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SSD 8660

Mr Bruce Zhang
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Dear Bruce

OEH Review of Environmental Impact Statement: Kariong Sand and Soil Supplies Facility (SSD 8660), Somersby – Central Coast LGA

I refer to your email dated 31 January 2019, seeking comments on the Environmental Impact Statement (EIS) for the proposed Kariong Sand and Soil Supplies project (SSD 8660), located at 90 Gindurra Road, Somersby (Lot 4 in DP 227279), in the Central Coast Local Government Area.

The Office of Environment and Heritage (OEH) has reviewed the EIS, including relevant appendices, annexures, attachments and parts of the document titled '*Environmental Impact Statement - Kariong Sand and Soil Supplies, Sand, Soil and Building Materials Recycling Facility - SSD8660*' (Prepared by Jackson Environment and Planning Pty Ltd, January 2019) in relation to impacts on biodiversity, Aboriginal Cultural Heritage and flood management.

OEH's recommendations are provided in **Attachment A** and detailed comments are provided in **Attachment B**. If you require any further information regarding this matter, please contact Steven Cox, Senior Team Leader Planning, on 4927 3140.

Yours sincerely

5 April 2019

SHARON MOLLOY
Director Hunter Central Coast Branch
Conservation and Regional Delivery Division

Contact officer: STEVEN COX
02 4927 3140

Enclosure: Attachments A and B

Attachment A

OEH's recommendations

Kariong Sand and Soil Supplies Facility (SSD 8660)

Biodiversity

1. OEH recommends that PCT1783 be changed to PCT1643. The credit calculator will need to be rerun to determine modified credit yields.

2. The Biodiversity Assessment Report should adequately assess and justify that the areas of non-native vegetation do not require further assessment under the Framework for Biodiversity Assessment.

3. Targeted surveys should be undertaken for *Hibbertia procumbens* and *Prostanthera junonis* in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016) and at their appropriate flowering times. If surveys are not undertaken, an expert report must be prepared in accordance with Section 6.6.2 of the FBA guidelines (OEH 2018).

4. Targeted surveys should be undertaken for *Caladenia tessellata* and *Diuris bracteata* in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016) and at their appropriate flowering times. If surveys are not undertaken, an expert report must be prepared in accordance with Section 6.6.2 of the FBA guidelines (OEH 2018).

5. OEH recommends that all targeted flora surveys are conducted in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016).

6. The impact of changes to hydrology resulting from the proposal should be assessed for the *Melaleuca biconvexa* community adjacent to the site and appropriate mitigation measures should be provided where required.

Aboriginal cultural heritage

7. OEH recommends that an Aboriginal cultural heritage assessment report be prepared for the project, in accordance with the Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (DECCW 2011).

8. OEH recommends that the Aboriginal archaeological assessment report be revised to clarify the scope and objectives of the assessment and ensure they align with the requirements of the *Code of practice for archaeological investigation of Aboriginal objects in NSW* (DECCW 2010).

9. OEH recommends that the Aboriginal archaeological assessment be revised and updated to adequately identify and describe all known Aboriginal cultural heritage sites within or surrounding the proposed development area, including those identified by previous studies of the Somersby Industrial Park.

10. OEH recommends that a new search of the Aboriginal Heritage Information Management System be undertaken for the project, and the results considered and incorporated into the revised and updated Aboriginal archaeological assessment report.

11. OEH recommends that a formal Aboriginal community consultation process should be undertaken for the project in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010). The outcomes of consultation should inform the preparation of an ACHAR for the project.

Water and soils

12. OEH recommends that the size of the on-site storage is reassessed to ensure that stormwater capture and re-use at the site is maximised.

13. OEH recommend that the size of the on-site storage be reassessed and increased to ensure that overflow from the on-site storage is matched to the capacity of the receiving environment.

14. OEH recommends that calculations relating to water retention be reviewed to ensure the impervious area used is accurate and relates to the disturbed portion of the site only.

15. OEH recommends that the post development impervious area used for modelling of on-site detention storage be reviewed. All “Drains” model inputs and results should be provided for review once this is completed.

16. OEH recommends that the on-site detention modelling be carried out for the required design events, inclusive of the 2-year ARI event which will assist in determining the impacts of discharges to adjacent bushland areas.

17. OEH recommends that flow velocities from the level spreader are determined to demonstrate that discharges will not result in scour and damage to downstream areas.

18. OEH recommends that:
    a. potential impacts to neighbouring properties from discharges of stormwater are confirmed and the EIS amended to reflect this
    b. additional contour information be provided for the lower portion of the development.

