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memorandum

TO	Selwyn District Council	FROM	Chris Bender
		DATE	3 September 2021
RE	Plan Change 73 – Odour Assessment Review		

Background

1. Rolleston West Residential Limited has lodged a private plan change request (Plan Change 73) with Selwyn District Council to rezone approximately 160 hectares of rural zoned land in two separate locations on Dunns Crossing Road, Rolleston. This will enable the development of approximately 2,100 residential sites and two commercial areas. An assessment of the effects on the environment (AEE) in support of the application has been prepared by Novo Group Limited.
2. Among the issues identified in the AEE regarding Plan Change 73 are reverse sensitivity effects on existing activities near the proposed development which have the potential to generate nuisance levels of odour. Golder Associates prepared an assessment of odour and reverse sensitivity effects, which was included as Appendix H of the AEE.
3. On 16 July 2021, Selwyn District Council requested that I review the odour assessment supporting the application together with information provided in the response to the Request for Further Information (RFI) and provide comment on the assessment of reverse sensitivity effects on existing activities from the proposed Plan Change 73. This memorandum summarises the findings of my review of the available information.

Air Quality Assessment

Introduction

4. The proposed plan change area consists of two blocks of land to be rezoned, referred to as the Holmes Block and the Skellerup Block. The proposed plan change area that has the potential for reverse sensitivity effects on nearby activities are shown in Figure 1 below taken from the Golder report. There are existing activities that have the potential to generate odour. The risk of adverse amenity effects arising due to odour discharges from these activities is potentially increased by the proposed residential development. The existing activities potentially impacted by reverse sensitivity effects are:

- The Pines wastewater treatment plant (WWTP), which includes a sludge drying plant and spraying of treated effluent to land;
- The Pines Resource Recovery Park (PRRP), which includes a waste transfer station and composting facility for green and household organic wastes; and,
- A series of poultry farms to the north of the Skellerup Block.

