

Continuation of Earthquake Waste Processing and Disposal Activities at the Burwood Resource Recovery Park and Burwood Landfill

Assessment of Effects on the Environment

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Executive Summary

The Burwood Resource Recovery Park (recovery park) was urgently established adjacent to Burwood Landfill following the Canterbury earthquake events of 2010-2011. The recovery park provides a facility for the receipt of earthquake waste from the demolition of commercial and residential buildings, and the subsequent sorting and recovery of reusable materials. Burwood Landfill (the landfill), formerly the municipal landfill for Christchurch, was subsequently re-opened with a new and separate cell to provide for the disposal of the residual waste stream from the recovery park, as well as other earthquake wastes such as infrastructure hardfill and sludge from the wastewater network.

In September 2012, Burwood Resource Recovery Park Limited (BRRP Ltd) and the Christchurch City Council (the Council) were granted resource consents under the Resource Management Act 1991 (RMA) for the processing and disposal of earthquake waste at the BRRP and landfill respectively. These consents expire in September 2017, which was determined based on various projections made in 2012. However, three years on it is now apparent that these projections were underestimated due to:

- Higher-than-expected volumes of earthquake waste generation;
- Lower-than expected recovery rate of bulk reusable material at the recovery park; and
- Lower-than-expected waste density due in part to the large volumes of wood in the residual waste arising from the recycling/recovery operation.

In addition, a recent fire in a recovered timber stockpile at the landfill and the subsequent remediation exercise for fire management has foreclosed the existing ability to dispose of the recovery park waste stream, and by implication, brought the recovery operations to a halt. An urgent solution is needed to address this situation.

Consequently there is a need to extend the duration of the recovery park and landfill operations beyond September 2017, and to create further disposal options within the landfill footprint. Based on current (2015) projections it is anticipated that earthquake waste processing and disposal activities will have ceased by the end of 2020. Rehabilitation and landscaping activities would occur progressively throughout that period and be fully completed by 31 December 2021.

In summary, resource consents are sought by BRRP Ltd and the Council to:

- 1) Continue earthquake waste processing activities (at Site B) until 31 December 2020;
- 2) Extend the existing waste cell (at Site A) to provide for disposal capacity of up to 160,000 tonnes of residual earthquake waste from the recovery park; close by 31 December 2020;
- 3) Develop a new earthquake waste cell (at Site G) to provide for disposal capacity of up to 540,000 tonnes of residual earthquake waste from the recovery park; close by 31 December 2020;
- 4) Continue the temporary storage (until 31 December 2020) of sensitive demolition materials (at Site D) sourced from buildings where human lives were lost during the earthquake events;
- 5) Continue the infrastructure hardfill and soil disposal (at Site F) until 31 December 2020; and
- 6) Rehabilitate all sites; complete by 31 December 2021.

Due to various statutory interventions initiated under the Canterbury Earthquake Recovery Act 2011 following the earthquake events, the key activities associated with the proposals have a controlled non-notified activity status. This means that the relevant resource consents must be granted (subject to conditions to manage environmental effects) and that only certain identified parties are invited to provide written comments on the proposals.

BRRP Ltd and the Council have consulted with key stakeholders and local residents. The most significant feedback received related to proposed Site G and its proximity to the residential area, as well as potential impacts on existing access tracks used for recreation. A strong preference for permanent disposal at Site B, rather than Site G, was expressed. BRRP Ltd and the Council acknowledge the concerns about Site G. Based on the feedback received both parties have subsequently made the commitment to pursue Site B for permanent disposal with the relevant authorities. Subject to obtaining all of the necessary authorisations for Site B, Site G would not proceed.

However, the authorisations for permanent disposal at Site B will require changes to the regional and district plans. This will require political support within the Canterbury Regional Council and the Christchurch City Council, and then approval by the Minister for Canterbury Earthquake Recovery under the Canterbury Earthquake

Recovery Act 2011. Resource consents and a further consultation process will then likely be required. Finally, the underlying reserve status of Site B will likely need to be amended.

Due to the uncertainty of timing and outcome in obtaining authorisations for permanent disposal at Site B, the use of Site G cannot be ruled out. Hence the resource consents for Site G will continue to be pursued at the current time. However, as above, BRRP Ltd and the Council will not develop Site G until an outcome for whether Site B can be used for permanent disposal is known. With approximately 10–12 months disposal capacity available in the Site A extension, there is sufficient time for Site B to be pursued before a further permanent disposal option is needed (i.e. Site B or G).

The environmental assessments undertaken in support of the 2012 resource consents have been comprehensively updated to the current proposals and circumstances. Broadly any adverse environmental effects are considered to be similar to that considered in 2012, albeit they will occur over a longer period than originally envisaged, and in the case of Site G, in a new area of the existing landfill site. The following are some key highlights of the current proposals:

- All environmental mitigation specified in the conditions of the existing resource consents, as developed with the community and consent authorities in 2012, are proposed to be rolled over into the new consents (except where modifications are required to address the current proposals or circumstances);
- Only building demolition material continues to be accepted at the BRRP; this material is cleared of general domestic refuse or any hazardous waste prior to entering the recovery park;
- The weekly hours of operation will be reduced, relative to the currently authorised activity, by 30 hours (proposed hours are 6am to 6pm Monday to Friday, 6am to 12pm Saturday and closed on Sunday and public holidays);
- Average monthly heavy vehicle movements to the sites have reduced by over 33% since the peak in mid to late 2014 and are expected to continue tailing off;
- The presence of the existing municipal waste landfill, and the hydrogeological characteristics of the underlying land, mean the sites are ideally suited to managing leachate and any water quality effects, to the extent that contact recreational standards in the receiving coastal environment can continue to be met;
- There are no potable water supplies affected by the activities;
- Operations at Site P (sludge ponds) will be closed by September 2017 and transferred to the Christchurch Wastewater Treatment Plant at Bromley;
- The development of Site G will commence at its northern end (furthest distance from residential area) and proceed south as incoming waste volumes require; the existing area of pine trees, and the existing recreational access tracks, will only be removed if and when required;
- In the event that the existing recreational access track in the footprint of Site G need to be removed, public access will continue to be provided around the southern extent of the landfill site;
- Progressive rehabilitation of the sites will provide the opportunity for some areas of the landfill to be made available to the public for passive recreation prior to the completion of operations in December 2020 (subject to health and safety requirements);
- The activities generally comply with permitted activity standards relating to noise and traffic;
- The landscape rehabilitation plan previously developed for the landfill will be updated to take account of the reconfigured site following development of the new waste cells (Site A extension and Site G); and
- The comprehensive management plans prepared for the 2012 consents, and subsequently implemented, have also been updated and will be incorporated into the current applications.

Overall, the proposals will continue to serve a significant and beneficial role in the efficient and cost-effective recovery of Christchurch following the 2010-11 earthquake events. It is acknowledged that there will continue to be some localised effects on the community and users of Bottle Lake Forest Park, but that these effects can be managed through appropriate consent conditions.

Abbreviations used in this report

Abbreviation	Description
AEE	Assessment of Effects on the Environment
BRRP Ltd	Burwood Resource Recovery Park Limited
C&D	Construction and demolition (waste)
CER Act	Canterbury Earthquake Recovery Act 2011
City Plan	Christchurch City District Plan (operative)
CCC	Christchurch City Council
ECan	Environment Canterbury / Canterbury Regional Council
ha	Hectare
H ₂ S	Hydrogen sulphide
km	Kilometre
LURP	Land Use Recovery Plan
MSW	Municipal solid waste
NES Air	Resource Management (National Environmental Standards for Air Quality) Regulations 2004
NES Soil	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NRRP	Natural Resources Regional Plan
OIC	Canterbury Earthquake (Resource Management Act—Burwood Resource Recovery Park) Order 2011 (Order in Council)
LWRP	Canterbury Land and Water Regional Plan (partially operative)
RAP	Remedial Action Plan
Recovery park	Burwood Resource Recovery Park
Recovery Strategy	Greater Christchurch Recovery Strategy
Replacement City Plan	Christchurch City District Plan (proposed)
RMA	Resource Management Act 1991

1.0 Introduction

1.1 Background

The Burwood Resource Recovery Park (recovery park) was urgently established adjacent to Burwood Landfill following the Canterbury earthquake events of 2010-2011. The recovery park provides a facility for the receipt of earthquake waste from the demolition of commercial and residential buildings, and the subsequent sorting and recovery of reusable materials.

Burwood Landfill (the landfill), formerly the municipal landfill for Christchurch, was subsequently re-opened to provide for the disposal of the residual waste stream from the recovery park; a new cell was developed for this purpose. The landfill also accepted other earthquake wastes such as infrastructure hardfill and sludge from the sewer network.

In September 2012, Burwood Resource Recovery Park Limited (BRRP Ltd) and the Christchurch City Council (CCC) were granted resource consents under the Resource Management Act 1991 (RMA) for the processing and disposal of earthquake waste at the BRRP and landfill respectively. These consents have an expiry date of September 2017, which was determined based on various projections made in 2012. However, three years on it is now apparent that these projections were underestimated due to:

- Higher-than-expected volumes of earthquake waste generation;
- Lower-than expected recovery rate of bulk reusable material at the recovery park; and
- Lower-than-expected waste density due in part to the large volumes of wood in the residual waste arising from the recycling/recovery operation.

In addition, a recent fire in a recovered timber stockpile at the landfill and the subsequent remediation exercise for fire management has foreclosed the existing ability to dispose of the recovery park waste stream, and by implication, brought the recovery operations to a halt. An urgent solution is needed to address this situation.

Consequently there is a need to extend the duration of the recovery park and landfill operations beyond September 2017, and to create further disposal options within the landfill footprint. Based on current (2015) projections it is anticipated that earthquake waste processing and disposal activities will have ceased by the end of 2020. Rehabilitation and landscaping activities would occur progressively throughout that period and be fully completed by 31 December 2021.

1.2 Overview of the proposal

In summary, resource consents are sought by BRRP Ltd and the Council to:

- 1) Continue earthquake waste processing activities (at Site B) until 31 December 2020;
- 2) Extend the existing waste cell (at Site A) to provide for disposal capacity of up to 160,000 tonnes of residual earthquake waste from the recovery park; close by 31 December 2020;
- 3) Develop a new earthquake waste cell (at Site G) to provide for disposal capacity of up to 540,000 tonnes of residual earthquake waste from the recovery park; close by 31 December 2020;
- 4) Continue the temporary storage (until 31 December 2020) of sensitive demolition materials (at Site D) sourced from buildings where human lives were lost during the earthquake events;
- 5) Continue the infrastructure hardfill and soil disposal (at Site F) until 31 December 2020; and
- 6) Rehabilitate all sites; complete by 31 December 2021.

The existing sludge pond operations (at Site P) will continue until September 2017 under existing resource consents. Prior to that date the site will be closed with any residual activity transferring to the Christchurch Wastewater Treatment Plant at Bromley.

The location of the sites is illustrated in Figure 1 overleaf. A full description of the proposal is contained in Section 3 of this report.

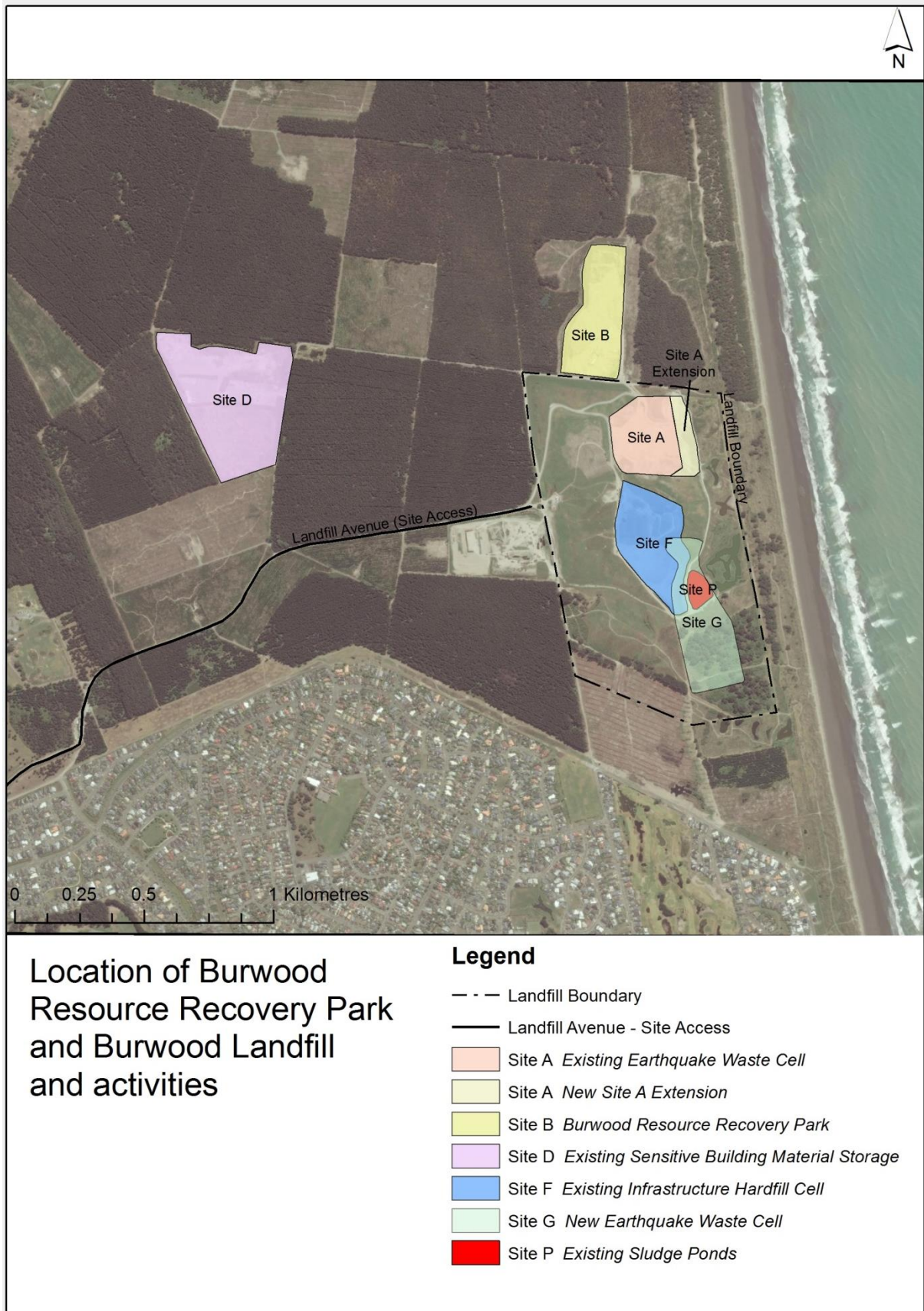


Figure 1 Location of Burwood Resource Recovery Park and Burwood Landfill and activities

1.3 The applicants

1.3.1 Burwood Resource Recovery Park Limited

BRRP Ltd is the applicant for those resource consents relating to the recovery park, i.e. Sites B and D. BRRP Ltd operate the recovery park and hold a lease for the site (which is owned by the Council). BRRP Ltd currently hold the resource consents referred to in Table 1 below. BRRP Ltd will also be responsible, on behalf of the CCC, for constructing and managing the earthquake waste disposal activities in the Burwood Landfill footprint (under the resource consents held by CCC).

