IN THE MATTER OF	The Resource Management Act 1991
AND	
IN THE MATTER OF	Applications by Frews Contracting Limited associated with the establishment and operation of a quarry and managed fill facility at Plantation Road, Hororata (CRC201181, CRC201182, CRC20180 and RC195747)

DECISION OF HEARING COMMISSIONERS

EMMA CHRISTMAS and CRAIG WELSH

13 August 2022

DECISION

1. Under our delegated authority from the Canterbury Regional Council (ECan)and Selwyn District Council (SDC) to hear and decide these applications we **GRANT** (subject to the attached consent conditions) to Frews Contracting Limited (Frews) the following resource consents:

From Canterbury Regional Council

- CRC201181: to discharge contaminants to air from the operation of a quarry and managed fill;
- CRC201182: to discharge contaminants to land from deposited managed fill material; and
- CRC201808: to use land for the deposition of material over an unconfined or semi-confined aquifer;

From Selwyn District Council

- RC195474: to use land to establish and operate an aggregate quarry and disposal facility for managed fill.

2. CRC201181 and CRC201182 are granted for a duration of 20 years.

THE HEARING

3. The hearing was held on 5 and 6 April 2022 at an online hearing. We reconvened the hearing on 3 June 2022 to hear further information with respect to water quality effects and the proposed conditions.

4. Copies of all the written material submitted during the consent process are held by ECan and by SDC. We refer to relevant elements of the submissions, statements, and evidence in this decision. The responses to questions are woven into the assessment below as appropriate.

5. The hearing was closed on 4 July 2022 following receipt of an amended set of proposed conditions and closing submissions from the applicant. We extended the deadline relating to the release of the decision to address outstanding matters in relation to the wording of some conditions, to ensure these are certain, practical and will achieve the best environmental outcome.

6. The following appearances were recorded.

For the applicant:

Mr Gerard Cleary, Legal Counsel;

Mr Barry Loe, Resource Management Consultant;

Mr Christopher Mongillo, Environmental Scientist;

Mrs Helen Mongillo, Environmental Engineer and Hydrogeologist;

Ms Wendy Moginie, Landscape Architect;

Mr Jeffrey Bluett, Air Quality Specialist;

Mr Anthony Kirk, Environmental Scientist;

Mr Hamish Frew, Applicant.

For Canterbury Regional Council:

Ms Bianca Sullivan, Resource Management Consultant;

Dr Michael Massey, Principal Science Advisor;

Ms Amber Kreleger, Senior Groundwater Scientist;

Mr Mark Trewartha, Senior Groundwater Scientist;

Mr Myles McCauley, Environmental Consultant.

For Selwyn District Council:

Mr Andrew Henderson, Consultant Planner.

Submitters:

Ms Susan Thornley, Gregory Jane Limited;

Mr George Deans, Springhead Trust and Springhead Farm Trust;

Mr Evan Frew.

SITE VISIT

7. We undertook a site visit on 4 April accompanied by Mr Tom Clark, Frews Waste Division Manager. We walked over the site and viewed the quarry pit and areas where fill is deposited, stockpiles of quarried material, the previously quarried area now backfilled and partly rehabilitated, the weighbridge and truck wash, and landscaping features such as bunds and existing planting. We also observed the surrounding area, including local gravel roads, adjacent farmland and nearby dwellings.

8. We visited the Hororata River and Derretts River headwaters located downstream of the site.

BACKGROUND

9. Frews operates a quarry and cleanfill disposal facility at Plantation road, Hororata. The existing site is subject to a number of consents[1]. Under existing consent CRC147389, Frews may quarry up to 50,000m^3 of material per year from a quarry 4.6 ha in area. All of this material may be moved off site. CRC147389 provides for the backfill of the quarry with cleanfill. The consents expire in 2049.

10. Frews seek new consents to allow for an expansion of the quarry operation over time, to cover approximately 59 hectares over 50 years. Quarrying will be undertaken in stages, with a maximum of one active quarry area at any time. The

[1] Frews existing consents are outlined in two tables in section 2 of Resource Consent Applications Planning Report Rev 1 December 2019.

quarry pit will be backfilled with 'managed fill'. This is defined in the application as soil containing contaminants that meet defined Waste Acceptance Criteria (WAC) and may include cleanfill.

11. Up to 75,000m^3 of aggregate will be quarried per year, with up to 50,000m^3 being removed from site. The remaining 25,000m^3 will be used as daily cover.

12. The existing fill operation is provided for by Condition 15 of CRC147389. This condition states that only material defined as 'cleanfill' in the Ministry for the Environment (MfE) Publication 'A guide to the Management of Cleanfills' (2002) can be accepted at the site. We understand from Ms Hayes' evidence that Frews has deposited material under an ECan approved Cleanfill Management Plan 2016 that includes WAC that are less stringent than the definition of cleanfill as defined in condition 15(a).

13. We acknowledge that any potential compliance issues are beyond the scope of the matters we may consider. The relevance of this background is that deposition of material under WAC that are similar in scale (some higher and some lower) to those proposed for this application was undertaken at the site for approximately six years. The applicant has relied on an absence (in its view) of contaminants from this fill being detected in downstream water quality monitoring, to support its application. This is discussed further below.

Details of the proposal

14. The details of the proposed operation are outlined in full in the application documents and expert evidence, and summarised in the various s42A reports. In brief, excavation will occur to a maximum depth of 8 metres, with an open quarry pit area of 1.5 ha at any one time (referred to as the 'active operations area'). A further 2.5 ha 'ancillary operations area' surrounding the pit will include stockpiles, the site office, truckwash, weighbridge and roading. Site management will ensure that operations in the part of the quarry pit being excavated and the part being filled are kept separate to avoid contamination of clean quarry material with contaminated fill.

15. The excavation area will move gradually across the 59ha site over 50 years. After each excavated section is filled, it will be covered with a low permeability engineered cap ('Managed Fill Cap'), sloped to promote drainage of water away from the fill, then grassed. No irrigation will be permitted to occur on the land and the intended post closure land use is pasture.

16. The material to be deposited includes soil with contaminants below WAC limits, including soil with small amounts of asbestos material, hardfill (ie, non-soil fill such as bricks, concrete, cured asphalt) including asbestos fragments, and clean material sourced from the quarry. The application anticipates that the total backfilling rate will not exceed 160 t/h.

17. Asbestos-containing material (ACM) will be accepted, but only if it is in soil or fragments of building material. The application states that waste containing asbestos will not include bulk asbestos-containing materials from demolition of buildings. ACM will only be accepted if it is double wrapped in sealed polyethylene.

18. An extensive list of prohibited wastes is provided in the application.

19. The WAC have been derived primarily through contaminant modelling to identify impacts on groundwater quality, with additional consideration of:

    a. contamination from dust deposition adjacent to the site;

    b. acceptance criteria for other managed fills operations;

    c. WAC derived by PDP for the draft WasteMINZ Class 3 guidelines;

    d. contaminated land soil acceptance criteria for landfill workers, and

    e. future land-use.

20. Both a maximum WAC and a 12 month rolling mean are proposed. Further details with respect to the contaminant transport model (CTM) and development of the WACs are provided later in this decision.

21. Monitoring will be undertaken utilising a series of up- and down-gradient wells, located in both shallow and deep aquifers. Two monitoring trigger levels are proposed: a Tier 1 level for each contaminant, set at approximately 15% above the background concentrations up-gradient of the site. Tier 2 levels are proposed to be set at 80% of half the maximum acceptable value (MAV) in the NZ Drinking Water Standards. Various monitoring and mitigation measures are required if trigger levels are reached. The trigger levels, monitoring and mitigation measures are discussed in more detail below.

22. Prior to quarrying commencing, a 2m high grassed bund will be constructed around the site, and a double row of pine trees planted. Bunding will also be constructed around the active operations area of the quarry at each stage. Stockpiles will be limited to 2m in height until the perimeter planting has reached 5m in height, at which time stockpiles can be increased to up to 4.5m in height.

23. Greenwaste will be accepted on site and stored in stockpiles up to 2m height for a maximum of 30 days, prior to being used on site (e.g., for rehabilitation) or removed from site.

24. Up to five heavy vehicles will be used on site. A crusher will be deployed periodically. This will be located within the pit wherever practicable, and at a distance of a least 400m from any dwelling.

25. The number of vehicles excepted to be accessing the site on average per week is 65 truck and trailer units, 90 trucks and 30 staff vehicles. Trucks will not be permitted to use Thwaites Road.

26. Hours of operation will be 7am to 7pm Monday to Friday, and 7am to 2.30 pm Saturday.

APPLICATION STATUS

Canterbury Regional Council

27. Consents are required under the Land and Water Regional Plan (LWRP) and the Canterbury Air Regional Plan (CARP), as outlined in the ECan s42A report. There was no dispute between parties that the applications are either restricted discretionary or discretionary, and should be bundled together with an overall activity status of discretionary.

Selwyn District Council

28. Consent is required for various aspects of the proposal including earthworks, shading from trees, disposal of hazardous substances, storage and disposal of solid waste, shredding of green waste and quarrying as outlined in SDC s42A report and attached s95 report. These activities are variously restricted discretionary, discretionary and non-complying activities. Overall, the status of the application is non-complying. This activity status was not disputed.

THE EXISTING ENVIRONMENT

29. The existing environment is described in detail in the application and both s42A reports.

30. The application site is on the corner of Plantation and Thwaites Road, approximately 1.8 km from Hororata. The site ranges from approximately 190 metres above sea level (masl) at the southern end to 210 masl in the northern end, with a gentle slope to the south-east. Part of the site is used for the existing quarry and fill operation, and is surrounded by low bunds and pine plantings of various ages and sizes, providing reasonable screening of this area. The remaining part of the site, and the surrounding area, is open farmland, primarily used for grazing.

31. There is an existing dwelling on the site, occupied by Frews' farm manager. The nearest house off-site is 250m away. Otherwise, the closest dwellings are 850 m west of the northern part of the site, 950 m east, 950 m south and 990 m southeast of the applicable site boundaries. Figure 3 of Mr McCauley's s42A report shows the dwelling locations.

32. The site and surrounding land is zoned Rural Outer Plains in the Selwyn District Plan (SDP). Within this zone, one dwelling per 20 ha is a permitted activity. Consequently, there is the potential for additional dwellings to be constructed as of right in the vicinity of the quarry.

33. The surrounding roads are relatively narrow and unsealed.

34. The site is part of a series of interbedded and discontinuous gravel, sand, silt and clay alluvium and glacial deposits characteristic of the Canterbury Plains. Groundwater in the region is generally 15 to 20 m below ground level and flows in unconfined or semi-confined water bearing units depending on the presence or absence of intermittent low permeability layers.

35. Shallow groundwater (less than 30 m below ground surface) flows perpendicular to the topographic (ground surface) contours in the area (i.e., in the same direction that surface water would flow). This means that shallow groundwater is likely to flow towards the south to the Hororata River and parallel with the Selwyn River. Deeper aquifers (deeper than 30 m) appear to be more influenced by the Selwyn River and therefore may flow to the south or south east in the vicinity of the site.

36. Water levels have been measured by ECan at well L35/0604, located approximately 300 m north-east of the site (up and cross gradient). The applicant has also installed 4 monitoring wells referred to as MW-1 (to the south of the existing quarry and fill operation), MW-2, MW-3 (both immediately to the east of the existing quarry and fill) and MW-4 (upgradient of the proposed quarry and fill). The location of these wells is shown in Figure CRC201808B in the attached consent conditions.

37. There was some dispute between Ms Mongillo and Ms Kreleger in relation to the depth to groundwater beneath the site, due primarily to the gradient of the land and the need to interpolate depth to groundwater from various monitoring wells. The groundwater surface is closest to the land surface at the southern end of the site. At this point, the highest groundwater depth is 9.45m below ground level (bgl), giving a 1.45m separation between the base of the quarry and the highest groundwater level. Ms Mongillo and Ms Kreleger agreed to use 10.4 m bgl as a conservative high groundwater level for the purpose of the contaminant transport modelling across the site. Ms Kreleger identified the median depth to groundwater as being 16.8m bgl.

38. The small horizontal gradient slows the lateral flow of groundwater. Both the vertical and horizontal groundwater flow is impeded by layers of lower permeability silty, clayey gravels.

39. The headwater springs of Derretts River are 2.8 km south of the site, between the site and the Hororata River[2]. Derretts River is a small spring-fed tributary of the Hororata River and flows parallel with the left bank of the Hororata River until their confluence just upstream of the Haldon Road bridge. Some of the groundwater flowing beneath the site is expected to emerge in the many springs located along Derretts River. It is also expected to enter the Hororata River.

40. The Hororata River is a tributary of the Selwyn River, which is approximately 1.6 km to the east. The Selwyn River ultimately discharges into Te Waihora / Lake Ellesmere.

41. There are a number of domestic, stockwater and irrigation wells drawing water down-gradient of the site. Figure 4 from the Discharge to Land AEE shows the location of nearby consented groundwater abstractions and water use[3]. The closest well (L35/0247) is on the site. It is 26.6m deep and is used for irrigation and dust suppression. The closest downgradient irrigation well is L35/0666, located at

[2] Refer Figure 3 of the Discharge to Land AEE.

[3] This figure was not challenged at the hearing.

284 Hawkins Road, about 1.1 km away from the site. The nearest domestic/stock watering well is L35/0887[4] located at Struie Road, 1.7 km away from the site.

42. The site is some distance from any community drinking water supply points or protection zones. According to Canterbury Maps, the nearest protection zone is a surface water take, Selwyn RWS, L35/0905 on the Selwyn River approximately 3.8 km north west (upstream) of the site.

43. The Dunsandel community well supply protection zone is 23 km downstream and the Rolleston community well supply protection zone is 27 km away.

44. Water quality in the area is 'reasonably good'[5] and well within the Selwyn Te Waihora sub-regional limits for groundwater quality (Table 11(m) of the LWRP).

45. Waterways and groundwater in the area are taonga to Te Ngāi Tūāhuriri and Te Taumutu Rūnanga, which hold mana whenua status over the area. The Selwyn and Hororata rivers and Te Waihora hold particular significance.