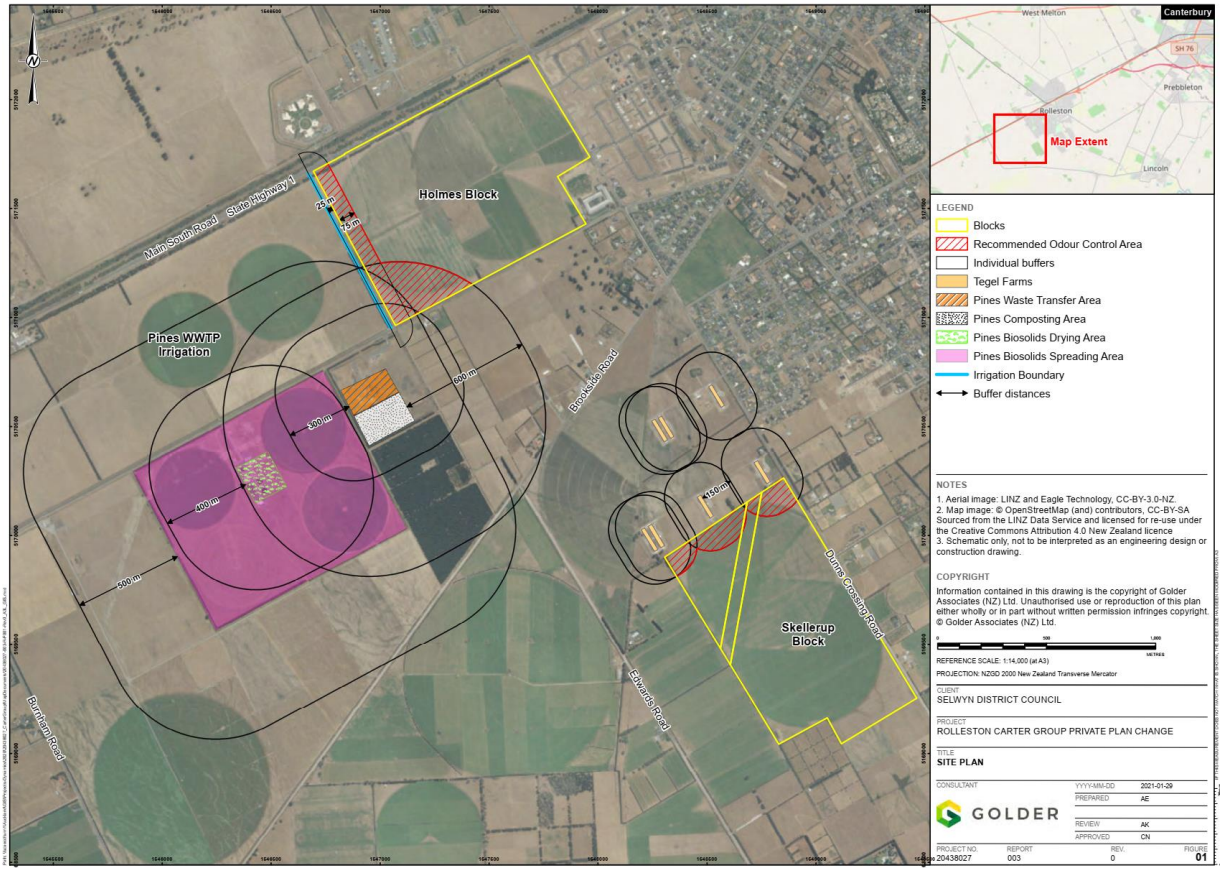

Figure 1 Proposed Plan Change Area with Separation Distances from Odour Generating Activities

Method of Assessment

5. In assessing the potential reverse sensitivity effects of the proposed plan change, Golder has relied primarily on recommended separation distances for the proposed plan change areas to the various odour producing activities. The intention of separation distances is to provide a buffer between activities that have potential for adverse odour effects and land use activities with higher sensitivity to those odours. The separation distances used in the Golder assessment were referenced from Australian guidance documents, specifically:

- Environmental Protection Authority Victoria, 2012. *Draft guidelines for separation distances for composting facilities*, EPA Victoria Publication 1445, 2012.
- Environmental Protection Authority Victoria, 2017. *Designing, Constructing and Operating Composting Facilities*: Guideline. Publication 1588.1, June 2017.
- Environmental Protection Authority South Australia, 2019, *Evaluation Distances for Effective Air Quality and Noise Management*. Issued August 2016, Updated March 2019.
- Australian Capital Territory, 2018. *Separation Distance Guidelines for Air Emissions*. November 2018.

6. Golder reviewed separation distances for the type and scale of the various odour producing activities to sensitive receivers as described in the AEE and these were plotted as buffer zones on a map showing the proposed development. Where the buffer zones impinged upon the Holmes and Skellerup blocks, these were designated as Odour Control Setback Areas within which the development of housing will be restricted.

Overview of Odour Generating Activities and Separation Distances

Pines WWTP

7. The Pines WWTP facility consists of three discrete activities with odour generating potential:

- A wastewater treatment plant;
- Biosolids handling, drying and disposal; and,
- Treated wastewater spray irrigation.

8. Golder determined applicable buffer zones for each of these activities from various Australian EPA guidelines based on the nature and scale of the activities.

Wastewater Treatment Plant

9. To designate the recommended separation distance from the wastewater treatment processes, Golder assumed the WWTP to consist of the wastewater treatment infrastructure including bioreactors, clarifiers, and sludge drying glass house. Golder recommended a separation distance from the WWTP to sensitive receivers of 430 m using the Victorian EPA guidelines[1] based on a population equivalent (PE) of 80,000. The evidence of Mr England (Asset Manager – Water Services for Selwyn District Council) outlines that the WWTP treatment facility will expand up to a PE of 120,000, which would equate to a separation distance of 490 metres using the Victorian EPA formula. Golder has used a separation distance of 500 metres based on an earlier (2008) assessment[2] which is higher than the 490 metres distance as determined using the Victoria EPA guidelines. The 500 metre buffer zone for the WWTP does not impinge on the proposed plan change areas and does not result in the need for Odour Control Setback Areas in either the Holmes or the Skellerup blocks.

10. I consider a separation distance of 500 metres to be appropriate to minimise the risk of reverse sensitivity for the WWTP.

Biosolids Handling

11. Biosolids at the Pines WWTP facility are dried in a drying facility, for which Golder has adopted a recommended separation distance from the ACT EPA guidelines[3] of 400 metres.

12. The Pines WWTP does not currently discharge biosolids to land, but this activity is allowed for under the existing resource consent for the site. Golder has adopted a 500 metre separation distance from the potential area for disposal of biosolids to land.

13. The 400 metre separation distance from the biosolids drying area and a 500 metre buffer zone for the area of potential discharges of biosolids to land do not impinge on the proposed plan change areas, and do not result in Odour Control Setback Areas in either the Holmes or the Skellerup blocks.