BRRP is owned by Transwaste Canterbury Limited, which is a joint venture between Waste Management NZ Limited and five territorial authorities in the Canterbury region, being the Council, and Ashburton, Selwyn, Waimakariri and Hurunui District Councils.

1.3.2 Christchurch City Council

The CCC, as owner and existing consent holder for the former municipal landfill, and as consent holder for the consents identified in Table 2 below, is the applicant for those resource consents relating to the landfill, i.e. Sites A, F, and G.

1.4 Resource consents sought

Tables 1 and 2 below identify the resource consents respectively sought by BRRP Ltd and CCC. Upon granting the new consents they will fully replace and supersede the existing consents, with the existing consents being surrendered. However, please note that in the case of Site P the existing consents will need to be retained to allow continued operation until current consent expiry in September 2017, or otherwise the conditions will need to be transferred into the relevant consents below.

Table 1 Resource consents sought by BRRP Ltd (recovery park – Sites B and D)

Consent type	Existing consent	Activity for which new consent is sought	Duration sought
Environment Canterbury			
Water permit	CRC130062	Take and use groundwater for dust suppression and potable supply at Site B	Operations cease by 31 December 2020 Landscaping and rehabilitation complete by 31 December 2021
Discharge permit	CRC130060	Discharge leachate and stormwater onto or into land where contaminants may enter groundwater at Sites B and D	
Discharge permit	CRC130061	Discharge contaminants (dust and odour) to air at Sites B and D	
Christchurch City Council			
Land use	RMA92020447	Continue existing recovery park operations (earthquake waste processing) and all ancillary activities at Sites B and D	Operations cease by 31 December 2020 Landscaping and rehabilitation complete by 31 December 2021

Table 2 Resource consents sought by the Council (landfill – Sites A, F, and G)

Consent type	Existing consent	Activity for which new consent is sought	Duration sought
Environment Canterbury			
Land use	n/a	Excavation, deposition, capping and rehabilitation earthworks at Sites A , F, and G	Operations ceased by 31 December 2020 Landscaping and rehabilitation complete by 31 December 2021
Discharge permit	CRC130055 (Site A) and CRC130058 (Sites F and P)	1. Discharge contaminants from earthquake waste (waste stream from recovery park) to land in circumstances where they may enter water at Sites A and G 2. Discharge earthquake waste (infrastructure hardfill and soils) to land in circumstances where they may enter water at Site F 3. To discharge stormwater to land at Sites A, F, and G.	31 March 2037
Discharge permit	CRC130055 (Site A) and CRC130058 (Sites F and P)	To discharge contaminants (principally dust and odour) to air from activities at Sites A, F, and G.	Operations ceased by 31 December 2020 Landscaping and rehabilitation complete by 31 December 2021
Christchurch City Council			
Land use	RMA92020450 (Site A, F and P)	To use land at Sites A, F, and G to deposit earthquake waste to land and all ancillary activities.	Operations ceased by 31 December 2020 Landscaping and rehabilitation complete by 31 December 2021

Notes to Tables 1 and 2:

- Although the recovery park, earthquake waste disposal, and rehabilitation activities are proposed to cease by 31 December 2021, the duration of the discharge permit for the waste cells needs to extend to 31 March 2037 to allow for the ongoing passive discharge of contaminants (leachate and stormwater). This date matches the expiry of the existing municipal landfill discharge permit (CRC011364.3).
- Existing consents for Site A include CRC130056 and CRC130057, which relate to a contingency groundwater interceptor trench already installed beneath the existing Site A cell. CRC130056 (land use consent) does not need to be replaced as it relates to construction which has already been completed. CRC130057 provides for groundwater/leachate removal to 31 March 2037. Additional interceptor trenches are not proposed for the Site A extension and Site G.
- Existing consent CRC130059 for Site B, relating to the use and storage of hydrocarbons to run plant and machinery, is no longer required as it is a permitted activity.

1.5 Activity status and processing

All activities relating to the recovery park operations (Sites B and D) are a controlled non-notified activity under the *Canterbury Earthquake (Resource Management Act—Burwood Resource Recovery Park) Order 2011* (OIC). The discharge of contaminants to land from the disposal of earthquake waste and stormwater in the landfill footprint (at Sites A, F and G) is a controlled non-notified activity under the Christchurch City Plan (City Plan) and Land and Water Regional Plan (LWRP).

The controlled non-notified activity status means:

- The resource consents must be granted;
- Conditions can only be imposed on those matters to which the consent authorities have reserved control; and
- Public or limited notification does not occur, submissions cannot be made for or against the proposal, no public hearing is held, and no appeal can be made.

Further discussion on activity status, including for ancillary activities, is contained in Section 6 of this report.

1.6 This AEE

This Assessment of Effects on the Environment (AEE) has been prepared in accordance with Schedule 4 of the RMA. The level of detail provided corresponds with the scale and significance of environmental effects under consideration. The remainder of this AEE is set out as follows:

- Section 2** Site location, site history, and environmental setting.
- Section 3** Detailed description of the proposal and consideration of alternatives.
- Section 4** Consultation undertaken with stakeholders.
- Section 5** An assessment of the environmental effects of the proposal.
- Section 6** An assessment of the proposal against the relevant statutory framework.
- Section 7** Conclusions.

The following appendices are attached in support of this AEE:

- Appendix A** Drawings for Sites A and G
- Appendix B** Water Quality Report
- Appendix C** Air Quality Report
- Appendix D** Noise Assessment
- Appendix E** Cultural Impact Assessment
- Appendix F** Concept Landscape Plan
- Appendix G** Management Plan
- Appendix H** Consultation Material
- Appendix I** Written Comments
- Appendix J** Response to Written Comments
- Appendix K** Proposed Consent Conditions

2.0 Site description

2.1 Location

The recovery park and landfill are located within the Bottle Lake Forest Park, approximately 9 km north-east of the Christchurch city centre. The sites are located approximately 400 m west of the coastal foreshore and mean high water springs, with coastal dunes occupying the space in between. Figure 1 in the previous section illustrates the general locality of the site.

2.2 History

The recovery park was established in 2011 following the Canterbury earthquake events. Prior to its establishment the land was used for forestry and recreational purposes associated with the Bottle Lake Forest Park.

Burwood Landfill was the principal refuse facility for Christchurch from July 1984 until its closure in May 2005. Approximately 230,000 tonnes of municipal solid waste (MSW) was placed annually during this time. The landfill was completed in two principal stages:

- Stage 1 (13.0 ha) was infilled between 1984 and 1988
- Stage 2 has three sub-parts:
 - Stage 2A (13.9 ha) was infilled between 1987 and 1991
 - Stage 2B (19.4 ha) was infilled between 1991 and 2005
 - Stage 2C (7.7 ha) and was infilled between 2000 and 2005.

The total landfill footprint is approximately 54 ha. Figure 2 below illustrates the location of the stages along with some of the monitoring borehole locations. Note that Stage 3 (32.8 ha) did not commence.



Figure 2 Location of Burwood Landfill stages

Stages 1 and 2 contain MSW up to 20 m in depth. The landfill does not have a constructed liner and relies on natural attenuation of the leachate as it flows east within the shallow unconfined aquifer, towards the Pacific Ocean. The MSW landfill has a capping system designed to absorb the low annual rainfall of the region and

encourage the evapotranspiration of the rainfall. This reduces rainfall infiltration and the volume of leachate generated in the landfill that discharges to groundwater.

2.3 Geology and hydrogeology

The geology beneath the sites consists of the following components:

- The unconfined aquifer (Christchurch Formation) which is comprised of fixed and semi-fixed sands which extend to approximately 35 m depth and is underlain by the confining layer.
- The confining layer (Christchurch Formation) which is comprised of clays, silts and peat which varies between 0.3 and 6.5 m thickness in the vicinity of the site and is underlain by the Riccarton Aquifer.
- The Riccarton Aquifer, which is comprised of gravels and is recognised as the uppermost confined aquifer in the Burwood area.

The conceptual hydrogeology of the site consists of the following components:

- An upward (artesian) hydraulic gradient from the Riccarton Aquifer (first confined aquifer) into the unconfined aquifer.
- Small upward hydraulic gradient throughout the unconfined aquifer.
- A relatively low hydraulic gradient exists across the site resulting in groundwater flow toward the coast.
- The receiving environment for leachate discharges from the site is therefore the marine waters of Pegasus Bay.

The water quality technical report in Appendix B describes the above in more detail.

2.4 Surface water hydrology

There are no permanent watercourses at the site. The nearest permanent surface watercourses are the Styx River and Brookland Lagoon, located more than 2 km north of the landfill. These watercourses are unaffected by the activities.

Artificial ponds have been established on the eastern edge of the landfill. Given the occurrence of shallow groundwater at the site, other intermittent ponding can occur.

2.5 Rainfall and wind

Rainfall at the site is on average approximately 620 mm per annum.

The air quality technical report in Appendix C contains detailed information on local wind conditions. In summary, data from the New Brighton Pier Station (the nearest weather station with a useful data record) indicates that the winds that have the potential to carry dust to the nearest residential receptors (i.e. from the northeast quadrant) occur 38% of the time. Winds with a speed greater than 10 m/s from the above direction occurred only 3% of the time. Wind speeds measured below 3 m/s from this direction were reasonably uncommon occurring just 8% of the time. The majority (76%) of winds from the northeast quadrant were between 3 and 10 m/s.

2.6 Ecological features

Due to recent uses of the site, there are no ecological features of note within the recovery park or landfill footprints. To the north, west and south, the area has been actively worked as a pine plantation for several decades. Some rehabilitation planting has commenced in the eastern part of the landfill site, but this will remain undisturbed as a result of the proposal.

To the east lies the coast and coastal dune system, which is recorded within the City Plan and Replacement Plan as an ecological heritage feature and significant ecological site respectively. These overlays partially enter into the landfill footprint (note: differing boundaries in each plan).

At Site A, the land has been significantly modified by previous disturbance activities (Figure 3 below). The proposed extension at the site will remain in this disturbed area, i.e. to the west of the existing access road.

At Site G, the waste cell, if developed to its full extent, will extend into an area of grassland and established pine trees. As illustrated in Figures 4 and 5 below, this area is similar to many of the other forested areas in Bottle Lake Forest Park, with no ecological values of note. Site G does not lie within the recently assessed significant ecological site proposed under the Replacement Plan.

The site does not lie within any coastal hazard area described in the RPS, City Plan, Replacement Plan, or Regional Coastal Environment Plan.



Figure 3 Area of the Site A extension



Figure 4 Area of the Site G cell (1 of 2)



Figure 5 Area of the Site G cell (2 of 2)

2.7 Social environment

The nearest residential properties are located approximately 700m south and south-west within the suburbs of Waimari Beach, Parklands/Queenspark and Tumara Park. At the current time a strip of plantation forestry approximately 375 m wide, located within the Bottle Lake Forest, screens the residential area from the landfill. The vehicle access point to the sites, via Landfill Avenue, is located in close proximity to residential properties near the entrance. As a result of the 2012 consultation and consenting process, significant mitigation was carried out to reduce impacts on residents, including installation of approximately 500m of acoustic bunding and fencing.

The land area between the eastern boundary of the landfill and the foreshore is public open space. As such, the area is frequented by those making use of the area for recreation.

Bottle Lake Forest Park is very popular with cyclists and walkers and as such is a central recreational focus for the wider area. Due to the operation of the recovery park, a number of tracks near the landfill have been re-routed and an exclusion area currently applies.

2.8 Cultural environment

A cultural impact assessment has been carried out and attached as Appendix E. By way of summary, Ngāi Tahu has a long history with the area dating back to around 1700AD. The Waitakiri (Bottle Lake Forest) had flax swamps and a coastal lagoon which were well recognised as food gathering areas. The area was also rich in various native plants that provided a constant supply of medicines and also materials building, making traps and nets, weaving footwear and weapons. There are no recorded wāhi taonga or wāhi tapu/urupā within the boundaries of the proposal.

3.0 Proposal Description

3.1 Overview

Resource consents are sought by BRRP Ltd and the Council to:

- 1) Continue earthquake waste processing activities (at Site B) until 31 December 2020;
- 2) Extend the existing waste cell (at Site A) to provide for disposal capacity of up to 160,000 tonnes of residual earthquake waste from the recovery park; close by 31 December 2020;
- 3) Develop a new earthquake waste cell (at Site G) to provide for disposal capacity of up to 540,000 tonnes of residual earthquake waste from the recovery park; close by 31 December 2020;
- 4) Continue the temporary storage (until 31 December 2020) of sensitive demolition materials (at Site D) sourced from buildings where human lives were lost during the earthquake events;
- 5) Continue the infrastructure hardfill and soil disposal (at Site F) until 31 December 2020; and
- 6) Rehabilitate all sites; complete by 31 December 2021.

The activities associated with these components are discussed in Section 3.4 to 3.8. Prior to this discussion is a general overview of the waste received to date and anticipated in the future (Section 3.2) and the statutory definitions of earthquake waste and processing (Section 3.3). Alternatives considered are detailed in Section 3.9.

3.2 Waste received and anticipated

Table 3 below contains some key figures relating to the demolition waste stream.

Table 3 Current and future earthquake waste estimates relating to demolition activities (all figures approximate)

Activity	Tonnes to date (As of 5 August 2015)	Tonnes future estimate (to 31 December 2021)	Tonnes (total)
Received at recovery park (Site B)	683,000	317,000	1,000,000
Processed at recovery park (Site B)	350,000	650,000	1,000,000
Recovered materials (other than timber)	16,000	30,000	46,000
Recovered timber	70,000	0	70,000
Deposited into Site A (from recovery park)	334,000	0	334,000
Deposited into Site A Extension (from recovery park)	0	160,000	160,000
Deposited into Site G (from recovery park)	0	540,000	540,000

As of 5 August 2015, approximately 333,000 tonnes of unprocessed earthquake waste remains stockpiled at the recovery park.

3.3 Key activity definitions

3.3.1 Definition and composition of earthquake waste

In relation to operations at the recovery park, 'earthquake waste' is defined in the OIC as:

- (a) *means –*
- (i) *solid waste resulting from the Canterbury earthquakes, including liquefaction silt;*
 - (ii) *solid waste resulting from any construction work (within the meaning of section 6 of the Construction Contracts Act 2002) undertaken as a result of the Canterbury earthquakes (within the meaning of section 4 of the Canterbury Earthquake Recovery Act 2011); but*

- (b) *does not include any of the following unless it is not reasonably practicable to separate it from the waste specified in paragraph (a):*
- (i) *general domestic refuse; or*
 - (ii) *human waste; or*
 - (iii) *building insulation and building materials containing asbestos; or*
 - (iv) *hazardous waste; or*
 - (v) *waste material from an industrial process or trade process.*

With respect to landfill operations, the definition of 'earthquake waste' in the City Plan is identical to the OIC, with the exception that it adds two other types of waste to clause (a):

- (iii) *hardfill from the City's sewer, water and road network; and*
- (iv) *liquid waste extracted from the City's infrastructure network [...]*

There is no definition of earthquake waste in the LWRP (and formerly NRRP).

