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255

Content

39 Replacements

34 Insertions

12 Deletions

Styling and Annotations

167 Styling

3 Annotations

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Astute Environmental Consulting

Report

Level 2 Odour Assessment – Clarkes Lane MBR STP – Updated Layout

Akvotek

Job: 24-140

Date: 8 August 2024

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Project Title	Level 2 Odour Assessment – Clarkes Lane MBR STP – Updated Layout
Job Number	24-140
Client	Akvotek
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1 INTRODUCTION

Astute Environmental Consulting (Astute) was engaged by Akvotek to perform an odour assessment for a proposed sewage treatment plant (STP) located off Clarkes Lane at Wangaratta.

1.1 Background

The Clarkes Lane STP will service a new housing development. The STP will treat the flow from 350 lots with an equivalent population of approximately 1,225 EP.

It is understood the STP will consist of:

- inlet works, including screening and grit removal with odour control;
- a single basin Membrane Bioreactor (MBR);
- a new membrane tank with 3 membranes to allow peak wet weather flow with one membrane train out of service;
- a new chemical storage and dosing facility;
- a new Ultraviolet disinfection system;
- new chlorine dosing and chlorine contact tanks;
- new de-chlorination dosing system; and
- water storage dam.

It is understood that unlike some package STPs that do not have odour control, the STP will have odour control on the inlet works, which will consist of a combination of a biological odour control system and activated carbon. The proposed location of the STP is shown in Figure 1-1 below highlighted with a light blue arrow. The water storage dam is located to the south east of the STP site. It is noted that the original site layout didn't include the water storage dam however the current layout does.

Figure 1-1: –Proposed STP (blue arrow)

1.2 Project Objective

The objective of this assessment was to assess the risk of odour form the sewage treatment plant in line with the Guidance for assessing odour (EPA Victoria, 2022)[1].

1.3 Scope of Work

The scope of work included:

- Prepare a level 2 odour risk assessment using the methodology in the guidance; and
- Documenting the assessment in this report.

[1] "the guidance"

2 ASSESSMENT

2.1 Background

The guidance provides information on how to assess the risk posed by odour emission sources and to understand the receiving environment where effects might occur. The guidance is focused on the assessment of odour under the provisions of the Environment Protection Act 2017, including the General Environmental Duty, which requires all Victorians to take precautionary and reasonable actions to avoid hazards causing harm (EPA Victoria, 2022).

There are three levels of assessment in the guideline, progression through each level of assessment will depend on the scale or complexity of the scenario. These steps should be performed in sequence: If the lower levels of assessment show that the activity is low risk for odour, there is no need to proceed to the higher levels of assessment (EPA Victoria, 2022). The three levels can be described as follows:

- Level 1 – a "gateway assessment" which uses basic tests for cumulative impacts, duration of emissions, wind direction and minor emission sources;
- Level 2 – a more complex assessment that determines a risk score on the basis of:
    - a cumulative effects test;
    - a source pathway receiving environment tool;
- Level 3 – a detailed risk assessment tool for complex issues where Level 1 and Level 2 assessments are not sufficient to define an odour risk.

Here the STP warrants a Level 2 assessment as a STP would lead pass a Level 1 assessment.

2.2 Recommended Separation Distances

Both the *Recommended separation Guideline distances for industrial residual air emissions* (EPA Victoria, 2013) and the *Draft Separation Distance Guideline* (publication 1949) (EPA Victoria, 2022) include a methodology for determining separation distances for STPs. Both include Equation 1 below for Mechanical/biological wastewater plants where D is the separation distance in metres, and n is the equivalent population (EP) of the STP. Using Equation 1, for 1,225 EP, the distance would be 107 m.

$$D = 10 \times n^{1/3}$$ **Equation 1**

The STP and the calculated buffer of 107 m are shown below in Figure 2-1. Regarding the figure it is noted:

- The blue oval shows the 107 m buffer;
- The STP complies with the buffer for all nearby sensitive location's dwellings;
- Covers a small part of a baseball field to the east; and
- Is likely conservative as the STP will have odour control on the inlet works, while the equation does not take this into account.