19. OEH recommends that an impact assessment is carried out for the downstream vegetated areas to determine the sensitivity of these areas to changes in frequency, volume and velocity of flow of water.

20. OEH recommends that consideration be given to provision of primary sediment removal points prior to vegetated systems to improve performance and maintainability of the water quality management system.

21. OEH recommends that all input parameters used for water quality modelling and justification for parameters be provided to OEH to enable a review of the proposed treatment train.

22. OEH recommends that additional details are provided of the suitability of any proposed proprietary membrane filter that is to be used as part of the water quality treatment train for the proposal. This should include any information required under Gosford City Council DCP Chapter 6.7.

23. OEH recommends that provision of a cover be considered for the waste sorting area, or the size of the pump-out tank is reviewed to ensure it is adequate in size to prevent overflows.

24. OEH recommends that staging of clearing and filling operations be considered to minimise exposed areas at any time and reduce risk to the receiving environment.

Flooding and flood risk

25. OEH recommends that consideration is given to the potential impacts to Kangoo Road from stormwater discharges that originate from the proposed development.

Attachment B

OEH's detailed comments

Kariong Sand and Soil Supplies Facility (SSD 8660)

Biodiversity

1. Justification for the plant community types used in the assessment has not been provided

Section 5.2.1.8 of the Framework for Biodiversity Assessment (FBA) guidelines (OEH 2018) states:

> '*the assessor must provide justification in the Biodiversity Assessment Report (BAR) of evidence used to identify a Plant Community Type (PCT) at the development site… This includes: …(b) matching the outputs of the quantitative analysis of existing and new site survey data to PCTs in the VIS Classification Database…*'.

OEH considers that the BAR does not provide detailed justification as to why PCT1783 'Red Bloodwood – Scribbly Gum / Old Man Banksia open forest on sandstone ridges of northern Sydney and the Central Coast' and PCT 1776 'Smooth-barked Apple – Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast' were selected, in particular when compared against other similar PCTs in the OEH BioNet Vegetation Classification database.

OEH considers that PCT1643 'Red Bloodwood - Smooth-barked Apple - Scribbly Gum - Old Man Banksia heathy woodland on sandstone ranges of the Central Coast' is a more appropriate PCT than PCT1783, which has been used for the bulk of the subject site. OEH considers PCT1643 is the more appropriate PCT given:

- this PCT was originally derived from a Hunter Central Coast CMA biometric vegetation type (BVT), which the proposal is located in, in comparison to a Hawkesbury Nepean CMA BVT from which PCT1783 was derived
- the plot data indicates that 12 species are consistent with PCT1643 'Characteristic Species' list as per the OEH BioNet Vegetation Classification database, which equates to 67% of the total species list, in comparison to 5 species for PCT1783, which is 42% of the total species list
- the sub-dominance of *Angophora costata* in some of the plots is consistent with PCT1643
- he absence of *Corymbia eximia* which is a co-dominant of PCT1783 in comparison to PCT1643 where it does not occur
- the dominance of *Leptospermum* in the understorey is more consistent with PCT1643, which is typically characterised by a dense heathy / shrubby stratum; *Leptospermum* is listed as a characteristic genus for PCT 1643 (it is absent for PCT1783) and
- PCT1643 is linked to two threatened flora species, *Hibbertia procumbens* and *Prostanthera junonis*, in the OEH Threatened Species Profile database, which occur within 70 metres west of the proposal in the same contiguous patch of vegetation as the development. PCT1643 represents key habitat for both threatened flora species.

Recommendation 1

OEH recommends that PCT1783 be changed to PCT1643. The credit calculator will need to be rerun to determine modified credit yields.

2. OEH is not satisfied with the biodiversity assessment of non-native vegetation

The BAR does not provide adequate justification as to why the areas of non-native vegetation / exotic vegetation, which equate to 2.38 hectares of the subject site, are not subject

to further assessment in the FBA process (as per Section 3.1.1.3). The BAR provides no analysis, vegetation description or assessment of the non-native vegetation areas, such as site value score (via the credit calculator), species present (richness), cover / abundance data or description of its habitat value to justify its exclusion. Furthermore, no sampling plots have been placed within this vegetation type to provide quantitative evidence of its exotic nature.

OEH recommends that the BAR adequately demonstrate that the areas of non-native vegetation do not contain habitat features or that they have a site value score of 17 or less, and thus do not require assessment under the FBA. Additional plot sampling may be required and the credit calculator may need to be rerun if any of the areas have a site value score greater than 17.

