Artesia Consulting

SES Water

WRMP19 Non-household consumption forecast

AR1156

5th September 2017

Report title:	**WRMP19 Non-household consumption forecast**
Report number:	**AR1156**
Date:	**5/09/2017**
Client:	**SES Water**
Author(s):	**Dene Marshallsay**

Any enquiries relating to this report should be referred to the authors at the following address:

Artesia Consulting Ltd, Unit 2 Badminton Court, Yate, Station Road, Bristol, BS37 5HZ.

Telephone: + 44 (0) 1454 320091

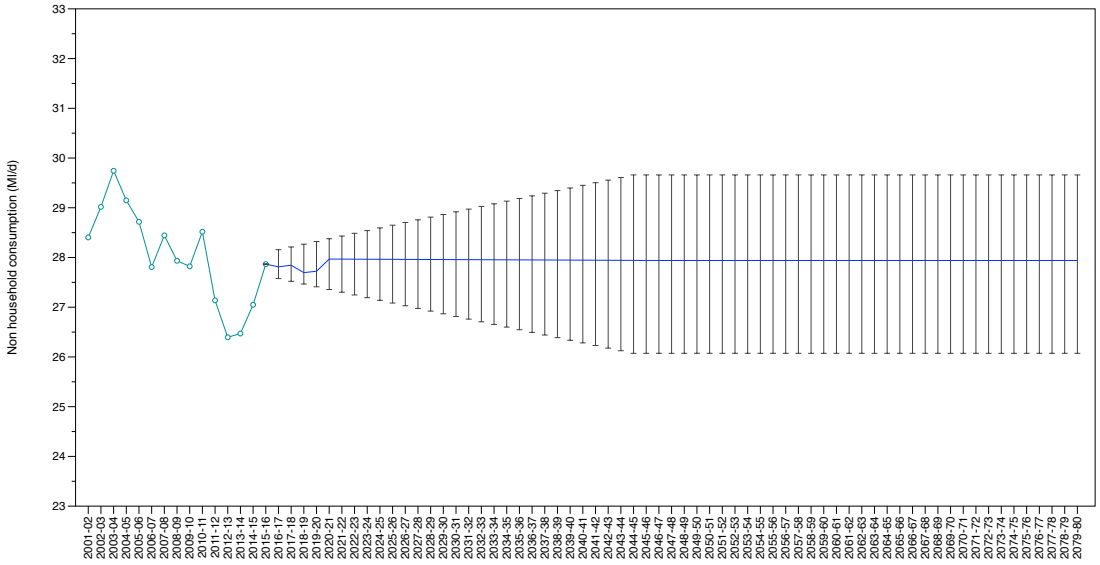
Website: www.artesia-consulting.co.uk

Executive Summary

This report presents the draft forecast for non-household demand for WRMP19 for SES Water. It is based on analysis of reported non-HH consumption from the two previous water resource zones (East Surrey, and Sutton), plus the consumption from the largest user – Gatwick Airport (which sits within the East Surrey zone).

Since the previous WRMP was produced, the non-household consumption has shown a decrease to a minimum in 2012-13 followed by a steady increase to 2015-16.

A central forecast has been produced based on time series and linear modelling, and upper and lower forecasts have been produced based on assumptions about trends and market competition. These are shown in the graph and table below.



Year	Central forecast (Ml/d)	Upper forecast (Ml/d)	Lower forecast (Ml/d)
2015/16 (Base year)	27.87	27.87	27.87
2020/21	27.97	28.38	27.36
2025/26	27.96	28.65	27.08
2030/31	27.96	28.92	26.81
2035/36	27.95	29.19	26.55
2040/41	27.95	29.45	26.28
2045/46	27.94	29.66	26.07
2079/80	27.94	29.66	26.07