46. The dominant winds are from the north-east, with marked contributions from the north to north-west. This pattern is typical of the mid and upper Canterbury plains. The application bases this assessment on the wind distribution measured at a recording weather station at Darfield, and states that given their relative locations, the two sites should be similar. Mr McCauley generally agreed with this but considered that the Darfield weather station is likely to be more strongly influenced by wind channelling from the Waimakariri River gorge than the site. He concluded that this potential difference is unlikely to substantially influence the assessment of effects.

47. The site experiences between 5% and 35% "wet" days per month (where rainfall exceeds evapotranspiration by 1 mm or more). This varies strongly depending on the season with the lowest number of wet days in February and the highest number of wet days in April for the two years assessed (2013 and 2014).

NOTIFICATION AND SUBMISSIONS

48. The applications were publicly notified by ECan on 14 and 20 April 2021. The SDC application was limited notified. The following submissions were received:

On the ECan applications:

a. Gregory Jane Ltd (oppose);

b. Hugh Foster (oppose);

c. Trustees of Springhead Trust (oppose);

d. Trustees of Springhead Farm Trust (oppose);

e. Diana Irving (oppose);

f. Consortium Construction (support);

[4] Table 1 attached to s42A Report of Ms Kreleger.

[5] Paragraph 69 Ms Kreleger primary evidence.

g. Evan Frew (support);

h. Southern Screenworks Limited (support);

i. Suckitup Limited (support);

j. Your Section Limited (support).

On the SDC application:

k. Susan Thornley, Gregory Jane Ltd (oppose);

l. Diana Irving (oppose).

49. Submissions were also received on the SDC application from the Trustees of Springhead Trust and the Trustees of Springhead Farm Trust. However, as these parties were not included in the limited notification process, the submissions were not accepted. We note that these submitters did make valid submissions on the ECan consent applications.

50. The key issues raised in the submissions were:

a. Effect on water quality, in particular on domestic, stock and irrigation wells;

b. Dust from the unsealed Plantation Road;

c. Mitigation of visual impacts and noise;

d. The need for a managed fill disposal site in the area.

SUMMARY OF EVIDENCE

The Applicant

Mr Gerard Cleary – Legal Counsel

51. Mr Cleary presented legal submissions and conducted the Applicant's case. He addressed the statutory framework, groundwater risk assessment, sensitivity of the receiving environment, the relevant planning instruments, section 105 and 107 matters and the relevance of Ms Hayes' compliance history memorandum under s104(1)(c) of the Act.

Mr Christopher Mongillo, Environmental Scientist

52. Mr Mongillo's evidence outlined the urgent regional need to establish appropriate disposal options for contaminated soil in Canterbury, the efficacy of the proposed waste acceptance procedures, and the appropriateness of the proposed two tier WAC (a maximum limit coupled with a lower 12 month rolling mean). He addressed matters arising from the s42A Reports of Dr Massey (soil mixing, model uncertainty) and Mr McCauley (ACM receipt and handling).

Mrs Helen Mongillo, Environmental Engineer and Hydrogeologist

53. Mrs Mongillo was the lead author of the application technical reports, including the Baseline Hydrogeological Assessment and the CTM reports. Her evidence addressed groundwater flow and levels, site specific hydrogeology (bore analysis

and findings), human health risk assessment (downgradient wells, risk), aquatic ecosystem risk assessment, and the contaminant transport assessment.

54. Also, it addressed the suitability of the proposed location, remediation, the monitoring programme, and matters arising from the expert conferencing (the accuracy of the model to derive the WAC), and matters arising from the s42A Report.

55. Mrs Mongillo produced an addendum report which was tabled at the hearing and addressed groundwater quality related to nitrate-nitrogen, and provision of water if remediation is required.

56. She also produced, at our request, information on the draft WasteMINZ Class 3 (managed fill) default WAC, additional modelling results, and information on groundwater metal concentrations in Canterbury.

Ms Wendy Moginie, Landscape Architect

57. Ms Moginie prepared an assessment of the landscape and visual effects of the proposal on rural character and amenity. This included a detailed description of the sequential development, and mitigation, of the quarry over the proposed 50 year lifespan.

Mr Jeffrey Bluett, Air Quality Specialist

58. Mr Bluett's evidence provided a summary of the assessment of dust effects generated by vehicles travelling on the unsealed Plantation Road as a result of the proposal. This included sources of discharged dust, potential impacts and travel distance of dust, sensitivity of the receiving environment, an assessment of dust impacts, dust mitigation, key points from the SDC review of the Air AEE, and response to submissions.

59. Mr Bluett produced an addendum to his evidence at the hearing which responded to three points raised by the evidence of Ms Thornley.

Mr Anthony Kirk, Environmental Scientist

60. Mr Kirk's evidence addressed the Waste Management Institute New Zealand (WasteMINZ) Technical Guidelines for Disposal to Land 2018 (WasteMINZ Guidelines 2018) and typical approaches to managing potential adverse effects to water quality at managed fill facilities. It also covered the characterisation of hydrogeological and hydrological conditions, development of WAC, monitoring and management, and his response to issues raised in the section 42A Report (screening level evaluation, back calculation, uncertainties in modelled leaching rates and proposed WAC, risk to groundwater quality and remedial options).

Mr Barry Loe, Resource Management Consultant

61. Mr Loe's evidence described the proposal and provided a summary of the positive and adverse effects. It outlined national directions for freshwater including the National Policy Statement for Freshwater Management 2020 (NPSFM 2020), the Resource Management (National Environmental Standards for Freshwater)

Regulations 2020 (NESF), and the Water Services Act 2021. He considered the two later national documents are not relevant to the proposal, which we accept.

62. His evidence addressed the regional planning framework (Canterbury Regional Policy Statement 2013 (CRPS), the CARP, the LWRP) and provided an assessment of what he considered to be the relevant objectives and policies.

63. Mr Loe commented on the SDP, the various section 42A Reports (Mr Henderson, Ms Sullivan), and the proposed conditions of consent.

The Submitters

Ms Susan Thornley, Gregory Jane Limited (2372 Bealey Road)

64. Ms Thornley's evidence expressed concerns about potential contamination of groundwater bores which supply domestic drinking water, dairy shed, irrigation and stock water. Gregory Jane's water is sourced from 3 bores, SDC reticulated supply and Central Plains Water. We clarified that the 3 bores are L35/0666, L35/0751, and L350332 which aligns with Mrs Mongillo's addendum evidence.

65. Also, the evidence outlined concerns about greater dust nuisance from an increase in aggregate extraction and corresponding increase in truck movements. Over 2 km of Plantation Road is adjacent to the submitter's property boundary.

66. Ms Thornley's evidence stated that if consent was to be granted, the submitters expected that stringent WAC, load verification and GPS tracking, environmental monitoring and reporting and cap placement would be required.

Mr George Deans, Springhead Trust and Springhead Farm Trust (2427 Bealey Road)

67. Mr Deans considered that Ms Thornley's evidence covered the issues of concern to the Trust. He considered that Plantation Road should be sealed to address dust issues. The Trust owns 34 ha of land on the south side of Bealey Road.

68. Mr Deans confirmed that the domestic wells of concern to the submitters were L36/0626 and L36/0627. In addition, the Trust irrigation well is L36/0490. This aligns with Mrs Mongillo's addendum evidence.

69. The submission mentioned that if consent is granted the managed cap should be installed within 6 months, not 2 years, and the submitters seek a compensation clause be included in the consent conditions. We address these matters later in this decision.

Mr Evan Frew

70. Mr Frew appeared in support of the proposal. Mr Frew lives in Darfield and is shareholder and director of Frew Properties Ltd, owner of the 59 ha block of land adjoining Frews Quarries Limited. He stated that the quarry is to be developed on land that he owns, but that he had no financial or beneficial interest in the quarry. His submission focussed on the need for a disposal site for low grade contaminated waste in Canterbury. Whilst Mr Frew has no financial interest in the quarry, we expect that that he will be compensated for use of his land for quarrying. As a

consequence, while we note his support, we have given this little weight in our decision-making.

The Canterbury Regional Council

Dr Michael Massey, Principal Science Advisor

71. Dr Massey's s42A Report provided a description of the activities, commented on matters raised in submissions (lack of economical disposal sites, potential groundwater contamination, mitigation measures, need for precautionary WAC), and described the receiving environment (aquifer sediments). Furthermore, it provided an assessment of actual and potential effects, noting that the timing and magnitude of contaminant release will determine the nature and degree of effects and that the monitoring data do not necessarily conform to the model predictions. We address these matters later in this decision.

72. Dr Massey addressed mitigation (WAC, use of maximum values of sampling, not allowing soil mixing to achieve WAC, difficulties of remediation), monitoring and consent conditions.

73. Dr Massey produced a supplementary report that summarised his s42A Report and addressed matters raised in the hearing (risk, aligning definitions of managed fill with Waste MINZ Guidelines, soil mixing and remediation shortcomings).

Ms Amber Kreleger, Senior Groundwater Scientist

74. Ms Kreleger's s42A Report addressed groundwater quality effects, including effects on existing users. It summarised the application and described the receiving environment (groundwater flow, stratigraphy, hydraulic conductivity, groundwater levels and trends, data from nearby monitoring bores, and separation between excavation depth and groundwater levels, groundwater quality, groundwater users).

75. The evidence included an assessment of actual and potential effects on water quality, and discussed matters raised in submissions (groundwater levels, quality and use). Also, it addressed mitigation, monitoring, and the proposed conditions. The evidence included an appended table listing active downgradient bores within 2km of the site.

76. Ms Kreleger produced a supplementary report that summarised her s42A Report and addressed matters raised in the hearing. These matters were the highest groundwater level, increased contaminant levels in the monitoring data from existing fill, concerns about the tier 2 trigger levels, response to points raised by Mrs Mongillo, alternative water supplies practicalities, nitrate-nitrogen sources, and effects on surface water.

Mr Mark Trewartha, Senior Groundwater Scientist

77. Mr Trewartha's s42A Report[6] and supplementary report focused on the validity of the CTM and the applicability of the model results in developing WAC.

Mr Myles McCauley, Environmental Consultant

78. Mr McCauley provided a s42A Report and a hearing statement of evidence relating to air quality. The s42A Report summarised the application, and outlined key monitoring and mitigation measures. It outlined contaminant sources and discharges, the affected environment, and assessed actual and potential effects on air quality. The Report addressed matters raised in submissions and the recommended conditions.

79. Mr McCauley's hearing statement responded to matters raised in the evidence of Mr Mongillo and Mr Loe (availability of water for dust suppression, wrapping of ACM, placement of immediate cover over deposited ACM, recommended conditions) and to matters raised in the hearing (key mitigation measures included as conditions, submitter dust concerns).

Ms Jana Hayes, Senior Resource Management Officer - Compliance Monitoring

80. Ms Hayes provided a memo outlining the compliance history of the existing Frews quarry and copies of correspondence in relation to this.

Ms Bianca Sullivan, Resource Management Consultant

81. Ms Sullivan provided an overview s42A report, including a background to the applications, legal and planning matters, a summary of the application, and comments on the assessment of effects. Her recommendation, relying in part on the evidence of other ECan witnesses, was that consent should be refused. She provided an addendum to this report at the hearing.

The Selwyn District Council

Mr Andrew Henderson, Consultant Planner

82. Mr Henderson prepared a s42A report summarising the effects of the proposal relevant to District Council matters and assessing the consistency of the proposal with the District Plan provisions. He considered that the effects were minor (except in the case of landscape effects, which were minor to moderate), and the proposal was consistent with the provisions of the two district plans. He recommended that consent is granted subject to conditions.

Joint Witness Statements

83. Two expert conferencing sessions were held. The first, prior to the hearing, focussed on matters related to hydrogeology and the existing groundwater

[6] Mr Trewartha's s42A Report was combined with Ms Kreleger's s42A Report.

environment, the CTM and the proposed WAC. This lead to some amendments by the applicant to initial WAC.

84. The second was held following the initial hearing and prior to the reconvened hearing. This focused specifically on whether groundwater quality data downgradient of the existing quarry showed elevated levels of contaminants attributable to the existing quarry, and whether the CTM predicts any increase attributable to the fill.

Applicant's Right of Reply

85. The Right of Reply was received on 29 June 2022. It addressed the implications of the proposed WAC being generally higher than the draft Class 3 Landfill WAC[7] and responded to the Reporting Officers' comments on information provided by the applicant dated 20 June 2022.

86. Mr Cleary provided a closing statement that addressed updated conditions, WAC, effects on groundwater, the CTM, and other matters (interpretation of Policy 4.7 of LWRP, consent duration and review).

87. We asked several questions of the witnesses in relation to their evidence. The witnesses' evidence and responses to questions are outlined in the remainder of this decision report as appropriate.

PRINCIPAL ISSUES IN CONTENTION

88. On the basis of the evidence we received, we consider the principal issues in contention are as follows:

    a. the effect of the discharge of managed fill on groundwater quality, in particular:

        (i) the validity of the contaminant transport model used;

        (ii) the appropriateness of the WAC; and

        (iii) the proposed monitoring and trigger level regime;

    b. the effects of the discharge of managed fill on surface water quality;

    c. landscape effects of the quarrying operation;

    d. traffic effects;

    e. noise effects; and

    f. dust effects from quarrying and managed fill.

89. Our main findings on the principal issues are outlined below.

[7] Pattle Delamore Partners, 2021. Derivation of Class 3 and 4 Landfill Waste Acceptance Criteria. For ministry for the environment.

RELEVANT STATUTORY PROVISIONS CONSIDERED

90. In determining the application we have had regard to sections 104, 104D, 105 and 107 of the Act. Our findings with respect to the relevant statutory provisions are discussed in more detail below.

91. In setting the conditions of consent we have given effect to the requirements of section 108 and 108AA.

SECTION 104 ASSESSMENT

92. Section 104(1) requires that when considering the application and submissions, we must, subject to Part 2 of the Act, have regard to:

(a) any actual or potential effects on the environment of allowing the activity; and

(b) any relevant provisions of

(i) a national policy statement;

(ii) a New Zealand Coastal Policy Statement;

(iii) a regional policy statement or proposed regional policy statement;

(iv) a plan or proposed plan; and

(c) any other matter the consent authority considers relevant or reasonably necessary to determine the application.

93. The adverse effects of the proposal, relevant provisions of planning documents and other matters are discussed in detail below.

