		Report section reference	Response Post Report Update
7	**Appendix 10 - Air Quality Report**		
7.2	**Odour**		
7.2.1	**FIDOL assessment**		
	A qualitative odour assessment approach has been used to assess the potential effects of odour associated with the operation of the landfill. This is principally based around an assessment of the FIDOL factors and is informed by an analysis of wind exposure for sensitive receptors and separation distance to the landfill. While this approach is generally appropriate, given the close proximity to sensitive neighbours (as close as 380 m to the proposed fill area), we consider odour dispersion modelling should be undertaken to complement the FIDOL evaluation. This would help to provide a more rigorous evaluation of the pattern of odour impact, particularly regarding the intensity and frequency of impacts. Notwithstanding the above, one aspect of the FIDOL assessment that we disagree with is the discussion on intensity of odour impacts. GHD Air Assessment focuses on topographical and wind flow considerations, which we consider to mainly be something that influences the frequency of exposure. Separation distance and site management of odorous activities are in our view the key considerations regarding the degree of odour intensity experienced at off-site locations.		
	Further information sought:		
a	Undertake odour dispersion modelling of the normal case operation of the landfill to better inform the FIDOL assessment, particularly regarding odour intensity. In this regard we note that a CALPUFF dispersion model and meteorological dataset has already been developed for assessing combustion discharges and is likely to be suitable for odour modelling, subject to our later comments regarding model setup.	Criteria provided in Section 7.1.2 (& Table 5) Section 9.4.7	
7.2.2	**Complaints analysis**		
	The GHD Air Assessment makes a review of the operation of DCC's existing Green Island Landfill (Section 9.1 of the GHD report), where it highlights that the landfill receives in the order of 20 - 30 complaints per year. The assessment describes this as a relatively low level of complaint, when compared with other much larger landfills, although we would consider that this level of complaint as moderate rather than low. Notwithstanding this, the complaints analysis notes that eight of the complaints relate to locations up to 1 km from the Green Island site, mainly due to the receipt of odorous materials. We consider that further detail of the Green Island landfill and analysis of the historic complaints is required to understand the relevance of the complaints to the proposed activities.		
	Further Information sought:		
	Provide a detailed complaint analysis regarding Green Island Landfill, including:		
a	A review of the wind conditions and separation distance to complainants at the Green Island Landfill.	Section 9.2	
b	Identified causes of the individual complaints.		
c	Detailed commentary of how the issues identified in complaints at Green Island would be addressed at Smooth Hill. In particular, describe how the proposed mitigation measures proposed for Smooth Hill vary from those currently undertaken at Green Island.		
7.2.3	**Separation distance guidance**		
	Comparison to separation distances recommended by EPA Victoria is made, however, no consideration is given to other relevant published separation distance criteria. Notably, there is an absence of discussion of the Auckland Council (Auckland Unitary Plan and Emission Impossible3 2012) 1 km separation distance for new landfills, derived from Auckland Council's experience with landfills where odour complaints can occur out to 1 km. This is consistent with the experience at Green Island Landfill where the GHD Air Assessment notes complaints have been recorded at distances of up to 1 km. Notwithstanding these considerations, it is unclear how the assessment uses the separation distance criterion in the context of the assessment, and this should be made more apparent.		
	Further information sought:		
a	Provide a consideration of the Auckland Council 1 km separation distance for new landfills. Furthermore, clarify how separation distances are used within the odour assessment and provide further discussion and justification of the statement that the information supports "... departing from the recommended separation distance".	Section 6.2 & 9.3	
b	Clarify what is meant by "departing from the recommended separation distance" and how this is accounted for in the odour assessment.	Section 6.2	
7.2.4	**Odours from normal operation versus odorous loads of waste**		
	The GHD Air Assessment has largely focused on normal operation of the landfill with relatively little focus on the management of odorous loads/upset conditions, which from the complaints analysis are noted as the key cause of odour complaints at the Green Island Landfill extending up to 1 km.		
