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Warragamba Dam Assessment Team
Department of Planning, Industry and Environment

(via Major Projects Planning Portal)

Dear Assessment Team

Warragamba Dam Raising (SSI 8441)
EPA advice on Environmental Impact Statement (EIS)

I am writing to you in reply to your invitation to the NSW Environment Protection Authority (EPA) to provide comment on the Environmental Impact Statement (EIS) for the above project.

The EPA understands the project involves raising the dam wall by 17 metres to provide flood mitigation to the downstream Hawkesbury-Nepean valley. Construction is expected to take up to five years and would include demolition and removal of parts of the existing dam, thickening and raising of the dam abutments and spillway, new discharge gates, road and bridge upgrades and the installation of environmental flow infrastructure.

The EPA has reviewed relevant EIS documents including:

- *Environment Impact Statement – Warragamba Dam Raising*, dated 10 September 2021, prepared by SMEC (the EIS)
- Appendix L: *Noise and Vibration Impact Assessment Report*, Ver 5, dated 25 February 2021, prepared by ERM (the NVIA)
- Appendix N1: *Soils and Contamination Assessment Report – La Perouse Site,* prepared by SMEC, dated 10 September 2021 (the contamination assessment)

Although water storage is not a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act), activities such as concrete works and crushing, grinding and separating of waste streams are outlined in the EIS, and may require licensing under the POEO Act if the thresholds stated in the legislation are likely to be exceeded.

The EPA will be the Appropriate Regulatory Authority (ARA) for the construction of the project because Water NSW is a public authority. Section 6(2)(c) of the POEO Act which states: *"A local authority is the appropriate regulatory authority for non-scheduled activities in its area, except in relation to … (c) activities carried on by the State or a public authority, whether at premises occupied by the State or a public authority or otherwise ..."* As

The EPA has reviewed the EIS and notes that the EIS does not provide the information required by the EPA. The EPA requests additional information to be able to assess the proposal. This is set out in **Appendix A**.

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Yours sincerely

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APPENDIX A

1. Matters to be addressed prior to determination

a) Surface Water

The proposed construction activities including underwater excavation, hydro blasting, controlled blasting, concrete batching plants, dewatering, vegetation clearing and thermal discharges from the concrete cooling pumping system have the potential to cause water pollution. The EIS has not appropriately assessed the potential impacts of these construction activities on receiving waters for all pollutants potentially present at non-trivial levels.

Further, the EIS has provided limited details on practical measures to prevent, minimise or mitigate water pollution for the proposed construction activities, deferring consideration of most matters until detailed design. For example, it is unclear if sediment basins or water treatment ponds will be appropriately sized for their intended use, or if enhanced erosion and sediment control measures and increased water reuse has been assessed.

Following is the EPA's considerations of the water assessment:

Process water and contaminated runoff discharges

'Significant' quantities of concrete dust and slurry would be generated from hydro blasting which will have high suspended solids and high pH. The EIS indicates 50 megalitres of water will be required for hydro blasting. Concrete dust will also be generated from demolition activities. The EIS has not provided details on how the concrete dust and the hydro blasting slurry will be managed and therefore whether a water quality impact assessment and mitigation measures are required.

Wastewater generated from concrete batching plants would be incorporated into the concrete batching process, however runoff from the plants would contain concrete and materials used in the manufacturing process that could impact water quality. The EIS indicates the concrete batching plants would have a dedicated drainage system that drains to treatment facilities such as a treatment pond or water treatment plant and that water would be either discharged or reused where possible. If a discharge to waters is necessary, a water quality impact assessment consistent with section 45 of the *Protection of the Environment Operations Act 1997* (POEO Act) is required.

The EIS indicates a 90th percentile 5-day rainfall event would be the basis to capture and treat runoff from construction areas. It should be noted that standard erosion and sediment controls based on *Managing Urban Stormwater Soils and Construction Volume 1 (the Blue Book)* are not appropriate for managing potential water pollution risks associated with contaminated sediments and runoff. Where stormwater is expected to contain pollutants other than 'clean' sediment at non-trivial levels **the proponent should consider additional or alternative treatment measures to mitigate potential water pollution risks**.