Contents

Figures

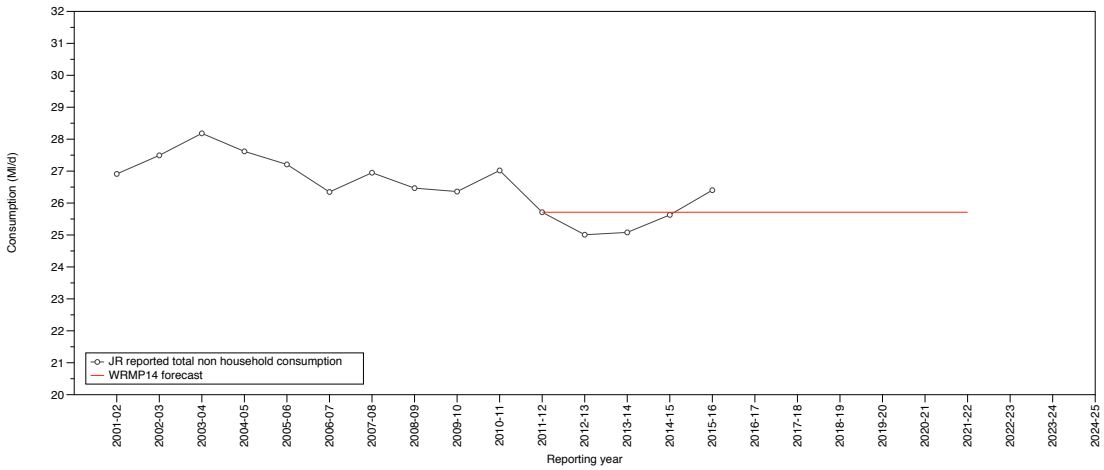
1 Introduction

This report presents the draft forecast for non-household demand for WRMP19 for SES Water. It is based on analysis of reported non-HH consumption from the two previous water resource zones (East Surrey, and Sutton), plus the consumption from the largest user – Gatwick Airport (which sits within the East Surrey zone).

The Company monitors the consumption of metered non-household properties within its WRZ. Meter readings during the period 2000 to 2016 are collected by the Company and used to estimate average daily consumption for each of the metered non-households. A small proportion of non-households are not metered, and for these the Company estimates their consumption.

In the previous WRMP, the Company carried out analysis of historical non-household consumption data, and found no clear trend in overall non-household consumption. Although employment in South East England was generally expected to grow, at the time there was considerable uncertainty regarding the effects of the economic downturn. The Company therefore took a prudent approach of maintaining non-household consumption at the then current levels throughout the planning period. The WRMP14 forecast is shown in Figure 1 (red line) plotted against the actual non-household consumption (black line).