All earthquake waste entering the recovery park and landfill complies with the above definitions. Table 4 below summarises the types of earthquake waste received at the various sites:

Table 4 Types of earthquake waste received

Location	Waste type	Typical constituents
Recovery park (Site B)	Demolition material from commercial and residential buildings	Concrete, tiles, insulation, carpet, tin, steel, electrical cable, glass, paper, plasterboard, rubber, paint, fabric, plastic and timber (treated and untreated).
Site A	Residual waste stream from recovery park	As per Site B (but with recyclable materials removed)
Site G		
Site D	Demolition material from commercial buildings where human lives were lost	As per Site B
Site F	Infrastructure hardfill and soils	Soil, bedding material, concrete haunching, concrete structures (all of which could have been in contact with wastewater and other contaminants)

3.3.2 Definition of earthquake waste processing activities

The OIC for the recovery park defines earthquake waste processing activities as follows:

- (a) *means—*
- (i) *the storage, sorting, and processing (including recycling) of earthquake waste; and*
 - (ii) *any ancillary activities for the purpose of the activities specified in subparagraph (i), including the discharge of contaminants, water take activities, and transportation; and*
 - (iii) *any remediation work required as a result of the effects of the activities specified in subparagraphs (i) and (ii); but*
- (b) *does not include the permanent storage or permanent disposal of earthquake waste.*

The activities subject to this AEE will continue to meet the above definition.

3.4 Continuation of recovery park and landfill operations

3.4.1 Hours of operation

The hours of operation for the recovery park and landfill activities are proposed to be:

<i>Monday to Friday</i>	<i>6.00 am to 6.00 pm (12 hours)</i>
<i>Saturday</i>	<i>6.00 am to 12.00pm (6 hours)</i>
<i>Sunday and Public Holidays</i>	<i>Closed</i>

This is a reduction in hours relative to the current land use consents (which authorised a 6-day 16-hour operation).

3.4.2 Staff numbers

Up to 16 BRRP Ltd staff are employed on the sites at one time. Staff park their vehicles at the recovery park (Site B). Further contracting staff are involved with after-care activities in the landfill footprint.

3.4.3 Receipt, stockpiling and sorting process at recovery park (Site B)

All material entering the sites occurs via a single entrance at Landfill Avenue. Following the 2011-12 consenting process this entrance was significantly realigned and upgraded with acoustic fencing and traffic calming measures. All trucks go past the weighbridge/kiosk, are weighed, and the weight recorded with the job reference to the customer. At this point the driver is instructed where to take the material.

Once at the recovery park the load is visually inspected to ensure it is compliant material. The truck is then directed to the appropriate location within the site for tipping prior to transfer into the stockpile. As of 5 August 2015, approximately 333,000 tonnes of unprocessed earthquake waste remains stockpiled at the recovery park. The stockpile extends approximately 500 m in a north-south direction and is approximately 100 m wide and 20m high at its greatest extent.

Upon tipping, a further visual inspection occurs to verify the load contents. A final visual inspection occurs by the machine operator responsible for moving the tipped pile into the stockpile. If non-compliant material is disclosed during any of these visual inspections, the customer is directed to remove the material from the site (at their expense).

Stockpiling is undertaken in a way to enhance the recovery potential of materials. A bulk pre-sort occurs upon tipping before the material is stockpiled. An excavator will pull out bulk steel and other large objects before carefully placing the balance of the material into the stockpile. The excavator will be supported by a dozer, or similar machine, that can push material to where the excavator can grab it. The excavator will also separate any large items into a hook bin for moving to another partially sorted material stockpile area.

Following the August 2015 fire at the landfill, which foreclosed the ability to dispose of the residual waste stream in the existing Site A, BRRP Ltd made the decision to cease operation of the screening and sorting plant already established on site. Going forward it is proposed all sorting will be undertaken at the stockpile face. However, the screening and sorting plant will remain on site and may be reactivated should circumstances change in the future, or should specific loads require more detailed sorting.

3.4.4 Hazardous substances storage and use at Site B

Up to 10,000 litres of diesel and 20,000 litres of other petroleum hydrocarbons are stored on site. These fuels are used to power plant and machinery. The diesel is stored in an above-ground container and the petroleum hydrocarbons are sorted in portable containers. All storage is managed in accordance with the Hazardous Substances (Emergency Management) Regulations 2001. A spill kit is retained on site in the event of any accidental leakages.

3.4.5 Groundwater take

A groundwater take is currently consented at Site B under CRC130062, for the purposes of supporting the processing activity and dust suppression. The rate is limited to 20 litres per second with a daily volume not exceeding 864 cubic metres and an annual volume not exceeding 315,360 cubic metres. The only changes to the consent proposed under these current applications is:

- an extension to the period of abstraction from the current expiry date of 19 September 2017 to 31 December 2021;

- inclusion of use for irrigation to supporting landscaping and rehabilitation activities, and
- removal of conditions that have already been given effect to, e.g. installation of a water meter.

3.4.6 Disposal of material at Sites A & G

The residual waste stream from Site B will be deposited into the Site A Extension or G. Once unloaded, the waste will be compacted with a purpose build landfill compactor. This occurs progressively throughout the day. Further discussion on the waste cells is contained in Sections 3.5 below.

3.4.7 Disposal of material at Sites D and F

No material is being directed to Site D at the current time. It is only the storage of existing materials that needs to continue (see Section 3.6 for further detail).

Material taken to Site F goes directly to that site and does not enter the recovery park. Further discussion is contained in Section 3.7 below.

3.4.8 Heavy vehicle movements

During the early days of the recovery park operation the sites generated high volumes of heavy vehicles; at its peak approximately 226 vehicles delivered earthquake waste to the sites on a daily basis. With the residential and commercial demolition well now advanced, and repair of the infrastructure network well progressed, these numbers have reduced significantly. Table 5 below provides data for all heavy vehicles entering the sites via Landfill Avenue. 'Vehicle trip' in this table is defined as a single journey to and from the sites.

Table 5 Heavy vehicle trips

Criteria	April – September 2014	April – September 2015
Average monthly heavy vehicle trips	5,870	3,896
Average operating days per month	26	26
Average vehicle trips per day	226	149

Although it is difficult to accurately estimate future demand, BRRP Ltd anticipate that average daily vehicle trips will sit between 100-150 vehicles for the next 6-12 months, before gradually tailing towards nil at the end of 2020.

3.4.9 Management plans

A comprehensive management plan was prepared for each of the recovery park and landfill sites in support of the 2011-2012 consenting process. The landfill management plan addressed all matters in Appendix 3 of the Landfill Guidelines (2000) published by the Centre for Advanced Engineering, University of Canterbury.

Conditions on the granted consents required various management plans to be prepared and submitted. This included a Site Management Plan, Waste Management Register, Landfill Gas Management Plan, and Dust Management Plan.

Following the grant of consent BRRP Ltd subsequently combined various aspects of the management plans. Attached in Appendix G of this AEE is the most recent iteration of the plan. The plans contain an extensive range of measures to manage the design parameters, management guidance, record keeping, mitigations and other procedures with respect to the on-going management of the recovery park and landfill.

The plans are live documents and will continue to be updated and adapted as the circumstances require. An update will be required immediately after the consents subject to this application are granted, to address new activities (e.g. Site G) and any new conditions of consent.

3.5 Extend Site A Cell and Create Site G Cell

3.5.1 Drawings

Full drawings of the proposed cells are contained within Appendix A of this AEE. References to drawings in the following sections are to the drawings contained in Appendix A.

3.5.2 Objectives and general design parameters

The objectives of the proposed cell extension at Site A and the new cell at Site G are to:

- Provide a total capacity for 1 million tonnes (~1.73 million m³) of residual C&D waste from the recovery park operations (note: these figures are inclusive of all existing and future anticipated waste including that in the recovery park and that already placed in Site A Cell;
- Maximise elevation to match existing landfill profile, and to not exceed the height of the existing MSW landfill;
- Ensure the lowest waste level is more than 1.0m above the ground water level;
- Ensure the leachate discharge to ground associated with the existing MSW landfill is not adversely impacted and improved where possible;
- Operate/construct progressively to minimise leachate effects;
- Ensure landfill gas from the residual C&D waste cells is properly managed;
- Allow degradation of organics to stabilise;
- Create an anaerobic environment in the waste during waste placement to reduce the potential for ignition and combustion of waste; and
- Ensure landfill construction remains cost effective;

3.5.3 Site A history and general design parameters

Site A was consented in 2012 to receive residual C&D waste from the recovery park. This operation continued until September 2015 when the segregated recovered timber stockpile was entirely consumed by fire. The C&D waste placed adjacent to the timber stockpile was unaffected by the fire, however as a precautionary measure, the C&D waste was capped off with up to 3.0m of compacted silty soils.

The resulting Site A cell has therefore not been constructed to the full extent of the consented design. The "existing levels" shown plan C-002 are of the Site A capped with the 3.0m of silt. Although further C&D waste could be placed over the now capped Site A, BRRP Ltd has chosen not to add further fill due to the complications of placing more waste over the substantial landfill cap and the relatively small void available for that waste.

The quantity of waste in the partially filled Site A is 580,000 cubic metres (334,000 tonnes) and is substantially less than the consented volume of 730,000 cubic metres.

Site A was filled from west to east and stopped around 30m short of its consented eastern (seaward) extent. The sloping capping level of the completed cell averages 12 metres less than that consented.

The capping design for the consented C&D landfill was the same as for the MSW landfill. This was 200mm of topsoil applied over 600mm of compacted silty soils over a capillary break. Due to the need to urgently apply cover to prevent fire spreading through the Site A C&D landfill, the capillary break was not applied, however, between 2.5 and 3.5 metres of silty soil was applied and lightly compacted. The capping as applied is installed at a gradient of 12% compared to the 4% minimum grade that was consented. Given the greatly thicker depth of the capping soils and the steep capping gradient, precipitation infiltration is expected to be less than the consented capping design.

The 2012 consent also provided for the installation of a groundwater interception trench and associated groundwater extraction pipework. This interception trench was a contingency measure to allow removal of leachate contaminated groundwater emanating from the MSW landfill in the event that leachate levels in the groundwater exceed acceptance criteria at the property boundary. The interception trench was installed to the locations required in the 2012 consents.

The design submitted for consent for the Site A extension provides for the filling of the eastern portion of the consented cell and to extend the cell a further 70 metres to the east to terminate at the existing access road. This location is the extension of the eastern batter of the existing MSW landfill and will form a logical landform that continues the existing landform. The existing road level is proposed to be raised 4.0 metres from existing levels using concrete waste and soils that accumulated during the operation of the BRRP and are currently stockpiled in the footprint of the Site A extension.

3.5.4 Site G history and general design parameters

A portion of the footprint of Site G contains an existing settling pond for sewage contaminated water and silts extracted from drainage affected by the earthquake (known as Site P). The Council has confirmed that drainage settling pond at Site P can be decommissioned during or before September 2017 and that the operation be transferred to the Christchurch Wastewater Treatment Plant.

The settling ponds will therefore be decommissioned immediately prior to the construction of Site G cell. The decommissioning procedure for this settling pond is discussed in detail below.

The proposed footprint of Site G cell is fully contained in the landfill zone and lies parallel to, and 100m west of, the seaward site boundary and east of the historical MSW landfill. The publically used portion of the historical landfill to the west of the proposed Site G cell is unaffected. The existing water feature ponds to the east of the sewerage settling ponds will not be affected.

An area of approximately 4ha of pine tree vegetation will be cleared from the southern portion of the proposed Site G cell footprint (and 10m to 20m beyond the footprint for construction and permanent access).

The existing landfill access road that connects western road access to the existing road immediately to the east of the publically used historical landfill will be retained. The access that currently services the staging area and drainage sedimentation ponds will be abandoned and a new access constructed around the perimeter of the propose Site G cell.

As with the nominal design for the C&D waste cells, the minimum grade on the top of the cell will be 4% and maximum grades 25%. The maximum height will be less than 25 metres above the intersection of Rothesay Road and Bower Avenue.

It is proposed that Site P will be decommissioned prior to the commencement of the construction of Site G cell. Removal of sediments from the pond, required for the preparation of filing, will be the same process as is currently undertaken during the operation of the settling ponds. This involves removal of sediment in the base of the pond by excavator, placed in leak-proof trucks and carted to the top of the Burwood MSW landfill (Site F) to dry out and degrade through composting. For the first phase of the pond decommissioning, an embankment will be extended into the pond to create a "dam" to allow the southern half of the pond to operate while the northern half is de-watered and filled.

In addition to settled solids, soil in the base of the pond that may be affected by liquid waste will be removed and treated as for sediments. The base of the trimmed pond base will be sampled and soils analysed to confirm all contaminants are removed prior to backfill.

Backfill material will be compacted liquefaction silt currently stockpiled at the Burwood landfill. The soils will be compacted in layers not exceeding 200mm thickness to the level being 1.0m above the ground water level.

3.5.5 Capping and liner concept

The proposed Site A extension and the proposed Site G will continue the design parameters approved in 2012 for the construction of the existing Site A, as summarised below.

Due to the low contamination potential of the waste leachate, a synthetic liner is not proposed for the cells. However, measures will be incorporated in the construction of the cells to avoid concentration or breakout of leachate should leachate arise.

The base of the cells will be constructed on a flat plane at RL12.5. This is above the minimum requirement of the City Plan which specifies that waste shall be no less than 1.00m above the ground water level taken to be a maximum of RL11.00. The subgrade surface will have all stockpiled and organic material removed and trimmed and rolled to the subgrade level. Any areas that are lower than subgrade will be filled with compacted site-sourced non-organic silty sands.

The natural soils within the footprint of the proposed cells comprise brown medium to fine sand in the upper 1.0m and grey medium to fine sand below. It is proposed that a horizontal layer of compacted silt no less than 300mm thick be placed immediately over the underlying natural sands after the removal of topsoil or stockpiled soils. This silt has less permeability than the sands and will encourage uniformity of dispersion of leachate flow permeating through the demolition waste; thereby lessening the risk of development of a preferential pathway for leachate that could reduce its natural attenuation into the groundwater below. The silt soil layer will also filter fine particulate that would otherwise flow to groundwater.

The landfill cap for the cells will be similar to the existing MSW landfill cap and the same as consented for the 2012 consented Site A. The cap will incorporate an open graded gas dispersion and capillary break layer below low permeability layers. It is possible that leachate may travel horizontally at perched water tables in the waste and flow down the capillary break aggregate. Any seepage that flows down the 1v:4h batters within this aggregate will be deflected at the low permeability toe abutment construction and back into the landfill footprint, where it will dissipate across the level landfill subgrade and permeate into the ground water in a diffuse manner.