94. Section 104(3) requires that, in considering the applications, we must not have regard to any effect on any person who has given written approval to the application. No written approvals were provided with respect to this application.

Section s104(1)(a) - Potential effects on the environment

Effects on groundwater quality from the discharge of managed fill to land

95. The application included an assessment of effects on water quality[8] from the discharge of contaminants to land (Discharge to Land (DTL) AEE), focusing primarily on groundwater quality. Surface water quality effects were also considered as the groundwater beneath the site feeds Derretts River, a tributary of the Hororata River, as outlined above. Surface water quality effects are discussed later in this decision.

[8] Sephira Limited. Discharge of Contaminants into Land Assessment of Effects on the Environment, October 2021.

96. This assessment relies on a Hydrogeological Conceptual Site Model (CSM) and numerical CTM to assess the water quality effects of the proposal. The CTM also assisted in setting the site specific WAC.

97. The proposal including a detailed monitoring and management regime aim at avoiding or mitigating adverse effects on water quality.

98. ECan staff raised several concerns relating to the CTM, establishment of the WAC, monitoring data, and the proposed waste management regime. These are outlined in more detail in the following sections.

Contaminant Transport Model Validity

99. The CTM is described in detail in the Sephira Environmental report entitled Contaminant Transport Model Frews Quarry and Managed Fill – Plantation Road, Hororata, Rev1-27 Oct21 (the CTM Report).

100. The assessment utilised a model called SEVIEW, which consists of two component parts, SESOIL and AT123D. SESOIL models leachate concentrations and the rate of discharge from contaminated soil in the unsaturated portion of the ground strata. If an unacceptable rate and concentration of leachate generation is predicted, the dispersion model AT123D can be used to evaluate likely downgradient contaminant concentrations in groundwater. Section 2.1 of the CTM Report explains that the model was selected after seeking advice from the current US-based developer, who suggested that the vadose zone soil leaching component of SESOIL would be a preferred method for simulating the Hororata managed fill conditions.

101. The CTM report states (section 2.1) that Sephira Environmental adopted the New Jersey Department of Environmental Protection (NJDEP) 2014 guidance document entitled, "Using the Combined SESOIL/AT123D Models to develop Site-Specific Impact to Ground Water Soil Remediation Standards for Mobile Contaminants," as a basis for the managed fill model development.

102. SESOIL model input parameters were developed in a way that is consistent with the 2014 NJDEP guidance document (see sections 3.0 and 4.0 of the CTM Report). Site-specific information was used when available. Where local parameters were not available, a range of inputs were considered and either a conservative input used, or one that was considered to most likely represent the site conditions. The sensitivity of each parameter on the modelled outputs was evaluated to assess model uncertainty. After several runs testing each parameter, a set of parameters were selected that were considered appropriate to represent site conditions and meet project objectives.

103. The SESOIL-derived leachate concentrations are automatically input into the AT123D model. The AT123D model estimates the plume concentrations over distance and time. Section 4.0 of the report describes the input parameter selection for AT123D, including the various hydrogeological parameters.

104. For each group of contaminants considered (metals, degradable organic compounds and persistent organic compounds) a number of model runs were

made, with increasing levels of conservatism. The results are present on p24-34 of CTM Report and were summarised by Ms Mongillo in evidence provided after the reconvened hearing[9] into three model outputs: 'reasonably' (or realistically) conservative', 'fast conservative' and 'extremely fast conservative'. We note these three categories are described in Ms Mongillo's earlier evidence as 'reasonably conservative', 'highly conservative' and 'extremely conservative', and we have adopted this terminology in this decision. The highly conservative scenario assumes a realistic leachability of contaminants to groundwater, but soil with higher permeability than is likely in practice. The extremely conservative scenario assumes a preferred pathway for water to leach from the quarry pit to groundwater, all soil contaminants to be highly leachable and all soil to be highly permeable[10]. The CTM notes that, in Sephira's view, the most conservative model scenarios are unrealistic.

105. Mr Kirk was engaged by the Applicant to peer review the model (and the WAC, which we discuss later). We note here Mr Kirk's extensive experience in relation to the effects of landfills and groundwater and surface water quality. He noted in his evidence that characterisation of the hydrogeological and hydrological setting is important to identify the key pathways of contaminant migration. The characterisation carried out by Ms Mongillo in his view provides a reasonable basis for predicting the effects of the proposed managed fill, and is generally consistent with typical industry expectations.

106. He noted that a key aspect of the site's hydrogeology that is unable to be predicted from the available information, is the potential for greater than average water and contaminant movement through discrete gravel lenses or channels within the underlying alluvium. These 'preferential flow paths' are common in the local geology; however they are typically disconnected and tortuous. The impact of these preferential flow paths on the predictive accuracy of the model was discussed at the reconvened hearing and is discussed further below.

107. Mr Kirk noted that where uncertainty regarding the hydrogeological characterisation, and the impact of this on the assessment of effects remains, it is industry practice to adopt a conservative assessment. Multiple layers of conservatism are typically adopted, such that there is a very high degree of confidence that the predicted effects are significantly greater than those likely to occur. In addition, a robust monitoring and management programme is put in place to ensure any unforeseen deterioration in water quality can be identified in sufficient time to mitigate those effects.

108. The levels of conservatism built into the model include the following assumptions[11]:

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[9]Letter to Ecan from Sephira Environmental dated 12 June 2022, titled: 'Re Follow Up Items from Reconvened Hearing – Frews Planation Road, Hororata Quarry and Managed Fill application'.

[10] See 8.4 of Ms Mongillo's primary evidence

[11] See 8.3 of Ms Mongillo's primary evidence.

a. All fill contains the maximum level of contaminants allowed;

b. The model assumes the highest groundwater level at all times (reducing the amount of alluvium the leachate must pass through before reaching the aquifer). In practice, the highest groundwater level occurs 1% of the time, and there is an average of an additional ~6m of unsaturated fill below the quarry base;

c. The model does not include the final Managed Fill Cap, which will reduce rainfall infiltration;

d. Biodegradation of organic hydrocarbons, which is likely to occur in the well-aerated and nutrient rich aquifer, is not included in the highly and extremely conservative model runs;

e. There is no provision for extraordinary dispersion and dilution, such as might eventuate from the pumping of wells nearby;

f. In general, the model simulates the conditions at the end of quarrying and filling, when the entire site is filled with contaminated soil;

g. The highly conservative and extremely conservative scenarios assume a highly conservative vertical and horizontal hydraulic conductivity (permeability). This does not account for silt and clay layers known to exist in the aquifer, which reduce permeability.

109. Mr Trewartha reviewed the modelling undertaken. He noted that the use of SEVIEW is appropriate and adequate for screening level evaluation, the modelling used inputs representative of literature values for pertinent contaminant characteristics and presumed aquifer parameters, and consequently, the modelling was adequate for a screening level evaluation of potential impacts to groundwater[12]. Mr Trewartha also reviewed the sensitivity analysis undertaken and found it to be adequate. In his summary of evidence, he criticised the lack of calibration of the model with local data, and noted that on-site testing of parameters would reduce the level of uncertainty of the model.

Issues raised by ECan officers

110. Dr Massey and Ms Kreleger identified additional matters that raised concerns about the accuracy of the model over and above the concern raised by Mr Trewartha that have been outlined above. These matters were discussed in the second JWS and include:

a. Concerns that elevated levels of some contaminants in the monitoring data collected down-gradient of the site (in monitoring wells MW-1S, MW-2S and MW-3S) stem from the existing landfill and show that the model results are inaccurate with respect to contaminant transport times; and

[12] See memo from Mr Trewartha attached to Ms Kreleger's and Mr Trewartha's s42A report

b. The impact of preferential flow paths on transport times.

Down-gradient monitoring data

111. Monitoring data from the wells immediately downstream of the existing quarry site, collected between 2018 and 2022, show elevated levels of some contaminants (in particular metals) in some wells on some monitoring occasions. All parties agreed that these increases were small, and were not environmentally significant. ECan officers considered the increase in metals was due to leaching from the existing fill. Since the model results presented predicted that metals would take many tens of years to be detected at the site boundary, this raised concerns that the model was signicantly inaccurate with respect to predicting travel times of contaminants.

112. The reasons for the detection of elevated contaminants in the downstream groundwater monitoring wells was discussed at the reconvened hearing on 3 June 2022.

113. We note that the elevated concentrations of metals at issue were primarily elevated measurements of copper and manganese with occasional (often only one reading) elevated levels of iron, aluminium, barium, boron, nickel and zinc. We also note that elevated concentrations of a number of metals were recorded up-gradient of the site, and where elevated levels were recorded downgradient, these were often in only one of the three monitoring wells. We also note that, with the exception of manganese, the increases in concentration downgradient are very small (within the same order of magnitude).

114. Ms Mongillo and Mr Kirk considered that the trace metal contaminants observed in the monitoring are more likely than not present due to other processes, rather than contaminants migrating from the landfill. In particular, natural variability, redox changes within the groundwater, variability within the accuracy of measurement or contamination of samples with small particles of sediment. They noted that the presence of metals and a number of major anions/ cations cannot be accommodated by dissolved contaminant transport processes, as contaminants move at different speeds.

115. Mr Kirk noted that the changes in concentrations that are identified in the wells are very small, and fluctuations around the detection levels does not necessarily mean a significant change in concentration. Contaminant levels in groundwater are naturally in a constant state of flux and the type of changes seen in the data are very common in these aquifers. He also stated that differences in groundwater chemistry between the monitoring locations do not necessarily constitute an elevated contaminant concentration, due to the natural differences in geology between locations. Mr Mongillo also described testing a sample of groundwater for copper on two occasions, and obtaining different results, due to very low concentrations, close to the limit of analytical ability.

116. In respect of possible redox changes, all experts agreed that this was a possibility, as a result of compost being stored on the site during the monitoring period. In particular, Mr Kirk noted that placement of compost in fill commonly causes such changes in the redox potential within groundwater, and this is evident as changes

in anions/cations and minerals releasing trace elements into groundwater. That is, the trace elements come from the aquifer minerals (not the fill). This is a typical groundwater response and widely seen in relation to fill sites.

117. While acknowledging the potential for redox changes, Dr Massey believed that the contaminants were coming from the landfill. He has particular expertise in redox reactions, but it was his view that a source of upstream contaminants (the existing fill), together with a potential pathway for their transfer (see discussion below) was a simpler explanation for the elevated levels observed. He acknowledged that there is general heterogeneity in metal concentrations within groundwater sampled in Canterbury, but due to the small number of upstream samples (only three sampling occasions), there is insufficient evidence to indicate that natural heterogeneity is the cause of the difference in concentrations observed downgradient.

118. Ms Kreleger's opinion was that the measured downgradient contaminants, in particular soluble trace elements, may be attributable to the existing fill. She agreed with Mr Kirk and Mrs Mongillo that there are indications of a change in redox potential based on the anion/cation parameters. However, in her view, the data for dissolved oxygen and ammonia did not indicate a strong change. She also noted that elevated levels were observed prior to September 2021, when a spike in nitrate levels was recorded (indicating a possible cause for redox changes). Consequently, she considered it likely that some of the elevated trace metal concentrations could be attributed to the existing fill.

119. All experts agreed that a lack of data made reaching clear conclusions on the cause of the observed exceedances difficult.

120. At the hearing on June 3, we asked the Applicant if there was any additional information demonstrating the variability of metals within groundwater in Canterbury. In response, the Applicant provided a monitoring report relating to Christchurch City Council's Comprehensive Stormwater Network Discharge consents, and drew attention to metal concentrations in two wells. While this report does show variability in metal concentrations of the same order of magnitude observed at the Frew's, the ECan officers responded that the validity of the comparison is limited as the report focusses on groundwater in Christchurch's generally confined aquifers, which are subject to a number of existing discharges.

121. We note that at least one of the wells referred to, M35/5119, appears to be up-gradient of Christchurch and close to the Waimakariri River; however, we have insufficient information to determine whether the setting is sufficiently similar to the environment at the site. The Applicant also responded that confined aquifers are unlikely to be subject to contamination via discharges. We cannot determine the validity of the comparison from the information available to us. Nonetheless, we accept the evidence of both Mr Kirk and Dr Massey that one would expect to see heterogeneity in sampling results within Canterbury aquifers.

122. We also accept the evidence of Mr Kirk and Ms Mongillo with respect to the likely reasons for the variability in contaminant levels shown in the water quality monitoring data. Given the very small changes observed and variability observed in the upstream well of the same order of magnitude, natural variability and

sampling accuracy seem the most likely explanations. All experts agreed that the larger increase in manganese recorded in one well appeared likely to be due to changing redox conditions. Overall, we consider that there is no strong evidence that elevated levels of contaminants, where observed, were derived from the fill.

Preferential Flow Channels

123. The second part of Dr Massey's concern in relation to elevated levels of contaminants downstream of the existing quarry relates to the potential for preferential flow paths to transit water and contaminants signicantly faster than modelled. In the second JWS, Dr Massey outlined the work of Dann et al (2008) from the Institute of Environmental Science and Research. This work investigated the impact of preferential flows channels in the gravel aquifers of Canterbury, and estimated that 82-89% of water in their study area flowed through preferential flow paths. The effective porosity in the study area was calculated as being 0.0032, which is two orders of magnitude lower than the value of 0.26 used in the CTM. He stated that if the effective porosity underlying the site was similar, transport times could be about 80 times faster than predicted (e.g. 3-5 years rather than 300+ years, or months rather than decades).

124. Dr Massey acknowledged that the work he referenced focused on horizontal transport in the saturated zone. He stated that other work by Burberry et al. (2017), using both smoke and water as tracers, demonstrated that the same process led to rapid vertical transport in Canterbury's aquifers as well. He stated that taken together, this work offers an explanation for relatively fast contaminant transport time, linking the landfill activities and the observations in the monitoring wells.

125. Mr Kirk considered that Dr Massey's focus on the effective porosity assessment was a "red herring". He stated that it is the infiltration rate (the speed at which water enters the soil) that is important in determining the amount of contaminants that reach groundwater. Rainfall generally infiltrates slowly. The effective porosity doesn't change the infiltration rate, only the velocity of the water and contaminants once they have reached the aquifer.

