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Via e-mail at [Deana.Burn@planning.nsw.gov.au](mailto:Deana.Burn@planning.nsw.gov.au)

Dear Ms Burn

**Cairncross Waste Management Facility Expansion (SSD 5792) – Notice of Exhibition**

I refer to the e-mail from Ms Amber Wilson of 13 February 2018 advising the Environment Protection Authority ("the EPA") that the Development Application ("DA") for the proposed expansion of Cairncross Waste Management Facility ("the Proposal") at 8395 Pacific Highway, PEMBROOKE NSW 2446 ("the Premises") had been placed on public exhibition. Please accept our apologies for the delay in providing this response.

The e-mail invited comments on the Proposal from the EPA, including advice on recommended conditions of consent.

We have reviewed the DA and associated Environment Impact Statement ("EIS"). Comments, recommended conditions of consent, and requests for further information are provided in Attachment A to this letter.

The Proponent will require an Environment Protection Licence ("EPL") issued under the *Protection of the Environment Operations Act 1997* ("the POEO Act") to construct and operate an expanded Landfill. Whilst there is an existing EPL for the Premises (EPL 11189), the Proponent will have to make separate application to the EPA to vary this EPL, or apply for a new EPL, if the Proposal is approved.

Please feel free to contact Mr Ian Hanson on (02) 6659 8278 or at [ian.hanson@epa.nsw.gov.au](mailto:ian.hanson@epa.nsw.gov.au) if you have any comments or concerns in relation to this matter.

Yours sincerely

 29/3/18

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## ATTACHMENT A

The EPA requests these comments be read in conjunction with our letter dated 7 February 2013, which detailed our EIS requirements. Regardless of whether the existing EPL is varied to accommodate the Proposal, or a new EPL is applied for, we recommend EPL conditions currently applying to Stage E, as contained in EPL 11189, apply to the Proposal, except as specified below.

### 1. Surface water quality

The environmental values of local surface waters do not appear to have been fully considered in the EIS. The EPA uses the NSW Water Quality Objectives to identify which environmental values of water apply to a specific waterway or catchment. The environmental values of water in the vicinity of the Premises can be identified by referring to the website at: [www.environment.nsw.gov.au/ieo/](http://www.environment.nsw.gov.au/ieo/).

According to the EIS (Page 127): "Surface water quality samples have been collected by PMHC generally on a quarterly basis over a period between September 2001 and March 2017." An analysis of surface water quality monitoring results from two existing monitoring points (CS8A and CS9 for Stage E) have been used to establish baseline surface water quality conditions for the Proposal. The monitoring points are in existing sediment basins. Results have been compared to trigger values in the 'Australian and New Zealand Guidelines for Fresh and Marine Water Quality' ("the ANZECC Guidelines") on Pages 127 and 128 of the EIS.

The fact that the results have been compared to trigger values in the ANZECC Guidelines suggests surface water quality data from the general area preceding construction of the existing landfill (Stage E) are not available, even though surface water quality was apparently assessed as part of the original (1999) EIS. The EPA is wary of relying on test results from surface waters that may be impacted upon by the existing Landfill to establish baseline conditions for future Landfill stages, as this approach does not allow for cumulative water quality impacts to be adequately assessed. We consider the 1999 EIS surface water quality monitoring results, if these exist, may be more appropriate for establishing baseline conditions for future Landfill stages than test results from samples taken from the sediment basins servicing Stage E.

The EPA is concerned Table 8-11 'Summary of surface water quality results at the Cairncross WMF from 2001-2017' on Page 127 of the EIS shows surface waters have often been contaminated with leachate. For example, ammonia and nitrate, which are acknowledged key indicators of leachate, have reached concentrations of 146mg/L and 228mg/L respectively in proximate surface waters. Phenols have reached a concentration of 2.29mg/L. These concentrations compare to relevant ANZECC Guideline trigger values of 0.9mg/L for ammonia, 0.7mg/L for nitrate, and 0.32mg/L for phenols. According to the EIS (Page 128): "Ten out of the 44 ammonia records (23 per cent) were above the ANZECC Guideline limit. Thirteen out of the 44 nitrate records (30 per cent) were above the ANZECC Guideline limit". Additionally, the EIS states 8 out of the 44 sampling records (18 per cent) indicated elevated concentrations of phenols.

There is no indication in the EIS whether the elevated ammonia, nitrate, or phenol concentrations were from samples taken from CS8A or CS9, and there is no explanation as to when, why or how surface waters came to be contaminated with leachate.

The EPA considers the 'Surface Water Management Strategy' referenced in Section 5.3.2 will not fully-address the apparent contamination of surface water with leachate.