Recommendation 2

The Biodiversity Assessment Report should adequately assess and justify that the areas of non-native vegetation do not require further assessment under the Framework for Biodiversity Assessment.

3. OEH requires targeted surveys for the threatened flora species: *Hibbertia procumbens* and *Prostanthera junonis*

OEH considers that the BAR has not adequately assessed two threatened flora species, which are restricted to the Somersby area and located in close proximity to the subject site: *Hibbertia procumbens* and *Prostanthera junonis*. Under the FBA, to determine a threatened candidate species you must:

> '*Using data from the Threatened Species Profile Database, an assessor must identify a threatened species as a candidate species for the development site or biobank site if… (b) the geographic distribution of the species is known or predicted to include the IBRA subregion in which the development site or biobank site is located, and…'.*

If this approach were taken, the database along with BioNet NSW, would have clearly identified that these two species occur within 70 metres (west) of the subject site within the same patch of native vegetation. Furthermore, the '*Somersby Industrial Park - Draft Plan of Management*' (Connell Wagner 2005) notes that boundaries of a management zone for *Prostanthera junonis* (known to OEH as Population 1C) extends within the southern part of Lot 4 (in DP 227279), which is the same Lot as the subject site (*Note: the draft plan is endorsed by Central Coast Council and attached to its Local Environmental Plan). Additionally, if the correct PCT (PCT1643) was used (see Recommendation 1 above), it would have linked these two species in the credit calculator, and they would have been marked as 'targeted surveying required'.

OEH recommends that targeted surveys are to be undertaken for *Hibbertia procumbens* and *Prostanthera junonis*, in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016) and at their appropriate flowering times (as listed below):

- Spreading Guinea-flower (*Hibbertia procumbens*) – flowers mostly in summer (Harden 2001), notably October (Benson & McDougall 1995)
- Somersby Mintbush (*Prostanthera junonis*) – the dominant flowering period for this species is October to mid-December depending on weather/site conditions; outside of its main flowering season, *P. junonis* is cryptic amongst the other understorey plants of the sclerophyllous woodland in which it occurs, and as such difficult to identify (NPWS 2000).

In the circumstance where surveys cannot be undertaken, an expert report must be prepared, in accordance with Section 6.6.2 of the FBA guidelines (OEH 2018). In determining the suitability of an expert, OEH takes the following into account:

(a) the expert's qualifications such as relevant degrees, post graduate qualifications
(b) their history of experience in the ecological research and survey method, for the relevant species

(c) a resume detailing projects pertaining to the survey of the relevant species (including the locations and dates of the work) over the previous 10 years
(d) relevant peer reviewed publications and
(e) evidence that the person is a well-known authority on the relevant species to which the survey relates.

Recommendation 3

Targeted surveys should be undertaken for *Hibbertia procumbens* and *Prostanthera junonis* in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016) and at their appropriate flowering times. If surveys are not undertaken, an expert report must be prepared in accordance with Section 6.6.2 of the FBA guidelines (OEH 2018).

4. Targeted surveys for *Caladenia tessellata* and *Diuris bracteata* were undertaken outside their known flowering / detection period

Targeted surveys for *Caladenia tessellata* and *Diuris bracteata* were undertaken outside their known flowering period, making their detection on site (if present) unlikely. Both these orchid species flower in spring, from September to October, with *Diuris bracteata* generally restricted to September. Section 5.1.2.2 of the BAR indicates that targeted flora surveys were undertaken on the 16 January 2018 and 10 April 2018, which do not capture the suitable detection timeframes of either orchid.

The FBA requires targeted surveys to be undertaken when a species is detectable and, in this instance, both orchids require flowering material for positive identification and as such targeted surveys should be undertaken in spring. OEH recommends that targeted surveys are undertaken in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016) and at their appropriate flowering times (as listed below):

- Tessellated Spider Orchid (*Caladenia tessellata*) – flowers August to November, with peak period in September (Benson & McDougall 2005); typically, more prevalent or detectable after fire.
- A Donkey Orchid (*Diuris bracteata*) – Benson & McDougall (2005) state that it has a short flowering period (usually 2 weeks) restricted to spring in September.

In the circumstance where surveys cannot be undertaken, an expert report must be prepared in accordance with Section 6.6.2 of the FBA guidelines (OEH 2018).

Recommendation 4

Targeted surveys should be undertaken for *Caladenia tessellata* and *Diuris bracteata* in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016) and at their appropriate flowering times. If surveys are not undertaken, an expert report must be prepared in accordance with Section 6.6.2 of the FBA guidelines (OEH 2018).

