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Department of Planning and Environment
Attention: Rose-Anne Hawkeswood
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Dear Madam

Port Kembla Gas Terminal – EPA Comments on Environmental Impact Statement

I am writing in response to the Department of Planning and Environment (DPE) request of 13 November 2018 to provide advice on the exhibited Port Kembla Gas Terminal development application (DA) (CSSI 18_9471). The proposal, if approved, will require Environment Protection Licences issued by the Environment Protection Authority (EPA) for both the construction and operational phases of the project.

The EPA has reviewed the Environmental Impact Statement (EIS) and provides comments in the attachment to this letter (Attachment 1). The comments highlight areas where the EPA recommends the proponent provide further information and clarification to assist DPE in the assessment of this proposal.

The EPA considers that the two focus areas for further attention by the proponent are:

- Water Pollution – including Cold Seawater discharges from the Floating Storage and Regasification Unit (FSRU) and the operation of the associated Marine Growth Prevention System (MGPS).
- Contamination Management – including dredging and spoil disposal.

The EPA may have further comments upon receipt and review of this information. The EPA can meet with DPE at a mutually convenient time to discuss any of our comments.

Should you require any further information please contact Greg Newman on (02) 4224 4100.

Yours sincerely

14/12/18

PETER BLOEM
Regional Manager Operations Illawarra
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Attachment 1: EPA submission on Port Kembla Gas Terminal

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Attachment 1

EPA Submission on Port Kembla Gas Terminal

Contents

Water

Appropriate Level of Protection for Port Kembla Harbour

The work of the community, government and industry since the 1970's has led to a significant reduction in pollution across Port Kembla Harbour and the quality of the marine environment has markedly improved. Large reductions in the concentrations of pollutants, including heavy metals, have occurred. There has been an increase in marine biodiversity and aquatic organism productivity. Marine life is more abundant across the whole harbour and the levels of contaminants in fish have decreased. These improvements are well documented.

The EIS does not appear to provide an adequate assessment of the impact of the project that is based on an appropriate level of protection for the receiving waters. The EPA recommends the proponent provide a revised water quality impact assessment, taking into account the following advice.

The general approach adopted in the EIS is to state a proposed construction method and then provide a justification on the anticipated level of environmental impact. The established water quality impact assessment methodology in NSW, however, involves the assessment of impacts and an evaluation of any necessary mitigation options. This process is informed by initially establishing the relevant water quality policy setting and the applicable guidelines (and trigger values). The next step is to assess the discharge impacts against these guideline levels and then consider the practical and reasonable mitigation options in the context of the proposal and receiving environment.

Consideration of the environmental outcomes can be separated into the construction phase and the operational phase. EPA policy for development assessments has generally been a pragmatic goal during the construction stage to consider ANZECC 90% species protection trigger values and 95% species protection for contaminants that can bioaccumulate, for example contaminant mobilisation during dredging and disposal.

For the assessment of the operational stage of the proposal, however, 95% species protection (99% species protection for contaminants that can bioaccumulate) should be used as a basis for assessing impacts and developing impact mitigation measures to address potential water quality impacts and protect the environmental values of the waterway. For example, operational stage cold water releases and biocide use.

The EIS states that "*for a working harbour, 80% species protection level criteria are considered to be applicable for this highly modified environment and have been adopted.*" This is not an appropriate level of protection for assessing potential discharges from the site during the projects operation stage and 90% species protection trigger values for highly modified systems should be considered in the first instance for the construction stage. This position is consistent with the water quality objectives utilised for the Port Kembla Outer Harbour Redevelopment Concept Plan planning process which is drawn upon for this proposal.

In a highly disturbed waterway, such as an industrialised port, a reduced level of protection can be used where the nature of the surrounding land use and disturbance to the waterway means that the community would not expect a higher level of protection. In many cases, currently degraded waterways can be eventually restored to the status of a 'slightly to moderately disturbed' and this is the appropriate level of protection where there is a community expectation for this level of waterway health and action can be taken over time to reduce the impacts on a degraded waterway.

