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October 12, 2016

Ms. Corrine Schakel
Permit Specialist
City of Stanwood
10220 270th Street NW
Stanwood, WA 98292

Sent via: Email

**Subject: McDay Septage Facility
Water Availability and Sewer Availability Evaluation**

Dear Ms. Schakel:

RH2 Engineering, Inc., (RH2) received a request to review water and sewer availability for the development of the McDay Septage Facility (Facility) for the City of Stanwood (City). The following documents were reviewed:

- Report to Document Sewage Treatment and Discharge to the City of Stanwood System, prepared for McDay Holdings, LLC, prepared by Wilson Engineering, LLC, dated July 28, 2016, and signed by Jeff Christner, P.E. (Report)

Preliminary water and sewer plans for the Facility were not provided. The Report prepared by Wilson Engineering was utilized to determine the approximate water demands and sewer flows and loadings of the proposed Facility. McDay Holdings is proposing construction of a Septage Receiving Facility and Class A Biolids Processing Facility. It was assumed that part of the Facility would be constructed on all four parcels included in the water and sewer availability application, which was received by the City on July 28, 2016.

The process design and site layout for the proposed Facility was **not** evaluated as part of this water and sewer availability review.

In accordance with Stanwood Municipal Code (SMC) 17.148.080, certificates of capacity for water and sewer facilities are granted upon the approval of a preliminary development permit or at the time of the final development permit issuance. RH2 is not aware of the permitting status for this project.

Water Availability Evaluation

Projected Demand and System Capacity

The projected water demand for the proposed Facility was estimated based on the information provided in the Report and the assumption that the proposed Facility would only operate 5 days per week. Based on this information, the average day demand (ADD) of the proposed Facility is estimated to be 20,000 gallons per day (gpd), as shown in **Table 1**. Calculated maximum day demands (MDD) and peak hour demands (PHD) are



based on the peaking factors identified in Table 4-10 of the City’s 2015 Comprehensive Water System Plan (WSP).

Table 1 also includes equivalent residential unit (ERU) calculations for the proposed Facility. One ERU is equivalent to the amount of water used by one single-family residence. The ERU is calculated based on 192 gpd per ERU, as identified in Table 4-13 of the City’s 2015 WSP.

Table 1
Proposed Facility Water Demand Data and ERUs

Projected Facility Average Day Demand	
Total Projected Demand (gpd)	20,000
Total Projected Demand (gpm)	14
Projected Facility Maximum Day Demand	
Maximum Day / Average Day Peaking Factor	1.69
Total Projected Demand (gpd)	33,841
Total Projected Demand (gpm)	24
Projected Facility Peak Hour Demand	
Peak Hour / Average Day Peaking Factor	2.45
Estimated Total Projected Demand (gpm)	34
Total Projected Demand, per applicant (gpm)	100
Projected Facility ERUs	
ADD per ERU (gpd per ERU)	192
Projected Facility ERUs	104

The City’s water system capacity evaluation included a review of the City’s sources of supply, water rights, storage facilities, and transmission main capacities, and determined that the City’s water facilities, with the exception of storage, have sufficient capacity to support the 104 proposed ERUs for the proposed Facility, in addition to existing customers and developments that have been constructed or approved for water availability. **Table 2** shows the supply evaluation for the 125 Zone, which the proposed Facility would be located in and connected to. **Table 3** shows the evaluation for the remainder of the City’s sources of supply, water rights, storage facilities, and transmission main capacities. As shown in **Table 3**, the City does not currently have adequate storage for the proposed Facility. Flows and ERUs for the approved developments were based on the flows used to review those developments, an ADD per ERU of 192 gpd per ERU (per the City’s 2015 WSP), and the peaking factors discussed previously in this letter.

