2 October 2020

660.10123-L01-v1.2.docx

Sealark Pty Ltd
GPO Box 2678
Sydney 2000

Attention: James Harris

Dear James

West Culburra Proposed Mixed Use Subdivision
Addendum to Odour Impact Assessment

Background

In February 2011, SLR prepared an odour impact assessment (OIA) for a proposed mixed use subdivision in West Culburra (SLR 2011a), parts of which would encroach upon the established buffer zone around the neighbouring Culburra Sewage Treatment Plant (STP). Dispersion modelling was conducted using a range of publicly available odour emission rates from comparatively larger STP sites (in terms of capacity) than the Culburra STP. The OIA stated that due to the use of published odour emission rates, there was a high likelihood that the dispersion modelling results would be an over-prediction of the actual odour impacts.

In July 2011, a revised OIA was prepared by SLR for the same site, using site-specific odour emission rates (SLR 2011b). For this study, an odour monitoring program was conducted by SLR in conjunction with Odour Research Laboratories Australia (ORLA), and the resultant site-specific odour emission rates were used to quantify emissions from the existing emission sources at Culburra STP (ORLA 2011). The OIA (SLR 2011b) concluded that:

> *"No exceedance of the odour criterion of 2 odour units (2 ou) would occur beyond the 400 m buffer zone. The potential for exceedance of the odour criterion was predicted for an area to the southeast of the proposed site, to a distance of approximately 400 m, with the potential for introduction of incompatible land uses in the northwest corner of Area 1."*

Since the completion of the revised OIA (SLR 2011b), the subdivision plan has undergone several revisions in response to findings/recommendations from various specialist studies (eg stormwater treatment, bushfire requirements, odour etc). The aim of this letter is to discuss the results of the 2011 modelling assessment in regard to the revised subdivision plan[1].

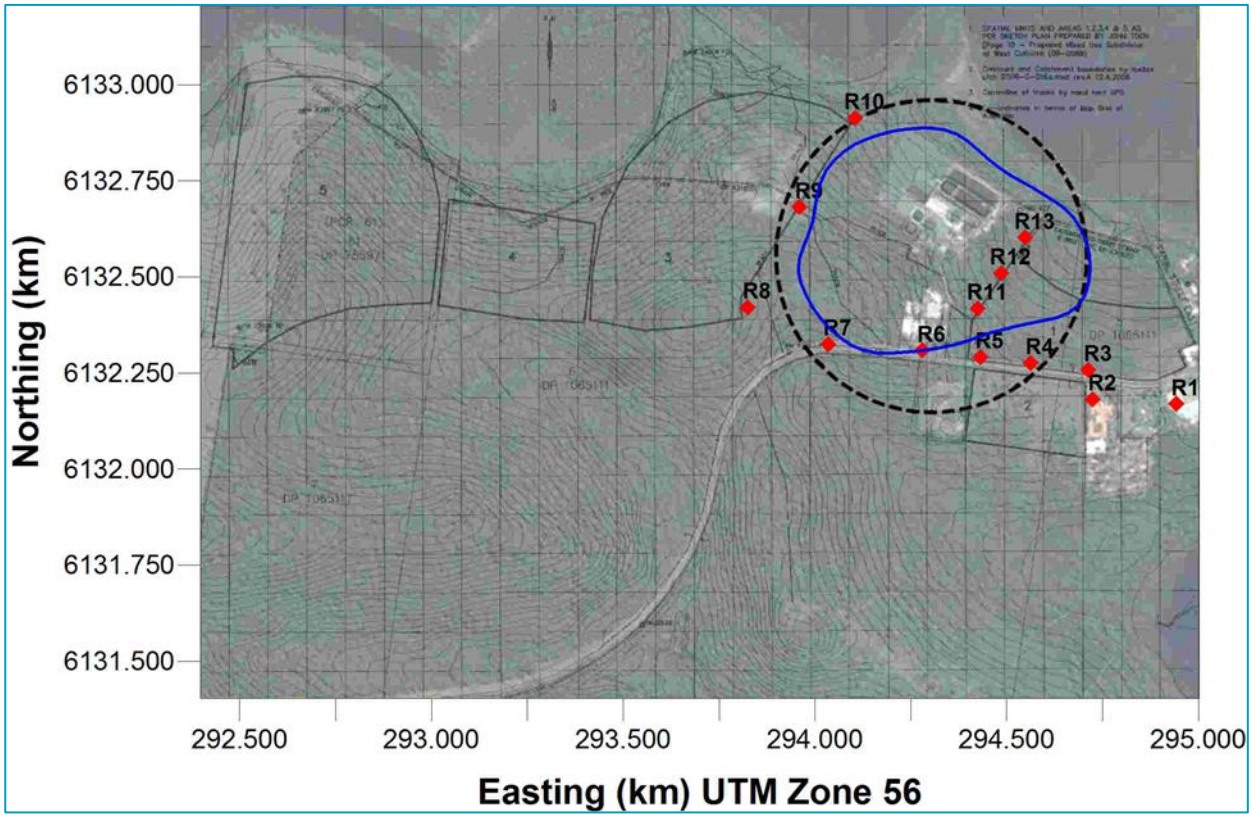
[1] The contents of this letter are limited to an assessment of the modelling results predicted in July 2011. The discussion presented in this letter assumes that the operational assumptions for the Culburra STP in the OIA (SLR 2011b) are still valid.