In a highly disturbed waterway, a reduced level of protection may be appropriate as a pragmatic short-term goal, with the aim of eventually restoring it to the status of 'slightly to moderately disturbed'. However, it is not acceptable to allow poor environmental management or water pollution, simply because a waterway is currently degraded.

These aims are one consideration in the overall impact assessment. Other considerations include the practicable measures that can be taken to mitigate the impacts of the pollution and maintain or restore the environmental values of the waterway.

The EPA recommends the proponent provide a revised water quality impact assessment utilising the following trigger levels for the specific stages of this project:

a. Construction stage - ANZECC 90% species protection trigger values and 95% species protection for contaminants that can bioaccumulate.
b. Operational Stage - ANZECC 95% species protection (99% species protection for contaminants that can bioaccumulate.

Marine Growth Prevention System (MGPS)

In relation to the proposed Marine Growth Prevention System (MGPS), the EIS does not appear to adequately address the following:

- proposed levels of chlorine discharge and the applicability of the adopted discharge criterion to NSW
- assessment of the mixing zones (both near-field and far-field) and the toxicity of the discharge
- assessment of MGPS by-products in the discharge.

Proposed level of chlorine discharge & the applicability of the adopted discharge criterion to NSW

The discharge from the MGPS will contain residual free chlorine as well various reaction products. The proposed levels of residual chlorine and by-products represent a risk to water quality and ecosystem health. The EIS references the NSW Water Quality Objective (WQO) of 3 µg/L chlorine (based on the freshwater ANZECC trigger value). The assessment, however, adopts an alternative criterion based on a IFC World Bank Group report of 200 µg/L based on free chlorine. This criterion does not relate to potential environmental impact and relates to international industry practice. The US EPA recognises risk to marine waters at 13µg/L (acute chlorine criteria) and 7.5 µg/L (chronic chlorine criteria): See https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table

The IFC World Bank document states that the 200 µg/L:

- applicability should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account;
- when host country regulations differ from the levels and measures presented in the document, projects are expected to achieve whichever is more stringent.

The potential environmental impacts associated with chlorine do not appear to have been adequately assessed in the EIS based on NSW policy settings and relevant WQO. The EPA recommends the document be revised accordingly.

Assessment of the mixing zones (both near-field and far-field) and the toxicity of the discharge

When considering mixing zones and the potential impacts within a mixing area, the EPA recommends several principles be adopted, including:

- the area or volume of an individual zone or group of zones should be limited to an area or volume as small as practicable that will not interfere with the designated uses or with the established community of aquatic life of the receiving waters.
- the shape of the mixing zone should be a simple configuration that is easy to locate in the body of water and avoids impingement on biologically important areas.
- shore hugging plumes should be avoided.
- the mixing zone should avoid impinging on sensitive biological features.
- impacts within mixing zones should be reversible.

- Mixing zones should not be used for chemicals which bioaccumulate.
- Mixing zones should not be used to manage the biostimulant impacts of nutrients, since the stimulation of algae (e.g. phytoplankton) may occur at considerable distances away from the nutrient source and is mediated by the biological characteristics of the waterbody as a whole.
- Mixing zones should not receive concentrations of pollutants that cause acute toxic impacts.

The EPA's policy is that the WQOs should be met at the edge of the area where initial mixing occurs or "near-field" mixing. 'Near Field' relates to initial mixing where the initial characteristics of momentum flux, buoyancy flux and outfall geometry influence the plume trajectory and mixing. Mixing that occurs through buoyant spreading motion and passive diffusion due to ambient turbulence is referred to as 'Far Field' mixing. Mixing zones should not receive concentrations of pollutants that cause acute toxic impacts meaning that acute impacts should be assessed at end-of-pipe. The US EPA recognises risk to marine waters at 13µg/L (acute chlorine criteria) and 7.5 µg/L (chronic chlorine criteria)

The discharge plume is predicted to have been diluted by a factor of four by the time the plume reaches the floor of the Inner Harbour. The seafloor represents an important boundary where WQOs should be achieved. Based on the above dilution factor, 50 µg/L of residual oxidant is expected at the sea floor which is highly elevated above both acute and chronic water quality criteria.