Figure 1 WRMP14 forecast plotted with actual non-household consumption



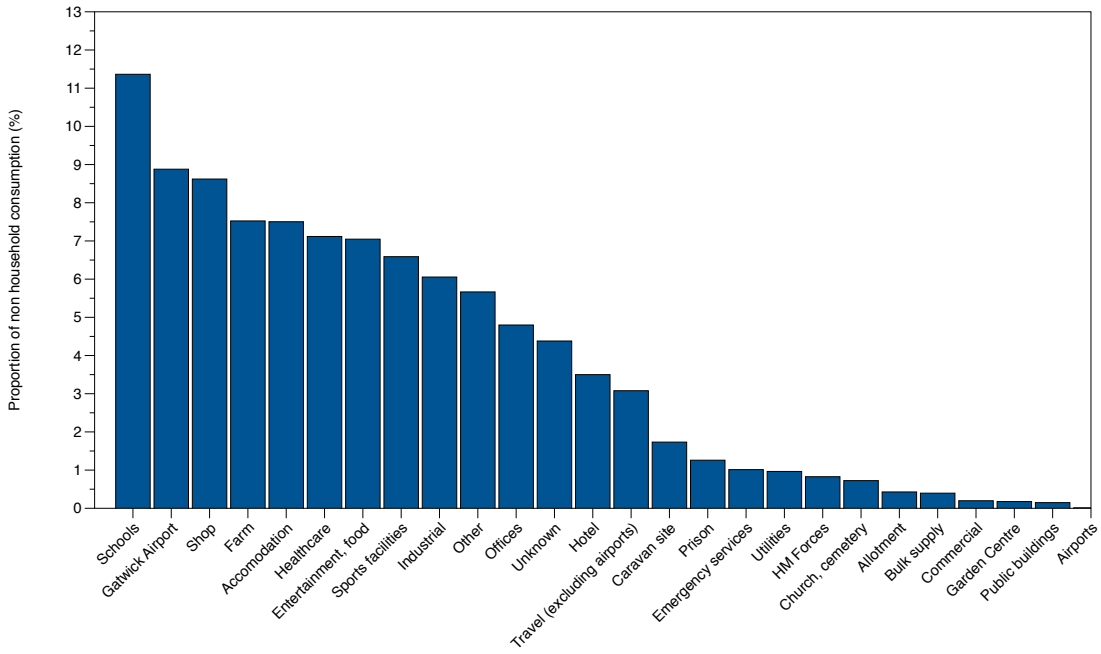
For the draft WRMP19 forecast of non-household consumption, we have taken a more detailed look at the historic consumption trends in each of the main company supply areas (East Surrey and Sutton) and the consumption in Gatwick Airport. This has been done to analyse consumption at the finer resolution possible with the data available and to identify whether any trend was present within each component. It is also important to note that Gatwick airport has been analysed separately as the airport has implemented various water efficiency measures, bringing down consumption for the last 3 years[1], and are currently forecasting no growth in water supply requirements. Their report highlights 24% reduction in water use since 2010, 45% reduction of water use per passenger since 2010, and new airport toilet facilities using 30% less water. Going forward the airport plan to continue their programme of leak surveys on the site, upgrade existing and install new meters across the site, and continue to identify projects with potential to include rainwater harvesting.

[1] http://www.gatwickairport.com/business-community/community-sustainability/sustainability/sustainability-reports/

2 Analysis of non-household consumption data

For the latest full reporting year the non-household consumption from each user has been grouped into usage description categories by SES Water. We have grouped these into a shorter set of alternative categories to illustrate the range of uses. This is shown in Figure 2.

Figure 2 Proportion of non-household water use by category



The largest category is schools (this includes boarding schools as well as day schools), the second largest Gatwick Airport, after that shops, farms and accommodation (domestic and managed flats). A large part of the non-household consumption appears to be associated with the general population (schools, healthcare, entertainment and food, sports, etc.) as opposed industrial use.

Figure 3 shows the trends in consumption broken down into the two main supply areas (East Surrey (minus Gatwick), and Sutton), Gatwick airport on its own, and the unmeasured non-households properties across the Company area.

East Surrey (minus Gatwick) shows a declining trend from 2001 to 2013, after this there is a steady increase in total consumption.

The Sutton area is very different in that there is a steady upward trend in consumption from 2001 to 2016.

