

## Estimated Wastewater Generation for Proposed Council on Aging / Community Center Facility in Wayland, MA

**TO:** Council on Aging / Community Center Committee  
**FROM:** Ian Catlow, P.E.  
Janet Moonan, P.E.  
**COPY:** Nan Balmer, Town Administrator  
**DATE:** March 9, 2016

---

Tighe & Bond has prepared the following memorandum to document our estimate of potential wastewater to be generated by the proposed Town of Wayland Council on Aging / Community Center (CoA/CC) facility.

Based on discussions with the CoA/CC Committee, the proposed facility will include the following components:

- 21,000 square feet of space total that consists of:
  - Activity Space and Drop in Space (total of 534 seats);
  - Office space (approximately 3,100 square feet);
  - Circulation space (hallways, stairs, etc.);
  - Service core (restrooms, equipment rooms, etc.); and
  - Catering kitchen.

The facility is expected to serve up to 571 occupants and will be available to the community seven days per week.

Tighe & Bond utilized the Massachusetts Department of Environmental Protection (MassDEP) *State Environmental Code, Title 5: Standard Requirements for the Siting, Construction, Inspection, Upgrade and Expansion of On-Site Sewage Treatment and Disposal Systems and for the Transport and Disposal of Septage* (310 CMR 15.00, commonly referred to as "Title 5") to estimate wastewater design flows to be generated from the proposed facility.<sup>1</sup>

Title 5 Section 15.203, System Sewage Flow Criteria, requires that "each component of on-site subsurface sewage disposal system shall be designed to treat sanitary sewage discharged from all buildings to be served by the system using the System Sewage Flow Design flows set forth at 310 CMR 15.203(2) through (5), except as provided in 310 CMR 15.203(6)." This section of the Title 5 code includes an extensive list of common building

---

<sup>1</sup> <http://www.mass.gov/eea/docs/dep/service/regulations/310cmr15.pdf>

uses/types, however a community center/council on aging facility is an establishment type not listed in 310 CMR 15.203(2) through (5). Therefore per 310 CMR 15.203(6), the facility may apply to MassDEP for a determination of design flow using actual meter readings of established flows from existing or similar installations without the need for a variance pursuant to 310 CMR 15.410 or 15.416.

Since the proposed community center/council on aging facility use is not explicitly defined in Title 5, we have looked at the actual meter readings for similar existing facilities. Sterling Associates Inc. provided a list of comparable facilities. Tighe & Bond was able to obtain water use data for the following:

- Cameron Senior Center, Town of Westford <sup>2</sup>;
- Town of Saugus Senior Center <sup>3</sup>; and
- John and Christina Markey Malden Senior Community Center, City of Malden <sup>4</sup>.

Attachment A includes tables presenting water use for each of the facilities based on records from each community.

The Town of Saugus Senior Center is a 14,650 square foot single story facility.<sup>5</sup> The Malden Senior Community Center is a 19,850 <sup>6</sup> square foot facility with a small second floor consisting of classrooms and fitness rooms. The Westford Senior Center is a 14,600 square foot two-story facility<sup>7</sup>. Along with flexible activity space, each of these locations has a kitchen and office space therefore we believe that their program is similar to what has been proposed in Wayland

Based on data obtained, the following table presents the minimum, maximum, and average water use for each facility per 1,000 square feet of space.

**Table 1: Summary of Water Use from Comparable Facilities**

<u>Comparable Facility (Community)</u>	<u>Average Water Use (gallons per day per 1,000 square feet)</u>	<u>Period of Record</u>
Westford	16.11	January 2012 – December 2015
Saugus	69.89	February 2008 – February 2016
Malden	18.21	January 2009 – December 2015

Title 5 Section 15.203 (6) specifies that “any design flow established by the Department pursuant to [this section] shall be based on 200% of average water meter readings in order to assimilate maximum daily flows...”