The other boundaries of the mixing zone are not defined in the EIS or whether the WQO of 3 µg/L is achieved at the edge of the near-field mixing zone. Acute impacts within the mixing zone are also not adequately assessed with the aim being to ensure that there is no acute toxicity at the point of discharge or after instantaneous discharge (e.g. within 1 metre). Proposed discharge levels (of 200 µg/L) are about 15 times greater than the USEPA acute toxicity criteria for chlorine (13 µg/L). The EIS states a dilution factor of 30 at a distance of 400m from the discharge point, however this is likely to represent far-field mixing.

Assessment of MGPS by-products in the discharge

In seawater, chlorine reacts readily with dissolved bromide, iodine, ammonium ions, among other elements, to produce a series of products such as chlorine gas, hypochlorous acid (HClO), hypochlorite (ClO^-), hypobromous acid (HBrO), hypobromite (BrO^-), bromate, other halide derivatives, trihalomethanes and halogenated acetic acids.

Bromine ions in the presence of chlorine can be converted to hypobromic acid and hypobromate, and even molecular bromine. Similarly, the co-existing iodide and iodate in seawater can be converted into hypoiodic acid, hypoiodate, and molecular iodine.

The potential impact of by-products do not appear to have been adequately assessed in the EIS. This includes relevant acute and chronic water quality criteria and potential impacts, any cumulative affects, or whether water quality criteria would be achieved at the edge of a near-field mixing zone.

The EPA recommends the proponent provide a more detailed assessment of the potential impact of the proposed Marine Growth Prevention System (MGPS) including:

- an assessment of the environmental impacts associated with the chlorine discharge based on NSW policy settings and relevant NSW water quality objectives.
- consideration of the EPAs mixing zone principles listed above.
- defining the configuration and boundaries of the near-field mixing zone.
- whether the relevant WQOs would be met at the edge of a near field mixing zone for chlorine. residual oxidants and other by-products based on appropriate water quality criteria.
- the potential for acute impacts at the point of discharge and within the mixing zone.
- the effect of temperature on the availability of residual oxidants in seawater.
- where the WQOs are not met at the edge of the near field mixing zone and/or there are acute impacts at the point of discharge, further practical mitigation measures that can be taken to mitigate the impacts of the pollution are assessed, including, but not limited to:
    - potential use of diffusers

- alternative antifouling methods/agents
- dechlorination
- pre-discharge dilution or treatment
- changed discharge location or method.

Cold Seawater discharges from FSRU

The EIS states that during operation, seawater used in the regasification process will be discharged into the Inner Harbour via a horizontal discharge outlet at a rate of approximately 10,000m^3 per hour at up to 7° Celsius cooler than the ambient sea water temperature. EIS modelling predicts that initial mixing will reduce the temperature differential to one degree at each end of the proposed berth and average temperatures within the port are expected to decrease by 0.1 to 0.2 degrees. The EIS indicates that the current warm water discharges from industrial releases into Allans Creek will partially offset the temperature decreases.

The EIS does not appear to have adequately described the impact over each season or in accordance with water quality trigger values in the Australian Water Quality Guidelines. The assessment should consider if the water quality criteria is achieved at the edge of the near-field mixing zone. The water quality guidelines for temperature decreases states, *for cold water discharges, the median temperature should not be permitted to fall below the 20%ile temperature value obtained from the seasonal distribution of temperature data from the reference ecosystem (page 8.2–67 ANZECC 2000, Vol 2).*

A range of alternative mitigation measures has not been adequately assessed to minimise the potential impact of cold water discharge and associated antifouling chemicals, including the use and orientation of diffusers in the design or alternative discharge points such as an ocean discharge.

It is not clear in the EIS if the predicted decrease in temperature by 0.1 to 0.2 degrees, on average, relates to either:

- temperatures with the warm water inputs factored in (and therefore whether current temperatures will remain elevated above natural temperatures due to the warm water discharges); or
- temperatures without the influence of warm water inputs.