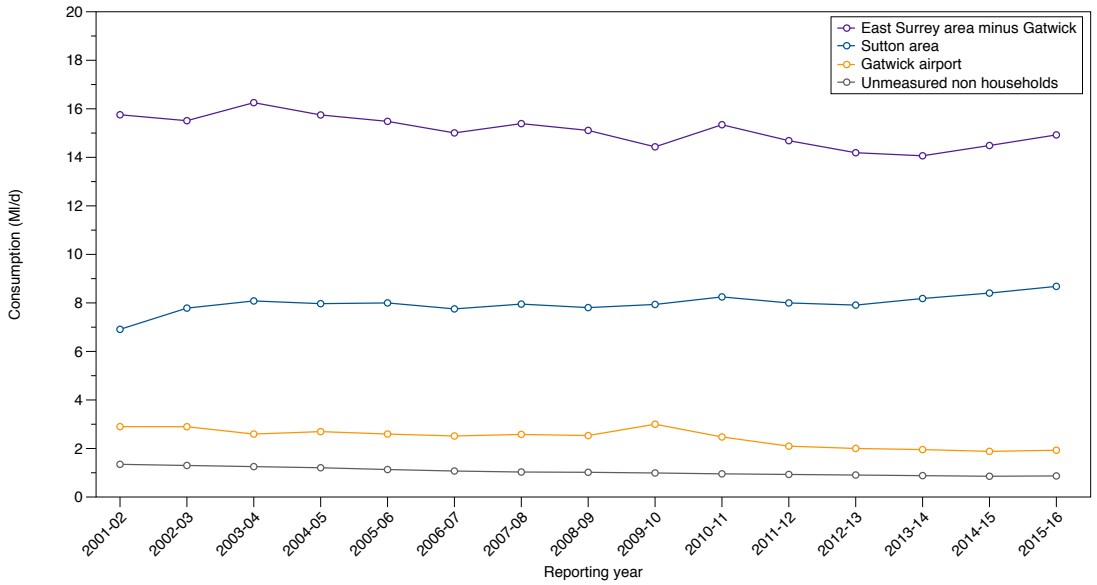
Gatwick airport has been fairly flat from 2001 to 2010. After this time, there as period of 3 years where consumption has reduced, and is now flat. This is largely due to a series of water efficiency and conservation initiatives taken by Gatwick airport after 2010. Gatwick airport estimates that it's water consumption will remain flat over the foreseeable future regardless of any increase on passenger numbers.

The unmeasured component of non-household water use has been steadily decreasing from 2001 due to a reduction in number of unmeasured non-households properties.

Note: The non-household cohort currently includes about 2000 shared flats, and the consumption from these is included in the non-household forecast. In the reporting year 2017/18, SES Water are planning

to move about 2000 'shared flats' properties from the non-household cohort into the household cohort. When these properties are moved from non-household to household, both the household and non-household forecasts will need to be updated, but this cannot be done until the precise nature of these properties (in terms of meter type and occupancy) is determined.

Figure 3 **Non-household consumption trends by area**



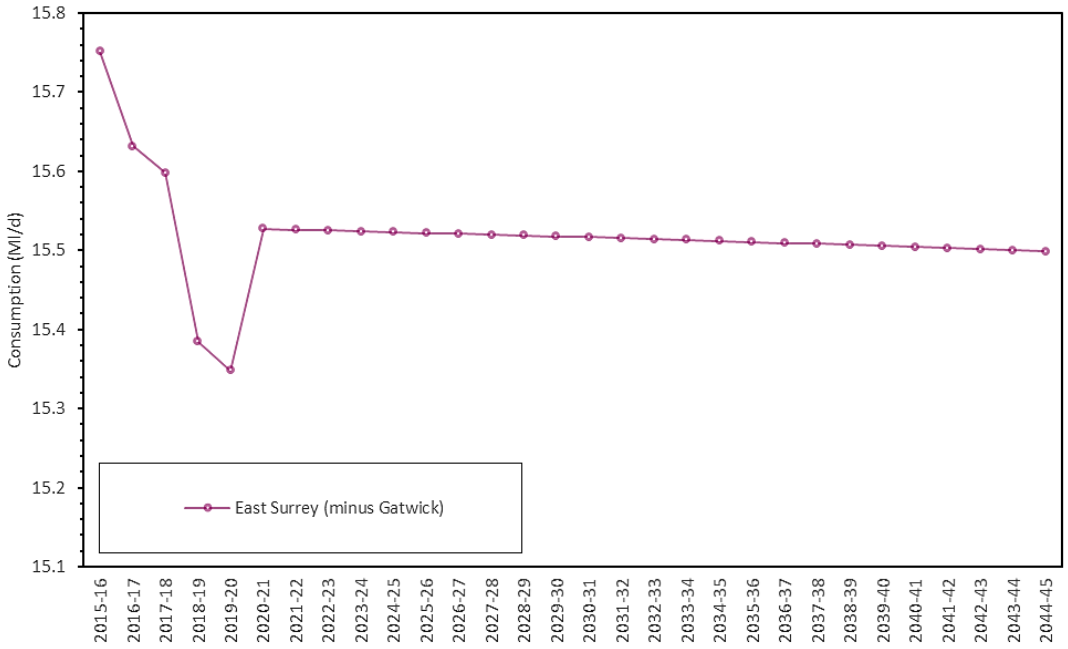
3 Non-household forecasts

The non-household forecasts have been based on four components with good quality historic data from 2000; these components are:

- Measured non-household consumption in the East Surrey water supply area (minus Gatwick).
- Measured non-household consumption in the Sutton water supply area.
- Measured non household consumption in Gatwick Airport.
- Unmeasured non-household consumption.

