



INTERDEPARTMENTAL COMMUNICATION

Acton Board of Health - Telephone 978-929-6632 - Fax 978-929-6340

May 12, 2015

TO: Steven Ledoux, Town Manager 

FROM: Doug Halley, Health Director

SUBJECT: South Acton Water Treatment Facility

The Acton Water District will be bringing their South Acton Water Treatment Facility on-line beginning this week and into next week. As part of the plant's operations it will be discharging processed water to the town's sewer system. The processed water is considered an industrial discharge and would be the first industrial discharge to the sewer system. The Sewer Commissioners have established residential and commercial rates but have not established an industrial rate.

Woodard and Curran have prepared a memorandum on the impact of this discharge to the treatment capacity and a potential cost evaluation (see attached). However this analysis is based on conservative estimates that may be significantly off the mark in terms of average gallons per day discharged or the increase in sludge generation. If an industrial rate of \$0.489/cf is set as compared to the current commercial rate of \$0.1727 the Water District would be paying a monthly bill of \$3,167 instead of a commercial rate bill of \$1,124.

Due to the uncertainties of the actual cost impacts this discharge will have I would recommend that the industrial rate be equal to the commercial rate for FY 16. During the course of this next year we will monitor the actual flow of the Water Treatment Facility, its effect on sludge generation at the sewer treatment plant and any other cost factors identified. We would come back to the Sewer Commissioners prior to FY 17 with a recommended industrial discharge rate based on measurable and actual impacts.

DRAFT

TECHNICAL MEMORANDUM



TO: Doug Halley, Director of Health, Town of Acton
FROM: Jack Troidl, P.E. & Paul Dombrowski, P.E.
DATE: January 16, 2015
RE: Acton Water District – New Process Discharge to Pump Station #11 (High Street)
Treatment Capacity and Cost Evaluation

CC: Bill Dickson, W&C
Mike Thompson, W&C

The purpose of this memorandum is to summarize the capacity impacts and treatment costs associated with the proposed process and sanitary wastewater discharge from the South Acton Water Treatment Plant being constructed and operated by the Acton Water District (AWD). This new wastewater discharge is expected to begin in February/March 2015.

The impact of the discharge was evaluated to determine its overall impact (due to the nature of the discharge, how much equivalent domestic wastewater capacity is displaced) and the increased treatment costs associated with the discharge (also due to the nature of the discharge). This analysis only includes conventional pollutants: Flow, BOD, and TSS. It is assumed that the iron and manganese will not adversely impact the treatment process. However, all potentially significant pollutants, (including iron, manganese, metals and arsenic) should be closely monitored over the first two years after connection to better understand the impacts of the proposed discharge on the Acton WWTF.

Given:

Flow (Maximum Daily): 11,200 gpd (will be discharged over 8-hour period, 25 gpm)
Flow (Average): 1,600 gpd (based on discharge frequency of once per week)
BOD: 0.69 lbs/day average (based on assumed 2% of solids)
TSS: 2,630 mg/l / [35.1 lbs/day] (based on future conditions, estimated at 1,315 mg/l [17.55 lbs/day] initially)
Typical Household Flow: 330 gpd (maximum daily flow based on 3 bedroom, assumed)
Typical Household BOD: 0.5 lbs/day (0.2 lbs/day * 2.5 people per household)
Typical Household TSS: 0.5 lbs/day (0.2 lbs/day * 2.5 people per household)

Flow

The Acton WWTF has a Groundwater Discharge Permit capacity of 299,000 gpd on a maximum day basis. Therefore, the proposed discharge accounts for 3.75% of the permitted capacity of the facility on a purely hydraulic basis (11,200 / 299,000). The proposed flow is equivalent to approximately 33.9 3 bedroom households on a maximum day basis.

BOD

While the proposed discharge is not expected to have a significant amount of BOD, assuming a nominal quantity of 2% organic solids results in approximately 4.8 lbs/day at maximum day and 0.69 lbs/day averaged over the week. Assuming 0.2 lbs/person of BOD and 2.5 people per household results in approximately 0.5 lbs/day of BOD from a typical residential user. The proposed discharge is 1.38 times greater than a typical residential user on a BOD basis but lower than an equivalent amount of sanitary flow.