The original site layout didn't include the water storage shown in the figure. Concerning the odour risk from the proposed water storage, in an email dated 30 July 2024 (17:38:45), Mr Hook of EPA Victoria noted "*EPA's considered view is a dam where treated water is stored would not be a significant [relevant] odour source, such that it can be removed from the odour assessment*". Based on this, it

has not been included in the separation distance figure below as it is not considered a significant source of odour by the project team or EPA.

Figure 2-1: –STP and 107 m Buffer (blue oval)

2.3 Level 2 Assessment

The Level 2 assessment requires the calculation of three scores:

- Odour Source Score (OSS) - which examines the hazard potential of the source;
- Odour Pathway Score (OPS) – which examines the exposure pathway between the source and sensitive locations; and
- Odour Receiving Environment Score (ORS) – which examines the sensitivity of the area around the source.

Tables 1 to 3 from the guideline are reproduced below as follows:

- Table 2-1: Derivation of scores for odour source hazard potential (Table 1 of Guideline);
- Table 2-2: Odour Control Effectiveness Weighting (Table 2 of Guideline); and
- Table 2-3: Scores for odour exposure pathway effectiveness (Table 3 of Guideline).

Where coloured grey, these are the values adopted for this assessment.

2.3.1 OSS

Regarding Table 2-1, Appendix A of the guideline only refers to STPs with treatment lagoons and sludge handling, and doesn't specifically refer to the proposed STP, however it is likely to fall into the moderate group, even if odour control is used. Due to the total volume of effluent passing through the site of ~400 m^3/year, the site is classified as small and due to the type of odour, the odour would be classified as unwelcome.

Table 2-1: Derivation of scores for odour source hazard potential (Table 1 of Guideline)

Score	Activity type	Size of odour hazard	Offensiveness potential
1	**Low odour potential:** Column 1, Appendix A	**Small size:** Materials usage hundreds of tonnes/m^3 per year Area sources of tens of m^2.	**Innocuous** Most people would not be bothered by the odour; however, prolonged or frequent exposure may cause adverse reactions.
2	**Moderate odour potential**: Column 2, Appendix A	**Medium size:** Materials usage thousands of tonnes/m^3 per year Area sources of hundreds of m^2	**Unwelcome** Unpleasant odour range: although not likely to be perceived as toxic or unsafe, these odours are usually unwelcomed for most people.
3	**High odour potential:** Column 3, Appendix A	**Large size:** Materials usage hundreds of thousands of tonnes/m^3 per year, or Area sources of thousands of m^2.	**Unsafe** Likely to trigger adverse responses as people are likely to perceive odour/s as unsafe or toxic. Most people would adversely react to these odour types.
4	**Very high odour potential**, Column 4 in Appendix A.		

Note:

1. High odour potential assumes odour control in use.
2. Large size is based on high volumetric flow of effluent per year.

High odour potential assumes all effluent in the system is odorous, in reality, MBR plants, especially those with control on the inlet works would be expected to have a moderate to low potential, especially when meeting the buffers in.

Although an odour control unit is proposed (Table 2-2 below), it is rated moderate only as it only treats the inlet works. Therefore, as the highest hazard potential score is 3, the OSS is 3-0 = 3.

Table 2-2: Odour Control Effectiveness Weighting (Table 2 of Guideline)

	Degree of effectiveness of odour controls		
Category	**High:** Tangible mitigation measures in place leading to little or no residual odour; releases only due to plant failure. Fully enclosed operations with extraction and treatment equipment utilising best available technology and techniques.	**Moderate:** Some mitigation measures in place, but significant residual odour remains. Some areas of the site may be controlled but there are areas not addressed. There is a lack of maintenance or monitoring of equipment.	**Ineffective:** • Open air operation with no containment • Reliance solely on management techniques requiring human intervention • Composting technology not commensurate with risk of feedstock.
Weighting	-1	0	1

2.3.2 OPS

The OPS takes into account distance, meteorology, terrain and buildings in the area, and hours of operation. The scores adopted for this site are shown by grey highlighting in Table 2-3 below. The maximum of the values gives an OPS of 3.