The side walls of the existing landfill are capped with topsoil, low permeability silts and a capillary break overlaying the waste. The capping is designed to capture the low annual rainfall within the capping (the capillary break prevents it flowing to the waste), permitting evapotranspiration to remove the accumulated precipitation.

The existing batter slope of the MSW landfill will become the liner between the MSW and new cell. This batter is 1v:4h with low permeability silts that will encourage the low anticipated leachate volumes within the earthquake waste to flow down the interface of the silt and overlying earthquake waste to the base of the new cell. The existing batter slope will have the topsoil removed and the existing low permeability layer will be checked for thickness and competency and increased where necessary. The low permeability silts will be kept moist due to infiltration and will reduce the incidence of landfill gas migrating between the MSW and demolition waste cells.

3.5.6 Geotechnical stability

A detailed technical report assessing geotechnical stability issues was prepared for the 2012 Site A C&D waste cell¹. The underlying foundation soils, groundwater levels and the proposed landfill profile and construction are unchanged from the 2012 Site A design and therefore are adopted for the Site A extension and for the new cell at Site G. A summary of that information is contained below

Ground investigations indicate the underlying soils comprise dune and beach deposits of the Christchurch Formation (<10,000 years of age), consisting of fine to coarse sand, with frequent silt/clay and shelly lenses. The area is generally underlain by Riccarton Gravel Formation, which is typically found at 30m to 40m below ground level.

Groundwater has been investigated in a series of groundwater monitoring wells located adjacent to the proposed cell extension. These indicate that the groundwater is generally between RL 10.5m and RL11m, (RL is m above mean sea level in terms of the CCC datum) i.e. approximately 1.5m and 2m below the existing ground surface at the proposed Cell A and Cell G locations.

The Peak Ground Acceleration (PGA) that will be used for earthquake design has been assessed in accordance with NZS1170.5 The Zone Factor Z given in the Department of Building and Housing document “Revised guidance on repairing and rebuilding houses affected by the Canterbury earthquake sequence,” published in November 2011 has been used for this design.

The landfill has been assumed to have an importance level of 2 (Normal structures and structures not in other importance levels) and accordingly designed to resist earthquake loadings with return periods of 500 and 1000 years for a design working life of 50 or 100 years respectively.

Peak Ground Accelerations for seismic design cases are as per Table 6 below.

Table 6 Design Peak Ground Accelerations

Design case	Design life (years)	Return period (years)	PGA (g)
Serviceability Limit State		1/25	0.08
Ultimate Limit State	50	1/500	0.34
Ultimate Limit State	100	1/1000	0.44

¹ Final Geotechnical Report, Earthquake Waste Cell, Burwood Landfill, Christchurch (URS, May 2012)

The strength parameters for the MSW portion of the Burwood Landfill is shown in Table 7 below:

Table 7 Summary of existing MSW design strength parameters

Parameter	Current conditions	Advanced decomposition
Effective Cohesion, c'	24 kPa where overburden pressure ≤ 30 kPa 0 kPa where overburden pressure > 30 kPa	2.4 kPa
Effective Angle of Friction, ϕ'	0° where overburden pressure ≤ 30 kPa 33° where overburden pressure > 30 kPa	19°
Bulk Density, γ_b	8.3 kN/m ³	8.3 kN/m ³

The proposed cells are required to accept demolition earthquake waste residues following recycling operations at the BRRP. Design parameters are as per the below Table 8.

Table 8 Design parameters for earthquake waste

Material	Effective Friction Angle ϕ' (degrees)	Bulk Density (kN/m ³)
Earthquake Waste (New)	33	7.8
Earthquake Waste (Advanced Decomposition)	24	7.8

This site is considered potentially susceptible to liquefaction during strong earthquakes due to the presence of loose sand layers below the site. Tests indicate that liquefaction will occur within the loose sands between approximately 4.5m to 7.5m and in the medium dense sand between 10m and 12m depth for both the 1 in 500 and 1 in 1000 year return periods earthquakes.

The degree of liquefaction induced lateral spreading towards the sea which could be expected to occur for the 50 and 100 year design life cases has been assessed using Youd & Bartlett (2002) and estimated to be less than 64mm for a 1/500 year return period and less than 136mm for a 1/1000 year return period.

It is thought that less than 150mm of lateral movement may cause some minor slumping within the fill but would not be expected to cause catastrophic failure. As discussed earlier in this report, there is no requirement for a liner at this site and accordingly no major issues are expected with cracking of the soils below the landfill.

The proposed earthquake waste cell has an outer slope batter angle of 1v:4h and a maximum vertical height of 20m. It has been shown that the MSW and proposed earthquake waste will be sufficiently free draining to prevent any build-up of water.

It is considered that the required factors of safety (FOS) for long term stability should be 1.5 for static conditions. A typical FOS required for seismic slope stability is FOS = 1.2, however, in accordance with accepted practice for landfill design, displacement criteria is used for the design of landfills under seismic loading.

The stability of the proposed cell has been analysed using the SLOPE-W software. The analysis has been carried out using advanced decomposition design parameters for the existing landfill (a conservative assumption as to the strength properties for advanced decomposition are weaker than those for new fill), and both new and advanced decomposition parameters for the proposed earthquake waste. The factors of safety calculated for static stability are shown in Table 9 below.

Table 9 Factors of safety for static stability

Waste conditions	Slope FOS	Required FOS	Result
Earthquake Waste (New)	2.6	1.5	OK
Earthquake Waste (Advanced Decomposition)	1.8	1.5	OK

From the results of the slope stability analysis, it is considered that the proposed slope angle of 1v:4h satisfies the long term stability requirements.

An acceptable Factor of Safety is achieved only for the Serviceability Limit State loading. For seismic events with a 50 year and 100 year design life the FOS drops below the required 1.2. Where the Factor of Safety falls below 1, movement in the slope is expected and displacements have been assessed.

Should the sands below the landfill liquefy (as is predicted by analysis), and as the C & D landfill waste degrades with time, the proposed 1v:4h slope will be at risk from displacements of between 50mm and 750mm for recent earthquake waste and between 60mm and 935mm for decomposed waste.

However, although this displacement would be expected to cause slumping within the fill, it would not be expected to cause catastrophic failure. The edge of the proposed new landfill Cell A Extension is approximately 130m to the west of the landfill boundary and cell G is 100m, meaning any slumped material is expected to remain within the landfill site, is unlikely to be odorous and can be mitigated by reshaping.

3.5.7 Waste Placement, Cover Soils and Fire Management

Residual waste from the BRRP will be transported to the Site A extension and Site G with trucks, utilising the access road from the BRRP along the road to the east of the landfill.

The C&D waste placed in the cells will be compacted in layers not exceeding 0.5m thick with conventional MSW landfill compactors to achieve a greater density than was achieved prior to the wood waste fire at Cell A. Cover soil 150mm thick will be placed weekly over the exposed C&D waste on the flat top and inclined sides of waste and compacted. The purpose of the cover soils is not to manage odour or landfill gas, but to exclude oxygen from the C&D cell. These operations are designed to reduce the potential of a fire to occur and/or propagate through the C&D waste cells.

Where waste is placed to final batter profiles, permanent capping will be progressively installed. This will create a restriction of oxygen ingress to landfill sides and minimisation of convection of air flow through the landfill waste.

The application of increased compaction to reduce voids in the waste, the application of cover soils weekly to all exposed waste and the installation of permanent capping as soon as is achievable will greatly reduce the likelihood of spontaneous landfill fire and will limit oxygen ingress to provide greater control of a fire should this occur.

3.5.8 Surface water management

Significant surface water flow is not expected except during extreme rainfall events as the final capping is designed to allow infiltration and retention of precipitation and later evapotranspiration. However, surface water flowpaths are provided for in the design.

The Site A extension will have a swale drain constructed from low permeability silts overlaid with scour proof rock armouring (in steep sections) to convey water from the current Site A surface to the swale drain at the toe of the C&D cell. The seaward side of Site A extension will be capture stormwater at the swale associated with the eastern access road and pipe this flow to a soakage trench in an vegetated area in the dune grasslands.

Proposed Site G is bordered by new access roads on all sides other than the upper face abutting the main portion of the MSW landfill to the north, these roads will be provided with swale drains. Where these drains exceed 10% gradient, rock scour protection will be installed. A portion of this road will be constructed between the sewerage system settling ponds and the fresh water ponds between the landfill and the seaward boundary (the ponds will not be affected).

Surface water collected from the swale on the edge of the road by the existing (water feature) ponds at the toe of Site G will be piped under the road to a soakage trench on the seaward side of the access road but not directed to the water feature ponds east of Site G. This water will be directed to separate soakage drain to allow soakage to groundwater rather than direct flow into the ponds.

3.5.9 Ground water management

As part of the 2012 consented works associated with the 2012 Site A construction, groundwater interception drains were installed along the interface of Site A and the MSW landfill to the west and south of Site A. These interception drains were installed as a contingency measure to extract leachate from the ground water near the source (being the MSW landfill).

The interception drainage remains functional as part of the extension of the Site A cell. The 2012 consented Site A installed ground water interception drainage as a contingency measure should leachate from the MSW landfill become elevated at some time in the future.

There is no requirement to provide contingency groundwater extraction systems in the Site G location as this cell is relatively narrow. Therefore, if groundwater needs to be intercepted and abstracted at some point in the future, this can be reasonably achieved from the eastern perimeter of the proposed Site G.

3.6 Continued storage at Site D

Materials from those central business district buildings where human lives were lost during the earthquake events are currently stored at Site D. A final decision has yet to be reached around the long-term plan for this material, and in the meantime, storage must continue in the event of criminal proceedings progressing.

3.7 Continue Site F operation

The mixed hardfill waste stream is expected to continue comprising of soil, bedding material, concrete haunching and concrete structures that may have been in contact with wastewater. This material has been derived from the removal of broken pipelines (and related infrastructure) within the city's wastewater and water networks.

Site F resides in the area which overlies Burwood landfill Stage 2C, representing an area previously filled between 2000 and 2005. Final cover is in place over this area. The existing MSW cell will remain unaltered, with hardfill continuing to be placed directly on the existing cell following removal of the topsoil cover to a depth of approximately 1 m. Trucks containing the mixed hardfill waste will arrive at the landfill and transport the material to the tipping area via the internal road network. Once they arrive at the landfill site the trucks are weighed and then directed by an operator to a position where they can unload.

Surface water flow from Site F will runoff the cover material and will infiltrate to ground. Final cover will be retained on Stage 2C until the area is needed for placement. This will minimise the generation of potentially sediment laden stormwater. Surface water collected from final capped and grassed areas (including areas of 2C which have not yet been disturbed) is not anticipated to be contaminated and will be discharged to the toe of the landfill where these flows will recharge the groundwater.

The hardfill material is proposed to be capped progressively. The final cover will be designed to restrict rainfall infiltration into the underlying waste material to minimise leachate generation. Cover design consists of the following from bottom to top:

- 600 mm layer of C&D materials (preferred) or alternative materials if C&D materials are not available with suitable characteristics as capillary break between the waste and the final cover.
- Filter cloth to prevent the overlying soil from clogging the capillary layer.
- 600 mm layer of silt of low permeability to restrict water movement into the underlying materials.
- 300 mm topsoil to provide a medium for vegetative growth.

3.8 Rehabilitation

BRRP Ltd and CCC propose to progressively rehabilitate areas of the landfill footprint as activities and capping are completed, with a view to then allowing public access to passive vegetation (subject to suitable mechanisms in place to protect public safety from the remaining operational areas). The landscape plan will be in general accordance with that already developed with community input (see Appendix F), albeit that some modification will be required given the development of the Site A extension and Site G subject to the current applications. This plan was developed and approved by the Council in late 2014.

BRRP Ltd will engage with the community to look at what areas of this landscape plan can be advanced during the consent term, and BRRP will fund the necessary work to complete those works that can safely be advanced. The balance of the landscape plan work will be completed in the rehabilitation period, after earthquake waste recovery activities have ceased.

3.9 Consideration of alternatives

Schedule 4 of the RMA requires that where it is likely that an activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity. Sections 105(1)(c) of the RMA requires that the consent authority must consider, in relation to discharges, alternative methods of discharge, including discharge into any other receiving environment

As detailed in Section 5 of this AEE the adverse effects of the proposal are not considered significant. The water quality technical assessment provided in support of this AEE (see Appendix B) has discussed the sensitivity of the receiving environment and concluded that the site is suitable for the proposed discharge.

Due to the requirement for a timely solution to the issue of earthquake waste disposal, the only realistic alternative is to transfer all earthquake waste to the regional landfill at Kate Valley. Developing a completely new landfill would take a considerable length of time and while this is occurring earthquake waste from the city would need to be stored at other locations far less suited to receiving this type of material.

Sending all waste to Kate Valley would likely have greater adverse effects than this proposal. These effects would result from:

- Traffic generation to and from Kate Valley (a return trip from central Christchurch of 140 km),
- including increased vehicle emissions, running costs, road wear, and a much larger receiving environment for these effects; and
- Inefficiencies associated with filling a Class A landfill with large volumes of primarily inert materials, necessitating the need for a further regional landfill at an earlier date (with associated environmental effects and economic costs).

4.0 Consultation

4.1 Process

Although there is ordinarily no duty under the RMA for applicants and councils to undertake consultation with respect to resource consent applications, the specific controlled non-notified process initiated for the recovery park and landfill requires certain consultation to be undertaken with identified parties.

In the case of the OIC applying to the recovery park, Clause 9 requires that as soon as practicable after an application is lodged, the consent authority must:

- 1) advise the following persons and organisations that an application has been lodged; and
 - a) Te Rūnanga o Ngāi Tahu and any relevant Papatipu Rūnanga identified by Te Rūnanga o Ngāi Tahu; and
 - b) the Canterbury District Health Board; and
 - c) the Burwood–Pegasus Community Board; and
 - d) the Parklands Residents Association Incorporated; and
 - e) the Queenspark Residents Association; and
 - f) the Selwyn Plantation Board Limited; and
 - g) owners and occupiers of land adjacent to the Burwood Resource Recovery Park; and
 - h) any other person or organisation that the consent authority considers would be adversely affected if the application were granted.
- 2) invite written comments from those persons and organisations (a 10 working day period applies for response).

The changes made to the City Plan and LWRP for the landfill are similar but with some important differences:

- the parties identified at (f) and (h) above are absent,
- clause (g) refers to the landfill (rather than the recovery park)
- written comments are required to be provided by the applicant at the time of lodgement (with evidence of 10 working days having been provided to receive those comments)

Given that BRRP and the CCC have lodged the recovery park and landfill applications together, they have adopted a conservative approach and sought written comments from all parties identified in the OIC prior to lodgement of this application. However, it is acknowledged that the consent authorities will need to seek further written comment the parties after lodgement as required by the OIC.

4.2 2011-12 consultation

Comprehensive consultation was undertaken with the community and stakeholders during the process for the original consents in 2011-12. This is detailed in full in the AEEs accompanying those applications, but by way of summary included:

- A consultation flyer and feedback form to 176 parties (those parties having been identified by Environment Canterbury as meeting the consultative requirements of the controlled non-notified process).
- A public meeting (open invitation to the 176 parties above), with presentations by both applicants and their representatives
- Receipt of written comments on the feedback forms (from 53 parties).
- A further public meeting (open invitation sent to 3,500 households), with presentations by both applicants and their representatives.