The EPA recommends the proponent undertake the following:

- considers options for increasing onsite storage to enable increased reuse, reducing potable water demand, and avoiding or minimising the need for a discharge;
- provides a water balance that clearly details the predicted frequency, duration and volumes of water to be discharged under a range of scenarios (including typical and worst-case scenarios)
- where a discharge is required, provides further details on:
    - proposed treatment plants (including specifications and design details, including expected treatment performance for all pollutants of concern at the site); and
    - water treatment ponds sizing and design rainfall event;

- considers additional or alternative treatment measures where stormwater is expected to contain pollutants other than 'clean' sediment at non-trivial levels;
- if construction phase discharges are to occur, the potential impact of those discharges must be considered consistent with the relevant matters under s45 of the POEO Act, including:
    - estimate the expected frequency and volume of discharges;
    - characterise the expected quality of each discharge in terms of the typical and maximum concentrations of all pollutants likely to be present at non-trivial levels;
    - assess the potential impact of each discharge on the environmental values of the receiving waterway consistent with the national Water Quality Guidelines (ANZG, 2018)
    - where relevant, identify appropriate measures to mitigate any identified impacts;
- develops a monitoring program that can inform a Trigger Action Response Plan (TARP). The TARP should include contingencies to identify and manage any unpredicted impacts and their consequences to ensure corrective actions are implemented.

Other construction activities

The EIS does not provide any details regarding potential water pollution impacts or identify practical measures to avoid impacts associated with the following construction activities:

- controlled blasting
- underwater excavations
- boat ramp construction
- dewatering activities and water diversions
- use of epoxy resins
- thermal discharges from concrete cooling pump systems

Additional information is required to identify all potential water pollution risks and ensure all practical and reasonable measures to avoid, minimise and mitigate impacts have been appropriately considered and adopted.

For the construction activities identified above, the EPA recommends the proponent undertake the following:

- assesses potential impacts on water quality within Warragamba Dam and the downstream receiving environment;
- considers potential cumulative water quality impacts associated with all construction activities; and
- provides further information on the practical measures to avoid, control or mitigate water pollution (including water reuse).

Erosion and sediment control

Approximately 22 ha of vegetation will be cleared for the construction works. The proponent has committed to erosion and sediment controls to be designed, installed, and operated in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004). The EPA notes the drinking water catchment surrounding Warragamba Dam should be considered a 'sensitive' receiving environment as per *Managing Urban Stormwater: Soils and Construction* and enhanced soil and erosion measures should be applied.

Examples of enhanced erosion and sediment control measures include (but are not limited to):

- stage construction activities so that land disturbance is confined to the minimum area possible;
- use timber windrows during clearing to assist erosion control;
- retain vegetation within flow lines for as long as possible;
- retain groundcover on soils to minimise the potential loss of sediment;
- treat topsoils with a high level of care to enable reuse of soils in rehabilitation phases;
- use surface covers and binders to limit soil loss; and

- install clean water diversions early and ensure prompt stabilisation and rehabilitation of the site.

The EIS proposes sediment basin discharge criteria (TSS, pH, oil and grease) based on *Managing Urban Stormwater Soils and Construction* (Landcom 2004). These criteria may not reflect all pollutants that may be discharged from sediment basins during construction.

The EIS indicates approximately 183 megalitres of water is required for construction and would generally be sourced from the potable water supply. However, **it is unclear if the proponent has considered all reasonable and practical measures to enable greater reuse of water collected** within sediment basins to reduce the reliance on potable water.

The EPA recommends that the proponent undertake the following:

