

**Water Consumption Analysis of Vanier- Hamber (137)**

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**PLAN 597**

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## Overview

The focus of this report is the analysis of water consumption in Vanier- Hamber (#137) at the University of British Columbia. Vanier- Hamber is a co-ed residency house with a capacity of 1,370 students. Data was collected from Erin Kastner from the UBC Utilities Department in the 2014 Fall Term. The analysis is uses quarterly data points in an effort to focus on the time change from 1999 to 2014. Several years during that time frame were excluded from the analysis due to missing or inaccurate data. These excluded years include 2007, 2009 and 2010. Vanier- Hamber (#137) has not had any renovations in regards to water consumption initiatives.

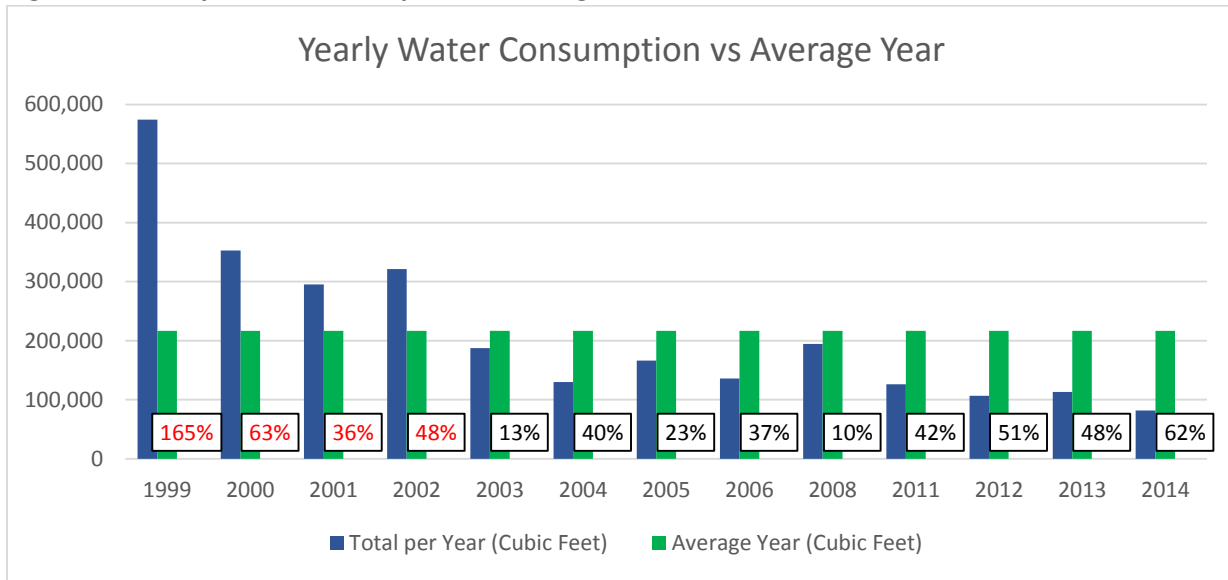
## Data Analysis

The below table, Table 1: Statistical Summary, shows the statistical summary of quarterly water usage at Vanier- Hamber (#137) for the years of 1999-2014 (excluding 2007, 2010, 2011).

<b>Table 1: Statistical Summary</b>	
<b>Significant Point</b>	<b>Quarterly Cubic Feet of Water Consumption</b>
Mean	54,636
Median	45,803
Variation	39,227
Upper Bound (Maximum)	188,085
Lower Bound (Minimum)	5,721

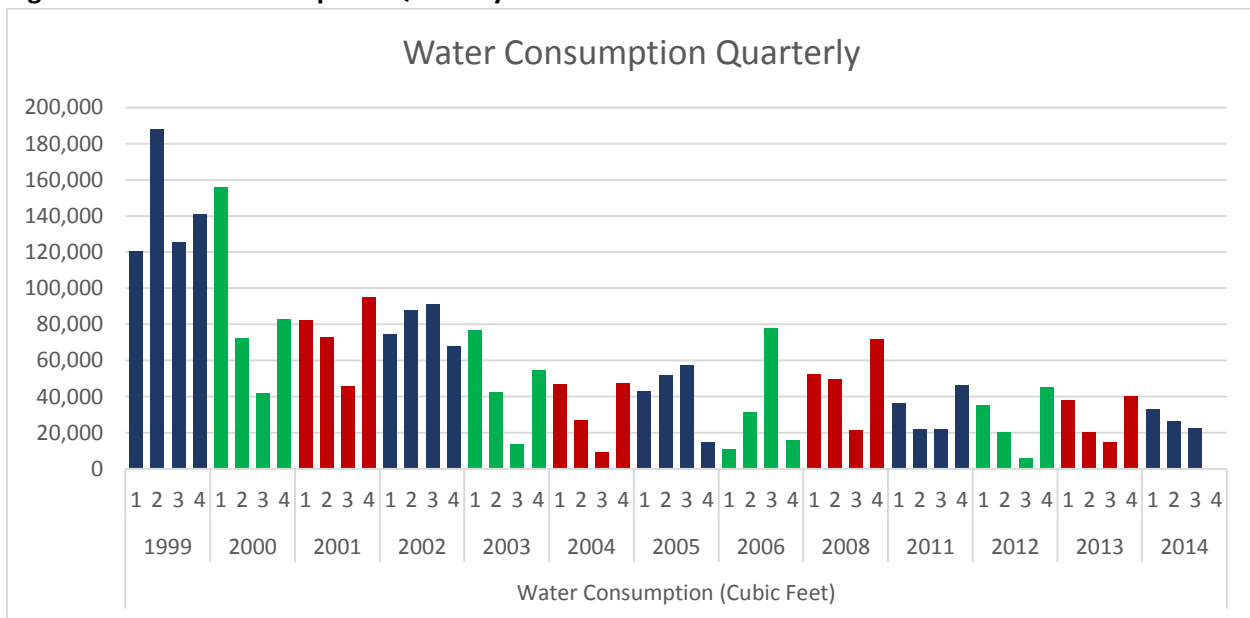
The following two figures, Figure 1A: Yearly Water Consumption vs Average Year and Figure 1B: Water Consumption Quarterly, are intended to highlight key points of the data acquired. A short explanation follows each. A time comparison is then included in Figure 2: Quarter Consumption vs Cumulative Consumption.

