16th December 2020

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By Email: daniel.gorgioski@planning.nsw.gov.au

Dear Daniel,

Western Harbour Tunnel and Warringah Freeway Upgrade Independent Peer Review - Receiving Water and Groundwater Final Assessment Report

1. Introduction

Mr Brett Miller (Hydrodynamics and Water Quality) and Dr Kevin Hayley (Groundwater) provided expert independent peer review of relevant components of the Environmental Impact Statement (EIS) for the Western Harbour Tunnel and Warringah Freeway Upgrade. The independent review included the review and provision of comments on the draft and final EIS, Response to Submissions Report and draft conditions of approval.

I, Brett Miller, am the Principal Engineer for Hydraulics and Modelling at the UNSW Water Research Laboratory (WRL) with over 29 years of experience in this field. Dr Kevin Hayley is a consulting geophysicist and groundwater modeler with 16 years of experience in the construction and calibration of numerical models of groundwater flow and contaminant transport.

2. Receiving water

The Environmental Impact Statement lacked presented data on the location and depth of contaminated sediments. This has been partially addressed by the provision of the report "*Western Harbour Tunnel and Beaches Link Geotechnical Investigation. Contamination Factual Report – Marine Investigations*" Douglas Partners and Golder Associates (DPGA) (2017a) and in part by additional sediment sampling investigations at the harbour crossing by Royal Haskoning DHV (RHDHV). It is understood that the RHDHV studies are still ongoing. Consequent to this data gap, it was recommended that the Conditions of Approval include a condition to ensure that the depth of the proposed closed clamshell dredging be suitably increased (if necessary) to ensure all contaminated sediments on the dredged alignment are removed and adequately disposed.

WRL also raised concerns about the effluent discharge to the harbour from the wastewater treatment plants. The response has stated that the treatment plants would achieve an effluent quality suitable to meet environmental mitigation measures WQ3 and WQ9. Notwithstanding, it has been recommended that receiving water quality monitoring suitable to confirm that the mitigation measures are achieved should be included in the Conditions of Approval.

WRL reviewed the draft conditions of approval and considers that they adequately address the issues and concerns raised.

3. Groundwater

Dr Kevin Hayley summarised the following specific deficiencies in the groundwater modelling in the EIS:

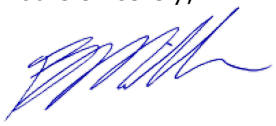
- While the conceptual model of groundwater flow and numerical model development are reasonable, the model parameterization does not reflect the complexity of groundwater recharge in an urban environment, or the heterogeneity shown in the conceptual model and hydraulic testing data. The current model parameterization limits the application of quantitative uncertainty analysis by simplifying parameters to a small number of large zones that cannot represent heterogeneous and largely unknown groundwater system described in the conceptual model.
- The groundwater level observation dataset used for model calibration is inadequate to constrain the uncertainty in parameter values and predicted impacts because water level data is only informative to a combination of model parameters, and there is significant uncertainty in the transient groundwater recharge in Urban environments.
- The impact assessment is based on model predictions from a single set of parameters. However, there is a wide range of alternative parameters that could result in a wide range of model predictions. The alternate model predictions produced by different parameter values cannot be discounted based on the current observation dataset because it does not contain enough information to uniquely identify parameters.
- The impact management strategies presented are all based on groundwater monitoring and adaptive management. The modelling provides no evidence that adverse groundwater impacts can be mitigated through monitoring and adaptive management.

The response from Jacobs defended the existing modelling as being 'fit for purpose' and to the requirements of the Australian Groundwater Modelling Guidelines. The response has not provided additional technical information or uncertainty analysis. The response from Jacobs also stated "The modelling was not set up to generate evidence of the effectiveness of the proposed environmental management measures."

Dr Kevin Hayley stated that without estimates from the groundwater modelling of the potential range of impacts, there is no evidence that proposed adaptive management measures can adequately mitigate the groundwater impacts.

Dr Kevin Hayley reviewed the draft conditions of approval and considers that they adequately address the issues and concerns raised.

Yours sincerely,



Brett Miller
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