DRAFT TECHNICAL MEMORANDUM

DATE: May 11, 2018

TO: Leana Johnson, City of Stevenson

FROM: Jack Wallis, PE

RE: Stevenson Industrial Wastewater Sampling Plan
WE # STEV18GS T1

Introduction

A number of industries in Stevenson discharge high volume and/or strength wastewater to the City's sewer system. To determine the magnitude of wastewater loadings from these industrial users, industrial wastewater sampling was performed in 2016 and 2017, in accordance with the recommendations of the July 29, 2016 *Technical Memorandum re: High Strength Dischargers Sampling Plan* [1]. Following these past sampling efforts, there have been questions regarding unexplained BOD spikes and foaming episodes at the City's wastewater treatment plant (WWTP). To resolve these questions and provide additional data for stakeholders, an additional round of wastewater sampling will be completed. The goals of this sampling effort are to:

1. Determine the strength and loadings of industrial wastewater users,
2. Determine Significant Industrial Users and support DOE permit applications,
3. Investigate the cause of BOD loading spikes and foaming at the wastewater treatment plant, and
4. Provide a basis for future planning and design efforts.

This memorandum summarizes the wastewater sampling plan for the industrial wastewater users in Stevenson.

Sampling Plan

Wastewater sampling will focus on measuring the BOD_5 concentration, pH, and temperature in each industry's effluent. Other constituents such as COD may also be measured to provide useful information to WWTP operations. Sampling will occur daily through the duration of the sampling period. In addition to the industrial user sampling, the City will also collect 24-hour composite samples at the WWTP influent during all days in which industrial user samples are collected. A summary of the industrial user sampling plan is shown below in Table 1, and discussed in further detail below for each user.

Table 1. Industrial User Sampling Plan Summary

Industrial User	Sampling Duration	Sampling Location	Flow Measurement	Notes
Waterfront Building (Backwoods Brewing, Skunk Brothers Distillery)	3 wks w/o BMPs[a] 3 wks w/ BMPs	~600 gallon sump	Magnetic flow meter on pump discharge line	Sampling location includes both process water and sanitary wastewater from entire waterfront building
LDB Beverage	3 wks w/o BMPs 3 wks w/ BMPs	Kanaka Pump Station	Water meter, multiplied by 0.8 consumption factor	Sampling location includes wastewater from public restroom and Silver Star Industries.
Walking Man Brewery	4 wks	Sample port	Water meter, multiplied by 0.8 consumption factor	Includes both process and sanitary wastewater
Skamania Lodge	4 wks	Manhole	Water meter with cooling tower water subtracted	

a. Best Management Practices, such as sidestreaming high concentration wastewater.

Backwoods Brewing and Skunk Brothers Distillery (Waterfront Building)

Wastewater from the waterfront building, including Backwoods Brewing and Skunk Brothers Distillery, is combined in a sump prior to being pumped to the City's collection system. Because it is not feasible to separate the various influent sources, the combined wastewater will be sampled from this sump (Figure 1). To assist these users in determining the efficacy of sidestreaming BMPs, sampling will be split into two three-week phases. During the first phase, the users will continue operating with no new BMPs in place. During the second phase, the users will implement sidestreaming BMPs to reduce their BOD load.

Wastewater flow for these users is measured with a magnetic flow meter on the pump discharge line, and will be recorded at the time of sample collection. Water meter use will also be recorded to determine the consumption factor for these users.

Figure 1. Sampling location for the Waterfront Building. Sump is located below the metal cover. Metal pipes shown are sump pump discharge lines, and plastic pipe is an influent drain line.

LDB Beverage

LDB Beverage process wastewater and sanitary wastewater enter the collection system at different points. Previous efforts took samples from a submerged pipe in the process water discharge line, and did not take into account the effect of the sanitary wastewater on the total wastewater strength. There are two options to provide better estimates of wastewater strength for this user. The first option is to sample from the process water line, and correct for the sanitary wastewater using standard volume and strength values from the Washington State Department of Ecology's (DOE) *Criteria for Sewage Works Design* ("Orange Book"). The second option is to sample from the influent sewer to the Kanaka Pump Station, and correct for the other connections to this sewer line (a public restroom and Silver Star Industries) using Orange Book volume and strength values. Due to the improved sampling location and low flows expected from the public restroom and Silver Star Industries, the second option is recommended. See Figure 2 for this sample location.

Wastewater flow for LDB Beverage will be estimated by multiplying the water meter use by a consumption factor. The consumption factor was previously determined to be 0.6, based on sixty days of water use data [2]. This consumption factor will be reevaluated using water use data collected during the sampling period.

Figure 2. Kanaka Pump Station Wetwell. LDB Beverage sample location will be from a container suspended below the influent sewer shown on right.

Walking Man Brewery

Walking Man Brewery process wastewater is combined with sanitary effluent prior to discharge. Wastewater will be sampled from a port (Figure 3) on the discharge sewer line. The brewery operation has implemented many sidestreaming BMPs, which the Brewer's Association Sustainability Mentor has estimated to reduce their total BOD load by approximately 40%. Because these BMPs are already in place, sampling before and after implementing these BMPs is impractical. Walking Man Brewery will therefore be sampled daily for 4 weeks, during which they will continue utilizing the implemented BMPs.