126. He explained using a whiteboard diagram[13] that preferential flow paths are discrete from the tight, surrounding material. Metals stick to this tight substrate, delaying their passage into the flow channel. In the channels they are exposed to oxygenated water. The chemistry on either side of the channels varies, causing minerals to precipitate out of solution. He showed a photograph from the Dann et al. paper demonstrating this.

127. The preferential channels are also short and discrete, in the order of 10s to 100m long. Such lenses and channels do not typically act as conduits over large distances, instead having more localised influence on groundwater movement.

[13] Recorded via cell phone photograph and circulated to parties.

128. Mr Kirk characterised Dr Massey's description of potential horizontal and vertical flow paths making a lattice through which containments could easily migrate as misleading. Mr Kirk stated that the smoke test is not relevant to the assessment, as gas is able to pass through pore spaces much more readily than liquid. We accept Mr Kirk's evidence on this matter as more compelling than Dr Massey's.

129. To demonstrate the effect of a significantly lower effective porosity on the model results, Ms Mongillo re-ran the model for two parameters (copper and nickel) using an effective porosity value of 0.0026, similar to the 0.0032 calculated by Dann *et al*. The results show that there is a small reduction (10 to 20%) in the time for leachate to reach the maximum concentration at groundwater for all scenarios, and a small increase in the concentrations of metals downgradient (results were only reported for the most conservative scenario). She also noted that this assessment is conservative as the lower effective porosity is only relevant to the aquifer, not to the unsaturated vadose zone above it. However, the model applies the same figure to both parts. The results obtained support Mr Kirk's evidence provided at the hearing.

130. On the basis of the evidence we heard, there is insufficient evidence to support the concern that the contaminant transport times in the models have been underestimated to a degree that is likely to affect the Applicant's conclusion in respect of effects. We prefer the evidence of the applicant, in particular Mr Kirk, in respect of the likely transport processes occurring in the aquifer.

131. Considering these matters together, we do not agree with Dr Massey's primary contention that the model should be considered unreliable because it did not accurately predict the presence of contaminants downstream of the existing fill after a relatively short period of time (within 6 years).

132. Overall, we accept that the model used by the Applicant to assess contaminant transport is appropriate and inputs are suitably conservative. We agree that the modelling undertaken is appropriate and can be used to derive WAC and assess the effects of the discharge of contaminants to land.

Derivation of the Waste Acceptance Criteria

133. Section 3 of the DTL AEE outlines the process followed to establish preliminary WACs for the site.

134. A suite of contaminants was developed for which managed fill WAC would be required, based on typical sources of low-level contamination soil around Canterbury. The contaminants included metals/metalloids, polycyclic aromatic hydrocarbons, phenols, pesticides, polychlorinated biphenyls, dioxin, and petroleum constituents.

135. The soil proposed to be accepted in the managed fill may come from sources with agricultural chemicals, demolition sites, and other sites with former or current Ministry for the Environment (MfE) Hazardous Activities and Industry List (HAIL) activities. Cleanfill comprising "virgin excavated natural material" and managed fill material comprising inert material (e.g. selected inert construction or demolition

material) or soils with trace element concentrations greater than applicable regional background concentrations will be accepted.

136. The initial soil contaminant concentrations selected as inputs for the model were the soil quality standards referenced in the National Environmental Standard for Assessing and Managing Contaminants in Soil to protect Human Health (NES-CS) for a commercial/industrial land use setting. The CTM was then used to refine the WAC for the managed fill and assess the potential for risks to human health and the environment, by modelling the impact on downgradient water quality of different contaminant concentrations, and adjusting them if effects were not acceptable. As discussed earlier, the model was run at several different levels of conservatism.

137. Mr Trewartha initially raised concerns about the suitability of the model for calculating WACS, however clarified this in the addendum to his s42A Report (5 April 2022). This addendum concluded:

> *The modelling conducted is of acceptable professional standards with appropriate conservative assumptions and suitable for inclusion as a line of evidence to support the development of Waste Acceptance Criteria. However, because of the inherent uncertainty in contaminant fate and transport modelling coupled with the combination of lack of site-specific data, no model calibration, and no model validation/verification, I do not support the model results being used as stand-alone evidence for setting WACs.*

138. Mr Kirk peer reviewed the work to develop the WAC undertaken by Ms Mongillo. He noted that the modelling approach is globally used by practitioners to set risk based 'acceptance criteria' such as for contaminated land. He referenced the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand as an example of this, noting:

> "*An obvious example is the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, developed and still supported by the Ministry for the Environment. The criteria provided in this particular guidance and many others, has been developed using simplistic models very similar to that used by Mrs Mongillo. Having extensive experience in the development and use of such contaminant transport models, I consider that Mr Trewartha's concerns regarding the approach to setting the waste acceptance criteria are without merit*[14]."

139. We have considered the response of Mr Kirk with respect to the concerns raised by Mr Trewartha and accept his opinion. We note that several lines of evidence were later used to refine the WAC, a point accepted by Mr Trewartha. In paragraph 6.6 of Mr Kirk's primary evidence, he outlines a number of concerns with the initial WAC developed and additional input he provided to assist in their revision. In particular, we note that acceptance criteria for other managed fills operations,

[14] Paragraph 9.4, Mr Kirk's Statement of Evidence

contaminated land soil acceptance criteria for landfill workers, and future land-use were considered.

140. In addition, a dust deposition model was developed by Sephira Environmental and NZ Air Limited to estimate the increase of soil contaminant concentrations adjacent to the site as a result of dust deposition. The WAC developed using the groundwater CTM were lowered if dust deposition WAC values were lower than the contaminant transport-derived WAC values.

141. Another source of information considered was WAC derived by Pattle Delamore Partners (PDP) for the draft WasteMINZ Class 3 guidelines[15]. In response to directions at the hearing on June 3, the Applicant provided a comparison between the proposed WAC and the PDP-derived WAC. ECAN Officers reviewed this comparison and noted the following:

> *Section 2 of the Sephira Letter includes a table comparing the proposed site WAC to those provided in the PDP report where these are available (18 of the 30 contaminants). In many cases, the proposed WAC are higher than the maximum values recommended by the PDP report (nine 12-month average proposed WAC and 13 maximum WAC). Where this occurs, the Sephira letter largely refers back to the modelling results to indicate that nevertheless, the values are appropriate for the site.*

142. In response, Ms Mongillo and Mr Kirk described the purpose of the PDP work as being to identify WAC that would not exceed the NZ drinking water standards MAV or aquatic ecosystem guidelines at nearby receptors at any site in New Zealand, regardless of rainfall. The PDP WAC are therefore highly conservative. They were derived using a simplistic, conservative approach, rather than the detailed site-specific assessment (described as a Tier 2 assessment) used to develop the Frews' WAC. These site-specific inputs allow for a more accurate assessment of attenuation and therefore enable higher WAC values in some cases. We accept this statement.

143. We also note Mr Kirk's opinion in his primary evidence[16]:

> *"It is my opinion that the final soil acceptance criteria have been developed in a manner that aligns with industry expectations and have been developed utilising appropriately conservative means, using tools that adequately represent the site processes, conditions and risks."*

144. We have considered the appropriateness of the proposed WAC. In our view, having regard to the evidence we received, the WAC have been developed appropriately using a recognised approach (the CTM), with significant levels of conservatism, and refined based on a number of independent factors.

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[15] Pattle Delamore Partners, 2021. Derivation of Class 3 and 4 Landfill Waste Acceptance Criteria. Prepared for Ministry for the Environment. June 2021

[16] Para 6.8

145. We note that Policy 4.7 is that consents will not be granted where this would cause limits set in section 6 to 15 to be breached. Policy 4.14 is that discharges to land should not exceed the natural capacity of the soil to treat or remove the contaminant, and where this is not practicable, discharges must utilise the best practicable option to ensure that any contaminant plume is as small as reasonably practicable. We have considered whether these policy tests are met considering the model results, as summarised by Ms Mongillo in her letter of 12 June 2022. We consider the 12 month rolling mean to be the most appropriate parameter to model, as this will give an indication of effects over the long term. We have also chosen to examine the results of the 'highly conservative' modelling scenario, as providing an additional level of conservatism over the 'reasonably conservative' scenario.

146. Modelling of the proposed 12 month rolling average WACs using the highly conservative modelling scenario shows that drinking water quality limits will be met at the property boundary. We consider this meets the test of 'as small a contaminant plume as reasonably practicable'.

~~147.~~ We also note that the aquatic ecosystem limits are predicted to be met at the nearest surface water body using the same highly conservative scenario. We have included the surface water quality limits from the LWRP in the conditions of consent.

148. We therefore consider the proposed WACs to be appropriate. In many cases, the groundwater limits are met at the property boundary, and the aquatic ecosystem limits met at Derretts River, using the extremely conservative modelling scenario, giving an additional level of comfort. We consider it appropriate that a conservative approach is taken to setting the WACs, given the potential impact of an exceedance above the trigger levels, and the very strong policy direction to maintain water quality.

Proposed mitigation

Capping of the fill

149. One of the primary mitigation measures discussed by the Applicant to reduce contaminant discharge is the capping of the fill with low permeability material, once each section of the quarry has been back-filled. This signicantly reduces infiltration of rainwater, thereby reducing leaching of contaminants into groundwater. Mr Kirk noted[17] that:

> *"Having developed landfill closure methodologies and developed remedial options for both operational and many closed landfills, it is my experience that the primary means of reducing leachate generation and discharge, and improving inground contaminant concentrations is through closure and capping of the landfill. The low permeability cap reduces the amount of water infiltrating through the waste, thereby decreasing the rate and mass of contaminants migrating away from the fill."*

[17] Paragraph 9.13 Primary evidence.

150. We note the modelling discussed above does not assume a Managed Fill Cap is in place; however, one is required by the conditions of consent.

151. Mr Deans sought that the fill should be capped within 6 months of the quarry being filled. However, we heard that sufficient time (at least 18 months) is required to allow the fill to settle before a cap can be installed. If the cap is installed before the fill has settled, the soil movement caused through the settling process will cause the cap to crack and let water in, thereby defeating its purpose.

152. The proposed conditions require that the cap is installed within two years of filling being completed.

153. While we agree that the cap should be installed as soon as possible after filling, we accept that it should not be installed until the fill has settled. Allowing up to two years for settling to occur is a precautionary measure that will avoid long term issues with cap maintenance.

154. We have also included ongoing maintenance of the managed fill cap as a requirement in the consent conditions and it is referenced in the bond conditions as one of the purposes for securing the bond.

The Proposed Managed Fill Monitoring and Management System

155. A critical part of the proposal is ensuring that the waste material deposited complies with the WAC. The modelling results predicting that trigger levels will not be exceeded at the property boundary rely heavily on compliance with the WAC, and in particular the rolling mean. Modelling of higher WAC rolling means presented in the Contaminant Transport Model Report in many cases showed exceedances of the LWRP contaminant limits. It is therefore critical that compliance with the rolling means can be monitored and both the applicant and ECan (and wider community) can be assured they are being met.

156. Calculation of the 12 month rolling mean was discussed at some length at the hearing, with different approaches promulgated by the applicant and ECan officers. At our request, the two parties discussed this matter further and provided additional information to inform potential consent conditions.

157. Both agreed that sampling data from each load should be included in the calculation of the rolling mean, and that this should be provided by the generator as part of a detailed site investigation or waste characterisation report, with sampling undertaken at a frequency of one sample per $100m^3$ of waste (with a minimum three samples).

158. Dr Massey's view was the highest result recorded should be used in the calculation of the rolling mean, but he also considered an average of the three highest samples taken as an acceptable (but less preferred) alternative. This would avoid a generator 'padding out' the results with additional low value samples and artificially lowering the average.

159. Ms Mongillo's suggested approach was that the highest seven samples (or some number less than seven) from each contaminant source area would be used. We

infer that a contaminant source area is an identified part of a site expected to have a particular contaminant profile, which has been characterised by a Suitably Qualified and Experienced Practitioner (SQEP). These samples would be averaged and this average used in the rolling mean, weighted in relation to the volume of soil from the specific source area. Sites (or source areas) for which contaminants are not considered to be present would be assigned a value equivalent to the background concentration for the site (for specific metals), or assigned a value of 0 (for organic compounds).

160. We acknowledge Dr Massey's concerns about the possibility of sampling underestimating the amount of contaminants being deposited; however we think an approach of only using the highest value recorded has a signicantly higher chance of over-estimating the amount of contaminants. Whatever approach is taken, there is the potential for generators to deliberately (or inadvertently) provide sample results that do not reflect the contaminant levels. This can be mitigated by requiring sampling to be undertaken by SQEPs, who have professional expertise and a reputation to maintain, and undertaking spot verification sampling, to confirm the results. However, ultimately there must be a reliance on trust and good judgement on the part of the SQEPs – not all material deposited can be tested. We consider that the approach suggested by the applicant of using between one and seven samples from each contaminant source area representing the highest concentrations of contaminants is an appropriate and more balanced approach.

161. The applicant also proposed including a schedule outlining sampling collection protocols in the consent conditions, seeking further detail from generators through the waste permit procedure, and including additional detail in the Site Management Plan in relation to calculation of the 12 month rolling mean. We consider these are all useful proposals, which would increase certainty. We have also included more detail around the waste permit procedure in the conditions, for certainty.

162. Having considered the material provided by the parties, we consider that an appropriate approach in relation to contaminated soil is:

    a. A detailed site investigation, preliminary site investigation or waste characterisation report, as appropriate, must be provided before fill can be deposited.

    b. Samples from each site must be used in the calculation of the rolling mean. These samples are to be collected at a minimum of one per $100m^3$ of waste, with a minimum of three samples from each source area within the site. Between one and seven samples representing the highest concentration of contaminants are to be included for each contaminant source area.

    c. Should random verification sampling show a higher concentration than that computed in the procedure for calculating the rolling mean (discussed below), the verification sample concentration should be used as the value for the calculation of the rolling mean for material from the entire waste generation site.

d. All site investigation and waste characterisation reports, along with documentation showing how sampling data from each site was used in the calculation of the rolling mean and any other supporting data such as weighbridge data, to be kept for a minimum of five years.

Acceptance of loads exceeding the WAC 12 month rolling mean

163. ECan officers questioned the Applicant's proposed consent conditions, which would allow waste material to be accepted if a verification sample subsequently determines that the material will cause the 12 month rolling mean to be exceeded. Acceptance of the waste is dependent upon an analysis by a SQEP that the 12-month rolling mean will be met within 30 days.