- provides a water balance that clearly details the predicted frequency, duration, and volumes of water to be discharged under a range of scenarios (including typical and worst case);
- provides further details on the erosion and sediment control approaches, including enhanced erosion controls and sediment basin sizing;
- considers reuse of any water collected within sediment basins to avoid or minimise discharges and reduce the reliance on potable water;
- if stormwater is expected to contain pollutants other than 'clean' sediment at non-trivial levels (e.g. oils and grease, metals) additional or alternative treatment measures are recommended to avoid, minimise and mitigate potential water pollution risks;
- if construction phase discharges are to occur, the potential impact of those discharges must be considered consistent with the relevant matters under s45 of the POEO Act, including:
    - estimate the expected frequency and volume of discharges;
    - characterise the expected quality of each discharge in terms of the typical and maximum concentrations of all pollutants likely to be present at non-trivial levels
    - assess the potential impact of each discharge on the environmental values of the receiving waterway consistent with the national Water Quality Guidelines (ANZG, 2018); and
    - where relevant, identify appropriate measures to mitigate any identified impacts; and
- develops a monitoring program that can inform a Trigger Action Response Plan (TARP). The TARP should include contingencies to identify and manage any unpredicted impacts and their consequences to ensure corrective actions are implemented.

Dissipator Pond

The EIS indicates coffer dams established in the dissipator pond could be used to capture runoff from the dam wall construction and hydro-blasting. It is unclear how the proposed water treatment ponds will be managed to prevent discharges to the downstream environment, and how contaminated water within the dissipator ponds will be managed in the event Warragamba Dam needs to release flows.

The EPA recommends that the proponent considers how contaminated water and sediment within the dissipator ponds will be managed if Warragamba Dam needs to release water.

b) Contamination

The *Soils and Contamination Assessment* report provided at Appendix N1 is a preliminary site investigation report comprising a desktop study that focuses on potential contamination of areas upstream and downstream of Warragamba Dam in the event of a flood event, as well as any contamination likely to be present in the construction/laydown areas linked to the dam raising development works. While the report identifies a number of areas that may be contaminated within proposed construction/laydown locations, **no environmental sampling has been undertaken so the contamination status of the areas intended to be disturbed is still unknown**.

The desktop review identified the following potentially contaminated areas with a range of contaminants including copper, lead, zinc, petroleum hydrocarbons and polychlorinated biphenyls (PCBs):

- explosives store and vehicle refuelling area
- former workshop yard on Farnsworth Avenue
- various commercial properties
- some portions of land around Megaritty's Creek, Weir Road, Warragamba
- the Warragamba Dam viewing platform at Eighteenth Street

The EPA notes that the Warragamba Dam viewing platform was previously notified to the EPA under the *Contaminated Land Management Act 1997* (CLM Act). The contamination report did not include further details on this notified site.

Warragamba Dam was constructed by 1960. However, the report did not mention if fill materials were used in the areas surrounding the Warragamba Dam. The contamination investigation would benefit from intrusive sampling to verify the desktop study conducted to date.

The EIS states that most construction works for raising the dam would occur on the existing wall, with some disturbance of adjacent areas required for ancillary works. The Soils and Contamination Assessment states that "*the likelihood of widespread contamination is low based on the reviewed documents.*" However, as no intrusive investigations have been undertaken, ecological and human health risks posed by contamination have not been properly determined.

The EPA recommends that appropriate contaminated site investigations – carried out by appropriately qualified contaminated land consultants – should be completed covering the areas likely to be disturbed as part of the development to determine what remedial and management measures are required. The investigations should assess all relevant media and justify if the proponent believes that groundwater testing is not necessary. Works should also consider whether asbestos is present in any building materials prior to the demolition works.

It is also noted that the following guidance documents cited in the soils and contamination assessment report are out of date:

- *Guidelines for Consultants Reporting on Contaminated Sites* (OEH, reprinted 2011). There is a 2020 version.
- *Guidelines for the NSW Site Auditor Scheme* (DEC 2006). There is now a 3rd addition, published in 2017.

The EPA also notes that the soils and contamination assessment report did not specify the guidelines they considered under "*other guidelines made or approved under section 105 of the CLM Act (as at the time of writing this report*)."

Given the inadequate contamination investigation and potential presence of areas of concern across the project site, **a NSW EPA-accredited Site Auditor is recommended to be engaged for the entire project footprint and throughout the duration of works** for this project to ensure that any work required in relation to contamination is appropriately managed, including any unexpected contamination finds, so that there is confidence that the site will be suitable for the proposed use.

It is further recommended that as part of RtS, the proponent submit Interim Audit Advice from a NSW EPA-accredited Site Auditor commenting on the nature and extent of the contamination and what further works are required.