The resolution in the *Thermal Plume Modelling* charts (Appendix F) provided is limited and the associated temperature scale should capture the minimum modelled temperature, and not just, *less than 16.5 degrees Celsius.*

The EPA recommends the proponent provides further information on:

- whether the full range of mixing zone principles are accounted for (set out above).
- whether the assessment of initial mixing relates to near-field mixing (defined above).
- whether water quality objectives (set out above based on seasons) would be achieved at the edge of the near-field mixing zone.
- the configuration and boundaries of the near-field mixing zone.
- whether the predicted seawater temperature decreases within the port are relative to current temperature or relative to predicted ambient temperatures if no warm water discharges were present.
- details on the full range of modelled water temperatures.
- where potential impacts do not meet WQOs at the edge of the near field mixing zone, further practical mitigation measures that can be taken to mitigate the impacts of the pollution must be assessed, including but not limited to:
    - use of diffusers
    - pre-discharge dilution
    - changed discharge location or method
    - consider opportunities for reuse of cold water on- or off-site.

Dredging and Sediment Disposal

The EIS appears to provide limited detail on the dredging / excavation and disposal. An estimated 720,000 m3 of material will be excavated and dredged from Berth 101 and moved by truck or barge to a disposal area largely located within the footprint of the proposed Outer Harbour berth structure. The EIS appears to state there may be almost 35,000 haul truck movements over the construction period or 112 trucks per day. The EIS states details on the timing, configuration, and engineering requirements of the Outer Harbour Berth structure are to be finalised. There are existing project and concept approvals for the Port Kembla Outer Harbour Development Expansion (under Part 3A).

EPA supports the reuse and reclamation of materials when it is safe and appropriate to do so. This could include the excavation and dredging of the berth 101 fill material and emplacement in the Outer Harbour for reuse in the future berth structure. The proponent should confirm that dredged and excavated Berth 101 material will be utilised as part of the Outer Harbour berth structure and demonstrate it is aligned with the Port Kembla Outer Harbour Development Expansion. Temporary emplacement of material in the Outer Harbour, particularly land based excavated material, is not an appropriate management measure for this material.

Mobilisation of sediment and attached contaminants

The EIS states that elevated metal levels were found in both the Berth 101 area and the outer harbour, at levels above screening levels, and the potential for mobilisation was flagged during dredging. The sampling was limited but does confirm previous assessments of the harbour that there is acid sulfate soil, and heavy contamination of sediment by metals, and also PAHs. The EIS appears to state that there is a high risk of contaminant mobilisation during the proposed works.

Further assessment is warranted to quantify risks associated with exposure to contamination (relating to delineation of potential contamination, assessment of acid sulfate soil, and contamination characterisation of any excavated or dredged material) during construction and operation of the project. A key risk with dredging and disposal via barge is dissolved and sediment-attached contaminants (particularly fine sediments) migrating away from the dredging and disposal areas.

There remains uncertainty regarding the volume of material to be excavated by long reach excavator and transported by haul truck versus the volume of material to be transported by barge. This will affect the extent of potential contaminant mobilisation.

Specific detail on the water quality controls for the dredging and disposal construction stage does not appear to be provided in the EIS. The EIS appears to defer this to a proposed *Dredging Management Plan* which will incorporate the specific contamination management and mitigation measures. In the absence of detailed project scheduling, contamination management and mitigation measures, the potential impacts of this component of the project are not able to be assessed.

Monitoring is the only mitigation measure proposed for dissolved contaminants and silt curtains are only likely to contain surface plumes. Information provided during the EPA site visit of 3 December 2018 is that silt curtains will not be full length due to the strain on the curtains. This means that the curtains may have limited potential to control dissolved and fine sediment mobilisation. The fines within this sediment mass which are typically associated with contaminants could be released to the water column rather than reach the middle of the bunded area when deposited from split hopper barges. The EPA recommends the assessment and presentation of options to minimise the volume of fines entering the water column.