Table 2-3: Scores for odour exposure pathway effectiveness (Table 3 of Guideline)

Score	Distance	Meteorology	Terrain & Built Form	Hours of Operation
1	**Long distance:** Receiving environment is kilometres or hundreds of metres from source	**Favourable:** Winds rarely (<10%) blow from source away from receiving environment	**Favourable:** Highly built-up intervening zone with multiple non-sensitive uses that have no emissions of their own Densely forested Source is downslope of receiving environment (or located in a valley or quarry hole).	**Low frequency**: Emissions are rare and only occur if there is a significant upset or multiple lines of failure Emissions related to specific infrequent planned (monthly or annual) activities.
2	**Medium distance:** Receiving environment is tens to hundreds of metres from source Separation distance has not been met or only just met at the threshold distances.	**Neutral:** Even distribution of winds (10–20%) from source to receiving environment	**Neutral:** Moderate vegetation, source is on same altitude as receiving environment Intervening land use zone contains other non-odorous industry or smaller businesses.	**Moderate frequency:** Emissions or operations not continuous, typically confined to business hours during the day Reasonably regular in frequency (once per day to several times per week).
3	**Short distance:** Receiving environment is adjacent to the source/site Distance well below (less than half) separation distances.	**Unfavourable:** High frequency (>20%) of winds from source to receiving environment	**Unfavourable:** Flat cleared land Source is upslope of receiving environment, with isolated dwellings or structures in pathway Receiving environment abuts source.	**High frequency:** Emissions continually occurring 24/7 or for long periods at a time (e.g., landfills, oil refineries, sewage treatment plants, etc.)

Note:

1. As shown in Figure 2-1, potential receptors are the sporting fields and dwellings;
2. Based on 9 am and 3 pm Bureau of Meteorology data at Wangaratta, winds are likely to be neutral.
3. Area around pump station will be flat, with trees in some directions but not towards the sporting fields to the east.
4. Emissions will occur frequently as the site continually operates (with odour control).
5. Maximum of any value is taken as the OPS score therefore if one of the columns is 3 then this is the adopted value.

2.3.3 ORS

The ORS is determined based on the environment sensitivity scores in Table 4 of the Guideline. As the separation distance is met, the STP will have odour control on the inlet works, the odour impacts will most likely occur at night, and the sports grounds and surrounding area are likely used during the day, the area surrounding the STP could be given a score of 1.

This value was included in the original Level 2 assessment report previously prepared for the original layout, which didn't include the water storage dam. In response to the original report, North East Water (NEW) provided feedback in a letter dated 12 July 2024 which is attached to this report.

In response to this feedback, as the park could be an ongoing use, i.e. people continually present, a score of 2 has been applied in lieu of a score of 1.

2.3.4 Overall Level 2 Score

The Source-pathway-receiving-environment tool (SPR) is calculated by adding the ORS, OSS and OPS which were:

- OSS = 3;
- OPS = 3; and
- ORS = 2.

The SPR = 3+3+2 = 8 (See section 5.2 of the guidance) which is a medium Risk and the lower of the two medium risk scores. While the short distance to the boundary of the site would be a score of 3 for exposure pathways within the Guidance, this would not change the OPS nor SPR further as scores of 3 already have been included in the assessment as shown in Table 2-3.

A medium risk is defined as follows: *borderline cases – there may be one element that can influence the score and tip it into a low or high score. In these cases, this should be explored further* (EPA Victoria, 2022).

3 DISCUSSION

As noted above, an earlier version of this report was prepared based on an earlier site layout, which didn't include the water storage dam, and used an ORS (receiving environ) score of 1.

In NEWS's letter of 12 July 2024, NEW made reference to the water storage dam and the ORS score. As a result of changes to the ORS from 1 to 2,, the Level 2 score in this report is 8, which is a medium risk. A medium risk, as stated in the guidance, requires further exploration but this exploration under the Guidance doesn't trigger a Level 3 assessment.

Part of understanding the implication of a score of 8 (medium risk) is understanding the sources of odour on site and how they may compare to a site with uncontrolled emissions, which is what the separation distances in the document *Recommended separation Guideline distances for industrial residual air emissions* (EPA Victoria, 2013) take into account.

Concerning this, the separation distance approaches in both EPA Victoria (2013) and the *Draft Separation Distance Guideline* (publication 1949) (EPA Victoria, 2022) assume a standard site layout for STPs. This would include inlet screenings, sludge handling, storage and disposal, as well as other sources such as recycled water tanks/lagoons.

