

ADDENDUM TO SERVICING AND INFRASTRUCTURE SCOPING REPORT (FEBRUARY 2012)

The purpose of this addendum is to further address the issue of on-site water usage, which dictates the resulting output volume to the existing downstream foul sewer network.

Since our original report, more detail has become available on the scope and scale of changes proposed to Mercy Hospital over the next 10 years.

A meeting was conducted with Dunedin City Council's Water and Waste Engineer, David Dewhirst, to analyse the existing water consumption records for Mercy Hospital, with a view to quantifying the increased water usage resulting from the proposed growth of the Hospital's facilities over the next 10 years. Mr Dewhirst tabled the Water Departments recorded water meter readings going back to 1999.

Mercy Hospital has been undergoing an upgrading process over the past five years, which has included reviewing water use activities and installing water saving devices wherever appropriate. Significant gains have been achieved via this approach. This strategy continues with the current and planned development for the site whereby Mercy always look to reduce water consumption (such as using low flow showers and toilets) at any available instance.

Mercy Hospital intends to develop its facility in accordance with the Structure Plan lodged as part of the Plan Change application. The Structure Plan depicts extensions proposed over the next 15 plus years. This growth will be carried out in stages, as set out below. Importantly, a fully developed site in accordance with the Structure Plan will not result in an increase in kitchen or laundry sizing. Those facilities are sufficiently large enough to cater for the proposed expansions. However use of those facilities may increase in intensity, meaning they are able to be run more efficiently.

In order to quantify projected water usage resulting from future growth, it was agreed the most tangible approach would be to calculate water consumption on a litres per patient bed unit rate (litres/bed/day). This method takes into account the predicted average increase in water consumption that results in each additional patient bed, which is made up of the following activities:

- Showers, toilet and hand basin water use;
- Kitchen activities – meal production, dish washing;
- Laundry activities – linen washing;
- Other activities including additional staff required, additional operations carried out etc.

There are currently 64 patient beds at Mercy Hospital. Proposed stages of development indicate there will be incremental increases in patient bed numbers as follows:

Stage 1 (Years 1 - 3): 6 additional patient beds

Stage 2 (Years 3 - 6): 13 additional patient beds

Stage 3 (Year 6 - completed development of the Structure Plan): 8 additional patient beds

Total number of beds proposed to be 83 by 2022 (i.e. Stages 1 and 2).

Existing Water Usage

Extensive hospital development works undertaken in 2007, resulted in improved operational efficiencies. Meter readings in the 5 years since the development works have been consistently lower than in the preceding 8 years. As such we have excluded the pre 2007 data from our calculations

because they do not accurately reflect the current operational environment within the hospital. The recorded water meter readings, taken at approximately three monthly intervals, over the last 5 years yield the following results:

Average daily water consumption = **29,200 litres/day**
Highest¹ recorded water consumption for a single three month period = 38,400 litres/day
Lowest recorded water consumption for a single three month period = 22,600 litres/day

With 64 patient beds at Mercy Hospital, this equates to an average daily water consumption rate of 456 litres per bed per day. Whilst this figure includes existing water saving devices which are currently available, it may be that over time, further water use savings can be achieved, thus reducing the per bed water usage figure. The projected water usage set out below is therefore a conservative estimate.

Projected Water Usage

Based on the average daily rate of 456 litres/bed/day, and the proposed staged growth in patient bed numbers, it is projected the additional water consumption would track as follows:

	Additional Beds	Additional Ave. Water Usage (litres per day)	Cumulative Total Site Ave. Water Usage (litres per day)
Stage 1 (Years 1 - 3)	6	2,736	31,920
Stage 2 (Years 3 - 6)	13	5,928	37,848
Stage 3 (Completed development)	8	3,648	41,496

As referred to above, the figures used to calculate likely average daily water use at the site in the future is a conservative estimate. Given advances in technology regarding water saving devices, Mercy may be able to achieve lower averages than described.

Residential 1 Zone: Water Consumption

By way of comparison, and under existing Residential 1 zone density rules, the establishment of 83 dwelling units would be a permitted activity on the existing site title area of 4.1619ha.

Based on the average residential dwelling unit consuming approximately 635 litres of water per day, the total water consumption of a fully developed residential site would equate to 52,700 litres per day. Accordingly, the current and intended use of the site, in accordance with the Structure Plan results in significantly lower levels of water usage than is permitted as of right with the current Residential 1 zoning.

Correction Note:

On page 5 of the main report, second bullet point under 3) Water Reticulation, it states "DCC records indicate, on average, Mercy Hospital is only consuming approximately 40m³ (40,000 litres) of reticulated water per month".

In light of the presented water meter records, the above bullet point is amended to **"DCC records indicate, on average, Mercy Hospital is consuming approximately 29m³ (29,000 litres) of reticulated water per day."**

¹ Two Consecutive readings (October 2009 & January 2010) were significantly higher, but have been excluded from calculations because they were found to be the result of water main leaks.

Terramark Ltd

C J Milburn
Registered Professional Surveyor

Date: 20 July 2012