Wastewater flow from Walking Man Brewery will be estimated by multiplying the water meter use by a consumption factor. This consumption factor was previously estimated to be 0.85 [2], but will be reevaluated using water use and beer production data collected during the sampling period.

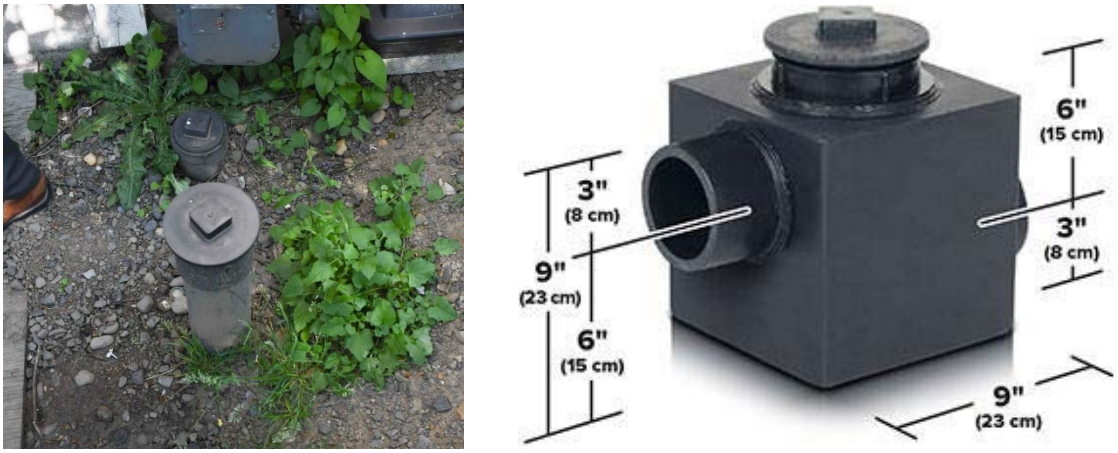

Figure 3. Sample port used at Walking Man Brewery, standpipe shown on left and in-line sample port fitting on right.

Skamania Lodge

Skamania Lodge will be sampled at a manhole just downstream of their grease trap (Figure 4). Because no additional BOD reduction strategies have been identified, sampling will occur throughout a 4 week period, during which they will operate as usual.

All City water used by Skamania Lodge enters the wastewater system, with the exception of water lost by an evaporative cooling tower. Flow for Skamania Lodge will be calculated by subtracting the water lost in the evaporative cooling tower from the water meter use. The water lost in the evaporative cooling tower will be measured by Skamania Lodge using a flow meter.

Figure 4. Skamania Lodge discharge manhole sampling location.

Sampling Procedures

Wastewater will be sampled using automatic composite sampling equipment. There are two options for composite sampling: flow proportional and time composite. Previous efforts collected 24-hour time composite samples, with sample aliquots collected every 15 minutes. While flow proportional samples give a more accurate representation of average daily concentration than time composite samples, they require input from a flow meter. Currently, only one user has an effluent flow meter installed (the Waterfront Building). Flow proportional sampling is an option for this user, but other users must be sampled using the time composite method unless effluent flow meters are installed. To provide the most representative sample possible, the time interval for time composite sampling will be reduced to the minimum allowable by the sample container size, and sampling will occur only during business hours (when wastewater flow is generated).

Sampling procedures will follow 40 CFR Part 136 requirements and EPA guidelines [3]. In general, sampling procedures will be as follows:

- Time-based composite samples.
- Minimum 100 mL aliquot per sample.
- Time interval between sample aliquots will be the minimum allowed by the sample container, 15 minutes maximum.
- Sample tube intake will be near the center of the flow channel, at approximately 40-60% of the water depth.
- Flow measurement will be recorded at the time of sample collection.
- Samples will be collected from composite sampling equipment daily and sent to laboratory for BOD_5 analysis within 48 hours. Samples will be stored at 4° C prior to analysis.
- pH and temperature of grab sample from sampling location will be measured daily during sample collection.

- Non-refrigerated sampling equipment will be filled with ice daily.
- Composite sampling equipment will be stopped when the industry is not in operation.
- Sample collection will be logged in a sample logbook kept at each sample location.
- In the event of a sample equipment failure, a grab sample will be collected but will not be included in data analysis for calculating averages.

Composite sampling equipment will consist of full sized Teledyne ISCO samplers. Samples will be collected by City staff and analyzed by a laboratory certified by the DOE to perform the required tests. Results will be distributed to the industrial users as soon as they are received.

Next Steps

Following the wastewater sampling period, concentration and flow data will be analyzed and summarized in a technical memorandum. Data analysis will include calculations of minimum, maximum, and average flows, concentrations, and loadings.

References

[1] *Technical Memorandum re: High Strength Dischargers Sampling Plan*. July 29, 2016. Tetra Tech.

[2] *Technical Memorandum re: Pretreatment and Source Control Alternatives - Addendum*. September 22, 2017. Tetra Tech.

[3] *Wastewater Sampling Operating Procedure SESDPROC-306-R3.* February 28, 2013. United States Environmental Protection Agency, Science and Ecosystem Support Division.