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MEMO – TSC COMMENTS TO SSD2

PROJECT NAME:	New Tweed Valley Hospital
PROJECT NUMBER:	190009
ATTENTION:	TSA Management/ Lend Lease
FROM:	JHA Consulting Engineers

We refer to Tweed Shire Council's (TSC) comments regarding SSD2 submission and provide the following responses:

WATER & SEWER INFRASTRUCTURE

Item No. 1

TSC Comment

Consistency across the documentation is sought regarding the beds in the proposed Hospital. The EIS document refers to 499 beds seeking an exemption of the additional 46 emergency treatment beds from loading calculations (transport & water and wastewater). However Appendix R uses a figure of 545 beds. Please confirm and update with a consistent figure

JHA Response

We note that 545 beds is the overall number of beds, across the entire the new hospital and it includes for 46 transient type beds/ treatment bays, which will predominantly be located in the emergency department. For waste water and potable water calculation purposes we can confirm the 499 overnight beds has been adopted.

Item No. 2

TSC Comment

Despite loadings for the proposed Skills Centre being temporary, the water and wastewater loadings from this use shall be estimated. Further information is required to outline to Council how the developer proposes to discharge to Council's sewerage system during this staging/construction period

JHA Response

The proposed skills centre is proposed to accommodate for 3 teaching staff and up to 40 students and shall generally operate between 8am – 5pm, Monday to Friday.

Based on this information the Skills Centre loading are as follows:

- Average Daily Water Demand – 43 occupants x 45 litres = 1,935 litres
- Peak Water Demand - Average Hour Demand (on peak day) x Peak Hour Factor (8), which equates to 0.18 l/s
- Average Dry Weather Flow (Sewer) – 0.0021×8.6 (43×0.2) = 0.018 l/s
- Peak Dry Weather Flow (Sewer) – Dry weather peaking factor (d) has been assumed to be 8; therefore PDWF is equal to 0.14 l/s

Item No. 3

TSC Comment

Errors have been made within the water and wastewater loading estimates in Appendix R. The EP to ET ratio has not been considered within the average dry weather flow (ADWF) calculations, which has led to an underestimation of flows provided within the report.

JHA Response

JHA acknowledges that there was an error made on the conversion of EP & ET. The correct waste water usage figures have been provided below:

Units	EP/ Units	Calculated EP's	ADWF	PDWF
Beds (Overnight)			(l/s)	(l/s)
499	3.4	1,697	3.6	17.8

Where:

- $ADWF = 0.0021 \times EP$ (Based on 180L /d/EP)
- $PDWF = d \times 0.0021 \times EP$. Dry weather peaking factor (d) has been calculated to be 5

Item No. 4

TSC Comment

Despite proposing a gravity sewerage system internally within the hospital lot, the developer has not provided peak wet weather flow (PWWF) estimates. Industry and Council standards require that PWWF calculations are provided as part of the assessment within Appendix R.

JHA Response

JHA understand Council's concern and the need to take into account peak wet weather flows; however in this instance we believe that peak wet weather flows will be negligible and inconsequential to Tweed Shire Council, for the following reasons:

- Peak discharges to Tweed Shire Council's sewer drainage system will be limited by the duty flow of the sewer pumping station
- Wet type, open sewer manholes and structures are not to be utilised, as the internal sewer drainage system will utilise closed type Sewer Maintenance Shafts, limiting the potential for water ingress
- As part of the commissioning phase, the entire sewer drainage system will be statically tested and CCTV's to confirm water tightness, connections to the stormwater system have not been made and that all pipework is in good working order

Item No. 5

TSC Comment

The 24 hour ADFW emergency storage of 200kL at the sewer pumping station outlined in Appendix R is insufficient due to the incorrect calculations outlined above.

JHA Response

JHA acknowledges that the 200kL emergency storage tank may appear undersized, based on high level assessment. I.e multiply PDWF (l/s) x 24 (hours) x 3600. This would equate to a total daily discharge in the order of 308kL. We have however undertaken a detailed analysis to confirm that the 200kL tank is sufficient. A summary of these calculations has been provided below for your information.