The key issue and concern raised in the 2011-12 process was around the potential disposal of asbestos containing materials (ACM) at the landfill. This proposal was subsequently removed from the suite of activities.

Other issues raised primarily related to traffic, noise and dust effects in the adjacent residential areas, and potential groundwater contamination.

As a result of this consultation a number of comprehensive mitigation measures were agreed to by BRRP and the CCC and implemented in the consent conditions, including:

- A new alignment of Landfill Avenue and acoustic barriers in the vicinity of residential dwellings
- Signage in the residential areas displaying “no truck stopping’ zones
- On-site signage displaying speed limits, and installation and operation of a speed camera
- Measures to minimise dust generation, including road maintenance and periodic cleaning
- Formation of a Community Liaison Group and complaints register
- Preparation and implementation of a management plan covering management and monitoring procedures for all environmental effects, emergency procedures, and rehabilitation procedures.

The same mitigation is proposed to be carried through to the new consents.

4.3 2015 consultation

A similar process to that undertaken in 2012 has been carried out in 2015. The various steps and outcomes are outlined below.

4.3.1 Consultation flyer

A consultation flyer and feedback form was sent to 187 parties. The parties were identified by Environment Canterbury and the Christchurch City Council as meeting the consultative requirements of the controlled non-notified process), and include:

- Te Runanga o Ngai Tahu Runanga;
- Te Ngai Tuahuriri Runanga;
- Canterbury District Health Board;
- Burwood–Pegasus Community Board;
- Parklands Residents’ Association Incorporated;
- Tumara Park Residents’ Association;
- Northshore Residents’ Association;
- Rayonier Matariki Forests Limited; and
- owners and occupiers of land adjacent to the Burwood Resource Recovery Park and Burwood Landfill.

A copy of the material is contained in Appendix H.

The material was hand-delivered to the owner and occupier properties on Wednesday 11 November 2015. The remaining parties were sent the material in the post.

4.3.2 Information drop-in sessions

Information drop-in sessions were held on the evenings of 17 and 18 November 2015 at the Parklands Baptist Community Church. The drop-in sessions were advertised through the consultation mail-out, local newspapers, New Brighton library, the CCC website, and through the social media channels of the various residents associations.

A series of stations were setup containing information covering a variety of topics, including operational matters, air and water quality, landscaping/rehabilitation, and the consenting process. Each station was staffed, as relevant to the topic, by representatives from BRRP Ltd, the Christchurch City Council, Environment Canterbury, AECOM, and residents.

The two sessions were respectively attended by 42 and 1 persons. Feedback forms were made available at the sessions.

4.3.3 Written comments

In accordance with the OIC and regional and district plan rules, parties were invited to provide written comments by Wednesday 2nd December. A total of approximately 3 weeks was available for written comments from the period in which the consultation material was first delivered. Ten working days were available following the second drop-in session of 18 November 2015.

Written comments were received from 86 parties. Full copies of these comments are included in Appendix I. By way of summary, the key issues raised were:

- Opposition to Site G due to its proximity to residential areas and impact on existing recreational access;
- Preference for permanent disposal at Site B rather than Site G;
- Concerns around amenity impacts from traffic, noise, dust, odour and visual;
- Human health, air quality, and water quality; and
- Fire risk.

Of the above matters the issues around Site G vs Site B were the most significant. BRRP Ltd and the Council acknowledge the concerns raised. Based on the feedback received both parties have subsequently made the commitment to pursue Site B for permanent disposal with the relevant authorities. Subject to obtaining all of the necessary authorisations for Site B, Site G would not proceed.

However, the authorisations for Site B will require changes to the regional and district plans. This will require political support within the Canterbury Regional Council and the Christchurch City Council, and then approval by the Minister for Canterbury Earthquake Recovery under the Canterbury Earthquake Recovery Act 2011. Resource consents and a further consultation process will then likely be required. Finally, the underlying reserve status of Site B will likely need to be amended.

Due to the uncertainty of timing and outcome in obtaining the authorisations for Site B, resource consents for Site G will continue to be pursued at the current time. However, as above, BRRP Ltd and the Council will not develop Site G until an outcome for whether Site B can be used for permanent disposal is known. With approximately 10–12 months disposal capacity available in the Site A extension, there is sufficient time for Site B to be pursued before a further permanent disposal option is needed (i.e. Site B or G).

A further summary of the remaining issues, and the response of BRRP Ltd and the Council, is contained in Appendix J. This response has been communicated to all parties who made written comments. The issues have also been addressed throughout this AEE, including the proposed consent conditions in Appendix K.

5.0 Assessment of Effects

5.1 Permitted baseline and the existing environment

In order to determine the scale and significance of detail required in this AEE², and to provide a baseline for the evaluation of the actual and potential effects of the proposal on the environment, it is important to establish the appropriate context in which such effects must be considered. Identification of the permitted baseline can assist in this regard.

The purpose of the permitted baseline is to isolate and make irrelevant the effects of activities on the environment that are anticipated 'as of right'. There are two limbs to consider; the extent to which:

- 1) the district or regional plan permits the activity; and
- 2) the effects already present in the environment, or are authorised to be present through resource consents (whether they are implemented or not).

Section 104(2) of the RMA allows a consent authority to disregard an adverse effect of an activity if a plan permits an activity with that effect. Such adverse effects can also be disregarded in determining notification under Section 95D and 95E.

In this case the permitted baseline includes those activities which are allowed as of right under the Special Purpose (Landfill) Zone in the City Plan. Landfill activities are permitted subject to meeting the critical standards specified in rule 7.2. An assessment of those rules indicates that only issues relating to compaction and cover and access do not comply. Therefore it can be assumed that waste disposal activities are generally an anticipated activity at the landfill site. There are no particularly relevant permitted activities rules for those activities relating to the recovery park, and to the matters requiring resource consents from ECan.

Section 2 of the RMA defines the environment as:

"environment includes—

- (a) ecosystems and their constituent parts, including people and communities; and*
- (b) all natural and physical resources; and*
- (c) amenity values; and*
- (d) the social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) or which are affected by those matters."*

These aspects of the environment are discussed throughout Section 2 of this AEE.

Case law has confirmed that the environment must be considered in its existing state, including as it might be modified in the future by permitted activities under a district plan or by utilisation of resource consents which have been granted and were likely to be implemented.

In the foregoing regard it must be borne in mind that the activities subject to this consent, with the exception of the Site A extension and Site G, are currently authorised until September 2017. Therefore these effects can be considered part of the existing environment. The existing environment is also informed by the presence of a MSW landfill (and associated infrastructure), which is authorised to passively discharge contaminants to the environment through to May 2037 (CRC11364.3). The adverse environmental effects resulting from the proposed inert earthquake waste disposal is considered to be almost imperceptible compared to that which is currently occurring in the receiving environment as a result of the MSW landfill.

Overall, many of the effects of the proposed activities are already authorised until September 2017. Many of the remaining effects beyond that date, particularly relating to the landfill footprint, can be considered to be anticipated given the current rule framework.

² Section 88(2)(b) of the RMA states that an application must include an AEE in such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

5.2 Positive effects

The continued operation of the recovery park and landfill will allow for earthquake waste from the Canterbury earthquake events to be disposed of in an appropriate manner. This will assist in the provision of social and economic benefits as the greater Christchurch area rebuilds. Both CERA and ECan staff have advised BRRP that in their view, continuation of the earthquake waste management process at Burwood is essential for the complete recovery of the region from the effects of the earthquake.

As noted earlier, the adverse effects associated with the primary alternative option, being disposal at the Kate Valley regional landfill, would have greater adverse effects than the proposal. These adverse effects would arise from the large amount of additional traffic which would be generated to and from Kate Valley; and inefficiencies associated with filling a Class A landfill with largely inert materials, leading to the need for a further regional landfill earlier than anticipated.

5.3 Effects on water quality

A detailed technical report assessing water quality issues is included in Appendix B of this AEE. The below discussion is a summary of information contained within that report.

5.3.1 Sites B & D

The receiving environment of discharges from Site B is the groundwater beneath the site and ultimately the downgradient marine environment. The stockpile will contain residential demolition material waste materials such as wood, plaster board, metal (tin roofing), carpet, concrete, brick, plastic and cement sheeting. The material is mostly inert material; however there is a potential for rainwater to generate leachate with this ultimately reporting to the underlying groundwater.

Potential effects to groundwater and the downgradient receiving environment are expected to be notably less than for Site A and G, owing to:

- The temporary nature of the activity, with no long term placement of waste.
- The greater distance to the coast.
- Potential for uptake of impacted water by downgradient forestry.
- Absence of MSW leachate allowing greater attenuation of contaminants.

As such, potential effects to water quality associated with activities at Site B are considered to be less than minor.

Site D is temporary storage of bulk demolition materials, principally concrete. There are expected to be less than minor adverse effects from this temporary storage.

5.3.2 Sites A & G

The waste stream for the new earthquake waste cells was sampled and analysed for potential contaminants of concern. Laboratory results indicate that a limited number of determinants are likely to be present in leachate from the earthquake waste cells at concentrations in excess of human health and freshwater ecology screening levels.

For the purposes of assessment, and in the context of contaminant transport, these COCs are considered to be conservatively represented by ammoniacal nitrogen.

Site specific trigger levels were derived for potential contaminants in the earthquake waste leachate in order to assess the risk to water quality and downgradient receptors associated with leachate discharges from the proposed waste cell. Based on the assessment undertaken it is considered that the risk to human health associated with the leachate discharges to groundwater is less than minor.

Leachate from the earthquake waste could potentially results in a slight deterioration in water quality, due to a reduction in rainwater infiltration diluting the existing MSW leachate plume.

The extension of Site A and the establishment of Site G decrease the dilution factor within the underlying groundwater by an estimated 3% compared to the current scenario. Therefore the additional earthquake waste material is expected to have an only minimal effect on the underlying groundwater's dilution factor, resulting in no more than minor effect on the receiving environment.

5.3.3 Site F

The infrastructure hardfill, soil and the bedding material have the potential to contain microbial contaminants and pathogens. Adverse environmental effects due to the presence of these contaminants of concern, however, are not anticipated due to biodegradation and effective filtration in the sands underlying the landfill. The theoretical treatment zone for microorganisms within coastal sands observed at the Site could potentially allow a 3.4 log reduction in over the 400 metre from Site F to the receiving environment at Pegasus Bay. Additionally, Site F is located further from the receiving environment than the earthquake waste cells Sites A and G, allowing for more dilution of leachate prior to discharge to the coast. The existing remedial action plan prepared for the MSW would address potential adverse effects that may be related to either the presence of the infrastructure waste, or any (unlikely) adverse influence it may have on MSW leachate.

5.4 Effects on air quality

A detailed technical report assessing air quality issues is included in Appendix C of this AEE. The below discussion is a summary of information contained within that report.

5.4.1 Sensitive receptors

The nearest sensitive residential properties are located approximately 460 m southwest of the proposed cell at Site G. The nearest school is located approximately 1.4 km to the southwest and the nearest hospital, Burwood Hospital, is located approximately 2.6 km to the southwest. The area between the eastern landfill boundary and the coast is a public amenity area under Chapter 3 of the NRRP.

5.4.2 Methane emissions

The residual waste stream from the recovery park is expected to contain a component of biodegradable materials, primarily treated and untreated wood and paper associated with dry wall. These degradable materials are expected to comprise a smaller component of the waste and be free of the putrescible and hence readily degradable component of typical municipal waste. As such landfill gas production is expected to occur but the volume and rate of gas production is expected to be significantly lower than for other parts of the existing landfill.

5.4.3 Hydrogen sulphide emissions

In addition to the small potential for methane there is potential, based on some published research, for hydrogen sulphide to be generated within Sites A and G in anaerobic conditions. This occurs when the gypsum comes into contact with any water within the landfill, and the sulphate and calcium are released into solution. If anaerobic conditions are present, sulphur reducing bacteria converts the sulphate to hydrogen sulphide (H₂S) which has the potential to be released as a gas from the landfill and cause human health effects as well as nuisance odour.

The experience to date with Site A is that there have been no issues with odour of this type. Consequently as there is no real change in the process it is not considered that there will be any change in the odour potential from the waste placement. In addition H₂S is readily biodegradable, and will be bioremediated in the site capping.

Regardless, capping will be constructed with gas collection points installed so that if significant quantities of gas are generated, it can be destroyed through smaller flares operating independently of the old landfill gas system.

5.4.4 Odour emissions

In addition to the H₂S there are a range of other odorous compounds that have the potential be generated by the degradation of the small quantities of putrescible material that may be present in the waste. However, these compounds are typically⁵ found to be lower in concentration than H₂S due to the negligible quantities of putrescible material that is present in C & D waste. Therefore it is considered extremely unlikely that these compounds will be generated in significant quantities by the earthquake waste. In addition these compounds are all readily biodegradable, and will like the H₂S be bioremediated in the capping.

The air quality report (see Appendix C) presents the odour threshold values for a selection of compounds that could be caused by the degradation of earthquake waste. AECOM considers that there are unlikely to be any off-site effects relating to odour, given the limited amount of odour produced by the degradation of waste, large buffer distances and limited frequency of suitable meteorological conditions.

Overall, the potential odour effects of this proposal are considered to be insignificant.

5.4.5 Dust emissions

The placement of waste into Sites A and G has the potential to cause dust (particulate) discharges that could have off-site effects if not properly managed. Particulate matter can be classified as suspended or deposited particulate, depending on the parameters such as particle diameter, density and behaviour in atmosphere.

Dust emissions from landfill operations will be controlled using the following mitigation measures:

- Restricting vehicles speeds to 20 kph on the active cell and haul roads;
- Dampening the haul roads with water trucks when necessary;
- Dampening the waste (when necessary) as waste is placed in the cell. If the dampening of the material is not sufficient at suppressing dust, suppressing cover will be sprayed onto the surface.
- If dust effects arise beyond the control of the above measures, a wind break can be erected along the eastern boundary of the cell.
- Rehabilitating completed sections of the landfill as soon as practicable to minimise the potential for dust.

Given the distances involved to potentially sensitive receptors, dust and particulate matter deposition from landfill operations is not expected to be an issue.

Dust has the potential to be generated from the waste itself. The waste will be capped with a 600 mm layer of liquefaction material followed by a 300 mm layer of topsoil. The liquefaction material is mostly made up of silts and sand which have significant potential to cause dust nuisance effects, due to small particle size and low density, which means they can be carried by wind over large distances.

The following measures will be used to reduce the potential for dust emissions from placement of the capping layer.

- Restricting vehicle speeds on silt to 20 kph;
- Avoiding placing the material in extremely windy conditions;
- Keep the height of stockpile below 3m; and
- Using water to control potential dust emissions

Based on the monitoring undertaken as part of the existing consent it does not appear that there are any significant issues associated with dust from the fill placement activities.