<sup>2</sup> [http://www.westfordma.gov/pages/government/towndepartments/boardsandcommittees/westfordma\\_coa/index](http://www.westfordma.gov/pages/government/towndepartments/boardsandcommittees/westfordma_coa/index)

<sup>3</sup> [http://www.saugus-ma.gov/Pages/SaugusMA\\_Senior/index](http://www.saugus-ma.gov/Pages/SaugusMA_Senior/index)

<sup>4</sup> <http://www.cityofmalden.org/department/senior-center>

<sup>5</sup> Based on parcel data from Saugus Board of Assessors

<sup>6</sup> Based on parcel data from Malden Assessor's Database

<sup>7</sup> Based on input by Town of Westford staff.

To estimate potential flows from the proposed Wayland Council on Aging/Community center, Tighe & Bond used 200% of the average water uses (gallons per day per 1,000 square feet) recorded at each comparable facility and applied them to 21,000 square foot proposed Wayland facility. Table 2 presents these estimates.

**Table 2: Estimate of Wastewater Flow for Proposed Wayland CoA/CC**

<u>Comparable Facility (Community)</u>	<u>Average Water Use (gallons per day per 1,000 square feet)</u>	<u>200% of Average Water Use (i.e. Wastewater Generation) (gallons per day per 1,000 square feet)</u>	<u>Proposed Wayland Facility Wastewater Flow (gallons per day) 21,000 square feet</u>
Westford	16.11	32.21	676.5
Saugus	69.89	139.79	2935.5
Malden	18.21	36.41	764.6

Water use and wastewater flows vary based on duration of use (e.g. hours per day, days per week) and type of use (e.g. activities, food service, outdoor water uses such as irrigation and car washes, etc.). For example, comparing the Saugus and Malden senior centers illustrates the differences in use to understand the difference in average water use (gallons per day per 1,000 square feet) presented in Table 2.

- The Saugus senior center is open from approximately 8 am to 3:15 pm Monday through Friday and is heavily used. The facility serves a continental breakfast and lunch daily to approximately 60 to 90 people. Lunch service uses china and therefore requires dishwashers to be run from 10 am to 2 pm daily. The facility also provides a large dinner for approximately 175 people twice a month. During the spring, summer, and fall, they let local schools hold car wash fundraisers. Based on plans provided by Sterling Associates, Inc., this facility has a 5,800 square foot auditorium (minus small closets and platform space) as well as 3,700 square feet of flexible use space and classrooms. Approximately 2,100 square feet are used as offices. This facility also irrigates the landscaping with automatic sprinklers.
- The Malden senior center is open five days a week. Monday, Wednesday, Thursday the facility is open from 8 am to 4 pm. Tuesdays is open from 8 am to 7 pm. On Fridays, the facility closes at noon. The facility is used for activities and does not serve food daily. Based on plans provided by Sterling Associates Inc., this facility has an auditorium able to seat 250 people that is approximately 4,500 square feet (minus closets/storage and platform space) and a large activity room that has capacity of 422 people that is approximately 3,700 square feet. In addition, there is approximately 2,000 square feet of office space. There are also 3,200 square feet of studio space and classrooms. This facility has limited irrigation of outdoor landscaping.

Based on the program planning completed, the proposed Wayland facility will contain a large amount of flexible space, including approximately 6,500 square feet of auditorium space that holds 324 people, which is slightly larger than the Saugus facility, and classrooms and activity rooms totaling around 4,800 square feet, which is also greater than the Saugus facility. The facility will potentially be open on weekdays and weekends from 8 am to 10 pm daily, for use by the Council on Aging as well as the recreation department and other community programs, which is more use time than Saugus and Malden. However, use may or may not include daily breakfast and/or lunch, which substantially drives the water consumption and wastewater generation as shown by comparing the Saugus and Malden normalized wastewater flows per 1,000 square feet. Table 3 presents a summary comparison between the three facilities.

