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Dear Daniel,

Sydney Heritage Fleet Maritime Facility – Issues for Discussion

Further to our meeting this morning, this letter outlines the key flooding and climate change issues for discussion and clarification with the Proponent of the Sydney Heritage Fleet (SHF) maritime facility development.

1) Sea Level Rise

The *Climate Change Induced Sea Level Rise* (CCISLR) report (Dec 2011) and the *Water Sensitive Urban Design* (WSUD) report (Jan 2012), both prepared by SLR, identify flood risk as a result of climate change induced sea level rise as a key issue for the proposed SHF maritime facility.

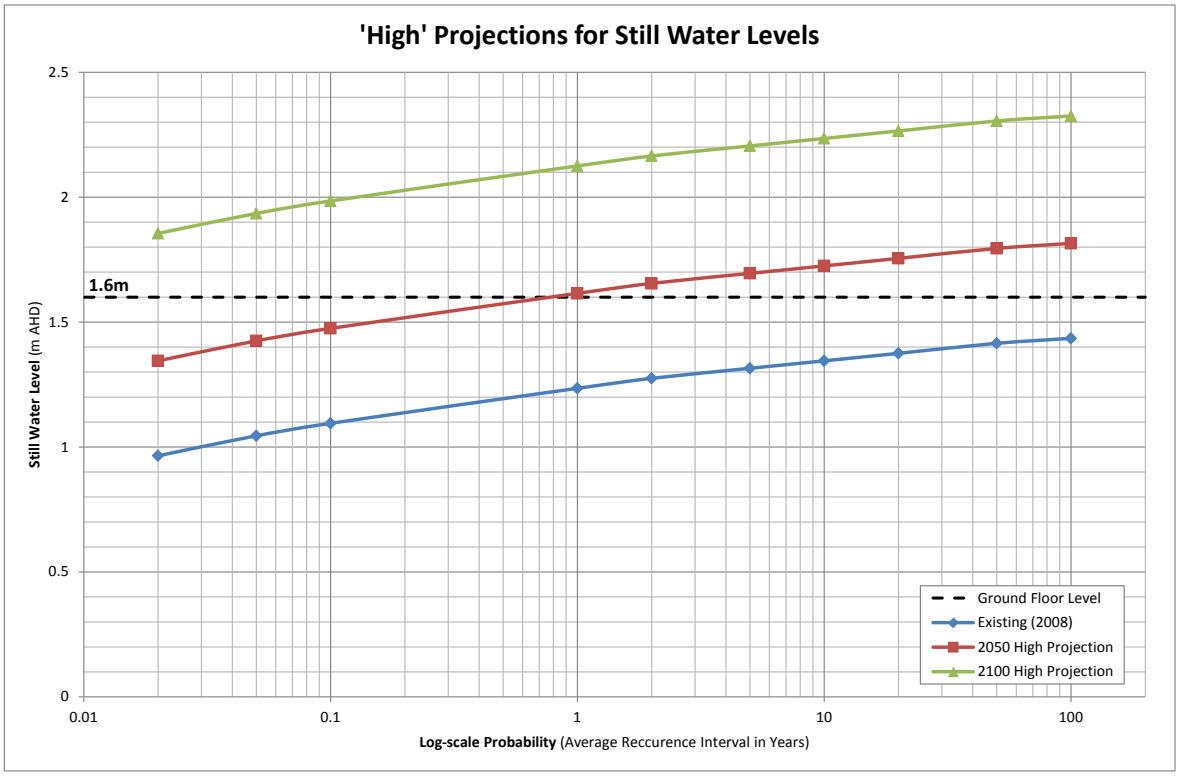
For planning purposes, the NSW Government's guidelines *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* specifies the following allowance for sea level rise compared to existing conditions:

- 2050 0.4 m
- 2100 0.9 m

The predicted sea levels reported in both SLR reports are based on the existing sea levels for Fort Denison (*Fort Denison Sea Level Rise Vulnerability Study*, DECC, 2008) with allowance for these climate change increases in sea level, and include allowance for tide and storm surge effects. The figure below is based on data taken directly from the DECC report and shows projected sea level for different probabilities (expressed as average recurrence interval) for 2050 and 2100. For reference purposes, the figure also shows the proposed ground floor level (1.6 m AHD).

The data in the figure can be interpreted as follows:

- By 2030 there is a small risk (100 year average recurrence interval) that the water level in the harbour (without allowing for any wave effects) could be the same as the floor level.
- By 2040, the average recurrence interval would reduce to 6 years;
- By 2050, the average recurrence interval would reduce to less than 1 year.



The questions for SHF to consider are:

- What are the consequences of flooding on the building and its contents?
- What is an acceptable risk of flooding at some stage in the future?
- What, if anything should be done to manage or mitigate the risk at this stage?

As noted above, by 2050, the consequences of the current proposed floor level (1.6 m AHD) would be flooding from the harbour approximately once every year on average which would cause shallow flooding in:

- The boat storage area,
- The lunch room,
- The amenities adjacent to the boat storage area and the lunch room,
- The foyer,
- The lift well, and
- The pavilion and kiosk.