Request for further information: The EPA requests advice as to whether the 1999 EIS surface water quality monitoring results are available, and if so, why these have not been compared to the results from the two existing monitoring points to assess cumulative water quality impacts.

**Recommended condition:** Prior to the construction of Stage 1, a pollution study, as defined in Section 68(1) of the POEO Act 1997, must be completed to establish appropriate baseline water quality parameters for ambient surface waters, identify mechanisms by which surface waters were contaminated by leachate in the past, and could be contaminated in the future, define site-



specific trigger values for appropriate indicator parameters, and assess best management practices and best available technology to reduce the potential for surface waters to be contaminated with leachate during future landfilling activities.

Note: The EPA provides further information in relation to pollution studies on its website at: <http://www.epa.nsw.gov.au/publications/licensing/140732-pollution-studies>.

## 2. Sediment control

Page 135 of the EIS states: *"Given the proximity of the Rawdon Creek Nature Reserve (located immediately downstream of the Stage 3 landfill area), particular attention has been given to the measures to avoid water quality impacts on the reserve. A combined sediment basin and fire-fighting storage dam would be located on the southern boundary of the Stage 3 landfill area, adjacent to the nature reserve. The basin has been designed to capture and treat all sediment-laden runoff during a 90th-percentile 5-day rainfall event, as recommended by Managing Urban Stormwater: Soils and Construction Volume 2B Waste Landfills (the Blue Book)."*

The Blue Book suggests the basin should be designed to capture all sediment laden runoff during a 95th-percentile 5-day rainfall event, because the receiving environment for the basin is Rawdon Creek Nature Reserve, an identified 'sensitive' receiving environment.

**Recommended condition:** The proposed sediment basin/fire-fighting storage dam for Stage 3 must be designed and constructed to capture all sediment-laden runoff during a 95<sup>th</sup>-percentile 5-day rainfall event.

The 'Total Basin Volume' figures for each of the Stage 1, Stage 2 and Stage 3 sediment basins in Table 16 on Page 29 of the 'Concept Design Report: Cairncross Waste Management Facility' ("the Concept Design Report") do not align with the detailed calculations that inform Table 16 in Appendix G of the Report. The Stage 1 sediment basin is 7,761m<sup>3</sup> in Table 16 versus 7,807m<sup>3</sup> in Appendix G, the Stage 2 basin is 6,254m<sup>3</sup> in Table 16 as opposed to 5,884m<sup>3</sup> in Appendix G, and the Stage 3 basin is 9,910m<sup>3</sup> versus 8,535m<sup>3</sup> in Appendix G. It is unclear why this is the case.

**Request for further information:** The EPA requests advice as to why the 'Total Basin Volume' figures for each of the stages 1, 2 and 3 sediment basins in Table 16 of the Concept Design Report differ from the detailed calculations for each sediment basin presented in Appendix G.

There does not appear to have been an analysis undertaken of the ability of the existing 'Sediment Basin D' to accommodate an expanding, disturbed catchment as Stage 1 operations progress (the so called "West Catchment" in Appendix H of the Concept Design Report, which is serviced by Sediment Basin D, will increase in size during Stage 1 works).

According to Table 1 'Existing Sediment Basin Details' in the Concept Design Report, Sediment Basin D has a surface area of 800m<sup>2</sup>. However, in the detailed water balance in Appendix H (Page 53), the "West" pond (Sediment Basin D) has an area of 850m<sup>2</sup>, which rises to 1,000m<sup>2</sup> during Stage 1, suggesting Sediment Basin D will be enlarged to accommodate an increasing catchment area during Stage 1. The need to increase the size of Sediment Basin D is not explicitly stated in the EIS.

**Recommended condition:** Prior to the construction of Stage 1, an assessment of the ability of Sediment Basin D to capture and treat all sediment-laden runoff from the "West Catchment" during a 90th-percentile 5-day rainfall event must be submitted for approval by the EPA.

## 3. Groundwater quality

The environmental values of local ground waters do not appear to have been fully identified in the EIS.

According to the 'Hydrogeological Assessment – Cairncross Landfill Expansion' ("the Hydrogeological Assessment") at Appendix F: *"The Landfill Site has a comprehensive baseline groundwater monitoring network within and outside of the Stage E area comprising nine groundwater monitoring points"* (Page



13). Some groundwater monitoring started in December 2001, so the network was installed to detect groundwater impacts from Stage E and is being used to establish baseline conditions for stages 1, 2 and 3. It appears, however, that four bores were established in 1998 to provide some baseline data for Stage E. The details of and raw data from these bores have not been provided in the EIS.