14. I note that Mr England states in his evidence that they have received 11 odour complaints regarding the operation of the Pines WWTP during the three-year period August 2018-August 2021. The locations of the odour complaints are not stated and would be needed to understand the implications for reverse sensitivity effects from the proposal. The complaints do,

[1] Victoria EPA, *Recommended Separation Distances for Industrial Residual Air Emissions, Publication 1518*, March 2013.
[2] Golder Associates, *Rolleston Odour Assessment prepared by Golder Associates (NZ) for Selwyn Plantation Board,* 2008.
[3] Australian Capital Territory, *Separation Distance Guidelines for Air Emissions*, November 2018.

however, indicate that nuisance levels of odour can be observed outside the site boundary. Golder states in response to the request for further information (RFI)[4] that the odour being generated is likely due to the sludge drying plant operating at times at the upper limit of the current design capacity of 30,000 PE. The site is currently in the process of being upgraded to a design capacity of 60,000 PE, and in future will be upgraded to a design capacity of 120,000 PE. I understand from the RFI response and the evidence of Mr England that with the progressive upgrades, the facility will have additional wastewater treatment capacity controls, which are expected to mitigate the effects of odour from the sludge drying activities at the site.

15. Notwithstanding the odour complaints received about the current operations of the WWTP, I consider a separation distance of 500 metres from the WWTP treatment infrastructure, 400 metres from the biosolids drying, and 500 metres from potential discharges to land to be adequate to protect against reverse sensitivity effects from a well-managed wastewater treatment and disposal operation. I note that the Holmes Block is located around 800 metres and the Skellerup block 1,700 metres from the WWTP treatment infrastructure, which provides sufficient separation from the odour generating activities.

Treated Wastewater Spray Irrigation

16. The Pines WWTP sprays treated wastewater on surrounding fields, including a parcel of land immediately to the west of the Holmes block. Conditions of the consent (consent ID CRC153952) allow the irrigation of treated wastewater on land up to 25 metres of the boundary of the areas designated for the irrigation. This distance is increased to 200 metres when the wind is blowing toward the boundary or if there is potential for the wastewater to be anaerobic. Golder has assessed this activity as not having risk of odour, but that there may be some risk of transport of viruses in the treated wastewater. I agree that if the wastewater is adequately treated to comply with water quality criteria as described in the resource consent, and aerobic conditions are maintained in the wastewater and the irrigation pipework then adverse odour effects are unlikely to occur from disposal to land of the treated wastewater.

17. Golder has assessed an appropriate separation distance from the irrigation areas of 100 metres to protect against the drift of viruses from the wastewater. Given that the Pines WWTP has a mandatory setback which restricts spraying within 25 metres from the site boundary, Golder has applied an Odour Control Setback Area of 75 metres on the western boundary of the Holmes block.

18. Based on PDP's experience with assessing the potential human exposure to bacteria and viruses from the irrigation of treated wastewater, I agree that a separation distance of 100 metres is sufficient to protect against adverse effects from the activity. Provided the Pines WWTP maintains an internal separation of 25 metres from the site boundary, I consider the Odour Control Setback Area of 75 metres from the boundary to be appropriate for the Holmes block.

Pines Resource Recovery Park

19. The PRRP is an established municipal waste transfer station, owned and operated by the Selwyn District Council. Landfill waste, recycling and organic waste from the entire Selwyn District is collected, sorted and processed on the site. The activities with potential for odour generation at the PRRP include a waste sorting and transfer, and a composting facility.

[4] Golder Associates, *Response to Request for Further Information - PC200073 – Private Plan Change Request to the Operative Selwyn District Plan from Rolleston West Residential Limited in Rolleston*, 1 February 2021.

Waste Transfer Operations

20. A separation distance of 300 metres for the waste transfer operations at the PRRP was referenced in the Golder odour assessment. This is consistent with the South Australia (2019) recommendation of 300 metres and the Victoria EPA (2013) recommendation of 250 metres. I agree that this separation is appropriate for minimising the potential for reverse sensitivity effects of the proposed plan change areas on the PRRP.

Composting Operations

21. The PRRP accepts green and organic wastes for open air composting in windrows within a designated area of the site. A separation distance of 600 metres was adopted by Golder for the composting operations in the odour assessment and is based on the EPA Victoria's *Designing, constructing and operating composting facilities* (June 2017), which has recommended separation distances of >600 metres for an open air composting plant with 1,200 tonnes per annum. The composting rate on which the separation distance is based is lower than the approximately 8,000 tonnes of organic waste that was received and processed at the PRRP during the 2020/2021 fiscal year. Mr Andrew Boyd (Solid Waste Manager for Selwyn District), states in his evidence that the volume of organic wastes to be accepted at the PRRP is projected to further increase over time. Under the resource consent that was granted on 3 May 2021 the site is permitted to accept up to 53,000 tonnes of organic waste per year. Based on the EPA Victoria guidance document, a much greater separation distance is applicable for an open air composting facility accepting these volumes of organic waste. Table 1 is excerpted from the EPA Victoria document and provides the recommended separation distance for open air composting facilities. Based on a future annual processing of over 50,000 tonnes, a separation distance of 2,000 metres is recommended in the EPA guidance.