It is noted that:

- The inlet works have odour control;
- The screenings are fully contained within a closed bin.
    - The discharge is placed into a plastic tube, and the tube is tied off on the chute which minimises the risk of odour compared to a system open to air;
    - The bin is in a room under negative pressure with odour control;
- The recycled water will be at discharge quality and as confirmed by the EPA is considered to be odour free compared to the effluent entering the plant. Therefore, any water storage on site will have a low risk; and
- The waste activated sludge will not be treated on site, but will be returned to the sewer main.

The information above highlights that the proposed design has additional management and odour control than a conventional system envisaged when Publication 1518 (EPA Victoria, 2013) was published. Therefore, compared to a conventional mechanical system, the total odour emissions would be lower and the separation distance shown in the figure above would be conservative. As such, the medium risk score of 8, considering the above, could be considered a low risk due to the controls and management. Notwithstanding this, odour may be detected if people stand adjacent to the plant for extended periods, however it is unlikely that this will be the case, compared for example, to a resident living for an extended period in a dwelling outside of the separation distance.

4 CONCLUSION

We have performed a Level 2 risk assessment is accordance with the Guidance. The STP meets the separation distance requirements to existing dwellings and will have odour control and other management measures in place. Using the Level 2 method, the risk has been found to be medium (score of 8) with odour control in place. By considering the on site management and compliance with the separation distance requirements at existing dwellings, it is concluded that the site poses a low odour risk.

5 REFERENCES

EPA Victoria, 2013. *Publication 1518 Recommended separation distances for industrial residual air emissions.,* Melbourne: State of Victoria.

EPA Victoria, 2022. *Draft Separation Distance Guideline (publication 1949) December 2022,* Melbourne: State of Victoria.

EPA Victoria, 2022. *Guidance for assessing odour June 2022,* Melbourne: EPA Victoria.

APPENDIX A – North East Water Letter

David Hunter
By email: integraldelta.strategy@gmail.com

12 July 2024

Dear David,

Planning Scheme Amendment C86wang – North East Water response regarding request to include a Buffer Area Overlay (BAO) in Targoora Park and installation of a solar system for MBR wastewater treatment plant

Thank you for your feedback regarding North East Water's (NEW) submission to Rural City of Wangaratta's Planning Scheme Amendment c86wang involving the rezoning of a portion of Targoora Park to PUZ1 for the purposes of a new wastewater treatment plant to service up to 350 new allotments in southern Wangaratta. Below is our response to further queries you have raised following NEW's submission on the Amendment.

Request for further information on plant energy consumption and solar array size to inform location of solar array

As detailed in our submission to Council, NEW does not support the solar system being located on private property such as Cathedral College. This presents access and maintenance challenges for NEW and the ongoing operations of the wastewater treatment plant when located on a third-party site.

NEW is open to considering two potential sites for the solar panels; either located within the rezoned PUZ1 area in Targoora Park or relocated to the North Wangaratta wastewater treatment plant. Targoora Park is the preferred site given that generating solar energy next to the energy-using asset will be more efficient and reduces energy network charges.

It is expected that the MBR plant will be energy intensive, and therefore we require further information about the plant energy load and the size of the solar system. This information will help us to determine whether placing the solar system within the rezoned PUZ1 area of Targoora Park will be the most appropriate location, factoring in land size constraints within Targoora Park for the area proposed to be rezoned, and the need for appropriately sized effluent storage.

We understand that Council's position is that Targoora Park is first and foremost a public park and NEW does not want to take up more 'public-park' space with the PUZ1 rezoned area than is absolutely necessary to accommodate the wastewater treatment plant infrastructure.

Engineering design - storage lagoon sizing

The capacity of the effluent storage lagoon needs to be able to hold effluent during prolonged wet weather periods and therefore the modelling for the lagoon will need to provide a level of detail to demonstrate the volume of storage required, based on wettest year conditions.

The size of the lagoon will also inform the amount of land that is required to be re-zoned to PUZ1 in addition to the size of the solar system discussed above. NEW's submission to Council indicated that it may be likely that more land would be needed within Targoora Park to adequately accommodate the wastewater treatment plant, the lagoon and potentially the solar system. However, as Targoora Park is

a public recreational facility, NEW will not need to request additional land be rezoned if it can be demonstrated that the wastewater treatment plant, the size of the lagoon and the solar system can be sufficiently accommodated within the proposed PUZ1 area.