	Further information sought:		
a	Provide an assessment of odour effects associated with activities that fall outside of 'normal operations' and describe in detail how those measures will be addressed at the proposed Smooth Hill landfill. This question should be addressed in conjunction with our comments below regarding mitigation measures.	Section 5.1.5 & Section 13.1.3	
b	We are aware that the landfill gas from Green Island landfill has high concentrations of H2S. Given that the same waste stream will be delivered to Smooth Hill, high landfill gas H2S concentrations could occur at the proposed landfill. Commentary regarding whether this will be expected at Smooth Hill and proposed management measures for H2S emissions should be provided.	Section 4.3.5 and Section 5.1.4	
7.3	**Dust**		
7.3.1	**Dust suppression**		
	Section 5.2.1 of the GHD Air Assessment estimates that approximately 40 m^3/day of water may be needed for dust suppression purposes but does not describe how this rate was determined and whether there is sufficient water supply available.		
	Further information sought:		

a	Describe how the water application rate was derived and demonstrate that sufficient water supply is available or being sought for this activity.	Section 5.2.1	The estimated maximum daily water supply volume required to control dust emissions of 40 m^3 has been based on our experience for other similar projects and will be further refined as part of detailed design.
7.3.2	**Wind triggers and monitoring**		
	Section 5.2. 1 describes the use of wind speed triggers as a means for determining requirements for water application for dust control, which is a reasonable approach. However, the application documents do not appear to propose on-site monitoring of wind (or other meteorological parameters).		
	Information sought:		
a	Clarify whether an on-site meteorological station would be established and if so set out the parameters that would be measured.	Section 5.2.1	The onsite weather station was installed on July 2020 and records the following parameters: wind speed and direction, temperature, relative humidity and rainfall
7.4	**Combustion emissions**		
7.4.1	**Modelling assessment**		
	The GHD Air Assessment has assessed the potential off-site effects of combustion gases associated with the operation of the enclosed ground flare used for the management of landfill gas. Emissions were derived from USEPA AP-42 emission factors for particulate matter, nitrogen dioxide, and carbon monoxide and used a mass balance approach for deriving SO2 emissions based on the expected concentration of hydrogen sulphide in the LFG. This is an appropriate method for deriving emission rates from an enclosed ground flare. The determined emission rates in Table 3 of the GHD Air Assessment are consistent with the projected maximum rate of LFG generation, an assumed 50% methane content, and the USEPA AP42 emission factors. In our experience, the methane content of LFG is typically as much as 60%. However, given the low ambient combustion contaminant concentrations predicted by the model we consider that this assumption is unlikely to be material to the conclusions reached in the GHD Air Assessment.		
	Further information sought:		
a	Demonstrate that the assumption regarding the methane content of the LFG. This should include analysis of the LFG generated at Green Island and other similar landfills. If it is found that a high methane content is typical, then provide an evaluation of the impact on the predicted contaminant emission rates and predicted off-site contaminant concentrations.	Section 4.3.5	
7.4.2	**Flare discharge parameters**		
	How the landfill gas flare discharge parameters were derived (i.e. flare, temperature, velocity etc.) is not clear and should be set out in more detail. Similarly, it would be helpful for the contaminant emission rate calculations for the flare to be provided. The GHD Air Assessment notes that the flare will meet the requirements of the National Environmental Standards for Air Quality (NESAQ) but does not provide any details of this. Notably, given the relatively high efflux velocity used in the modelling of the flare it is unclear how the flare would achieve the gas retention time of 0.5 seconds set out in Regulation 27(2) of the NESAQ.		
	Further information sought:		
a	Clarify how the proposed flare will meet Regulation 27 of the NESAQ and describe in detail the determination of discharge parameters for the flare (such as efflux velocity and temperature).	Section 5.3.1 & Section 11.2	
7.4.3	**Model configuration**		
	Dispersion modelling of combustion emissions has been undertaken using the CALMET/CALPUFF dispersion modelling package, which is an appropriate choice of model. A preliminary review of the CALMET meteorological model indicates that settings are generally reasonable. However, based on our experience we consider the terrain radius of influence (TERRAD) setting (1 km) may be too small, resulting in a relatively homogenous wind field in areas where terrain induced flow might be expected. Analysis of the wind-field output from the CALMET model should be provided to justify this setting. The CALPUFF dispersion model is generally configured appropriately, although we note that the recommended4 'probability density function' (MPDF) has not been used.		