Table 2
125 Zone Supply Capacity Evaluation

125 Zone Supply Evaluation	
125 Zone Supply Capacity (gpm)	460.0
2013 Estimated 125 Zone MDD (gpm)	323.9
Estimated Approved Development MDD (gpm)	2.6
Projected Facility MDD (gpm)	23.5
Remaining 125 Zone Supply Capacity (gpm)	110.0



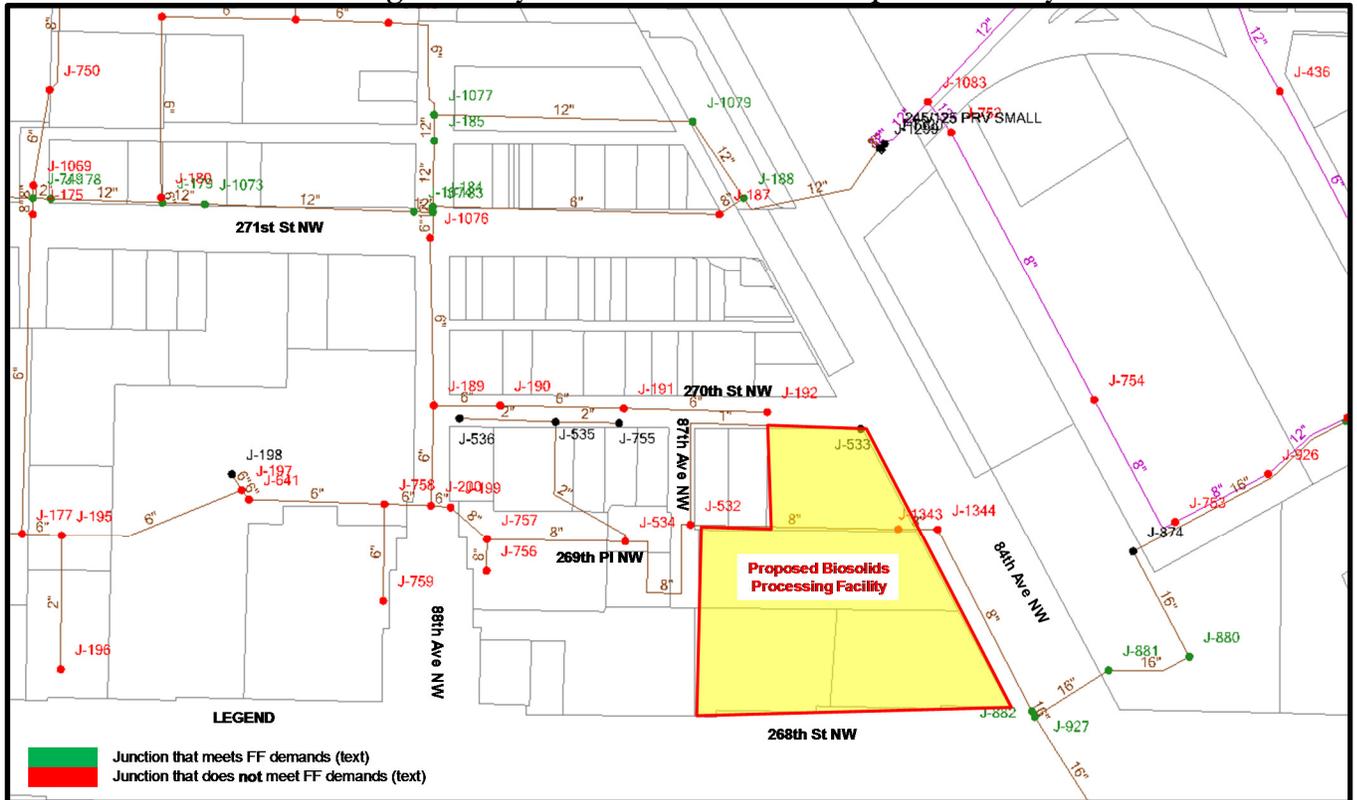
**Table 3
System Capacity Analysis**

System Capacity (ERUs)	
Well and Spring Supply Source	8,673
Annual Water Rights Source	24,677
Instantaneous Water Rights Source	17,222
Storage	4,702
Transmission Capacity	11,324
ERUs	
2013 ERUs	4,331
Approved Development ERUs	362
Projected Facility ERUs	104
Remaining System Capacity Available (ERUs)	
Well and Spring Supply Source	3,876
Annual Water Rights Source	19,880
Instantaneous Water Rights Source	12,425
Storage	-95
Transmission	6,526

