



SUBJECT: 2012 Greater Vernon Water Master Water Plan
Technical Memorandum No. 1.
Domestic and Agricultural Demand Forecast

Summary date: August 2015 / Updated: January 2016

TM1 PURPOSE:

A Master Water Plan (MWP) is a planning tool that water utilities use to guide them in making utility improvements and infrastructure renewal decisions to ensure investments are completed in an organized and cost effective way. In other words, by completing this planning process Greater Vernon Water (GVW) is striving to achieve the most cost effective way to bring the utility up to provincial standards and upgrading the current infrastructure so all customers receive the same level of service.

In order to develop a MWP, the utility must first understand how much water is being used now and how much water will be needed in the future. Technical Memorandum No. 1 (TM1) looks at the current water use ("demand") for GVW and provides a prediction of how much water will be required in the future. These demands are then used as a basis for the rest of the MWP.

METHODS:

The following was completed to assess the current water demands and predict future demands:

- Water use records of customers collected by GVW between 2009 and 2011 were used to determine current demand,
- Water demands were further broken into customer class. Customer classes for GVW include Domestic and Agricultural customers. The Domestic class can be further broken down into residential and ICI (industrial, commercial & institutional),
- A 40 year planning horizon was used to predict future demand to maintain consistency with previous planning exercises that GVW has undertaken,
- Future demand for the Domestic class used the density and population projections of the planning documents of the municipal partners serviced by GVW, specifically the; Regional Growth Strategy, Vernon Official Community Plan (OCP) and District of Coldstream OCP, and
- Future Agricultural demands also used the same planning documents as the Domestic predictions but included guidance from the GVW Agricultural policy and the Okanagan Water Demand Model.

RESULTS:

Total yearly consumption for GVW between 2009 and 2011 was found to fluctuate between 22,000 megalitres (ML) and 27,000 ML per year. The average residential customer water consumption was found to be 271 liters/capita/day (l/c/d). To predict the future water demand, it was assumed that GVW would have a Water Conservation Strategy to promote a reduction in residential water use to an average of 250 l/c/d, which is used in the following table. TM6 outlines the recommended GVW Water Conservation Strategy to achieve 250 l/c/d.

The following table provides a summary of the current and expected system demands for GVW:

| Year | Annual Demand (ML) | | | Max. Day Demand Consumption (MLD) | | | |
|------|--------------------|----------------------------|---------------------------------|-----------------------------------|----------|--------------|-------|
| | Domestic | Agricultural (Actual Used) | Agricultural (Total Allocation) | Total | Domestic | Agricultural | Total |
| 2011 | 9,670 | 12,600 | 17,400 | 27,100 | 59.4 | 213 | 272 |
| 2016 | 9,880 | | 17,400 | 27,300 | 60.1 | 213 | 273 |
| 2021 | 10,470 | | 17,400 | 27,900 | 63.1 | 213 | 276 |
| 2026 | 11,060 | | 17,400 | 28,500 | 66 | 213 | 279 |
| 2031 | 11,550 | | 17,400 | 29,000 | 68.1 | 213 | 281 |
| 2041 | 12,450 | | 17,400 | 29,900 | 73.4 | 213 | 286 |
| 2052 | 13,360 | | 17,400 | 30,800 | 78.5 | 213 | 292 |

The year 2011 in this table represents the current demand. Future demand predictions are based on population predictions for the corresponding years. These demands are used in the rest of the MWP to assess water supply, size infrastructure in conceptual designs, develop costs and staging of projects. The Domestic class is predicted to grow whereas the Agricultural class is predicted to have no growth and to remain consistent into 2052.

There is a total of 3,452 hectares (ha) of agricultural properties with Allocation. Allocation represents a discrete volume of water equivalent to 5,500 cubic meters (m³)/ha per Irrigation Season. Only properties with Farm Status (through BC Assessment) or Farm (Agricultural) Classification (GVW application process) can receive Agricultural water rates and approximately 2,670 ha/yr receive Agricultural rates.

The following is additional information that can be reviewed in TM1:

- Historic amounts used from each GVW water source,
- Different demand parameters used in the MWP for design purposes such as:
 - Average Day Demand (ADD) - total water used each year averaged over 365 days,
 - Maximum Day Demand (MDD) - maximum water use in a day (occurs in the summer),
 - Base Demand - minimum daily flow representing indoor use (occurs in the winter when outdoor watering is not occurring),
 - Seasonal flows that represent irrigation flows,
 - Amounts and flows used in Agriculture,
- Predictions of future demands forecasted out to 2052,
- Predictions of future demands in the different areas within GVW, and
- Predictions of climate change impacts on Agricultural demands using the Okanagan Water Demand model.

Although reclaimed water was examined in TM1, it was not included in the water use analysis for GVW. Due to the restrictive legislation pertaining to the end use, it is currently not a viable water source for GVW.