164. Dr Massey considered that this raised issues for compliance, as there is no clear measure as to whether a load complies with the requirements. Mr Mongillo accepted this, and suggested that exceeding the rolling average should be limited to once per year. The purpose of the rolling average is to understand the mass of contaminants being deposited, and thereby providing the ability to reject loads if the risk of exceeding the limit is too great.

165. Mr Kirk's view was that the risk of exceedance is not high, as Frews should be checking the risk of a load exceeding the rolling mean limit and rejecting if it too great.

166. We agree that the onus should be on the applicant to check, prior to accepting a load and using the contaminant data provided through the permit process, that the rolling mean will remain under the limit. We consider this more likely to occur if there is a requirement to remove loads that cause the limit to be exceeded. We have therefore removed this proposed provision from the conditions of consent.

Mixing of Material or Averaging Contaminant Levels to Comply with WAC

167. Dr Massey considered that mixing of contaminated soil and averaging of sample results to comply with WAC should be prohibited. By mixing, he referred to mixing soils with soil with lower contaminant concentrations, to achieve a mixture that fully complies with the WAC. By averaging, he referred to averaging soil testing results within a site, to achieve an overall acceptable concentration. He considered that the maximum values of an investigation or sampling should be used to determine waste acceptance, but noted that this is a precautionary approach.

168. We are aware that the NES-CS and associated guidelines produced by the Ministry for the Environment address these matters. Contaminated land management guidelines No 5: Site investigation and analysis of soils covers use of averaging[18] and composite samples under the guidance of a suitably qualified and experienced practitioner (SQEP). The generator of the contaminated material is required to comply with this management framework.

[18] Including section 4.2.6 composite samples and section 7.4.1 use of averages

169. Paragraph 5.4 to 5.7 of Mr Mongillo's evidence addresses Dr Massey's concerns about site wide averaging and soil mixing in detail. Mr Mongillo provided evidence[19] that mixing of material in accordance with the directions of a Suitably Qualified and Experienced Practitioner (SQEP) to meet WACs is common practice, and he considered that this was appropriate. However, averaging soil results without mixing was inappropriate.

170. We accept Mr Mongillo's evidence on this matter. The primary point of difference between Mr Mongillo and Dr Massey appears to be how certain Frews (and ECan) can be that soil being deposited has been appropriately characterised, and mixed (if that is considered appropriate), such that the soil testing results provided with each load accurately characterise the waste.

171. This issue is not unique to soil that has been mixed, but applies to all waste deposited and is a critical issue in ensuring that the WAC are being met. Correct characterisation of the waste material is primarily dependent upon the professional expertise of the SQEP, and recorded via Frews permit process[20]. To verify the quality of the waste being deposited, the applicant proposes to test one sample per 500m^3 of waste material (approximately one per 30 truck loads). Ensuring the remaining loads have been accurately characterised, such that the effects will not exceed those predicted, relies on the permit process.

172. In practice, we do not see how this can be avoided. The only other alternative would be to significantly increase the amount of sampling of waste prior to deposition. While this would reduce the risk to some extent, it would not eliminate it. The applicant outlined a process whereby an SQEP could be effectively 'blacklisted' if a verification sample showed that a load did not reflect the contaminant concentrations advised. We consider that the periodic sampling proposed should ensure that SQEPs act appropriately. If verification sampling frequently indicated discrepancies with purported contaminant loads, we suggest that the sampling frequency should increase.

Groundwater monitoring regime

173. Mr Kirk provided Ms Mongillo with advice related to the proposed groundwater monitoring programme, including locations of wells, frequency of monitoring, the tiered structure of trigger levels and appropriate responses. He considered the proposed monitoring to be appropriate and in line with typical industry requirements.[21]

174. In general, we accept the proposed monitoring regime as being appropriate, including the location of wells, frequency of monitoring, proposed actions should trigger levels be exceeded, and the overall compliance limits.

[19] Paragraph 5.9 primary evidence.

[20] See appendix B of the Site Management Plan provided wit the application

[21] Paragraph 2.11 Mr Kirk's summary evidence

175. The Applicant has proposed Tier 2 groundwater monitoring trigger levels equivalent to 80% of half the NZ Drinking Water Standards MAV (ie. 40% MAV) for determinands of health significance in the NZ Drinking Water Guidelines, or 80% of the Guideline Value for aesthetic determinands. Ms Kreleger proposed lower Tier 2 trigger level limits as outlined in paragraph 153(e)(ii) of her primary evidence, but later amended these in comments on the proposed conditions to generally reflect 25% of MAV for determinands of health significance.

176. Ms Kreleger was concerned that contaminant discharge into groundwater can occur for a prolonged period before it is detected in bore samples. By then, it would be unclear which area of the managed fill provided the contaminant source, and removal of the source material and clean-up of the downgradient plume would be costly, and in her view potentially impossible. Therefore, a lower trigger would provide more time to mitigate or remediate the contamination. We discuss the remediation shortcomings outlined by ECan officers below.

177. We understand Ms Kreleger's concerns with respect to the need for early contamination detection and response. We had no compelling evidence to suggest that either set of Tier 2 trigger values was optimal in terms of triggering a management response. A balance needs to be struck between being sufficiently precautionary, such that any contaminant discharge that may result in water quality standards being exceeded is detected early enough for appropriate remediation to occur, and ensuring that increases in contaminant levels that are unlikely to lead to adverse effects or are the result of natural variability do not cause trigger levels to be exceeded frequently, leading to an inefficient response for no environmental gain.

178. In order to take a precautionary approach, we have decided to take a pragmatic approach and set the Tier 2 trigger level values approximately half way between the two suggested levels provided in the draft set of conditions of 3 June. We note that in this annotated set of conditions, ECan had proposed revised figures for only some contaminants. A different approach to phenols was proposed by the applicant and ECan. Ms Kreleger's approach of 80% of the guideline value for one isomer as a limit for total phenols seems unreasonable. Where a guideline value for a phenol isomer is included in the Drinking Water Standards, we have used a value of 80% of the guideline value. Other figures we have left as the applicant has proposed as we have no information on which to revise these.

179. Bearing in mind this is a trigger level for a management response as outlined in the conditions of consent, we consider this has no impact on the proposed WAC or the proposed contaminant compliance limits.

180. A further matter of dispute between Ms Kreleger and Ms Mongillo was the number of baseline samples taken prior to fill deposition commencing. The application proposed a single round of monitoring, while Ms Kreleger considered one year's data (four quarterly samples) was required to understand baseline levels in different seasons. We note that the applicant can already collected and analysed a number of samples over the past two or three years from downstream shallow wells 1S, 2S and 3S, which are those likely to be affected first by any change in levels of contaminants. Sampling in accordance with the regime in Schedule CRC201808C

will commence from the other wells once they are installed. We consider that this provides sufficient baseline data.

Remediation

181. Remedial actions may be required if contaminant levels are such that there is a potential risk to human health or the environment. The Applicant does not anticipate these will be required; however, they form part of the suite of actions that may be required to be undertaken should contaminant levels exceed Tier 2 trigger levels as outlined in the conditions of consent. The methods outlined in the DTL AEE range from monitored natural attenuation to active ex-situ groundwater treatment.

182. Dr Massey expressed concerns with the practicality and likely effectiveness of remediating the site. He considered reacting or responding to groundwater quality degradation may be extremely difficult and disruptive to those affected. If groundwater contamination is detected in monitoring bores, remediation of the contaminant source will likely be contentious and impractical, or effectively impossible[22].

183. Dr Massey stated that the primary way to mitigate potential groundwater contamination impacts is by strict adherence to precautionary WAC. Other measures, such as a landfill cap, groundwater monitoring, and in the worst case, remediation, are secondary and generally reactive rather than proactive[23]. We have addressed the WAC above, and consider that these reflect a highly conservative, precautionary approach.

184. The applicant was clear that remediation included a range of possible options. As noted earlier, Mr Kirk stated that in his experience, closure and capping of a landfill is the primary means of reducing leachate concentration. Mr Kirk also addressed the issue of groundwater treatment, stating:

> *Where interception of an existing groundwater contaminant plume is required, the preferred approach for landfills is the use of groundwater interception trenches, immediately downgradient of the facility. These need only produce a small drawdown to provide effective containment, with impacted water typically being treated by a small onsite plant, and/or irrigated back to the landfill. I have assessed, assisted in the design and worked with such installations in both [municipal solid waste] landfill, contaminated land and wastewater discharge settings. In my experience, such a remedial solution would provide simplistic and effective control of discharges from the site if needed. It is also my opinion that such remediation is highly unlikely to be required as a result of the proposed activity.*

185. While the depth to groundwater at this location would seem likely to limit the use of groundwater inception trenches, we accept Ms Mongillo's and Mr Kirk's

[22] Paragraph 51 Primary evidence.

[23] Paragraph 54 Primary evidence.

evidence that there are various options and that a system could be designed to remediate groundwater. However, we have reservations about how much this might cost and who would be responsible for carrying it in the event of a default by the consent holder. We have included bond conditions in the consent to address this issue.

186. Overall, we consider that the issues discussed above do not give rise to significant uncertainties with respect to the monitoring and management system proposed by the applicant and included in the conditions of consent. Adherence of those conditions is a key factor in ensuring actual and potential adverse effects on groundwater quality do not exceed those assessed.

Cumulative Effects on Groundwater

187. There is potential for cumulative adverse effects to arise from discharges to groundwater from the proposal and the existing fill activity. However, we consider that the proposed monitoring and management system provided by the consent conditions will address this issue, as the down-gradient monitoring locations are also downgradient of the existing quarry.

Overall Findings With Respect to Adverse Effects on Groundwater

188. We have carefully considered the views of all the experts and submitters presenting evidence on the groundwater quality issues. As outlined above, we are satisfied that the modelling undertaken is appropriate and highly conservative, and that we can rely on the results of this, including to assist in determine appropriate WACs.

189. We note that the highly conservative modelling scenario demonstrates that all contaminants are predicted to meet the relevant drinking water standards (half the NZ Drinking Water MAVs and the Guideline Values for aesthetic determinands) at the property boundary. We are confident that, given the level of conservatism built into the modelling, the risk of these limits being exceeded is low.

190. We have carefully considered the proposed monitoring network and response system proposed by the Applicant. This includes an extensive groundwater monitoring network, Tier 1 and Tier 2 trigger levels that require a management response, and groundwater compliance limits that must be met. We agree that this is appropriate and have included it in the conditions. This will ensure that any increase in contaminants is detected early, before groundwater quality limits are reached, further reducing the risk of limits being exceeded. If the event that limits are exceeded, remediation options exist, including providing alternative water supplies if necessary, to downstream users. However, we consider it highly unlikely that such a situation would arise.

191. Overall, on the basis of the discussion above and subject to the conditions of consent we consider that effects on groundwater quality are likely to be at most minor in the immediate vicinity of the site, and that the potential for meaningful change at receptors (bores) down-gradient is very low.

Effects on surface water quality from the discharge of managed fill to land

192. We have determined that adverse effects on the groundwater quality will be appropriately addressed through the conditions of consent. Some of the groundwater that flows beneath the site will emerge in the headwaters of Derrett's River and the Hororata River to the south of the site.

193. These surface water bodies are a considerable distance from the site, which, on the basis of the evidence we heard, provides a buffer to water quality effects arising from the site through natural attenuation. Mr Kirk stated that with regards to the potential for migration to the River, it is uncommon for contaminant plumes to extend more than 100-200 meters in permeable alluvial aquifers[24]. Given the relatively modest waste acceptance criteria proposed, it was his opinion that the potential for a detectable contaminant plume to develop and extend 2.5 - 3 km from the site is *de minimis*.

194. We also note that the modelling (using the highly conservative scenario) indicates that with the proposed WAC, contaminants will not reach the aquatic ecology limits in the LWRP.

195. The conditions of consent require surface water quality monitoring of Derretts River and Hororata River if groundwater trigger levels are met, and include trigger levels that require a managed response if they are exceeded. We considered applying absolute surface water quality limits as well as groundwater limits; however both Applicant and ECan noted that groundwater quality is the primary issue to manage given the distance to surface water (over two kilometres) and provided effects on groundwater are managed, effects on surface water should not occur. We agree, and on this basis have decided not to apply absolute limits.

196. On the basis of the discussion above, and subject to the conditions of consent, we consider that the adverse effects on surface water quality will be less than minor.

Effects on tangata whenua values

197. The site lies within the rohe of Te Ngāi Tūāhuriri Rūnanga and Te Taumutu Rūnanga. As noted above, the discharge of contaminants has the potential to affect ground and surface water quality and consequently instream biodiversity within Derretts River and the Hororata River. It therefore has the potential to affect the mauri of these areas and intrinsic values of significance to Māori. We do not downplay the importance of these surface water resources to mana whenua.

198. The applicant consulted the rūnanga during the application process, and while remaining concerned about the effects of contaminant leaching on ground and surface waters, the rūnanga took a neutral position on the proposal at that time and did not lodge submissions.

199. An assessment of the proposal against the relevant policies of the Mahaanui Iwi Management Plan (MIMP) was undertaken by Mahaanui Kurataiao Ltd. The assessment notes that the wāhi taonga status of aquifers and other water

[24] Paragraph 9.11 Mr Kirk's primary evidence.

resources means it is unacceptable to use them as a receiving environment for contaminants, and that any contamination of groundwater has the potential to impact the cultural health of Te Waihora. Ngā Rūnanga have concerns that the managed fill may be inappropriate for the soil type (gravel substrate), with a potential for leaching of contaminants.

200. As discussed above, we have concluded that the risk to groundwater and surface water quality is low, and that effects will be no more than minor. We have confidence in the modelling undertaken and this shows, using a conservative approach, that groundwater water quality limits should not be exceeded at the property boundary and surface water aquatic ecology limits will not be exceeded at Derretts River or the Hororata River. While contaminants may leach from the fill into the aquifer below the site, various attenuation and dispersion processes will limit the spread, and the concentration of these contaminant, down-gradient.

201. We therefore have confidence that the values of the water bodies above of significance to mana whenua will not be adversely affected by the proposal.