Without these details and raw data, and given only five parameters (pH, iron, manganese, ammonia and phenols) appear to have been measured, it is difficult to assess the veracity of the claim made on Page 21 of the Hydrogeological Assessment that: *"Compared to baseline data collected in 1998 prior to landfill operation, current groundwater quality results are either improved or within the range of values measured before the start of the operation."*

Furthermore, results for the full suite of pollutants required to be measured under EPL 11189 have not been presented or discussed in the EIS. In addition to the parameters listed in Table 5 of the Hydrogeological Assessment, EPL 11189 requires alkalinity (as calcium carbonate), calcium, chloride, fluoride, magnesium, potassium, sodium, sulfate, total organic carbon and volatile halogenated compounds to be measured, on a quarterly basis. It is unclear why results for these additional parameters have not been presented or discussed.

*Request for further information:* *The EPA requests the raw data for the groundwater monitoring undertaken in 1998 and advice as to why the full suite of pollutants required to be measured under EPL 11189 have not been presented or discussed in the EIS.*

We note local ground waters have been assigned a protection level of 'slightly-to-moderately disturbed systems'. Given groundwater underlying the Site flows from elevated areas in the north and west of stages E, 1 and 2 to low-lying areas in the south, southwest and southeast (that is towards Rawdon Creek, which flows through Cairncross State Forest and vegetated private property, and Tommy Owens Creek, which flows through Rawdon Nature Reserve and a mapped SEPP 14 wetland), we consider a more appropriate protection level would be 'high conservation/ecological value systems' (necessitating application of the 99% protection level trigger values for freshwater ecosystems).

#### **4. Ground water quality monitoring**

Proposed site-specific groundwater quality trigger values, based upon up to 15 years-worth of results from Stage E monitoring, are presented in Table 9 on Page 38 of the Hydrogeological Assessment. Trigger values have not been defined for the full suite of indicator parameters required to be monitored under EPL 11189 however, including for alkalinity, calcium, chloride, fluoride, magnesium, potassium, sodium, sulfate, total organic carbon and volatile halogenated compounds.

The EPA notes the site-specific trigger values have been defined to indicate whether local ground waters are being contaminated with leachate as landfilling progresses, and not to establish discharge criteria.

Whilst we acknowledge discharges to local ground waters are not proposed, the apparent absence of a full consideration of the environmental values of local ground waters and the exclusion of certain indicator parameters makes it difficult for the EPA to assess the appropriateness of the site-specific trigger values presented Table 9.

The EPA therefore cannot endorse the site-specific trigger values presented in Table 9 and will refer to the default trigger values in the ANZECC Guidelines for high conservation/ecological value systems to indicate whether the environmental values of local ground waters are being impacted upon.

**Recommended condition:** **The indicator parameters for ground waters currently listed in EPL 11189 must be monitored for comparison with the relevant ANZECC trigger values.**

Two of the existing groundwater monitoring bores – CG104 and CG105 – are licensed monitoring points (that is, they are included in EPL 11189 as monitoring points 5 and 6). It is assumed these bores will be removed to make way for Stage 1. The EPA expects at least two replacement bores will be



installed according to the 'Environmental Guidelines – Solid Waste Landfills' Second Edition 2016 ("the Environmental Guidelines") and included in an EPL before these bores are decommissioned.

**Recommended condition: The EPA must be advised in writing before monitoring bores CG104 and CG105 are decommissioned to enable suitable replacements to be included in an EPL for the Proposal.**

Given CG102, CG103 and CG109/CG110 are hydraulically up-gradient of stages E, 1, 2 and 3, and were only installed in 2013, some of these monitoring points will be included in an EPL as licensed monitoring points.

**Recommended condition: Suitable hydraulically up-gradient groundwater monitoring bores must be included in an EPL for the Proposal.**

## **5. Groundwater interception trench**

As stated in the EIS, the proposed excavations for stages 1, 2 and 3, particularly those for stages 1 and 2, are expected to intercept groundwater during above-average groundwater levels. According to the EIS (Page 48) *"In order to avoid any risk of groundwater infiltration into the landfill cells, a gravel/ rubble trench is proposed around the perimeter of the landfill at locations where groundwater may be encountered ... The gravel trench will drain to the landfill low point at the southern perimeter, and prevent groundwater from entering the landfill cell during excavation and filling operations"*.