It is noted that if land designated for the rezoning is constrained, NEW would consider the option to relocate the solar system to the North Wangaratta wastewater treatment plant to avoid the need to take up more public recreational space than is necessary in Targoora Park.

Engineering design - Inlet screening and sludge handling
NEW requires further information on how the wastewater treatment plant facility will store, manage and dispose of inlet screening waste and sludge, which can be highly odorous. Depending on the proposed facility, if sludge and waste is not contained and appropriately stabilised and stored, the odour impact to Targoora Park and the surrounding areas may be significantly higher than what has been determined in the odour assessment prepared by Astute Environmental Consulting, dated 26 June 2024.

Request to include a Buffer Area Overlay
With regard to our request to Council to amend the Planning Scheme Amendment to include the addition of a Buffer Area Overlay (BAO), NEW concedes that the inclusion of the BAO at this point in time is not critical to the progress of the project. NEW is still in favour the establishment of a BAO around the new MBR wastewater treatment plant, however the timing for implementing a BAO around the new MBR plant can be re-assessed and determined at a future point in time.

NEW acknowledges that our request to include the BAO in Planning Scheme Amendment c86wang would result in the need for it to be re-exhibited by Council. We also acknowledge that Council is still considering the content of the submissions it has received through the exhibition process.

Therefore, whilst NEW will not insist on the inclusion of the BAO at this point in time, should there be other submissions requesting substantial changes to the Planning Scheme Amendment that would trigger the need for re-exhibition then NEW would like for Council to still consider including the BAO if re-exhibition will be required for any other significant changes to the Planning Scheme Amendment.

Astute Environmental Consulting odour assessment report – low ORS score
NEW has reviewed the odour assessment report prepared by Astute Environmental Consulting, dated 26 June 2024, and has sought independent advice on the odour emission assessment.

Some inaccuracies have been identified within the odour report prepared by Astute Environmental Consulting. The Odour Receiving Environment Score (ORS) within the report forms part of the Level 2 assessment that considers land use around the activity site. The ORS detailed by Astute Environmental Consulting in 2.3.3ORS appears to be scored as ‘1 (low)’, which results in an overall Level 2 score for the wastewater treatment plant determined as a ‘7’, which is also ‘Low’ (refer 2.3.4 Overall Level 2 Score).

There is little evidence in the report to indicate how Astute Environmental Consulting have reached an ORS of ‘1’ resulting in a ‘low’ overall Level 2 assessment score. The EPA guidance on these types of assessments indicates that the ORS should be scored as either ‘2’ based on sporting fields that would fall within the separation distance, or ‘3’ based on the residential area within 2km.

NEW’s experience is that odour impacts do not only occur at night as indicated in the 2.3.3ORS in the report. Odour impacts will also occur during normal daytime operations during handling and disposal of sludge and screening waste, and during upset conditions, which have not been considered by the report. A higher ORS will shift the Level 2 assessment from a ‘low’ risk to a ‘medium’ risk that would warrant further assessment and consideration.

Under EPA *Guidance for assessing odour* (section 5.2) the change in the project from ‘low’ to ‘medium’ score indicates that the odour risk should be further explored.

To conclude, NEW is of the view that the ORS determined by Astute Environmental Consulting in their odour report scored as 'low' does not align with the EPA guidance for assessing odour impacts in these circumstances.

Inlet screening waste, sludge and effluent storage lagoon
The odour assessment report from Astute Environmental Consulting also does not consider the odour impacts resulting from inlet screening waste, sludge handling, storage and disposal, and recycled water storage lagoon, which are also potential future odour sources for the site. NEW would like to better understand how inlet screening waste and sludge storage, handling and disposal will be undertaken, to ensure odour will be effectively managed, and how the recycled water storage site has been considered in the odour assessment.

We welcome further discussions with you regarding the issues raised in this letter or in our earlier submission to Council regarding Planning Scheme Amendment c86wang. We particularly welcome further discussion regarding the wastewater treatment plant detailed design and future operations.

Yours faithfully,

Guy Wilson-Browne
General Manager Planning & Infrastructure