**Table 3: Comparison of Facilities**

<u>Criteria</u>	<u>Saugus Senior Center</u>	<u>Malden Senior Center</u>	<u>Proposed Wayland CoA/CC</u>
Days per week facility is open	Monday - Friday	Monday - Friday	Monday - Sunday
Hours open	8:00 AM – 3:15 PM, open until 7 PM on Tuesday and closes at noon on Friday	8:00 AM – 4:00 PM	8:00 AM – 10:00 PM
Approximate Office space (square feet)	2,100	2,000	3,100
Approximate Auditorium space (square feet and #occupants)	5,800 Unknown	4,500 250 occupants	6,000 324 occupants
Approximate flexible space (i.e. classrooms, activity rooms) (square feet)	3,700	3,200	4,800
Food services	Continental breakfast available. Lunch served daily to 60 to 90 people on china, requires use of dishwashers. Two times per month, dinner served to approximately 175 people.	No	TBD
Allows school use for car wash fundraisers	Yes	Unknown	TBD
Landscape irrigation	Yes, automatic	Yes, some	TBD

Until the final program is confirmed with respect to food service and outdoor water uses, Tighe & Bond recommends that the Town plan on a wastewater design flow of approximately 3,000 gallons per day for the proposed facility. This value is based on the conservative approach of applying similar water usage rates to those observed at the Saugus facility.

## Attachment A

**Cameron Senior Center, Town of Westford**

Water Consumption History

14,600 square feet

Date Read	Usage (cubic feet)	Annual Usage (cubic feet per year)	Annual Usage (gallons per year)	Average Use (gallons per day)	Use (gallons per day per 1,000 square foot)
12/3/2015	2800	10300	77044	211.1	14.46
9/3/2015	3200				
6/1/2015	2500				
3/5/2015	1800				
12/8/2014	500	11600	86768	237.7	16.28
11/21/2014	3100				
9/4/2014	3000				
6/3/2014	3000				
3/3/2014	2000				
12/4/2013	3000	13000	97240	266.4	18.25
9/5/2013	3000				
6/3/2013	4000				
3/5/2013	3000				
12/4/2012	3000	11000	82280	225.4	15.44
9/11/2012	3000				
6/4/2012	3000				
3/2/2012	2000				

Minimum	10300	77044	211.1	14.46
Maximum	13000	97240	266.4	18.25
Average	11475	85833	235.2	16.11

## Attachment A

**Town of Saugus Senior Center**

## Water Consumption History

14,650 square feet

Date Read	Reading (cubic feet)	Annual Usage (cubic feet per year, Feb-Feb)	Annual Usage (gallons per year)	Average Use (gallons per day)	Use (gallons per 1,000 square foot)
Feb-16	589,040	31,360	234572.8	642.7	43.87
Aug-15	571,720				
Feb-15	557,680	23,000	172040	471.3	32.17
Aug-14	547,450				
Feb-14	534,680	25,440	190291.2	521.3	35.59
Aug-13	523,290				
Feb-13	509,240	59,120	442217.6	1211.6	82.70
Aug-12	485,240				
Feb-12	450,120	37,710	282070.8	772.8	52.75
Aug-11	426,730				
Feb-11	412,410	72,810	544618.8	1492.1	101.85
Aug-10	383,190				
Feb-10	339,600	67,410	504226.8	1381.4	94.30
Aug-09	310,960				
Feb-09	272,190	82,870	619867.6	1698.3	115.92
Aug-08	233,750				
Feb-08	189,320				

Minimum	23000	172040.0	471.34	32.17
Maximum	82870	619867.6	1698.27	115.92
Average	49965	373738.2	1023.94	69.89

