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Appendix A: Summary of Submissions and Responses to Issues Raised in Submissions

RtS Ref No.	Issue no.	Key Issues Summary	Lend Lease Response
Department of Primary Industries			
<i>Office of Water</i>			
A1	1	Dewatering Licence The EIS does not clarify the length of time that the take of groundwater is likely to occur, or if the proposed dewatering is temporary or permanent. Prior to intercepting and dewatering groundwater and dewatering licence under the Water Act 1912 will need to be obtained.	Dewatering will be temporary only, approximately for the duration of the remediation works – a period of approximately 24 months. A dewatering licence will be obtained prior to any works being carried out that will intercept or require the dewatering of groundwater at Block 5.
A2	2	Groundwater Management Plan The Office of Water requests that it is consulted in the preparation of the GMP	Lend Lease confirms a minor correction to terminology used in Section 7.6.3 of the EIS. Section 7.6.3 of the EIS incorrectly referred to the GMP as a “Groundwater Management Plan”. The corrected term for this is “Groundwater Monitoring Plan”, as per the RAP. Lend Lease would be willing to consult with NSW Office of Water in relation to the preparation of the Groundwater Monitoring Plan.
A3	3	Groundwater Monitoring Plan The Office of Water requests that it is consulted in the preparation of the monitoring plan.	Per response at A2 above, Lend Lease would be willing to consult with NSW Office of Water in relation to the preparation of the Groundwater Monitoring Plan.
<i>Fisheries NSW, Agriculture NSW and Crown Lands</i>			
A4	1	No issues raised	Noted
Fire and Rescue NSW			
A5	1	Fire Incidents and Hazmat Incidents The EIS does not specifically identify and discuss some types of unplanned incidents which may pose risks to first responders and members of the public. Should a fire or hazmat incident occur it is important that first responders have ready access to information which	The Construction Framework Environmental Management Plan (provided in Appendix Y of the EIS), includes a site-wide Incident and Emergency Management Plan. Lend Lease would be willing to consult with Fire and Rescue NSW in relation to future

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		enables effective control measures to be quickly implemented. Information which should be readily available to first responders includes: ▪ The names of chemicals and heavy metals which may be involved in a fire/hazmat incident, (including POPC and others). ▪ The properties of each chemical and heavy metal (including when involved in a fire). ▪ The risk to health posed by identified chemicals (especially when involved in a fire). ▪ The appropriate control measures which must be implemented in order to safely mitigate potential risks. Such measures would include the level of personal protective clothing required to be worn, the minimum level of respiratory protection required, decontamination procedures, minimum evacuation zone distances and the means to bund or confine contaminated water and fire water runoff. ▪ Unique control measures implemented which are specific to the remediation works, (e.g. odour suppressant foam treatment of bulk material prior to transporting off site). ▪ The location of any nearby public infrastructure which may be at risk from a significant fire and its contaminated smoke plume, (e.g. shipping corridors, ferry lanes, flight paths, public road ways and public assembly areas).	updates of this plan.
A6	2	Recommended Conditions of Consent The following conditions should be imposed: ▪ That appropriate emergency procedures are developed by the proponent to address and mitigate, as far as reasonably practicable, the consequences of fire and hazmat incidents and the potential health risks to firefighters undertaking emergency operations in relation to foreseeable fire/hazmat scenarios;	Lend Lease do not object to these conditions being imposed.

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		▪ That two copies of the emergency plan (detailed in recommendation 1 above) be stored in a prominent 'Emergency Information Cabinet' which is located in a position directly adjacent to the entry point into the Block 5 remediation site; ▪ That appropriate first aid fire fighting equipment be provided to all plant during the Block 5 remediation project. In addition, that all operators of plant and other equipment be trained to undertake first aid fire fighting operations using the equipment provided.	
A7	3	Consultation and Engagement The development of an effective emergency response plan, specific to Block 5, would be significantly enhanced by the site's operators engaging and liaising with FRNSW local command management. Such enhancement would be best facilitated by ensuring that FRNSW personnel were afforded the opportunity to undertake pre-incident planning of identified hazards and to familiarise themselves with the emergency procedures developed by the proponent.	Fire and Rescue NSW local command management can be consulted during the future updates of the Incident and Emergency Management Plan that will apply to the project.
NSW Health			
A8	1	Recommended Management Measures The works should be carried out in accordance with the following measures: ▪ Environment Health Risk Assessment Guidelines for assessing human health risks from environmental hazards (2012) Department of Health; and ▪ Provisions are to be put in place to control contaminated water seepage from the surrounding area migrating into the site; and ▪ Provisions are to be in place to capture contaminated water migrating into the site, including runoffs including treatment to remove air impurities before release into the harbour; and	In response to the issues raised by NSW Health, the following responses are provided: ▪ The Health Risk Assessment (Appendix M of the EIS), as revised and appended as Appendix D of the Response to Submissions (RTS) Report, was prepared in accordance with the Department of Health Environmental Risk Assessment Guidelines. ▪ The EIS includes detailed mitigation measures to ensure that all contaminated water will be collected and treated at the on-site water treatment plant prior to discharge. ▪ Sump pits collecting contaminated water will generally be located within the excavation enclosure. As such, air

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		Provisions are to be in place to vent the sump pits collecting contaminated water at the site elevating the plume as to protect the health of the residents and the public at that site.	emissions from the collection of contaminated water within the sump pits will be treated as part of the air filtration system installed for the excavation enclosure.
Office of Environment and Heritage			
A9	1	No issues raised.	Noted.
Sydney Water			
A10	1	Sydney Water has no in-principal objection to the proposed stormwater diversion works, subject to continuous liaison with Sydney Water by the proponent prior to carrying out any work within the zone of influence of this stormwater pipe and during the deviation of the pipe, to ensure that the proposed work methods are acceptable to Sydney Water and the diversion work is carried out as per Sydney Water's Asset Creation Process.	Lend Lease will continue to liaise with Sydney Water to ensure that work methods are acceptable to Sydney Water and the diversion work is carried out as per Sydney Water's Asset Creation Process.
Transport for NSW			
A11	1	Public Transport Transport for NSW's <i>'Sydney City Centre Access Strategy'</i> has foreshadowed a number of bus corridors in the vicinity of Barangaroo and along Hickson Road. These are proposed to commence operation in late 2014. The details of these routes have not been finalised, however, the services will not be of a high frequency. These new routes need to be considered as a part of any traffic impact assessment and traffic management plan.	Lend Lease will consult with the State Transit Authority (STA) during the preparation of the Traffic Site Control Plan – which will be prepared as part of the Construction Traffic Management Plan (see Section 7.9.6 of the EIS and Appendix R of the EIS). This will include consideration of any new bus services along Hickson Rd.
A12	2	Existing traffic, public transport, pedestrian and cyclist movements need to be identified . Consideration needs to be given to proposing measures for minimising any impact on these movements adjacent to the site.	Existing traffic, public transport, pedestrian and cyclist movements will be identified and considered as part of the preparation of the Traffic Site Control Plan which will be prepared as part of the Construction Traffic Management Plan (see Section 7.9.6 of the EIS and Appendix R of the EIS).

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A13	3	Further consideration needs to be given to construction impacts and management, in particular the cumulative impacts arising from the overlap of construction projects within the Barangaroo and Wynyard Precincts. Potential construction impacts that need to be addressed include: ▪ Impacts on traffic movements and parking along Hickson Road; ▪ Impacts on the existing transport services within the precinct including buses; ▪ Impacts on pedestrian and cyclist movements, safety and accessibility (mobility impaired pedestrians, including wheelchair access) within the Barangaroo Precinct; and ▪ Impacts on emergency access and egress.	Section 5.3 of the Traffic Impact Assessment (see Appendix R of the EIS) specifically considers the cumulative impacts of overlapping construction activities in the Barangaroo and Wynyard precincts during the construction period of the proposed works. Table 5 on page 18 provides a summary of these works and the expected number of construction traffic movements during the AM peak hour. Traffic analysis undertaken for the study forecast minimal changes in the operation of key intersections as a result of the construction of the Block 5 remediation works. Given the Block 5 works are to be contained entirely within the Barangaroo site, there are to be no impacts to parking or public transport services along Hickson Road. With implementation of site access controls, as specified by the Construction Traffic Management Plan. No queuing on CBD roads is to occur as a result of the proposed works. Impacts on pedestrian and cyclist movements, safety and accessibility within the Barangaroo Precinct will not be affected as the Block 5 site is not accessible to the general public. Access along Hickson Road will be maintained per the existing arrangements. Emergency access and egress to and around the Barangaroo site will not be affected as there are no works in Hickson Road, and there will be no change to the construction site access arrangements.
A14	4	The proponent should consult with the State Transit Authority (STA) prior to commencement of construction, in regards to the operational management of the proposal during construction.	Lend Lease will consult with the STA during the preparation of the Traffic Site Control Plan which will be prepared as part of the Construction Traffic Management Plan (see Section 7.9.6 of the EIS and Appendix R of the EIS).