Hydraulic Analyses Results

Hydraulic analyses were performed using the City's existing hydraulic model to determine pressure and fire flow availability to the proposed Facility. The model included existing demands for 2013, as calculated for the City's 2015 WSP. The application did not include a conceptual plan for the proposed water system. The City's existing hydraulic model was updated with demands for the proposed Facility. According to the City's WSP, new water mains that will carry fire flow in commercial and industrial areas shall be a minimum of 12 inches in diameter minimum and looped for proposed developments. The fire flow requirement for the proposed Facility was not provided; therefore, the planning-level fire flow requirement for light industrial of 3,500 gallons per minute (gpm) for 3 hours was assumed for the proposed Facility. **Figure 1** shows the location of the proposed Facility.

Figure 1
Existing Water System and Location of Proposed Facility



Fire flow analyses were performed during MDD conditions with the City’s facilities operating at their normal settings. The first set of analyses assumed no off-site water main improvements for the proposed Facility.

The analyses indicate that approximately 700 to 5,600 gpm will be available from nearby fire hydrants, as shown in **Table 4**. The calculated fire flow rates are based on a residual pressure of 20 pounds per square inch (psi) in the water main adjacent to the hydrant and water velocities in the distribution system of 8 feet per second or less. The available fire flow for most of the junctions modeled is less than the general fire flow requirement of 3,500 gpm.

Table 4
Hydraulic Analyses Results

Junction	Existing System		with Water Main Improvements	
	PHD Pressure (psi)	Available Derated Fire Flow (gpm)	PHD Pressure (psi)	Available Derated Fire Flow (gpm)
J-192	49	703	49	6,029
J-532	49	1,739	49	4,764
J-882	47	5,615	47	7,097
J-1343	47	1,808	47	3,557
J-1344	47	1,747	47	5,978
J-1345	---	---	47	6,001



- The Cedarhome Reservoir was drawn down 8.5 feet, resulting in a hydraulic elevation of 356.5 feet for the pressure analyses. The Cedarhome Reservoir was drawn down 26.5 feet, resulting in a hydraulic elevation of 338.5 feet for the fire flow analyses.
- The Bailey Booster Pump Station was not operating.
- The Knittle Booster Pump Station was not operating.
- One of the three pumps at the Cedarhome Booster Pump Station was operating.
- Bryant Well No. 1 was supplying approximately 1,350 gpm.
- Bryant Well No. 2 was not operating.
- The Cedarhome Well was supplying approximately 600 gpm.
- Hatt Slough Springs was not operating.
- All pressure reducing stations were operating at their normal set points.

Sewer Availability Evaluation

Projected Sewer Flows and System Capacity

The projected sewer flows for the proposed Facility were estimated based on the information provided in the Report and the assumption that the proposed Facility would only operate 5 days per week. Based on this information, the average annual flow (AAF) of the proposed Facility is estimated to be 43,805 gpd, as shown in **Table 5**. The evaluation of the City’s wastewater gravity collection system capacity is based on peak hourly flows (PHF), which are estimated to be 4 times greater than the AAF, per the City’s 2015 Comprehensive Sewer System Plan (SSP). **Table 5** shows the resulting PHF from the proposed Facility as 122 gpm. However, the proposed Facility is anticipated to discharge to the City’s sewer system through a pump with a capacity of approximately 200 gpm. It was assumed that the proposed Facility would contribute 200 gpm during PHF for the purposes of this evaluation.

**Table 5
 Proposed Facility Sewer Flow Data**

Projected Facility Average Annual Flow	
Total Facility Sewer Discharge (gpd)	43,805
Total Facility Sewer Discharge (gpm)	30.4
Projected Facility Peak Hour Flow	
Peak Hour / Average Annual Peaking Factor	4.00
Estimated Facility Total Sewer Discharge (gpm)	122
Proposed Facility Sewer Pump Capacity, per applicant (gpm)	200

The capacity of the wastewater treatment facility was reviewed and there is sufficient capacity for the proposed Facility. The capacity of the Main Lift Station was reviewed and there is **not** sufficient capacity during PHF for existing customers, developments that have been constructed or approved for sewer availability, and the proposed Facility. This is shown in **Table 6**. PHF for the approved developments were based on the PHFs used to review those developments, an AAF per ERU of 290 gpd per ERU (per the City’s SSP), and a peaking factor of four.