SLR Consulting Australia Pty Ltd Tenancy 202 Submarine School, Sub Base Platypus, 120 High Street North Sydney NSW 2060 Australia
T: +61 2 9427 8100 E: sydney@slrconsulting.com
www.slrconsulting.com ABN 29 001 584 612

Review of Potential Odour Impacts

The cumulative 99th percentile (88th highest) odour concentrations (nose-response time, 1-second average) predicted due to the operations of the Culburra STP are presented as a contour plot in **Figure 1** (from (SLR 2011b)). This plot illustrates a compilation of the predicted 99th percentile odour concentration at all locations downwind, taking into account all combinations of meteorological conditions modelled across the entire year.

Figure 1 Predicted Cumulative Ground Level 99th Percentile Odour Concentrations (SLR 2011b)



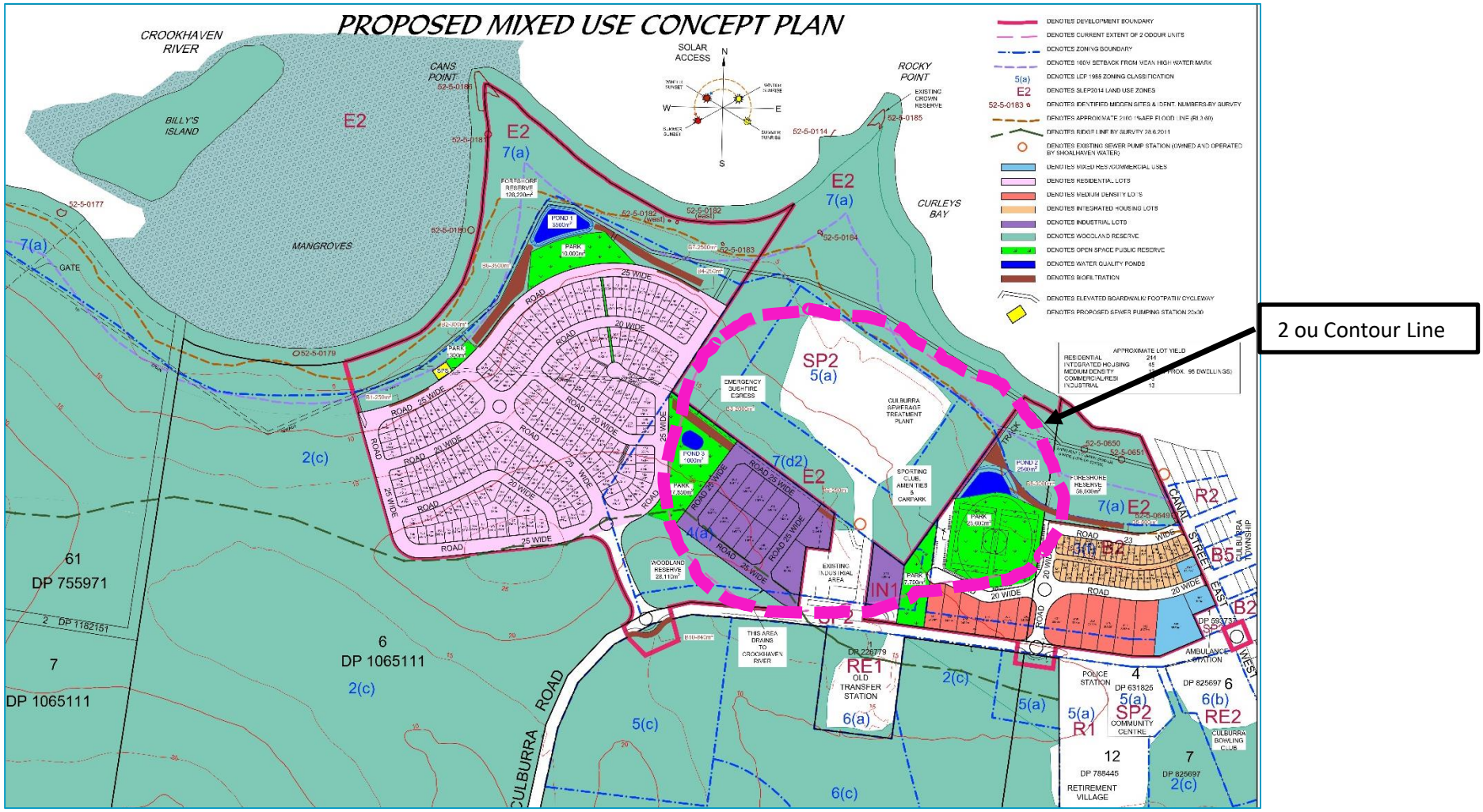
Note: Project odour criterion of 2 ou is shown in blue and the black dotted line indicates the 400 m buffer zone prescribed by Shoalhaven Councils Development Control Plan (DCP 67).