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A15	5	Truck movements to and from the site should be limited during the peak period, specifically the PM peak.	Lend Lease will investigate measures to minimise, where reasonable and feasible, heavy vehicle movements during the PM peak period.
A16	6	Existing traffic, public transport, pedestrian and cyclist facilities need to be identified. These facilities should be accessible at all times, should closure be required due to construction activities, appropriate alternatives be proposed.	The Block 5 remediation works will not require the closure of existing traffic, public transport, pedestrian and cyclist facilities.
NSW Environment Protection Authority (EPA)			
<i>Air Quality (EPA)</i>			
A17	1.1	The assumptions adopted for the quantitative assessment require clarification Noting the assumptions for the modelling scenario, the EPA recommends that additional information is required to confirm: ▪ The nominated stack height of 4 m, is meant to be 4 m from building height, approximately 18 m from ground level; ▪ Ventilation systems fitted to odour control enclosures would operate continuously (24 hrs per day, 7 days per week) reflecting the dispersion modelling scenario and noting: - Emissions of volatile compounds from contaminated soil are likely to occur outside typical operating periods; and - Emissions may cause adverse impacts if the ventilation systems are not operational outside these assumed excavating periods.	Additional information is provided as follows: ▪ Stacks were modelled at 4 m height above ground level. Higher stacks do not improve results at higher receptors. Clarifications have been made to this effect in Section 5.4 of the updated AQIA (see Appendix C of the RTS). ▪ As specified in the AQIA the final design and detailing of the air filtration systems will be subject to further design development, the details of which will be submitted to the EPA for review and comment. The air filtration systems will be powered by two generators and designed to operate continuously (including outside of normal working hours) with a minimum of two filters installed in series for each emission stack to prevent fugitive emissions during filter exchanges.



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A18	1.2	The AQIA hasn't accounted for any potential variations in the proposed remediation project design The dispersion modelling utilised within the AQIA has considered a single design scenario incorporating a single discharge point, however it is noted that there is no commitment to the number of odour enclosures or the number of discharge points, prior to final design. The EPA recommends additional modelling or a sensitivity analysis that considers potential variations in the overall design to adequately demonstrate that the project can meet the impact assessment criteria. The outcomes of the additional assessment must outline any limitation on the final design.	The AQIA has been updated to include Section 6.3 (odour mitigation capture efficiency sensitivity analysis) and 6.4 (excavation odour emission sensitivity analysis), in response to this feedback.
A19	1.3	Assessment against the Protection of the Environment (Clean Air) Regulation 2010 As with all stationary point source emissions any generators must comply, as minimum, with the requirements of the Protection of the Environment (Clean Air) Regulation 2010, specifically the in stack concentration limits, as minimum. This would be applied at the generator exhaust point, prior to any merging with other air streams (if applicable). The EPA recommends that the proponent must demonstrate compliance with the Regulation as a minimum for all proposed emission units at the site.	Section 5.4 of AQIA has been amended to include a commitment to design the discharge stacks so that they comply with the <i>Protection of the Environment (Clean Air) Regulation 2010</i>.
A20	1.4	The methods of dust and odour control during off-site transport are not considered best practice The proposed use of suppressant foam has not been demonstrated as a technique that controls emissions during off-site transport of excavated material to the maximum extent achievable. The EPA recommends that the proponent investigate the use of an alternate control such as, but not limited to storage in sealed containers.	The Block 5 Supplementary Assessment: Off-Site Ex-Situ Transport and Treatment (see Appendix B of the RTS) addresses the off-site treatment and transport of untreated contaminated materials. It nominates proposed types of foam and its specification to demonstrate that products are available that are specifically designed for the proposed purpose (ie. suppressing odour from soil). Foam agents have previously been used on other remediation sites as a method of suppressing odour from contaminated soil, including from tarry waste (e.g. Hunter River Remediation project).



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A21	1.5	The assessment provides limited information on potential emissions from treatment works The AQIA outlines that Lend Lease has committed to undertake all excavation and ex-situ treatment works (if done on-site) within temporary odour control structures (OCSs) fitted with emission control systems (filters). However, no discussion on the potential treatment options is provided, with any indication of the potential emissions to air and the proposed controls' ability to mitigate any of these discharges to air. The EPA recommends that the proponent must outline all treatment options that are being considered and any additional emissions to air associated with these treatment options.	The updated AQIA provides clarification that on site treatment is not proposed as part of SSD 6533 and therefore was not assessed.
A22	1.6	Proposed monitoring measures require clarification The AQIA states that filter saturation and change-over frequency would be guided by the stack emission monitoring. The EPA considers that a more proactive approach would be needed to manage activated carbon filter saturation (i.e. continuous inter-bed monitoring). The EPA recommends that the proponent must outline a proactive approach to the management of the emission controls proposed, including the management of filter bed saturation.	A note has been added to Section 7.3 of amended AQIA specifying that continuous post-commissioning monitoring would be carried out between the two filters in order to detect and manage any carbon bed breakthrough. As specified in the AQIA and the EIS, the details of the emission control system, including the details of the proposed methodology to detect carbon bed breakthrough, will be submitted to the EPA for review and comment.
A23	1.7	Reactive Management Procedure for total VOCs requires clarification The EPA recommends that the proponent must outline a monitoring method (and frequency) that is suitable to enable the nominated reactive management trigger levels for VOCs to be effectively implemented. Additionally the proponent must adequately justify all nominated trigger levels outlined in the reactive management measures.	In discussions with the EPA it was agreed with EPA that hand-held measurements were more reliable. Therefore the nominated VOC trigger levels (which are based on continuous monitoring equipment) have been removed and daily photoionisation detection (PID) monitoring of VOCs has been added into the amended AQIA (Table 25).

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A24	1.8	Monitoring agenda requires clarification Clarification is required on whether or not ambient air monitoring is to be conducted throughout the remediation (and possible treatment) works. The EPA considers that monitoring of each pollutant should be undertaken during all the stages where that pollutant can be released to atmosphere. The EPA is unable to provide recommended approval conditions under this heading until such time as the above advice is forthcoming.	A note has been added to the first paragraph of Section 7.0 of the amended AQIA confirming that monitoring will be undertaken at all stages throughout the remediation and excavation works.
<i>Chemical Risk (EPA)</i>			
A25	2.1	Remediation works outside the excavation enclosures involving contaminated material represent a potential significant risk with respect to adverse air impacts The EPA recommends that Lend Lease incorporates and implements best practice emission controls and process design, including consideration of movement of contaminated material immediately into an enclosure (OCS) and other contingency measures, to ensure emissions generated outside the excavation enclosure/s (e.g. during construction of retaining walls and piling) are minimised to the maximum extent practicable.	The Block 5 PRW Preliminary Odour Control Plan has been added at Appendix D of the amended AQIA, and a reference to the plan inserted in Section 3.2.5 of the amended AQIA. The Plan provides a description of emission controls and process design to be implemented to ensure emissions generated outside the excavation enclosure/s (e.g. during construction of retaining walls and piling) are minimised.
A26	2.2	Off-site treatment, transport and disposal of excavated material have the potential to be significant sources of emissions	See the response to A20 above. The Block 5 Supplementary Assessment: Off-Site Ex-Situ Transport and Treatment (provided at Appendix B of the RTS) addresses the off-site treatment and transport of untreated contaminated materials.



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A27	2.3	Emission control systems must be designed to capture any asbestos emissions generated within the emission enclosure/s The EPA notes that where asbestos fibres are potentially present or being generated within the excavation enclosure (OCS), appropriate high-efficiency particulate air filtration must be installed in the ECS to ensure the effective capture of asbestos fibres. The EPA recommends that Lend Lease provides EPA with clarification that appropriate best practice emission controls and management practices will be implemented to ensure asbestos emissions are prevented or appropriately controlled.	A note has been added to Section 3.5 of the AQIA specifying that the air filtration system would be designed to filter odorous emissions, not asbestos fibres. Management of asbestos encountered on the site would be in accordance with the site Asbestos Management Plan, which would include air monitoring.
A28	2.4	Additional information and clarification is required to demonstrate potential receptors located within the Barangaroo site have been adequately considered The EPA recommends that Lend Lease provides additional information and clarification to demonstrate all potential sensitive receptors have been adequately considered in EA – including potential future receptors in Barangaroo Stage 1 buildings.	The AQIA has been amended to add additional receptors to the model (reflected in Appendix D and Figure 3 of the amended AQIA). The results of air dispersion modelling did not change as a result of these additional receptors.

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A29	2.5	It is unclear if the proposed remediation works are consistent with the preferred works outlined in the Remedial Action Plan (RAP) The proposed remediation strategy appears to be excavation of contaminated material in an excavation enclosure, followed directly by transport of the material off-site for treatment (where required) and off-site landfill disposal. It is not clear what provisions will be implemented or are available, if required, for stockpiling, draining and drying of contaminated materials, SPGWT and CIM (as specified in the RAP). The EPA notes that the proposal for off-site treatment creates additional emission sources, and consequently has the potential to result in a significant increase in off-site air risks where emissions are not appropriately managed. The EPA recommends Lend Lease provides additional information and clarification that the proposed remediation works are consistent with the preferred options of the RAP. The EPA recommends Lend Lease reviews the HIA and EA to ensure the proposed remediation works are described accurately and consistently.	The Block 5 Supplementary Assessment: Off-Site Ex-Situ Transport and Treatment (Appendix B of the RTS) has been prepared to provide additional details for: ▪ The management of odours materials during excavation. ▪ The on-site preparation of odorous materials for transportation. ▪ The off-site transport and treatment of contaminated materials. The Block 5 Supplementary Assessment: Off-Site Ex-Situ Transport and Treatment includes a review of the consistency of this approach with the RAP, and concludes that it is consistent with the RAP. Section 3.2.4 of the AQIA and Section 3.3.4 of the HIA have been updated to include a description of proposed methods to manage air emissions during the off-site transport of odorous material in accordance with the RAP and EPA requirements, and with reference to the Block 5 Supplementary Assessment: Off-Site Ex-Situ Transport and Treatment. See also the response to issue A20 above.
A30	2.6	Additional information is required in the HIA including details of the risk assessment for local receptors. The EPA recommends Lend Lease provides additional clarification and information in the HIA to address the following issues. ▪ despite low levels of odour not necessarily being an indicator of health risk, it is important to recognise that odour may be an indicator of risk if the concentration of odorous compounds exceeds health based criteria, or other accompanying non-odorous organic compounds are also volatilised to sufficiently high levels. In addition, odour response is	An amended Health Impact Assessment (HIA) has been prepared which includes the following: ▪ Section 4.3.6 has been added to the amended HIA to clarify the complexity of the relationship between odour and health risks. ▪ A completed Risk Analysis Matrix has been added to