That monitoring does appear to indicate that there are issues with dust control on the existing site access road, and additional mitigation will need to be implemented to reduce this. In particular the following measures will be required:

- Restrict vehicle speeds on the access road to 20 kph,
- Require all vehicles to pass through a wheelwash when exiting the unsealed portions of the landfill roads,
- Regularly cleaning the sealed portions of the landfill access road.

5.5 Effects on ecology

The Burwood Landfill is located within the old Pegasus Bay dune system. Any former ecological features have been significantly modified by the existing landfill. In the dune area outside the landfill footprint, stabilisation plantings of marram grass have modified the foreshore significantly. Few plantings of the native pingao are noted in the vicinity of the landfill.

The City Plan zones the land to the east of the site as Conservation 1A (coastal margins). The zone aims to recognise and protect areas of significant natural flora and fauna, and prevent these areas being subject to the adverse effects of inappropriate use or development, particularly disturbance of the land surface and of vegetation.

The City Plan and Replacement Plan also identifies part of the landfill site as an ecological heritage site / significant ecological site. However, the majority of the site has been heavily modified by past landfill activities and does not have any indigenous vegetation present. The Site G area has an area of established pine trees,

however, this area is not dissimilar to many other areas of Bottle Lake Forest and in that regard is not considered unique.

All sites within the operational landfill footprint are contained by a security fence. This fence prevents anyone or anything (e.g. vehicles) from accessing the adjacent conservation zone from the landfill site. This removes any opportunity for disturbance of the potentially fragile dune systems and their flora adjacent to the site.

Sites B and D are formerly part of the Bottle Lake Forest (a working pine plantation) and have subsequently been modified by the current authorised activities. Consequently there are no significant ecological values affected by the proposed ongoing activities at these sites.

5.6 Effects on landscape

The landfill and recovery park operations are largely screened from residential areas given the presence of the pine plantation along the southern boundary. However, there are some views into the site from public vantage points within Bottle Lake Forest Park and the coastal dune area.

The ongoing operations within the landfill footprint, and the resulting landform, are generally in keeping with that anticipated at the site. The City Plan specifies a maximum height to which the final landform can extend. This height equates to an elevation of 37.51 m above datum (28.47 m above sea level). All disposal within the landfill footprint has been designed not to exceed this height limit. The cells will also be contoured to blend in to existing ground levels as best as practicable.

Upon completion of the recovery activities, the recovery park will be returned to a similar state to what which existing prior to activities commencing. In other words, all waste and plant/equipment will be removed from the site, and the ground levelled and contoured to match the surrounds. The area can then be used once again for plantation forestry and/or recreation.

At the landfill, landscaping will progressively occur in general accordance with the conceptual landscape plan attached as Appendix F. This plan was developed by the Council in consultation with the community and is a proposed appendix in Chapter 21.12 *Specific Purpose (Burwood Landfill and Resource Recovery Park) Zone* of the Replacement Plan. It includes planting, sculptures, and biking and walking tracks. The plan will require modification as a result of the proposals subject to this consent, but its general principles will continue to be adhered to. Where opportunity exists to undertake some of this landscape plan work without affecting site operations, BRRP will work with the Council and the local community to advance the work and open areas for recreation as early as possible. Once the rehabilitation exercise is fully complete (December 2021), the entire site can be used for passive recreation purposes.

Overall, while there will be some continuing impacts on landscape values for the duration of the active operations, these are screened from most public vantage points. Long term the sites will be rehabilitated to become an asset for the Christchurch area

5.7 Effects on the community

5.7.1 Recreational use

Sites A, B, D, and F are within the current operational area of the landfill and recovery park and therefore are not accessed by the general public or used for recreation. However, once the earthquake waste processing and disposal activities have ceased, these areas will be returned to recreational and/or plantation forest use.

Site G is located within the area designated as landfill since 1984. However, because this area was not ultimately used for the former municipal landfill, part of the area is accessible by the public. The area has established pine trees and a walking track which accesses the beach area. As such the site is frequently used for passive recreation.

Should Site G proceed, it will be constructed in a north to south direction commencing in late- 2016 / early- 2017. Its full extent will ultimately be determined by the volume of earthquake waste received. If less waste is received than anticipated, then Site G will be smaller and not extend as far south. In that regard the existing fence and trees will only be removed should the circumstances require.

Should Site G be required at its full capacity, then the existing recreational track access will be rerouted to the south. The waste cell does not extend as far south as the existing ponds near the southern boundary, so these will be retained.

Opportunities will be available to progressively open up other areas of the landfill to public access and recreation over the next several years. BRRP Ltd and the Council have made the commitment to bring forward the landscaping programme and progressively rehabilitate the site. The landscape plan will continue to be developed with community input.

5.7.2 Noise

A noise assessment is contained in Appendix D. The assessment is primarily focussed on Site G, which is the only previously unassessed activity relative to the existing 2012 consents. The nearest residential buildings are located approximately 450 m south-west of the closest boundary of Site G (if developed to its full extent).

Some noise can be expected to be generated on site with the construction and operation of the waste disposal sites, and associated with the operation of machinery used for excavation and the processes of tipping the demolition materials. This has the potential to impact nearby residents as well as recreational users of the Bottle Lake Forest and dune and foreshore area.

The hours of operation have been reduced from the current consents. They are designed to minimise impacts on residents, while allowing an efficient use of the BRRP and landfill sites.

The existing acoustic bunding and fencing installed in 2012, near the landfill entrance, will be retained for the duration of operations.

Noise from activities is anticipated to meet the New Zealand Standards NZS 6803: Acoustics - Construction Noise and the limits contained in Section Volume 3: Part 11 of the City Plan. Overall, the expected noise to arise from the construction and operation of the proposed new cell at the Burwood landfill on sensitive receivers is expected to be less than minor.

5.7.3 Traffic

As noted in Section 3.4.7, heavy vehicle movements to the sites have progressively reduced since the initial period following the earthquake events. As of August 2015, the vehicle movements generally fall within the permitted activity standards of the Replacement Plan, and to that extent, any adverse effects can be considered no more than minor. It is expected that vehicle trips will continue tailing off, including a significant drop-off in September 2017 when Site P will be closed. The current land use consents for the recovery park and landfill authorise a much higher level of traffic through to September 2017.

Notwithstanding the above, based on feedback from community consultation and the air quality assessment, a number of mitigation measures from the existing consents are proposed to be carried over to any new consents. This includes restrictions on vehicle speeds within the sites.

5.8 Effects on groundwater quantity

The continued abstraction of groundwater at Site B to support processing activities, dust mitigation and irrigation is, subject to the rolling over the conditions of the existing resource consent, considered to have no more than minor adverse effects. There are no other groundwater users, or surface water features, which are adversely impacted by this activity.

5.9 Effects on cultural values

The cultural impact assessment in Appendix E provides a full evaluation of the potential effects on cultural values and the mitigation recommended. The key issues have been identified by Te Ngāi Tūāhuriri Rūnanga as potential adverse effects on:

- Cultural Heritage,
- Groundwater quality,
- Effects to shellfish and aquatic species and their habitats,
- Air quality.

Table 10 overleaf contains the CIA recommendations, and the applicant's response, which provides a summary of the relevant effects and proposed mitigation.

Table 10 Applicant response to CIA

Recommendation	Applicant response
1.) Registration of "Site D" as a wāhi tapu/urupā to acknowledge those people who lost their lives in buildings from whence the sensitive demolition materials have been sourced.	The applicants propose to further discuss this recommendation with Te Ngāi Tūāhuriri Rūnanga.
2.) Adoption of a six monthly program of sampling and analysis of shellfish from the ocean beach immediately adjacent to the Burwood Resource Recovery Park testing for the presence of faecal coliform and the various potential leachate contaminants listed in CRC011364.3.	The applicants propose to further discuss this recommendation with Te Ngāi Tūāhuriri Rūnanga.
3.) Copies of the results of the analysis to be provided to Te Ngāi Tūāhuriri Rūnanga.	The applicants propose to further discuss this recommendation with Te Ngāi Tūāhuriri Rūnanga.
4.) When the levels of contaminants present in shellfish samples are found to be in excess of recommended limits for safe human consumption, the consent holder will implement contingency or remedial actions set out in the Remedial Action Plan.	The applicants propose to further discuss this recommendation with Te Ngāi Tūāhuriri Rūnanga.
5.) Adoption of a Hazardous Substances and Spill Response Plan that is consistent with the policies and objectives of the Mahaanui Iwi Management Plan, the Christchurch City District Plan and or the Replacement City Plan and the Canterbury Natural Resources Regional Plan.	Accepted. These measures are already incorporated into the existing site management plan (Appendix F)
6.) Containment of all onsite diesel tanks, petroleum hydrocarbon tanks, hydraulic oils and other hazardous substances to within a facility located within a purpose built secondary containment bund made of either steel or concrete, or similar self bunding containment systems.	Accepted. These measures are already incorporated into the existing site management plan (Appendix F)
7.) Adoption of a Restoration Re-vegetation Planting Plan that utilises taonga plant species that would historically occur within the project area.	Accepted. The landscape plan (existing concept in Appendix F) will continue to be developed with community input, including that of Te Ngāi Tūāhuriri Rūnanga.
8.) Adoption of a Landfill Gas Management Plan, that sets out a monitoring regime to test for the presence of methane and hydrogen sulphide, and that identifies appropriate measures to bring concentrations of these gases below appropriate "trigger levels".	Accepted. These measures are already incorporated into the existing site management plan (Appendix G)
9.) The engagement of members of Ngai Tuahuriri who are trained in the recognition of archaeological sites to monitor earthworks and assist the lead archaeologist when excavations to create waste storage "cells" are created in areas of previously undisturbed soils.	The Site A extension and Site G are in areas of previously disturbed soil. The applicants would be happy to accept implementation of an accidental discovery protocol through the consents.
10.) Consultation with Te Ngai Tuahuriri Runanga regarding the display and or storage of prehistoric artefacts located within the proposed Burwood Resource Recovery Park.	Accepted.

5.10 Conclusion on effects

Overall, given the extent and nature of the proposed activity within the receiving environment of an existing landfill, alongside the mitigation proposed, the adverse effects of the proposal are considered to be no more than minor.

5.11 Proposed Consent Conditions

In broad terms BRRP and CCC propose to carry over existing consent conditions without modification. However, various updates are required to reflect current circumstances, and in some instances new conditions are required. The proposed conditions are presented in Appendix K.

6.0 Statutory Assessment

6.1 Canterbury Earthquake Recovery Act 2011

6.1.1 Recovery park (Sites B and D)

The *Canterbury Earthquake (Resource Management Act—Burwood Resource Recovery Park) Order 2011* (Order in Council or OIC) was made pursuant to Section 71 of the CER Act and provides for the earthquake waste processing activities (as defined in Section 3.3.2 of this report) at the recovery park as a controlled non-notified activity. The OIC applies to any resource consent applications lodged with the CCC and ECan, and in effect overrides any rules in the relevant regional and district plans.

The matters of control are specified in the OIC as:

- a) site management, including hours of operation:
- b) noise and vibration:
- c) visual effects:
- d) lighting, safety, and security:
- e) cultural effects:
- f) effects on recreational users:
- g) traffic and access:
- h) earthworks:
- i) landscaping:
- j) air discharge (including dust, contaminants, and odour):
- k) hazardous substances:
- l) stormwater:
- m) groundwater (including quality and quantity):
- n) aquifer stability:
- o) surface water depletion (including quality and quantity):
- p) effects on the coastal environment, including the coastal marine area:
- q) biodiversity effects:
- r) remediation:
- s) record keeping and reporting:
- t) monitoring (including data management):
- u) duration of the consent:
- v) review of conditions:
- w) bond:
- x) community liaison-complaints process and reporting:
- y) health effects:
- z) receipt and management of waste.

These matters have been addressed throughout this report and in the proposed conditions of consent.

6.1.2 Landfill (Sites A, F, and G)

By way of public notice from the Minister for Canterbury Earthquake Recovery on 24 November 2011, amendments were made to both the NRRP and the City Plan to provide for Burwood Landfill to be used for the permanent disposal of earthquake waste. Provided conditions are complied with, resource consent applications

are treated as a non-notified controlled activity. The amendments were made under Section 27(1)(a) of the CER Act.

Since that time the NRRP has been replaced by the LWRP. To ensure continuation of the controlled non-notified provisions, Action 46 of the Land Use Recovery Plan was implemented pursuant to section 24(1)(c) of the CER Act. This inserted a new Policy 9.5.10 and new Rules 9.5.13 and 9.5.14 into Section 9 of the LWRP and took effect on 12 June 2015 (respectively renumbered to Policy 9.4.4B and Rules 9.5.17 and 9.5.18 in the partially operative LWRP of 13 August 2015). These provisions are assessed further in sections below.

The City Plan is in the process of being superseded by the Replacement Plan. However, for the time being, the majority of provisions of the Replacement Plan have no legal effect³, and therefore the provisions of the City Plan still apply. The exception to this is rule relating to transportation and ecology. The City Plan and Replacement Plan are addressed further below.

6.2 National Environmental Standards

6.2.1 Air quality

The *Resource Management (National Environmental Standards for Air Quality) Regulations 2004* (NES Air) is primarily designed to ensure that air quality within a defined air shed is maintained at acceptable levels. Consequently, they are not particularly relevant to the Burwood Landfill, as the NES target emissions are primarily those associated with those in urban areas arising from high concentrations of vehicles and domestic fires.

The most relevant sections of the NES are Clauses 25-27 which specifically relate to landfills. These are addressed in full in the air quality report in Appendix C. In summary, the requirements of Clauses 26 and 27 apply, and appropriate systems have been developed to meet these requirements. The addition of the new cell does not change the requirements, and if required any gas generated by the cell could be combusted in this system. Therefore no resource consent is required under the NES.

6.2.2 Soil contamination

The *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES Soil) is primarily designed to ensure that land affected by contaminants in soil is appropriately identified and assessed before it is developed, and if necessary the land is remediated or the contaminants contained to make the land safe for human use. Both the landfill and recovery park activities fall under the Hazardous Activities and Industries List (HAIL) and are therefore subject to the NES. Disturbing the soils is a discretionary activity under the NES

The existing activities are already authorised by way of resource consents, which include comprehensive consent conditions to manage environmental effects, including those on human health. It is proposed that these conditions carry over to the new consents.

6.3 Rule assessment: Recovery park (Sites B & D)

As noted previously, the OIC overrides any relevant rules in the regional and district plans. All activities meeting the definition of earthquake waste processing activities, as defined in the OIC, are controlled non-notified activities. All applications in relation to Sites B and D must be assessed according to this activity status.

6.4 Rule assessment: Landfill (Sites A, F, and G)

6.4.1 Environment Canterbury

Rule 9.5.17 in Section 9 of the LWRP states:

9.5.17 The discharge of earthquake related residual demolition waste, liquefaction silt, and infrastructure waste onto or into land in circumstances where contaminants may enter water, is a controlled activity provided the following conditions are met:

- 1. A management plan for the landfill has been prepared and is submitted with an application for a discharge permit. The plan shall address all the matters in Appendix 3 of the Landfill Guidelines (2000) published by the*

³ Pursuant to Section 86B of the RMA

Centre for Advanced Engineering, University of Canterbury.