Table 1 Recommended Separation Distances for Open Air Composting Facilities

Types of feedstock	Technology being used	Size of the plant	Recommended separation distance (metres)
Green wastes	Open air receival Open turned windrow Open air maturation	1,200 tonnes per annum	>600
		14,000 tonnes per annum	>1,100
		36,000 tonnes per annum	>2,000
		50,000 tonnes per annum	>2,000

22. I note that other guidance for composting of green and organic wastes have been published, including Emission Impossible report[5] to Auckland Council (AC). The AC report recommends a separation distance for the composting of green waste of 500 metres, and a separation distance from the composting of human and animal waste of 1500 metres, regardless of the volumes of composting. The South Australia EPA[6] recommends that composting operations not be undertaken within 1,000 metres of sensitive land uses, and also notes that greater separation distances may be necessary based on site specific conditions.

23. I note that that the separation distances are guidelines only and lower separation distances may be adequate depending on other factors such as the specific makeup of the organic waste,

[5] Wickham, L (2012). Separation Distances for Industry, A discussion document prepared for Auckland Council, July 2012. Prepared by Emission Impossible Ltd.

[6] South Australia Environmental Protection Agency, *Compost Guideline*, Updated June 2019.

procedures for ensuring the waste remains aerobic, and FIDOL[7] criteria such as the prevalence of winds which may carry odour from the composting site toward the sensitive locations.

24. A site-specific assessment of the PRRP, and in particular the potential for adverse effects of odour generated from the composting facility, was undertaken by Specialist Environmental Services (SES) in July 2018. The assessment was undertaken to support a resource consent application for the windrow composting of organic wastes at the site. The SES report assessed the potential for adverse odour effects on the closest residential receptors which are approximately 500 metres from the active composting area to be minor or less than minor. I consider that this assessment would also extend to residences within the Holmes Block, which are in the same direction as the existing dwelling and further away. A subsequent memo by SES in June 2020 was provided to support a change to conditions of the consent to allow for increased acceptance of organic material at the composting facility, which considered that the increase in composting volumes would not significantly increase the risk of adverse odour generated from the site provided that the site is well operated and maintained and the existing separation distances are maintained. The conclusions of this assessment were accepted by Environment Canterbury, subject to development of an odour and dust management plan (ODMP) that outlines management procedures to mitigate the potential for adverse odour effects from the site. A change to the conditions of the resource consent for discharges to air (CRC211594) was granted on the 3rd of May 2021.

25. The operations of the PRRP as described in the resource consent application documents and ODMP were developed to ensure that the site can operate without generating adverse off-site air quality effects. On this basis, I accept that the site should be able to operate without resulting in offensive odours beyond the separation distance of 600 metres. In practice, however, upset conditions may occur in which offensive odours are released, e.g. if pockets within a windrow of active compost become anaerobic and are subsequently exposed to air. If abnormal emissions do occur, the increased density of housing and associated increase in sensitivity of the receiving environment could contribute to additional odour complaints from any incident.

26. The applicant has measured the Odour Control Setbacks Areas from the active compost windrows, which I agree have the greatest risk of generating offensive odours. The proposed separation distance of 600 metres results in an Odour Control Setback Area in the southwest corner of the Holmes block extending between approximately 300 - 400 metres within the property boundary of the block. Mature compost windrows are located nearer to the site boundary and are closer to the Holmes Block. The Odour Control Setback Area for the Holmes Block extends to approximately 490 metres from the closest mature compost storage and handling area. The compost windrows are managed to be progressively more mature as they are located nearer to the site boundary.

27. The mature compost is screened near the site boundary and loaded for offsite transport. The screening process is a potential source of odour that may be detected beyond the operational area. The odour from mature compost will likely be relatively inoffensive and will have a lower intensity than odour from active compost. However, the duration and frequency of the odour generation from the mature compost will likely be greater than from the active compost area due to the nature of the screening process and therefore, has potential to cause nuisance type odour in a highly sensitive receiving environment. I consider the proposed Odour Control Setback Area for the Holmes Block should be sufficient to protect against adverse effects from the storage and handling of mature compost.

[7] Frequency, Intensity, Duration, Offensiveness/Character and Location. These factors are considered to assess whether an odour is likely to be offensive or objectionable to the extent that there is an adverse effect.