5. Targeted threatened flora surveys have not been undertaken in accordance with the OEH '*NSW Guide to Surveying Threatened Plants'*

OEH notes that the targeted threatened flora surveys described in the BDAR have not been undertaken in accordance with '*NSW Guide to Surveying Threatened Plants*' (OEH 2016), as per FBA guidelines. Section 5.1.2.2. of the BAR refers to the 'random meander' technique for such surveys, which is no longer an appropriate method. OEH requires (as per OEH 2016) spaced parallel transects across all suitable habitat based on a species growth habit to determine suitable spacing widths for detectability.

OEH recommends that all threatened flora surveys are conducted in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016) to ensure that all areas of potentially

suitable habitat are surveyed and no threatened plants are missed. If threatened flora species are identified, the BAM Credit Calculator will need to be rerun.

Recommendation 5

OEH recommends that all targeted flora surveys are conducted in accordance with OEH '*NSW Guide to Surveying Threatened Plants*' (OEH 2016).

6. Impacts to *Melaleuca biconvexa* have not been suitably assessed

OEH considers that the impacts to the small patch of *Melaleuca biconvexa* (i.e. 15 individuals) have been underestimated and the proposed 10-metre-wide buffer will not ensure the species is not impacted by the development. The EIS states that this vegetation will not be impacted by the proposal, as it will not be cleared.

Concept civil engineering plans by Cardno (NSW/ACT) Pty Ltd(Cardno NSW) indicate the following changes in the area around this vegetation: site filling/regrading, provision of bentonite (impervious) working areas, and provision of diversion drains to divert site stormwater around this vegetation. OEH does not consider that a 10-metre-buffer will be suitable to offset these impacts.

All of the above changes will reduce runoff received by the vegetation to less than that provided by current runoff. *Melaleuca biconvexa* is known to inhabit damp areas or areas adjacent to watercourses (NSW Scientific Committee 1998) and may be adversely impacted by changes to hydrology from the proposal. These potential impacts have not been assessed by the EIS.

OEH recommends that the impact of changes to hydrology resulting from the proposal be assessed for *Melaleuca biconvexa* and appropriate mitigation measures be provided if required, including the retirement of species credits if long-term survival cannot be guaranteed. If the retirement of species credits is needed, the BAM Credit Calculator will need to be rerun.

Recommendation 6

The impact of changes to hydrology resulting from the proposal should be assessed for the *Melaleuca biconvexa* community adjacent to the site and appropriate mitigation measures should be provided where required.

References

Benson, D. & McDougall, L. (1995) Ecology of Sydney Plant Species Part 3: Dicotyledon families Cabombaceae to Eupomatiaceae. *Cunninghamia* **4(2)**: 217-431.

Benson, D. and McDougall, L. (2005) Ecology of Sydney plant species - Part 10: Monocotyledon families Lemnaceae to Zosteraceae. *Cunninghamia*, **9(1)**: 16-212.

Connell Wagner (2005) Somersby Industrial Park – Draft Plan of Management. Prepared by Connell Wagner for Gosford City Council.

Harden, G.J. (ed.) (1990-2002) *Flora of New South Wales: Volumes 1 - 4*. New South Wales University Press, Kensington.

NSW National Parks and Wildlife Service (2000) *Somersby Mintbush Prostanthera junonis Recovery Plan*. NSW NPWS. Hurstville NSW, 67pp.

OEH (2016) *NSW Guide to Surveying Threatened Plants*. February 2016. NSW Office of Environment and Heritage, Sydney. http://www.environment.nsw.gov.au/resources/threatenedspecies/160129-threatened-plants-survey-guide.pdf

OEH (2018) *Framework for Biodiversity Assessment - NSW Biodiversity Offsets Policy for Major Projects*. Office of Environment and Heritage.

Aboriginal cultural heritage

7. An Aboriginal Cultural Heritage Assessment Report should be supplied

OEH has reviewed the supplied documentation with respect to Aboriginal cultural heritage, including the EIS and the Aboriginal Archaeological Assessment (Biosis 2018), and is of the view that the supplied documentation does not satisfy the Secretary's Environmental Assessment Requirements (SEARs) (issued 23 August 2017). The SEARs stipulate that a detailed assessment of Aboriginal cultural heritage must be undertaken, in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (Guide) (DECCW 2011). However, rather than supplying an Aboriginal Cultural Heritage Assessment Report (ACHAR) (as required by the Guide), the applicant has supplied an Aboriginal archaeological assessment. An archaeological assessment is a stand-alone technical report, prepared in accordance with the *Code of practice for archaeological investigation of Aboriginal objects in NSW* (Code of Practice) (DECCW 2010). OEH guidelines indicate that an archaeological assessment should be integrated with other findings from the assessment of Aboriginal heritage, to support the conclusions and management recommendations in an ACHAR.