TSS

TSS is evaluated on an average daily basis and results in 35.1 lbs/day of TSS (0.0016 * 2,630 * 8.34). Assuming a typical residential user is at 0.2 lbs/person of TSS and 2.5 people per household results in approximately 0.5 lbs/day of TSS from a typical residential user. The proposed discharge is 70.2 times greater than a typical residential user. However, assuming approximately 0.75 lbs sludge is produced

from a pound of TSS from domestic wastewater and 1.0 lb sludge is produced from a pound of AWD wastewater TSS, the overall impact is increased by 1.33 times resulting in an overall impact of 93.4 times. This max day loading is evaluated on an average day basis.

Summary & Recommendation

Based on the assumption that approximately 1/3 of the treatment costs are equally based on flow, BOD and TSS, the table below presents a comparison of the treatment costs for the AWD discharge compared to domestic wastewater. If the characteristics of the discharge are as proposed the existing sewer rate does not appear to adequately capture the projected treatment costs. The final column of the table below presents the total proposed treatment cost for the AWD discharge to capture the projected treatment costs including sludge disposal.



Parameter	Comparison of AWD Discharge with Typical Residential User (Max Day or Avg)	Annual Treatment Cost Per Typical Residential User ^{a, b}	Flow/Load to be Treated from Equivalent Number of Typical Residential Users	Flow/Load to be Treated from AWD	Proposed Annual Treatment Cost for AWD Discharge ^c
Flow ($\frac{1}{3}$)	Max Day 33.9 times greater	\$464	11,200 gpd (max – 33.9 users) 1,600 gpd (avg – 9.6 users)	Charged based on use (1:1)	\$4,495
BOD ($\frac{1}{3}$)	Avg 1.38 times greater	\$464	4.8 lbs/day (avg – 9.6 users)	0.69 lbs/day (avg)	\$646 ^e
TSS ($\frac{1}{3}$)	Avg 93.4 times greater	\$464	4.8 lbs/day (avg – 9.6 users)	35.1 lbs/day (avg)	\$32,870 ^d
Total Cost		\$1,392			\$38,011
Total Flow		60,225 gal			584,000 gal
Sewer Rate		\$0.1727 / cf \$23.09 / 1,000gal			\$0.4869 / cf \$65.09 / 1,000gal

a All Costs based on a commercial rate of \$0.1727 per cubic foot or \$23.09 per thousand gallons

b Assumes 330 gpd / 2 = 165 gpd average daily flow or 60,255 gpy.

c AWD Discharge cost includes a premium for excess TSS and accounts for low BOD loading

d TSS Premium does not include factor for typical residential sludge production being less per pound of TSS

e Based on typical residential usage, cost would be \$4,495

Sludge Summary

Based on AWD’s approximately 35.1 lbs/day of sludge on average less 3.6 lbs/day of sludge from 1,600 gpd of residential flow (75% of 4.8 lbs/day), approximately 31.5 lbs/day of excess sludge is discharged or 11,498 lbs annually. The Acton WWTF currently disposes of sludge at a cost of \$158/dt for hauling and \$260/dt for disposal for a total of \$418/dt based on 2013/2014 costs. This results in an annual increase in sludge hauling and disposal costs of \$2,403 in comparison to the 2013/2014 April to March annual cost for the facility of \$22,000. However, this cost is already included in the premium to the sewer rate.

Note:

It is our understanding that the AWD discharge sewer privilege fee has been calculated and assessed to the user. The method used 1,600 gpd (process) and 150 gpd (sanitary) flow to arrive at a fee of \$71,776.16. It should be noted that this method inherently utilizes a maximum day flow 3,200 gpd based on typical peaking factors. However, the AWD proposes to discharge at 11,200 gpd on the maximum day. While the Acton WWTF is not currently approaching it’s discharge capacity, the AWD discharge effectively will utilize substantially more capacity on a maximum day flow basis where the discharge is equal to 33.9 equivalent users. The GWDP governs the discharge capacity and is based on a max day basis.