BMT WBM Pty Ltd
Level 8, 200 Creek Street
Brisbane Qld 4000
Australia
PO Box 203, Spring Hill 4004

Tel: +61 7 3831 6744
Fax: + 61 7 3832 3627

ABN 54 010 830 421

www.bmtwbm.com.au

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23 October 2014

NSW Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Robert Byrne

Dear Robert

RE: WEST CULBURRA – WATER CYCLE MANAGEMENT REPORT - PEER REVIEW

Further to previous reviews, I have conducted further analysis on the Martens Water Cycle Management Report P1203365JR01V05 dated August 2014. Generally, the report complies with my previous recommendations.

In terms of report outcomes, I believe there are issues regarding certain aspects of the report and I am not satisfied that the applicant has adequately accounted for the stormwater impacts of the development. These issues are outlined below.

1. In Section 3.4.3.3 with regards to the results from the CLASS modelling, I am still concerned that the applicant is dismissing the change in increased groundwater recharge. The estimated change is a 57% increase in infiltration flows according to the predictions given in Table 5. This could have a significant impact downstream and for it to be stated that it is only marginally increased according to their dot point on p25 seems to be too dismissive of the actual impact. The estimate of 60% of the grassed model results to represent the developed case is a gross simplification of the groundwater hydrology and given the downstream wetlands, inadequate assessment could result in major hydrologic changes to these ecosystems.
2. In Section 4.2 regarding water quality objectives, while the draft Council DCP objectives are similar to other stormwater objectives in built up areas, they are not suitable for application in sensitive receiving environments and should not be used for comparison purposes in the report. The only objectives that require consideration are the Neutral or Beneficial Effect objectives for the site. These are the ones with which compliance has to be demonstrated.
3. I note that the proposal still contains development which will drain to Lake Wollumboola. It was my understanding that this was not allowable given the sensitivity of the Lake to any increases in pollutant loads.
4. Under Section 4.4.10.1 I do not support the increased infiltration rate of the swale base and sides. MUSIC models account for sidewall and base exfiltration if used. I am not aware of any studies that justify the use of filter media on swale batters or how this is proposed to be designed. I would recommend that the applicant provide details of how the proposed swales are to be designed to verify that they will be suitable and have been modelled correctly.

5. The applicant's consultant has still relied on using exfiltration out of treatment systems to achieve water quality objectives. I note that they state that the inclusion of a vegetation uptake node and MUSIC modelling process was confirmed as being acceptable by BMT WBM. This was not the case. I did discuss the use of such a node with Martens staff, however I stated that it also needed to be solidly justified. For the reasons set out below, I do not believe that this has been done.

   It is stated that they have used vegetation uptake rates based on the reference of CSIRO 1999. The study referenced was for wastewater effluent irrigation of woodlands/plantations. No consideration of the relevance of this study to the project site was made, the results were just accepted by Martens as being applicable. There is no documentation of what soils and plants were used in the CSIRO report, nor has any consideration of the nutrient input rates and the soil nutrients on the site been presented. If soil nutrients themselves are high and the applicant discharges lower concentrations into the soil, increased nutrient leaching downstream may result. I therefore do not support their approach and consider that the use of exfiltration reductions applied to the MUSIC model is not justifiable. Further work to justify this approach would be needed to demonstrate that such reductions are possible with stormwater exfiltration into the subsoils of the region.

6. Under section 4.6.3 on Oyster Leases, the statements regarding faecal coliform breakdown in bioretention systems has not been justified. I have not seen bioretention basins that have been "designed to increase residence time to allow for breakdown of faecal coliforms". In fact, increased detention times may actually result in increased faecal coliform concentrations if the conditions are suitable for their growth, or there are continued faecal inputs by other fauna. Deactivation of faecal bacteria and other pathogens occurs through many processes, however UV degradation is typically used where possible. This requires open water bodies, high quality light climates and suitable deactivation periods for the bacteria to be reduced. I therefore still have concerns that the risk to Oyster Leases from faecal contamination off the new development has not been adequately addressed. The statement that the impact on oyster leases is anticipated to be negligible is not supported by the evidence provided.

7. The construction phase scenarios have been well thought out, however I would defer to my colleague Dr Michael Barry regarding the assessment of downstream impacts and whether this has been completed appropriately in the Estuary Management Study.

8. Under section 6.4 Management Recommendations, the extended detention depths of the proposed bioretention systems of 0.5 m and 0.4 m for wetlands are likely to be too high for sustainable plant growth. It is typically recommended that values of 0.3m maximum are used (as outlined in various WSUD Technical Design Guidelines).

I do realise that the applicant has proceeded based on our previous recommendations, however it appears to me that the consultant has not adequately demonstrated compliance with those recommendations in terms of the detail provided to address them. I would be more than happy to discuss these further with the applicant's consultant if required.

These review comments should also be read in conjunction with the findings of the review of the Estuary Management Study being undertaken by Dr Michael Barry of BMT WBM.

I hope that this review is suitable for your current purposes. Please feel free to contact me if I can be of further assistance.

Yours Faithfully
BMT WBM

Tony Weber
National Practice Leader – Water Quality
Visiting Fellow – Australian National University