The supplied Aboriginal archaeological assessment focuses on the identification and assessment of archaeological (scientific) values, and does not demonstrate that Aboriginal cultural heritage values have been appropriately assessed in relation to the development proposal. The Somersby area is known to be a location of very high Aboriginal cultural significance, with a range of tangible and intangible cultural values (including broader cultural landscape values) identified in the general area. A detailed assessment of Aboriginal cultural heritage is required for this proposal, and as required by the SEARs.

Recommendation 7

OEH recommends that an Aboriginal cultural heritage assessment report be prepared for the project, in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (DECCW 2011).

8. The scope of the Aboriginal archaeological assessment should be clarified

A review of the supplied Aboriginal archaeological assessment report has identified some confusion regarding the scope and objectives of the assessment. The report contains conflicting information about the scope of the investigation that has been undertaken. For example, Section 1.4 states that the scope of the assessment includes to "determine levels of archaeological and cultural significance of the study area" and to "make recommendations to mitigate and manage any cultural heritage values" (Biosis 2018:7). Cultural significance cannot be assessed via an archaeological assessment, particularly in the absence of a formal Aboriginal community consultation process.

The appropriate way to assess cultural significance is via the preparation of an ACHAR (prepared in accordance with the Guide), which should include a process of Aboriginal community consultation undertaken in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (Consultation Requirements) (DECCW 2010). The supplied archaeological assessment does not provide broad assessment of Aboriginal cultural significance, beyond the assessment of archaeological (scientific) values.

In addition, while many parts of the Aboriginal archaeological assessment refer to the Code of Practice, Section 1.5 makes reference to the requirements of the due diligence process, leading to some confusion about the scope and objectives of this assessment. Due diligence is a legal defence against harm under the *National Parks and Wildlife Act 1974*. OEH considers that a due diligence process is inadequate to assess the impacts of a proposal on potential areas, objects, places or landscapes of heritage significance to Aboriginal culture and people. It is unclear why the due diligence requirements are relevant to the preparation of the supplied Aboriginal archaeological assessment.

Recommendation 8

OEH recommends that the Aboriginal archaeological assessment report be revised to clarify the scope and objectives of the assessment and ensure they align with the requirements of the *Code of practice for archaeological investigation of Aboriginal objects in NSW* (DECCW 2010).

9. All known Aboriginal cultural heritage sites should be identified and described

OEH is of the view that the supplied Aboriginal archaeological assessment does not adequately consider all the available information relevant to the proposed development area. The proposed development area lies within the Somersby Industrial Park, an area of land that has been subject to detailed Aboriginal heritage investigations in the past (e.g. Lough and Associates 1982, AMBS 2002 Vol1-3). This previous work has identified around 40 Aboriginal sites within the industrial park, and the Somersby Industrial Park Plan of Management (Somersby POM) (Connell Wagner 2005) provides overarching management provisions for the identified Aboriginal cultural heritage values of the park. The results of this previous work are directly relevant to the current proposal and should be considered within the Aboriginal archaeological assessment.

For example, while the work of Lough and Associates (1981) is briefly discussed in the Aboriginal archaeological assessment, the report does not acknowledge that this work identified several sites in the immediate vicinity of the proposed development area, including a rock engraving in the adjacent lot. The Somersby POM consequently identifies an Aboriginal heritage management zone within this adjacent lot, less than 25 metres from the western boundary of the proposed development area. Several more Aboriginal heritage management zones are also located a short distance to the north. These sites have not been identified and considered in relation to the current assessment. OEH considers that the supplied Aboriginal archaeological assessment does not adequately identify and describe all known Aboriginal cultural heritage sites within the proposed development area and its immediate surrounds, nor does it consider their implications for the current assessment.

Recommendation 9

OEH recommends that the Aboriginal archaeological assessment be revised and updated to adequately identify and describe all known Aboriginal cultural heritage sites within or surrounding the proposed development area, including those identified by previous studies of the Somersby Industrial Park.

10. An updated AHIMS search should be undertaken

The Aboriginal archaeological assessment includes an outdated search of the Aboriginal Heritage Information Management System (AHIMS) (undertaken on 17 January 2018). OEH recommends that the results of an AHIMS search should only be relied upon for up to 12 months.

Recommendation 10

OEH recommends that a new search of the Aboriginal Heritage Information Management System be undertaken for the project, and the results considered and incorporated into the revised and updated Aboriginal archaeological assessment report.