The EPA recommends the proponent provide the following as part of the Response to Submissions:

1. a **Sampling and Analysis Quality Plan (SAQP)**, prepared in accordance with the relevant guidelines made or approved by the EPA under s105 of the *Contaminated Land Management Act 1997* (CLM Act), to ensure that field investigations and analyses will be undertaken in a way that enables the collection and reporting of reliable data to meet project objectives, including (where applicable) the relevant site characterisation requirements of the detailed or targeted site investigations;
2. a **Detailed Site Investigation (DSI)**, that investigates the nature and extent of contamination in the soil, and groundwater, to adequately inform what management measures or remediation would be required to safeguard the environment and people during construction and operation of the proposed SSI;
3. **Interim Audit Advice** from an NSW EPA-accredited Site Auditor commenting on:
    (a) the nature and extent of the contamination; and
    (b) the adequacy of the *Soils and Contamination Assessment* (Appendix N1) – and the SAQP and DSI once completed – and any other contamination investigations which have been completed for the project.

2. Matters to be addressed with conditions

a) Noise and Vibration

The EPA reviewed the Noise and Vibration Impact Assessment (NVIA) and generally considers it to have satisfactorily considered construction impacts.

It is noted that the predicted construction noise levels at sensitive receivers provided in Section 5.2 of the NVIA may be approximately 1 dB to 2 dB higher than those shown if a more conservative 50% ground absorption factor is adopted. While this is not expected to substantially change the outcomes of the assessment, **all feasible and reasonable noise mitigation and management measures should be implemented** to address any additional impacts arising from this change.

Construction traffic noise along the proposed southern access route has been assessed based on the existing traffic volumes for Silverdale Road. While the traffic volumes on the Silverdale Road section of the route may not appreciably increase due to construction traffic, the EPA expects that the existing traffic volumes along Warradale Road will be lower, resulting in more appreciable noise increases/impacts at receivers along this section. **It is recommended the proponent implement all feasible and reasonable noise mitigation and management measures to address any construction traffic noise impacts along the southern access route, particularly along Warradale Road and leading into Warragamba**.

The EPA notes that the proposed construction activities associated with this project are predicted to significantly impact many receivers in the surrounding community for both daytime and out-of-hours works. Construction traffic noise is also likely to affect some receivers along the proposed transport routes. **The proponent should implement all feasible and reasonable noise mitigation and management measures to address these impacts, as outlined in Section 7 of the NVIA**.

Following are the EPA's recommended noise and vibration conditions of approval covering construction hours, blasting, and the application of reasonable and feasible mitigation measures:

Construction Noise

Hours of Construction

1. All construction work at the premises must be conducted:

   (a) between 7am and 6pm Monday to Friday;
   (b) between 8am and 1pm Saturdays; and
   (c) at no time on Sundays and public holidays.

Exceptions to construction hours

2. The following activities may be carried out outside the recommended construction hours:

   (a) construction that causes $L_{Aeq(15minute)}$ noise levels that are:
      i. no more than 5dB above Rating Background Level at any residence in accordance with the *Interim Construction Noise Guideline* (DECC, 2009); and
      ii. no more than the Noise Management Levels specified in Table 3 of the *Interim Construction Noise Guideline* (DECC, 2009) at other sensitive land uses; or
   (b) for the delivery of materials required by the police or other authorities for safety reasons; or
   (c) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or
   (d) as approved through the process outlined in "Variation of construction hours" of this approval.

Variation of construction hours

3. The hours of construction activities specified under "Exceptions to construction hours" [**2(d)**] of this approval may be varied with the prior written approval of the Secretary. Any request to alter the hours of construction shall be:

   (a) considered on a case-by-case or activity-specific basis
   (b) accompanied by details of the nature and justification for activities to be conducted during the varied construction hours
   (c) accompanied by written evidence that appropriate consultation with potentially affected sensitive receivers and notification of relevant Council(s) (and other relevant agencies) has been and will be undertaken
   (d) where all feasible and reasonable noise mitigation measures have been put in place
   (e) accompanied by a noise impact assessment consistent with the requirements of the *Interim Construction Noise Guideline* (DECCW, 2009).