2. *A cultural impact assessment has been prepared and submitted with an application for a discharge permit.*
3. *The discharge occurs within the area defined as the Burwood Landfill Special Purpose Site as shown on Map 9.2.*
4. *Any application for resource consent provides written comments on the application, or evidence of 10 working days having been provided for receipt of those comments, from the following parties: Te Runanga O Ngai Tahu or papitipu runanga identified by them; Christchurch District Health Board; Burwood–Pegasus Community Board; Parklands Residents Association Incorporated; Queenspark Residents Association; and owners and occupiers of land adjacent to the Burwood Landfill.*

The CRC reserves control over the following matters:

1. *Cultural effects; and*
2. *Effects on recreational users; and*
3. *Earthworks; and*
4. *Landscaping; and*
5. *Air discharge (including dust, contaminants, and odour); and*
6. *Health effects; and*
7. *Hazardous substances; and*
8. *Stormwater; and*
9. *Groundwater quality; and*
10. *Effects on the coastal environment, including the coastal marine area; and*
11. *Biodiversity effects; and*
12. *Remediation; and*
13. *Record keeping and reporting; and*
14. *Monitoring (including data management); and*
15. *Duration of the consent; and*
16. *Review of conditions; and*
17. *Bond; and*
18. *Community liaison-complaints process and reporting, and*
19. *Receipt and management of waste.*

Notification

Pursuant to sections 95A and 95B of the RMA an application for resource consent under this rule will be processed and considered without public or limited notification.

Note that limited notification to affected order holders in terms of section 95F of the RMA will be necessary, where relevant, under section 95B(3) of the RMA.

The proposed discharge of contaminants to land meets all the above conditions as follows:

- 1) A management plan is attached as Appendix G
- 2) A cultural impact assessment is attached as Appendix D
- 3) All discharges are within the Burwood Landfill Special Purpose Site
- 4) The consultation process and outcomes is described in Section 4; with relevant material attached as Appendices H, I and J.

Therefore the discharge of earthquake waste to land is a controlled non-notified activity.

Ancillary activities associated with disposing of the earthquake waste include:

- Excavation over the coastal confined aquifer to prepare cell bases: restricted discretionary activity under Rule 5.176 (LWRP)
- Stormwater discharge to land in circumstances where it may enter water from construction and post-construction phases: non-complying activity under Rule 5.97 (LWRP)
- Discharge of contaminants (principally dust and odour) to air from earthquake waste disposal activities: discretionary activity under Rules AQL57 and AQL69 (NRRP); discretionary activity under Rule 7.59 (PCARP).

6.4.2 Christchurch City Council

Sites A, F, and G fall within the Special Purpose (Landfill) Zone under the City Plan. Clause 7.1.1 in Volume 3: Part 8 of the City Plan states:

Volume 3: Part 8 – Rule 7.1.1

- (a) *Any activity which complies with all of the critical standards under Clause 7.2 shall be a permitted activity.*
- (b) *Any activity, other than in relation to earthquake waste, which does not comply with any one or more of the critical standards under Clause 7.2, shall be a non-complying activity.*
- (c) *Any activity, in relation to earthquake waste, which does not comply with any one or more of the critical standards under Clause 7.2, shall be a non-notified controlled activity, with the Council's control limited to:*
 - *effects on the amenity of residences and business areas along the designated access routes illustrated in Appendix 7;*
 - *effects in terms of traffic, dust and noise, also taking account of the hours of operation;*
 - *effects on the coastal environment*
 - *proposed method of site rehabilitation*

An application for a resource consent for the permanent disposal of earthquake waste to the Special Purpose (Landfill) Zone must include written comments on the application, or evidence of 10 working days having been provided for those comments to be made, from the following parties:

- (a) *Te Rūnanga o Ngāi Tahu and any relevant Papatipu Rūnanga identified by Te Rūnanga o Ngāi Tahu; and*
- (b) *The Canterbury District Health Board; and*
- (c) *The Burwood-Pegasus Community Board; and*
- (d) *The Parklands Residents Association Incorporated; and*
- (e) *The Queenspark Residents Association; and*
- (f) *Owners and occupiers of land adjacent to the Burwood Landfill.*

On the above basis, disposal of earthquake waste is a permitted activity subject to meeting the conditions in Clause 7.2. Table 11 overleaf provides an assessment against Clause 7.2.

Table 11 Assessment against the City Plan Volume 3 Part 8 Clause 7.2: Critical standards

Critical standard	Assessment
<p><i>7.2.1 Compaction and containment of refuse</i> Refuse and/or earthquake waste permanently placed in the landfill shall be compacted using specialised compaction equipment, and shall be covered by sand or soil to a minimum depth of 150mm on a daily basis, except materials collected for composting. The working surface of each daily refuse cell shall not exceed an area of 500m². Mesh fences and screens shall be maintained around working areas to contain windblown refuse, and any material blown beyond this containment area shall be collected on a weekly basis, or more frequently if required.</p>	Does not comply. The method for depositing earthquake waste does not involve compaction, daily cover, or screen fencing around working areas.
<p><i>7.2.2 Buildings</i> Any buildings, shall be ancillary to landfill operations, and shall not exceed 200m² gross floor area.</p>	Complies. No buildings are required.
<p><i>7.2.3 Access to the zone</i> (a) All refuse and/or earthquake waste going to the landfill site, shall be transported in a container or covered except where because of the nature of the load and/or the method of securing it, no problem of litter or dust can arise. (b) Vehicles carrying refuse to the landfill shall adhere to a route of access including Marshland Road, Prestons Road and thence the driveway via Rothesay Road and Bottle Lake Forest, as illustrated in Appendix 7. (c) Vehicles carrying earthquake waste from various sources within the City and possibly from neighbouring Territorial Authorities to the landfill for permanent disposal shall adhere to the routes shown in Appendix 7 as soon as reasonably practicable. (d) At no place shall the designated route to the landfill site, as illustrated in Appendix 7, be closer than 300 metres from the land at Parklands within the Living 1 Zone. (Any further residential subdivisions which are developed adjacent to this access route shall mitigate adverse effects through mounding or other noise reduction measures.) (e) So long as the route, shown in Appendix 7, continues to be used for landfill purposes, the following provisions shall apply: (i) A belt of mature trees at least 5 metres in width will be retained at all times between that route and Rothesay Road. In the event of natural causes eliminating the existing screens of mature trees, then these areas shall be immediately windrowed to a height necessary to prevent vehicle sighting from the southern areas and replanted immediately. (ii) The area between the route and Rothesay Road will at all times be windrowed and/or mounded and/or planted with trees of a sufficient height to eliminate the possibility of vehicles using the route being seen from that land at Parklands presently contained within the Living 1 Zone. (iii) At all times that area (excluding areas occupied by windrows and forestry access roads) will be planted and/or replanted with conifers. (f) Vehicles carrying refuse or compostable material from the northern, western and eastern transfer station to the landfill, or to other transfer stations, shall adhere to the routes shown in Appendix 7 to these rules. (g) When the road link from Wainoni Road to Travis Road has been completed, the route for vehicles carrying refuse from the eastern transfer station to the landfill site shall be via this road, as shown in Appendix 7.</p>	Does not comply. The routes specified in Appendix 7 were formerly used for material arriving from transfer stations, and are not applicable to the routes being used to bring earthquake waste to the landfill. Also note that this standard only applies to vehicles accessing the landfill zone directly (i.e. Sites F and P). Material delivered to the recovery park is covered by the OIC and not subject to the City Plan standards. Traffic between the recovery park and landfill is also not affected by this standard.
<p><i>7.2.4 Boundary planting</i> Each of the three major landfill stages shall be planted with trees on the zone boundary capable of reaching a height of 8m at maturity. Planting on the zone boundary shall consist of at least three parallel rows of trees. These trees shall not be removed, unless three rows of replacement trees parallel to these are already established to a height of 8m.</p>	Complies. Planting has been previously undertaken at the site.

Critical standard	Assessment
<p><i>7.2.5 Fire control and air pollution</i> (a) Access shall be provided for fire appliances through boundary planting areas and a water supply shall be available to assist with fire fighting both within the landfill area and in the adjoining Bottle Lake Forest (Rural 1 Zone). (b) No burning of refuse or incineration processes shall be undertaken within the zone.</p>	Complies.
<p><i>7.2.6 Height of ground surface after filling</i> Dunes and downlands within the zone shall at no point be more than 25 metres above the level of the ground as measured at the intersection of Rothesay Road and Bower Avenue, and shall merge with the natural ground level of the terrain at the outer edge of the landfill.</p>	Complies.
<p><i>7.2.7 Protection of groundwater</i> Refuse and/or earthquake waste shall be placed above the highest anticipated ground water level, and any excavated or low areas below this level shall be backfilled to above this level with inert fill, and filling shall be undertaken in compliance with any conditions of resource consents granted by the Canterbury Regional Council for discharges.</p>	Complies.
<p><i>7.2.8 Hazardous and/or toxic substances</i> No substances which are of such hazardous or toxic character that they could not be safely accommodated in the landfill, and/or could give rise to hazardous chemical pollution or leaking to groundwater, shall be deposited in the landfill.</p>	Complies.
<p><i>7.2.9 Control of birds and vermin</i> Control programmes shall be undertaken should any significant concentration of birds or vermin became apparent within an adjoining zone.</p>	Complies.
<p><i>7.2.10 Hours of operation and access to landfill</i> Any delivery of refuse and/or earthquake waste for permanent disposal shall take place between 0530 and 1830 hours, unless exceptional circumstances apply. Public access to the landfill shall be confined to vehicles owned by or under contract to the Christchurch City Council, except: (a) vehicles of any other local authority approved by the Council; (b) vehicles carrying compacted refuse; (c) vehicles carrying hardfill or other materials unsuited to compaction; and (d) vehicles carrying cover material.</p>	Complies.
<p><i>7.2.11 Completion and Closure</i> A landscape/concept plan for rehabilitation shall be prepared for the site by the landfill operator and approved by the Council and shall take into account the following: • Final contours of each completed stage of the landfill shall be in general accordance with the concept plan prepared for the site. • The preparation of areas of rehabilitated landfill that are to be planted in accordance with the landscape plan, should be adequate to ensure that healthy planting and growth of trees and shrubs and grass cover on the landfill can occur. • All planting shall be maintained in accordance with the landscape/concept plan. • Each completed landfill stage shall, as soon as practicable after completion of refuse placement in that stage, be capped and landscaped in accordance with the landscape plan.</p>	Complies.

On the above basis, the proposed activity is a non-notified controlled activity under Rule 7.1.1(c).

Section 1 within Volume 3: Part 11 of the City Plan deals with noise. The Special Purpose (Landfill) zone is sited within Group 2 which is classified as a moderately sensitive noise zone. Rule 1.3.3 sets noise standards which must be met in order to be a permitted activity. However, Clause 1.3.4, which provides exceptions to these standards, was amended under the CER Act as follows:

*Volume 3: Part 11 – Rule 1.3**(e) Special Purpose (Landfill) Zone**Notwithstanding the provisions of Clause 1.3.3 and Table 1 the following exception shall apply:**Any activity, which does not comply with any one or more of the critical standards for Group 2 Zones under Clause 1.3.3, shall be a non-notified controlled activity, with the Council's control limited to noise effects on recreational and residential activities.*

While it is expected that the permitted noise standards will be met, a conservative approach has been taken and consent for a non-notified controlled activity in respect to noise forms part of this application.

Decisions under the Replacement Plan have been made with respect to Chapter 7: Transport, and therefore relevant rules are considered to supersede the City Plan. The proposal is capable of complying with all permitted activity standards set out in Clauses 7.3.2.1 – 7.3.2.10. Of particular importance to potential environmental effects of the proposal in the wider community is Clause 7.3.2.10(k), which relates to high trip generation from mixed use activities. The proposal will generally comply with the permitted activity standard of no more than 50 vehicle trips per peak hour or 250 heavy vehicle trips per day.

An 'ecological heritage area' (ref: 14.09) and 'site of ecological significance' (ref: SES/LP/6) respectively overlie the eastern most extent of the landfill site, albeit with differing boundaries under each plan. Both overlays relate primarily to the coastal dune system extending from the Waimakariri River mouth to Southshore Spit. No activities will occur in the ecological overlay in the City Plan. The creation of Site G may occur partly within the overlay in the Replacement Plan, however, there is no indigenous vegetation present.

Overall, the proposal is considered a controlled non-notified activity with respect to the applications made to Christchurch City Council for Sites A, F and G.

6.5 Section 104(b) Assessment

Section 104(1)(b) of the RMA requires that when considering an application for a resource consent, the consent authority must, subject to Part 2, have regard to the relevant provisions of a range of statutory documents. These are addressed below.

6.5.1 Recovery Strategy for Greater Christchurch and Land Use Recovery Plan

The Recovery Strategy, prepared under the CER Act, is the key reference document that guides and coordinates the programmes of work, including Recovery Plans. The Strategy aims to:

- provide overall direction to all those individuals and organisations who have a role in recovery activities;
- coordinate recovery activities by helping individuals and organisations to identify the interests they have in common and to understand they need to work together in their recovery activities;
- give the community confidence that recovery is well-planned and progressing; and
- take every opportunity to restore, renew and revitalise and enhance greater Christchurch.

The Land Use Recovery Plan (LURP), also prepared under the CER Act, is a statutory document which helps to achieve the vision of the Recovery Strategy by providing direction for residential and business land use development to support recovery and rebuilding across metropolitan greater Christchurch in the next 10–15 years. Any decisions on resource consents, or changes to planning documents under the RMA, must not be inconsistent with LURP.

The 2010-2011 process leading to the enactment of the OIC (for the recovery park) and the changes to the regional and city plans (for the landfill) satisfied the required statutory tests under the CER Act. By way of summary, the conclusions reached at that time were:

- a) There are no other reasonably practical and appropriate sites for the activity on the scale proposed for the recovery park,
- b) A single facility for the receipt and processing of earthquake waste is most likely to support the recycling of waste,

- c) The landfill provides for the economic disposal of residual demolition waste remaining after sorting has occurred, as well as disposal of other types of earthquake wastes (infrastructure hardfill and wastes from the sewer and water network),
- d) The nature of the existing environment at the recovery park and landfill is conducive to avoiding and mitigating many adverse effects; in particular the sites:
 - i. have an appropriate buffer to residential areas,
 - ii. do not overlie or impact on groundwater used for drinking water supply,
 - iii. have advantageous hydro-geological characteristics which minimise the potential for contamination of groundwater and coastal water.
- e) Transport of earthquake waste to Kate Valley is uneconomic, would introduce traffic related effects over a larger area, and would reduce the life of the regional landfill,
- f) An expedited consent process is consistent with the purposes of the CER Act, namely the facilities assist with:
 - i. Provision of appropriate measures to ensure that greater Christchurch and the councils and their communities respond to, and recover from, the impacts of the Canterbury earthquakes,
 - ii. Enabling of a focused, timely and expedited recovery,
 - iii. Facilitation, co-ordination and directing of the planning and rebuilding of recovery of affected communities, including the repair and rebuilding of land, infrastructure and other property, and
 - iv. Restoring the social, economic, cultural and environmental well-being of greater Christchurch communities.