11. A formal Aboriginal community consultation process should be undertaken

OEH notes that a formal Aboriginal community consultation process has not been undertaken for this project that satisfies OEH requirements. The SEARs stipulate that consultation with Aboriginal people must be undertaken for the project in accordance with the Consultation Requirements, in order to document the significance of cultural heritage values for Aboriginal people who have a cultural association with the land.

It is noted that consultation with Darkinjung Local Aboriginal Land Council was undertaken during the preparation of the Aboriginal archaeological assessment, however this limited consultation does not satisfy OEH's Consultation Requirements. The Consultation Requirements outline a clear process that ensures relevant Aboriginal cultural knowledge holders have an opportunity to be consulted with respect to a proposed project, and to provide relevant information about cultural significance and values. The outcomes of the consultation process should inform the preparation of an ACHAR. OEH considers that the consultation completed for the project does not satisfy the SEARs.

Recommendation 11

OEH recommends that a formal Aboriginal community consultation process should be undertaken for the project in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010). The outcomes of consultation should inform the preparation of an ACHAR for the project.

Water and soils

Current waste management operations at 90 Gindarra Road occur under a previous development consent from Gosford City Council. The existing facility stores waste in mounds without formal controls for stormwater containment or management. The proposed development includes provision of formal pavements, sorting and storage areas and a water and waste management pond. These works would improve stormwater and waste management associated with existing operations. However, the scale of the proposed operation and its need to discharge water to a natural bushland area requires development of stormwater management systems in line with best practice methods and it appears that these methods have not been followed for the proposed development.

OEH has reviewed the Soil and Water Management and the Water Cycle Management Plan for the proposed development, together with statements made in the EIS to determine if the requirements specified under the Soils and Water section of the SEARs have been addressed.

The information provided in these reports requires additional clarification to determine if the size of proposed water management features is correct and ensure that the receiving environment is protected. This is detailed in the following sections.

12. Insufficient water storage is provided on-site for reuse purposes and to minimise downstream impacts

Cardno NSW prepared a water balance as part of a Water Balance Management Plan (included as Appendix I of the EIS) using "Music" modelling software. Full details of the modelling have not been provided in the report, however some of the assumptions were listed. On-site capture and reuse of runoff is required for dust suppression, which is noted to require 2l/sqm/day, equating to a minimum daily rainfall of 2mm to ensure that additional dust suppression is not required. The Music model treated dry days as those receiving less than 1mm rather than 2mm. Therefore, the required reuse volumes have been underestimated.

The Music model results provided show that the proposed on-site water storage is capable of providing 4.38% of the water required for dust suppression. No mention is made of where the remaining 95.62% of water would be sourced.

Additionally, the system is predicted to overflow about 35 times per year, indicating that further quantities of runoff water could be captured and that potential downstream impacts from overflows could be avoided. No mention is made of the impact of these overflows on the downstream environment.

Recommendation 12

OEH recommends that the size of the on-site storage is reassessed to ensure that stormwater capture and re-use at the site is maximised.

13. Insufficient storage is provided on site to protect the environment

The Music model results indicate that the proposed on-site water storage overflowed 901 times during the simulation period which is stated as an average of 35 overflows per year.

Recommendation 13

OEH recommend that the size of the on-site storage be reassessed and increased to ensure that overflow from the on-site storage is matched to the capacity of the receiving environment.

14. Water retention calculations have been incorrectly based on 'deemed to comply' solutions

Section 7 of the Cardno NSW Water Cycle Management Plan (Water Conservation) uses water retention calculations based on the 'deemed to comply' formulae in the Gosford City Council DCP (2013) Chapter 6.7. These methods are only valid for sites of less than 2,500 square metres and for domestic water users. Under the DCP, commercial or industrial developments are required to carry out full water balance calculations to determine appropriate storage volumes to reduce reliance on town water and to reduce runoff volumes due to impervious surfaces.

The calculation provided also assumes a ground imperviousness of 17% for the development site. This is based on an impervious area of 17,000 square metres divided by the entire site area. It is not stated what the 17,000 square metres relates to, however it is likely to be the pavement area which is to be provided as concrete or asphalt only. Section 12.5.7 of the EIS states that the proposed development area is 6.7 hectares and overall property is 10.75 hectares.

The EIS and civil plans provided in Appendix E indicate that bentonite geotextile will be placed below other working surfaces formed from crushed aggregate. This will protect groundwater at the site and will effectively make the crushed aggregate surface behave as an impervious surface. The extent of heavy traffic movement is likely to compact these areas and increase runoff rate and volume.

