTW permit number is WA0023370.*
- u) Provisions for any committed future plans;
 - *This system is sized to accommodate all growth plans of OSB at this time. See the included Wastewater Process Description.*
- v) A discussion of the various alternatives evaluated, if any, and reasons they are unacceptable;
 - *A manual pH adjustment system is possible, but takes time and man power.*
 - *An above ground tank is susceptible to below freezing temperatures.*
 - *An indoor skid mounted system would work, but takes up more space.*
- w) A timetable for final design and construction;
 - *The system will undergo final design in June 2018 with construction immediately following.*
- ~~x) A statement regarding compliance with the State Environmental Policy Act (SEPA) and the National Environmental Policy Act (NEPA), if applicable;~~
- ~~y) Additional items to be included in an engineering report for a solid waste leachate treatment system are:~~
 - ~~i. A vicinity map and also a site map that shows topography, location of utilities, and location of the leachate collection network, treatment systems, and disposal;~~
 - ~~ii. Discussion of the solid waste site, working areas, soil profile, rainfall data, and groundwater movement and usage;~~

- ~~iii. A statement of the capital costs and the annual operation and maintenance costs;~~
- ~~iv. A description of all sources of water supply within two thousand feet of the proposed disposal site. Particular attention should be given to showing impact on usable or potentially usable aquifers.~~

WAC 173-240-140:

1. Upon request of the owner the department may, at its discretion, allow submission of conceptual plans for industrial facilities, as noted in WAC 173-240-110(5). Two copies of the plans and specifications must be submitted to the department for approval before the start of construction.
2. The plans and specifications shall include the following information together with any other relevant data as requested by the department:
 - a) Repeat presentation of the basic engineering design criteria from the engineering report.
 - i. *See included wastewater process description, process flow diagram, schematic flow diagram, and layout drawing.*
 - b) If there are any deviations from the concepts of the engineering report, an explanation of the changes that includes as much detail as would have been provided in an engineering report.
 - c) The plan and section drawings of major components, such as the treatment units, pump stations, flow measuring devices, sludge handling equipment, and influent and effluent piping. Foundations or soil preparation or both should be shown for major structures.
 - i. *See included OSB WW layout drawing.*
 - d) A general site drawing that shows the location with respect to the entire plant site and a detailed site drawing that shows the component siting.
 - i. *See included General site drawing and OSB WW layout drawing.*
 - e) A schematic drawing that shows flows that include: In plant collection, and wastewater pumping, treatment, and discharge.
 - i. *See included OSB WW layout drawing.*
 - f) A hydraulic profile that shows head under maximum flows. This requirement may be waived where the three step submission of documents has been waived under WAC173-240-110.
 - i. *See included pump curve 50PU2.75-63. The discharge pumps should discharge a minimum of 70 gallons per minute, head should be 20 ft or less, depending on liquid level in the tank and back pressure through piping.*
 - g) Instrumentation, controls, and sampling schematics.
 - i. *See sample ports called out in Schematic Flow Diagram and OSB WW Layout.*
 - ii. *See included OSB WW Manual DRAFT*
 - h) General operating procedures, such as startup, shutdown, spills, etc.
 - i. *See included OSB WW Manual DRAFT*
 - ii. *If there is a spill, staff can switch a valve and pump contents of the lift station to one or more IBC totes. This would isolate any spill and allow the brewery to resume normal operation. The material in the totes would be tested and a disposal plan would be created in conjunction with the Town of Twisp and POTW staff.*

It has been a pleasure preparing this engineering report for you and the Department of Ecology. Please let me know if you have questions or need more information.

Signed,

John Mercer
Owner, Brewery Wastewater Design