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		complicated and the level at which an odour is perceived to be of nuisance depends on a combination of a number of factors such as: odour quality, odour intensity; odour frequency, timing and duration, population sensitivity, background level, public expectation; source characteristics and health effects; - the HIA does not provide details of the risk classification assessment or the completed risk analysis matrix, which was used to assess the level of risk for each identified issues. Rather only the framework used in the risk ranking is provided in the HIA; - the HIA recommends the use of air monitoring to demonstrate ongoing low risks to the identified potentially impacted receptor groups. This monitoring program must be carefully designed so that it is fit for purpose to meet the proposed objectives. A management plan and monitoring program is also required to ensure the effective and ongoing implementation of emission controls - which are identified in the HIA as critical to ensure risks to potentially impacted receptor groups remain low; - the HIA refers to air conditioning systems equipped with particle filters and/or intake areas located away from proposed works, where installed, as providing additional but not essential mitigation. However the EA does not clarify how this will be communicated or implemented; and - the HIA refers to wetting down stockpiles, however does not clarify what the stockpiles will consist of, or if they will be located inside or outside the emission enclosure/s. In addition, the AQIA does not include emissions from stockpiles located outside the emission enclosure/s.	Appendix A of the amended HIA. Likelihoods and consequences were assigned on a qualitative basis. As such, no calculations can be provided. It should also be noted that the ratings relate to activities assuming that site control measures have been implemented. - Section 9 of the amended HIA has been updated to clarify that the monitoring program recommended in the HIA will be integrated with the air quality monitoring program and air quality management plan to ensure it is fit-for-purpose and effective. - The reference to existing air conditioners that have particle filters installed relates to Table 4 of the HIA which identifies the likely exposure of sensitive receptors. The note is only intended to identify that where air conditioning systems are already in place then they would provide added mitigation (but is not a mitigation measure that is essential). This has been clarified in Table 4 of the amended HIA. - It is clarified in Table 5 of the HIA that stockpiles will be within excavation enclosures.

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A31	2.7	Additional information and details of the final Project design and Project operation elements are required to ensure Project air impacts have been adequately assessed and appropriate mitigation methods and management strategies will be implemented The EPA notes that additional information is proposed to be provided to EPA, and that it should ensure the design and management of the OCS filtration units will be fit for purpose. The EPA notes however that the location and number of excavation enclosure/s for Block 4 and Block 5, and remediation enclosure/s for Block 4, have not been finalised. Despite this, the assessment of air impacts (AQIA, Section 5.4) appears to have included emissions from only one OCS for Block 4 (for an excavation OCS) and emissions from only one OSC for Block 5 (also an excavation OCS). The AQIA states that the modelled emissions scenario, and cumulative impact assessment of air impacts, represents worst case emissions and likely air impacts; however it is unclear if this applies if additional excavation or remediation emission enclosures are included in either Block 4 or Block 5 remediation. The EPA recommends that Lend Lease provide: - additional information and clarification to demonstrate the Project design is sufficient to effectively control air emissions; - details of all proposed mitigation methods, management strategies and contingencies to ensure the effective control of Project air emissions; - additional information and clarification to demonstrate worst case air emissions scenarios have been assessed; and - details of the final design of each Project element with respect to controlling air emissions.	The amended AQIA provides the information recommended by the EPA, in particular: - The AQIA has been updated to include Section 6.3 (odour mitigation capture efficiency sensitivity analysis) and 6.4 (excavation odour emission sensitivity analysis). - The sensitivity analyses indicate sthat a good margin of safety has been applied to the pollution reduction of the odour control equipment compared to what is considered normal operating parameters, and that even with a significant increase in excavation footprint, the odour emissions are not expected to rise to a degree where adverse impacts are expected to occur. - Section 5.7 of the amended AQIA confirms that pollutant concentrations associated with the concurrent Block 4 remediation, construction works for buildings C3/T1 and the operation of the water treatment plant were included in the dispersion model, to provide for a cumulative assessment. As specified in the AQIA the final design and detailing of the air filtration systems will be subject to further design development, the details of which will be submitted to the EPA for review and comment.



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A32	2.8	To ensure emissions are effectively controlled, Lend Lease proposes to expand the existing air quality monitoring program and management plan The EPA advises the air quality management plan must include: - the implementation of best available control technology and best environmental practice to ensure emissions are being reduced to the maximum extent achievable for all air pollutant generating activities; - an ambient air monitoring program and reactive management strategy, including real-time meteorological monitoring, continuous particulate and VOC monitoring for management purposes, fit for purpose odour monitoring, and the implementation of appropriate triggers to further develop the reactive management strategy for air pollution mitigation; - details of all proposed air quality emission control measures including: - timeframe for implementation of all identified emission controls; - key performance indicator(s) for emission controls; - monitoring method(s) including location, frequency and duration; - response mechanisms; - responsibilities for demonstrating and reporting achievement of key performance indicator(s); - record keeping and complaints response register; and - compliance reporting.	As specified in the AQIA and the EIS an Air Quality Management Plan would be prepared, and ambient air quality monitoring would be carried out with a reactive management strategy. Section 7.3 of the amended AQIA has been updated to incorporate the specific items identified by the EPA as items that would be addressed by the Air Quality Management Plan.
A33	2.9	Additional information and clarification is required to address issues identified in the AQIA The EPA recommends Lend Lease revises the AQIA to address the following issues.	The AQIA has been amended to address the EPA comments, as follows:

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		- Table 14 of the AQIA (Section 5.5.1) erroneously refers to "Treatment Tent Stack" rather than "Excavation Tent Stack"; - Section 5.7 of the AQIA does not state that concurrent Block 4 excavation and remediation works emissions were included in the dispersion model, despite Block 4 excavation equipment and OCS stack characteristics being provided in the Source Characteristics section (Section 5.4); - the AQIA should comply with the requirements of Section 9 of the Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales (DEC, 2005). The AQIA does not include a clear summary of dispersion model results. Results should be presented in both tabulated and graphical (isopleth) form. Results must specify: i. The project incremental ground level concentration for all sources (combined); ii. The background particle concentration; iii. The cumulative assessment prediction (project increment plus background); and iv. The number of predicted exceedances of EPA's impact assessment criteria (if any); - the detailed calculations used to derive to emission rates in AQIA (Section 5.5) are not provided, however should be included in the AQIA; - clarification is required how the assessment of benzo(a)pyrene has been used to assess PAHs; - the AQIA does not include an assessment of PM_{2.5} emissions, despite Block 5 and nearby operations requiring the use of a significant number of plant using combustion engines; and - justification is required why the site average soil concentration was	- Table 14 has been corrected in the amended AQIA. - Section 5.7 of the amended AQIA confirms that pollutant concentrations associated with the concurrent Block 4 remediation, construction works for buildings C3/T1 and the operation of the water treatment plant were included in the dispersion model, to provide for a cumulative assessment. - The AQIA (as amended) complies with the Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales, with the exception of the provision of isopleths, which the EPA has agreed were not required to be presented. - Detailed calculations used to derive emission rates have been added as Appendix D of the amended AQIA. - Reference to PAHs throughout the AQIA have been removed and only benzo(a)pyrene has been retained as an assessed pollutant in the amended AQIA. - As the relative contribution of the site would be low compared to existing PM_{2.5} sources (i.e. local vehicle traffic), it has been agreed with the EPA that PM_{2.5} does not require assessment in the AQIA. Section 3.5 of the amended AQIA has been updated reflect this. - Section 5.6 of AQIA provides a justification for the use of the average soil concentration. The average concentrations were considered to be most appropriate for use for estimating concentrations from the contaminated area as a whole given the highly variable levels of contamination across the site.