The proposed point of discharge from the facility is to a bushland area below the proposed storage dam. Calculations of impervious area percentage should use the disturbed site only to ensure that any change in discharge to the bushland area can be assessed.

Recommendation 14

OEH recommends that calculations relating to water retention be reviewed to ensure the impervious area used is accurate and relates to the disturbed portion of the site only.

15. Post development flow rates appear too low

The Cardno NSW Water Cycle Management Plan provides a summary of "Drains" model results for the proposed on-site detention storage.

Post development flows from the site with and without on-site detention were examined as part of this model for the 5 year and 100-year storms only. For both of these storm events, the post development flow rates without on-site detention appear to be much lower than would be expected for a development of this size and type. Some details are provided in the report for the predevelopment inputs into the model. However; the post development inputs have not been provided. OEH considers it likely that the effective impervious area on site has been

underestimated. This may lead to under sizing of the required on-site detention basin and increased flow rates to the downstream environment from discharges. All of the “Drains” inputs and outputs (results) should be provided for review.

Recommendation 15

OEH recommends that the post development impervious area used for modelling of on-site detention storage be reviewed. All “Drains” model inputs and results should be provided for review once this is completed.

16. Drains modelling has not been provided for the full range of events

Gosford City Council DCP 6.7 and the GCC Civil Works Specification require that post development flows are limited to predevelopment flows for all design storms up to and including the 100-year annual recurrence interval (ARI). The Cardno NSW Water Cycle Management Plan has only provided results for the 5-year and 100-year events and therefore does not meet these requirements.

For discharge to natural areas rather than piped drainage systems, on-site detention design usually considers much more frequent events such as the 1 or 2-year event.

Recommendation 16

OEH recommends that the on-site detention modelling be carried out for the required design events, inclusive of the 2-year ARI event which will assist in determining the impacts of discharges to adjacent bushland areas.

17. Discharge from the on-site detention pond may damage downstream areas

The proposed discharge from the on-site detention pond is predicted to be 643 litres per second (l/s) in the 5-year ARI event and 1770 l/s in the 100-year ARI event. Discharges would occur via a 675mm diameter pipe into 25m long level spreader. Flows from the predevelopment site were distributed over a large flow area including flow to adjoining properties. The proposed regrading and stormwater management system would discharge all flows over a maximum width of 25 metres. No details of the proposed level spreader are given and there is no assessment of the likely flow velocities for discharge from the level spreader. Flow velocities from the level spreader should be determined to show that they are low enough to prevent scour and damage to vegetation.

Recommendation 17

OEH recommends that flow velocities from the level spreader are determined to demonstrate that discharges will not result in scour and damage to downstream areas.

18. Discharges may flow onto neighbouring properties

No contours are shown on plans provided in the EIS beyond the development area and it is not clear where the water will flow once it leaves the level spreader. Section 7.4 of the EIS states that water discharged from the level spreader will flow to the undeveloped southern end of the proponent’s property. The EIS goes on to state that ‘No stormwater should leave the property’.

Section 7.3.3. of the Cardno NSW Water Cycle Management Plan (Appendix I of the EIS) states that water discharged from the level spreader would flow ‘at grade through vegetation over approximately 280 metres to Kangoo Road, where the road drainage system would collect it’. This contradicts Section 7.4 of the EIS and would result in water discharged from the proposed activity draining to the roadway and potentially across neighbouring properties.

Recommendation 18

OEH recommends that:

a) potential impacts to neighbouring properties from discharges of stormwater are confirmed and the EIS amended to reflect this
b) additional contour information be provided for the lower portion of the development.

19. Hydrology for downstream vegetation community may be adversely affected

The proposed stormwater management system will discharge water directly to a vegetated area. On site detention will be able to manage flow rates to remain similar to predeveloped rates, however; discharges will occur over a much smaller area than the predeveloped situation. In addition, flow volumes will greatly increase post development. The frequency of discharges is also expected to increase.

Sections of the vegetation not covered by the level spreader that releases discharges from the proposed operation will receive lower flows due to sealing of the upstream catchment, resulting in less overland drainage reaching these areas and lower ingress of water into the soil column and groundwater.

Biodiversity impacts have only been carried out for areas that are proposed to be cleared. There has been no assessment provided for the remainder of the site, including downstream areas and therefore impacts from stormwater discharges or changes to hydrology are unknown.

Recommendation 19

OEH recommends that an impact assessment is carried out for the downstream vegetated areas to determine the sensitivity of these areas to changes in frequency, volume and velocity of flow of water.