**Figure 1A: Yearly Water Consumption vs Average Year**



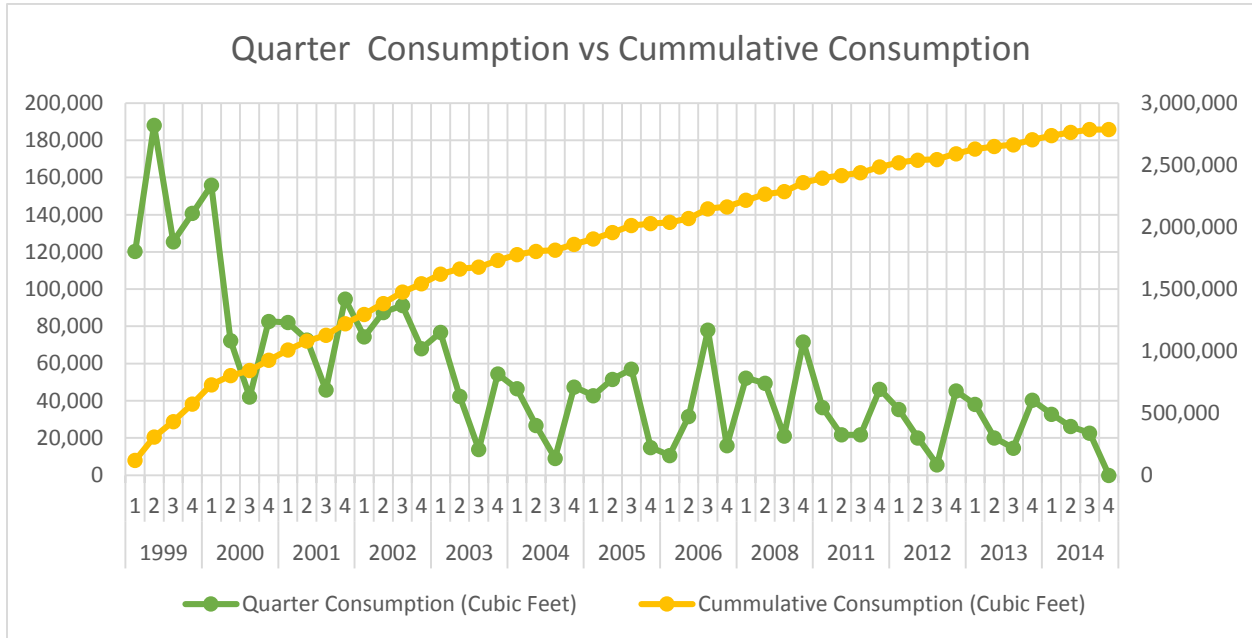
In order to understand the change in water consumption from 1999 to 2014, the quarterly data was summed per year and then compared to the average yearly consumption over the included years. From this graph we can see that the yearly consumption rate has dropped significantly since 1999 with the last several years seeing approximately 225,200 cubic feet of water per year. The importance is understood when looking comparatively to the yearly average over the time span. The last several years have seen about 50% of water consumption as compared to the average. This data appears to show an overall reduction of water consumption in the building since 1999 and the early 2000s.

**Figure 1B: Water Consumption Quarterly**



To better understand the implications of Figure 1A, the quarterly data for water consumption was analyzed for the years of importance. Figure 1B then shows us some interesting data. It appears that most years (8 of 13), the quarter with the least amount of consumption was the third quarter. This is most likely due to the residency not being fully occupied during that quarter as it includes the summer term. Years that did have a high water use in the third term could consider the possibility that residency during the summer term impacted consumption. Even further, because some third quarters were the highest consumption of their related year, it could be considered that more water is required per user during the warmer months (assuming equal capacity full).

**Figure 2: Quarterly Consumption vs Cumulative Consumption**



This figure illustrates the consumption per quarter compared to the cumulative consumption over the chosen time frame. A few interesting points are shown, one of which is that there seems to be an absolute minimum around 10,000 cubic feet for any particular quarter and that may be of which the quarter is unoccupied (or at least reduced). Possibly the most significant is the stabilization of the cumulative consumption line as the years had a more consistent and efficient use of water. More data is still needed for a proper analysis. This would be to include the number of occupants in the residency per term and to analyze the effects more specific to populous. It would also be curious to see if there were any reasons for higher water consumption from any variation of the beginning years. For example, were the meters monitoring this building also pulling data from water used for plants and grass or has the building reduced its capacity for occupants in recent years? Although the building is not mentioned as having experienced renovations, it may need to be investigated to see if any repairs included installation of water conscious features such as low flow toilets.

**Conclusion**

Although there were no renovations for Vanier- Hamber, the building did experience a reduction in water consumption from 1999 to 2014. The events and variables of the improved years should be investigated to determine if any of said conditions could be applied towards other buildings for benefit. Along with renovate processes such as low flush toilets, education of the importance of water conservation should be implemented to new residents of Vanier- Hamber. Renovations for Vanier- Hamber and an educational program on water conservation could help to further reduce the consumption of the building.