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		used to estimate odour flux during excavation works, rather than, for example, the maximum soil concentration.	
A34	2.10	Block 5 Remediation, Environmental Impact Statement (SSD 6533) - On page 4 of the EIS, reference is made to BTEX as consisting of ethylene, which is incorrect. - Table 4, page 44. The marine trigger value quoted for ammonia is 4830 ~g/L. The value appears to be pH corrected from the default ammonia trigger value. An explanation is required as to why a pH of 6.7 was adopted for determining the ammonia value and how many pH measurements this was based on. An explanation is also required as to the effect of having treatment levels set at this value, when there is the potential for pH to change to about 8 down gradient nearer to Darling Harbour.	- This is a typographical error. The EIS should have referred to ethylbenzene. - The ammonia trigger value of 4830 g/l is stated in the VMP HHERA (see Appendix L of the EIS), which has previously been reviewed and agreed by the NSW EPA and Site Auditor. The source of the ammonia trigger value is described on page 83 of the VMP HHERA. It is noted that Table 4 in the EIS are not treatment levels, but rather they are criteria established in the VMP HHERA as part of remediation goals associated with the EPA Declaration. In relation to potential discharge to the harbour treatment levels for ammonia would be as prescribed by the NSW EPA in a relevant Environment Protection License.
A35	2.11	Barangaroo Block 5 Soil and Water Impact Assessment Report - Dewatering and pumping of groundwater will take place as part of the remediation works. It is unclear what effect if any will this have on the flow of ground water towards the harbour, either during or after pumping. - Section 7.3 suggests that no heavy metals will be treated by the WTP although some heavy metals including lead have been found dissolved in groundwater. An explanation should be provided as to how heavy metals such as lead would be removed if found in exceedance of the license limit dissolved in water. - For bioaccumulative or acutely toxic pollutants (such as PAHs), a mixing zone is not allowable, therefore dilution alone cannot be	The Soil and Water Impact Assessment Report has been amended as follows: - Clarification added to Section 5.6.5 that there will be no impact on groundwater flows. - Clarification added to Section 7.3 that the WTP will be designed to ensure the heavy metal limits will be complied with. - Clarification added to Section 8.2 and Section 8.4 confirming that diverters and storage basins will be used during unexpected failures of the WTP to prevent discharge of "untreated" or non-compliant waters into Darling Harbour. - Clarification added to Section 8.4 explaining the



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		relied upon for providing a means to achieve compliance with license conditions. Use of diverters and storage basins (as stated in section 8.7.3) during unexpected failures to prevent discharge of "untreated" or non-compliant waters into Darling Harbour is the preferred response. 4. The turbidity-TSS relationship may be influenced by the pollutant load of the suspended particles. It is essential that for the analysis of organic contaminants (eg. PAHs) in waters, the samples are not filtered prior to any extraction procedures in the lab. Or if filtered, then the filtered particulate is also extracted, and added to the filtrate (or extract) for the analysis. This will inform the level of contaminants to expect for a given amount of turbidity/TSS. Generally, the turbidity-TSS relationship can vary widely depending on the type of particulate matter causing the turbidity/TSS. It is therefore recommended that the proposed limit of turbidity/TSS be re-evaluated after a relationship is established using the method suggested above. 5. Given that treated waters will continue to discharge before analytical results confirm compliance (weekly sampling plus analysis lag), it may be prudent to extend the commissioning phase to one month to better understand treatment and chemical variabilities in the feed and discharge waters.	methodology for determining site-specific turbidity-TSS relationships. 5. Clarification added to Section 8.5.1 confirming that the commissioning period will be extended from 2 weeks to 1 month.

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A36	2.12	Health Impact Assessment 1. A definition of and method to determine "highly contaminated liquid" is required to establish what water will be transferred to the onsite WTP for treatment and licensed discharge and what pumped by licensed liquid waste contractors (vacuum truck) and disposed of off-site. 2. During large rainfall events, overflows, leaks and blockages, there may be a potential for migration of contaminants directly into the harbour or into clean stormwater systems. The control measures that will be used to manage these scenarios should be provided and discussed. 3. The EPA recommends the HIA should be revised to consider the potential "mist derived" exposure pathways. In addition, details should be provided on the controls that will be used to manage any associated risks. Mists that may be laden with POPC/dust have the potential to be inhaled by exposed receptors. In addition, there is the potential for contaminated surface water, soil and sediments to result and accumulate over a significant area from the use of mist sprays.	The HIA has been amended as follows: 1. Clarified in Section 3.1 of the amended HIA that highly contaminated liquid will be determined as liquid having a strong odour or high level of visible contamination, such as surface water sheens or a smell of tar or petroleum. 2. Added section 3.3.4 to the amended HIA, which clarifies that the environmental control measures would be regularly checked to ensure their ongoing integrity and operability, and that any spillages would be appropriately managed in accordance with an Emergency Response and Contingency Plan as specified by the RAP. 3. As discussed with the EPA, mist is not considered to be an additional pathway as the misting sprays will reduce the existing potential off-site dust exposure pathway. The only risk associated with misting sprays relates to the accumulation of moisture or liquids from the sprays. This liquid would be monitored and controlled as part of the site surface water management plan). Section 7.2.2 of the amended HIA has been updated to reflect this.
Noise and Vibration (EPA)			
A37	3.1	Construction Noise Assessment ▪ It is unclear whether mitigation measures have been factored into the noise model. The noise and vibration assessment suggests a 2.4m barrier is included while the modelling assumptions do not include this. ▪ The proponent has not provided sufficient evidence to justify why the 24 hour noise sources (odour control enclosure, wastewater treatment plant and bentonite treatment plant) supporting remediation work should not be assessed in accordance with the NSW Industrial Noise Policy.	The Construction Noise and Vibration Assessment Report has been updated as follows: ▪ Section 2.4 and Section 6 have been updated to reference that a 2.4 m barrier / hoarding was included in the acoustic modelling. ▪ The Interim Construction Noise Guideline is the appropriate guideline to apply to construction-related excavation works. It is however noted that night-time noise is in all cases predicted to be less than 35dBA which is the most conservative and

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			limiting criteria established under the NSW Industrial Noise Policy. It can therefore be inferred that the night-time noise levels would comply with the NSW Industrial Noise Policy. No update to Construction Noise and Vibration Assessment Report is considered to be required.
A38	3.2	Construction Vibration - British Standard (BS) 6472-1992 has been superseded by a 2008 version of the standard. The proponent should justify why the criteria for exposure to continuous vibration in the 1992 version has been adopted. - The assessment does not provide discussion of monitoring or mitigation measures for cosmetic or structural damage from vibration.	The Construction Noise and Vibration Assessment Report has been updated as follows: - Corrections have been made to make reference to the current version of standard, including to the current relevant criteria. - Section 7 has been amended to include the recommendation for vibration monitoring.
A39	3.3	Construction Traffic Noise It is unclear whether construction traffic noise will exceed the relevant RNP absolute and relative change criteria outside the peak AM or PM period where existing traffic volumes (and hence noise levels) on local roads may be lower.	Section 9 of the Construction Noise and Vibration Assessment Report has been updated to clarify that the noise levels on Hickson Road exceed of the RNP day-time traffic noise criteria at all times during the hours of proposed for remediation works.
A40	3.4	Cumulative noise and vibration Mitigation measures are not discussed.	The Construction Noise and Vibration Assessment Report has been updated as follows: - Mitigation measures from the Noise and Vibration Sub plan for the Barangaroo South Site have been included in the amended report - Appendix E has been added to the amended report which assesses the reasonable and feasible noise mitigation measures.
A41	3.5	Mitigation Mitigation measures are provided as recommendations only, and do not discuss whether they are feasible or reasonable or quantify the	The Construction Noise and Vibration Assessment Report has been updated as follows: Mitigation measures from the Noise and Vibration Sub plan

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		benefits. ▪ It is recommended that the EIS is revised: - To include a consolidated list of noise sources; a discussion of all feasible and reasonable noise and vibration mitigation measures for each source; and a justification for selecting a specific mitigation measure(s) along with an estimate of its benefit and whether it will achieve the appropriate criteria, - Clearly set out what mitigation measures are included in the noise model. ▪ The adequacy of Construction Noise and Vibration Plan and discussion of whether it includes feasible and reasonable mitigation to manage noise form Block 5 is unclear. The EIS suggests the plan will be updated to take account project specific noise and vibration management measures discussed within the noise assessment. It is unclear whether the mitigation measures will be adopted within enforceable consents, licences or conditions. ▪ It is unclear whether compliance with the highly noise affected noise management level of 75 dB(A) is based on recommended mitigation measures being put in place. ▪ The EIS does not provide any indication of monitoring procedures as required by the SEAR. ▪ The EPA recommends that the applicant must: - Provide justification for assessing 24-hour operations in accordance with the construction noise criteria in the INCG instead of the NSW INP; - Clarify if the noise modelling has taken into account any noise mitigation measures; - Provide further details of the feasible and reasonable mitigation	for the Barangaroo South Site have been included in the report ▪ Appendix E has been added to the report which assesses the reasonable and feasible noise mitigation measures. ▪ Section 2.4 and Section 6 have been updated to reference that a 2.4 m barrier / hoarding was included in the acoustic modelling. ▪ As described in Section 6 of the Construction Noise and Vibration Assessment Report the acoustic modelling assumes a “typical worst-case” scenario whereby all the plant is running continuously. As such, the modelling represents likely noise levels that would occur during intensive periods of construction. Therefore, the presented noise levels can be considered in the upper range of noise levels that can be expected at surrounding receivers when the various construction scenarios occur. Application of the noise mitigation measures could therefore result in lower noise levels than predicted, and are aimed at working towards achieving the noise management levels established at surrounding receivers. ▪ Amendment of the Construction Noise and Vibration Management Plan to incorporate Block 5 remediation works is a mitigation measure committed to in the EIS. As such, it forms part of the development application documentation. ▪ Details of monitoring and complaints handling procedures have been included into Section 8. In response to the EPA’s summary recommendations: ▪ See response above to A37,

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		measures that shall be adopted; - Provide justification, and estimate the mitigation benefits; - Provide a commitment from the proponent to implement feasible and reasonable mitigation; - Demonstrate how such commitments shall be enforceable through consents, licences or conditions; and - Provide details of monitoring to audit noise and vibration conditions,	▪ See response above to A37, ▪ See response above to A40, ▪ Application of the noise mitigation measures could therefore result in lower noise levels than predicted, and are aimed at working towards achieving the noise management levels established at surrounding receivers. ▪ The Construction Noise and Vibration Management Plan would be updated to include details of reasonable and feasible management measures that would be implemented. ▪ See above. Amendment of the Construction Noise and Vibration Management Plan to incorporate Block 5 remediation works is a mitigation measure committed to in the EIS, and so forms part of the development application documentation. ▪ See above. Details of monitoring and complaints handling procedures have been included into Section 8 of the amended Construction Noise and Vibration Assessment Report.
	<i>Water quality (EPA)</i>		
A42	4	The applicant must ensure that the special conditions attached to EPL 13336 relating to the Barangaroo Water Treatment Plants, including E2.1, E2.2 and E2.6, are complied with and that water treatment processes are optimised for potential changes in the quality of water generated from this part of the development and appropriate monitoring is in place to characterise the new wastewater stream. The EPA recommends that any new WTP to be installed at the site must be designed to meet all likely flow scenarios as well as the concentrations limits attached to Environment Protection Licence (EPL) 13336.	Noted.