Figure 5-8 on Page 49 of the EIS shows areas where maximum groundwater levels are above the landfill floor level, and Figure 5-9 on Page 49 indicates the trench will only be installed where the maximum groundwater level is above the landfill floor level. There appear to be areas across Stage 3 where the maximum groundwater level is expected to be above the landfill floor level (albeit typically less than 0.2 metres), and yet it is not proposed to extend the trench towards Stage 3 (there appears to be a contradiction between Figure 5-8, which suggests there are areas across Stage 3 where maximum groundwater levels are above the landfill floor level, and the statement on Page 28 of the Hydrogeological Assessment' that: *"Within Stage 3 there is a very small area in which the maximum groundwater head will exceed 0.2 m above the average groundwater head (i.e. a maximum of 1.8 m below the landfill floor) ..."*

Additionally, Figure 5-9 indicates the trench will not be installed in areas where the maximum groundwater level is at, or above, the depth of excavation (0.5 metres) and at or below the landfill floor level (two metres). The EPA is concerned that in areas where the maximum groundwater level is between 0.5 metres and two metres above average groundwater level, upward pressure may be exerted by rising ground waters on the underside of the landfill barrier system, which may compromise the long-term integrity of the system. The EPA will consequently be requiring that the proposed gravel/ rubble trench be extended into areas where the maximum groundwater level is expected to be above the level of excavation.

According to the Hydrogeological Assessment (Page 28): *"It is assumed that the drainage trench will be constructed during the development of Stages 1 and 2, and within 100 days of the start of each of the stage excavations"*. If the trench is only to be constructed along the western boundary of Stage 1, there may be groundwater inflows from the south of Stage 1, until the trench is constructed along the southern boundary of Stage 2.

**Recommended condition: Prior to construction of the gravel/ rubble trench, detailed technical specifications including full construction plans for the trench must be submitted for approval by the EPA.**

It is not clear where the gravel/ rubble trench will discharge to, or whether surface or subsurface discharge is proposed. According to the EIS, the trench will discharge via natural flow to the "south" – either to the 'Koala Connectivity Corridor' to the immediate south or the 'Compensatory Habitat Area' to the immediate south-west of Stage 2. The location and manner of groundwater discharges are important because the Hydrogeological Assessment at Appendix F suggests groundwater in the vicinity



of Cairncross Waste Management Facility can be naturally brackish. Discharging saline ground waters to surface environments may have unintended consequences and impact upon local ecological conditions at and near the discharge sites in the Koala Connectivity Corridor and Compensatory Habitat Area.

**Recommended condition: Where surface discharges of groundwater are proposed, a pollution study, as defined in Section 68(1) of the POEO Act 1997, must be completed prior to the construction of the gravel/ rubble trench to assess potential impacts of surface discharges on the local receiving environment.**

Management of groundwater discharge zone(s), and the impact groundwater discharges may have on local ecological values, should be considered in any updates to the 'Operational Environmental Management Plan' (for the Koala Connectivity Corridor) or the 'Compensatory Habitat Management Plan' (for the Compensatory Habitat Area).

## **6. Leachate barrier system**

We note the Proponent has committed to installing a leachate barrier system for stages 1, 2 and 3 in (general) accordance with the Environmental Guidelines. We support this commitment.

We also note the Proponent proposes to use polyvinyl chloride ("PVC") pipes to collect leachate. The EPA recommends the use of high density polyethylene ("HDPE") to collect leachate, as HDPE pipes are flexible and more resistant to a greater array of chemicals than PVC pipes.

**Recommended condition: Prior to construction of each of stages 1, 2 and 3, detailed technical specifications including full construction plans for each stage must be submitted for approval by the EPA.**

## **7. Leachate management**

We note leachate from Stages E, 1, 2 and 3 will be captured, collected in storage tanks and pumped via a rising main to the proposed Telegraph Point Sewage Treatment Plant ("STP"), which is expected to be built adjacent to the Proposal site in 2018.

The storage tanks have been sized to accommodate two days-worth of leachate at the maximum predicted leachate flow-rate detailed in the 'Cairncross Landfill Leachate Generation Modelling Report' at Appendix H. The basis for arriving at the two-day storage capacity for the tanks is not clear from information presented in the EIS.

We also note it is expected primary holding tanks within the STP will provide leachate storage capacity additional to the two-day capacity provided by proposed leachate storage tanks. The volumes of these tanks is unknown.

Although the EIS implies the STP *will* be built, contingency arrangements for storing and disposing of leachate in the event the STP is not built have not been discussed in the EIS. Similarly, contingency arrangements for storing and disposing of leachate in the event the STP is unable to accept leachate for more than two days have not been discussed.

Given there appears to have been contamination of local surface waters by leachate, as discussed previously, and that the EIS acknowledges on Page 141: "... *there remains the potential for a malfunction of the leachate management system ...*", we consider it important that contingency arrangements for storing and disposing of leachate be formulated in the event the STP cannot be built or is unable to accept leachate for more than two days.