The EPA recommends the proponent provide further information on:

- staging of the excavation, dredging, and emplacement.
- proposed volumes of barge and truck transported material.

- details of the disposal structure (bunded and armoured areas that will encapsulate contaminated sediment as part of a delineated reclamation area).
- the silt curtain arrangements.

- Further mitigation measures be considered (and presented) to minimise the mobilisation of contaminants, including, but not limited to:
  - additional options to limit fine sediment movement at the dredging area, e.g. a multiple barrier approach, use of clam shell dredge heads.
  - where disposal to the Outer Harbour may be approved, options to minimise the migration of contaminants and ensure maximum placement of sediment in their target location, e.g. a curtain system that can adequately contain the disposal area to adequate depth, a system to allow barges in and out of a curtained area while minimising the loss of sediments and use of fall tubes to convey the sediment to the bed.
  - in the case where a barge would be unloaded into trucks using an excavator and spoil dumped close to the shore line and pushed out using dozers, adequate runoff controls and mitigation measures for contaminates, sediment and acid sulfate soils should be provided
  - the timeframes before material is to be covered and bunds armoured.
  - an appropriately designed silt curtain system, with adequate depth to control fine sediment.
  - the list of proposed contaminants to be sampled.
  - management triggers for sediment and contaminants and specific management actions.
  - the proposed correlation between total suspended solids and turbidity for a range of different sediment types based on an appropriate method, e.g. https://clu-in.org/download/contaminantfocus/sediments/Turbidity.pdf
  - sampling of contaminants during active dredging and emplacement operations.

Disposal Method and Bunding Structure

The EIS states that "Emerged" (up to 4m out of the water) and "Submerged" disposal is proposed. Prior to disposal a stabilising bund will be constructed along the perimeter of the disposal area. The stabilising bund is proposed to be constructed from the granular and sandy material excavated and dredged from the Berth 101 site.

The EIS (Section 3.1 of Appendix F) indicates that the contractor may have areas within the disposal footprint only involving submerged placement and, in this case, dredging may not be required for the construction of a containment bund. There is uncertainty in the EIS regarding how much disposal will be emerged and how much will remain submerged. The fill material within the land-based area to be excavated at Berth 101 may be the material proposed to create bunds. Dredge material from the Inner Harbour and slag may have been used in the berth's construction. The sampling presented in the EIS indicates "relatively minor" contamination. The EIS states, that dioxin levels in excavated sediments are not considered further based on low human health risks but aquatic ecosystem risk does not appear to be adequately assessed in relation to emplacement in the Outer Harbour (Appendix E1, page 47).

The EPA recommends the proponent provide further information on the suitability of the excavation and dredge material to be used for outer bunding material, including but not limited to the following:
- the acceptability of contaminant levels and potential for hotspots to be present.
- the potential for acute and chronic toxicity of material that would be part of an outer bund that may be colonised by marine life between proposed armouring.
- ensuring material with elevated dioxin, BaP (TEQ) or hydrocarbons in the land-based fill are adequately quantified and characterised and not used for bunding material where there could be impacts to the water quality of aquatic ecosystems.

Monitoring

The EIS states that continuous turbidity monitoring is proposed to be undertaken using a series of monitoring buoys to provide impact and background data (turbidity (NTU), pH, temperature). A Water Quality Monitoring Program is proposed to ensure no exceedance of a marine water quality criterion

of background plus 50 mg/L of suspended sediment. Subject to the detail of the assessment and the proposed *Dredging Management Plan* this criterion may not be adequate to manage the potential risks of dissolved, and sediment attached contaminant mobilisation. Water samples and laboratory analysis for an agreed set of contaminants is proposed to be undertaken on a weekly basis during dredging operations.

The EPA recommends the proponent develop specific triggers for contaminants related to weekly laboratory-based monitoring. Visual inspections should also be incorporated as part of monitoring methods.