Effects on landscape character and visual amenity

202. Objectives and policies in the operative District Plan and proposed District Plan both focus on maintaining the rural character of rural areas, low levels of building density and a predominance of vegetative cover, while allowing for primary production and managing the effects of other activities within the rural environment.

203. A landscape assessment, including proposed visual mitigation measures, was provided by Ms Moginie. A critical aspect of the proposed mitigation is that the area will be quarried and backfilled sequentially, with planting and bunding around each area installed prior to commencing quarrying of that area.

204. Before any quarrying is undertaken, the site perimeter will be planted out in a double row of pines (existing pines may be relocated to achieve this). These will be maintained over the duration of the consent at a height of 5m. Active quarrying of the site will not commence until year 4 following commencement of the consent, at which time the perimeter trees are expected to be 3m in height.

205. Stockpiles will be maintained at a maximum height of 2m until the perimeter trees are 5m in height (anticipated to be in year 7 following commencement of the consent). At this time, stockpiles may be raised to a maximum height of 4.5m.

206. The existing 3-4m high bunding along Thwaites Road and Plantation Road (south of the entrance) will remain in place throughout the duration of the quarrying operation. A 300m length of existing bunding alongside Plantation Road north of the site entrance will be realigned and reduced to 2m in height. Bunds of at least 2m in height will be constructed in front of each active quarry area ('leading edge bunds') and between the active quarry area and Plantation Road, prior to quarrying commencing in each area. These bunds will be removed and the material used elsewhere once quarrying and backfilling of each area is complete.

207. The effects will therefore vary over time as quarrying progresses over the site. Ms Moginie noted that there will be substantial change to the existing rural pastoral character on the site, but the surrounding rural landscape will remain unchanged. As rehabilitation of each area is complete, the rural character will return. Ms Moginie assessed the effects as very high over the part of the site being quarried, but these effects will be transitory in nature and contained within the quarry site. The active part of the quarry site will be screened by the bunds and pine shelterbelt and not visible from adjoining roads. Effects on landscape values and character from beyond the site are considered to be low – none. The pine shelterbelts, in Ms Moginie's view, are an expected part of the rural landscape in this area. New bunds will be viewed in the context of existing bunding and pasture, with a very low effect on visual amenity from adjoining roads.

208. Ms Moginie's assessment was reviewed for the SDC by Ms Rachael Annan. Ms Annan considered that due to the presence of the bunding, which can detract from rural character, and the industrial nature of the activity (with ongoing construction, use and deconstruction across the site over a prolonged period), in her view the visual effects of the activity, particularly for some local residents, would be 'minor to moderate.'

209. We note that landscape values were not raised as a significant issue by submitters. Ms Irving sought that the bunds are properly grassed and maintained, and a double row of trees planted to help with dust, smell and noise, as well as improving the look of the quarry. She stressed the importance of the planting and bunding to be in place and at the appropriate height prior to works taking place at each stage.

210. We agree that the proposed mitigation of bunds and planting will signicantly visually screen the activities from surrounding roads and local residents, to the extent that these effects will generally be minor, or moderate at most for those living in close proximity to the site. As the scale of works at each stage is similar to what is currently experienced in the existing quarry, the visual effects experienced at any one time will not be significantly different those experienced at present.

211. We agree with both Ms Moginie and Ms Annan that it is critical that the mitigation is fully in place prior to works be commencing on each stage. The proposed conditions of consent reflect this. There was some dispute from Ms Thornley that the trees would not grow as fast as predicted in the local conditions. To address this, conditions are included requiring that the perimeter planting has reached a height of 3m prior to excavation commencing, and a height of 5m before stockpiles can exceed 2m in height.

Shading

212. The pine shelterbelts will cause some shading of Thwaites Road for short periods during mid-winter months. However, ice formation is not considered to be a concern as the road is unsealed. The application included shade analysis from the perimeter shelterbelt over 306 Thwaites Road; however, the diagrams provided show minimal shading on the property, and none over or close to the existing buildings.

Traffic effects

213. The operative and proposed district plans' objectives and policies seek to ensure that activities do not compromise the efficient and safe operation of the district's transport networks. They also seek to manage the effects (including traffic-related effects) of activities in the rural environment on rural character and amenity.

214. The roads immediately surrounding the quarry site are unsealed, low volume, local roads. At present, trucks visiting the existing quarry are not permitted to use Thwaites Road, which runs immediately to the south of the site. Quarry traffic generally accesses the site via Plantation Road, connecting to Bealey Road (an arterial road under the SDP) approximately 2km to the south. The application states that a relatively small proportion of quarry traffic uses Plantation Road to the north of the site, or uses Hawkins Road, another local road perpendicular to Plantation Road.

215. The applicant proposes that the restriction on using Thwaites Road will continue under the proposal, noting that it is generally respected by truck drivers; however, it is acknowledged that Frews has limited ability to enforce it.

216. An assessment of the effects of the traffic generated by the proposal was undertaken by Stantec and peer reviewed for SDC by Abley. The assessment was based on data provided by Frews of the vehicles needed to operate the quarry; that is, an average of 90 trucks, 65 truck and trailer units and 30 staff cars visiting the site per week. Truck movements will vary in response to demand for aggregate and disposal of fill, resulting in some peaks in activity and some quieter periods. Average daily equivalent car movements (ecm), determined by Stantec to be 197[25] and a peak of 260, exceed the permitted threshold in the District Plan of 60 ecm per day (Rule 9.13.1.2).

217. The assessment notes that the roads in the vicinity of the site have a good safety record. The number of traffic movements associated with the site equate to an average of approximately six per hour, which Stantec considers to be insignificant in terms of the efficiency of the existing road network.

218. The site is close to an arterial road network, providing for safe and efficient longer distance transport. As noted by Stantec, there are also beneficial effects on the transport network by removing some of the material that would otherwise be transported to Kate Valley landfill, which is likely, on average, to involve a longer travel distance.

219. Stantec recommends that increased signage warning of trucks operating is installed close to local intersections, to increase awareness and therefore safety. No mitigations are required in terms of the site access, which is suitable for the level of traffic generated by the quarry. Abley's review agreed with Stantec's assessment.

[25] Stantec's Table 6-1 calculates average vehicle movements equating one truck and trailer to 12 car movements. Abley relies on NZTA Planning Policy definition of one truck and trailer being equal to 10 car movements, giving a weekly average of 179 ecm.

220. In terms of amenity, Mr Henderson considered that the effects of traffic will not give rise to significant adverse effects on neighbouring properties, taking into account the fact that vacant sites along Plantation Road may ultimately have dwellings constructed on them.

221. Abley's peer review and Mr Henderson's conclusions note that the proposed number of vehicles movements will be the same as occurs at present, in relation to the existing quarry operation. While the proposal is for an increase in the rate of extraction per year, the application details that the additional aggregate extracted will be retained on site and used as cover for the fill, so the amount of material exported will not increase. This conclusion was challenged by both ECan experts and Ms Thornley, who noted that some of the existing material quarried is also used as fill, so the overall scale of the activity (and therefore potentially vehicle movements) will increase.

222. We note that Stantec's assessment does not appear to rely on a presumption of no increase in vehicular traffic, but was undertaken based on the anticipated vehicle movement numbers provided by the applicant.

223. Overall, we conclude that with the mitigation measures proposed (in particular no trucks on Thwaites Road and additional signage) effects on the safety and efficiency of the road network, and effects on amenity, will be minor and consistent with the policies of the operative and proposed district plans.

Noise effects

224. Policy B3.4.13 of the operative district plan is to ensure that continuous or regular noise is at a level that does not disturb people indoors on adjoining properties. Rule 9.16.1 sets noise limits which must be complied with at the notional boundary of any dwelling. An assessment of noise effects was carried out by Marshall Day Acoustics for the applicant and peer reviewed by Acoustic Engineering Services Ltd on behalf of SDC. The assessment shows that the activity will fully comply with the district plan noise limits and will also comply with the more recent (2008) NZS6802:2008 noise standard, which is considered to be industry best practice. The assessment and peer review considered noise amenity effects on owners and occupiers of existing dwellings to be less than minor. In relation to potential new dwellings, a proposed condition of consent that the crusher is not operated within 400m of any dwelling will ensure that effects on these buildings will also be minor.

225. Critical mitigation factors are that only one crusher operates at any time, the crusher is operated no closer than 400m from any dwelling, crushing does not occur between 2000 and 0730 hours, and construction activities are undertaken in accordance with NZS6803:1999 Acoustics – Construction Noise and comply with the 'typical duration' noise limits within that Standard. Both Marshall Day and Acoustic Engineering Services Ltd also recommended noise limits of 55 dB L_{Aeq} between 0730 and 2000 hours in accordance with NZS6802:2008, and 40 dB L_{Aeq} between 2000 and 0730. This night time limit is more conservative than the NZS6802:2008 limit of 45 dB L_{Aeq} to reflect the relative quietness of the area.

226. We accept the noise assessment provided and agree that effects on neighbours will be minor and consistent with the District Plan provisions. The proposed mitigation measures are included in the conditions of consent.

Nuisance dust effects

227. The impact of dust from trucks on the unsealed Plantation Road was one of the key issues raised by submitters opposing the applications. Ms Thornley and Mr Deans noted increased time and costs for house maintenance and cleaning, and impacts on paddocks and stock feed. Ms Thornley, Mr Deans and Ms Irving all requested that Planation Road be sealed. Nuisance dust can also arise from activity on the quarry site, in particular from quarrying activity, deposition of fill, vehicle movements and stockpiled materials.

228. Both the operative and proposed district plans have objectives and policies concerned with maintaining the amenity of rural areas. Policy B3.4.16 in the operative plan is to mitigate nuisance effects on adjoining dwellings caused by dust from earthworks or stockpiled material. Objective 5.9 of the CARP is that offensive and objectionable effects and noxious or dangerous effects on the environment are generally avoided. Policy 6.1 of the CARP is that discharges to air do not cause (c) signicantly diminished visibility, or (d) significant soiling or corrosion of structures or property.

229. The effects of nuisance dust discharged from the quarry site was assessed in the Discharge to Air AEE and discussed in evidence for the Applicant by Mr Mongillo, and the effects from trucks travelling on unsealed roads was assessed by PDP Ltd (Mr Bluett).

Discharges from quarry and fill operations

230. The Discharge to Air AEE categorises nuisance dust from the quarry operation as being 'total suspended particulate' generally greater than 30 µm in diameter. Smaller particles are respirable and are discussed under dust health effects. The larger particle sizes generally do not travel further than 250m from source, even in high wind conditions (greater than 10m/s). The AEE notes that particles 100 µm or greater are likely to settle out within 55m at wind speeds of 10m/s. Smaller particles are unlikely to travel greater than 250m based on a recent study at the Yaldhurst Quarry zone, near Christchurch. The Yaldhurst site, which due to its scale has the potential to generate significantly more dust than Frew's proposed operation, generated levels of respirable dust (10 µm) 160-190m metres from the quarry zone that were similar to background levels measure 4,800m away.

231. Discharge of nuisance dust was assessed against the FIDOL criteria (frequency of dust events, intensity, duration, offensiveness of the discharge and location in relation to sensitive receptors). Mitigation proposed by Frews to minimise dust generation includes:

- stripping top soil and forming bunds in winter, when soil is damp;
- use of water dampening when required, including on site roads when wind speeds exceed 5 m/s;

- use of bunds around active quarry area;
- minimising drop heights for aggregate and fill;
- limiting the active working area at any time;
- crushing below ground level (ie. within the pit) whenever practicable;
- use of truck covers when transporting loads;
- a 20 km speed limit on site;
- regular road maintenance within the site to reduce the amount of fine material;
- limiting stockpile height and spraying stockpiles with water to form a crust.

232. The AEE concludes that considering each of the FIDOL factors, the quarry operation has a low potential of generating nuisance dust, providing dust management measures are implemented. Mr McCauley reviewed the AEE and generally agreed with this conclusion. However, he also commended that assessments of dust discharges from quarries are subject to substantial uncertainty as they (by necessity) are qualitative or semi-quantitative in nature and are highly reliant on proper implementation of mitigation practices. These practices are generally assumed to be effective at all times; however, in reality there are times when staff are not present to respond to increased dust discharges and meteorological conditions will occasionally occur such that it is impossible to prevent all discharges of dust. A realistic goal is therefore minimisation of dust, rather than no dust discharges. Uncertainty can, however, be mitigated by on-site monitoring and actions in response.

233. In addition to the mitigation proposed by the applicant, Mr McCauley recommended that if quarry operations are within 500m of an occupied dwelling (other than a dwelling on site or owned and occupied by the consent holder) then PM10 monitoring is undertaken, with alarms to alert the quarry operator when defined trigger values are exceeded. A management response would then be required to reduce the dust discharge.

234. We agree that this approach is prudent to ensure that discharges remain at an acceptable level. A consent condition has been included to require monitoring. The trigger levels will be included in the Air Quality Management Plan.

235. The issue of whether sufficient water will be available to properly manage dust emissions was raised by Mr McCauley. The application identifies that 100m^3/day is available on site; however, Mr McCauley assessed that demand may be up to 480m^3/day. The application indicates that an on-site water storage tank would be used to provide a buffer, and Mr Mongillo in evidence, stated that vegetable oil dust suppressant is also used. Frews also potentially has access to water from an adjoining site.

236. We agree that there are a number of options available to the applicant to source water, including trucking it in if necessary. Operations will be required to cease if insufficient water is available for dust suppression.

Dust from Plantation Road

237. Both Ms Thornley and Mr Deans gave a clear description of the impact of dust from trucks on Plantation Road on their properties. Both properties are located close to the intersection of Plantation Road and Bealey Road, a point where many of the trucks accessing the quarry will pass.

238. We do not doubt that dust is a significant issue at their properties and others nearby. The issue is whether the dust is primarily caused by quarry trucks using Plantation Road, or derives from other sources.

239. Mr Bluett's evidence was that dust impacts occur mainly within 400m of the source and that dust impacts from unsealed roads are unlikely beyond 250m. Small particles (less than 10 µm) have the potential to persist further, but their impact is minimal due to dispersion. Nine dwellings are located within 400m of Plantation Road, mostly clustered close to the intersection with Bealey Road to the south, and Hororata Road to the north. Four dwellings are located within 250m of the road.