Table 6
Main Lift Station Capacity Analysis

Main Lift Station Capacity Analysis	
Main Lift Station Firm Capacity (gpm)	1,900
2012 PHF (gpm)	1,660
Estimated Approved Development PHF (gpm)	324
Proposed Facility Sewer Pump Capacity (gpm)	200
Main LS Remaining Capacity (gpm)	-284

Sewer Analysis Results

Analyses were performed to determine if the sewer system could handle the projected flow from the proposed Facility. It was assumed the proposed Facility would discharge to MH 19SW-130, and the sewer discharge would follow the flow path shown in **Figure 3**. The analyses are based on 2013 peak hour flow data, which was the base year for the City’s SSP. System monitoring was performed to assist with calibrating the sewer system model based on 2013 flow data and the model’s flows have not been updated since the preparation of the SSP. The results of the analyses indicate that the existing wastewater gravity collection system has sufficient capacity to support the proposed Facility, with 967 LF of 8-inch-diameter sewer main in 88th Avenue NW and 269th Place NW, and 245 LF of 20-inch-diameter sewer main in 94th Drive NW exceeding 50 percent of the pipe’s capacity (**Figure 4**).

Figure 3
Proposed Facility Flow Path in Existing Wastewater Collection System

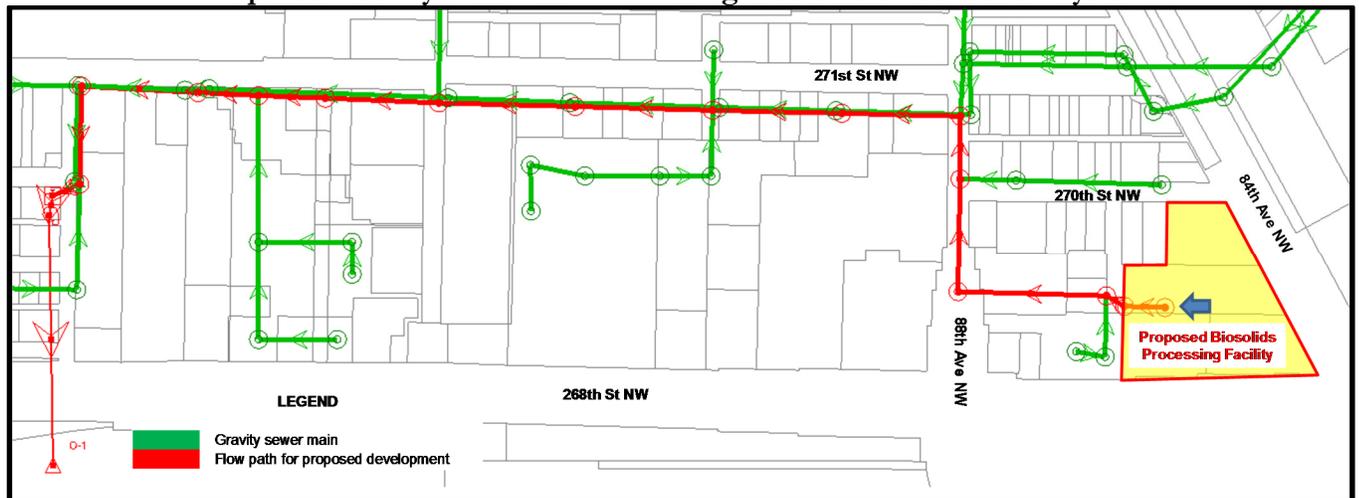
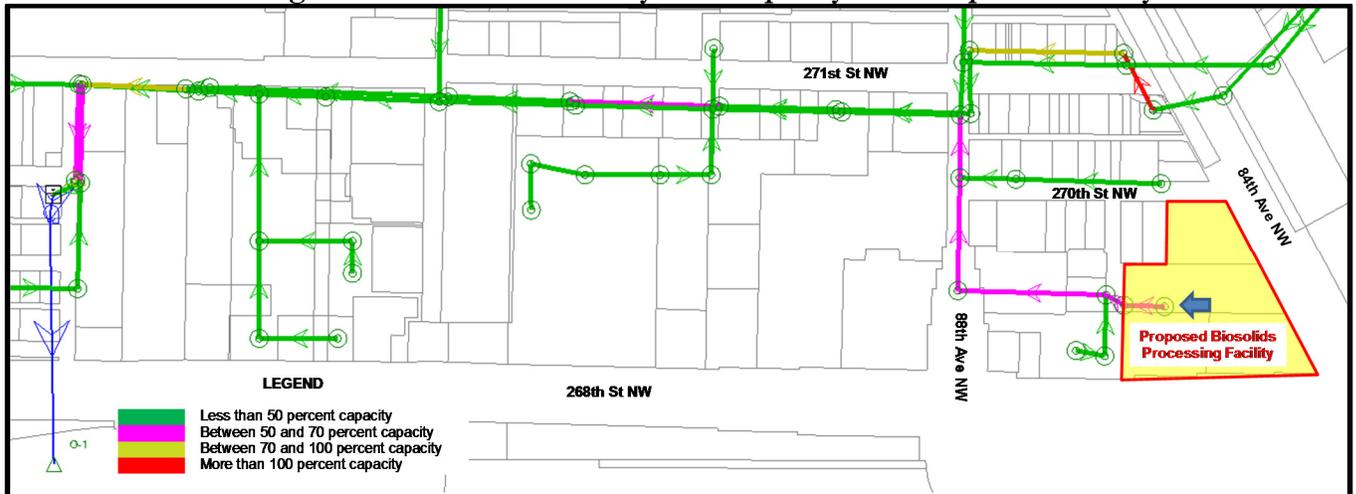