Coal Terminal East Stockyard Spoil Disposal Option

One option for disposal presented in the EIS is the establishment of a very large permanent embankment on the current Coal Terminal East Stockyard. There would be a range of potential impacts associated with implementing this option that have not been adequately assessed including contaminate leaching to surface waters and groundwaters as well as windblown dust emissions.

If the establishment of a permanent stockpile or mound is further considered, then the environmental impacts must be adequately assessed and incorporated into the EIS.

Spoil Transport

The EPA recommends the proponent assess and implement all feasible dredge spoil and excavated material transport options which represent the least environmental impact. The EIS appears to state almost 35,000 proposed truck movements from Berth 101 to the Outer Harbour may occur over the construction period. The proponent should clearly justify the need for this number of truck movements and to consider transport options with fewer environmental impacts and to propose options to mitigate the impacts. These impacts may include noise, dragout, air emissions as well as traffic issues.

Long term fate of Contaminants

The Outer Harbour structure completed as an outcome of this project may remain in a partially completed state for an extended period of time. Environmental risks include the potential for infiltration of the finished structure by rainfall and tides that could mobilise emplaced contaminants. The long-term fate of the contaminants is not adequately considered in the EIS in terms of

- the potential for future impacts from the emplaced material; and
- viable alternative options that could remove the contaminants from Port Kembla as a permanent solution.

There is also uncertainty in the fate of the structure as the separate Outer Harbour reclamation footprint has only concept plan approval and that concept appears to have changed. It appears the proposed emplacement fits with a likely new design, however that new design could change in future, with the potential for contaminated sediment to be disturbed again.

The proponent should provide further information that includes an assessment of alternative options for managing contaminated sediments; including use of Commonwealth sea dumping permits, offsite disposal and treatment / stabilisation of material to be emplaced in the Outer Harbour Footprint.

If emplacement remains the preferred option solution to manage contaminated sediments, further information should be provided that demonstrates:

- the fate of contaminants in emplaced areas including both emerged and submerged areas, is adequately assessed.
- the bunded areas should be built as permanent and durable long-term structures for a full range of hydrologic conditions in the Outer Harbour, including the bund walls, surfaces and armouring
- bund material should not contain contaminants.

- the need for stabilisation of contaminants placed into the bund should be adequately assessed to minimise potential leaching of contaminants and neutralise acid generating capacity (emerged reclamation creates and actual acid sulfate soil risk).
- the surface of the emplaced material should be impermeable to minimise the potential for contaminant mobilisation.
- the surface on any emplaced areas that remain submerged will also need to adequately armoured.

Contamination

The Berth 101 investigation presented in the EIS does not appear to provide a full assessment of the on-site contamination and associated risks. The EPA makes the following observations:

- The investigation considered that due to heavy industrial activity in the harbour reducing the amenity for ecological receptors, then '*ecological values are considered to be significantly degraded and are therefore not considered to require further assessment.*' EPA does not support this position and requires an assessment of the risks to benthic marine organisms for Berth 101 material.
- The assessment of polychlorinated biphenyls (*PCBs*) is limited. It is unclear which NEPM criteria was used in the assessment, or what the surface concentrations were. Also PCBs were not assessed at depth.
- Benzo(α)pyrene-TEQ impacts have not been sufficiently delineated to determine the extent of the B(α)P-TEQ.
- Groundwater has not been characterised sufficiently.

The Pipeline route sampling provided in the EIS does not appear to be sufficient to characterise or confirm the extent of any on-site contamination as:

- no groundwater has been assessed.
- it is unclear what the depth of the proposed development is relative to the vertical extent of the investigations.
- there has been no environmental sampling along a large portion of Springhill Road, and also the land between borehole locations BH-16 and BH-15.
- the area historically impacted by nightsoil does not appear to have been tested for nutrient contaminant compounds (such as nitrates, ammonia etc).
- the results presented in the report are summary analytical results only, and no laboratory reports were provided.