240. Mr Bluett used the FIDOL method, combined with the Institute of Air Quality Management's (IAQM) source-receptor-pathway model, to assess effects. Mr Bluett assessed that:

    a. Sensitive receptors (ie. dwellings) will be downwind at times when wind speeds exceed 5 m/s between 1.3% and 4.7% of the time (113-415 hours per year). He described the assumption that high risk dust conditions occur at wind speeds greater than 5 m/s as conservative.

    b. Given the distance of the dwellings from the road, the pathway effectiveness is assessed as 'ineffective'. That is, there is a low risk that road dust will be carried to the dwellings. Large vehicles travelling greater than 50 km/hour on dry roads are considered a large potential dust source. The combination of an ineffective dust pathway and a large dust source gives an overall dust impact risk of 'low'.

    c. Based on wind data, theoretical exposure to a dust event lasting longer than 12 hours is predicted to occur once per year for two dwellings, and less than once per year for the others. The duration of dust impacts is therefore also considered to be low. The vast majority of dust events are expected it be limited to no more than one hour.

    d. Dust emissions from the road are considered to be moderate to low in terms of offensiveness.

241. The overall conclusion is that the likely impact from vehicles accessing the quarry is a low risk of a minor adverse event occurring at a small number of dwellings. While Mr Bluett acknowledged dust impacts on the submitter's dwellings, he considered they were likely to derive from other sources within the rural environment.

242. Mr McCauley provided a review of the assessment of effects and agreed with Mr Bluett's conclusion, based on current levels of quarry traffic. He also noted that

road dust tends to be fine material and in his experience in some conditions it can create substantial plumes. While these are generally localised, under some conditions (eg. dry conditions) it can travel further. He noted that Ms Thornley's house is 200m from Plantation Road and under some circumstances it could be subject to elevated dust levels from the road.

243. Frews have proposed developing a dust management plan to manage effects if adverse effects are greater than predicted or if additional dwellings locate within the sensitive area. Measures that Mr Bluett recommend should be included within a management plan include a voluntary speed limit of 20 km/hour along Plantation Road, use of a water truck to wet dusty sections of road, planting vegetation to provide shelter from the road and applying chemical dust suppressant.

244. While we have every sympathy with the submitters, the expert evidence we have received is that dust experienced at the majority of properties is in general unlikely to be due to road traffic on Plantation Road. However, it is clear from both Mr Bluett's and Mr McCauley's evidence that nuisance dust may on occasion (but not routinely) be an issue, particularly with properties closer to the road. With this in mind, we agree that dust management measures addressing emissions from Plantation Road are appropriate.

245. Mr Henderson, for SDC, had no concerns with a dust management plan being included within the conditions if it was proposed by the applicant. The applicant has proposed conditions to attach to consent RC195747 requiring a dust management plan to be prepared and certified by SDC. We have adopted these conditions.

Dust - health effects

246. Mr Bluett considered that health impacts related to the discharge of small particles in relation to road dust are not considered to be an issue[26]. We received no evidence to the contrary, and accept this.

247. The Discharge to Air AEE considered that general potential dust health effects from the quarry and managed fill are likely to be low because the proportion of respirable material in the discharge will be small and the material will be "biologically inert". Further, it considered that effects due to the discharge of respirable crystalline silica (RCS) are unlikely, primarily based on the Yaldhurst monitoring study discussed above. Crystalline silica is a common mineral that is found in construction materials such as sand, stone, concrete, brick, and mortar. When workers cut, grind, drill, or crush materials that contain it, very small dust particles are created. These tiny particles (known as "respirable" particles) can travel deep into workers' lungs and cause silicosis.

248. Mr McCauley audited the Discharge to Air AEE and generally agreed with the conclusions, particularly given the separation distances to existing sensitive receptors around the site. He also considered that overall, RCS discharges are likely to be insubstantial.

[26] Paragraph 13.4(c).

249. He considered that potential health impacts are not non existent, and achieving low level of effect is contingent on good site management. In this regard Mr McCauley recommended additional monitoring, which includes respirable particulate matter. His recommendations have been included as conditions of consent.

250. Mr McCauley's main health effect concerns were with respect to the disposal of ACM. These concerns were in regard to the sealing of ACM loads, and the inadequacy of placement of 100mm of immediate cover over deposited ACM.

251. ACM material will be double wrapped in plastic. Mr Mongillo clarified that the intent is not for the loads to be completely sealed when deposited, and that tears and punctures should be anticipated given the nature of the load and wrapping materials. Mr McCauley accepted that as this aligned with his practical understanding of the rigors of encapsulating, transporting and depositing such material. In Mr McCauley's view, this heightens the necessity of scrupulous management and mitigation, particularly to ensure that the loads are kept damp during deposition. He considered that the proposed management and mitigation practices should enable control of asbestos discharges as long as they are properly carried out.

252. Mr Mongillo clarified that 100 mm of immediate cover is an initial measure to prevent wind erosion of deposited material, and that as filling progresses this cover will be deepened to around 300 mm, to provide a better surface for subsequent vehicle movements.

253. The mitigation measures outlined in section 6.6 of the Discharge to Air AEE have been included in the conditions of consent, as recommended by Mr McCauley.

254. At the hearing, Mr McCauley stated that he was happy with the proposed set of conditions dated 31 May 2022 as he had appropriate input into them. These conditions followed through into the final set of proposed conditions in the Right of Reply and we have adopted them in our decision.

255. On the basis of the discussion above, and subject to the conditions of consent, we find that the dust health effects associated with the proposal will be minor.

Positive effects

256. The primary positive effect discussed by the applicant, raised in a number of submissions, and acknowledged by ECan officers, related to the provision of a Class 3 managed fill site that could accept contaminated soil, and avoid the need to deposit this elsewhere. Mr Mongillo described this as an urgent regional need. Existing alternatives are limited and include the Kate Valley regional landfill, a Class 1 facility designed and managed to receive signicantly more contaminated material. Depositing Class 3 waste will foreshorten the life of this landfill. The view expressed was that it should be reserved for more contaminated material. Deposition here is also expensive and a considerable distance north.

257. Other alternatives include Dunedin's Green Island Landfill, which is coming to the end of its life and is also a considerable distance away. Mr Mongillo's evidence was

that there are currently no other consented Class 3 or Class 4 landfills within Canterbury.

258. In addition, Ms Sullivan considered the proposal offers employment and likely some local economic stimulus. The controlled localisation of contaminated waste is also a clear positive environmental effect.

259. We accept these positive effects. However, we record that despite this urgent regional need, we would not grant consent unless we were satisfied that the effects of this proposal on the environment were appropriately avoided, remedied or mitigated and in accordance with relevant policy provisions.

Section 104(1)(b) - Policy Statements and Plans

260. The relevant planning instruments are identified in the application documents (see Planning Report) and the s42A reports. These are:

- National Policy Statement for Freshwater Management 2020 (NPS-FM)
- National Environmental Standards for Freshwater (NES-F)
- National Environmental Standards for Air Quality (NES-AQ)
- Canterbury Regional Policy Statement (RPS)
- Canterbury Land and Water Regional Plan (LWRP)
- Canterbury Air Regional Plan (CARP)
- Selwyn District Plan 2016 (SDP)
- Proposed Selwyn District Plan

261. The NES-F has been discussed earlier. Ms Sullivan advised that there are no provisions in the NES-AQ affecting this application. As neither NES contains objectives and policies they are not discussed further.

National Policy Statement for Freshwater Management

262. The NPS-FM has a single objective, to ensure that natural and physical resources are managed in a way that prioritises firstly the health and wellbeing of water bodies and freshwater ecosystems, secondly the health needs of people, and thirdly the social, economic and cultural wellbeing of people.

263. This reflects the over-arching concept of the NPS-FM, Te Mana o te Wai, which refers to the fundamental importance of water and recognises that protecting the health of the water protects the health and wellbeing of the wider environment. Te Mana o te Wai is relevant to all freshwater management.

264. Ms Sullivan and Mr Loe both assessed the application against the NPS-FM. Ms Sullivan's assessment was reliant on the views of ECan technical experts in relation to effects on water quality, and so generally considered the application inconsistent with relevant NPS-FM policies. In particular, she considered the application inconsistent with Policy 1, that freshwater is managed in a way that gives effect to Te Mana o Te Wai. Mr Loe's view was that the balance between

water, the wider environment and people will not be disrupted by this application, as the health and well-being of freshwater will be maintained by the safeguards built into the proposal.

265. We agree with Mr Loe and consider that the health and mauri of freshwater will be protected. While contaminants will be discharged to water, their levels are predicted to remain within the limits set out in the LWRP. The LWRP groundwater limits will be met at the property boundary, meaning that the discharge will not affect the use of the water by down-gradient users. While mana whenua have not been involved in the hearing, we have had regard to the iwi management plans in reaching our conclusions.

266. In making our decision we are prioritising the heath of the freshwater above the needs of people to provide for their social economic wellbeing, and so meeting the hierarchy of obligations outlined in Te Mana o Te Wai and Objective 1 of the NPS.

267. The issue of uncertain information was raised by Mr Loe. The NPS requires the use of the best information available at the time, when councils are setting target attribute states, limits on resource use and environmental flows and levels. What best information means is outlined in section 1.6. While, as noted by Ms Sullivan, the NPS does not explicitly refer to the use of the best information in relation to resource consent decisions, we consider the principles in section 1.6 also apply. Due to the nature of the activity, the assessment of effects is highly dependent upon modelling. The use of modelling is acceptable under section 1.6 in the absence of complete data, and provided that the most certain information is preferred, and all practicable steps have been taken to reduce uncertainty. As discussed above, we are satisfied with the modelling undertaken, and the use of other sources of information to review and confirm the modelling results. Most importantly, a robust monitoring process is proposed, with a requirement to act should contaminant levels exceed trigger levels.

Canterbury Regional Policy Statement (RPS)

268. We acknowledge Ms Sullivan's evidence that the RPS was prepared some time ago (2013), prior to the NPS-FM, LWRP and CARP. Consequently, she focussed her evidence on the two regional plans. We agree that issues are considered in more detail in the plans, but also note that the application is not inconsistent with relevant objectives and policies within the RPS, including:

    a. the sustainable management of fresh water (Objective 7.2.1 and supporting policies);

    b. protection of intrinsic values of water bodies (Objective 7.2.3. and supporting policies);

    c. integrated management of fresh water (Objective 7.2.4 and supporting policies);

    d. avoiding, remedying or mitigating localised effects of discharges on air quality (Objective 14.2.2 and supporting policies); and

e. minimising adverse effects of waste (Objective 19.2.2 and supporting policies).

Canterbury Land and Water Regional Plan

269. The LWRP, including proposed Plan Change 7 to the LWRP, contains a suite of objectives and policies concerned with managing water and land use in order to maintain or enhance water quality, the intrinsic values associated with water bodies and their riparian margins, and the ecosystems that they support. There are a number of relevant provisions related to the proposal, which are identified in the application and s42A report. The plan also recognises the importance of regionally significant infrastructure. The plan was prepared prior to the most recent version of the NPS-FM taking effect; however, it includes the policies required to be inserted by the NPS-FM. It gives effect to the RPS.

270. As noted earlier, a key policy for our consideration is Policy 4.7 which reads "Resource consents for new or existing activities will not be granted if the granting would cause a water quality or quantity limit set in Sections 6 to 15 to be breached or further over allocation (water quality and/or water quantity) to occur or in the absence of any water quality standards in Sections 6 to 15, the limits set in Schedule 8 to be breached." Policy 4.4 (d) is that groundwater is managed so that overall water quality does not decline.

271. Section 11 of the LWRP includes Table 11(m) (Limits for groundwater), which apply within the Selwyn Te-Waihora area and prevail over the limits in Schedule 8. For all contaminants other than *E.coli* and nitrate nitrogen, the limit is <50% MAV (listed in NZ Drinking-water Standards). Schedule 5, Table S5B, includes numerical standards for protection of aquatic organisms, for surface water receiving bodies. These limits are included as consent conditions. On the basis of the evidence we received, we consider that the LWRP quality limits will not be breached.

272. In addition, and as discussed earlier, Policy 4.14 requires that discharges should not exceed the natural capacity of the soil to treat or remove the contaminant, and where this is not practicable, must utilise the best practicable option to ensure that any contaminant plume is as small as reasonably practicable. We consider that the modelling shows that this will occur.

273. Ms Sullivan considered that Policy 4.19, which is that the discharge of contaminants to groundwater from waste disposal sites is avoided or minimised by ensuring that activities are sited, designed and manged to avoid contamination of groundwater, will not be met. The (in)appropriateness of the location and design of the fill site (without a liner) was raised by ECan technical experts. As discussed above, we are satisfied based on the evidence we received that the modelling shows that effects of the proposal in this location, with conditions as proposed (including WAC limits and a managed fill cap), will have no more than minor effects on groundwater quality.

274. Likewise, in relation to Policy 4.26, the modelling predicts that adverse effects beyond the boundary of the site will be avoided.

275. In relation to policies in Section 11, a number of which focus on the importance of maintaining and improving water quality in Te Waihora / Lake Ellesmere and its sources, as noted above we are satisfied that water quality limits will not be breached, and the quality of water in the Selwyn River, and downstream in Te Waihora, will not be adversely affected.

276. Overall, we find that the relevant objectives and policies of the LWRP will be met.

Canterbury Air Regional Plan (CARP)

277. The CARP contains a suite of objectives and policies to protect the life-supporting capacity of the air and ensure that amenity values are maintained.

278. Both Ms Sullivan and Mr Loe assessed the proposal against the relevant objectives and policies and concluded that the proposal was consistent with the plan. Mitigation measures have been put in place to avoid localised effects of discharge to air, particularly from dust, including asbestos fibres.

279. We agree with the assessments made.

Selwyn District Plan 2016 and Proposed Selwyn District Plan

280. The key objectives and policies of the SDP and proposed district plan have been discussed earlier. A thorough assessment was undertaken by Mr Loe for the applicant and Mr Henderson for SDC. These assessments both conclude that the application is consistent with the relevant provisions. We agree.

Section 104(1)(c) - any other matters

281. We have had regard to the relevant Iwi Management Plans and the WasteMINZ Guidelines under section 104(1)(c). These matters are discussed further below.