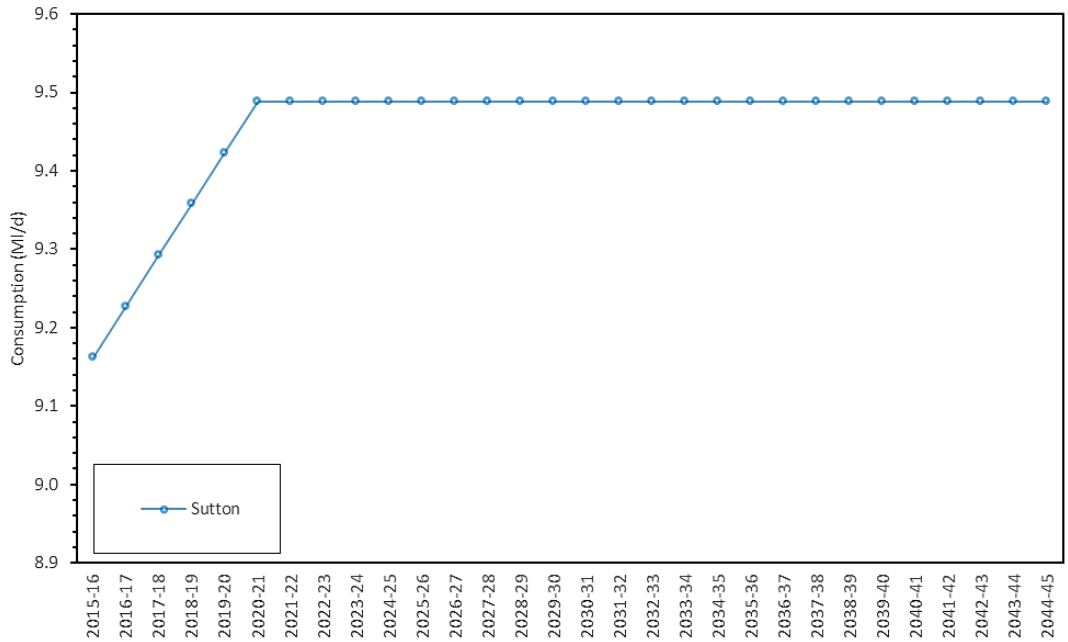
The East Surrey (minus Gatwick) area consumption produces a reasonable linear model with ONS unemployment data with a lag of one year. There is a five year forecast of the unemployment rate, which increases from the base year value of 4.9 to 5.7 in 2018 and then reduces to 5.2 in 2019 and 2020; we assume that the figure remains unchanged after this period. This forecast of unemployment rate has been used to predict the East Surrey (minus Gatwick) area consumption. The East Surrey (minus Gatwick) area consumption also shows a downward time-series linear trend and this has been added to the forecast. The final forecast for East Surrey (minus Gatwick) shows a decline over the planning period from 15.75 to 15.5 Ml/d (Figure 4).