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	<i>Waste (EPA)</i>		
A43	5.1	The proponent will need to update all references to the new Waste Classification Guidelines published in November 2014, and ensure it meets the requirements of the new guidelines.	The applicable sections of the Waste Management Plan (WMP) have been updated to include reference to the NSW EPA (2014) <i>Waste Classification Guidelines</i> .
A44	5.2	There appears to be some inconsistencies regarding the remedial strategy. In JBA 2014, it appears offsite treatment of contaminated waste followed by offsite disposal is the preferred remedial strategy (page 36). However, Page 84 of JBA 2014 and section 6.2.1 in AECOM 2014 indicates that treated material may potentially be reused onsite at Barangaroo.	Sections 2.1 and 6.2.1 of the WMP have been updated to confirm that treated materials from the site will not be reused at Barangaroo.
A45	5.3	It is EPA's position that hazardous waste treatment by stabilisation or solidification followed by reuse for land application is not considered to be eligible for a resource recovery exemption given the contamination is not removed or destroyed, and will require ongoing monitoring. The proponent will need to clarify the remediation strategy consider disposal of all materials after treatment.	Sections 2.1 and 6.2.1 of the WMP have been updated to confirm that all treated (stabilised) materials will not be reused and will be appropriately disposed of to a NSW EPA licensed landfill facility.
A46	5.4	The EIS indicates that Hazardous Waste that has been treated may be transported directly offsite for reuse by 'others under a separate approval'. Proponent will need to clarify what the 'separate approval' process is.	As above, Sections 2.1 and 6.2.1 of the WMP have been updated to confirm that all treated (stabilised) materials will not be reused and will be appropriately disposed of to a NSW EPA licensed landfill facility.
A47	5.5	The proponent has referenced the old Waste Regulation 2005, and will need to update all references to the new Waste Regulation 2014.	Sections 3.1 and 5.3.2 of the WMP have been updated to reference the new Waste Regulation 2014.
A48	5.6	In section 5.3.2 of AECOM 2014, trackable waste has been defined to meet either Part 1 or 2 of Schedule 1 of the Waste Regulation. This is incorrect. Waste is considered trackable waste if it meets Part 1 and 3, or Part 2 of the Waste Regulation.	Section 5.3.2 of the WMP has been updated to reference Part 1 to 3 of the new Waste Regulation 2014.

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<i>Site Contamination / Remediation (EPA)</i>			
A49	6.1	The remediation strategy adopted by the RAP is ex-situ excavation followed by onsite treatment. This is the remediation strategy that has been endorsed by the EPA. This remediation strategy implies less demanding handling with respect to the transportation and final disposal of the treated waste because the treated gasworks waste has been stabilised (minimal concerns of offensive odour) and is adequately dry (no concerns of leaking of waste liquid during transportation). As such, the EIS is inconsistent with the RAP in terms of the remediation strategy to be adopted since it proposes transport of waste heavily impacted or saturated by liquid tar in an untreated form.	AECOM has prepared the Block 5 Supplementary Assessment: Off-Site Ex-Situ Transport and Treatment (see Appendix B of the RTS) in relation to the transportation of potentially hazardous waste to an offsite licensed treatment facility. This Supplementary Assessment outlines proposed control measures associated with loading, off-site transport and treatment of hazardous waste, and confirms the consistency of the proposed DA remediation strategy with the RAP. The accredited Contaminated Sites Auditor has reviewed the Supplementary Assessment and concludes that: - off-site treatment is consistent with EPA guidelines if managed appropriately; and - the proposed strategy is consistent with the remediation approach described in the RAP
A50	6.2	- The EIS offers inadequate pollution control measures in terms of the transportation of untreated gasworks waste that is potentially saturated with water and liquid tar, which would have required far more demanding pollution control measures during the transportation of the untreated waste from the excavation site to a treatment location yet to be identified. EPA considers the EIS needs to better explore likely impacts associated with transporting this material and propose controls sufficient to prevent odours and/or chemical emissions. - In particular, odour control measures and the procedures need to be far more elaborated than "applying odour suppressant".	As above, AECOM has prepared a separate report in relation to the transportation of contaminated materials to an offsite licensed treatment facility. This report outlines environmental control measures which will be adopted for these works.
A51	6.3	The EIS provides no information with respect to the receiving end of the untreated gasworks waste other than describing it as a "licensed treatment facility". In view of the scale of the quantity of the tar-impacted gasworks waste to be treated (the remediation of Block 4	The off-site treatment facility has not yet been identified. AECOM's Block 5 Supplementary Assessment: Off-Site Ex-Situ Transport and Treatment sets out the minimum requirements that the selected off-site treatment facility will be required to meet.

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		more than likely switches to offsite treatment as well), the EIS should have provided reasonable information about the final destination of the untreated gasworks waste and provide justification of the suitability of the chosen licenced treatment facility, if such facility has been identified. If such facility has not been identified, the EIS should provide specifications of such facility that will meet the environmental requirements for treating gasworks waste.	
City of Sydney			
A52	1	Monitoring The Department should request details from the Applicant regarding their monitoring of air quality and noise and what they have learnt that can be incorporated into the Block 5 methodology.	Lend Lease operate comprehensive noise and air quality monitoring programs across Barangaroo South. This monitoring is proposed to continue throughout the Block 5 remediation works, using the same equipment and monitoring locations for consistency. The understanding of site issues and how the works interact with sensitive receptors will inform the monitoring and management programs established for the Block 5 remediation works. For example, ambient VOC monitoring is proposed to use PID equipment rather than AreaRae equipment, which was found to have reliability problems during earlier Stage 1A works.
A53	2	Construction Noise and Vibration The noise report has recommended some engineering controls to the plant and equipment used on the site as well as a complaints handling management system. It is recommended that these recommendations are formalised through the consent granted with consideration for the success of the existing controls.	The recommendations in the Construction Noise and Vibration Assessment Report have been included in the schedule of mitigation measures set out in Section 9 of the EIS. Lend Lease would not object to consent conditions that required the implementation of these recommendations.
Jemena			
<i>Page 1 Summary (Jemena)</i>			
A54	1	Characterisation of Development	It should be noted that there is nothing in relevant planning

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		Jemena submits that “<i>The works, if carried out, go substantially beyond what is “required” or “appropriate” to facilitate the removal of the EPA Declaration. In reality the works have been designed to serve the separate purpose of the Barangaroo development. It is an artificial construct to seek to describe and justify the works as being specifically for remediation to enable the removal of the EPA declaration and not for the separate purpose of facilitating the Barangaroo development..</i>” a) The Barangaroo Concept Plan approved under the Environmental Planning and Assessment Act 1979 (which is relied on in the EIS to support the Block 5 DA) designates using Block 5 for commercial and residential buildings, The excavations proposed in the Block 5 DA match the shape and area proposed for the development of Block 5 rather than the shape and area of the remediation extent identified in the applicant’s HHERA and RAP. The RAP only shows a portion of the proposed area of excavation as requiring remediation; b) The RAP for the Block 5 remediation works makes it clear on page 94 that Lend Lease would select the appropriate remediation approach only after decisions had been made about the nature of the proposed development of the site; c) The EIS contemplates that Block 5 will be used for the Barangaroo project and that further applications will be made for the buildings to be located on Block 5. The EIS uses the consistency of the excavation with the Concept Plan and future development to justify the remediation approach (see page 3). The EPA Declaration area is zoned Mixed Use and the Concept Plan approves the use of Block 5 for large buildings, which will necessarily require deep excavations to facilitate their construction. Block 5 is designated for commercial development and will need to be excavated to facilitate that development. The	legislation that requires the scope of a development application involving remediation to remove a Declaration made under the <i>Contaminated Land Management Act 1997</i> to be limited to what is required to remove the Declaration. Nevertheless, in this case, the extent and scope of remediation at Block 5 is limited to that which is required to remove the EPA Declaration, as clearly set out in the EIS and RAP (AECOM, 2013). Any additional excavation or remediation associated with development works at Block 5 would be the subject of a separate RAP and a separate development application. In response to the specific reasons put forward by Jemena for this assertion: a) The indicative remediation extent is shown in red boundary in the DA plans (see Appendix E of the EIS) which reflects the anticipated remediation extent as shown in the RAP (AECOM, 2013). b) Section 11.3 (P94) of the RAP (AECOM, 2013) makes it clear that the Preferred Remediation Option has been developed to facilitate removal of the NSW EPA Declaration and on the basis that the nature of future development of Block 5 is yet to be defined. c) The Director-General’s Environmental Assessment Requirements require that the EIS assess the consistency of the proposed Block 5 remediation works against the Barangaroo Concept Plan and other strategic planning documents. The EIS specifically states that whilst the proposed remediation works do not provide for any development for particular land uses at Block 5, they do not negatively impact on the future development of Barangaroo in accordance with the Concept Plan (as modified). Further, it states that the details of future development will be the subject of