28. I note that other than increasing separation distance from the composting site, options to mitigate odour from the composting site may include process controls, e.g.in vessel composting or active aeration (Victoria EPA 2017). While alternative systems with improved odour control could be more appropriate for composting facilities near to sensitive land uses, these mitigations are not within the control of the applicant for the plan change. In my view, a future requirement for the composting facility to adopt more expensive composting technologies is a possible outcome of the intensification of residential development and the establishment of residences beyond the 600 metre separation distance from the composting activity.

Tegel Poultry Sheds

29. The recommended separation distance from the poultry sheds in the Golder odour assessment was 150 metres based on a dispersion modelling assessment undertaken in 2008 for the Selwyn Plantation Board to support a plan change to the Skellerup block. Subsequent reviews of the modelling assessment as described in the Section 42A report[8] for that plan change called into question the use of the AUSPLUME dispersion model as well as the use of emission factors for broiler chicken farms which may differ from the emissions at the Tegel poultry sheds which house breeder chickens.

30. Golder notes in the RFI Response (1 February 2021) that the modelling and associated separation distance of 150 metres has been validated in other modelling although these assessments were not referenced in the RFI Response. In the 2008 modelling, the odour emission rates were calculated from published emission factors for full grown broiler birds to represent the breeder chickens, which would result in higher emission rates from the poultry sheds. I consider the emission factors to be appropriate and are likely be conservative. Golder also notes that in flat terrain AUSPLUME is an appropriate model given that the odour criteria were developed using the AUSPLUME model. I note that in my experience, in conditions of flat terrain that AUSPLUME and CALPUFF will give similar results.

31. Notwithstanding the reverse sensitivity issues with rezoning, I note that the Tegel poultry sheds are already adjacent to residential areas to the east of the sheds, with the nearest houses being around 70 metres from the closest chicken shed directly to the east of the shed and downwind of the predominant wind direction for the area. If there were odour issues associated with the operation of the poultry sheds, they would likely be affecting the existing residences in these locations. The applicant has not stated whether there are odour complaints regarding the chicken sheds in the residential area, but assuming there are none, a 150 metre separation distance from the poultry sheds is likely to be adequate.

Conclusion

32. I have reviewed the application and associated documentation for the proposed Plan Change 73, with particular focus on reverse sensitivity effects of the proposed plan change areas on nearby odour generating activities. Overall, I agree that the approach of using minimum separation distances applicable to the nature and scale of the odour-generating activities is appropriate for minimising the potential for reverse sensitivity effects of the proposal. I also consider that for the most part, the separation distances are appropriate for use in this instance. The proposed separation distance of 600 metres is significantly less than the Victoria EPA guidance of 2,000 metres for a composting facility which is projected to accept up to 53,000 tonnes per year of organic and green waste over the lifetime of the current resource consent.

[8] https://www.selwyn.govt.nz/__data/assets/pdf_file/0013/51430/S42a-Report.pdf

33. The site specific assessment of potential odour discharges from the composting facility undertaken by SES, as accepted by Environment Canterbury, assessed the effects of the composting operations on the nearest residences as being minor or less than minor. I consider that this assessment would also extend to residences within the Holmes Block, which are in the same direction as the existing dwelling and further away. The site specific assessment of the composting facility furthermore states that the PRRP should be able to increase the scale of operations to allow an increase in organic matter processed of up to 53,000 tonnes per year provided the procedures in the ODMP are followed. While I consider this a reasonable assertion, I also note that there is potential for upset conditions to occur in any large scale composting facility, which may lead to adverse odour effects being experienced. I therefore consider that there is potential for the proposed plan change to result in reverse sensitivity effects on the PRRP.

References

- Canterbury Regional Council, Resource Consent CRC211594 – Selwyn District Council.
- Golder Associates, *Rolleston Odour Assessment prepared by Golder Associates (NZ) for Selwyn Plantation Board*, 2008.
- Golder Associates, *Review of Odour Effects Relating to Holmes and Skellerup Blocks – Rolleston West Plan Change*, 11 November 2020.
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- Specialist Environmental Services Ltd, *Assessment of Effects of Discharges into Air from a Composting Operation.* July 2018.
- Specialist Environmental Services Ltd, *Assessment of Effects of Odour and Dust from Windrow Composting at Pines RRP, Rolleston – Update to Consider any Requirement for Volume Restrictions.* June 2020.
- Wickham, L (2012). Separation Distances for Industry, A discussion document prepared for Auckland Council, July 2012. Prepared by Emission Impossible Ltd.

Limitations

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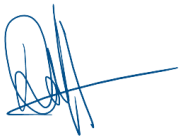
Review and Approved by



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