Building	Item	Qty	Daily Sewer Discharge (litres)	Sub- total Sewer Discharges (Kilolitres)
Main Hospital Building	Ambulatory Care/Emerg/Med Im/Oncology/Renal	46	135	6.21
	IPU/ICU/COU (overnight beds)	499	200	99.80
	Maternity	30	360	10.80
	Food Services	545	20	10.90
	Laundry	545	15	8.18
	Office/Eng/Research Staff	375	20	7.50
	Cooling Towers	1	28,723	28.72
	Retail Provision	1	2000	2.00
Health Hub	Dental	12	720	8.64
	Staff	20	20	0.40
	Retail Provision	1	2000	2.00
Total				185.15

Furthermore we note that the ADFW figures, calculated using the method prescribed in WSA02 are "Default Values" and there is an acknowledgement made in WSA02, where suitable flow measurement may be utilised. We provide values below, where suitable flow measurements have been established, as well as the calculated ADFW applicable to the New Tweed Valley Hospital:

- Sydney Water Values – Sydney Water Flow Study Reports have indicated that hospitals consume in the order of 271 litres, per bed, per day. Applying the results of this report the calculated average daily sewerage discharge would equate to. $545 \text{ (overall beds)} \times 271 \times 90\% \text{ (discharge factor)} = 133\text{kL}$. For further information refer to link below:
https://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mdq2/~edisp/dd_046262.pdf
- Wyong Hospital (Reference) – 3 years of utility bills collected from Wyong Hospital, indicate that the existing 430 overnight bed hospital consumes an average of 153kL a day, or 356 litres, per bed, per day. Applying the results of these typical usage figures, the calculated average daily sewerage discharge would equate to. $499 \text{ (overnight beds)} \times 356 \times 90\% \text{ (discharge factor)} = 160\text{kL}$

The above values confirms that the usage figures provided in our report are conservative and have not been underestimated.

Item No. 6

TSC Comment

The Water demand load estimate is incorrect. The EP to ET ratio has not been considered Appendix R and are underestimated – please update.

JHA Response

JHA notes that water demand load estimates have not been based on the “Default Values” as specified in WSA03. Similar to item 5, a more detailed analysis has been undertaken, which has subsequently been cross checked with actual collected data. Refer below:

Building	Item	Qty	Daily Potable Water Demand (litres)	Sub- total Daily Water Demand (Kilolitres)	Peak Potable Water Flow (l/s)
Main Hospital Building	Ambulatory Care/Emerg/Med Im/Oncology/Renal	46	150	6.90	1.14
	IPU/ICU/COU (overnight beds)	499	240	119.76	8.42
	Maternity	30	600	18.00	1.13
	Food Services	545	25	13.63	1.35
	Laundry	545	20	10.90	1.02
	Office/Eng/Research Staff	375	25	9.38	0.28
	Cooling Towers	1	71808	71.81	4.41
Health Hub	Dental	12	800	9.60	0.45
	Staff	20	25	0.50	0.15
	Retail Provision	1	3000	3.00	0.08
Total				263.47	18.42

The above daily demand value is higher than applying a pro-rata to the data collected by Sydney Water, as well as the utility data collected at Wyong Hospital, which would equate to the following:

- 545 (overall beds) x 271 = 148kL
- 499 (overnight beds) x 356 = 178kL

Furthermore the peak potable water flow can be calculated by applying the peak hour factor of 5 (as nominated in WSA03), which would equate to the following value being applicable at the New Tweed Valley Hospital

- Based on Sydney Water Report – 8.55 l/s
- Based on Wyong Reference – 10.28 l/s

JHA confirms that the water demand estimates and usage figures provided in the SSD2 submission are correct and have underestimated.

Item No. 7

TSC Comment

Water Storage tanks may be undersized as a result of the underestimated water demand and should be reviewed and updated in Appendix R.

JHA Response

JHA notes that water demand load estimates have not been based on the "Default Values" as specified in WSA03. Similar to item 5 & 6, a more detailed analysis has been undertaken to determine the required 3 hour water potable water emergency storage capacity. Refer below table.

Building	Room	Qty	3 hour PCW Load (litres)	Sub – Total (litres)
Main Hospital Building	Day Beds (Ambulatory/ Emergency/ Medical Imaging/ Oncology/ Renal)	46	50	2,300
	Overnight Beds (IPU/ ICU/ COU)	499	80	39,920
	Maternity	30	200	6,000
	Food Services	545	5	2,725
	Laundry	545	2.5	1,363
	Office/ Engineering/ Research Staff	375	5	1,875
	Dental	12	200	2,400
Health Hub	Staff	20	5	100
	Retail (provision)	1	2,000	2,000
Calculated Potable Water Storage				58,683

Item No. 8

TSC Comment

The Plans and Drawings in Appendix B (Part 5) shall update the connection shown to the Council sewer rising main to include a boundary kit at the Hospital property boundary and a connection to Council standards within the road reserve.