These conclusions remain unchanged for the current situation.

6.5.2 Canterbury Regional Policy Statement (2013)

The Canterbury Regional Policy Statement (RPS) gives an overview of the significant resource management issues facing the region, including issues of resource management significance to Ngāi Tahu. The purpose of the RPS is to set out objectives, policies and methods to resolve those resource management issues and to achieve the integrated management of the natural and physical resources of Canterbury.

Objectives and policies which are of particular relevance to the current proposal are:

Objective 6.2.1 - Recovery framework

Recovery, rebuilding and development are enabled within Greater Christchurch through a land use and infrastructure framework that: [...]

(3) avoids urban development outside of existing urban areas or greenfield priority areas for development, unless expressly provided for in the CRPS; [...]

(5) protects and enhances indigenous biodiversity and public space;

(6) maintains or improves the quantity and quality of water in groundwater aquifers and surface water bodies, and quality of ambient air;

(11) optimises use of existing infrastructure; [...]

Objective 7.2.1 – Sustainable management of fresh water

The region's fresh water resources are sustainably managed to enable people and communities to provide for their economic and social well-being through abstracting and/or using water for irrigation, hydro-electricity generation and other economic activities, and for recreational and amenity values, and any economic and social activities associated with those values, providing:

(1) the life-supporting capacity ecosystem processes, and indigenous species and their associated freshwater ecosystems and mauri of the fresh water is safe-guarded;

(2) the natural character values of wetlands, lakes and rivers and their margins are preserved and these areas are protected from inappropriate subdivision, use and development and where appropriate restored or enhanced;

and

- (3) any actual or reasonably foreseeable requirements for community and stockwater supplies and customary uses, are provided for.

Objective 7.2.3 - Protection of intrinsic value of waterbodies and their riparian zones

The overall quality of freshwater in the region is maintained or improved, and the life supporting capacity, ecosystem processes and indigenous species and their associated fresh water ecosystems are safeguarded.

Policy 7.3.1 – Adverse effects of activities on the natural character of fresh water

To identify the natural character values of fresh water bodies and their margins in the region and to:

- (1) *preserve natural character values where there is a high state of natural character;*
- (2) *maintain natural character values where they are modified but highly valued; and*
- (3) *improve natural character values where they have been degraded to unacceptable levels;*

unless modification of the natural character values of a fresh water body is provided for as part of an integrated solution to water management in a catchment in accordance with Policy 7.3.9, which addresses remedying and mitigating adverse effects on the environment and its natural character values.

Policy 7.3.7 – Water quality and land uses

To avoid, remedy or mitigate adverse effects of changes in land uses on the quality of fresh water (surface or ground) by:

- (1) *identifying catchments where water quality may be adversely affected, either singularly or cumulatively, by increases in the application of nutrients to land or other changes in land use; and*
- (2) *controlling changes in land uses to ensure water quality standards are maintained or where water quality is already below the minimum standard for the water body, it is improved to the minimum standard within an appropriate timeframe.*

Objective 8.2.6 – Protection and improvement of coastal water

Protection of coastal water quality and associated values of the coastal environment, from significant adverse effects of the point and non-point discharge of contaminants; and enhancement of coastal water quality where it has been degraded.

Objective 14.2.2 — localised adverse effects of discharges on air quality

Enable the discharges of contaminants into air provided there are no significant localised adverse effects on social, cultural and amenity values, flora and fauna, and other natural and physical resources.

Policy 14.3.3 — Avoid, remedy or mitigate localised adverse effects on air quality

To set standards, conditions and terms for discharges of contaminants into the air to avoid, remedy or mitigate localised adverse effects on air quality.

The locations of proposed activities, at and adjacent to the site of a former municipal waste landfill, are ideally suited to managing and minimising any potential adverse effects on public health, and on air and water quality. Given the former and currently authorised uses the sites are already significantly modified from their original natural state. The key activities are located with significant buffer distances from residential dwellings and recreational uses, which when coupled with the additional mitigation proposed, will ensure any adverse effects from issues such as dust are limited to the greatest extent practicable. The hydrogeological characteristics of the sites are also ideal for managing leachate production from the former landfill and proposed activities, to the extent that any risks to human health, including for recreation in the coastal waters, can readily be managed. Overall, the proposal is considered to be consistent with the RPS.

6.5.3 Proposed Land and Water Regional Plan

Relevant objectives and policies of the LWRP include:

3.1 Land and water are managed as integrated natural resources to recognise and enable Ngāi Tahu culture, traditions, customary uses and relationships with land and water.

3.23 Soils are healthy and productive, and human-induced erosion and contamination are minimised.

3.24 All activities operate at good environmental practice or better to optimise efficient resource use and protect the region's fresh water resources from quality and quantity degradation.

4.4 Groundwater is managed so that: [...]

(e) overall water quality in aquifers does not decline; [...]

Water is managed through the setting of limits to safeguard the life-supporting capacity of ecosystems, support customary uses, and provide for group or community drinking-water supplies and stock water, as a first priority and to meet the needs of people and communities for water for irrigation, hydro-electricity generation and other economic activities and to maintain river flows and lake levels needed for recreational activities, as a second priority.

9.4.10 Enable the discharge to land of earthquake related residual demolition waste, liquefaction silt and infrastructure waste within the Burwood Landfill Special Purpose Site, as shown on Map 9.2, provided the adverse effects on the environment are mitigated.

Policy 9.4.10 provides strong direction to enable the disposal of earthquake waste at the landfill site. Comprehensive mitigation is proposed to be consistent with the previous consents for the sites. In all other respects, and as noted in sections above, the inherent environmental attributes of the location of the activities, coupled with the methodologies and mitigation proposed, will ensure that any adverse effects on Ngāi Tahu values, and on water quality in the underlying aquifer and adjacent coastal marine area, will be very limited. Overall, the proposal is considered consistent with the objectives and policies of the LWRP.

6.5.4 Natural Resources Regional Plan and Proposed Canterbury Air Regional Plan

Objectives and policies of relevance to the proposed air discharges include:

NRRP

Objective AQL1 Objective for localised air quality

Localised contaminant discharges into air do not, either on their own or in combination with other discharges, result in significant adverse effects on the environment, including:

- (a) the loss of air as a taonga to Tāngata Whenua; and*
- (b) adverse effects on human health and safety; and*
- (c) offensive or objectionable odours; and*
- (d) diminished visibility, as a consequence of human activities; and*
- (e) corrosion and soiling of structures, not being property owned by those causing the discharge; and*
- (f) adverse effects on health and functioning of ecosystems, plants and animals; and*
- (g) contamination of water.*

Policy AQL5 Odour nuisance

- (a) The discharge to air of odour from new activities shall not be offensive or objectionable to the extent that it has or is likely to cause an adverse effect on the environment beyond the boundary of the site where the discharge originates.*
- (b) Where appropriate existing activities that discharge contaminants into air shall adopt the best practicable option to avoid remedy or mitigate offensive or objectionable effects of odour beyond the boundary of any site from which they originate.*
- (c) Avoid encroachment of sensitive activities on existing activities discharging odorous contaminants into air, unless*

adverse effects of the odour can be avoided or mitigated by the encroaching activity.

For the purposes of this policy: new activities are those activities which are established after 1 June 2002 or not lawfully established on or before 1 June 2002; and existing activities are those activities which are lawfully established on or before 1 June 2002.

Policy AQL6 Avoid dust nuisance

(a) The discharge to air of dust shall not be corrosive, noxious, dangerous, objectionable, or offensive to the extent that it has or is likely to cause an adverse effect on the environment beyond the boundary of the site where the discharge originates.

(b) Avoid the encroachment of sensitive activities on existing activities discharging dust into air, unless adverse effects of the discharge can be avoided or mitigated by the encroaching activity.

(c) Recognise and provide for the handling of bulk materials at the Ports of Lyttelton and Timaru while avoiding, remedying or mitigating adverse effects on the environment caused by the associated discharge of dust.

For the purposes of this policy existing activities are those activities which are lawfully established on or before 1 June 2002.

PCARP

5.4 Discharges to air are managed to maintain the amenity values of the receiving environment.

5.5 Discharges to air do not adversely effect the relationship of Ngāi Tahu with their culture and traditions.

5.8 It is recognised that air quality expectations throughout the Region differ depending on location and the characteristics of the receiving environment.

5.9 Activities are spatially located so that they result in appropriate air quality outcomes being achieved both at present and in the future.

6.1 Discharges of contaminants into air, either individually or in combination with other discharges, do not cause:

a Adverse effects on human health and wellbeing; or

b Significantly diminished visibility; or

c Corrosion or significant soiling of structures or property; or

d Adverse effects on the mauri/life supporting capacity of ecosystems, plants or animals.

6.6 Discharges of contaminants into air, and the effects of those discharges, occur in appropriate locations, taking into account the distribution of land use as provided for by the relevant district plan.

Comprehensive mitigation is proposed to manage dust and odour on the surrounding environment from the activities. Coupled with the location of the site and existing buffers to sensitive activities, it is expected that there will be no objectionable or offensive effects beyond the site boundaries, and the overall amenity values of the receiving environment will be maintained. On this basis the proposal is considered consistent with the objectives and policies of the NRRP and PCARP.

6.5.5 City Plan and Replacement Plan

Objectives and policies which are of particular relevance to the current proposal are:

CITY PLAN

2.1 Objective : Land and soil

To maintain and enhance those physical, chemical and biological characteristics of land and soils, and the ecosystems they contain, in a way that best enables them to support life and provide for community needs.

2.1.5 Policy : Waste disposal

To continue the operation and maintenance of refuse transfer stations and landfill sites as the primary disposal system for wastes, and to control the disposal of hard fill and specialised wastes.

*2.2 Objective : Water**Maintenance and enhancement of the quality and availability of the City's water resources, and of the natural and cultural values and public accessibility of waterways and their margins.**2.1 Policy : Groundwater quality**To ensure land use activities do not detract from the quality or availability of groundwater.**2.3 Objective : Air**Updated 14 November 2005**Improvement of the standards of air quality over the City, influenced by the location and nature of land use activities.**2.3.2 Policy : Land uses**To ensure that the location of processes causing airborne contaminants is considered when assessing land uses.**4.2 Objective : Amenity**A pleasant and attractive City.**4.2.9 Policy : Impacts of noise**To achieve a low ambient level of noise in the City and the protection of the environment from noise that can disturb the peace, comfort, or repose of people to the extent necessary to avoid, remedy or mitigate unreasonable levels of sound.**4.2.13 Policy : Airborne contamination**To ensure that processes giving rise to airborne contamination, particularly odours, are located so that any adverse effects on the amenities of adjoining areas are avoided, remedied or mitigated.***REPLACEMENT PLAN***3.3.1 Objective - Enabling recovery and facilitating the future enhancement of the district**The expedited recovery and future enhancement of Christchurch as a dynamic, prosperous and internationally competitive city, in a manner that:*

- a. Meets the community's immediate and longer term needs for housing, economic development, community facilities, infrastructure, transport, and social and cultural wellbeing; and*
- b. Fosters investment certainty; and*
- c. Sustains the important qualities and values of the natural environment.*

As noted in other sections above, the site locations, and their historic and currently authorised activities, are ideally situated to minimising the adverse effects of an earthquake waste processing and disposal operation on public health, amenity, water quality, and air quality. The effects will be limited to the duration of the consents (through to 2021), at which point the site will have completed landscaping and be fully returned to the public realm for passive recreation purposes.

6.6 Part 2 of the Resource Management Act 1991

The RMA is the principal statutory document governing the use of land, air and water. Part II of the RMA, contained in sections 5-8, sets out the purpose and principles of the Act.

The purpose of the RMA, as set out in section 5, is to "promote the sustainable management of natural and physical resources". The method of applying section 5 involves an overall broad judgement, which allows for the comparison of conflicting considerations, the scale of them and their relative significance or proportion in the final outcome.

Sections 6, 7 and 8 of the RMA set out the principles to be applied in achieving the purpose of the Act. These sections respectively outline the matters of national importance that must be recognised and provided for; other

matters to which particular regard must be had; and the requirement to take into account the principles of the Treaty of Waitangi.

The proposal is considered consistent with Part 2. The processing and disposal of earthquake waste will assist in the rehabilitation and rebuilding of the greater Christchurch area, and contribute to the social and economic benefits and health and safety benefits to be derived from those activities. On the basis of the assessment provided in Section 5 of this AEE, the adverse effects can be appropriately avoided, remedied or mitigated, and the life-supporting capacity of air, water, soil and ecosystems will be safeguarded.

7.0 Conclusions

The earthquake waste processing and disposal activities at the Burwood Resource Recovery Park and Burwood Landfill continue to be critical activities in the support of the recovery of Christchurch. Extending the operations through to 31 December 2021 will allow for the increased volumes of earthquake waste to be processed and disposed of in an appropriate manner.

The key activities associated with the proposals have a controlled non-notified activity status. Therefore the relevant resource consents must be granted subject to conditions to manage environmental effects.

The applicants' consultation with key stakeholders identified that the proposed waste cell at Site G is not favoured due to its proximity to the residential area, as well as potential impacts on existing access tracks used for recreation. A strong preference for permanent disposal at Site B, rather than Site G, was expressed. BRRP Ltd and the Council acknowledge the concerns about Site G. Based on the feedback received both parties have subsequently made the commitment to pursue Site B for permanent disposal with the relevant authorities. Subject to obtaining all of the necessary authorisations for Site B, Site G would not proceed.

However, due to the uncertainty of timing and outcome for permanent disposal at Site B, the use of Site G cannot be ruled out. Hence the resource consents for Site G have been pursued at the current time. However, as above, BRRP Ltd and the Council will not develop Site G until an outcome for whether Site B can be used for permanent disposal is known. Notwithstanding this, subject to mitigation, Site G is considered an appropriate site for permanent disposal.

Broadly any adverse environmental effects are considered to be similar to that considered in 2012, albeit they will occur over a longer period than originally envisaged, and in the case of Site G, in a new area of the existing landfill site. All proposed consent conditions are proposed to be rolled-over from the 2012 consents, with minor updates to reflect current circumstances.

Overall, the proposals will continue to serve a significant and beneficial role in the efficient and cost-effective recovery of Christchurch following the 2010-11 earthquake events. It is acknowledged that there will continue to be some localised effects on the community and users of Bottle Lake Forest Park, but that these effects can be managed through appropriate consent conditions.

Appendix A

Drawings - Sites A & G

Appendix B

Water Quality Report

Appendix C

Air Quality Report

Appendix D

Noise Assessment

Appendix E

Cultural Impact Assessment

Appendix F

Concept Landscape Plan

Appendix G

Management Plan

Appendix H

Consultation Material

Appendix I

Written Comments

Appendix J

Response To Written Comments

Appendix K

Proposed Consent Conditions