Figure 4
Existing Wastewater Collection System Capacity with Proposed Facility



The City’s SSP indicates that if peak flow capacity through a pipe exceeds 70 percent of the pipeline capacity, then plans for an expansion and/or upgrade of the deficient pipe segments should be implemented. Although no pipe segments have projected flow in excess of 70 percent as a result of the proposed Facility, the southernmost 284 LF of 8-inch-diameter sewer main in 88th Avenue NW will be flowing at 66 percent of its capacity during peak hourly flow conditions. There were no CIPs identified in the City’s SSP for this portion of the sewer system. If no permit applications are submitted within the sewer drainage basin area served by this sewer main prior to a permit application being submitted for the proposed Facility, no wastewater gravity collection system improvements will be required to support the proposed Facility.

Conclusion

Water and sewer capacities were evaluated for the proposed Facility. The City’s water system has sufficient supply capacity for the proposed Facility, **but does not have enough storage for the proposed Facility.**

The required size of the on-site water main will be determined by the fire flow requirement of the proposed Facility, but will likely be 12-inch. Off-site improvements in 84th Avenue NW, 270th Street NW, 269th Place NW, and 88th Avenue NW may also be necessary depending on the determined fire flow requirement.

The City’s existing wastewater treatment and gravity collection system has sufficient capacity to handle the projected flows from the proposed Facility. However, **Main Lift Station does not have sufficient capacity to handle the projected flows from the proposed Facility.** Improvements will need to be made to the Main Lift Station to increase its capacity so that it has sufficient capacity to serve the proposed Facility. In addition, if permit applications from other developments are received by the City prior to submittal of the proposed Facility permit application, 284 LF of 8-inch-diameter sewer main in 88th Avenue NW may need to be replaced with larger sewer main. Certificates of water availability and sewer availability should be finalized and issued for the applicant at the time of preliminary permit approval as defined in SMC 17.148.080.



This concludes the water availability and sewer availability evaluation for the proposed Facility. If you have any questions regarding the information within, please contact me at (425) 951-5416.

Sincerely,

RH2 ENGINEERING, INC.

Kenny Schonberger, P.E.
Project Engineer



10/12/2016



10/12/2016

Bret Beaupain, P.E.
Engineer in Responsible Charge

KS/BB/dc/jq

- cc: Mr. Ryan Larsen, Community Development Director, City of Stanwood
Mr. Erick Aurand, City Planner, City of Stanwood
Mr. Kevin Hushagen, Public Works Director, City of Stanwood
Mr. Shawn Smith, P.E., Assistant Public Works Director and City Engineer