Figure 4 **East Surrey (minus Gatwick) forecast**



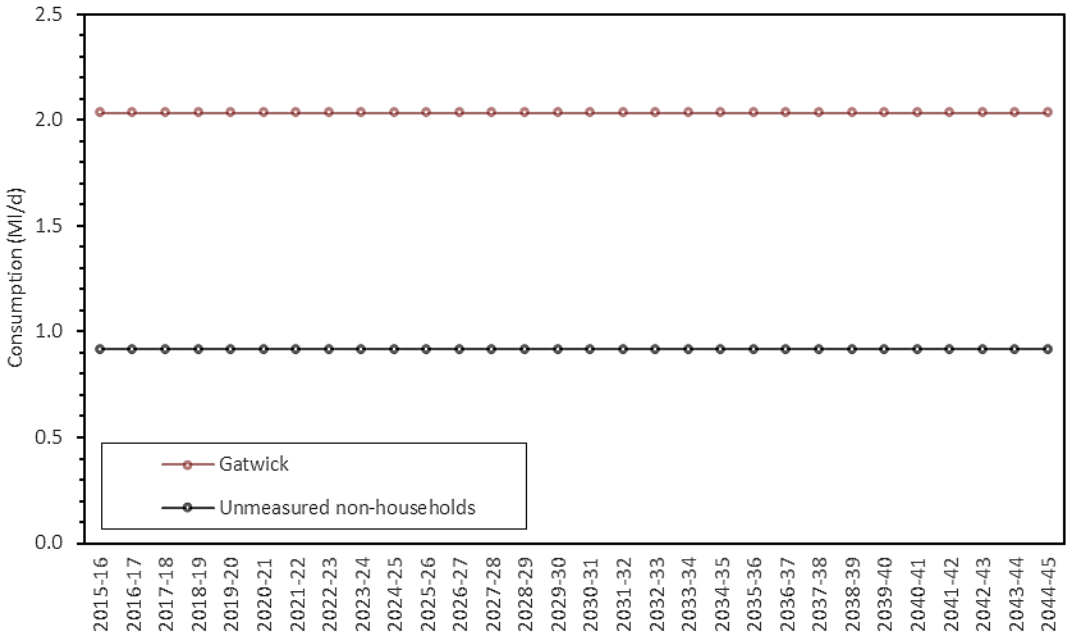
The Sutton area consumption has an upward time-series linear trend, this is assumed to be related to growth in the services sector. This upward trend has been used to forecast the Sutton area consumption for the first 5 years of the plan. After this date, the consumption remains flat. The increase from 9.16 to 9.49 Ml/d is shown in Figure 5.

Figure 5 **Sutton forecast**



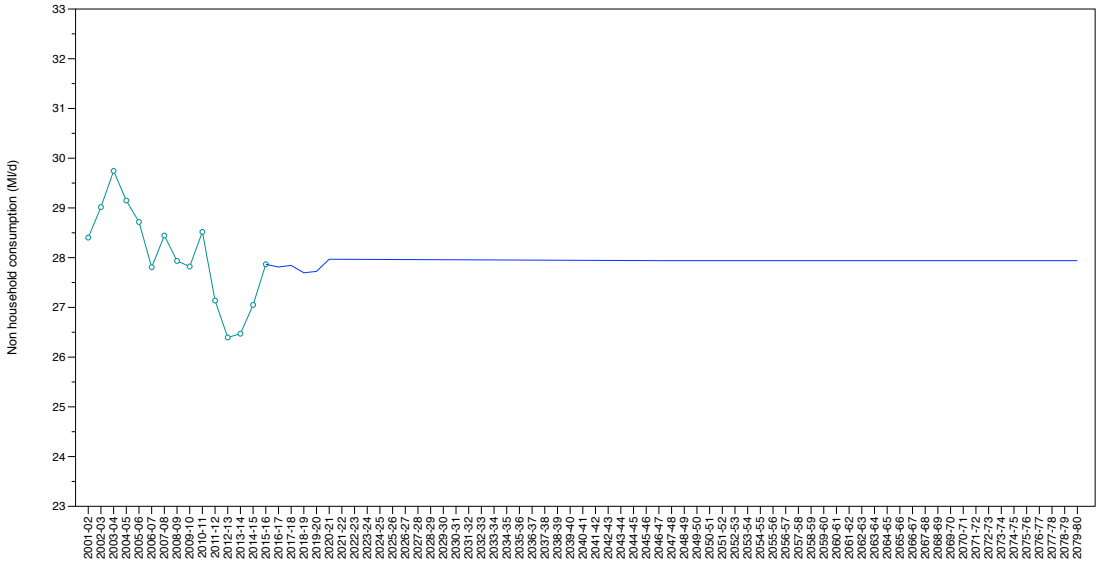
Gatwick (2.04 Ml/d) and the unmeasured non-household consumption (0.92 Ml/d) are assumed to remain flat over the forecast period (Figure 6).

