greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

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Committee	Social and Cultural Wellbeing Committee
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Wholesale water supply - security of supply standard

1. Purpose

To advise the Committee of the outcome of a review into Greater Wellington's security of supply standard for the wholesale water supply.

2. Significance of the decision

The matters for decision in this report **do not** trigger the significance policy of the Council or otherwise trigger section 76(3)(b) of the Local Government Act 2002.

3. Background

The current security of supply standard was adopted by the Council in 1999 following discussion with each of the city customer water supply managers. The planning standard requires the wholesale water supply to be capable of meeting consumer demand in all except a 1-in-50 year drought. This means that forecasting models may predict a shortfall between water supply and demand, on at least one day in a year, and this would not occur more frequently than once every 50 years on average. The shortfall could be minor, for example less than 3% of total demand, nevertheless it is still counted as a shortfall.

The security of supply standard is one of the planning inputs used to identify the necessary timing of future wholesale water supply developments. Other planning inputs are population growth forecasts, water consumption figures and historic climate records. The Water Supply Department's "sustainable yield model" (SYM) is a sophisticated computer model that uses these planning inputs to calculate the impact of population growth and water source changes on the security of supply standard. The SYM calculates the probability of a water supply shortfall occurring within a year. This is expressed as a "percentage annual shortfall probability" (% ASP). A 2% ASP equates to the 1-in-50 year drought security of supply standard.

Greater Wellington's 1-in-50 year drought standard has been questioned both internally and by our customer water supply managers. A lower standard would defer new water infrastructure development, but because of Greater Wellington's low level of raw water storage, it would make real-time operation of the wholesale water supply more difficult, particularly in a dry spring and potentially dry summer.

Real-time system management requires decisions to be made on demand restrictions looking forward, whereas the severity and length of a drought is never known until it is over. Therefore summer demand restrictions are likely to be imposed more frequently and be more onerous as the security of supply standard reduces, when in retrospect the level of restriction may have been unnecessary.

The security of supply standard is a measure of the level of risk the community is prepared to accept between the cost of supplying water and the impact of restrictions from not supplying sufficient water.

It was decided to review how the current security of supply standard compared with other water suppliers and whether the standard was appropriate for the metropolitan Wellington wholesale water supply. International consultant MWH NZ Ltd was commissioned to carry out this review.

4. Review of security of supply standard

MWH surveyed 15 local and overseas water suppliers, including New Zealand, Canada, USA, United Kingdom and Australia, selected due to their similarity of size or operation as Greater Wellington. Four suppliers from the Pacific north-west coast of North America (two in Canada and two in the USA) were chosen for having a similar climate and water use environment to Greater Wellington. The Canadian suppliers also had a similar wholesale water operation to Greater Wellington.

The main water source for many of these overseas suppliers was raw water storage reservoirs or groundwater, although some of the United Kingdom suppliers surveyed use run-of-river as a main water source. The New Zealand suppliers surveyed use run-of-river with only a low volume of raw water storage or ground water (the exception is Auckland where storage is a very high percentage).

4.1 Security of supply standard (level of service) identified by survey

Practically all United Kingdom water suppliers surveyed define their security of supply standard (referred to as the level of service) in terms of a drought return period. The Canadian, USA and Australian suppliers either use drought return period or reservoir storage level. The New Zealand water suppliers use drought return period or a combination of low river flow and peak demand.

The survey revealed that the most common level of service for an unrestricted water supply is a 1-in-50 year drought return period. Two-thirds of those

suppliers with a security of supply standard use 1-in-50 year drought return period or higher.

Of the three suppliers with a higher level of service, two rely substantially on run-of-river sources and have a relatively low level of storage capacity. The third supplier, Auckland's Watercare Services, raised its security of supply standard from 1-in-50 year to 1-in-200 year drought return period following the 1994 Auckland drought crisis.

Four suppliers (three in the United Kingdom) have a lower standard, with 1-in-15 year drought return period being the lowest. Each of these suppliers relies heavily on groundwater sources and/or has a high level of storage reservoir capacity.

4.2 Conclusions from the review

The main conclusions reached by MWH from this review were:

(a) A 1-in-50 year drought return period (2% ASP) is the most common target level of service for unrestricted water supply and is a reasonable target for Greater Wellington.

(b) The target level of service could be further improved by identifying the desirable maximum duration and severity of water restrictions.

(c) Greater Wellington's SYM modelling approach is a best practice methodology for defining system yield and probability of supply.

5. Discussion

Greater Wellington's wholesale water supply is approximately 60% run-of-river and 40% aquifer, supplemented by raw water storage providing around 15 days supply at peak demand.

This combination of run-of-river and aquifer water sources provides a greater level of supply certainty than the water suppliers relying mainly on run-of-river and operating to a higher security of supply standard. Increasing Greater Wellington's security of supply standard above a 1-in-50 year drought return period does not therefore appear to be justified.

Greater Wellington's low volume of raw water storage and heavy reliance on run-of-river does not compare favourably with the water suppliers surveyed that have large amounts of storage and a security of supply standard less than 1-in-50 year drought return period. Reducing Greater Wellington's current security of supply standard below a 1-in-50 year drought return period does not look practical at the present time.

The analysis above supports MWH's conclusion that a 1-in-50 year drought return period (2% ASP) is a reasonable target for Greater Wellington.

The SYM (upgraded in 2010 to improve the modelling methodology and include the reduced consumption demand figures since 2005) has modelled the

actual security of supply of the wholesale water supply system at 2% ASP. The system is therefore currently achieving the 1-in-50 year drought standard.

However, unless demand savings can be sustained at the rate of population growth, the current position will continue to deteriorate until additional raw water storage is developed. The project to increase the storage volume of the Stuart Macaskill Lakes should ensure the current security of supply standard continues to be achieved in 2013.

Development of the Whakatikei dam is likely to take up to 8 years or a storage lake 5 years. With design commencing in 2012, the actual security of supply could fall to a 1-in-25 year drought return period (4% ASP) by completion, or lower if the decision to develop is delayed. Completion of the Whakatikei dam or a storage lake will immediately raise the actual security of supply well above a 1-in-50 year drought level.

6. Communication

A public media statement is not proposed at this time.

7. Recommendations

That the Committee:

1. ***Receives*** *the report.*

2. ***Notes*** *the content of the report.*

3. ***Agrees*** *to the release of the MWH report on the review of the security of supply standard to the four city water supply managers for information and feedback.*

4. ***Notes*** *that the results of the customer consultation will be reported back to the committee for a decision on whether or not the security of supply standard should be changed.*

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