The predicted 2 ou contour line (ie Project criterion) is transposed onto the latest subdivision plan (shown as a pink dotted line) in **Figure 2**. The 2 ou contour line encroaches upon the following areas within the subdivision plan:

- Parks (x3) southwest, south and east of the STP (including an amenities block and carpark);
- Industrial lots (x13) south of the STP; and
- Foreshore Reserve area around the STP.

No residential lots proposed as part of the mixed use subdivision lie within the 2 ou contour line buffer. Further, the presence of Reserve areas between the Culburra STP and the recreational areas and industrial lots provides a buffer zone to reduce the potential for odour impacts.

Figure 2 Proposed Modified Subdivision Proposal (Revision 08)



Review of Project Odour Criterion

The Project odour criterion of 2 ou adopted in the 2011 OIA, is the guideline set by NSW EPA for odour-affected urban areas with affected populations of ~2,000 people.

Since the completion of the OIA (SLR 2011b), NSW EPA has provided further guidance on the approach to be used to determine the appropriate odour criterion for odour impact assessments. The EPA has advised that the odour impact assessment criterion is to be derived on a project-by-project basis by identifying the area within the 99th percentile 2 ou contour for the Project and using the population within this area to select the appropriate criterion (eg, by counting the affected number of households or multiplying this area by the relevant population density of the receptors).

The area located within the 2 ou contour line predicted for the Culburra STP encompasses 14 industrial lots and three parks/sports fields. The population estimates for the West Culburra Concept Plan show that on average:

- Industrial zone is estimated to have 5 employees per lot
- Sportsgrounds are estimated to have 60 participants per field

Based on this, the total affected population within the 99th percentile 2 ou contour is estimated to be approximately 250. Using this estimated population, the odour criterion adopted for this Project would be 3 ou (DEC, 2006b).

Odour Impacts Context

To provide some context, the UK *Odour Guidance for Local Authorities* (DEFRA 2010) provides the following guidance as to when odour concentrations becomes apparent (derived from laboratory measurements of intensity):

- 1 ou is the detection threshold for odour (by definition);
- 5 ou is a typical concentration for a faint odour; and
- 10 ou is a typical concentration for a distinct odour.

Further, the NSW EPA recommends within the Odour Framework (DEC 2006a) that, as a design goal, no individual be exposed to ambient odour levels of greater than 7 ou detection (99th percentile, nose response time).

Therefore, the modelling indicates that odours are unlikely be detected at any of the residential lots beyond the parks and industrial lots.

Potential for Cumulative Odour Impacts

As identified in the OIA, multiple odour generating sources were assessed as part of the Culburra STP operations. A source contribution analysis was conducted to identify the main contributing sources and it was concluded that the chlorine tanks were predicted to contribute approximately 33% of the downwind impacts.