The EPA recommends the proponent conduct further detailed site assessments across the footprint of the site to provide certainly on the extent of contamination and site suitability for the intended use, for Berth 101 and the Gas Pipeline, as follows:

Berth 101 Contamination Assessment:

EPA recommends the proponent conduct further detailed site assessments to include assessment of:

- future risks to benthic marine organisms (i.e., marine ecological values) of Berth 101 material for the purpose of excavation in the inner harbour, and for the purpose of land reclamation material within the outer harbour.
- future risk to site users associated from exposure to excavated materials that may be stockpiled on the site.
- the potential for subsurface contamination of polychlorinated biphenyls (*PCBs*), by subsurface sampling. The EPA understands trace PCB was formerly identified in the surface material of a former substation and a decision was made to not pursue further investigation because the levels did not exceed health screening levels. The EPA considers there is not sufficient justification presented in the EIS to support the decision not to investigate PCB at depth.

- Benzo(α)pyrene-TEQ impacts have not been sufficiently delineated. It will be important to undertake further on-site sampling assessment to verify extents and sources of the contamination, and also assess risks associated with the material, and subsequently provide recommendations for any necessary remediation.
- Additional assessment of groundwater. The proponent should provide some appraisal of groundwater flow direction, and possible sources of the identified trace metal and ammonia contamination, and whether or not it will impact on the proposed development.

Gas Pipeline Contamination Assessment:

EPA recommends the proponent conduct further detailed site assessments to:

- allow for adequate contamination characterisation across the breadth of the pipeline, using sufficient sampling density as per the NSW EPA (1995) Sampling Design Guidelines, and sampling in areas including but not limited to areas not previously accessed, such as the land between BH15 and BH16.
- target vertical depths of proposed excavations of the pipeline which are currently unknown.
- enable further assessment for nutrients in the soil and groundwater in vicinity of a former nightsoil area, which are presently unknown.
- identify contaminants in groundwater, and hydrogeology.
- provide recommendations for remediation and management of any encountered contamination.
- The proponent must also provide all laboratory certificates and reports for the gas pipeline assessment, for inclusion in the EIS.
- Following compilation of the above Berth 101 and Gas pipeline information, the proponent undertake a reassessment of contaminants in the material to be excavated and dredged against the relevant guidelines.

Air

The Air Quality Impact Assessment has been undertaken with reference to the EPA's guidance, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.* For the pollutant scenarios assessed, the assessment predicts compliance with the EPA's impact assessment criteria, under normal operations. However, there are limitations with the assessment that should be addressed, as detailed below.

Construction Phase - Site preparation and establishment

The EIS states that excavation and dredging will be required in order to establish the berth and wharf facilities. It is estimated that about up to 720,000 cubic metres of material would be excavated and dredged for the construction of berth and wharf facilities. It is proposed that the dredging, excavation and disposal activities will occur for a duration of 10-12 months.

Further, the EIS states that marine sediments within Port Kembla harbour are known to be contaminated as a result of the historical industrial land use in surrounding areas. Several previous contamination investigations have determined the upper soft silty clays to be contaminated within both the Inner Harbour and Outer Harbour sediments. Heavy metals commonly exceeded the screening levels for cadmium, chromium, copper, lead, nickel, mercury and zinc and tributyltin, dioxins and polycyclic aromatic hydrocarbons (PAHs) were reported above the nominated guidelines in several previous studies.

The assessment advises that all material dredged and excavated from the ocean floor will have a high moisture content. It is asserted that due to the high moisture content, minimal dust will be released during the handling and transfer of the material and no significant dust impacts are expected during these construction works.

Based on the project description, there is likely to be a combination of wet (dredged) and dry (landside excavation) material handled as part of the proposed construction and site establishment works. Even if the bulk material is originally moist, there is potential for:

- material to dry out during handling and stockpiling, resulting in particle emission, including emission of particle bound contaminants – air toxics
- volatilisation of air toxics – resulting in vapour phase air emissions.

The assessment does not include a detailed characterisation and evaluation of potential air emissions from bulk earthworks activities.