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		EIS includes a statement that confirms that the applicant knows the excavations need to occur irrespective of the contamination and is consistent with the applicant selecting the remediation approach of excavation to facilitate the future development of the Barangaroo site. If the applicant is proposing to use the site for basements and the Barangaroo development, the applicant should state this in the Block 5 DA and include that development in the Block 5 DA to enable a proper assessment of impacts of the proposal to be made. This is information relevant to the Block 5 DA; d) The Block 5 DA is for excavation of all of Block 5 and areas outside of Block 5. It proposes excavation of all material to bedrock and includes substantial areas outside of the "blue" area that the applicant's HHERA/Remediation Extent documents identify as requiring remediation; e) The Block 5 DA includes the construction of walls which will be used for the basement walls for car parks for future buildings; f) The Block 5 DA includes excavation outside of the EPA Declaration area; g) The EIS eliminates options for remediation such as in situ stabilisation or solidification because these may be inconsistent with future land use (section 6.2). No proper consideration has been given to in-situ remediation options which may have less substantial environmental impacts because they are incompatible with the proposed development on the site and the Barangaroo Concept Plan; h) The proposed splitting and staging of the remediation has been adopted solely for the purpose of the Barangaroo development. Blocks 4 and 5 (where ex-situ remediation is proposed) are	separate development applications, within which strategic planning matters will be appropriately addressed. d) The Block 5 DA does not propose the excavation of all of Block 5 to bedrock. It proposes excavation of part of Block 5 sufficient to remove contaminated materials in order to facilitate removal of the EPA Declaration (defined by the RAP (AECOM, 2013) as the VMP Remediation Works). As detailed in Section 8.5 of the RAP (AECOM, 2013), the vertical extent of remediation within Block 5 will be to the depth of the underlying natural bedrock to a maximum depth of 10 m below ground level (bgl). It is noted that some excavation outside the VMP Remediation Extent in Block 5 may be required to facilitate excavation of the nominated VMP Remediation Extent (eg. battering of excavations). e) The Block 5 DA does not include the construction of any retention walls which could be used for the basement walls for car parks for future buildings. f) There is a small area of contamination that has been identified through contamination investigations that is outside of the EPA Declaration Area. However, consultation with the EPA has confirmed that EPA Declaration Area is indicative only and that remediation to remove the EPA Declaration may need to occur outside of the specified boundary if gas works contamination is identified. Remediation outside of the EPA Declaration Area is proposed only to this extent and in order to address the EPA Declaration. g) Section 6.2 of the EIS explains that in-situ stabilisation or solidification are inappropriate because they will likely

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		development blocks. Hickson Road (where in-situ remediation is proposed) is a public road outside of the Barangaroo development area. The need to split and stage remediation is entirely driven by the Barangaroo development (see for example section 19.2.1 of the RAP); and i) A HHERA dated 2011 was prepared for the applicant for the development works in the EPA Declaration area, which assumes that Block 5 will be excavated for basement car parking and that HHERA develops remediation criteria based on the excavations occurring and basements being installed. This HHERA was approved by the EPA pursuant to condition A8 of Project Approval MP10-0023 on 9 June 2011. In these circumstances, the Block 5 DA and its supporting material should be treated with caution. It would be an error for the Department and the Minister to proceed on the basis that the proposal is justified from a planning perspective, because the proposed development in Block 5, as described in the Block 5 DA and supporting documentation, is required to remove the EPA Declaration. If the applicant needs to excavate Block 5 for the purposes of the Barangaroo project, irrespective of the contamination, then this is a matter which should be disclosed and made clear, and properly assessed, as part of the Block 5 DA.	require on-going environmental management (such as ongoing dewatering of the treatment area and long-term monitoring) because the contaminated material is not removed or destroyed. Onsite containment is the less preferred approach identified by the EPA and the National Environment Protection Council in the hierarchy of clean-up and management protocols. h) The benefits of splitting and staging the remediation works across Block 4, 5 and Hickson Road take into account the different ownership arrangements, development extent and current land use, and afford the opportunity to ensure the most appropriate remediation strategy is adopted for each of the 3 remediation areas. In particular, Block 5 is an undeveloped and largely unused site whereas Hickson Road is an operational public road. An in situ remedial approach that minimises ground level disturbance to Hickson Road is the preferred remediation option and more appropriate on the public road, whereas an ex situ remediation approach (but with higher ground level impacts – such as excavation as proposed at Block 5) is more suitable on the vacant block. i) The relevant <i>VMP Human Health and Ecological Risk Assessment</i> (2012) for this DA is appended to the EIS, dated October 2012, does not assume that Block 5 will be excavated for basement car parking. The <i>VMP HHERA</i> (AECOM, 2012) is based on consideration of risk to human health and the environment under land use scenarios prior to development and land use scenarios allowable at the Site without a development approval. The partial excavation of Block 5 is required to address the

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			EPA Declaration, insofar as the EPA Declaration relates to Block 5 (noting that the EPA Declaration also applies to part of Block 4 and part of Hickson Road).
A55	2	Inconsistency between HHERA and Development Application The applicant's reliance on the previous HHERA risk assessment and RAP to justify the remediation approach is flawed. The HHERA states that the contamination in the EPA Declaration area presents unacceptable risks because an unprotected maintenance worker may dig 2 metres below the surface of the site and that the existing contamination may impact on groundwater dependent ecosystems (GDEs) within the vicinity of the site or possibly Darling Harbour. The HHERA concludes that these are unacceptable risks which drive the need to remediate the contamination. The HHERA is flawed and inconsistent with the excavation approach in the Block 5 DA because of the following reasons: a) The HHERA does not consider that workers accessing service trenches on the site could wear personal protective equipment as part of a management plan. The RAP and Block 5 DA, however, propose the excavation of the contamination which will directly expose workers and surrounding residents to the contamination. The health risk assessment accompanying the Block 5 DA is based on the workers wearing protective equipment as well as management plans and odour control systems. If a valid comparison is to be made between the health risks of managing the contamination in situ and ex situ removal, then the HHERA and the health risk assessment for the application should use the same assumptions about use of personal protective equipment. Instead, the unreasonable assumption that maintenance workers would not use personal protective equipment when excavating the existing site is used to drive a result that all contamination should be removed from the site. This is absurd. The fallacy of this	The EPA through the Declaration has determined that the site is significantly contaminated land which is significant enough to warrant regulation. Under the Contaminated Land Management Act 1997 (CLM Act) a Voluntary Management Proposal (VMP) has been agreed with the EPA to remediate the significant contamination referred to in the EPA Declaration. The VMP required various investigations to be undertaken and a remedial action plan to be developed which was approved by the EPA and an independent site auditor accredited under the CLM Act. The VMP required, amongst other things, preparation of a HHERA to identify the site specific acceptance criteria for the site and for the remediation works. The <i>VMP HHERA</i> (AECOM, 2012) for the VMP Remediation Works Area has sought to establish appropriate acceptance criteria in the context of existing land uses allowable without a development approval. In addition the VMP/Block 4 RAP sets out remediation objectives that must be met. a) The objective of the <i>VMP HHERA</i> (AECOM, 2012) was to derive remediation criteria which would be acceptable to remain in-situ under existing land use scenarios, to address the NSW EPA Declaration. Reliance on the use of appropriate protective clothing to manage risk of contamination exposure of onsite workers involved in excavation of soils at the Site would require implementation of a Long Term Environmental Management Plan. On-site containment and the implementation of a Long Term Site Management Plan was not the preferred remediation option, as it is the least

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		approach is demonstrated by the applicant currently using the EPA Declaration area for its construction activities, the use of the site to accommodate 100,000 people for the papal visit, the installation and use of Sydney Water's underground sewer pumping station under Block 5, the way the site has been managed for 90 years by the NSW Government and the applicant's use of such measures to manage the risk in positively exposing the contamination to the environment through its remediation approach; b) The HHERA is based on an assumption that GDEs are present and that these need to be protected. It uses this as justification for unacceptable risk which drives the asserted need to remediate the site. The HHERA is inconsistent with the development HHERA approved by the EPA on 9 June 2011, which does not mention GDEs. Further, the development applications for Block 4 and Block 5 now state that there are no GDEs on the site and are used to justify a conclusion that the environmental impacts are acceptable because excavation will not impact on GDEs. The applicant cannot have it both ways. Either the HHERA, which concludes that the GDEs need to be protected, is flawed and needs to be re-done or alternatively the consent authority needs to assume the GDEs are present consistently with the HHERA to determine the application (in which case the Block 5 DA must be rejected because the HHERA concludes that the site should be remediated to protect the GDEs). Jemena's view is that there are no GDEs present so that the conclusion to be drawn is that the HHERA/RAP is flawed and cannot lawfully be used as a basis to approve the Block 5 DA; and c) There is no evidence that the contamination of the site poses a threat to Darling Harbour. The discharge study undertaken by the Barangaroo Delivery Authority's consultants, which is referred to	preferred management approach under the EPA's hierarchy of controls. The approach of assuming no management plan would be in place was adopted to enable derivation of remediation criteria which would be sufficiently conservative where no management plan is present for current and ongoing land use scenarios. An objective of the <i>RAP</i> (AECOM, 2013) was to incorporate the remediation criteria derived from the <i>VMP HHERA</i> (AECOM, 2012) into a strategy for undertaking remedial works at the Site such that soil and groundwater contamination would not impact on the existing land uses at the Site or the environment. An objective of the <i>HIA</i> (AECOM, 2014) was to undertake a qualitative assessment of the potential health risks arising from completion of the remediation works. The <i>HIA</i> (AECOM, 2014) was prepared on the basis that OHS risks during construction can be controlled by the use of management measures such as wearing appropriate PPE. The approach and methodology used in the <i>VMP HHERA</i> (AECOM, 2012) and the <i>HIA</i> (AECOM, 2014) are consistent with current guidance. However, as the objectives are very different for each document it is not intended that the <i>VMP HHERA</i> (AECOM, 2012) and <i>HIA</i> (AECOM, 2014) should be directly compared. The approach and methodology set out in the <i>VMP HHERA</i> (AECOM, 2012) and <i>RAP</i> (AECOM, 2013) have been endorsed and approved by the Site Auditor and the EPA.