In regard to the cumulative odours, the Queensland Department of Environment and Science Guideline *Odour Impact Assessment from Developments* (DEHP 2013) states:

> *"One of the drawbacks of dispersion modelling with multiple sources of odour is that the model assumes that the odours are additive. While this is correct for single chemical contaminants, it is not correct for odour units because the actual downwind odour concentration will depend on the various concentrations of the chemical constituents in the odour mixture.*
>
> *If the two sources were of quite different make-up, then the combined, diluted mixture of these two odour sources can have quite a different cumulative impact on the receiving environment. In some cases the effects may be additive and in other cases it may be positively or negatively synergistic. The modelling of multiple odour sources is quite complex and a little is currently understood about the cumulative impacts of multiple odour sources. It is reasonable to expect multiple sources of the same type of odorant (eg. multiple sheds on a poultry farm) to be additive in nature. An example of different type of odorant would be the rendering plant cooking odour via a chimney and the diffuse source odour from a wastewater treatment system."*

Further, the *Technical Notes: Assessment and management of odour from stationary sources in NSW* (DEC 2006b) only requires:

> *"Where it is likely that two or more facilities with **similar odour character** will result in cumulative odour impacts, the combined odours due to emissions resulting from all nearby facilities should also be assessed against the odour assessment criteria."*

As odours from the chlorine tanks will have a different characteristic compared to odours from the rest of the Culburra STP operations, it may be appropriate to conclude that the odour contours predicted in the dispersion modelling assessment are conservative representations of the extent of worst case impacts.

Complaints History

The Shoalhaven Council was contacted on 28 January 2020 to obtain an odour complaints history related to the Culburra STP. A formal request was also submitted to the Council on 5 February 2020 (receipt number: CouncilContact-162). The Council via their Information and Privacy Officer Governance (Diana Lord), issued a response on 19 February 2020, which states that:

> *"I can advise that there have been no complaints received by Council for the Culburra Waste-Water Treatment Plant"*

This indicates that Culburra STP has not historically been a source of nuisance odours in the existing community.

Conclusion

The dispersion modelling results should be viewed as a conservative representation of the odour impacts from the Culburra STP, and the likelihood of any odour impacts at more sensitive locations (ie residential areas) is considered to be low, for the following reasons:

- Based on current NSW EPA policy, an odour criterion of 3 ou would be considered appropriate for this Project, given the estimated affected population within the 2 ou contour line. The 99th percentile concentration predicted at the discrete receptor immediately east of the Culburra STP (R12) (SLR 2011b) was predicted to be 6 ou, which was the only discrete receptor exceeding the criterion of 3 ou.

- The character of the odour from the chlorine tanks are likely to be distinctly different from those emitted from the other sources at the Culburra STP due to the difference in chemical composition. The approach used in the modelling assumed that these odours are additive, which is unlikely to be the case.
- The presence of Reserve areas between the Culburra STP and the industrial lots provides a buffer zone to reduce the potential for odour impacts;
- The complaints history suggests there have been no odour complaints received by the Council regarding current STP operations in recent years.

Given the conservative nature of the assessment, low off-site odour concentrations predicted for the Culburra STP operations, the recent complaints history (ie zero complaints), and the proposed layout of the subdivision (ie industrial lots and recreational parks located in the 2 ou contour and no residential uses within this area), the potential for any odour impacts at the nearest sensitive receptor locations due to emissions from Culburra STP is concluded to be low.

REFERENCES

- DEC 2006a, Technical framework: assessment and management of odour from stationary sources in NSW, Department of Environment and Conservation NSW, November 2006.
- DEC 2006b, Technical Notes: Assessment and management of odour from stationary sources in NSW, Department of Environment and Conservation NSW, November 2006.
- DEFRA 2010, *Odour Guidance for Local Authorities*, Department of Environment, Food and Rural Affairs, March 2010.
- DEHP 2013, Odour Impact Assessment from Developments, prepared by Department of Environment and Heritage Protection, available online at https://environment.des.qld.gov.au/licences-permits/business-industry/pdf/guide-odour-impact-assess-developments.pdf, accessed on 11 March 2019.
- SLR 2011a, West Culburra – Proposed Mixed Use Subdivision – Odour Impact Assessment, Report number: 660.10019-R1D2, 25 February 2011.
- SLR 2011b, West Culburra – Proposed Mixed Use Subdivision – Odour Impact Assessment, Report number: 660.10123-R01-v1.0, 19 July 2011.
- ORLA 2011, Culburra Wastewater Treatment Plant (WTP), ORLA Report Number: 4837/ORLA, 17-19 May 2011.

We trust this information is sufficient for your purposes, but please don't hesitate to contact the undersigned if you require any further information.

Yours sincerely

VARUN MARWAHA
Associate Air Quality Consultant

Checked/
Authorised by: KL