The EPA recommends the proponent revise the EIS:

- to account for potential air emissions from site establishment works, including excavation, stockpiling and material handling. As a minimum, the revised assessment must consider potential for particulate and vapour phase emissions, including air toxics associated with contaminated material and dust.
- to benchmark excavation, dredging, material handling and stockpiling activities with best practice process design and emission control/management.

Project Operation

Fugitive emissions and leak detection and repair

The assessment states that the primary emission sources associated with the operation of the project are the engines on board the FSRU and LNG carrier. These emissions are released via a stack on each vessel. It is understood that the FSRU and the LNG carrier can be operated using gas (LNG) or liquid fuel (MGO).

The assessment does not account for, or assess, gas losses due to leaks or other 'working losses'. EPA believes that gas and liquid storage can potentially result in emissions due to working losses (such as transfers), standing losses (such as tank storage) and leaks in process infrastructure.

POEO Clean Air Regulation Emission standards

The assessment advises that during operations of the project, compliance with International Maritime Organization (IMO) legislation and guidelines will minimise the impacts and ensure compliance with domestic air quality guidelines. It is also stated that the project would be operated to ensure it complies with the POEO (Clean Air) Regulation.

EPA considers the FSRU is likely to be incorporated within the EPA licence premises description as the vessel will be stationary and moored for the life of the project. Accordingly, the FSRU could be subject to Protection of the Environment Operations (POEO) Act and POEO (Clean Air) Regulation requirements including Part 3 and Part 4 Clean Air Regulation limits.

To assess impacts associated with the operational stage of the project, EPA requests:

- The EIS be revised to account for potential air emissions from working losses, standing losses and leaks.
- The EIS be modified to include a commitment to implement a gas leak detection and repair program for the duration of the project operation.
- The air impact assessment incorporate an assessment against POEO Clean Air Regulation, Part 3 and or Part 4 emission limits. Pending the outcome of this comparison, the EPA may provide additional comments relating to the FSRU emissions performance.
- The proponent provide advice on any legislation that overrides the Protection of the Environment Operations Act and/or the Protection of the Environment Operations (Clean Air) Regulation applying to the FSRU. Eg Commonwealth maritime legislation such as Protection of the Sea (Prevention of Pollution from Ships) Act 1983 and Maritime Legislation Amendment Act 2015.

Noise

Construction hours

The EIS does not appear to provide sufficient justification to demonstrate the need for construction outside of the recommended standard hours of work defined in Table 1 of the *Interim Construction Noise Guideline*. A copy of the document can be found at https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/09265cng.pdf

The construction noise predictions incorporated in the reviewed documentation are based on adjusted sound power levels for construction activities. They are likely to under predict construction noise impacts.

The EPA recommends the proponent provide further information on the following:

- Justification of the need to undertake construction outside recommended standard hours defined in Table 1 of the *Interim Construction Noise Guideline*. This process is covered in Section 2.3 of the Guideline. In the absence of any justification EPA expects construction activities to be limited to the standard hours.
- Revised noise predictions that includes updated predicted construction noise levels with no adjustment applied to the construction equipment sound power levels.

Methodology and Modelling of Sensitive Receiver Impacts

The nominated sound power levels and adjusted run-time for plant in a 15-minute period used for operational noise modelling are lower than expected. In addition, the sound power levels of some plant and equipment used to model construction noise impacts are higher than the same plant and equipment used to model operational noise impacts. It is also not clear if the modelling has considered any annoying characteristics of some of the plant and equipment. The predicted operational noise levels may be underpredicted.

The EPA recommends the proponent review the predicted operational noise levels, including the validity of the nominated sound power levels. The proponent should also assess any potential annoying characteristics from operational activities.

The Adequacy of Any Mitigation Measures Proposed

The Noise Impact Assessment currently does not include any recommended mitigation measures for operation, as the noise levels were not predicted to exceed the Project Noise Trigger Levels. As mentioned above, the predicted operational noise levels may have been underestimated.

Following the reassessment of noise levels and impacts per the above recommendations, the EPA recommends that the Proponent reassess the need for feasible and reasonable mitigation in consideration of the revised information.