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		in the RAP, confirms that the contaminants from the EPA Declaration area do not impact on the harbour because tidal flux in the imported fill. The statements in the EIS that the contamination is discharging to Darling Harbour in excess of the MWQC (see for example, page 92) are false.	b) The EPA instructed AECOM to consider the protection of GDEs at the down hydraulic gradient boundary of the EPA Declaration Area. The VMP HHERA (AECOM, 2012) identified a potential unacceptable risk to GDEs at the EPA Declaration Area down hydraulic gradient boundary. The MWQC were adopted at the direction of the NSW EPA¹, as suitable screening criteria that are protective of the environment including: GDEs which may be present down hydraulic gradient of the EPA Declaration Area boundary currently or in the foreseeable future. Exceedances of the MWQC have been identified in groundwater within the site and at the site boundary indicating the potential for an unacceptable risk to the environment. The Auditor supports the selection of ecological receptor, and the assumption on GDEs. In his Site Audit Report, the Auditor states <i>"The closest ecological receptors identified in the VMP HHERA (AECOM, 2012d) are aquatic ecosystems within the groundwater down hydraulic gradient of the site boundary, between the site and Darling Harbour. The Auditor considers that the identified ecological receptor is appropriate"</i> (Environ 2013, pg 59). c) The EIS does not state that contamination is discharging to Darling Harbour in excess of the MWQC. Rather, it states that the "remediation works intend to significantly reduce the risk of future environmental harm

¹ The MWQC were adopted based on an e-mail from the NSW EPA Accredited Site Auditor dated 24 February 2012 (which was understood to be based on discussions between the Site Auditor and the NSW EPA). The MWQC were applied at the EPA Declaration Area boundary based on directions from the NSW EPA received during the project meeting attended by the NSW EPA, the NSW EPA Accredited Site Auditor, the BDA and Lend Lease on 19 June 2012.



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			in the vicinity of the site by removing contaminant mass within Block 5 such that the site is safe for its current and ongoing use, and the discharge of groundwater into Sydney Harbour is improved to a point where it approaches the MWQC". Consistent with the <i>VMP HHERA</i> (AECOM, 2012) and <i>RAP</i> (AECOM, 2013), the proposed Block 5 remediation works intend to significantly reduce the risk of future environmental harm in the vicinity of the site by removing contaminant mass within Block 5 such that the site is safe for its existing use, and the discharge of groundwater from the site is improved to a point where it approaches the MWQC, and groundwater discharge to Darling Harbour is improved.
A56	3	Failure to adequately consider alternatives The applicant has not properly considered the available options for remediation of Block 5. In this regard, the National Environmental Protection (Assessment of Contaminated Land) Measure (NEPM) (which is given effect in NSW as an EPA guideline under s105 of the Contaminated Land Management Act 1997) provides guidance on attainment of environmental outcomes in relation to the hierarchy of options. Jemena contends that <i>"the applicant has not properly applied the NEPM requirements in section 6.2.3 of the EIS. In particular, the applicant has not considered the environmental, economic and social impacts of each option in the context where excavation is not required for the Barangaroo development. A proper consideration of these issues would demonstrate that the proposed excavation of the site is not the best environmental, social or economic way of remediating the site (unless of course the purpose of the excavations is to facilitate the Barangaroo development)."</i>	Section 6.2.3 of the EIS is not intended to satisfy the NEPM requirements. Rather it is intended to satisfy Clause 7 of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i>, which requires that the EIS include an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to the objectives of the development, including the consequences of not carrying out the development, activity or infrastructure. Section 6.2.3 of the EIS satisfactory addresses this requirement. It is the purpose of the EIS to identify feasible alternatives, and to explain why the development subject of the SSDA is the preferred alternative. In support of this consideration, the RAP includes (at Chapter 10) a detailed comparative analysis of the remedial technology options – which considered sustainability, technical, financial, logistical, timing and community issues. This assessment of remediation options in the RAP was undertaken with consideration of NSW EPA policy on their preferred

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			hierarchy of remediation management (NSW DEC 2006). The RAP was prepared consistent with the requirements of the NEPM (RAP, Section 2.2.4). Whilst the Block 5 remediation works are not related to the delivery of the Concept Plan, it is appropriate that the preferred option should not unreasonably constrain development of Block 5 consistent with the Concept Plan. In this way, the preferred remediation option for Block 5 is not inconsistent with the Concept Plan. It is highlighted that the NEPM states that the acceptance of any specific option or mix of options in any particular set of circumstances is a matter for the responsible participating jurisdiction. In this case, the responsible body would be the NSW EPA and under the terms of the VMP the EPA is required to assess and consider the approaches proposed in the remedial strategy.
A57	4	Inconsistency with Block 4 DA The Block 5 DA is inconsistent with the development application for remediation of Block 4. The development application for Block 4 is based on using Block 5 for a remediation enclosure for the treatment and storage of material excavated from Block 4. The Block 5 DA involves excavating Block 5 as from April 2015 for 24 months. These two applications seem incompatible.	The Block 4 DA (SSD 5897) is not solely based on a remediation enclosure located on Block 5. The Block 4 DA includes for <u>either</u> on-site treatment, or for treatment at an off-site facility. Accordingly, the Block 4 DA can be undertaken with no on-site treatment/remediation enclosure, allowing the Block 5 DA to be concurrently undertaken with excavation on Block 4. These two applications are therefore consistent with each other. It is further noted that the program of works presented in the Block 5 DA was indicative to guide the assessment of potential worst-case impacts, assuming works were concurrent with Block 4 remediation.
A58	5	Proposed excavation exceeds remediation extent The development contemplated by the Block 5 DA involves excavation of a large area of land which is much larger than the "blue" area which	The figures provided in pages 45 and 46 of the EIS are extracts from the RAP (AECOM, 2013) and so identify the proposed remediation extent.



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		is identified in the applicant's own HHERA/Remediation Extent/RAP documentation as requiring remediation (see pages 45 and 46 of EIS). The "blue area" overestimates the area requiring remediation in any event. The environmental impacts of the remediation could be substantially reduced by limiting the remediation to the contaminated areas identified in the applicant's documents.	The DA Site (as shown in Figure 2 (page 9), and described in Section 2.2 of the EIS) includes additional land for the purposes of further excavation (e.g. battering to access the material required for remediation) and remediation related logistics and storage. This additional land is not proposed to be remediated. The remediation extent is as described in Section 7.2.3 of the EIS and shown in Figures 5 and 6 (pages 45 and 46), subject to the validation protocols established in the RAP (AECOM, 2013).
A59	6	Incomplete information The EIS contemplates that Block 5 will be used for the Barangaroo project and that further applications will be made for the buildings on Block 5. The EIS uses the consistency of the excavation with the Concept Plan and future development to justify the remediation approach. The consent authority cannot properly evaluate the Block 5 DA and its relationship with the Barangaroo project in the absence of the development applications for Block 5 or the applicant disclosing what arrangements it has in place for the development of Block 5. In our submission, the consent authority cannot properly assess the Block 5 DA in the absence of this information.	The proposed remediation extent within Block 5 has not been developed on the basis of any future development at Block 5. It has been determined on the basis of continuation of the current land use with the purpose being the removal of the EPA Declaration (i.e. 'VMP Remediation Works'). Consistency with the Concept Plan has not been used to justify the remediation approach. The remediation approach has been selected based on the RAP, which provides for either a preferred in-situ chemical oxidation method (subject to pilot trial) or an alternate ex-situ remediation method. The in-situ remediation option under the RAP is not preferred in SSD 6533, as review of the initial pilot Trial (Proving Phase Trial) indicated that the in-situ chemical oxidation method was unlikely to be as suitable in the heterogeneous fill material of Block 5 compared to ex-situ remediation of material in this area. Consequently, the alternate ex-situ remediation method, per the RAP, has been selected for SSD 6533. The SEARs and the Environmental Planning and Assessment Act 1979 require that the proposal be assessed against the approved Barangaroo Concept Plan to ensure it is consistent with that Concept Plan. Given the nature of the proposed remediation works (i.e. not being works that facilitate the