JHA Response

An updated plan illustrating the boundary kit will be submitted to TSC for approval

Item No. 9

TSC Comment

As outlined within Stage 1 approvals, prior to any approval being issued for connection to Council's water and wastewater infrastructure, an agreement to provide services is to be in place. The agreement will address the conditions under which the applicant may connect to and use Council provided water supply and sewerage services and any fees to be paid by the proponent to Council or any works to be done by the proponent to satisfy Council's requirements. This requirement is recommended to stand as a condition of consent for Stage 2.

JHA Response

Submission will be made with TSC, in order to execute the appropriate services agreements.

ONSITE SEWAGE MANAGEMENT

Reference No. 96

TSC Comment

The design of sewer pumping station shall comply with the Water Services Association (WSA) standards WSA02-2002-2.3 or WSA07-2007 for Pressure Sewerage.

JHA Response

The proposed pumping station is to be a private pumping station and in accordance with the requirements of AS/NZS 3500.2 - Sanitary Plumbing and Drainage. As the pumping station is not to be a council/ utility asset, WSA02 & WS07 are not applicable.

Reference No. 97

TSC Comment

The sewer pumping station is to be constructed in a flood proof well with electrical equipment located above 1 in 100 ARI. Pumps should be designed to pump a minimum of less than every 8 hours to reduce septicity in the pump well and rising mains. Pump system shall be sized for industrial/ commercial and not domestic requirements.

JHA Response

Noted – details to be provided to Tweed Shire Council illustrating that the above requirements have been satisfied.

Reference No. 98

TSC Comment

At least 24 hours emergency storage capacity shall be provided within the sewer pump system, or hours of storage equivalent to the operating hours of the commercial property per day.

JHA Response

We can confirm that the sewer pumping station has been provided with a minimum of 24 hour emergency storage capacity.

Reference No. 99

TSC Comment

The maximum flow rate discharge from the sewage pump station shall not exceed 5L/sec.

JHA Response

Based on discussions with TSC 14/11/2019, this was an error. TSC have confirmed that the maximum flow rate from the sewage pump station shall not exceed 35.0L/sec, as per previous discussions and agreement.

PUBLIC HEALTH – MICROBIAL CONTROL

Reference No. 101

TSC Comment

Four (4) cooling towers are proposed at the site and it is anticipated that many warm-water systems will also be required. Water cooling systems and warm- water systems require registration with Council and compliance with the Public Health Act 2010 and Public Health Regulation 2012.

JHA Response

Confirmation that TMV's will be provided in the new hospital building which will comply with the Public Health Regulation 2012.

BUILDING CODE OF AUSTRALIA & CERTIFICATION REQUIREMENTS

Reference No. 107.u. Plumbing

TSC Comment

- A plumbing permit is to be obtained from Council prior to commencement of any plumbing and drainage work.
- The whole of the plumbing and drainage work is to be completed in accordance with the requirements of the Plumbing Code of Australia and AS/NZS 3500.

JHA Response

Noted – confirmation that a plumbing permit will be obtained from council prior to commencement of works and that the installation shall comply with the requirements of the Plumbing Code of Australia and AS/NZS 3500

Reference No. 107.v

TSC Comment

Back flow prevention devices shall be installed wherever cross connection occurs or is likely to occur. The type of device shall be determined in accordance with AS 3500.1 and shall be maintained in working order and inspected for operational function at intervals not exceeding 12 months in accordance with Section 4.7.2 of this Standard.

JHA Response

Noted – confirmation that backflow prevention devices shall be installed and tested in accordance with AS/NZS 3500.1

Reference No. 107.w

TSC Comment

Overflow relief gully is to be located clear of the building and at a level not less than 150mm below the lowest fixture within the building and 75mm above finished ground level.

JHA Response

Noted – confirmation that an overflow fully shall be installed in accordance with AS/NZS 3500.2

Reference No. 107.x**TSC Comment**

All new hot water installations shall deliver hot water at the outlet of sanitary fixtures used primarily for personal hygiene purposes at a temperature not exceeding:

- 45°C for childhood centres, primary and secondary schools and nursing homes or similar facilities for aged, sick or disabled persons; and
- 50°C in all other classes of buildings.

A certificate certifying compliance with the above is to be submitted by the licensed plumber on completion of works.

JHA Response

Noted – confirmation that hot water delivery temperature to personal hygiene fixtures shall be installed in accordance with AS/NZS 3500.4