Figure 6 Gatwick and Unmeasured non-households



The forecast consumptions for the East Surrey (minus Gatwick) area, Sutton area, Gatwick and unmeasured non-households have then been added together. This provides the central forecast shown in Figure 7.

Figure 7 Non-household consumption forecast



An upper forecast has been produced by allowing applying the Sutton upward trend over to 2045, after which the consumption is assumed to remain flat to 2080.

A lower forecast has been produced by firstly producing a linear downward trend from the historic total consumption (minus the recession years from 2010 to 2015) for the first four years. After this an

assumption is made that the trend continues due to the impact of market competition to 2045, followed by flat consumption to 2080.

The resulting upper and lower bounds to the forecast are shown in Figure 8.

Figure 8 Non-household consumption forecast showing upper and lower limits

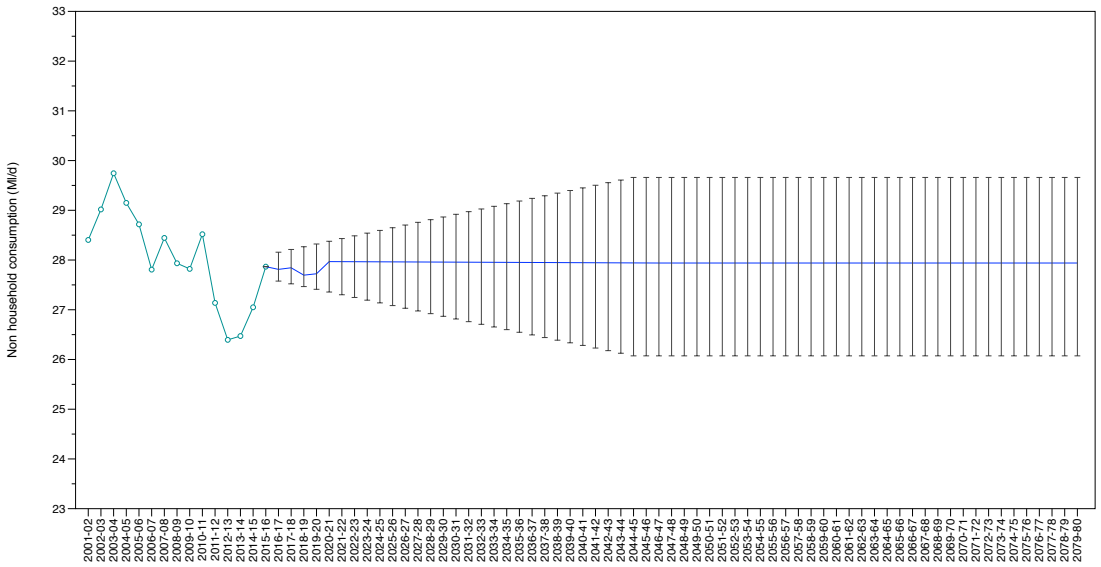


Table 1 shows the summary values for the non-household demand forecast every five years, along with the upper and lower ranges.

Table 1 Summary non-household demand forecast values

Year	Central forecast (Ml/d)	Upper forecast (Ml/d)	Lower forecast (Ml/d)
2015/16 (Base year)	27.87	27.87	27.87
2020/21	27.97	28.38	27.36
2025/26	27.96	28.65	27.08
2030/31	27.96	28.92	26.81
2035/36	27.95	29.19	26.55
2040/41	27.95	29.45	26.28
2045/46	27.94	29.66	26.07
2079/80	27.94	29.66	26.07