20. The proposed treatment train is not consistent with best practice for management of water quality

The water treatment train modelled in the Cardno NSW Water Cycle Management Plan recommends the use of a grass swale upstream of a sediment basin. Vegetated treatment systems are most effective if they occur after primary treatment to remove the bulk of the sediment load. The proposed facility will have sediment as the primary pollutant due to the use of compacted gravel work and storage areas, and some pavement areas together with the nature of the materials to be stored on site. The EIS notes that removal of sediment from grass swales forms part of the maintenance requirement of the facility. This can only be carried out by removing or damaging the grass lining and is considered unlikely to be a viable long-term treatment option.

Recommendation 20

OEH recommends that consideration be given to provision of primary sediment removal points prior to vegetated systems to improve performance and maintainability of the water quality management system.

21. Pollutant load from the proposed use of the facility have not been provided

The Music model contains separate nodes of pavements, processing and storage areas. It is noted in the report that sediment will be the primary pollutant. However, no details have been provided for the pollutant loads that were assumed in the model or how these were derived. Similarly, no details are given for the input parameters for the treatment nodes in the model. It is not possible to determine from the information provided if the proposed treatment train is appropriate.

Recommendation 21

OEH recommends that all input parameters used for water quality modelling and justification for parameters be provided to OEH to enable a review of the proposed treatment train.

22. Additional information is required for use of proprietary filters as part of pollution control equipment

A “jelly fish” or equivalent membrane filter has been included as the last item in the proposed water quality treatment train. Filters of this type are commonly used on much smaller development sites with limited sediment loads.

Gosford City Council DCP Chapter 6.7 requires that pollutant removal parameters for proprietary products be verified by independent testing where they are proposed to achieve a required level of water quality. In this case, the supplier should provide independent testing results and confirm the suitability of this product for achieving the water quality outcomes described in the Water Cycle Management Plan. It is considered likely that devices of this type will be an expensive option and may be difficult to maintain into the future. No access pathway appears to have been provided for maintenance of this filter.

If a proprietary filter such as a ‘jelly fish’ is used, operation and maintenance of the filter would need to form part of the site management procedures.

Alternative treatment options such as wetlands or bioretention may be more appropriate for this proposal.

Recommendation 22

OEH recommends that additional details are provided of the suitability of any proposed proprietary membrane filter that is to be used as part of the water quality treatment train for the proposal. This should include any information required under Gosford City Council DCP Chapter 6.7.

23. The proposed pollutant capture tank for the sorting area will fill quickly in a rainfall event and may overflow

The waste sorting area would be provided with a 25kL tank that would subsequently be pumped out. The sorting and waste receival area are bunded but not covered. The sorting area is approximately 1,350 square metres in size, with the receiving area being slightly larger. A 25kL tank is adequate to contain a maximum of 9mm of rainfall from each area. Based on average rainfall for the Sydney region, 9mm or more of rainfall would occur about 33 times per year. It is recommended that a cover be considered for these areas or the tank be increased in size to reduce the likelihood of overflows. A cover would also improve safety for workers using these areas.

Recommendation 23

OEH recommends that provision of a cover be considered for the waste sorting area, or the size of the pump-out tank is reviewed to ensure it is adequate in size to prevent overflows.

24. Erosion and sediment control plan does not include any staging

An area of about 6 hectares within the site is proposed to be cleared and filled/regraded as part of the proposed development. Disturbance of such a large area would create a high potential for erosion and this should be managed in stages to minimise potential impacts.

Recommendation 24

OEH recommends that staging of clearing and filling operations be considered to minimise exposed areas at any time and reduce risk to the receiving environment.

Flooding and flood risk

25. Kangoo Road may be subject to additional flows

The EIS and Water Cycle Management Plan show that stormwater flows from the proposed development will be discharged to vegetated areas on the downstream portion of the site. The EIS states that this discharge would flow overland to Kangoo Road. Provision of insufficient on-site detention, concentration of off-site flows over a narrow flow path, potential blockage of orifice control in the basin and weir overflow from the basin have the potential to subject Kangoo Road to flash flooding. Matching total off-site flow rates to predeveloped flow rates may not be sufficient to prevent flooding of Kangoo road without consideration of the method and point of discharge together with risk assessment on basin performance. The EIS does not consider the potential impacts of the proposed stormwater management system on Kangoo Road drainage. The SEARS require consideration of flood events including the 10-year, 100 year and probable maximum flood (PMF) events.

Recommendation 25

OEH recommends that consideration is given to the potential impacts to Kangoo Road from stormwater discharges that originate from the proposed development.