	Information sought:		
a	Demonstrate that the appropriate terrain radius of influence (TERRAD) value has been used to give realistic wind-fields for the landfill site that reflect the likely local topographical influences on winds.	Section 8.4.2 & 8.4.3	
b	Update the dispersion modelling assessment to use the MPDF function or justify why it has not been used.	Section 8.4.3	
7.5	**Mitigation measures**		
	Section 5 of the GHD Air Assessment sets out the odour, dust and combustion emission mitigation measures, and makes reference to the Landfill Management Plan (LMP). Presumably much of the detail of control measures will be provided in the LMP, but it is not provided with the application. The application variously describes that the proposed landfill (as with the existing Green Island landfill) will operate in accordance with best practice guidelines. However, details of best practice measures are only very generally discussed. Given the high degree of reliance on such measures for controlling both acute and chronic odour events and the close proximity of a number of sensitive receptors, we consider a significantly more detailed evaluation of the proposed odour control measures and how those measures are consistent with best practice is required. This would be assisted through the provision of a draft LMP or at least LMP content related to odour control, management and monitoring. An important aspect of odour mitigation relates to the size of the active working face and depth of daily cover material, along with contingency measures and measures for handling highly odorous wastes. The GHD report only describes these aspects in very general terms.		

	Measures to monitor the effectiveness of the mitigation measures would benefit from being set out in more detail.		
	Information sought:		
a	Provide a draft LMP, or equivalent detail, that addresses odour control, contingency measures and monitoring in detail.	Section 5.1 and refer to LMP	Refer to LMP
b	Provide a more detailed discussion on mitigation measures that are proposed and how those measures conform to the "best practice operations standards", measures currently in place at Green Island, and current industry practice. This should include details relating to contingency measures and highly odorous wastes.	Section 5.1 and refer to LMP	Refer to LMP
7.6	**Proposed conditions**		
	We have reviewed the conditions relating to air discharges to identify any aspects where information may be required to better understand and assess the application. Proposed condition 41 identifies that on-site standby electrical supply is to be available to provide for the operation of the landfill gas flare equipment in the case of mains power supply outage. However, this is not described in the GHD Air Assessment.		
	Information sought:		
a	Clarify whether the application includes discharges to air from a diesel fired electricity generator and if so, confirm the maximum size of such a generator (MWe) and if necessary, undertake an appropriate assessment of the effects of emissions from the generator on air quality.	Section 4.1	
	Condition 32 of the proposed conditions sets out a requirement that there be: … no objectionable odour, or nuisance deposits of particulate matter at any building used for residential activity in existence at the date this consent is granted as a result of any of the consent holder's activities on the site. Conditions requiring avoidance of objectionable impacts beyond the consent site boundary are commonly applied to discharge to air consents but the proposed application of this restriction only to existing residential activities is unorthodox. The condition appears to be seeking to manage the potential for reverse sensitivity effects that could arise because of potential introduction of sensitive residential activities in proximity to the proposed landfill odour and dust sources. However, it is unclear whether such a condition could impose such restrictions on third party land and whether more appropriate measures to achieve this purpose are available (such as no-complaint agreements or covenants with adjacent land holders).		
	Information sought:		
a	Comment on whether it is appropriate to exclude existing land uses other than residential and whether this is consistent with the FIDOL assessment approach.		This consent condition (now condition 34) is designed based on the assessment of potential effects on the environment as it exists now. Should the environment materially change in the future , the general duty under section 17 of the Resource Management Act 1991 to avoid, remedy or mitigate adverse effects on the environment will apply.
b	Comment on whether it is appropriate/legal within the context of the RMA to exclude the requirement of the landfill in relation to future activities.		If the environment changes in the future and residential activities choose to locate close to the landfill, the general duty under section 17 of the Resource Management Act 1991 to avoid, remedy or mitigate adverse effects on the environment will apply.
c	Comment on whether DCC has suitable legal instruments in place to support the approach given in the proposed condition, such as a no-complaint covenant registered on surrounding property titles.		The DCC does not have covenants registered on surrounding property titles. Given that the conclusion in the Air Quality Assessment that offsite odours are unlikely to cause nuisance at offsite sensitive receptor location, these are not considered necessary. Furthermore, no-complaint covenants do not themselves reduce the potential for adverse effects, they simply mean property owners cannot complain about adverse effects. They are not a requirement under the RMA.