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			delivery of the Concept Plan) consistency with the Concept Plan has only been considered to the extent that the remediation works would unreasonably constrain the future development of Block 5. As set out in Section 3.3 of the EIS, the proposed VMP Remediation Works do not negatively impact on any future development of Barangaroo contemplated in the Concept Plan (as modified).
A60	7	Increased risks relative to current state The applicant has failed to explain whether the undertaking of the works as proposed would result in a more significant risk of harm to human health or the environment than ongoing lawful use of the land in absence of the development work. The proposed development creates a health and environmental risk as it involves exposing the contamination to persons and creating and discharging contaminants into the harbour. These are the issues that the HHERA sought to prevent. The applicant should undertake a comparative risk and environmental analysis of managing the contamination in situ based on existing use and excavating the material and exposing it to the environment. The applicant has not done this. In this respect, a valid comparison would require an undertaking of risk and environmental analysis using the same human health and environmental risk assessment criteria for the development application (which contemplates exposing the contamination to the air, protected workers accessing the subsurface and direct discharge of treated wastewater to the harbour) as is used in the HHERA/RAP (which is based on the contamination being presently covered with concrete capping, an assumption that unprotected workers will access the subsurface, no evidence of discharge of elevated contaminants to the harbour but an assumption there are GDEs on the development site requiring protection).	The <i>VMP HHERA</i> (AECOM, 2012) demonstrated that there is potential for unacceptable risks to human health and the environment as a result of the presence of soil and groundwater impacts detected at the Site under existing land use scenarios. The <i>VMP HHERA</i> (AECOM, 2012) identified a potential unacceptable risk to GDEs at the EPA Declaration Area down hydraulic gradient boundary. The proposed remediation for Block 5 will remove soil contamination such that the remaining soil does not represent a significant risk of harm to human health or the environment under existing land use scenarios and comply with the remediation objectives in the <i>RAP</i>. It is considered that successful implementation of the Block 5 remediation works in accordance with the <i>RAP</i> (AECOM, 2013) and related management plans can appropriately mitigate risks to human health and Darling Harbour during the development works. In particular, a comprehensive environmental impact assessment has been carried out, including a Health Impact Assessment. This assessment is documented in the EIS, which concludes that the Block 5 remediation works can be carried out in a manner that can ensure significant adverse environmental effects do not occur and environmental impacts will remain within acceptable



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			limits through the application of appropriate mitigation measures and robust management measures. These mitigation and management measures set out in the EIS include (amongst other things): ▪ Implementation of air pollutant and odour emission controls as provided for in the Construction Air Quality Management Plan - including undertaking all excavation (where practicable) within excavation enclosures from which the emissions will be filtered prior to discharge. ▪ Implementation of a comprehensive air quality monitoring program, involving continuous monitoring where appropriate, and including a reactive management procedure. ▪ Collection and treatment of all contaminated water for treatment at the on-site treatment plant prior to discharge in accordance with an Environment Protection Licence. ▪ A Water Quality Monitoring Program will be put in place to ensure the remediation works are not having an adverse impact on water quality conditions in the Harbour. ▪ Implementation of noise reduction controls and monitoring as provided for in the Construction Noise and Vibration Management Plan. It is necessary to demonstrate that the proposed development does not exceed mandated thresholds for human health and environmental impacts, including Government guidelines, and that on-balance, when a whole range of long term and short term benefits and impacts are weighed up there is a net public interest benefit to carrying out the development. The Block 5 VMP remediation works EIS and this RTS demonstrate that the works can be carried out in a manner that ensures significant adverse environmental effects do not occur and environmental

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			impacts will remain within acceptable limits. The proposed works meet the guidelines in terms of short term impacts and will result in a net public interest benefit in the long term. The proposed remediation works clearly achieve this as they will remove sources of gasworks contamination in order to meet the RAP objectives and the VMP HHERA remediation criteria.
A61	8	Lack of Block 5 remediation detail in RAP The RAP approved by the EPA is missing necessary detail about the proposed excavation of Block 5 and is insufficient, from a planning perspective, to justify granting consent to the Block 5 DA.	The Block 5 DA is not seeking consent to excavate all of Block 5. Excavation is only sought to the extent specified in the RAP insofar as it is required to remediate the contamination and enable the removal of the EPA Declaration (i.e. 'VMP Remediation Works'), plus any ancillary excavation required to access this area (e.g. excavation batters).
A62	9	Ecologically sustainable development (ESD) The analysis of the development in the context of ESD is flawed. It does not properly consider and balance the environmental impacts and risks of the existing contamination within Block 5 (which is of less significance than contamination within Block 4) against the environmental impacts and risks of excavating the contamination and exposing it to persons and the environment. It does not, for example, consider: - the quality of groundwater currently discharging or likely to discharge into Darling Harbour arising from existing contamination, against the quality of water proposed to be disposed of by the applicant directly into the harbour as part of the development, or - the health risks of leaving the contamination in situ against exposing workers and residents by excavating the contamination.	It is sufficient to demonstrate that the environmental impacts of carrying out the works do not exceed mandated thresholds for human health and safety, including Government guidelines. The proposed remediation works meet the guidelines in terms of short term impacts. The principles of ESD were considered in the development of the remediation extent as described by the <i>VMP Remediation Extent</i> report (AECOM, 2013), and again in the EIS. It is anticipated that successful implementation of the Block 5 remediation works in accordance with the <i>RAP</i> (AECOM, 2013), the EIS, and the related management plans can appropriately mitigate potential risks to human health and the environment during the development works. Therefore risks to workers and nearby residents are likely to be low and acceptable. Section 8 of the EIS includes a consideration of the principles of ESD, and concludes that the completion of Block 5 remediation works will



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			- Address the significant risk of harm to human health and the environment identified by the EPA Declaration through the removal of contaminant mass. - Contribute to a long term improvement of ground water quality which is leaving the Site and provide for an improvement to the environmental conditions in the vicinity of the site. - Result in a net public interest benefit in the long term through the removal of the historical legacy of contamination at the Site.
A63	10	Underlying land use to remove EPA Declaration The EIS is silent on identifying the underlying land use which is required to remove the EPA Declaration. The EIS should expressly state what land use is required to remove the declaration so that the remediation can be properly considered and assessed.	The VMP HHERA and RAP which form part of the EIS state that remediation criteria (for VMP Remediation Works) have been developed based on the existing land use within the EPA Declaration Area which is paved open space.
A64	11	Remediation Extent Overstates Remediation Area The remediation area presented in Figure F15 of the VMP Remediation Extent document (which has been adopted and presented in the RAP and EIS) is much larger than that which the underlying bore data supports. The remediation area identified in these remediation documents extends across parts of the EPA Declaration area where no evidence of exceedences of the contamination criteria (SPGWT or CIM) has been reported and where no evidence of contamination exceeding the soil or groundwater SSTC has been found. Attached is a site plan (F007) prepared by Dr Ian Swane that indicates the locations of saturated CIM (including SPGWT) evidenced by the bore logs in the applicant's remediation documents. This shows that there are no exceedences of saturated CIM or SPGWT in Block 5 which is consistent with not needing to excavate all of the material in	As detailed in Section 8.1 of the RAP (AECOM, 2013), the lateral extent of remediation required for protection of human health and the environment (VMP Remediation Works) was determined based on consideration of: - The presence of historic gasworks infrastructure and the distribution of Separate Phase Gasworks Waste and Tar (SPGWT) and Confirmed Impacted Material (CIM) within the respective Site areas; and - The extent of remediation that can be practicably accomplished for the protection of the environment based on: - The standard of remediation that can be practically achieved by the remediation technologies that are most likely to be implemented; - Regulatory policy requirements including:



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		Block 5.	- source removal, removal of NAPL to the extent practicable, and clean-up to the extent practicable as contemplated by the NSW DEC (2007) <i>Guidelines for the Assessment and Management of Groundwater Contamination</i>; - the principles of ESD as required by Section 9 of the <i>CLM Act</i> (1997); and - the principles of the <i>Waste Avoidance and Resource Recovery Act</i> (2001). That is, the extent of remediation is not simply based on the identification of CIM or SPGWT from previous intrusive investigations.
A65		For these reasons, Jemena submits that the application should be refused	The works sought for consent in SSD 6533 are: - remediation works as part of addressing Remediation Site Declaration 21122; and - Category 1 Remediation Works (as defined in SEPP 55), as noted in Section 3.1.3 of the EIS. As a consequence of the above, Clause 12 (1) of SEPP 55 applies. Clause 12 (1) of SEPP 55 states that: <i>“The consent authority must not refuse development consent for a category 1 remediation work unless the authority is satisfied that there would be a more significant risk of harm to human health or some aspect of the environment from the carrying out of the work than there would be from the use of the land concerned (in the absence of the work) for any purpose for which it may lawfully be used.”</i> The Block 5 remediation works EIS and this Response to

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			Submissions demonstrate that undertaking the works the subject of SSD 6533 would not result in a more significant risk of harm than if the works were not carried out. In particular the proposed Block 5 remediation works: ▪ Comply with the relevant guidelines in terms of short term impacts associated with the emission of pollutants to air and water. ▪ Address the significant risk of harm to human health and the environment identified by the EPA Declaration through the removal of contaminant mass. ▪ Contribute to a long term improvement of ground water quality which is leaving the Site and provide for an improvement to the environmental conditions in the vicinity of the site. ▪ Result in a net public interest benefit in the long term through the removal of the historical legacy of contamination at the Site. Accordingly, Clause 12 of SEPP 55 should inform the determination of SSD 6533.