Blasting

Blasting Limits

4. The airblast overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

5. The airblast overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

6. Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10 mm/sec at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

7. Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5 mm/sec at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

8. Blasting at the premises may only take place between 9:00 am and 5:00 pm Monday to Saturday. Blasting is not permitted on public holidays.

9. Blasting outside of the hours specified in condition [**8**] can only take place with the written approval of the EPA.

10. The airblast overpressure and ground vibration levels in conditions [**4 to 7**] do not apply at noise sensitive locations that are owned by the licensee or subject to a private agreement, relating to airblast overpressure and ground vibration levels, between the licensee and land owner.

11. Blasting at the premises is limited to 1 blast on each day on which blasting is permitted.

Blast Monitoring

12. To determine compliance with conditions [**4 to 7**]:

    (a) Airblast overpressure and ground vibration levels must be measured and electronically recorded in accordance with the ANZECC guidelines for all production blasts carried out in or on the premises; and
    (b) The written record must include:
        i. the time and date of each blast;
        ii. the station(s) at which the noise was measured;
        iii. the ground vibration for each blast;
        iv. the airblast overpressure for each blast;
        v. evidence that during the past 12 month period, a calibration check had been carried out on each blast monitor to ensure accuracy of the reported data; and
        vi. the waveform for the ground vibration and overpressure for each blast that exceeds a ground vibration of 5mm/sec (peak particle velocity) or an airblast overpressure of 115dB(L).
    (c) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard 2187.2 of 2006.

Blast Management Plan

13. A **Blasting/Vibration Management Protocol** is to be prepared by the Applicant prior to blasting to demonstrate the protocol to comply with conditions set in conditions [**4 to 12**]. The Protocol shall include details about:

    (a) compliance standards;
    (b) measures to ensure compliance with licence limits;
    (c) remedial and reporting action plan;
    (d) monitoring methods and program; and
    (e) notification of procedures for neighbours prior to detonation of each blast.

Noise Management and Traffic Management

Noise Management Plan

14. The proponent must prepare and implement a detailed **Construction Noise Management Plan** (CNMP), prior to commencement of construction activities, that includes but is not necessarily limited to:

    (a) identification of each work area, site compound and access route (both private and public);
    (b) identification of the specific activities that will be carried out and associated noise sources at the premises and access routes;
    (c) identification of all potentially affected sensitive receivers;
    (d) the construction noise and vibration objectives identified in the Environmental Assessment;
    (e) assessment of potential noise and vibration from the proposed construction methods (including noise from construction traffic) against the objectives identified in the Environmental Assessment;
    (f) where the objectives are predicted to be exceeded an analysis of feasible and reasonable noise mitigation measures that can be implemented to reduce construction noise impacts;
    (g) description of management methods and procedures and specific noise mitigation treatments that will be implemented to control noise and vibration during construction, including the early erection of any operational noise control barriers;
    (h) procedures for notifying residents of construction activities that are likely to affect their noise and vibration amenity; and
    (i) measures to monitor noise performance and respond to complaints.

Traffic Noise Management Strategy

15. A **Traffic Noise Management Strategy** (TNMS) must be developed by the proponent, prior to commencement of construction and operation activities, to ensure that feasible and reasonable noise management strategies for vehicle movements associated with the facility are identified and applied, that include but are not necessarily limited to, the following:

    (a) driver training to ensure that noisy practices such as the use of compression engine brakes are not unnecessarily used near sensitive receivers;
    (b) best noise practice in the selection and maintenance of vehicle fleets;
    (c) movement scheduling where practicable to reduce impacts during sensitive times of the day,
    (d) communication and management strategies for non licensee/proponent owned and operated vehicles to ensure the provision of the TNMS are implemented;
    (e) a system of audited management practices that identifies non conformances, initiates and monitors corrective and preventative action (including disciplinary action for breaches of noise minimisation procedures) and assesses the implementation and improvement of the TNMS;
    (f) specific procedures for drivers to minimise impacts at identified sensitive receivers; and
    (g) clauses in conditions of employment, or in contracts, of drivers that require adherence to the noise minimisation procedures and facilitate effective implementation of the disciplinary actions for breaches of the procedures.