**Request for further information: The EPA requests advice as to how the two days-worth of leachate storage capacity for the storage tanks was arrived at. We also request advice as to the expected storage capacity of the primary holding tanks at the STP. Finally, we request advice as to whether the**



*proponent has considered contingencies in the event the STP cannot be built or is unable to accept leachate for more than two days, such as constructing leachate dams.*

## **8. Earthworks and materials balance, final capping and final landform**

Table 5-2 'Materials Balance Summary' on Page 50 of the EIS may overestimate the clay balances resulting from earthworks. The Materials Balance Summary assumes the depth of topsoil over stages 1, 2 and 3 is 300 millimetres, when the 'Hydrogeological Investigation of Proposed Cairncross Landfill' (GHD-Longmac Pty Ltd in 1998) revealed topsoil depths are 0.1 to 0.2 metres deep. This may have implications in terms of the amount of topsoil available for the revegetation layer of the final cap. The EPA's expectation is that the final cap will have a 200-millimetre topsoil layer to facilitate vegetation establishment and growth.

It is proposed the final landform will have the following characteristics:

- *"Maximum finished landform slope of 1V:4H to allow maintenance (mowing) of finished surface after capping*
- *Minimum finished landform slope of 1V:25H (4 percent grade) to ensure rainfall sheds from the surface and does not infiltrate the landfill*
- *A temporary batter of 1V:2H will be used between stages to ensure leachate and waste is contained appropriately and to limit the use of excess fill."* (Page 50 of the EIS)

The first two slope criteria do not align with the recommendations in the Environmental Guidelines. The Environmental Guidelines recommend:

- A maximum finished landform slope of 1V:5H (20 percent grade) to reduce the risk of erosion.
- A minimum finished landform slope of 1V:20H (five per cent grade) to defined drainage points to facilitate runoff and minimise ponding of water.

**Recommended condition: All final capping must be installed according to specifications in the Environmental Guidelines – Solid Waste Landfills, Second Edition 2016.**

The EPA is concerned a *"temporary batter of 1V:2H"*, which equates to a gradient of 50%, may not allow a sufficient depth of daily cover (150 millimetres of virgin excavated material) or intermediate cover (300 millimetres of VENM) to be reliably applied to waste during landfilling.

All landfilled waste must be covered regularly during operations with a suitable material to minimise emissions of odour and dust, the generation of litter, the presence of scavengers and vermin, the risk of fire, the infiltration of rainwater into the waste (and therefore the amount of leachate generated) and the emission of landfill gas.

**Recommended condition: All landfilled waste must be covered according to specifications in the Environmental Guidelines – Solid Waste Landfills, Second Edition 2016.**

## **9. Landfill Environmental Management Plan**

The EIS refers throughout to a 2008 version of the 'Operational Environmental Management Plan' ("the OEMP"). The EPA notes there is a February 2015 update to the OEMP (this being the 'Operational Environmental Management Plan – Cairncross Waste Management Facility' February 2015).

The Proponent should refer to and update the most recent version of the OEMP as construction and operation of the future stages of the Landfill progress. The EPL for the Proposal will reference the Operational Environmental Management Plan – Cairncross Waste Management Facility dated February 2015 where appropriate.

## **10. Landfill gas management**

The EIS states the extent of landfill gas ("LFG") controls to be designed and implemented for the existing and future stages of the landfill will be guided by the results of a LFG pumping trial, and that the Proponent will develop a LFG management plan based upon the findings of the trial.

The EPA understands the trial has been postponed.

**Recommended condition:** A landfill gas monitoring program must be established according to the requirements of the Environmental Guidelines – Solid Waste Landfills, Second Edition 2016.

#### **11. Noise management**

We note existing ambient noise levels have only been measured at one (R1) of four identified sensitive receivers (Table 2-2 on Page 7 of the 'Noise Impact Assessment' at Appendix I). The EPA considers the measurements, which have been used to establish a project-specific  $L_{Aeq(15 \text{ minute})}$  intrusiveness criterion and a project specific  $L_{Aeq(15 \text{ minute})}$  noise level of 39 dBA, have been affected by extraneous noise. Consequently, we propose to apply the minimum  $L_{Aeq(15 \text{ minute})}$  intrusiveness noise level of 35 dBA for nearby sensitive receivers (that is, the EPL for the Premises will specify an  $L_{Aeq(15 \text{ minute})}$  intrusiveness noise limit of 35 dBA for nearby sensitive receivers).

**Recommended condition:** Noise generated at the Premises must not exceed an  $L_{Aeq(15 \text{ minute})}$  noise level of 35dBA measured at identified sensitive receivers.