Flooding of the boat storage and associated facilities could be tolerable as long as:

- All building materials were immune to water damage;
- All electrical supply and outlets were above the flood level;
- All storage (floatable materials, power tools, etc) was above flood level;
- No cabinets were located at ground level;
- The floor level was graded to naturally drain after flooding.

Flooding of the foyer, lunch room and lift well could be a bit more problematic because of water damage to floor coverings and, particularly water flooding into the lift well.

Are these consequences acceptable?

Options for eliminating some, or all, of these potential problems could include those identified in the Climate Change Induced Sea Level Rise (CCISLR) report and reflected in the Statement of Commitments:

- Raising the sea wall to create a levee;
- 'Flexible design' to allow the floor level to be raised in the future. (Which could require consideration of the design ceiling hight);
- Designing a flood compatible building, including placing services above flood level;
- Raise the ground level (and whole building?) to accommodate projected sea levels.

Another option could be to segregate areas of the ground floor (eg raise the level of the foyer and lunch room).

Evans & Peck are interested in understanding the degree to which the Proponent is willing to accept (and manage) the risk of inundation of the ground floor level.

This will provide some guidance in relation to framing recommended Conditions of Approval.

2) Overland Flow of Stormwatwer from Bank Street

The existing site entrance is located adjacent to a low point in Bank Street. Any stormwater runoff that cannot be conveyed by the existing piped drainage system is likely to flow through the site along a route past the bridge pylon.

The WSUD report is ambiguous in its assessment stormwater drainage. A '*Proposed Stormwater Plan*' has been provided as an appendix to the report. This proposal would involve:

- Re-routing the pipeline from near the existing stormwater pit at the low point in Bank Street so that it would not run under the building. This is likely to be a requirement by Council. However, the proposed route runs across land that is located outside the eastern boundary of the site. Does this matter?
- Provision of complex stormwater pipe interconnections to convey some stormwater in an easterly direction to an existing pipeline that is presumed to run between bank Street and the harbour across vacant land adjoining the Poulos Bros site. The need for this pipeline is unclear, particularly if any excess stormwater from Bank Street would be conveyed by overland flow around both sides of the proposed development.
- 'Boundary treatment' (presumable a low wall) to divert overland flow towards flow paths to the east and west of the site.

However the body of the report appears to only provide detail on the proposed overland flow mitigation strategy, and no detail on the proposed in-ground stormwater drainage structures.

The WSUD report provides a preliminary assessment of the expected overland flow rate during a 100 year ARI storm event, '*depending on the capacity of the existing pipe network*'. This indicates some uncertainty as to whether the proposed modifications to the existing stormwater drainage network are intended to be constructed or not. (As a minimum any stormwater pipe diversion around the eastern side of the site, would need to have a similar hydraulic capacity to the existing pipe.) However, the analysis of the overland flow rate is questionable as it does not appear to account for possible contribution of runoff from Quarry Master Drive or the flow taken by the piped drainage system.

The *Blackwattle Bay Catchment Area Flood Study* (WMA Water, 2012) indicates that ponding can be expected in Bank Street adjacent to the site. The analysis underlying the flood assessment includes taking account of Council's pit and pipe system which appears to

correspond to the drainage system shown in Appendix B of the WSUD report. In the case of a 100 year ARI storm Figure 19 in the *Flood Study* indicates ponding about 0.5 m deep adjacent to the site (see attached extract). This suggests that the catchment draining towards the low point in Bank Street may be considerably larger than assessed in the WSUD report and that the existing stormwater drainage system has limited capacity.

It would be useful to clarify the intention of the Proponent regarding the implementation of the '*Proposed Stormwater Plan*' and for consideration to be given to a situation in which the assessed flow to be conveyed overland is significantly greater than estimated in the WSUD report. Particular issues to be considered would include:

- What provision would need to be made for the width of each overland flow path (east and west of the site) to ensure that the flow complied with Council's requirements for flow to be less than 0.2 m deep and less than 1 m/s?
- What modification would need to be made to footpath levels in Bank Street at locations where overland flow drains from Bank Street?

3) Stormwater Quality

Evans & Peck agree with the findings of the WSUD report in that proposed SHF maritime facility is likely to have minimal impact on stormwater quality. However, Evans & Peck considers there may be stormwater quality risks associated with the maintenance of vessels, such as '*brass polishing, deck cleaning and occasional touch-up painting*' (Environmental Assessment).

Evans & Peck would like to better understand the proposed maintenance activities and what, if any, measures might need to be implemented in order to ensure that the site would be fully compliant with the *Environmental Action for Marinas, Boatsheds and Slipways* (DECC, 2007)

Evans & Peck would appreciate the opportunity to meet with the Department and, if possible, the appropriate representatives of the Proponent to discuss and clarify the issues outlined above.

Yours faithfully,

EVANS & PECK PTY LTD

Dr Steve Perrens

Principal

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