**John and Christina Markey Malden Senior Community Center, City of Malden**

Water Consumption History

19,850 square feet

Date Read	Reading	Previous Reading	Monthly Usage (cubic feet)	Annual Usage (cubic feet per year)	Annual Usage (gallons per year)	Average Use (gallons per day)	Use (gallons per day per 1,000 square foot)
12/15/2015	135,438	134,427	1,011	16,538	123,704	338.92	17.07
11/16/2015	134,427	133,340	1,087				
10/15/2015	133,340	131,589	1,751				
09/15/2015	131,589	129,671	1,918				
08/14/2015	129,671	127,699	1,972				
07/15/2015	127,699	125,871	1,828				
06/15/2015	125,871	124,065	1,806				
05/15/2015	124,065	122,480	1,585				
04/14/2015	122,480	121,317	1,163				
03/13/2015	121,317	120,442	875				
02/13/2015	120,442	119,770	672				
01/15/2015	119,770	118,900	870				
12/16/2014	118,900	117,896	1,004	19,126	143,062	391.95	19.75
11/14/2014	117,896	115,950	1,946				
10/14/2014	115,950	113,649	2,301				
09/15/2014	113,649	111,278	2,371				
08/14/2014	111,278	109,055	2,223				
07/15/2014	109,055	107,138	1,917				
06/16/2014	107,138	105,117	2,021				
05/16/2014	105,117	103,768	1,349				
04/16/2014	103,768	102,478	1,290				
03/14/2014	102,478	101,456	1,022				
02/13/2014	101,456	100,558	898				
01/15/2014	100,558	99,774	784				
12/16/2013	99,774	98,813	961	18774	140,430	384.74	19.38
11/15/2013	98,813	97,432	1,381				
10/16/2013	97,432	95,263	2,169				
09/16/2013	95,263	93,111	2,152				
08/15/2013	93,111	90,786	2,325				
07/16/2013	90,786	88,740	2,046				
06/14/2013	88,740	86,589	2,151				
05/16/2013	86,589	85,000	1,589				
04/16/2013	85,000	84,000	1,000				
03/15/2013	84,000	83,000	1,000				
02/15/2013	83,000	82,000	1,000				
01/15/2013	82,000	81,000	1,000				
12/14/2012	81,000	80,000	1,000	16,000	119,680	327.89	16.52
11/15/2012	80,000	79,000	1,000				
10/15/2012	79,000	77,000	2,000				
09/17/2012	77,000	75,000	2,000				
08/15/2012	75,000	73,000	2,000				
07/16/2012	73,000	71,000	2,000				
06/14/2012	71,000	69,000	2,000				
05/15/2012	69,000	68,000	1,000				
04/17/2012	68,000	67,000	1,000				
03/15/2012	67,000	66,000	1,000				
02/15/2012	66,000	66,000	0				
01/17/2012	66,000	65,000	1,000				
12/15/2011	65,000	64,000	1,000	16,000	119,680	327.89	16.52
11/15/2011	64,000	63,000	1,000				
10/17/2011	63,000	61,000	2,000				
09/16/2011	61,000	59,000	2,000				
08/18/2011	59,000	56,000	3,000				
07/14/2011	56,000	54,000	2,000				
06/15/2011	54,000	53,000	1,000				

## Attachment A

**John and Christina Markey Malden Senior Community Center, City of Malden**

Water Consumption History

19,850 square feet

Date Read	Reading	Previous Reading	Monthly Usage (cubic feet)	Annual Usage (cubic feet per year)	Annual Usage (gallons per year)	Average Use (gallons per day)	Use (gallons per day per 1,000 square foot)
05/17/2011	53,000	52,000	1,000				
04/14/2011	52,000	51,000	1,000				
03/17/2011	51,000	50,000	1,000				
02/16/2011	50,000	50,000	0				
01/19/2011	50,000	49,000	1,000				
12/15/2010	49,000	48,000	1,000	22,000	164,560	450.85	22.71
11/15/2010	48,000	46,000	2,000				
10/18/2010	46,000	42,000	4,000				
09/16/2010	42,000	39,000	3,000				
08/13/2010	39,000	36,000	3,000				
07/15/2010	36,000	33,000	3,000				
06/15/2010	33,000	31,000	2,000				
05/17/2010	31,000	30,000	1,000				
04/15/2010	30,000	29,000	1,000				
03/15/2010	29,000	28,000	1,000				
02/16/2010	28,000	27,000	1,000				
01/14/2010	27,000	27,000	0				
12/15/2009	27,000	26,000	1,000	15,000	112,200	307.40	15.49
11/16/2009	26,000	23,000	3,000				
10/15/2009	23,000	20,000	3,000				
09/15/2009	20,000	18,000	2,000				
08/17/2009	18,000	17,000	1,000				
07/14/2009	17,000	16,000	1,000				
06/16/2009	16,000	15,000	1,000				
05/14/2009	15,000	14,000	1,000				
04/16/2009	14,000	13,000	1,000				
03/17/2009	13,000	13,000	0				
02/17/2009	13,000	12,000	1,000				
01/15/2009	12,000	12,000	0				

Minimum	15,000	112,200	307.4	15.49
Maximum	22,000	164,560	450.8	22.71
Average	17,634	131,902	361.4	18.21