Iwi management plans

282. There are two relevant iwi management plans, the Mahaanui Iwi Management Plan (MIMP) and the Ngāi Tahu Freshwater Policy Statement.

283. The Ngāi Tahu Freshwater Policy Statement focuses on restoring and protecting the mauri of freshwater resources, maintaining healthy mahinga kai populations and habitats and enabling kaitiakitanga. The MIMP outlines issues and policy in relation to wai Māori, land use activities and restoration of indigenous biodiversity.

284. Contamination of ground and surface water is contrary to the policies of the MIMP. As discussed above, an assessment of the proposal against the policies of the MIMP was undertaken by Mahaanui Kurataiao Ltd. This raised potential concerns in relation to impacts on aquifers and Te Waihora / Lake Ellesmere.

285. However, on the basis of the discussion above, and subject to the conditions of consent (particularly the WAC, capping, monitoring, trigger level and compliance limit conditions), we consider that the adverse effects of the proposal on groundwater and surface water will be appropriately managed such that adverse

effects will be minor. In our view, the activity will not be contrary to the objectives and policies of the Iwi Management Plans.

Technical Guidelines for Disposal to Land 2018

286. The Waste MINZ Guideline 2018 replaced the Guide to the Management of Cleanfills (2002).

287. The stated purpose of the Waste MINZ Guideline 2018 is:

> *To provide technical guidance relating to the siting, design, operation and monitoring of landfills in New Zealand, based on local and international experience.*

288. The Guidelines define a Managed Fill site as a Class 3 landfill that accepts only clean fill material, controlled fill material and managed fill material.

289. Furthermore it defines Managed Fill Material as:

> *Predominantly clean fill material and controlled fill material that may also contain material with contaminant concentrations in excess of controlled fill limits where site specific management controls are in place to manage discharges to the environment.*

290. The Guidelines state that they do not reduce the necessity for the development of site-specific requirements for investigations, design, operations and monitoring. In addition, they acknowledge that the final decision on site-specific requirements for a landfill are to be made by the appropriate regulatory authority under the provisions of the Resource Management Act (1991).

291. We have given careful consideration to the evidence that refers to the Guidelines and consider that they have been utilised appropriately by the relevant technical experts we heard.

292. The proposal includes an appropriate level of site specific investigation and design. The consent conditions provide for effective monitoring and management of air and water quality effects.

293. We have included site specific acceptable waste material in the conditions of consent (refer Schedule CRC201182A) and consider that the management framework provided by the consent conditions will appropriately manage discharges to the environment.

294. Overall, we consider that our decision is consistent with the Guidelines.

SECTION 104D

295. Ms Sullivan considered that it is appropriate to bundle the ECan consents given that the activities are all tightly linked to the overall operation of the quarry and managed fill, with an overall activity status being discretionary.

296. The SDC land use consent has been assessed as a non-complying activity. Whilst we heard the application under a joint hearing process, no suggestion was made that the applications for consent from the both councils should be bundled together with one overall activity status. Hence, the section 104D test is only relevant to the SDC land use consent.

297. Section 104D requires that we may only grant a resource consent for a non-complying activity if we are satisfied that either:

a. adverse effects of the activity on the environment will be minor; or

b. the application is for an activity that will not be contrary to the objectives and policies of –

(i) the relevant plan, if there is a plan but no proposed plan in respect of the activity; or

(ii) the relevant proposed plan, if there is a proposed plan but no relevant plan in respect of the activity; or

(iii) both the relevant plan and the relevant proposed plan, if there is a plan and a proposed plan in respect of the activity."

298. Under section 104(1)(a) the test is whether the adverse effects as proposed to be remedied and/or mitigated are more than minor.

299. We have concluded that the effects of the activities to be authorised under the SDC consent individually will be minor, with the exception of effects on landscape values, which will be minor to moderate for local residents. This includes effects on noise, dust, traffic, shading and landscape issues. Mr Henderson explains in his s42A report[27] that while the District Plan contains rules managing the deposition of solid waste, these are included to manage effects such as noise, vermin and odour. Effects on groundwater are under the control of the Regional Council. Mr Henderson concluded that the adverse effects on matters within the jurisdiction of the District Plan in relation to the deposition of waste are no more than minor, with the exception of the effects on landscape character and visual amenity, which were assessed by Ms Annan as being minor to moderate.

300. Consequently, we consider that the 104(1)(a) test cannot be met.

301. Section 104D(1)(b) requires that the activity is not contrary to the relevant objectives and policies of both the operative and proposed district plans. As discussed above, Mr Henderson has undertaken thorough assessments of the

[27] Paras 78-86, Selwyn District Council s42A Report

proposal again the provisions of the two plans. He concludes that the proposal is not contrary to the provisions of either plan.

302. We agree with this assessment. The proposal therefore meets the test in s104(1)(b) and can be granted.

SECTIONS 105(1) AND SECTION 107 – MATTERS RELEVANT TO DISCHARGE APPLICATIONS

303. **Section 105** requires that when considering an application for a discharge permit, regard must be had to:

a. the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and

b. the applicant's reasons for the proposed choice; and

c. any possible alternative methods of discharge, including discharge into any other receiving environment.

304. The nature of the discharge and sensitivity of the receiving environment have been discussed earlier. Possible alternatives to the discharge proposal include lining the pit prior to discharge and collecting the leachate, and using an alternative location. We note that liners are not promoted for Class 3 facilities by the WasteMINZ guidelines. Liners have finite lifetimes and are considered unnecessary as the primary management of effects for Class 3 landfills is through appropriate site selection and waste acceptance criteria.

305. The site chosen is the site of an existing quarrying and cleanfill operation. The applicant also notes its distance from sensitive receptors, particularly surface water sources and the coast, and its relative proximity to Christchurch.

306. The waste acceptance criteria have been discussed above and our conclusion is that the effects of the proposal with the attached conditions are acceptable.

307. **Section 107** prevents granting discharge permits if certain effects will arise after reasonable mixing. A consent authority may grant a discharge permit that gives rise to these effects where there are exceptional circumstances, the discharge is temporary, or it is associated with necessary maintenance work.

308. The effects of concern include the production of oil and grease films, a change in colour or clarity, odour, rendering water unsuitable for consumption by farm animals, and significant adverse effects on aquatic life.

309. We have considered the effects of the discharge on water quality in detail above, and conclude that subject to the conditions we have imposed, including the WAC and compliance limits, the effects listed in section 107 will not arise.

PART II OF THE RESOURCE MANAGEMENT ACT 1991

310. Consideration of an application under s 104 is 'subject to Part 2' RMA. In *Davidson*[28] the Court of Appeal determined that:

a. in contrast to plan change processes, RMA decision-makers should usually consider Part 2 when making decisions on resource consents (that is the implication of the words 'subject to Part 2' in s 104);

b. where the relevant plan provisions have clearly given effect to Part 2, there may be no need to do so as it "*would not add anything to the evaluative exercise*". It would be inconsistent with the scheme of the RMA to override those plan provisions through recourse to Part 2;

c. use of conditional language ("may") suggests a residual discretion to consider Part 2 RMA.

311. Ms Sullivan stated that the CARP and the LWRP are operative plans prepared in a manner that reflects the provisions of Part 2. Therefore, she was satisfied that the relevant regional plans give effect to the relevant provisions of the higher order instruments and did not resort directly back to Part 2 when making her recommendations.

312. Mr Loe's planning assessment considered that Part 2 was relevant to all consents. Mr Henderson also considered it to be relevant.

313. We consider Part 2 for completeness.

Section 6, 7 and 8

314. Sections 6 and 7 identify matters that must be recognised and provided for, and matters to which particular regard should be had. Section 8 requires that the principles of the Treaty of Waitangi are taken into account. Of particular relevance are sections:

- 6(e) - the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu and other taonga
- 7(a) – kaitiakitanga
- 7(b) - the efficient use and development of natural and physical resources
- 7(c) – the maintenance and enhancement of ecosystems
- 7(d) - the intrinsic values of ecosystems
- 7(f) - maintenance and enhancement of the quality of the environment, and
- Section 8

315. The effects on these matters have been discussed earlier.

[28] RJ Davidson Family Trust v Marlborough District Council [2018] NZCA 316

316. Mr Henderson considered that the proposed activity is consistent with section 7 (b), (c), (f) as it will enable the efficient use and development of an important aggregate resource, while not adversely affecting amenity values or the quality of the overall environment. We accept this.

317. The purpose of the Act is to promote the sustainable management of natural and physical resources. Sustainable management involves managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety. However, the Act promotes the use and development of natural resources only while:

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil and ecosystems; and

(c) avoiding, remedying or mitigating any adverse effects of activities on the environment.

318. In light of our findings on effects and the proposal's consistency with relevant planning documents, we consider that the activity meets the purpose of the Act.

DURATION

319. We note that under section 123, the land use consents under consideration (which relate to section 9 of the Act) may be granted for an unlimited duration. The discharge consents may be granted for a maximum period of 35 years.

320. The applicant requested a duration of 35 years. Mr Cleary, in closing submissions, noted that the LWRP does not include a policy basis for consent durations shorter than 35 years, except for certain farming activities. Ms Sullivan, in her summary statement at the hearing, stated that if we decide to grant the consents, a 15 year duration would be appropriate for the discharge to land (CRC201182). This would allow for a re-assessment of effects based on monitoring results and ground-truthed modelling.

321. She also considered that 35 years, or alternatively an unlimited duration, would be appropriate for the land use consent, CRC201808. This would provide for ongoing monitoring to be carried out.

322. She noted that it is common to rely on a review of consent conditions to manage any unanticipated effects of longer-duration consents. She considered this to be inappropriate in this case because, if significant adverse effects are observed, it would take time to gather information and undertake a review. In addition, a review cannot have the effect of cancelling a consent. It could not, therefore, require the closure of the managed fill operation.

323. We agree to some extent. While we acknowledge this concern, conditions are imposed designed to detect any reduction in water quality, and if so, a process must commence that will investigate and address the issue. The outcome could include cessation of discharge and immediate closure, if necessary. However, we note that the application is based on modelling, and while we accept this as being

highly conservative, there is always the potential that it is not correct. We also note that some contaminants are predicted to move slowly, and so (if they are moving through the aquifer) may not be apparent in monitoring data in the first few years.

324. Therefore we consider that a re-assessment of effects, with the ability to consider up-to-date monitoring data and to use this to improve the modelling process, would be prudent to confirm that effects will be as predicted over the longer-term. The most effective way of doing this is to set an earlier expiry date for the consent, requiring a re-assessment of the effects. We have therefore granted the discharge to land consent for 20 years. This duration should provide sufficient certainty to the applicant and enable investment, while providing for a 'check' on effects almost mid-way through the proposed life of the quarry.

325. The two land use consents are not limited in duration, to provide for ongoing monitoring once deposition has ceased.

326. While we have no particular concerns about the effects of the air discharge consent over a longer duration, we have also granted that for 20 years to be consistent with the discharge to land permit, so the operation can be reconsidered at one time.

CONDITIONS

327. Following discussion at the hearing, the applicant provided a revised set of conditions. We have generally accepted those conditions. Where changes are made, these have in most cases been discussed above.

328. We have made changes to more clearly link the consents together. As the ECan land use consent (CRC201808) will endure once deposition has ceased, in order to provide for continued monitoring of water quality and the managed fill cap, conditions relating to the site management plan, monitoring conditions and the bond are attached to that consent, rather than the discharge to land consent. However, they are clearly also relevant to the discharge consent, and so the conditions of that consent refer to CRC201808.

Site closure and bond conditions

329. Following discussion at the hearing, bond conditions were proposed by the applicant to ensure that in the event of any default by the consent holder, the conditions of consent would continue to be complied with, in particular the need for groundwater quality monitoring and potentially remediation, and installation and ongoing maintenance of the managed fill cap, which is a critical part of the proposed mitigation.

330. Discussion at the reconvened hearing identified that a joint bond between both Environment Canterbury and Selwyn District Council was preferred as more efficient. We have generally accepted the bond conditions as proposed. One critical aspect is the trigger for release of the bond. The proposed conditions required that the bond is released once the site has been rehabilitated, required groundwater monitoring undertaken and any response to groundwater contamination has been addressed.

331. Conditions outlining the process for site closure were also proposed. These indicated that a Closure Management Plan must be prepared not less than one prior to the permanent cessation of quarrying the managed fill operations. The Closure Management Plan would address installation, monitoring and maintenance of the managed fill cap, site restoration and landscaping, groundwater monitoring and maintenance of groundwater wells, responses to seismic events and responses to water quality trigger level exceedances including remediation if required.

332. In response to a question about the appropriateness of proposed conditions detailing when the site is formally closed, both ECan and Ms Thornley suggested that the bond be held for a specified period following cessation of managed fill, to ensure that any future effects on water quality from the operation are identified and remediated. Ms Thornley proposed ten years; ECan proposed 50 years.

333. We agree and envisage, as we think has the applicant, that monitoring of the cap and water quality, and remediation if required, will occur after filling had ceased.

334. On this basis, we consider that the bond should not be released until the site has been determined to be "closed" by the consent authority in accordance with criteria in the Closure Management Plan. We do not think it appropriate to specify a fixed period identifying when the site is closed in the consent conditions, as we have no information on which to base that period. ECan officers' comment that ECan is dealing with historical landfills that have been closed for 30 may or may not be relevant to this situation, as management of landfills 30 years ago was likely to be less stringent than proposed here, and we have no information on the type of material deposited or the specific situation.

335. The Closure Management Plan must include a programme of groundwater monitoring. We consider that this should specify the test needed to be met for monitoring to cease, for example that water quality does not exceed the trigger levels and is stable for a specified period, which may be supported by modelling based on known levels of deposition and water quality data collected to that point. We cannot determine this test based on the evidence provided. We have worded the conditions to reflect this.

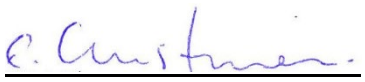
336. The applicant also proposed a condition allowing partial release of the bond once the managed fill cap had been installed and the site rehabilitated. We consider this is reasonable and have included this approach in the conditions.

DECISION

337. For the reasons given above we grant the consents applied for, for a duration of 20 years for the discharge permits, subject to the conditions in Annexure A.

DATED the 13 August 2022

Signed:



E Christmas, Chair

C Welsh, Independent Hearing Commissioner

Annexure A